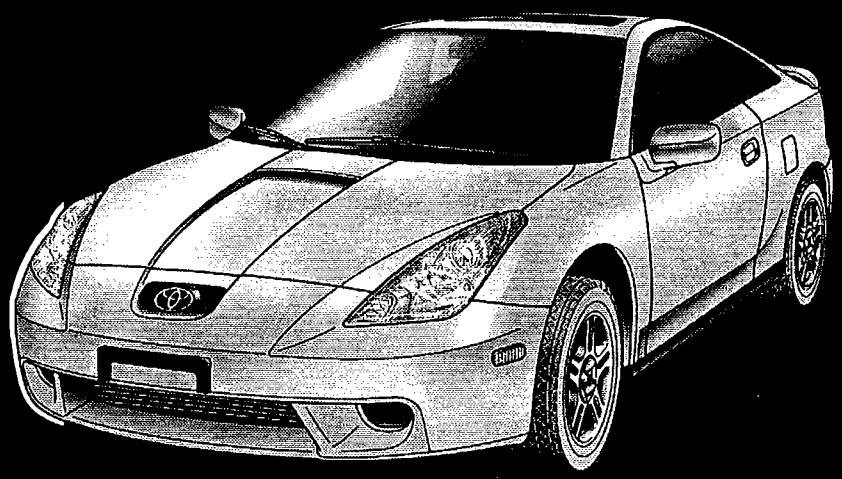
TOYOTA



REPAIR MANUAL

- ENGINE
- CHASSIS
- BODY
- ELECTRICAL

Pub. No. RM744U2

VOLUME 2

FOREWORD

This manual (Volume 2) contains repair procedures for the engine, chassis and body, and electrical service procedures for the 2000 CELICA.

Applicable models: ZZT230, 231 series

For maintenance, preparation, specifications and diagnostics service procedures, refer to VOLUME 1 (Pub. No. RM744U1).

The manual is divided into 21 sections with a thumb index for each section at the edge of the pages.

Please note that the publications below have also been prepared as relevant service manuals for the components and systems in this vehicles.

Manual Name	Pub. No.
• U240E Automatic Transaxle Repair Manual (Aug., 1999)	RM740U
• U340E, U341E Automatic Transaxle Repair Manual (Aug., 1999)	RM735U
• 2000 CELICA Electrical Wiring Diagram	EWD399U
• 2000 CELICA New Car Features	NCF169U

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

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CAUTION

This manual does not include all the necessary items about repair and service. This manual is made for the purpose of the use for the persons who have special techniques and certifications. In the cases that non–specialized or uncertified technicians perform repair or service only using this manual or without proper equipment or tool, that may cause severe injury to you or other people around and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damages to your customer's vehicle, be sure to follow the instruction shown below.

- Must read this manual thoroughly. It is especially important to have good understanding all the contents written in the PRECAUTION of "IN" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non–specified or recommended tools and service method, be sure to confirm safety of the technicians and any possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, must replace the part with the same part number or equivalent part. Do not replace it with inferior quality.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive, because it is important to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

NOTE: The screen toned sections below are in VOLUME 1 (Pub. No. RM744U1).

INTRODUCTION IN
MAINTENANCE MA
PREPARATION PP
SERVICE SPECIFICATIONS SS
DIAGNOSTICS DI
ENGINE MECHANICAL EM
EMISSION CONTROL EC
SFI SF
COOLING CO
LUBRICATION LU
IGNITION IG
STARTING ST
CHARGING CH
CLUTCH CL
C56 MANUAL TRANSAXLE MX
C60 MANUAL TRANSAXLE MX
U240E AUTOMATIC TRANSAXLE AX
U341E AUTOMATIC TRANSAXLE AX
SUSPENSION AND AXLE SA
BRAKE BR
STEERING SR
SUPPLEMENTAL RESTRAINT SYSTEM RS
BODY ELECTRICAL BE
BODY BO
AIR CONDITIONING AC
ALPHABETICAL INDEX ID

ENGINE MECHANICAL

CO/HC EM–1
COMPRESSION EM–3
VALVE CLEARANCE EM–4
IGNITION TIMING EM–13
IDLE SPEED EM–14
TIMING CHAIN EM–15
CYLINDER HEAD EM–36
ENGINE UNIT EM–70
CYLINDER BLOCK EM–85
EXHAUST SYSTEM EM–115

EM

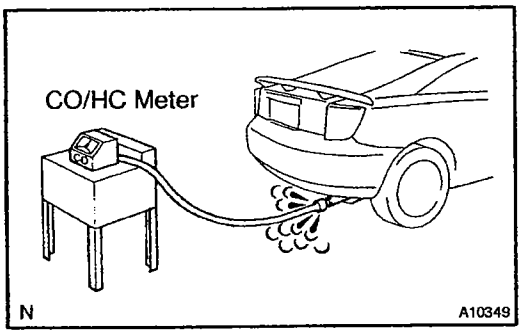
CO/HC

EM05J-05

INSPECTION

HINT:
This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. **INSTALL CONDITIONS**
(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) Air pipes and hoses of air induction system connected
(d) All accessories switched OFF
(e) All vacuum lines properly connected
(f) SFI system wiring connectors fully plugged
(g) Ignition timing check correctly
(h) Transmission in neutral position
(i) Tachometer and CO/HC meter calibrated by hand
2. **START ENGINE**
3. **RACE ENGINE AT 2,500 RPM FOR APPROX. 180 SECONDS**



4. **INSERT CO/HC METER TESTING PROBE AT LEAST 40 cm (1.3 ft) INTO TAILPIPE DURING IDLING**
5. **IMMEDIATELY CHECK CO/HC CONCENTRATION AT IDLE AND/OR 2,500 RPM**

Complete the measuring with 3 minutes.
HINT:
When doing the 2 mode (idle and 2,500 rpm) test, these measurement order prescribed by the applicable local regulations.

EM

If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.

- Check heated oxygen sensor operation (See page DI–49).
- See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignitions: • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed high–tension cords 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinders
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hoses • Intake manifold • Throttle body • IAC valve • Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty SFI systems: • Faulty pressure regulator • Defective ECT sensor • Defective IAT sensor • Faulty ECM • Faulty injectors • Faulty throttle position sensor

COMPRESSION

EM0SK–05

INSPECTION

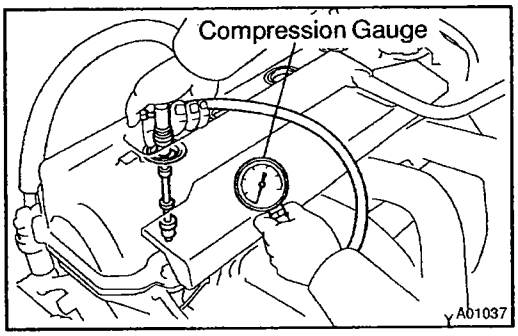
HINT:

If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

1. **WARM UP AND STOP ENGINE**

Allow the engine to warm up to normal operating temperature.

2. **REMOVE IGNITION COIL (See page IG–6)**
3. **REMOVE SPARK PLUGS**
4. **INSPECT CYLINDER COMPRESSION PRESSURE**



(a) Insert a compression gauge into the spark plug hole.

(b) Fully open the throttle.

(c) While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain engine speed of 250 rpm or more.

(d) Repeat steps (a) through (c) for each cylinder.

NOTICE:

This measurement must be done in as short a time as possible.

Compression pressure:
1ZZ–FE 1,500 kPa (15.3 kgf/cm^2, 218 psi)
2ZZ–GE 1,400 kPa (14.3 kgf/cm^2, 203 psi) or more
Minimum pressure:
1ZZ–FE 1,000 kPa (10.2 kgf/cm^2, 145 psi)
2ZZ–GE 1,000 kPa (10.2 kgf/cm^2, 145 psi)
Difference between each cylinder:
1ZZ–FE 100 kPa (1.0 kgf/cm^2, 15 psi) or less
2ZZ–GE 110 kPa (1.1 kgf/cm^2, 16 psi) or less

(e) If the cylinder compression in one more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) through (c) for cylinders with low compression.

- If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are worn or damaged.
- If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.

5. **REINSTALL SPARK PLUGS**
6. **INSTALL IGNITION COIL (See page IG–7)**

EM

VALVE CLEARANCE

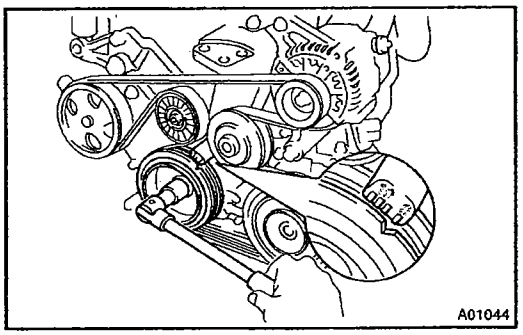
ADJUSTMENT

EM150-01

HINT:

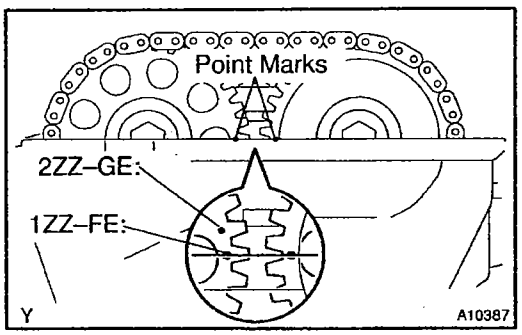
Inspect and adjust the valve clearance when the engine is cold.

1. **REMOVE CYLINDER HEAD COVER**
   (See page EM–18)



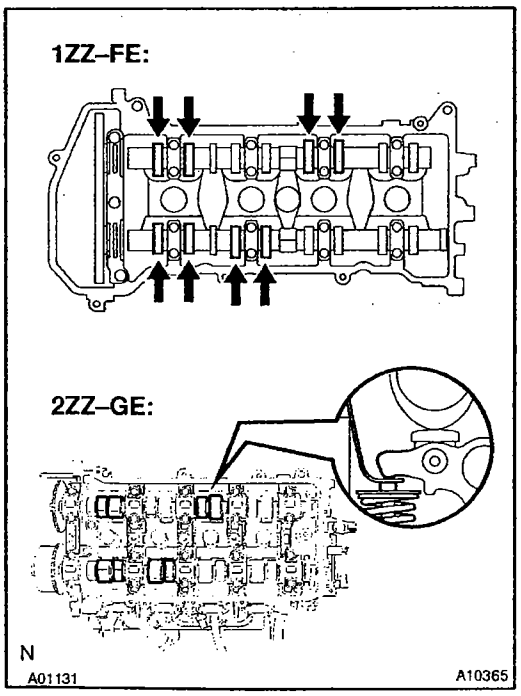
2. **SET NO. 1 CYLINDER TO TDC/COMPRESSION**

(a) Turn the crankshaft pulley, and align its groove with the timing mark "0" of the timing chain cover.



(b) Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration.

If not, turn the crankshaft 1 revolution (360°) and align the marks as above.



3. **INSPECT VALVE CLEARANCE**

(a) Check only the valves indicated.

- Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
- Record the out–of–specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

1ZZ–FE:

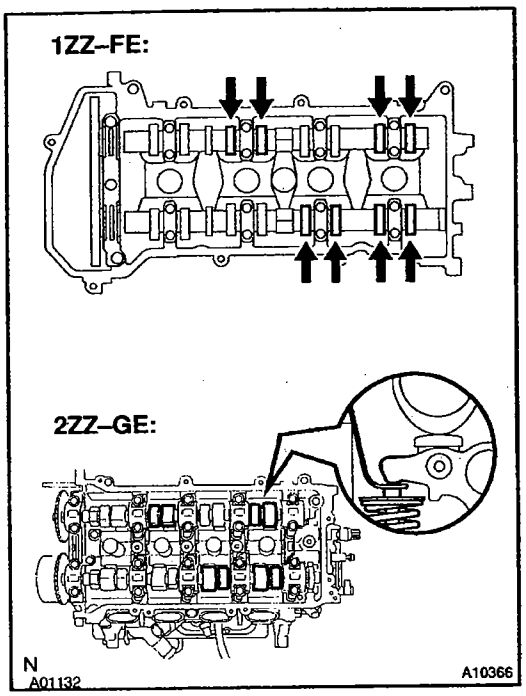
Intake 0.15 – 0.25 mm (0.006 – 0.010 in.)

Exhaust 0.25 – 0.35 mm (0.010 – 0.014 in.)

2ZZ–GE:

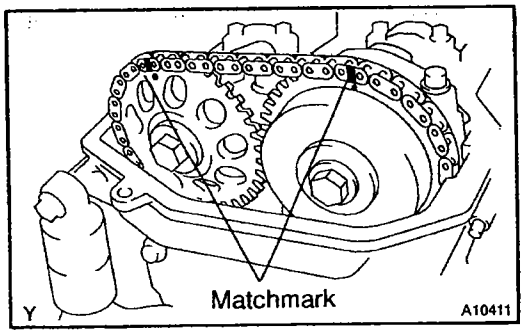
Intake 0.15 – 0.25 mm (0.006 – 0.010 in.)

Exhaust 0.35 – 0.45 mm (0.014 – 0.018 in.)



(b) Turn the crankshaft 1 revolution (360°) and align the mark as above (See procedure in step 2).

(c) Check only the valves indicated as shown. Measure the valve clearance (See procedure in step (a)).

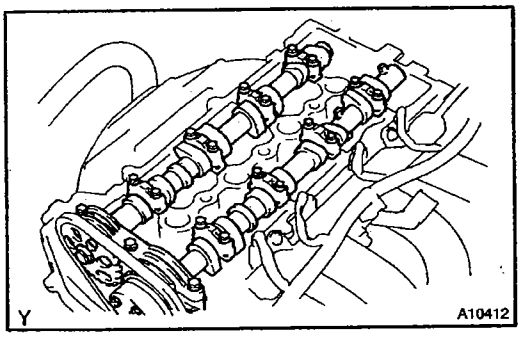


4. 1ZZ–FE:
ADJUST VALVE CLEARANCE

(a) Set the No. 1 cylinder to the TDC/compression (See procedure in step 2).

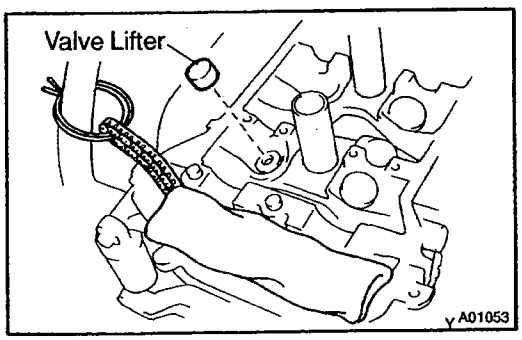
(b) Place matchmarks on the timing chain and camshaft timing sprockets.

(c) Remove the 2 bolts and chain tensioner.



(d) Remove the camshaft and timing sprocket assemblies (See page EM–42).
- (1) 19 camshaft bearing cap bolts
- (2) 9 camshaft bearing caps (No. 1 & No. 3)
- (3) Exhaust camshaft and timing sprocket assembly
- (4) Intake camshaft and timing sprocket assembly

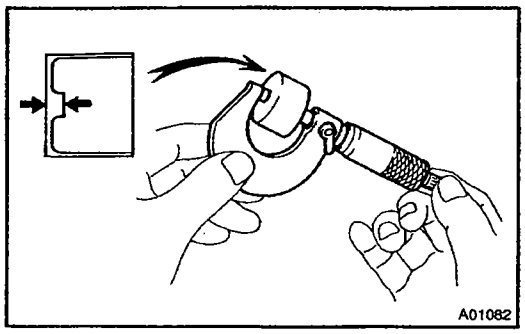
HINT:
When disconnect the timing chain from the camshaft timing sprocket, holding the timing chain.



(e) Tie the timing chain with a string as shown in the illustration.

NOTICE:
- **Be careful not to drop anything inside the timing chain cover.**
- **Do not allow the chain to come into contact with water or dust.**

(f) Remove the valve lifters.



(g) Determine the replacement valve lifter size according to these Formula or Charts:

- Using a micrometer, measure the thickness of the removed lifter.
- Calculate the thickness of a new lifter so the valve clearance comes within the specified value.

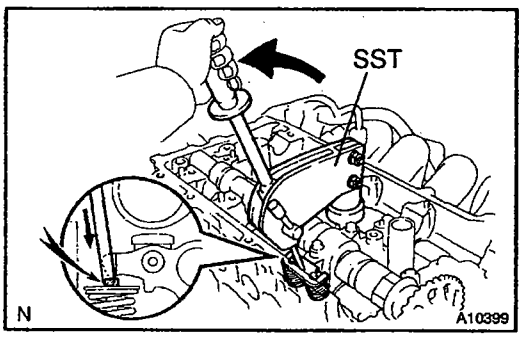
T..... Thickness of used lifter
A..... Measured valve clearance
N..... Thickness of new lifter
Intake: N = T + (A – 0.20 mm (0.008 in.))
Exhaust: N = T + (A – 0.30 mm (0.012 in.))

- Select a new lifter with a thickness as close as possible to the calculated values.

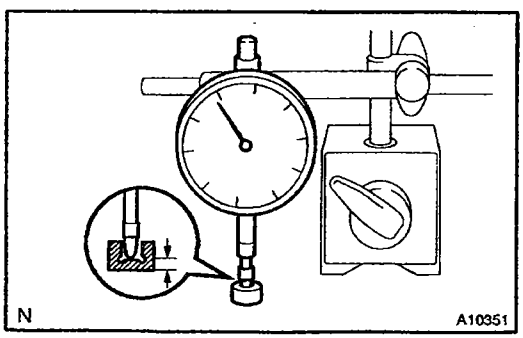
HINT:
Lifter are available in 35 sizes in increments of 0.020 mm (0.0008 in.), from 5.060 mm (0.1992 in.) to 5.740 mm (0.2260 in.).

5. 2ZZ–GE:
ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.
(1) Turn the crankshaft so that the cam lobe of camshaft on the adjusting valve points upward.



(2) Using SST, press down the valve.
(3) Using SST, remove the adjusting shim.



(4) Determine the replacement shim size according to these Formula or Charts:

- Using dial indicator, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so the valve clearance comes within the specified value.

T..... Thickness of used shim
A..... Measured valve clearance
N..... Thickness of new shim
Intake: N = T+ (A – 0.20 mm (0.008 in.))
Exhaust: N = T+ (A – 0.40 mm (0.016 in.))

- Select a new shim with a thickness as close as possible to the calculated values.

HINT:
Shim are available in 41 size in increments of 0.020 mm (0.0008 in.), from 2.000 mm (0.0787 in.) to 2.800 mm (0.1102 in.).

1ZZ–FE: Valve Lifter Selection Chart (Intake)

Measured clearance mm (in.) \ Installed lifter thickness mm (in.)	5.060 (0.1992)	5.080 (0.2000)	5.100 (0.2008)	5.120 (0.2016)	5.140 (0.2024)	5.160 (0.2031)	5.180 (0.2039)	5.200 (0.2047)	5.210 (0.2051)	5.220 (0.2055)	5.230 (0.2059)	5.240 (0.2063)	5.250 (0.2067)	5.260 (0.2071)	5.270 (0.2075)	5.280 (0.2079)	5.290 (0.2083)	5.300 (0.2087)	5.310 (0.2091)	5.320 (0.2094)	5.330 (0.2098)	5.340 (0.2102)	5.350 (0.2106)	5.360 (0.2110)	5.370 (0.2114)	5.380 (0.2118)	5.390 (0.2122)	5.400 (0.2126)	5.410 (0.2130)	5.420 (0.2134)	5.430 (0.2138)	5.440 (0.2142)	5.450 (0.2146)	5.460 (0.2150)	5.470 (0.2154)	5.480 (0.2157)	5.490 (0.2161)	5.500 (0.2165)	5.510 (0.2169)	5.520 (0.2173)	5.530 (0.2177)	5.540 (0.2181)	5.550 (0.2185)	5.560 (0.2189)	5.570 (0.2193)	5.580 (0.2197)	5.590 (0.2201)	5.600 (0.2205)	5.620 (0.2213)	5.640 (0.2220)	5.660 (0.2228)	5.680 (0.2236)	5.700 (0.2244)	5.720 (0.2252)	5.740 (0.2260)
0.000 – 0.030 (0.0000 – 0.0012)									06	06	08	08	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	28	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56
0.031 – 0.050 (0.0012 – 0.0020)						06	06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	48	50	52	54	56	58
0.051 – 0.070 (0.0020 – 0.0028)						06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60
0.071 – 0.090 (0.0028 – 0.0035)					06	06	06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60	62
0.091 – 0.110 (0.0036 – 0.0043)				06	06	06	08	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62	64
0.111 – 0.130 (0.0044 – 0.0051)			06	06	06	08	10	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	56	58	60	62	64	66
0.131 – 0.149 (0.0052 – 0.0059)		06	06	06	08	10	12	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	58	60	62	64	66	68
0.150 – 0.250 (0.0059 – 0.0098)																																																								
0.251 – 0.270 (0.0099 – 0.0106)	12	14	16	16	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	70	72	74	74	74
0.271 – 0.290 (0.0107 – 0.0114)	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	72	74	74	74	
0.291 – 0.310 (0.0115 – 0.0122)	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74	74	74		
0.311 – 0.330 (0.0122 – 0.0130)	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74	74	74				
0.331 – 0.350 (0.0130 – 0.0138)	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74					
0.351 – 0.370 (0.0138 – 0.0146)	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74						
0.371 – 0.390 (0.0146 – 0.0154)	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74						
0.391 – 0.410 (0.0154 – 0.0161)	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74							
0.411 – 0.430 (0.0162 – 0.0169)	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74									
0.431 – 0.450 (0.0170 – 0.0177)	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74												
0.451 – 0.470 (0.0178 – 0.0185)	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74														
0.471 – 0.490 (0.0185 – 0.0193)	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																
0.491 – 0.510 (0.0193 – 0.0201)	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																		
0.511 – 0.530 (0.0201 – 0.0209)	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																			
0.531 – 0.550 (0.0209 – 0.0217)	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																				
0.551 – 0.570 (0.0217 – 0.0224)	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																					
0.571 – 0.590 (0.0225 – 0.0232)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.591 – 0.610 (0.0233 – 0.0240)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.611 – 0.630 (0.0241 – 0.0248)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.631 – 0.650 (0.0248 – 0.0256)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.651 – 0.670 (0.0256 – 0.0264)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.671 – 0.690 (0.0264 – 0.0272)	54	56	58	60	62	64	66	68	70	70	72	72	74	74	74	74	74	74																						
0.691 – 0.710 (0.0272 – 0.0280)	56	58	60	62	64	66	68	70	72	72	74	74	74	74	74	74																						
0.711 – 0.730 (0.0280 – 0.0287)	58	60	62	64	66	68	70	72	74	74	74	74	74	74																						
0.731 – 0.750 (0.0288 – 0.0295)	60	62	64	66	68	70	72	74	74	74	74	74																								
0.751 – 0.770 (0.0296 – 0.0303)	62	64	66	68	70	72	74	74	74	74																										
0.771 – 0.790 (0.0304 – 0.0311)	64	66	68	70	72	74	74	74																												
0.791 – 0.810 (0.0311 – 0.0319)	66	68	70	72	74	74	74																													
0.811 – 0.830 (0.0319 – 0.0327)	68	70	72	74	74	74																														
0.831 – 0.850 (0.0327 – 0.0335)	70	72	74	74	74																															
0.851 – 0.870 (0.0335 – 0.0343)	72	74	74	74																																
0.871 – 0.890 (0.0343 – 0.0350)	74	74	74																																	
0.891 – 0.910 (0.0351 – 0.0358)	74	74																																		
0.911 – 0.930 (0.0359 – 0.0366)	74																																			

Intake valve clearance (Cold):
0.15 – 0.25 mm (0.006 – 0.010 in.)

EXAMPLE: The 5.250 mm (0.2067 in.) lifter is installed, and the measured clearance is 0.400 mm (0.0157 in.).
Replace the 5.250 mm (0.2067 in.) lifter with a new No. 48 lifter.

New lifter thickness mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)		

A01234

1ZZ–FE: Valve Lifter Selection Chart (Exhaust)

Measured clearance mm (in.) \ Installed lifter thickness mm (in.)	5.060 (0.1992)	5.080 (0.2000)	5.100 (0.2008)	5.120 (0.2016)	5.140 (0.2024)	5.160 (0.2031)	5.180 (0.2039)	5.200 (0.2047)	5.220 (0.2055)	5.240 (0.2063)	5.260 (0.2071)	5.280 (0.2079)	5.300 (0.2087)	5.320 (0.2094)	5.340 (0.2102)	5.360 (0.2110)	5.380 (0.2118)	5.400 (0.2126)	5.420 (0.2134)	5.440 (0.2142)	5.460 (0.2150)	5.480 (0.2157)	5.500 (0.2165)	5.520 (0.2173)	5.540 (0.2181)	5.560 (0.2189)	5.580 (0.2197)	5.600 (0.2205)	5.620 (0.2213)	5.640 (0.2220)	5.660 (0.2228)	5.680 (0.2236)	5.700 (0.2244)	5.720 (0.2252)	5.740 (0.2260)
0.000 – 0.030 (0.0000 – 0.0012)															06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	36	38	40	42	44	46
0.031 – 0.050 (0.0012 – 0.0020)												06	06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	38	40	42	44	46	48
0.051 – 0.070 (0.0020 – 0.0028)											06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	28	28	30	30	32	32	34	34	36	36	38	40	42	44	46	48	50
0.071 – 0.090 (0.0028 – 0.0035)										06	06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	40	42	44	46	48	50	52
0.091 – 0.110 (0.0036 – 0.0043)									06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	44	46	48	50	52	54
0.111 – 0.130 (0.0044 – 0.0051)								06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56
0.131 – 0.150 (0.0052 – 0.0059)								06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56	58
0.151 – 0.170 (0.0059 – 0.0067)						06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60
0.171 – 0.190 (0.0067 – 0.0075)					06	06	06	06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62
0.191 – 0.210 (0.0075 – 0.0083)				06	06	06	06	08	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	54	56	58	60	62	64
0.211 – 0.230 (0.0083 – 0.0091)			06	06	06	08	10	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	56	58	60	62	64	66
0.231 – 0.249 (0.0091 – 0.0098)		06	06	06	08	10	12	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	58	60	62	64	66	68
0.250 – 0.350 (0.0098 – 0.0138)																																																					
0.351 – 0.370 (0.0138 – 0.0146)	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	70	72	74	74	74
0.371 – 0.390 (0.0146 – 0.0154)	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	72	74	74	74	
0.391 – 0.410 (0.0154 – 0.0161)	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74	74	74		
0.411 – 0.430 (0.0162 – 0.0169)	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74			
0.431 – 0.450 (0.0170 – 0.0177)	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74				
0.451 – 0.470 (0.0178 – 0.0185)	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74					
0.471 – 0.490 (0.0185 – 0.0193)	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74					
0.491 – 0.510 (0.0193 – 0.0201)	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74							
0.511 – 0.530 (0.0201 – 0.0209)	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74									
0.531 – 0.550 (0.0209 – 0.0217)	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74											
0.551 – 0.570 (0.0217 – 0.0224)	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74														
0.571 – 0.590 (0.0225 – 0.0232)	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																
0.591 – 0.610 (0.0233 – 0.0240)	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																		
0.611 – 0.630 (0.0241 – 0.0248)	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																				
0.631 – 0.650 (0.0248 – 0.0256)	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.651 – 0.670 (0.0256 – 0.0264)	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																								
0.671 – 0.690 (0.0264 – 0.0272)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.691 – 0.710 (0.0272 – 0.0280)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.711 – 0.730 (0.0280 – 0.0287)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.731 – 0.750 (0.0288 – 0.0295)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.751 – 0.770 (0.0296 – 0.0303)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.771 – 0.790 (0.0304 – 0.0311)	54	56	58	60	62	64	66	68	70	70	72	72	74	74	74	74	74	74																										
0.791 – 0.810 (0.0311 – 0.0319)	56	58	60	62	64	66	68	70	72	72	74	74	74	74	74	74	74	74																										
0.811 – 0.830 (0.0319 – 0.0327)	58	60	62	64	66	68	70	72	74	74	74	74	74	74	74	74																										
0.831 – 0.850 (0.0327 – 0.0335)	60	62	64	66	68	70	72	74	74	74	74	74	74																													
0.851 – 0.870 (0.0335 – 0.0343)	62	64	66	68	70	72	74	74	74	74	74																															
0.871 – 0.890 (0.0343 – 0.0350)	64	66	68	70	72	74	74	74																																	
0.891 – 0.910 (0.0351 – 0.0358)	66	68	70	72	74	74	74																																		
0.911 – 0.930 (0.0359 – 0.0366)	68	70	72	74	74	74																																			
0.931 – 0.950 (0.0367 – 0.0374)	70	72	74	74	74																																				
0.951 – 0.970 (0.0374 – 0.0382)	72	74	74	74																																					
0.971 – 0.990 (0.0382 – 0.0390)	74	74	74																																						
0.991 – 1.010 (0.0390 – 0.0398)	74	74																																							
1.011 – 1.030 (0.0398 – 0.0406)	74																																								

Exhaust valve clearance (Cold):
0.25 – 0.35 mm (0.010 – 0.014 in.)

EXAMPLE: The 5.340 mm (0.2102 in.) lifter is installed, and the measured clearance is 0.440 mm (0.0173 in.).
Replace the 5.340 mm (0.2102 in.) lifter with a new No. 48 lifter.

New lifter thickness mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)		

A01235

EM

2ZZ-GE: Valve Shim Selection Chart (Intake)

Measure clearance mm (in.) \ Installed lifter thickness mm (in.)	2.000 (0.0787)	2.020 (0.0795)	2.040 (0.0803)	2.060 (0.0811)	2.080 (0.0819)	2.100 (0.0827)	2.120 (0.0835)	2.140 (0.0843)	2.160 (0.0850)	2.180 (0.0858)	2.190 (0.0858)	2.200 (0.0862)	2.210 (0.0866)	2.220 (0.0870)	2.230 (0.0878)	2.240 (0.0882)	2.250 (0.0886)	2.260 (0.0890)	2.270 (0.0894)	2.280 (0.0898)	2.290 (0.0902)	2.300 (0.0906)	2.310 (0.0909)	2.320 (0.0913)	2.330 (0.0917)	2.340 (0.0921)	2.350 (0.0925)	2.360 (0.0929)	2.370 (0.0933)	2.380 (0.0937)	2.390 (0.0941)	2.400 (0.0945)	2.410 (0.0949)	2.420 (0.0953)	2.430 (0.0957)	2.440 (0.0961)	2.450 (0.0965)	2.460 (0.0969)	2.470 (0.0972)	2.480 (0.0976)	2.490 (0.0980)	2.500 (0.0984)	2.510 (0.0988)	2.520 (0.0992)	2.530 (0.0996)	2.540 (0.1000)	2.550 (0.1004)	2.560 (0.1008)	2.580 (0.1016)	2.600 (0.1024)	2.620 (0.1031)	2.640 (0.1039)	2.660 (0.1047)	2.680 (0.1055)	2.700 (0.1063)	2.720 (0.1071)	2.740 (0.1079)	2.760 (0.1087)	2.780 (0.1094)	2.800 (0.1102)
0.000-0.030 (0.0000-0.0012)									00	00	00	00	02	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	40	42	44	46	48	50	52	54	56	58	60
0.031-0.050 (0.0012-0.0020)							00	00	00	00	02	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	42	44	46	48	50	52	54	56	58	60	62
0.051-0.070 (0.0020-0.0028)						00	00	00	00	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	44	46	48	50	52	54	56	58	60	62	64
0.071-0.090 (0.0028-0.0035)					00	00	00	00	02	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56	58	60	62	64	66
0.091-0.110 (0.0035-0.0043)				00	00	00	00	02	04	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	48	50	52	54	56	58	60	62	64	66	68
0.111-0.130 (0.0043-0.0051)			00	00	00	00	02	04	06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60	62	64	66	68	70
0.131-0.149 (0.0051-0.0059)		00	00	00	00	02	04	06	08	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62	64	66	68	70	72
0.150-0.250 (0.0059-0.0098)																																																												
0.251-0.270 (0.0099-0.0106)	06	08	10	12	14	16	18	20	22	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	64	66	68	70	72	74	76	78	80	80	80	80	
0.271-0.290 (0.0107-0.0114)	08	10	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	68	70	72	74	76	78	80	80	80		
0.291-0.310 (0.0115-0.0122)	10	12	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	70	72	74	76	78	80	80	80			
0.311-0.330 (0.0122-0.0130)	12	14	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	72	74	76	78	80	80	80				
0.331-0.350 (0.0130-0.0138)	14	16	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74	76	78	80	80	80					
0.351-0.370 (0.0138-0.0146)	16	18	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	76	78	80	80	80						
0.371-0.390 (0.0146-0.0154)	18	20	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	78	80	80	80							
0.391-0.410 (0.0154-0.0161)	20	22	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	58	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	80	80	80								
0.411-0.430 (0.0162-0.0169)	22	24	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80									
0.431-0.450 (0.0170-0.0177)	24	26	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80										
0.451-0.470 (0.0178-0.0185)	26	28	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80											
0.471-0.490 (0.0185-0.0193)	28	30	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80												
0.491-0.510 (0.0193-0.0201)	30	32	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80														
0.511-0.530 (0.0201-0.0209)	32	34	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																
0.531-0.550 (0.0209-0.0217)	34	36	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																		
0.551-0.570 (0.0217-0.0224)	36	38	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																				
0.571-0.590 (0.0225-0.0232)	38	40	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																						
0.591-0.610 (0.0233-0.0240)	40	42	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																								
0.611-0.630 (0.0241-0.0248)	42	44	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																										
0.631-0.650 (0.0248-0.0256)	44	46	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																												
0.651-0.670 (0.0256-0.0264)	46	48	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																														
0.671-0.690 (0.0264-0.0272)	48	50	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																																
0.691-0.710 (0.0272-0.0280)	50	52	54	56	58	60	62	64	66	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																																		
0.711-0.730 (0.0280-0.0287)	52	54	56	58	60	62	64	66	68	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80																																				
0.731-0.750 (0.0288-0.0295)	54	56	58	60	62	64	66	68	70	72	74	74	76	76	78	78	80	80	80	80	80	80																																						
0.751-0.770 (0.0296-0.0303)	56	58	60	62	64	66	68	70	72	74	76	76	78	78	80	80	80	80	80	80																																								
0.771-0.790 (0.0304-0.0311)	58	60	62	64	66	68	70	72	74	76	78	78	80	80	80	80	80	80																																										
0.791-0.810 (0.0311-0.0319)	60	62	64	66	68	70	72	74	76	78	80	80	80	80	80	80																																												
0.811-0.830 (0.0319-0.0327)	62	64	66	68	70	72	74	76	78	80	80	80	80	80																																														
0.831-0.850 (0.0327-0.0335)	64	66	68	70	72	74	76	78	80	80	80	80																																																
0.851-0.870 (0.0335-0.0343)	66	68	70	72	74	76	78	80	80	80																																																		
0.871-0.890 (0.0343-0.0350)	68	70	72	74	76	78	80	80	80																																																			
0.891-0.910 (0.0351-0.0358)	70	72	74	76	78	80	80	80																																																				
0.911-0.930 (0.0359-0.0366)	72	74	76	78	80	80	80																																																						
0.931-0.950 (0.0367-0.0374)	74	76	78	80	80	80																																																							
0.951-0.970 (0.0374-0.0382)	76	78	80	80	80																																																								
0.971-0.990 (0.0382-0.0390)	78	80	80	80																																																									
0.991-1.010 (0.0390-0.0398)	80	80	80																																																										
1.011-1.030 (0.0398-0.0406)	80	80																																																											
1.031-1.050 (0.0406-0.0413)	80																																																												

New Shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness
00	2.000 (0.0787)	28	2.280 (0.0898)	56	2.560 (0.1008)
02	2.020 (0.0795)	30	2.300 (0.0906)	58	2.580 (0.1016)
04	2.040 (0.0803)	32	2.320 (0.0913)	60	2.600 (0.1024)
06	2.060 (0.0811)	34	2.340 (0.0921)	62	2.620 (0.1031)
08	2.080 (0.0819)	36	2.360 (0.0929)	64	2.640 (0.1039)
10	2.100 (0.0827)	38	2.380 (.0.0937)	66	2.660 (0.1047)
12	2.120 (0.0835)	40	2.400 (0.0945)	68	2.680 (0.1055)
14	2.140 (0.0843)	42	2.420 (0.0953)	70	2.700 (0.1063)
16	2.160 (0.0850)	44	2.440 (0.0961)	72	2.720 (0.1071)
18	2.180 (0.0858)	46	2.460 (0.0969)	74	2.740 (0.1079)
20	2.200 (0.0866)	48	2.480 (0.0976)	76	2.760 (0.1087)
22	2.220 (0.0874)	50	2.500 (0.0984)	78	2.780 (0.1094)
24	2.240 (0.0882)	52	2.520 (0.0992)	80	2.800 (0.1102)
26	2.260 (0.0890)	54	2.540 (0.1000)		

Intake valve clearance (Cold):
0.15 – 0.25 mm (0.006 – 0.010 in.)

EXAMPLE: The 2.200 mm (0.0826 in.) shim is installed, and the measured clearance is 0.400 mm (0.0157 in.).
Replace the 2.400 mm (0.0945 in.) shim with a new No. 40 shim.

A10466

2ZZ–GE: Valve Shim Selection Chart (Exhaust)

Installed lifter thickness mm (in.) / Measure clearance mm (in.)

Measure clearance mm (in.)	2.000 (0.0787)	2.020 (0.0795)	2.040 (0.0803)	2.060 (0.0811)	2.080 (0.0819)	2.100 (0.0827)	2.120 (0.0835)	2.140 (0.0843)	2.160 (0.0850)	2.180 (0.0858)	2.190 (0.0862)	2.200 (0.0866)	2.210 (0.0870)	2.220 (0.0874)	2.230 (0.0878)	2.240 (0.0882)	2.250 (0.0886)	2.260 (0.0890)	2.270 (0.0894)	2.280 (0.0898)
0.000–0.030 (0.0000–0.0012)																				
0.031–0.050 (0.0012–0.0020)																				
0.051–0.070 (0.0020–0.0028)																				
0.071–0.090 (0.0028–0.0035)																				00
0.091–0.110 (0.0036–0.0043)																		00	00	00
0.111–0.130 (0.0044–0.0051)																00	00	00	00	00
0.131–0.150 (0.0052–0.0059)														00	00	00	00	00	00	00
0.151–0.170 (0.0059–0.0067)												00	00	00	00	00	00	00	02	02
0.171–0.190 (0.0067–0.0075)										00	00	00	00	00	00	00	02	02	04	04
0.191–0.210 (0.0075–0.0083)									00	00	00	00	00	00	02	02	04	04	06	06
0.211–0.230 (0.0083–0.0091)								00	00	00	00	00	02	02	04	04	06	06	08	08
0.231–0.250 (0.0091–0.0098)							00	00	00	00	02	02	04	04	06	06	08	08	10	10
0.251–0.270 (0.0099–0.0106)						00	00	00	00	02	04	04	06	06	08	08	10	10	12	12
0.271–0.290 (0.0107–0.0114)					00	00	00	00	02	04	06	06	08	08	10	10	12	12	14	14
0.291–0.310 (0.0115–0.0122)				00	00	00	00	02	04	06	08	08	10	10	12	12	14	14	16	16
0.311–0.330 (0.0122–0.0130)			00	00	00	00	02	04	06	08	10	10	12	12	14	14	16	16	18	18
0.331–0.349 (0.0130–0.0137)		00	00	00	00	02	04	06	08	10	12	12	14	14	16	16	18	18	20	20
0.350–0.450 (0.0138–0.0177)																				
0.451–0.470 (0.0178–0.0185)	06	08	10	12	14	16	18	20	22	24	26	26	28	28	30	30	32	32	34	34
0.471–0.490 (0.0185–0.0193)	08	10	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36
0.491–0.510 (0.0193–0.0201)	10	12	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38
0.511–0.530 (0.0201–0.0209)	12	14	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	42
0.531–0.550 (0.0209–0.0217)	14	16	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	42	42	44
0.551–0.570 (0.0217–0.0224)	16	18	20	22	24	26	28	30	32	34	36	36	38	38	40	42	42	44	44	46
0.571–0.590 (0.0225–0.0232)	18	20	22	24	26	28	30	32	34	36	38	38	40	42	42	44	44	46	46	48
0.591–0.610 (0.0223–0.0240)	20	22	24	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50
0.611–0.630 (0.0241–0.0248)	22	24	26	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52
0.631–0.650 (0.0248–0.0256)	24	26	28	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54
0.651–0.670 (0.0256–0.0264)	26	28	30	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	64	56
0.671–0.690 (0.0264–0.0272)	28	30	32	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58
0.691–0.710 (0.0272–0.0280)	30	32	34	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60
0.711–0.730 (0.0280–0.0287)	32	34	36	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62
0.731–0.750 (0.0288–0.0295)	34	36	38	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64
0.751–0.770 (0.0296–0.0303)	36	38	40	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66
0.771–0.790 (0.0304–0.0311)	38	40	42	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68
0.791–0.810 (0.0311–0.0319)	40	42	44	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70
0.811–0.830 (0.0319–0.0327)	42	44	46	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72
0.831–0.850 (0.0327–0.0335)	44	46	48	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74
0.851–0.870 (0.0335–0.0343)	46	48	50	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	76
0.871–0.890 (0.0343–0.0350)	48	50	52	54	56	58	60	62	64	66	68	70	70	72	72	74	74	76	76	78
0.891–0.910 (0.0351–0.0358)	50	52	54	58	58	60	62	64	66	68	70	72	72	74	74	76	76	78	78	80
0.911–0.930 (0.0359–0.0366)	52	54	56	58	60	62	64	66	68	70	72	74	74	76	76	78	78	70	80	80
0.931–0.950 (0.0367–0.0374)	54	56	58	60	62	64	66	68	70	72	74	76	76	78	78	80	80	80	80	80
0.951–0.970 (0.0374–0.0382)	56	58	60	62	64	66	68	70	72	74	76	78	78	80	80	80	80	80	80	80
0.971–0.990 (0.0382–0.0390)	58	60	62	64	66	68	70	72	74	76	78	80	80	80	80	80	80	80		
0.991–1.010 (0.0390–0.0398)	60	62	64	66	68	70	72	74	76	78	80	80	80	80	80	80				
1.011–1.030 (0.0398–0.0406)	62	64	66	68	70	72	74	76	78	80	80	80	80	80						
1.031–1.050 (0.0406–0.0413)	64	66	68	70	72	74	76	78	80	80	80	80								
1.051–1.070 (0.0414–0.0421)	66	68	70	72	74	76	78	80	80	80										
1.071–1.090 (0.0422–0.0429)	68	70	72	74	76	78	80	80	80											
1.091–1.110 (0.0430–0.0437)	70	72	74	76	78	80	80	80												
1.111–1.130 (0.0437–0.0445)	72	74	76	78	80	80	80													
1.131–1.150 (0.0445–0.0453)	74	76	78	80	80	80														
1.151–1.170 (0.0453–0.0461)	76	78	80	80	80															
1.171–1.190 (0.0461–0.0469)	78	80	80	80																
1.191–1.210 (0.0469–0.0476)	80	80	80																	
1.211–1.230 (0.0477–0.0484)	80	80																		
1.231–1.250 (0.0485–0.0492)	80																			

Measure clearance mm (in.)	2.290 (0.0902)	2.300 (0.0906)	2.310 (0.0909)	2.320 (0.0913)	2.330 (0.0917)	2.340 (0.0921)	2.350 (0.0925)	2.360 (0.0929)	2.370 (0.0933)	2.380 (0.0937)	2.390 (0.0941)	2.400 (0.0945)	2.410 (0.0949)	2.420 (0.0953)	2.430 (0.0957)	2.440 (0.0961)	2.450 (0.0965)	2.460 (0.0969)	2.470 (0.0972)	2.480 (0.0976)
0.000–0.030 (0.0000–0.0012)							00	00	00	00	00	00	02	02	04	04	06	06	08	08
0.031–0.050 (0.0012–0.0020)				00	00	00	00	00	00	00	02	02	04	04	06	06	08	08	10	10
0.051–0.070 (0.0020–0.0028)		00	00	00	00	00	00	00	02	02	04	04	06	06	08	08	10	10	12	12
0.071–0.090 (0.0028–0.0035)	00	00	00	00	00	00	02	02	04	04	06	06	08	08	10	10	12	12	14	14
0.091–0.110 (0.0036–0.0043)	00	00	00	00	02	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16
0.111–0.130 (0.0044–0.0051)	00	00	02	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18
0.131–0.150 (0.0052–0.0059)	02	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20
0.151–0.170 (0.0059–0.0067)	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22
0.171–0.190 (0.0067–0.0075)	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24
0.191–0.210 (0.0075–0.0083)	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26
0.211–0.230 (0.0083–0.0091)	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28
0.231–0.250 (0.0091–0.0098)	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30
0.251–0.270 (0.0099–0.0106)	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32
0.271–0.290 (0.0107–0.0114)	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34
0.291–0.310 (0.0115–0.0122)	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36
0.311–0.330 (0.0122–0.0130)	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38
0.331–0.349 (0.0130–0.0137)	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40
0.350–0.450 (0.0138–0.0177)																				
0.451–0.470 (0.0178–0.0185)	36	36	38	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56
0.471–0.490 (0.0185–0.0193)	38	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	56
0.491–0.510 (0.0193–0.0201)	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60
0.511–0.530 (0.0201–0.0209)	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	68	60	60	60
0.531–0.550 (0.0209–0.0217)	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64
0.551–0.570 (0.0217–0.0224)	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	64
0.571–0.590 (0.0225–0.0232)	48	50	50	52	52	54	54	56	56	58	68	60	60	62	62	64	64	66	66	68
0.591–0.610 (0.0223–0.0240)	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	68
0.611–0.630 (0.0241–0.0248)	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72
0.631–0.650 (0.0248–0.0256)	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	72
0.651–0.670 (0.0256–0.0264)	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76
0.671–0.690 (0.0264–0.0272)	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	76
0.691–0.710 (0.0272–0.0280)	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80
0.711–0.730 (0.0280–0.0287)	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80
0.731–0.750 (0.0288–0.0295)	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80
0.751–0.770 (0.0296–0.0303)	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80	80
0.771–0.790 (0.0304–0.0311)	68	70	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80	80		
0.791–0.810 (0.0311–0.0319)	70	72	72	74	74	76	76	78	78	80	80	80	80	80	80	80				
0.811–0.830 (0.0319–0.0327)	72	74	74	76	76	78	78	80	80	80	80	80	80	80						
0.831–0.850 (0.0327–0.0335)	74	76	76	78	78	80	80	80	80	80	80	80								
0.851–0.870 (0.0335–0.0343)	76	78	78	80	80	80	80	80	80	80										
0.871–0.890 (0.0343–0.0350)	78	80	80	80	80	80	80	80												
0.891–0.910 (0.0351–0.0358)	80	80	80	80	80	80														
0.911–0.930 (0.0359–0.0366)	80	80	80	80																
0.931–0.950 (0.0367–0.0374)	80	80																		
0.951–0.970 (0.0374–0.0382)																				
0.971–0.990 (0.0382–0.0390)																				
0.991–1.010 (0.0390–0.0398)																				
1.011–1.030 (0.0398–0.0406)																				
1.031–1.050 (0.0406–0.0413)																				
1.051–1.070 (0.0414–0.0421)																				
1.071–1.090 (0.0422–0.0429)																				
1.091–1.110 (0.0430–0.0437)																				
1.111–1.130 (0.0437–0.0445)																				
1.131–1.150 (0.0445–0.0453)																				
1.151–1.170 (0.0453–0.0461)																				
1.171–1.190 (0.0461–0.0469)																				
1.191–1.210 (0.0469–0.0476)																				
1.211–1.230 (0.0477–0.0484)																				
1.231–1.250 (0.0485–0.0492)																				

Measure clearance mm (in.)	2.490 (0.0980)	2.500 (0.0984)	2.510 (0.0988)	2.520 (0.0992)	2.530 (0.0996)	2.540 (0.1000)	2.550 (0.1004)	2.560 (0.1008)	2.580 (0.1016)	2.600 (0.1024)	2.620 (0.1031)	2.640 (0.1039)	2.660 (0.1047)	2.680 (0.1055)	2.700 (0.1063)	2.720 (0.1071)	2.740 (0.1079)	2.760 (0.1087)	2.780 (0.1094)	2.800 (0.1102)
0.000–0.030 (0.0000–0.0012)	10	10	12	12	14	14	16	16	18	20	22	24	26	28	30	32	34	36	38	40
0.031–0.050 (0.0012–0.0020)	12	12	14	14	16	16	18	18	20	22	24	26	28	30	32	34	36	38	40	42
0.051–0.070 (0.0020–0.0028)	14	14	16	16	18	18	20	20	22	24	26	28	30	32	34	36	38	40	42	44
0.071–0.090 (0.0028–0.0035)	16	16	18	18	20	20	22	22	24	26	28	30	32	34	36	38	40	42	44	46
0.091–0.110 (0.0036–0.0043)	18	18	20	20	22	22	24	24	26	28	30	32	34	36	38	40	42	44	46	48
0.111–0.130 (0.0044–0.0051)	20	20	22	22	24	24	26	36	28	30	32	34	36	38	40	42	44	46	48	50
0.131–0.150 (0.0052–0.0059)	22	22	24	24	26	26	28	28	30	32	34	36	38	40	42	44	46	48	50	52
0.151–0.170 (0.0059–0.0067)	24	24	26	26	28	28	30	30	32	34	36	38	40	42	44	46	48	50	52	54
0.171–0.190 (0.0067–0.0075)	26	26	28	28	30	30	32	32	34	36	38	40	42	44	46	48	50	52	54	56
0.191–0.210 (0.0075–0.0083)	28	28	30	30	32	32	34	34	36	38	40	42	44	46	48	50	52	54	56	58
0.211–0.230 (0.0083–0.0091)	30	30	32	32	34	34	36	36	38	40	42	44	46	48	50	52	54	56	58	60
0.231–0.250 (0.0091–0.0098)	32	32	34	34	36	36	38	38	40	42	44	46	48	50	52	54	58	58	60	62
0.251–0.270 (0.0099–0.0106)	34	34	36	36	38	38	40	40	42	44	46	48	50	52	54	56	58	60	62	64
0.271–0.290 (0.0107–0.0114)	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56	58	60	62	64	66
0.291–0.310 (0.0115–0.0122)	38	38	40	40	42	42	44	44	46	48	50	52	54	56	58	60	62	64	66	68
0.311–0.330 (0.0122–0.0130)	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60	62	64	66	68	70
0.331–0.349 (0.0130–0.0137)	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62	64	66	68	70	72
0.350–0.450 (0.0138–0.0177)																				
0.451–0.470 (0.0178–0.0185)	56	58	58	60	60	62	62	64	66	68	70	72	74	76	78	80	80	80	80	
0.471–0.490 (0.0185–0.0193)	60	60	60	62	62	64	64	66	68	70	62	74	76	78	80	80	80	80		
0.491–0.510 (0.0193–0.0201)	60	62	62	64	64	66	66	68	70	72	74	76	78	80	80	80	80			
0.511–0.530 (0.0201–0.0209)	64	64	64	66	66	68	68	70	72	74	76	78	80	80	80	80				
0.531–0.550 (0.0209–0.0217)	64	66	66	68	68	70	70	72	74	76	78	80	80	80	80					
0.551–0.570 (0.0217–0.0224)	68	68	68	70	70	72	72	74	76	78	80	80	80	80						
0.571–0.590 (0.0225–0.0232)	68	70	70	72	72	74	74	76	78	80	80	80	80							
0.591–0.610 (0.0223–0.0240)	72	72	72	74	74	76	76	78	80	80	80	80								
0.611–0.630 (0.0241–0.0248)	72	74	74	76	76	78	78	80	80	80	80									
0.631–0.650 (0.0248–0.0256)	76	76	76	78	78	80	80	80	80	80										
0.651–0.670 (0.0256–0.0264)	76	78	78	80	80	80	80	80	80											
0.671–0.690 (0.0264–0.0272)	80	80	80	80	80	80	80	80												
0.691–0.710 (0.0272–0.0280)	80	80	80	80	80	80														
0.711–0.730 (0.0280–0.0287)	80	80	80	80																
0.731–0.750 (0.0288–0.0295)	80	80																		
0.751–0.770 (0.0296–0.0303)																				
0.771–0.790 (0.0304–0.0311)																				
0.791–0.810 (0.0311–0.0319)																				
0.811–0.830 (0.0319–0.0327)																				
0.831–0.850 (0.0327–0.0335)																				
0.851–0.870 (0.0335–0.0343)																				
0.871–0.890 (0.0343–0.0350)																				
0.891–0.910 (0.0351–0.0358)																				
0.911–0.930 (0.0359–0.0366)																				
0.931–0.950 (0.0367–0.0374)																				
0.951–0.970 (0.0374–0.0382)																				
0.971–0.990 (0.0382–0.0390)																				
0.991–1.010 (0.0390–0.0398)																				
1.011–1.030 (0.0398–0.0406)																				
1.031–1.050 (0.0406–0.0413)																				
1.051–1.070 (0.0414–0.0421)																				
1.071–1.090 (0.0422–0.0429)																				
1.091–1.110 (0.0430–0.0437)																				
1.111–1.130 (0.0437–0.0445)																				
1.131–1.150 (0.0445–0.0453)																				
1.151–1.170 (0.0453–0.0461)																				
1.171–1.190 (0.0461–0.0469)																				
1.191–1.210 (0.0469–0.0476)																				
1.211–1.230 (0.0477–0.0484)																				
1.231–1.250 (0.0485–0.0492)																				

New Shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness
00	2.000 (0.0787)	28	2.280 (0.0898)	56	2.560 (0.1008)
02	2.020 (0.0795)	30	2.300 (0.0906)	58	2.580 (0.1016)
04	2.040 (0.0803)	32	2.320 (0.0913)	60	2.600 (0.1024)
06	2.060 (0.0811)	34	2.340 (0.0921)	62	2.620 (0.1031)
08	2.080 (0.0819)	36	2.360 (0.0929)	64	2.640 (0.1039)
10	2.100 (0.0827)	38	2.380 (.0.0937)	66	2.660 (0.1047)
12	2.120 (0.0835)	40	2.400 (0.0945)	68	2.680 (0.1055)
14	2.140 (0.0843)	42	2.420 (0.0953)	70	2.700 (0.1063)
16	2.160 (0.0850)	44	2.440 (0.0961)	72	2.720 (0.1071)
18	2.180 (0.0858)	46	2.460 (0.0969)	74	2.740 (0.1079)
20	2.200 (0.0866)	48	2.480 (0.0976)	76	2.760 (0.1087)
22	2.220 (0.0874)	50	2.500 (0.0984)	78	2.780 (0.1094)
24	2.240 (0.0882)	52	2.520 (0.0992)	80	2.800 (0.1102)
26	2.260 (0.0890)	54	2.540 (0.1000)		

Exhaust valve clearance (Cold):
0.35 – 0.45 mm (0.014 – 0.018 in.)

EXAMPLE: The 2.200 mm (0.0862 in.) shim is installed, and the measured clearance is 0.500 mm (0.0197 in.).
Replace the 2.300 mm (0.0906 in.) shim with a new No. 30 shim.

A10467

6. **1ZZ–FE:**
REINSTALL CAMSHAFT

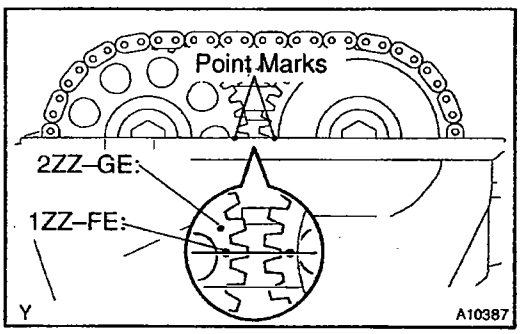
(a) Reinstall the valve lifters (See page EM–61).

(b) Align the crankshaft pulley groove with the timing mark "0" of the timing chain cover.

(c) Hold the timing chain, and place the intake camshaft and timing sprocket assembly.

(d) Align the matchmarks on the timing chain and camshaft timing sprocket.

(e) Reinstall the camshaft and timing sprocket assemblies (See page EM–65).



(f) Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration.

(g) Check that the matchmarks on the timing chain and camshaft timing sprockets.

(h) Install the chain tensioner (See page EM–25).

(i) Recheck the valve clearance (See procedure in step 3).

(j) Check the valve timing (See page EM–25).

7. **REINSTALL CYLINDER HEAD COVER (See page EM–25)**

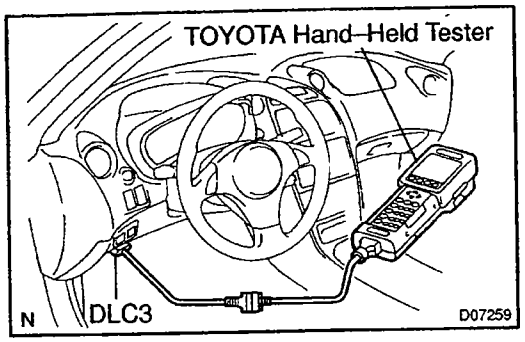
IGNITION TIMING

EM15P–01

INSPECTION

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

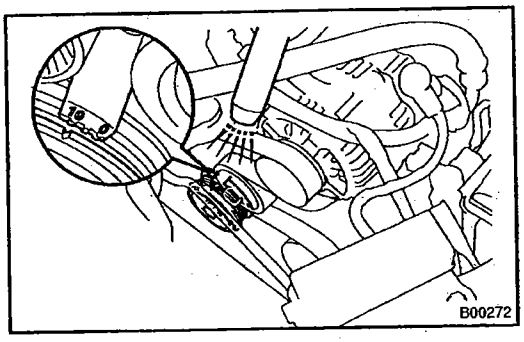


2. CONNECT TOYOTA HAND–HELD TESTER OR OBDII SCAN TOOL

(a) Connect the TOYOTA hand–held tester or OBDII scan tool to the DLC3.

(b) Please refer to the TOYOTA hand–held tester or OBDII scan tool operator's for further details.

3. CONNECT TIMING LIGHT TO ENGINE



4. INSPECT IGNITION TIMING

Using a timing light, check the ignition timing.

Ignition timing:
1ZZ–FE:
10 – 18° BTDC @ idle
2ZZ–GE:
8 – 12° BTDC @ idle
(Transmission in neutral position)

HINT:

After engine rpm is kept at 1,000 – 1,300 rpm for 5 seconds, check that it returns to idle speed.

5. DISCONNECT TIMING LIGHT FROM ENGINE

6. DISCONNECT TOYOTA HAND–HELD TESTER OR OBDII SCAN TOOL

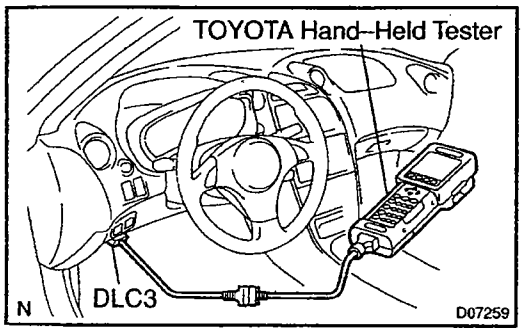
IDLE SPEED

INSPECTION

EM05N–03

1. INSTALL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All vacuum lines properly connected
(e) SFI system wiring connectors fully plugged
(f) All operating accessories switched OFF
(g) Ignition timing check correctly
(h) Transmission in neutral position
(i) Air conditioning switched OFF



2. CONNECT TOYOTA HAND–HELD TESTER OR OBDII SCAN TOOL

(a) Connect the TOYOTA hand–held tester or OBDII scan tool to the DLC3.
(b) Please refer to the TOYOTA hand–held tester or OBDII scan tool operator's manual for further details.

3. INSPECT IDLE SPEED

(a) Race the engine at 2,500 rpm for approx. 90 seconds.
(b) Check the idle speed.

Idle speed (w/ Cooling fan OFF):
1ZZ–FE
M/T 700 ± 50 rpm
A/T 750 ± 50 rpm
2ZZ–GE
M/T 800 ± 50 rpm
A/T 750 ± 50 rpm

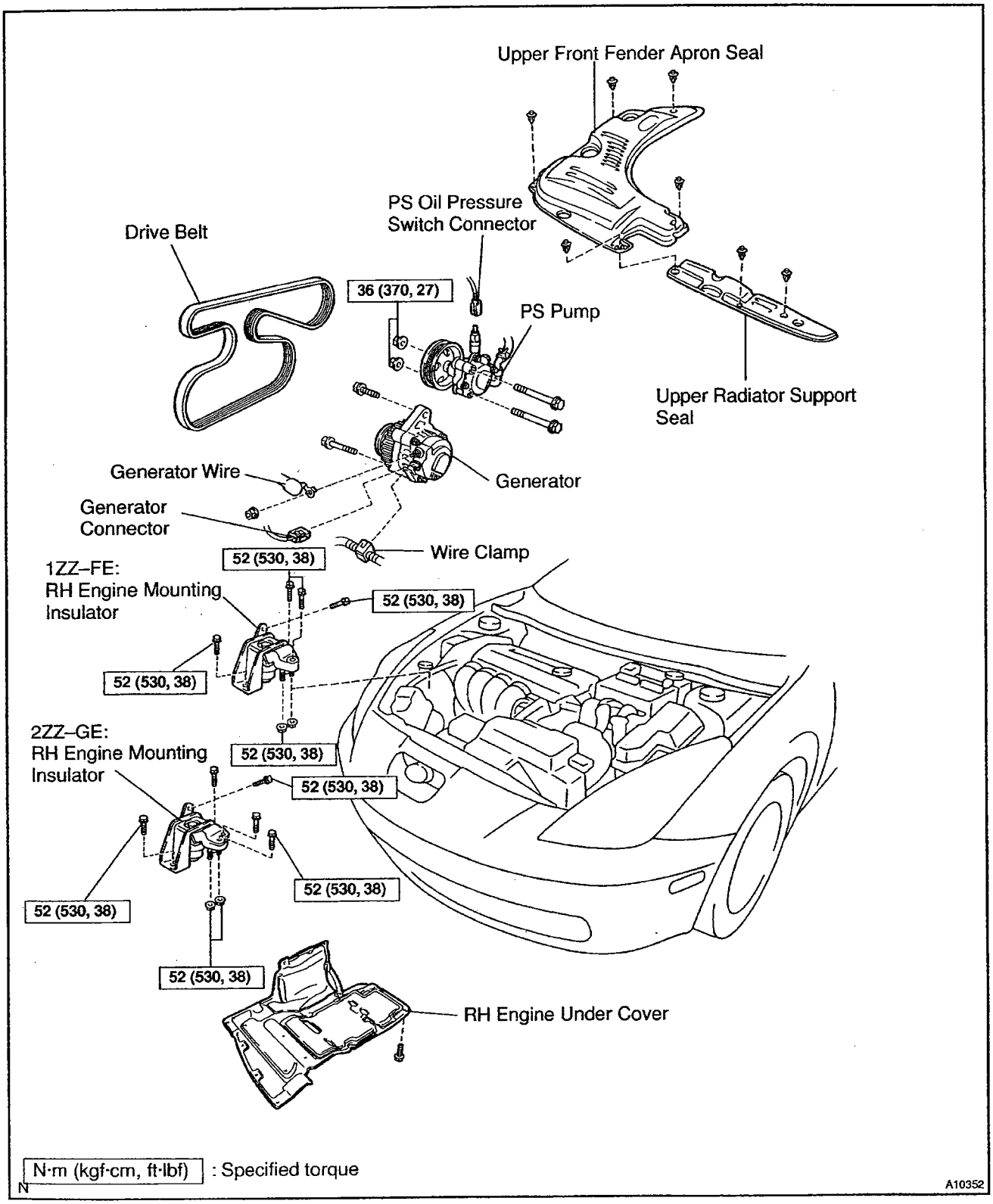
If the idle speed is not as specified, check the IAC valve and air intake system.

4. DISCONNECT TOYOTA HAND–HELD TESTER OR OBDII SCAN TOOL

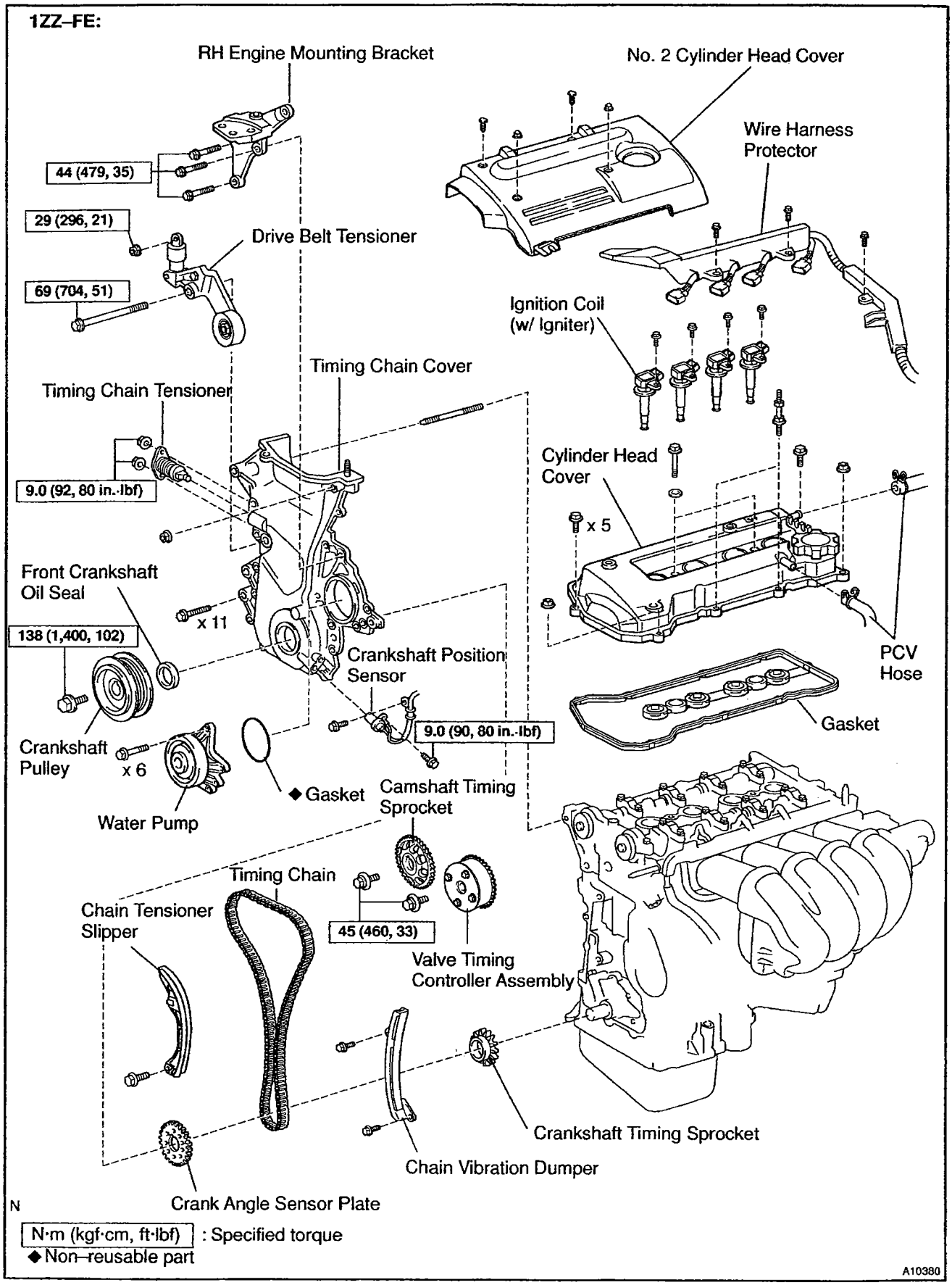
TIMING CHAIN

COMPONENTS

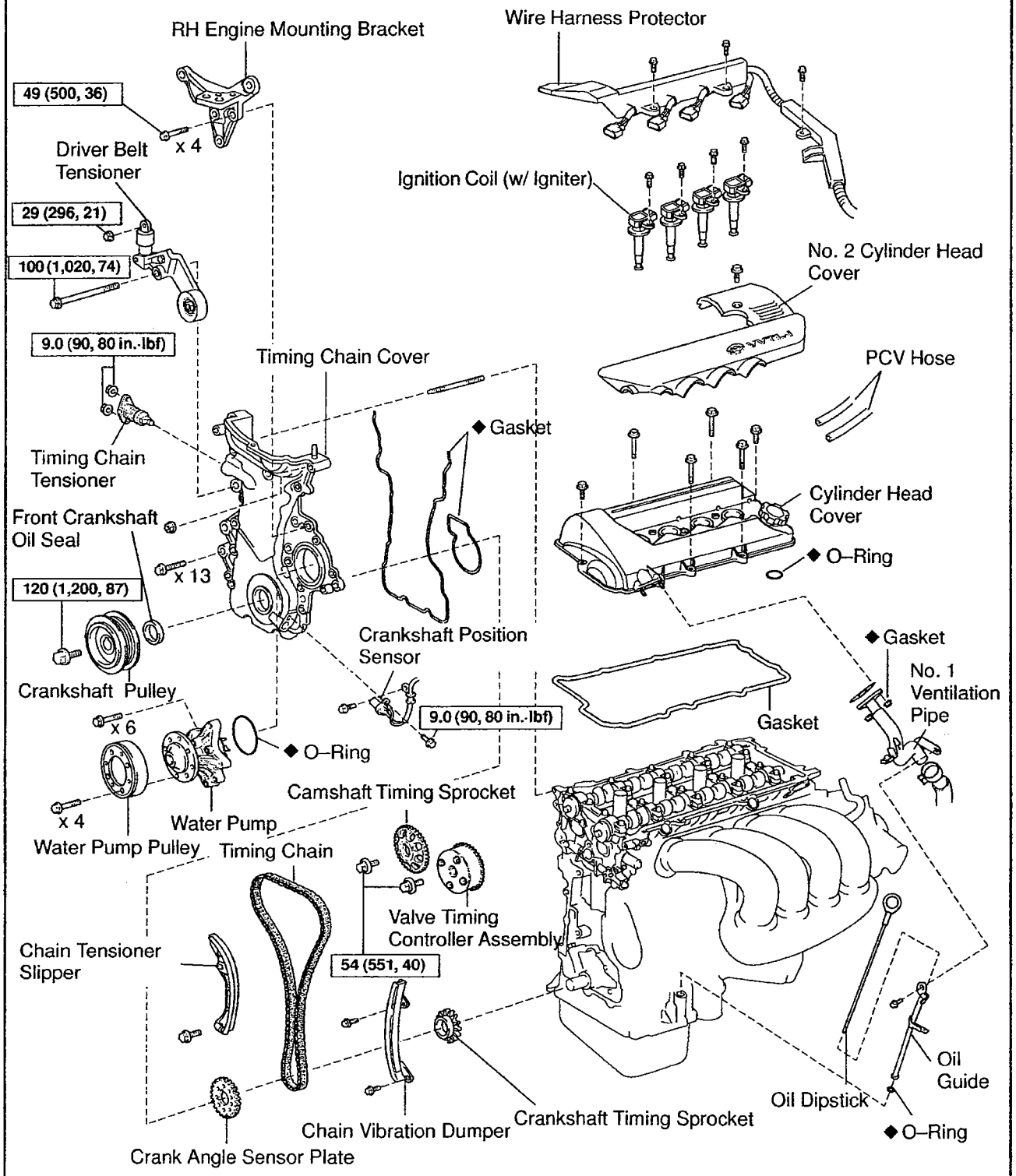
EM15R-01



1ZZ–FE:


RH Engine Mounting Bracket
No. 2 Cylinder Head Cover
Wire Harness Protector
44 (479, 35)
29 (296, 21)
Drive Belt Tensioner
69 (704, 51)
Ignition Coil (w/ Igniter)
Timing Chain Cover
Timing Chain Tensioner
9.0 (92, 80 in.·lbf)
Cylinder Head Cover
x 5
Front Crankshaft Oil Seal
138 (1,400, 102)
x 11
Crankshaft Position Sensor
PCV Hose
Gasket
9.0 (90, 80 in.·lbf)
Crankshaft Pulley
x 6
◆Gasket
Camshaft Timing Sprocket
Water Pump
Timing Chain
Chain Tensioner Slipper
45 (460, 33)
Valve Timing Controller Assembly
Crankshaft Timing Sprocket
Chain Vibration Dumper
N
Crank Angle Sensor Plate
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
A10380

2ZZ–GE:



N

N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

A10353

EM05P-05

REMOVAL

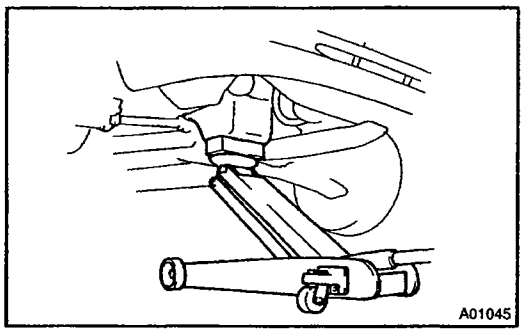
1. **REMOVE UPPER FRONT FENDER APRON SEAL AND UPPER RADIATOR SUPPORT SEAL**
2. **DRAIN ENGINE COOLANT**
3. **REMOVE RH FRONT WHEEL**
4. **REMOVE RH ENGINE UNDER COVER**
5. **REMOVE DRIVE BELT AND GENERATOR**
   (See page CH–7)
6. **DISCONNECT PS PUMP FROM ENGINE**

(a) Disconnect the PS oil pressure switch connector.

(b) Remove the 2 nuts and through bolts, and disconnect the PS pump from the engine (See page SR–24).

HINT:

Put aside the pump and suspend it to the cowl with a string.

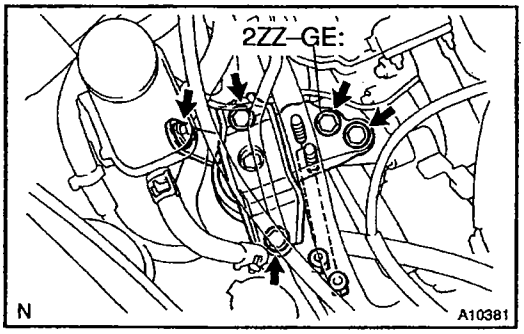


7. **REMOVE RH ENGINE MOUNTING INSULATOR**

(a) Set the jack to the engine.

HINT:

Place a wooden block between the jack and engine.



(b) 1ZZ–FE:
Remove the 4 bolts, 2 nuts and RH engine mounting insulator.

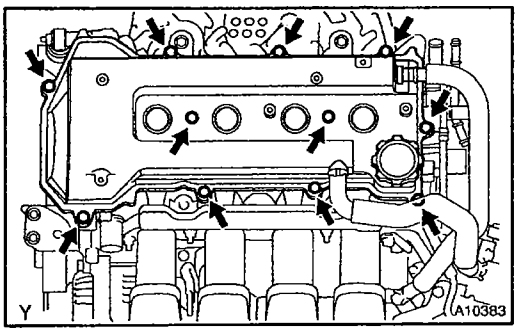
(c) 2ZZ–GE:
Remove the 5 bolts, 2 nuts and RH engine mounting insulator.

8. **1ZZ–FE:**
   REMOVE CYLINDER HEAD COVER

(a) Remove the 4 bolts and No. 2 cylinder head cover.

(b) Remove the 4 ignition coils (See page IG–6).

(c) Disconnect the 2 PCV hoses from the cylinder head.

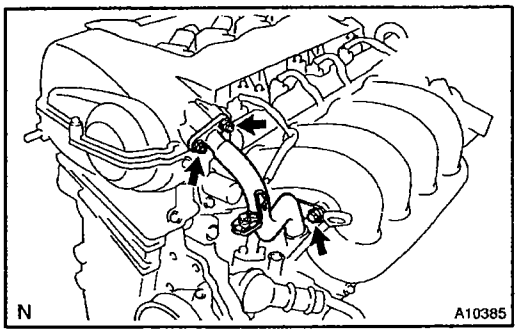


(d) Remove the 9 bolts, 2 seal washers, 2 nuts, cylinder head cover and gasket.

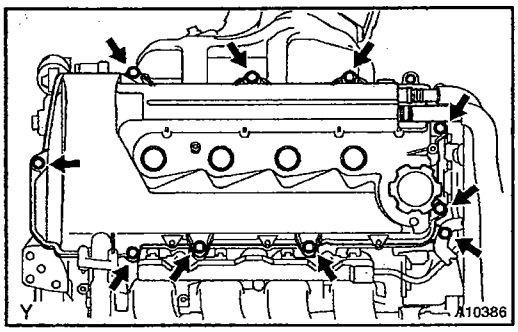
9. 2ZZ–GE:

REMOVE CYLINDER HEAD COVER

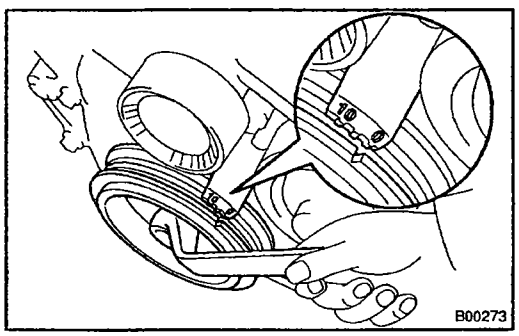
(a) Remove the 4 bolts and No. 2 cylinder head cover.
(b) Remove the ignition coils (See page IG–6).
(c) Disconnect the 2 PCV hoses from the cylinder head cover.



(d) Remove the 2 nuts, bolt and disconnect the No. 3 ventilation hose from the No. 1 ventilation pipe.
(e) Remove the No. 1 ventilation pipe and gasket.

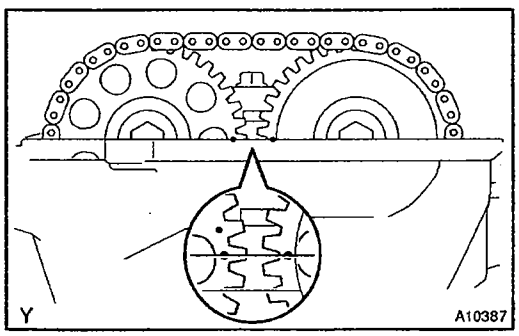


(f) Remove the 9 bolts, wire harness protector, cylinder head cover and gasket.
(g) Remove the O–ring from the cylinder head cover.



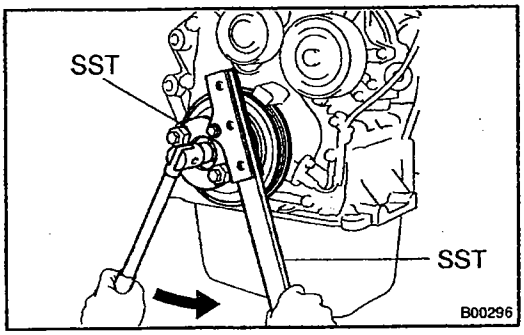
10. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the timing chain cover.



(b) Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration.

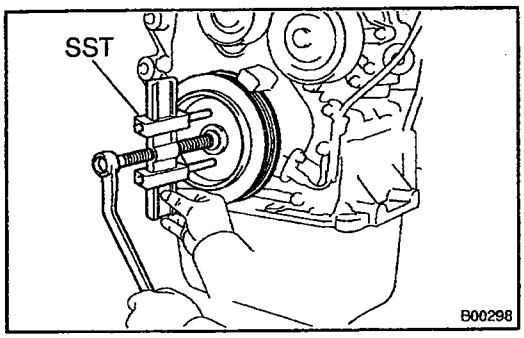
If not, turn the crankshaft 1 revolution (360°) and align the marks as above.



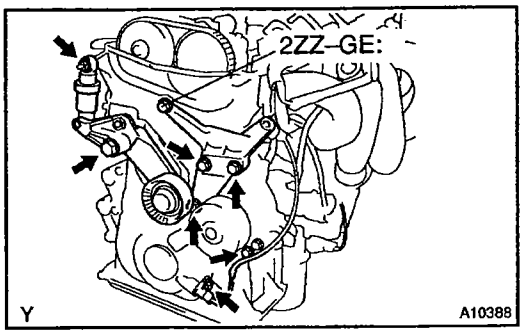
11. REMOVE CRANKSHAFT PULLEY

(a) Using SST and 2 nuts (width: 10 mm (0.25 in.)), remove the pulley bolt.
SST 09213–70010, 09330–00021

(b) Remove the crankshaft pulley.



HINT:
If necessary, remove the pulley with SST.
SST 09950–50012 (09951–05010, 09952–05010, 09953–05020, 09954–05020)



12. DISCONNECT CRANKSHAFT POSITION SENSOR FROM TIMING CHAIN COVER

Remove the 2 bolts and crankshaft position sensor.

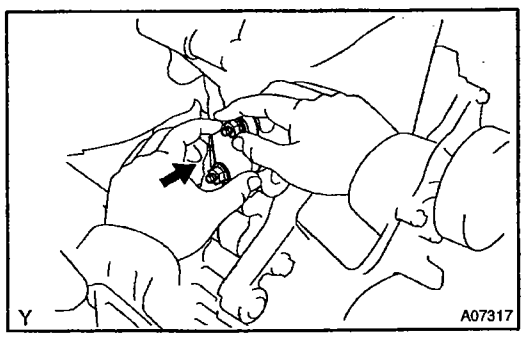
13. REMOVE DRIVE BELT TENSIONER

Remove the bolt, nut and drive belt tensioner.

14. REMOVE RH ENGINE MOUNTING BRACKET

(a) 1ZZ–FE:
Remove the 3 bolts and mounting bracket.

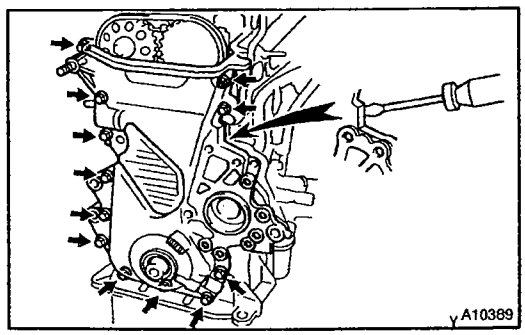
(b) 2ZZ–GE:
Remove the 4 bolts and mounting bracket.



15. REMOVE CHAIN TENSIONER

Remove the 2 nuts and chain tensioner.

16. REMOVE WATER PUMP (See page CO–5)



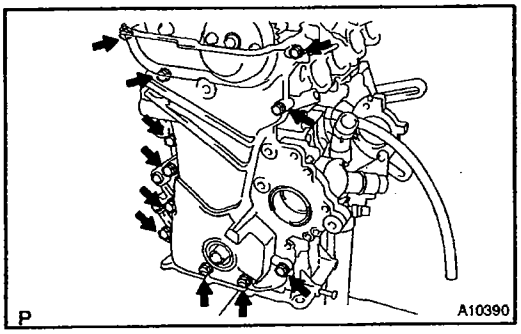
17. 1ZZ–FE:
REMOVE TIMING CHAIN COVER

(a) Remove the 11 bolts and nut.

(b) Using a torx wrench socket (E8), remove the stud bolt.

(c) Remove the timing chain cover by prying the portions between the cylinder head and cylinder block with a screwdriver.

NOTICE:
Be careful not to damage the contact surfaces of the timing chain cover, cylinder head and cylinder block.



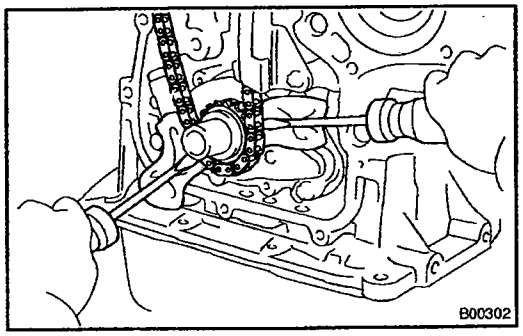
18. 2ZZ–GE:
REMOVE TIMING CHAIN COVER

(a) Remove the 12 bolts.
(b) Using a torx wrench socket (E8), remove the stud bolt.
(c) Remove the timing chain cover and 2 gaskets.

19. REMOVE CRANK ANGLE SENSOR PLATE

20. REMOVE CHAIN TENSIONER SLIPPER

Remove the bolt and slipper.



21. REMOVE TIMING CHAIN AND CRANKSHAFT TIMING SPROCKET

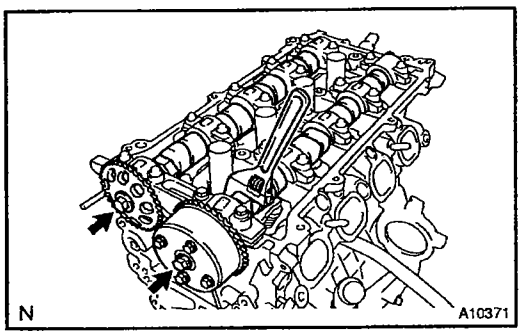
If the crankshaft timing sprocket cannot be removed by hand, use 2 screwdrivers.

NOTICE:

Position shop rags as shown to prevent damage.

22. REMOVE CHAIN VIBRATION DAMPER

Remove the 2 bolts and damper.



23. REMOVE VALVE TIMING CONTROL ASSEMBLY AND CAMSHAFT TIMING SPROCKET

Hold the hexagonal head wrench portion of the camshaft with a wrench, and remove the bolt, valve timing controller assembly and timing sprocket.

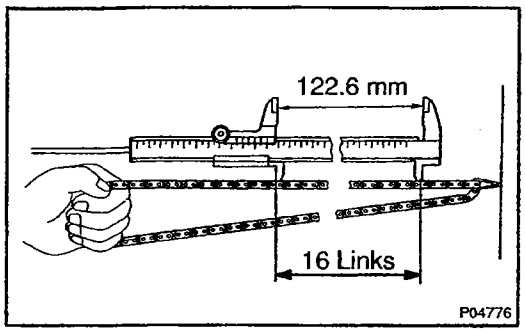
NOTICE:

- **Be careful not to damage the cylinder head and valve lifter with the wrench.**
- **Do not disassemble the valve timing controller assembly.**

EM05Q-04

INSPECTION

1. INSPECT TIMING CHAIN AND TIMING SPROCKETS



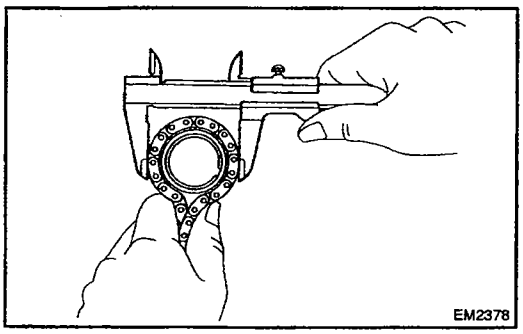
(a) Using a vernier calipers, measure the length of 16 links with the chain dully stretched.

Maximum chain elongation: 122.6 mm (4.827 in.)

If the elongation is greater than maximum, replace the chain.

HINT:

Make the same measurements pulling at 3 or more places selected at random.



(b) Wrap the chain around the timing sprocket.

(c) Using a vernier calipers, measure the timing sprocket diameter with the chain.

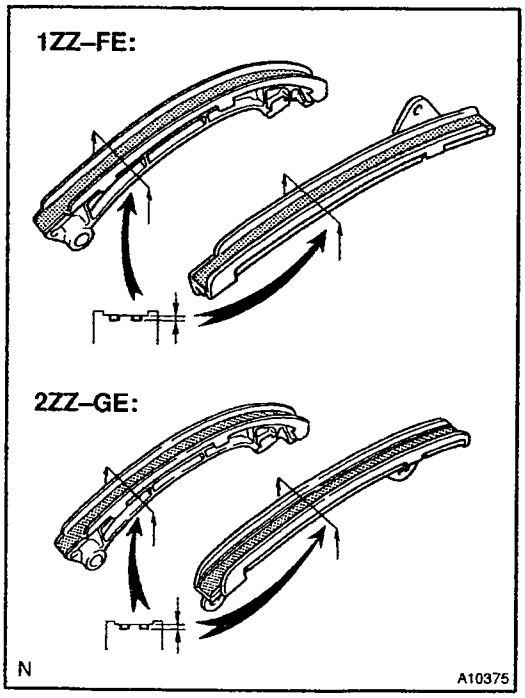
NOTICE:

Vernier calipers must contact the chain rollers for measuring.

Minimum sprocket diameter (w/ Chain):
Camshaft 97.3 mm (3.831 in.)
Crankshaft 51.6 mm (2.031 in.)

If the diameter is less than minimum, replace the chain and sprockets.

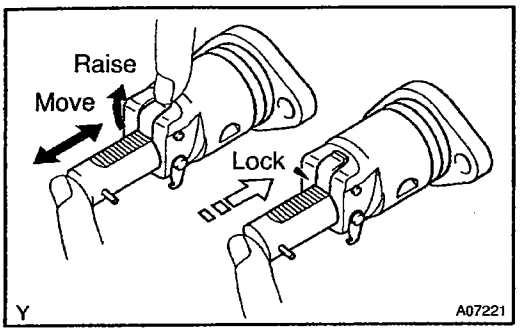
2. INSPECT CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER



Measure the chain tensioner slipper and vibration damper wears.

Maximum wear: 1.0 mm (0.039 in.)

If the wear is greater than maximum, replace the slipper and/or damper.



3. INSPECT CHAIN TENSIONER

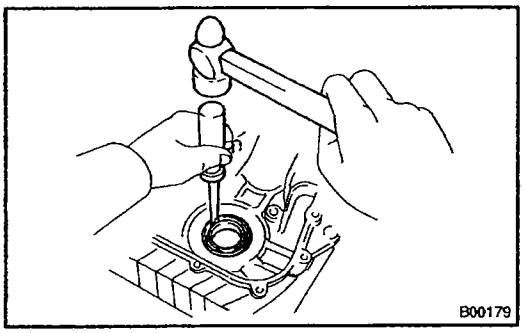
(a) Check that the plunger moves smoothly when the ratchet pawl is raised with your finger.

(b) Release the ratchet pawl and check that the plunger is locked in place by the ratchet pawl and does not move when pushed with your finger.

4. INSPECT OIL JET (See page LU–11)

EM0SR-04

REPLACEMENT



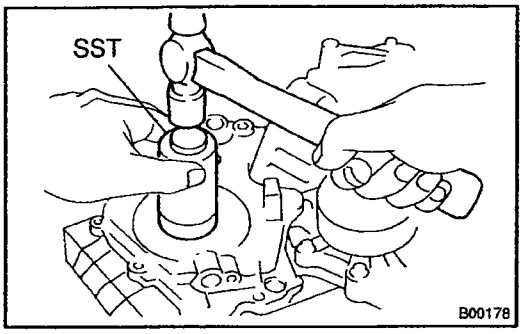
HINT:

There are 2 methods (A and B) to replace the oil seal which are as follows:

REPLACE CRANKSHAFT FRONT OIL SEAL

(a) If timing chain cover is removed from cylinder block.

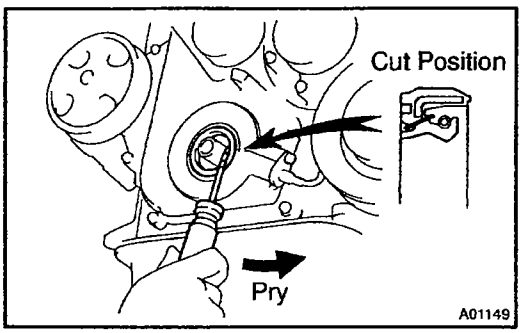
(1) Using a screwdriver and a hammer, tap out the oil seal.



(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing chain cover edge.

SST 09309–37010

(3) Apply MP grease to the oil seal lip.



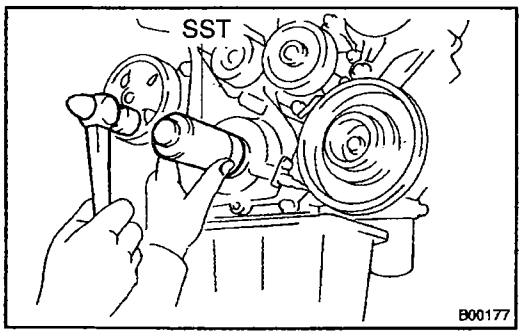
(b) If timing chain cover is installed to the cylinder block.

(1) Using a knife, cut off the oil seal lip.

(2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.

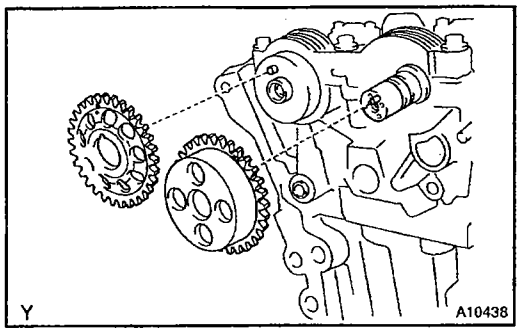


(3) Using SST and a hammer, tap in the oil seal until its surface is flush with the timing chain cover edge.

SST 09309–37010

EM15S–01

INSTALLATION



1. INSTALL VALVE TIMING CONTROLLER ASSEMBLY AND CAMSHAFT TIMING SPROCKET

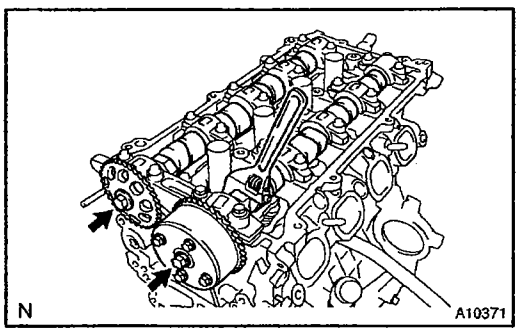
(a) Apply engine oil in the range from the tip of the intake camshaft to 16 mm from that tip.

(b) Align the timing mark on the value timing controller assembly with the knock pin, and install the value timing controller assembly to the cam shaft.

NOTICE:

Do not push valve timing controller assembly to the camshaft forcibly when installing it.

(c) Align the knock pin hole in the cam shaft timing sprocket with the knock pin of the cam shaft, and exhaust the sprocket to the cam shaft.



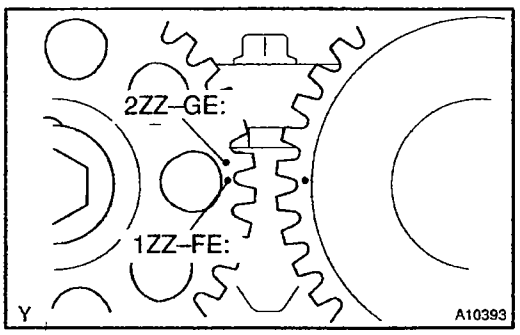
(d) Temporarily install the timing sprocket bolt.

(e) Hold the hexagon wrench head portion of the camshaft with a wrench, and tighten the timing sprocket bolt.

Torque:

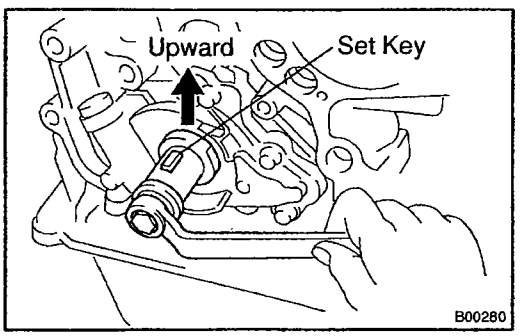
1ZZ–FE 45 N·m (460 kgf·cm, 33 ft·lbf)

2ZZ–GE 54 N·m (551 kgf·cm, 40 ft·lbf)

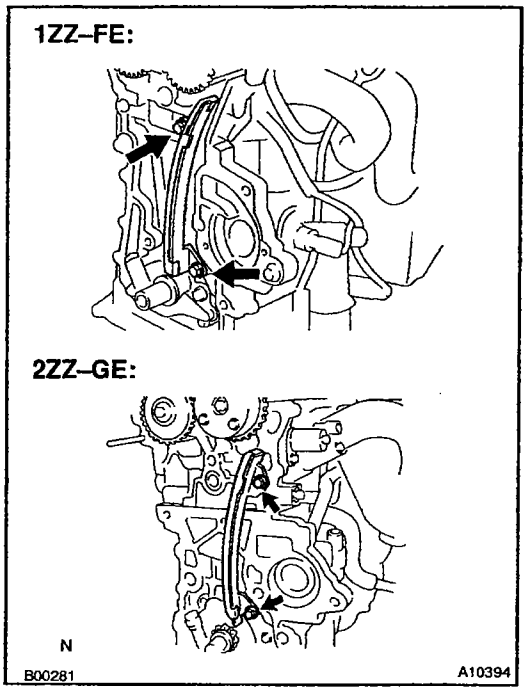


2. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Turn the hexagonal wrench head portion of the camshafts, and align the point marks of the camshaft timing sprockets.



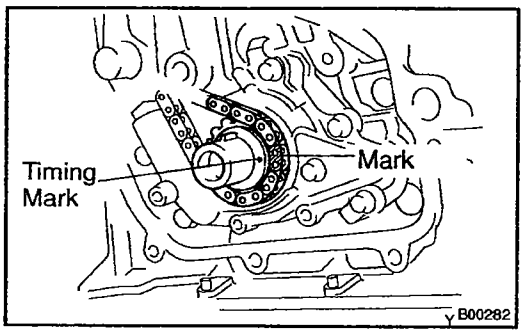
(b) Using a crankshaft pulley bolt, Turn the crankshaft and set the set key on the crankshaft upward.



3. INSTALL CHAIN VIBRATION DAMPER

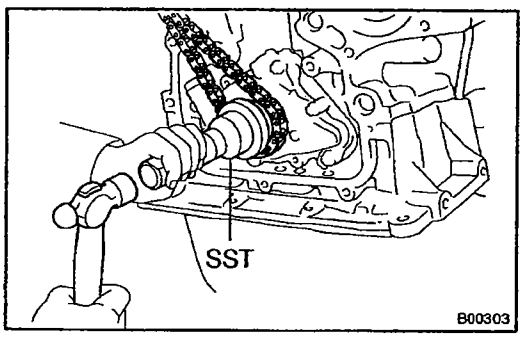
Install the damper with the 2 bolts.

Torque:
1ZZ–FE 11 N·m (113 kgf·cm, 8 ft·lbf)
2ZZ–GE 20.5 N·m (209 kgf·cm, 15 ft·lbf)

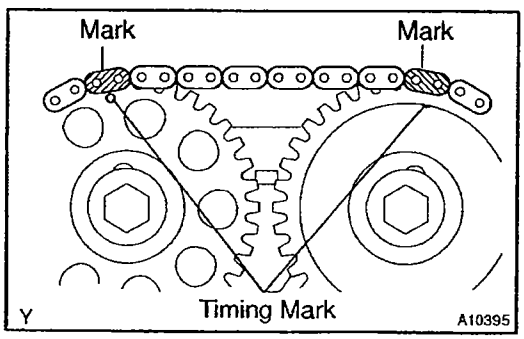


4. INSTALL TIMING CHAIN AND CRANKSHAFT TIMING SPROCKET

(a) Install the timing chain on the crankshaft timing sprocket with the yellow color link aligned with the timing mark on the crankshaft timing sprocket.

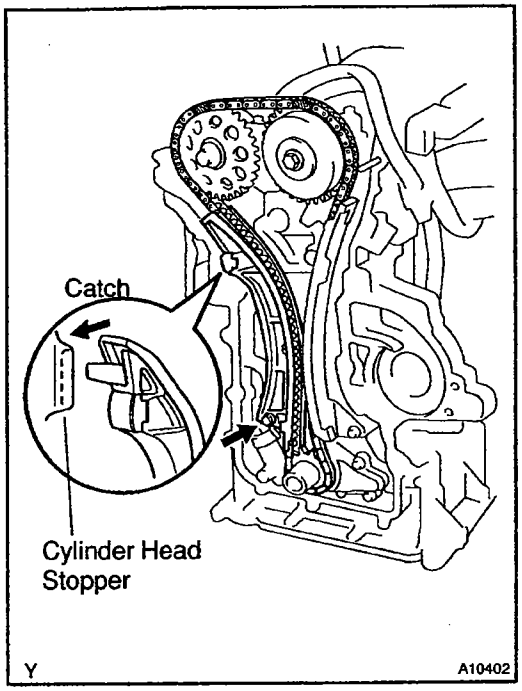


HINT:
If necessary, install the sprocket with SST.
SST 09223–22010



(b) 1ZZ–FE:
Install the timing chain on the camshaft timing sprockets with the yellow color links aligned with the timing marks on the camshaft timing sprockets.

(c) 2ZZ–GE:
Install the timing chain on the camshaft timing sprockets with the orange color links aligned with the timing marks on the camshaft timing sprockets.



(d) Check that the tension between the intake camshaft timing sprocket and crankshaft timing sprocket.

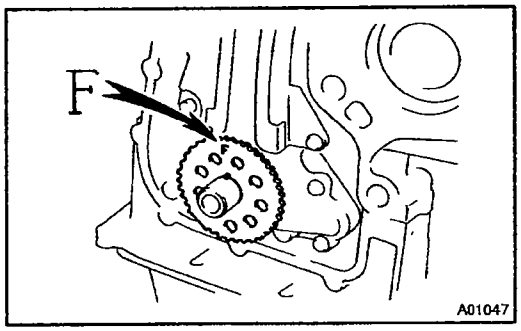
5. INSTALL CHAIN TENSIONER SLIPPER

(a) Install the slipper with the bolt.

Torque:
1ZZ–FE 18.5 N·m (189 kgf·cm, 14 ft·lbf)
2ZZ–GE 20.5 N·m (209 kgf·cm, 15 ft·lbf)

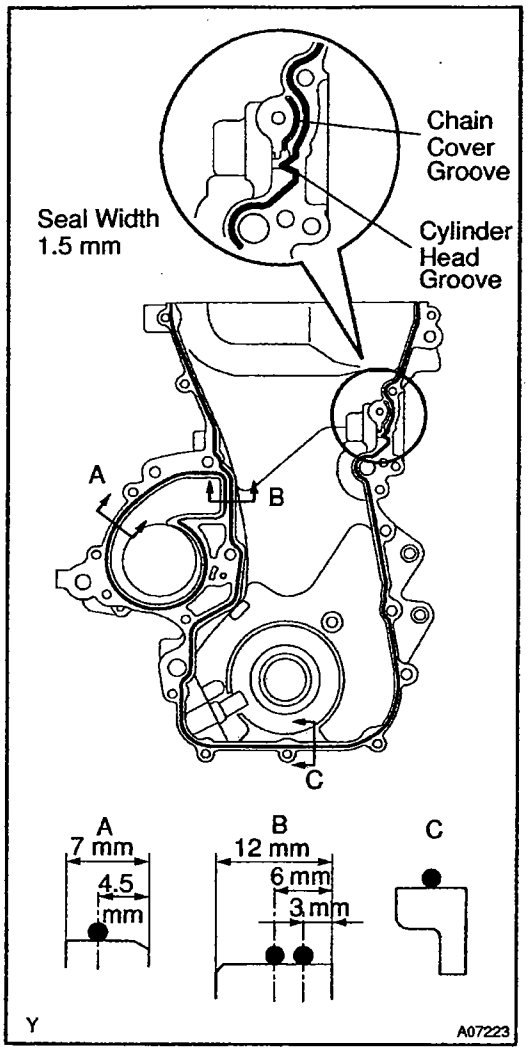
(b) Check that the slipper moves is caught on the cylinder head stopper.

NOTICE:
DO not turn the crankshaft.



6. INSTALL CRANK ANGLE SENSOR PLATE

Install the plate with the "F" mark facing forward.

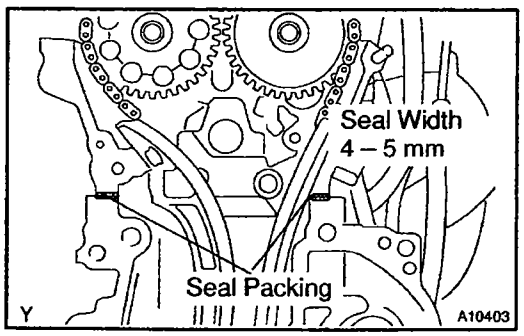


7. **1ZZ–FE:**
INSTALL TIMING CHAIN COVER AND WATER PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.
- Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

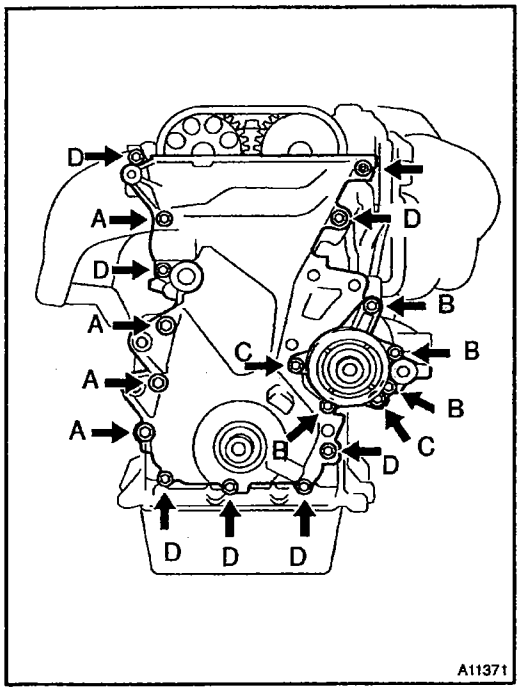
(b) Apply seal packing to the timing chain cover as shown in the illustration.
Seal packing:
Part No. 08826 – 00100 or equivalent
- Install a nozzle that has been cut to a 1.5 mm (0.16 – 0.20 in.) opening.

HINT:
Avoid applying an excessive amount to the surface.
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Apply seal packing to 2 locations as shown in the illustration.
Seal packing:
Part No. 08826 – 00080 or equivalent
- Install a nozzle that has been cut to a 1.5 mm (0.16 – 0.20 in.) opening.

HINT:
Avoid applying an excessive amount to the surface.
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(d) Install the timing chain cover, O–ring and water pump with the 17 bolts and nut. Uniformly tighten the bolts and nut in several passes.

Torque:
10 mm head:
9 N·m (92 kgf·cm, 80 in.·lbf) for C
13 N·m (133 kgf·cm, 10 ft·lbf) for A
11 N·m (113 kgf·cm, 8 ft·lbf) for others
12 mm head:
18.5 N·m (189 kgf·cm, 14 ft·lbf)

NOTICE:

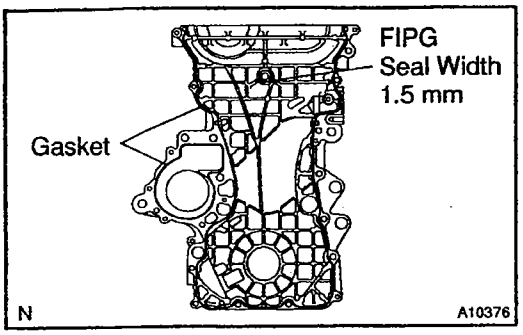
- **Pay attention not to wrap the chain and slipper over the chain cover seal line.**
- **After installing the chain cover, must install the mounting bracket and water pump within 15 minutes.**

HINT:

Each bolt length in indicated in the illustration.

A 45 mm (1.77 in.)
B 35 mm (1.38 in.)
C 30 mm (1.18 in.)
D 25 mm (0.98 in.)

(e) Using a torx wench socket (E8), install the stud bolt.
Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)



8. **2ZZ–GE:**

INSTALL TIMING CHAIN COVER AND WATER PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.

- Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

(b) Apply seal packing to the timing chain cover as shown in the illustration.

Seal packing:

Part No. 08826–00100 or equivalent

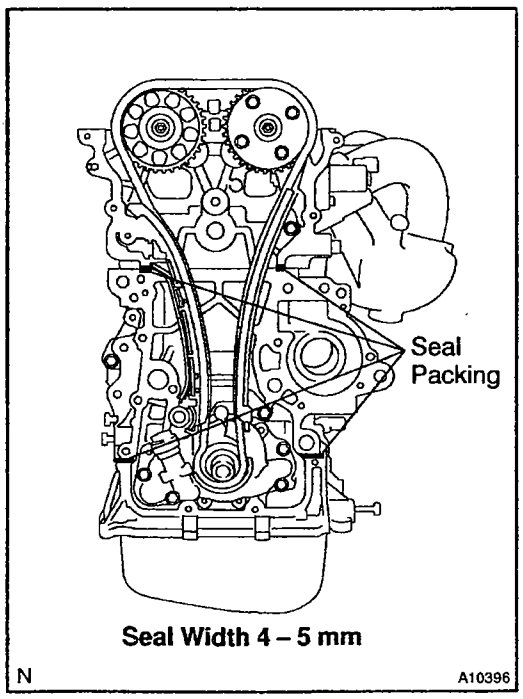
- Install a nozzle that has been cut to a 1.5 mm opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the 2 gasket to the timing chain cover as shown in the illustration.



(d) Apply seal packing to 4 locations as shown in the illustration.

Seal packing:

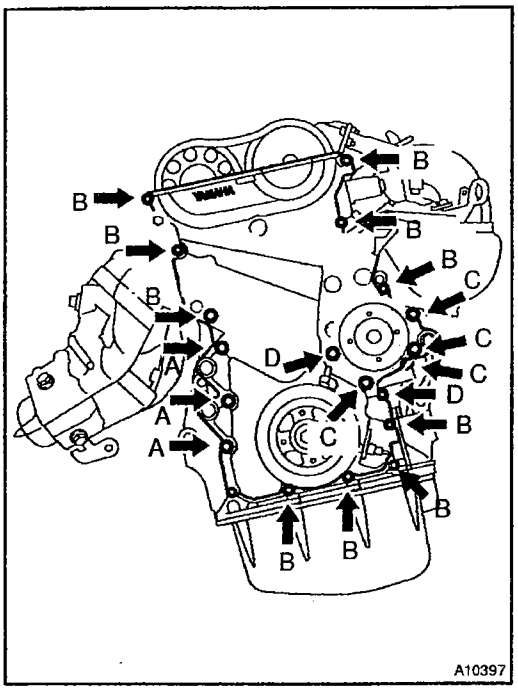
Part No. 08826–00080 or equivalent

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

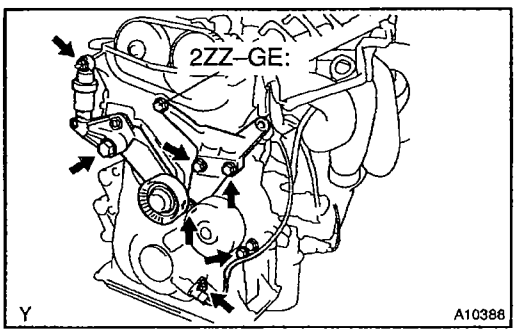


(e) Install the timing chain cover, O–ring and water pump with the 19 bolts. Uniformly tighten the bolts in several passes.
Torque:
A: 21 N·m (214 kgf·cm, 15 ft·lbf)
B: 11 N·m (113 kgf·cm, 8 ft·lbf)
C: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
D: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

NOTICE:

- **Pay attention not to wrap the chain and slipper over the chain cover seal line.**
- **After install the chain cover, must install the mounting bracket and water pump within 15 minutes.**

(f) Using a torx wrench socket (E8), install the stud bolt.
Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)



9. 1ZZ–FE:
INSTALL RH ENGINE MOUNTING BRACKET

(a) Apply seal packing to threads of the mounting bolt.
Seal packing:
Part No. 08826 – 00080 or equivalent

HINT:
Do not apply seal packing to 2 or 3 threads of the bolt end.

(b) Install the mounting bracket with the 3 bolts.
Torque: 47 N·m (479 kgf·cm, 35 ft·lbf)

10. 2ZZ–GE:
INSTALL RH ENGINE MOUNTING BRACKET

Install the mounting bracket with the 4 bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

11. INSTALL DRIVE BELT TENSIONER

(a) Check the appearance before installing the drive belt tensioner.

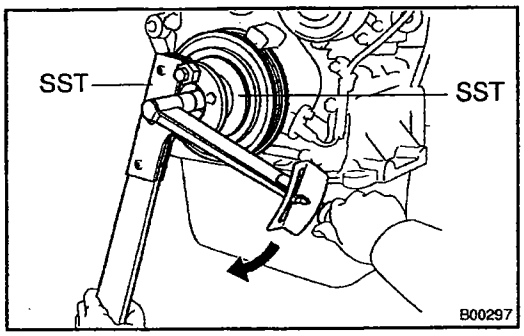
If in case of having the oil leakage, crack, and etc., replace the drive belt tensioner.

(b) Install the drive belt tensioner.
Torque:
Bolt
1ZZ–FE 69 N·m (704 kgf·cm, 51 ft·lbf)
2ZZ–GE 100 N·m (1,020 kgf·cm, 74 ft·lbf)
Nut 29 N·m (296 kgf·cm, 21 ft·lbf)

(c) Hook the tool on the hexagonal portion of the drive belt tensioner bracket and operate drive belt tensioner 3 times with full stroke.

HINT:
Take 3 seconds or more for 1 full stroke.

12. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

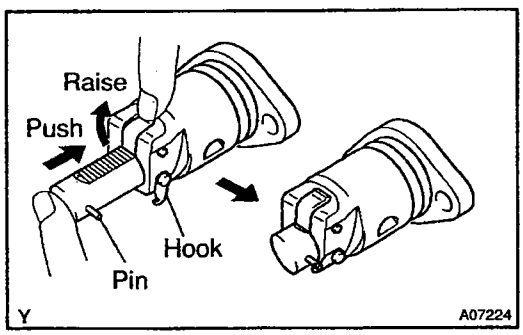


13. INSTALL CRANKSHAFT PULLEY

(a) Clean the crankshaft pulley inside.

(b) Align the pulley set key with the key groove of the pulley, and slide on the pulley.

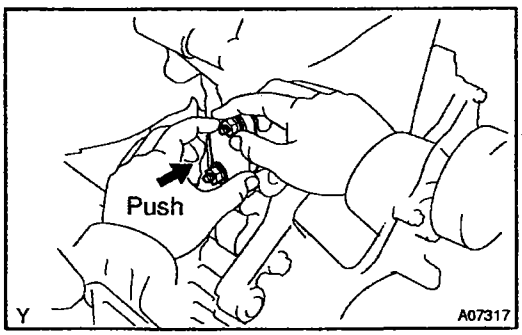
(c) Using SST and 2 nuts (width: 10 mm (0.25 in.), install the pulley bolt.
SST 09213–70010, 09330–00021
Torque:
1ZZ–FE 138 N·m (1,409 kgf·cm, 102 ft·lbf)
2ZZ–GE 120 N·m (1,200 kgf·cm, 87 ft·lbf)



14. INSTALL CHAIN TENSIONER

(a) Check the chain tensioner.
(See page EM–16)

(b) Release the ratchet pawl, fully push in the plunger and apply the hook to the pin so that the plunger cannot spring out.

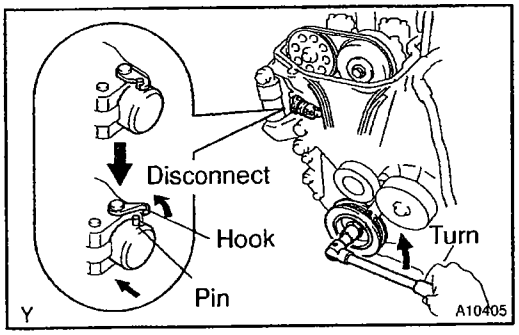


(c) Insert the O–ring with your hand until it reaches to the chamfering position and install nut temporally. Then, by tightening the nut, insert the chain tensioner to the installation position.

HINT:

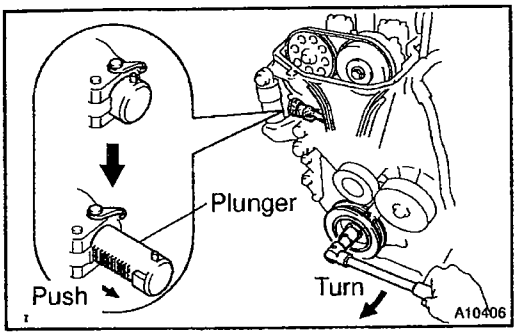
- In the case that the hook is released while pushing in, apply the hook again and push the tensioner in.
- Pay attention not to catch the O–ring as it is built in the chain tensioner previously.

(d) Tighten the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

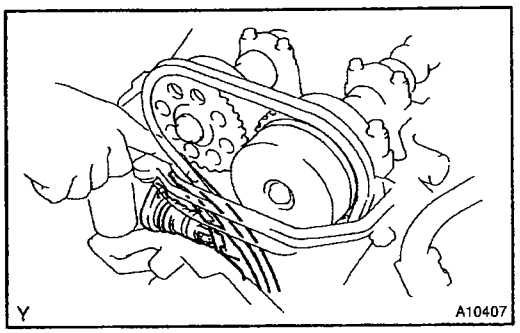


15. SET CHAIN TENSION

(a) Turn the crankshaft counterclockwise, and disconnect the plunger knock pin from the hook.



(b) Turn the crankshaft clockwise, and check that the slipper is pushed by the plunger.



HINT:

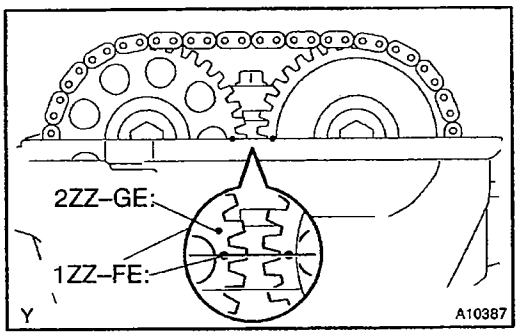
If the plunger does not spring out, press the slipper into the chain tensioner with a screwdriver or your finger so that the hook is released from the knock pin and the plunger springs out.

16. CHECK VALVE TIMING

(a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the timing chain cover.

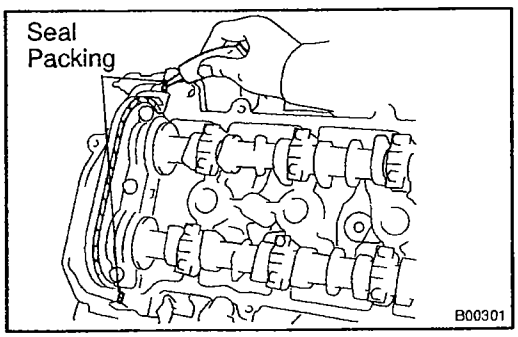
NOTICE:

Always turn the crankshaft clockwise.



(b) Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration.

If not, turn the crankshaft 1 revolution (360°) and align the marks as above.



17. 1ZZ–FE:
INSTALL CYLINDER HEAD COVER

(a) Remove any old packing (FIPG) material.

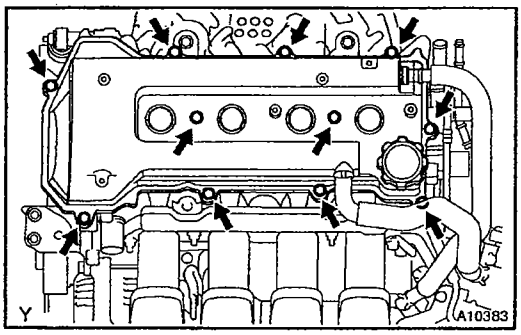
(b) Apply seal packing to 2 locations as shown in the illustration.

Seal packing:
Part No. 08826 – 00080 or equivalent

(c) Install the gasket to the cylinder head cover.

HINT:

Part must be assembled within 3 minutes of application. Otherwise the material must be remove and reapplied.



(d) Install the cylinder head cover with the 9 bolts, 2 seal washers and 2 nuts.

Uniformly tighten the bolts and nuts, in the several passes, in the sequence shown.

Torque:

w/o washer

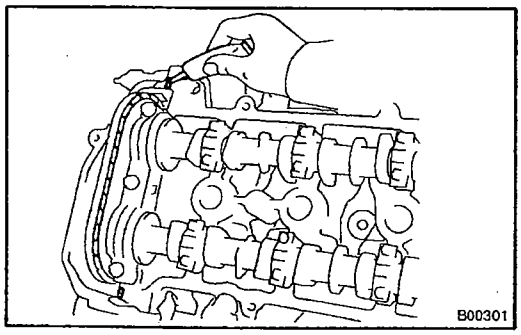
11 N·m (113 kgf·cm, 8 ft·lbf)

w/ washer

9.0 N·m (92 kgf·cm, 80 in.·lbf)

(e) Connect the 2 PCV hoses to the cylinder head cover.

(f) Install the ignition coil (See page IG–7).



18. 2ZZ–GE:

INSTALL CYLINDER HEAD COVER

(a) Remove any old packing (FIPG) material.

HINT:

When FIPG on the head cover gasket side cannot be eliminated completely, replace the gasket.

(b) Apply seal packing to 2 locations as shown in the illustration.

Seal packing:

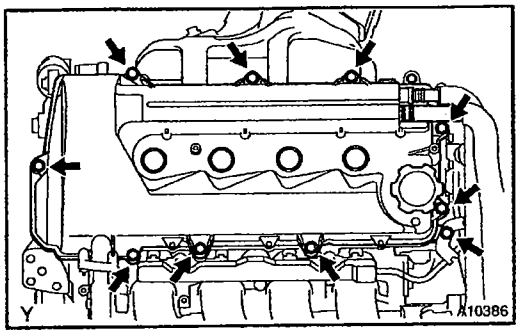
Part No. 08826–00080 or equivalent

(c) Install the gasket to the cylinder head cover.

HINT:

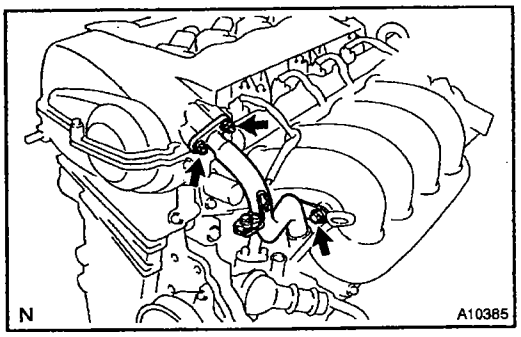
Part must be assembled within 3 minutes of application. Otherwise the material must be remove and reapplied.

(d) Install a new O–ring to the cylinder head cover.



(e) Install the cylinder head cover and wire harness protector with the9 bolts. Uniformly tighten the bolts, in the several passes, in the sequence shown.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

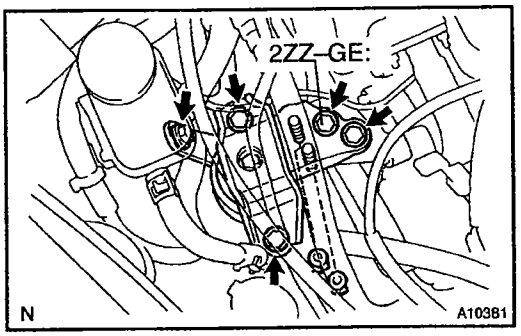
(f) Connect the 2 PCV hoses to the cylinder head cover.



(g) Install a new gasket and No. 1 ventilation pipe with 2 nuts and bolt.
Torque:
Nut 10 N·m (100 kgf·cm, 7 ft·lbf)
Bolt 25 N·m (255 kgf·cm, 18 ft·lbf)

(h) Connect the No. 3 ventilation hose to the No. 1 ventilation pipe.

(i) Install the ignition coil (See page IG–7).



19. INSTALL RH ENGINE MOUNTING INSULATOR

(a) 1ZZ–FE:
Install the RH engine mounting insulator with the 4 bolts and 2 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

(b) 2ZZ–GE:
Install the RH engine mounting insulator with the 5 bolts and 2 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

20. INSTALL PS PUMP

(a) Install the PS pump with the 2 through bolts and nuts.
Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

(b) Install the PS pump pulley with the pulley nut.

(c) Connect the PS oil pressure switch connector.

21. INSTALL GENERATOR AND DRIVE BELT (See page CH–17)

22. INSTALL RH ENGINE UNDER COVER

23. INSTALL RH FRONT WHEEL

24. FILL WITH ENGINE COOLANT (See page CO–2)

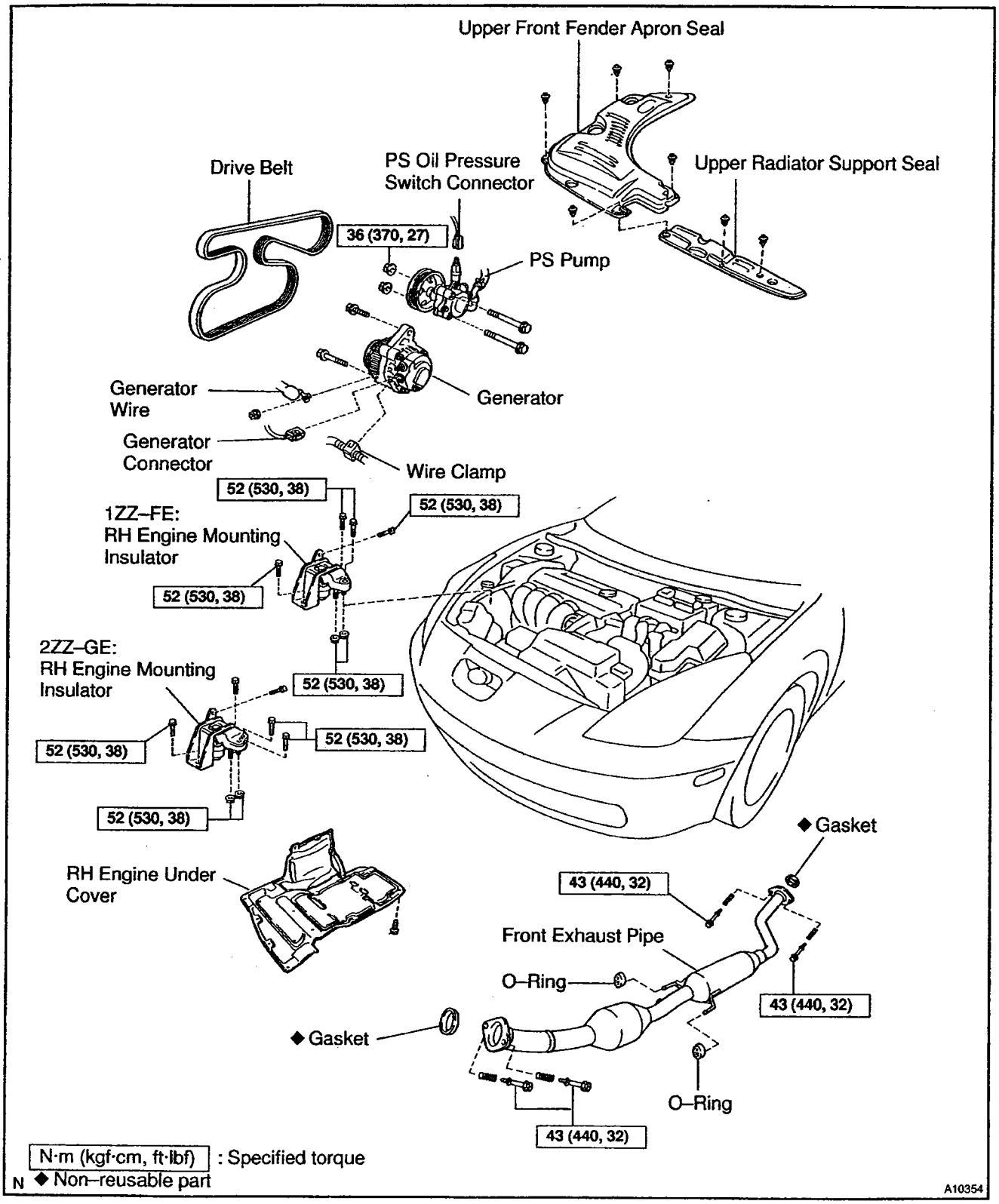
25. INSTALL FRONT FENDER APRON SEAL AND UPPER RADIATOR SUPPORT SEAL

26. START ENGINE AND CHECK FOR COOLANT LEAKS

CYLINDER HEAD

COMPONENTS

EM15T-01

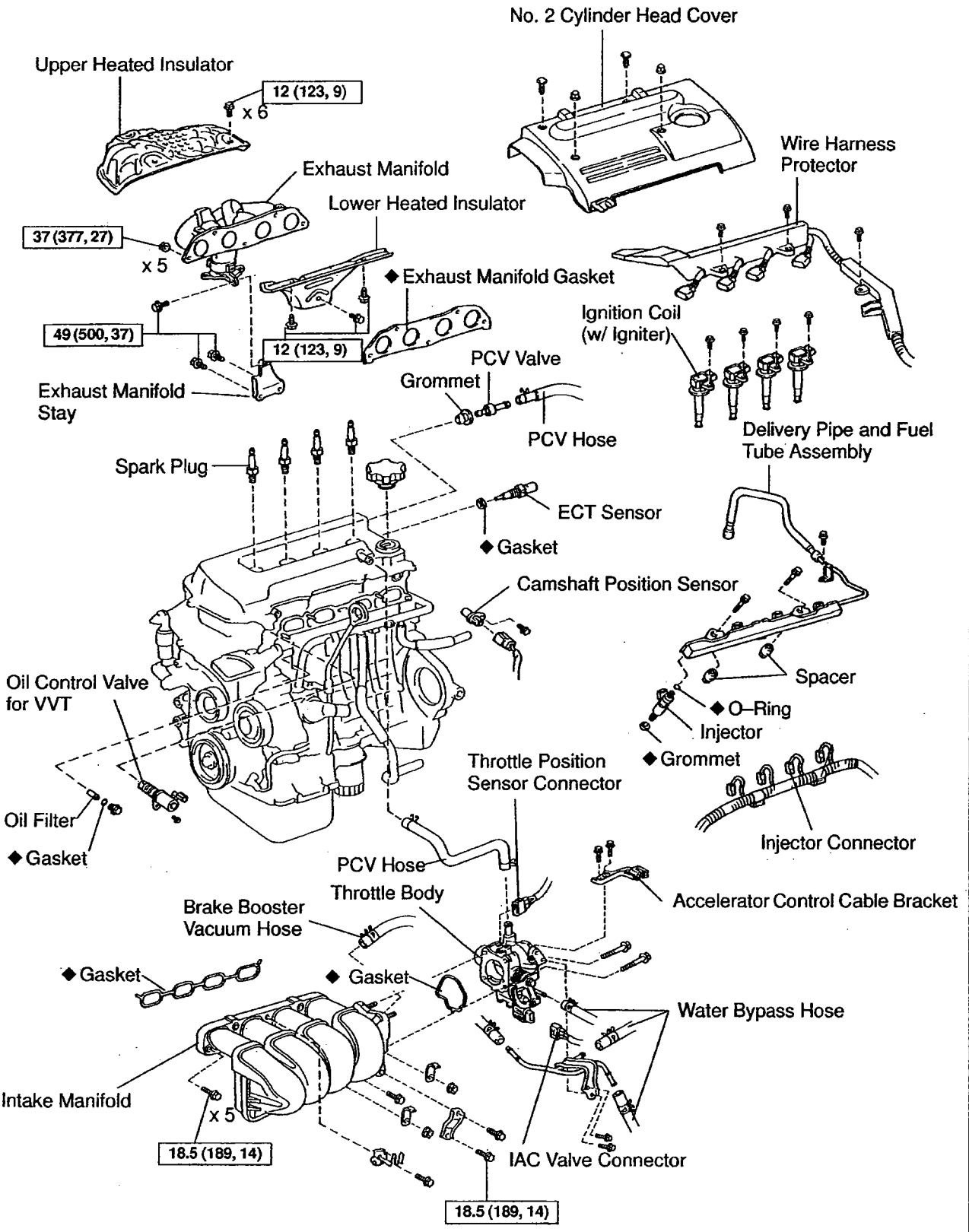


N·m (kgf·cm, ft·lbf) : Specified torque

N ◆ Non–reusable part

A10354

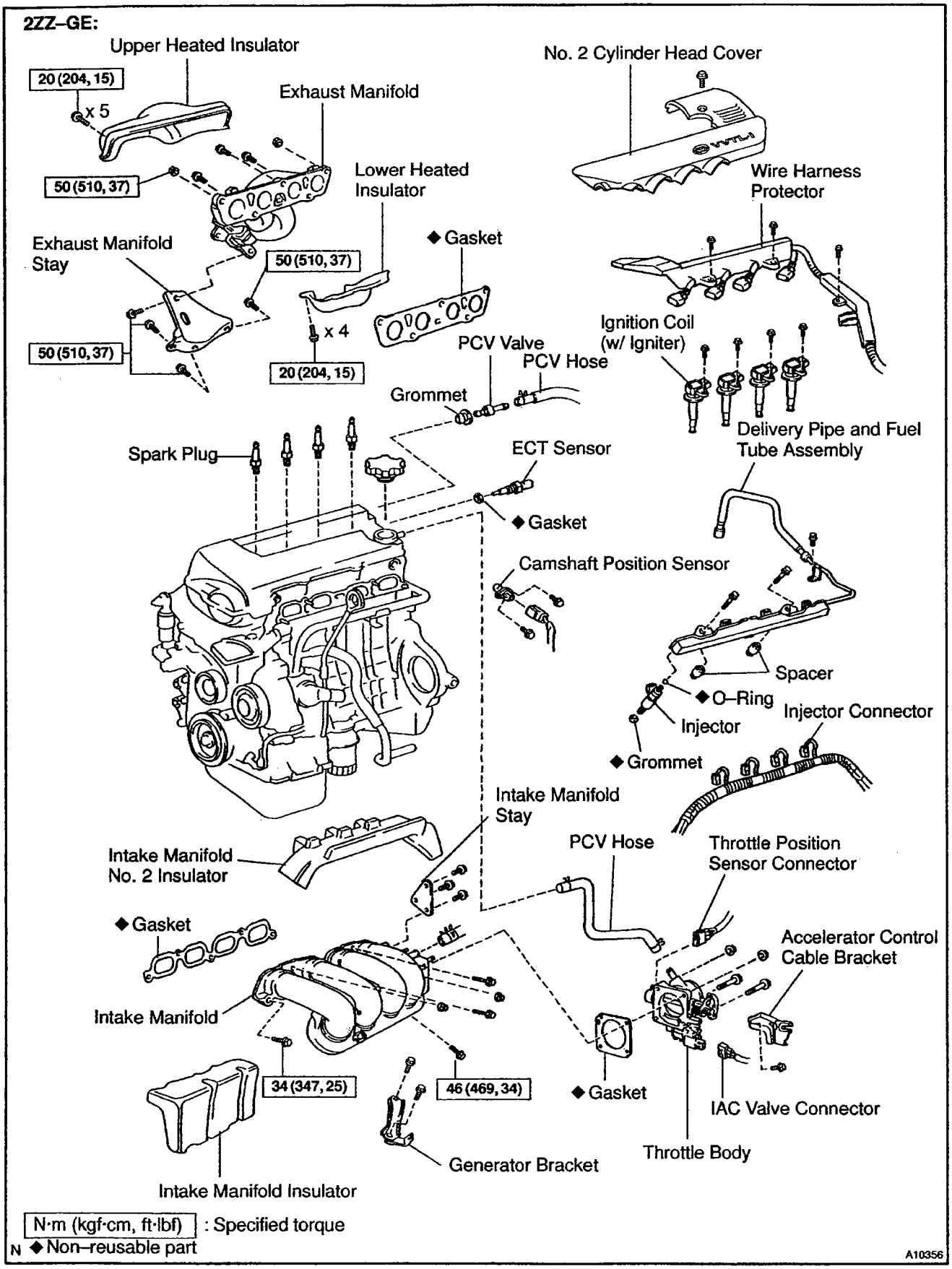
1ZZ–FE:



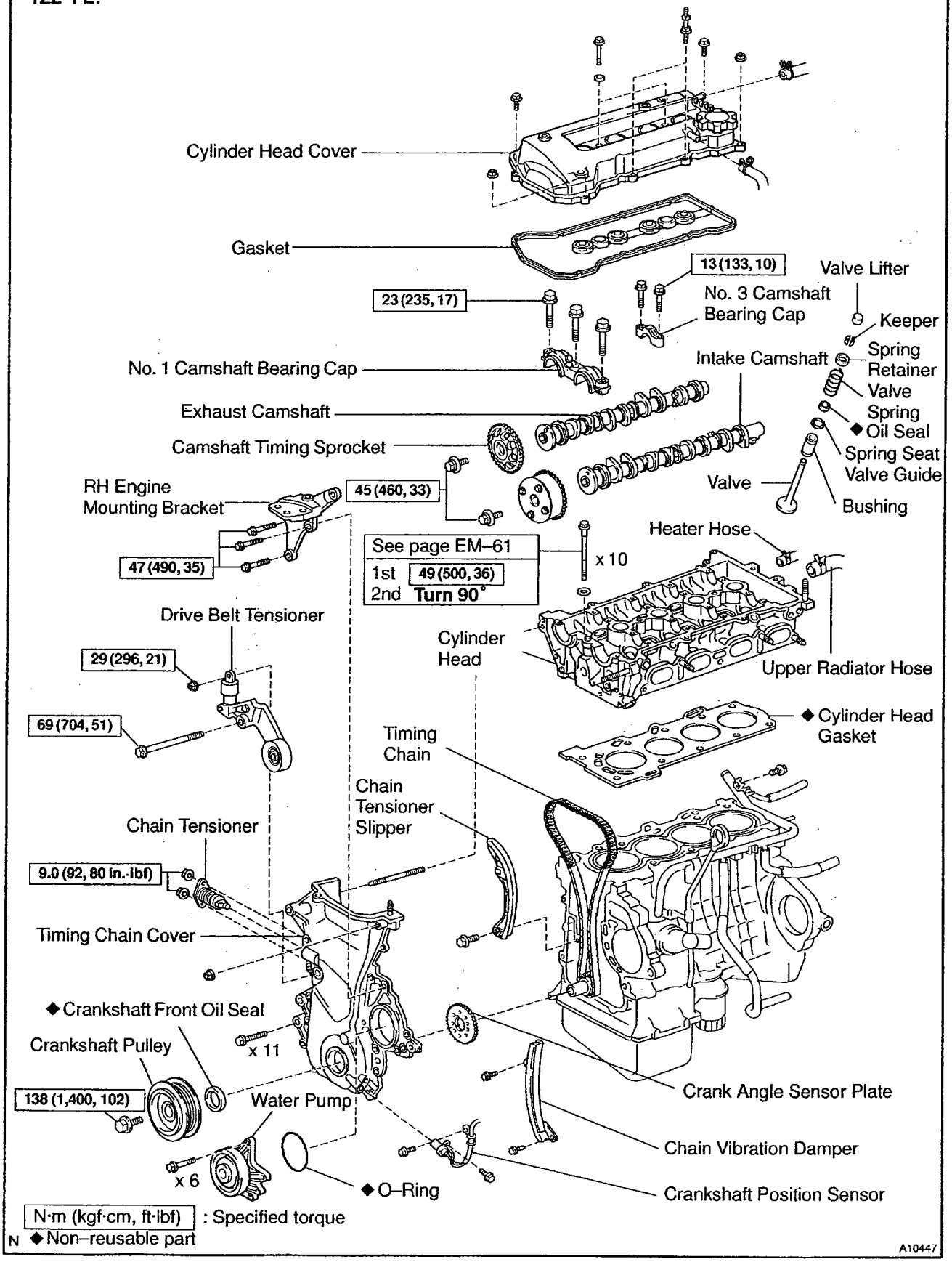
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

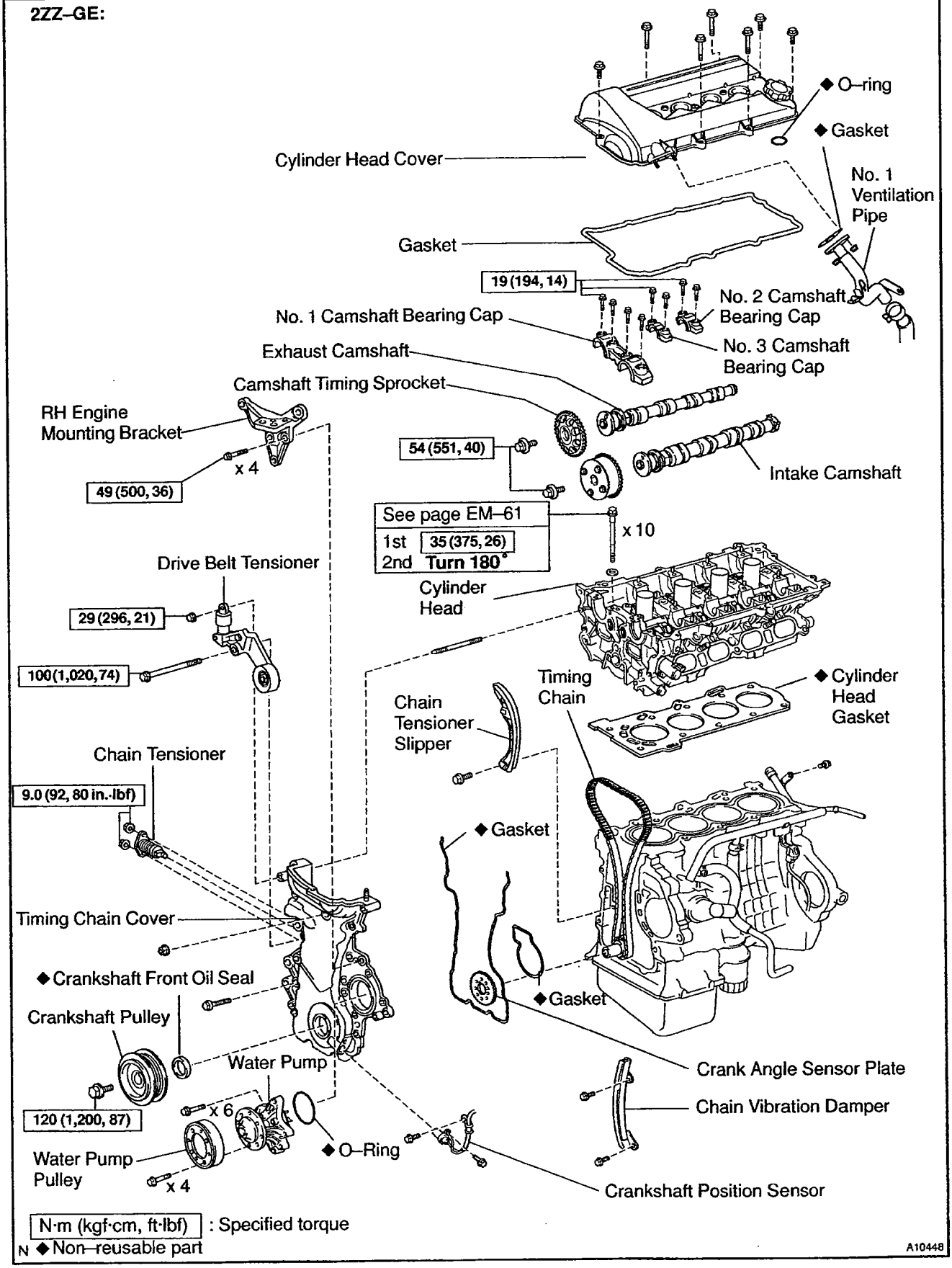
A10355


2ZZ–GE:
Upper Heated Insulator
20 (204, 15)
x 5
Exhaust Manifold
50 (510, 37)
Lower Heated Insulator
◆ Gasket
Exhaust Manifold Stay
50 (510, 37)
x 4
50 (510, 37)
20 (204, 15)
No. 2 Cylinder Head Cover
Wire Harness Protector
Ignition Coil (w/ Igniter)
PCV Valve
PCV Hose
Grommet
Spark Plug
ECT Sensor
◆ Gasket
Delivery Pipe and Fuel Tube Assembly
Camshaft Position Sensor
Spacer
◆ O–Ring
Injector
Injector Connector
◆ Grommet
Intake Manifold Stay
Intake Manifold No. 2 Insulator
PCV Hose
Throttle Position Sensor Connector
◆ Gasket
Accelerator Control Cable Bracket
Intake Manifold
34 (347, 25)
46 (469, 34)
◆ Gasket
IAC Valve Connector
Throttle Body
Generator Bracket
Intake Manifold Insulator
N·m (kgf·cm, ft·lbf) : Specified torque
N ◆ Non–reusable part
A10356

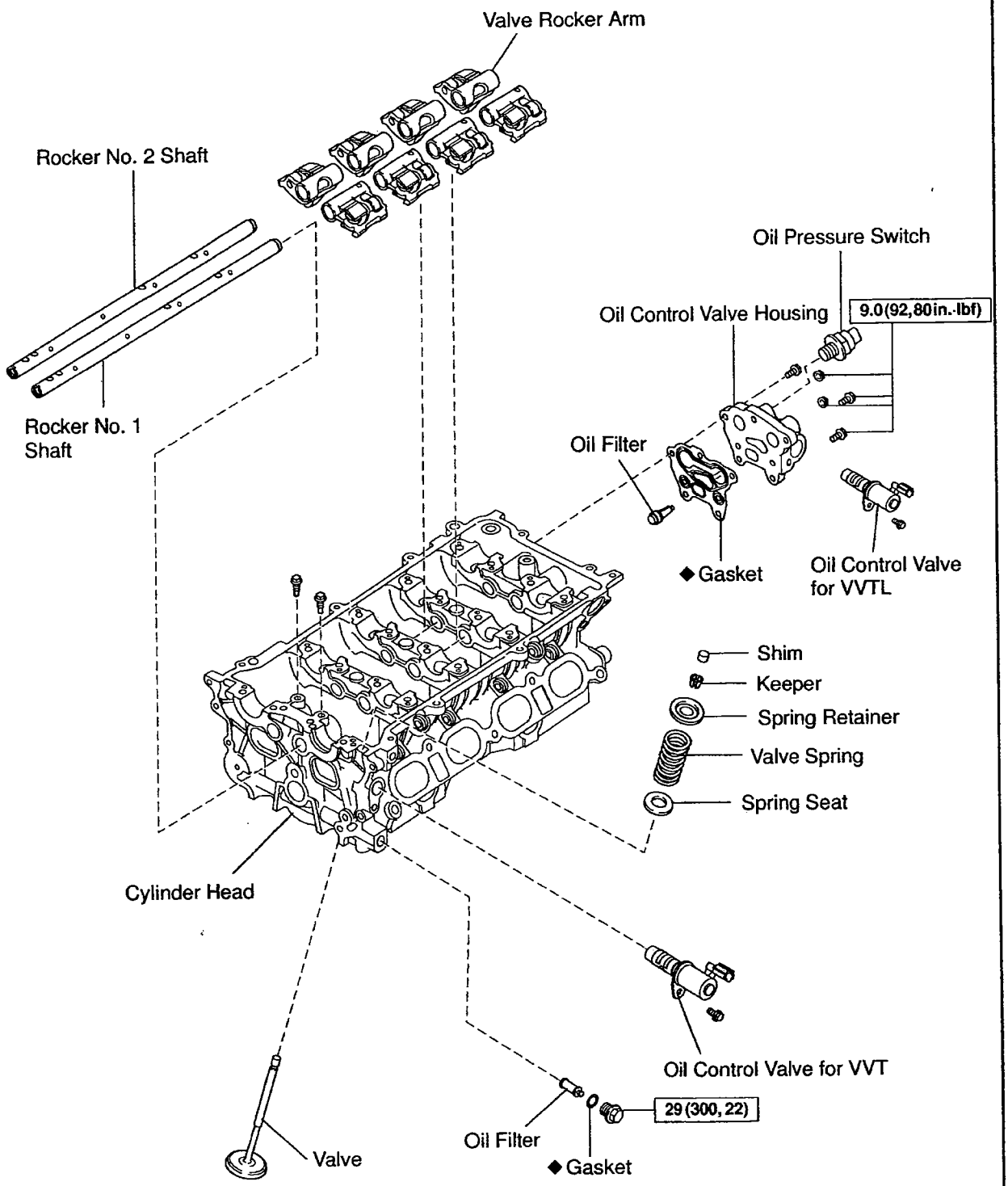
1ZZ–FE:


Cylinder Head Cover
Gasket
13 (133, 10)
Valve Lifter
23 (235, 17)
No. 3 Camshaft Bearing Cap
Keeper
Spring Retainer
No. 1 Camshaft Bearing Cap
Intake Camshaft
Valve
Exhaust Camshaft
Valve Spring
◆ Oil Seal
Camshaft Timing Sprocket
Spring Seat
Valve Guide
RH Engine Mounting Bracket
45 (460, 33)
Valve
Bushing
Heater Hose
See page EM–61
x 10
1st 49 (500, 36)
2nd Turn 90°
47 (490, 35)
Drive Belt Tensioner
Cylinder Head
29 (296, 21)
Upper Radiator Hose
69 (704, 51)
◆ Cylinder Head Gasket
Timing Chain
Chain Tensioner Slipper
Chain Tensioner
9.0 (92, 80 in.-lbf)
Timing Chain Cover
◆ Crankshaft Front Oil Seal
x 11
Crankshaft Pulley
138 (1,400, 102)
Water Pump
Crank Angle Sensor Plate
Chain Vibration Damper
x 6
◆ O–Ring
Crankshaft Position Sensor
N·m (kgf·cm, ft·lbf) : Specified torque
N ◆ Non–reusable part
A10447

2ZZ–GE:


◆ O–ring
◆ Gasket
Cylinder Head Cover
No. 1 Ventilation Pipe
Gasket
19 (194, 14)
No. 2 Camshaft Bearing Cap
No. 1 Camshaft Bearing Cap
No. 3 Camshaft Bearing Cap
Exhaust Camshaft
Camshaft Timing Sprocket
RH Engine Mounting Bracket
x 4
49 (500, 36)
54 (551, 40)
Intake Camshaft
See page EM–61
1st 35 (375, 26)
2nd Turn 180°
x 10
Drive Belt Tensioner
29 (296, 21)
100 (1,020, 74)
Cylinder Head
Timing Chain
◆ Cylinder Head Gasket
Chain Tensioner Slipper
Chain Tensioner
9.0 (92, 80 in.·lbf)
◆ Gasket
Timing Chain Cover
◆ Crankshaft Front Oil Seal
Crankshaft Pulley
Water Pump
x 6
120 (1,200, 87)
◆ O–Ring
Water Pump Pulley
x 4
◆ Gasket
Crank Angle Sensor Plate
Chain Vibration Damper
Crankshaft Position Sensor
N·m (kgf·cm, ft·lbf) : Specified torque
N ◆ Non–reusable part
A10448

2ZZ–GE



N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part

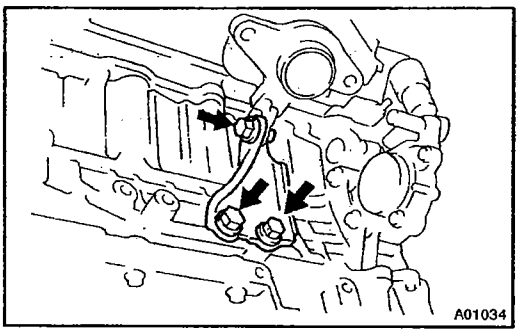
N

A10368

EM15U-01

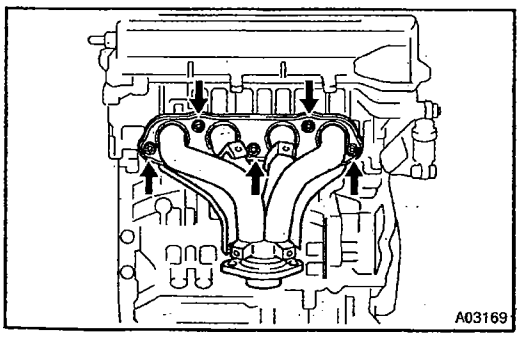
REMOVAL

1. REMOVE BATTERY
2. REMOVE ECU BOX (See page EM–74)
3. DRAIN ENGINE COOLANT
4. DISCONNECT ENGINE COOLANT RESERVOIR
5. REMOVE AIR CLEANER ASSEMBLY
6. DISCONNECT ACCELERATOR CABLE
7. REMOVE DRIVE BELT AND ALTERNATOR (See page CH–7)
8. REMOVE EXHAUST PIPE (See page EM–74)



9. 1ZZ–FE:
   REMOVE EXHAUST MANIFOLD

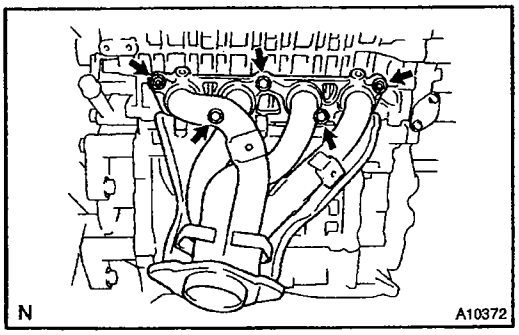
(a) Remove the 3 bolts and exhaust manifold stay.
(b) Remove the 6 bolts and upper heat insulator.



(c) Remove the 5 nuts, exhaust manifold and gasket.
(d) Remove the 3 bolts and lower heat insulator.

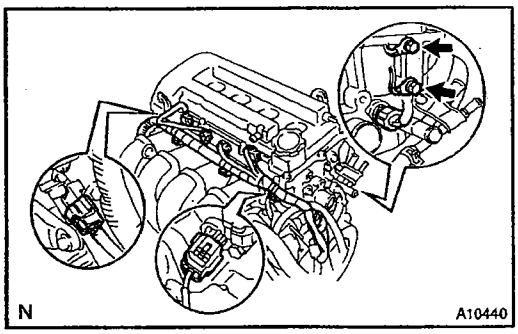
10. 2ZZ–GE:
REMOVE EXHAUST MANIFOLD

(a) Remove the 4 bolts and exhaust manifold stay.
(b) Remove the 5 bolts and upper heat insulator.



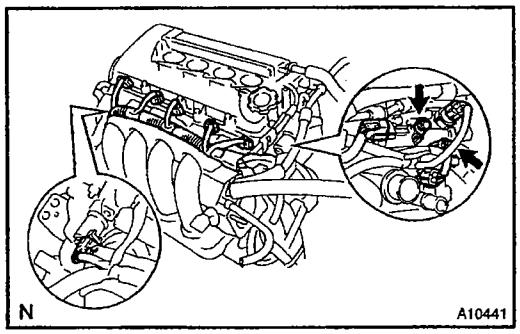
(c) Remove the 3 bolts, 2 nuts, exhaust manifold and gasket.
(d) Remove the 4 bolts and lower heat insulator.

11. REMOVE IGNITION COIL (See page IG–6)
12. REMOVE SPARK PLUG (See page IG–1)
13. REMOVE PCV HOSES
14. REMOVE THROTTLE BODY (See page SF–36)
15. REMOVE INJECTOR (See page SF–21)



16. 1ZZ–FE:
DISCONNECT ENGINE WIRE FROM CYLINDER HEAD

(a) Disconnect the ECT sensor connector.
(b) Disconnect the camshaft position sensor connector.
(c) Disconnect the oil control valve for VVT connector.
(d) Disconnect the 2 ground wires.
(e) Disconnect the 2 clamps and engine wire protector from the intake manifold.

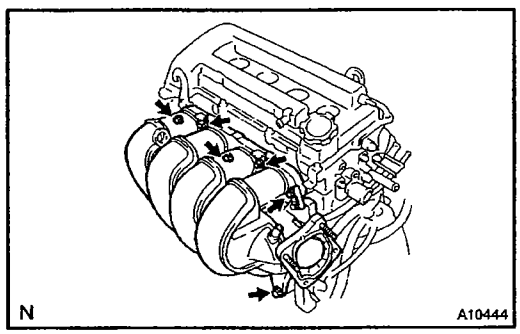


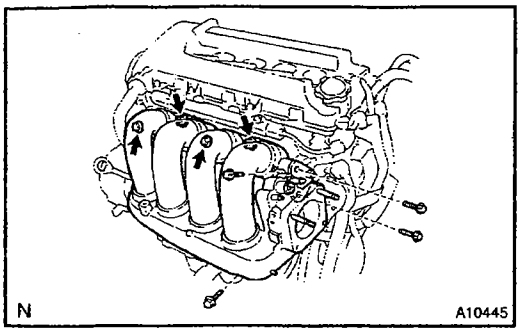
17. 2ZZ–GE:
DISCONNECT ENGINE WIRE FROM CYLINDER HEAD

(a) Disconnect the ECT sensor connector.
(b) Disconnect the camshaft position sensor connector.
(c) Disconnect the oil control valve for VVT connectors.
(d) Disconnect the oil control valve for VVTL connectors.
(e) Disconnect the oil pressure switch connector.
(f) Disconnect the 2 ground wires.
(g) Remove the 2 bolts, and disconnect the engine wire.
(h) Remove the intake manifold No. 2 insulator.

18. 1ZZ–FE:
REMOVE INTAKE MANIFOLD

(a) Disconnect the EVAP hose for ORVR.
(b) Disconnect the brake booster vacuum hose.
(c) Remove the 4 bolts, 2 nuts, intake manifold, 2 wire harness stays and gasket.





19. 2ZZ–GE:
REMOVE INTAKE MANIFOLD

(a) Disconnect the EVAP hose for ORVR.
(b) Disconnect the brake booster vacuum hose.
(c) Remove the bolt and disconnect the No. 1 ventilation pipe and oil dipstick and guide.
(d) Remove the 2 bolts, nut and stay.
(e) Remove the 4 bolts, 2 nuts, intake manifold and gasket.
(f) Remove the intake manifold insulator.

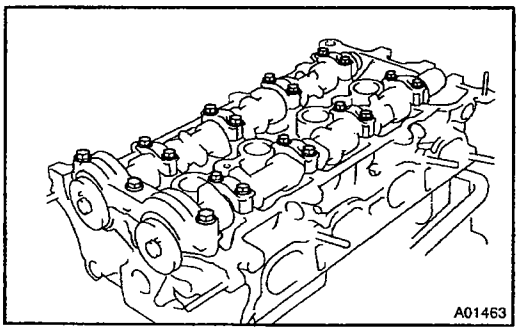
20. REMOVE CAMSHAFT POSITION SENSOR

21. REMOVE ECT SENSOR

22. REMOVE PCV VALVE AND GROMMET

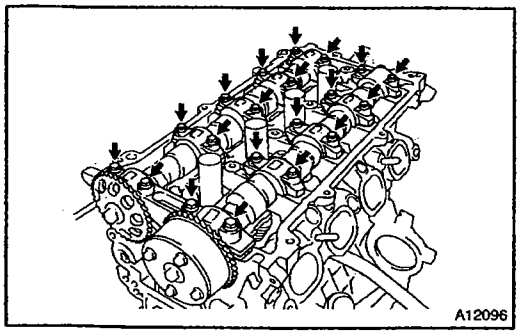
23. REMOVE OIL FILLER CAP

24. REMOVE CAMSHAFT TIMING SPROCKETS
(See page IG–9)



25. 1ZZ–FE:
REMOVE CAMSHAFT

Uniformly loosen and remove the 19 bearing cap bolts, in several passes, in the sequence shown, and remove the 9 bearing caps, intake and exhaust camshafts.



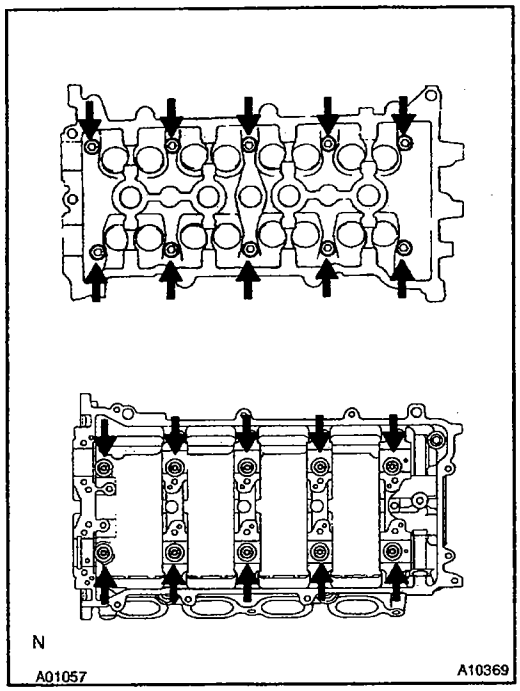
26. 2ZZ–GE:
REMOVE CAMSHAFT

Uniformly loosen and remove the 20 bearing cap bolts, in several passes, in the sequence shown, and remove the 9 bearing caps intake and exhaust camshaft.

27. REMOVE CYLINDER HEAD

(a) Disconnect the upper radiator hoses from the water hose union.

(b) Disconnect the heater water hose from the water hose union.

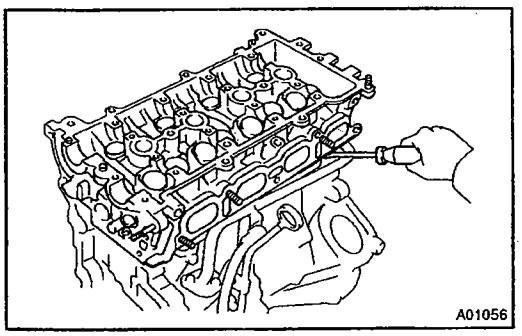


(c) Using a 10 mm bi–hexagon wrench, uniformly loosen and remove the 10 cylinder head bolts, in several passes, in the sequence shown. Remove the 10 cylinder head bolts and plate washers.

NOTICE:

Head warpage or cracking could result from removing bolts in an incorrect order.

(d) Remove the bolt holding the water bypass pipe to the cylinder head.



(e) Lift the cylinder from the dowels on the cylinder block and replace the cylinder head on wooden blocks on a bench.

HINT:

If the cylinder head is difficult to lift off, pry between the cylinder head and cylinder block with a screwdriver.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

EM15V-01

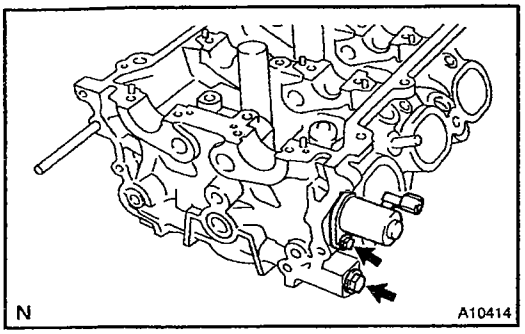
DISASSEMBLY

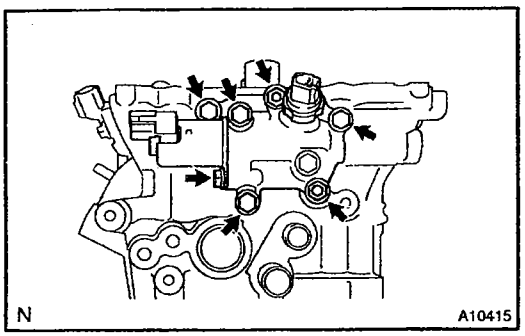
1. REMOVE OIL CONTROL VALVE for VVT

Remove the bolt and cam timing oil control valve.

2. REMOVE OIL CONTROL VALVE FILTER

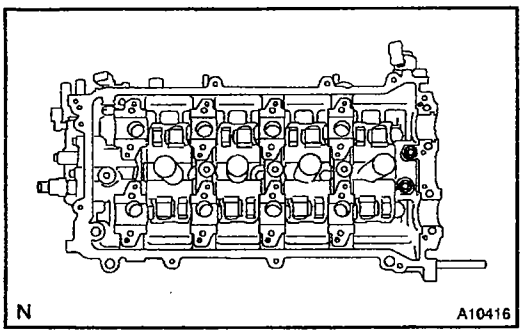
Remove the bolt, gasket and oil control valve filter.





3. 2ZZ–GE:
REMOVE OIL CONTROL VALVE HOUSING

(a) Remove the bolt and oil control valve for VVTL.
(b) Using SST, remove the oil pressure switch.
SST 09816–30010
(c) Remove the 3 bolts, 2 nuts, oil control valve housing and gasket.
(d) Remove the oil control valve filter.



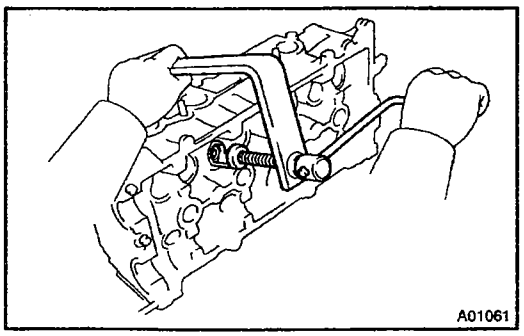
4. 2ZZ–GE:
REMOVE VALVE ROCKER ARM

(a) Remove the 2 bolts, rocker No. 1 and No. 2 shafts.
(b) Remove the 8 valve rocker arm.

HINT:
Arrange the rocker arms in the correct order.

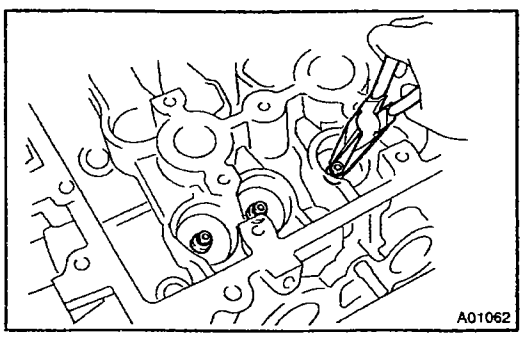
5. REMOVE VALVE LIFTERS

HINT:
Arrange the valve lifters in the correct order.

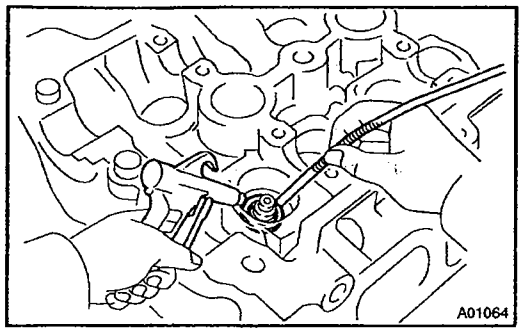


6. REMOVE VALVES

(a) Using SST, compress the valve spring and remove the 2 keepers.
SST 09202–70020 (09202–00020)
(b) Remove the spring retainer.
(c) Remove the valve spring.
(d) Remove the valve.



(e) Using needle–nose pliers, remove the oil seal.



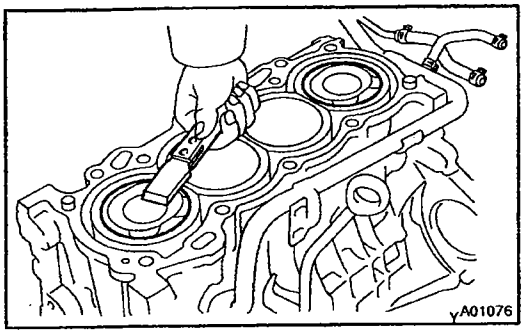
(f) Using compressed air and magnetic finger, remove the spring seat by blowing air.

HINT:

Arrange the valves, valve springs, spring seats, and spring retainers in the correct order.

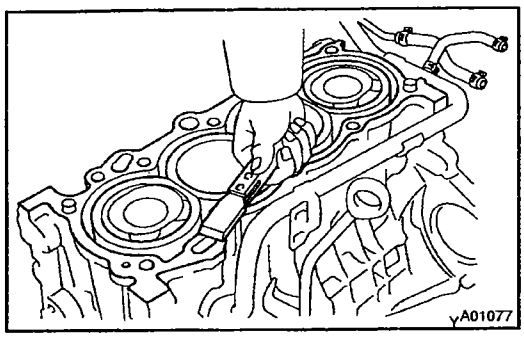
EM15W-01

INSPECTION



1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

(a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston surface.

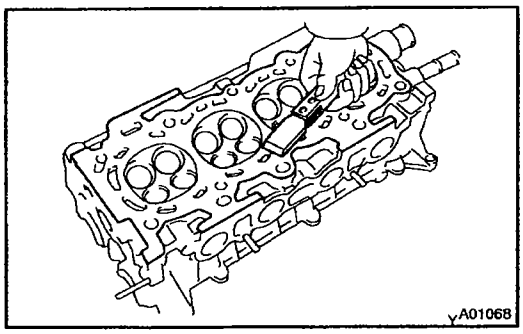


(b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.

(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high pressure compressed air.

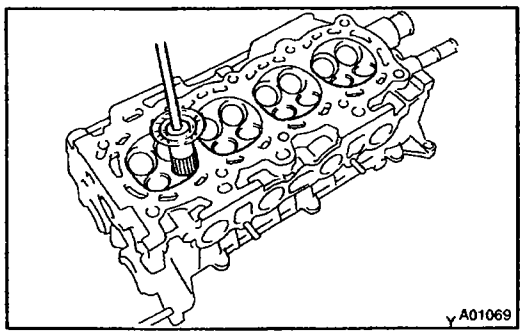


2. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

Be careful not to scratch the cylinder block contact surface.

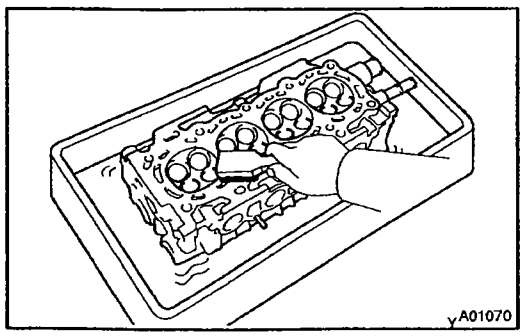


3. CLEAN COMBUSTION CHAMBERS

Using a wire brush, remove all the carbon from the combustion chambers.

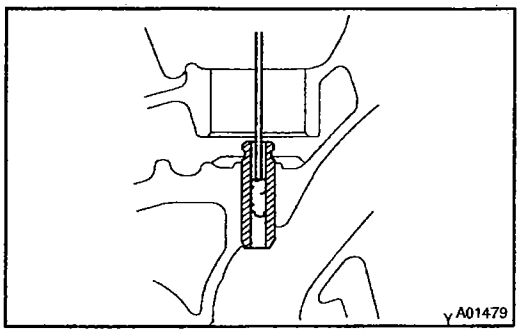
NOTICE:

Be careful not to scratch the cylinder block contact surface.



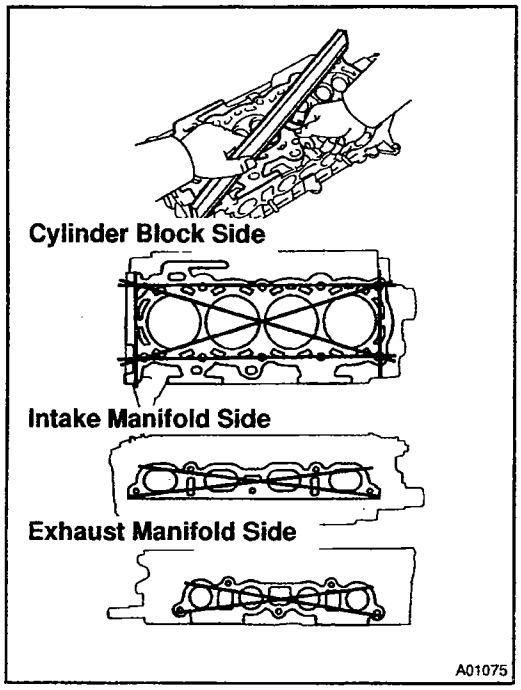
4. CLEAN CYLINDER HEAD

Using a soft brush and solvent, thoroughly clean the cylinder head.



5. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide bushing brush and solvent, clean all the guide bushings.

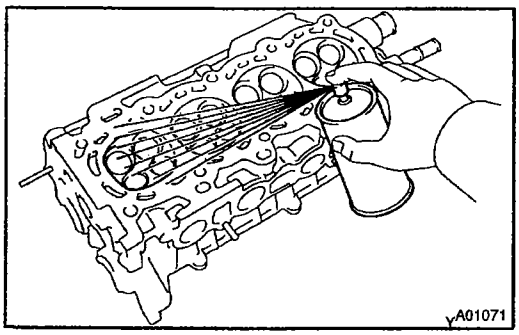


6. INSPECT FOR FLATNESS

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder block and the manifolds for warpage.

Maximum warpage: 0.05 mm (0.0020 in.)

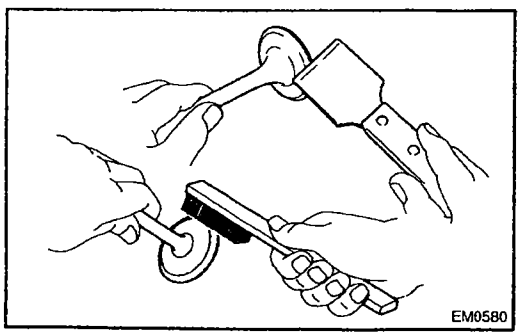
If warpage is greater than maximum, replace the cylinder head.



7. INSPECT FOR CRACKS

Using a dye penetrate, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

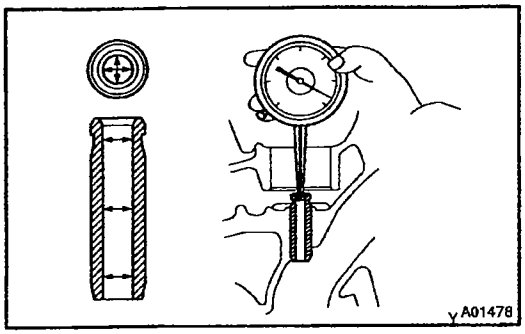
If cracked, replace the cylinder head.



8. CLEAN VALVES

(a) Using a gasket scraper, chip off any carbon from the valve head.

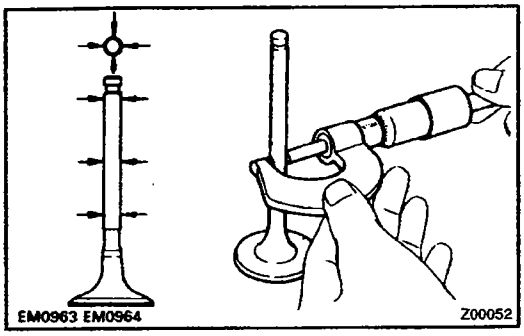
(b) Using a wire brush, thoroughly clean the valve.



9. INSPECT VALVE STEMS AND GUIDE BUSHINGS

(a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:
1ZZ–FE 5.510 – 5.530 mm (0.2169 – 0.2177 in.)
2ZZ–GE 5.500 – 5.518 mm (0.2165 – 0.2172 in.)



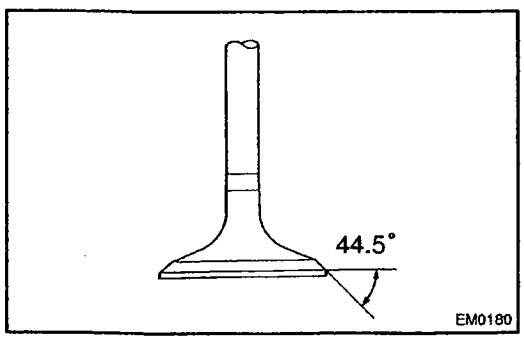
(b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:
1ZZ–FE
Intake 5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Exhaust 5.465 – 5.480 mm (0.2152 – 0.2157 in.)
2ZZ–GE
Intake 5.460 – 5.475 mm (0.21496 – 0.21555 in.)
Exhaust 5.445 – 5.470 mm (0.21437 – 0.21535 in.)

(c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

Standard oil clearance:
1ZZ–FE
Intake 0.025 – 0.060 mm (0.0010 – 0.0024 in.)
Exhaust 0.030 – 0.065 mm (0.0012 – 0.0026 in.)
2ZZ–GE
Intake 0.025 – 0.058 mm (0.00098 – 0.00228 in.)
Exhaust 0.030 – 0.063 mm (0.00118 – 0.00248 in.)
Maximum oil clearance:
1ZZ–FE
Intake 0.08 mm (0.0031 in.)
Exhaust 0.10 mm (0.0039 in.)
2ZZ–GE
0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing.

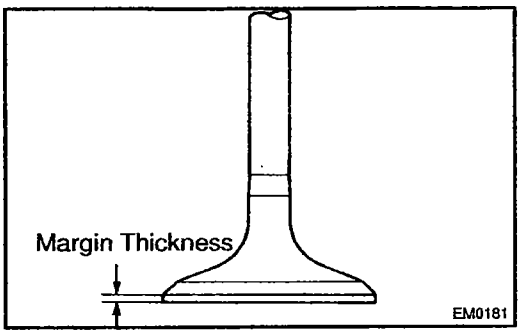


10. INSPECT VALVES

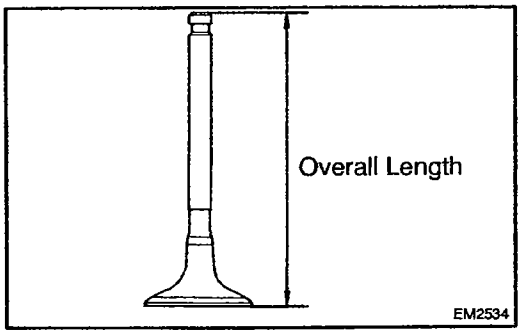
(a) Check the valve is ground to the correct valve face angle.
Valve face angle: 44.5°

(b) Check that the surface of the valve for wear.

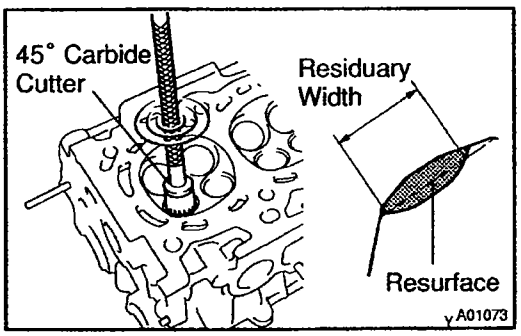
If the valve face is worn, replace the valve.



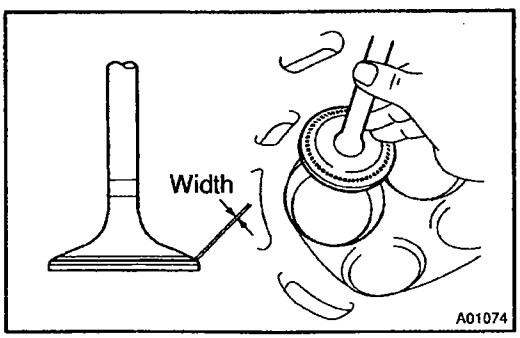
(c) Check the valve head margin thickness.
Standard margin thickness: 1.0 mm (0.039 in.)
Minimum margin thickness: 0.7 mm (0.028 in.)
If the margin thickness is less than minimum, replace the valve.



(d) Check the valve overall length.
Standard overall length:
1ZZ–FE
Intake 88.65 mm (3.4902 in.)
Exhaust 88.69 mm (3.4917 in.)
2ZZ–GE
Intake 111.3 mm (4.382 in.)
Exhaust 111.7 mm (4.398 in.)
Minimum overall length:
1ZZ–FE
Intake 88.35 mm (3.4783 in.)
Exhaust 88.39 mm (3.4799 in.)
2ZZ–GE
Intake 110.9 mm (4.366 in.)
Exhaust 111.3 mm (4.382 in.)
If the overall length is less than minimum, replace the valve.
(e) Check the surface of the valve stem tip for wear.
If the valve stem tip is worn, replace the valve.



11. INSPECT AND CLEAN VALVE SEATS
(a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.
(b) After resurfacing the valve seat 45°, measure the residuary width of the valve seat 45°.
Minimum residuary length:
Intake 3.3 mm (0.130 in.)
Exhaust 3.2 mm (0.126 in.)

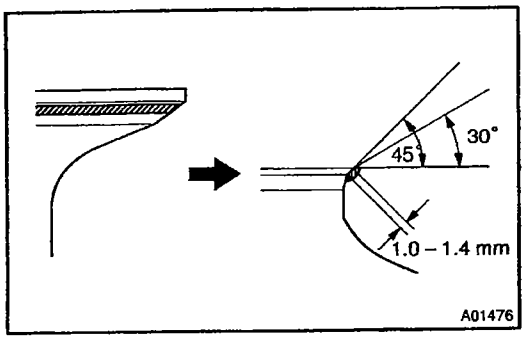


If the valve seat 45° residuary width less than minimum, replace the cylinder head.
(c) Check the valve seating position.
Apply a light coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate valve.
(d) Check the valve face and seat for the following:
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.

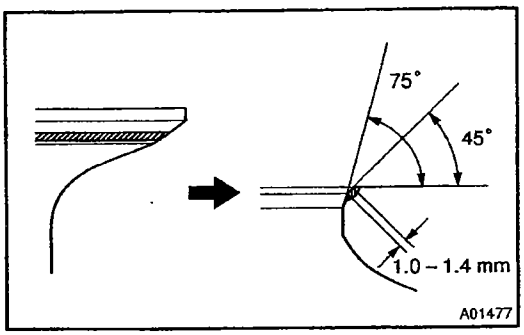
- If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:

1.0 – 1.4 mm (0.039 – 0.055 in.)

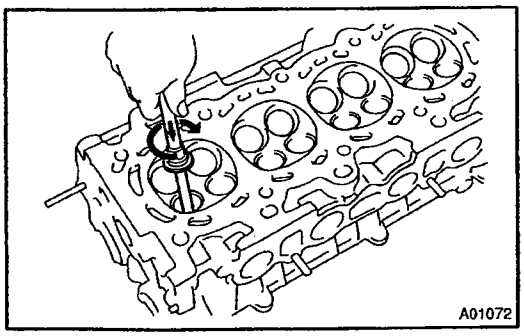
If not, correct the valve seats as follows:



(1) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

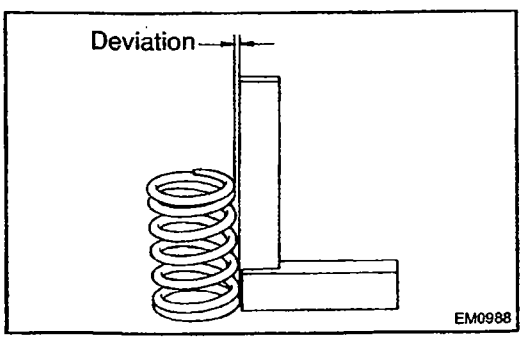


(2) If the seating is too low on the valve face, use 75° and 45° cutters to correct the seat.



(e) Hand–lap the valve and valve seat with an abrasive compound.

(f) After hand–lapping, clean the valve and valve seat.



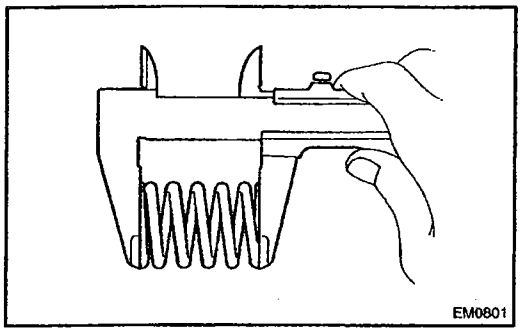
12. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the deviation of the valve spring.

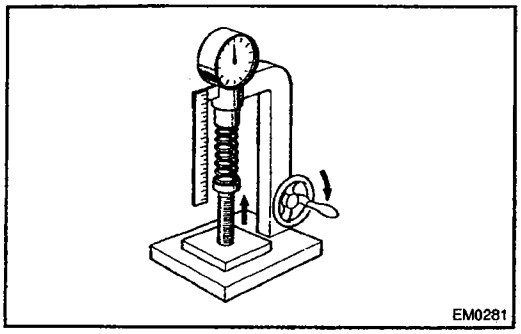
Maximum deviation: 1.6 mm (0.063 in.)

Maximum angle (reference): 2°

If the deviation is greater than maximum, replace the valve spring.

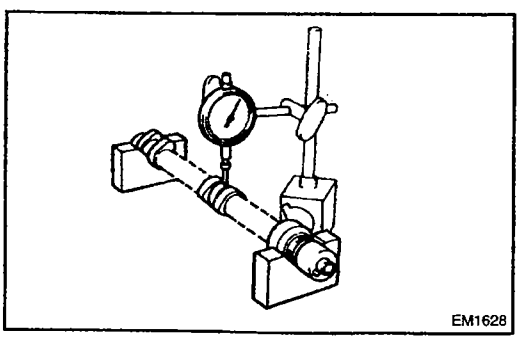


(b) Using vernier calipers, measure the free length of the valve spring.
Free length:
1ZZ–FE 45.90 mm (1.8070 in.)
2ZZ–GE
Intake 46.4 mm (1.830 in.)
Exhaust 46.5 mm (1.831 in.)



(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.
Installed tension:
1ZZ–FE
139.6 – 154.4 N (14.2 – 15.8 kgf, 31.3 – 34.8 lbf)
at 33.6 mm (1.323 in.)
2ZZ–GE
Intake
220.2 – 243.8 N (22.5 – 24.7 kgf, 49.6 – 55.5 lbf)
at 38.5 mm (1.516 in.)
Exhaust
208.2 – 229.8 N (21.2 – 23.4 kgf, 47.6 – 52.6 lbf)
at 38.5 mm (1.516 in.)
Maximum working tension:
1ZZ–FE
244.9 – 276.1 N (25.5 – 28.1 kgf, 56.2 – 61.9 lbf)
at 24.6 mm (0.969 in.)
2ZZ–GE
Intake
533 – 589 N (54.4 – 60.1 kgf, 119.9 – 132.5 lbf)
at 27.3 mm (1.075 in.)
Exhaust
495.5 – 548.5 N (50.5 – 55.9 kgf, 111.3 – 123.2 lbf)
at 28.5 mm (1.122 in.)

If the installed tension is not as specified, replace the valve spring

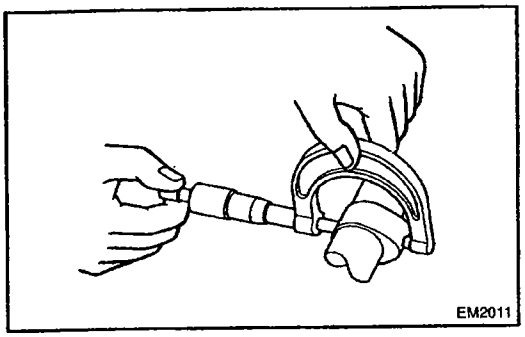


13. INSPECT CAMSHAFT FOR RUNOUT

(a) Place the camshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.
Maximum circle runout: 0.03 mm (0.0012 in.)

If the circle runout is greater than maximum, replace the camshaft.

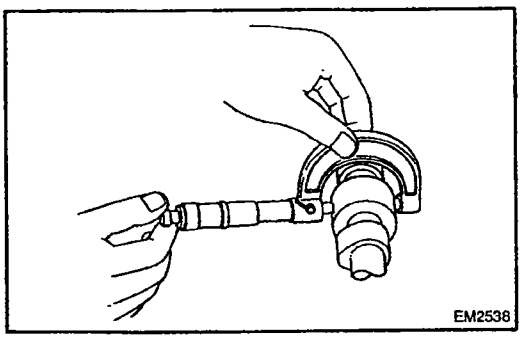


14. INSPECT CAM LOBES

Using a micrometer, measure the cam lobe height.

Standard cam lobe height:
1ZZ–FE:
Intake 44.333 – 44.433 mm (1.7454 – 1.7493 in.)
Exhaust 43.761 – 43.861 mm (1.7229 – 1.7268 in.)
2ZZ–GE:
INTAKE
No. 1 40.607 – 40.707 mm (1.59586 – 1.59979 in.)
No. 2 38.769 – 38.869 mm (1.52362 – 1.52755 in.)
2ZZ–GE:
EXHAUST
No. 1 40.019 – 40.119 mm (1.57275 – 1.57668 in.)
No. 2 38.863 – 38.963 mm (1.52732 – 1.53125 in.)
Minimum cam lobe height:
1ZZ–FE:
Intake 44.18 mm (1.7394 in.)
Exhaust 43.61 mm (1.7169 in.)
2ZZ–GE:
Intake
No.1 40.45 mm (1.5925 in.)
No.2 38.61 mm (1.5201 in.)
Exhaust
No.1 39.86 mm (1.5693)
No.2 38.71 mm (1.5240)

If the cam lobe height is less than minimum, replace the camshaft.

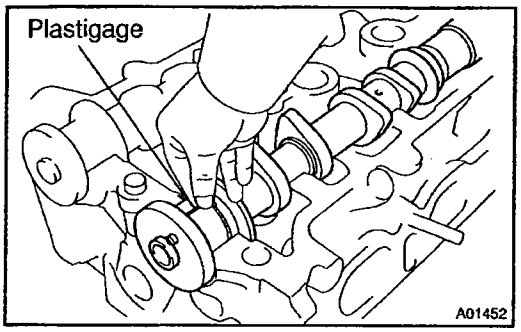


15. INSPECT CAMSHAFT JOURNALS

Using a micrometer, measure the journal diameter.

1ZZ–FE:
No.1 journal diameter:
34.449 – 34.465 mm (1.3563 – 1.3569 in.)
Others journal diameter:
22.949 – 22.965 mm (0.9035 – 0.9041 in.)
2ZZ–GE:
No.1 journal diameter:
34.449 – 34.465 mm (1.35626 – 1.35689 in.)
Other journal diameter:
27.949 – 27.965 mm (1.10035 – 1.10098 in.)

If the journal diameter is not as specified, check the oil clearance.

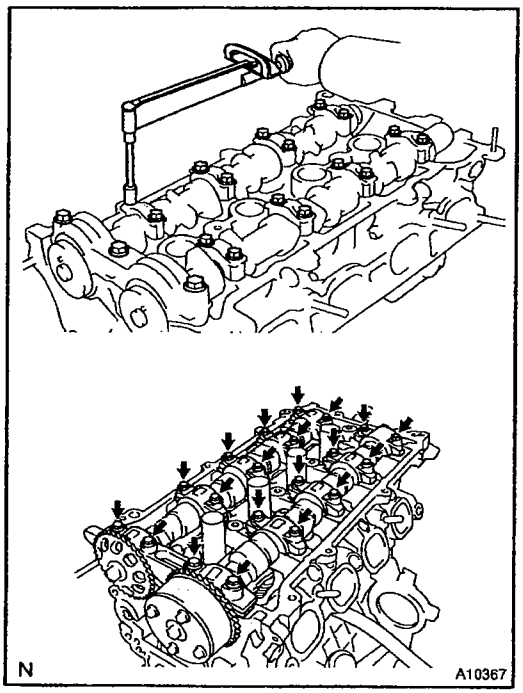


16. INSPECT CAMSHAFT JOURNAL CLEARANCE

(a) Clean the bearing caps and camshaft journals.

(b) Place the camshafts on the cylinder head.

(c) Lay a strip of Plastigage across each of the camshaft journal.

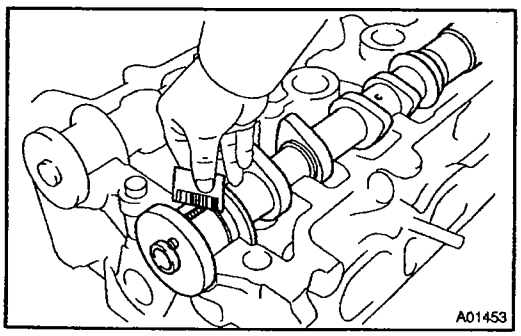


(d) Install the bearing caps (See page EM–65).

Torque:
1ZZ–FE:
No.1 23 N·m (235 kgf·cm, 17 ft·lbf)
No.3 13 N·m (133 kgf·cm, 10 ft·lbf)
2ZZ–GE: 18.5 N·m (189 kgf·cm, 14 ft·lbf)

NOTICE:
Do not turn the camshaft.

(e) Remove the bearing caps.



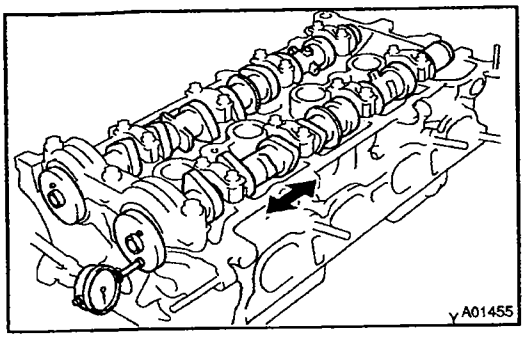
(f) Measure the plastigage at its widest point.

1ZZ–FE:
Standard oil clearance:
0.035 – 0.072 mm (0.0014 – 0.0028 in.)
Maximum oil clearance:
0.10 mm (0.0039 in.)
2ZZ–GE:
Standard oil clearance:
No. 1 journal 0.035 – 0.076 mm (0.00138 – 0.00299 in.)
Other journal 0.035 – 0.072 mm (0.00138 – 0.00283 in.)
Maximum oil clearance:
0.10 mm (0.039 in.)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

(g) Completely remove the Plastigage.

(h) Remove the camshafts.



17. INSPECT CAMSHAFT THRUST CLEARANCE

(a) Install the camshafts. (See page EM–65)

(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

1ZZ–FE:

Standard thrust clearance:

0.040 – 0.095 mm (0.0016 – 0.0037 in.)

Maximum thrust clearance:

0.11 mm (0.0043 in.)

2ZZ–GE:

Standard thrust clearance:

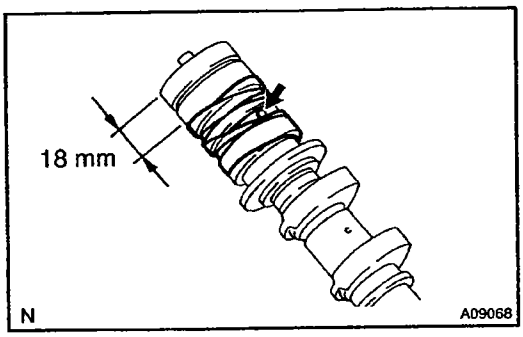
0.04 – 0.14 mm (0.0016 – 0.0055 in.)

Maximum thrust clearance:

0.15 mm (0.0059 in.)

If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

(c) Remove the camshafts.



18. INSPECT VALVE TIMING CONTROLLER ASSEMBLY

(a) Apply vinyl tape to all the ports except the one indicated by the arrow in the illustration.

NOTICE:

Do not apply tape in the range from the tip of the camshaft to 18 mm from that tip.

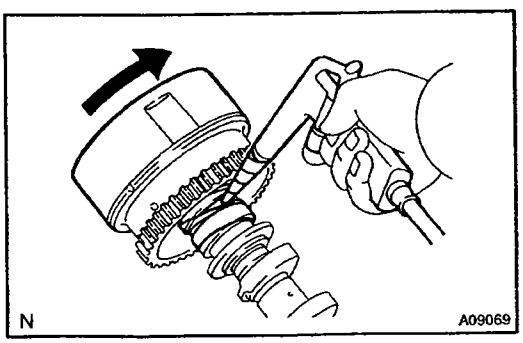
(b) Install the valve timing controller assembly.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

NOTICE:

Do not push valve timing controller assembly to the camshaft forcibly when installing it.

(c) Check that the valve timing controller assembly will not turn.



(d) Wind tape around the tip of the air gun and apply air of approx. 100 kPa (1 kgf/cm^2, 14 psi) to the port of the camshaft.

NOTICE:

When the oil splashes, wipe it off with a shop rag and the likes.

HINT:

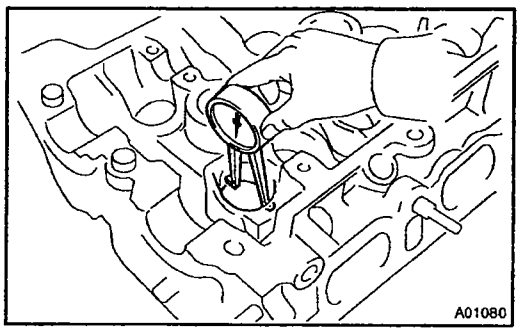
Perform this in order to release the lock pin for the maximum delay angle locking.

(e) Under the condition of (d), turn the valve timing controller assembly to the advance angel side (the arrow marked direction in the illustration) with your hand.
Standard: Must turn

HINT:
Depending on the air pressure, the valve timing controller assembly will turn to the advance angle side without applying force by hand. Also, under the condition that the pressure can be hardly applied because of the air leakage from the port, there may be the case that the lock pin could be hardly released.

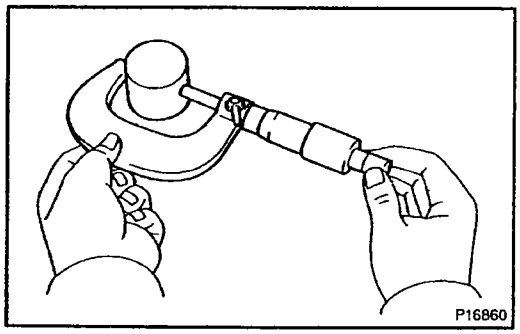
(f) Except the position where the lock pin meets at the maximum delay angle, let the valve timing controller assembly turn back and forth and check the movable range and that there is no disturbance.
Standard: Movable smoothly in the range about 30°

(g) Turn the valve timing controller assembly with your hand and lock it at the maximum delay angel position.



19. 1ZZ–FE:
INSPECT VALVE LIFTERS AND LIFTER BORES

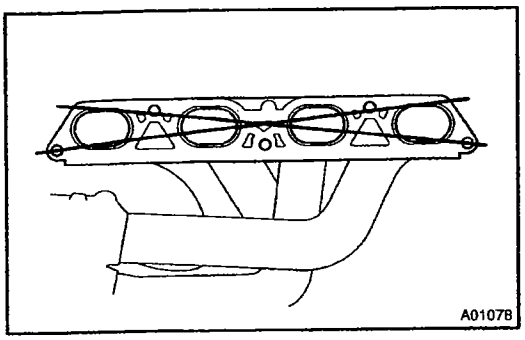
(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.
Lifter bore diameter:
31.000 – 31.025 mm (1.2205 – 1.2215 in.)



(b) Using a micrometer, measure the lifter diameter.
Lifter diameter:
30.966 – 30.976 mm (1.2191 – 1.2195 in.)

(c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.
Standard oil clearance:
0.024 – 0.059 mm (0.0009 – 0.0023 in.)
Maximum oil clearance:
0.079 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the lifter.
If necessary, replace the cylinder head.

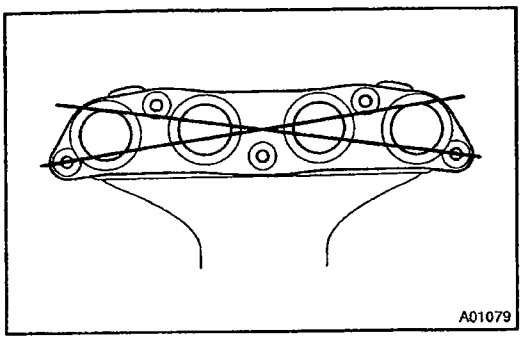


20. INSPECT INTAKE MANIFOLD

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the manifold.

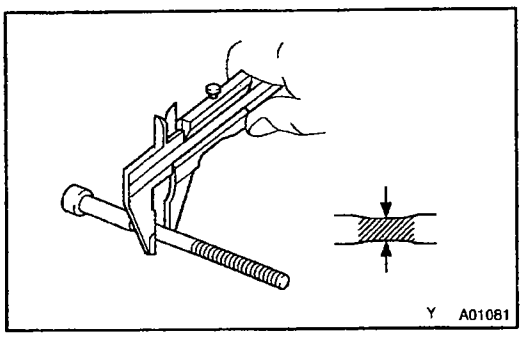


21. INSPECT EXHAUST MANIFOLD

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage: 0.70 mm (0.0276 in.)

If warpage is greater than maximum, replace the manifold.



22. INSPECT CYLINDER HEAD BOLTS

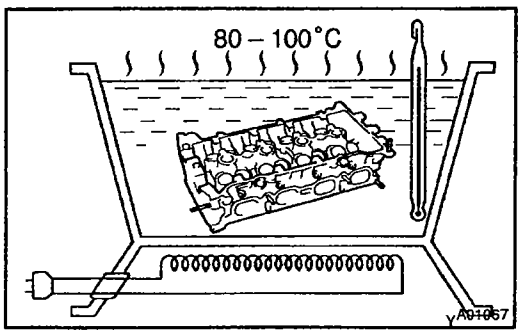
Standard outside diameter:
9.0 – 9.2 mm (0.354 – 0.362 in.)
Minimum outside diameter:
9.0 mm (0.354 in.)

If the outer diameter is less than minimum, replace the bolt.

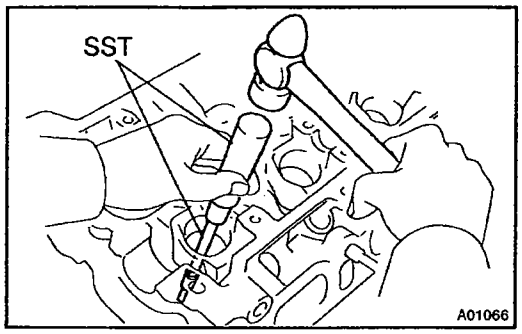
EM05X-04

REPLACEMENT

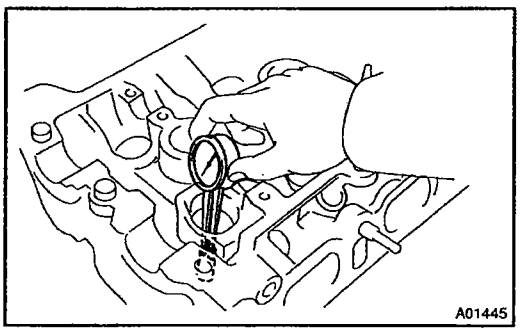
REPLACE VALVE GUIDE BUSHINGS



(a) Gradually heat the cylinder head to 110 – 130 °C (230 – 266 °F).



(b) Using SST and a hammer, tap out the guide bushing.
SST 09201–01055, 09950–70010 (09951–07100)



(c) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

Both intake and exhaust

Bushing bore diameter mm (in.)	Bushing size
10.285 – 10.306 (0.4049 – 0.4057)	Use STD
10.335 – 10.356 (0.4068 – 0.4077)	Use O/S 0.05

(d) 1ZZ–FE:
Select the new guide bushing (STD or O/S 0.05).
If the bushing bore diameter of the cylinder head is greater than 10.306 mm (0.4057 in.), machine the bushing bore to the following dimension:
10.335 – 10.356 mm (0.4068 – 0.4077 in.)
If the bushing bore diameter of the cylinder head is greater than 10.356 mm (0.4077 in.), replace the cylinder head.

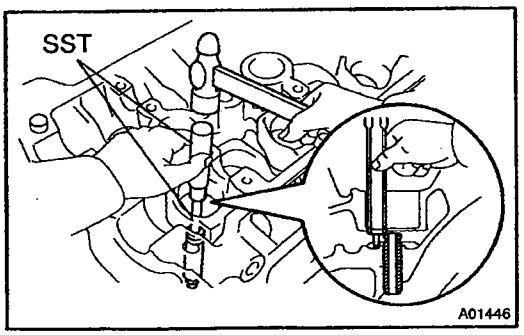
(e) 1ZZ–FE:
Gradually heat the cylinder head to 80 – 100 °C (176 – 212 °F).

Both intake and exhaust

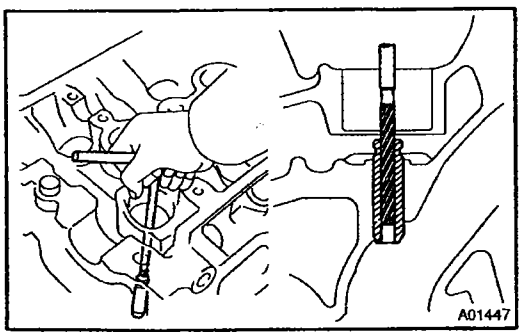
Bushing bore diameter mm (in.)	Bushing size
10.488 – 10.506 (0.4129 – 0.4136)	Use STD
10.538 – 10.556 (0.4149 – 0.4156)	Use O/S 0.05

(f) 2ZZ–GE:
Select the new guide bushing (STD or O/S 0.05).
If the bushing bore diameter of the cylinder head is greater than 10.506 mm (0.4136 in.), machine the bushing bore to the following dimension:
10.538 – 10.556 mm (0.4149 – 0.4156 in.)
If the bushing bore diameter of the cylinder head is greater than 10.556 mm (0.4156 in.), replace the cylinder head.

(g) 2ZZ–GE:
Gradually heat the cylinder head to 110 – 130 °C (230 – 266 °F).



(h) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.
SST 09201–01055, 09950–70010 (09951–07100)
Protrusion height:
1ZZ–FE 8.7 – 9.1 mm (0.342 – 0.358 in.)
2ZZ–GE 15.3 – 15.7 mm (0.602 – 0.618 in.)



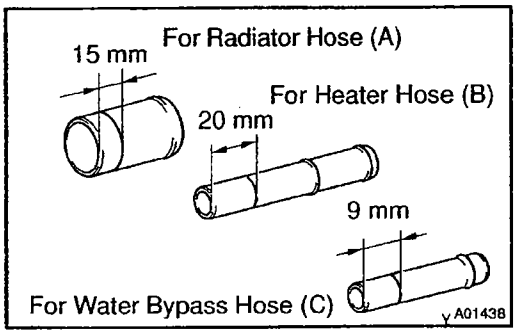
(i) Using a sharp 5.5 mm reamer, ream the guide bushing to obtain the standard specified clearance
(See page EM–48) between the guide bushing and valve stem.

EM15X–01

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace oil seals with new ones.

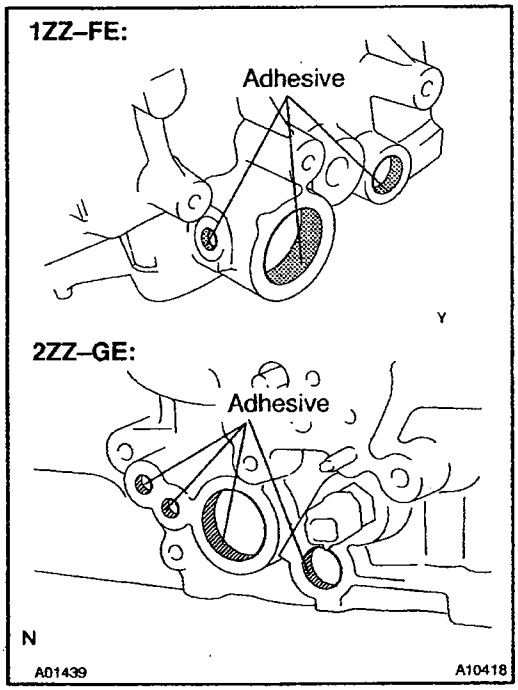


1. INSTALL WATER HOSE UNIONS

HINT:

When using a new cylinder head, water hose unions must be installed.

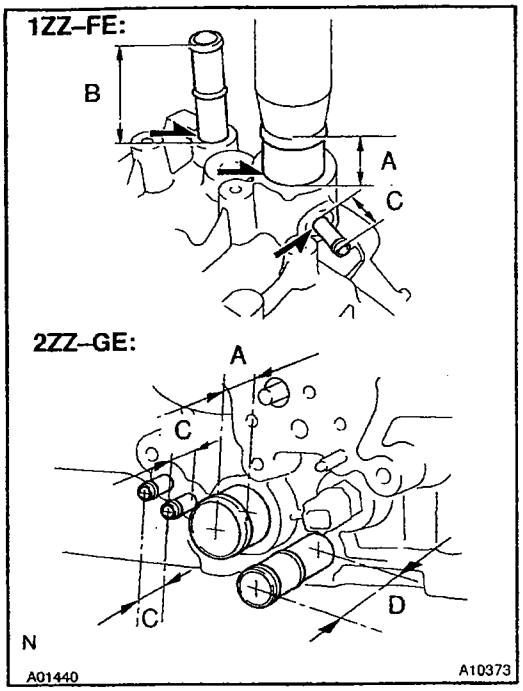
(a) Mark the standard position away from the edge, onto the water hose union.



(b) Apply adhesive to the water hose union hole of the cylinder head.

Adhesive:

Part No.08833–00070, THREE BOND 1324 or equivalent



(c) Using a press, press in a new water hose union until there is protruding from the cylinder head.

Standard protrusion:

A 29 mm (1.14 in.)

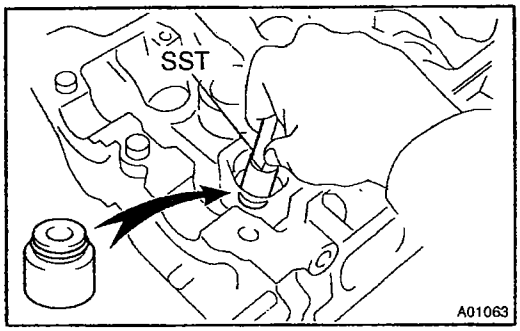
B 66.5 mm (2.618 in.)

C 24 mm (0.95 in.)

D 69.8 mm (2.630 in.)

NOTICE:

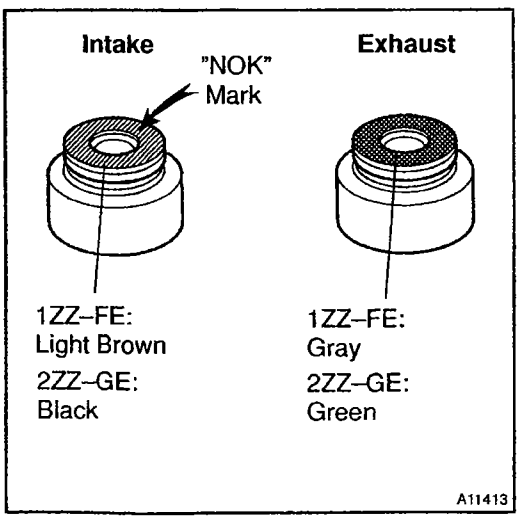
Avoid pressing a new water hose union in too far by measuring the amount of protrusion while pressing.



2. INSTALL VALVES

(a) Using SST, push in a new oil seal.

SST 09201–41020

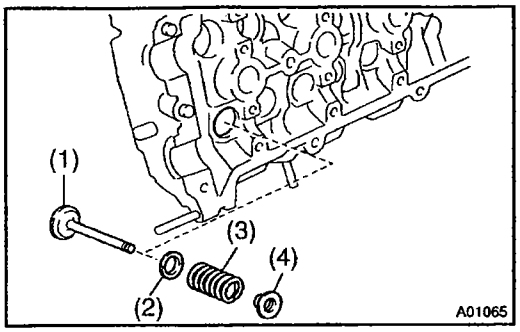


HINT:

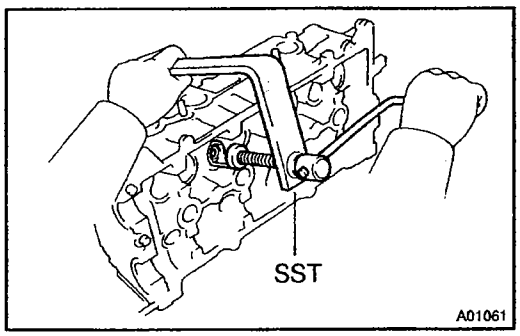
- 1ZZ–FE:
  The intake valve oil seal is light brown and the exhaust valve oil seal is gray.
- 2ZZ–GE:
  The intake valve oil seal is black and the exhaust valve oil seal is green.

NOTICE:

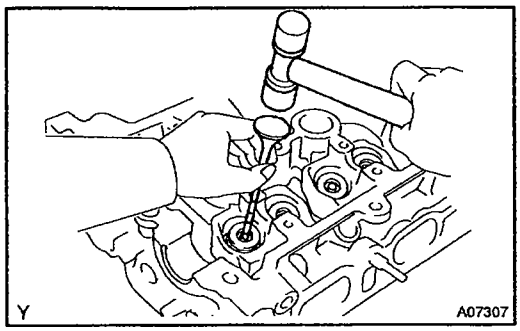
Pay much attention assembling the oil seal for intake and exhaust. Assembling the wrong one may cause a failure.



(b) Install the valve (1), spring (2), valve spring (3), and spring retainer (4).



(c) Using SST, compress the valve spring and place the 2 keepers around the valve stem.
SST 09202–70020 (09202–00020)



(d) Using a plastic–faced hammer and the valve stem (not in use) tip wound with vinyl tape, lightly tap the valve stem tip to ensure a proper fit.

NOTICE:

Be careful not to damage the valve stem tip.

3. INSTALL VALVE LIFTERS

(a) Install the valve lifter.

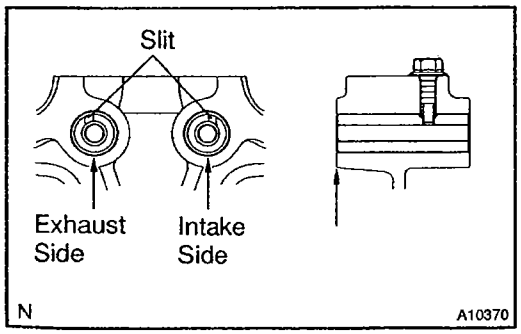
(b) Check that the valve lifter rotates smoothly by hand.

4. 2ZZ–GE:

INSTALL VALVE ROCKER ARM

(a) Set the 8 valve rocker arms.

(b) Install the rocker No. 1 and No. 2 shaft with the 2 bolts.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



HINT:

- Position the slit of the locker shaft in the direction shown in the illustration.
- Align the locker shaft end with the cylinder head end.

5. 2ZZ–GE:

INSTALL OIL CONTROL VALVE HOUSING

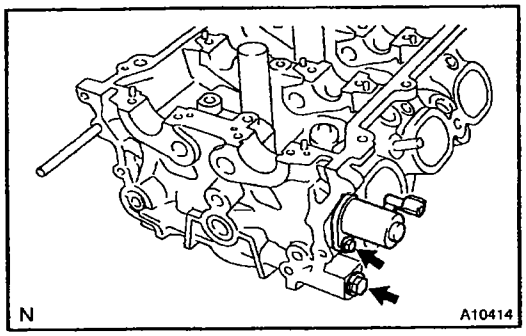
(a) Install the oil control valve filter.

(b) Install the gasket and oil control valve housing with the 3 bolts and 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

(c) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Using SST, install the oil pressure switch.
SST 09816–30010
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(e) Install the oil control valve for VVTL with the bolt.



6. INSTALL CONTROL VALVE for VVT

Install the oil control valve for VVT with the bolt.

7. INSTALL OIL CONTROL VALVE FILTER

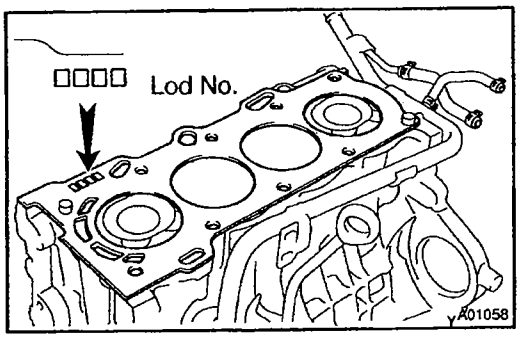
Install the oil control valve filter and new gasket with the bolt.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

EM1SY–01

INSTALLATION

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



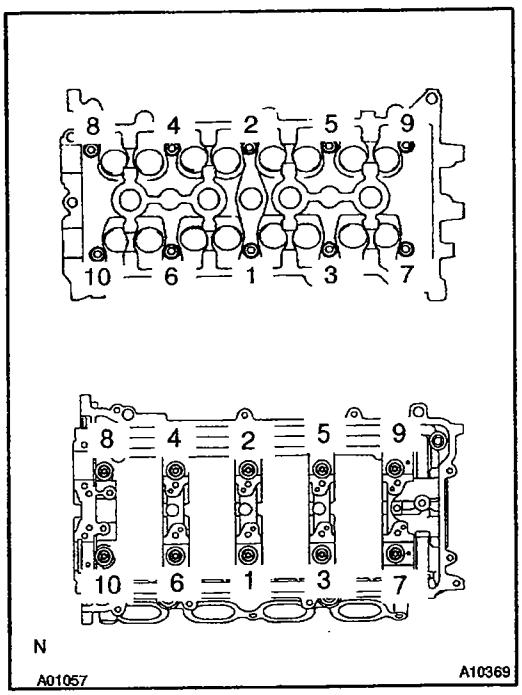
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

(a) Place a new cylinder head gasket on the cylinder block surface with the Lod No. stamp upward.

NOTICE:

Be careful of the installation direction.

(b) Place the cylinder head quietly in order not to damage the gasket with the bottom part of the head.



2. INSTALL CYLINDER HEAD BOLTS

HINT:

- The cylinder head bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any cylinder head bolt is broken or deformed, replace it.

(a) Apply a light coat if engine oil on the threads and under the heads of the cylinder head bolts.

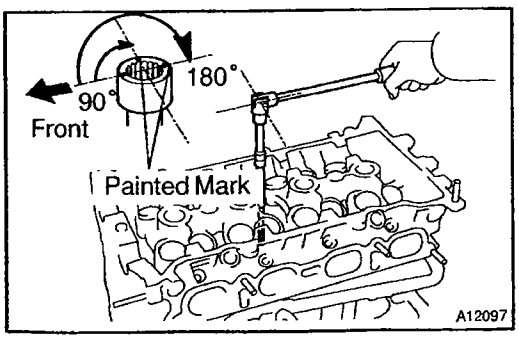
(b) Using a 10 mm bi–hexagon wrench, install and uniformly tighten the 10 cylinder head bolts and plate washers, in several passes, in the sequence shown.

Torque:

1ZZ–FE: 49 N·m (500 kgf·cm, 36 ft·lbf)

2ZZ–GE: 35 N·m (375 kgf·cm, 26 ft·lbf)

If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



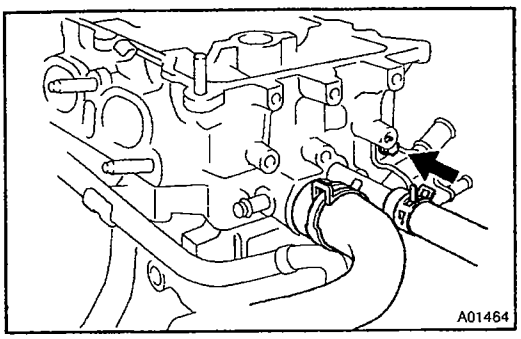
(c) Mark the front of the cylinder head bolt with paint.

(d) 1ZZ–FE:
Retighten the cylinder head bolts 90° in the numerical order shown.

(e) 2ZZ–GE:
Retighten the cylinder head bolts 180° in the numerical order shown.

(f) 1ZZ–FE:
Check that the paint mark is not at a 90° angle to the front.

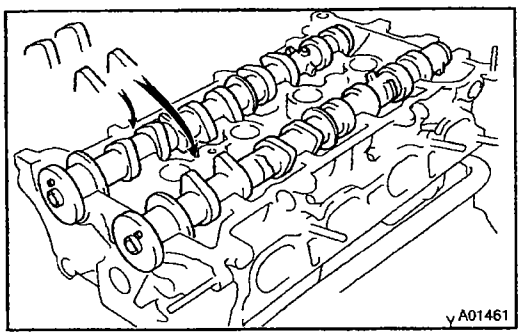
(g) 2ZZ–GE:
Check that the paint mark is not at a 180° angle to the front.



(h) Install the bolt holding the water bypass pipe to the cylinder head.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

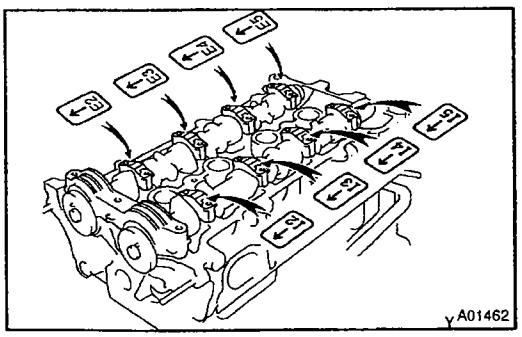
(i) Connect the upper radiator hose to the water hose unions.

(j) Connect the heater hose to the water hose unions.



3. INSTALL CAMSHAFTS

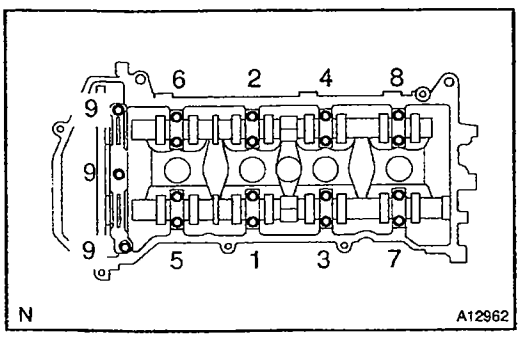
(a) Place the 2 camshafts on the cylinder head with the No. 1 cam lobes facing as shown the illustration.



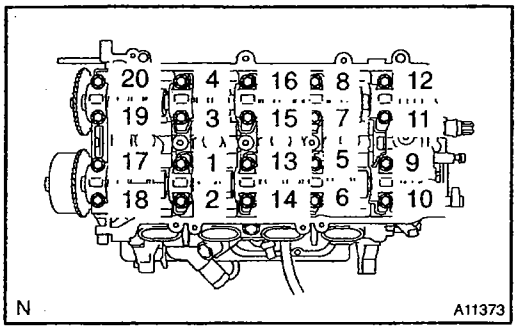
(b) Install the bearing caps in their proper locations.
HINT:

- 1ZZ–FE:
  No. 3 camshaft bearing cap has a number and front mark.
- 2ZZ–GE:
  No. 2, No.3 camshaft bearing cap has a number and front mark.

(c) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.

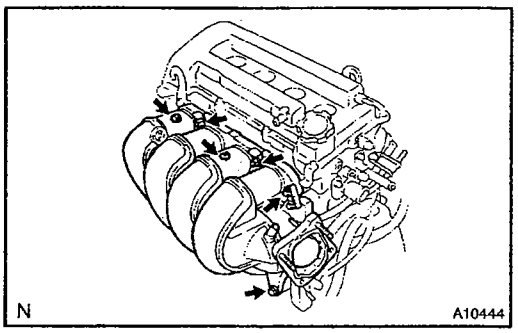


(d) 1ZZ–FE:
Install and uniformly tighten the 19 bearing cap bolts.
After tightening the No. 1 camshaft bearing cap, tighten then in several passes, in the sequence shown.
Torque:
No. 1 23 N·m (235 kgf·cm, 17 ft·lbf)
No. 3 13 N·m (133 kgf·cm, 10 ft·lbf)



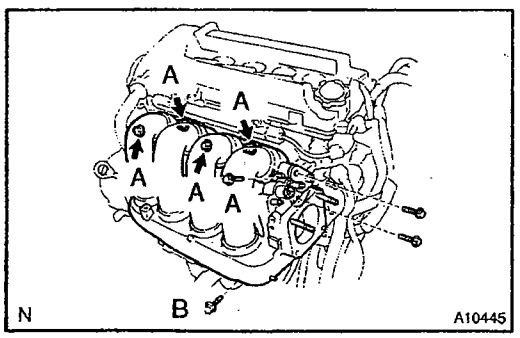
(e) 2ZZ–GE:
Install and uniformly tighten the 20 bearing cap bolts. After tightening the No. 1 camshaft bearing cap, tighten then in several passes, in the sequence shown.
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)

4. **CHECK AND ADJUST VALVE CLEARANCE (See page EM–4)**
5. **INSTALL CAMSHAFT TIMING SPROCKETS AND VALVE TIMING CONTROLLER ASSEMBLY (See page EM–25)**
6. **INSTALL OIL FILTER CAP**
7. **INSTALL GROMMET AND PCV VALVE**
8. **INSTALL ECT SENSOR (See page SF–63)**
9. **INSTALL CAMSHAFT POSITION SENSOR (See page IG–10)**



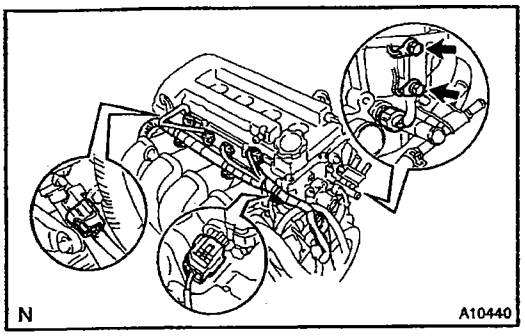
10. **1ZZ–FE:**
INSTALL INTAKE MANIFOLD

(a) Install a new gasket, the intake manifold with the 4 bolts and 2 nuts.
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)
(b) Connect the brake booster vacuum hose.
(c) Connect the EVAP hose for ORVR.



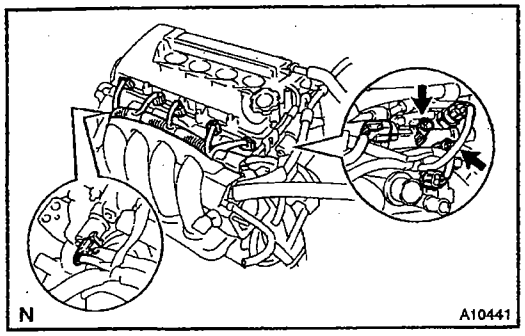
11. **2ZZ–GE:**
INSTALL INTAKE MANIFOLD

(a) Install the intake manifold insulator to the cylinder block.
(b) Install a new gasket, the intake manifold with the 4 bolts and 2 nuts.
Torque:
A: 27 N·m (275 kgf·cm, 20 ft·lbf)
B: 46 N·m (469 kgf·cm, 34 ft·lbf)
(c) Install the stay with the 2 bolts and nut.
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)
(d) Install the oil dipstick and guide with the bolt.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
(e) Connect the brake booster vacuum hose.
(f) Connect the EVAP hose for ORVR.



12. 1ZZ–FE:
CONNECT ENGINE WIRE TO CYLINDER HEAD

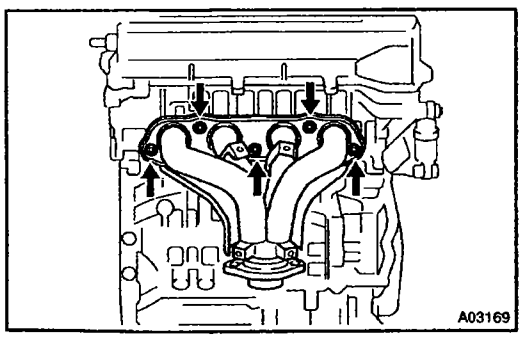
(a) Connect the 2 clamps of engine wire to the intake manifold.
(b) Connect the 2 ground cables.
(c) Connect the oil control valve for VVT connector.
(d) Connect the camshaft position sensor connector.
(e) Connect the ECT sensor connector.



13. 2ZZ–GE:
CONNECT ENGINE WIRE TO CYLINDER HEAD

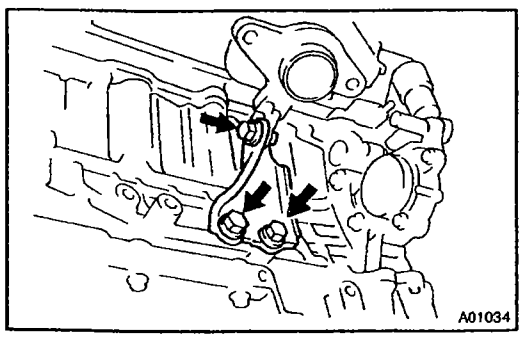
(a) Install the intake manifold insulator No. 2.
(b) Connect the 2 ground cables.
(c) Connect the oil pressure switch connector.
(d) Connect the oil control valve for VVT connector.
(e) Connect the oil control valve for VVTL connector.
(f) Connect the camshaft position sensor connector.
(g) Connect the ECT sensor connector.
(h) Install the accelerator cable bracket with the 2 bolts.

14. INSTALL INJECTORS (See page SF–24)
15. INSTALL THROTTLE BODY (See page SF–39)
16. INSTAL PCV HOSES
17. INSTALL SPARK PLUGS (See page IG–1)
18. INSTALL IGNITION COIL (See page IG–7)

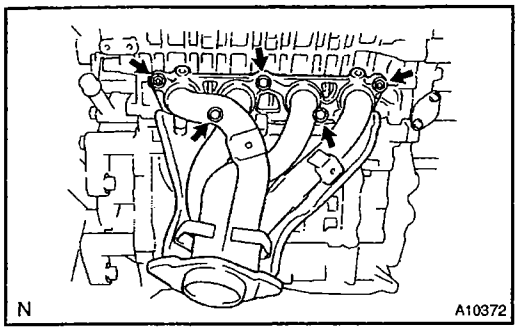


19. 1ZZ–FE:
INSTALL EXHAUST MANIFOLD

(a) Install the lower heat insulator with the 3 bolts.
Torque: 12 N·m (123 kgf·cm, 9 ft·lbf)
(b) Install a new gasket, and the exhaust manifold with the 5 nuts. Uniformly tighten the nuts in several passes.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)
(c) Install the upper heat insulator with the 6 bolts.
Torque: 12 N·m (123 kgf·cm, 9 ft·lbf)



(d) Install the exhaust manifold stay with the 3 bolts.
Torque: 49 N·m (500 kgf·cm, 37 ft·lbf)

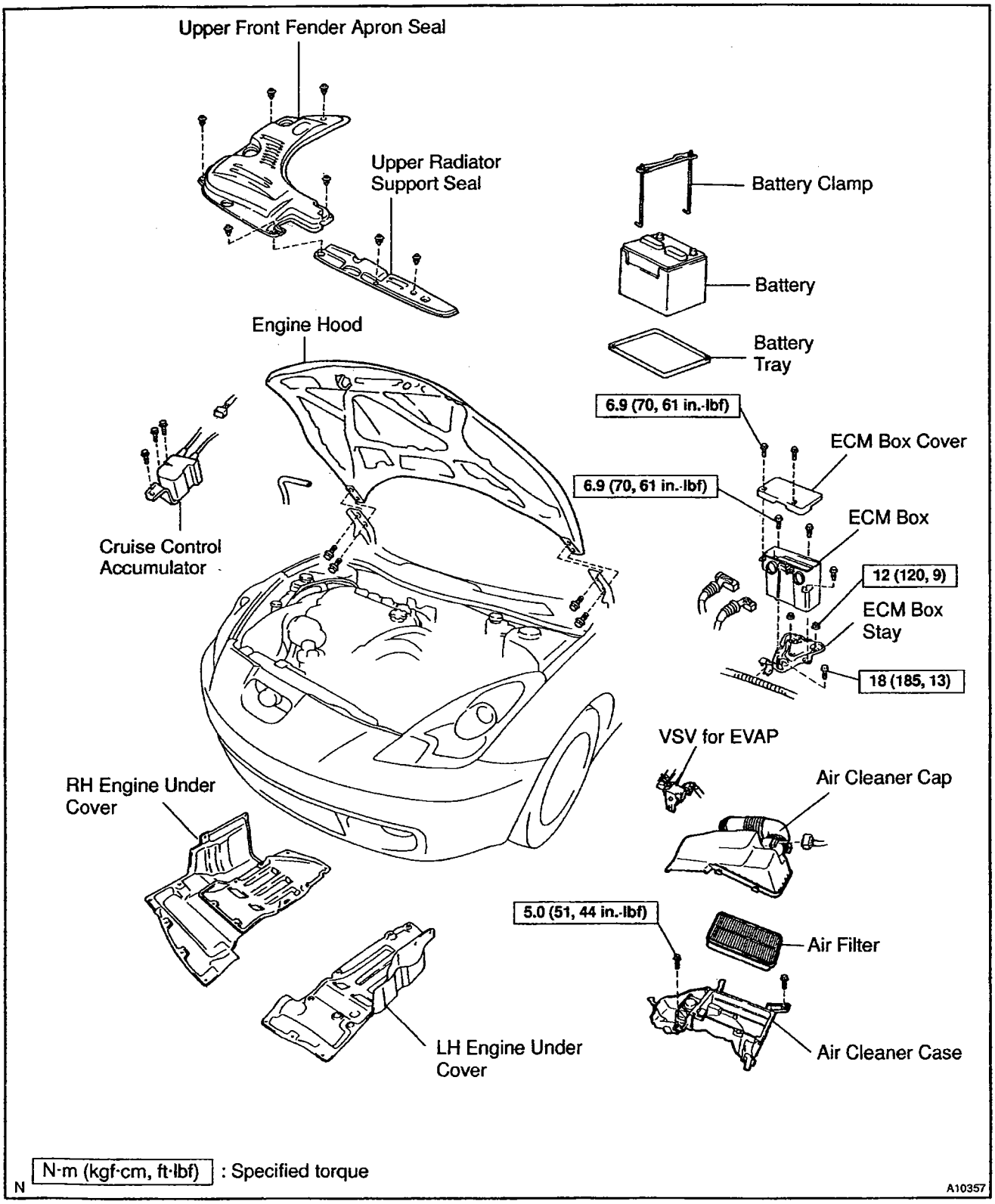


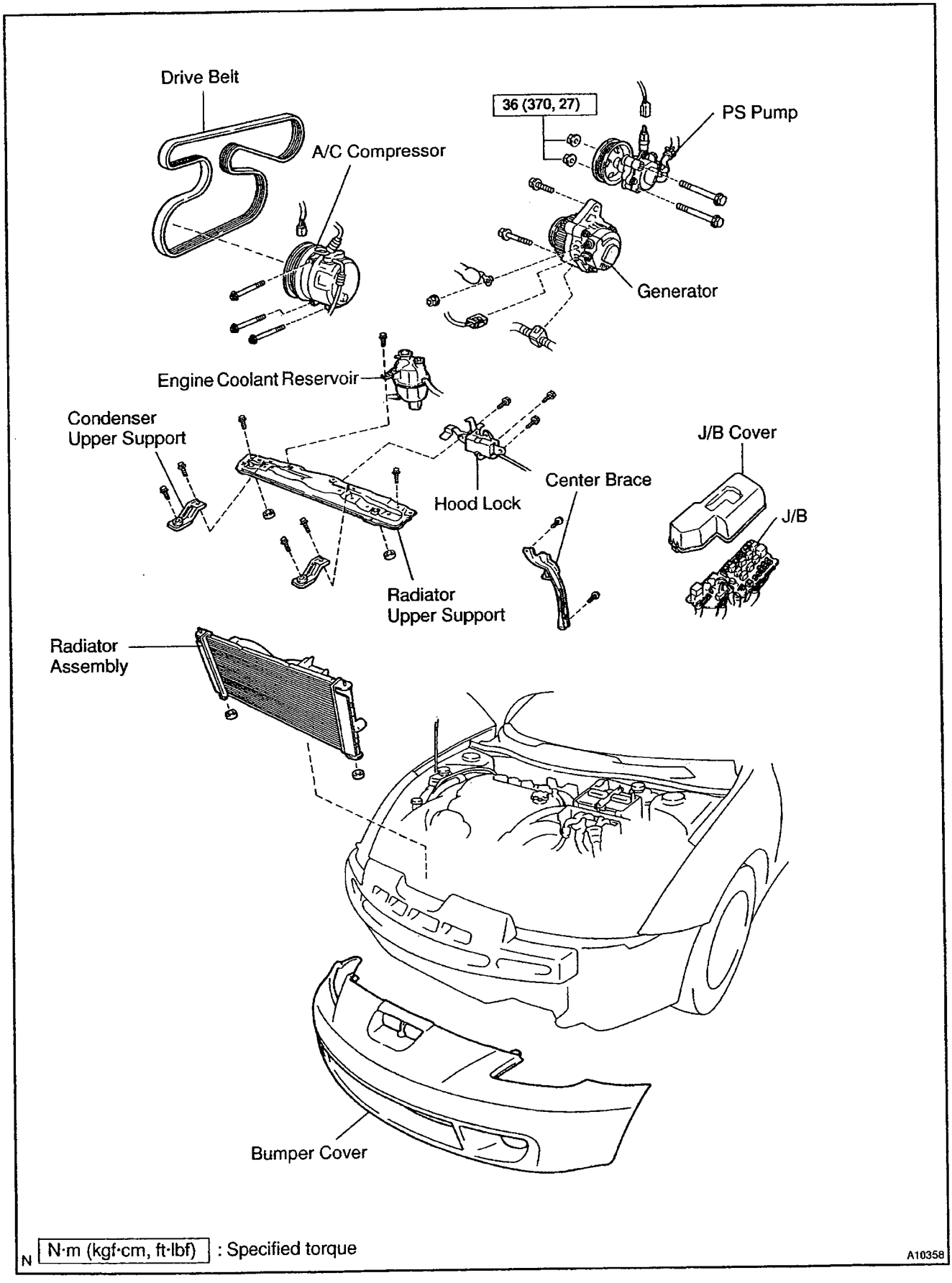
20. **2ZZ–GE:**
    INSTALL EXHAUST MANIFOLD
    (a) Install the lower heat insulator with the 4 bolts.
    Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
    (b) Install the exhaust manifold with the 3 bolts and 2 nuts.
    Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)
    (c) Install the upper heat insulator with the 5 bolts.
    Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
    (d) Install the exhaust manifold stay withe 4 bolts.
    Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)
21. **INSTALL EXHAUST PIPE (See page EM–80)**
22. **INSTALL GENERATOR AND DRIVE BELT (See page CH–17)**
23. **CONNECT ACCELERATOR CABLE**
24. **INSTALL AIR CLEANER ASSEMBLY**
25. **INSTALL ECM BOX (See page EM–80)**
26. **INSTALL BATTERY**
27. **FILL WITH ENGINE COOLANT (See page CO–2)**
28. **START ENGINE AND CHECK FOR LEAKS**
29. **RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL**

ENGINE UNIT

COMPONENTS

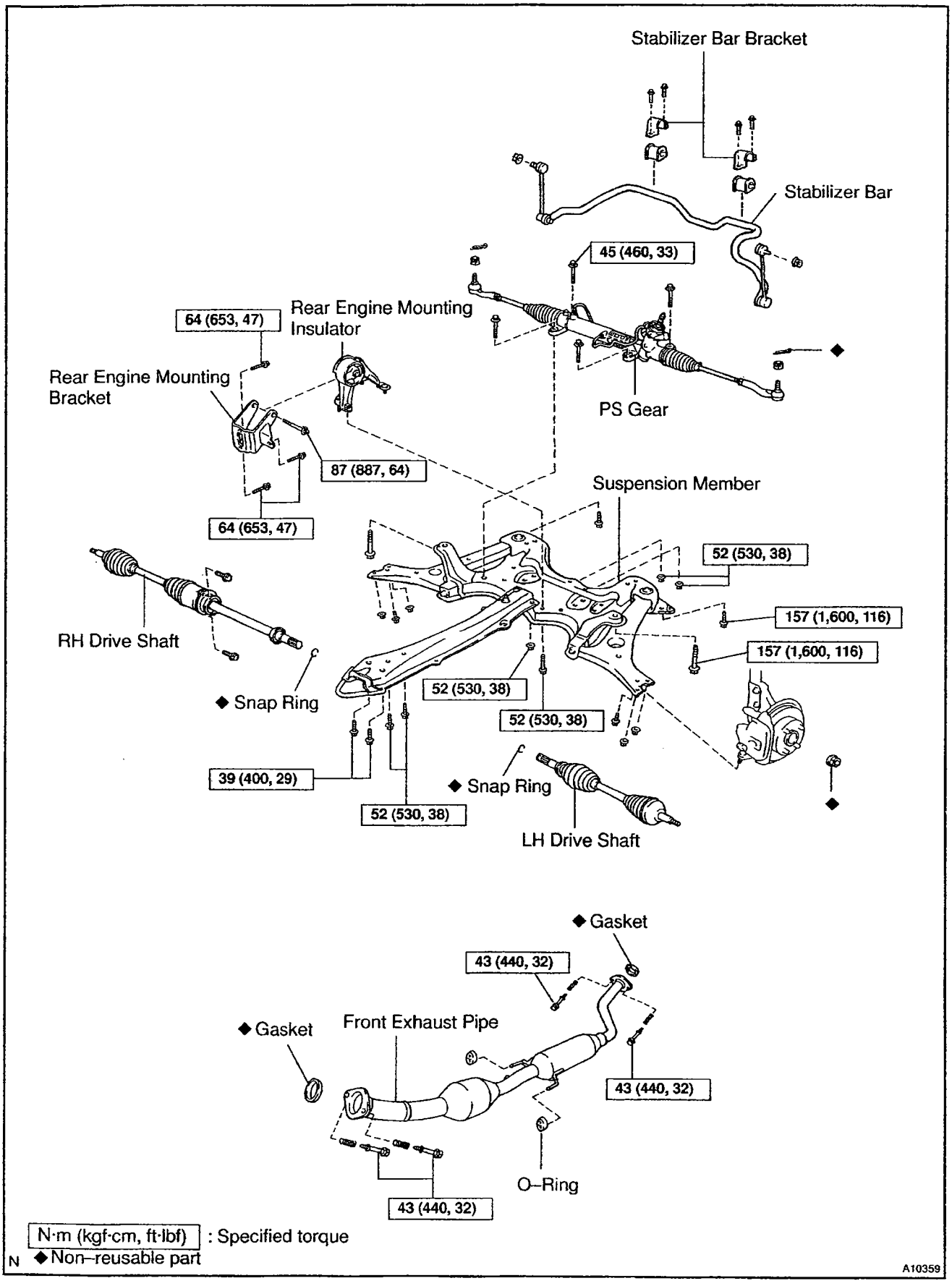
EM1SZ-01

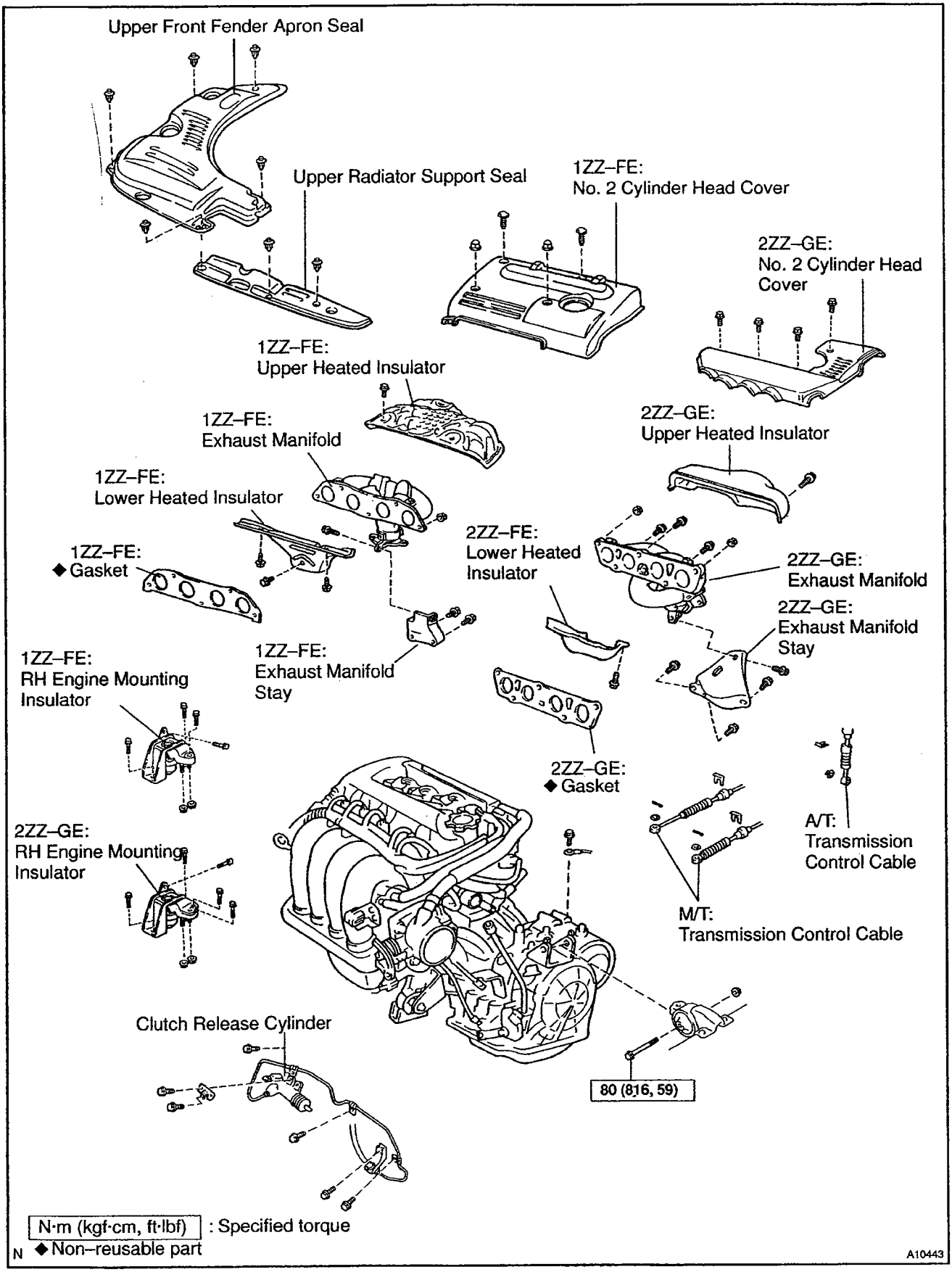




N N·m (kgf·cm, ft·lbf) : Specified torque

A10358

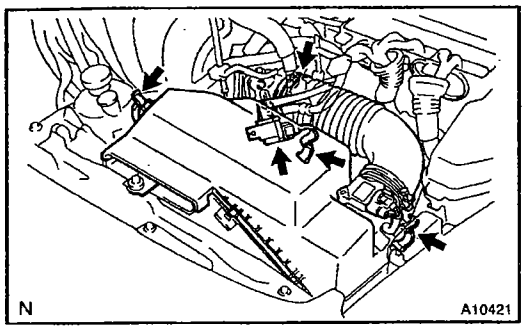

Stabilizer Bar Bracket
Stabilizer Bar
45 (460, 33)
64 (653, 47)
Rear Engine Mounting Insulator
Rear Engine Mounting Bracket
87 (887, 64)
64 (653, 47)
PS Gear
Suspension Member
52 (530, 38)
157 (1,600, 116)
157 (1,600, 116)
RH Drive Shaft
◆ Snap Ring
52 (530, 38)
52 (530, 38)
39 (400, 29)
◆ Snap Ring
52 (530, 38)
LH Drive Shaft
◆ Gasket
43 (440, 32)
◆ Gasket
Front Exhaust Pipe
43 (440, 32)
O–Ring
43 (440, 32)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
A10359


Upper Front Fender Apron Seal
Upper Radiator Support Seal
1ZZ–FE:
No. 2 Cylinder Head Cover
2ZZ–GE:
No. 2 Cylinder Head Cover
1ZZ–FE:
Upper Heated Insulator
1ZZ–FE:
Exhaust Manifold
2ZZ–GE:
Upper Heated Insulator
1ZZ–FE:
Lower Heated Insulator
1ZZ–FE:
◆Gasket
2ZZ–FE:
Lower Heated Insulator
2ZZ–GE:
Exhaust Manifold
2ZZ–GE:
Exhaust Manifold Stay
1ZZ–FE:
Exhaust Manifold Stay
1ZZ–FE:
RH Engine Mounting Insulator
2ZZ–GE:
◆Gasket
2ZZ–GE:
RH Engine Mounting Insulator
A/T:
Transmission Control Cable
M/T:
Transmission Control Cable
Clutch Release Cylinder
80 (816, 59)
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
N
A10443

EM160-01

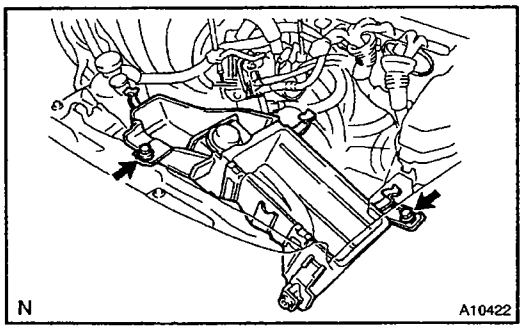
REMOVAL

1. **REMOVE BATTERY AND TRAY**
2. **REMOVE HOOD**
3. **REMOVE ENGINE UNDER COVERS**
4. **DRAIN ENGINE COOLANT**
5. **DRAIN ENGINE OIL**
6. **DRAIN TRANSAXLE OIL**
7. **REMOVE BUMPER COVER AND HEAD LIGHT**



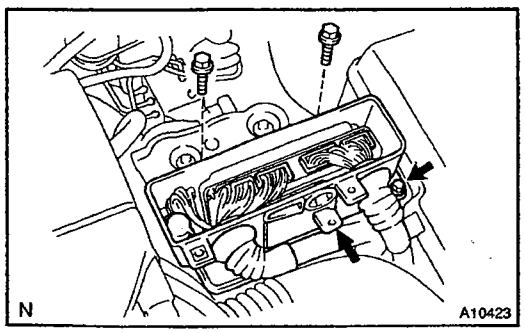
8. REMOVE AIR CLEANER CAP

(a) Disconnect the MAF meter connector.
(b) Disconnect the VSV for EVAP.
(c) Disconnect the 2 hoses.
(d) Disconnect the 3 clamps, and disconnect the air cleaner cap from the air cleaner case.
(e) Loosen the hose clamp, and disconnect the air cleaner hose from the throttle body.



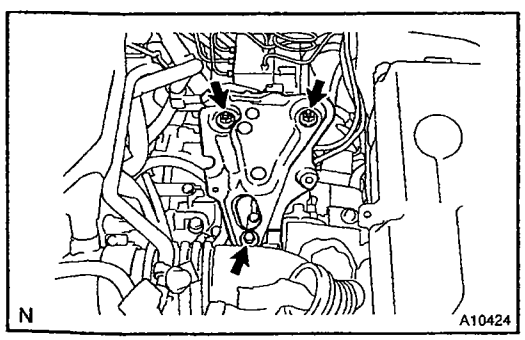
9. REMOVE AIR CLEANER CASE

(a) Remove the air filter.
(b) Disconnect the hose from the VSV for Canister Closed VALVE (CVC).
(c) Disconnect the hose from the intake air control valve.
(d) Remove the 2 bolts, and disconnect the air cleaner case.
(e) Disconnect the 2 hoses from the air cleaner case.

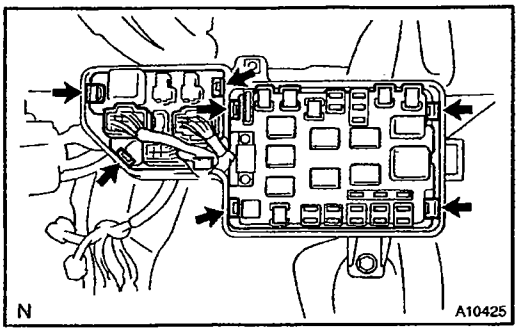


10. REMOVE ECM BOX

(a) Remove the 2 bolts and ECM cover.
(b) Disconnect the 4 connectors from the ECM.
(c) Disconnect the 2 connectors from the ECM box.
(d) Remove the ECM from the ECM box.
(e) Disconnect the clamp from the ECM box.
(f) Disconnect the 2 engine wires from the ECM box.
(g) Remove the 3 bolts and ECM box.

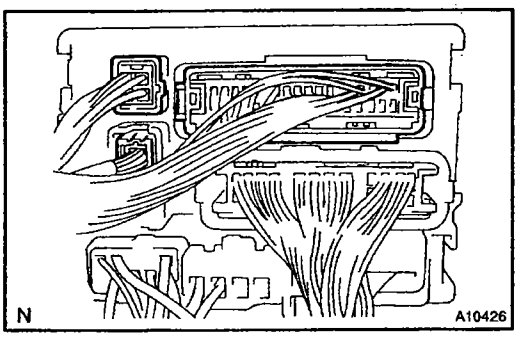


(h) Remove the 2 nuts, bolt and ECM box stay.

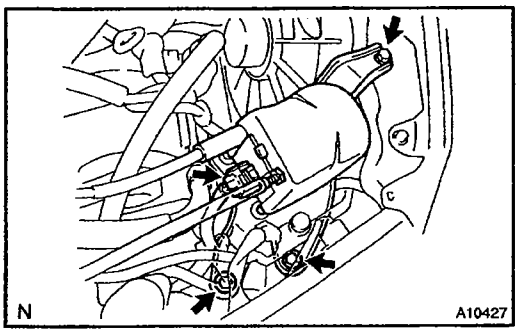


11. DISCONNECT ENGINE WIRE FROM ENGINE COMPARTMENT RELAY BOX

(a) Remove the relay box upper cover.
(b) Disconnect the 3 connectors.
(c) Disconnect the 7 claws and J/B from the relay box.



(d) Disconnect the 3 connectors.
(e) Disconnect the engine wire from the relay box.

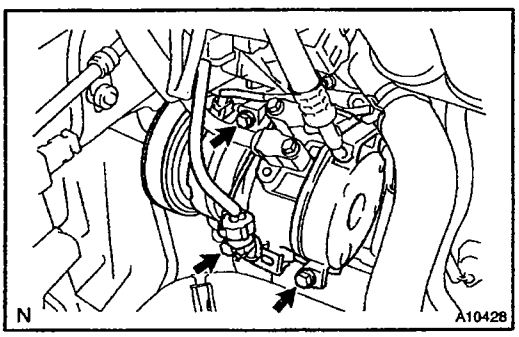


12. w/ Cruise Control System:
DISCONNECT CRUISE CONTROL ACTUATOR

(a) Disconnect the actuator connector.
(b) Remove the 3 bolts and disconnect the actuator from the body.

13. REMOVE RADIATOR ASSEMBLY (See page CO–17)

14. REMOVE DRIVE BELT AND GENERATOR (See page CH–7)



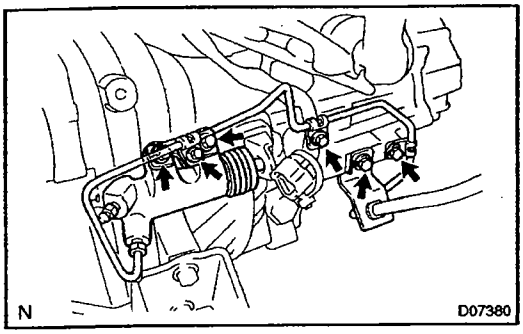
15. w/ A/C:
DISCONNECT A/C COMPRESSOR

(a) Disconnect the A/C compressor connector.
(b) Remove the 3 bolts, and disconnect the A/C compressor from the engine.

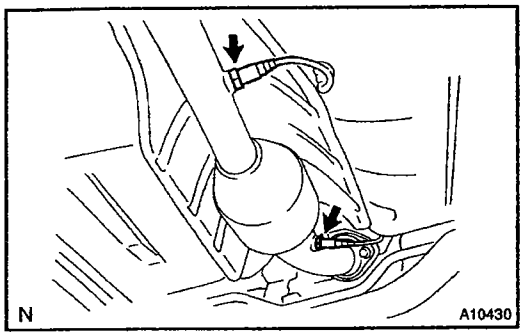
HINT:
Suspend the A/C compressor securely.

16. DISCONNECT TUBE AND HOSE

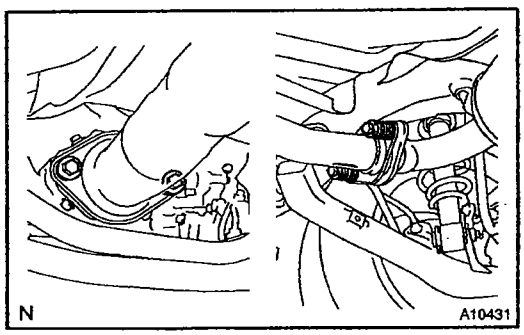
(a) Disconnect the fuel tube from the fuel pipe on vehicle side.
(b) Disconnect the 2 heater hoses from the engine side.
(c) Disconnect the brake booster vacuum hose.



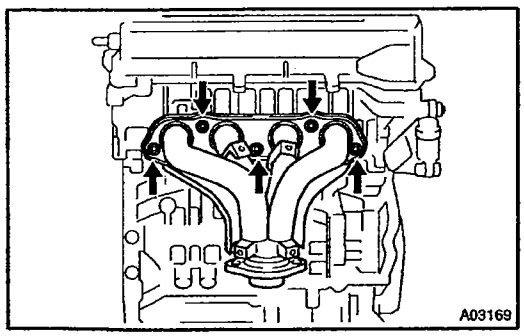
17. **M/T:**
DISCONNECT CLUTCH RELEASE CYLINDER
(a) Remove the 3 bolts, and disconnect the brackets from the transaxle.
(b) Remove the 2 bolts, and disconnect the release cylinder from the transaxle.
18. **DISCONNECT TRANSAXLE CONTROL CABLE (S)**
19. **DISCONNECT 2 GROUND CABLES**
20. **REMOVE DRIVE SHAFT (See page SA–20)**



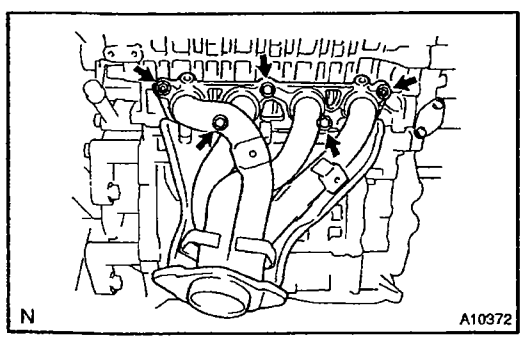
21. **REMOVE EXHAUST PIPE**
(a) Disconnect the 2 heated oxygen sensor.



(b) Remove the 4 bolts and springs.
(c) Disconnect the 2 O–rings, and remove the exhaust pipe and 2 gaskets.



22. **1ZZ–FE:**
REMOVE EXHAUST MANIFOLD
(a) Remove the 6 bolts and upper heat insulator.
(b) Remove the 3 bolts and exhaust manifold stay.
(c) Remove the 5 nuts, exhaust manifold and gasket.



23. **2ZZ–GE:**
REMOVE EXHAUST MANIFOLD
(a) Remove the 5 bolts and upper heat insulator.
(b) Remove the 4 bolts and exhaust manifold stay.
(c) Remove the 2 nuts, 3 bolts, exhaust manifold and gasket.

24. DISCONNECT PS PUMP

(a) Disconnect the PS oil pressure switch connector.

(b) Remove the 2 nuts and through bolts, and disconnect the PS pump from the engine (See page SR–24).

HINT:

Put aside the pump and suspend it to the cowl with a string.

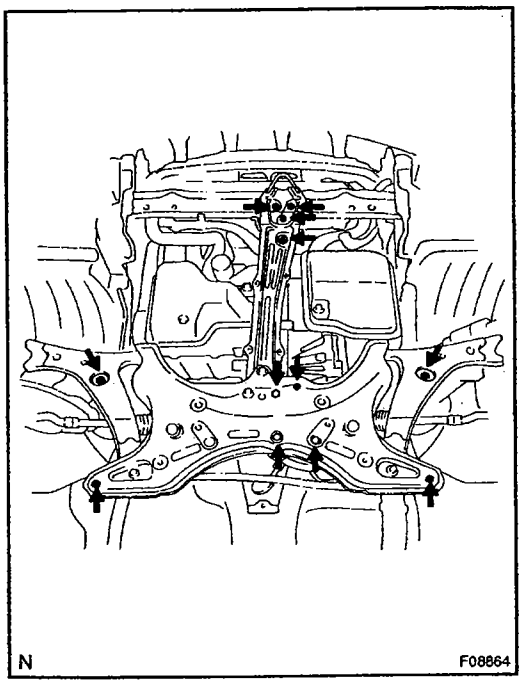
25. REMOVE STABILIZER BAR BRACKET (See page SA–51)

26. DISCONNECT PS GEAR

Remove the 4 bolts, and disconnect the PS gear from the suspension member.

HINT:

Suspend the PS gear securely.



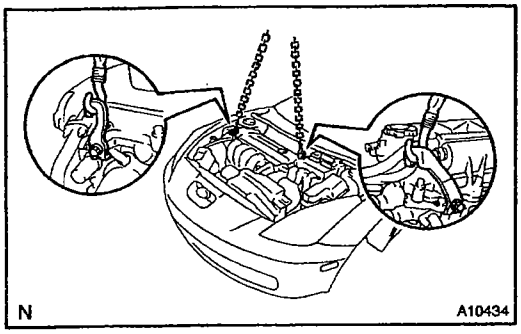
27. REMOVE SUSPENSION MEMBER

Remove the 9 bolts, 3 nuts and suspension member.

28. ATTACH ENGINE SLIDING DEVICE TO ENGINE HANGER

(a) Remove the 4 bolts and No. 2 cylinder head cover.

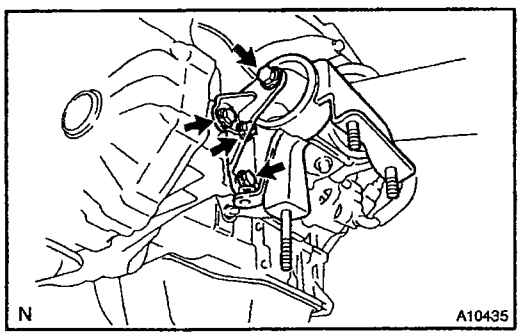
(b) Disconnect the PCV hoses from the cylinder head cover.



(c) Install the 2 engine hangers in the correct direction.
Engine hanger part No.:
1ZZ–FE
Front: 12281–22021
Rear: 12281–15040 or 12281–15050
Bolt: 91512–B1016
2ZZ–GE
Front: 12281–88600
Rear: 12282–88600
Bolt: 91512–61020
Torque: 38 N·m (388 kgf·cm, 28 ft·lbf)

(d) Attach the engine sling device to the engine hangers.

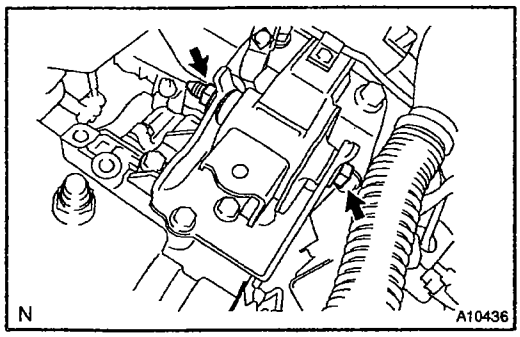
CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.



29. REMOVE REAR ENGINE MOUNTING

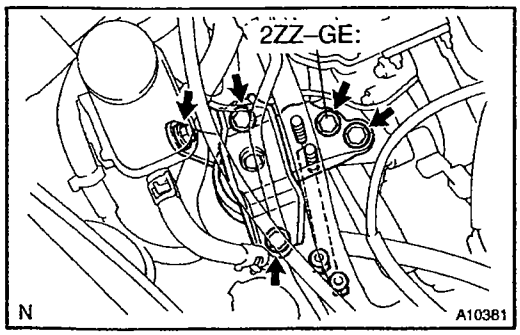
(a) Remove the through bolt and rear engine mounting insulator.

(b) Remove the 3 bolts and rear engine mounting bracket.



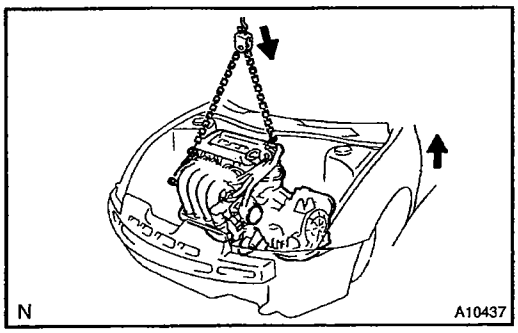
30. REMOVE ENGINE AND TRANSAXLE ASSEMBLY

(a) Remove the LH engine mounting through bolt and nut.



(b) 1ZZ–FE:
Remove the 4 bolts, 2 nuts and RH engine mounting insulator.

(c) 2ZZ–GE:
Remove the 5 bolts, 2 nuts and RH engine mounting insulator.



(d) Lower the engine out of vehicle slowly and carefully, and raise the vehicle.

HINT:

Make sure the engine is clear of all wiring, hoses and cables.

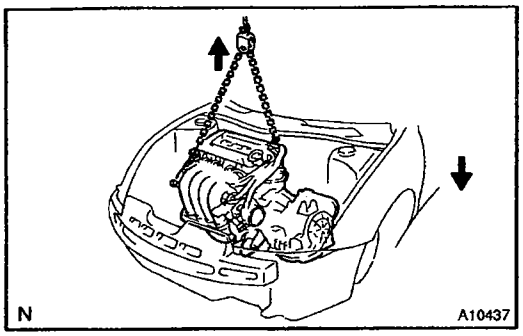
(e) Place the engine and transaxle assembly onto the stand.

31. SEPARATE ENGINE AND TRANSAXLE

(C56 M/T: See page MX–4)
(C60 M/T: See page MX–4)
(U240E A/T: See page AX–31)
(U341E A/T: See page AX–31)

INSTALLATION

1. **ASSEMBLY ENGINE AND TRANSAXLE**
(C56 M/T: See page MX–8)
(C60 M/T: See page MX–8)
(U240E A/T: See page AX–35)
(U341E A/T: See page AX–35)

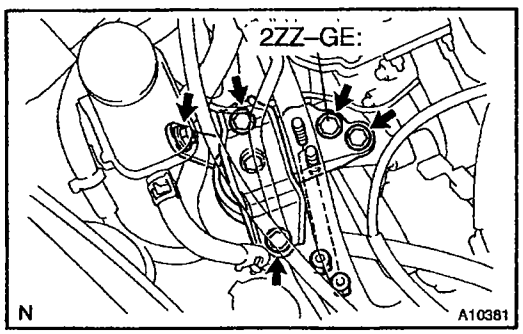


2. **INSTALL ENGINE AND TRANSAXLE ASSEMBLY IN VEHICLE**

(a) Attach the engine sling device to the engine hangers.

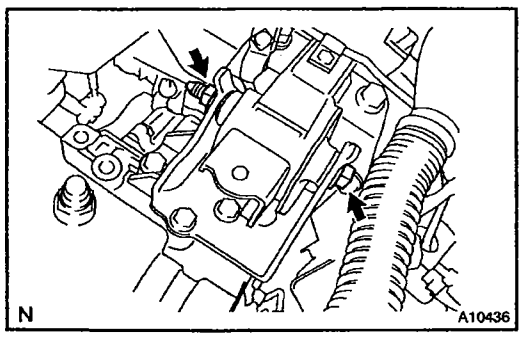
(b) Slowly lower the vehicle, and raise the engine into the engine compartment.

(c) Keep the engine level, and align RH and LH mountings with the body bracket.



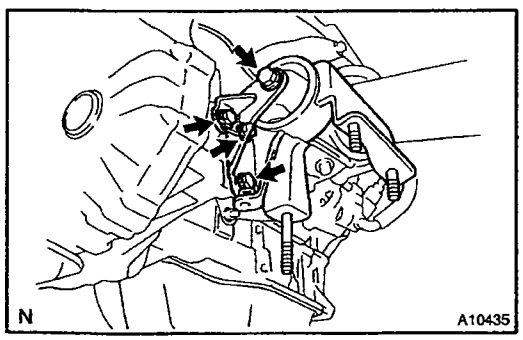
(d) 1ZZ–FE:
Install the RH engine mounting insulator with the 4 bolts and 2 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

(e) 2ZZ–GE:
Install the RH engine mounting insulator with the 5 bolts and 2 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



(f) Install the LH engine mounting through bolt and nut.
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

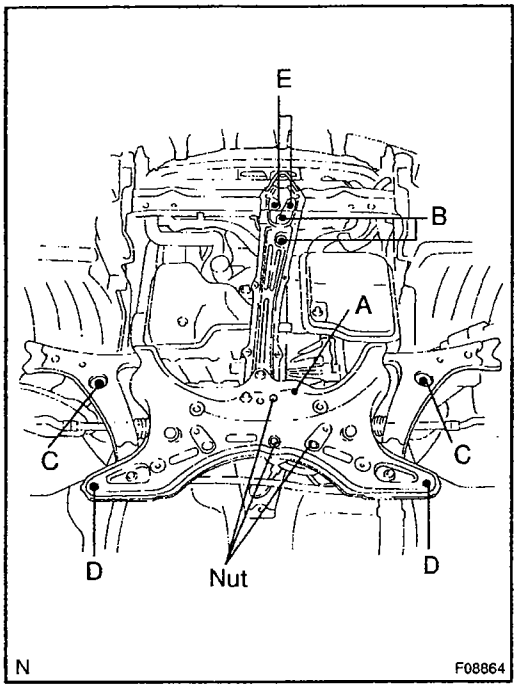
3. **REMOVE ENGINE SLING DEVICE**



4. **INSTALL REAR ENGINE MOUNTING**

(a) Install the rear engine mounting bracket with the 3 bolts.
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

(b) Temporarily install the rear engine mounting insulator with the through bolt.



5. INSTALL SUSPENSION MEMBER

(a) Install the suspension member with the 9 bolts and 3 nuts.
Torque:
A 52 N·m (530 kgf·cm, 32 ft·lbf)
B 52 N·m (530 kgf·cm, 32 ft·lbf)
C 157 N·m (1,600 kgf·cm, 116 ft·lbf)
D 157 N·m (1,600 kgf·cm, 116 ft·lbf)
E 39 N·m (400 kgf·cm, 29 ft·lbf)
Nut 52 N·m (530 kgf·cm, 32 ft·lbf)

(b) Tighten the rear engine mounting through bolt.
Torque: 87 N·m (887 kgf·cm, 64 ft·lbf)

6. CONNECT PS GEAR

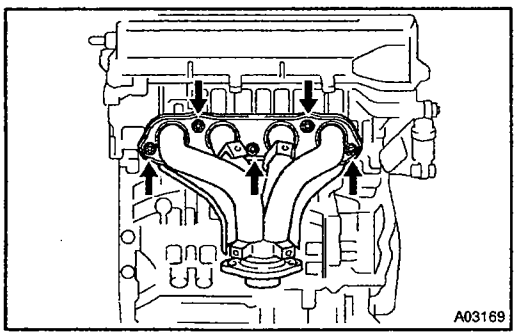
Install the PS gear with the 4 bolts.
Torque: 45 N·m (460 kgf·cm, 33 ft·lbf)

7. INSTALL STABILIZER BAR BRACKET
(See page SA–53)

8. CONNECT PS PUMP

(a) Install the PS pump with the 2 through bolts and nuts (See page SR–32).
Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

(b) Connect the PS oil pressure switch connector.

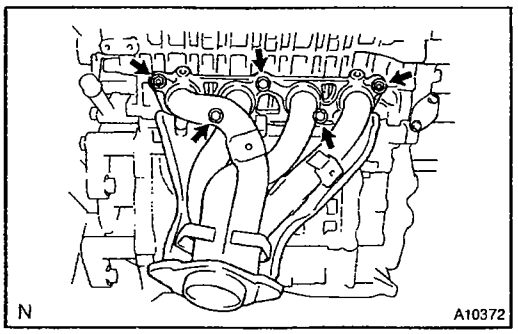


9. 1ZZ–FE:
INSTALL EXHAUST MANIFOLD

(a) Install the gasket and exhaust manifold with the 5 nuts.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

(b) Install the exhaust manifold stay with the 3 bolts.
Torque: 49 N·m (500 kgf·cm, 37ft·lbf)

(c) Install the upper heat insulator with the 6 bolts.
Torque: 12 N·m (123 kgf·cm, 9 ft·lbf)

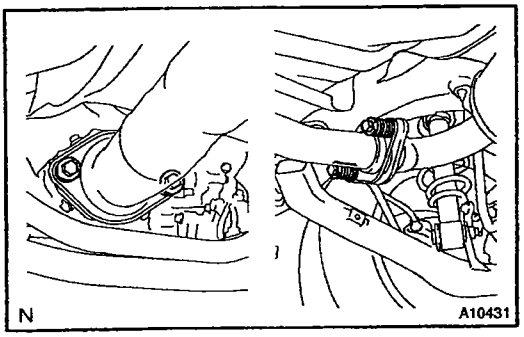


10. 2ZZ–GE:
INSTALL EXHAUST MANIFOLD

(a) Install the gasket and exhaust manifold with the 2 nuts and 3 bolts.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

(b) Install the exhaust manifold stay with the 4 bolts.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

(c) Install the upper heat insulator with the 5 bolts.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)



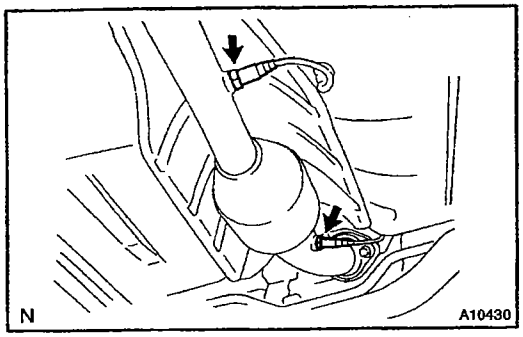
11. INSTALL EXHAUST PIPE

(a) Install the 2 gaskets and exhaust pipe.

(b) Connect the 2 O–rings.

(c) Install the 4 springs and bolts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

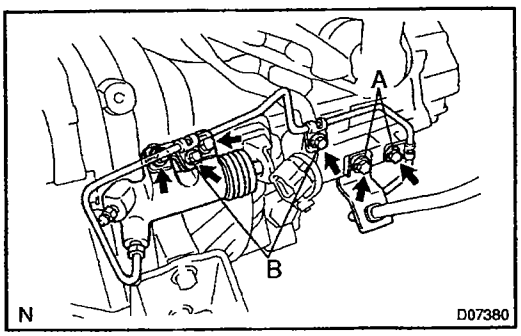


(d) Connect the 2 heated oxygen sensor.

12. INSTALL DRIVE SHAFT (See page SA–32)

13. CONNECT 2 GROUND CABLES

14. CONNECT TRANSAXLE CONTROL CABLE (S)



15. M/T:
CONNECT CLUTCH RELEASE CYLINDER

(a) Install the release cylinder with the 2 bolts.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(b) Install the brackets with the 3 bolts.

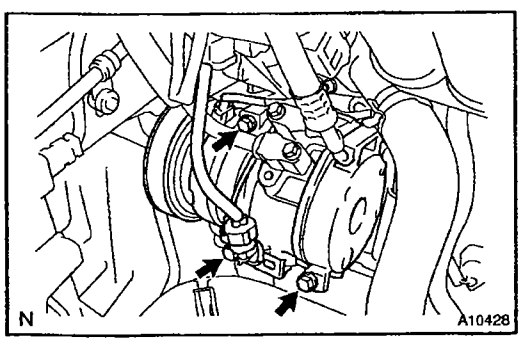
Torque:
Bolt A 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt B 4.9 N·m (50 kgf·cm, 43 in.·lbf)

16. CONNECT TUBE AND HOSE

(a) Connect the brake booster vacuum hose.

(b) Connect the 2 heater hoses to the engine side.

(c) Connect the fuel tube to the fuel pipe on vehicle side.



17. w/ A/C:
INSTALL A/C COMPRESSOR

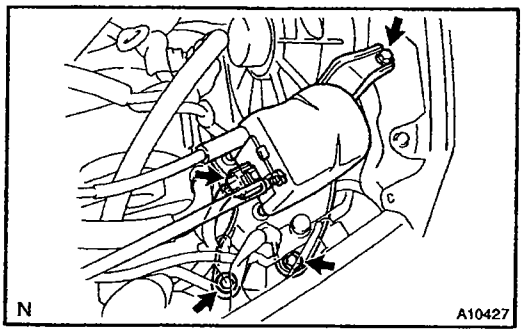
(a) Install the A/C compressor with the 3 bolts.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

(b) Connect the A/C compressor connector.

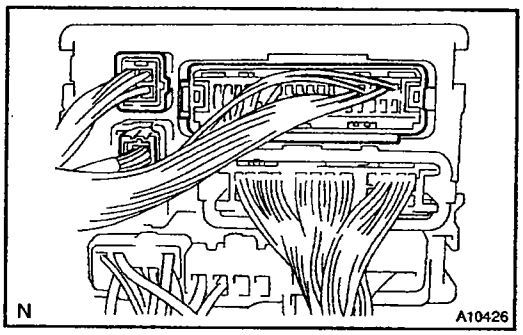
18. INSTALL GENERATOR AND DRIVE BELT (See page CH–17)

19. INSTALL RADIATOR ASSEMBLY (See page CO–23)



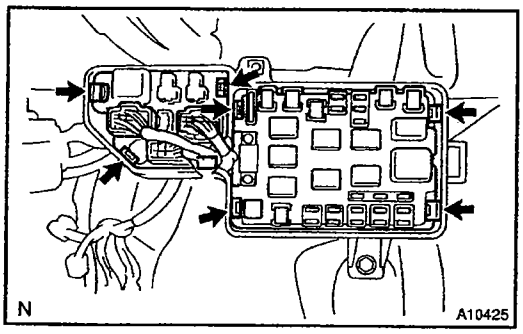
20. w/ Cruise Control System:
INSTALL CRUISE CONTROL ACTUATOR

(a) Install the actuator with the 3 bolts.
(b) Connect the actuator connector.

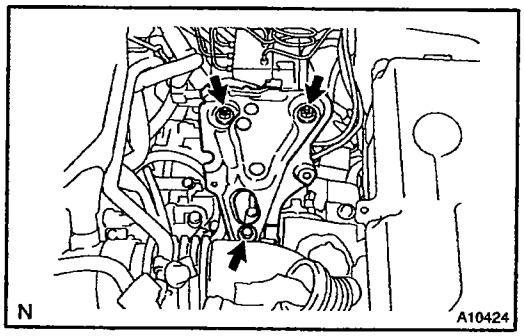


21. CONNECT ENGINE WIRE TO ENGINE COMPARTMENT RELAY BOX

(a) Install the engine wire to the relay box.
(b) Connect the 3 connectors.

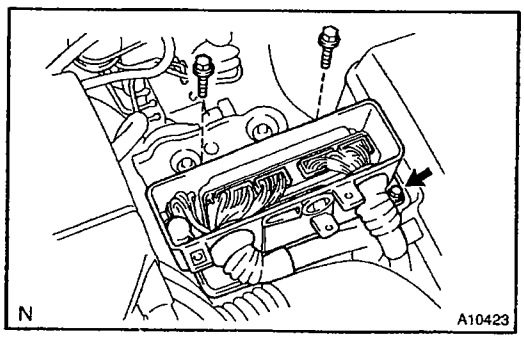


(c) Connect the J/B to the relay box.
(d) Connect the 3 connectors.
(e) Install the relay box upper cover.

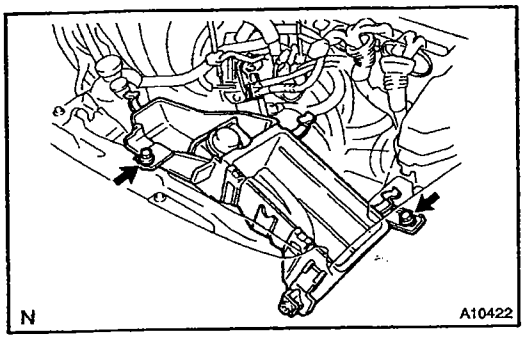


22. INSTALL ECM BOX

(a) Install the ECM box stay with the 2 nuts and bolt.
Torque:
Nut 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt 18 N·m (185 kgf·cm, 13 ft·lbf)

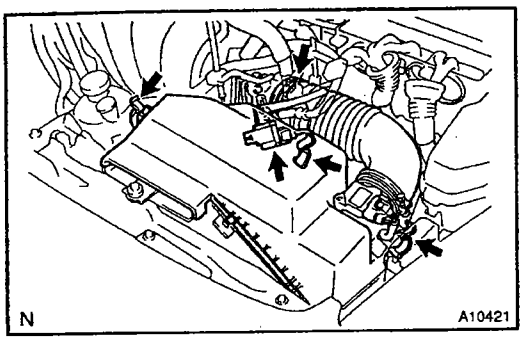


(b) Instal the ECM box with the 3 bolts.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
(c) Connect the 2 engine wire to the ECM box.
(d) Connect the clamp to the ECM box.
(e) Install the ECM to the ECM box.
(f) Connect the 2 connectors to the ECM box.
(g) Connect the 4 connectors to the ECM
(h) Install the ECM cover with the 2 bolts.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)



23. INSTALL AIR CLEANER CASE

(a) Connect the 2 hoses to the air cleaner case.
(b) Install the air cleaner case with the 2 bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(c) Connect the hose to the intake air control valve.
(d) Connect the hose to the VSV for canister closed valve (CVC).
(e) Install the air filter.



24. INSTALL AIR CLEANER CAP

(a) Install the air cleaner hose to the throttle body with the hose clamp.
(b) Connect the air cleaner cap to the air cleaner case with the 3 clamps.
(c) Connect the 2 hoses.
(d) Connect the VSV for EVAP.
(e) Connect the MAF meter connector.

25. INSTALL HEADLIGHT AND BUMPER COVER

26. INSTALL BATTERY AND TRAY

27. FILL WITH TRANSAXLE OIL

28. FILL WITH ENGINE OIL

29. FILL WITH ENGINE COOLANT (See page CO–2)

30. START ENGINE AND CHECK FOR LEADS

31. PERFORM ENGINE ADJUSTMENT

32. CHECK FRONT WHEEL ALIGNMENT

33. INSTALL ENGINE UNDER COVERS

34. INSTALL ENGINE HOOD

35. ROAD TEST VEHICLE

Check for abnormal noises, shock slippage, correct shift points and smooth operation.

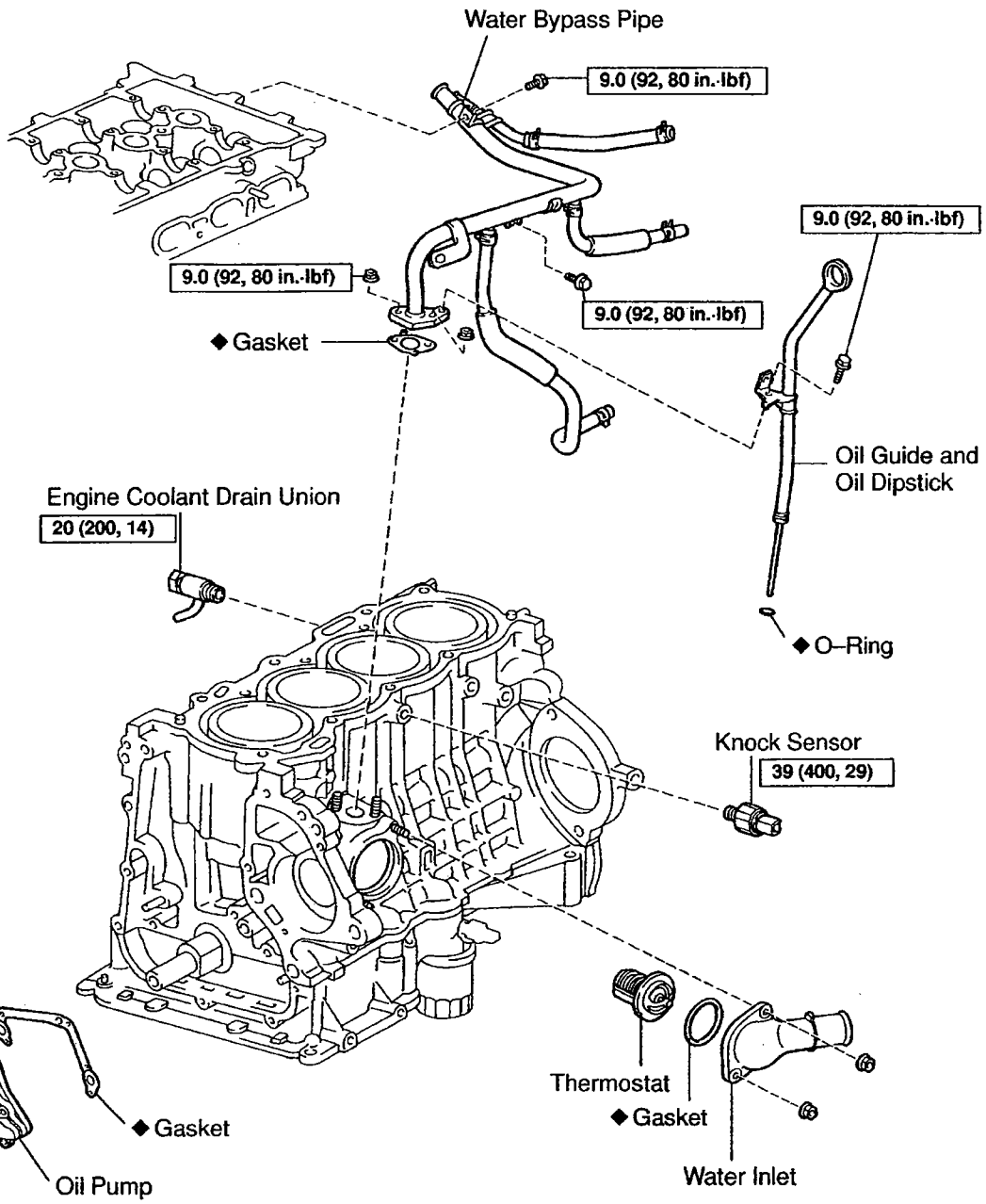
36. RECHECK ENGINE COOLANT AND OIL LEVELS

CYLINDER BLOCK

COMPONENTS

EM162-01

1ZZ–FE:

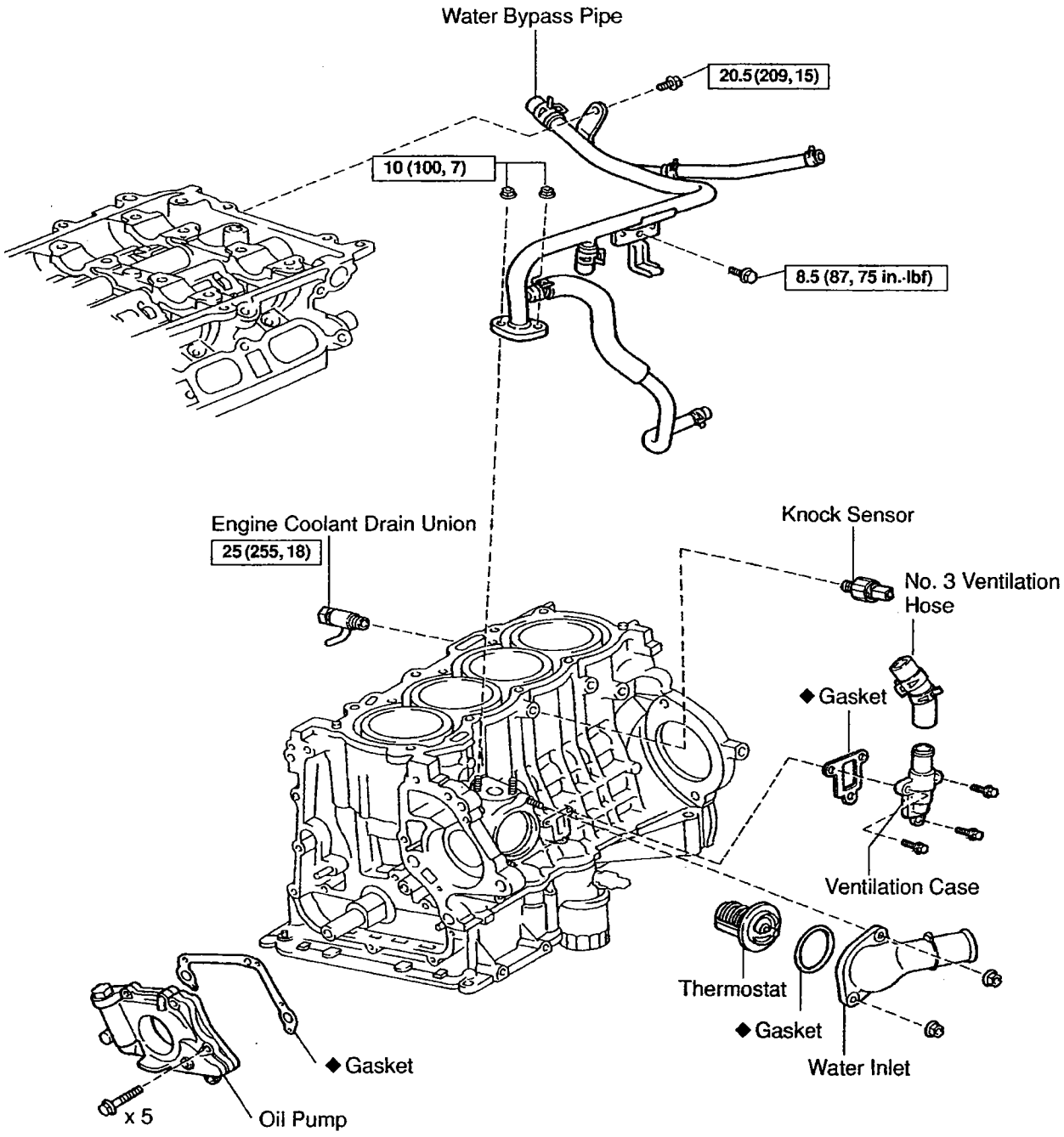


N·m (kgf·cm, ft·lbf) : Specified torque

N ◆ Non–reusable part

A10449

2ZZ–GE:



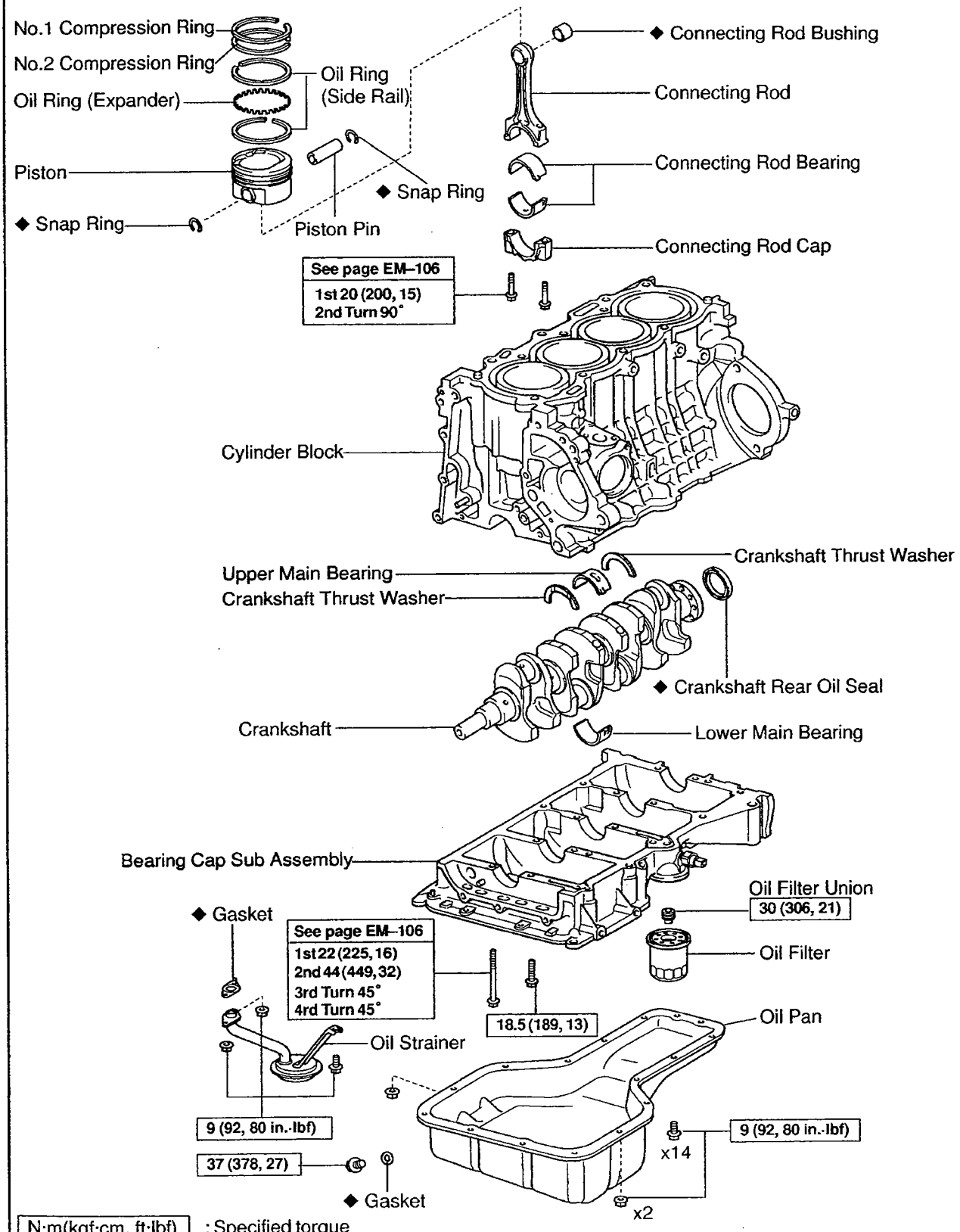
N

N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

A10360

1ZZ–FE:

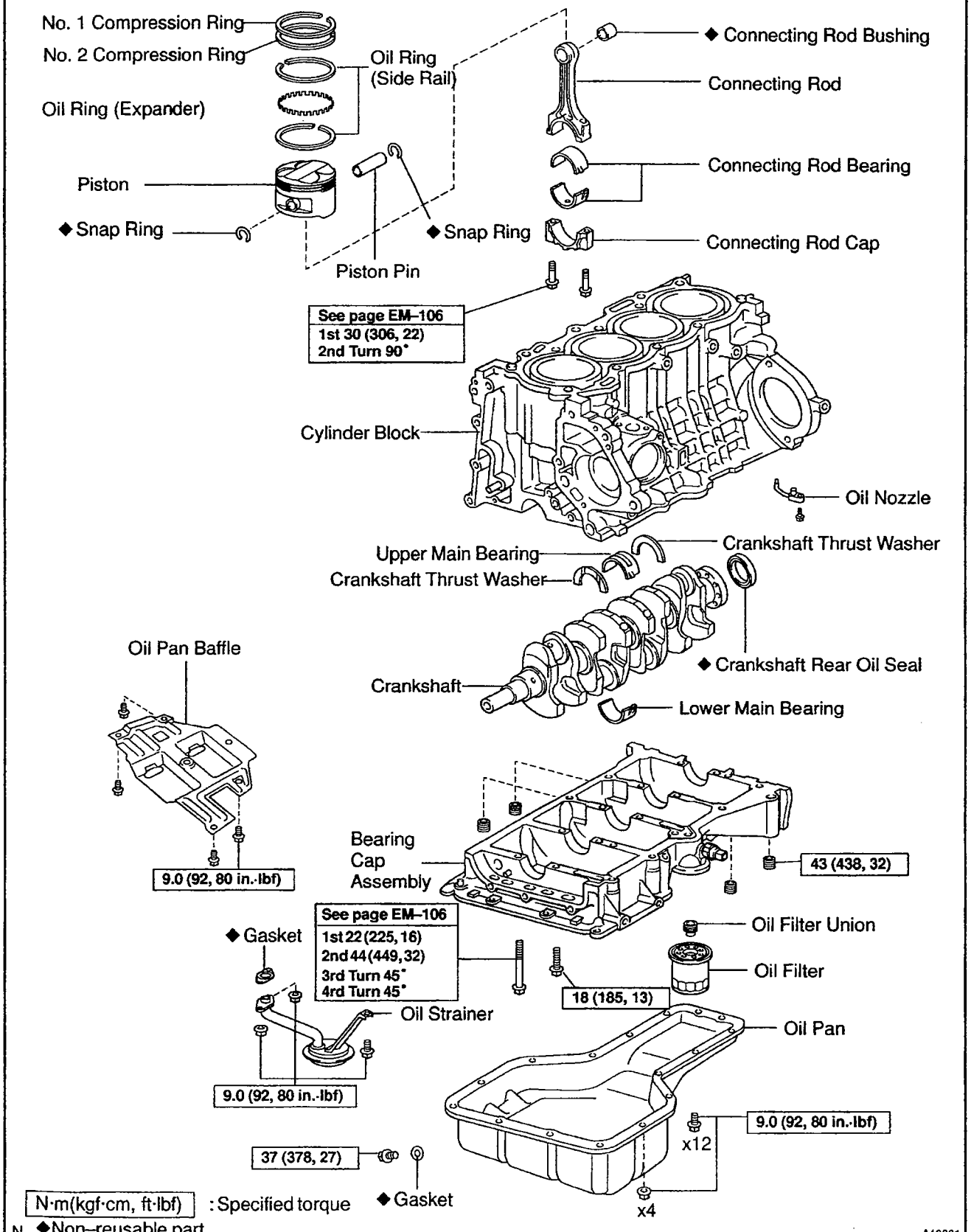


N·m(kgf·cm, ft·lbf) : Specified torque

◆Non–reusable part

A01210

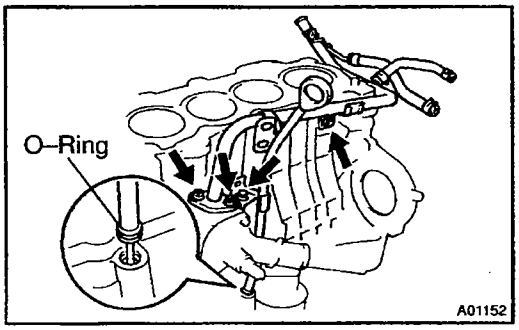
2ZZ–GE:


No. 1 Compression Ring
No. 2 Compression Ring
Oil Ring (Side Rail)
Oil Ring (Expander)
Piston
◆Snap Ring
◆Snap Ring
Piston Pin
◆ Connecting Rod Bushing
Connecting Rod
Connecting Rod Bearing
Connecting Rod Cap
See page EM–106
1st 30 (306, 22)
2nd Turn 90°
Cylinder Block
Oil Nozzle
Upper Main Bearing
Crankshaft Thrust Washer
Crankshaft Thrust Washer
◆ Crankshaft Rear Oil Seal
Crankshaft
Lower Main Bearing
Oil Pan Baffle
9.0 (92, 80 in.·lbf)
Bearing Cap Assembly
43 (438, 32)
See page EM–106
1st 22 (225, 16)
2nd 44 (449, 32)
3rd Turn 45°
4rd Turn 45°
◆Gasket
Oil Filter Union
Oil Filter
18 (185, 13)
Oil Strainer
Oil Pan
9.0 (92, 80 in.·lbf)
9.0 (92, 80 in.·lbf)
x12
37 (378, 27)
◆Gasket
x4
N·m(kgf·cm, ft·lbf) : Specified torque
N ◆Non–reusable part
A10361

EM163–01

DISASSEMBLY

1. **M/T:**
   REMOVE FLYWHEEL
2. **A/T:**
   REMOVE DRIVE PLATE
3. **INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY**
4. **REMOVE TIMING CHAIN AND SPROCKETS (See page EM–18)**
5. **REMOVE ENGINE WIRE**
6. **REMOVE CYLINDER HEAD (See page EM–42)**



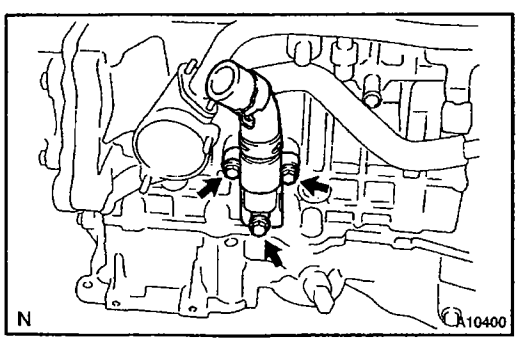
7. **1ZZ–FE:**
   REMOVE OIL DIPSTICK AND GUIDE

(a) Remove the bolt and oil dipstick and guide.
(b) Remove the O–ring from the dipstick.

8. **REMOVE WATER BYPASS PIPE**

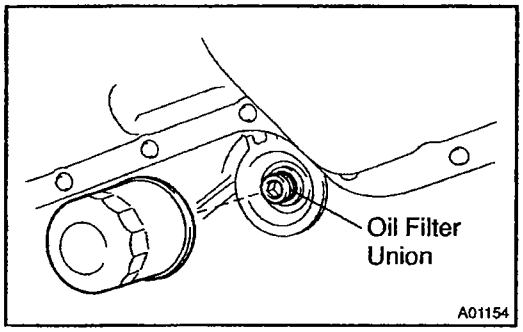
Remove the 2 nuts, bolts and water bypass pipe.

9. **REMOVE THERMOSTAT (See page CO–9)**
10. **REMOVE KNOCK SENSOR**
11. **REMOVE ENGINE COOLANT DRAIN UNION**
12. **REMOVE OIL PUMP (See page LU–9)**



13. **2ZZ–GE:**
    REMOVE VENTILATION CASE

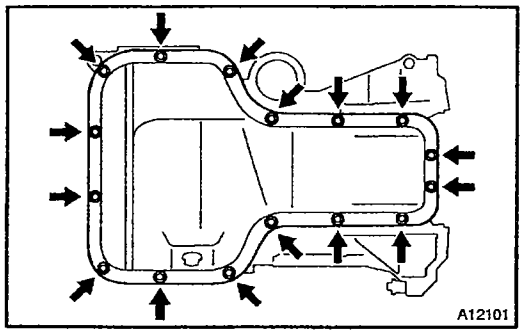
(a) Remove the 3 nuts, ventilation case and gasket.
(b) Remove the clip and No. 3 ventilation hose.



14. REMOVE OIL FILTER (See page LU–3)

15. REMOVE OIL FILTER UNION

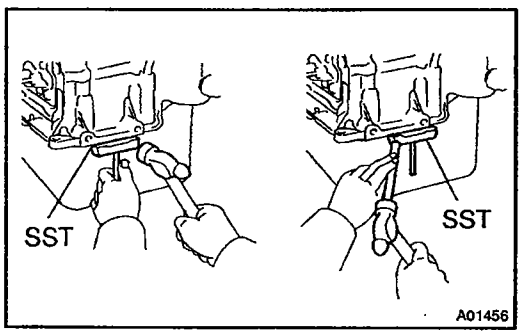
Using a 12 mm hexagon wrench, remove the oil filter union.



16. REMOVE OIL PAN

(a) 1ZZ–FE:
Remove the 14 bolts and 2 nuts.

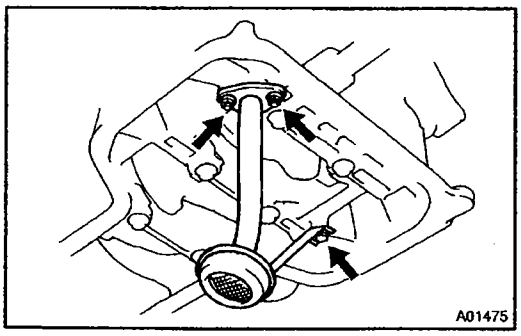
(b) 2ZZ–GE:
Remove the 12 bolts and 4 nuts.



(c) Insert the blade of SST between the bearing cap sub–assembly and oil pan, and cut off applied sealer and remove the oil pan.
SST 09032–00100

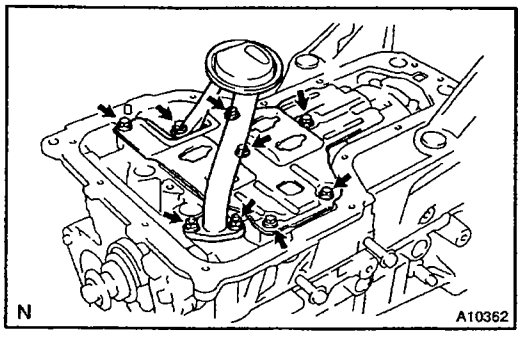
NOTICE:

- **Be careful not to the damage the oil pan contact surface of the bearing cap sub–assembly.**
- **Be careful not to damage the oil pan flange.**



17. 1ZZ–FE:
REMOVE OIL STRAINER

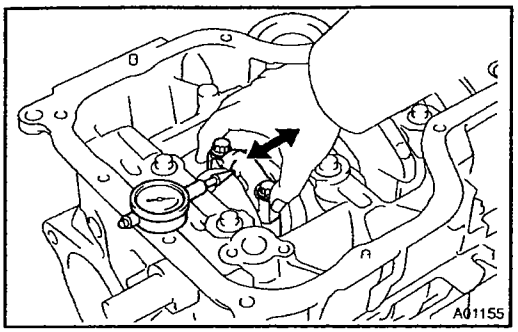
Remove the 2 nuts, bolt, oil strainer and gasket.



18. 2ZZ–GE:
REMOVE OIL STRAINER AND OIL PAN BAFFLE

(a) Remove the 2 nuts, bolt, oil strainer and gasket.

(b) Remove the 4 bolts, 2 nuts and oil pan baffle.



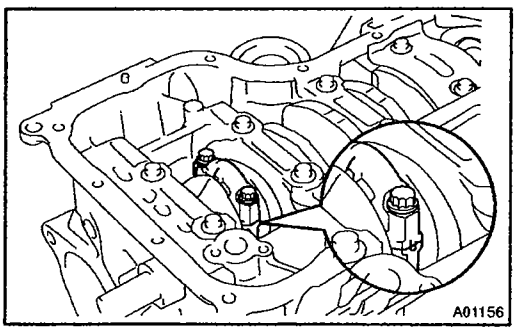
19. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:
0.160 – 0.342 mm (0.0063 – 0.0135 in.)
Maximum thrust clearance:
0.342 mm (0.0135 in.)

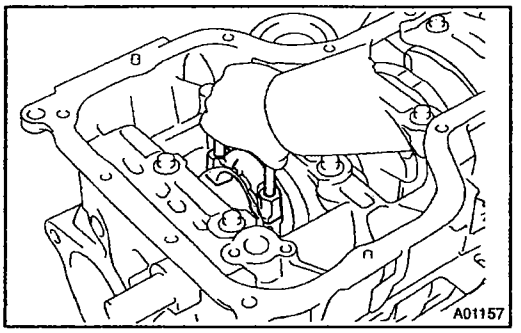
If the thrust clearance is greater than maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.

Connecting rod thickness:
19.788 – 19.840 mm (0.7791 – 0.7811 in.)



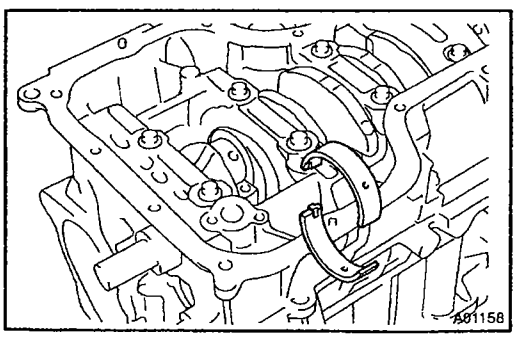
20. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

(a) Check the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.
(b) Remove the 2 connecting rod cap bolts.



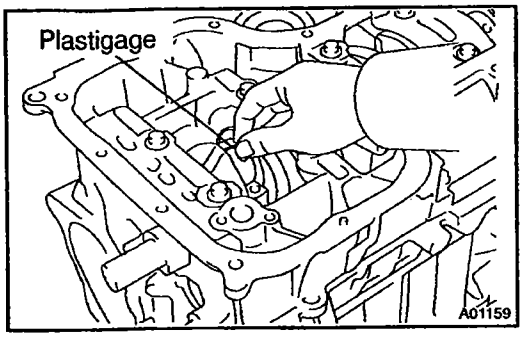
(c) Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

HINT:
Keep the lower bearing inserted with the connecting rod cap.

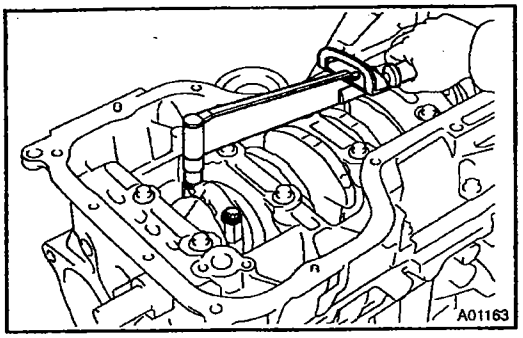


(d) Clean the crank pin and bearing.
(e) Check the crank pin and bearing for pitting and scratches.

If the crank pin or bearing is damaged, replace the bearings.
If necessary, replace the crankshaft.



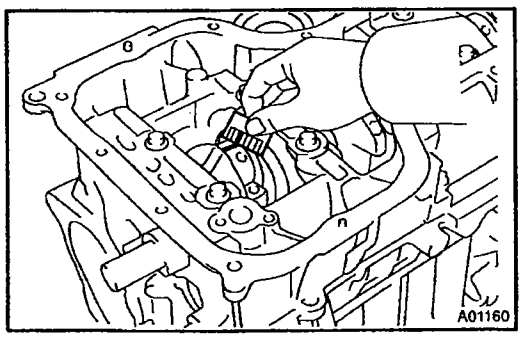
(f) Lay a strip of Plastigage the crank pin.



(g) Install the connecting rod cap with the 2 bolts (See page EM–106).
Torque:
1st:
1ZZ–FE: 20 N·m (204 kgf·cm, 15 ft·lbf)
2ZZ–GE: 30 N·m (306 kgf·cm, 22 ft·lbf)
2nd: Turn extra 90°

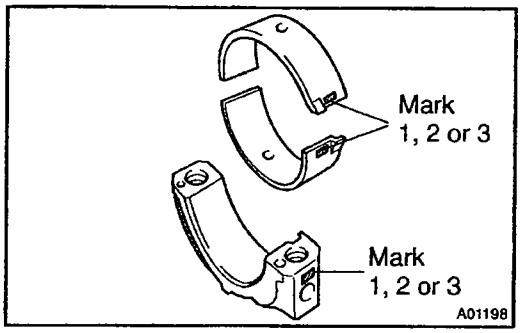
NOTICE:
Do not turn the crankshaft.

(h) Remove the 2 bolts, connecting rod cap and lower bearing. (See procedure (b) and (c) above)



(i) Measure the Plastigage at its widest point.
Standard oil clearance:
1ZZ–FE:
0.028 – 0.060 mm (0.0011 – 0.0024 in.)
2ZZ–GE:
0.028 – 0.052 mm (0.0011 – 0.0020 in.)
Maximum oil clearance;
0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.



HINT:
If replacing a bearing, replace it with one having the same number as marked on the connecting rod. There are 3 sizes of standard bearings, marked "1", "2" and "3" accordingly.

Reference

Standard bearing center wall thickness

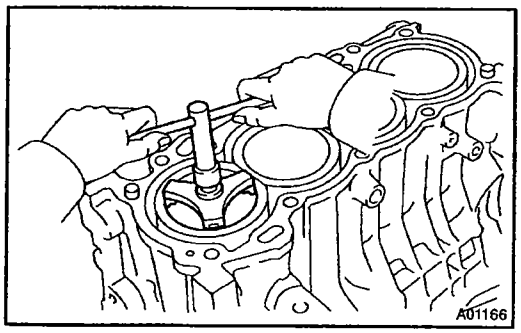
1ZZ–FE:

Mark	mm (in.)
"1"	1.486 – 1.490 (0.0585 – 0.0587)
"2"	1.490 – 1.494 (0.0587 – 0.0588)
"3"	1.494 – 1.498 (0.0588 – 0.0590)

2ZZ–GE:

Mark	mm (in.)
"1"	1.482 – 1.486 (0.0583 – 0.0585)
"2"	1.486 – 1.490 (0.0585 – 0.0587)
"3"	1.490 – 1.494 (0.0587 – 0.0588)

(j) Completely remove the Plastigage.



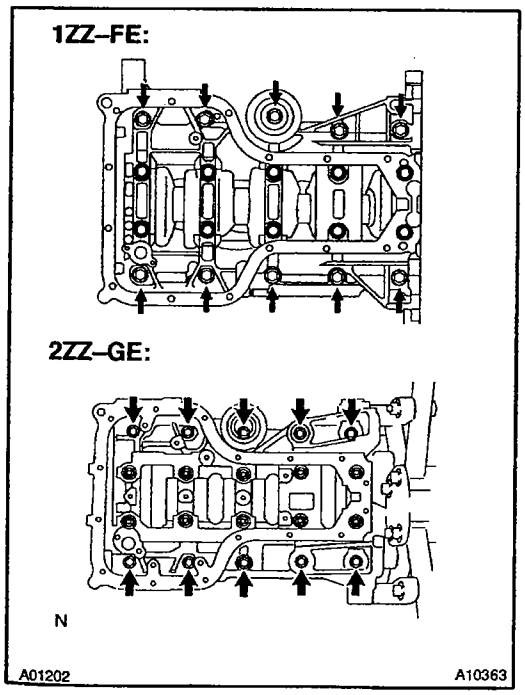
21. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.

(b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order.

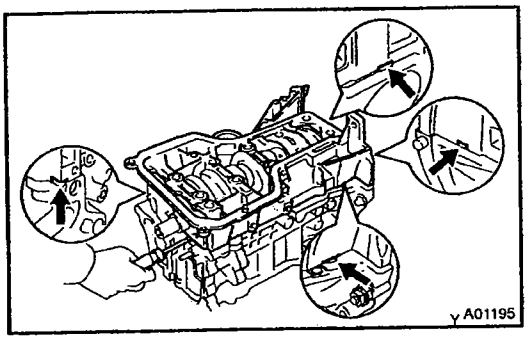


22. REMOVE BEARING CAP SUB–ASSEMBLY AND CRANKSHAFT REAR OIL SEAL, AND CHECK OIL CLEARANCE

(a) 2ZZ–GE:
Remove the 4 screw plugs from the bearing cap sub–assembly.

(b) Remove the 10 hexagon head bearing cap sub–assembly bolts.

(c) Uniformly loosen and remove the 10 bearing cap sub–assembly bolts, in several passes, in the sequence shown.



(d) Using a screwdriver, remove the bearing cap sub–assembly by prying the portions between the cylinder block and bearing cap sub–assembly. Remove the 5 lower main bearings.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder block and bearing cap sub–assembly.

HINT:

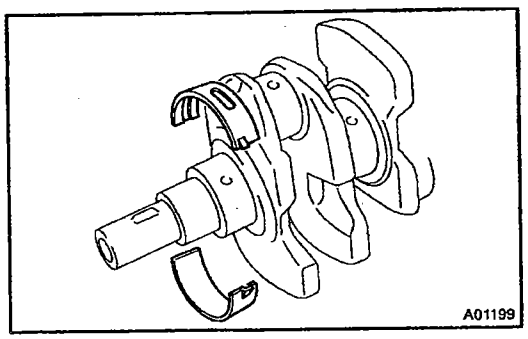
Keep the lower bearing and bearing cap sub–assembly together.

(e) Remove the crankshaft rear oil seal.

(f) Lift out the crankshaft.

HINT:

Keep the upper bearings together with the cylinder block.

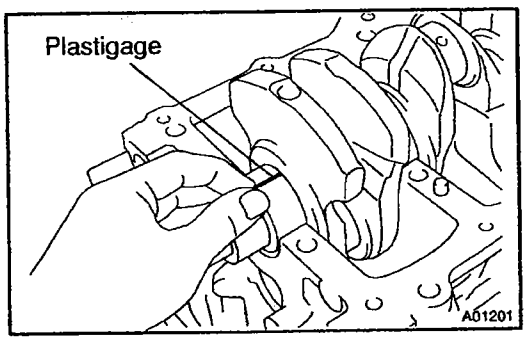


(g) Clean each main journal and bearing.

(h) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings.

If necessary, replace the crankshaft.



(i) Place the crankshaft on the cylinder block.

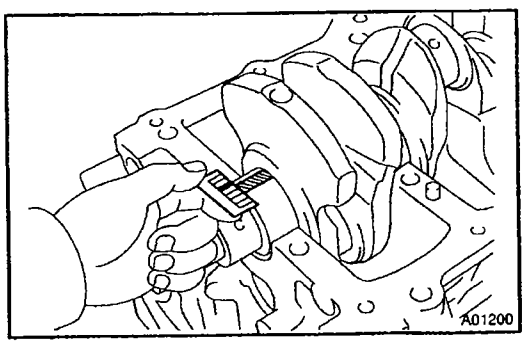
(j) Lay a strip of Plastigage across each journal.

(k) Install the bearing cap sub–assembly (See page EM–106).

NOTICE:

Do not turn the crankshaft.

(l) Remove the bearing cap sub–assembly (See procedures (a) to (e) above).



(m) Measure the Plastigage at its widest point.

Standard oil clearance:

1ZZ–FE:

0.015 – 0.032 mm (0.0006 – 0.0013 in.)

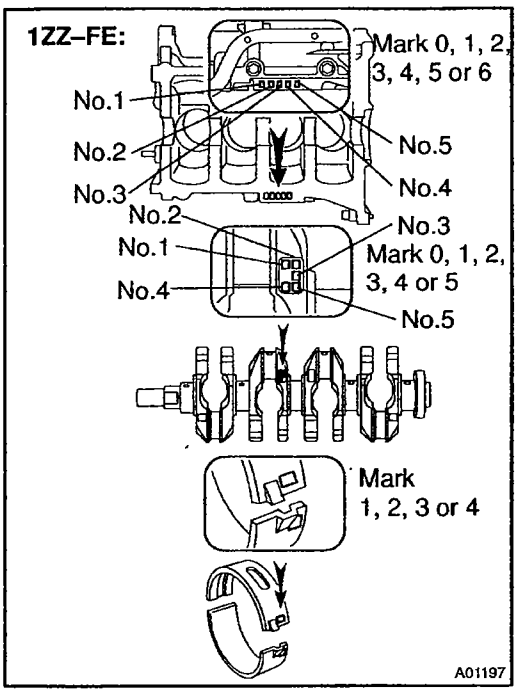
2ZZ–GE:

0.016 – 0.032 mm (0.0006 – 0.0013 in.)

Maximum oil clearance:

0.050 mm (0.0020 in.)

If the oil clearance is greater then maximum, replace the bearings. If necessary, replace the crankshaft.

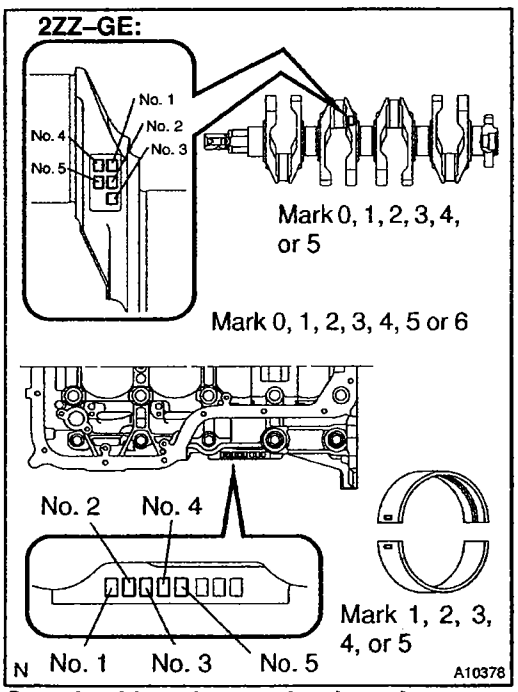


(n) 1ZZ–FE:

If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then selecting the bearing with the same number as the total. There are 4 sizes of standard bearings, marked "1", "2", "3" and "4" accordingly.

	Total number			" ": Number mark
Cylinder block (A) + Crankshaft (B)	0 – 2	3 – 5	6 – 8	9 –11
Use bearing	"1"	"2"	"3"	"4"

EXAMPLE: Cylinder block "4" (A)
+ Crankshaft "3" (B)
= Total number 7 (Use bearing "3")



(o) 2ZZ–GE:

If using standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, refer to the following table to select bearing.

Standard bearings selection chart

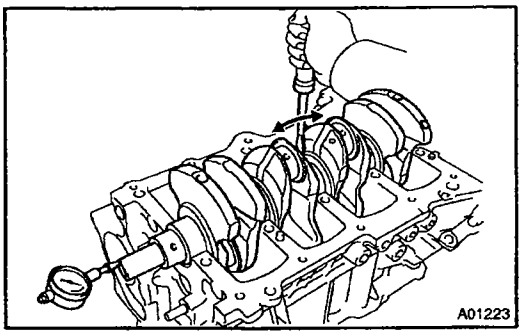
Cylinder block Number mark	Crank shaft number mark					
	0	1	2	3	4	5
0	1	1	1	2	2	2
1	1	1	2	2	2	3
2	1	2	2	2	3	3
3	2	2	2	3	3	3
4	2	3	3	3	4	4
5	3	3	3	4	4	4
6	3	3	4	4	4	5

EXAMPLE: Cylinder block "4", Crank shaft "3", Use bearing "3"

Reference

Item	Mark	mm (in.)
Cylinder block main journal bore diameter (A)	"0"	52.000 – 52.003 (2.0472 – 2.0473)
	"1"	52.003 – 52.005 (2.0473 – 2.0474)
	"2"	52.005 – 52.007 (2.0474 – 2.0475)
	"3"	52.007 – 52.010 (2.0475 – 2.0476)
	"4"	52.010 – 52.012 (2.0476 – 2.0477)
	"5"	52.012 – 52.014 (2.0477 – 2.0478)
	"6"	52.014 – 52.016 (2.0478 – 2.0479)
Crankshaft main journal diameter (B)	"0"	47.998 – 48.000 (1.8897 – 1.8898)
	"1"	47.996 – 47.998 (1.8896 – 1.8897)
	"2"	47.994 – 47.996 (1.8895 – 1.8896)
	"3"	47.992 – 47.994 (1.8894 – 1.8895)
	"4"	47.990 – 47.992 (1.8893 – 1.8894)
	"5"	47.988 – 47.990 (1.8892 – 1.8893)
1ZZ–FE: Standard bearing center wall thickness	"1"	1.993 – 1.996 (0.0785 – 0.0786)
	"2"	1.996 – 1.999 (0.0786 – 0.0787)
	"3"	1.999 – 2.002 (0.0787 – 0.0788)
	"4"	2.002 – 2.005 (0.0788 – 0.0789)
2ZZ–GE Standard bearing center wall thickness	"1"	1.989 – 1.992 (0.0783 – 0.0784)
	"2"	1.992 – 1.995 (0.0784 – 0.0785)
	"3"	1.995 – 1.998 (0.0785 – 0.0787)
	"4"	1.998 – 2.001 (0.0787 – 0.0788)
	"5"	2.001 – 2.004 (0.0788 – 0.0789)

(p) Completely remove the Plastigage.



23. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.04 – 0.24 mm (0.0016 – 0.0094 in.)
Maximum thrust clearance:
0.30 mm (0.0118 in.)

If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:
2.430 – 2.480 mm (0.0957 – 0.0976 in.)

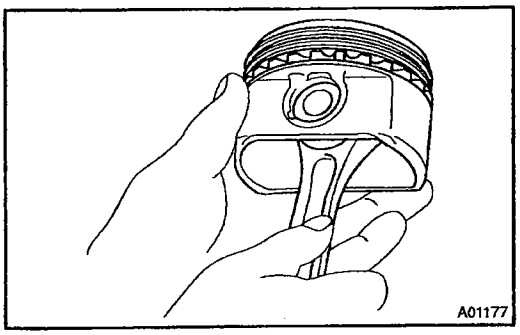
24. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the 5 upper main bearings and 2 thrust washers from the cylinder block.

HINT:

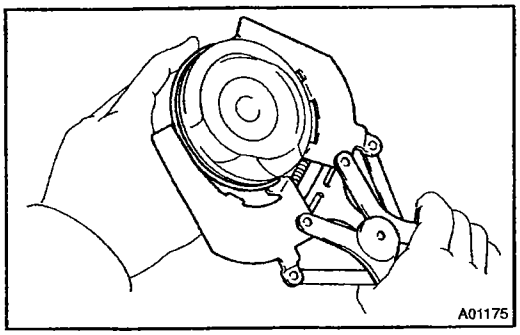
Arrange the main bearings and thrust washers in the correct order.



25. CHECK FIT BETWEEN PISTON AND PISTON PIN

Try to move the piston back and forth on the piston pin.

If any movement is felt, replace the piston and pin as a set.



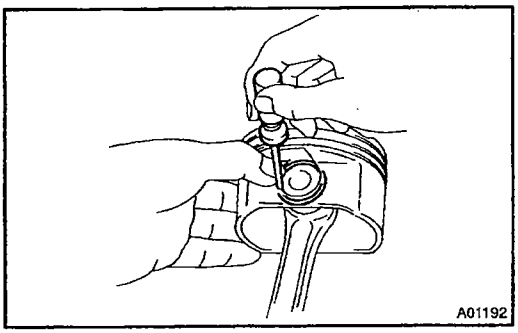
26. REMOVE PISTON RINGS

(a) Using a piston ring expander, remove the 2 compression rings.

(b) Remove the 2 side rails and oil ring by hand.

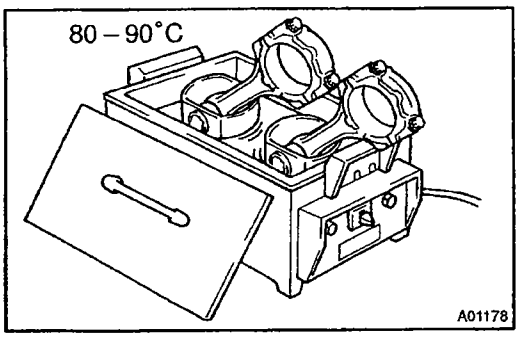
HINT:

Arrange the piston rings in the correct order only.



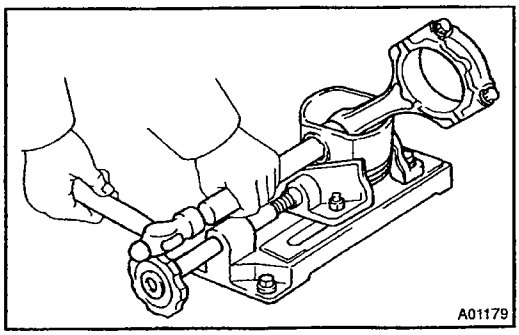
27. DISCONNECT CONNECTING ROD FROM PISTON

(a) Using a small screwdriver, pry out the 2 snap rings.



(b) 1ZZ–FE:

Gradually heat the piston to 80 – 90°C (176 – 194°F).



(c) 1ZZ–FE:

Using a plastic–faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

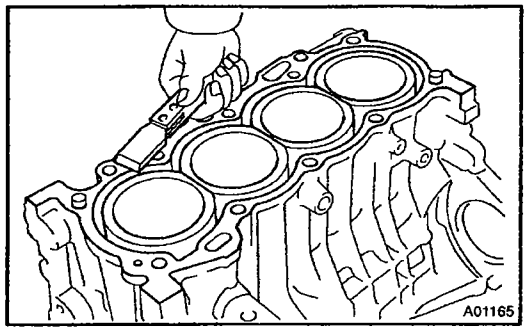
- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.

(d) 2ZZ–GE:

Remove the pin and connecting rod from the piston.

EM164-01

INSPECTION



1. REMOVE GASKET MATERIAL

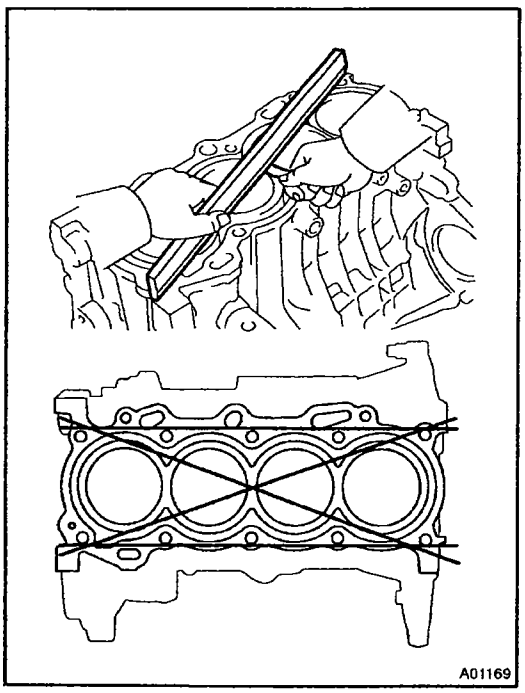
Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

2. CLEAN CYLINDER BLOCK

Using a soft brush and solvent, thoroughly clean the cylinder block.

NOTICE:

If the cylinder is washed at high temperatures, the cylinder liner sticks out beyond the cylinder block, so always wash the cylinder block at a temperature of 45°C (133°F) or less.

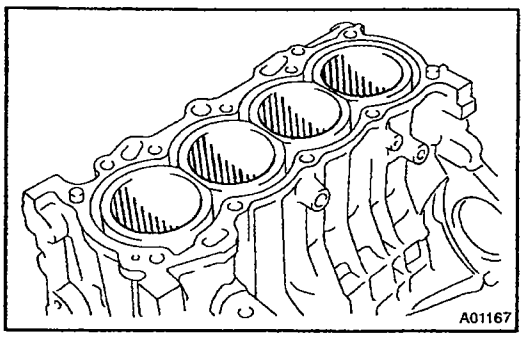


3. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

Maximum warpage: 0.05 mm (0.0020 in.)

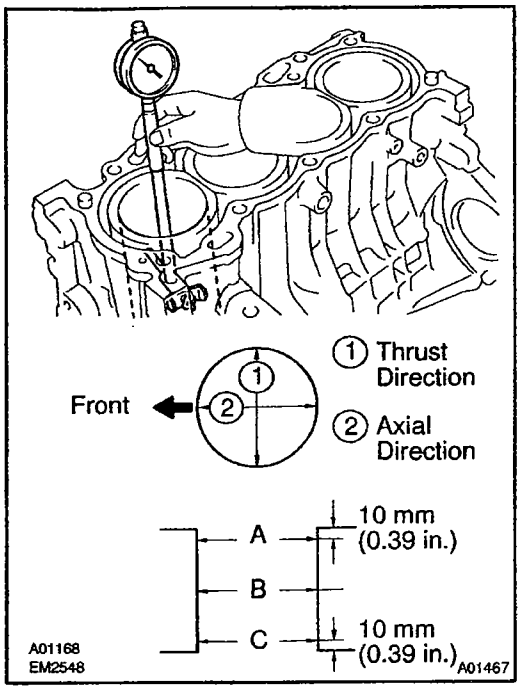
If warpage is greater than maximum, replace the cylinder block.



4. INSPECT CYLINDER BORE DIAMETER

Visually check the cylinder for vertical scratches.

If deep scratches are present, replace the cylinder block.

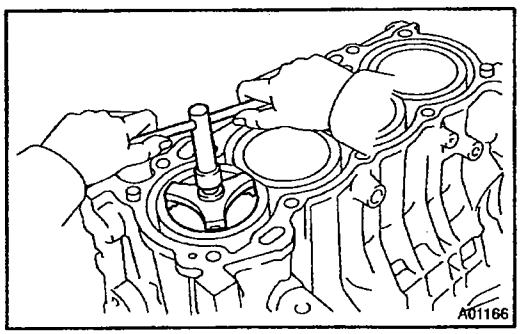


5. INSPECT CYLINDER BORE DIAMETER

Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

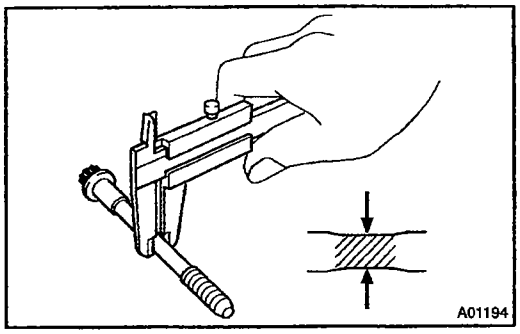
Standard diameter:
1ZZ–FE 79.000 – 79.013 mm (3.1102 – 3.1107 in.)
2ZZ–GE 82.000 – 82.013 mm (3.2283 – 3.2289 in.)
Maximum diameter:
1ZZ–FE 79.013 mm (3.1107 in.)
2ZZ–GE 82.013 mm (3.2289 in.)

If the diameter is greater than maximum, replace the cylinder block.



6. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

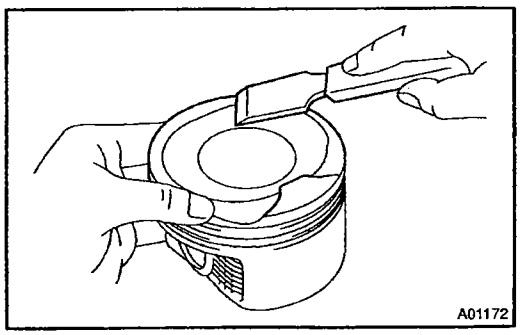


7. INSPECT 12 POINTED HEAD BEARING CAP SUB–ASSEMBLY BOLTS

Using vernier calipers, measure the tension portion diameter of the bolt.

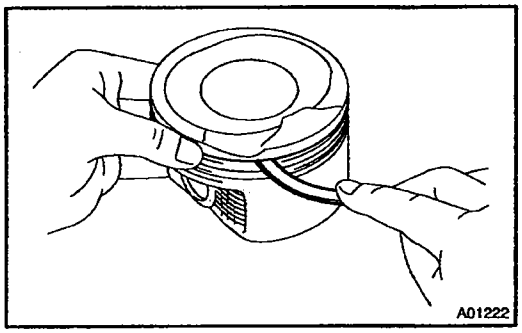
Standard diameter: 7.3 – 7.5 mm (0.287 – 0.295 in.)
Minimum diameter: 7.3 mm (0.287 in.)

If the diameter is less than minimum, replace the bolt.

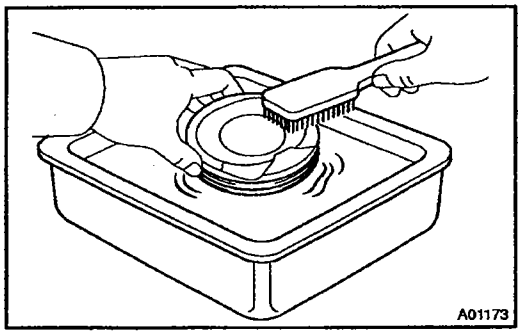


8. CLEAN PISTON

(a) Using a gasket scraper, remove the carbon from the piston top.



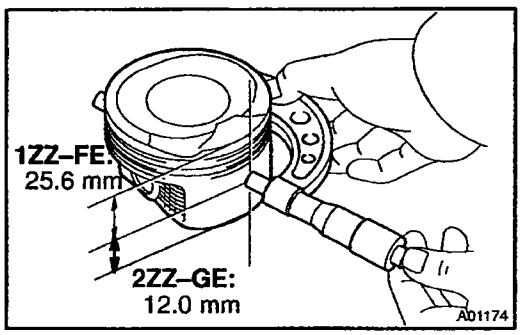
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



9. INSPECT PISTON OIL CLEARANCE

(a) 1ZZ–FE:
Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 25.6 mm (1.008 in.) from the piston head.

(b) 2ZZ–GE:
Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 12.0 mm (0.048 in.) from the piston bottom.

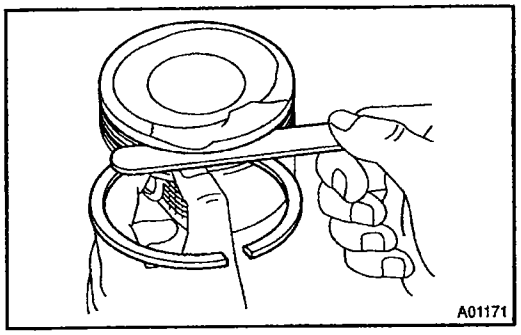
Piston diameter:
1ZZ–FE:
78.925 – 78.935 mm (3.1073 – 3.1077 in.)
2ZZ–GE:
81.975 – 81.993 mm (3.2274 – 3.2281 in.)

(c) Measure the cylinder bore diameter in the thrust directions (See procedure in step 5).

(d) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:
1ZZ–FE:
0.065 – 0.088 mm (0.0026 – 0.0035 in.)
2ZZ–GE:
0.007 – 0.038 mm (0.0003 – 0.0015 in.)
Maximum oil clearance:
0.10 mm (0.0039 in.)

If the oil clearance is greater than maximum, replace all the 4 pistons. If necessary, replace the cylinder block.

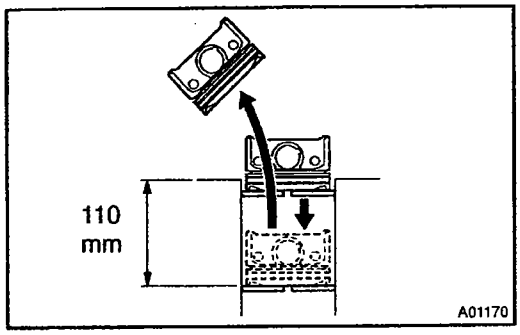


10. INSPECT PISTON RING END GAP

Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

Ring groove clearance:
0.030 – 0.070 mm (0.0012 – 0.0028 in.)

If the clearance is not as specified, replace the piston.



11. INSPECT PISTON RING END GAP

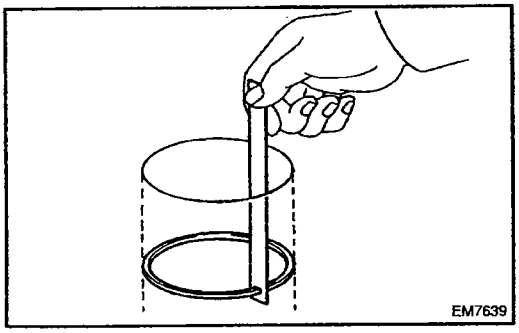
(a) Insert the piston ring into the cylinder bore.

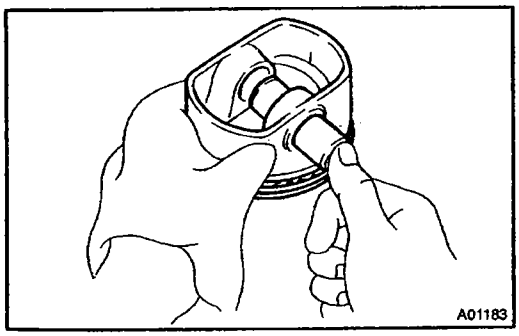
(b) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 110 mm (4.33 in.) from the top of the cylinder block.

(c) Using a feeler gauge, measure the end gap.

Standard end gap:
No.1 0.25 – 0.35 mm (0.0098 – 0.0138 in.)
No.2 0.35 – 0.50 mm (0.0138 – 0.0197 in.)
Oil (Side rail) 0.15 – 0.40 mm (0.0059 – 0.0157 in.)
Maximum end gap:
No.1 1.05 mm (0.0413 in.)
No.2 1.20 mm (0.0472 in.)
Oil (Side rail) 1.05 mm (0.0413 in.)

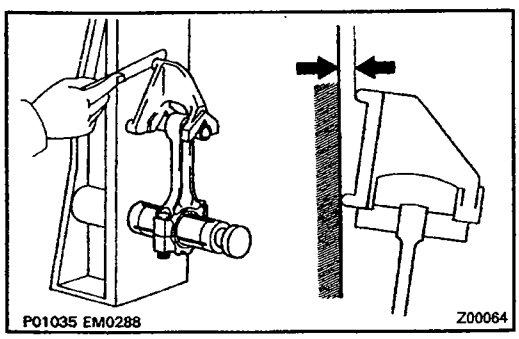
If the end gap is greater than maximum, replace the piston ring.
If the end gap is greater than maximum, even with a new piston ring, replace the cylinder block.





12. INSPECT PISTON PIN FIT

At 80 – 90°C (176 – 194°F), you should be able to push the piston pin into the piston pin hole with your thumb.



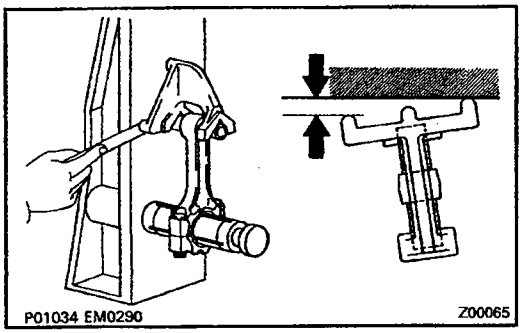
13. INSPECT CONNECTING ROD ALIGNMENT

Using a rod aligner and feeler gauge, check the connecting rod alignment.

- Check for out–of–alignment

Maximum out–of alignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

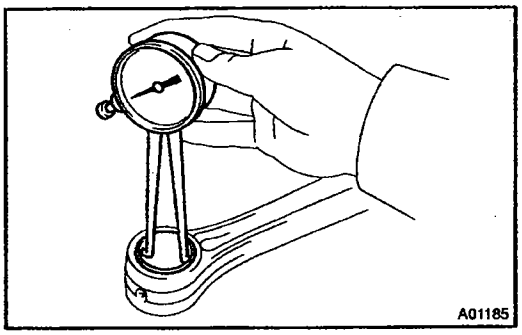
If out–of alignment is greater than maximum, replace the connecting rod assembly.



- Check for twist

Maximum twist:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

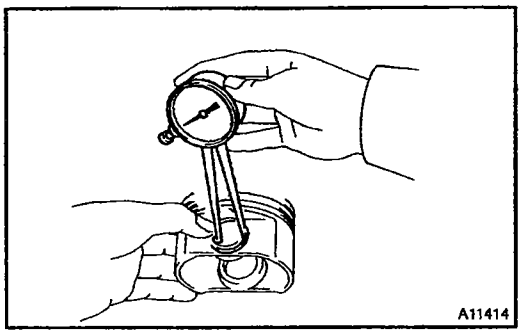
If twist is greater than maximum, replace the connecting rod assembly.



14. INSPECT PISTON PIN OIL CLEARANCE

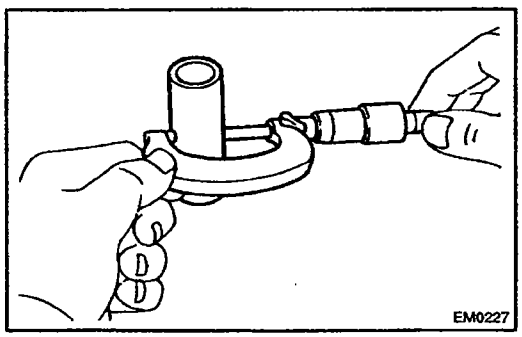
(a) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:
1ZZ–FE 20.012 – 20.021 mm (0.7879 – 0.7882 in.)
2ZZ–GE 20.011 – 20.023 mm (0.7878 – 0.7883 in.)



(b) 2ZZ–GE:
Using caliper gauge, measure the inside diameter of the piston bushing.

Bushing inside diameter:
20.013 – 20.025 mm (0.7879 – 0.7884 in.)



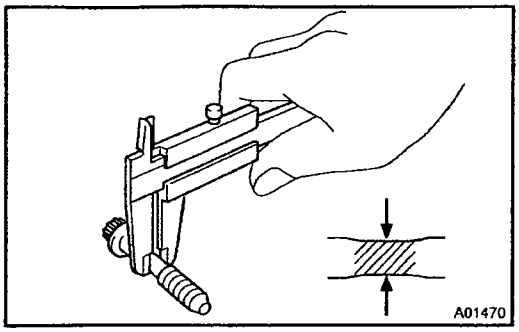
(c) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:
1ZZ–FE 20.004 – 20.013 mm (0.7876 – 0.7879 in.)
2ZZ–GE 20.004 – 20.016 mm (0.7876 – 0.7880 in.)

(d) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

Standard oil clearance:
1ZZ–FE 0.005 – 0.011 mm (0.0002 – 0.0004 in.)
2ZZ–GE
Piston x Piston pin
0.005 – 0.013 mm (0.0002 – 0.0005 in.)
Piston pin x Connecting rod
0.005 – 0.009 mm (0.0002 – 0.0004 in.)
Maximum oil clearance:
0.05 mm (0.0020 in.)

If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.

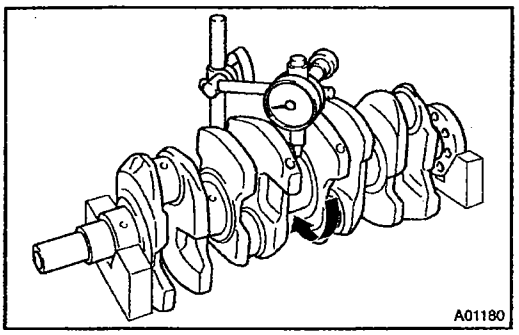


15. INSPECT CONNECTING ROD BOLTS

Using a vernier calipers, measure the tension portion diameter of the bolt.

Standard diameter: 6.6 – 6.7 mm (0.260 – 0.264 in.)
Minimum diameter: 6.4 mm (0.252 in.)

If the diameter is less than minimum, replace the bolt.



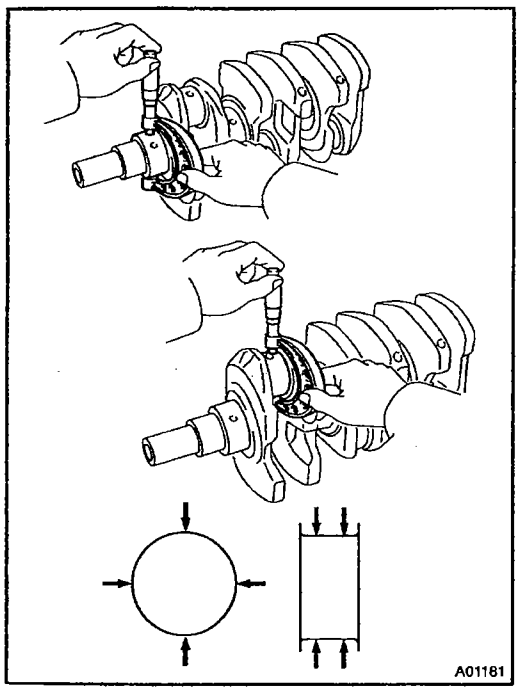
16. INSPECT CRANKSHAFT FOR CIRCLE RUNOUT

(a) Place the crankshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout, as shown in the illustration.

Maximum circle runout: 0.03 mm (0.0012 in.)

If the circle runout is greater than maximum, replace the crankshaft.



17. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:
47.988 – 48.000 mm (1.8893 – 1.8898 in.)
Crank pin diameter:
1ZZ–FE:
43.992 – 44.000 mm (1.7320 – 1.7323 in.)
2ZZ–GE:
44.992 – 45.000 mm (1.7713 – 1.7717 in.)

If the diameter is not as specified, check the oil clearance (See page EM–89).

If necessary, replace the crankshaft.

(b) Check each main journal and crank pin for taper and out–of–round as shown.

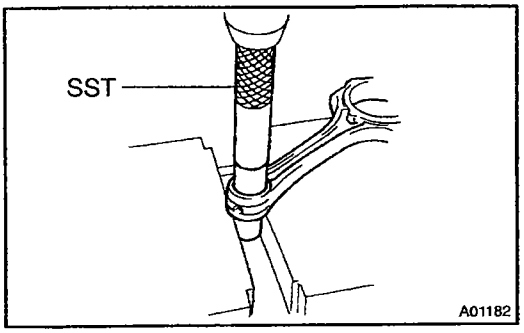
Maximum taper and out–of–round:
0.02 mm (0.0008 in.)

If the taper and out–of round is greater than maximum, replace the crankshaft.

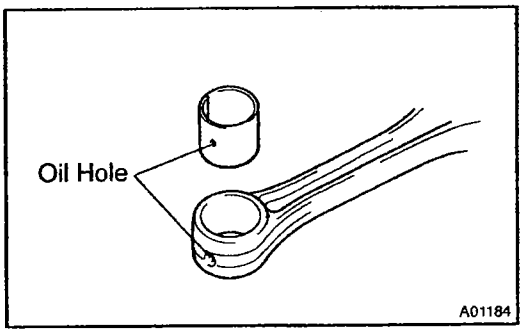
EM066-03

REPLACEMENT

1. REPLACE CONNECTING ROD BUSHINGS

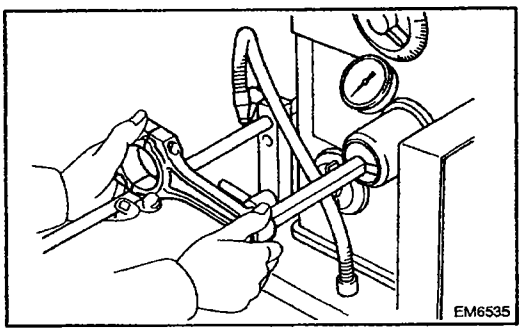


(a) Using SST and a press, press out the bushing.
SST 09222–30010

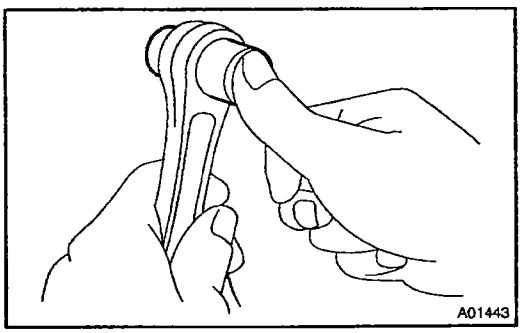


(b) Align the oil hoses of a new bushing and the connecting rod.

(c) Using SST and a press, press in the bushing.
SST 09222–30010

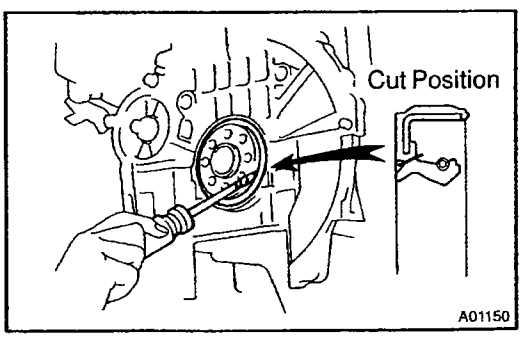


(d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (See page EM–98) between the bushing and piston pin.



(e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

2. REPLACE CRANKSHAFT REAR OIL SEAL



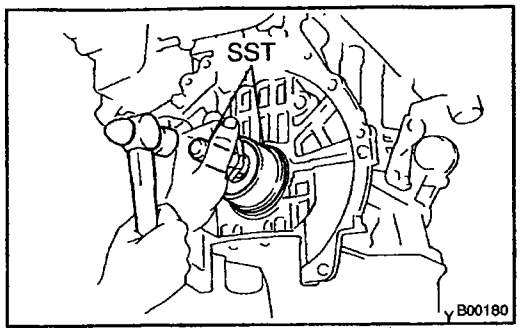
If rear oil seal is installed to cylinder block.

(a) Using a knife cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.



(c) Apply MP grease to a new oil seal lip.

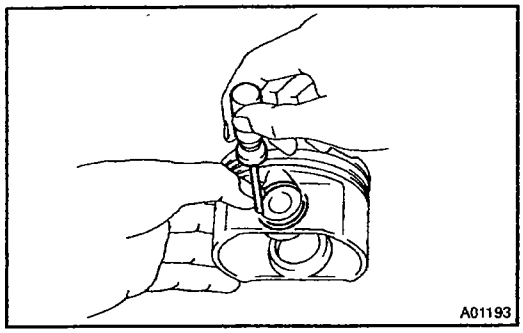
(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223–15030, 09950–70010 (09951–07100)

EM165-01

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O–rings and oil seals with new parts.

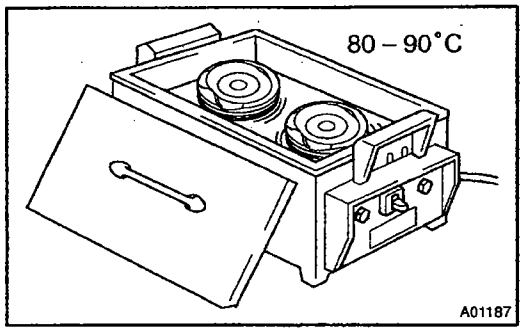


1. ASSEMBLE PISTON AND CONNECTING ROD

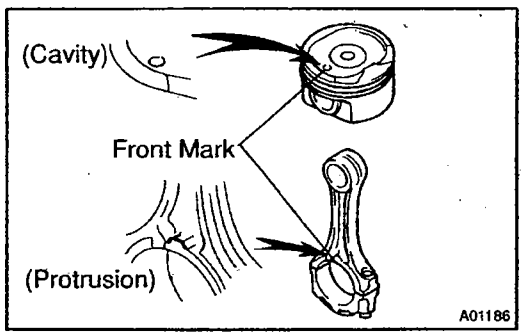
(a) Using a small screwdriver, install a new snap ring at one end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

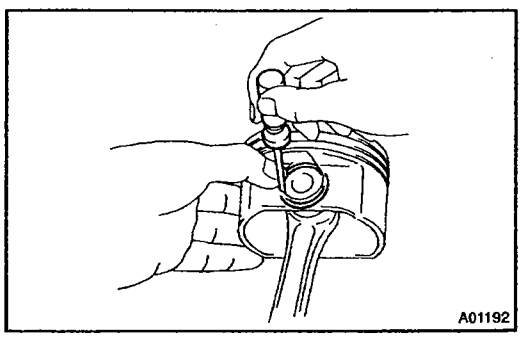


(b) 1ZZ–FE:
Gradually heat the piston to 80 – 90°C (176 – 194°F).



(c) Coat the piston pin with engine oil.

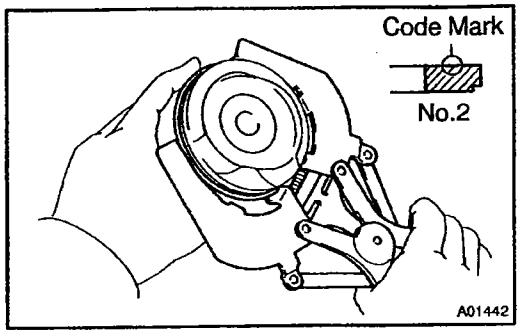
(d) Align the front marks on the piston and connecting rod, and push in the piston with your thumb.



(e) Using a small screwdriver, install a new snap ring on the other end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not as aligned with the pin hole cutout portion of the piston.

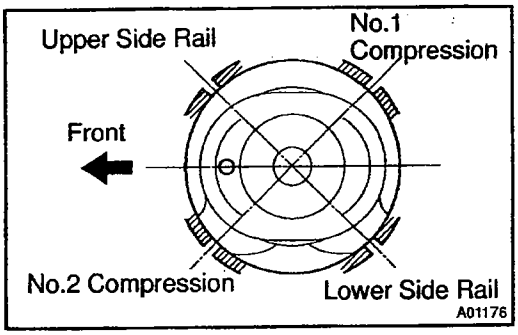


2. INSTALL PISTON RINGS

(a) Install the oil ring expander and 2 side rails by hand.

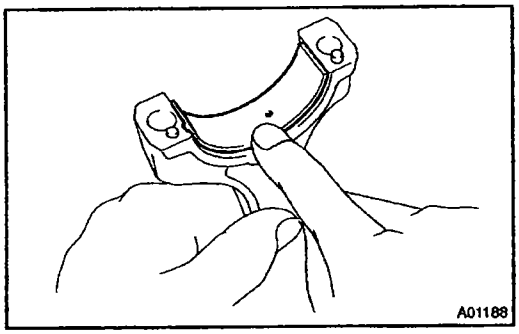
(b) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.

Code mark :
1ZZ–FE: T or 2R
2ZZ–GE: T



(c) Position the piston rings so that the ring ends are as shown.

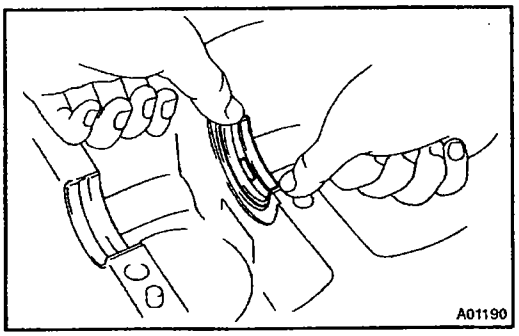
NOTICE:
Do not align the ring ends.



3. INSTALL CONNECTING ROD BEARINGS

(a) Align the bearing claw with the groove of the connecting rod or connecting cap.

(b) Install the bearings in the connecting rod and connecting rod cap.

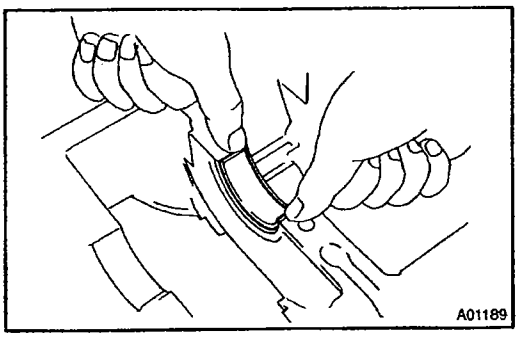


4. INSTALL MAIN BEARINGS

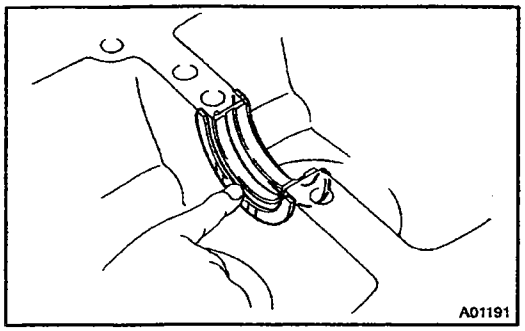
HINT:
Upper bearings have an oil groove and oil holes; Lower bearings do not.

(a) Align the bearing claw with the claw groove of the cylinder block, and push in the 5 upper bearings.

NOTICE:
Install the bearing with the oil hole in the cylinder block.



(b) Align the bearing claw with the claw grove of the main bearing cap, and push in the 5 lower bearings.

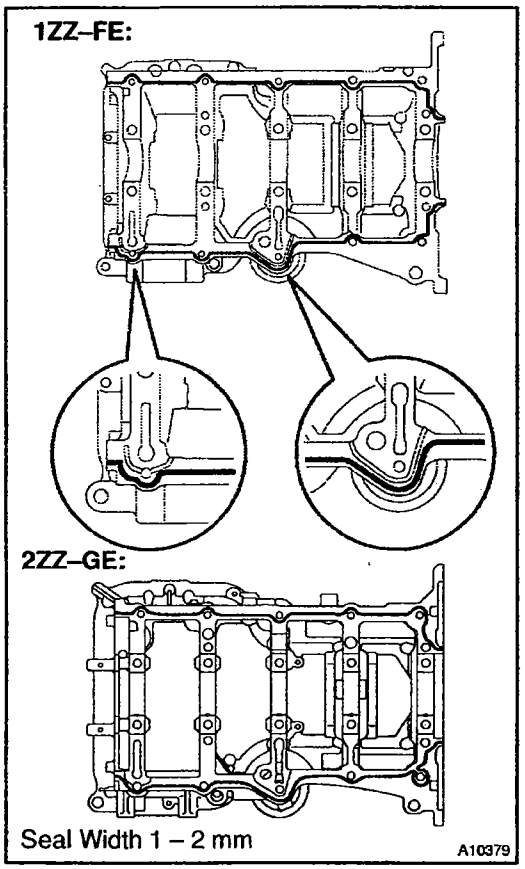


5. INSTALL THRUST WASHERS

Install the 2 thrust washers under the No.3 journal position of the cylinder block with the oil grooves facing outward.

6. PLACE CRANKSHAFT ON CYLINDER BLOCK

7. PLACE BEARING CAP SUB–ASSEMBLY ON CYLINDER BLOCK



(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bearing cap sub–assembly and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- thoroughly clean all components to remove all the loose material.
- Using a non–reusable solvent, clean both sealing surfaces.

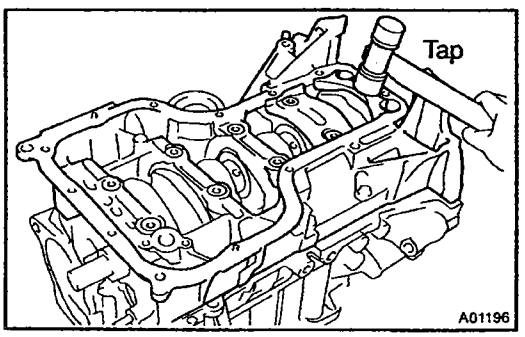
(b) Apply seal packing to the bearing cap sub–assembly as shown in the illustration.

Seal packing:
Part No. 08826–00080 or equivalent

- Install a nozzle that has been cut to a 1 – 2 mm (0.004 – 0.08 in.) opening.

HINT:
Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

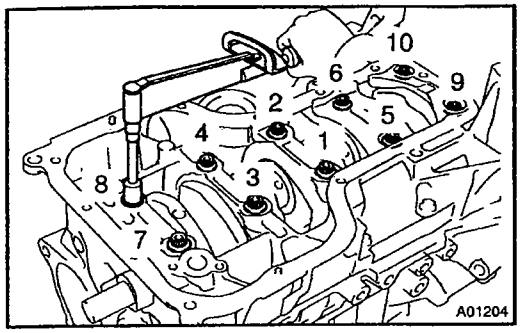


(c) Using a plastic–faced hammer, lightly tap the bearing cap sub–assembly to ensure a proper fit.

8. INSTALL 12 POINTED HEAD BEARING CAP SUB–ASSEMBLY BOLTS

HINT:

- The bearing cap sub–assembly bolts are tightened in 3 progressive steps (steps (b), (c) and (e)).
- If any of the bearing cap sub–assembly bolts in broken or deformed, replace it.

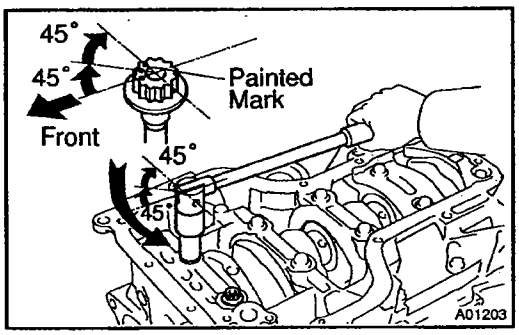


(a) Apply a light coat of engine oil on the threads and under the bearing cap sub–assembly bolts.

(b) Install and uniformly tighten the 10 bearing cap sub–assembly bolts, in several passes, in the sequence shown.
Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

(c) Retighten the bearing cap sub–assembly bolts, in several passes, in the sequence shown.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

If any of the bearing cap sub–assembly bolts does not meet the torque specification, replace the bearing cap sub–assembly bolt.



(d) Mark the front of the bearing cap sub–assembly bolts with paint.

(e) Retighten the bearing cap sub–assembly bolts by 45° and 45° in the numerical order shown.

(f) Check that the painted mark is now at a 90° angle to the front.

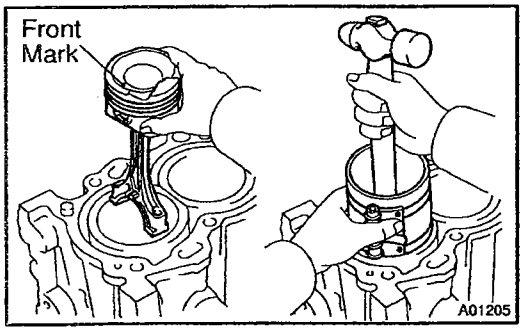
9. INSTALL HEXAGON HEAD BEARING CAP SUB–ASSEMBLY BOLTS

(a) Install and uniformly tighten the 10 bearing cap sub–assembly bolts in several passes.
Torque:
1ZZ–FE: 18.5 N·m (189 kgf·cm, 14 ft·lbf)
2ZZ–GE: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Check that the crankshaft turns smoothly.

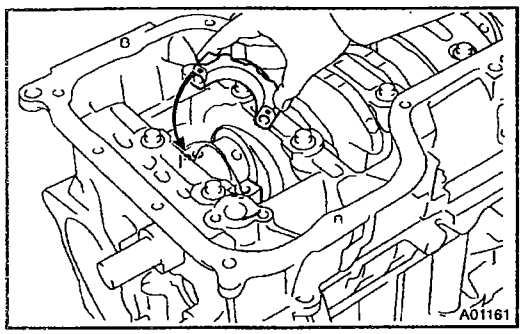
(c) 2ZZ–GE:
Apply adhesive to 2 or 3 threads, and install the 4 screw plugs.
Adhesive:
Part No. 08833 – 00070, THREE BOND 1324, or equivalent
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

10. CHECK CRANKSHAFT THRUST CLEARANCE (See page EM–98)



11. INSTALL PISTON AND CONNECTING ROD ASSEMBLES

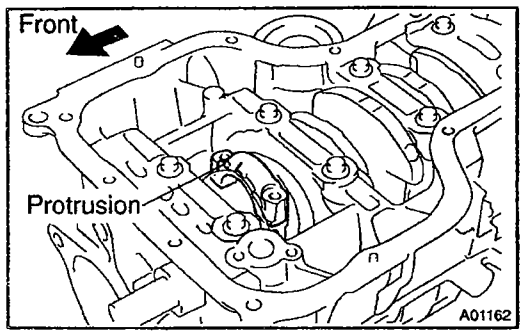
Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



12. PLACE CONNECTING ROD CAP ON CONNECTING ROD

(a) Match the numbered connecting rod cap with the connecting rod.

(b) Align the pin dowels of the connecting rod cap with the pins of the connecting rod, and install the connecting rod.

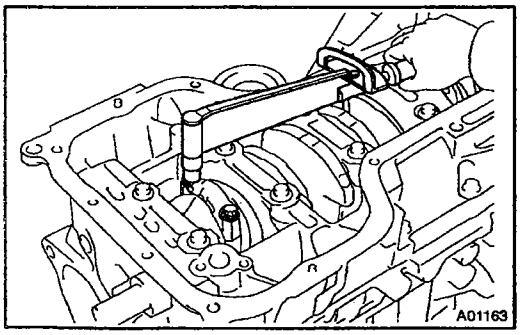


(c) Check that the protrusion of the connecting rod cap is facing in the correct direction.

13. INSTALL CONNECTING ROD CAP BOLTS

HINT:

- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any of the connecting rod cap bolts is broken or deformed, replace it.

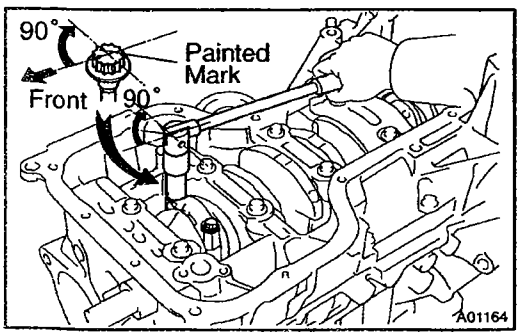


(a) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.

(b) Install and alternately tighten the 2 connecting rod cap bolts in several passes.

Torque:
1ZZ–FE: 20 N·m (204 kgf·cm, 15 ft·lbf)
2ZZ–GE: 30 N·m (306 kgf·cm, 22 ft·lbf)

If any of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.



(c) Mark the front of the connecting cap bolts with paint.

(d) Retighten the cap bolts by 90° as shown.

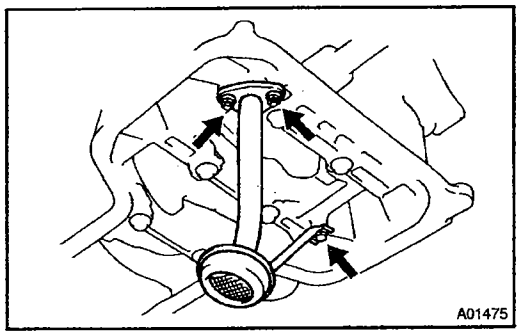
(e) Check that the painted mark is now at a 90° angle to the front.

(f) Check that the crankshaft turns smoothly.

14. CHECK CONNECTING ROD THRUST CLEARANCE (See page EM–98)

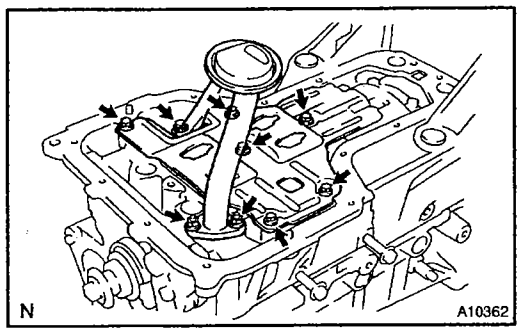
15. INSTALL REAR CRANKSHAFT OIL SEAL (See page EM–104)

HINT:
Wipe seal packing away from the contact surface of the cylinder block assembly and oil seal.



16. 1ZZ–FE:
INSTALL OIL STRAINER

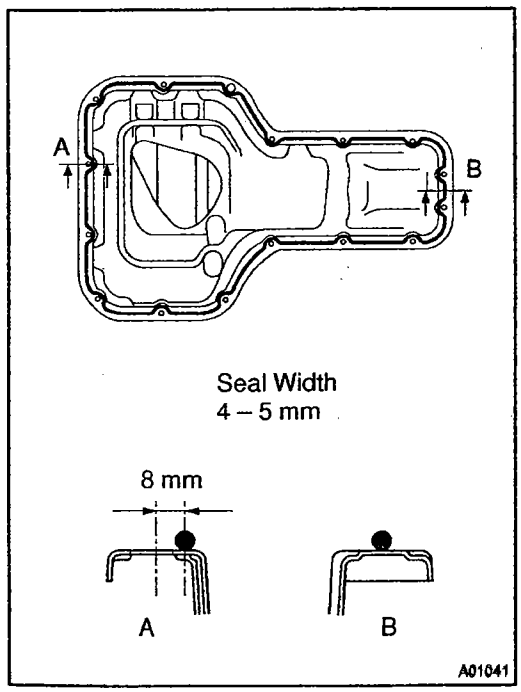
Install a new gasket and the oil strainer with the 2 nuts and bolt.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



17. 2ZZ–GE:
INSTALL OIL PAN BAFFLE AND OIL STRAINER

(a) Install the oil pan baffle with the 4 bolts and 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

(b) Install a new gasket and oil strainer with the 2 nuts and bolt.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



18. INSTALL OIL PAN

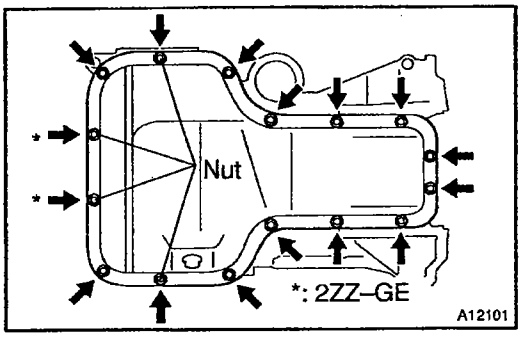
(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the main bearing cap and oil pan.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

NOTICE:
Do not use a solvent which will affect the painted surfaces.

(b) Apply seal packing to the oil pan as shown in the illustration.
Seal packing:
Part No. 08826–00080 or equivalent
- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:
Avoid applying an excessive amount to the surface.

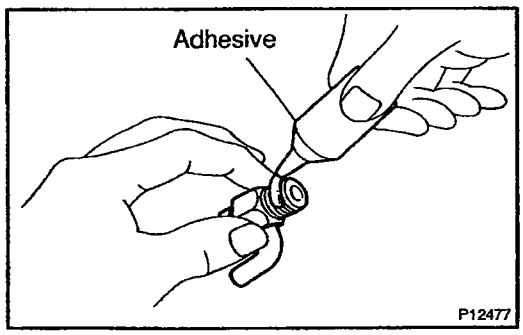
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) 1ZZ–FE:
Install the oil pan with the 14 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

(d) 2ZZ–GE:
Install the oil pan with the 12 bolts and 4 nuts. Uniformly tighten the bolts and nuts in several passes.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

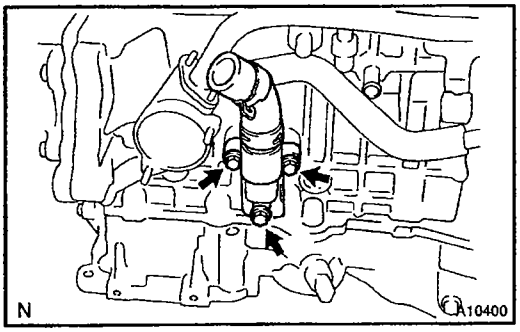
19. **INSTALL OIL FILTER UNION**
Torque: 30 N·m (306 kgf·cm, 21 ft·lbf)
20. **INSTALL OIL FILTER (See page LU–3)**
21. **INSTALL OIL PUMP (See page LU–13)**



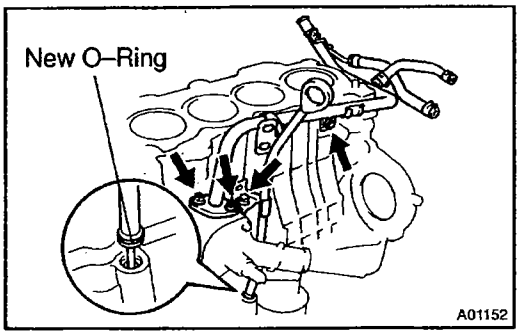
22. **INSTALL ENGINE COOLANT DRAIN UNION**
(a) Apply adhesive to 2 or 3 threads.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(b) Install the drain union.
Torque:
1ZZ–FE 20 N·m (200 kgf·cm, 14 ft·lbf)
2ZZ–GE 25 N·m (255 kgf·cm, 18 ft·lbf)

HINT:
After applying the specified torque, rotate the drain union clockwise until its drain port is facing downward.

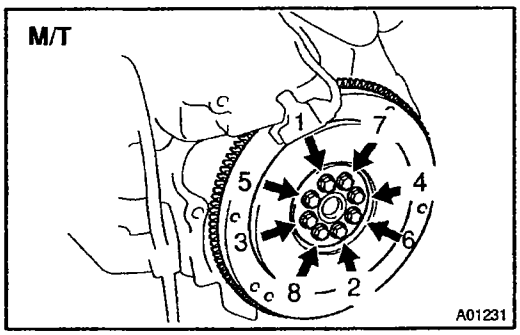
23. **INSTALL KNOCK SENSOR**
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



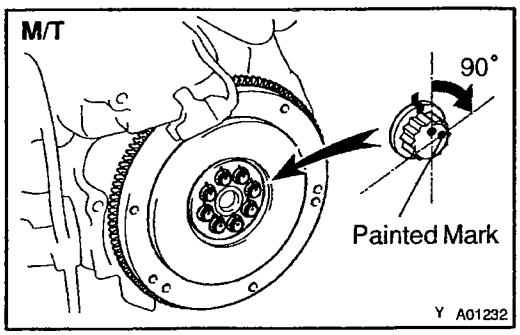
24. **2ZZ–GE:**
INSTALL VENTILATION CASE
(a) Install a new gasket and ventilation case with the 3 bolts.
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)
(b) Install the No. 3 ventilation hose and connect the clip.
25. **INSTALL THERMOSTAT (See page CO–11)**



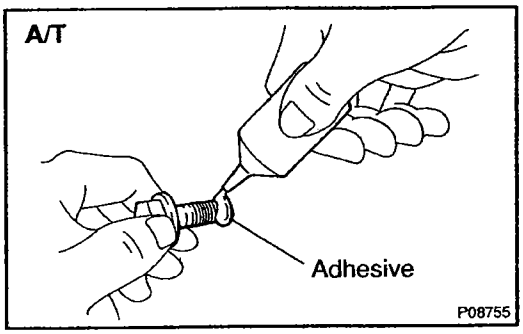
26. **INSTALL WATER BYPASS PIPE**
Torque:
1ZZ–FE 9.0 N·m (92 kgf·cm, 80 in.·lbf)
2ZZ–GE
Bolt 8.5 N·m (87 kgf·cm, 75 in.·lbf)
Nut 10 N·m (100 kgf·cm, 7 ft·lbf)
27. **1ZZ–FE:**
INSTALL OIL DIPSTICK AND GUIDE
(a) Install a new O–ring on the dipstick guide.
(b) Apply soapy water on the O–ring.
(c) Connect the dipstick guide end to the main bearing cap.
(d) Install the dipstick guide with the bolt.
Torque: 11 N·m (113 kgf·cm, 8 ft·lbf)
28. **INSTALL CYLINDER HEAD (See page EM–65)**
29. **INSTALL ENGINE WIRE**
30. **INSTALL TIMING SPROCKETS AND TIMING CHAIN (See page EM–25)**
31. **REMOVE ENGINE STAND**



32. **M/T:**
INSTALL FLYWHEEL
HINT:
The flywheel bolts are tightened in 2 progressive steps, (a) and (c).
(a) Install and uniformly tighten the 8 mounting bolts, in several passes, in the sequence shown.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



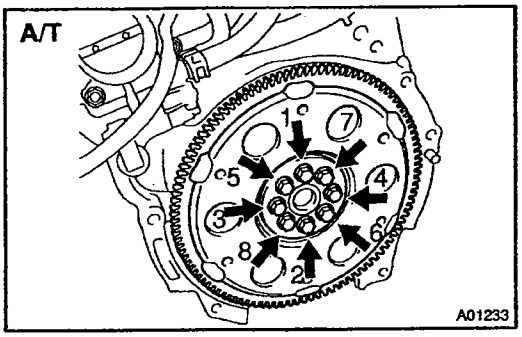
(b) Mark the flywheel bolt with paint.
(c) Retighten the flywheel bolts by an additional 90°.
(d) Check that the painted mark in now at a 90° angle to (b).



33. **A/T:**
INSTALL DRIVE PLATE

(a) Install the front spacer, drive plate and rear plate on the crankshaft.

(b) Apply adhesive to 2 or 3 threads of the mounting bolt end.
Adhesive:
Part No. 08833–00070, THREE BOND or equivalent

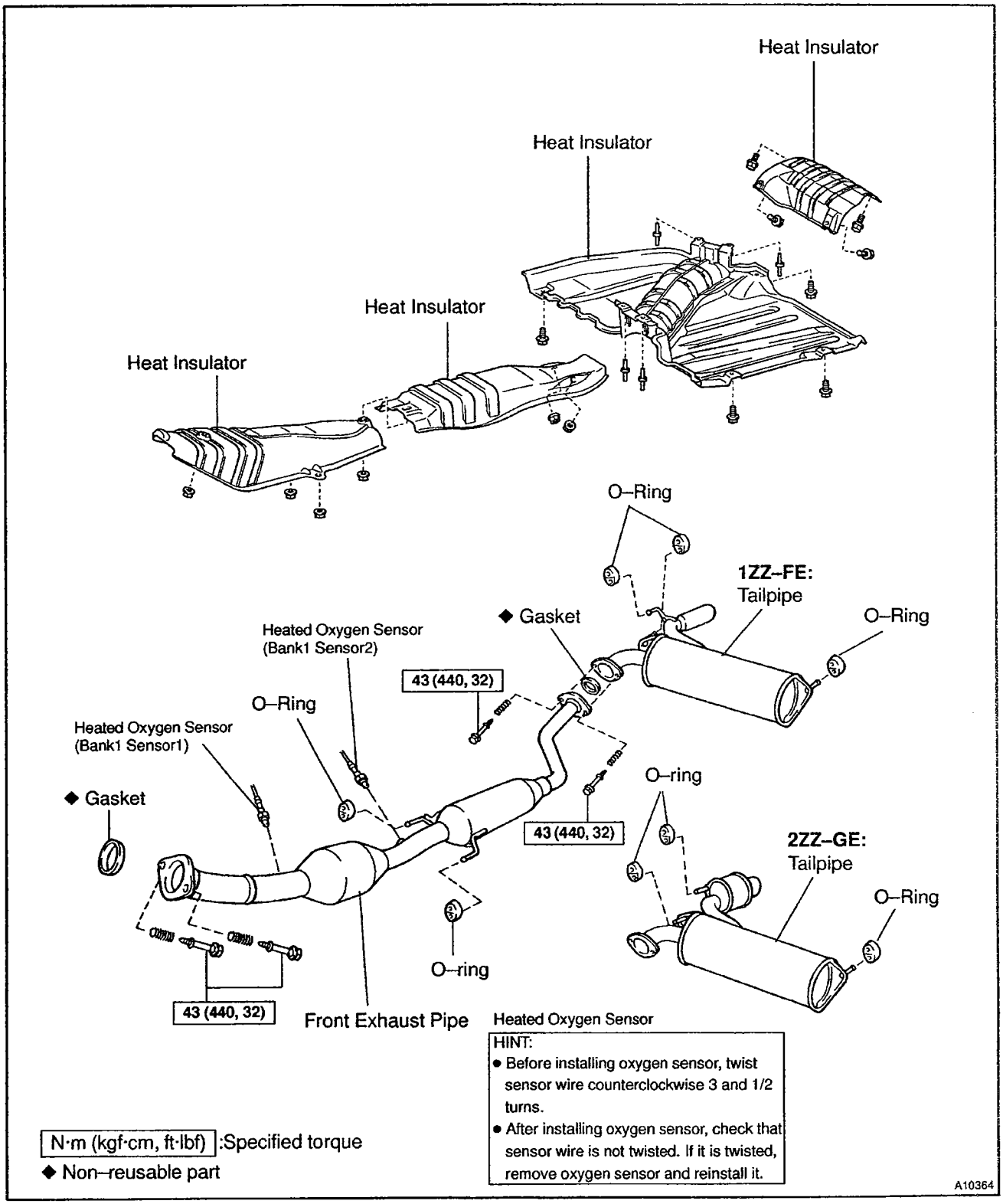


(c) Install and uniformly tighten the 8 mounting bolts, in several passes, in the sequence shown.
Torque: 88 N·m (897 kgf·cm, 65 ft·lbf)

EXHAUST SYSTEM

COMPONENTS

EM166-01



– MEMO –

EMISSION CONTROL

EMISSION CONTROL SYSTEM EC–1
PARTS LAYOUT AND SCHEMATIC DRAWING EC–2
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM EC–4
EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM EC–5
THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM EC–11

EC

EMISSION CONTROL SYSTEM

PURPOSE

EC02E-01

The emission control systems are installed to reduce the amount of CO, HC and NOx exhausted from the engine ((3) and (4)), to prevent the atmospheric release of blow–by gas–containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).
The function of each system is shown in these table.

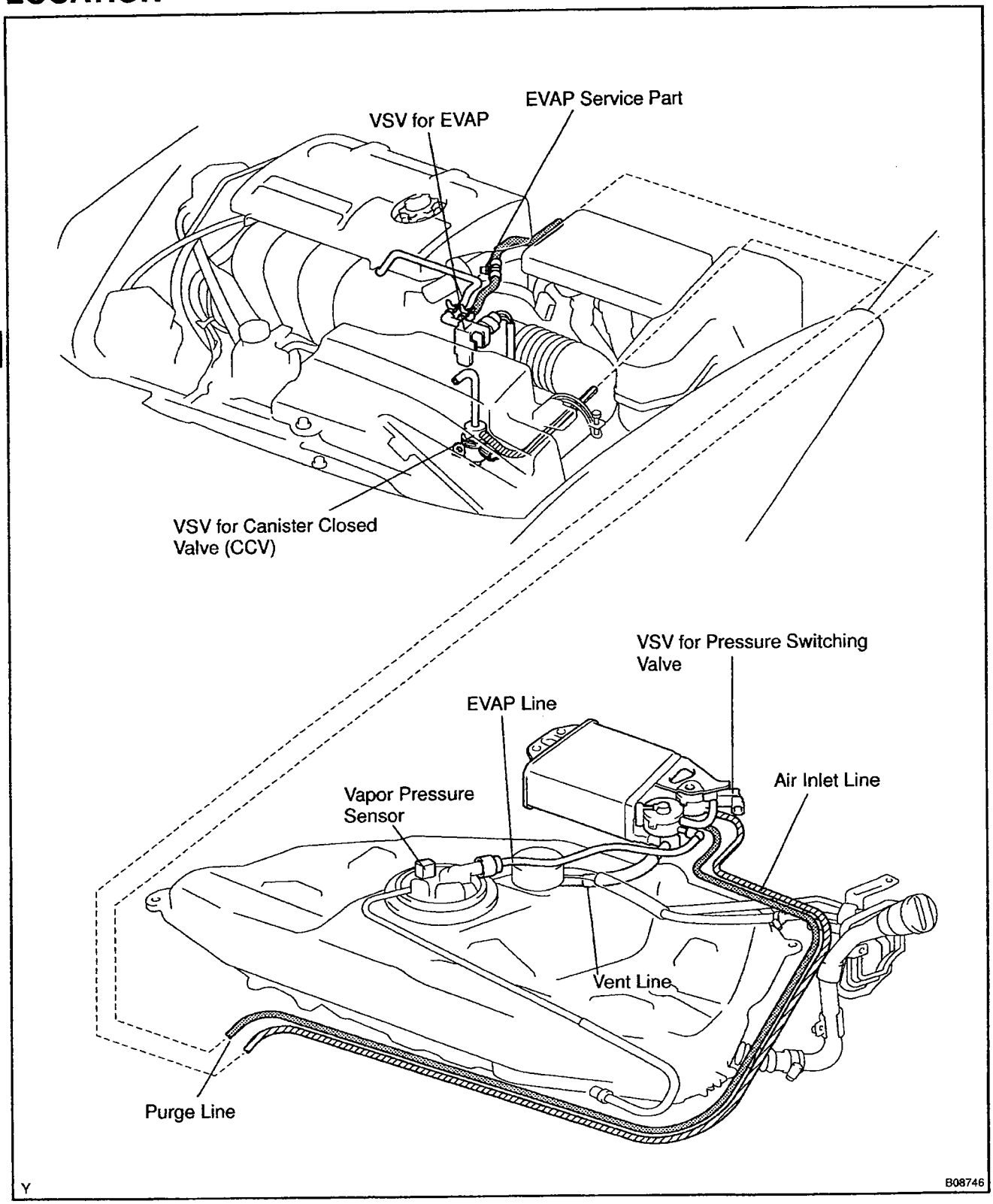
System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces HC
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Three–way Catalytic Converter	TWC	Reduces HC, CO and NOx
(4) Sequential Multiport Fuel injection*	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: *For inspection and repair of the SFI system, refer to the SF section of this manual.

PARTS LAYOUT AND SCHEMATIC DRAWING

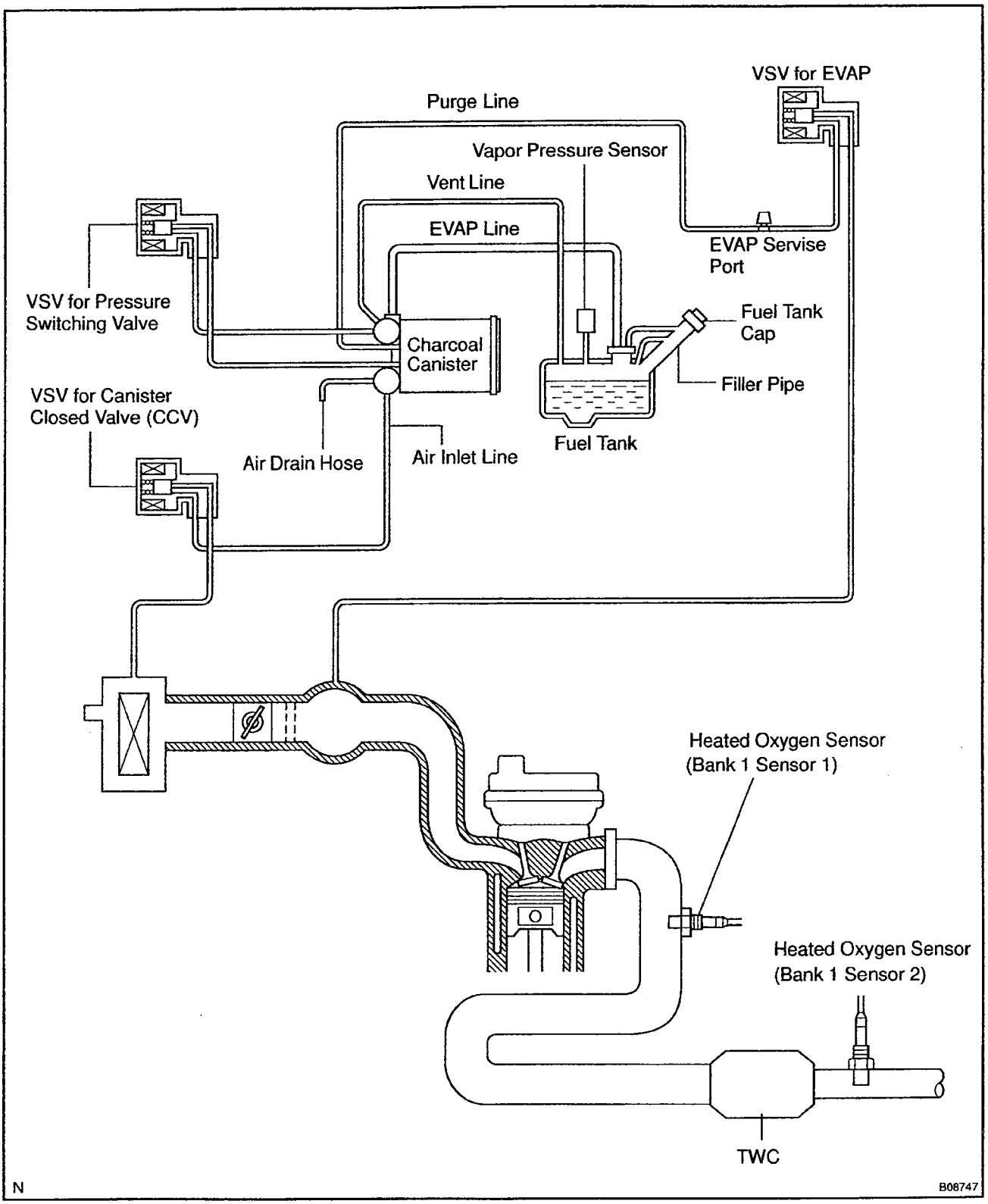
EC02F–07

LOCATION

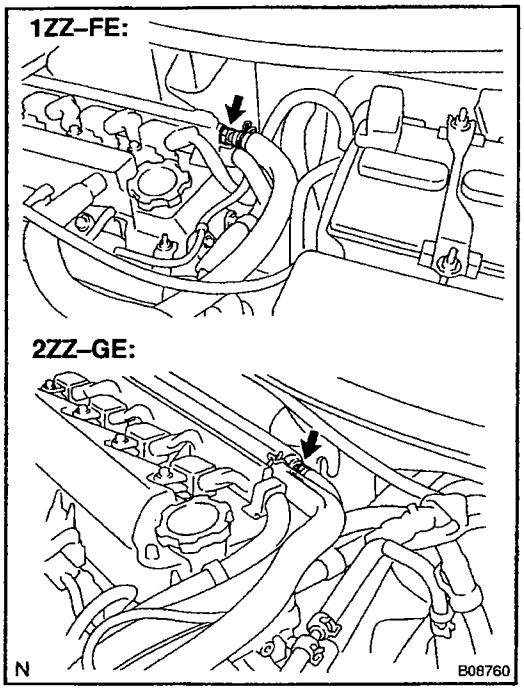


EC02G-06

DRAWING



EC



POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

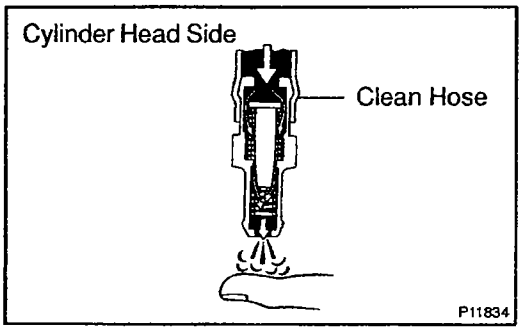
EC02H–04

INSPECTION

1. REMOVE PCV VALVE

(a) Disconnect the PCV hose from the PCV valve.

(b) Remove the PCV valve.



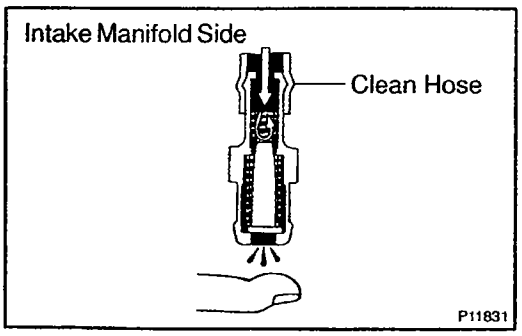
2. INSTALL CLEAN HOSE TO PCV VALVE

3. INSPECT PCV VALVE OPERATION

(a) Blow air into the cylinder head side, and check that air passes through easily.

CAUTION:

Do not suck air through the valve. Petroleum substances inside the valve are harmful.

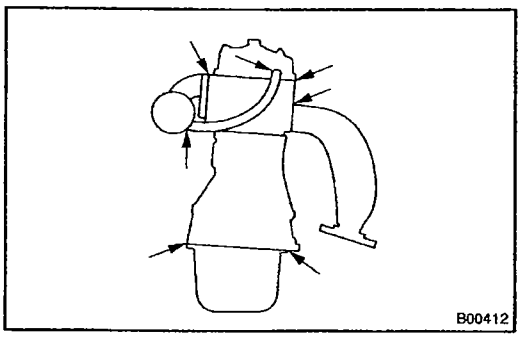


(b) Blow air into the intake manifold side, and check that air passes through with difficulty.

If operation is not as specified, replace the PCV valve.

4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE



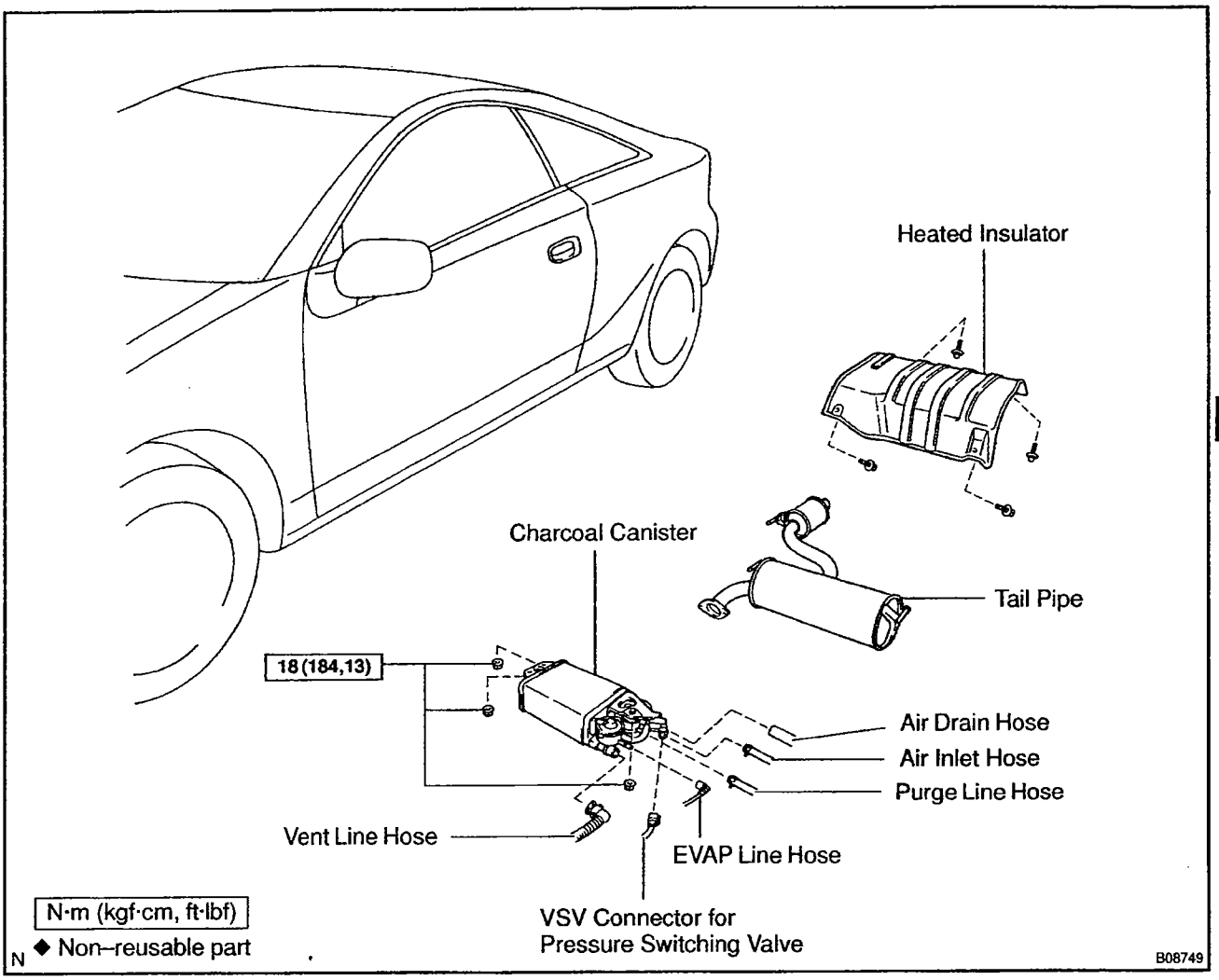
6. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

EC021-05

COMPONENTS



EC

EC0DR-01

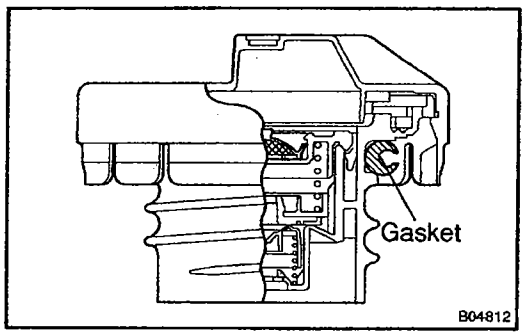
INSPECTION

1. **REMOVE EXHAUST TAIL PIPE AND HEATED INSULATOR (See page EM–115)**
2. **INSPECT LINES AND CONNECTORS**

Visually check for loose connections, sharp bends or damage.

3. **INSPECT FUEL TANK FILLER PIPE**

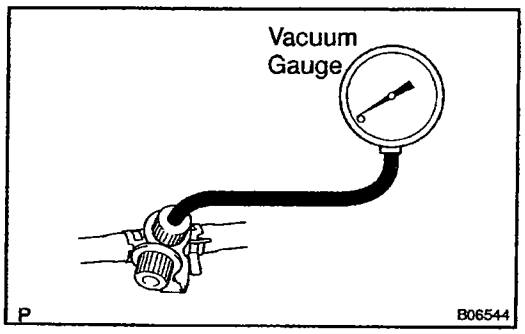
Visually check for deformation, cracks or fuel leakage.



4. **INSPECT FUEL TANK CAP**

Visually check if the cap and/or gasket are deformed or damaged.

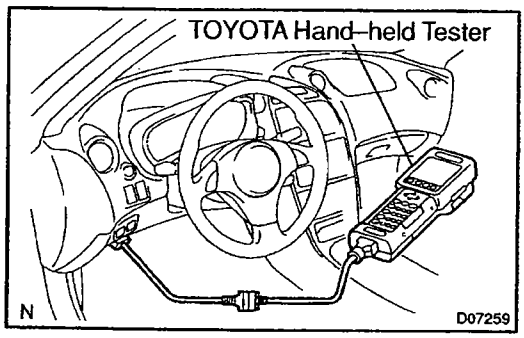
If necessary, repair or replace the cap.



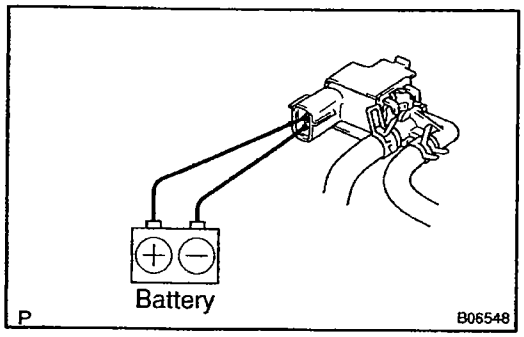
5. **INSPECT EVAP SYSTEM LINE**

(a) Warm up the engine and stop the engine.
Allow the engine to warm up to normal operating temperature.

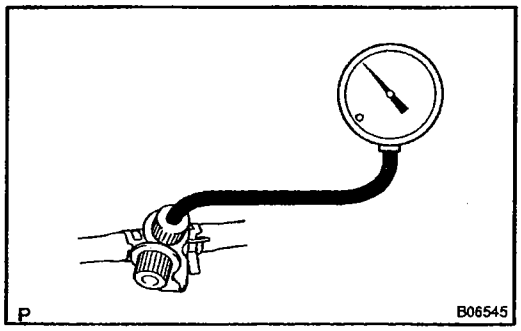
(b) Install a vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.



(c) TOYOTA hand–held tester:
Forced driving of the VSV for the EVAP.
(1) Connect a TOYOTA hand–held tester to the DLC3.
(2) Start the engine.
(3) Push the TOYOTA hand–held tester main switch ON.
(4) Use the ACTIVE TEST mode on the TOYOTA hand–held tester to operate the VSV for the EVAP.



(d) If you have no TOYOTA hand–held tester:
Forced driving of the VSV for the EVAP.
(1) Disconnect the VSV connector for the EVAP.
(2) Connect the positive (+) and negative (–) leads from the battery to the VSV terminals for the EVAP.
(3) Start the engine.



(e) Check the vacuum at idle.
Vacuum:
Maintain at 0.368 – 19.713 in.Hg (5 – 268 in.Aq) for over 5 seconds

HINT:
If the vacuum does not change, you can conclude that the hose connecting the VSV to the service port has come loose or is blocked, or the VSV is malfunctioning.

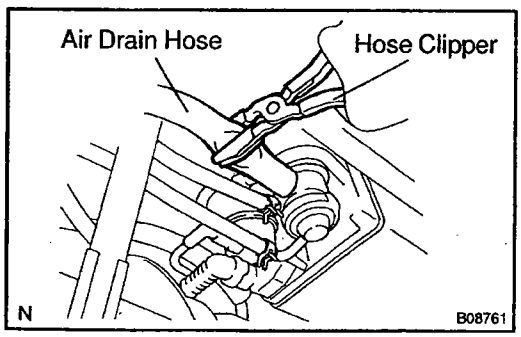
(f) If you have TOYOTA hand–held tester:
Conclude forced driving of the VSV for the EVAP.
(1) Stop the engine.
(2) Disconnect the TOYOTA hand–held tester from the DLC3.

(g) If you have no TOYOTA hand–held tester:
Conclude forced driving of the VSV for the EVAP.
(1) Stop the engine.
(2) Disconnect the positive (+) and negative (–) leads from the battery, and from the VSV terminals for the EVAP.
(3) Connect the VSV connector for the EVAP.

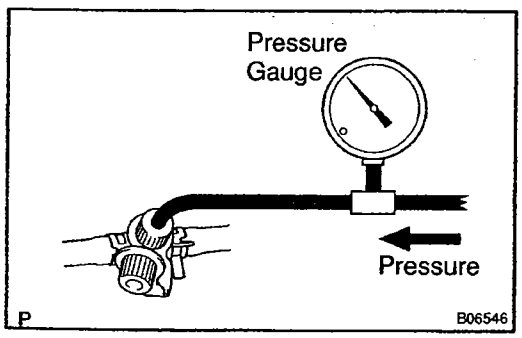
(h) Disconnect the vacuum gauge from the EVAP service port on the purge line.

(i) Connect a pressure gauge to the EVAP service port on the purge line.

EC

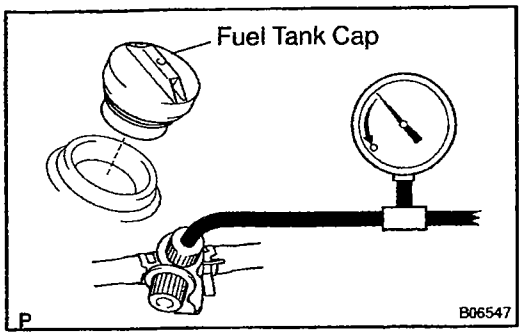


(j) Check the pressure.
(1) Close off the air drain hose at the marked position of the canister with a hose clipper or similar instrument.



(2) Add the pressure (13.5 – 15.5 in.Aq) from the EVAP service port.
Pressure:
2 minutes after the pressure is added, the gauge should be over 7.7 – 8.8 in.Aq.

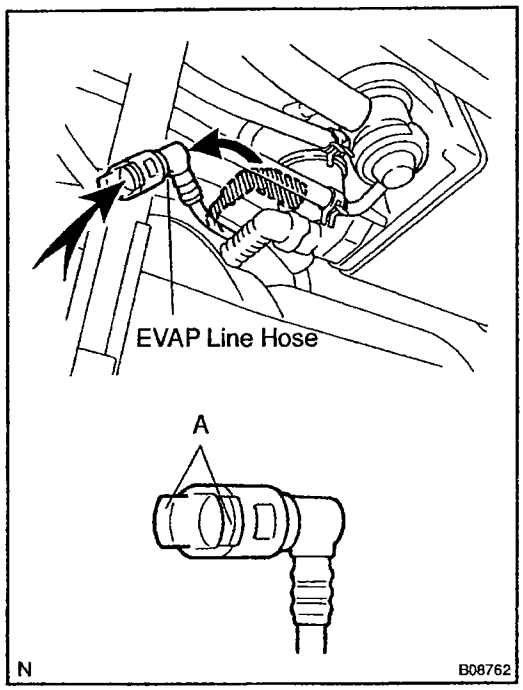
HINT:
If you can't add pressure, you can conclude that the hose connecting the VSV–canister–fuel tank has slipped off or the VSV is open.



(3) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

HINT:
If the pressure does not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

(k) Disconnect the pressure gauge from the EVAP service port on the purge line.



6. CHECK AIRTIGHTNESS IN FUEL TANK AND FILLER PIPE

(a) Disconnect the EVAP line hose from the charcoal canister.
  (1) Pinch portion A.
  (2) Pull out the connector.

(b) Pressurize and make the internal pressure in the fuel tank 4 kPa (41 gf/cm^2, 0.58 psi).

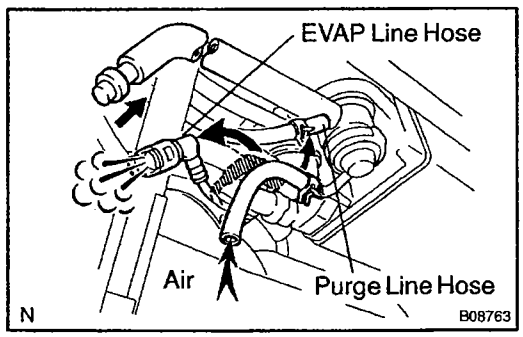
(c) Check that the internal pressure of the fuel tank can be held for 1 minute.

(d) Check the connected portions of each hose and pipe.

(e) Check the installed parts on the fuel tank.

If there is no abnormality, replace the fuel tank and filler pipe.

(f) Reconnect the EVAP line hose to the charcoal canister.



7. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE

(a) Disconnect the purge line hose and EVAP line hose from the charcoal canister.

(b) Plug the cap to the air drain hose.

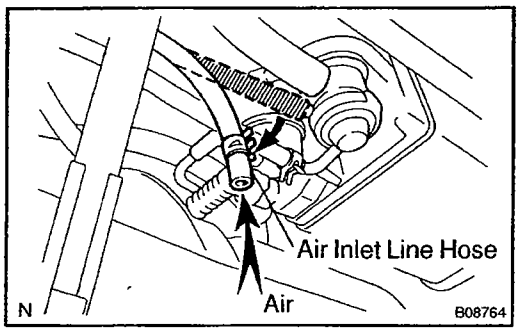
(c) Pressurize 4 kPa (41 gf/cm^2, 0.58 psi) to the purge port and check that there is ventilation through the EVAP line hose.

HINT:
In the condition that the fuel is full, as the float value of the fill check valve is closed and has no ventilation, it is necessary to check the fuel amount (volume).

(d) Check if there is anything stuck in the vent line hose and EVAP line hose.

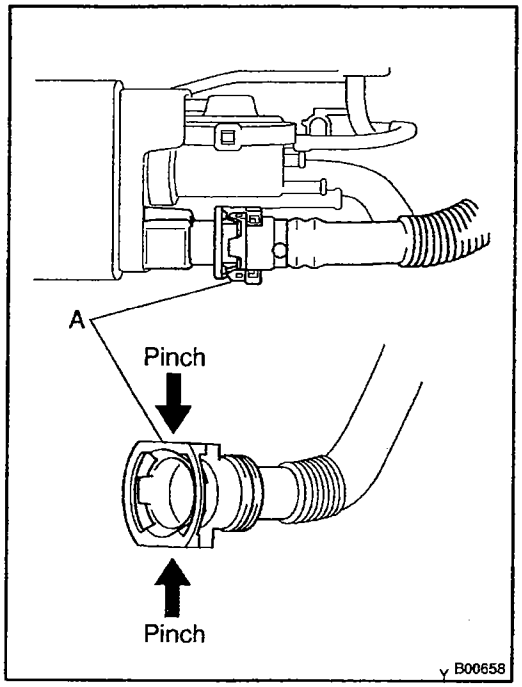
If there is nothing stuck in them, replace the fuel cut off valve and fill check valve.

(e) Reconnect the purge line hose and EVAP line hose to the charcoal canister.



8. CHECK AIR INLET LINE

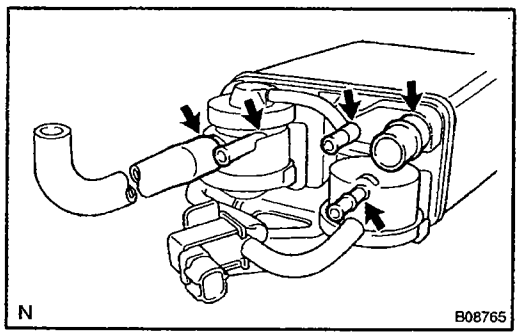
(a) Disconnect the air inlet line hose from the charcoal canister.
(b) Check that there is ventilation in the air inlet line.
(c) Reconnect the air inlet line hose to the charcoal canister.



9. REMOVE CHARCOAL CANISTER ASSEMBLY

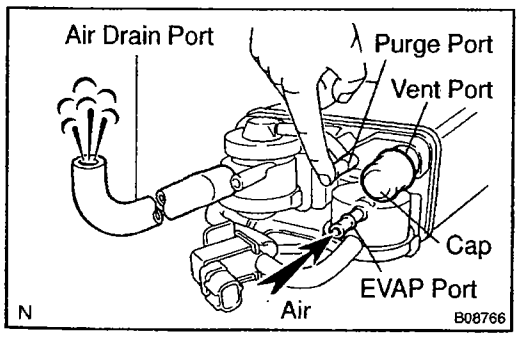
(a) Disconnect the VSV connector.
(b) Disconnect the purge line hose, EVAP line hose and air inlet line hose from the charcoal canister.
(c) Disconnect the vent line hose from charcoal canister.
  (1) Push the connector deep inside.
  (2) Pinch portion A.
  (3) Pull out the connector.
(d) Remove the 3 nuts and charcoal canister assembly.

EC

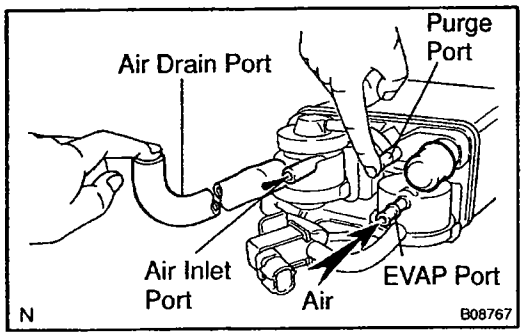


10. INSPECT CHARCOAL CANISTER

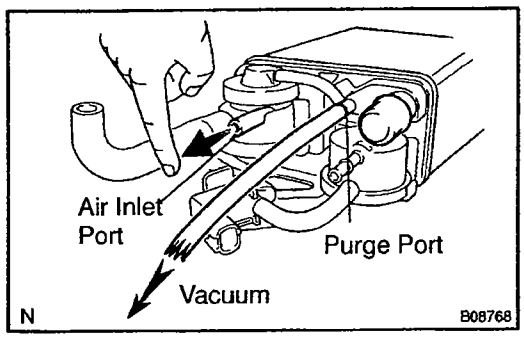
(a) Visually check the charcoal canister for cracks or damage.



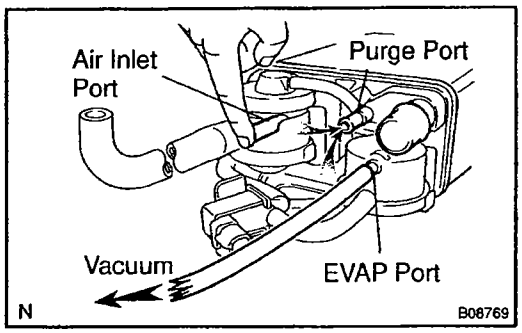
(b) Inspect the charcoal canister operation.
  (1) Plug the vent port with a cap.
  (2) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm^2, 0.26 psi) into the EVAP port and check that air flows from the air drain port.



(3) While holding the purge port and the air drain port closed, blow air (1.76 kPa, 18 gf/cm^2, 0.26 psi) into the EVAP port and check that air does not flow from the air inlet port.



(4) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the purge port, check that the vacuum does not decrease when the air inlet port is closed, and check that the vacuum decreases when the air inlet port is released.



(5) While holding the air inlet port closed, apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the EVAP port and check that air flows into the purge port.

If a problem is found, replace the charcoal canister.

(6) Remove the cap from the vent port.

11. INSPECT VSV FOR EVAP
(See page SF–57)

12. INSPECT VSV FOR CANISTER CLOSED VALVE (CCV)
(See page SF–59)

13. INSPECT VAPOR PRESSURE SENSOR
(See page SF–65)

14. REINSTALL CHARCOAL CANISTER ASSEMBLY

THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM

EC02K–04

INSPECTION

1. **CHECK TWC FOR DENTS OR DAMAGE**

If any port of the heat insulator is damaged or dented to the extent that it contacts the three–way catalytic converter, repair or replace it.

2. **CHECK EXHAUST PIPE CONNECTIONS FOR LOOSENESS OR DAMAGE**
3. **CHECK EXHAUST PIPE CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE**
4. **CHECK HEAT INSULATOR FOR DAMAGE**
5. **CHECK FOR ADEQUATE CLEARANCE BETWEEN EXHAUST SYSTEM AND HEAT INSULATOR ON THE BODY**

– MEMO –

SFI

SFI SYSTEM SF–1
FUEL PUMP SF–6
FUEL PRESSURE REGULATOR SF–15
INJECTOR SF–18
FUEL TANK AND LINE SF–26
MASS AIR FLOW (MAF) METER SF–29
THROTTLE BODY SF–33
IDLE AIR CONTROL (IAC) VALVE SF–40
CAMSHAFT TIMING OIL CONTROL VALVE SF–46
EFI MAIN RELAY SF–52
CIRCUIT OPENING RELAY SF–53
VSV FOR INTAKE AIR CONTROL VALVE SF–54
VSV FOR EVAPORATIVE EMISSION (EVAP) SF–56
VSV FOR CANISTER CLOSED VALVE (CCV) SF–58
VSV FOR PRESSURE SWITCHING VALVE SF–60
ENGINE COOLANT TEMPERATURE (ECT) SENSOR SF–62
VAPOR PRESSURE SENSOR SF–64
KNOCK SENSOR SF–66
HEATED OXYGEN SENSOR SF–69
ENGINE CONTROL MODULE (ECM) SF–71
FUEL CUT RPM SF–73

SF

SFI SYSTEM

PRECAUTION

SF0Z7-02

1. BEFORE WORKING ON THE FUEL SYSTEM , DISCONNECT THE NEGATIVE (–) TERMINAL CABLE FROM THE BATTERY

HINT:

Any diagnostic trouble code retained by the computer will be erased when the negative (–) terminal cable is removed from the battery. Therefore, if necessary, read the diagnosis before removing the negative (–) terminal cable from the battery.

2. DO NOT SMOKE OR WORK NEAR AN OPEN FLAME WHEN WORKING ON THE FUEL SYSTEM

3. KEEP GASOLINE AWAY FROM RUBBER OR LEATHER PARTS

4. MAINTENANCE PRECAUTIONS

(a) In event of engine misfire, these precautions should be taken.

(1) Check proper connection to battery terminals, etc.

(2) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.

(3) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

(b) Precautions when handling oxygen sensor.

(1) Do not allow oxygen sensor to drop or hit against an object.

(2) Do not allow the sensor to come into contact with water.

If vehicle is Equipped with Mobile Radio System (HAM, CB, etc.)

If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

5. AIR INDUCTION SYSTEM

(a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of turn.

(b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run out of turn.

6. ELECTRONIC CONTROL SYSTEM

(a) Before removing SFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch to LOCK or disconnecting the negative (–) terminal cable from the battery.

HINT:

Always check the diagnostic trouble code before disconnecting the negative (–) terminal cable from the battery.

(b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.

(c) Do not permit parts to receive a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.

(d) Be careful during troubleshooting as there are numerous transistor circuit, and even slight terminal contact can cause further troubles.

(e) Do not open the ECM cover.

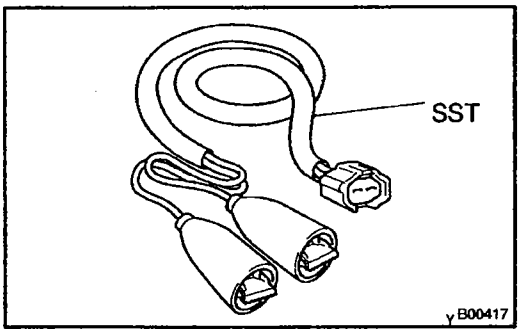
(f) When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the SFI parts and wiring connectors.

(g) Parts should be replaced as an assembly.

(h) Care should be taken when pulling out and inserting wiring connectors.

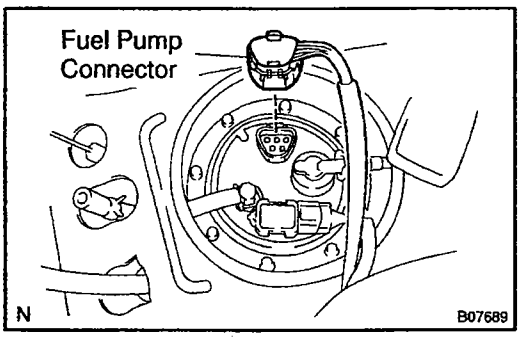
(1) Release the lock and pull out the connector, pulling on the connectors.

(2) Fully insert the connector and check that it is locked.



(i) Use SST for inspection or test of the injector or its wiring connector.

SST 09842–30080



7. FUEL SYSTEM

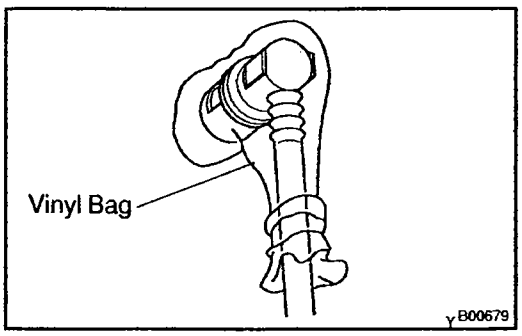
(a) When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe these procedures.

(1) Disconnect the fuel pump connector.

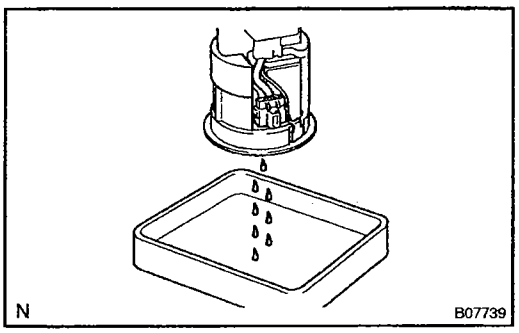
(2) Start the engine. After the engine has stopped on its own, turn the ignition switch to LOCK.

(3) Disconnect the fuel tube (See page SF–11).

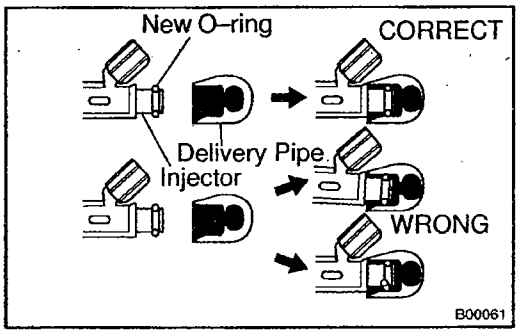
(4) Drain the fuel remained inside the fuel tube.



(5) Prevent the disconnected fuel tube from damaging and mixing foreign objects by covering them with a vinyl bag.

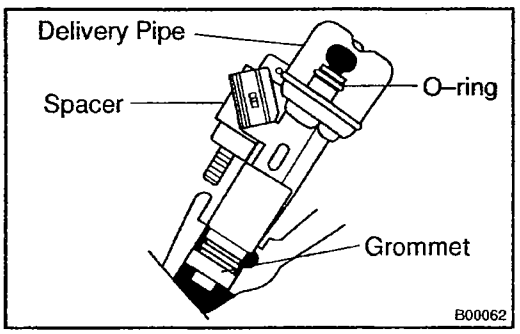


(6) Put a container under the connection.

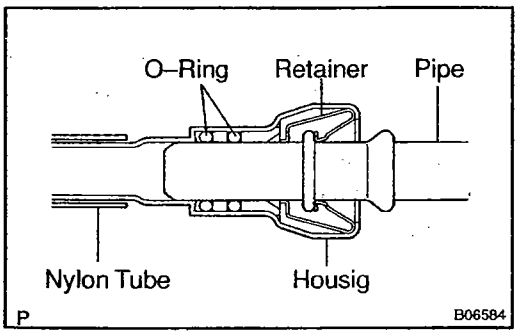


(b) Observe these precautions when removing and installing the injector.
(1) Never reuse the O–ring.
(2) When placing a new O–ring on the injector, take care not to damage it in any way.
(3) Coat a new O–ring with spindle oil or gasoline before installing never use engine, gear or brake oil.

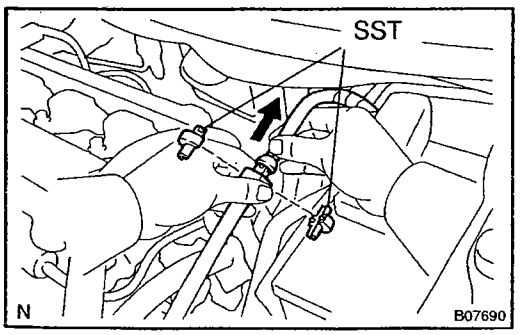
SF



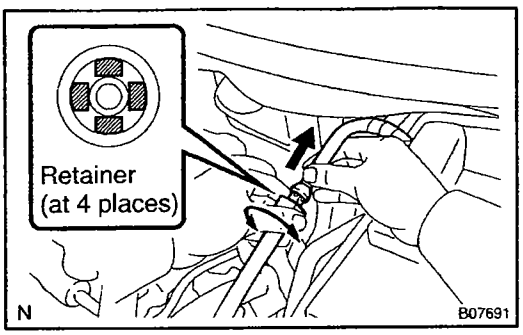
(c) Install the injector to the delivery pipe and cylinder head, as shown in the illustration. Before in installing the injector, must apply spindle oil or gasoline on the place where a delivery pipe or a cylinder head touches on O–ring of the injector.



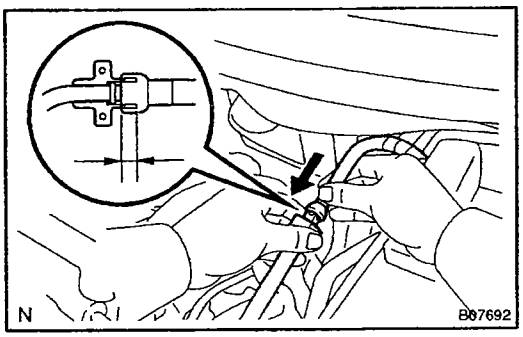
(d) Observe these precautions when disconnecting the fuel delivery pipe. The structure of the metallic connector is shown as left.
(1) Remove the fuel pipe clamp.



(2) Get the metallic connector of the fuel tube assembly, pull it out towards the rear and hold it as it is.
(3) Assemble SST to the connection as shown.
SST 09268–21010

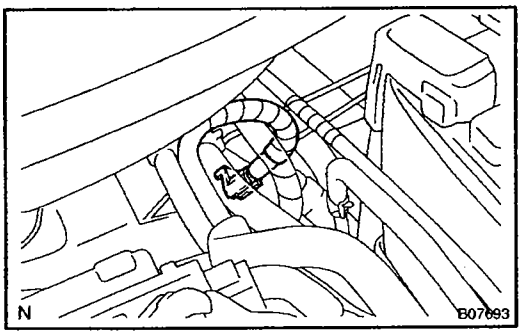


(4) Turn SST, align the retainers inside the connector with SST chamfered parts and incert SST into the connector.

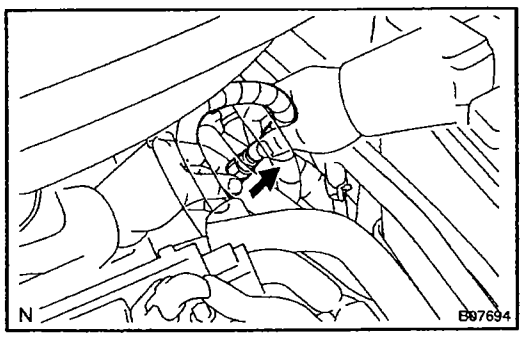


(5) Hold SST as it at step 4, push the connector towards SST to put the retainers on SST champfered parts.
(6) Slide SST and the connector together towards the fuel tube assembly.

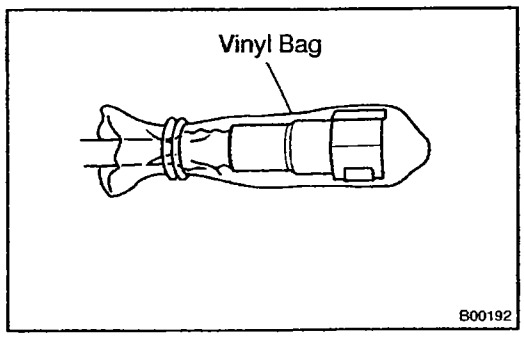
SF



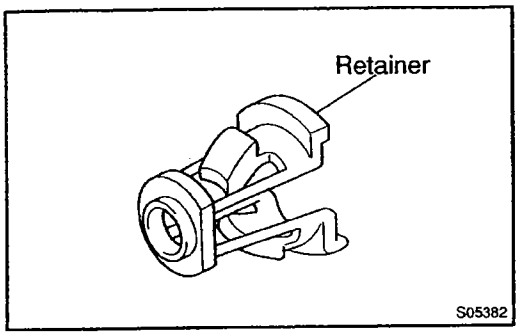
(e) Observe these precautions when disconnecting the fuel tube connector (quick type).
(1) Remove the fuel pipe clamp.
(2) Check if there is any dirt like mud on the pipe and around the connector before disconnecting them and clean the dirt away.



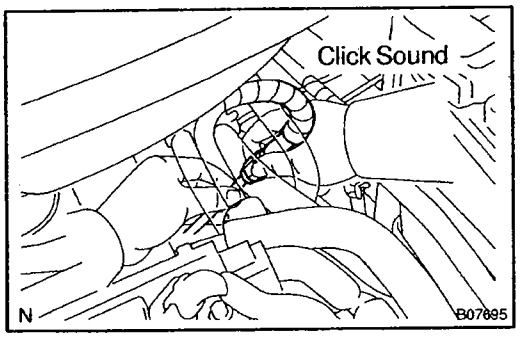
(3) Be sure to disconnect with hands.
(4) When the connector and the pipe are stuck, pinch the retainer between the hands, push and pull the connector to free to disconnect and pull it out. Do not use any tool at this time.
(5) Inspect if there is any dirt or the likes on the seal surface of the disconnected pipe and clean it away.



(6) Prevent the disconnected pipe and connector from damaging and mixing foreign objects by covering them with a vinyl bag.

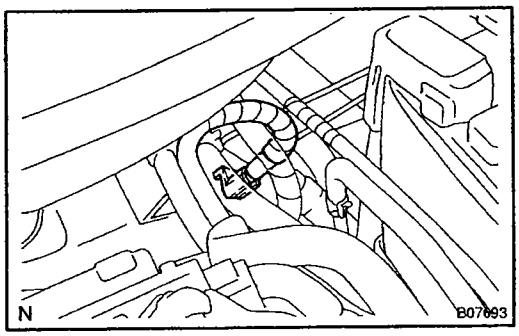


(f) Observe these precautions when connecting the fuel tube connector (quick type).
(1) Do not reuse the retainer removed from the pipe.
(2) Must use hands without using tools when to remove the retainer from the pipe.
(3) Check if there is any damage or foreign objects on the connected part of the pipe.



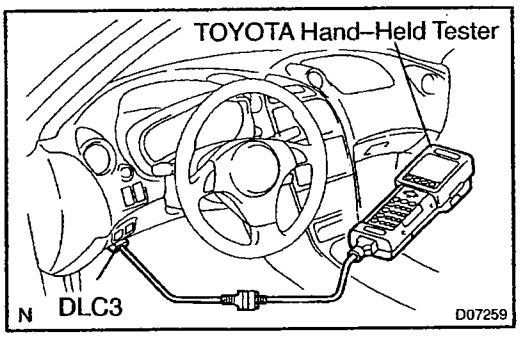
(4) Match the axis of the connector with axis of the pipe, and push in the connector until retainer makes a "click" sound. In case that the connections is tight, apply little amount of new engine oil on the tip of the pipe.
(5) After having finished the connection, check if the pipe and the connector are securely connected by pulling them.

SF

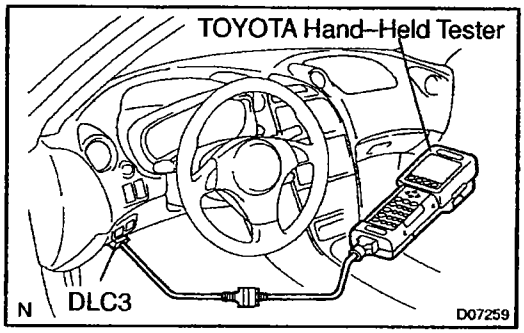


(6) Install the fuel pipe clamp.
(7) Check if there is any fuel leakage.

(g) Observer these precautions when handling nylon tube.
(1) Pay attention not to turn the connected part of the nylon tube and the quick connector with force when connecting them.
(2) Pay attention not to kink the nylon tube.
(3) Do not remove the nylon tube.
(4) Must not close the piping with the nylon tube by bending it.



(h) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
(1) Connect the TOYOTA hand–held tester to the DLC3.
(2) Turn the ignition switch ON and push TOYOTA hand–held tester main switch ON.
(3) Select the active test mode on the TOYOTA hand–held tester.
(4) Please refer to the TOYOTA hand–held tester operator's manual for further details.
(5) If you have no TOYOTA hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector.
(See page SF–6)
(6) Check that there are no leaks from any part of the fuel system.
(7) Turn the ignition switch to LOCK.
(8) Disconnect the TOYOTA hand–held tester from the DLC3.



FUEL PUMP

ON–VEHICLE INSPECTION

SF096-05

1. CHECK FUEL PUMP OPERATION

(a) Connect the TOYOTA hand–held tester to the DLC3.

(b) Turn the ignition switch ON and TOYOTA hand–held tester main switch ON.

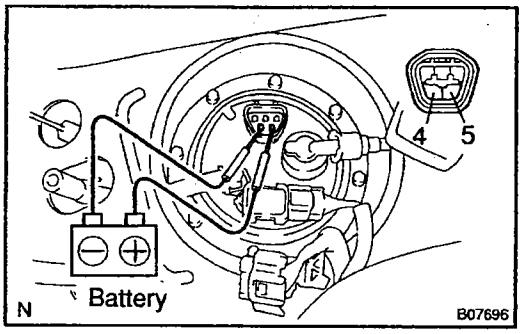
NOTICE:

Do not start the engine.

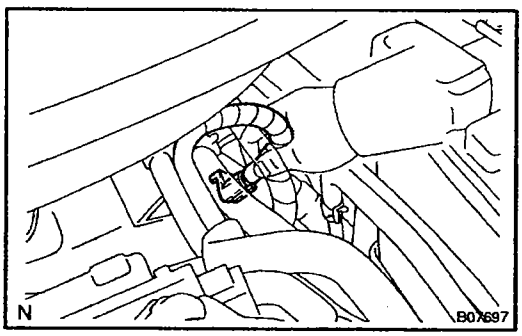
(c) Select the active test mode on the TOYOTA hand–held tester.

(d) Please refer to the TOYOTA hand–held tester operator's manual for further details.

SF



(e) If you have no TOYOTA hand–held tester, connect the positive (+) lead from the battery to terminal 4 of the connecter, and the negative (–) lead to terminal 5.



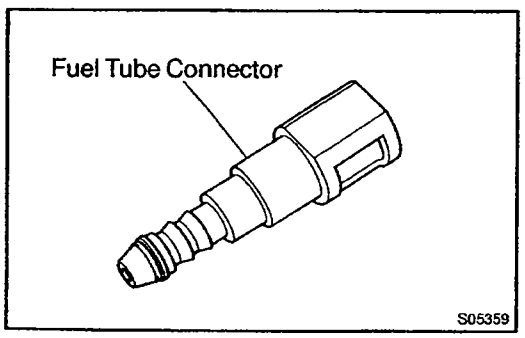
(f) Check that there is pressure in the fuel inlet pipe from the fuel line.

HINT:

If there is fuel pressure, you will hear the sound if fuel following. If there is no pressure, check these parts, Fusible link, Fuses, EFI Main relay, Fuel pump, ECM, and Witting connector.

(g) Turn the ignition switch to LOCK.

(h) Disconnect the TOYOTA hand–held tester from the DLC3.



2. CHECK FUEL PRESSURE

(a) Check the battery positive voltage is above 12 V.

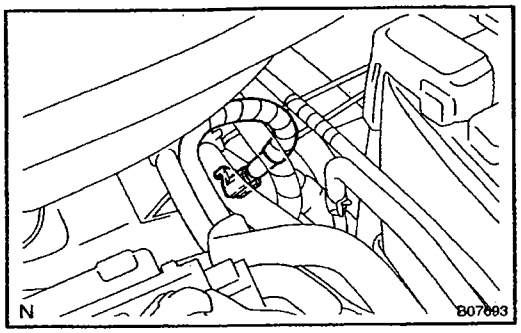
(b) Disconnect the negative (–) terminal cable from the battery.

(c) Purchase the new fuel tube and take out the fuel tube connector from its pipe.

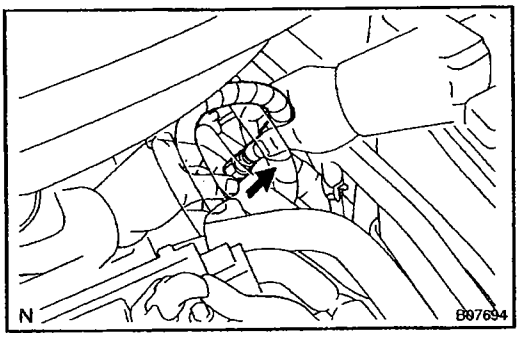
Part No.:

1ZZ–FE: 23901–22100

2ZZ–GE: 23271–88600



(d) Remove the fuel pipe clamp.

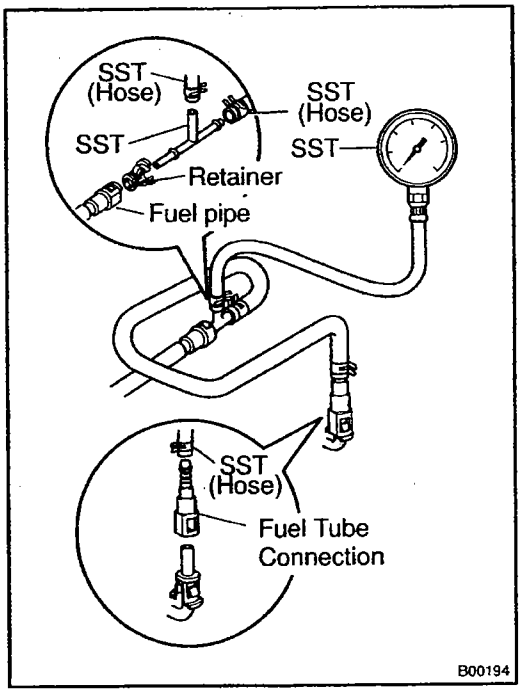


(e) Disconnect the fuel tube (fuel tube connector) from the fuel pipe.

CAUTION:

- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent if from splashing inside the engine comportment.**

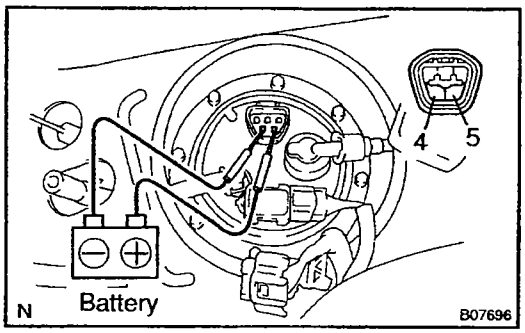
SF



(f) Install SST (pressure gauge) as shown in the illustration by using SST and fuel tube connector.
SST 09268–41047 (95336–08070), 09268–45014 (09268–41200, 09268–41220, 09268–41250)

(g) Wipe off any splattered gasoline.

(h) Reconnect the negative (–) terminal cable to the battery.



(i) Connect the TOYOTA hand–held tester to the DLC3.
If you have no TOYOTA hand–held tester, connect the positive (+) lead from the battery to terminal 4 of the connecter, and the negative (–) lead to terminal 5.

(j) Measure the fuel pressure.
Fuel pressure:
301 – 347 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)
If pressure is high, replace the fuel pressure regulator.
If pressure is low, check the Fuel hoses and connections, Fuel pump, Fuel filter, and Fuel pressure regulator.

(k) Disconnect the TOYOTA hand–held tester from the DLC3.

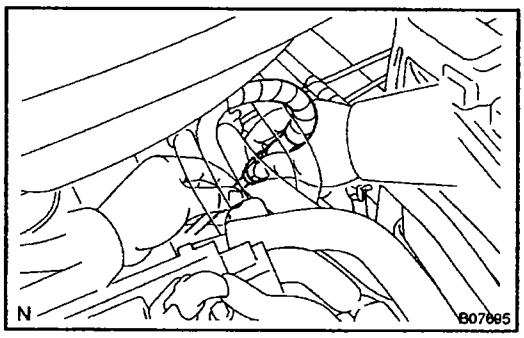
(l) Start the engine.

(m) Measure the fuel pressure at idle.
Fuel pressure:
301 – 347 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)

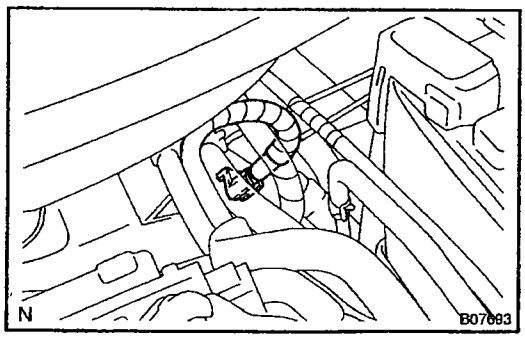
(n) Stop the engine.

(o) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.
Fuel pressure:
147 kPa (1.5 kgf/cm^2, 21 psi) or more
If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

(p) After checking fuel pressure, disconnect the negative (–) terminal cable from the battery and carefully, remove the SST and fuel tube connector to prevent gasoline from splashing.
SST 09268–41047 (95336–08070), 09268–45014 (09268–41200, 09268–41220, 09268–41250)



(q) Reconnect the fuel tube (fuel tube connector).
CAUTION:
Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.



(r) Install the fuel pipe clamp.

(s) Reconnect the negative (–) terminal cable to the battery.

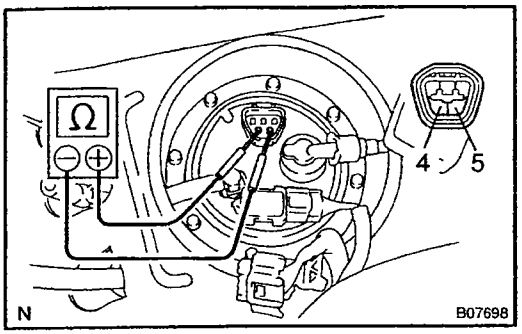
(t) Check for fuel leakage.

3. REMOVE REAR SEAT CUSHION

4. REMOVE FLOOR SERVICE HOLE COVER

5. DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

SF

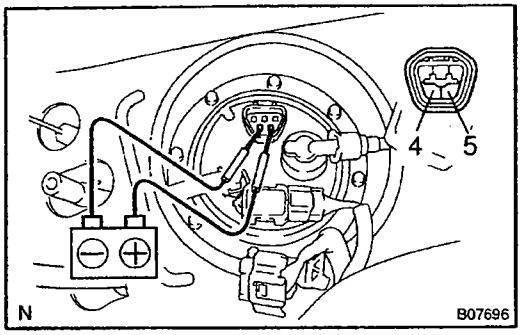


6. INSPECT FUEL PUMP RESISTANCE

Using an ohmmeter, measure the resistance between terminals 4 and 5.

Resistance: 0.2 – 3.0 Ω at 20°C (68 °F)

If the resistance is not as specified, replace the fuel pump.



7. INSPECT FUEL PUMP OPERATION

Connect the positive (+) lead from the battery to terminal 4 of the connector and the negative (–) terminal 5. Check that the pump operates.

NOTICE:

- **These tests must be done quickly (within 10 seconds) to prevent the coil burning out.**
- **Keep fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**

If operation is not as specified, replace the fuel pump or lead wire.

8. RECONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

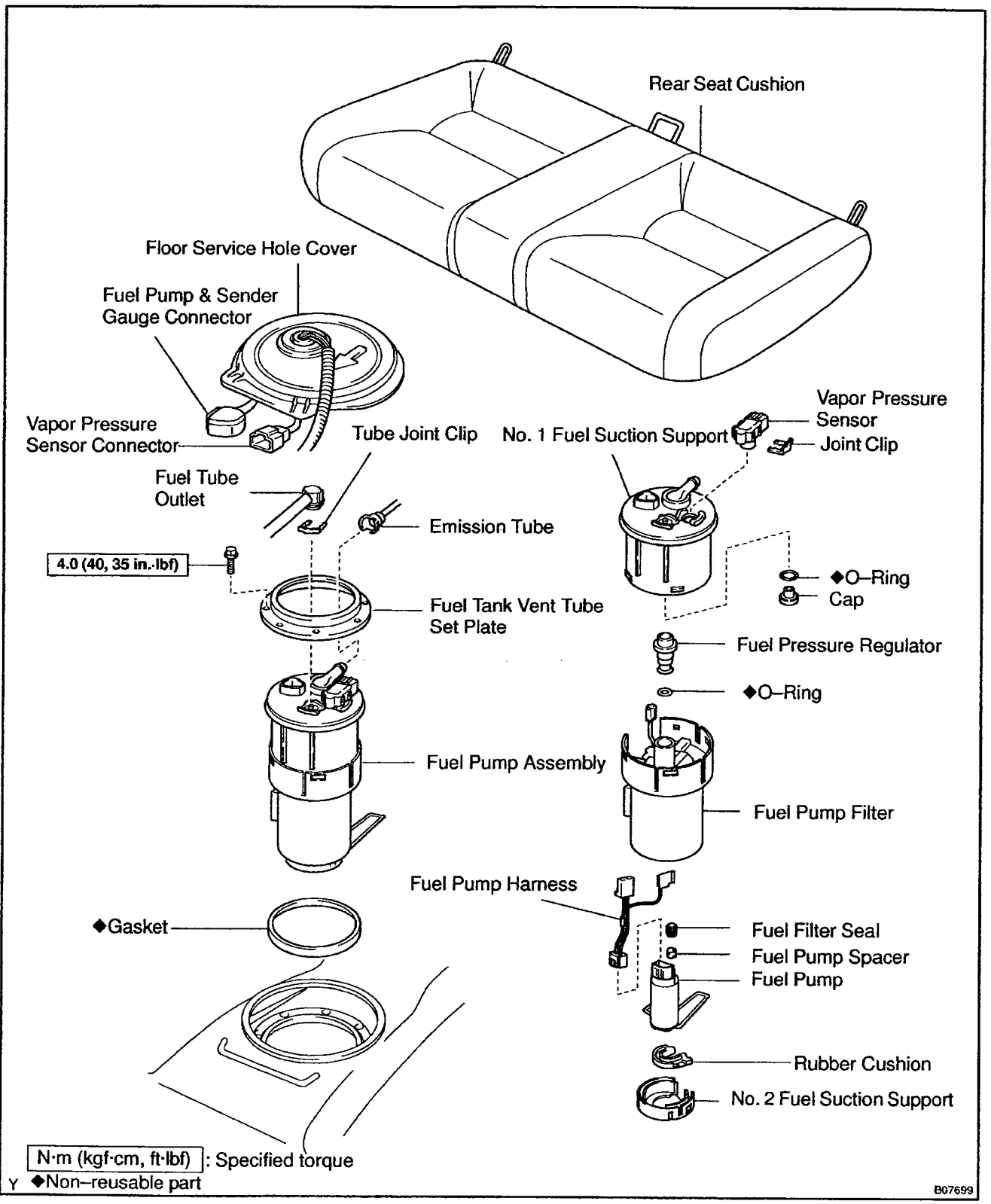
9. REINSTALL FLOOR SERVICE HOLE COVER

10. REINSTALL REAR SEAT CUSHION

SF

COMPONENTS

SF099–04



SF09A-04

REMOVAL

CAUTION:

Do not smoke or work near an open flame when working on the fuel pump.

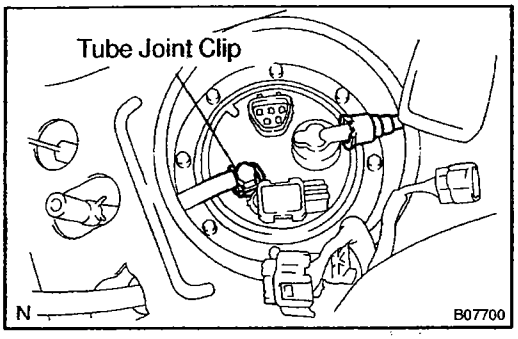
1. **REMOVE REAR SEAT CUSHION**
2. **REMOVE FLOOR SERVICE HOLE COVER**
3. **DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR AND VAPOR PRESSURE SENSOR CONNECTOR**
4. **DISCONNECT FUEL TUBE AND EMISSION TUBE**

(a) Wash away the mud, dust and the likes on the fuel suction plate with water.

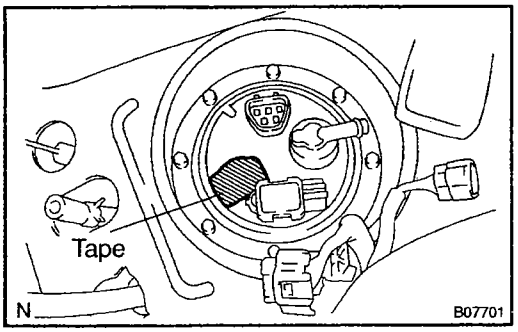
(b) Pull off the tube joint clip from the No. 1 fuel suction plate.

(c) Disconnect the fuel tube from the fuel pump assembly.

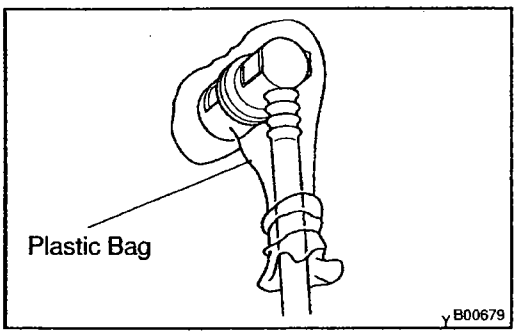
(d) Disconnect the emission tube from the fuel pump assembly.



(e) Attach the tape in order to protect the port portion from the dust.



(f) Protect the disconnected fuel tube from damage and foreign material by covering it with a plastic bag.



5. **REMOVE FUEL PUMP ASSEMBLY FROM FUEL TANK**

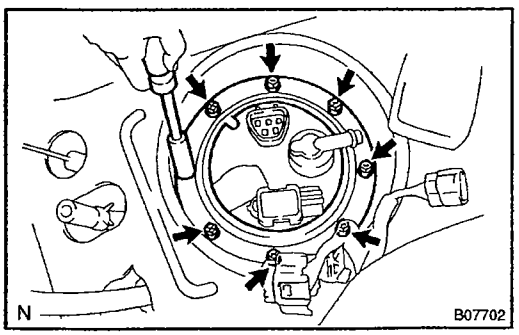
(a) Remove the 8 bolts and fuel tank vent tube set plate.

(b) Pull out the fuel pump assembly.

NOTICE:

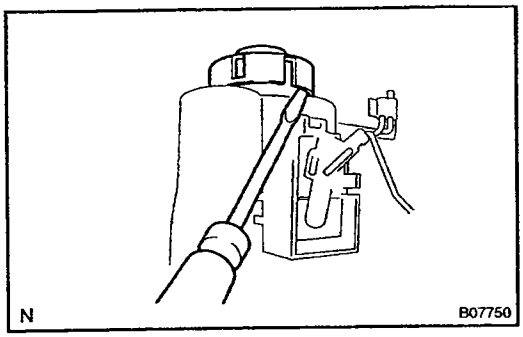
- **Do not damage the fuel pump filter.**
- **Be careful that the arm of the sender gauge should not bent.**

(c) Remove the gasket from the pump assembly.



SF13P-02

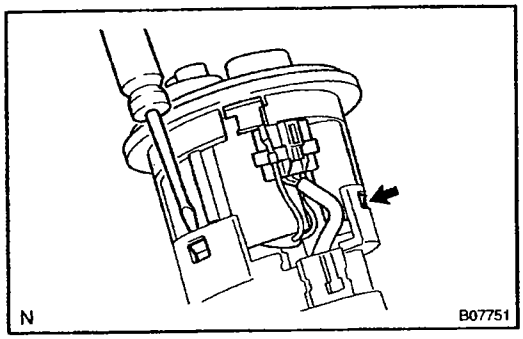
DISASSEMBLY



1. REMOVE NO. 2 FUEL SUCTION SUPPORT

(a) Using a small screwdriver, remove the No. 2 fuel suction support.

(b) Remove the rubber cushion.



2. REMOVE NO. 1 FUEL SUCTION SUPPORT

(a) Disconnect the fuel sender gauge connector and earth plate.

(b) Using a small screwdriver, remove the No. 1 fuel suction support.

NOTICE:

Do not damage the fuel suction support and fuel suction plate.

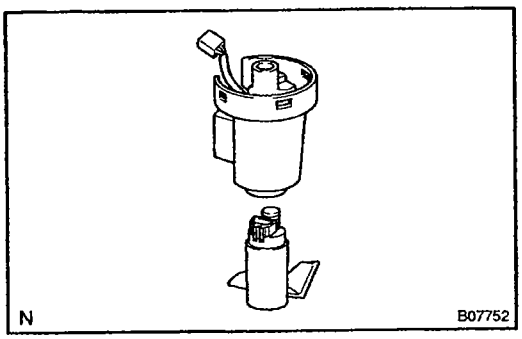
(c) Disconnect the fuel pump harness from the No. 1 fuel suction support and fuel pump.

3. REMOVE VAPOR PRESSURE SENSOR

Pull off the joint clip and remove the vapor pressure sensor from No. 1 fuel suction support.

4. REMOVE FUEL PRESSURE REGULATOR

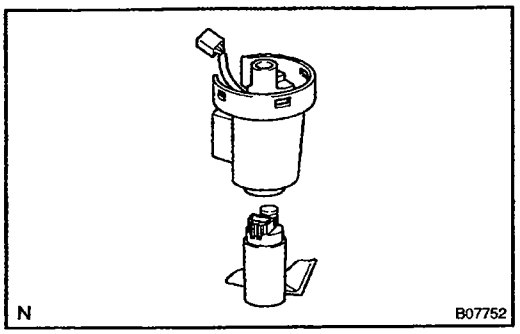
Pull out the fuel pressure regulator and O–ring from the fuel filter.



5. REMOVE FUEL PUMP

Remove the pump from the fuel filter.

SF130-02



REASSEMBLY

1. INSTALL FUEL PUMP

Connect the fuel pump to the fuel filter.

2. INSTALL FUEL PRESSURE REGULATOR

(a) Install the O–ring to the pressure regulator.

HINT:

Apply a light coat of gasoline to a new O–ring, and install it to the pressure regulator.

(b) Connect the pressure regulator to the fuel filter.

3. INSTALL NO. 1 FUEL SUCTION SUPPORT

(a) Connect the fuel pump harness to the No. 1 fuel suction support and fuel pump.

(b) Install the No. 1 fuel suction support to the fuel filter.

(c) Connect the fuel sender gauge connector and earth plate.

4. INSTALL NO. 2 FUEL SUCTION SUPPORT

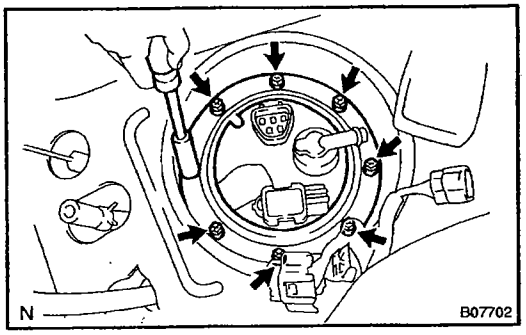
(a) Install the rubber cushion.

(b) Install the No. 2 fuel suction support to the No. 1 fuel suction support.

5. INSTALL VAPOR PRESSURE SENSOR

Install the vapor pressure sensor and connect the joint clip to the No. 1 fuel suction support.

SF09D-04



INSTALLATION

1. INSTALL FUEL PUMP ASSEMBLY

(a) Install the new gasket to the fuel pump assembly.

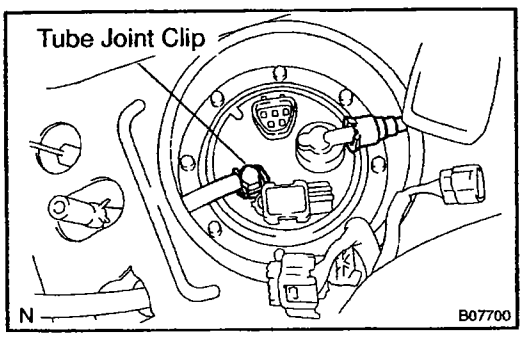
(b) Install the fuel pump assembly to the fuel tank.

NOTICE:

- **Do not damage the fuel pump filter.**
- **Be careful that the arm of the sender gauge should not bent.**

(c) Install the 8 bolts and fuel tank vent tube set plate from the fuel tank.

Torque: 4.0 N·m (40 kgf·cm, 35 in.·lbf)



2. CONNECT FUEL TUBE

(a) Clean up around the fuel tube.

(b) Connect the fuel tube and emission tube to the fuel pump assembly.

(c) Connect the tube joint clip to the fuel suction plate.

3. CONNECT FUEL PUMP AND SENDER GAUGE CONNECTOR AND VAPOR PRESSURE SENSOR CONNECTOR

HINT:

Start the engine, check for fuel leakage.

4. INSTALL FLOOR SERVICE HOLE COVER

(a) Install the service hole cover.

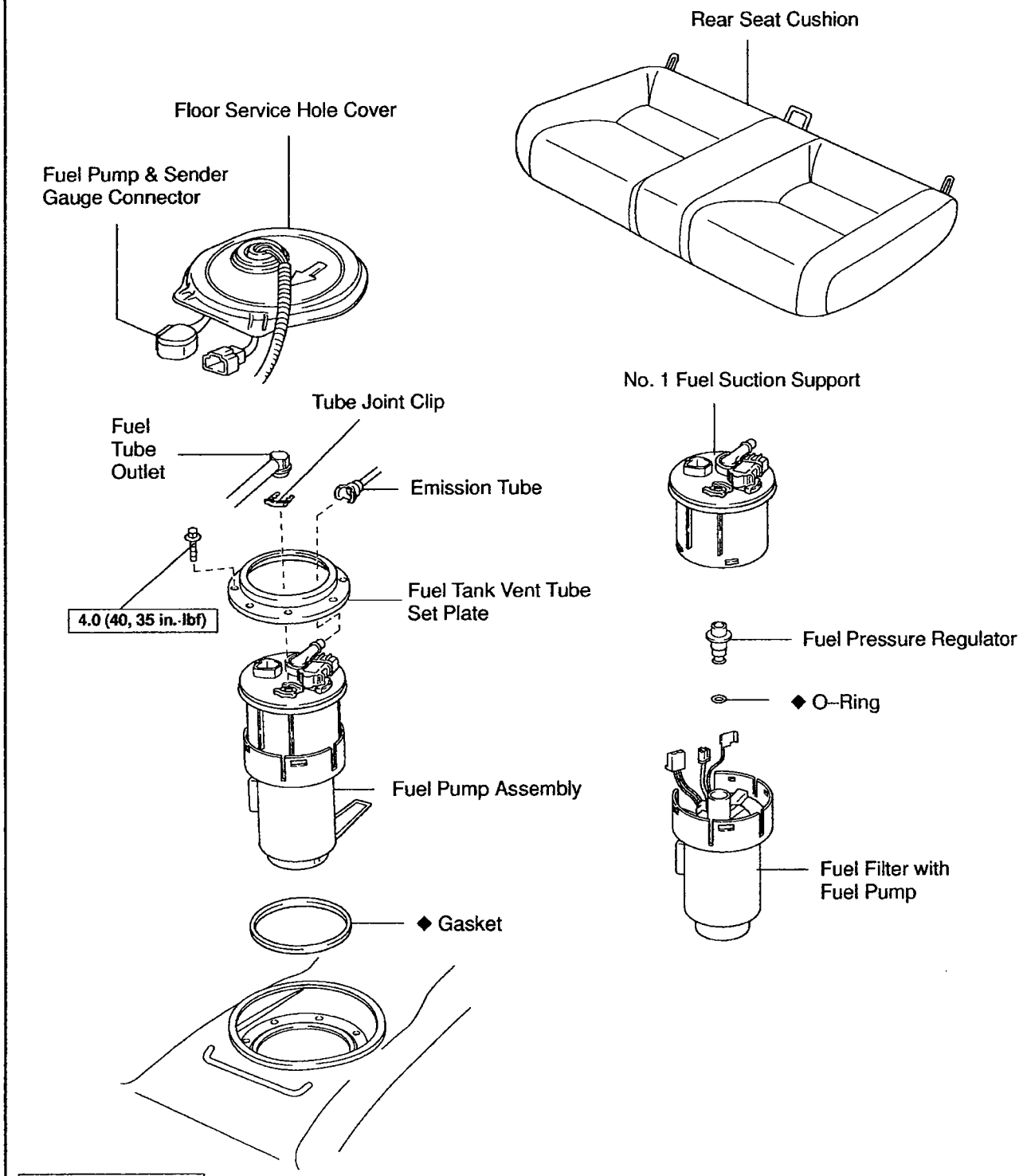
(b) Install the floor carpet.

5. INSTALL REAR SEAT CUSHION

FUEL PRESSURE REGULATOR

SF09E-04

COMPONENTS



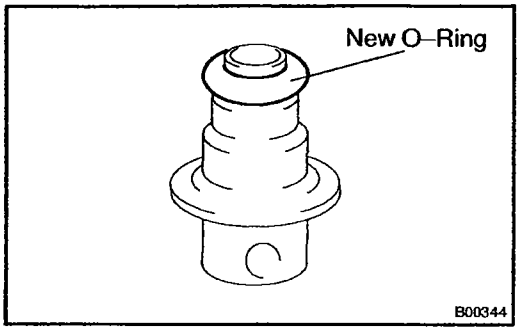
SF13R–02

REMOVAL

1. **REMOVE FUEL PUMP ASSEMBLY FROM FUEL TANK (See page SF–11)**
2. **REMOVE NO. 1 FUEL SUCTION SUPPORT (See page SF–12)**
3. **REMOVE FUEL PRESSURE REGULATOR**

(a) Pull out the pressure regulator.

(b) Remove the O–ring from the pressure regulator.



SF0Z6-04

INSTALLATION

1. INSTALL FUEL PRESSURE REGULATOR

(a) Install the O–ring to the pressure regulator.

HINT:

Apply a light coat of gasoline to a new O–ring, and install it to the pressure regulator.

(b) Connect the pressure regulator from the fuel filter.

2. INSTALL NO. 1 FUEL SUCTION SUPPORT
(See page SF–13)

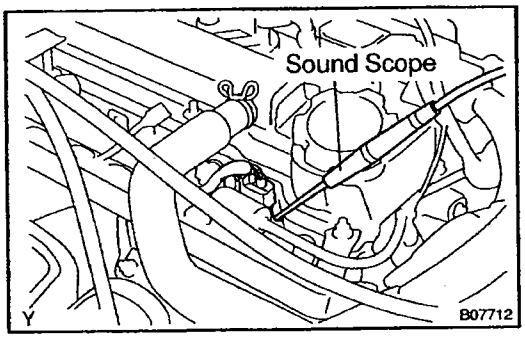
3. INSTALL FUEL PUMP ASSEMBLY TO FUEL TANK
(See page SF–14)

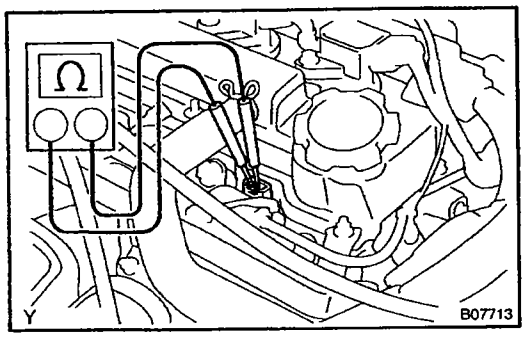
INJECTOR

SF15O-01

ON–VEHICLE INSPECTION

1. REMOVE NO. 2 CYLINDER HEAD COVER





2. CHECK OPERATION SOUND FROM EACH INJECTOR

(a) Connect the PCV hose to cylinder head cover.

(b) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine speed.

(c) If you have no sound scope, you can check the injector transmission operation with your finger.

If no sound or unusual sound is heard, check the wiring connector, injector signal from the ECM.

(d) Disconnect the PCV hose from cylinder head cover.

3. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connector.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 13.4 – 14.2 Ω at 20°C (68°F)

If the resistance is not as specified, replace the injector.

(c) Reconnect the injector connector.

4. INSTALL WIRE HARNESS PROTECTOR COVER

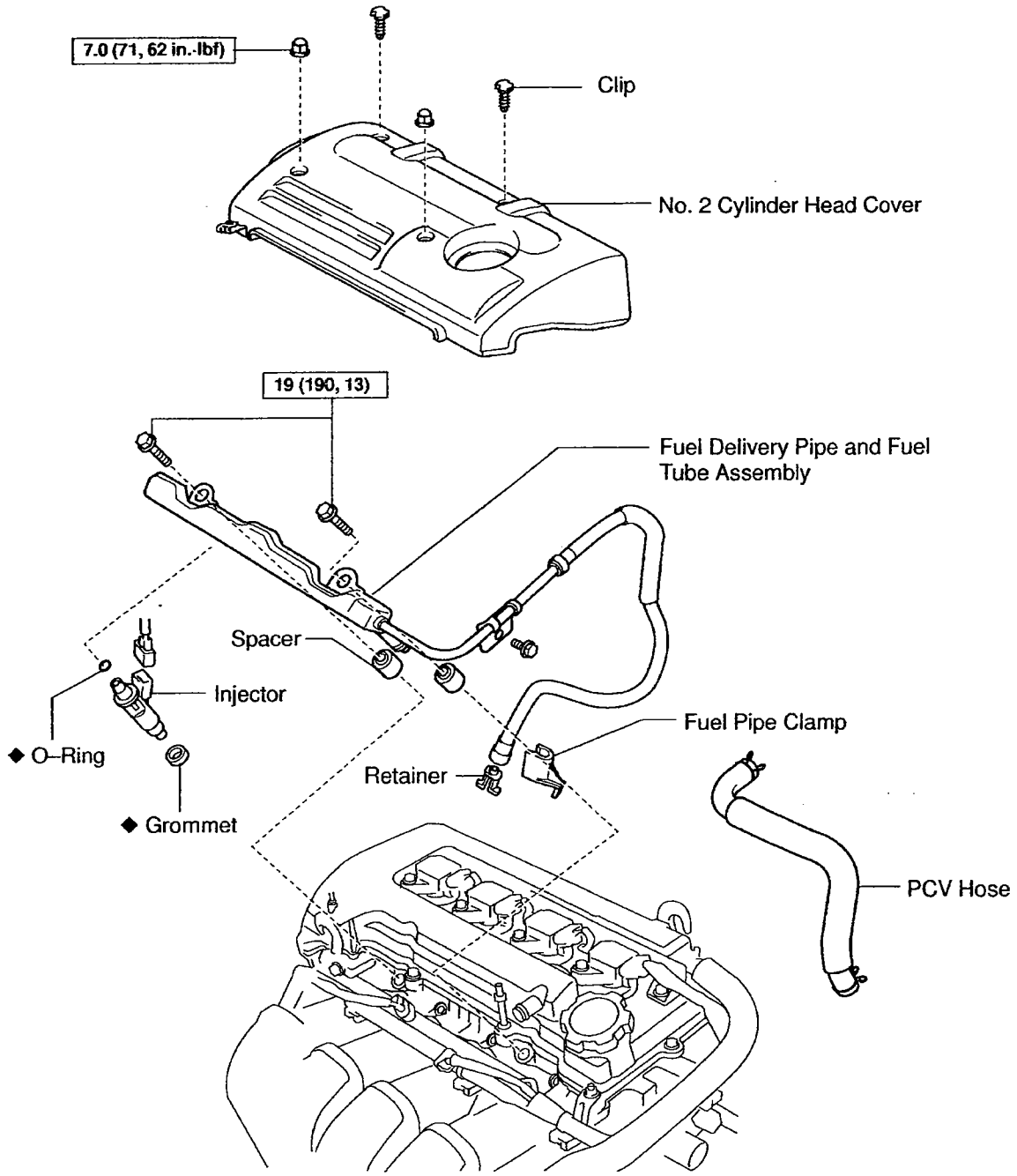
(a) Install the wire harness protector cover with bolt and 2 nuts.

(b) Connect the PCV hose to cylinder head cover.

SF1SP-01

COMPONENTS

1ZZ–FE:



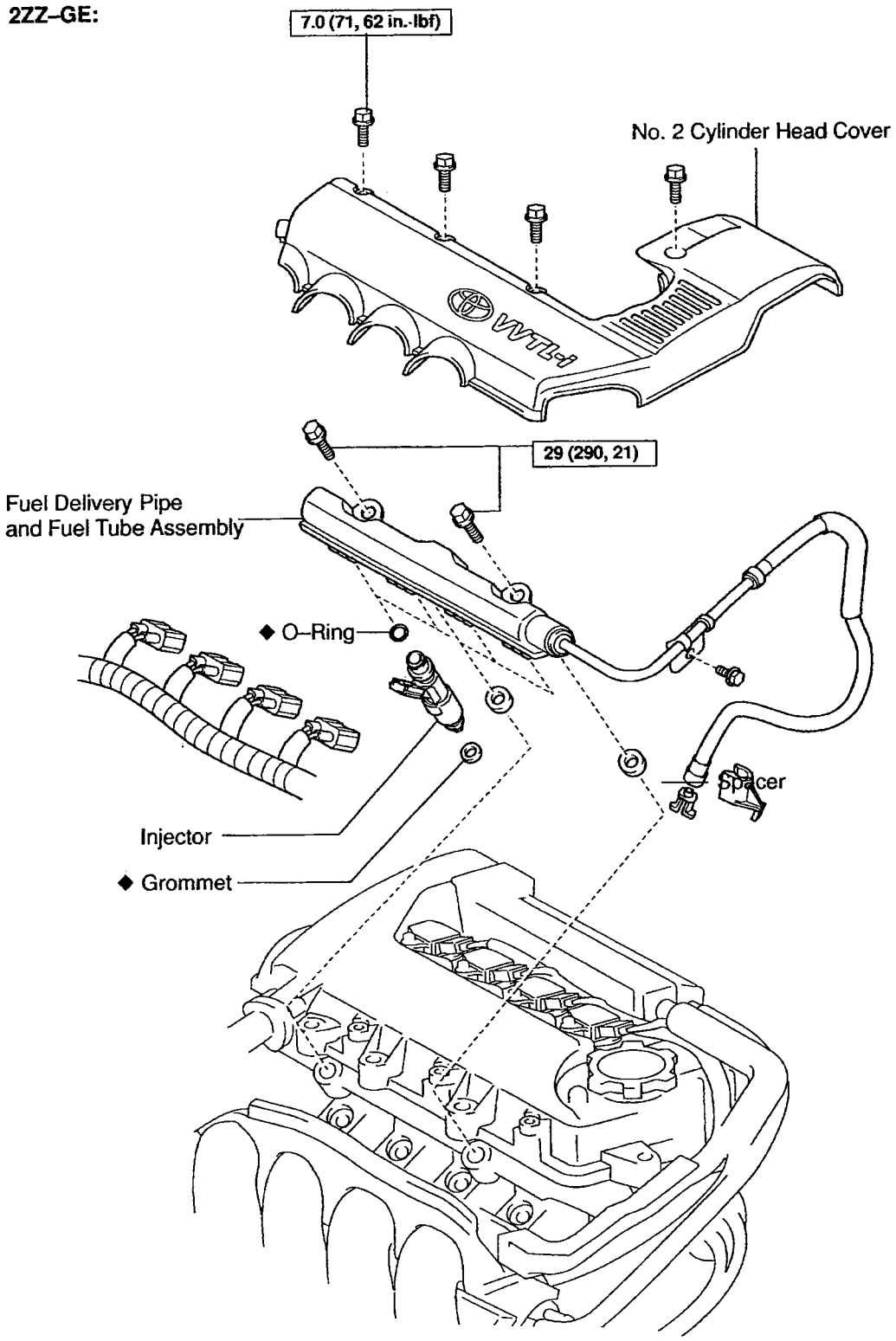
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

Y

B09173

2ZZ–GE:



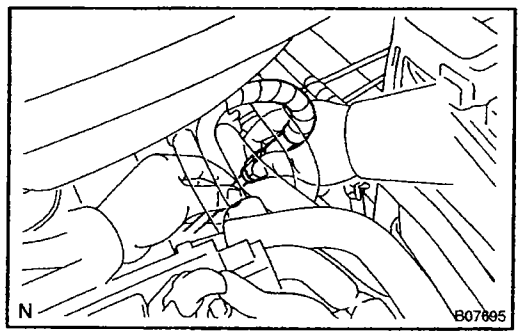
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B07714

SF15Q-01

REMOVAL

1. **REMOVE NO. 2 CYLINDER HEAD COVER**
2. **1ZZ–FE:**
   REMOVE PCV HOSE



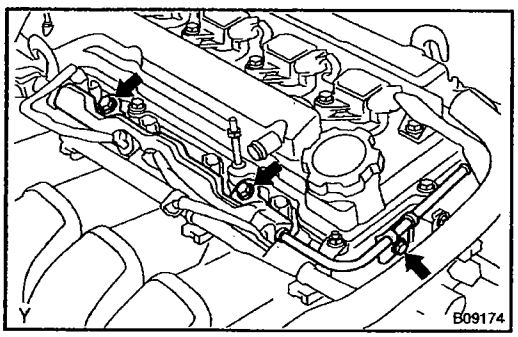
3. **DISCONNECT FUEL TUBE**

(a) Remove the fuel pipe clamp.

(b) Disconnect the fuel tube (fuel tube connector) from the fuel pipe.

CAUTION:

- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.**



4. **REMOVE DELIVERY PIPE AND INJECTORS**

NOTICE:

Be careful not to drop the injectors when removing the delivery pipe.

(a) Disconnect the 4 injector connectors from injector.

(b) Remove the 3 bolts and delivery pipe together with the 4 injectors and fuel pipe.

(c) Remove the 2 spacers from the cylinder head.

(d) Pull out the 4 injectors from the delivery pipe.

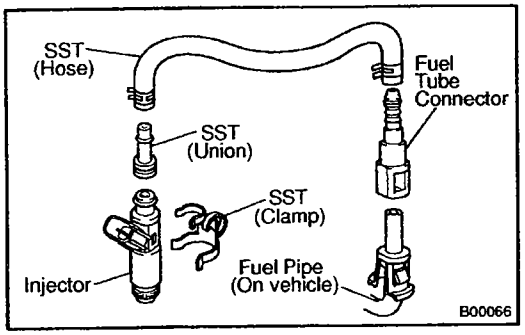
(e) Remove the O–ring and grommet from each injector.

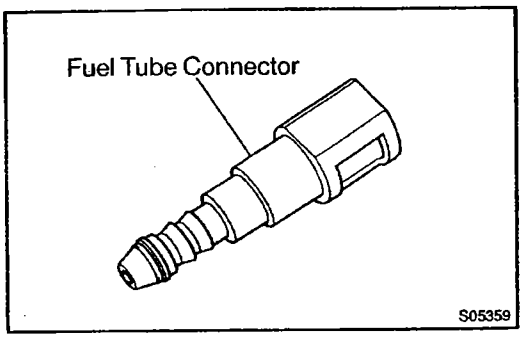
SF09K–05

INSPECTION

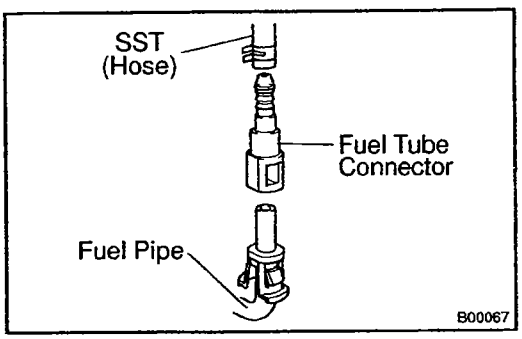
1. INSPECT INJECTOR INSPECTION

CAUTION:
Keep injector clear of sparks during the test.



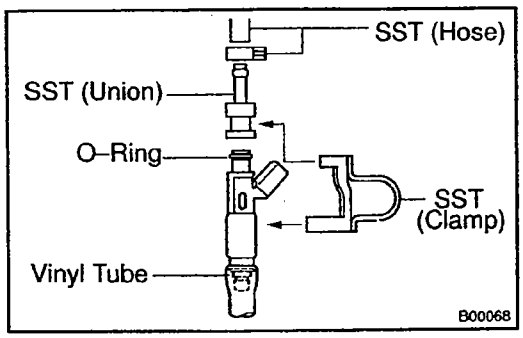


(a) Purchase the new fuel tube and take out the fuel tube connector from its pipe.
Part No. 23901–22010



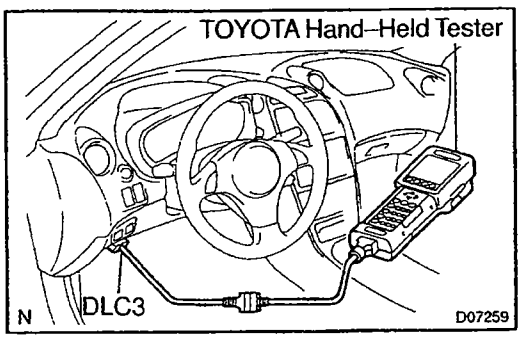
(b) Connect SST (hose) and fuel tube connector to the fuel pipe.
SST 09268–41047

CAUTION:
Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.



(c) Install the grommet and O–ring to the injector.
(d) Connect SST (union and hose) to the injector, and hold the injector to prevent gasoline from splashing out.
SST 09268–41047
(e) Put the injector into a graduated cylinder.

HINT:
Install a suitable vinyl tube onto the injector to prevent gasoline from splashing out.

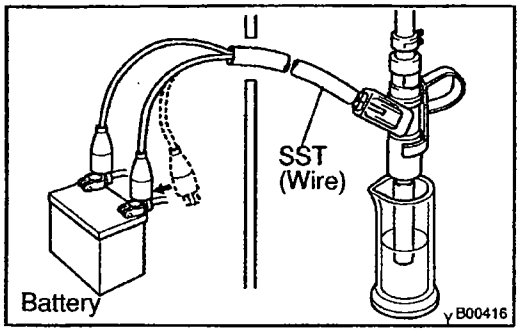


(f) Connect the TOYOTA hand–held tester to the DLC3.
(g) Turn the ignition switch ON and TOYOTA hand–held tester main switch ON.

NOTICE:
Do not start the engine.

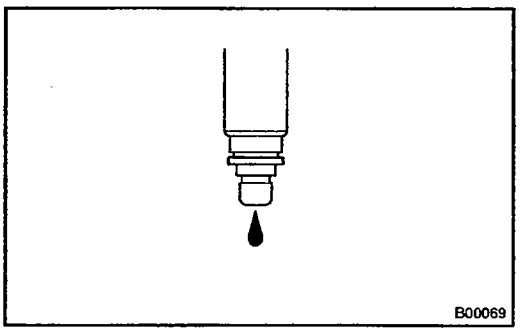
(h) Select the active test mode on the TOYOTA hand–held tester.
(i) Please refer to the TOYOTA hand–held tester operator's manual for further details.

(j) If you have no TOYOTA hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page SF–18).



(k) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector 2 or 3 times.
SST 09842–30080
Volume:
47 – 58 cm³ (2.7 – 3.3 cu in.) per 15 sec.
Difference between each injector:
10 cm³ (0.6 cu in.) or less

If the injection volume is not as specified, replace the injector.



2. INSPECT LEAKAGE

(a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.
SST 09842–30080
Fuel drop:
1 drop or less per 12 minutes

(b) Turn the ignition switch to LOCK.

(c) Disconnect the negative (–) terminal cable from the battery.

(d) Remove the SST and fuel tube connector.
SST 09268–41047

CAUTION:

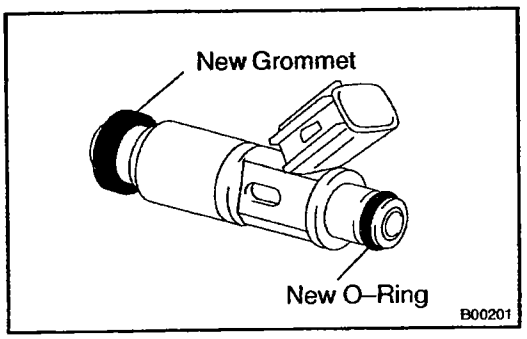
- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.**

(e) Disconnect the TOYOTA hand–held tester from the DLC3.

SF09L-04

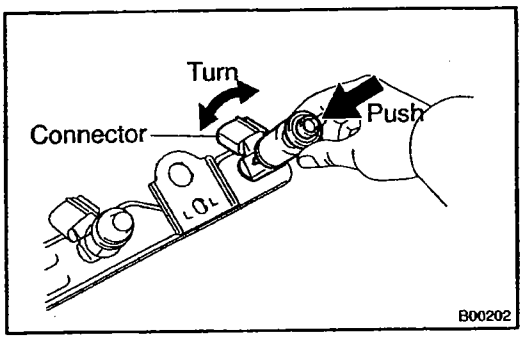
INSTALLATION

1. INSTALL INJECTORS AND DELIVERY PIPES



(a) Install the grommet to each injector.

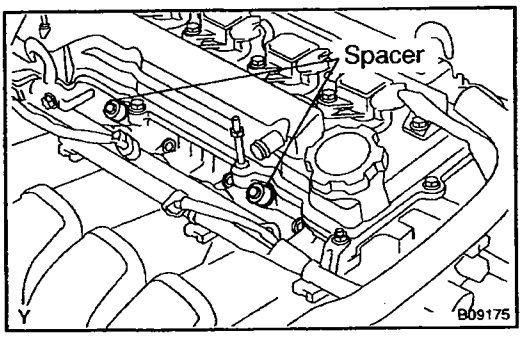
(b) Apply a light coat of spindle oil or gasoline to new O–ring and install them to each injector.



(c) Apply a light coat of spindle oil or gasoline on the place where a delivery pipe touches on O–ring.

(d) While turning the injector clockwise and counterclockwise, push it to the delivery pipes. Install the 4 injectors.

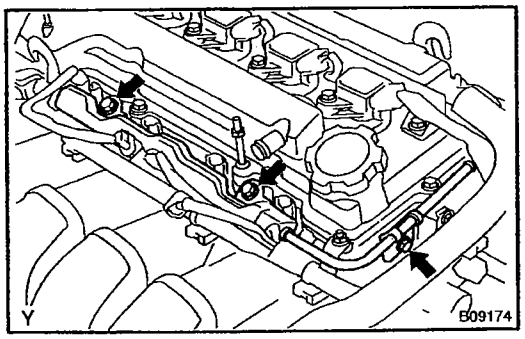
(e) Position the injector connector outward.



(f) Place the 2 spacers in position on the cylinder head.

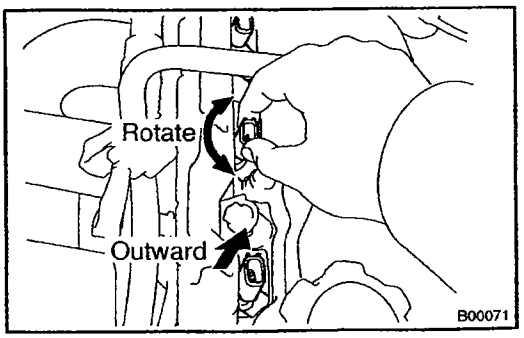
(g) Apply a light coat of spindle oil or gasoline on the place where a cylinder head touches an O–ring of the injector.

(h) Place the delivery pipe and fuel pipe together with the 4 injectors in position on the cylinder head.



(i) Temporarily install the 2 bolts holding the delivery pipe to the cylinder head.

(j) Temporarily install the bolt holding the fuel pipe to the cylinder head.

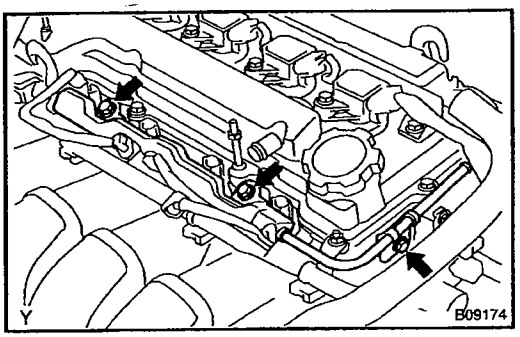


(k) Check that the injectors rotate smoothly.

HINT:

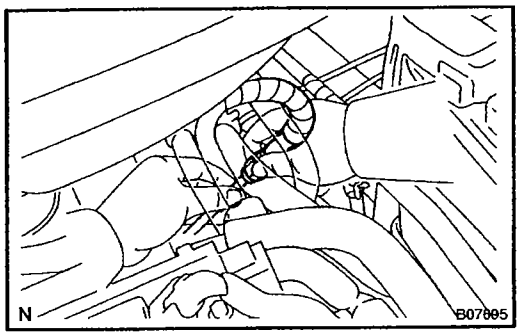
If injectors do not rotate smoothly, the probable cause is incorrect installation of O–ring. Replace the O–ring.

(l) Position the injector connector connector outward.



(m) Tighten the 2 bolts holding the delivery pipe to the cylinder head.
Torque:
1ZZ–FE: 19 N·m (190 kgf·cm, 14 ft·lbf)
2ZZ–GE: 29 N·m (290 kgf·cm, 21 ft·lbf)

(n) Tighten the bolt holding the fuel pipe to the cylinder head.
Torque: 9 N·m (92 kgf·cm, 7 ft·lbf)



2. CONNECT FUEL TUBE

(a) Connect the fuel tube (fuel tube connector) to the fuel pipe.

CAUTION:
Perform connecting operations of the connector (quick type) after observing the precautions.

(b) Install the fuel pipe clamp.

3. INSTALL NO. 2 CYLINDER HEAD COVER

FUEL TANK AND LINE

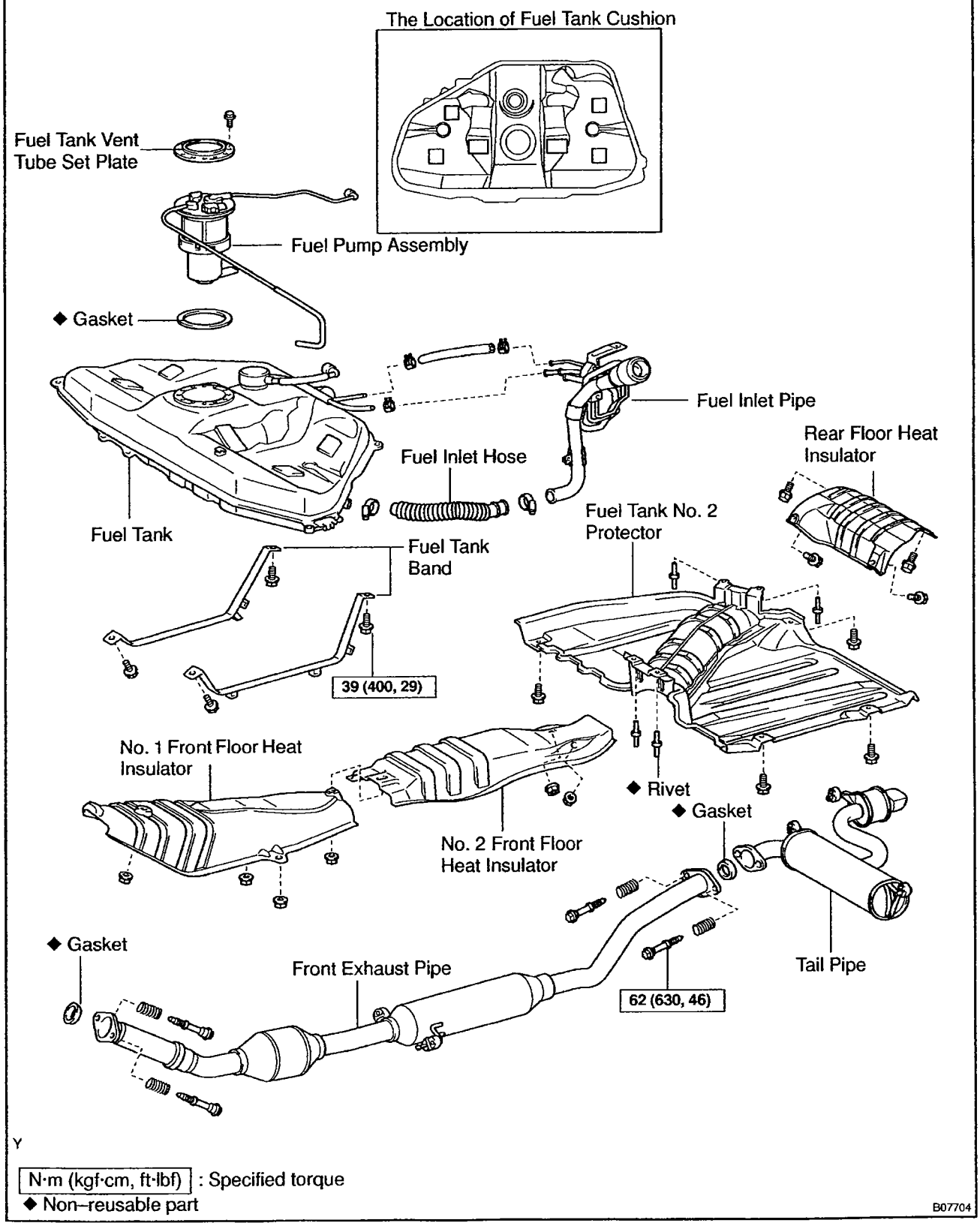
PRECAUTION

SF09M-01

- **Always use new gaskets when replacing the fuel tank or component parts.**
- **Apply the proper torque to all parts tightened.**

SF03N-04

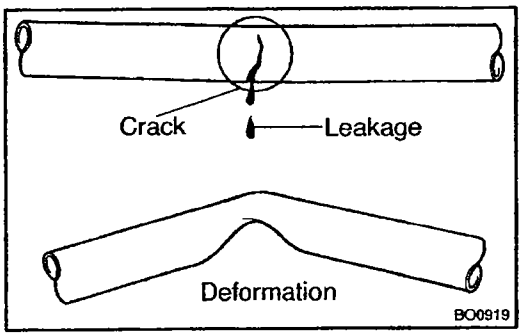
COMPONENTS

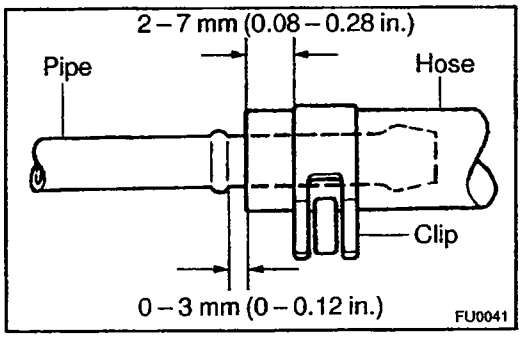


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B07704

SF09O-03





INSPECTION

INSPECT FUEL TANK AND LINE

(a) Check the fuel lines for cracks or leakage, and all connections for deformation.

(b) Check the fuel tank for deformation, cracks fuel leakage or tank band looseness.

(c) Check the filter neck for damage or fuel leakage.

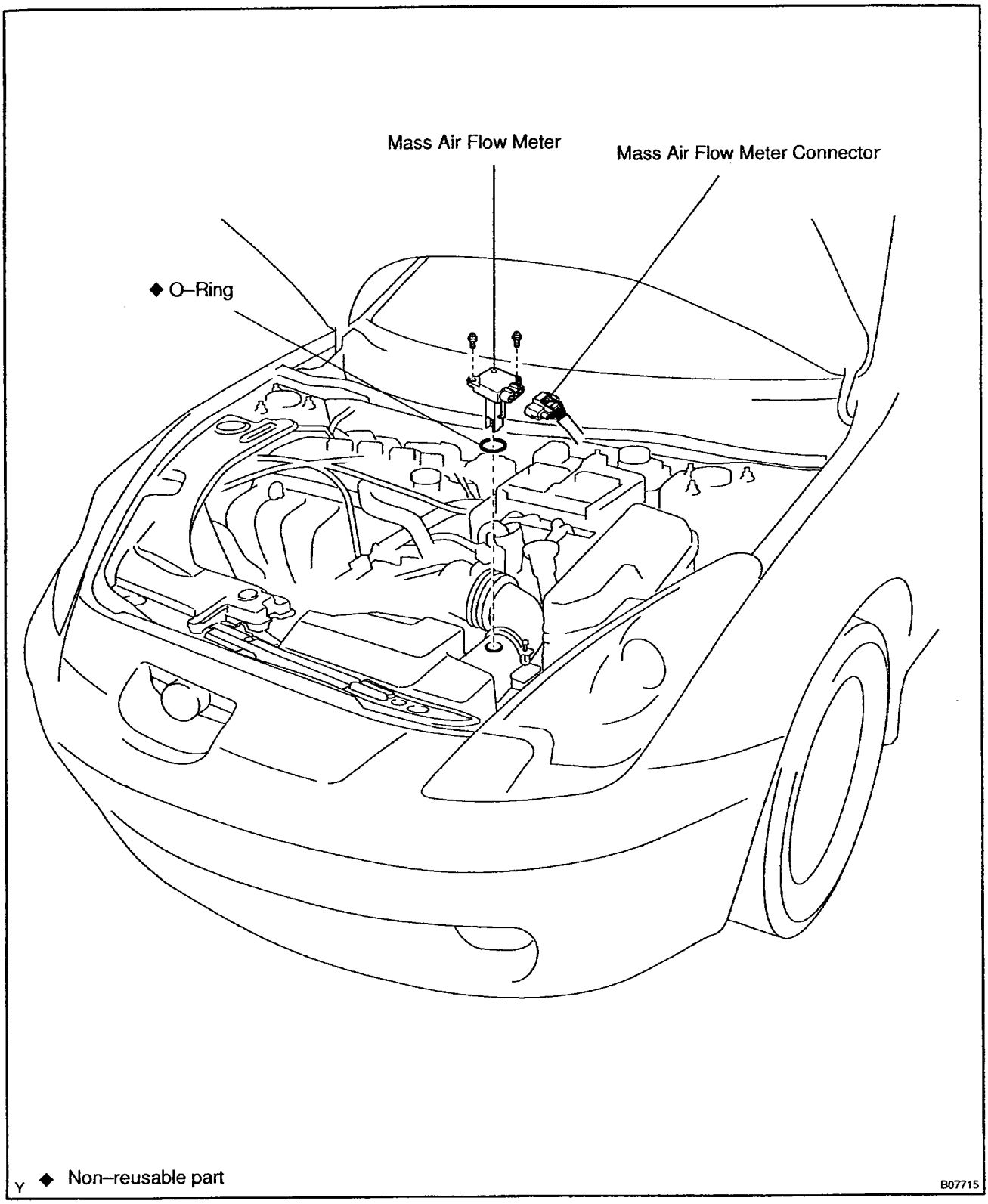
(d) Hose and tube connections are as shown in the illustration.

If a problem is found, repair or replace the part as necessary.

MASS AIR FLOW (MAF) METER

COMPONENTS

SF07P–05



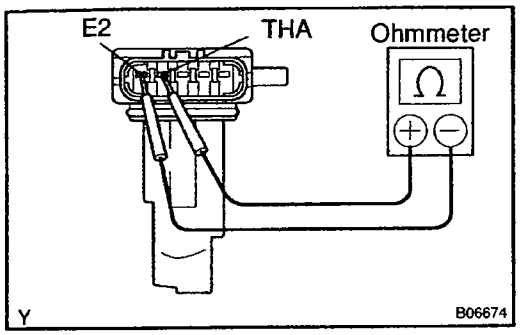
F0M7–02

REMOVAL

REMOVE AIR FLOW METER

Remove the 2 screws, air flow meter and O–ring.

FKM8-02



INSPECTION

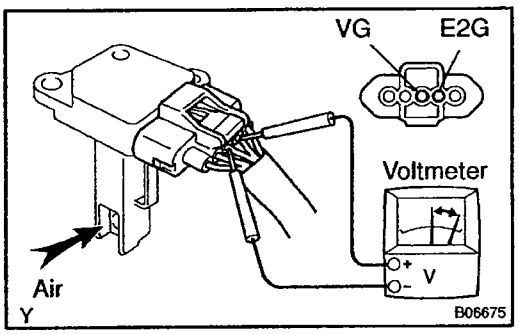
1. INSPECT MAF METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Resistance:

Terminals	Resistance	Temperature
THA – E2	13.6 – 18.4 kΩ	–20°C (–4°F)
THA – E2	2.21 – 2.69 kΩ	20°C (68°F)
THA – E2	0.49 – 0.67 kΩ	60°C (140°F)

If the resistance is not as specified, replace the MAF meter.



2. INSPECT MAF METER OPERATION

(a) Connect the MAF meter connector.
(b) Turn the ignition switch to ON.
(c) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.
(d) Blow air into the MAF meter, and check that the voltage fluctuates.

If operation is not as specified, replace the MAF meter.

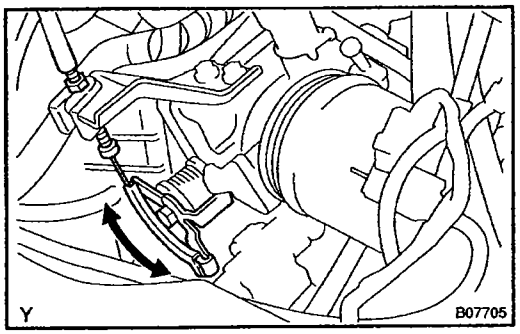
(e) Turn the ignition switch LOCK.
(f) Disconnect the MAF meter connector.

FI0M9–02

INSTALLATION

INSTALL AIR FLOW METER

Install the air flow meter and a new O–ring with 2 screws.



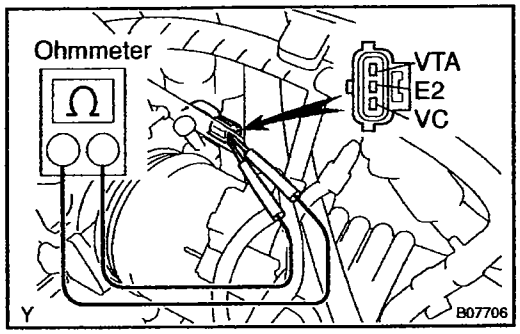
THROTTLE BODY

SF09P-05

ON–VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

Check that the throttle linkage moves smoothly.



2. INSPECT THROTTLE POSITION SENSOR

(a) Remove the air cleaner assembly with air flow meter.
(b) Disconnect the throttle position sensor connector.
(c) Using an ohmmeter, measure the resistance between each terminal.

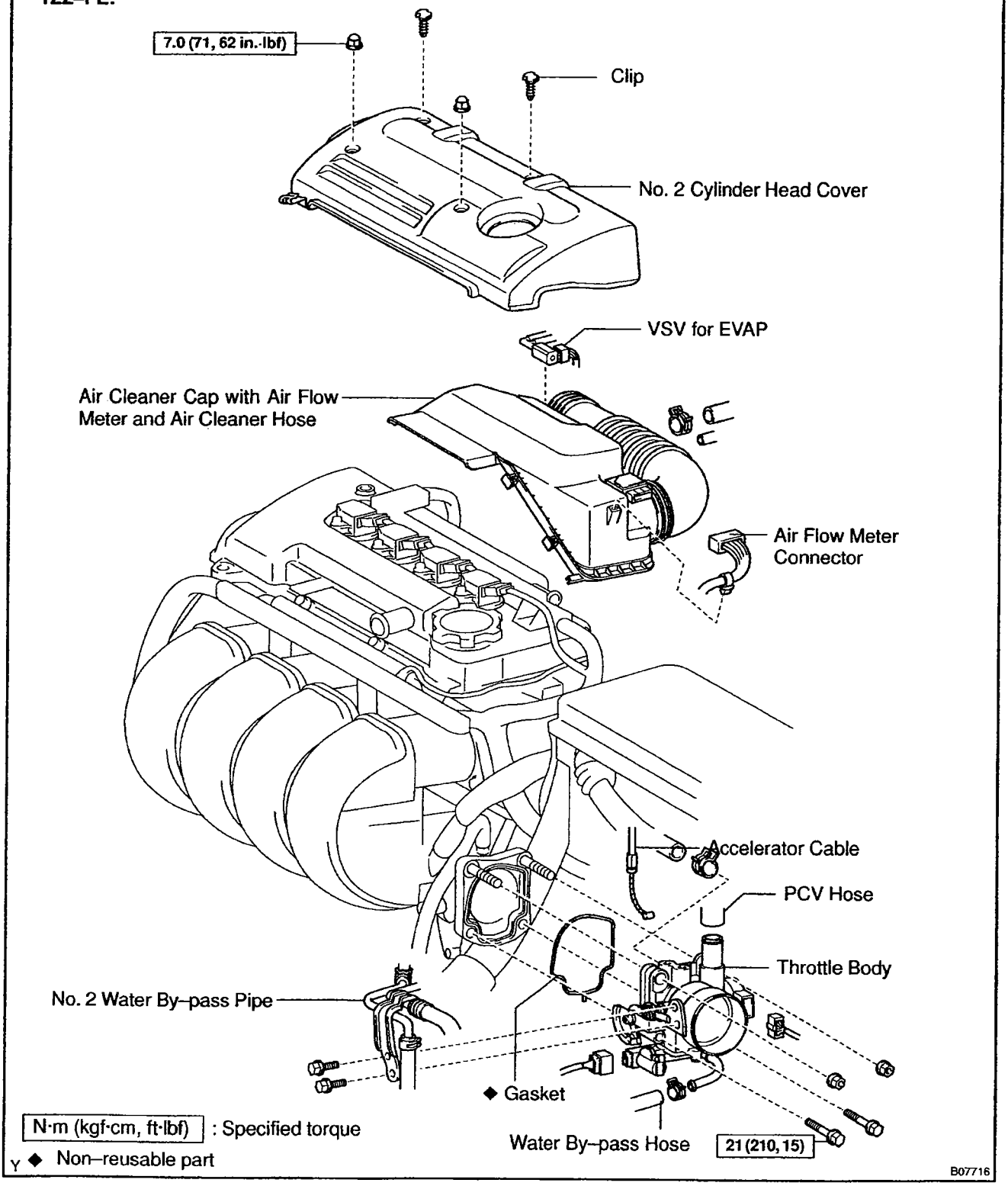
Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA – E2	0.2 – 5.7 kΩ
Throttle valve fully open	VTA – E2	2.0 – 10.2 kΩ
–	VC – E2	2.5 – 5.9 kΩ

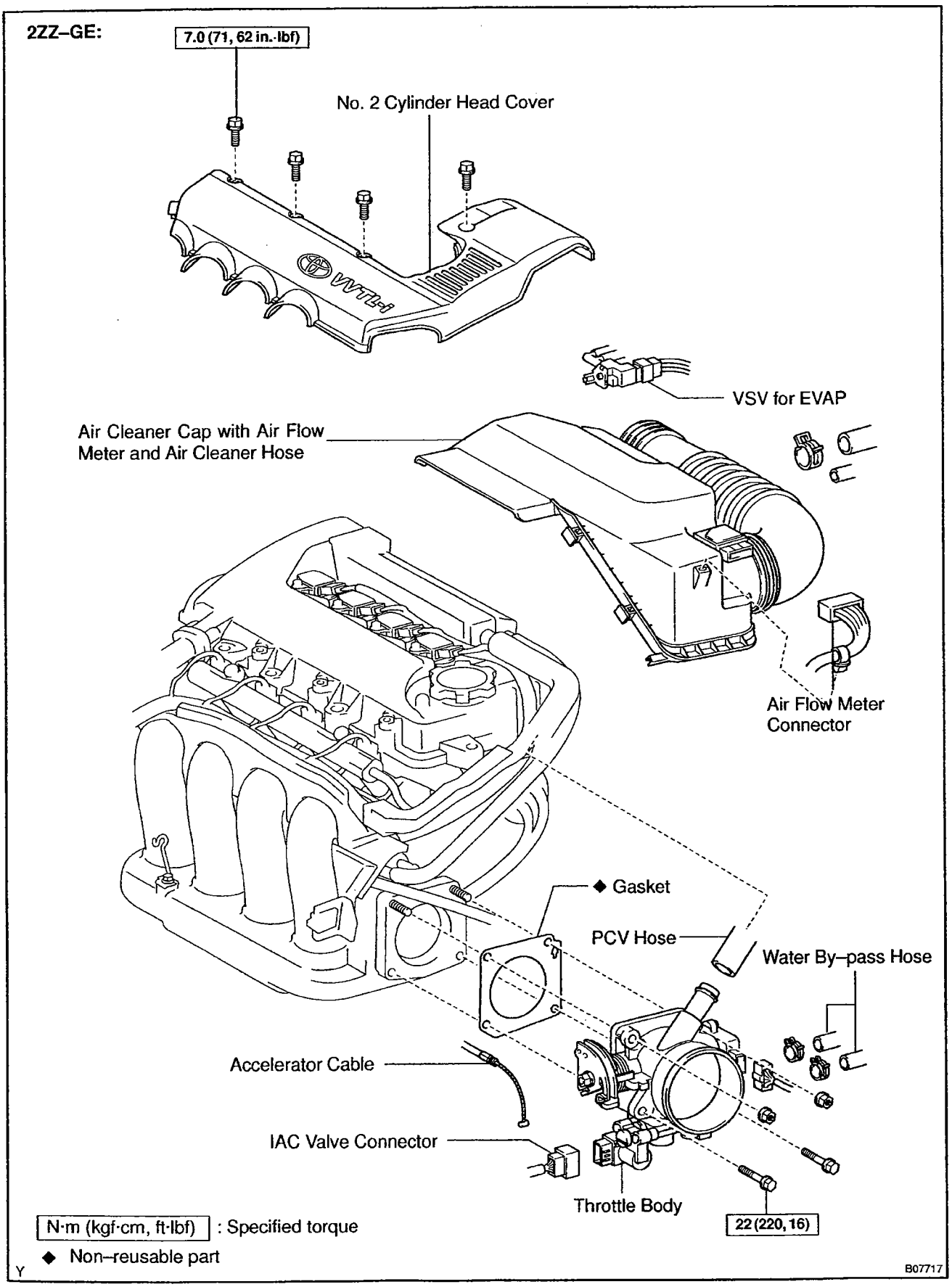
(d) Reconnect the throttle position sensor connector.
(e) Reinstall the air cleaner assembly with air flow meter.

COMPONENTS

SF168–01

1ZZ–FE:



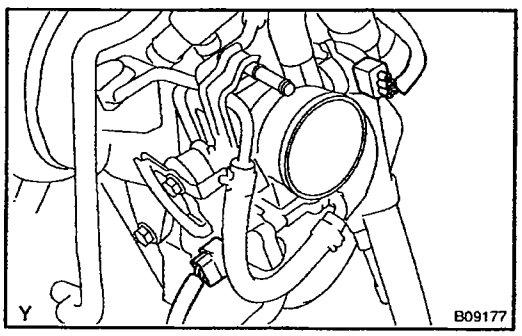

2ZZ–GE:
7.0 (71, 62 in.·lbf)
No. 2 Cylinder Head Cover
VSV for EVAP
Air Cleaner Cap with Air Flow Meter and Air Cleaner Hose
Air Flow Meter Connector
◆ Gasket
PCV Hose
Water By–pass Hose
Accelerator Cable
IAC Valve Connector
Throttle Body
22 (220, 16)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Y
B07717

SF09R–02

REMOVAL

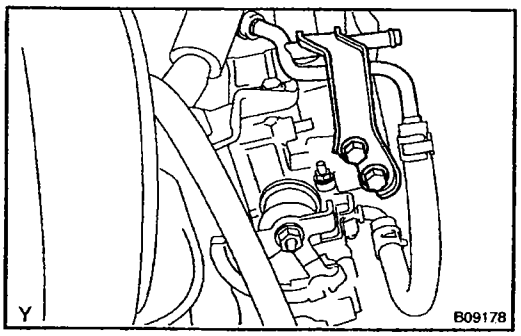
1. **DRAIN ENGINE COOLANT**
2. **DISCONNECT ACCELERATOR CABLE**
3. **REMOVE NO. 2 CYLINDER HEAD COVER**
4. **REMOVE AIR CLEANER HOSE AND CAP WITH MAF METER**

(a) Disconnect the VSV for EVAP.
(b) Disconnect the 2 air hoses from air cleaner cap.
(c) Loosen the air cleaner hose clamp bolt.
(d) Disconnect the mass air flow meter connector.
(e) Disconnect the 3 air cleaner cap clips.
(f) Disconnect the air cleaner hose from the throttle body, and remove the air cleaner cap together with the air cleaner hose.

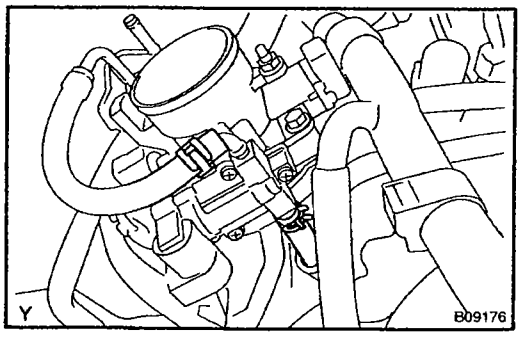


5. **REMOVE THROTTLE BODY**

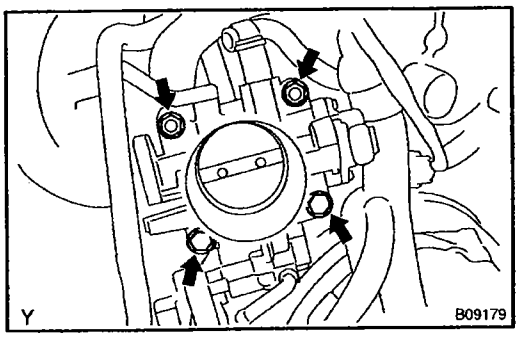
(a) Disconnect the throttle position sensor connector.
(b) Disconnect the IAC valve connector.
(c) Disconnect the PCV hose from throttle body.



(d) 1ZZ–FE:
Remove the 2 bolts and disconnect the No. 2 water bypass pipe.

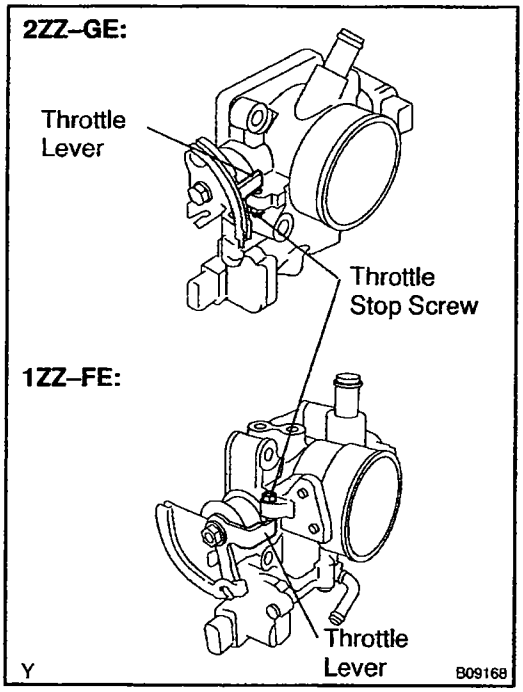


(e) Disconnect the 2 water bypass hoses.



(f) Remove the 2 bolts, 2 nuts and throttle body from the intake manifold.

(g) Remove the throttle body gasket.

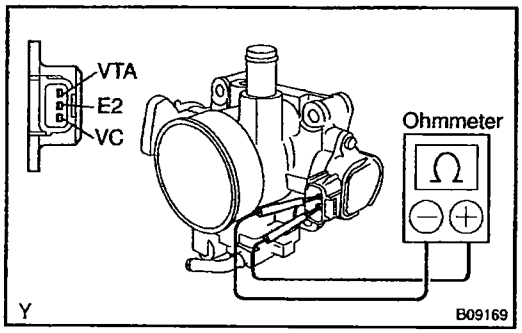


SF09S–05

INSPECTION

1. INSPECT THROTTLE VALVE

Check that there is no clearance between the throttle stop screw and throttle lever when the closed throttle position.



2. INSPECT THROTTLE POSITION SENSOR

Using an ohmmeter, measure the resistance between each terminal.

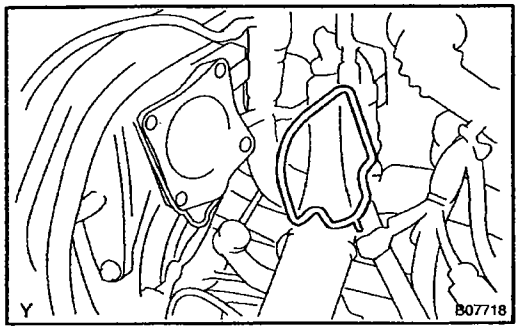
Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA – E2	0.2 – 5.7 kΩ
Throttle valve fully open	VTA – E2	2.0 – 10.2 kΩ
–	VC – E2	2.5 – 5.9 kΩ

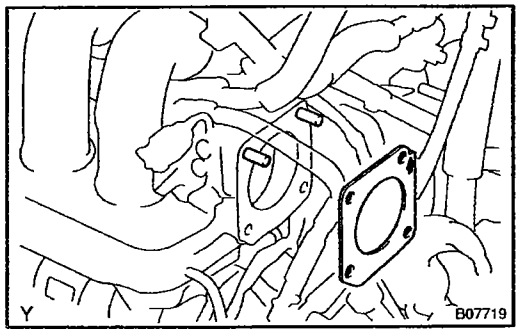
SF169–01

INSTALLATION

1. INSTALL THROTTLE BODY

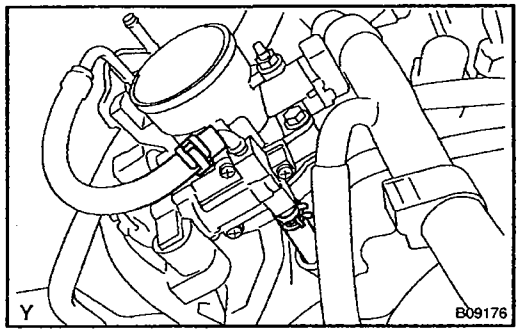
(a) 1ZZ–FE:
Install a new gasket on the intake manifold, as shown in the illustration.



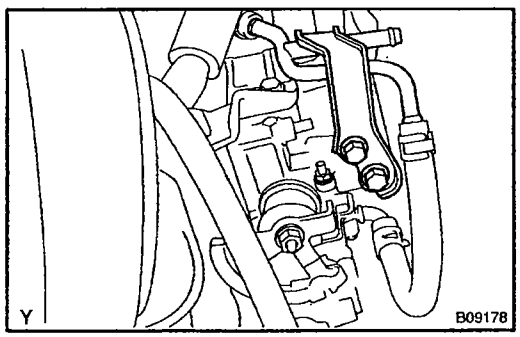


(b) 2ZZ–GE:
Install a new gasket on the intake manifold, as shown in the illustration.

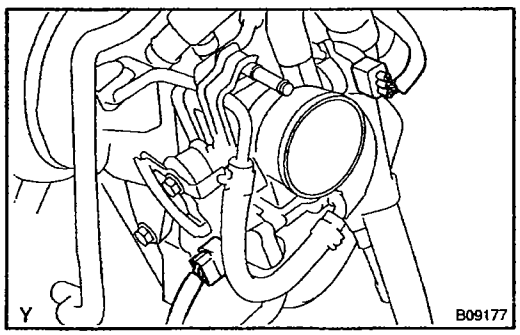
(c) Install the throttle body with the 2 bolts and 2 nuts.
Torque:
1ZZ–FE: 21 N·m (210 kgf·cm, 15 ft·lbf)
2ZZ–GE: 22 N·m (220 kgf·cm, 16 ft·lbf)



(d) Connect the 2 water bypass hoses to the throttle body.



(e) 1ZZ–FE:
Install the No. 2 water by–pass pipe with the 2 bolts.



(f) Connect the IAC valve connector.
(g) Connect the throttle position sensor connector.
(h) Connect the PCV hose to throttle body.

2. INSTALL AIR CLEANER HOSE AND CAP WITH MAF METER

3. INSTALL NO. 2 CYLINDER HEAD COVER

4. FILL RADIATOR WITH ENGINE COOLANT

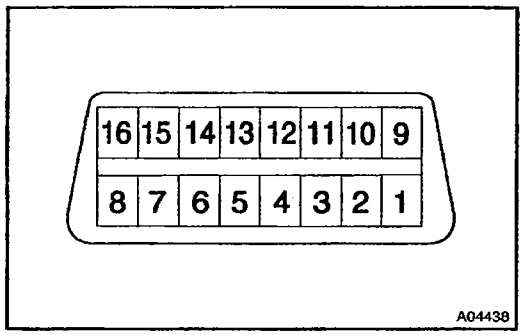
IDLE AIR CONTROL (IAC) VALVE

SF09U–03

ON–VEHICLE INSPECTION

INSPECT IAC VALVE OPERATION

(a) Initial conditions:
- Engine at normal operating temperature
- Idle speed set correctly
- Transmission in neutral
- A/C switch OFF



(b) Using SST, connect terminals TC and CG of the DLC3.
SST 09843–18020

(c) After engine speed are kept at 900 – 1,300 rpm for 5 seconds, check that they return to idle speed.

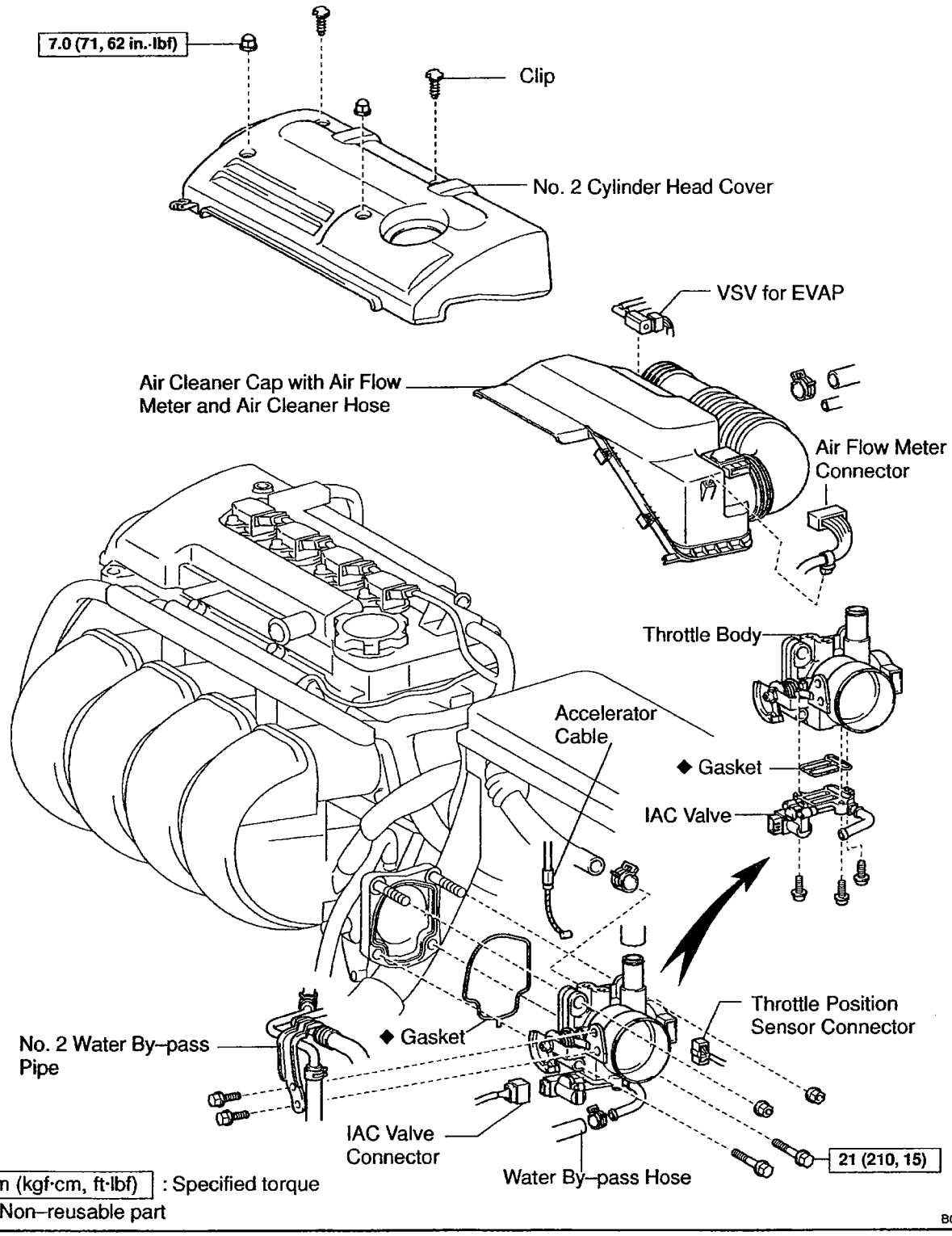
If the rpm operation is not as specified, check the IAC valve, wiring and ECM.

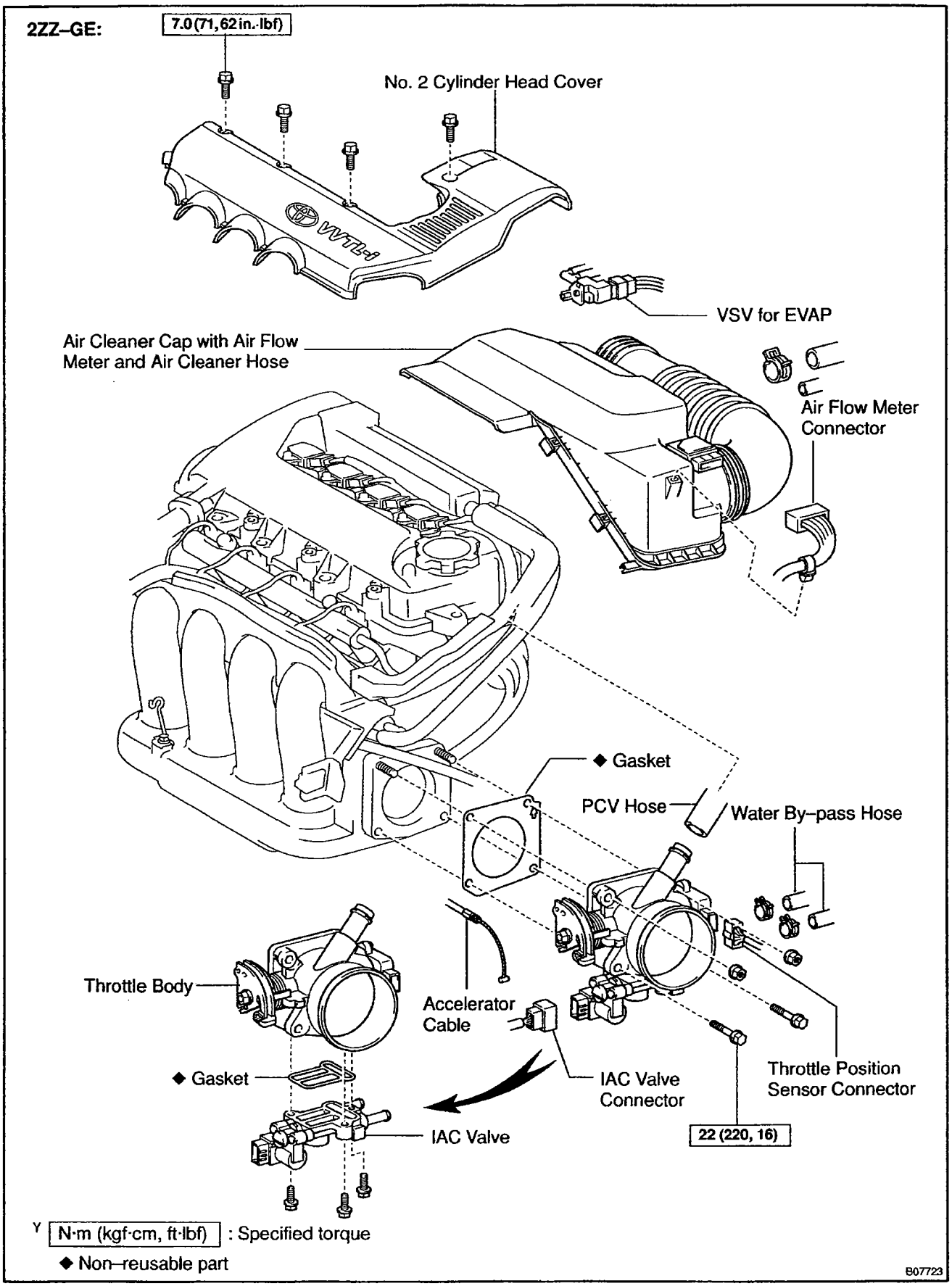
(d) Remove the SST from the DLC3.
SST 09843–18020

SF15U-01

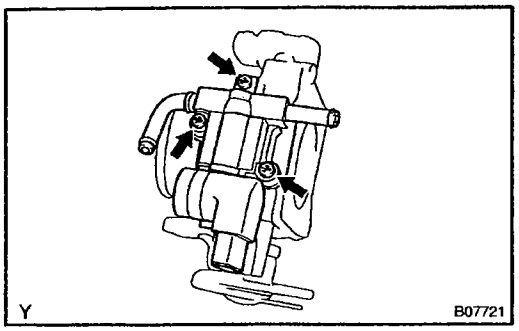
COMPONENTS

1ZZ–FE:




2ZZ–GE:
7.0 (71, 62 in.-lbf)
No. 2 Cylinder Head Cover
VSV for EVAP
Air Cleaner Cap with Air Flow Meter and Air Cleaner Hose
Air Flow Meter Connector
◆ Gasket
PCV Hose
Water By–pass Hose
Throttle Body
Accelerator Cable
◆ Gasket
IAC Valve Connector
Throttle Position Sensor Connector
IAC Valve
22 (220, 16)
Y N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
B07723

SF09W-04

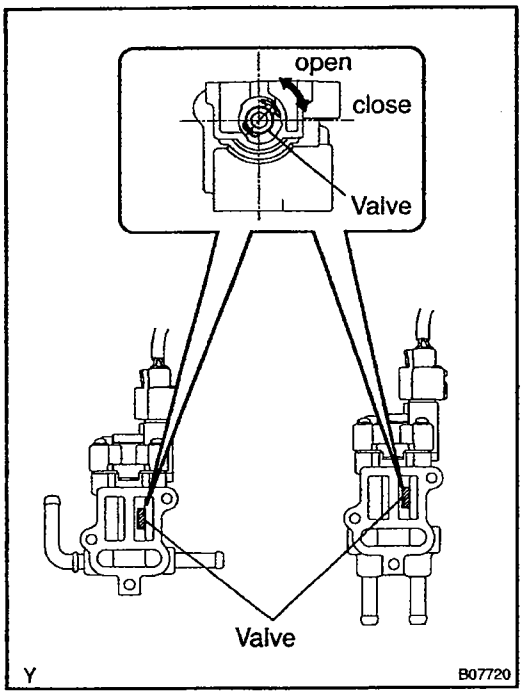


REMOVAL

1. **REMOVE THROTTLE BODY**
   (See page SF–36)
2. **REMOVE IAC VALVE**

Remove the 4 screws, IAC valve and gasket.

SF09X-04



INSPECTION

INSPECT IAC VALVE OPERATION

(a) Check that the IAC valve is half opened.
(b) Connect the IAC valve connector to the IAC valve.
(c) Disconnect the ECT sensor connector from the ECT sensor.
(d) Turn the ignition switch ON.
(e) Check that the IAC valve moves.

HINT:

Repeat connecting and disconnecting of IAC valve connector several times and check the operation of the valve.

If operation is not as specified, replace the IAC valve.

(f) Turn the ignition switch OFF.
(g) Connect the ECT sensor connector to the ECT sensor.
(h) Disconnect the IAC valve connector from the IAC valve.

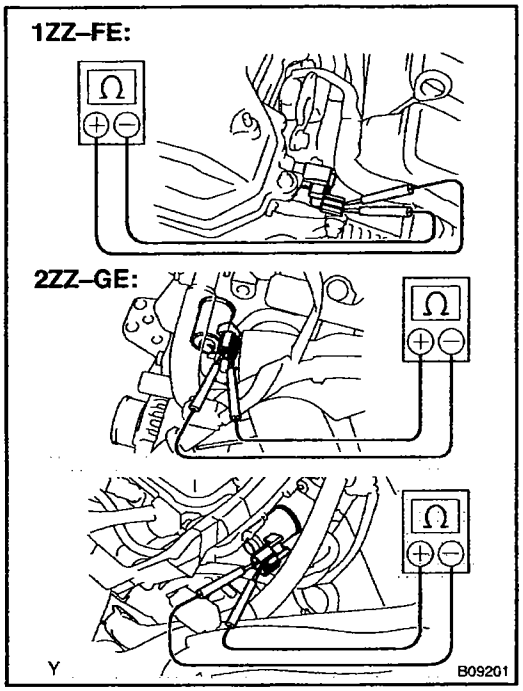
SF09Y-01

INSTALLATION

Installation is in reverse order of removal (See page SF–43).

HINT:

Install the IAC valve with a new gasket.



CAMSHAFT TIMING OIL CONTROL VALVE

ON–VEHICLE INSPECTION

SF0SL–06

INSPECT OIL CONTROL VALVE RESISTANCE

(a) Remove the No. 2 cylinder head cover.
(b) 2ZZ–GE:
Disconnect the 2 PCV hoses.
(c) Disconnect the oil control valve connector.
(d) Using an ohmmeter, measure the resistance between the terminals.
Resistance: 6.9 – 7.9 Ω at 20°C (68°F)

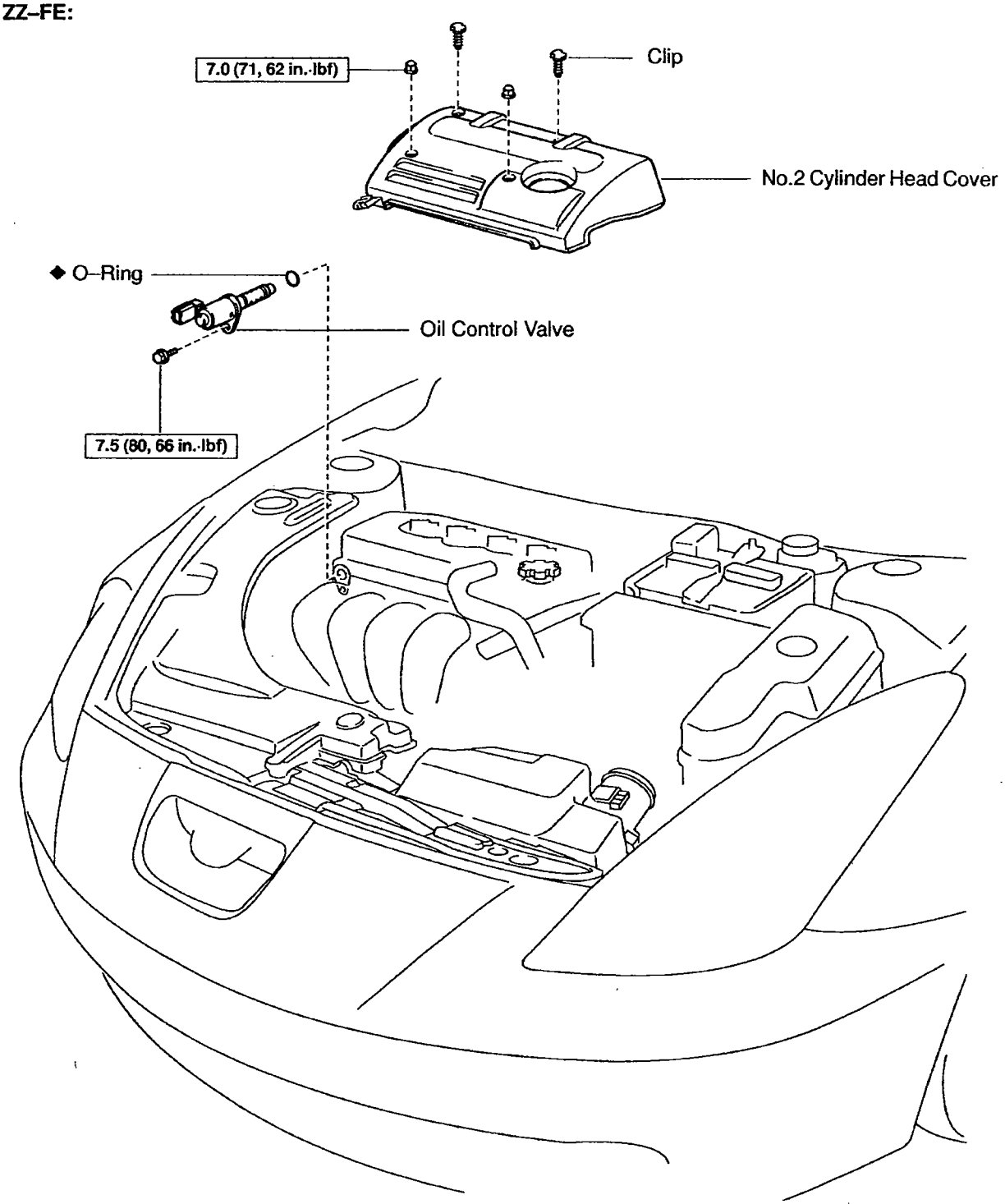
If the resistance is not as specified, replace the valve.

(e) Reconnect the oil control valve connector.
(f) Reinstall the V–bank cover.

SF15V-01

COMPONENTS

1ZZ–FE:

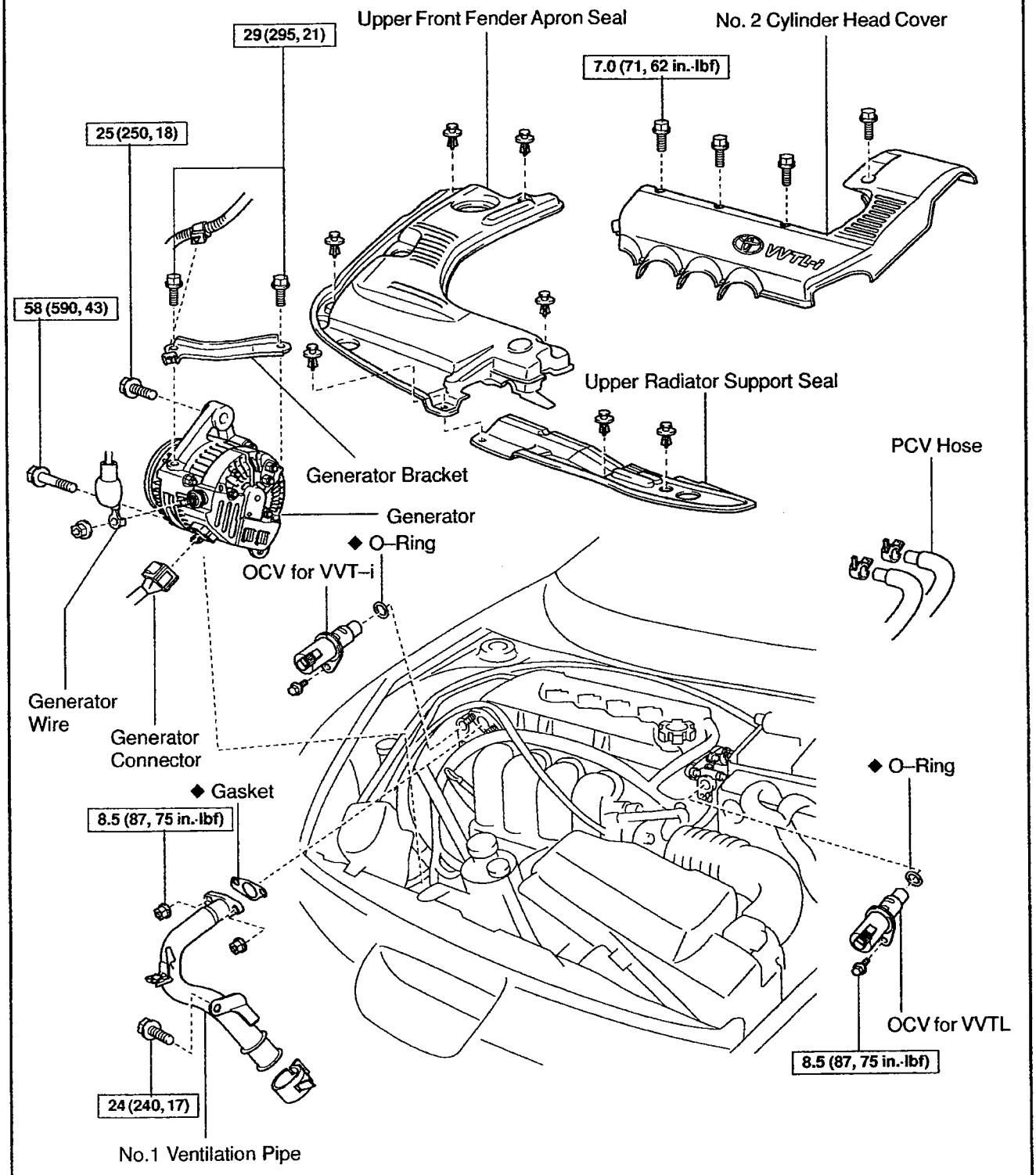


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

B09200

2ZZ–GE:



Y

N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B07724

SF0ZY-02

REMOVAL

1. **REMOVE NO. 2 CYLINDER HEAD COVER**
2. **2ZZ–GE:**
   DISCONNECT 2 PCV HOSES, UPPER FRONT FENDER APRONSEAL AND UPPER RAKIATOR SUPPORT SEAL
3. **2ZZ–GE:**
   REMOVE GENERATOR (See page CH–7)
4. **2ZZ–GE:**
   REMOVE NO. 1 VENTILATION PIPE

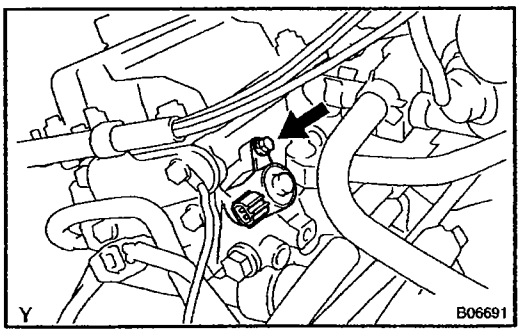
(a) Remove the 2 nuts, bolt and gasket.

HINT:

At the time of installation, please refer to the following items.

Use a new gasket.

(b) reomve the hose clamp and disconnect No.1 ventilation pipe.



5. **1ZZ–FE:**
   REMOVE CAMSHAFT TIMING OIL CONTROL VALVE

(a) Disconnect the oil control valve connector.

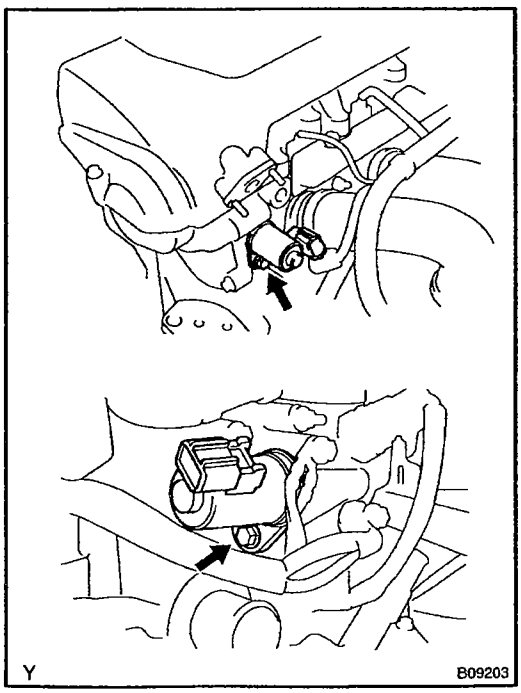
(b) Remove the bolt and oil control valve.
Torque: 7.5 N·m (80 kgf·cm, 66 in.·lbf)

(c) Remove the O–ring from the oil control valve.

HINT:

At the time of installation, please refer to the following items.

Use a new O–ring.



6. **2ZZ–GE:**
   REMOVE 2 CAMSHAFT TIMING OIL CONTROL VALVES

(a) Disconnect the oil control valve connector.

(b) Remove the 2 bolts and oil control valves.
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

(c) Remove the O–ring from the each oil control valve.

HINT:

At the time of installation, please refer to the following items.

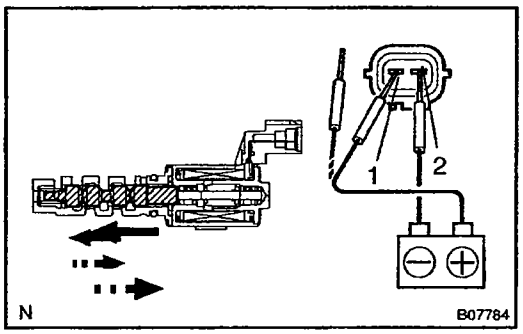
Use a new O–ring.

SF0SO-06

INSPECTION

INSPECT CAMSHAFT OIL CONTROL VALVE OPERATION

Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, and check the movement of the valve.



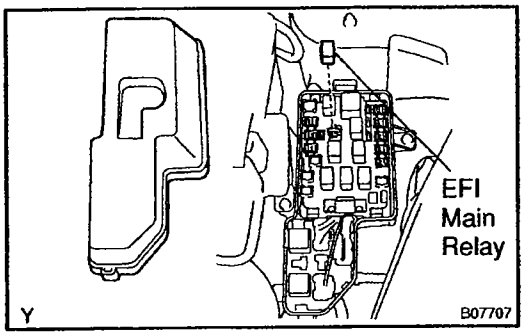
Battery positive voltage is applied	Valve moves in ◀ direction
Battery positive voltage is cut off	Valve moves in ▪▪▶ direction

If operation is not as specified, replace the valve.

SF0SP-03

INSTALLATION

Installation is in the reverse order of removal. (See page SF–49)

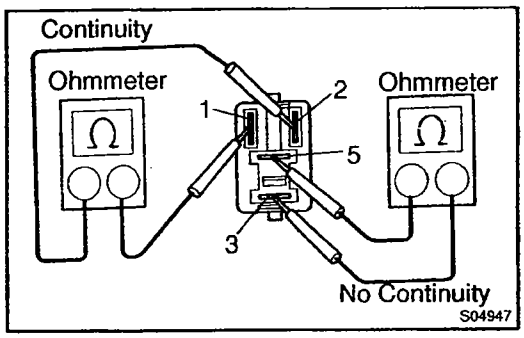


EFI MAIN RELAY

SF05Z-04

INSPECTION

1. **REMOVE EFI MAIN RELAY (Marking: EFI)**



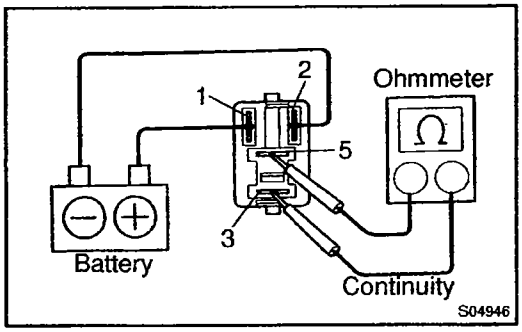
2. **INSPECT EFI MAIN RELAY CONTINUITY**

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



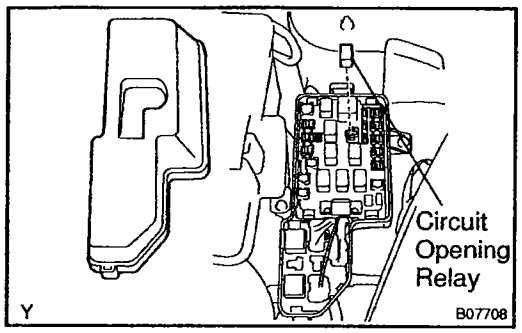
3. **INSPECT EFI MAIN RELAY OPERATION**

(a) Apply battery voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. **REINSTALL EFI MAIN RELAY**

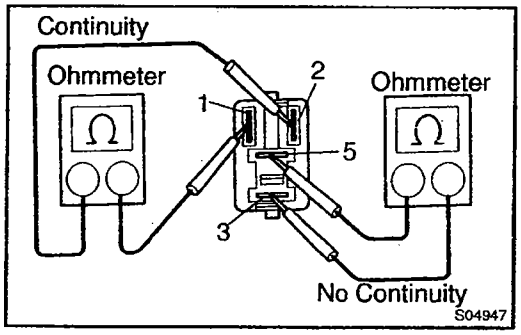


CIRCUIT OPENING RELAY

SF0A0-04

INSPECTION

1. REMOVE CIRCUIT OPENING RELAY



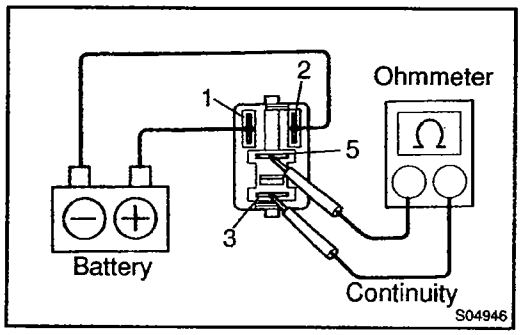
2. INSPECT CIRCUIT OPENING RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



3. INSPECT CIRCUIT OPENING RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

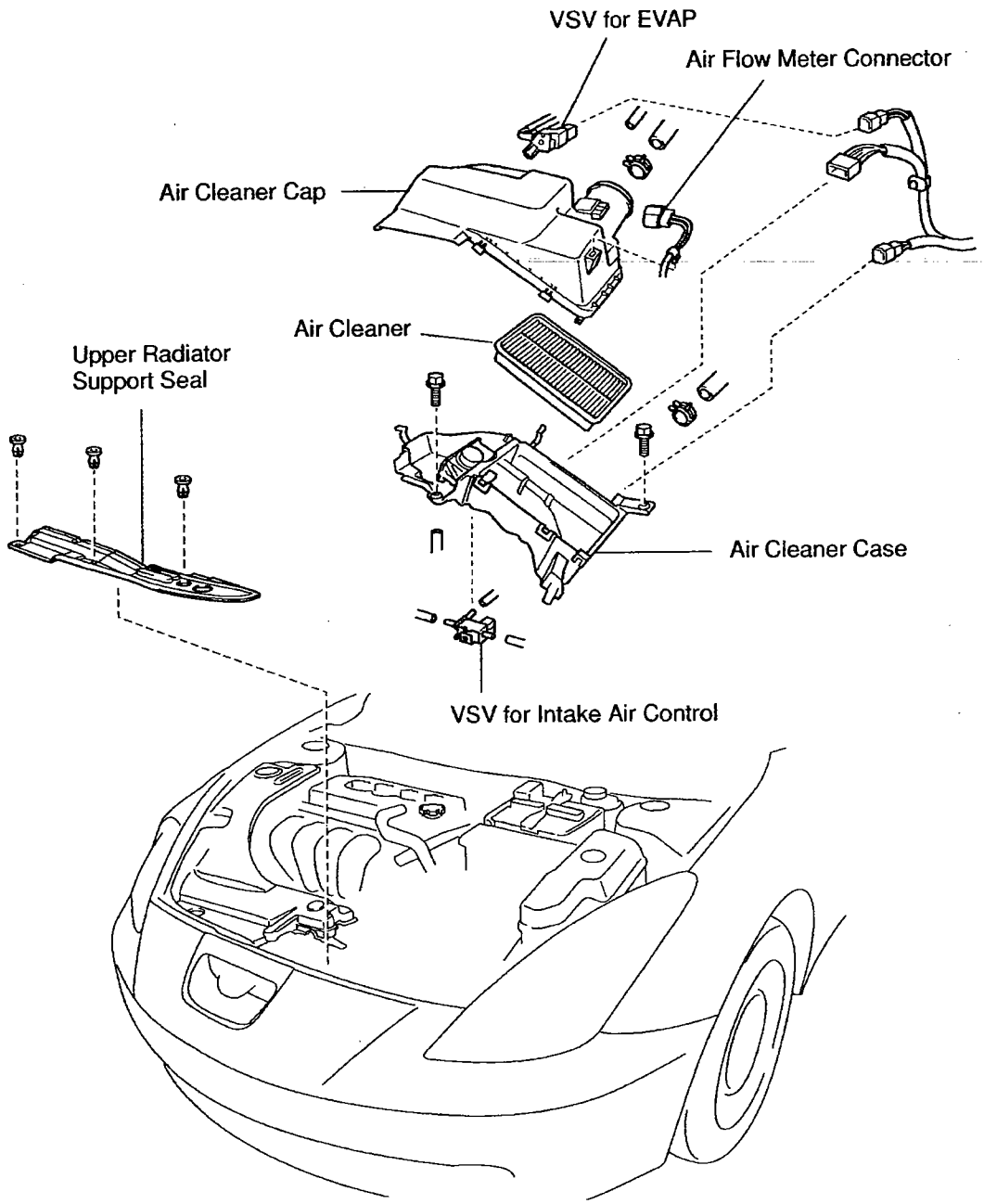
If there is no continuity, replace the relay.

4. REINSTALL CIRCUIT OPENING RELAY

VSV FOR INTAKE AIR CONTROL VALVE

SF0Y8-05

COMPONENTS



Y

B09180

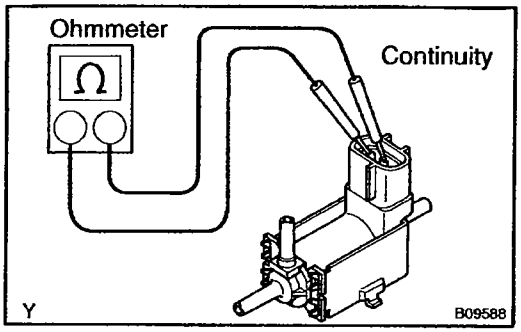
SF0PM-06

INSPECTION

INSPECT VSV

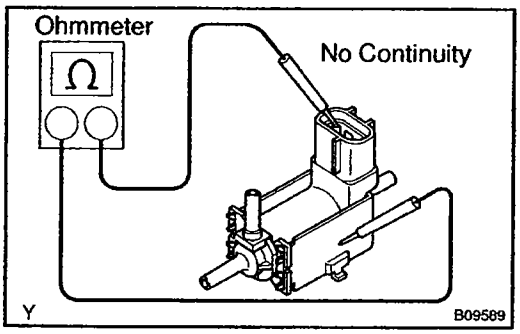
(a) Inspect the VSV for open circuit.
Using an ohmmeter, check that there is no continuity between the terminals.
Resistance: 37 – 44 Ω at 20°C (68°F)

If there is no continuity, replace the VSV.

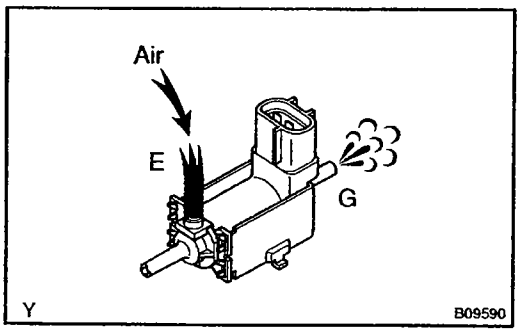


(b) Inspect the VSV for ground.
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.

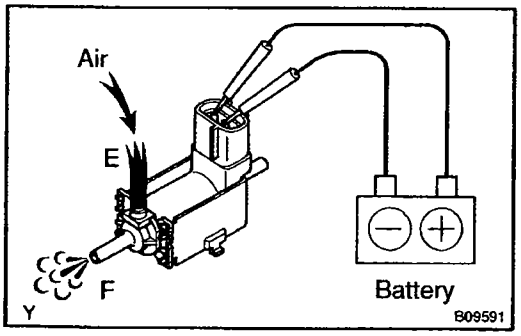


(c) Inspect the VSV operation.
(1) Check that air flows from ports E to G.



(2) Apply battery positive voltage across the terminals.
(3) Check that air flows from ports E to F.

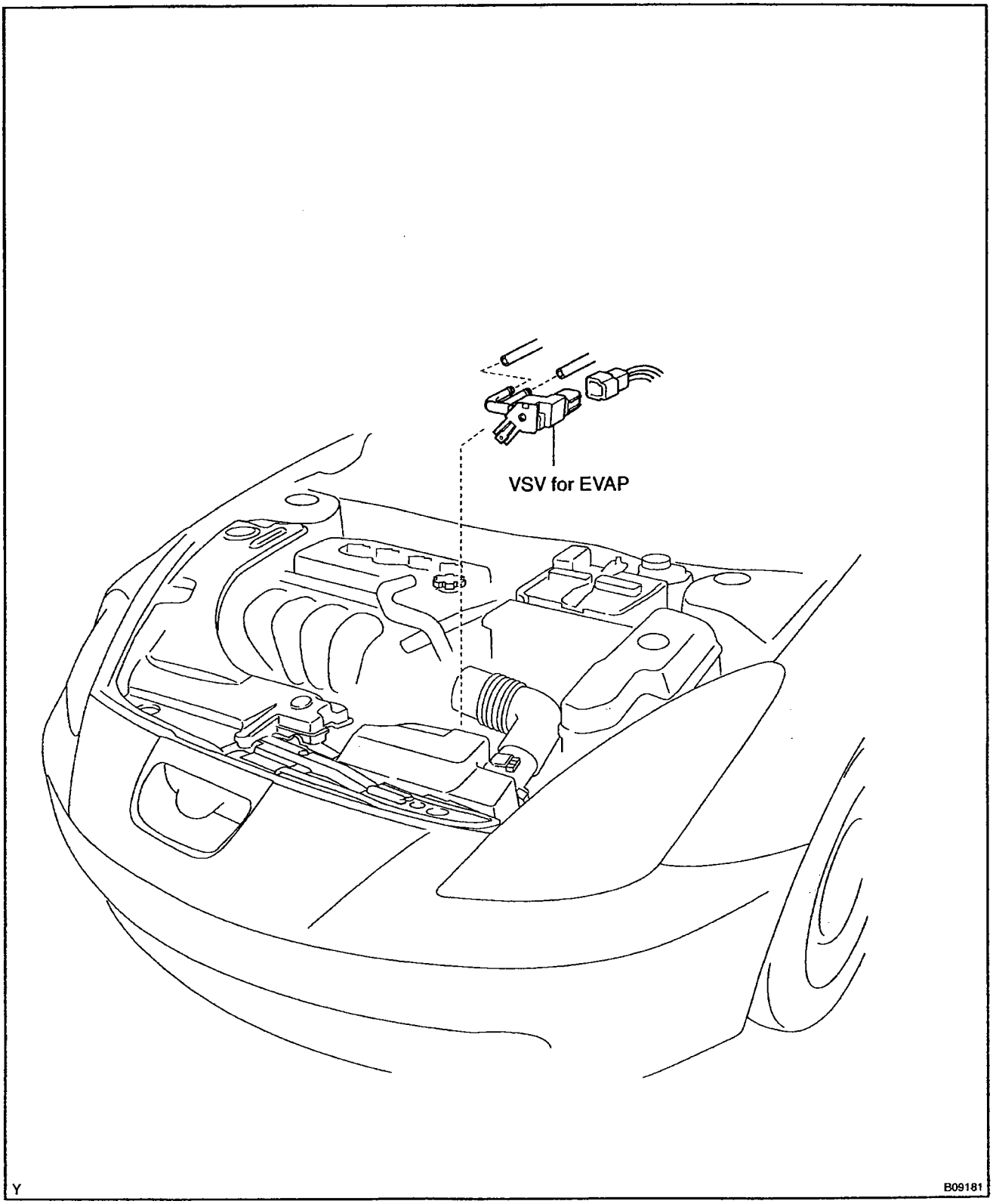
If operation is not as specified, replace the VSV.



VSV FOR EVAPORATIVE EMISSION (EVAP)

COMPONENTS

SF15W-01

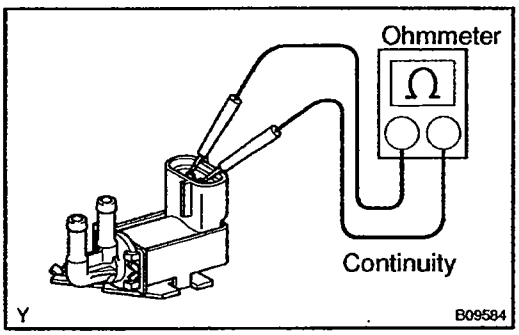


SF15X-01

INSPECTION

1. REMOVE VSV

(a) Disconnect the 2 EVAP hoses from the VSV.
(b) Disconnect the VSV connector.
(c) Remove the bolt and VSV.

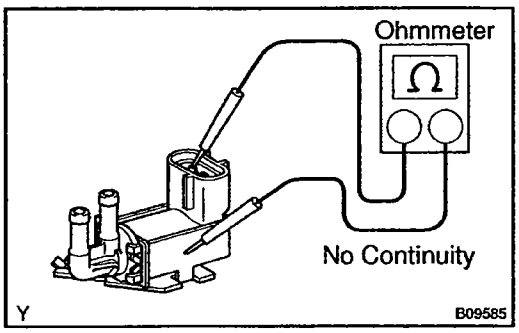


2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20°C (68°F)

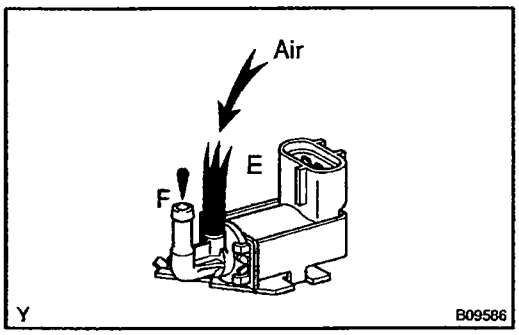
If there is no continuity, replace the VSV.



3. INSPECT VSV FOR GROUND

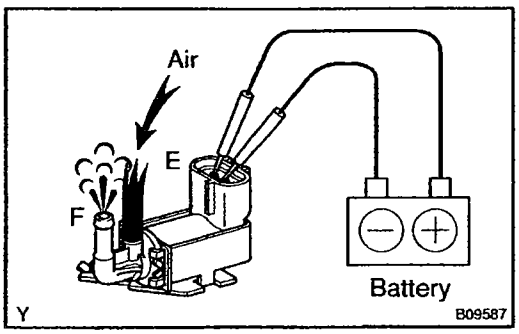
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



4. INSPECT VSV OPERATION

(a) Check that air flows with difficulty from port E to port F.



(b) Apply battery voltage across the terminals.
(c) Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

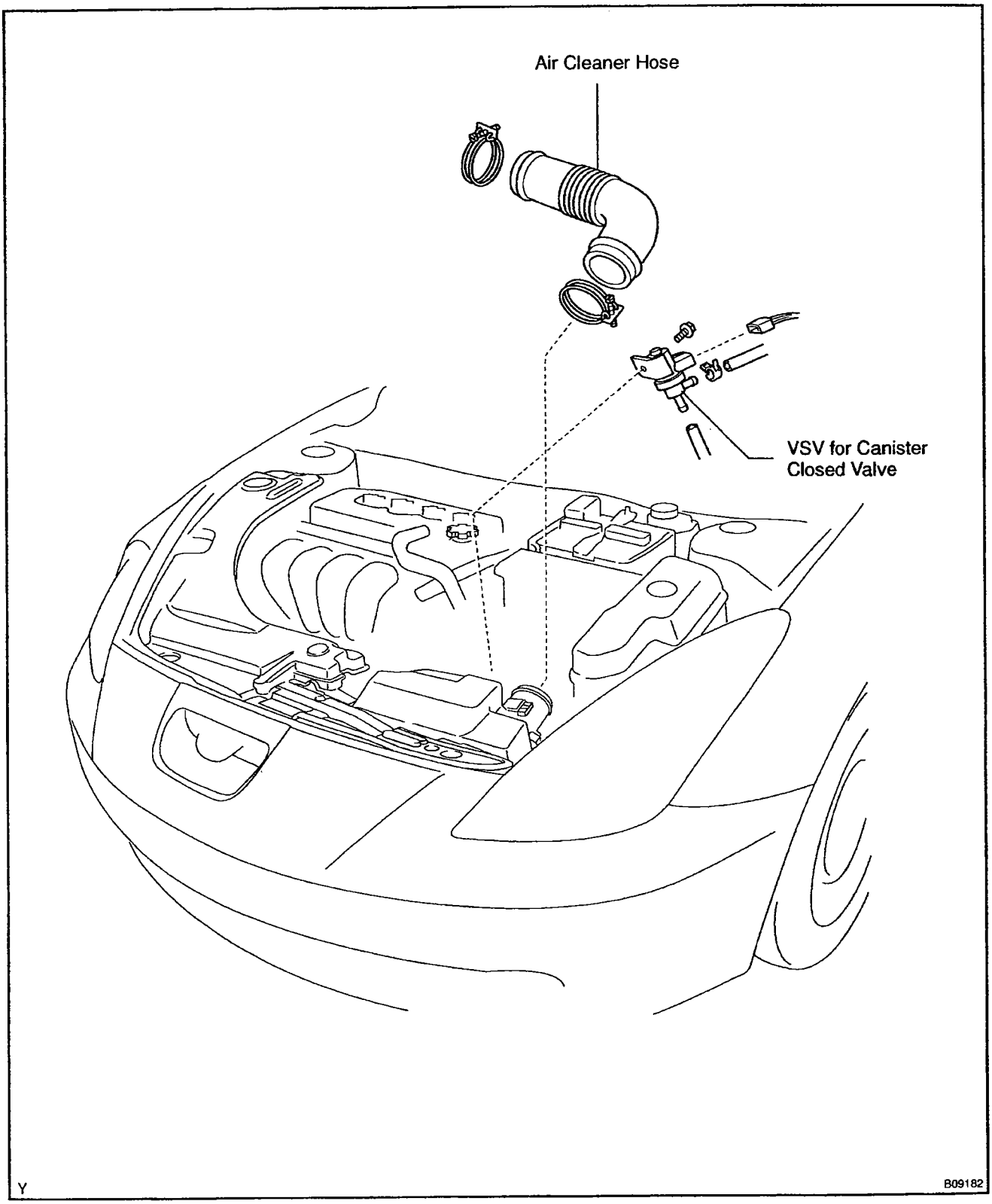
5. REINSTALL VSV

(a) Install the VSV with the bolt.
(b) Connect the VSV with the bolt.
(c) Connect the 2 EVAP hoses to the VSV.

VSV FOR CANISTER CLOSED VALVE (CCV)

SF15Y-01

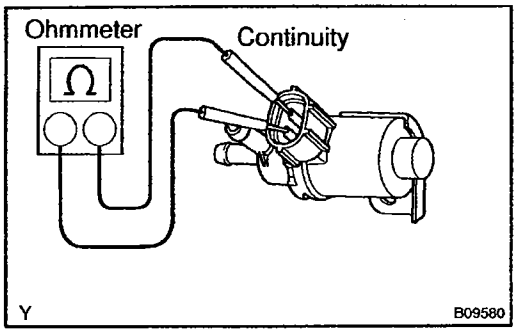
COMPONENTS



SF15Z–01

INSPECTION

1. REMOVE VSV



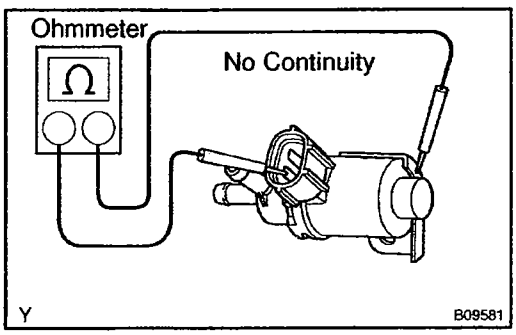
2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance:

At 20 °C (68 °F)	24 – 30 Ω

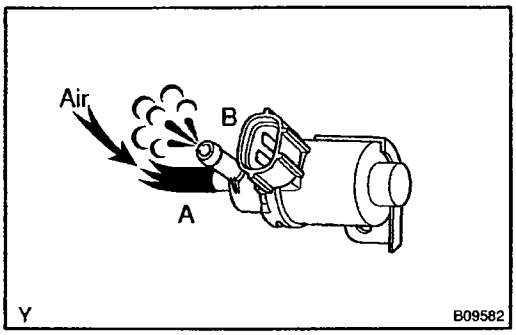
If there is no continuity, replace the VSV.



3. INSPECT VSV FOR GROUND

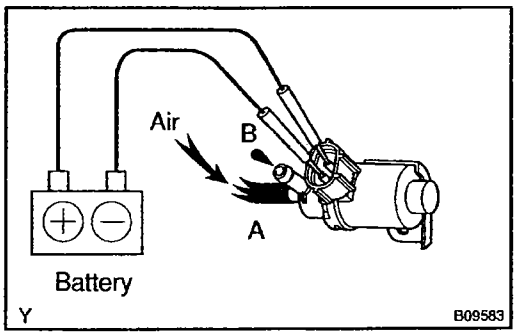
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is no continuity, replace the VSV.



4. INSPECT VSV OPERATION

(a) Check that air flows from ports A to B.



(b) Apply battery positive voltage across the terminals.

(c) Check that air does not flow from ports A to B.

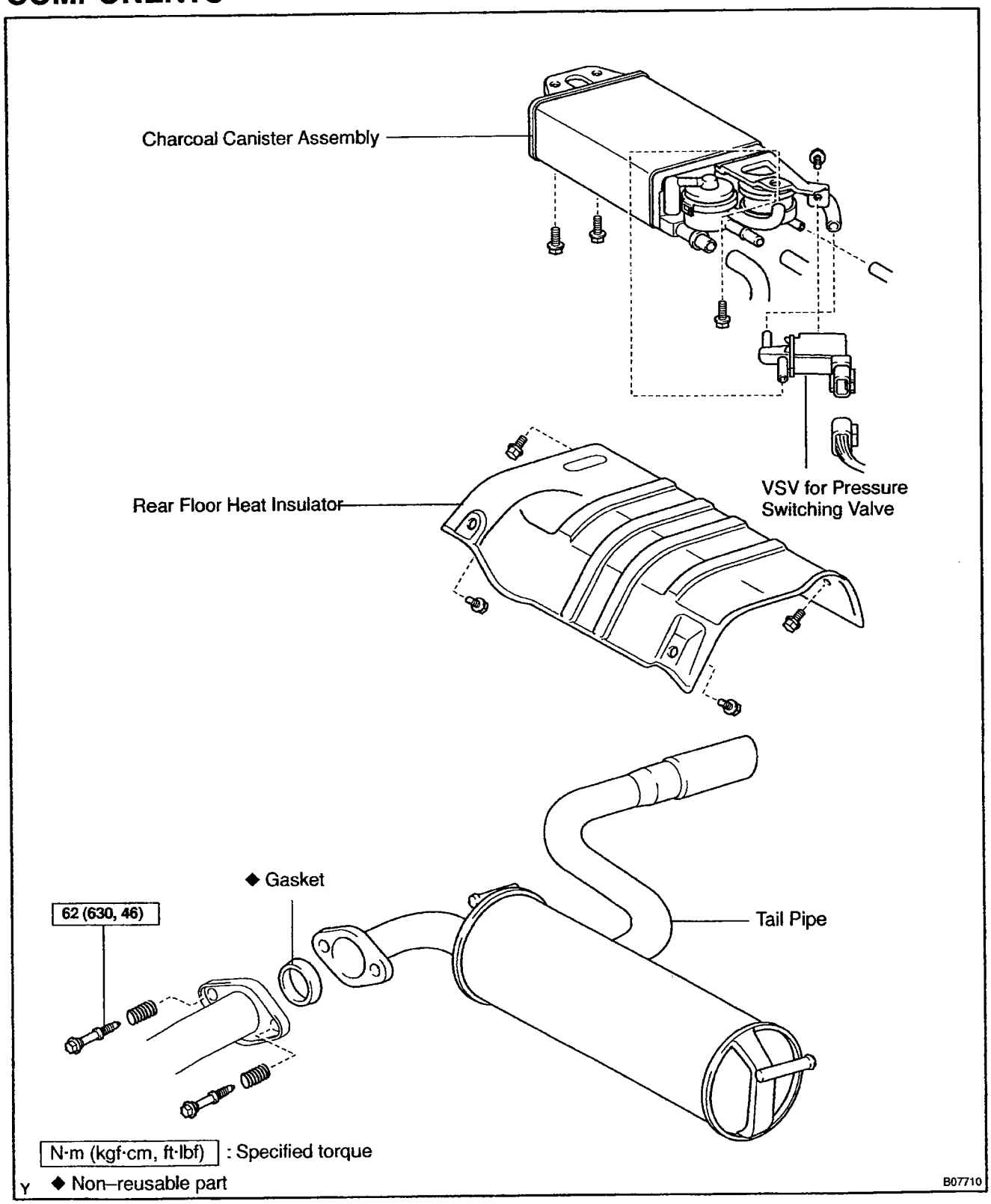
If operation is not as specified, replace the VSV.

5. REINSTALL VSV

VSV FOR PRESSURE SWITCHING VALVE

SF160-01

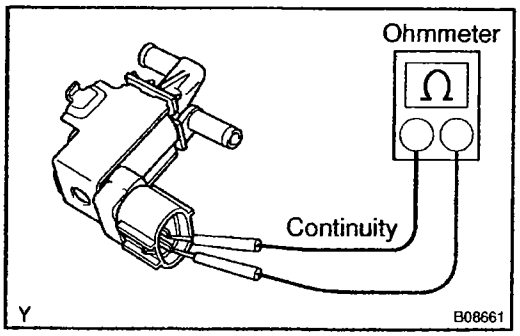
COMPONENTS



SF161-01

INSPECTION

1. REMOVE VSV



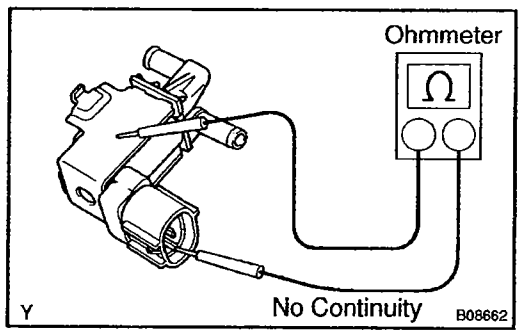
2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance:

At 20 °C (68 °F)	37 – 44 Ω
At 120 °C (248 °F)	51 – 62 Ω

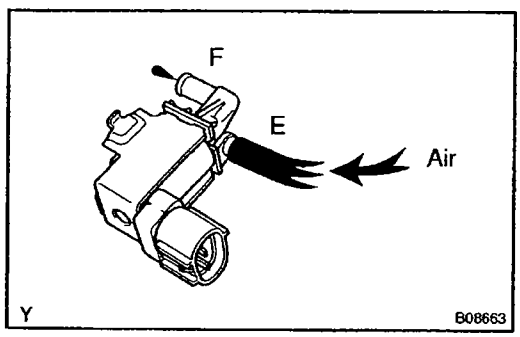
If there is no continuity, replace the VSV.



3. INSPECT VSV FOR GROUND

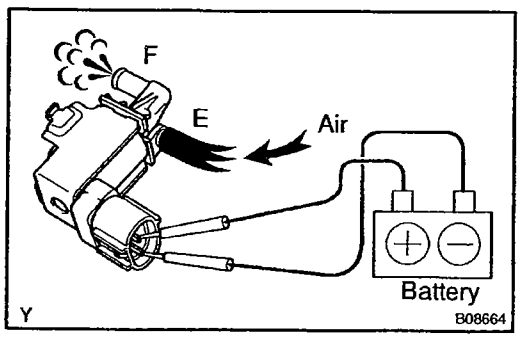
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is no continuity, replace the VSV.



4. INSPECT VSV OPERATION

(a) Check that air does not flow from ports E to F.



(b) Apply battery positive voltage across the terminals.

(c) Check that air flows from ports E to F.

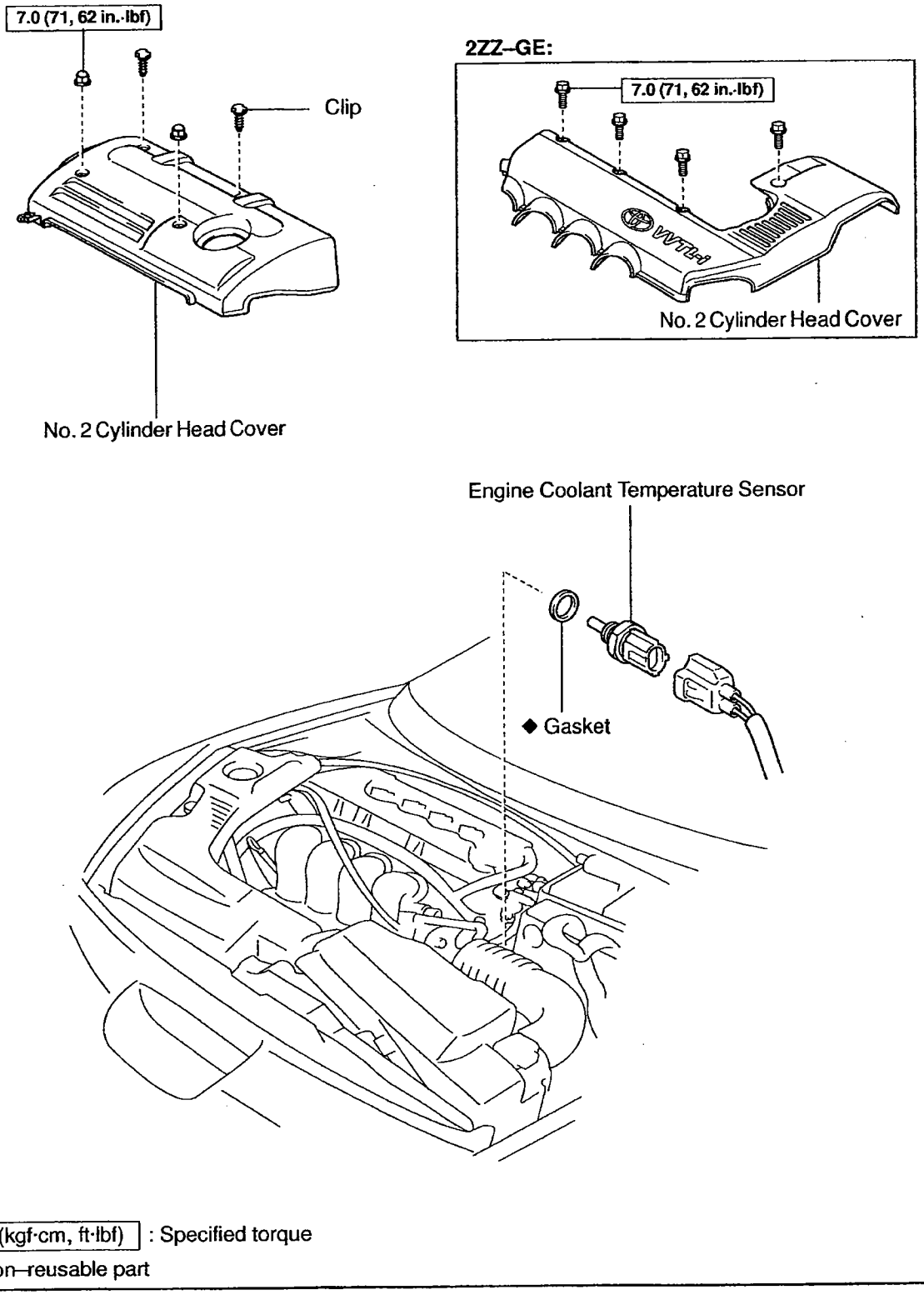
If operation is not as specified, replace the VSV.

5. REINSTALL VSV

ENGINE COOLANT TEMPERATURE (ECT) SENSOR

SF162–01

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

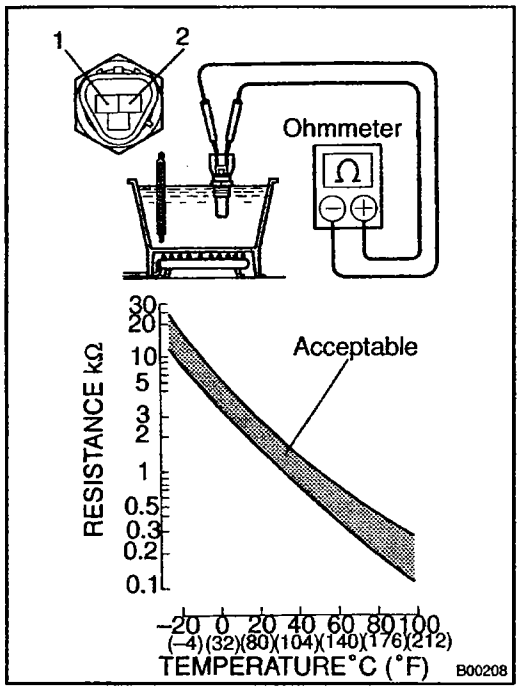
◆ Non–reusable part

B09183

SF163-01

INSPECTION

1. **DRAIN ENGINE COOLANT**
2. **REMOVE NO.2 CYLINDER HEAD COVER**
3. **REMOVE ECT SENSOR**



4. **INSPECT ECT SENSOR RESISTANCE**

Using an ohmmeter, measure the resistance between terminals 1 (E2) and 2 (THW).

Resistance: Refer to the graph

If the resistance is not as specified, replace the ECT sensor.

5. **REINSTALL ECT SENSOR**

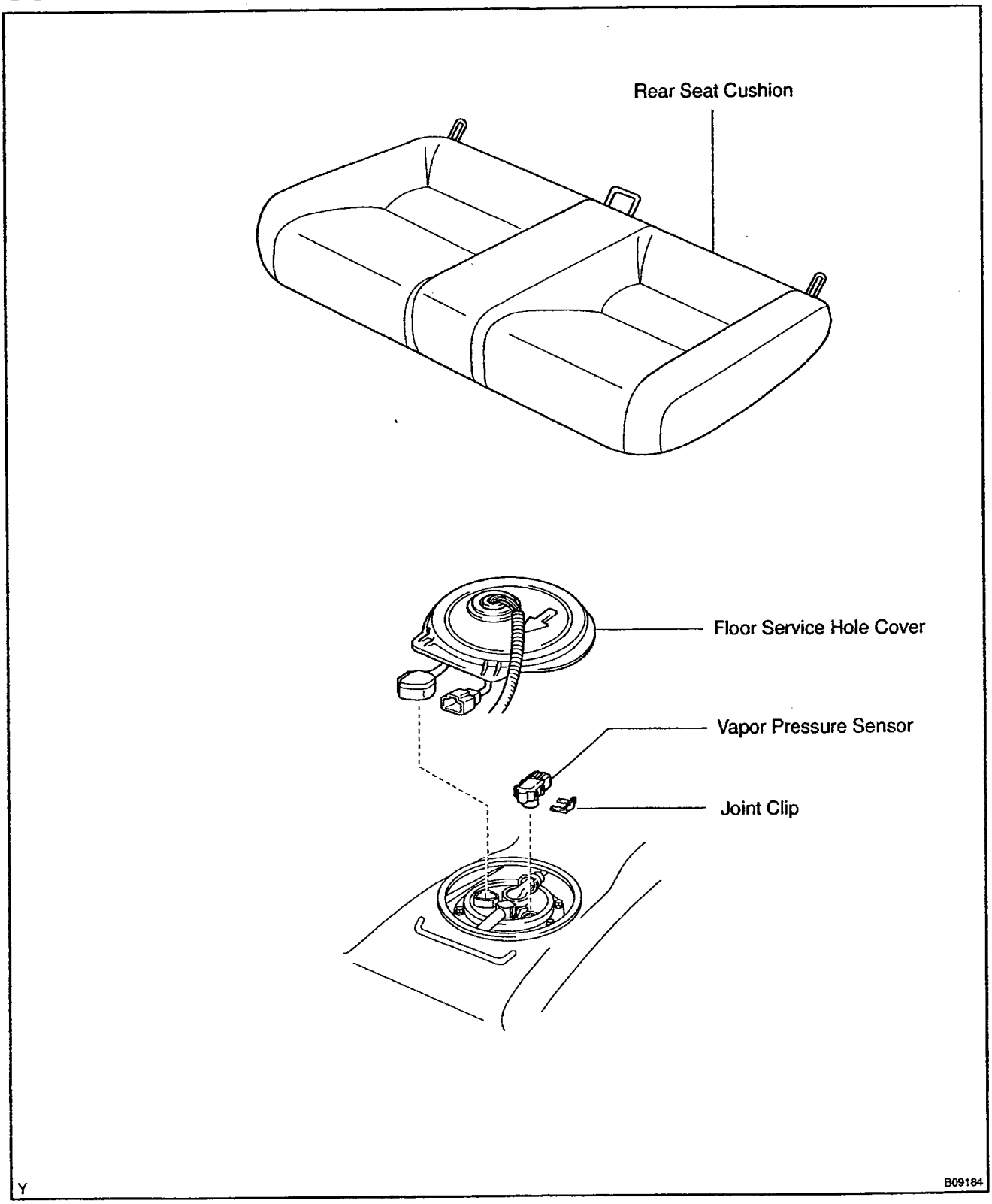
Install a new gasket to the ECT sensor.

6. **REINSTALL NO.2 CYLINDER HEAD COVER**
7. **FILL RADIATOR WITH ENGINE COOLANT**

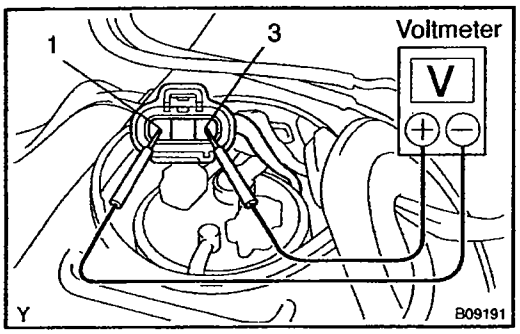
VAPOR PRESSURE SENSOR

SF164-01

COMPONENTS



SF165-01



INSPECTION

1. INSPECT POWER SOURCE VOLTAGE OF VAPOR PRESSURE SENSOR

(a) Disconnect the vapor pressure sensor connector.

HINT:

Near the fuel tank.

(b) Turn the ignition switch ON.

(c) Using a voltmeter, measure the voltage between connector terminals 1 and 3 of the wiring harness side.

Voltage: 4.5 – 5.5 V

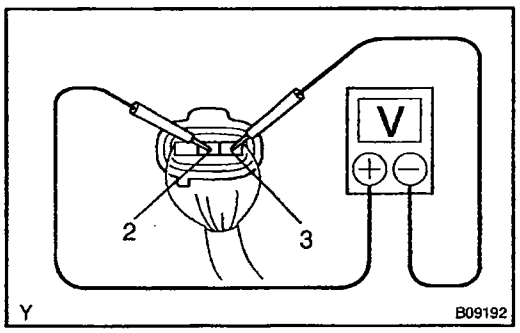
(d) Turn the ignition switch to LOCK.

(e) Reconnect the vapor pressure sensor connector.

2. INSPECT POWER OUTPUT OF VAPOR PRESSURE SENSOR

(a) Turn the ignition switch ON.

(b) Remove the fuel tank cap.



(c) Connect a voltmeter to terminals 2 and 3, and measure the output voltage.

Voltage: 3.0 – 3.6 V

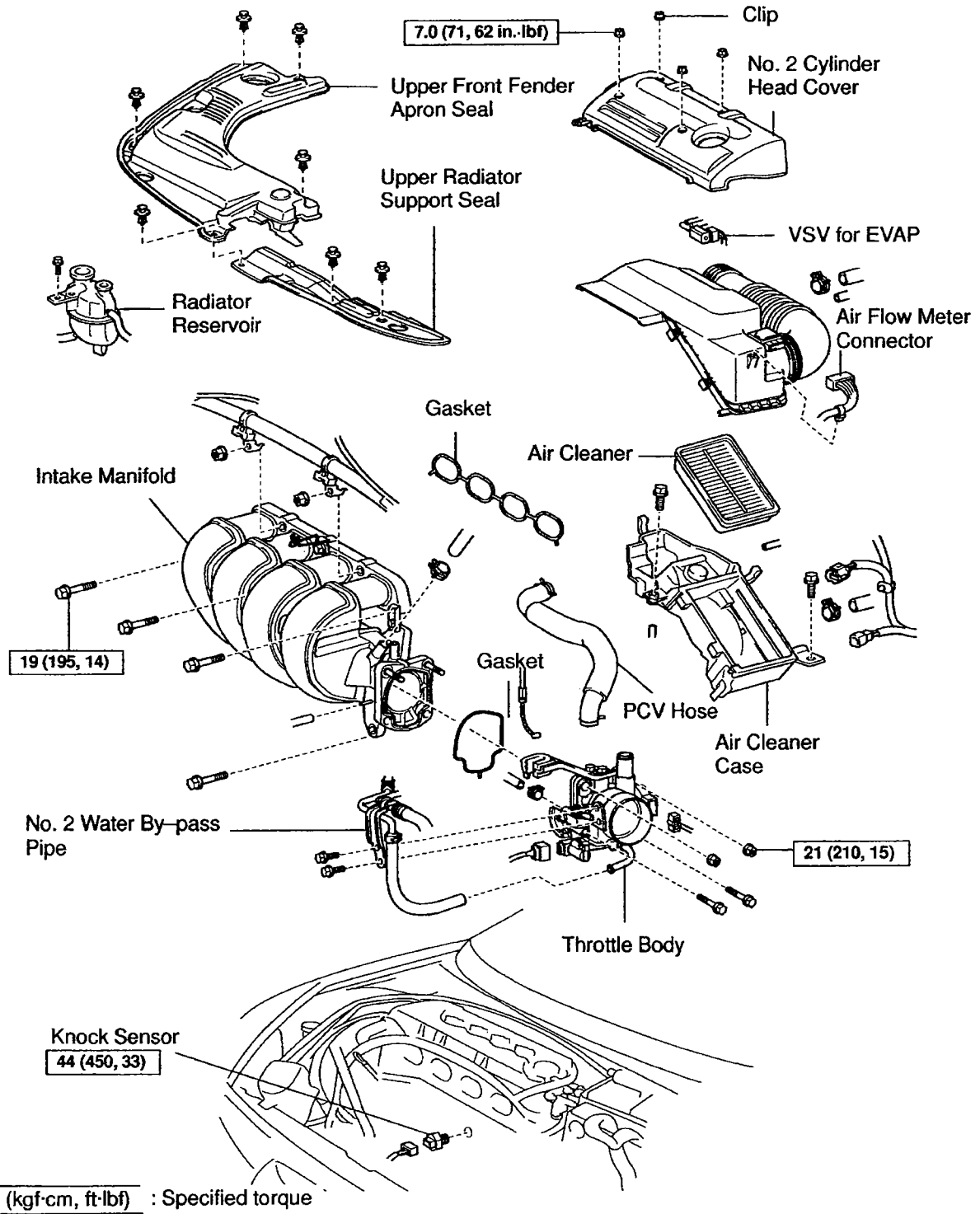
(d) Reinstall the fuel tank cap.

KNOCK SENSOR

COMPONENTS

SF166–01

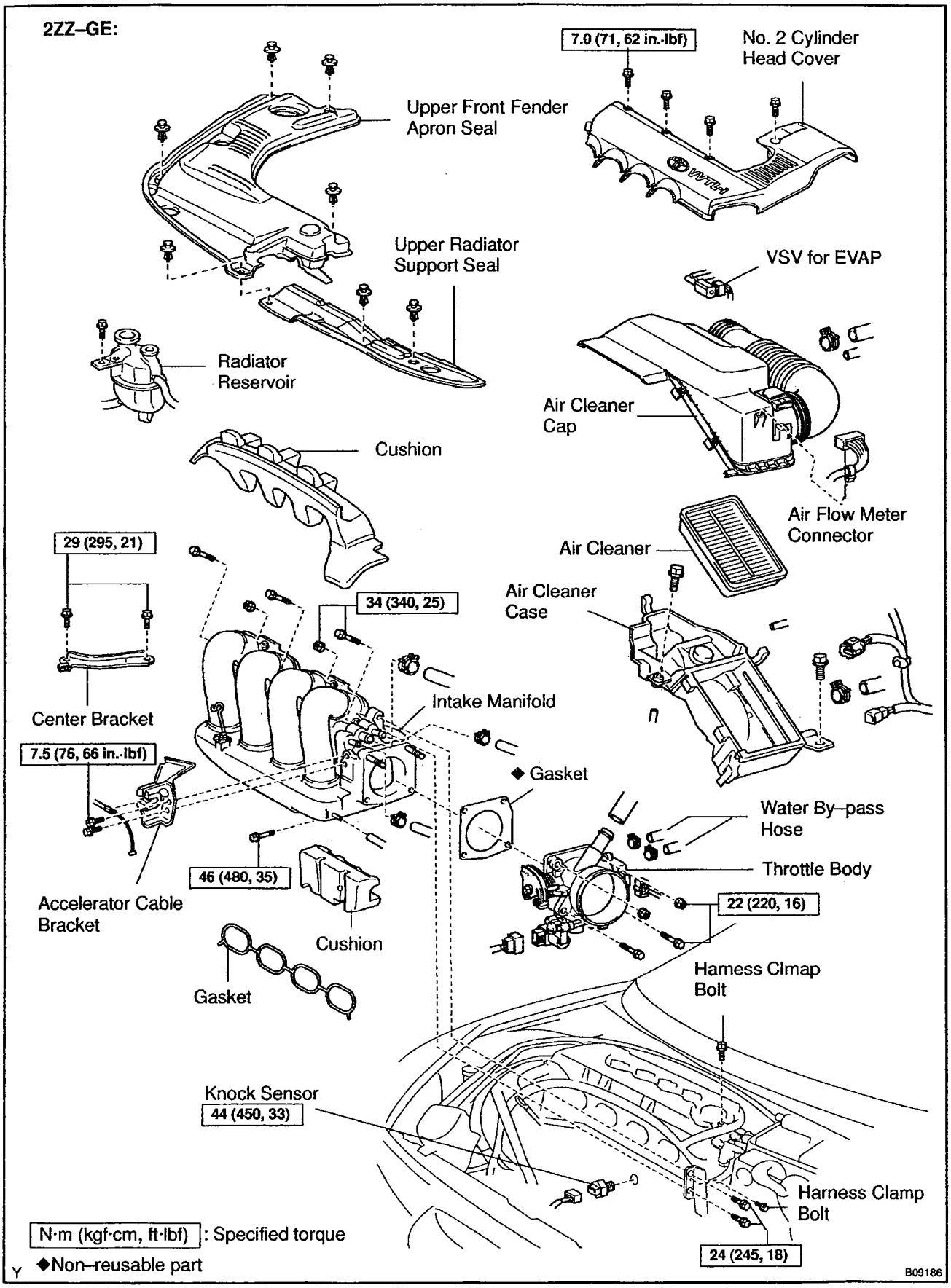
1ZZ–GE:



N·m (kgf·cm, ft·lbf) : Specified torque

◆Non–reusable part

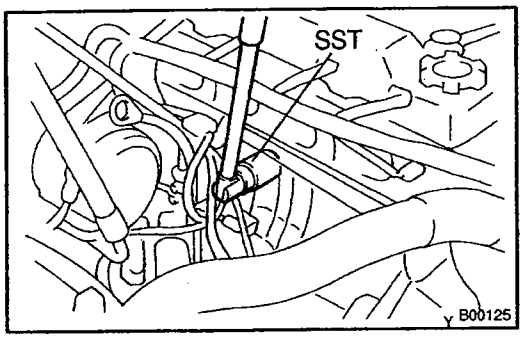
B09187


2ZZ–GE:
7.0 (71, 62 in.·lbf)
No. 2 Cylinder Head Cover
Upper Front Fender Apron Seal
Upper Radiator Support Seal
VSV for EVAP
Radiator Reservoir
Air Cleaner Cap
Cushion
Air Flow Meter Connector
29 (295, 21)
Air Cleaner
34 (340, 25)
Air Cleaner Case
Intake Manifold
Center Bracket
7.5 (76, 66 in.·lbf)
◆ Gasket
Water By–pass Hose
Throttle Body
46 (480, 35)
22 (220, 16)
Accelerator Cable Bracket
Cushion
Harness Clmap Bolt
Gasket
Knock Sensor
44 (450, 33)
Harness Clamp Bolt
24 (245, 18)
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
B09186

SF0AS-03

INSPECTION

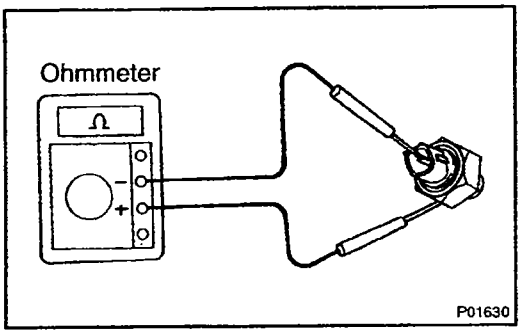
1. **REMOVE THROTTLE BODY**
   (See page SF–36)
2. **REMOVE RADIATOR RESERVOIR**
   (See page CO–17)
3. **REMOVE INTAKE MANIFOLD**
   (See page EM–42)



4. **REMOVE KNOCK SENSOR**

(a) Disconnect the knock sensor connector.

(b) Using SST, remove the knock sensor.
SST 09816–30010



5. **INSPECT KNOCK SENSOR**

Using an ohmmeter, check that there is continuity between the terminal and body.

If there is continuity, replace the sensor.

6. **REINSTALL KNOCK SENSOR**

(a) Using SST, install the knock sensor.
SST 09816–30010

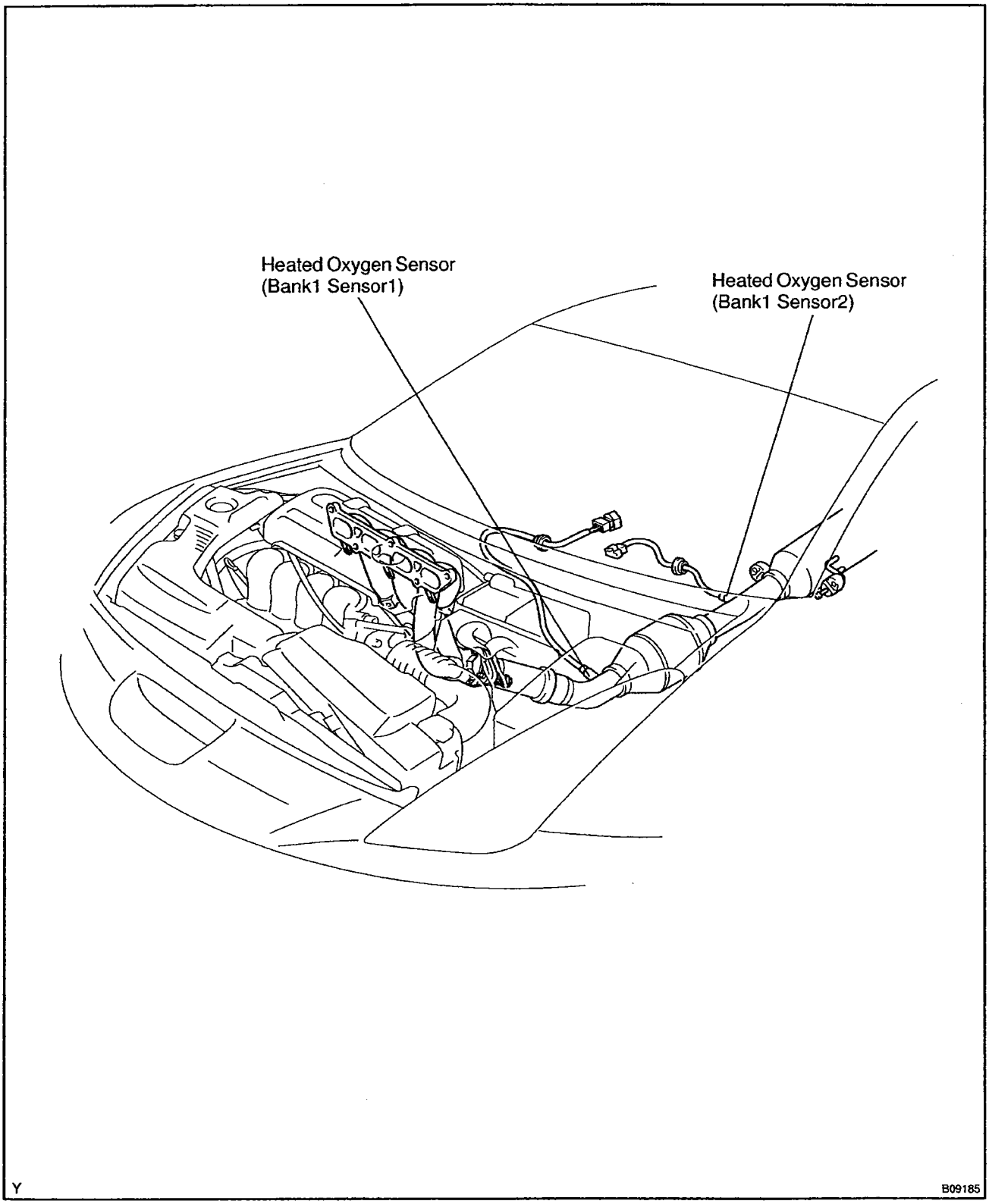
(b) Connect the knock sensor connector.

7. **REINSTALL INTAKE MANIFOLD**
   (See page EM–65)
8. **REINSTALL RADIATOR RESERVOIR**
   (See page CO–23)
9. **REINSTALL THROTTLE BODY**
   (See page SF–39)

HEATED OXYGEN SENSOR

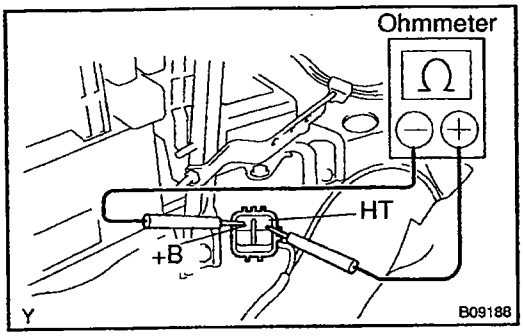
COMPONENTS

SF167-01



SF0AA-03

INSPECTION



1. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR (Bank1 Sensor1)

(a) Disconnect the oxygen sensor connector.

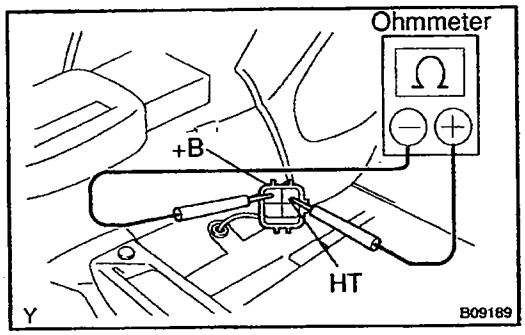
(b) Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (450 kgf·cm, 31 ft·lbf)

(c) Reconnect the oxygen sensor connector.



2. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR (Bank1, Sensor2)

(a) Remove the passenger's seat.

(b) Take out the floor carpet.

(c) Disconnect the oxygen sensor connector.

(d) Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (450 kgf·cm, 31 ft·lbf)

(e) Reconnect the oxygen sensor connector.

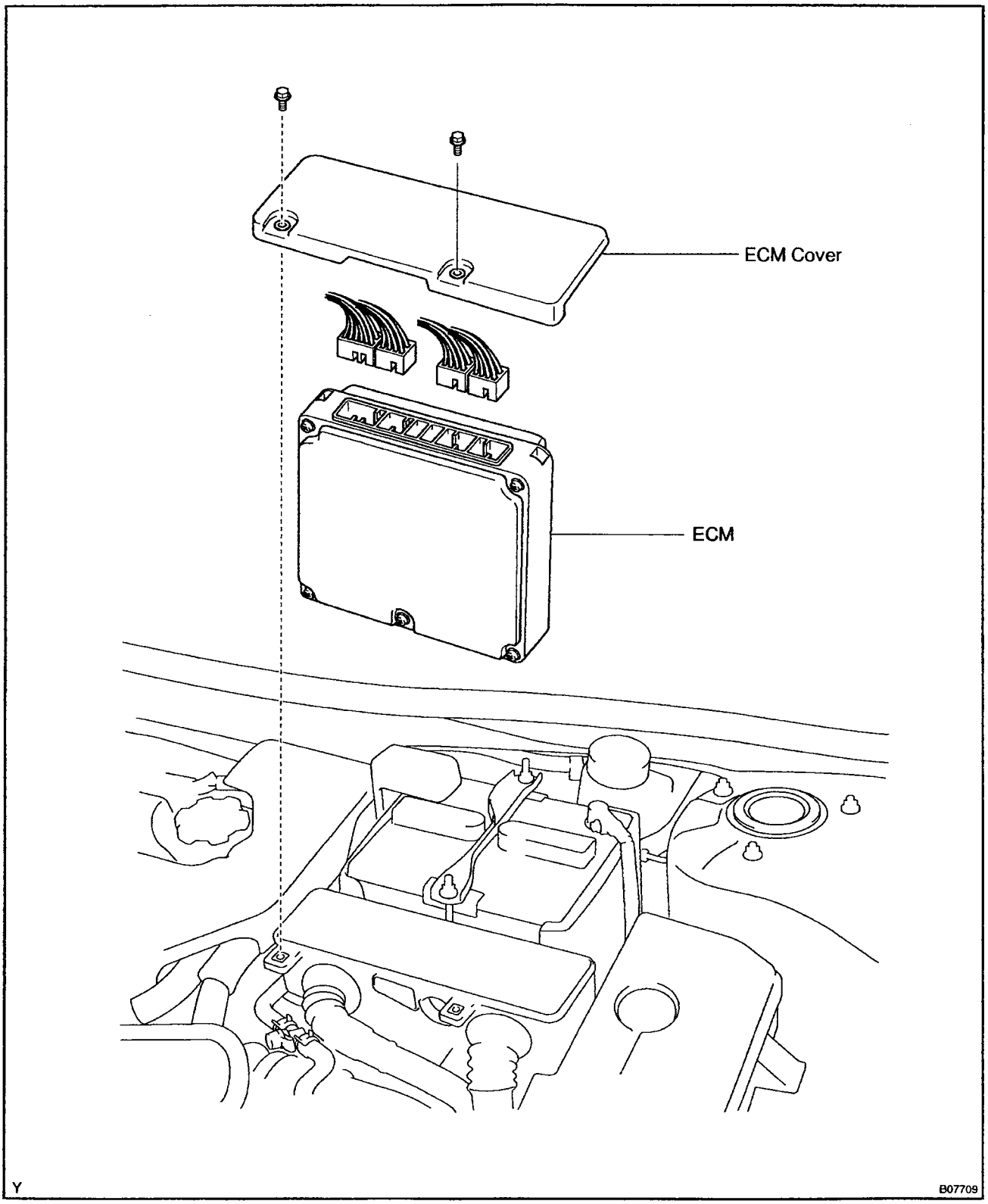
(f) Resistance the floor carpet.

(g) Reinstall the passenger's seat.

ENGINE CONTROL MODULE (ECM)

COMPONENTS

SF90F-02



INSPECTION

1. REMOVE ECM
2. INSPECT ECM (See page DI–20)
3. REINSTALL ECM

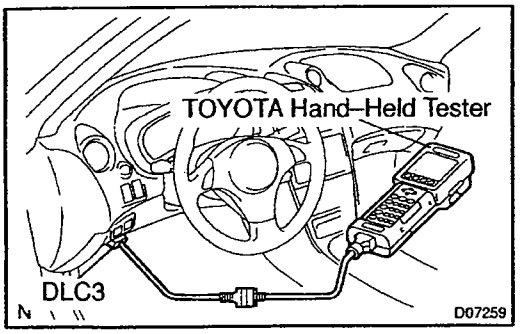
FUEL CUT RPM

SF0AD-05

INSPECTION

1. WARM UP ENGINE

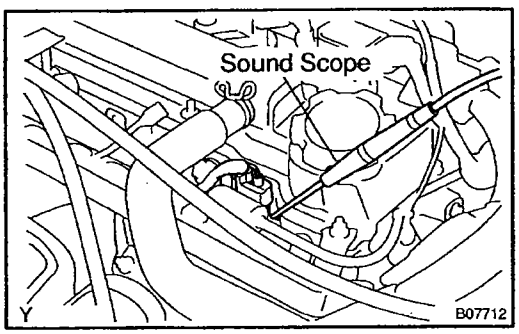
Allow the engine to warm up to normal operating temperature.



2. CONNECT TOYOTA HAND–HELD TESTER OR OBD II SCAN TOOL

(a) Connect the TOYOTA hand–held tester or OBD II scan tool to the DLC3.

(b) Please refer to the TOYOTA hand–held tester or OBD II scan tool operator's manual for further details.



3. INSPECT FUEL CUT OFF RPM

(a) Increase the engine speed to at least 3,500 rpm.

(b) Use a sound scope to check for injector operating noise.

(c) Check that when the throttle lever is released injector, operation noise stops momentary and then resumes.

HINT:

Measure with the A/C OFF.

Fuel return rpm: 1,400 rpm

4. DISCONNECT TOYOTA HAND–HELD TESTER OR OBD II SCAN TOOL

– MEMO –

COOLING

COOLANT CO–1
WATER PUMP CO–4
THERMOSTAT CO–8
RADIATOR CO–12
ELECTRIC COOLING FAN CO–24
COOLING FAN RELAY CO–31

CO

COOLANT

INSPECTION

CO04D-04

HINT:

Check the coolant level when the engine is cold.

1. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

The engine coolant level should be between the "LOW" and "FULL" line.

If low, check for leaks and add "Toyota Long Life Coolant" or equivalent up to the "FULL" line.

2. CHECK ENGINE COOLANT QUALITY

(a) Remove the reservoir cap.

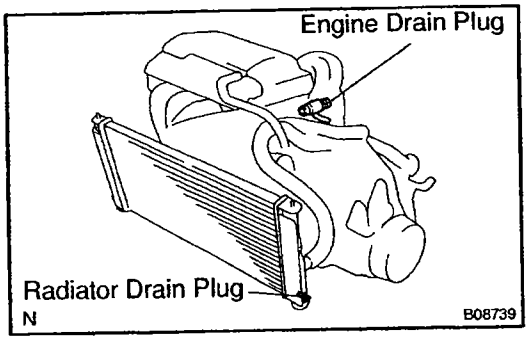
CAUTION:

To avoid the danger of being burned, do not remove the reservoir the cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

(b) There should not be any excessive deposits of rust or scale around the reservoir cap or reservoir filler hole, and the coolant should be free from oil.

If excessively dirty, replace the coolant.

(c) Reinstall the reservoir cap.



REPLACEMENT

HINT:

For replacing the heater parts such a heater core or heater hose, refer to AC–29.

1. DRAIN ENGINE COOLANT

(a) Remove the reservoir cap.

CAUTION:

To avoid the danger of being burned, do not remove the reservoir cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

(b) Loosen the radiator drain plug (on the left under side of the radiator tank) and engine drain plug on the engine coolant drain union (on the left rear of the cylinder block), and drain the coolant.

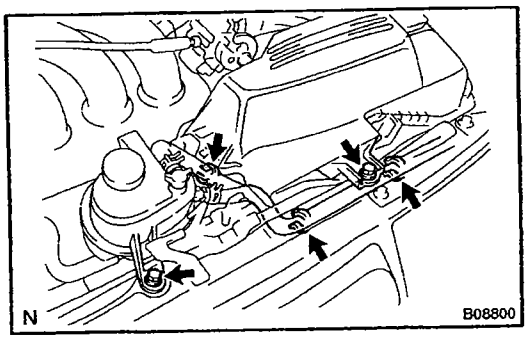
(c) Close the drain plugs.

Torque: 12.7 N·m (130 kgf·cm, 9 ft·lbf) for engine

2. FILL ENGINE COOLANT

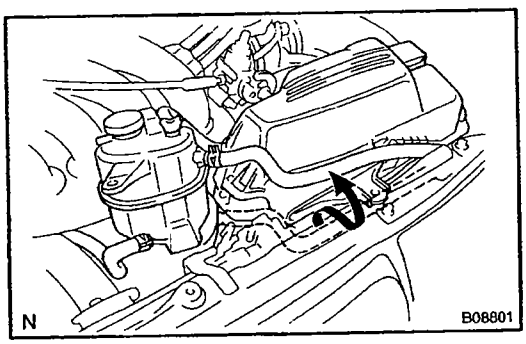
(a) Remove the upper front fender apron seal and upper radiator support seal.

CO



(b) Remove the 2 bolts.

(c) Disconnect the 3 clamps and 2 hoses, then place hoses on air cleaner case.



(d) Lift the engine coolant reservoir and hook it on a hood latch to fix.

(e) Remove the bleeder plug.

(f) Supply coolant of approx. 3.7 liters into the reserve tank until the level reaches FULL line.

- Use of improper coolants may damage engine cooling system.
- Use "Toyota Long Life Coolant" or equivalent and mix it with plain water according to the manufactures directions.
- Use of the coolant which includes more than 50% [freezing protection down to –35°C (–31°F)] or 60% [freezing protection down to –50°C (–58°F)] of ethylene–glycol is recommended, but not more than 70%.

NOTICE:

- **Do not use an alcohol type coolant or plain water alone.**
- **The coolant should be mixed with plain water (preferably demineralized water or distilled water).**

Capacity:

1ZZ–FE:

M/T	5.7 litters (6.0 US qts, 5.0 Imp. qts)
A/T	5.6 litters (5.9 US qts, 4.9 Imp. qts)

2ZZ–GE:

M/T	5.9 litters (6.2 US qts, 5.2 Imp. qts)
A/T	5.8 litters (6.1 US qts, 5.1 Imp. qts)

HINT:

When the level can not be lowered before the supply of the 3.7 liters coolant, squeeze the radiator lower hose several times while blocking the hole in the bleeder plug with a finger, and surely supply the coolant.

(g) Start the engine with the reservoir cap and the bleeder plug removed and warm it up until the cooling fan blows first and then stops.

HINT:

At this time, the A/C switch should be OFF.

(h) Additionally supply 500 cc coolant with the engine idling.

(i) Install the bleeder plug and reservoir cap.

HINT:

Close the reservoir cap by marking approx. 2.5 rotations until clicks is heard.

(j) Repeat 5 sec. engine operation at 3,000 rpm and 5 sec. idling alternately for 15 min. or more.

(k) After complete cooling of the engine, the level shall be between Low and FULL.

HINT:

After warming–up of engine, the level shall be over the FULL.

(l) Connect the 2 hoses and clamps.

(m) Install the 2 bolts.

(n) Install the cover.

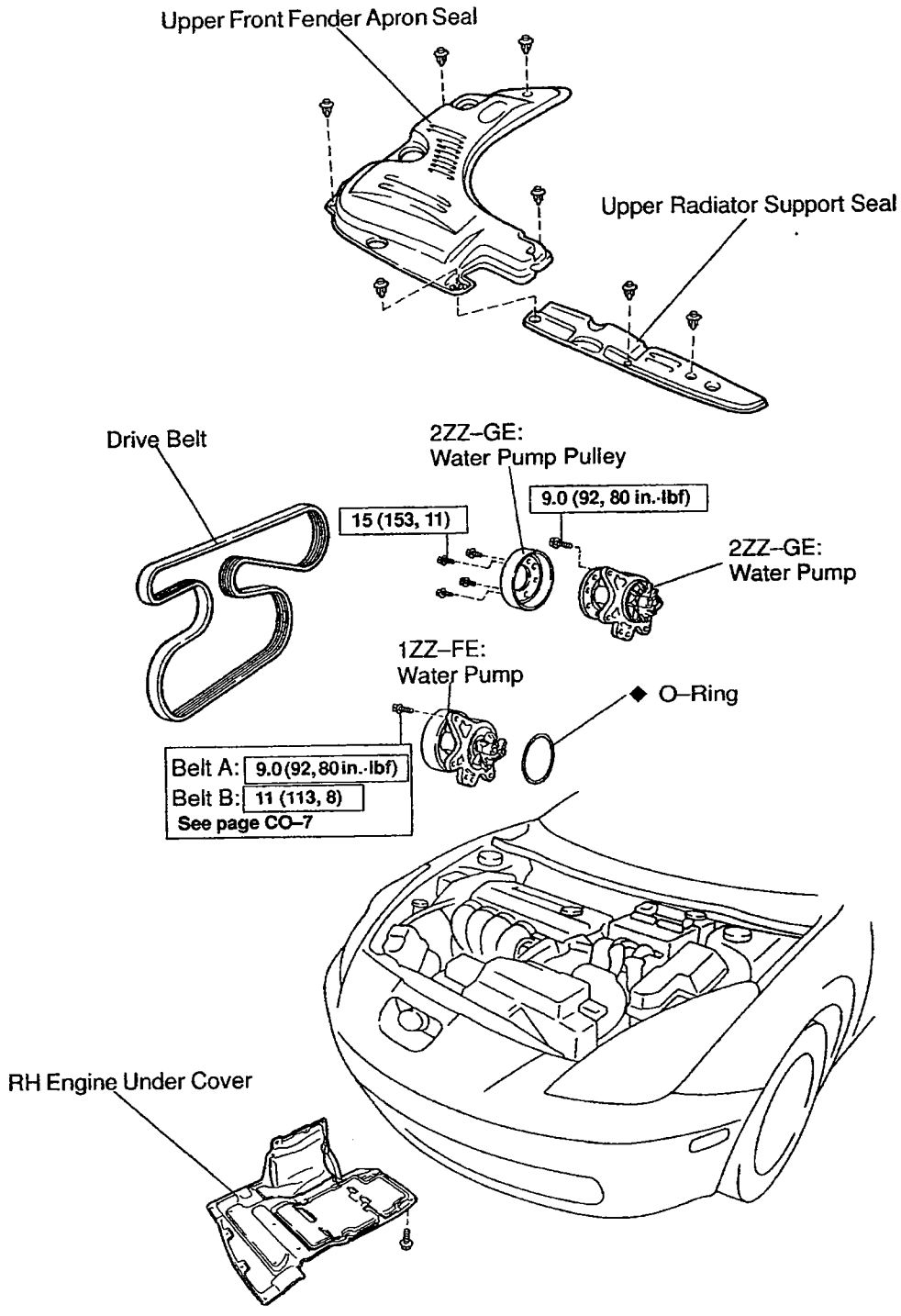
3. CHECK FOR COOLANT LEAKS

4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY

WATER PUMP

COMPONENTS

CO04F-04



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

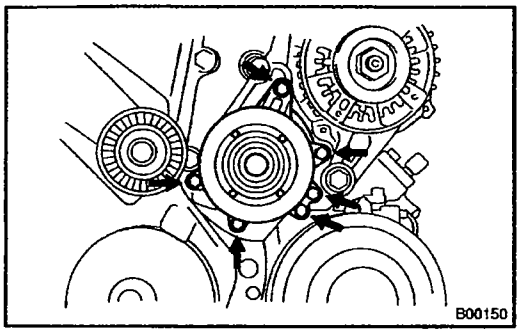
B08740

CO

CO0WY-01

REMOVAL

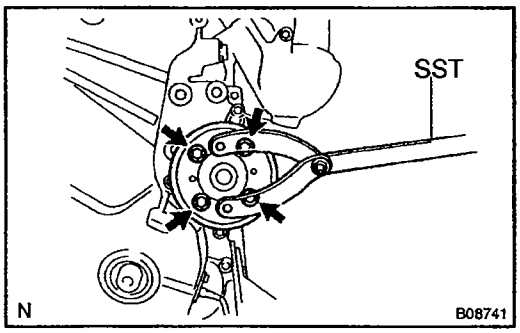
1. **REMOVE RH ENGINE UNDER COVER**
2. **DRAIN ENGINE COOLANT**
3. **REMOVE DRIVE BELT (See page CH–7)**



4. **1ZZ–FE:**
   REMOVE WATER PUMP

(a) Remove the 6 bolts, water pump and O–ring.

(b) Clean up the engine coolant from the water chamber room.



5. **2ZZ–GE:**
   REMOVE WATER PUMP

(a) Using SST, remove the 4 water pump pulley set bolts.
SST 09960–10010 (09962–01000, 09963–00600)

(b) Remove the water pump pulley.

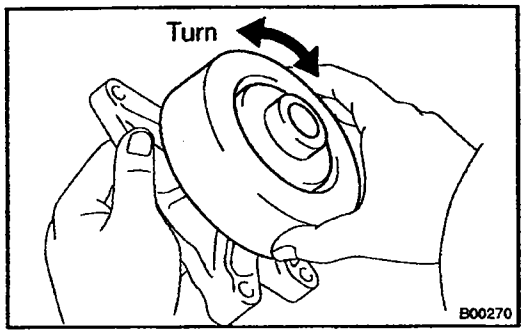
(c) Remove the 6 bolts, water pump and O–ring.

(d) Clean up the engine coolant from the water chamber room.

NOTICE:

Do not remove the RH engine mounting bracket and generator when the water pump alone is replaced.

CO04H-04



INSPECTION

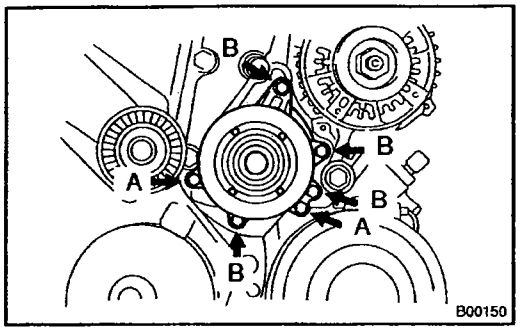
INSPECT WATER PUMP

(a) Visually check the drain hole for coolant leakage.
If leakage is found, replace the water pump.

(b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

CO0WZ-01



INSTALLATION

1. **1ZZ–FE:**
   INSTALL WATER PUMP

(a) Place a new O–ring on the timing chain cover.

(b) Install the water pump with the 6 bolts.
Torque:
Bolt A 9.0 N·m (92 kgf·cm, 80 in.·lbf)
Bolt B 11 N·m (113 kgf·cm, 8 ft·lbf)

HINT:
Each bolt length is indicated in the illustration.
A: 30 mm (1.18 in.)
B: 35 mm (1.38 in.)

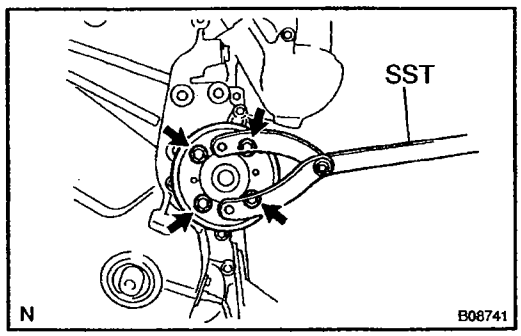
2. **2ZZ–GE:**
   INSTALL WATER PUMP

(a) Place a new O–ring on the timing chain cover.

(b) Install the water pump with the 6 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

HINT:
Each bolt length is indicated in the illustration.
A: 30 mm (1.18 in.)
B: 35 mm (1.38 in.)

(c) Install the water pump pulley.



(d) Using SST, tighten the 4 water pump pulley set bolts.
SST 09960–10010 (09962–01000, 09963–00600)
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

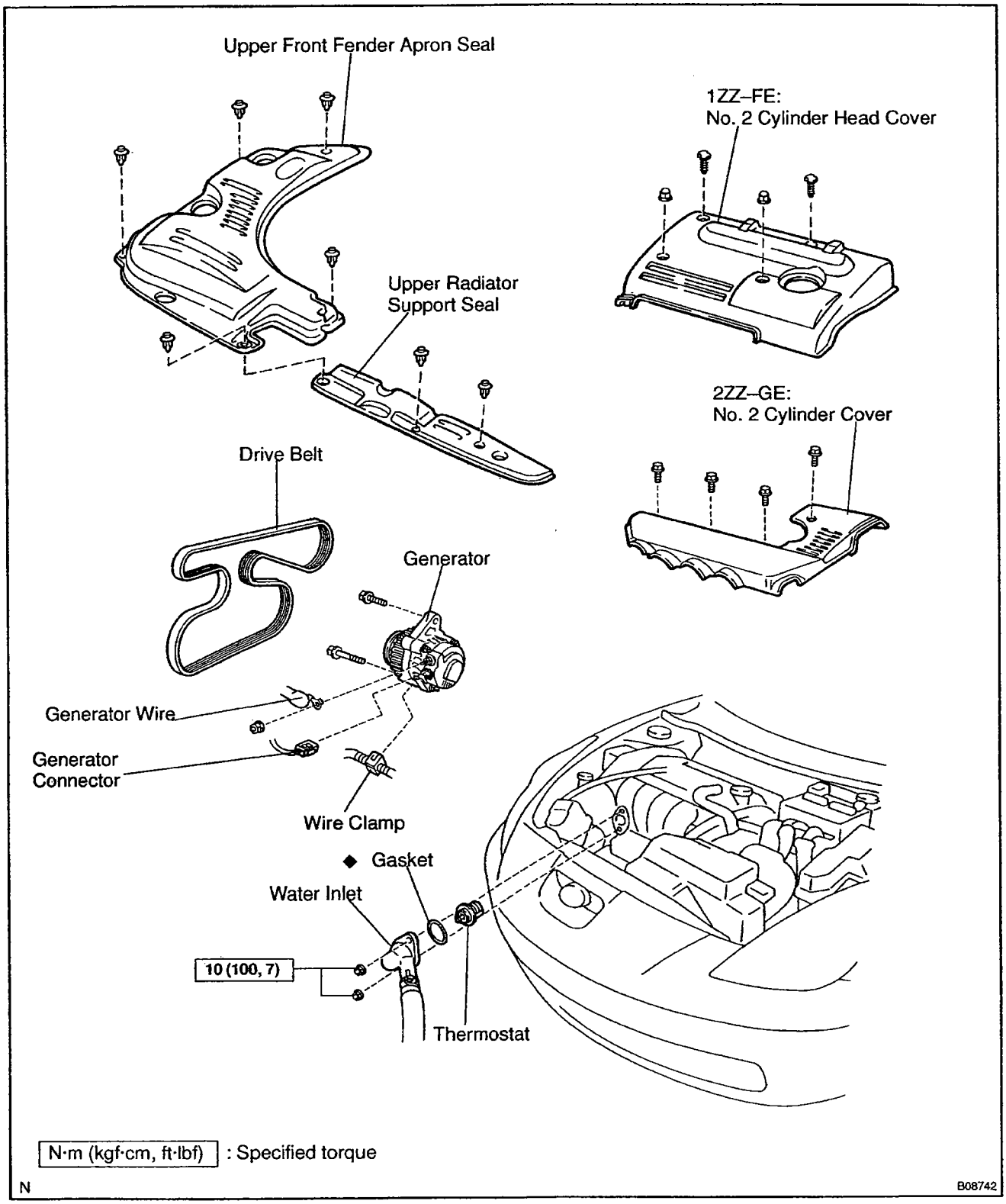
3. **INSTALL RH ENGINE UNDER COVER**
4. **INSTALL DRIVE BELT**
   (See page CH–17)
5. **FILL WITH ENGINE COOLANT**
6. **START ENGINE AND CHECK FOR LEAKS**
7. **RECHECK ENGINE COOLANT LEVEL**

CO

THERMOSTAT

COMPONENTS

CO04J-04



CO

CO04K-04

REMOVAL

HINT:

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. **DRAIN ENGINE COOLANT**
2. **REMOVE DRIVE BELT AND GENERATOR**
   (See page CH–7)
3. **REMOVE WATER INLET AND THERMOSTAT**

(a) Remove the 2 nuts, and disconnect the water inlet from the cylinder block.

(b) Remove the thermostat.

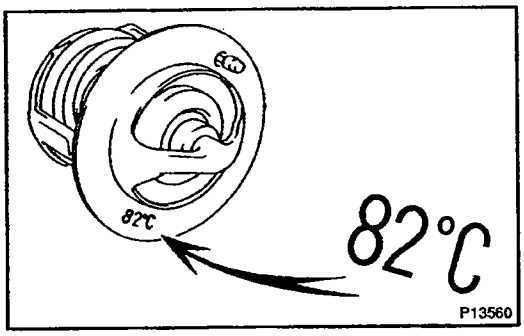
(c) Remove the gasket from the thermostat.

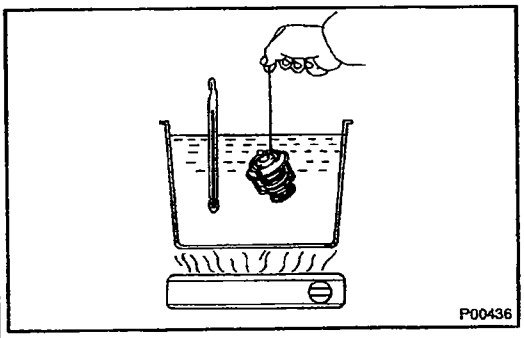
CO04L-04

INSPECTION

INSPECT THERMOSTAT

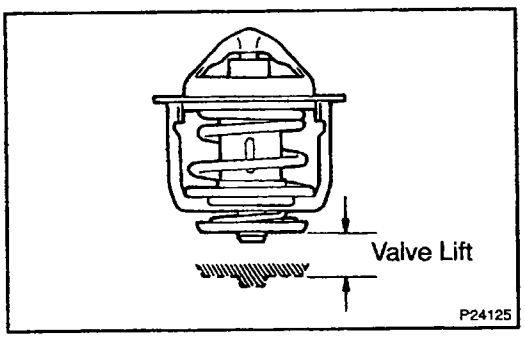
HINT:
The thermostat is numbered with the valve opening temperature.





(a) Immerse the thermostat in water and gradually heat the water.
(b) Check the valve opening temperature.
Valve opening temperature:
80.0 – 84.0°C (176 – 183°F)

If the valve opening temperature is not as specified, replace the thermostat.

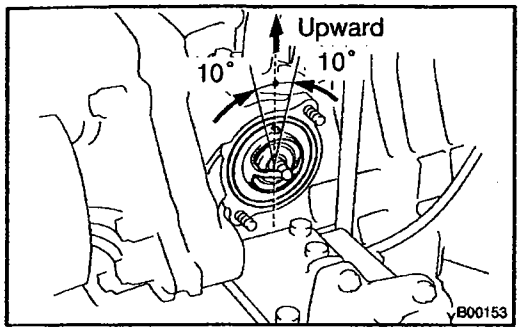


(c) Check the valve lift.
Valve lift: 10 mm (0.39 in.) or more at 90°C (194°F)

If the valve lift is not as specified, replace the thermostat.
(d) Check that the valve is fully closed when the thermostat is at low temperatures (below 40°C (104°F)).

If not closed, replace the thermostat.

CO



CO04M-04

INSTALLATION

1. PLACE THERMOSTAT IN CYLINDER BLOCK

(a) Install a new gasket to the thermostat.

(b) Install the thermostat with the jiggle valve upward.

HINT:

The jiggle valve may be set within 10° of either side of the prescribed position.

2. INSTALL WATER INLET

Install the water inlet with the 2 nuts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

3. INSTALL GENERATOR AND DRIVE BELT

(See page CH–17)

4. FILL WITH ENGINE COOLANT

5. START ENGINE, AND CHECK FOR COOLANT LEAKS

RADIATOR

CO04N-01

ON–VEHICLE CLEANING

Using water or a steam cleaner, remove any mud or dirt from the radiator core.

NOTICE:

If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. (i.e. Maintain a distance between the cleaner nozzle and radiator core.)

CO04O-04

ON–VEHICLE INSPECTION

1. REMOVE RESERVOIR CAP

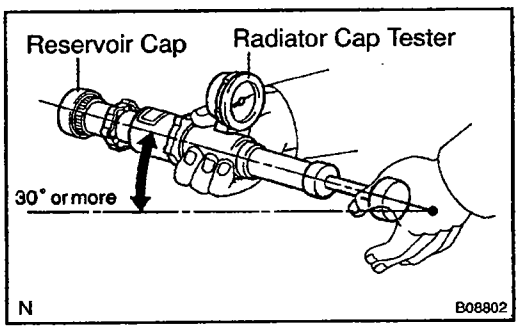
CAUTION:

To avoid the danger of being burned, do not remove the reservoir cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

2. INSPECT RESERVOIR CAP

NOTICE:

- **If the reservoir cap has contaminations, always rinse it with water.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**
- **When performing steps (a) and (b) below, keep the radiator cap tester at an angle of over 30° above the horizontal.**



(a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push/(3 seconds or more)

NOTICE:

Push the pump at a constant speed.

If air is not coming from the vacuum valve, replace the reservoir cap.

(b) Pump the tester and measure the relief valve opening pressure.

Pump speed: 1 push within 1 seconds

NOTICE:

This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:

93 – 123 kPa (0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi)

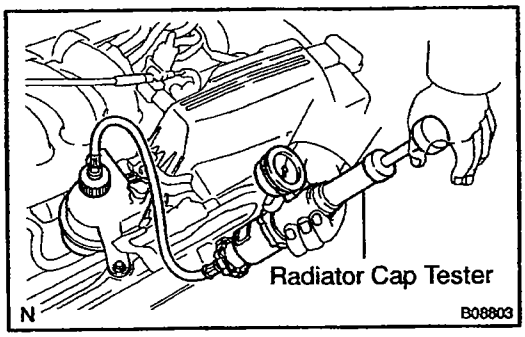
Minimum opening pressure:

79 kPa (0.8 kgf/cm^2, 11.5 psi)

HINT:

Use the tester's maximum reading as the opening pressure.

If the opening pressure is less than minimum, replace the reservoir cap.



3. INSPECT COOLING SYSTEM FOR LEAKS

(a) Fill the radiator with coolant and attach a radiator cap tester.

(b) Warm up the engine.

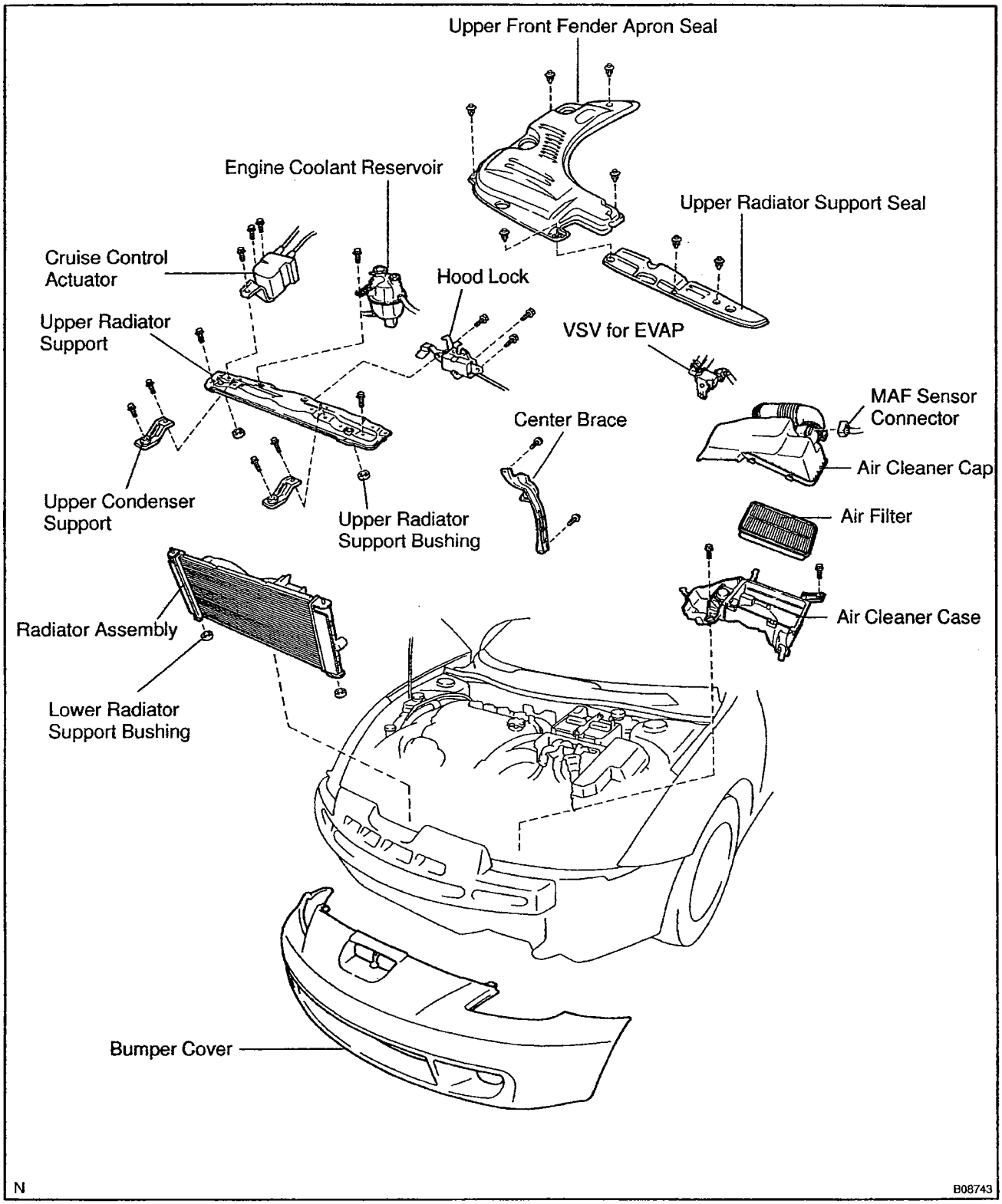
(c) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), and check that the pressure does not drop.

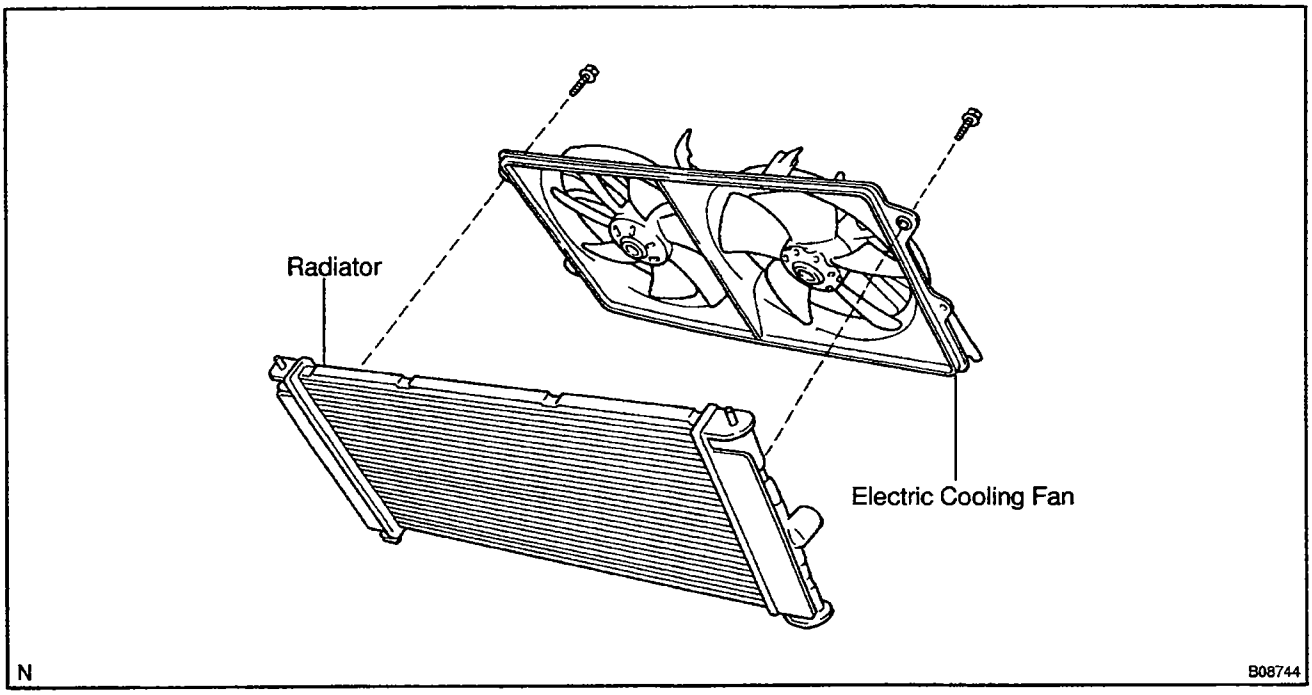
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

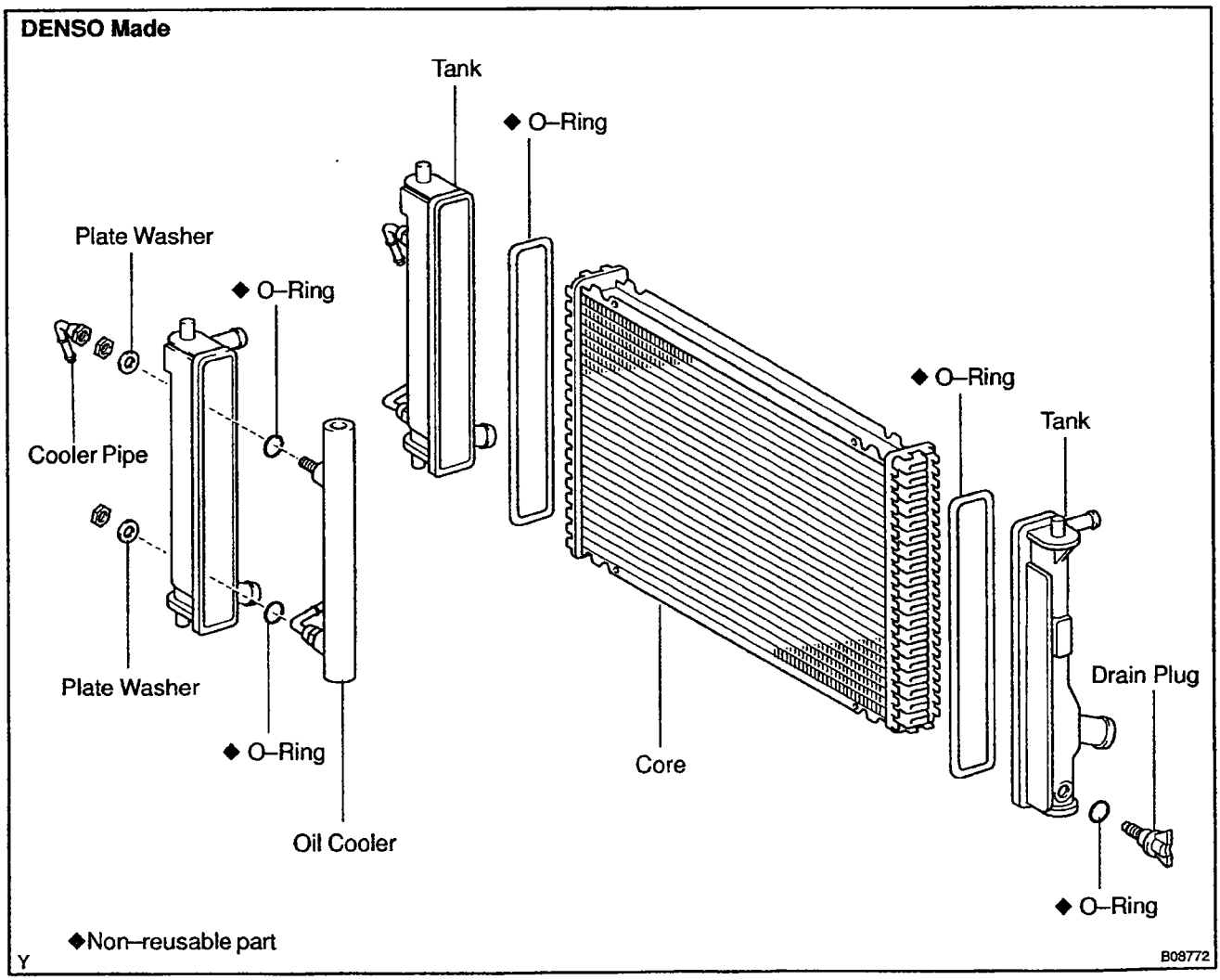
4. REINSTALL RESERVOIR CAP

CO04P-03

COMPONENTS



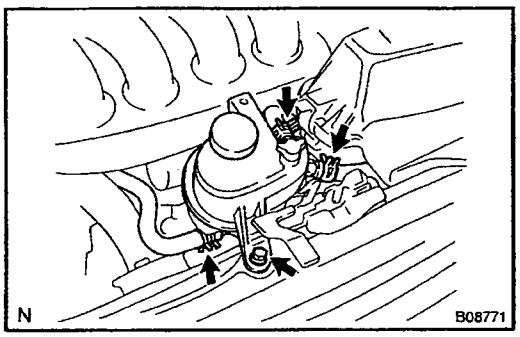

Radiator
Electric Cooling Fan
N
B08744


DENSO Made
Tank
◆ O–Ring
Plate Washer
◆ O–Ring
Cooler Pipe
Plate Washer
◆ O–Ring
Oil Cooler
◆ O–Ring
Tank
Drain Plug
Core
◆ O–Ring
◆Non–reusable part
Y
B08772

CO0X4-01

REMOVAL

1. **REMOVE UPPER FRONT FENDER APRON SEAL AND UPPER RADIATOR SUPPORT SEAL**
2. **DRAIN ENGINE COOLANT**
3. **REMOVE BUMPER COVER (See page BO–4)**
4. **REMOVE AIR CLEANER**

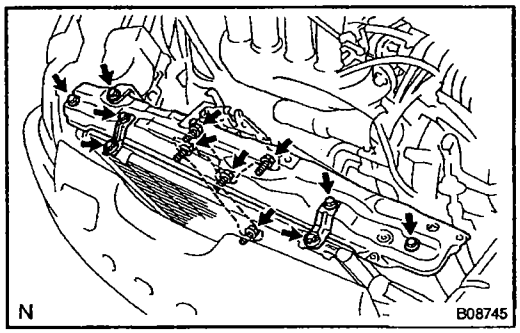


5. **REMOVE ENGINE COOLANT RESERVOIR**

(a) Disconnect the 3 radiator reservoir hoses.
(b) Remove the bolt and engine coolant reservoir.

6. **REMOVE RADIATOR ASSEMBLY**

(a) Disconnect the No. 1 electric cooling fan connector.
(b) Disconnect the No. 2 electric cooling fan connector.
(c) Disconnect the upper radiator hose.
(d) Disconnect the lower radiator hose.
(e) Disconnect the 2 A/T oil cooler hoses.



(f) Remove the 3 bolts, and disconnect the hood lock.
(g) Remove the 2 bolts and center brace.
(h) Remove the 2 bolts, 2 nuts and 2 condensor upper supports.
(i) w/ Cruise control system:
Remove the bolt, and disconnect the cruise control accuator.
(j) Remove the 2 bolts and radiator upper support.
(k) Remove the 2 upper radiator support bushings.
(l) Remove the radiator assembly.
(m) Remove the 2 lower radiator support bushings.

7. **REMOVE ELECTRIC COOLING FAN FROM RADIATOR**

Remove the 2 bolts and cooling fan assembly.

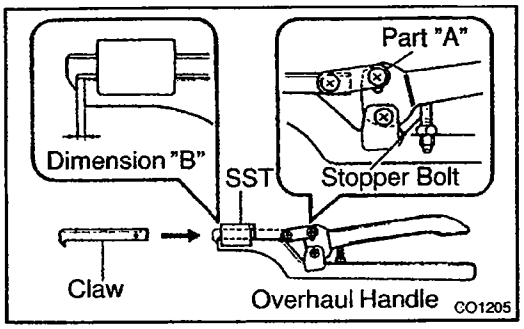
CO04R-04

DISASSEMBLY

1. REMOVE DRAIN PLUG

(a) Remove the drain plug.

(b) Remove the O–ring.



2. DENSO Made:
ASSEMBLE SST

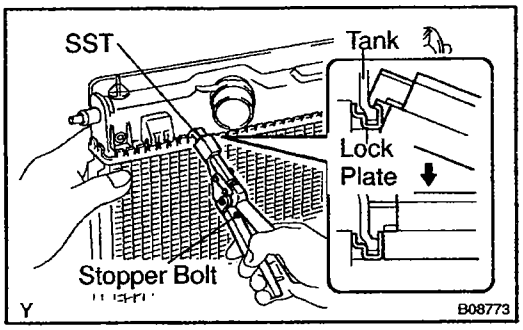
SST 09230–01010

(a) Install the claw to the overhaul handle, inserting it in the hole in part "A" as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolts so that dimension "B" shown in the diagram is 0.2 – 0.3 mm (0.008 – 0.012 in.).

NOTICE:

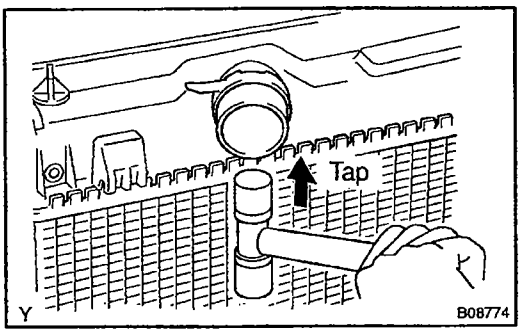
If this adjustment is not done the claw may be damaged.



3. DENSO Made:
UNCAULK LOCK PLATES

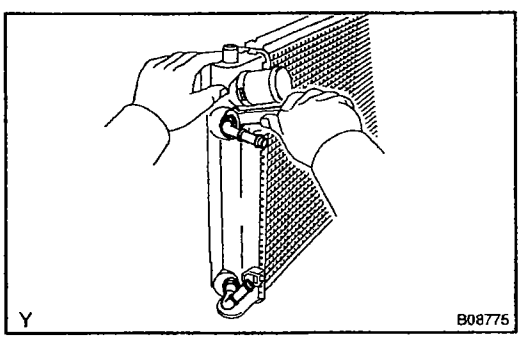
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolts.

SST 09230–01010



4. DENSO Made:
REMOVE TANKS AND O–RINGS

Lightly tap the bracket of the radiator (or radiator inlet or outlet) with a soft–faced hammer, and remove the tank and the O–ring.

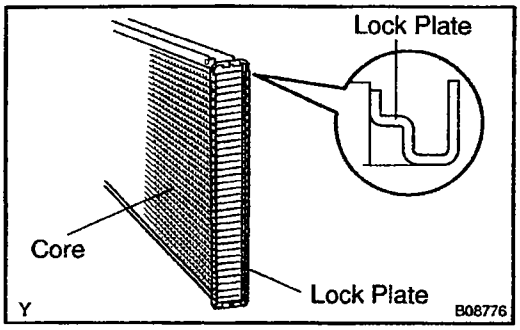


5. A/T (DENSO Made):
REMOVE OIL COOLER FROM LOWER TANK

(a) Loosen the nut, and remove the cooler pipe.

(b) Remove the 2 nuts and 2 plate washers.

(c) Remove the oil cooler and 2 O–rings.



CO04S-04

INSPECTION

DENSO Made:

INSPECT LOCK PLATE FOR DAMAGE

HINT:

- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.
- Therefore, first correct any deformation with pliers or similar object. Water leakage will result if the bottom of the lock plate groove is damaged.

NOTICE:

The radiator can only be recaulked 2 times. After the 2nd time, the radiator core must be replaced.

CO6XS-01

REASSEMBLY

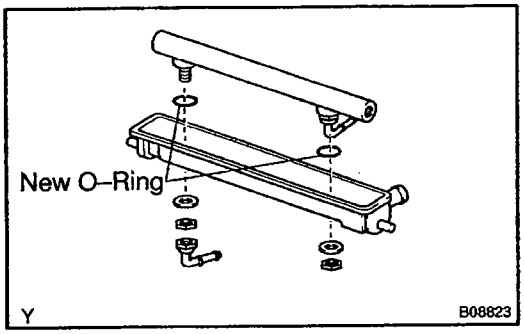
1. **A/T (DENSO Made):**
INSTALL OIL COOLER TO LOWER TANK

(a) Clean the O–ring contact surface of the lower tank and oil cooler.

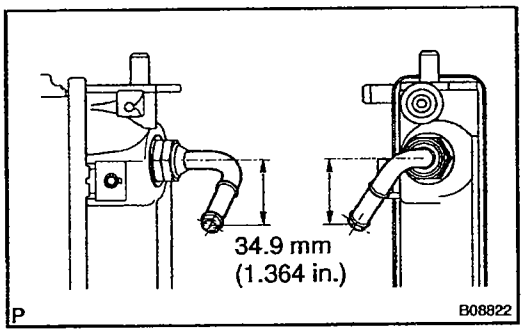
(b) Install 2 new O–rings to the oil cooler.

(c) Install the oil cooler to the lower tank.

(d) Install the 2 plate washers and 2 nuts.
Torque: 8.34 N·m (85 kgf·cm, 74 in.·lbf)



(e) Install the cooler pipe in the direction indicated as shown in the illustration.
Torque: 14.7 N·m (150 kgf·cm, 11 ft·lbf)

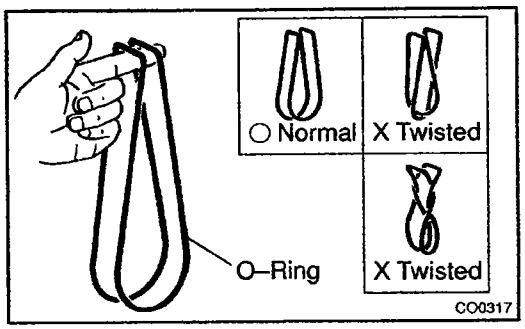


2. **DENSO Made:**
INSTALL NEW O–RINGS AND TANKS

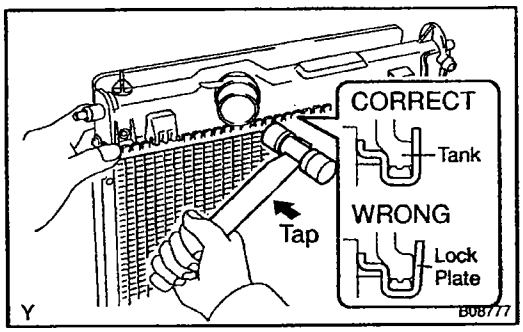
(a) After checking that there are no foreign objects in the lock plate groove, install the new O–ring without twisting it.

HINT:
When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.

(b) Install the tank without damaging the O–ring.



(c) Tap the lock prate with a soft–faced hammer so that there is no gap between it and the tank.

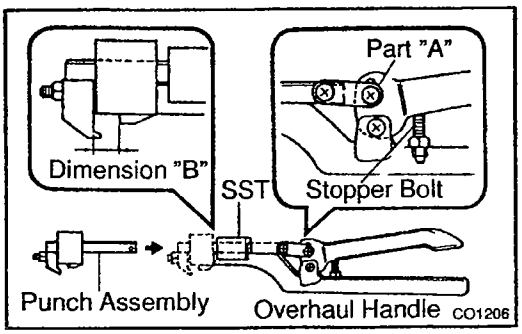


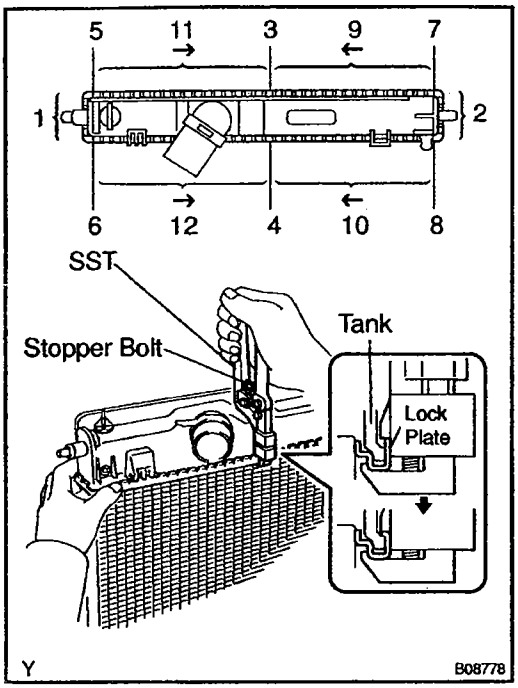
3. **DENSO Made:**
ASSEMBLE SST

SST 09230–01010, 09231–14010

(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part "A" as shown in the illustration.

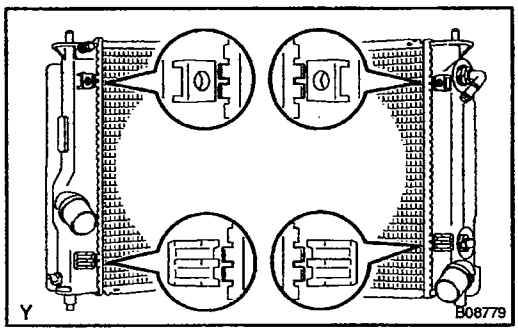
(b) While gripping the handle, adjust the stopper bolt so that dimension "B" is as shown in the illustration.
Dimension: 8.4 mm (0.331 in.)





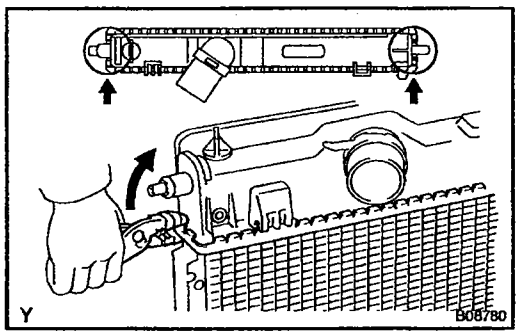
4. DENSO Made:
CAULK LOCK PLATE

(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopped plate.
SST 09230–01010

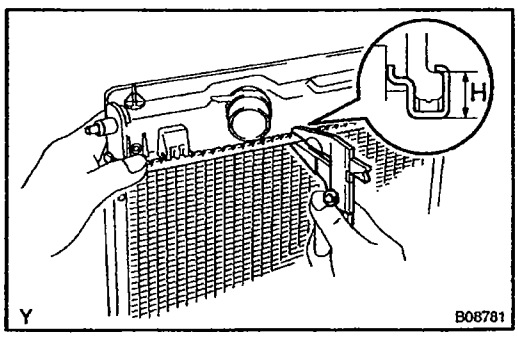


HINT:

- Do not stake the areas protruding around the pipes, brackets or tank rids.



- The points shown in the illustration and oil cooler near here (A/T) cannot be staked with SST. Use wrap vinyl tape around the tip of a pair or similar object and be careful not to damage the core plates.

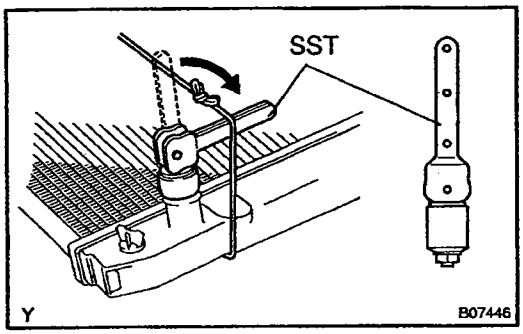


(b) Check the lock plate height (H) after completing the caulking.
Plate height: 7.40 – 7.80 mm (0.2913 – 0.3071 in.)

If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

5. INSTALL DRAIN PLUG

(a) Install a new O–ring to the drain plug.
(b) Install the drain plug.



6. INSPECT FOR WATER LEAKS

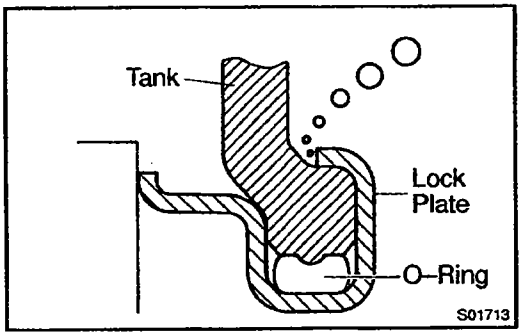
(a) Tighten the drain plug.

(b) Install the engine coolant reservoir.

(c) Plug the inlet and outlet pipes of the radiator with SST.
SST 09230–01010

(d) Using a radiator cap tester, apply pressure to the radiator.
Test pressure: 177 kPa (1.8 kgf/cm^2, 26 psi)

(e) Submerge the radiator in water.



(f) Inspect for leaks.

HINT:

On radiators with resin tanks, there is a clearance between the tank and lock plate where a minute amount of air will remain, giving the appearance of an air leak when the radiator is submerged in water. therefore, before doing the water leak test, first swish the radiator around in the water until all bubbles disappear.

CO0X3-01

INSTALLATION

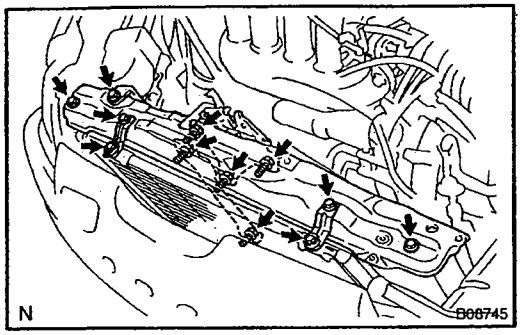
1. INSTALL ELECTRIC COOLING FAN TO RADIATOR

Install the cooling fan with the 2 bolts.

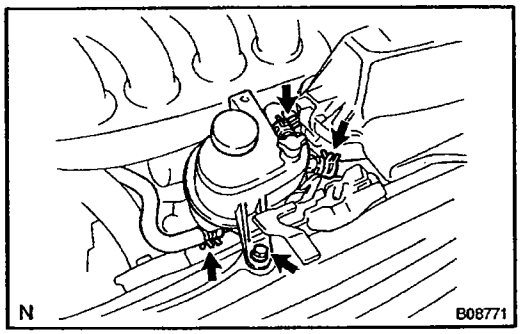
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

2. INSTALL RADIATOR ASSEMBLY

(a) Install the 2 lower radiator support bushings.
(b) Install the radiator assembly.
(c) Install the 2 upper radiator support bushings.



(d) Install the radiator upper support with the 2 bolts.
(e) w/ Cruise control system:
Install the cruise control actuator with the 3 bolts.
(f) Install the 2 condenser upper supports with the 2 bolts and nuts.
(g) Install the center brace with the 2 bolts.
(h) Install the hood lock with the 3 bolts.
(i) Connect the 2 A/T oil cooler hoses.
(j) Connect the lower radiator hose.
(k) Connect the upper radiator hose.
(l) Connect the No. 1 electric cooling fan connector.
(m) Connect the No. 2 electric cooling fan connector.



3. INSTALL ENGINE COOLANT RESERVOIR

(a) Install the engine coolant reservoir with the bolt.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(b) Connect the 3 radiator reservoir hoses.

4. INSTALL AIR CLEANER

5. INSTALL BUMPER COVER (See page BO–4)

6. FILL WITH ENGINE COOLANT

7. INSTALL UPPER FRONT FENDER APRON SEAL AND UPPER RADIATOR SUPPORT SEAL

8. START ENGINE AND CHECK FOR COOLANT LEAKS

ELECTRIC COOLING FAN

CO0X0-01

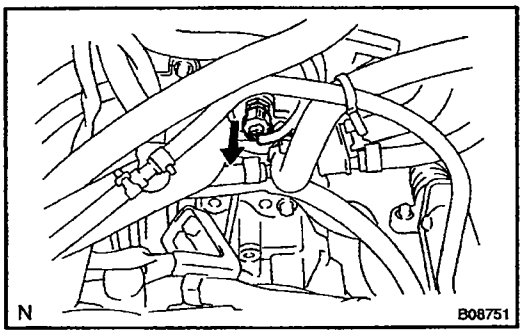
ON–VEHICLE INSPECTION

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83°C (181°F))

(a) Turn the ignition switch ON.

(b) Check that the cooling fan stops.

If not, check the cooling fan relay and ECT sensor, and check for a separated connector or severed wire between the cooling fan relay and ECT sensor.



(c) Disconnect the ECT sensor connector.

(d) Check that the cooling fan rotates.

If not, check the engine main relay, cooling fan relay, cooling fan, fuses, and check for short circuit between the cooling fan relay and ECT sensor.

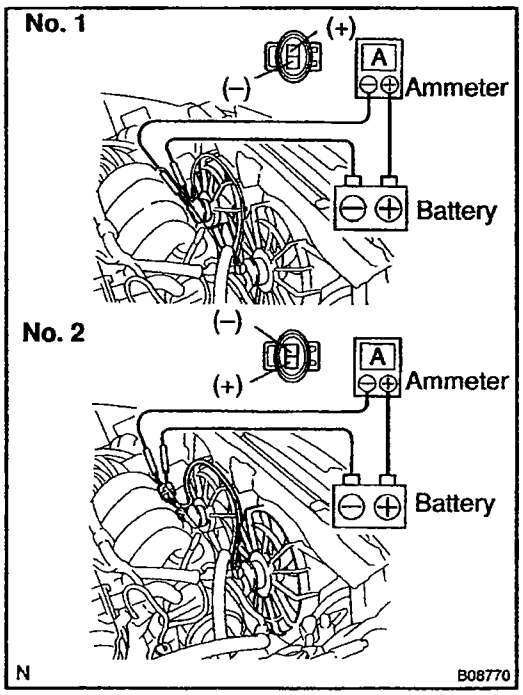
(e) Reconnect the ECT sensor connector.

2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 93°C (199°F))

(a) Start the engine, and raise coolant temperature to above 93°C (199°F).

(b) Check that the cooling fan rotates.

If not, replace the ECT sensor.



3. INSPECT COOLING FANS

(a) Disconnect the cooling fan connector.

(b) Connect battery and ammeter to the connector.

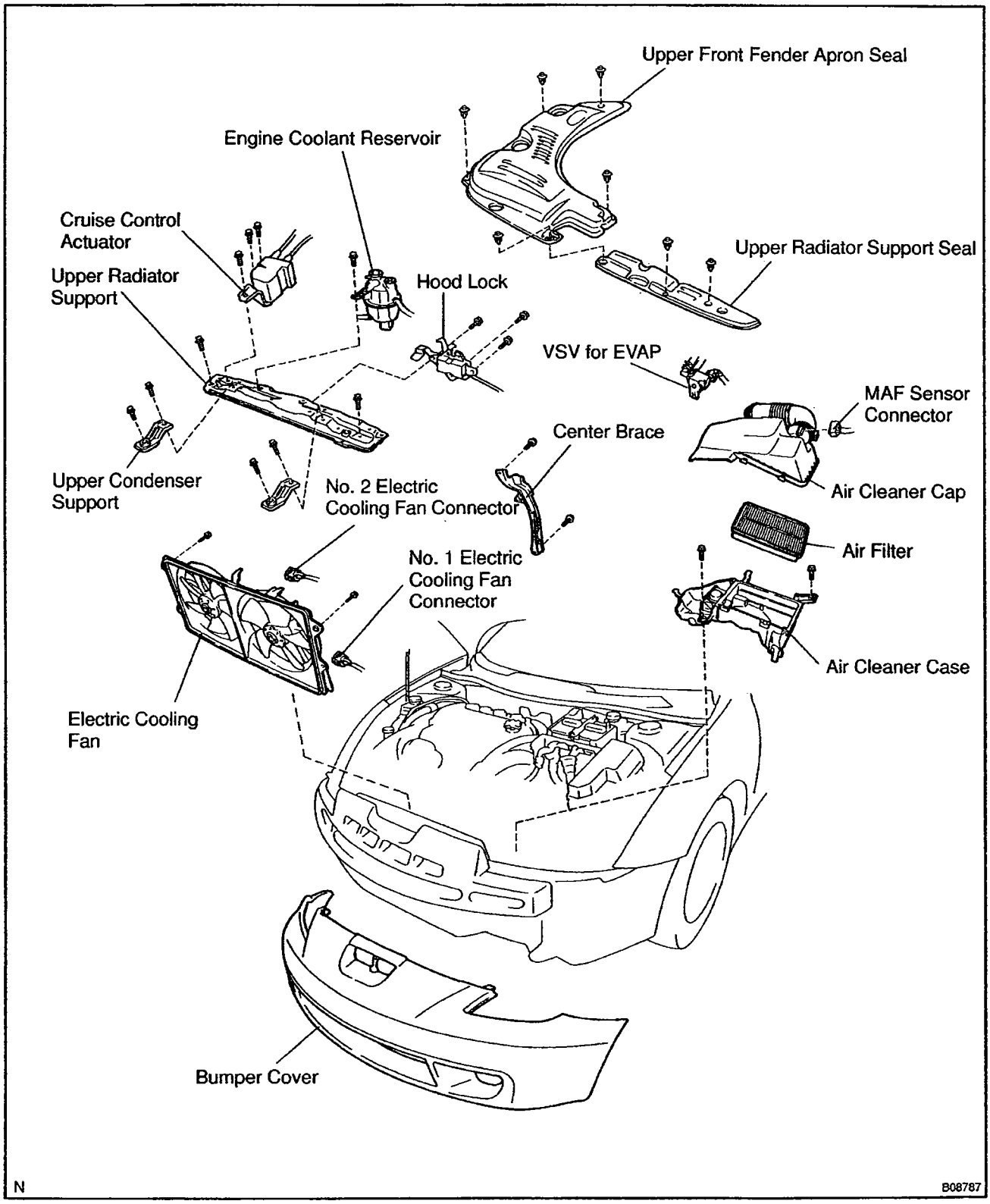
(c) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

Standard amperage: 5.2 – 8.2 A

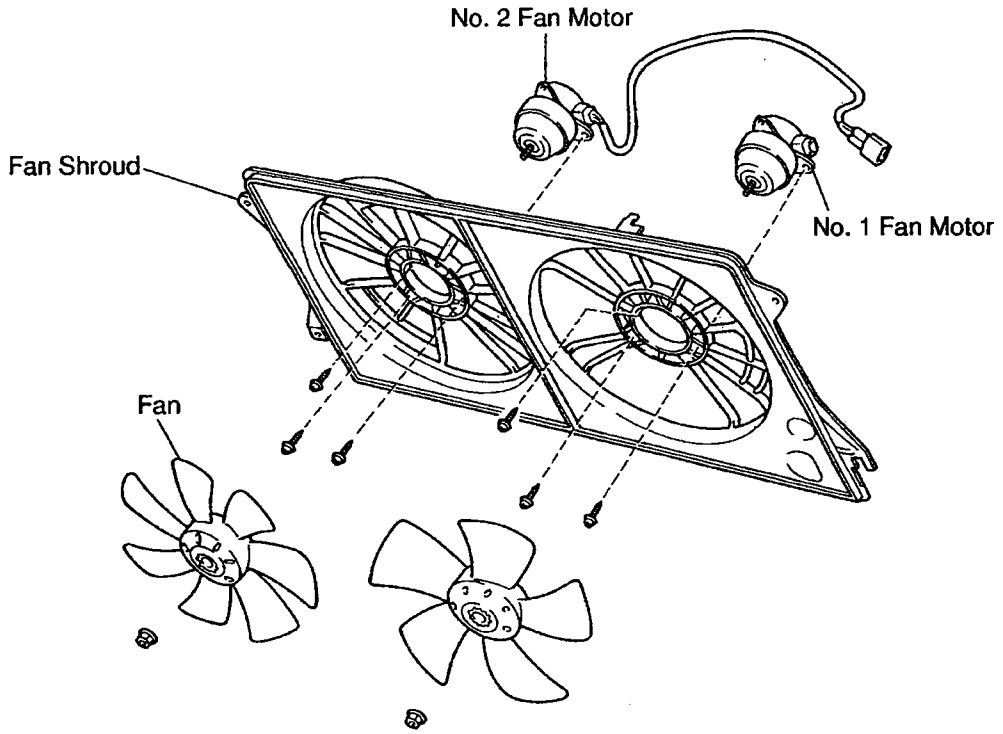
(d) Reconnect the cooling fan connector.

CO04W-03

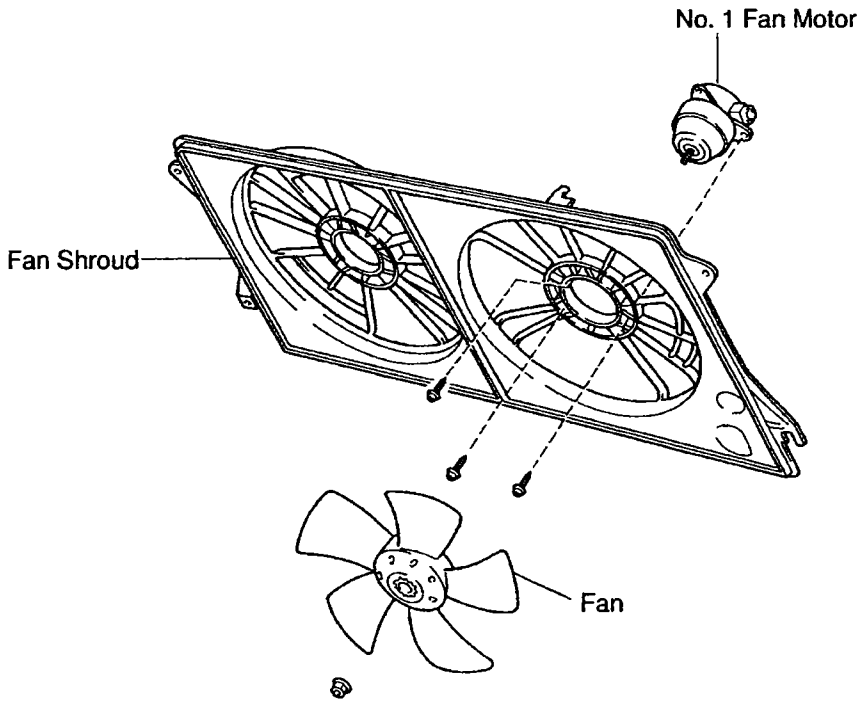
COMPONENTS



w/ A/C



w/o A/C



N

B08788

CO04X-03

REMOVAL

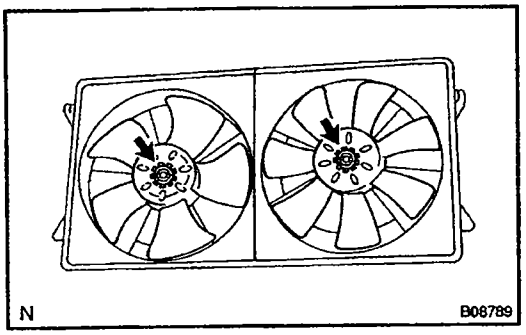
1. **REMOVE UPPER FRONT FENDER APRON SEAL AND UPPER RADIATOR SUPPORT SEAL**
2. **DRAIN ENGINE COOLANT**
3. **REMOVE BUMPER COVER (See page BO–4)**
4. **REMOVE RADIATOR UPPER SUPPORT**

(a) Remove the air cleaner assembly.
(b) Remove the engine coolant reservoir.
(c) Remove the 3 bolts, and disconnect the hood lock.
(d) Remove the 2 bolts and center brace.
(e) Remove the 2 bolts, 2 nuts and 2 condenser upper supports.
(f) w/ Cruise control system:
Remove the bolt, and disconnect the cruise control actuator.
(g) Remove the 2 bolts and radiator upper support.

5. **REMOVE COOLING FAN**

(a) Disconnect the 2 cooling fan connectors.
(b) Remove the 2 bolts and cooling fan.

CO04Y-03



DISASSEMBLY

1. **REMOVE FAN(S)**

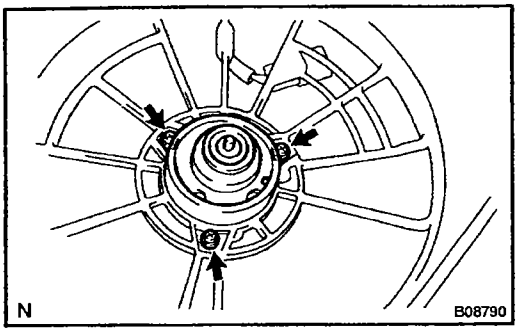
   Remove the nut and fan.

2. **REMOVE FAN MOTOR(S)**

(a) Disconnect the wire and connector holder from the fan shroud.

(b) Remove the 3 screws and fan motor.

CO0X1-01

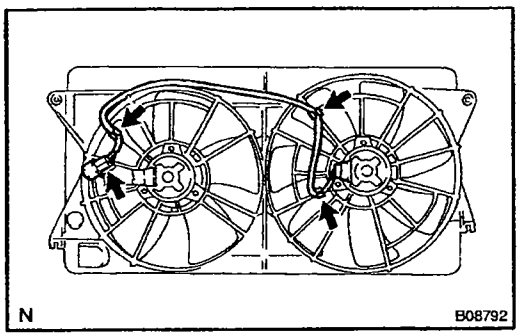


REASSEMBLY

1. INSTALL FAN MOTOR(S)

(a) Install the fan motor with the 3 screws.

Torque: 2.55 N·m (26 kgf·cm, 23 in.·lbf)



(b) Install the wire and connector holder to the fan shroud.

2. INSTALL FAN(S)

Install the fan with the nut.

Torque: 6.18 N·m (63 kgf·cm, 55 in.·lbf)

CO0X2-01

INSTALLATION

1. INSTALL COOLING FAN

(a) Install the cooling fan with the 2 bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(b) Connect the 2 cooling fan connectors.

2. INSTALL RADIATOR UPPER SUPPORT

(a) Install the radiator upper support with the 2 bolts.

(b) w/ Cruise control system:
Install the cruise control actuator with the 3 bolts.

(c) Install the 2 condenser upper supports with the 2 bolts and nuts.

(d) Install the center brace with the 2 bolts.

(e) Install the hood lock with the 3 bolts.

(f) Install the engine coolant reservoir.

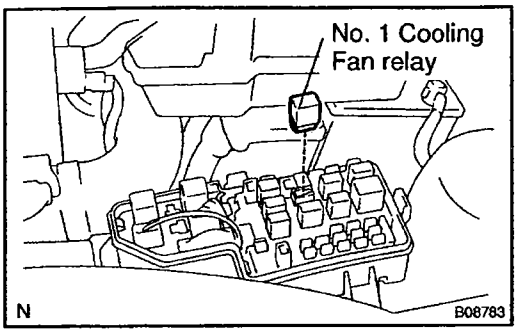
(g) Install the air cleaner assembly.

3. INSTALL FRONT BUMPER (See page BO–4)

4. FILL WITH ENGINE COOLANT

5. INSTALL COOLING FAN

6. START ENGINE AND CHECK FOR COOLANT LEAKS



COOLING FAN RELAY

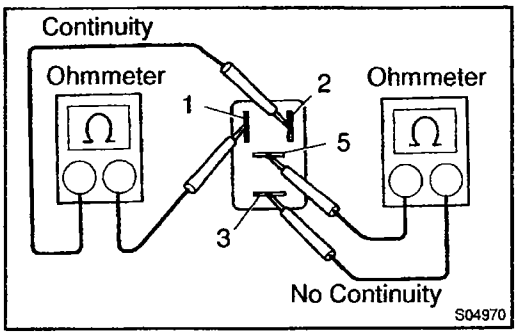
CO054-03

INSPECTION

1. INSPECT NO. 1 COOLING FAN RELAY

(a) Remove the relay box cover.

(b) Remove the No. 1 cooling fan relay. (Marking: FAN No. 1)



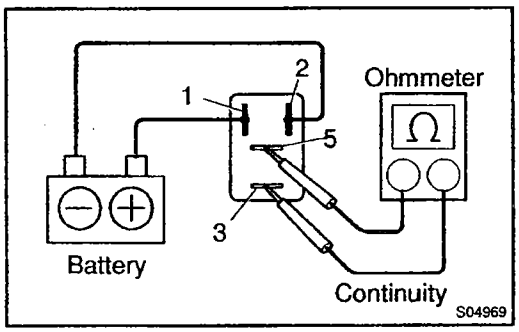
(c) Inspect the No. 1 cooling fan relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(d) Inspect the No. 1 cooling fan relay operation.

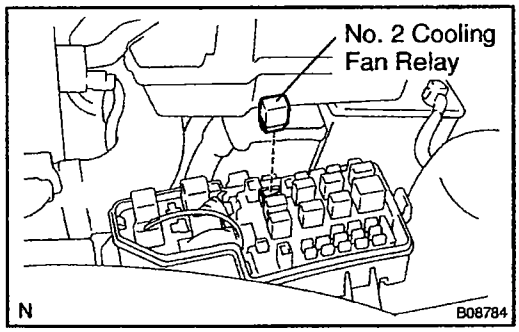
(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

(e) Reinstall the No. 3 cooling fan relay.

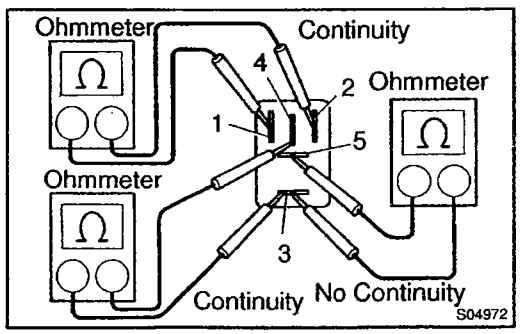
(f) Reinstall the relay box cover.



2. w/ A/C:
INSPECT NO. 2 COOLING FAN RELAY

(a) Remove the relay box cover.

(b) Remove the No. 2 cooling fan relay. (Marking: FAN No. 2)



(c) Inspect the No. 2 cooling fan relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

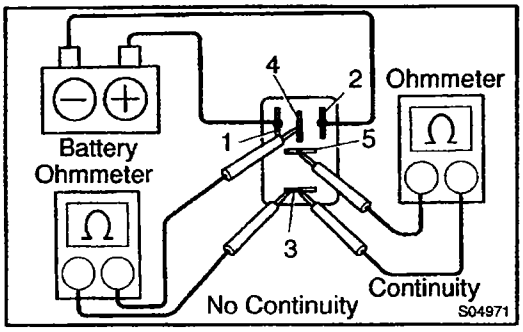
If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

(3) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



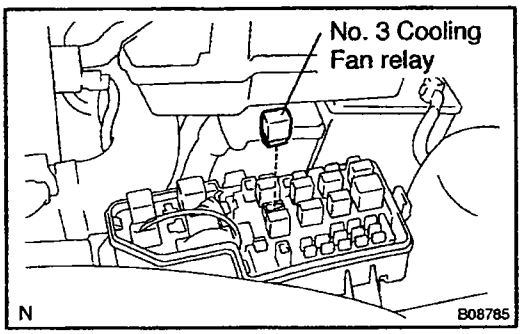
(d) Inspect the No. 2 cooling fan relay operation.
  (1) Apply battery positive voltage across terminals 1 and 2.
  (2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

  (3) Check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

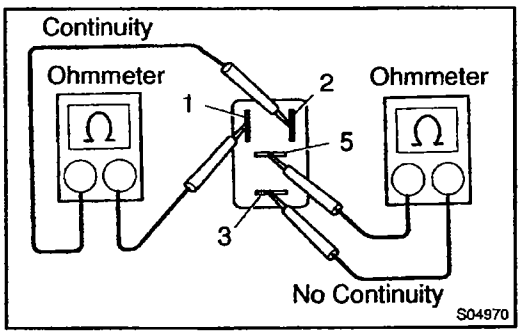
(e) Reinstall the No. 2 cooling fan relay.
(f) Reinstall the relay box cover.



3. w/ A/C:

INSPECT NO. 3 COOLING FAN RELAY

(a) Remove the relay box cover.
(b) Remove the No. 3 cooling fan relay. (Marking: FAN No. 3)

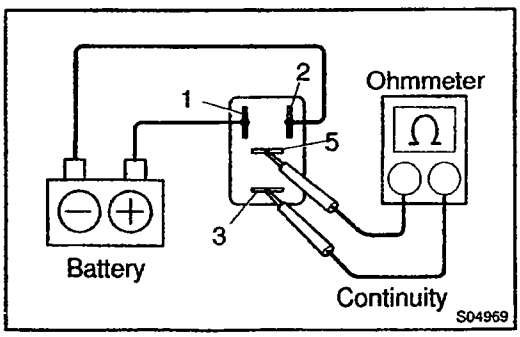


(c) Inspect the No. 3 cooling fan relay continuity.
  (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

  (2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(d) Inspect the No. 3 cooling fan relay operation.
  (1) Apply battery positive voltage across terminals 1 and 2.
  (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

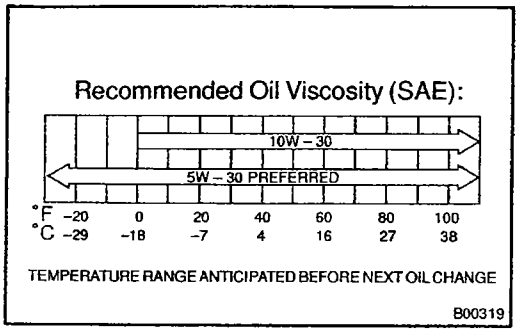
If there is no continuity, replace the relay.

(e) Reinstall the No. 3 cooling fan relay.
(f) Reinstall the relay box cover.

LUBRICATION

OIL AND FILTER LU–1
OIL PUMP LU–5
OIL NOZZLE (2ZZ–GE) LU–14

LU



OIL AND FILTER

INSPECTION

LU0N-01

1. CHECK ENGINE OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is visibly poor, replace the oil.

Oil grade:

API grade or SJ, Energy–Conserving or ILSAC multi-grade engine oil is recommended. SAE 5W–30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.

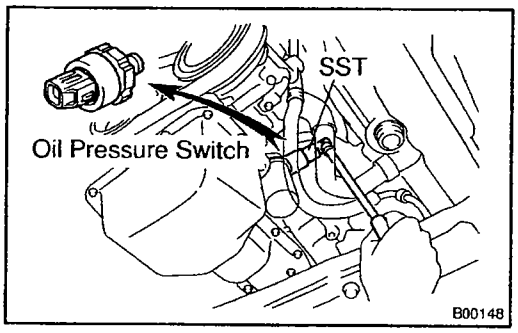
2. CHECK ENGINE OIL LEVEL

After warming up the engine and then 5 minutes after the engine stop, oil level should be between the "L" and "F" marks on the dipstick.

If low. check for leakage and add oil up to the "F" mark.

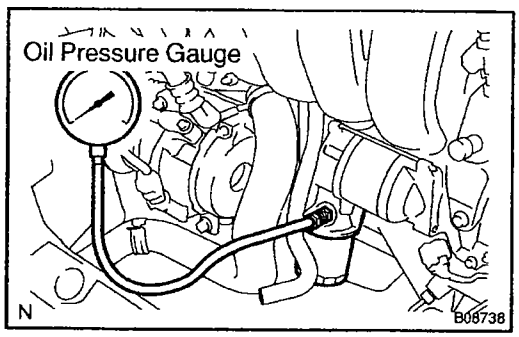
NOTICE:

Do not fill with engine oil above the "F" mark.



3. REMOVE OIL PRESSURE SWITCH, AND INSTALL OIL PRESSURE GAUGE

(a) Using SST, remove the oil pressure switch.
SST 09816–30010



(b) Install the oil pressure gauge.

4. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

5. CHECK OIL PRESSURE

Oil pressure:

At idle speed

1ZZ–FE 29 kPa (0.3 kgf/cm^2, 4.3 psi) or more

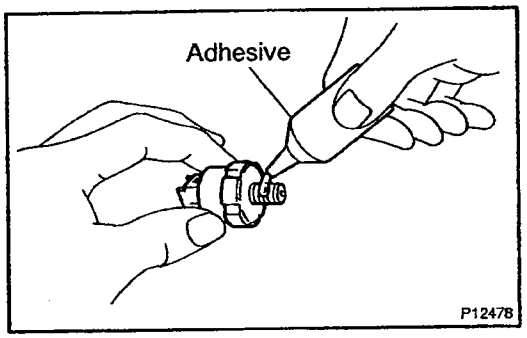
2ZZ–GE 39.2 kPa (0.4 kgf/cm^2, 5.7 psi) or more

At 3,000 rpm

294 – 539 kPa (3.0 – 5.5 kgf/cm^2, 43 – 78 psi)

6. REMOVE OIL PRESSURE GAUGE AND REINSTALL OIL PRESSURE SWITCH

(a) Remove the oil pressure gauge.



(b) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Using SST, install the oil pressure switch.
SST 09816–30010
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

7. START ENGINE AND CHECK FOR LEAKS

LU02L-02

REPLACEMENT

CAUTION:

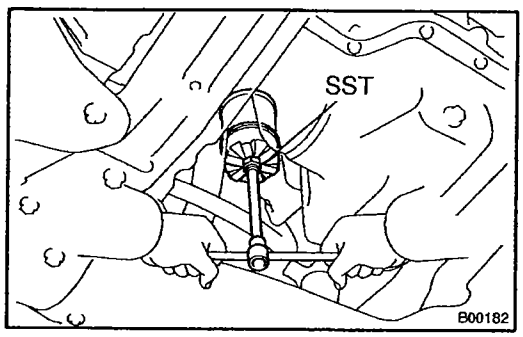
- **Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- **Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use water–less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.**
- **In order to preserve the environment, used oil and used oil filter must be disposed of only at designated disposal sites.**

1. REMOVE CENTER ENGIEN UNDER COVER

2. DRAIN ENGINE OIL

(a) Remove the oil filter cap.

(b) Remove the oil drain plug, and drain the oil into a container.



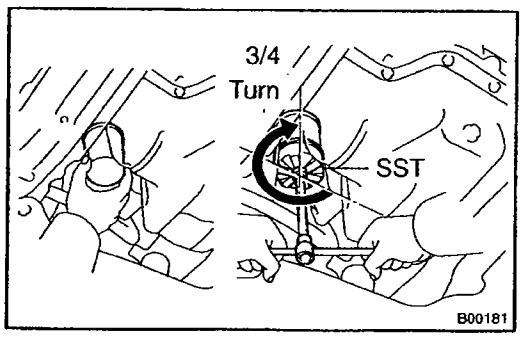
3. REPLACE OIL FILTER

(a) Using SST, remove the oil filter.
SST 09228–06501

(b) Check and clean the oil filter installation surface.

(c) Check the part number of the new oil filter is as same as old one.

(d) Apply clean engine oil to the gasket of a new oil filter.



(e) Lightly screw the oil filter into place, and tighten it until the gasket contacts the seat.

(f) Using SST, tighten it an additional 3/4 turn.
SST 09228–06501

4. REFILL WITH ENGINE OIL

(a) Clean and install the oil drain plug with a new gasket.
Torque: 37 N·m (378 kgf·cm, 27 ft·lbf)

(b) Fill with fresh engine oil.

Capacity
1ZZ–FE
Drain and refill:
w/ Oil filter change: 3.7 liters (3.9 US qts, 3.3 Imp. qts)
w/o Oil filter change: 3.5 liters (3.7 US qts, 3.1 Imp. qts)
Dry fill: 4.1 liters (4.3 US qts, 3.6 Imp. qts)
2ZZ–GE
w/ Oil filter change: 4.4 liters (4.8 US qts, 4.0 Imp. qts)
w/o Oil filter change: 4.2 liters (4.6 US qts, 3.8 Imp. qts)
Dry fill: 5.2 liters (5.5 US qts, 4.6 Imp. ats)

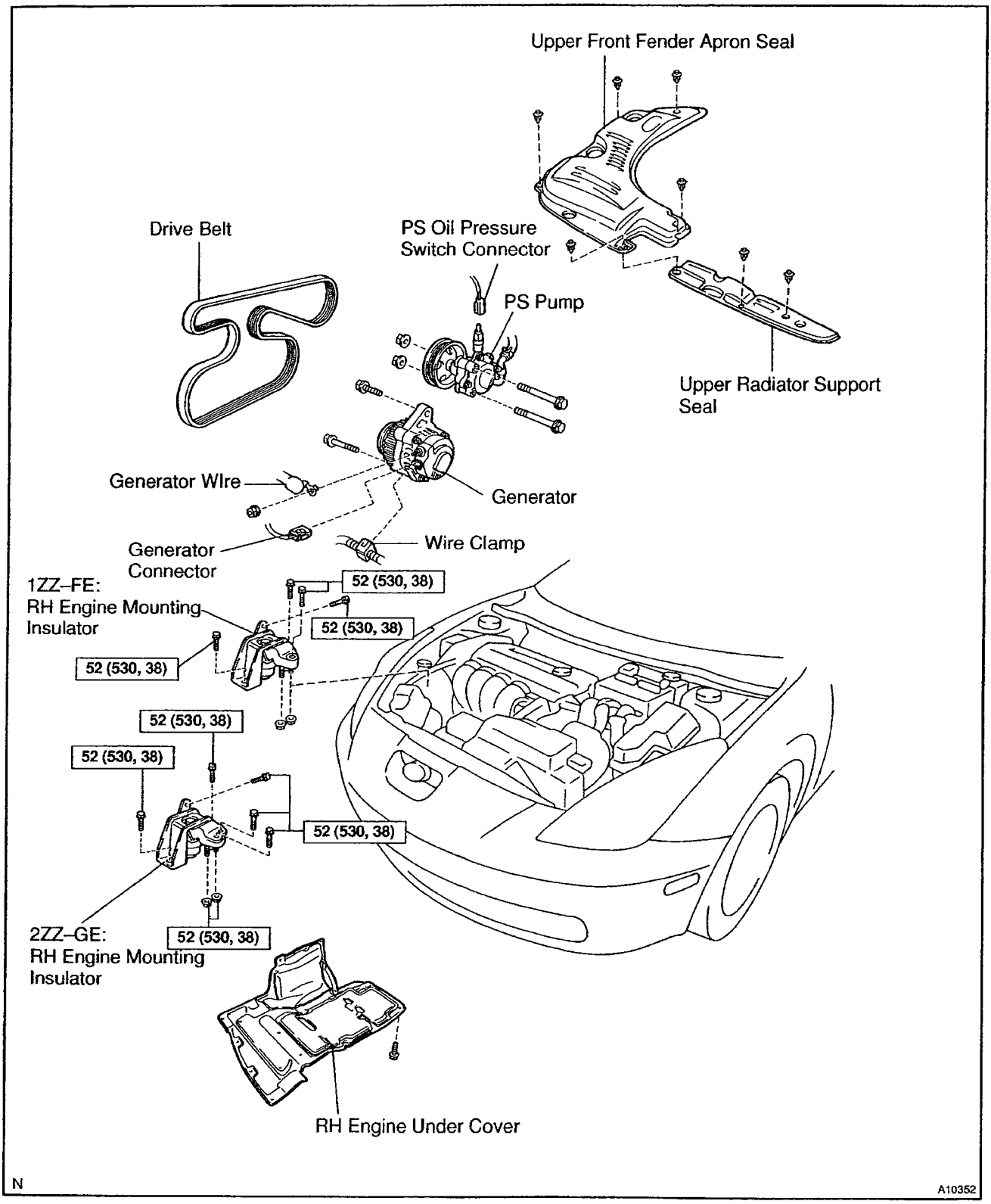
(c) Install the oil filter cap.

5. **START ENGINE AND CHECK FOR OIL LEAKS**
6. **INSTALL CENTER ENGINE UNDER COVER**
7. **RECHECK ENGINE OIL LEVEL**

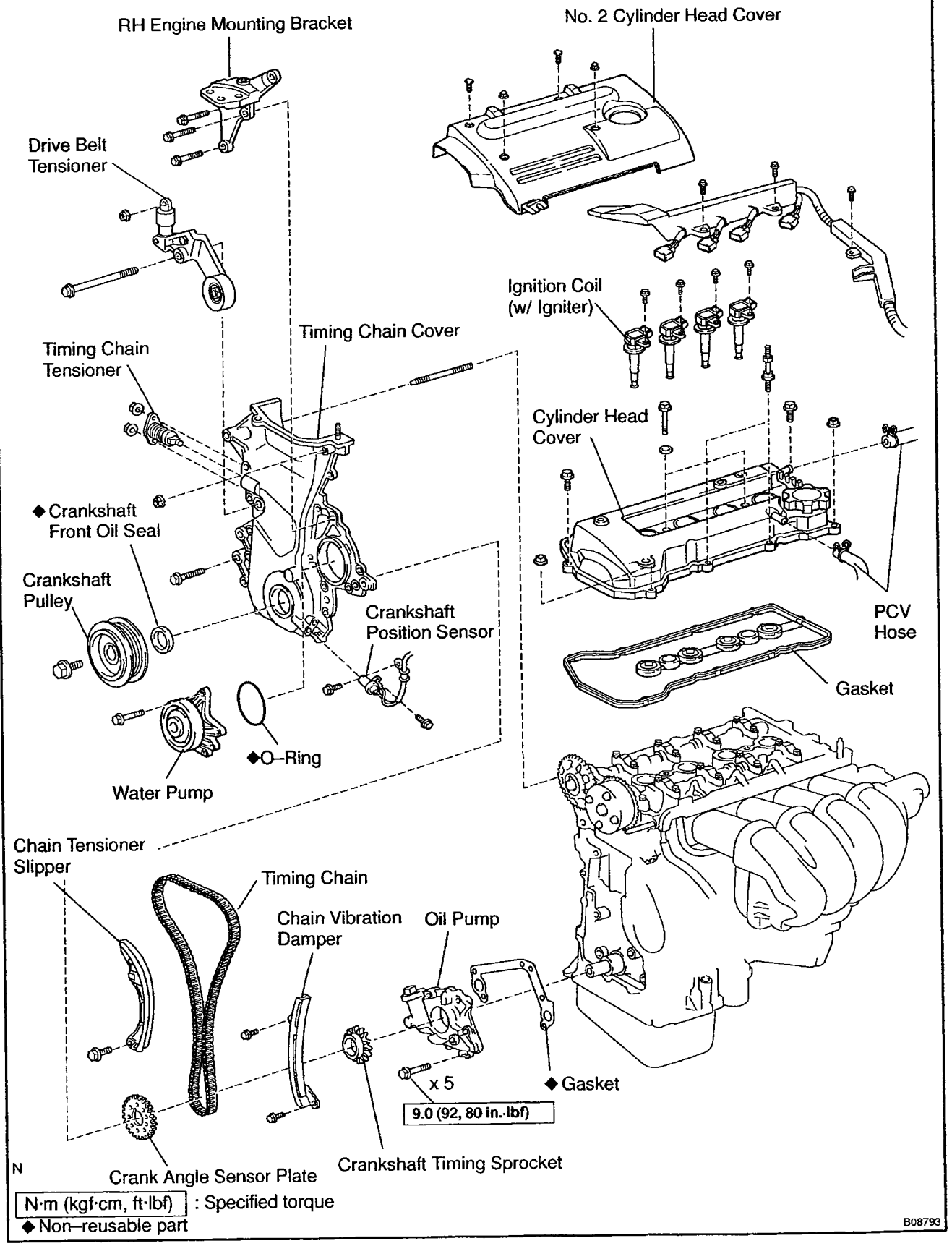
OIL PUMP

COMPONENTS

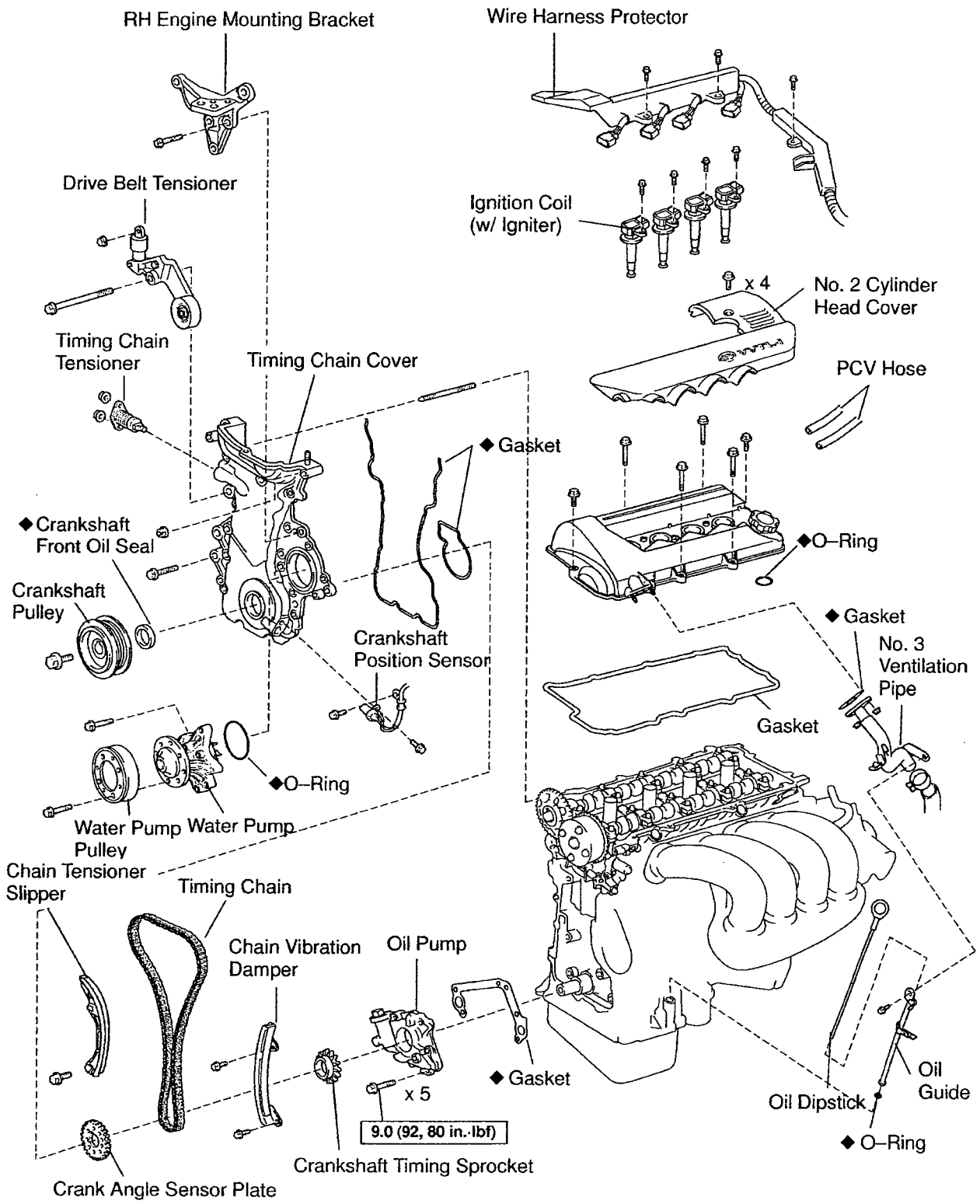
LU0IG-01

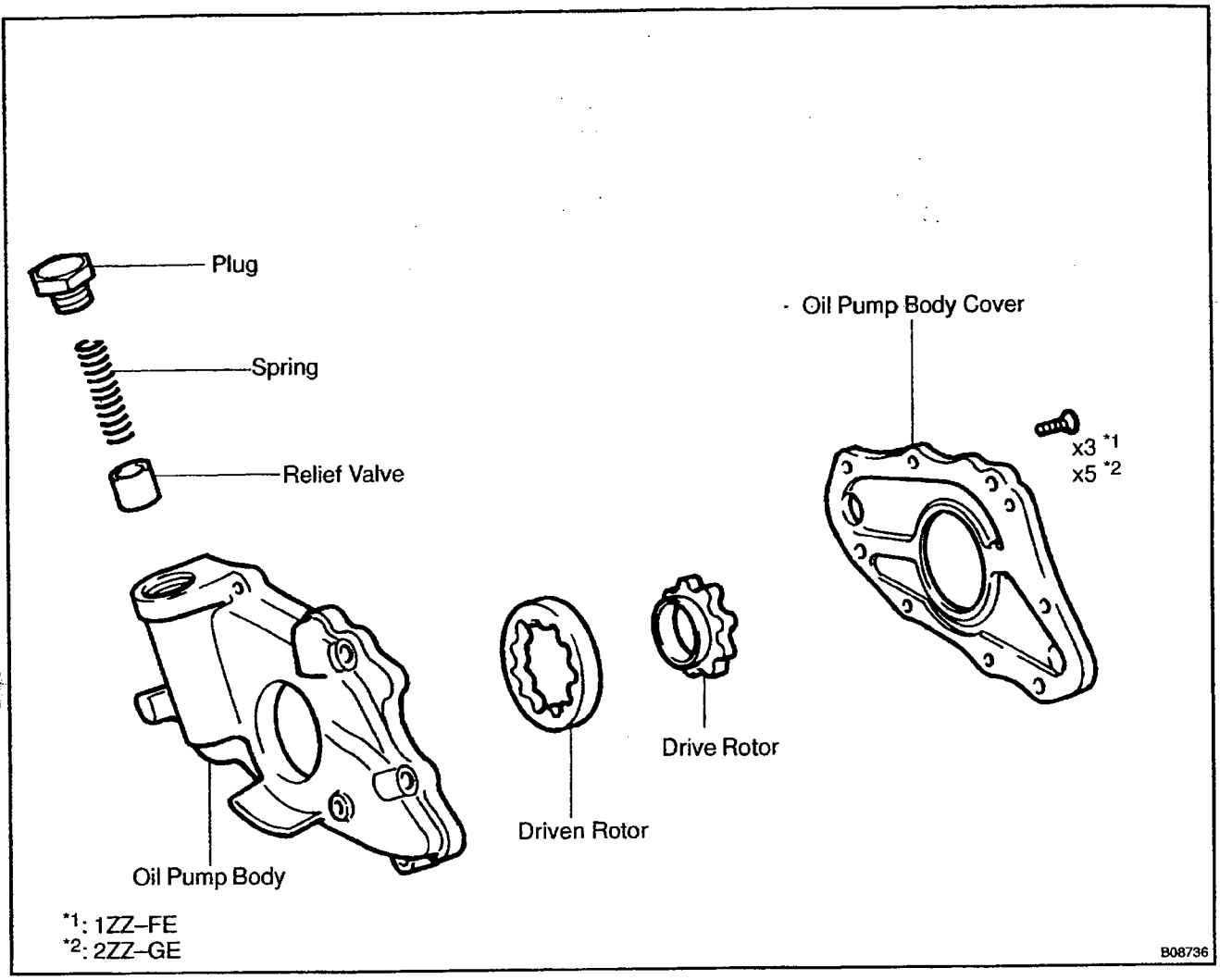


1ZZ–FE:


RH Engine Mounting Bracket
No. 2 Cylinder Head Cover
Drive Belt Tensioner
Ignition Coil (w/ Igniter)
Timing Chain Cover
Timing Chain Tensioner
Cylinder Head Cover
◆Crankshaft Front Oil Seal
Crankshaft Pulley
Crankshaft Position Sensor
PCV Hose
Gasket
◆O–Ring
Water Pump
Chain Tensioner Slipper
Timing Chain
Chain Vibration Damper
Oil Pump
x 5
◆Gasket
9.0 (92, 80 in.·lbf)
Crank Angle Sensor Plate
Crankshaft Timing Sprocket
N
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
B08793

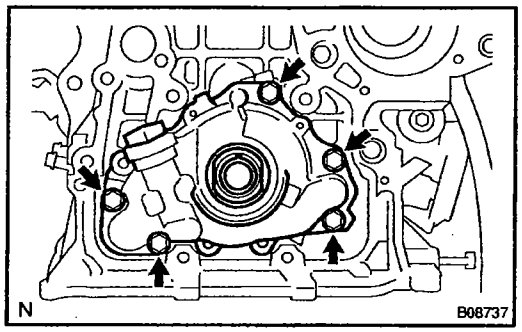
2ZZ–GE:


RH Engine Mounting Bracket
Wire Harness Protector
Drive Belt Tensioner
Ignition Coil
(w/ Igniter)
x 4
No. 2 Cylinder
Head Cover
Timing Chain
Tensioner
Timing Chain Cover
PCV Hose
◆Gasket
◆Crankshaft
Front Oil Seal
◆O–Ring
Crankshaft
Pulley
◆Gasket
No. 3
Ventilation
Pipe
Crankshaft
Position Sensor
Gasket
◆O–Ring
Water Pump
Pulley
Water Pump
Chain Tensioner
Slipper
Timing Chain
Chain Vibration
Damper
Oil Pump
◆Gasket
x 5
9.0 (92, 80 in.·lbf)
Oil Dipstick
Oil
Guide
◆O–Ring
Crankshaft Timing Sprocket
Crank Angle Sensor Plate
N
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
B08794


Plug
Spring
Relief Valve
Oil Pump Body Cover
x3 *1
x5 *2
Drive Rotor
Driven Rotor
Oil Pump Body
*1: 1ZZ–FE
*2: 2ZZ–GE
B08736

LU

LU02N-02



REMOVAL

1. **DRAIN ENGINE OIL**
2. **REMOVE TIMING CHAIN AND CRANKSHAFT TIMING SPROCKET (See pages EM–18)**
3. **REMOVE OIL PUMP**

Remove the 5 bolts, oil pump and gasket.

LU020-02

DISASSEMBLY

1. REMOVE RELIEF VALVE

Remove the plug, spring and relief valve.

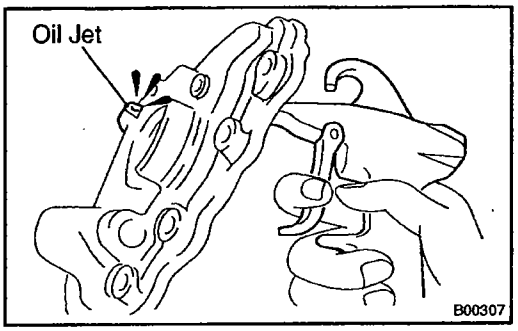
2. REMOVE DRIVE AND DRIVEN ROTORS

(a) 1ZZ–FE:
Remove the 3 screws, pump body cover, drive and driven rotors.

(b) 2ZZ–GE:
Remove the 5 screws, pump body cover, drive and driven rotors.

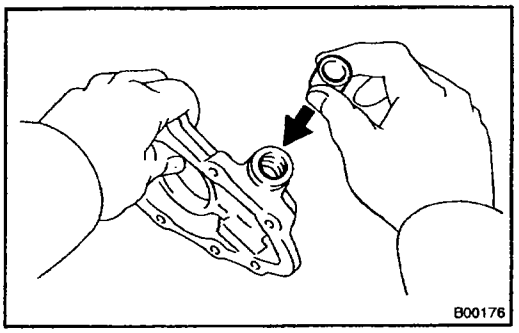
LU02P–02

INSPECTION



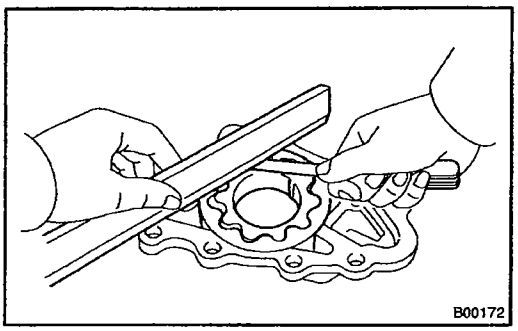
1. INSPECT OIL JET

Check the oil jet for damage or clogging.
If necessary, replace the oil pump assembly.



2. INSPECT RELIEF VALVE

Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.
If it does not, replace the relief valve. If necessary, replace the oil pump assembly.

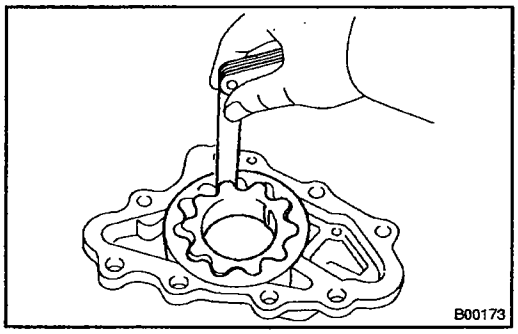


3. INSPECT ROTOR SIDE CLEARANCE

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:
0.030 – 0.080 mm (0.0012 – 0.0031 in.)
Maximum side clearance:
0.16 mm (0.0062 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

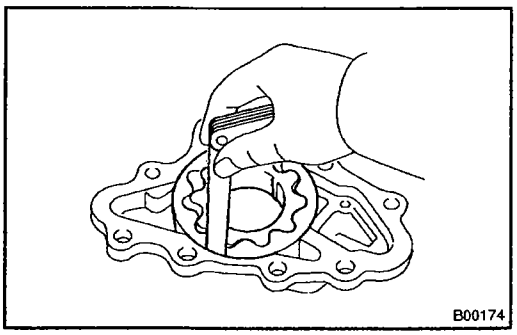


4. INSPECT ROTOR TIP CLEARANCE

Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Standard tip clearance:
0.060 – 0.180 mm (0.0024 – 0.0071 in.)
Maximum tip clearance:
0.35 mm (0.0138 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.



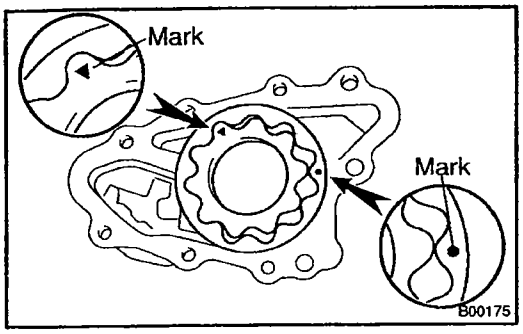
5. INSPECT ROTOR BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven rotor and body.

Standard body clearance:
0.125 – 0.180 mm (0.00492 – 0.00709 in.)
Maximum body clearance:
0.325 mm (0.01280 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

LU03Q-02



REASSEMBLY

1. INSTALL DRIVE AND DRIVEN ROTORS

(a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.

(b) 1ZZ–FE:
Install the pump body cover with the 3 screws.
Torque: 10.5 N·m (107 kgf·cm, 8 ft·lbf)

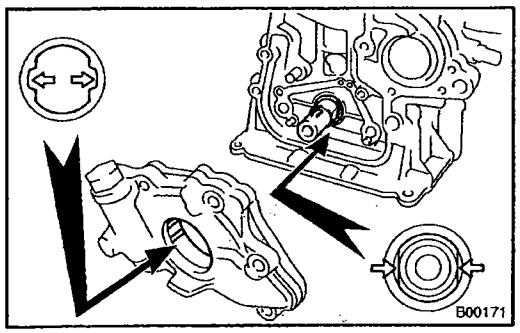
(c) 2ZZ–GE:
Install the pump body cover with the 5 screws.
Torque: 10.5 N·m (107 kgf·cm, 8 ft·lbf)

2. INSTALL RELIEF VALVE

Insert the relief valve and spring into the pump body hole, and install the plug.

Torque:
1ZZ–FE: 37 N·m (375 kgf·cm, 27 ft·lbf)
2ZZ–GE: 49 N·m (500 kgf·cm, 36 ft·lbf)

LU02R-02



INSTALLATION

1. **INSTALL OIL PUMP**

(a) Place a new gasket on the cylinder block.

(b) Engage the spline teeth of the oil pump drive rotor with the large teeth of the crankshaft, and slide the oil pump.

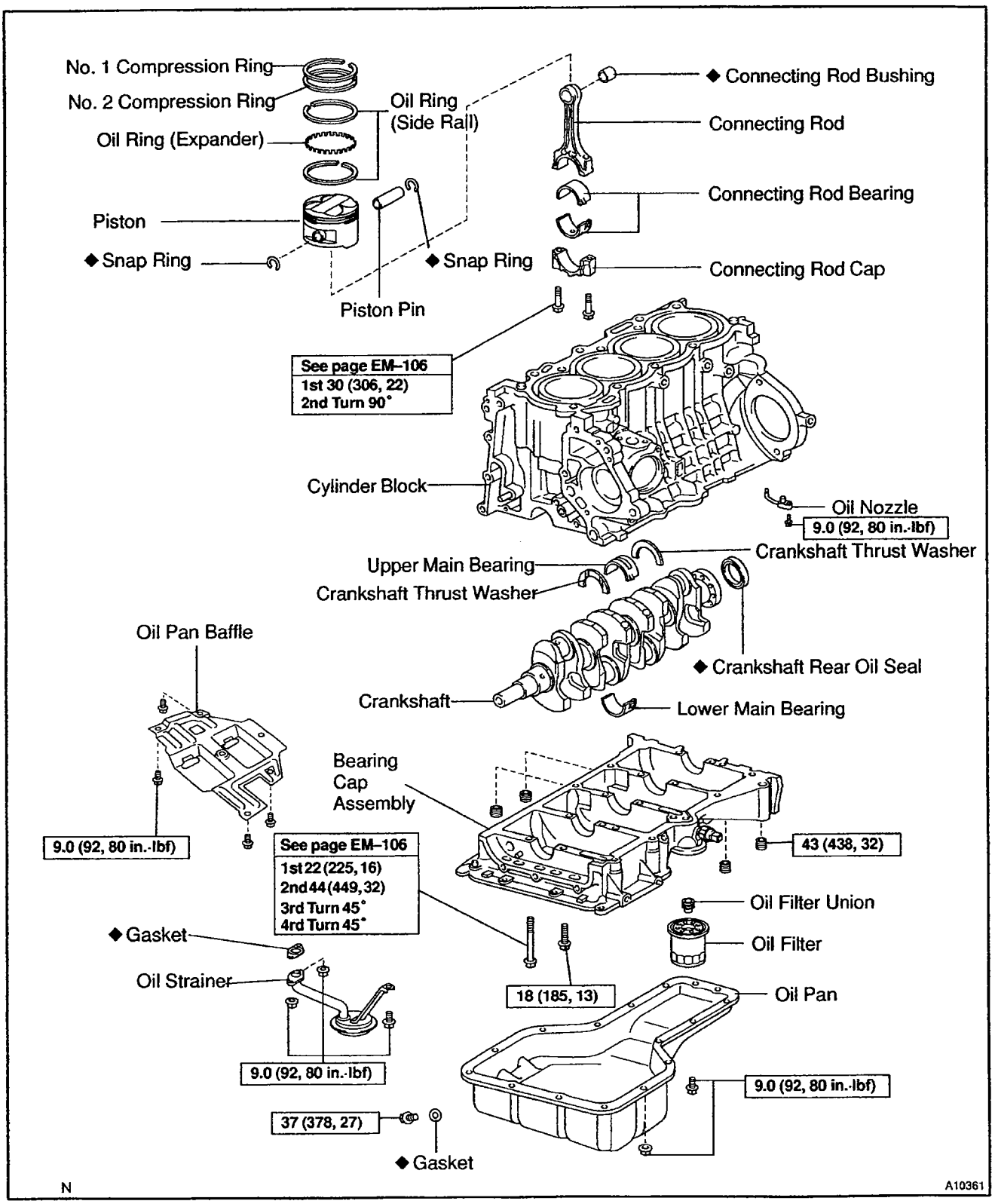
(c) Install the oil pump with the 5 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

2. **INSTALL CRANKSHAFT TIMING SPROCKET AND TIMING CHAIN (See pages EM–25)**
3. **FILL ENGINE WITH OIL**
4. **START ENGINE AND CHECK FOR LEAKS**
5. **RECHECK ENGINE OIL LEVEL**

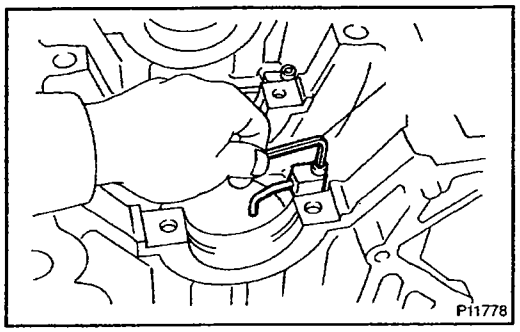
OIL NOZZLE (2ZZ–GE)

COMPONENTS

LU0RH-01



LU0XD–01

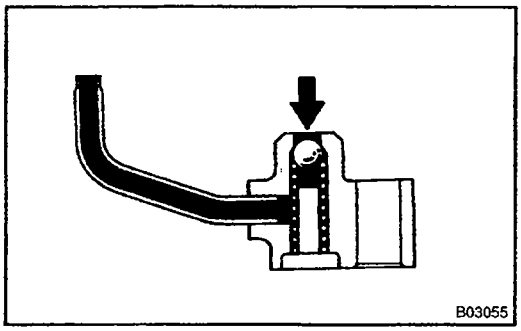


REMOVAL

1. **REMOVE CRANKSHAFT (See page EM–89)**
2. **REMOVE OIL NOZZLE (WITH RELIEF VALVE)**

Using a 5 mm hexagon wrench, remove the bolt and oil nozzle.

LU01E–01

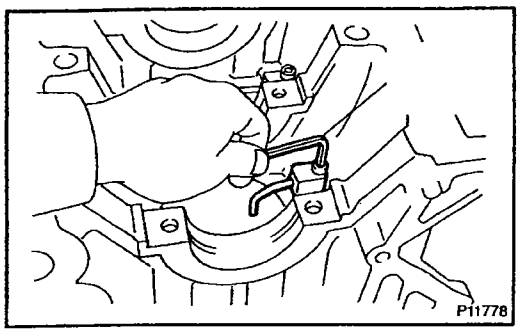


INSPECTION

INSPECT RELIEF VALVE (OIL NOZZLE)

Push the valve with a wooden stick to check if it is stuck.
If stuck, replace the relief valve.

LU01F–01



INSTALLATION

1. INSTALL OIL NOZZLE (WITH RELIEF VALVE)

Using a 5 mm hexagon wrench, install the oil nozzle with the bolt.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

2. INSTALL CRANKSHAFT (See page EM–106)

– MEMO –

IGNITION

IGNITION SYSTEM IG–1
IGNITION COIL IG–5
CAMSHAFT POSITION SENSOR IG–8
CRANKSHAFT POSITION SENSOR IG–11

IG

IGNITION SYSTEM

IG0FA-01

ON–VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the coils themselves. "Cold" is from –10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

1. INSPECT IGNITION COIL (WITH IGNITER) AND SPARK TEST

Check that the spark occurs.

(1) Remove the ignition coils (with igniter).
(See page IG–6)

(2) Using a 16 mm (0.63 in.) plug wrench, remove the spark plugs.

(3) Install the spark plugs to each ignition coils (with igniter), and connect the ignition coil connectors.

(4) Disconnect the 4 injector connectors.

(5) Ground the spark plugs.

(6) Check if spark occurs while engine is being cranked.

NOTICE:

To prevent gasoline from being injected from injectors during this test, crank the engine for no more than 5 – 10 seconds at time.

If the spark does not occur, do the test as follows:

SPARK TEST

↓ NO

CHECK CONNECTION OF IGNITION COIL CONNECTOR → BAD → Connect securely.

↓ OK

CHANGE IT TO NORMAL IGNITION COIL (WITH IGNITER) AND PERFORM SPARK TEST AGAIN → OK → Replace the ignition coil (with igniter).

↓ NO

CHECK POWER SUPPLY TO IGNITION COIL (WITH IGNITER)
1. Turn ignition switch to ON.
2. Check that there is battery voltage at ignition coil positive (+) terminal.

→ BAD → Check wiring between ignition switch to ignition coil (with igniter).

↓ OK

CHECK RESISTANCE OF CAMSHAFT POSITION SENSOR (See step 3)

	Cold	Hot
Resistance:	835 – 1,400 Ω	1,060 – 1,645 Ω

→ BAD → Replace the camshaft position sensor.

↓ OK

CHECK RESISTANCE OF CRANKSHAFT POSITION SENSOR (See step 4)

	Cold	Hot
Resistance:	1,630 – 2,740 Ω	2,065 – 3,225 Ω

→ BAD → Replace the crankshaft position sensor.

↓ OK

CHECK IGT SIGNAL FROM ECU (See page DI–114) → BAD → Check wiring between ECU and ignition coil (with igniter), and then try another ECU.

↓ OK

TRY ANOTHER IGNITION COIL (WITH IGNITER)

IG

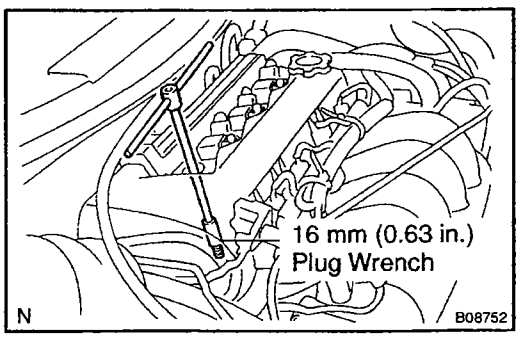
(7) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

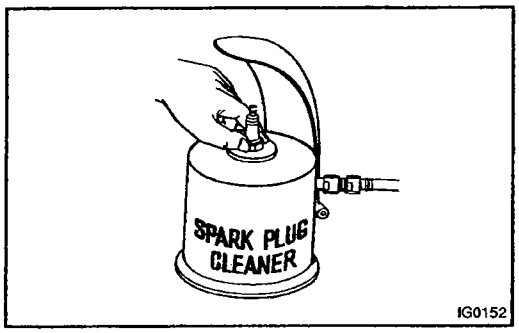
(8) Install the ignition coils (with igniter). (See page IG–7)

2. INSPECT SPARK PLUGS

(a) Remove the ignition coils (with igniter). (See page IG–6)



(b) Using a 16 mm (0.63 in.) plug wrench, remove the spark plugs.



(c) Clean the spark plugs.

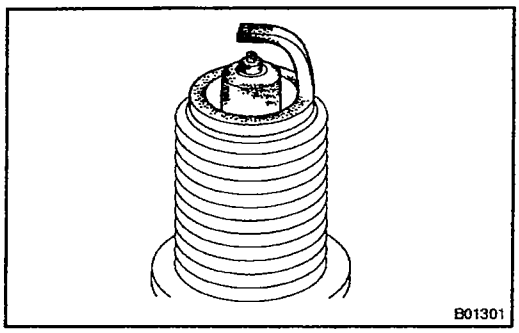
If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

Air pressure: Below 588 kPa (6 kgf/cm^2, 85 psi)

Duration: 20 seconds or less

HINT:

If there are traces of oil, remove it with gasoline before using the spark plug cleaner.



(d) Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

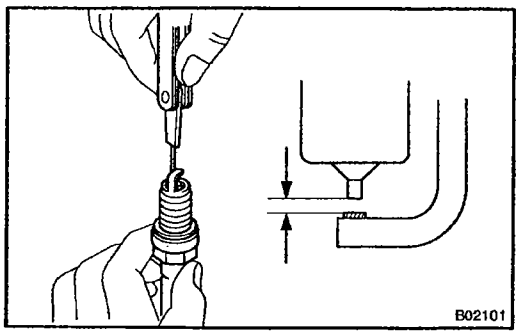
1ZZ–FE:

DENSO made	SK16R11
NGK made	IFR5A11

2ZZ–GE:

DENSO made	SK20R11
NGK made	IFR6A11

IG



(e) Adjust electrode gap.

Carefully bend the outer electrode to obtain the correct electrode gap.

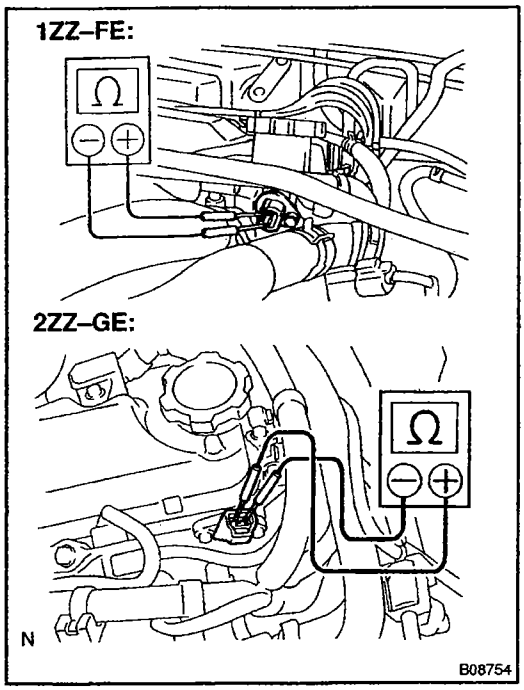
Electrode gap: 1.1 mm (0.043 in.)

(f) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

(g) Install the ignition coils (with igniter).

(See page IG–7)



3. INSPECT CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	835 – 1,400 Ω
Hot	1,060 – 1,645 Ω

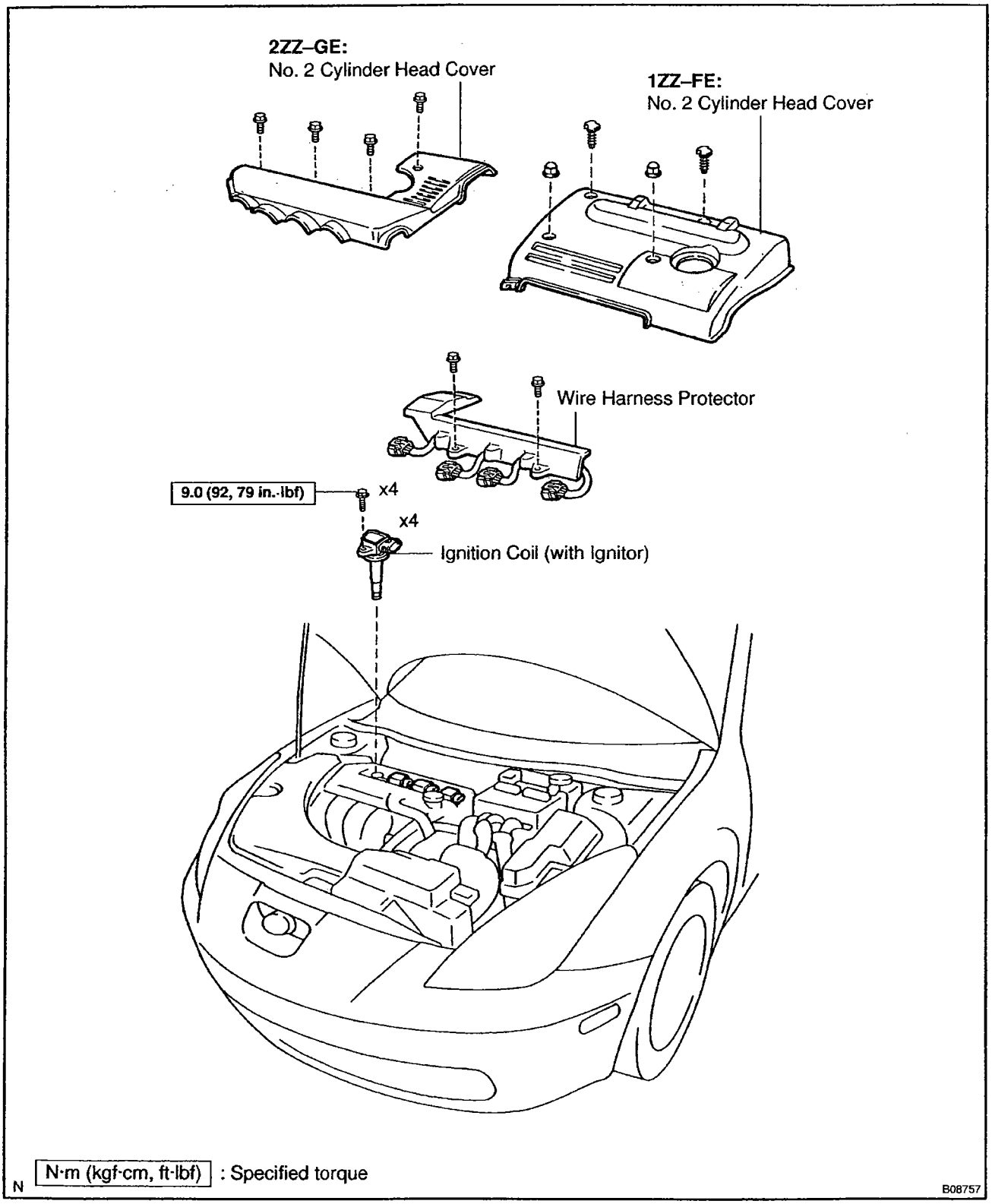
If the resistance is not as specified, replace the camshaft position sensor.

(c) Connect the camshaft position sensor connector.

IGNITION COIL

COMPONENTS

IG0BO-03

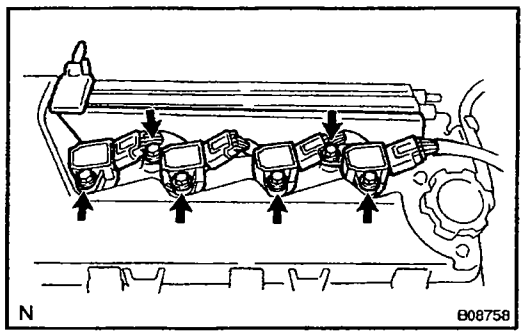


IG

IG0EP-03

REMOVAL

1. REMOVE NO. 2 CYLINDER HEAD COVER



2. REMOVE IGNITION COILS (WITH IGNITER) FROM SPARK PLUGS

(a) Remove the 2 bolts and disconnect the wire harness protector.

(b) Disconnect the 4 ignition coil connectors.

(c) Remove the 4 bolts and pull out the 4 ignition coils (with igniter).

Torque: 9.0 N·m (92 kgf·cm, 79 in.·lbf)

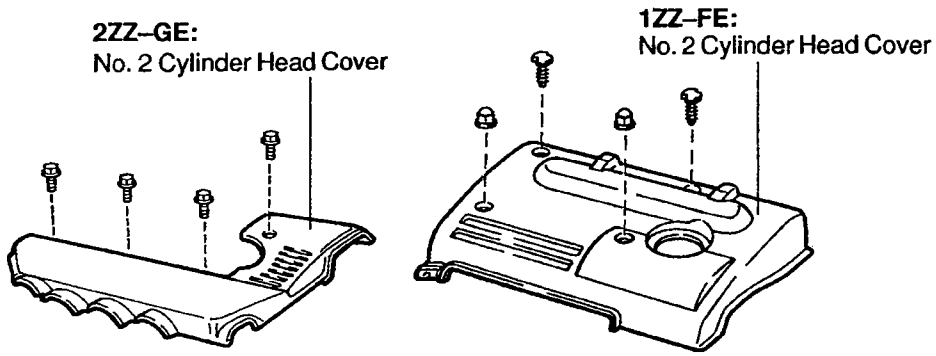
INSTALLATION

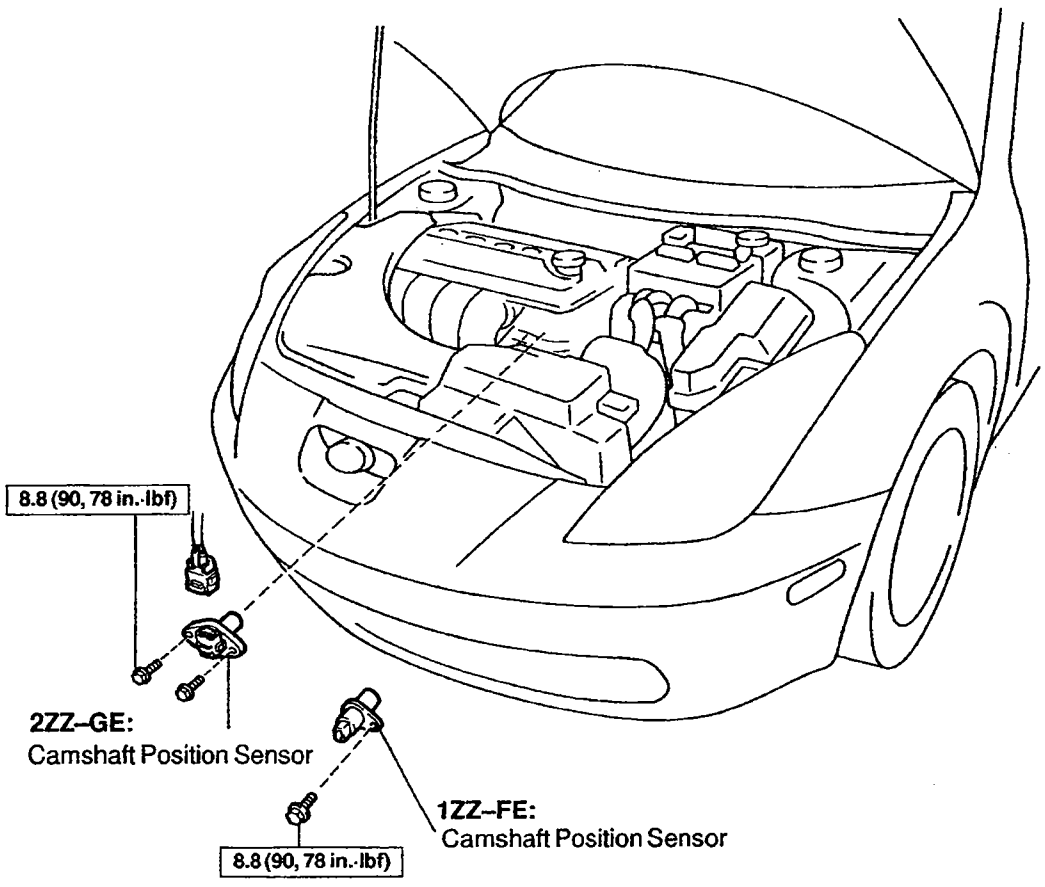
Installation is in the reverse order of removal (See page IG–6).

CAMSHAFT POSITION SENSOR

IG08R-03

COMPONENTS





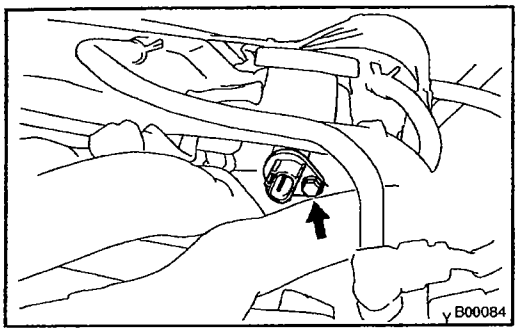
N·m (kgf·cm, ft·lbf) : Specified torque

N

B08759

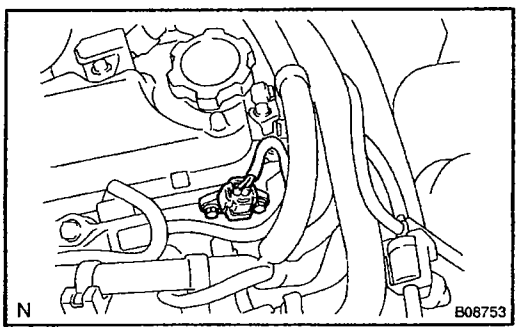
REMOVAL

1. REMOVE NO. 2 CYLINDER HEAD COVER



2. 1ZZ–FE:
REMOVE CAMSHAFT POSITION SENSOR

(a) Disconnect the connector.
(b) Remove the bolt and camshaft position sensor.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)



3. 2ZZ–GE:
REMOVE CAMSHAFT POSITION SENSOR

(a) Disconnect the connector.
(b) Remove the 2 bolts and camshaft position sensor.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

IG

IG0EQ-01

INSTALLATION

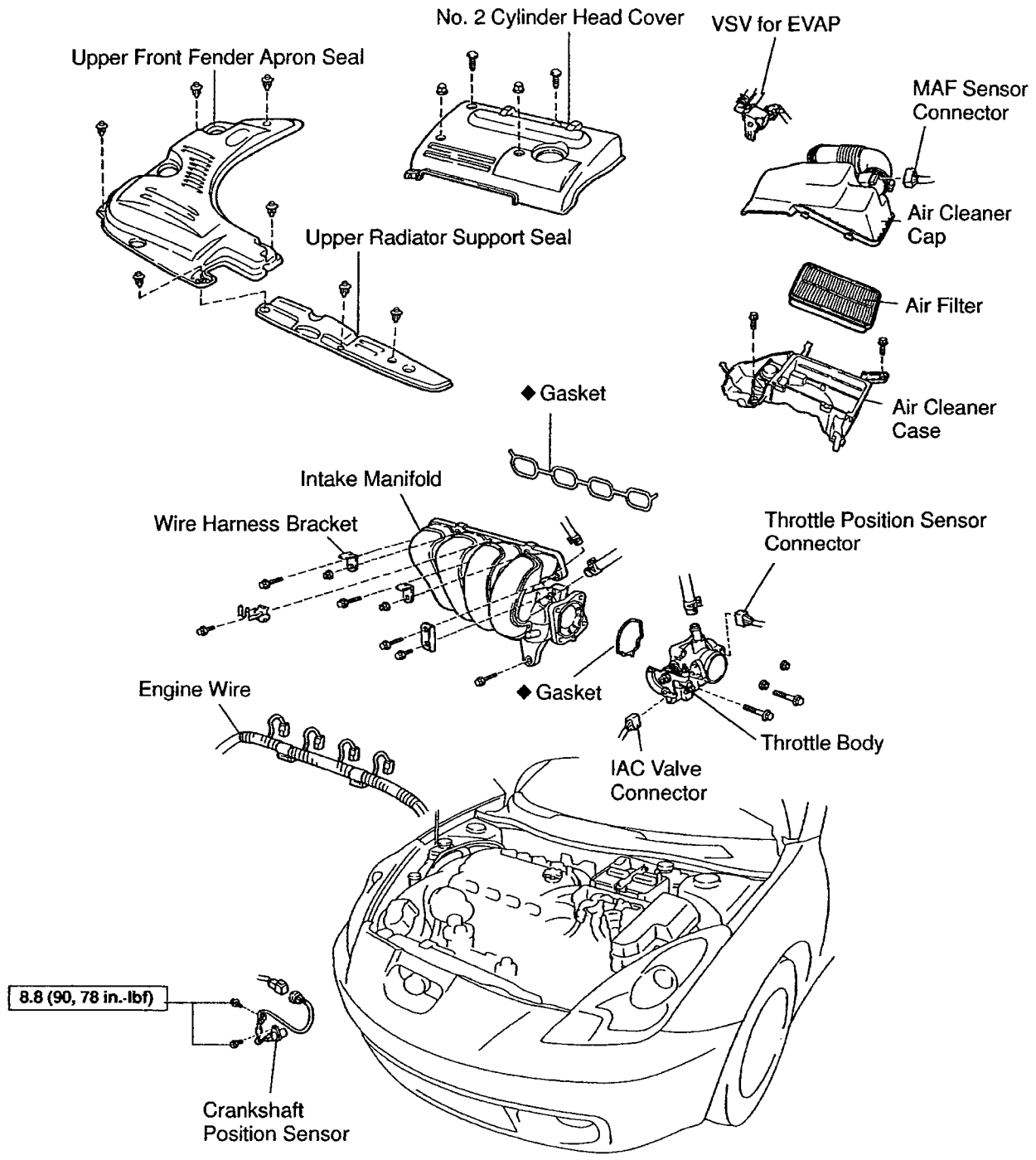
Installation is in the reverse order of removal (See page IG–9).

CRANKSHAFT POSITION SENSOR

COMPONENTS

IG0F9–01

1ZZ–FE:

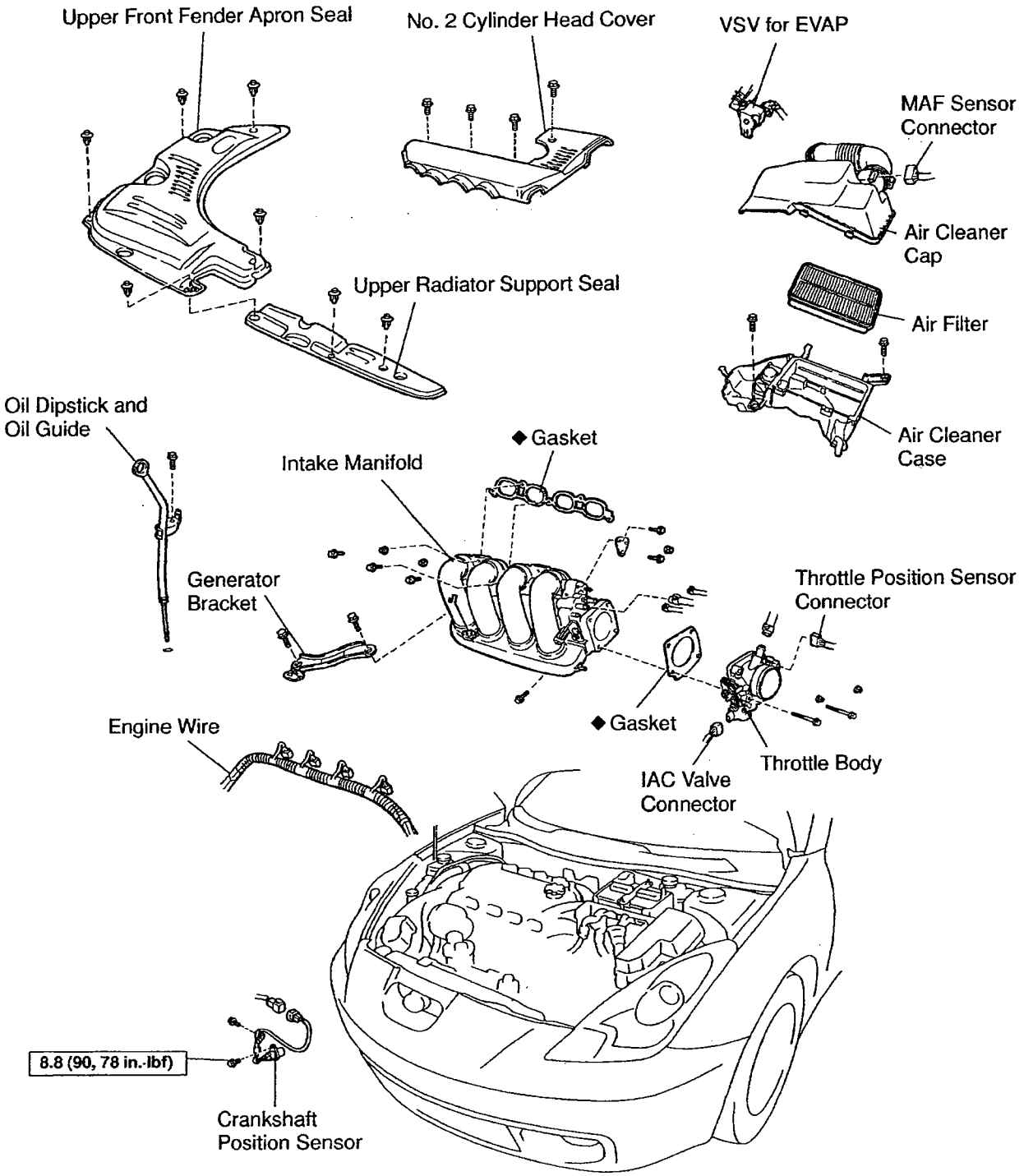


N·m (kgf·cm, ft·lbf) : Specified torque

N ◆ Non–reusable part

B08804

2ZZ–GE:



N

N·m (kgf·cm, ft·lbf) : Specified torque

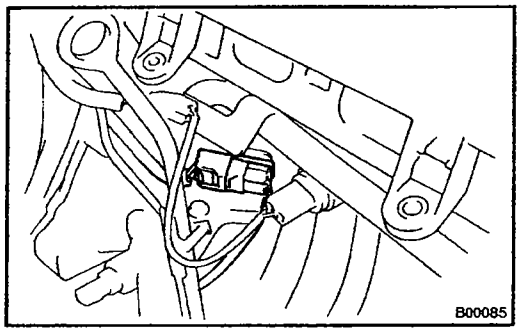
◆ Non–reusable part

B09366

IG0F7-01

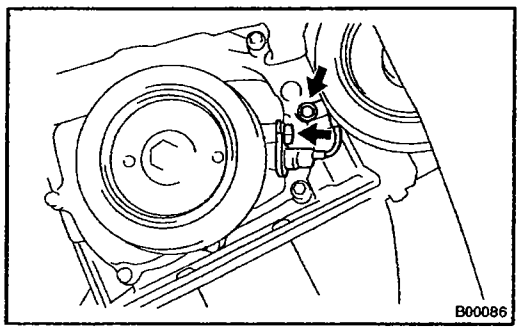
REMOVAL

1. **REMOVE INTAKE MANIFOLD (See page EM–42)**
2. **REMOVE ENGINE UNDER COVER RH**



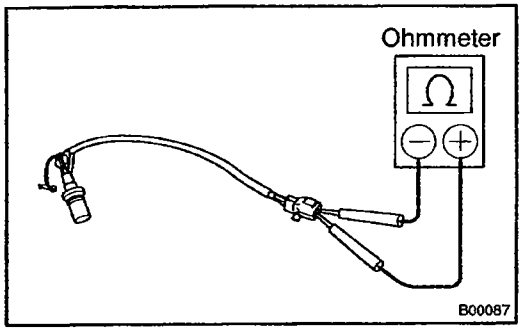
3. **REMOVE CRANKSHAFT POSITION SENSOR**

(a) Disconnect the crankshaft position sensor connector.



(b) Remove the 2 bolt and crankshaft position sensor.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

IG0F8-01



INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the sensor itself. "Cold" is from –10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

INSPECT CRANKSHAFT POSITION SENSOR RESISTANCE

Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold: 1,630 – 2,740 Ω

Hot: 2,065 – 3,225 Ω

If the resistance is not as specified, replace the crankshaft position sensor.

IG0BW–03

INSTALLATION

Installation is in the reverse order of removal (See page IG–13).

– MEMO –

STARTING

STARTING SYSTEM ST–1
STARTER ST–2
STARTER RELAY ST–17

ST

STARTING SYSTEM

ON–VEHICLE INSPECTION

ST02L–01

NOTICE:

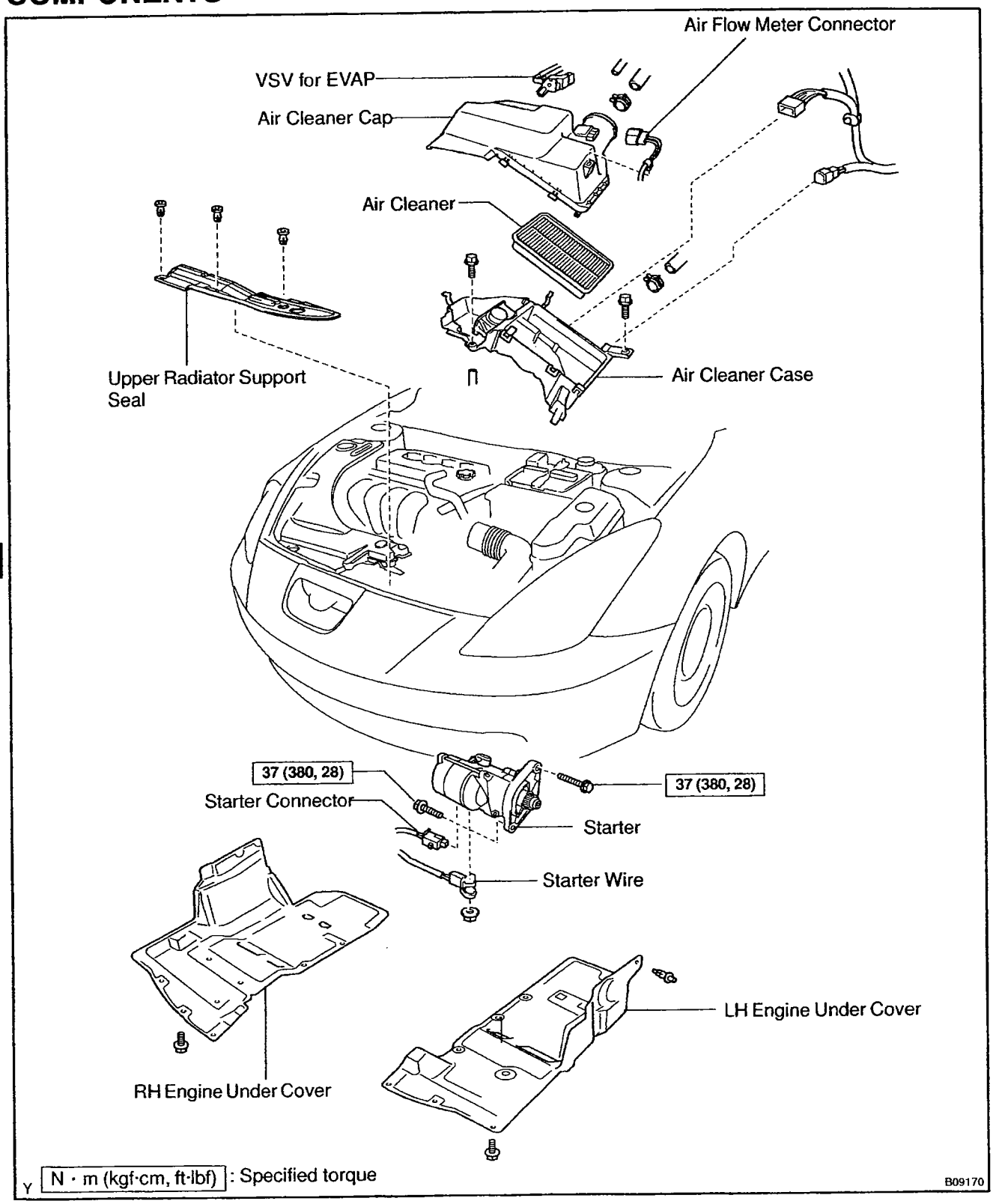
Before changing the starter, check these items again:

- **Connector connection**
- **Accessory installation, e.g.:theft deterrent system**

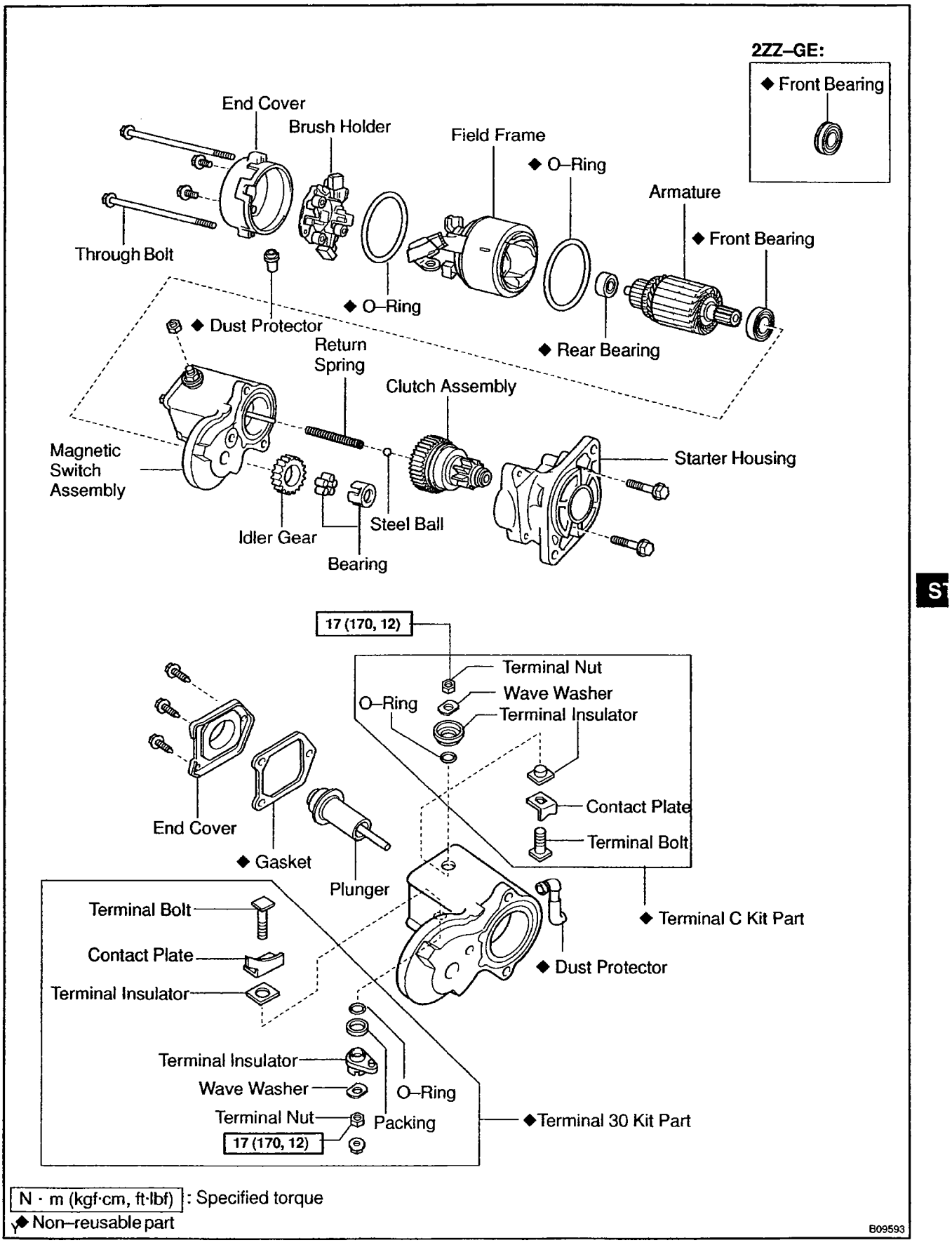
STARTER

COMPONENTS

ST02M-03



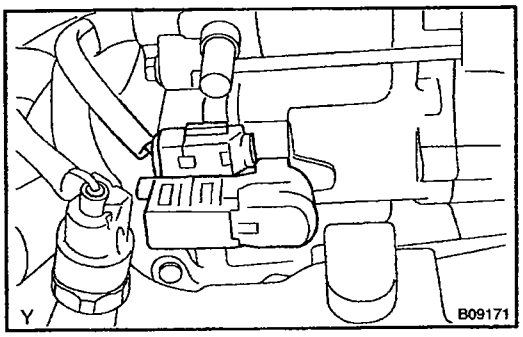
ST


2ZZ–GE:
◆ Front Bearing
End Cover
Brush Holder
Field Frame
◆ O–Ring
Armature
◆ Front Bearing
Through Bolt
◆ O–Ring
◆ Dust Protector
Return Spring
Clutch Assembly
◆ Rear Bearing
Magnetic Switch Assembly
Starter Housing
Idler Gear
Steel Ball
Bearing
17 (170, 12)
Terminal Nut
Wave Washer
O–Ring
Terminal Insulator
Contact Plate
Terminal Bolt
End Cover
◆ Gasket
Plunger
◆ Terminal C Kit Part
◆ Dust Protector
Terminal Bolt
Contact Plate
Terminal Insulator
Terminal Insulator
Wave Washer
O–Ring
Terminal Nut
Packing
17 (170, 12)
◆ Terminal 30 Kit Part
N · m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
B09593

ST0HO-01

REMOVAL

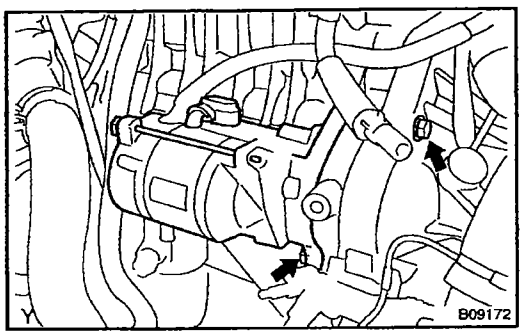
1. **REMOVE UPPER RADIATOR SUPPORT SEAL**
2. **REMOVE AIR CLEANER ASSEMBLY**
   (See page EM–74)
3. **REMOVE RH AND LH ENGINE UNDER COVER**



4. **REMOVE STARTER**

(a) Disconnect the starter connector.

(b) Remove the nut, and disconnect the starter wire.



(c) Remove the 2 bolts and starter.

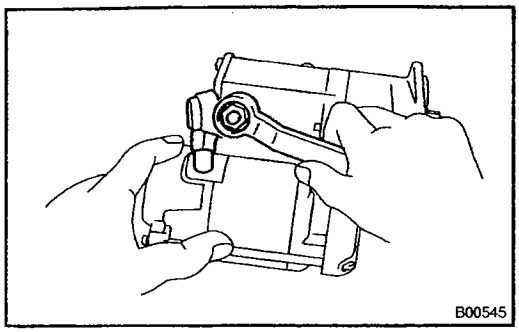
ST

ST0HP-01

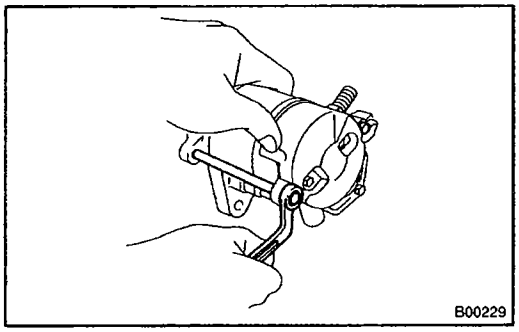
DISASSEMBLY

1. REMOVE FIELD FRAME WITH ARMATURE FROM MAGNETIC SWITCH ASSEMBLY

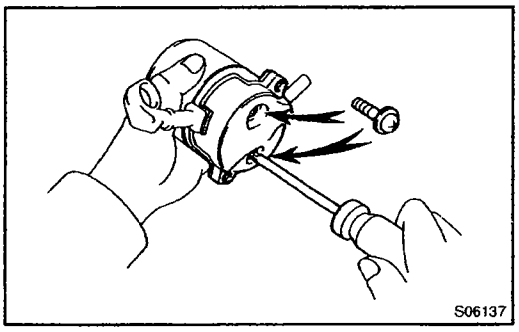
(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.



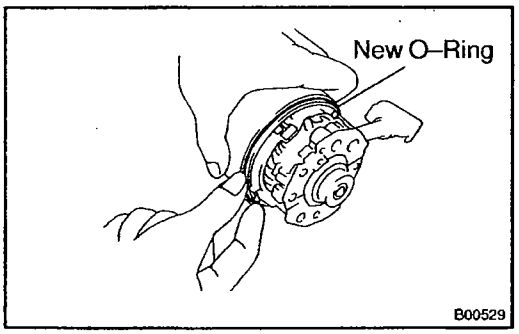
(b) Remove the 2 through bolts.



(c) Remove the 2 screws and end cover from the field frame.



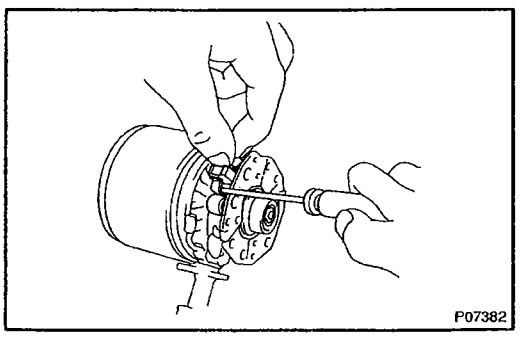
(d) Remove the O–ring from the field frame.



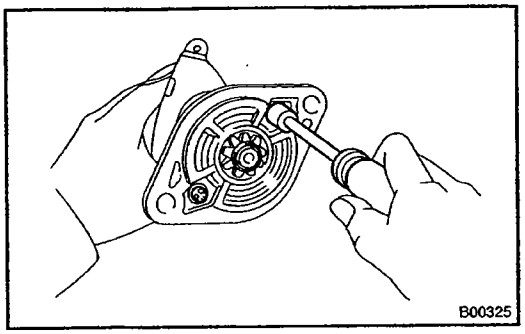
(e) Using a screwdriver, hold the spring tank back and disconnect the brush from the brush holder. Disconnect the 4 brushes and remove the brush holder.

(f) Pull out the field frame from the magnetic switch assembly.

(g) Remove the O–ring.

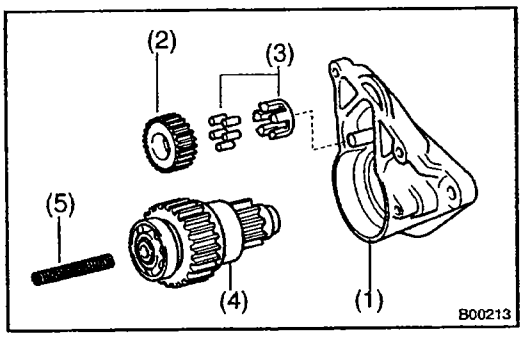


ST

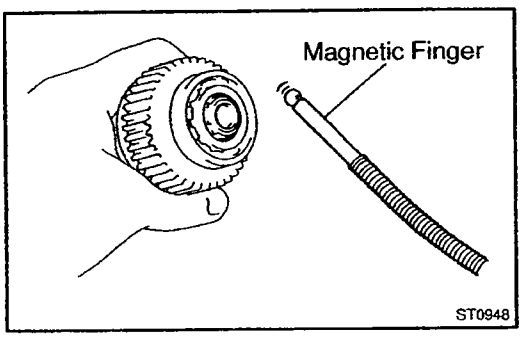


2. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEARS

(a) Remove the 2 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

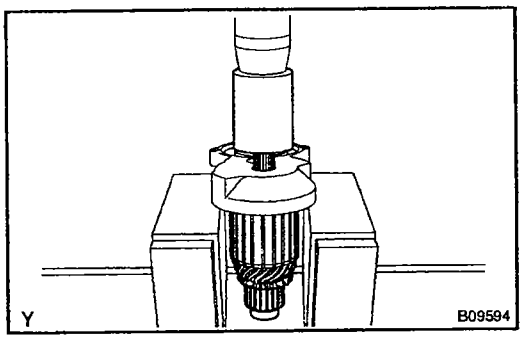


(b) Remove these parts from the magnetic switch assembly:
(1) Starter housing
(2) Idler gear
(3) Bearing
(4) Clutch assembly
(5) Return spring



3. REMOVE STEEL BALL

Using a magnetic finger, remove the steel ball from the clutch shaft hole.



4. REMOVE ARMATURE FROM MAGNETIC SWITCH ASSEMBLY

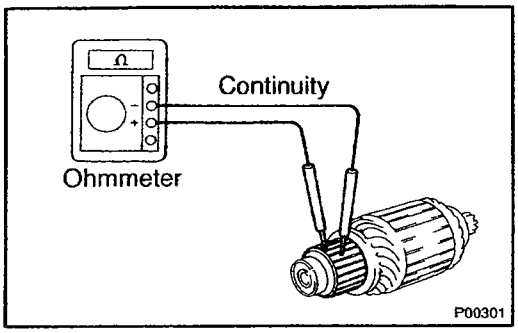
(a) 1ZZ–FE
Remove the armature from the magnetic switch assembly.

(b) 2ZZ–GE:
Using a press, remove the armature from the magnetic switch assembly.

ST

STDFP-02

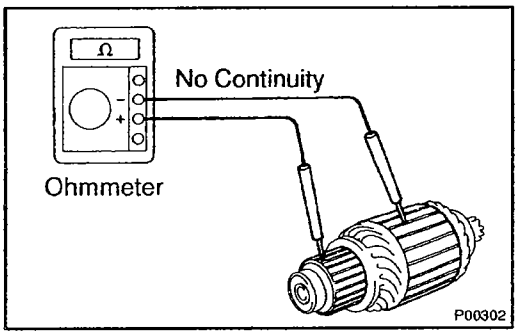
INSPECTION



1. INSPECT ARMATURE COIL COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segment, replace the armature.



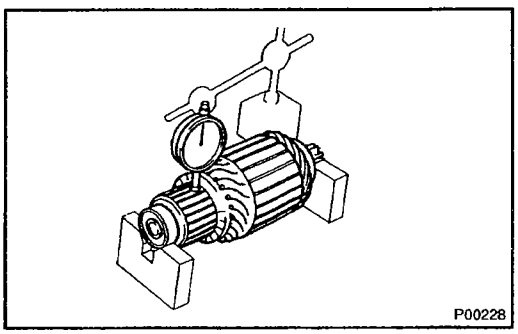
2. INSPECT ARMATURE COIL COMMUTATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.

3. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If the surface is dirty or burnt, correct with sandpaper (No.400) or a lathe.



4. INSPECT COMMUTATOR CIRCLE RUNOUT

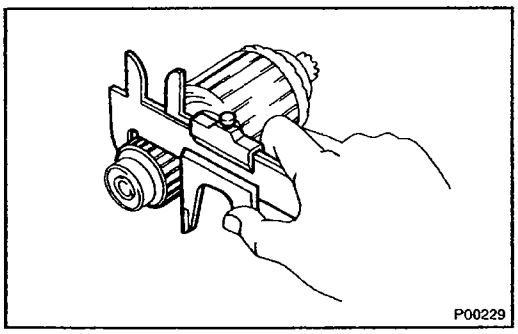
(a) Place the commutator on V–blocks.

(b) Using a dial gauge, measure the circle runout.

Maximum circle runout:
0.05 mm (0.0020 in.)

If the circle runout is greater than maximum, correct it on a lathe.

ST

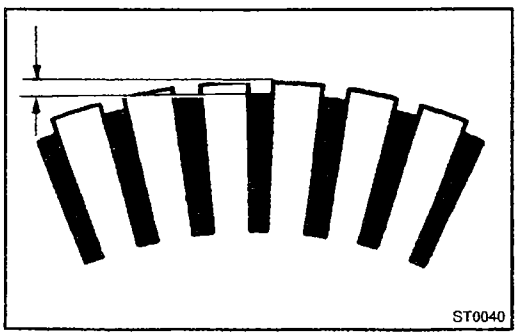


5. INSPECT COMMUTATOR DIAMETER

Using vernier calipers,measure the commutator diameter.

Standard diameter:
30 mm (1.18 in.)
Minimum diameter:
29 mm (1.14 in.)

If the diameter is less than minimum, replace the armature.

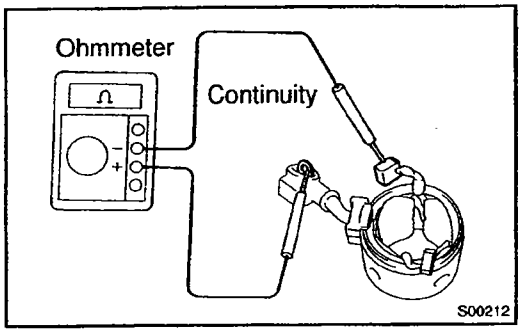


6. INSPECT COMMUTATOR UNDERCUT DEPTH

Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

Standard undercut depth:
0.6 mm (0.024 in.)
Minimum undercut depth:
0.2 mm (0.008 in.)

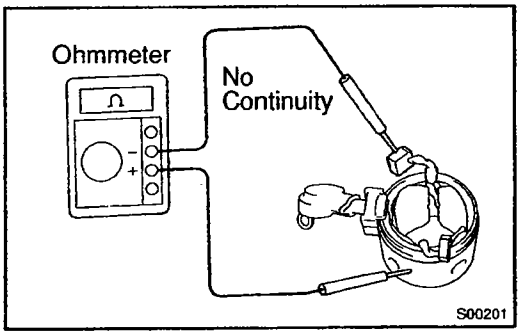
If the undercut depth is less than minimum, correct it with a hacksaw blade.



7. INSPECT FIELD FRAME (FIELD COIL) FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

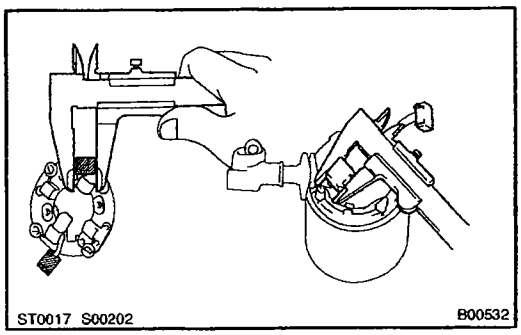
If there is no continuity, replace the field frame.



8. INSPECT FIELD FRAME (FIELD COIL) GROUND

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If the is continuity, repair or replace the field frame.

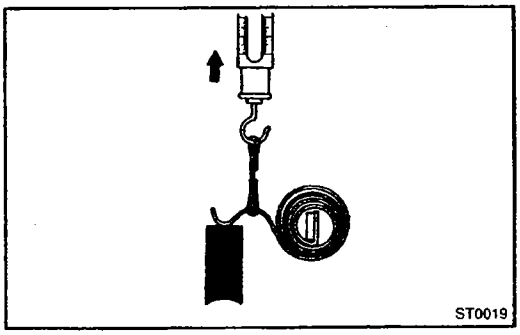


9. INSPECT BRUSH LENGTH

Using vernier calipers, measure the brush length.

Standard length:
15.5 mm (0.610 in.)
Minminum length:
10.0 mm (0.394 in.)

If the length is less than minimum, replace the brush holder and field frame.



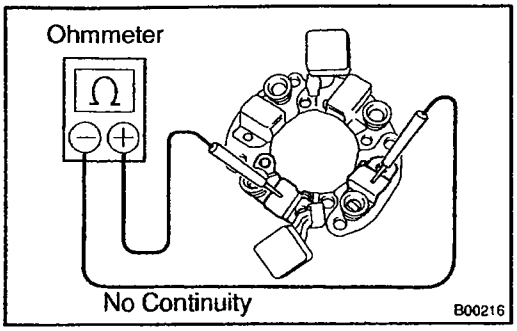
10. INSPECT BRUSH SPRING LOAD

Take the pull scale reading the instant the brush spring separates from the brush.

14 kW type
Standard spring installed load:
17.6 – 23.5 N (1.80 – 2.40 kgf, 4.0 – 5.3 lbf)
Minimum spring installed load:
11.8 N (1.20 kgf, 2.6 lbf)
1.2 kW type
Standard spring installed load:
13.7 – 19.6 N (1.40 – 2.0 kgf, 3.1 – 4.6 lbf)
Minimum spring installed load:
8.8 N (0.9 kgf, 2.0 lbf)

If the installed load is not within specification, replace the brush springs.

ST



11. INSPECT BRUSH HOLDER INSULATION

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

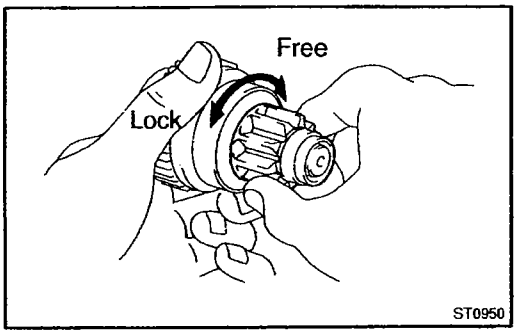
If there is continuity, repair or replace the brush holder.

12. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idler gear and clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

If damaged, also check the drive plate ring gear for wear or damage.

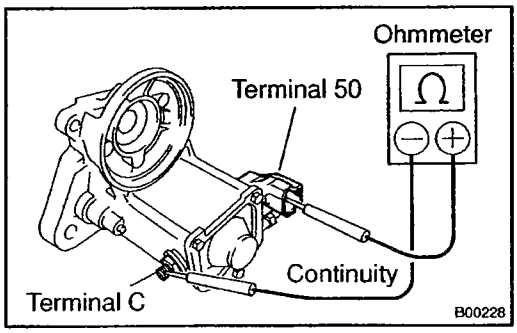


13. INSPECT CLUTCH

Rotate the clutch pinion gear clockwise, and check that it turns freely.

Try to rotate the clutch pinion gear counter–clockwise and check that it locks.

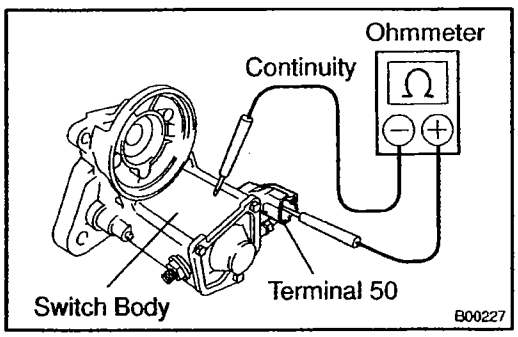
If necessary, replace the clutch assembly.



14. DO MAGNETIC SWITCH PULL–IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.



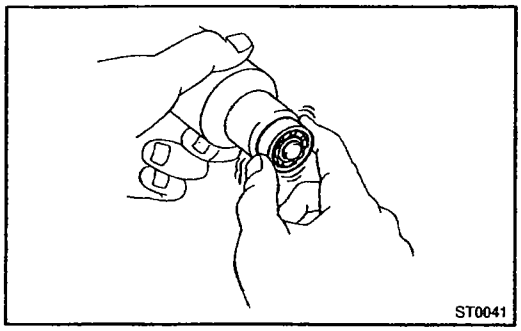
15. DO MAGNETIC SWITCH HOLD–IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

If there is no continuity, replace the magnetic switch.

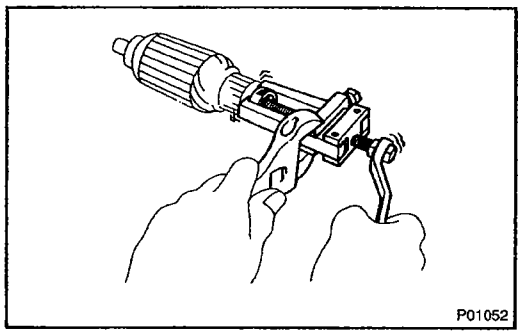
ST0FQ–02

REPLACEMENT



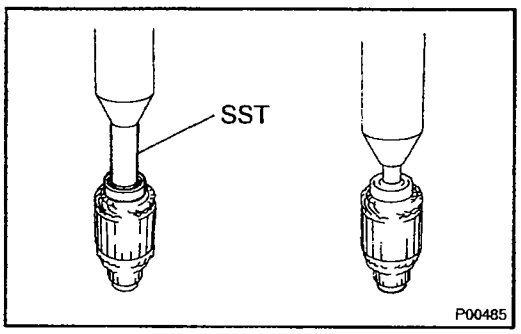
1. INSPECT BEARING

Turn the bearing by hand while applying inward force.
If resistance is felt or if the sticks, replace the bearing.



2. REPLACE BEARINGS

(a) Using SST, remove the bearing.
SST 09286–46011

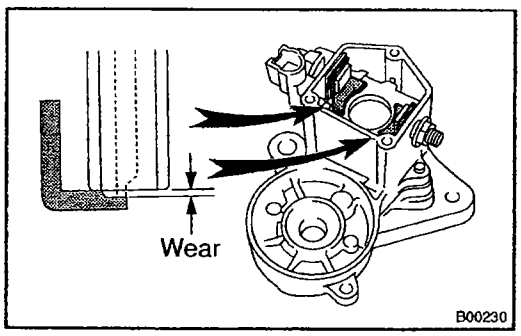


(b) Using SST and a press, press in a new front bearing.
SST 09820–00030

(c) Using a press, press in a new rear bearing.

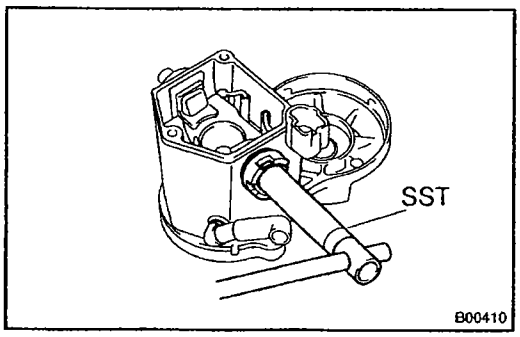
3. REMOVE MAGNETIC SWITCH END COVER

(a) Remove the 3 bolts, end cover, gasket and plunger.



(b) Inspect the contact plate for wear.
Using vernier calipers, measure the contact plate for depth of wear.
Maximum wear: 0.9 mm (0.035 in.)

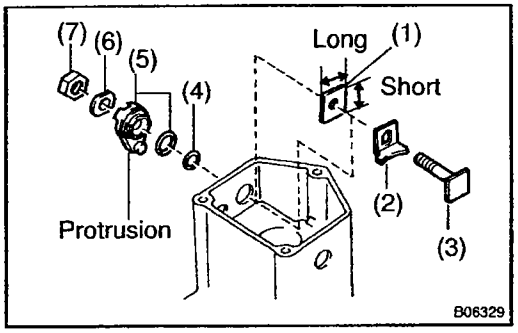
If the depth of wear is greater than the maximum, replace the contact plate.



(c) Remove the terminal kit parts.
(1) Using SST, loosen the terminal nuts.
SST 09810–38140
(2) Terminal C:
Remove the terminal nut,wave washer, terminal insulator (outside), O–ring, terminal bolt, contact plate and terminal insulator (inside).

ST

(3) Terminal 30:
Remove the terminal nut, wave washer, terminal insulator (outside), packing, O–ring, terminal bolt, contact plate, and terminal insulator (inside).



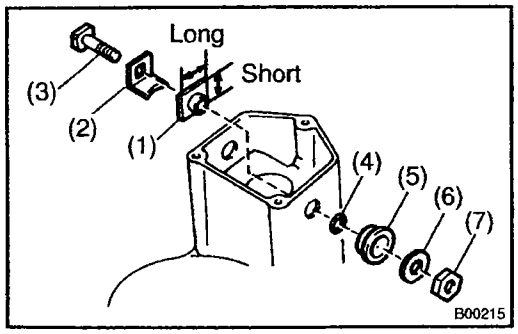
(d) Temporarily install a new terminal 30 kit parts.
(1) Install a terminal insulator (inside).

NOTICE:
Be careful to install the terminal insulator in the correct direction.

(2) Install a contact plate.
(3) Install a terminal bolt.
(4) Install a O–ring.
(5) Install a packing and terminal insulator (outside). Install the packing to the terminal insulator, and install them.

HINT:
Match the protrusion of the insulator with the indentation of the housing.

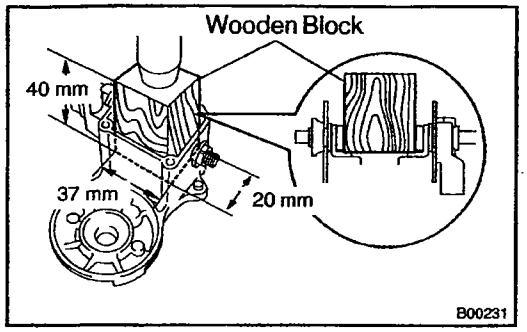
(6) Install a wave washer.
(7) Install a terminal nut.



(e) Temporarily install new terminal C kit parts.
(1) Install a terminal insulator (inside).
(2) Install a contact plate.
(3) Install a terminal bolt.
(4) Install a O–ring.
(5) Install a terminal insulator (outside).
(6) Install a wave washer.
(7) Install a terminal nut.

NOTICE:
Be careful to install the terminal insulator (inside) in the correct direction.

(f) Temporarily tighten the terminal nuts.



(g) Tighten terminal nut.

(1) Put a wooden block on the contact plate and press it down with a hand press.

Dimensions of wooden block:
20 x 37 x 40 mm (0.79 x 1.46 x 1.57 in.)
Press force:
981 N (100 kgf, 221 lbf)

NOTICE:
Check the diameter of the hand press ram. Then calculate the gauge pressure of the press when 981 N (100 kgf, 221 lbf) of force is applied.

Gauge pressure:

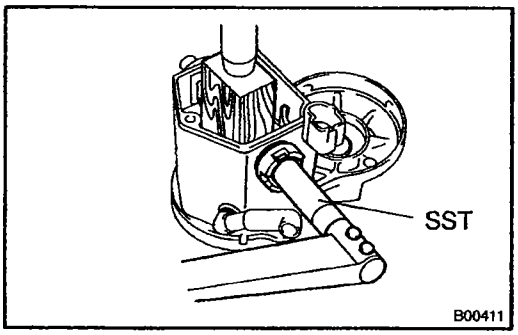
$$(\text{kgf/cm}^2) = \frac{100\ \text{kgf}}{\left(\frac{\text{Ram diameter (cm)}}{2}\right)^2 \times 3.14(\pi)}$$

$$(\text{psi}) = \frac{221\ \text{lbf}}{\left(\frac{\text{Ram diameter (in.)}}{2}\right)^2 \times 3.14\ (\pi)}$$

$$(\text{kpa}) = (\text{kgf/cm}^2) \times 98.1$$

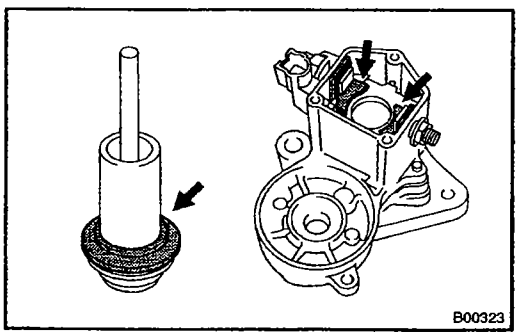
$$(\text{kpa}) = (\text{psi}) \times 6.9$$

If the contact plate is not pressed down with the specified pressure, the contact plate may tilt due to coil deformation or the tightening of the nut.



(2) Using SST, tighten the nuts to the specified torque.
SST 09810–38140
Torque: 17 N·m (173 kgf·cm, 12 ft·lbf)

NOTICE:
If the nut is over tightened, it may cause cracks on the inside of the insulator.



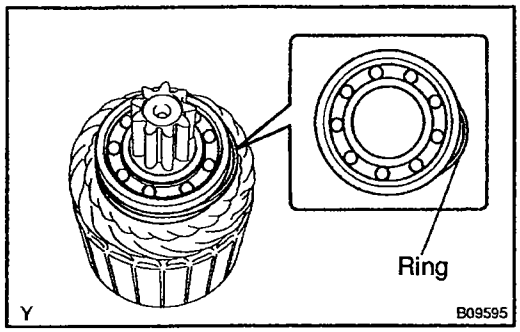
(h) Clean contact surfaces of contact plate and plunger.
Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.

(i) Reinstall magnetic switch end cover.
Install the plunger, new gasket, end cover with the 3 bolts.
Torque: 2.5 N·m (26 kgf·cm, 23 in.·lbf)

ST0HQ–01

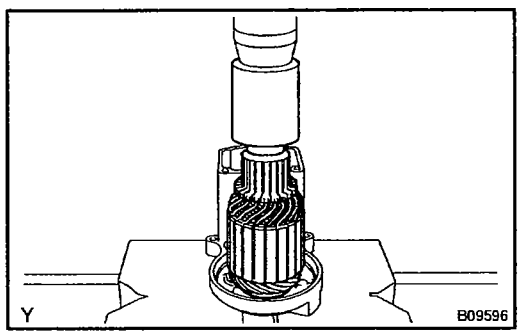
REASSEMBLY

HINT:
Use high–temperature grease to lubricate the bearings and gears when assembling the starter.

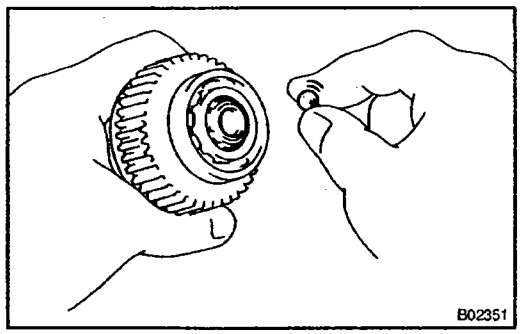


1. INSTALL ARMATURE TO MAGNETIC SWITCH ASSEMBLY

(a) 2ZZ–GE:
Rotating the ring of the front bearing, set it properly so that the projection of the ring is positioned in the narrowest part.

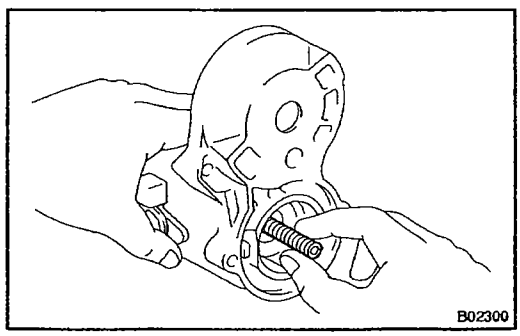


(b) Apply grease to the armature bearings.
(c) 1ZZ–FE:
Install the armature to the magnetic switch assembly.
(d) 2ZZ–GE:
Using a press, install the armature to the magnetic switch assembly.



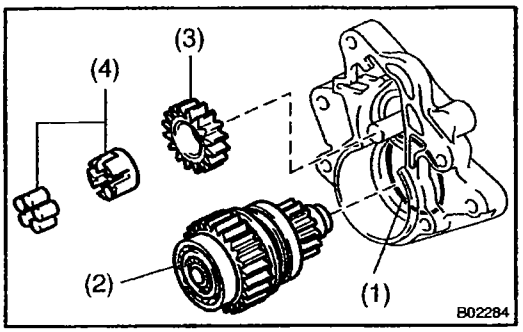
2. INSERT STEEL BALL INTO CLUTCH SHAFT HOLE

(a) Apply grease to the steel ball.
(b) Insert the steel ball into the clutch shaft hole.



3. INSTALL STARTER HOUSING, CLUTCH ASSEMBLY AND GEARS

(a) Apply grease to the return spring.
(b) Insert the return spring into the magnetic switch hole.



(c) Place these parts on the starter housing:
(1) New O–ring
(2) Starter clutch assembly
(3) Idler gear
(4) Bearing

(d) Install the starter housing to the magnetic switch with the 2 screws.
Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)

4. INSTALL FIELD FRAME

(a) Install a new O–ring to the groove of the filed frame.

(b) Align the protrusion of the field frame with the groove of the magnetic switch, and install the field frame.

5. INSTALL BRUSH HOLDER

(a) Place the brush holder on the field frame.

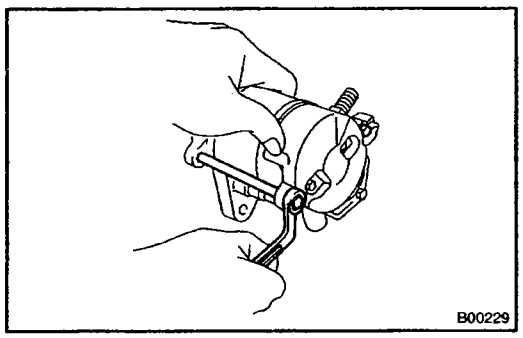
(b) Using a screwdriver, hold the brush spring back, and connect the brush into the brush holder. Connect the 4 brushes.

NOTICE:
Check that the positive (+) lead wires are not grounded.

6. INSTALL END COVER

(a) Install a new O–ring to the groove of the field frame.

(b) Install the end cover to the field frame with the 2 screws.
Torque: 3.8 N·m (39 kgf·cm, 34 in.·lbf)



(c) Install the field frame and armature assembly with the 2 through bolts.
Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)

(d) Connect the lead wire to terminal C with the nut.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

7. INSTALL NEW DUST PROTECTOR

ST02S-01

TEST

NOTICE:

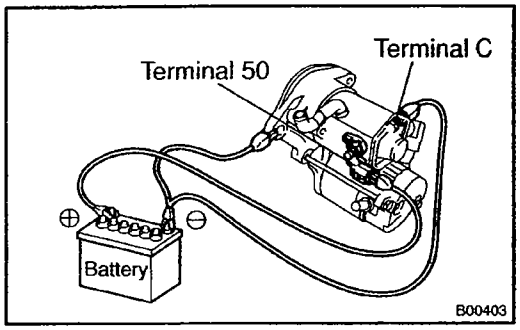
These tests must be performed within 3 to 5 seconds to avoid burning out the coil.

1. DO PULL–IN TEST

(a) Disconnect the field coil lead wire from terminal C.

(b) Connect the battery to the magnetic switch as shown. Check that the clutch pinion gear moves outward.

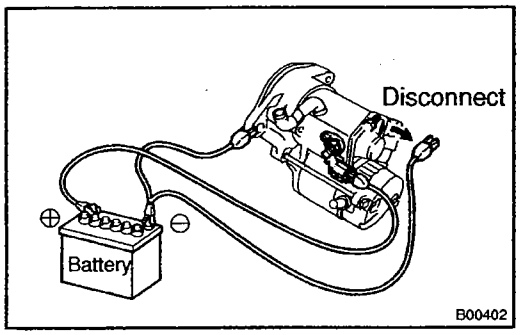
If the clutch pinion gear does not move.



2. DO HOLD–IN TEST

With battery connected as above with the clutch pinion gear out, disconnect the negative (–) lead from terminal C.

If the clutch pinion gear returns inward.

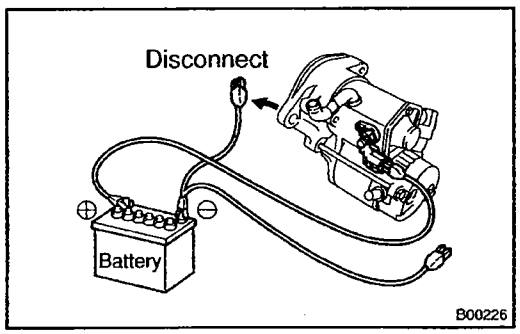


3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (–) lead from the switch body.

Check that the clutch pinion gear returns inward.

If the clutch pinion gear does not return.



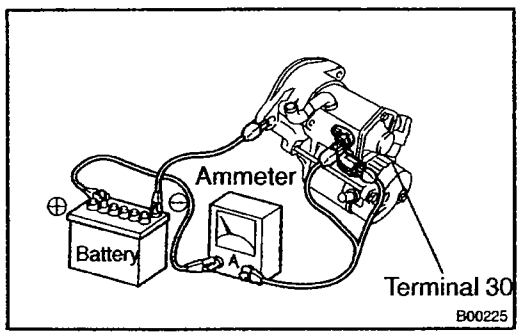
4. DO NO–LOAD PERFORMANCE TEST

(a) Connect the battery and ammeter to the starter as shown.

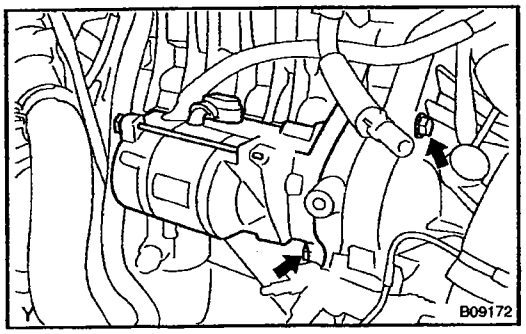
(b) Check that the starter rotates smoothly and steadily with the pinion gear moving out.

Check that the ammeter shows the specified current.

Specified current: 90 A or less at 11.5 V



ST0HR-01



INSTALLATION

1. INSTALL STARTER

(a) Install the 2 bolts and starter.

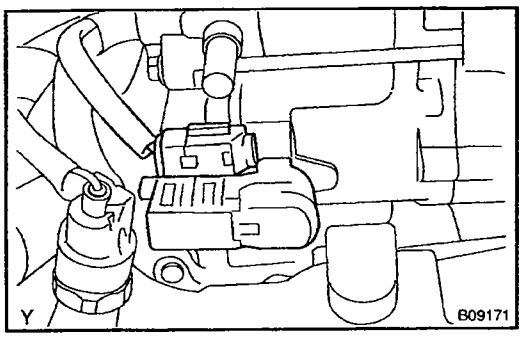
HINT:

Each bolt length is indicated in the illustration.

Bolt length

A 64 mm (2.72 in.)

B 54 mm (2.13 in.)



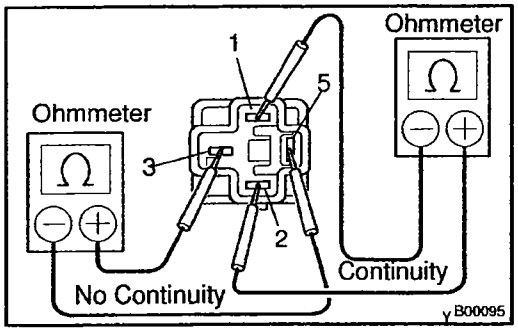
(b) Connect the starter wire, and install the nut.

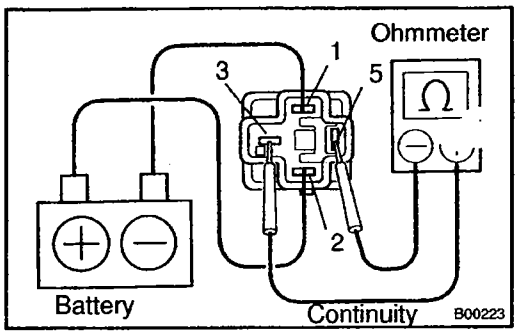
(c) Connect the starter connector.

2. INSTALL RH AND LH ENGINE UNDER COVER

3. INSTALL AIR CLEANER ASSEMBLY

4. INSTALL UPPER RADIATOR SUPPORT SEAL





STARTER RELAY

ST02U-01

INSPECTION

1. REMOVE STARTER RELAY

2. INSPECT STARTER RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.

3. INSPECT STARTER RELAY OPERATION

(a) Apply battery positive voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is continuity, replace the relay.

4. REINSTALL STARTER RELAY

– MEMO –

CHARGING

CHARGING SYSTEM CH–1
GENERATOR CH–5

CH

CHARGING SYSTEM

PRECAUTION

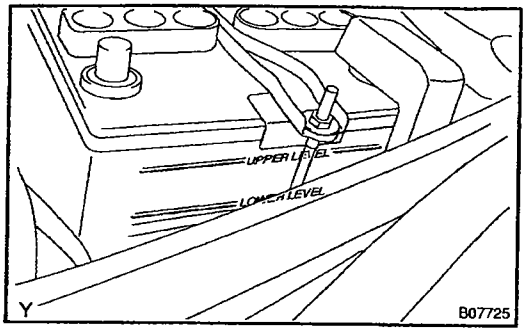
CH021-01

- **Check that the battery cables are connected to the correct terminals.**
- **Disconnect the battery cables when the battery is given a quick charge.**
- **Do not perform tests with a high voltage insulation resistance tester.**
- **Never disconnect the battery while the engine is running.**

C

CH0AP–03

ON–VEHICLE INSPECTION



1. CHECK BATTERY ELECTROLYTE LEVEL

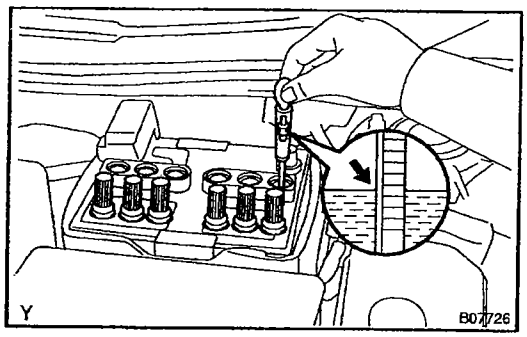
Check the electrolyte quantity of each cell.

Maintenance–Free Battery:

If under the lower level, replace the battery (or add distilled water if possible) and check the charging system.

Except Maintenance–Free Battery:

If under the lower level, add distilled water.

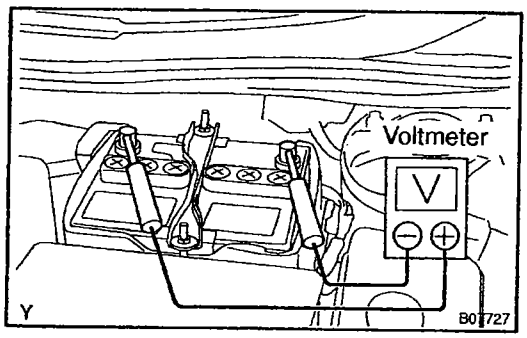


2. Except Maintenance–Free Battery: CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

Standard specific gravity:
1.25 – 1.29 at 20°C (68 °F)

If the specific gravity is less than specification, charge the battery.



3. CHECK BATTERY VOLTAGE

(a) After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.

(b) Turn the ignition switch OFF and turn off the electrical systems.

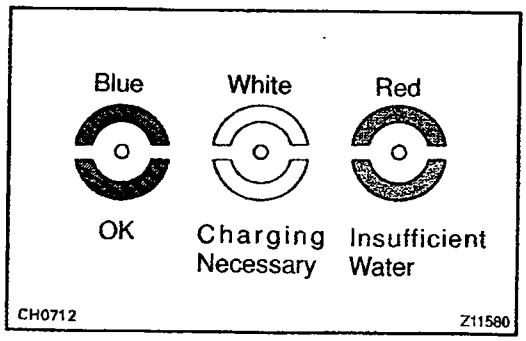
(c) Measure the battery voltage between the negative (–) and positive (+) terminals of the battery.

Standard voltage: 12.5 – 12.9 V at 20°C (68°F)

If the voltage is less than specification, charge the battery.

HINT:

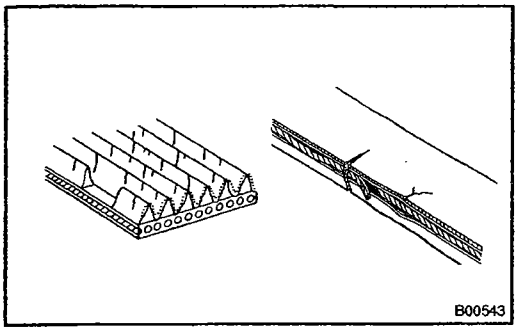
Check the indicator as shown in illustration.



4. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

(a) Check that the battery terminals are not loose or corroded.

(b) Check the fusible link, H–fuses and fuses for continuity.



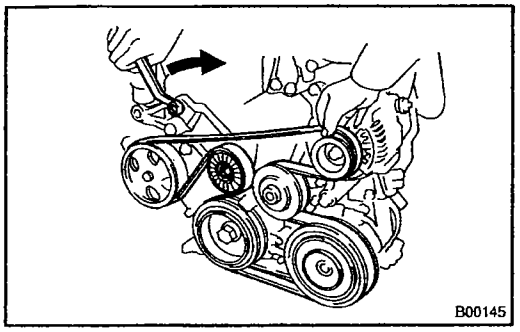
5. INSPECT DRIVE BELT

(a) Visually check the belt for excessive wear, frayed cords etc.

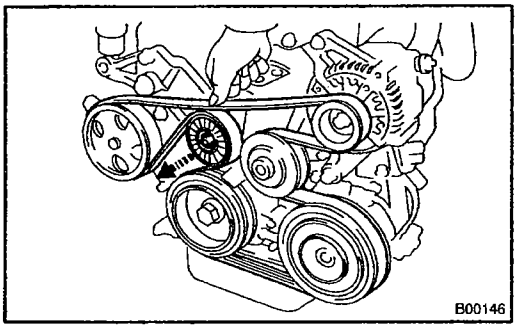
If any defect has been found, replace the drive belt.

HINT:

- Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



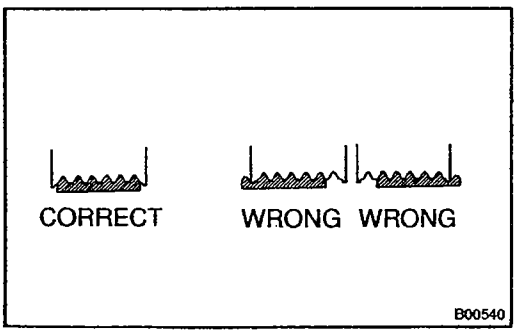
- The drive belt tension can be released by turning the belt tensioner clockwise.



(b) Check the belt tensioner operation.

- Check that belt tensioner moves downward when the drive belt is pressed down at the points indicated in the illustration with approx. 98 N (10 kgf, 22.0 lbf) of force.
- Check the alighment of the belt tensioner pulley to make sure the drive belt will not slip off the pulley.

If necessary, replace the belt tensioner.



HINT:

- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- After installing a new belts, run the engine for about 5 minutes and check the belt tension existing.

6. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

(a) Check that the wiring is in good condition.

(b) Check that there is no abnormal noise from the generator while the engine is running.

7. INSPECT DISCHARGE WARNING LIGHT CIRCUIT

(a) Turn the ignition switch "ON". Check that the discharge warning light comes on.

(b) Start the engine. Check that the light goes off.

If the light does not operate as specified, troubleshoot the discharge warning light circuit.

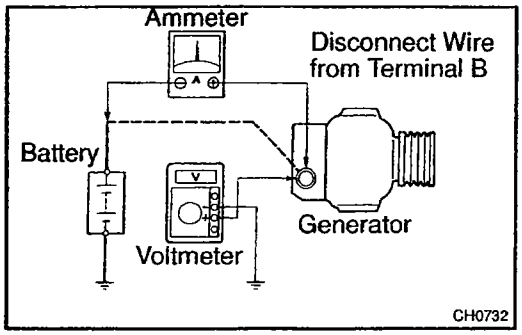
8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT:

If a battery/generator tester is available, connect the tester to the charging circuit as permanufacturer's instructions.

(a) If a tester is not available, connect a voltmeter to the charging circuit as follows:

- Disconnect to the wire from terminal B of the generator and connect it to the negative (–) lead of the ammeter.



- Connect the positive (+) lead of the ammeter to terminal B of the generator.
- Connect the positive (+) lead of the voltmeter to terminal B of the generator.
- Ground the negative (–) lead of the voltmeter.

(b) Check the charging circuit as follows:

With the engine running from idle to 2,000 rpm, check the reading on the ammeter and voltmeter.

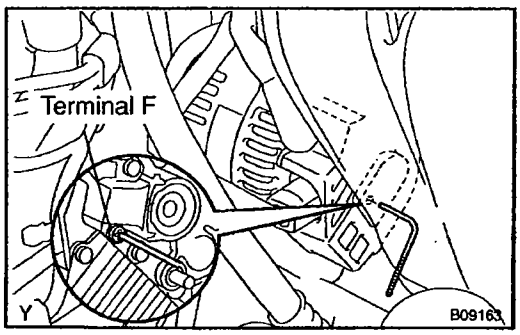
Standard amperage: 10A or less

Standard voltage: 13.2 – 14.8 V

If the voltmeter reading is more than standard voltage, replace the voltage regulator.

If the voltmeter reading is less than the standard voltage, check the voltage regulator and generator as follows:

CH



- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than standard voltage, replace the voltage regulator.
- If the voltmeter reading is less than standard voltage, check the generator.

9. INSPECT CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "H".

(b) Check the reading on the ammeter.

Standard amperage: 30 A or more

If the ammeter reading is less than standard amperage, repair the generator.

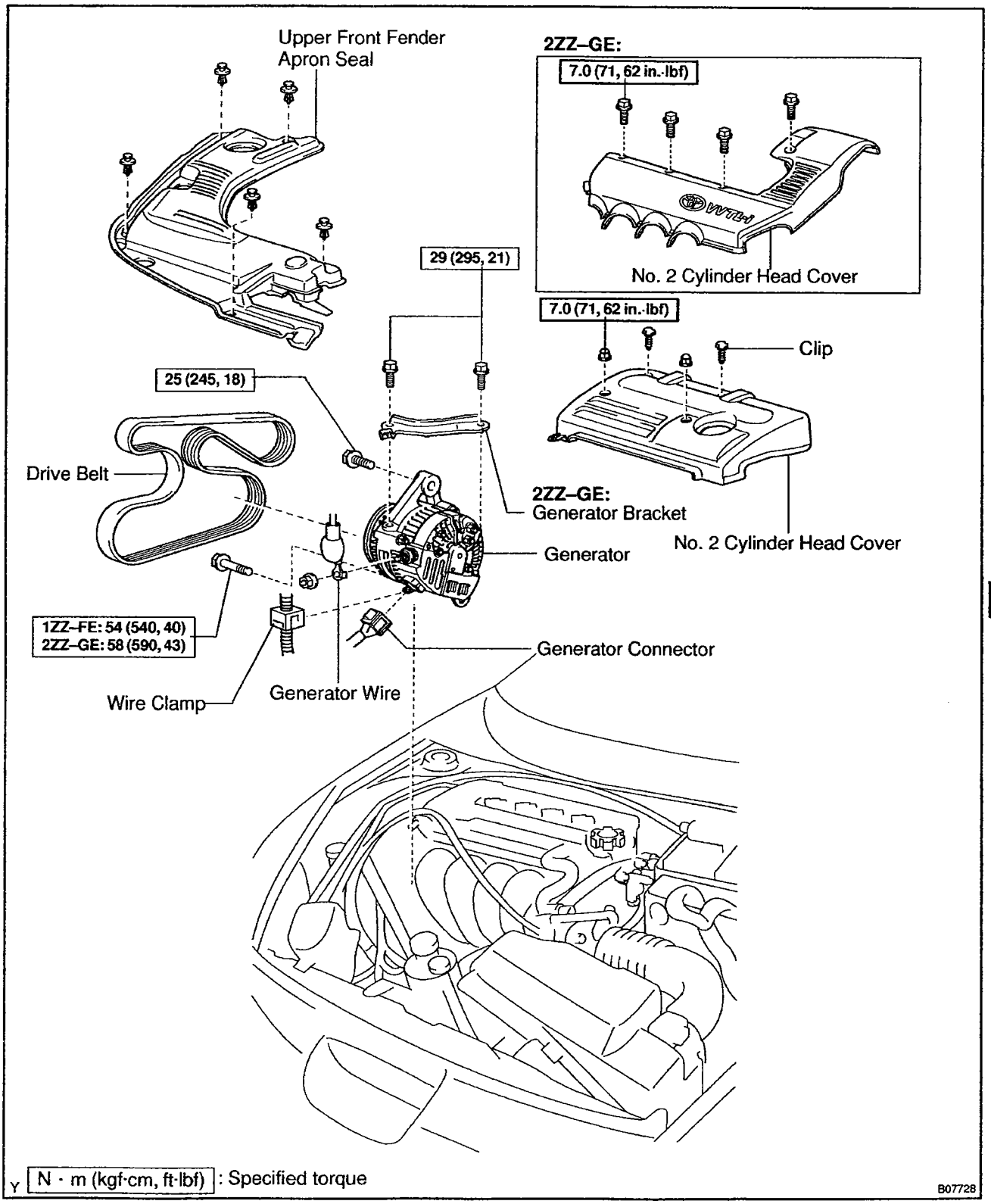
HINT:

If the battery is fully charged, the indication will sometimes be less than standard amperage.

GENERATOR

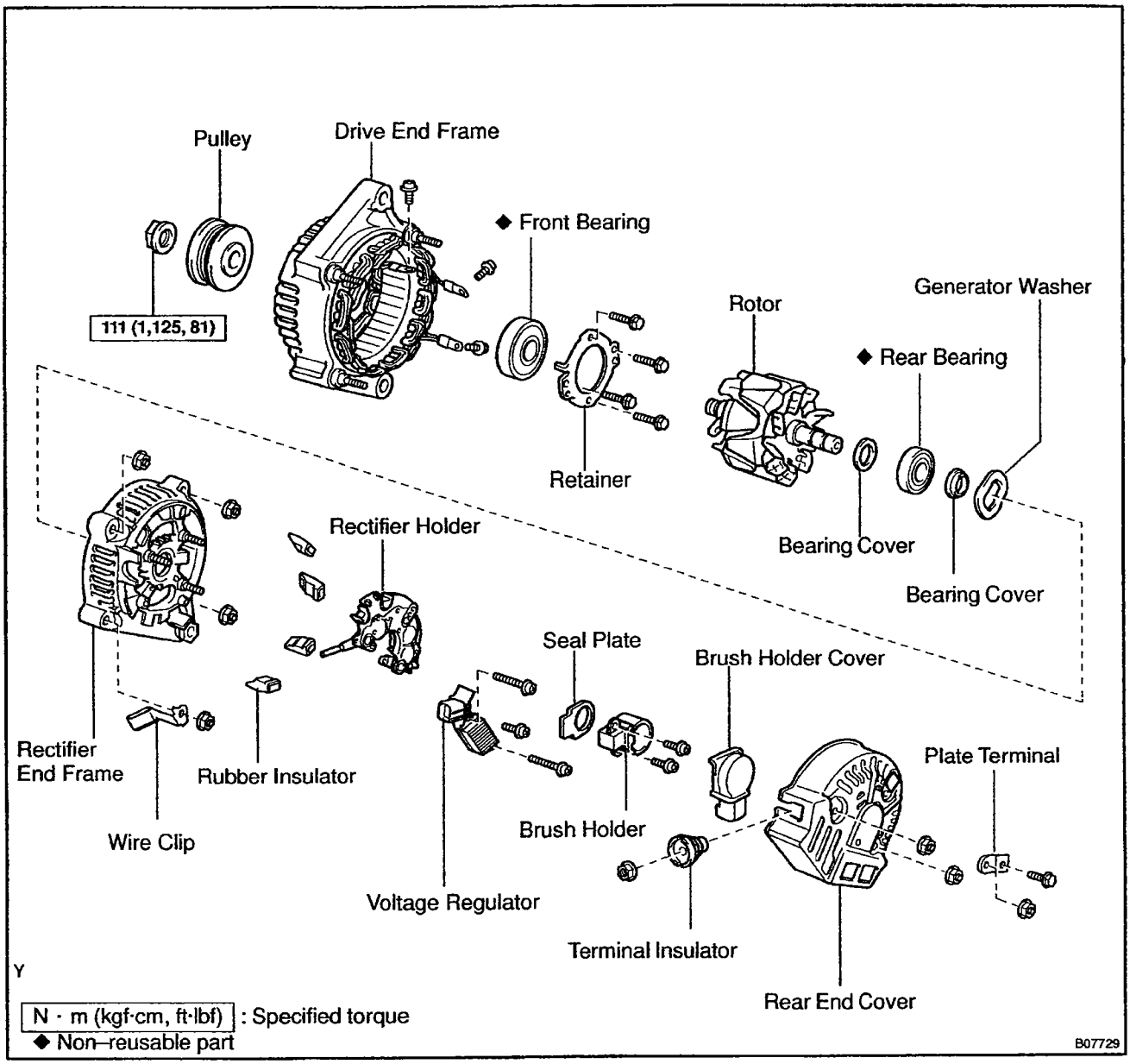
COMPONENTS

CH023-02



Y N · m (kgf·cm, ft·lbf) : Specified torque

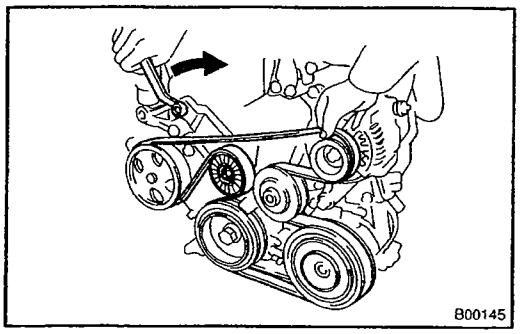
B07728


Pulley
Drive End Frame
◆ Front Bearing
111 (1,125, 81)
Rotor
Generator Washer
◆ Rear Bearing
Retainer
Bearing Cover
Bearing Cover
Rectifier Holder
Seal Plate
Brush Holder Cover
Plate Terminal
Rectifier End Frame
Rubber Insulator
Wire Clip
Brush Holder
Voltage Regulator
Terminal Insulator
Rear End Cover
Y
N · m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
B07729

CH

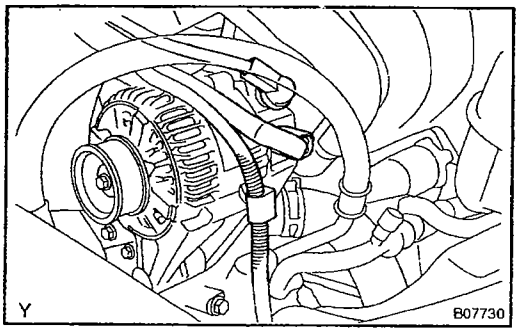
CH024-02

REMOVAL



1. REMOVE DRIVE BELT

Turn the drive belt tensioner slowly clockwise and loosen it. Then, remove the drive belt and replace the drive belt tensioner little by little and fix it quietly.



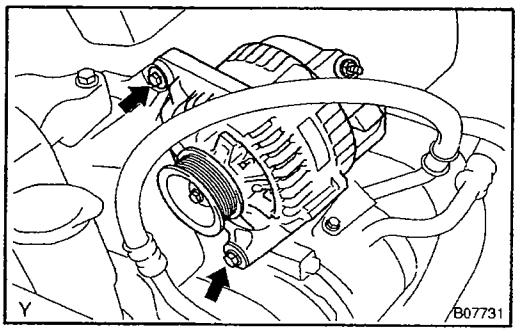
2. REMOVE GENERATOR

(a) Disconnect the wire clamp from the wire clip on the rectifier end frame.

(b) Remove the rubber cap and nut, and disconnect the generator wire.

(c) Disconnect the generator connector.

(d) 2ZZ-GE:
Remove the 2 bolts and generator bracket.

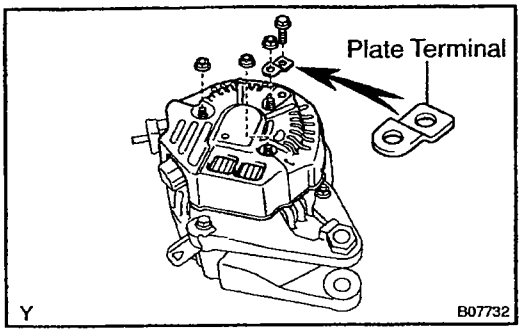


(e) Remove the 2 bolts and generator.

CH

CH025-03

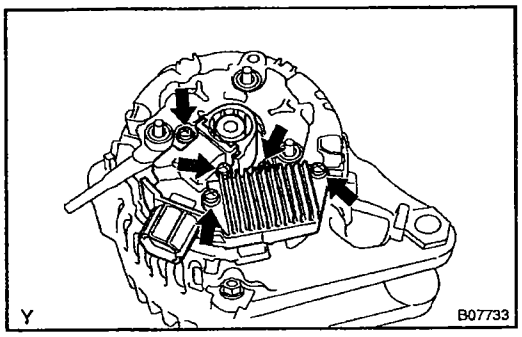
DISASSEMBLY



1. REMOVE REAR END COVER

(a) Remove the nut and terminal insulator.

(b) Remove the bolt, 3 nuts, plate terminal and end cover.

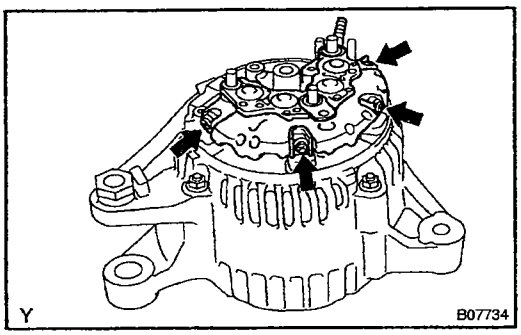


2. REMOVE BRUSH HOLDER AND VOLTAGE REGULATOR

(a) Remove the brush holder cover from the brush holder.

(b) Remove the 5 screws, brush holder and voltage regulator.

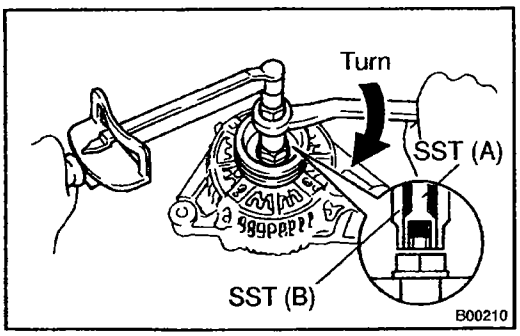
(c) Remove the seal plate from the rectifier end frame.



3. REMOVE RECTIFIER HOLDER

(a) Remove the 4 screws and rectifier holder.

(b) Remove the 4 rubber insulators.



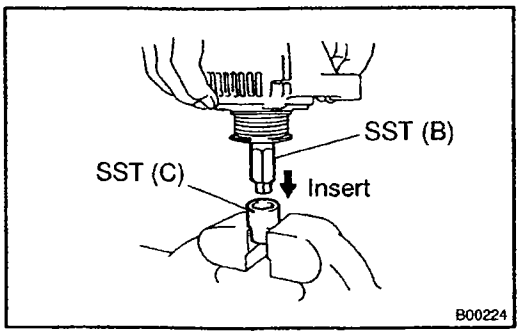
4. REMOVE PULLEY

(a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820–63010

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

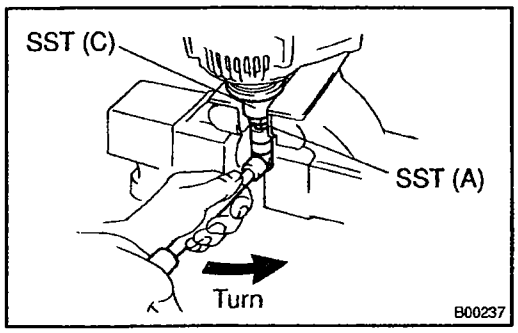
(b) Check that SST (A) is secured to the rotor shaft.



(c) Mount SST (C) in a vise.

(d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).

CH

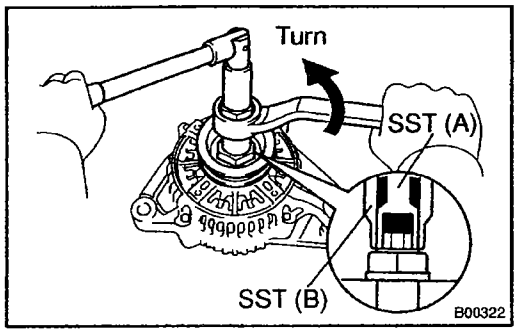


(e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE:

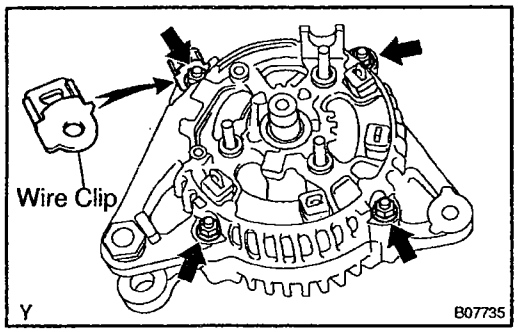
To prevent damage to the rotor shaft, do not loosen the pulley nut more than one–half of a turn.

(f) Remove the generator from SST (C).



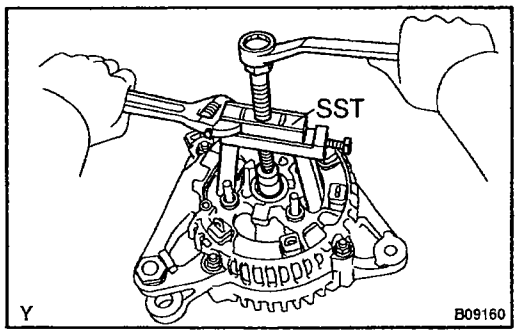
(g) Turn SST (B), and remove SST (A and B).

(h) Remove the pulley nut and pulley.



5. REMOVE RECTIFIER END FRAME

(a) Remove the 4 nuts and wire clip.



(b) Using SST, remove the rectifier end frame.
SST 09286–46011

(c) Remove the generator washer from the rotor

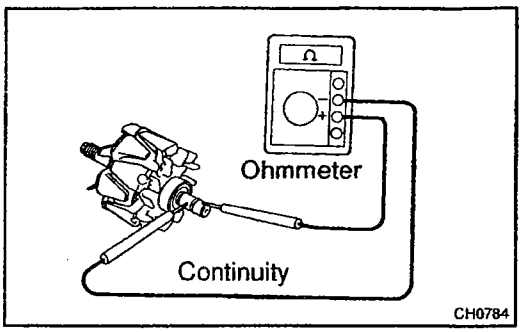
6. REMOVE ROTOR FROM DRIVE END FRAME

CH

CH026-04

INSPECTION

1. INSPECT ROTOR FOR OPEN CIRCUIT

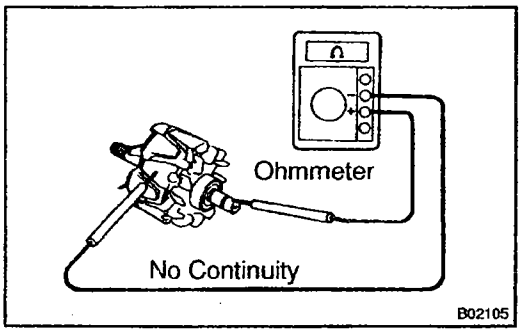


Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance:
MT 2.7 – 3.1 Ω at 20°C (68°F)
AT 2.1 – 2.5 Ω at 20°C (68°F)

If there is no continuity, replace the rotor.

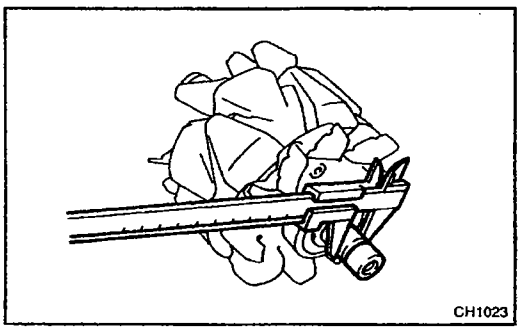
2. INSPECT ROTOR FOR GROUND



Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.

3. INSPECT SLIP RINGS



(a) Check that the slip rings are not rough or scored.

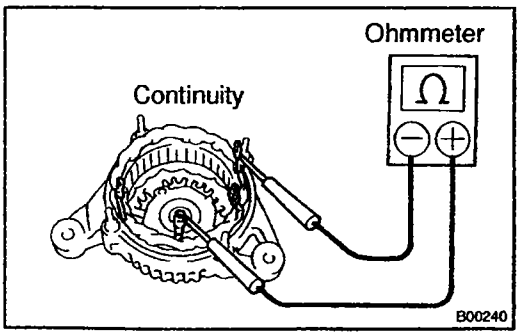
If rough or scored, replace the rotor.

(b) Using a vernier caliper, measure the slip ring diameter.

Standard diameter:
14.2 – 14.4 mm (0.559 – 0.567 in.)
Minimum diameter:
12.8 mm (0.504 in.)

If the diameter is less than minimum, replace the rotor.

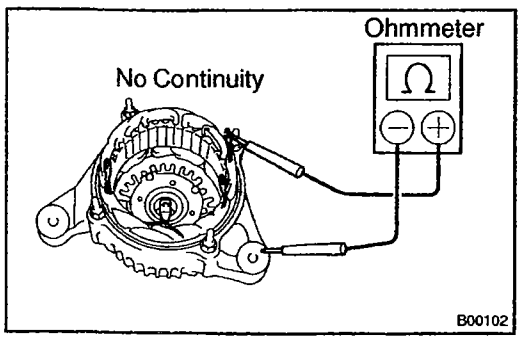
4. INSPECT STATOR (DRIVE END FRAME) FOR OPEN CIRCUIT



Using an ohmmeter, check that there is continuity between the coil leads.

If there is no continuity, replace the drive end frame assembly

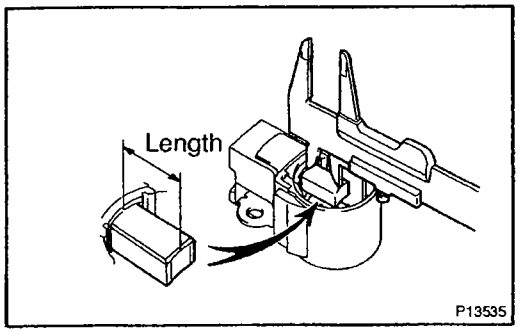
5. INSPECT STATOR (DRIVE END FRAME) FOR GROUND



Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly

CH

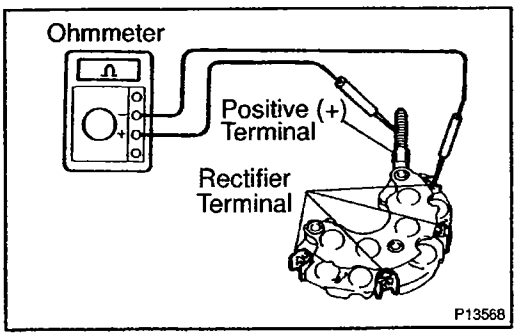


6. INSPECT EXPOSED BRUSH LENGTH

Using vernier calipers, measure the exposed brush length.

Standard exposed length:
9.5 ~ 11.5 mm (0.374 ~ 0.453 in.)
Minimum exposed length:
1.5 mm (0.059 in.)

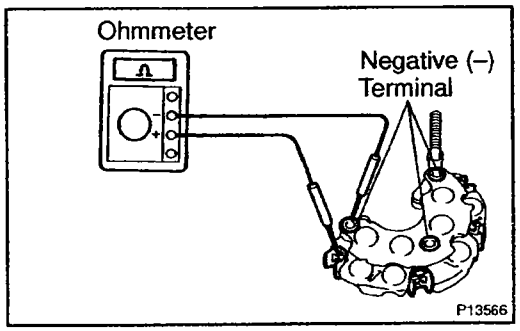
If the exposed length is less than minimum, replace the brush holder assembly.



7. INSPECT POSITIVE RECTIFIER HOLDER

(a) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.
(b) Reverse the polarity of the tester probes and repeat step (a).
(c) Check that one shows continuity and the other shows no continuity.

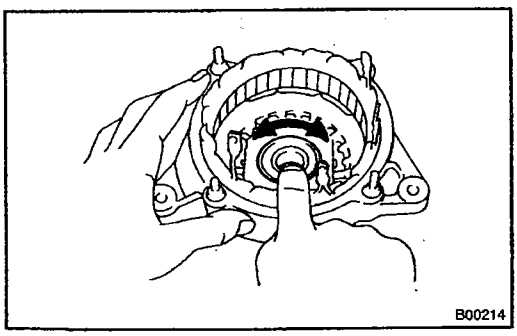
If continuity is not as specified, replace the rectifier holder.



8. INSPECT NEGATIVE RECTIFIER HOLDER

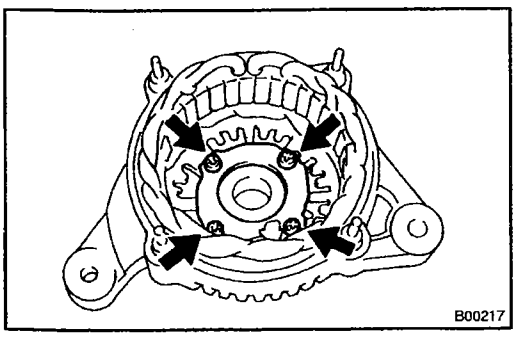
(a) Using an ohmmeter, connect one tester probe to each negative (–) terminal and the other to each rectifier terminal.
(b) Reverse the polarity of the tester probes and repeat step (a).
(c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



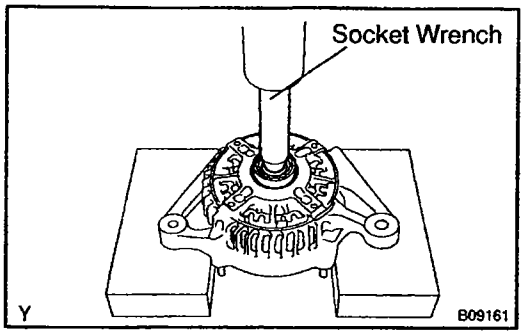
9. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

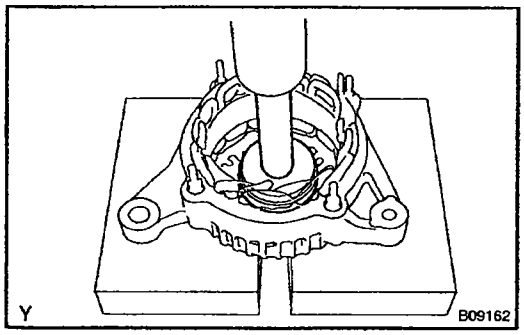


10. IF NECESSARY, REPLACE FRONT BEARING

(a) Remove the 4 screws, bearing retainer and bearing.

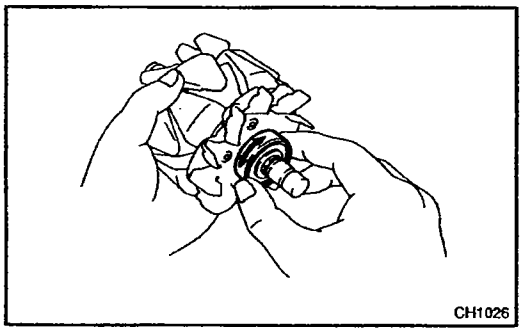


(b) Using SST and a press, press out the bearing.
SST 09950–60010 (09951–00350) 09950–70010 (09951–07100)

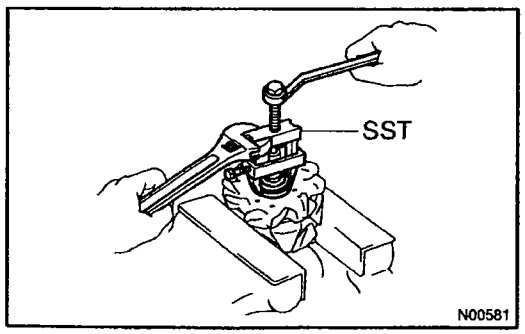


(c) Using SST and a press, press in a new bearing.
SST 09950–60010 (09951–00530) 09950–70010 (09951–07100)

(d) Install the bearing retainer with the 4 screws.
Torque: 3.0 N·m (31 kgf·cm, 27 in.·lbf)



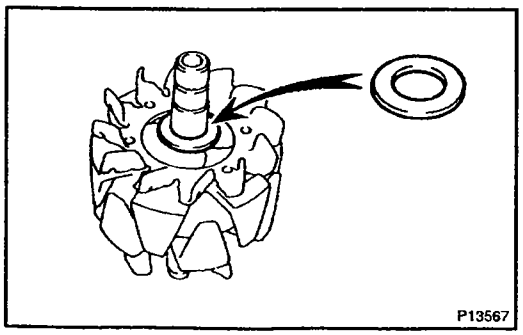
11. INSPECT REAR BEARING
Check that the bearing is not rough or worn.



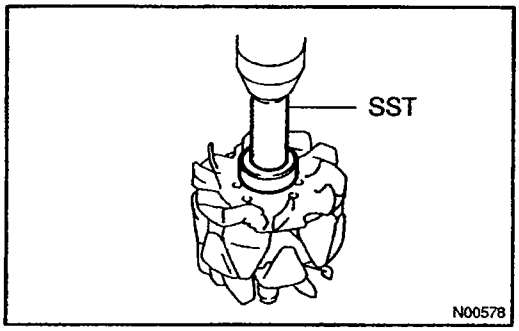
12. IF NECESSARY, REPLACE REAR BEARING
(a) Using SST, remove the bearing cover (outside) and bearing.
SST 09820–00021

NOTICE:
Be careful not to damage the fan.

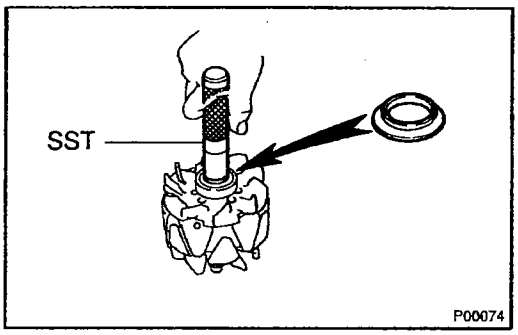
(b) Remove the bearing cover (inside).



(c) Place the bearing cover (inside) on the rotor.



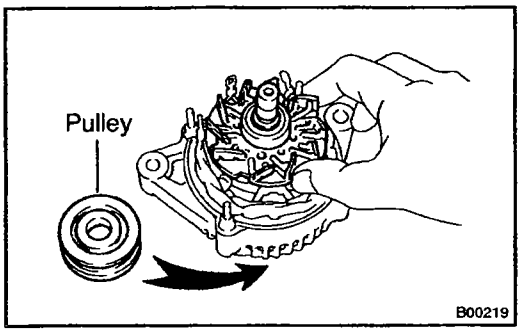
(d) Using SST and a press, press in a new bearing.
SST 09820–00030



(e) Using SST, push in the bearing cover (outside).
SST 09285–76010

CH0CB–01

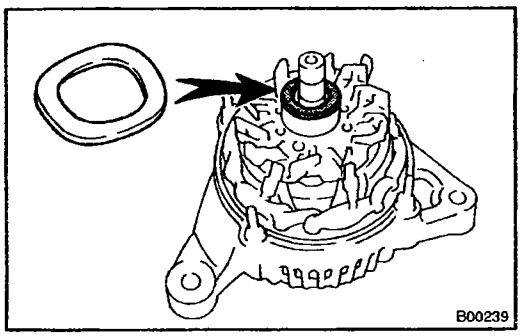
REASSEMBLY



1. INSTALL ROTOR TO DRIVE END FRAME

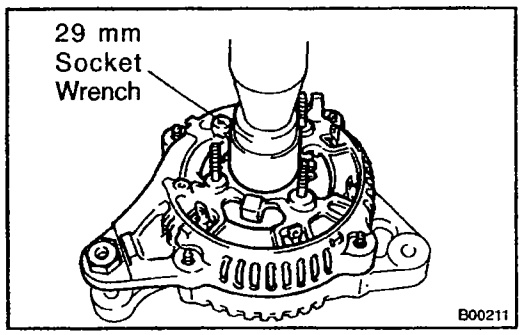
(a) Place the drive end frame on the pulley.

(b) Install the rotor to the drive end frame.

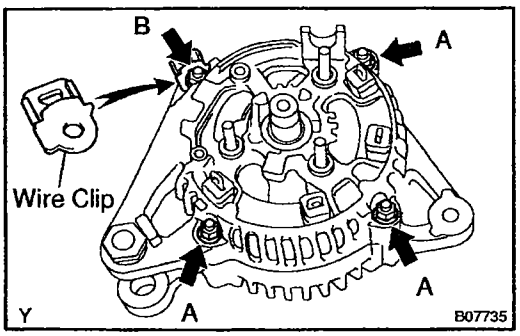


2. INSTALL RECTIFIER END FRAME

(a) Place the generator washer on the rotor.

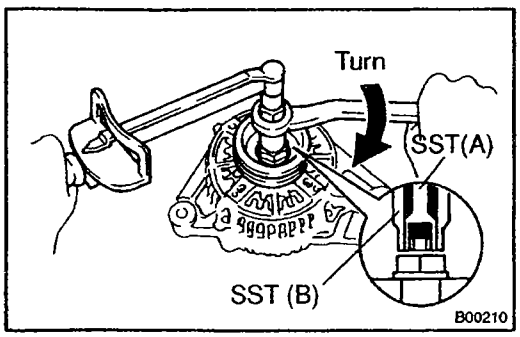


(b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.



(c) Install the wire clip and 4 nuts.

Torque:
Nut A 4.5 N·m (46 kgf·cm, 40 in.·lbf)
Nut B 5.4 N·m (55 kgf·cm, 48 in.·lbf)



3. INSTALL PULLEY

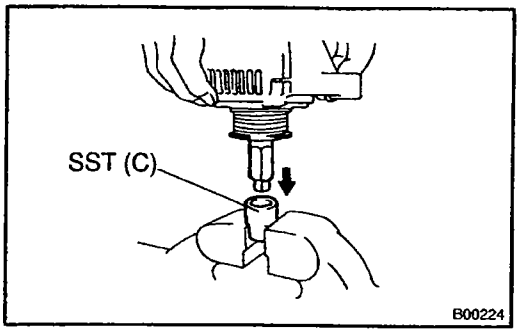
(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

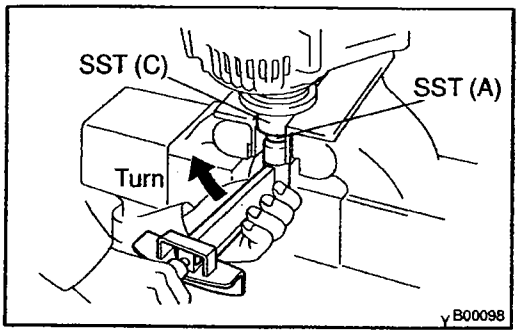
SST 09820–63010

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

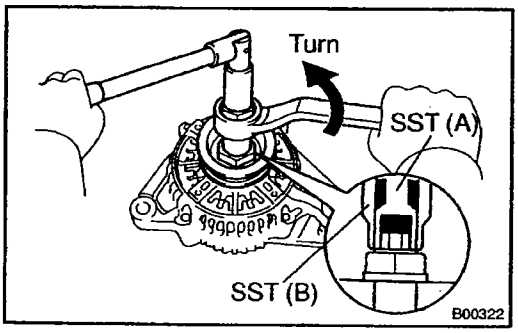
(c) Check that SST (A) is secured to the pulley shaft.



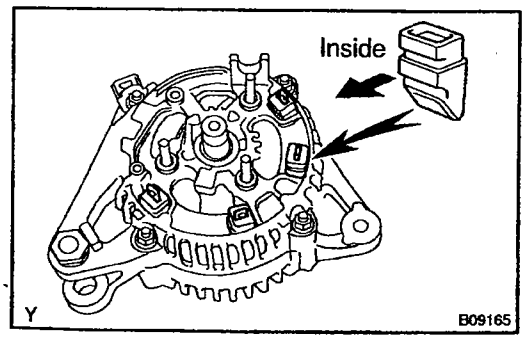
(d) Mount SST (C) in a vise.
(e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).



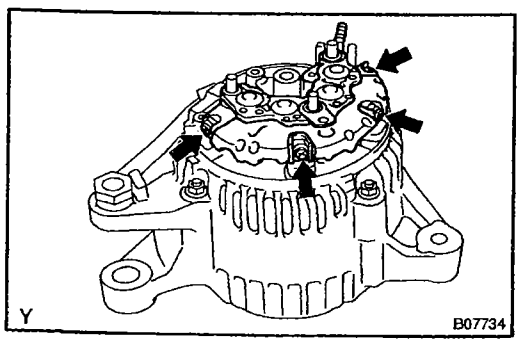
(f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 111 N·m (1,125 kgf·cm, 81 ft·lbf)
(g) Remove the generator from SST (C).



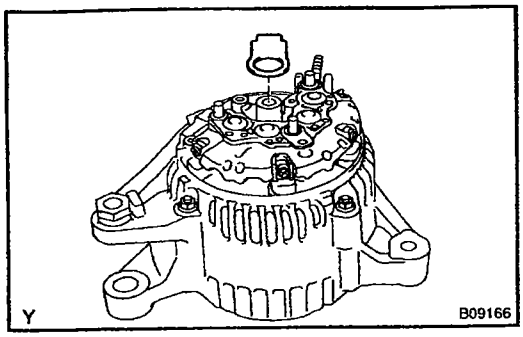
(h) Turn SST (B), and remove SST (A and B).



4. INSTALL RECTIFIER HOLDER
(a) Install the 4 rubber insulators on the lead wires.
NOTICE:
Be careful of the rubber insulators installation direction.

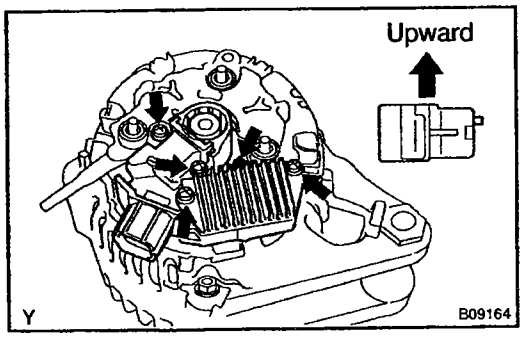


(b) Install the rectifier holder while pushing it with the 4 screws
Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)



5. INSTALL VOLTAGE REGULATOR AND BRUSH HOLDER

(a) Place the seal plate on the rectifier end frame.



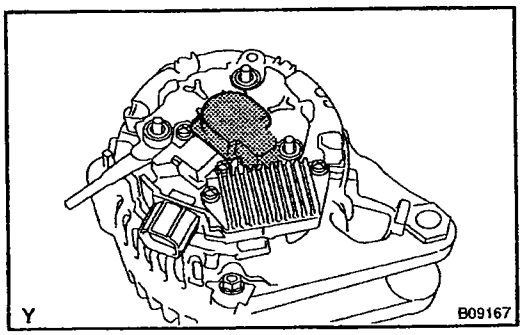
(b) Place the voltage regulator and brush holder on the rectifier end frame.

NOTICE:

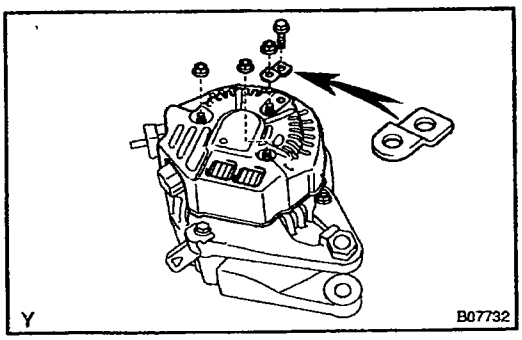
Be careful of the holder installation direction.

(c) Install the 5 screws.

Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)



(d) Place the brush holder cover on the brush holder.



6. INSTALL REAR END COVER

(a) Install the end cover and plate terminal with the bolt and 3 nuts.

Torque:

Nut 4.4 N·m (45 kgf·cm, 39 in.·lbf)

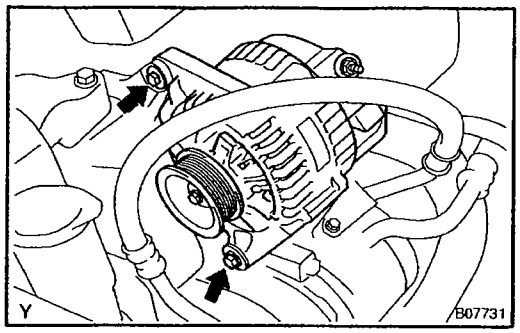
Bolt 3.9 N·m (39 kgf·cm, 35 in.·lbf)

(b) Install the terminal insulator with the nut.

Torque: 4.1 N·m (42 kgf·cm, 36 in.·lbf)

7. CHECK THAT ROTOR ROTATES SMOOTHLY

CH028-03



INSTALLATION

1. INSTALL GENERATOR

(a) Install the 2 bolts and generator.
Torque:
14 mm head 25 N·m (250 kgf·cm, 18 ft·lbf)
17 mm head
1ZZ–FE: 54 N·m (550 kgf·cm, 40 ft·lbf)
2ZZ–GE: 58 N·m (590 kgf·cm, 43 ft·lbf)

(b) 2ZZ–GE:
Install the generator bracket with the 2 bolts.
Torque: 29 N·m (295 kgf·cm, 21ft·lbf)

(c) Connect the generator connector.

(d) Connect the generator wire, and install the nut and rubber cap.

(e) Connect the generator wire, and install the rubber cap and nut.

2. INSTALL DRIVE BELT

– MEMO –

CLUTCH

TROUBLESHOOTING CL–1
CLUTCH PEDAL CL–2
CLUTCH MASTER CYLINDER CL–4
CLUTCH RELEASE CYLINDER CL–9
CLUTCH UNIT CL–14

CL

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

CL02N–04

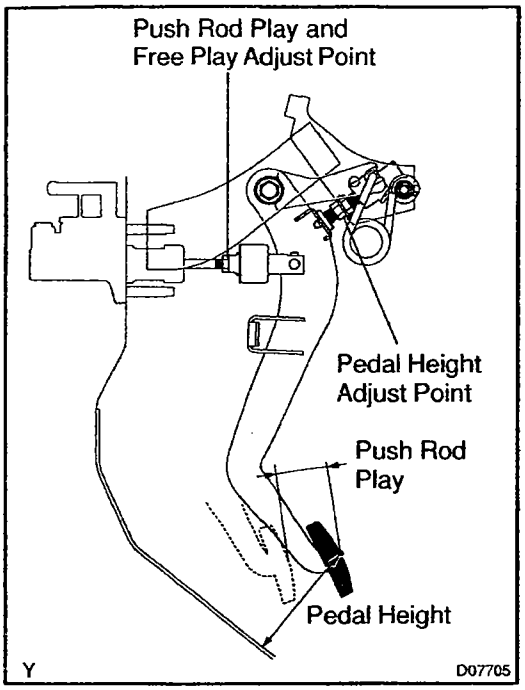
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Clutch grabs/chatters	1. Engine mounting (Loosen)	–
	2. Clutch disc (Runout is excessive)	CL–14
	3. Clutch disc (Oily)	CL–14
	4. Clutch disc (Worn out)	CL–14
	5. Clutch disc torsion rubber (Damaged)	CL–14
	6. Clutch disc (Glazed)	CL–14
	7. Diaphragm spring (Out of tip alignment)	CL–14
Clutch pedal spongy	1. Clutch line (Air in line)	–
	2. Master cylinder cup (Damaged)	CL–4
	3. Release cylinder cup (Damaged)	CL–9
Clutch noisy	1. Release bearing (Worn, dirty, or damaged)	CL–14
	2. Clutch disc torsion rubber (Damaged)	CL–14
Clutch slips	1. Clutch pedal (Free play out of adjustment)	CL–2
	2. Clutch disc (Oily)	CL–14
	3. Clutch disc (Worn out)	CL–14
	4. Diaphragm spring (Damaged)	CL–14
	5. Pressure plate (Distortion)	CL–14
	6. Flywheel (Distortion)	–
Clutch does not disengage	1. Clutch pedal (Free play out of adjustment)	CL–2
	2. Clutch line (Air in line)	–
	3. Master cylinder cup (Damaged)	CL–4
	4. Release cylinder cup (Damaged)	CL–9
	5. Clutch disc (out of true)	CL–14
	6. Clutch disc (Runout is excessive)	CL–14
	7. Clutch disc (Lining broken)	CL–14
	8. Clutch disc (Dirty or burned)	CL–14
	9. Clutch disc (Oily)	CL–14
	10.Clutch disc (Lack of spline grease)	CL–14
	11.Diaphragm spring (Damaged)	CL–14
	12.Diaphragm spring (Out of tip alignment)	CL–14
	13.Pressure plate (Distortion)	CL–14

CL09K-01

CLUTCH PEDAL

INSPECTION



1. **CHECK PEDAL HEIGHT**

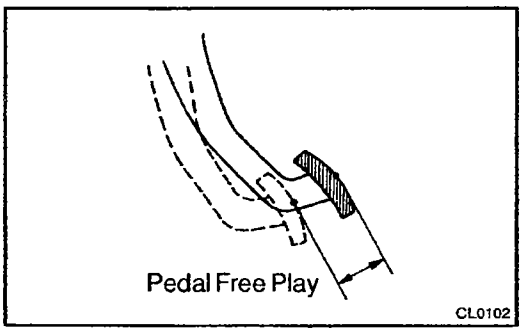
Pedal height from asphalt sheet:
Standard pedal:
135.6 – 145.6 mm (5.339 – 5.732 in.)
Sport pedal:
136.9 – 146.9 mm (5.390 – 5.783 in.)

2. **IF NECESSARY, ADJUST PEDAL HEIGHT**

(a) Loosen the lock nut and turn the stopper bolt until the height is correct.
(b) Tighten the lock nut.

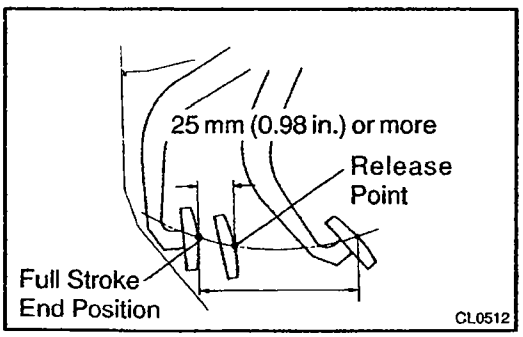
3. **CHECK PEDAL FREE PLAY AND PUSH ROD PLAY**

(a) Depress the pedal until clutch resistance begins to be felt.
Pedal free play: 1.0 – 5.0 mm (0.039 – 0.197 in.)
(b) Gently push on the pedal until the resistance begins to increase a little.
Push rod play at pedal top:
5.0 – 15.0 mm (0.197 – 0.591 in.)



4. **IF NECESSARY, ADJUST PEDAL FREE PLAY AND PUSH ROD PLAY**

(a) Loosen the lock nut and turn the push rod until the free play and push rod play are correct.
(b) Tighten the lock nut.
(c) After adjusting the pedal free play, check the pedal height.



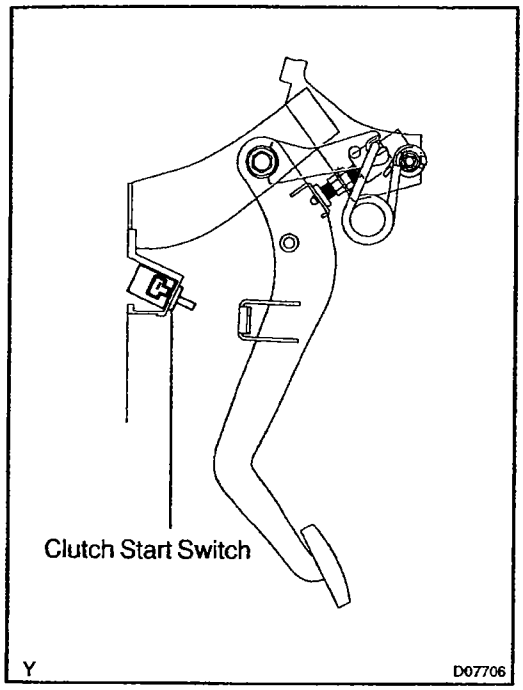
5. **CHECK CLUTCH RELEASE POINT**

(a) Pull the parking brake lever and install wheel stopper.
(b) Start and idle the engine.
(c) Without depressing the clutch pedal, slowly shift the shift lever into reverse position until the gears contact.
(d) Gradually depress the clutch pedal and measure the stroke distance from the point the gear noise stops (release point) to the full stroke end position.
Standard distance: 25 mm (0.98 in.) or more
(From pedal stroke end position to release point)

If the distance is not as specified, perform the following operations.

- Inspect pedal height.
- Inspect push rod play and pedal free play.
- Bleed the clutch line.
- Inspect the clutch cover and disc.

CL

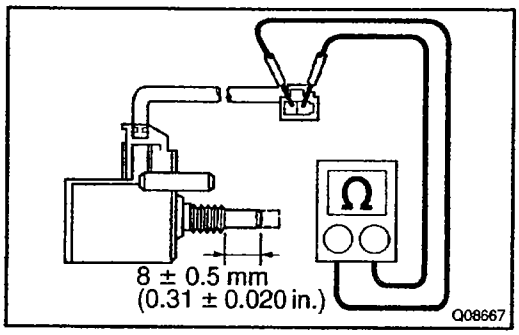


6. CHECK CLUTCH START SYSTEM

(a) Check that the engine does not start when the clutch pedal is released.

(b) Check that the engine starts when the clutch pedal is fully depressed.

If necessary, replace the clutch start switch.



7. INSPECT CLUTCH START SWITCH CONTINUITY

Check the continuity between terminals when the switch is ON and OFF.

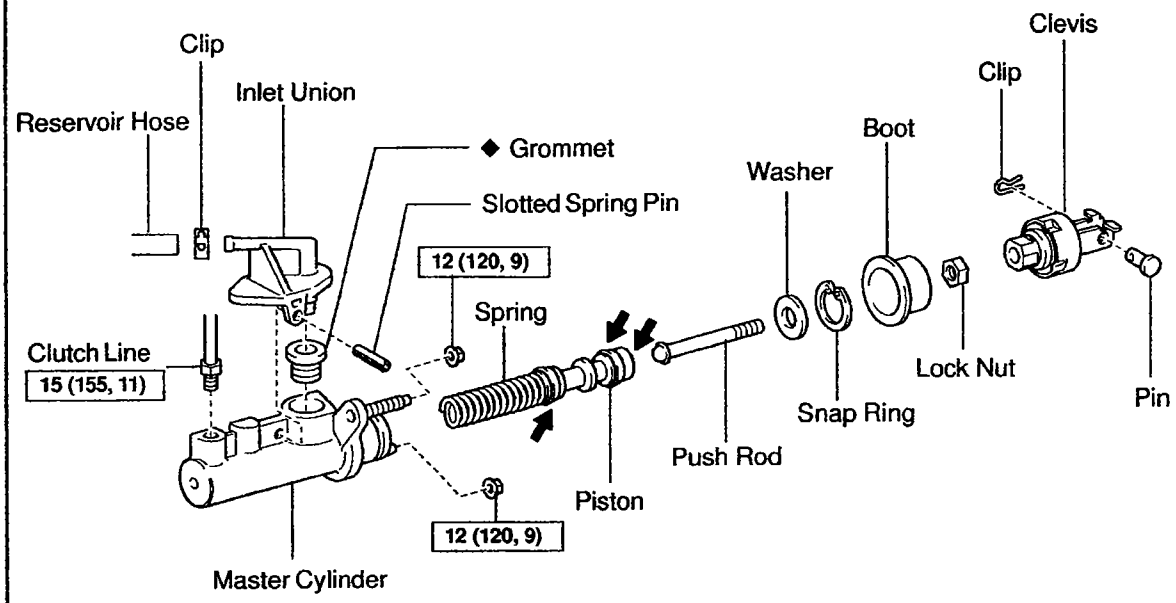
Switch position	Condition
ON (pushed)	Continuity
OFF (free)	No continuity

CL

CLUTCH MASTER CYLINDER

COMPONENTS

CL09E-02



Y N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⬅ Lithium soap base glycol grease

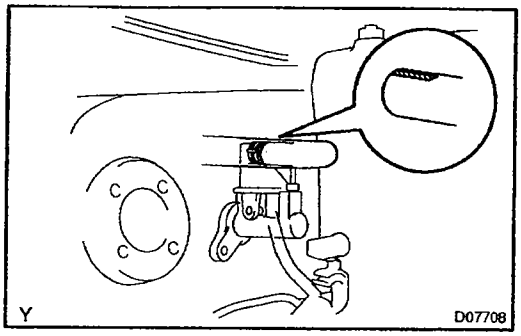
D07726

CL

CL017-04

REMOVAL

1. REMOVE BRAKE BOOSTER (See page BR–15)

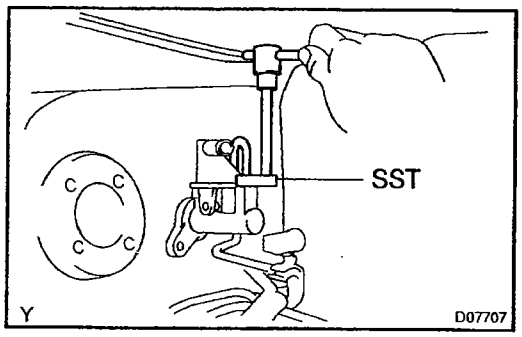


2. DISCONNECT RESERVOIR HOSE

(a) Using pliers, disconnect the clip.

(b) Disconnect the reservoir hose from the inlet union.

(c) Use a container to catch the fluid.



3. DISCONNECT CLUTCH LINE

(a) Using SST, disconnect the clutch line.
SST 09023–00100

(b) Use a container to catch the fluid.

4. REMOVE CLIP AND PIN

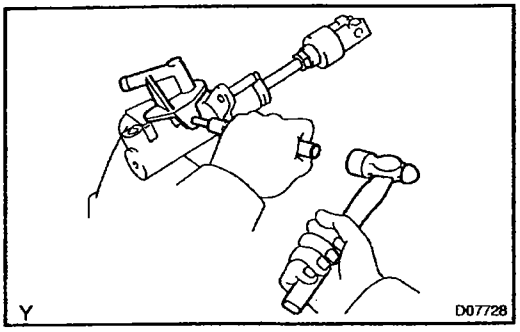
Using needle–nose pliers, remove the clip and pin.

5. REMOVE 2 MOUNTING NUTS AND PULL OUT MASTER CYLINDER

CL

CL09L-01

DISASSEMBLY



1. REMOVE INLET UNION

(a) Using a pin punch (3 mm) and hammer, drive out the slotted spring pin.

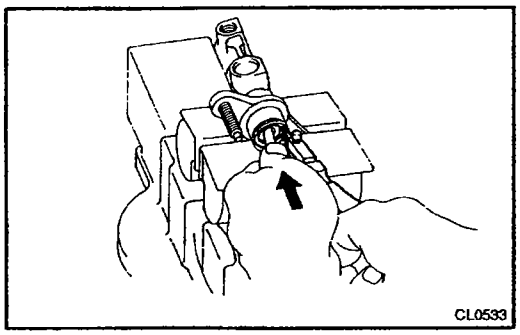
(b) Remove the inlet union.

(c) Remove the grommet.

2. REMOVE CLEVIS

Loosen the lock nut to remove the clevis and remove the lock nut.

3. REMOVE BOOT FROM CYLINDER



4. REMOVE PUSH ROD

(a) While pushing the push rod, using snap ring pliers, remove the snap ring.

(b) Pull out the push rod and washer.

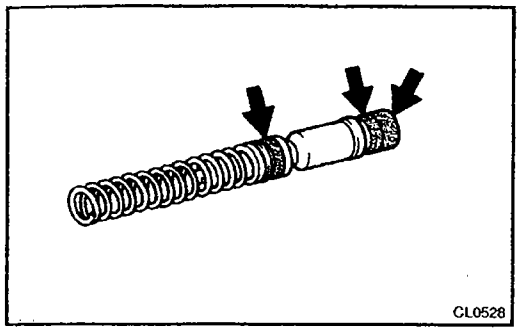
5. REMOVE PISTON WITH SPRING FROM CYLINDER

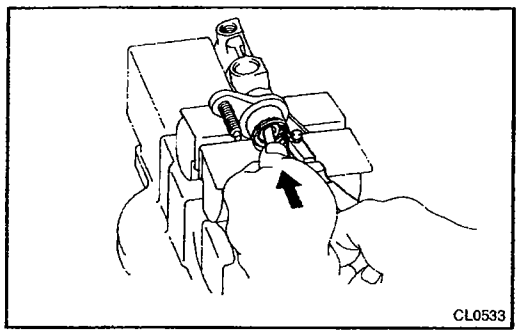
CL

CL09M-01

REASSEMBLY

1. **COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN IN ILLUSTRATION**
2. **INSERT PISTON WITH SPRING INTO CYLINDER**



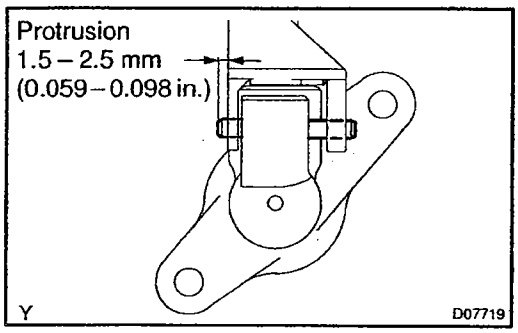


3. **INSTALL PUSH ROD**

(a) Install the washer to the push rod.

(b) Push the push rod into the piston, using snap ring pliers, install the snap ring.

4. **INSTALL BOOT TO CYLINDER**
5. **TEMPORARILY INSTALL LOCK NUT AND CLEVIS**



6. **INSTALL INLET UNION**

(a) Install a new grommet.

(b) Install the inlet union.

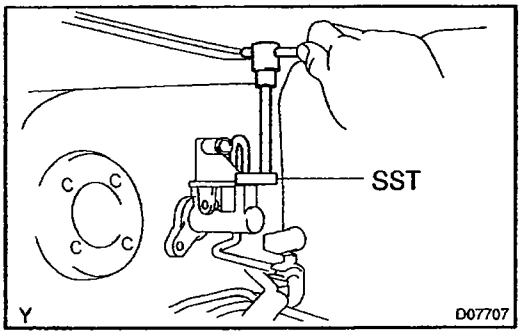
(c) Using a pin punch (3 mm) and hammer, drive in the slotted spring pin.

CL

CL09G-02

INSTALLATION

1. **INSTALL MASTER CYLINDER WITH 2 MOUNTING NUTS**
   Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)
2. **INSTALL PIN AND CLIP**

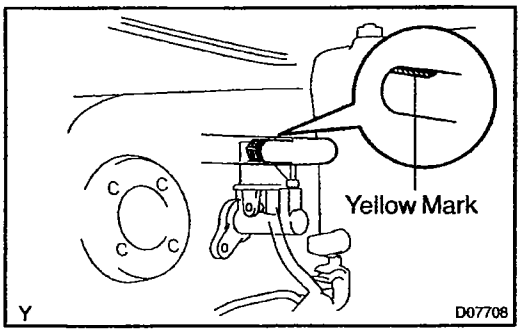


3. **CONNECT CLUTCH LINE**

Using SST, connect the clutch line.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



4. **CONNECT RESERVOIR HOSE**

(a) Connect the reservoir hose to the inlet union.

NOTICE:

Facing the yellow mark upwards.

(b) Using pliers, connect the clip.

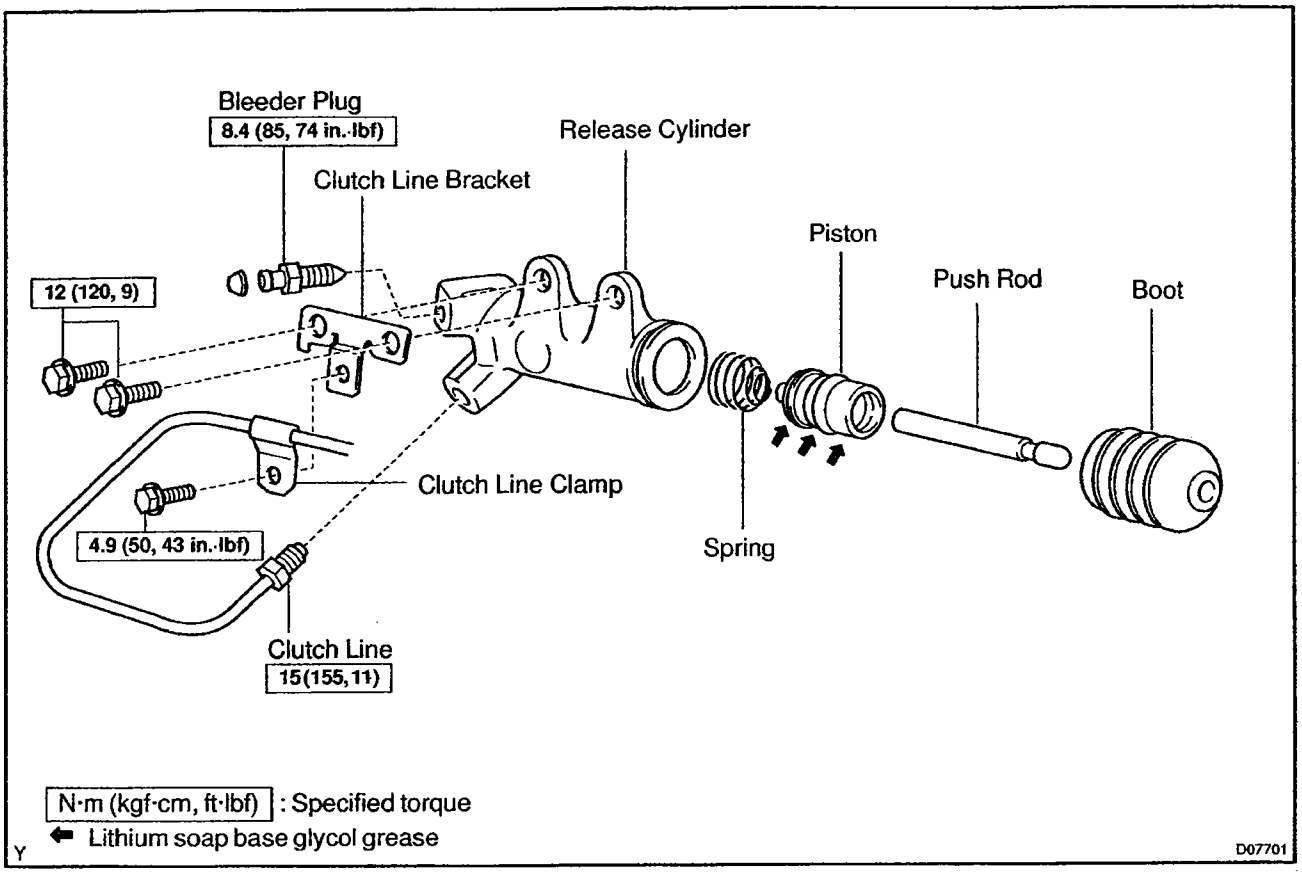
5. **INSTALL BRAKE BOOSTER (See page BR–16)**
6. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED CLUTCH SYSTEM (See page BR–4)**
7. **ADJUST CLUTCH PEDAL (See page CL–2)**
8. **CHECK FOR LEAKS**

CL

CLUTCH RELEASE CYLINDER

CL02U-04

COMPONENTS



CL

CL09H-01

REMOVAL

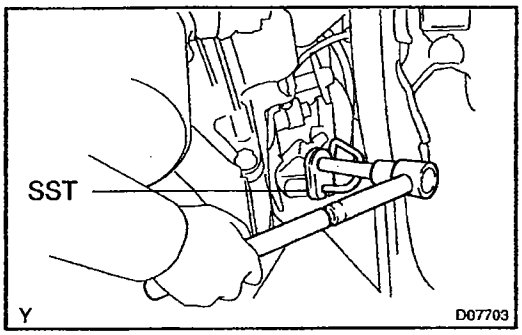
1. DISCONNECT CLUTCH LINE

(a) Raise the vehicle.

CAUTION:

Make sure that the vehicle is securely supported.

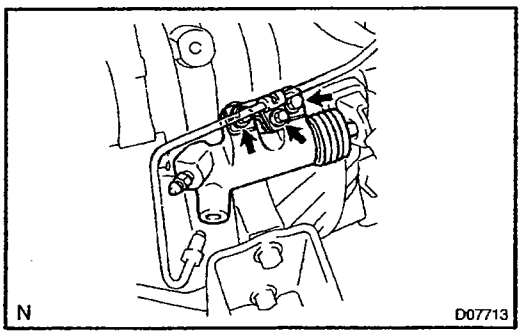
(b) Remove the LH and RH engine under covers.



(c) Using SST, disconnect the clutch line.
SST 09023–00100

(d) Use a container to catch the fluid.

(e) Lower the vehicle.



2. REMOVE RELEASE CYLINDER

(a) Remove the air cleaner case assembly with the air hose.

(b) Remove the clutch line clamp set bolt.

(c) Remove the 2 bolts, clutch line bracket and release cylinder.

CL

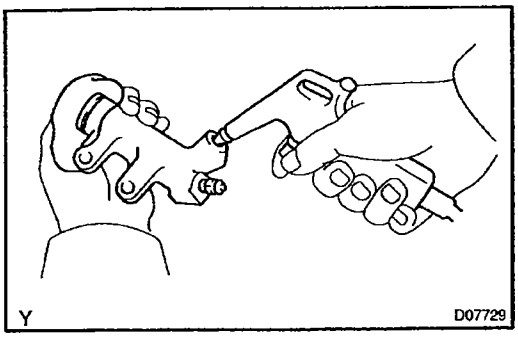
CL02F–03

DISASSEMBLY

1. REMOVE BOOT AND PUSH ROD

(a) Pull out the boot with the push rod.

(b) Remove the boot from the push rod.



2. REMOVE PISTON AND SPRING

Using compressed air, remove the piston with the spring from the cylinder.

NOTICE:

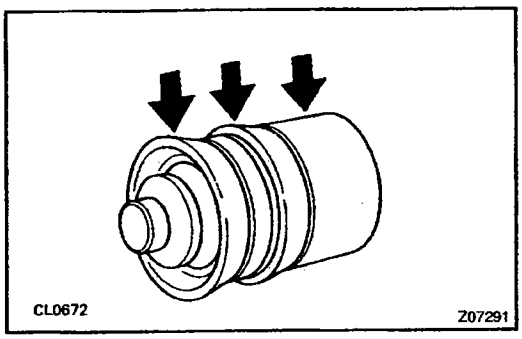
- **Blowing off the air may cause the piston's jump–out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash brake fluid when air–blowing.**

3. REMOVE BLEEDER PLUG

CL02G-03

REASSEMBLY

1. **INSTALL BLEEDER PLUG**
   Torque: 8.4 N·m (85 kgf·cm, 74 in.·lbf)



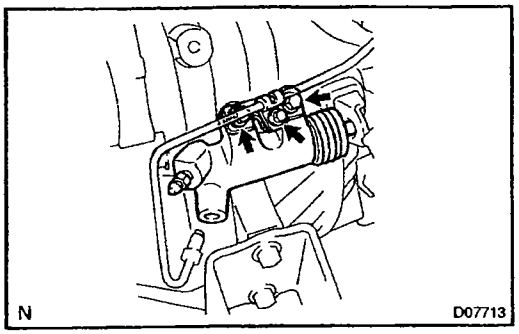
2. **COAT PISTON WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**
3. **INSTALL PISTON AND SPRING INTO CYLINDER**
4. **INSTALL BOOT AND PUSH ROD**

(a) Install the push rod to the boot.

(b) Install the boot with the push rod to the cylinder.

CL09I–01

INSTALLATION

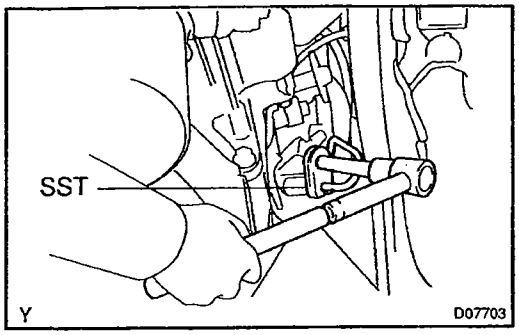


1. INSTALL RELEASE CYLINDER

(a) Install the release cylinder and clutch line bracket with the 2 bolts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(b) Install the clutch line clamp to the clutch line bracket with the bolt.
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(c) Install the air cleaner case assembly with the air hose.



2. CONNECT CLUTCH LINE AND BLEED CLUTCH SYSTEM

(a) Raise the vehicle.

CAUTION:
Make sure that the vehicle is securely supported.

(b) Using SST, connect the clutch line.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

(c) Fill the brake reservoir tank with brake fluid and bleed clutch system.

(d) Check for the leaks.

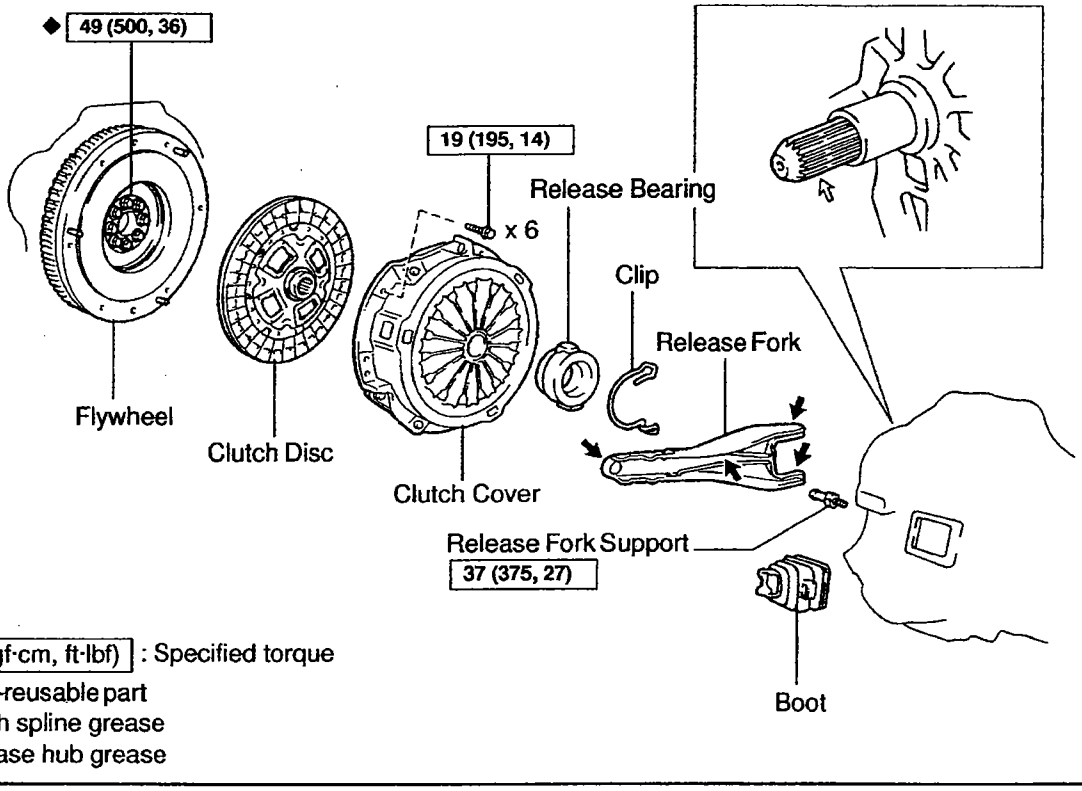
(e) Install the LH and RH engine under covers.

(f) Lower the vehicle.

CLUTCH UNIT

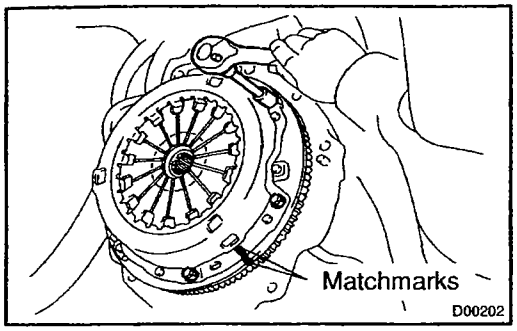
COMPONENTS

CL02Z-04



CL030-04

REMOVAL



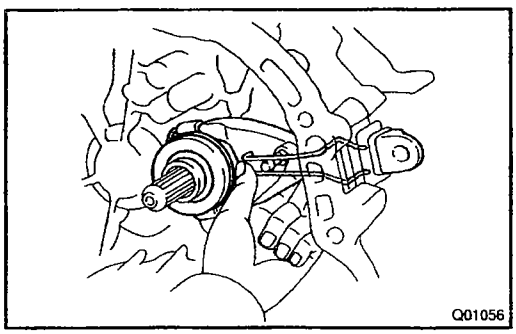
1. **REMOVE TRANSAXLE FROM ENGINE**
   (C56: See page MX–4)
   (C60: See page MX–4)
2. **REMOVE CLUTCH COVER AND DISC**

(a) Align the matchmark on the clutch cover with the one on the flywheel.

(b) Loosen each set bolt one turn at a time until spring tension is released.

(c) Remove the set bolts, and pull off the clutch cover with the clutch disc.

NOTICE:
Do not drop the clutch disc.



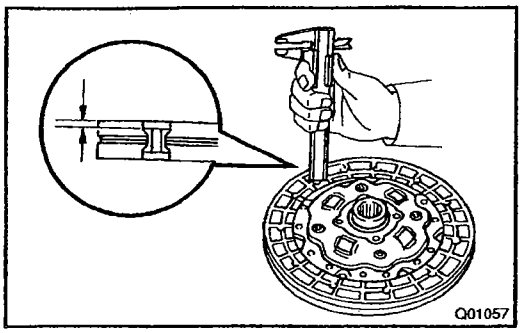
3. **REMOVE RELEASE BEARING AND FORK FROM TRANSAXLE**

Remove the release bearing with the fork together and then separate them.

4. **REMOVE RELEASE FORK SUPPORT AND BOOT**

CL031-04

INSPECTION

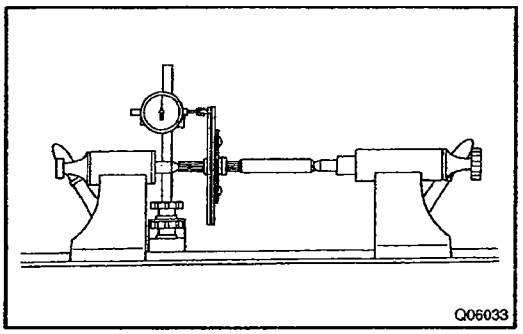


1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using vernier calipers, measure the rivet head depth.

Minimum rivet depth: 0.3 mm (0.012 in.)

If necessary, replace the clutch disc.

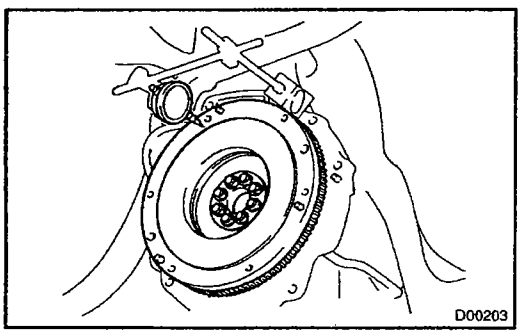


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If necessary, replace the clutch disc runout.



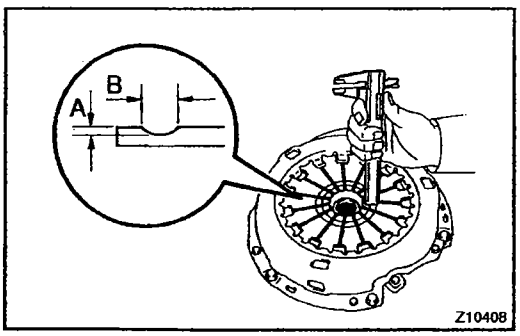
3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout: 0.1 mm (0.004 in.)

If necessary, replace the flywheel.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



4. INSPECT DIAPHRAGM SPRING FOR WEAR

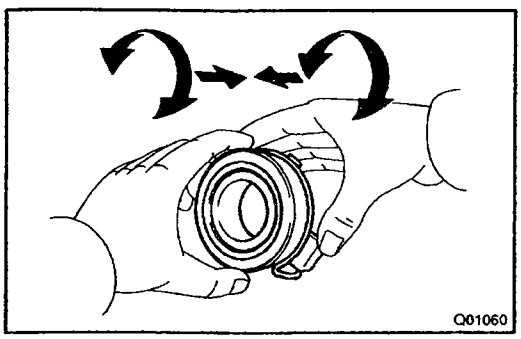
Using vernier calipers, measure the diaphragm spring for depth and width of wear.

Maximum:

A (Depth): 0.5 mm (0.020 in.)

B (Width): 6.0 mm (0.236 in.)

If necessary, replace the clutch cover.



5. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the axial direction.

HINT:

The bearing is permanently lubricated and requires no cleaning or lubrication.

If necessary, replace the release bearing.

CL032-05

INSTALLATION

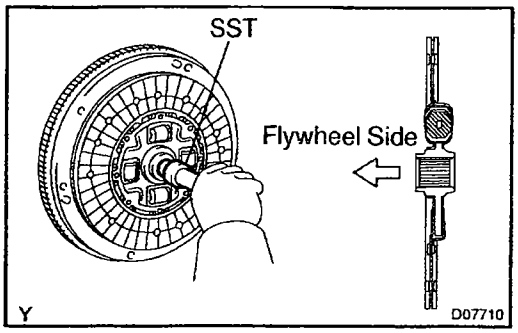
1. INSTALL CLUTCH DISC AND CLUTCH COVER ON FLYWHEEL

(a) Insert SST in the clutch disc, then insert them in the flywheel.

SST 09301–00210

HINT:

Take care not to insert clutch disc in the wrong direction.



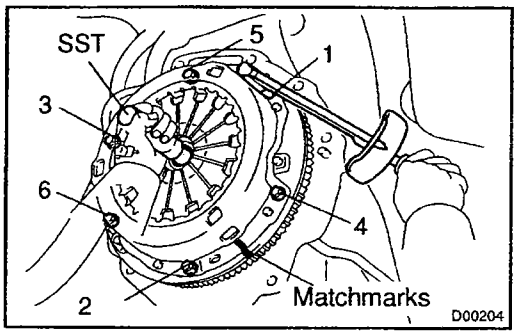
(b) Align the matchmarks on the clutch cover and flywheel.

(c) Following the procedures shown in the illustration, tighten the 6 bolts in the order starting the bolt locating near the knock pin on the top.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:

- Following the order in the illustration, tighten the bolts at a time evenly.
- Move SST up and down, right and left lightly, after checking that the disc is in the center, tighten the bolts.



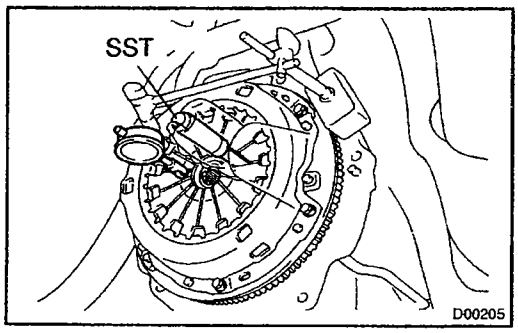
2. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

Using a dial indicator with roller instrument, check the diaphragm spring tip alignment.

Maximum non–alignment: 0.5 mm (0.020 in.)

If alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.

SST 09333–00013



3. INSTALL BOOT AND RELEASE FORK SUPPORT TO TRANSAXLE

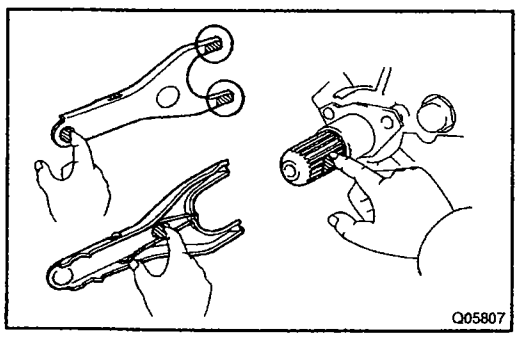
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

4. APPLY RELEASE HUB GREASE

Apply release hub grease to the release fork and hub contact, release fork and push rod contact and release fork pivot points.

Sealant:

Part No. 08887–01806, RELEASE HUB GREASE or equivalent



5. APPLY CLUTCH SPRING GREASE

Apply clutch spline grease to the input shaft spline.

Sealant:

Part No. 08887–01706, CLUTCH SPLINE GREASE or equivalent

6. INSTALL RELEASE BEARING AND FORK TO TRANSAXLE

Install the bearing to the release fork, and then install them to the transaxle.

7. INSTALL TRANSAXLE TO ENGINE

(C56: See page MX–8)

(C60: See page MX–8)

– MEMO –

MANUAL TRANSAXLE (C56)

TROUBLESHOOTING	MX–1
MANUAL TRANSAXLE UNIT	MX–2
MANUAL TRANSAXLE ASSEMBLY	MX–9
INPUT SHAFT	MX–26
OUTPUT SHAFT	MX–34
SHIFT AND SELECT LEVER SHAFT	MX–44
DIFFERENTIAL CASE	MX–45
SHIFT LEVER AND CONTROL CABLE	MX–52

MX

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

MX002-03

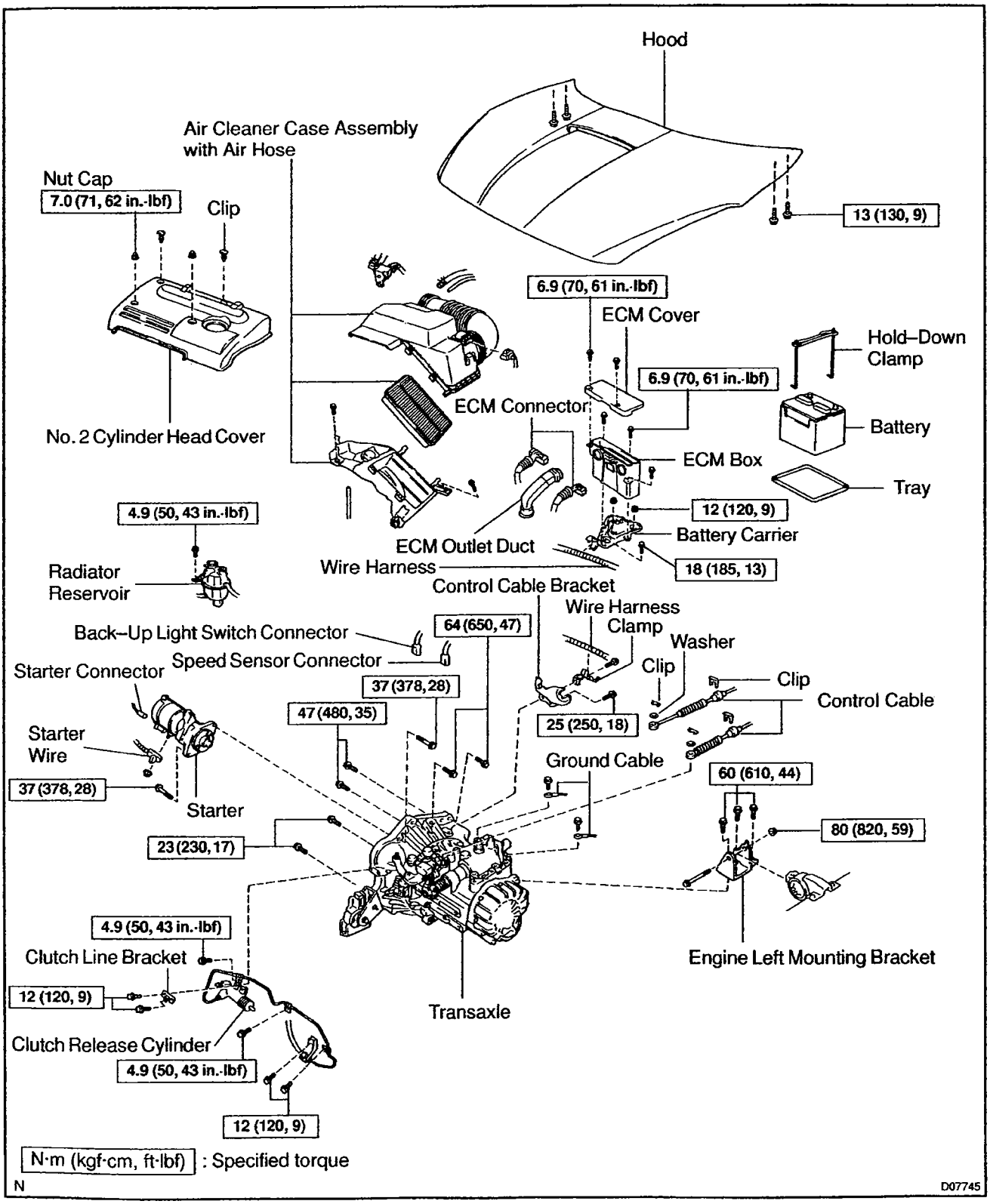
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace parts.

Symptom	Suspect Area	See page
Noise	1. Oil (Level low)	MX–4
	2. Oil (Wrong)	MX–4
	3. Gear (Worn or damaged)	MX–9
	4. Bearing (Worn or damaged)	MX–9
Oil leakage	1. Oil (Level too high)	MX–4
	2. Gasket (Damaged)	MX–4
	3. Oil seal (Worn or damaged)	MX–4
	4. O–Ring (Worn or damaged)	MX–4
Hard to shift or will not shift	1. Control cable (Faulty)	MX–52
	2. Synchronizer ring (Worn or damaged)	MX–4
		MX–29
		MX–38
	3. Shifting key spring (Damaged)	MX–4
		MX–29
		MX–38
Jumps out of gear	1. Locking ball spring (Damaged)	MX–4
	2. Gear shift fork (Worn)	MX–4
	3. Gear (Worn or damaged)	MX–4
	4. Bearing (Worn or damaged)	MX–4

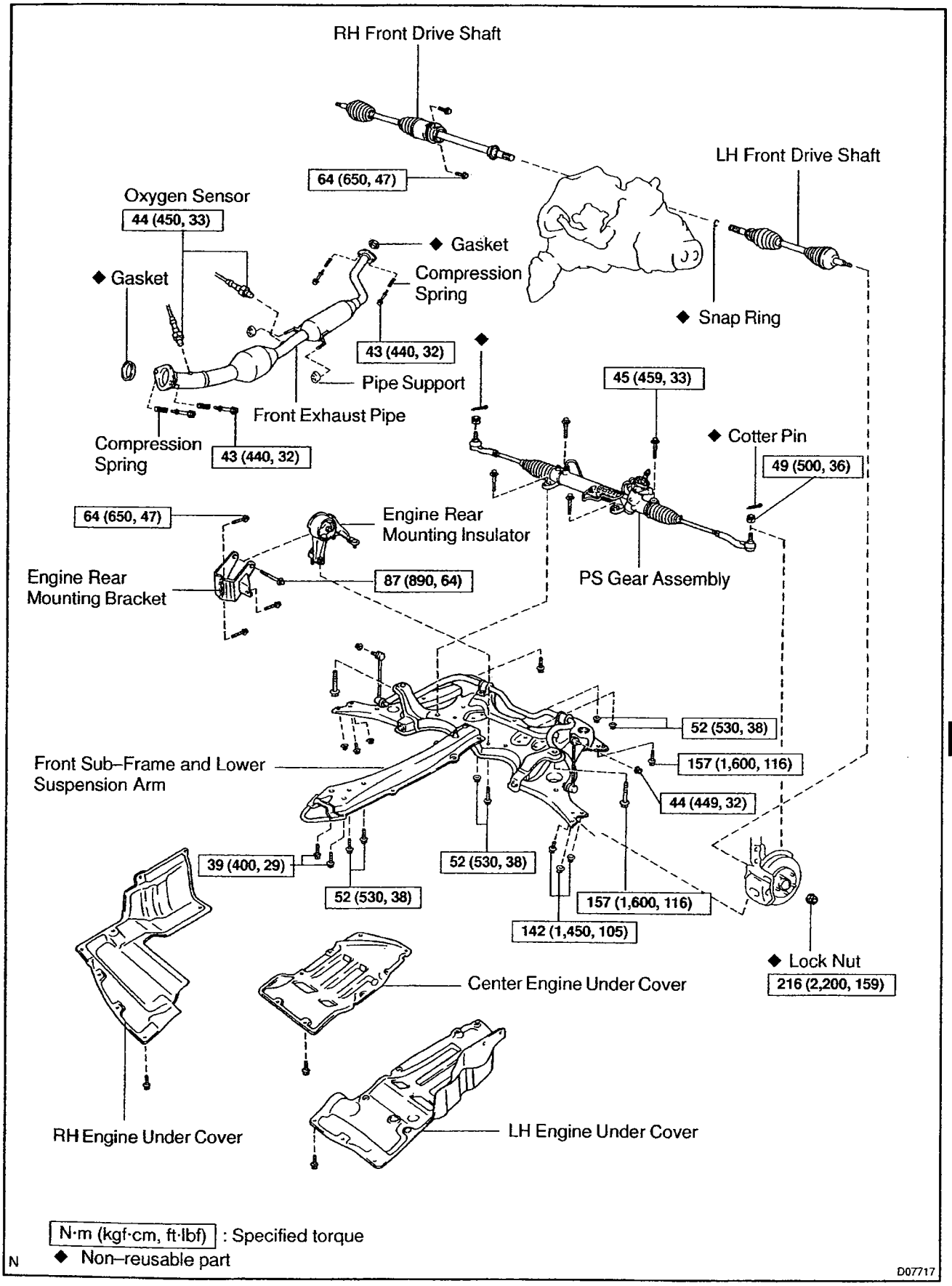
MANUAL TRANSAXLE UNIT

COMPONENTS

MX09F–01



MX



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

N

D07717

MX09G-01

REMOVAL

1. REMOVE HOOD

HINT:

At the time of installation, please refer to the following item.

Adjust the hood. (See page BO–9)

2. REMOVE NO. 2 CYLINDER HEAD COVER

Remove the 2 nut caps, clips and No. 2 cylinder head cover.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

3. DISCONNECT RADIATOR RESERVOIR

Remove the bolt and disconnect the radiator reservoir.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

4. REMOVE BATTERY

5. REMOVE AIR CLEANER CASE ASSEMBLY WITH AIR HOSE AND ECM BOX

(a) Remove the 2 bolts and ECM cover.

Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(b) Disconnect the ECM connectors from the ECM.

(c) Remove the ECM outlet duct.

(d) Remove the air cleaner case assembly with the air hose.

(e) Remove the 3 bolts and ECM box.

Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(f) Disconnect the wire harness, and remove the 2 nuts, bolt and battery carrier.

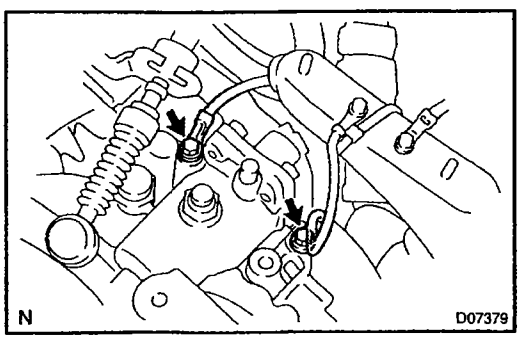
Torque:
Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)

6. DISCONNECT CONTROL CABLE

(a) Remove the 2 clips and washers.

(b) Remove the 2 clips and disconnect the control cables from the transaxle.

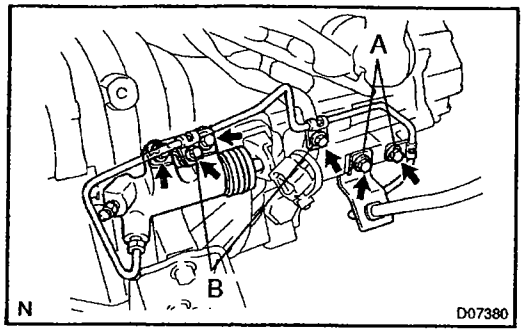
MX



7. DISCONNECT GROUND CABLE

Remove the 2 set bolts of the 2 ground cables from the transaxle.

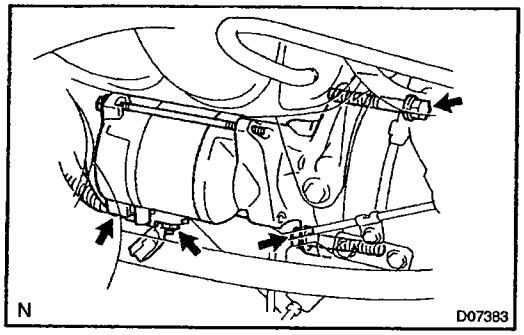
8. DISCONNECT SPEED SENSOR AND BACK–UP LIGHT SWITCH CONNECTORS



9. DISCONNECT CLUTCH RELEASE CYLINDER

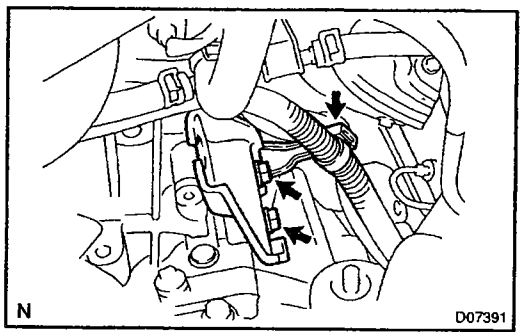
(a) Remove the 4 set bolts of the clutch line.
Torque:
Bolt A: 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt B: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(b) Remove the 2 set bolts of the clutch release cylinder and clutch line bracket.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



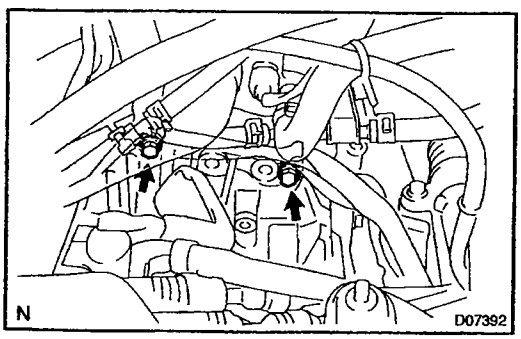
10. REMOVE STARTER

(a) Disconnect the starter connector.
(b) Remove the nut and disconnect the starter wire.
(c) Remove the 2 bolts and starter.
Torque: 37 N·m (378 kgf·cm, 28 ft·lbf)

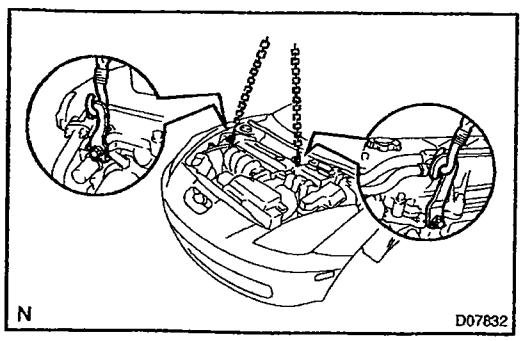


11. REMOVE CONTROL CABLE BRACKET

(a) Disconnect the wire harness from the clamp.
(b) Remove the 2 bolts, clamp and control cable bracket from the transaxle.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



12. REMOVE 2 TRANSAXLE UPPER SIDE MOUNTING BOLTS
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

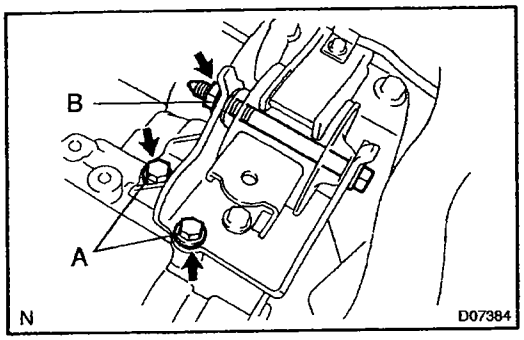


13. ATTACH ENGINE SLING DEVICE TO ENGINE HANGER

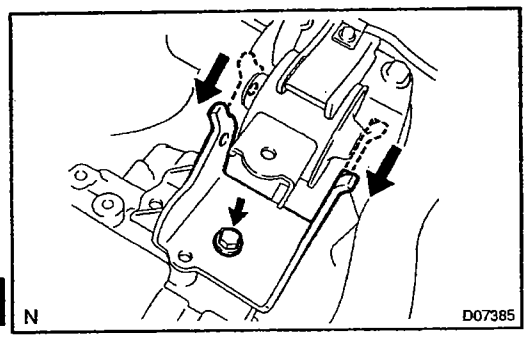
(a) Disconnect the 2 PCV hoses.
(b) Install the No. 1 and No. 2 engine hangers in the correct direction.
Parts No.:
No. 1 engine hanger: 12281–22021
No. 2 engine hanger: 12281–15040 or 12281–15050
Bolt: 91512–B1016
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(c) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.



14. REMOVE ENGINE LEFT MOUNTING BRACKET 3 SET BOLTS AND NUT
Torque:
Bolt A: 60 N·m (610 kgf·cm, 44 ft·lbf)
Nut B: 80 N·m (820 kgf·cm, 59 ft·lbf)

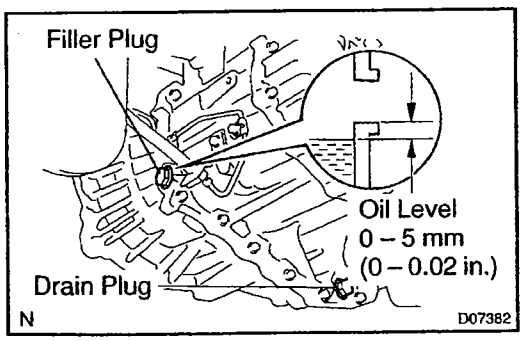


15. REMOVE ENGINE LEFT MOUNTING BRACKET
Lower the transaxle side, and remove the bolt and engine left mounting bracket.
Torque: 60 N·m (610 kgf·cm, 44 ft·lbf)

16. RAISE VEHICLE

CAUTION:
Make sure that the vehicle is securely supported.

17. REMOVE CENTER, LH AND RH ENGINE UNDER COVERS



18. DRAIN TRANSAXLE OIL
Oil grade: API GL–4 or GL–5
Viscosity: SAE 75W–90
Capacity: 1.9 liters (2.0 US qts, 1.7 Imp. qts)
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

19. REMOVE LH AND RH FRONT DRIVE SHAFTS
(See page SA–18)

20. REMOVE FRONT EXHAUST PIPE

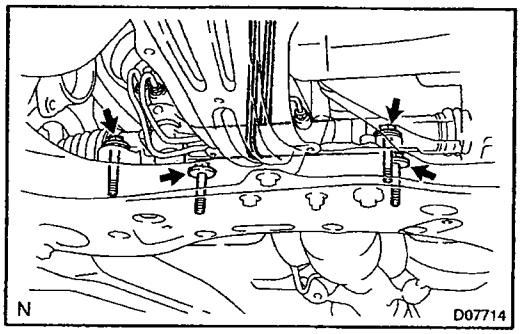
(a) Disconnect the 2 heated oxygen sensors.
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

HINT:
At the time of installation, please refer to the following items.
- Before installing the heated oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing the heated oxygen sensor, check that the sensor wire is not twisted. If it is twisted, remove the heated oxygen sensor and reinstall it.

(b) Remove the 4 bolts, compression springs and 2 gaskets.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

MX

(c) Disconnect the front exhaust pipe from the pipe supports and remove it.



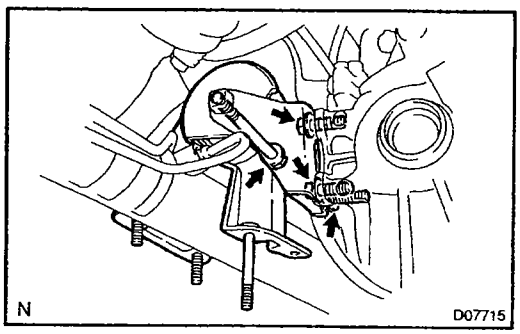
21. REMOVE FRONT SUB–FRAME AND LOWER SUSPENSION ARM

(a) Tie the PS gear assembly to the proper position with a code or an equivalent to suspend the assembly securely.

(b) Remove the 4 set bolts of the PS gear assembly.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

(c) Disconnect the LH and RH stabilizer bar links from the shock absorber. (See page SA–51)

(d) Remove the front sub–frame and lower suspension arm. (See page SA–42)



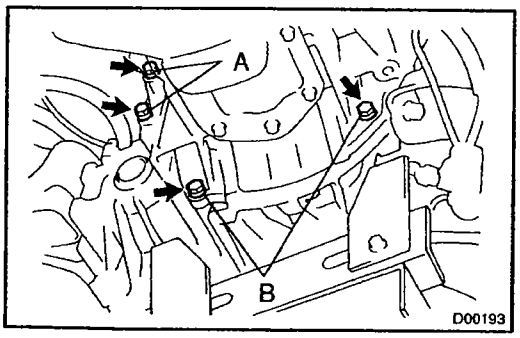
22. REMOVE ENGINE REAR MOUNTING INSULATOR AND BRACKET

(a) Remove the bolt and engine rear mounting insulator.
Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)

(b) Remove the 3 bolts and engine rear mounting bracket.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

23. JACK UP TRANSAXLE SLIGHTLY

Using a transmission jack, support the transaxle.



24. REMOVE 4 TRANSAXLE LOWER SIDE MOUNTING BOLTS
Torque:
Bolt A: 47 N·m (480 kgf·cm, 35 ft·lbf)
Bolt B: 23 N·m (230 kgf·cm, 17 ft·lbf)

25. REMOVE TRANSAXLE

Lower the engine left side and remove the transaxle from the engine.

HINT:

At the time of installation, please refer to the following items.

- Align the input shaft with the clutch disc and install the transaxle to the engine.
- Temporarily tighten the transaxle mounting bolts.

MX09H–01

INSTALLATION

Installation is in the reverse order of removal. (See page MX–4)

HINT:

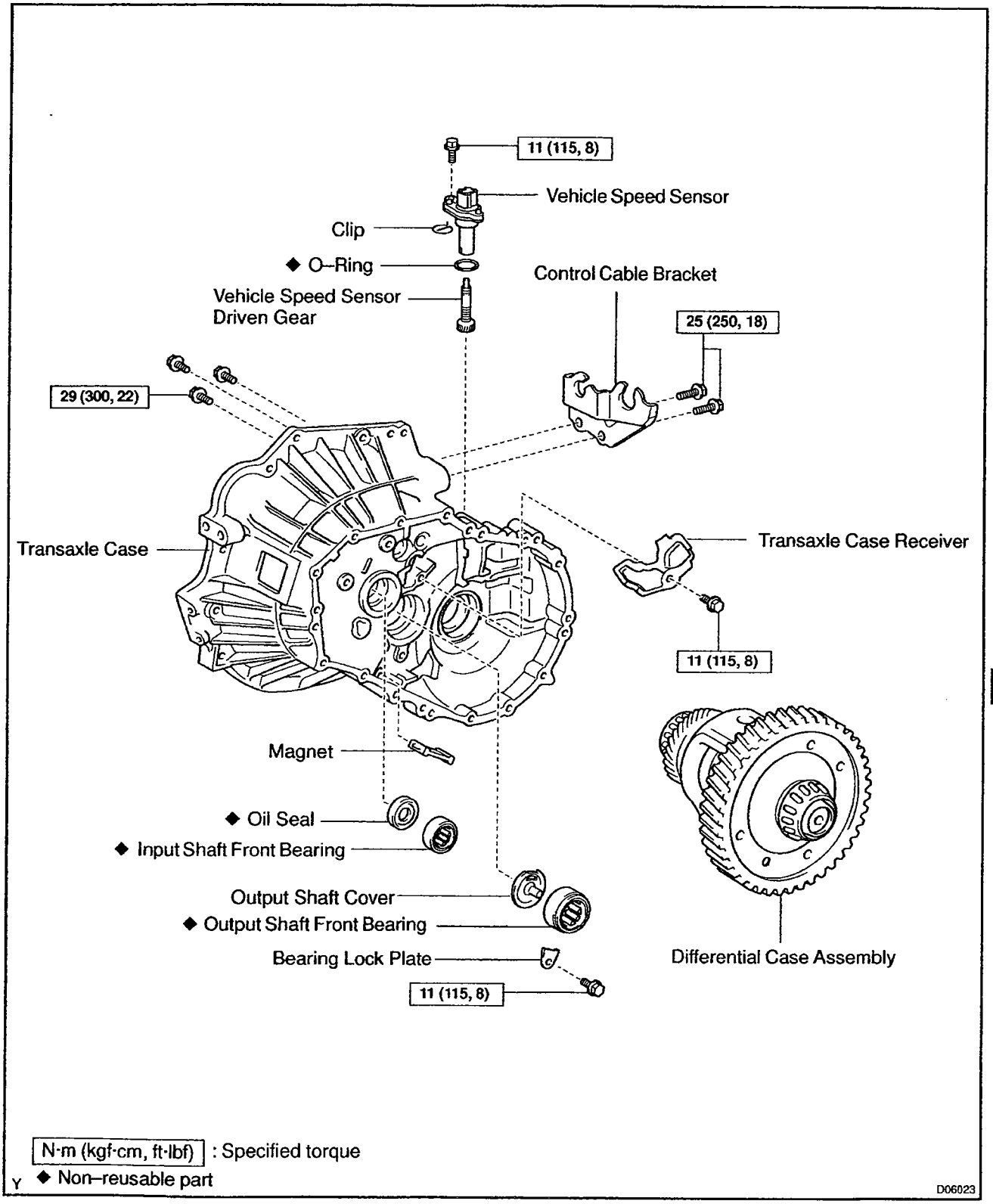
After installation, check and inspect items as follows.

- Front wheel alignment. (See page SA–4)
- Do the road test.

MANUAL TRANSAXLE ASSEMBLY

COMPONENTS

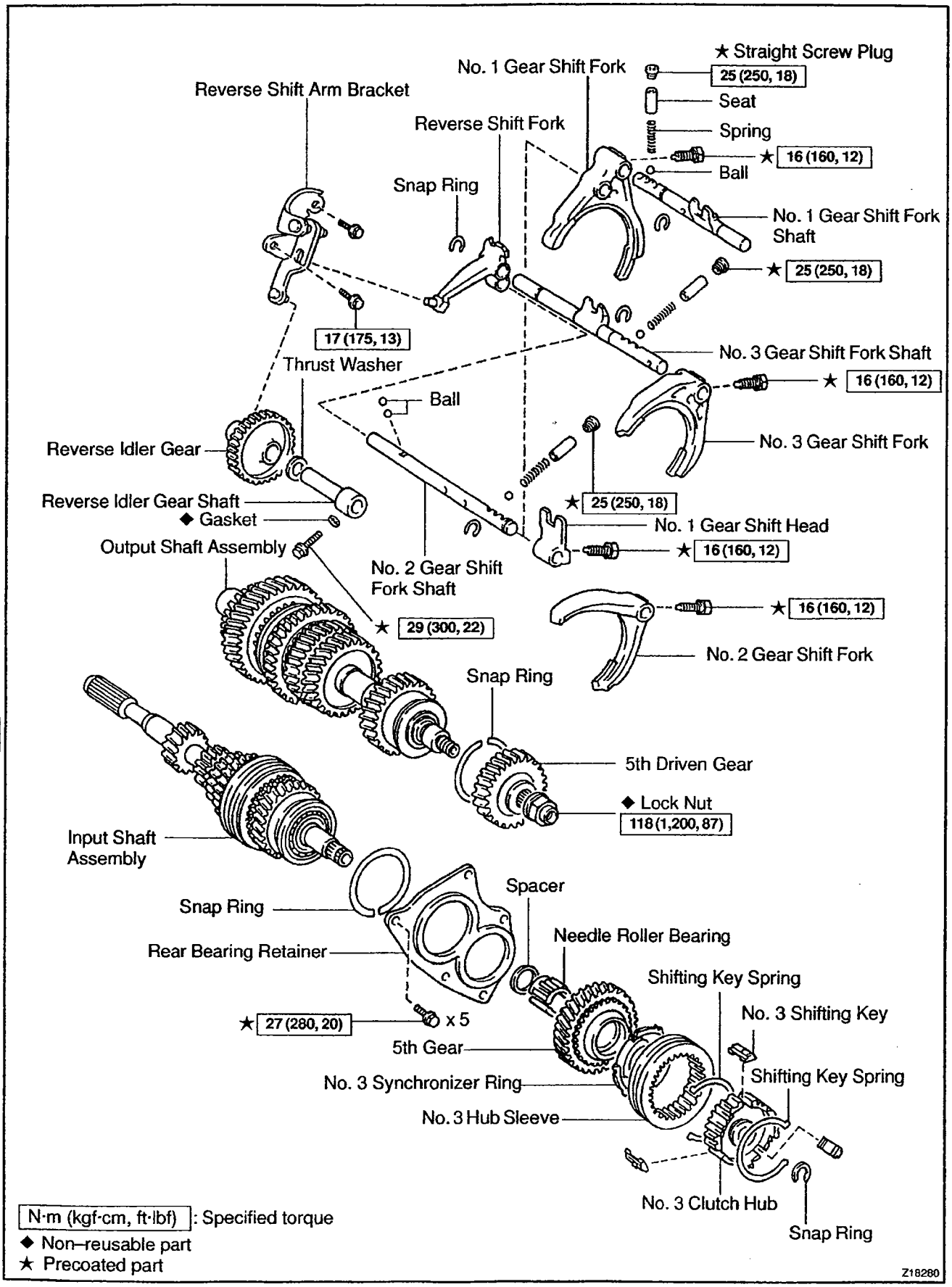
MX006-03



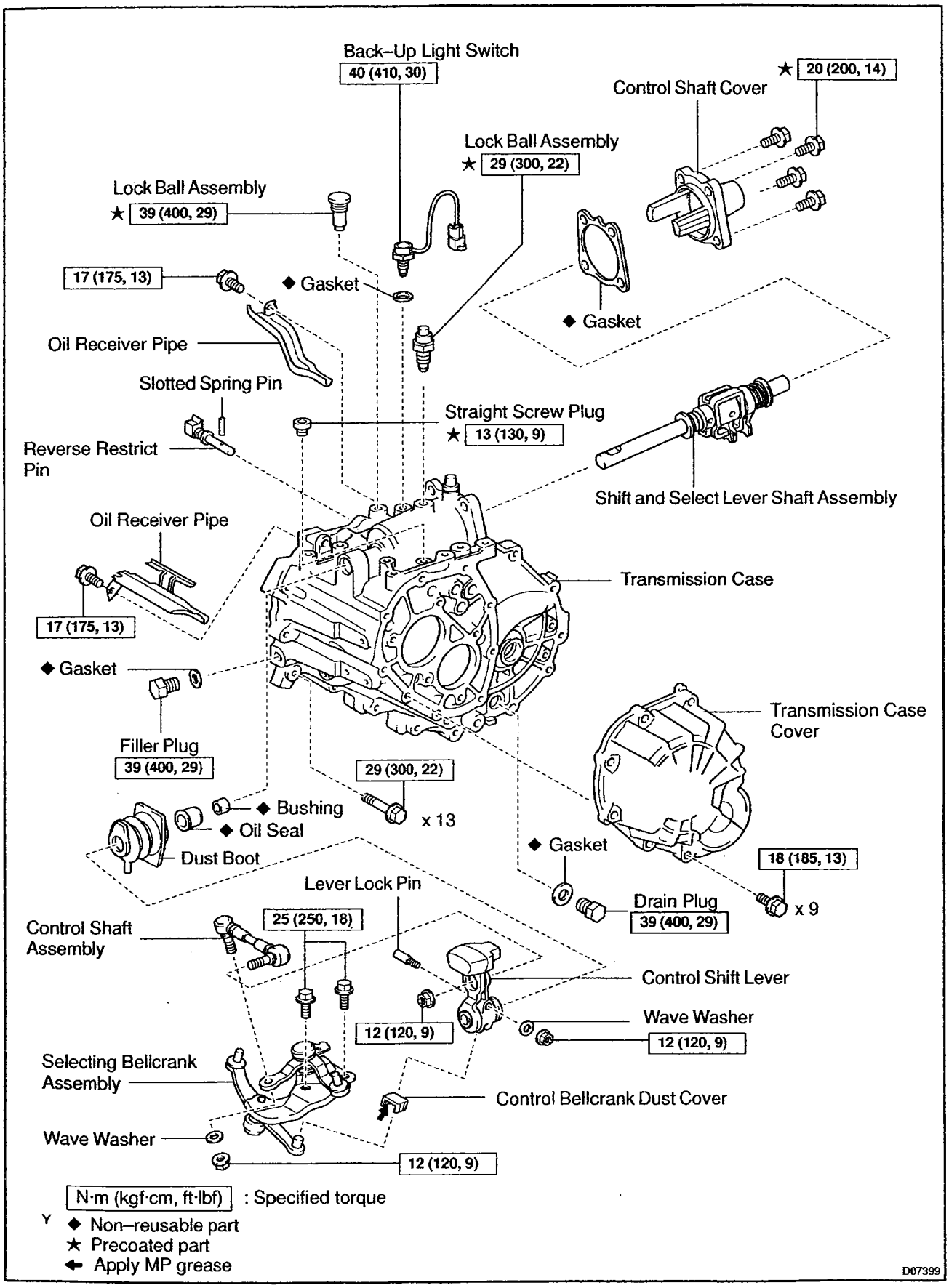
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

D06023


★ Straight Screw Plug
25 (250, 18)
No. 1 Gear Shift Fork
Seat
Spring
★ 16 (160, 12)
Ball
Reverse Shift Arm Bracket
Reverse Shift Fork
Snap Ring
No. 1 Gear Shift Fork Shaft
★ 25 (250, 18)
17 (175, 13)
No. 3 Gear Shift Fork Shaft
Thrust Washer
★ 16 (160, 12)
Ball
Reverse Idler Gear
No. 3 Gear Shift Fork
Reverse Idler Gear Shaft
◆ Gasket
★ 25 (250, 18)
No. 1 Gear Shift Head
Output Shaft Assembly
★ 16 (160, 12)
No. 2 Gear Shift Fork Shaft
★ 29 (300, 22)
★ 16 (160, 12)
No. 2 Gear Shift Fork
Snap Ring
5th Driven Gear
◆ Lock Nut
118 (1,200, 87)
Input Shaft Assembly
Spacer
Snap Ring
Needle Roller Bearing
Rear Bearing Retainer
Shifting Key Spring
No. 3 Shifting Key
★ 27 (280, 20) x 5
5th Gear
Shifting Key Spring
No. 3 Synchronizer Ring
No. 3 Hub Sleeve
No. 3 Clutch Hub
Snap Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
Z18280

MX


Back–Up Light Switch
40 (410, 30)
★ 20 (200, 14)
Control Shaft Cover
Lock Ball Assembly
★ 29 (300, 22)
Lock Ball Assembly
★ 39 (400, 29)
17 (175, 13)
◆ Gasket
◆ Gasket
Oil Receiver Pipe
Slotted Spring Pin
Straight Screw Plug
★ 13 (130, 9)
Reverse Restrict Pin
Shift and Select Lever Shaft Assembly
Oil Receiver Pipe
Transmission Case
17 (175, 13)
◆ Gasket
Transmission Case Cover
Filler Plug
39 (400, 29)
29 (300, 22)
x 13
◆ Bushing
◆ Oil Seal
Dust Boot
◆ Gasket
18 (185, 13)
x 9
Drain Plug
39 (400, 29)
Lever Lock Pin
25 (250, 18)
Control Shaft Assembly
Control Shift Lever
Wave Washer
12 (120, 9)
12 (120, 9)
Selecting Bellcrank Assembly
Control Bellcrank Dust Cover
Wave Washer
12 (120, 9)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
Apply MP grease
D07399

MX09I-01

DISASSEMBLY

1. **REMOVE FILLER PLUG AND DRAIN PLUG WITH 2 GASKETS**
   Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
2. **REMOVE VEHICLE SPEED SENSOR**

(a) Remove the bolt and vehicle speed sensor.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

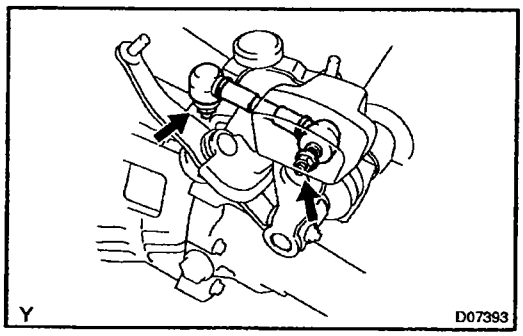
(b) Using a small screwdriver, remove the clip from the vehicle speed sensor.

(c) Remove the vehicle speed sensor driven gear from the speed sensor.

(d) Using a small screwdriver, remove the O–ring from the vehicle speed sensor.

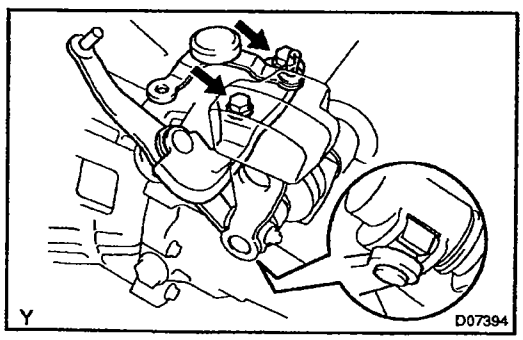
3. **REMOVE BACK–UP LIGHT SWITCH WITH GASKET**
   Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)
4. **REMOVE CONTROL CABLE BRACKET**

Remove the 2 bolts and control cable bracket.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



5. **REMOVE CONTROL SHAFT ASSEMBLY**

Remove the 2 nuts, wave washer and control shaft assembly.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



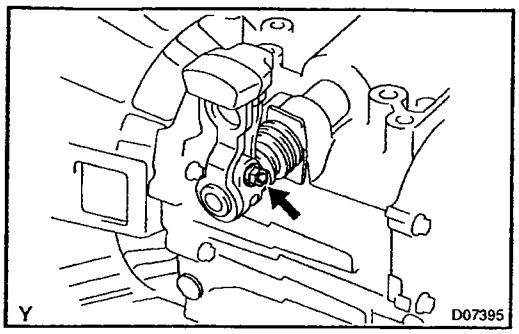
6. **REMOVE SELECTING BELLCRANK ASSEMBLY**

(a) Remove the 2 bolts and selecting bellcrank assembly.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:
At the time of reassembly, please refer to the following item.
Fit the selecting bellcrank assembly pin part with the dust cover into a groove in the control shift lever.

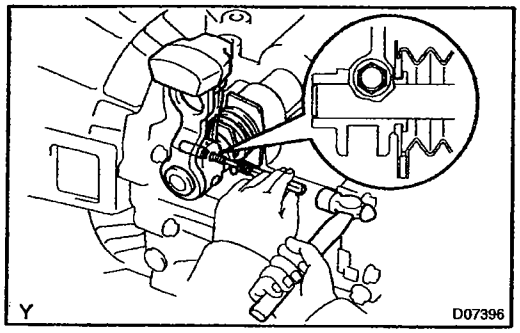
(b) Remove the control bellcrank dust cover from the selecting bellcrank assembly.

NOTICE:
At the time of reassembly, please refer to the following item.
Apply MP grease to the inside circumferential surface of the control bellcrank dust cover.



7. REMOVE CONTROL SHIFT LEVER AND DUST BOOT

(a) Remove the nut and wave washer.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



(b) Using a pin punch and hammer, drive out the lever lock pin.

NOTICE:

At the time of reassembly, please refer to the following item.

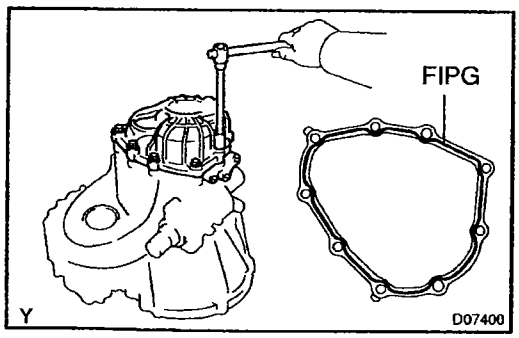
When fixing the lever lock pin, properly position the shaft groove.

(c) Remove the control shift lever and dust boot.

NOTICE:

At the time of reassembly, please refer to the following items.

- **Install the dust boot into a groove in the control shift lever.**
- **Be sure to install the dust boot in the correct direction, as shown in the illustration.**



8. REMOVE TRANSMISSION CASE COVER

(a) Remove the 9 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

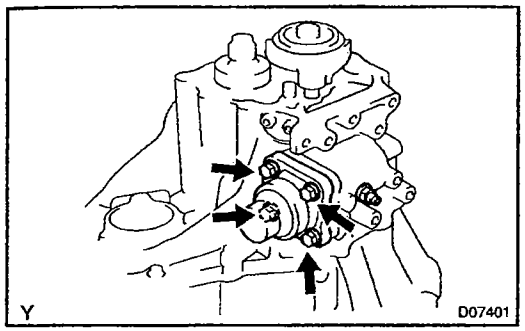
(b) Using a brass bar and hammer, carefully tap the projection of the transmission case cover to remove the transmission case cover from the transmission case.

HINT:

At the time of reassembly, please refer to the following item.

Apply FIPG to the transmission case cover, as shown in the illustration.

FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent



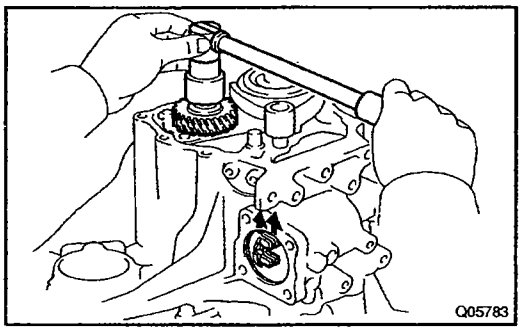
9. REMOVE LOCK BALL ASSEMBLY AND CONTROL SHAFT COVER

(a) Remove the lock ball assembly.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Remove the 4 bolts and control shaft cover with the gasket.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

10. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY

NOTICE:
At the time of reassembly, please refer to the following item.
Set the claws of the shift interlock plate into the shift head part of the gear shift fork shaft securely.



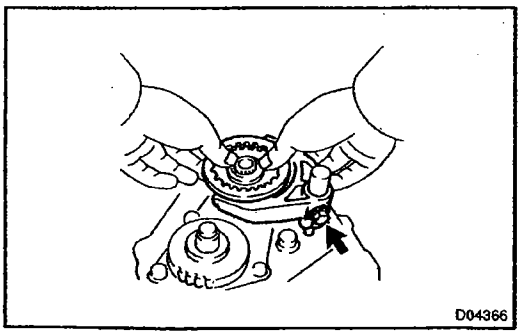
11. REMOVE LOCK NUT

(a) Engage the gear double meshing.

(b) Using a chisel and hammer, loosen the staked part of the nut.

(c) Remove the lock nut.
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

(d) Disengage the gear double meshing.

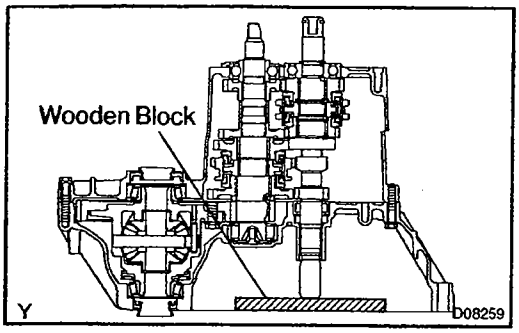


12. REMOVE NO. 3 HUB SLEEVE AND NO. 3 GEAR SHIFT FORK

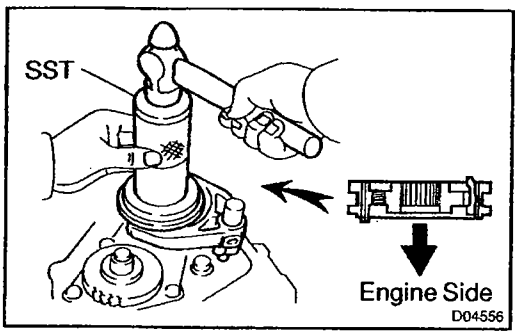
(a) Remove the bolt from the No. 3 gear shift fork.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Remove the No. 3 hub sleeve with the No. 3 gear shift fork.

HINT:
At the time of reassembly, please refer to the following items.
- Install the No. 3 clutch hub assembly to the No. 3 hub sleeve.



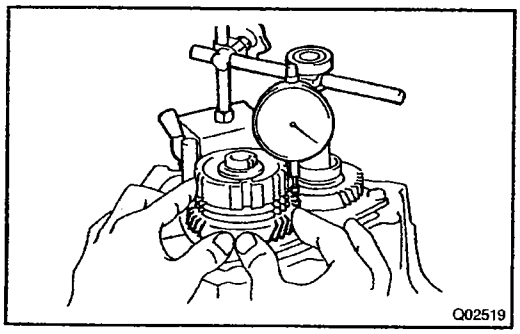
- Before driving in the No. 3 clutch hub assembly, place the suitable sized wooden block on the rear side of the input shaft, as shown in the illustration. When driving it in, fix the input shaft firmly so that it is not pushed downward. Otherwise the input shaft rear radial ball bearing is overloaded, it might be damaged.



- Using SST and a hammer, drive in the No. 3 hub sleeve assembly with the No. 3 gear shift fork.
  SST 09636–20010

NOTICE:

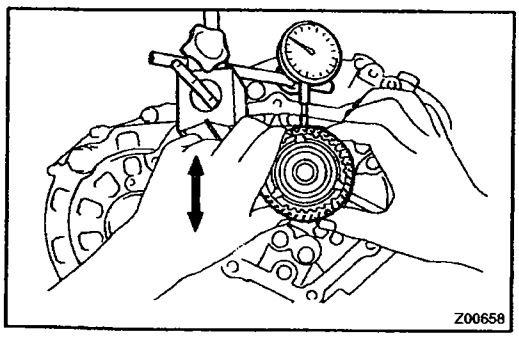
- **Be sure to install the No. 3 hub sleeve assembly in the correct direction, as shown in the illustration.**
- **Align the No. 3 synchronizer ring slots with the No. 3 shifting keys.**



13. INSPECT 5TH GEAR THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance.

Standard clearance:
0.10 – 0.57 mm (0.0039 – 0.0224 in.)
Maximum clearance:
0.57 mm (0.0224 in.)

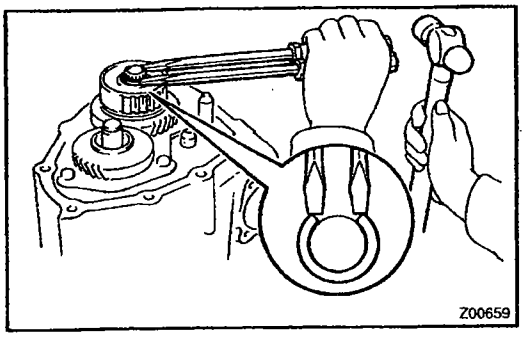


14. INSPECT 5TH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056mm (0.0022 in.)

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.



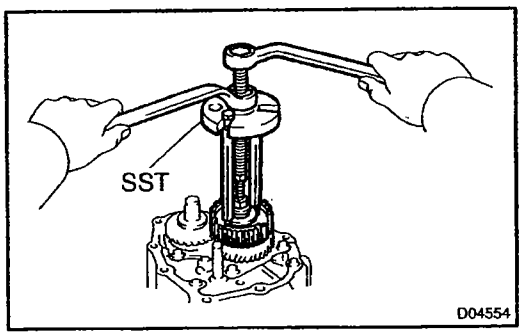
15. REMOVE NO. 3 CLUTCH HUB AND 5TH GEAR

(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:
At the time of reassembly, please refer to the following item.
Select a snap ring from the table below that will make the thrust clearance of the No. 3 clutch hub less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.25 (0.0886)	E	2.49 (0.0980)
B	2.31 (0.0909)	F	2.55 (0.1004)
C	2.37 (0.0933)	G	2.61 (0.1028)
D	2.43 (0.0957)	–	–

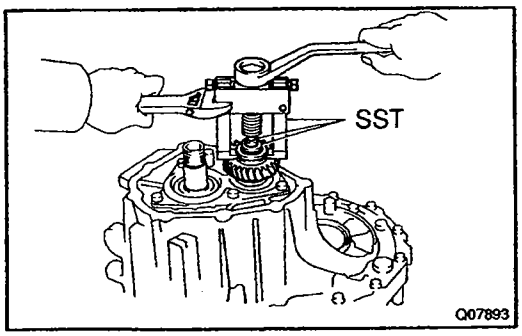
(b) Using a screwdriver, remove the shifting key spring from the No. 3 clutch hub.



(c) Install a bolt and washer to the tip of the input shaft and using SST, remove the No. 3 clutch hub.
SST 09950–30011

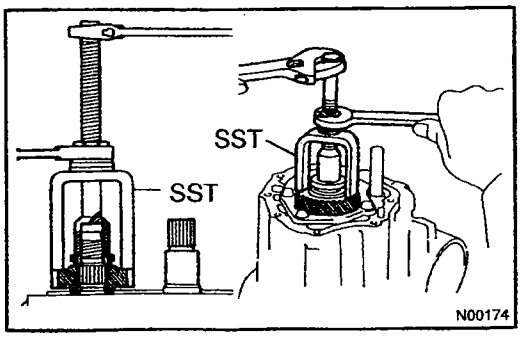
HINT:
Select a bolt whose outer diameter is smaller than the screw hole of the input shaft so that it can be turned easily.

(d) Remove the No. 3 synchronizer ring, 5th gear, needle roller bearing and spacer.

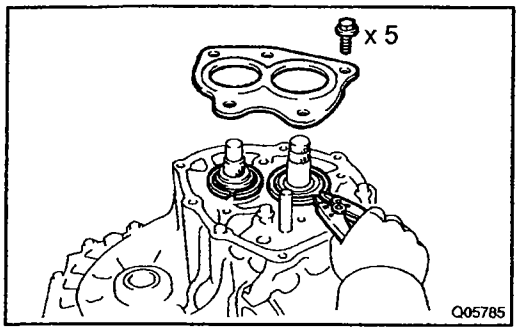


16. REMOVE 5TH DRIVEN GEAR

Using SST, remove the 5th driven gear.
SST 09628–62011, 09950–40011 (09957–04010), 09950–60010 (09951–00230)



HINT:
At the time of reassembly, please refer to the following item.
Using SST, install the 5th driven gear.
SST 09309–12020



17. REMOVE REAR BEARING RETAINER

Remove the 5 bolts and rear bearing retainer.

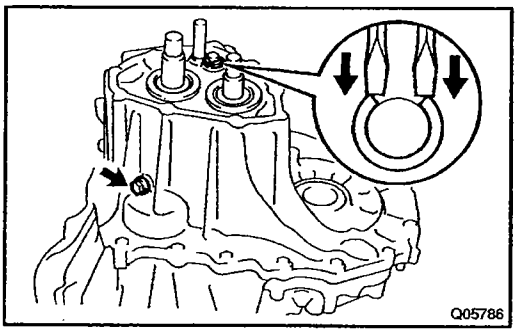
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

18. REMOVE BEARING SNAP RING

Using a snap ring expander, remove the 2 snap rings.

HINT:

If it is difficult to remove and install the snap rings, pull up the shafts.

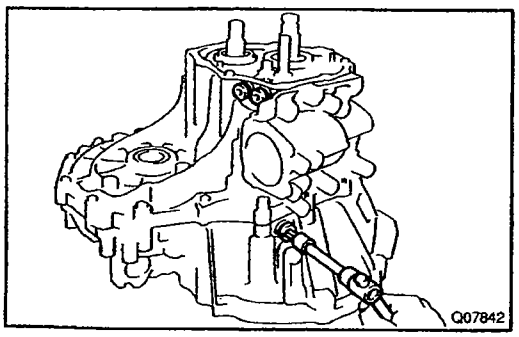


19. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT AND GASKET

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

20. REMOVE SNAP RING FROM NO. 2 SHIFT FORK SHAFT

Using 2 screwdrivers and a hammer, tap out the snap ring.

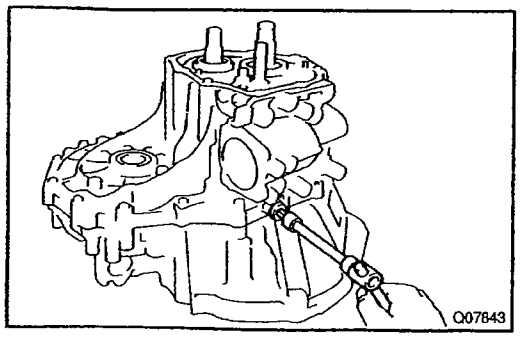


21. REMOVE STRAIGHT SCREW PLUG, SEAT, SPRING AND BALL

(a) Using a hexagon wrench, remove the 3 straight screw plugs.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

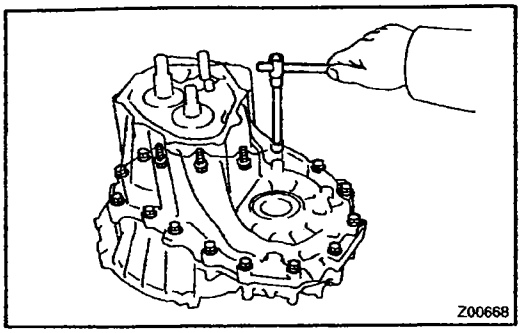
(b) Using a magnetic finger, remove the 3 seats, springs and balls.



22. REMOVE LOCK BALL ASSEMBLY

Using a hexagon wrench, remove the lock ball assembly.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

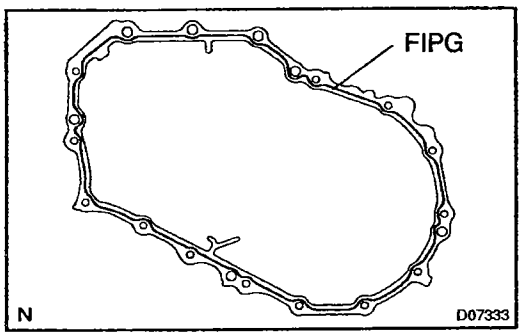


23. REMOVE TRANSMISSION CASE

(a) Remove the 16 bolts.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Using a plastic hammer, carefully tap the projection of the transmission case to remove the transmission case from the transaxle case.



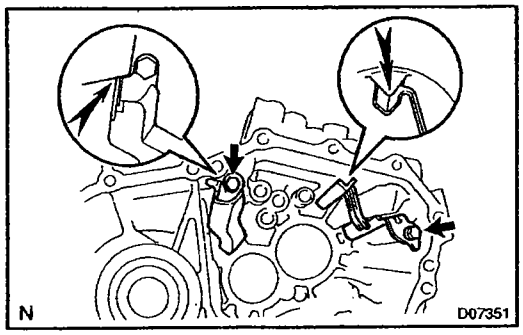
HINT:

At the time of reassembly, please refer to the following item.

Apply FIPG to the transaxle case, as shown in the illustration.

FIPG:

Part No. 08826–00090, THREE BOND 1281 or equivalent



24. REMOVE OIL RECEIVER PIPE

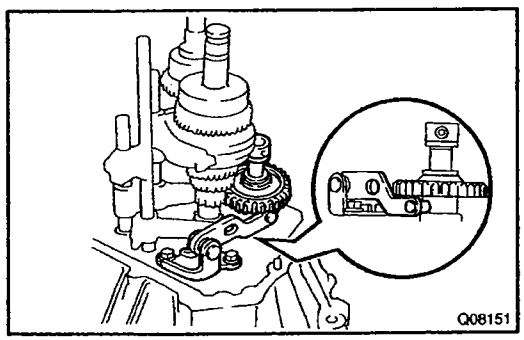
Remove the 2 bolts and oil receiver pipes from the transmission case.

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

NOTICE:

At the time of reassembly, please refer to the following items.

- **Prevent the oil receiver pipes from being deformed.**
- **Install the oil receiver pipes while placing it against the transmission case, as shown in the illustration.**



25. REMOVE REVERSE IDLER GEAR, THRUST WASHER AND SHAFT

26. REMOVE REVERSE SHIFT ARM BRACKET

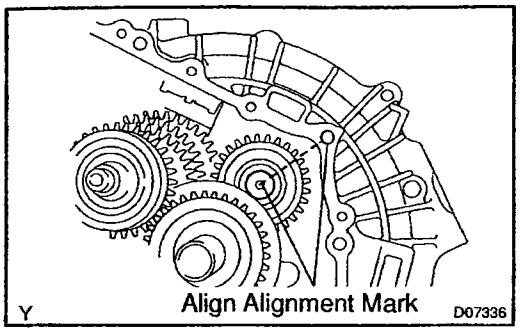
Remove the 2 bolts and reverse shift arm bracket.

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

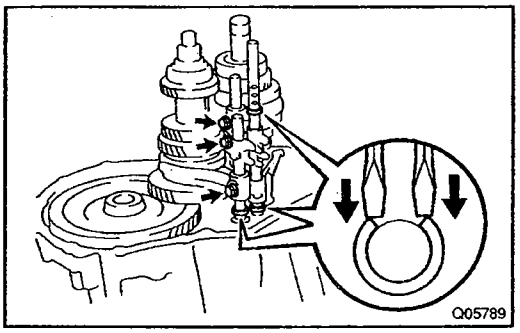
NOTICE:

At the time of reassembly, please refer to the following items.

- **Set the pin on the top of the reverse shift arm into a groove on the reverse idler gear.**
- **Fit the claw of the reverse shift arm bracket with the notch of the input shaft front bearing.**



- **Install the reverse idler gear, thrust washer and shaft, as shown in the illustration.**

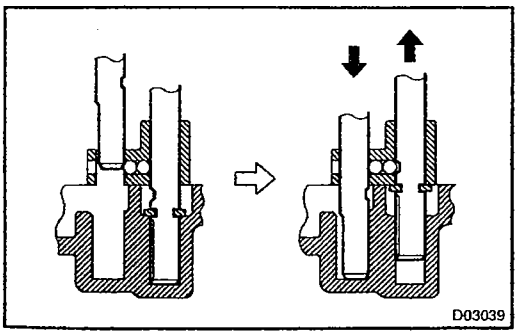


27. REMOVE GEAR SHIFT FORK AND GEAR SHIFT FORK SHAFT

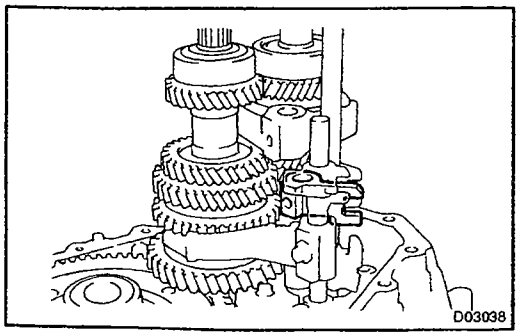
(a) Using 2 screwdrivers and a hammer, tap out the 3 snap rings from each gear shift fork shaft.

(b) Remove the 3 bolts from the No. 1 gear shift head, No. 1 and No. 2 gear shift forks.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

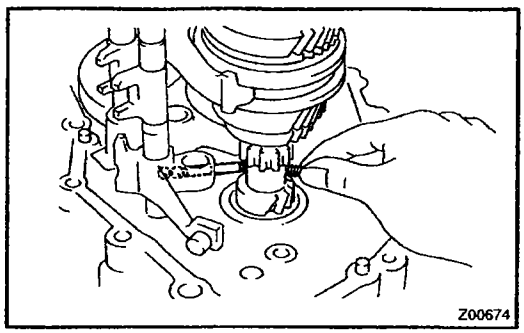
(c) Pull up the No. 3 gear shift fork shaft, remove the No. 2 gear shift fork shaft.



NOTICE:
At the time of reassembly, please refer to the following item.
To avoid the interference of the 2 balls, lift up the No. 3 gear shift fork shaft at the position shown in the illustration.



(d) Remove the No. 1 gear shift head.



(e) Using a magnetic finger, remove the 2 balls from the reverse shift fork.
(f) Remove the No. 3 gear shift fork shaft and reverse shift fork.
(g) Pull out the No. 1 gear shift fork shaft.
(h) Remove the No. 1 and No. 2 gear shift forks.

28. REMOVE INPUT AND OUTPUT SHAFTS TOGETHER FROM TRANSAXLE CASE

29. REMOVE DIFFERENTIAL CASE ASSEMBLY

NOTICE:

At the time of reassembly, please refer to the following item.

Before reassembly, inspect the differential tapered roller bearing preload. (See page MX–49)

30. REMOVE MAGNET FROM TRANSAXLE CASE

31. DISASSEMBLE NO. 3 CLUTCH HUB ASSEMBLY

(a) Using a screwdriver, remove the shifting key spring.

NOTICE:

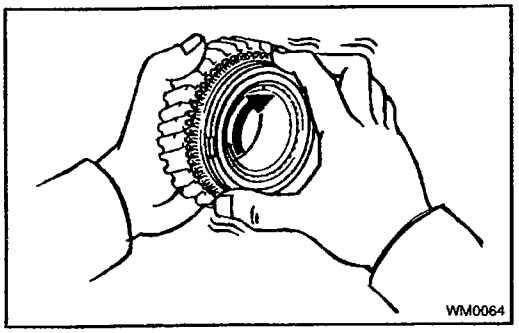
At the time of reassembly, please refer to the following item.

Position the shifting key springs so that their end gaps are not aligned.

(b) Remove the 3 No. 3 shifting keys from the No. 3 clutch hub.

MX09J-01

INSPECTION



1. INSPECT 5TH GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

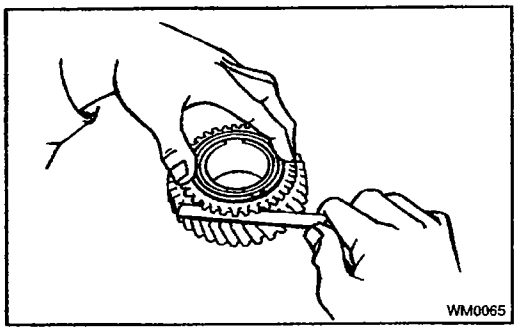
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



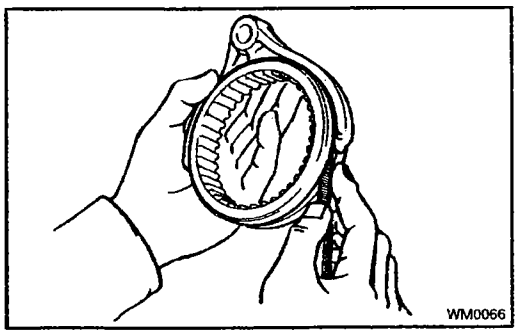
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.5 mm (0.020 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.



2. INSPECT GEAR SHIFT FORK AND HUB SLEEVE CLEARANCE

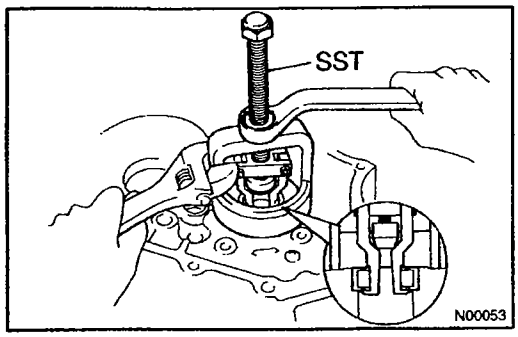
Using a feeler gauge, measure the clearance between the hub sleeve and gear shift fork.

Maximum clearance: 0.5 mm (0.020 in.)

If the clearance exceeds the maximum, replace the gear shift fork or hub sleeve.

3. REMOVE TRANSAXLE CASE RECEIVER

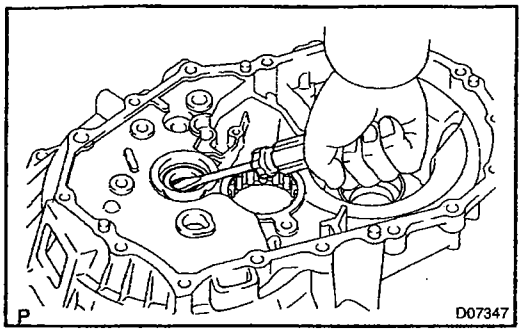
Remove the bolt and transaxle case receiver from the transaxle case.



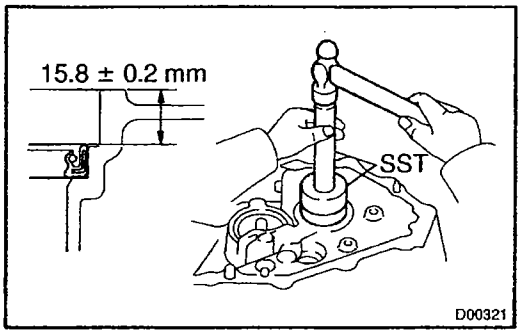
4. IF NECESSARY, REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL

(a) Using SST, remove the input shaft front bearing.

SST 09612–65014

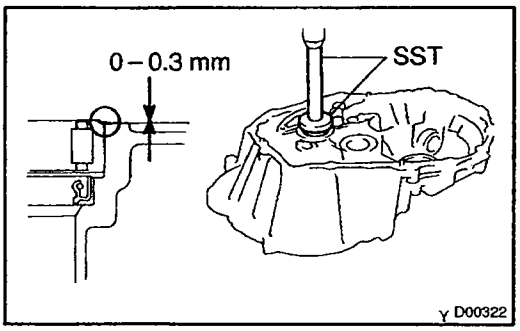


(b) Using a screwdriver, remove the oil seal.



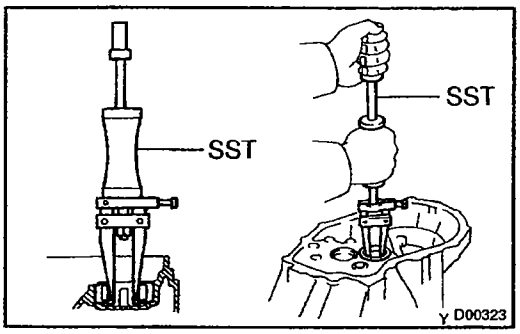
(c) Using SST and a hammer, drive in a new oil seal.
SST 09950–60010 (09951–00360), 09950–70010 (09951–07150)
Drive in depth: 15.8 ± 0.2 mm (0.622 ± 0.008 in.)

(d) Coat the lip of the oil seal with MP grease.



(e) Using SST and a press, install a new input shaft front bearing.
SST 09950–60010 (09951–00400), 09950–70010 (09951–07150)
Drive in depth: 0 – 0.3 mm (0 – 0.012 in.)

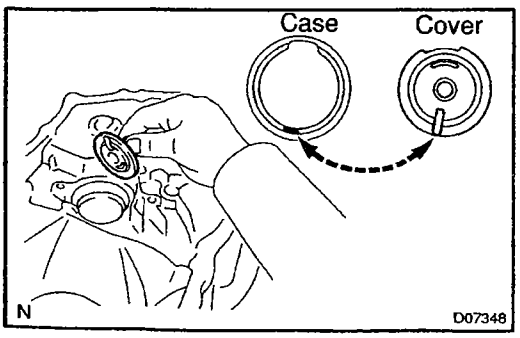
NOTICE:
Be sure to install a new bearing in the correct direction, as shown in the illustration.



5. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING AND OUTPUT SHAFT COVER

(a) Remove the bolt and bearing lock plate.

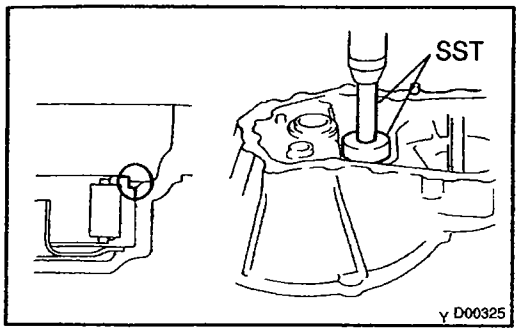
(b) Using SST, pull out the output shaft front bearing.
SST 09308–00010



(c) Remove the output shaft cover.

(d) Install the output shaft cover.

NOTICE:
Install the output shaft cover projection into the case side hollow.



(e) Using SST and a press, install a new output shaft front bearing.
SST 09950–60010 (09951–00560), 09950–70010 (09951–07150)

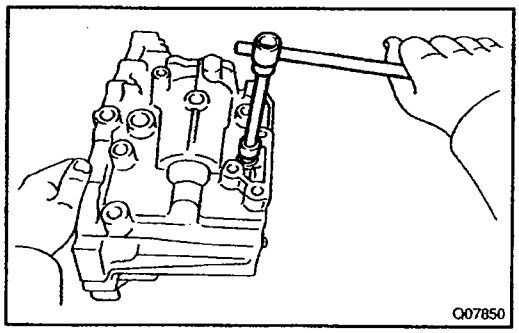
NOTICE:

- **Be sure to install a new bearing in the correct direction, as shown in the illustration.**
- **When replacing the output shaft front bearing, replace the output shaft front bearing inner race along with it.**

(f) Install the bearing lock plate with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

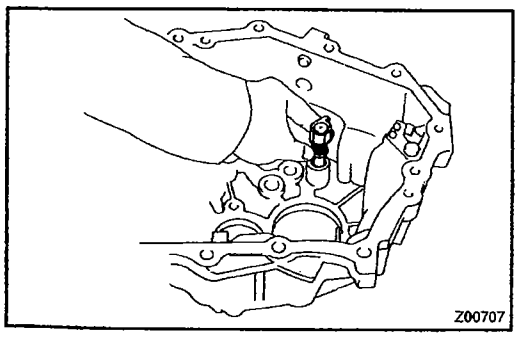
6. INSTALL TRANSAXLE CASE RECEIVER

Install the transaxle case receiver to the transaxle case with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

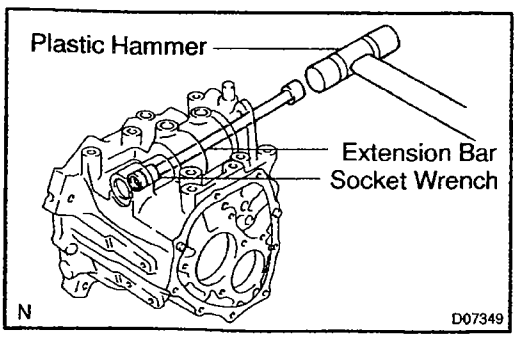


7. IF NECESSARY, REPLACE REVERSE RESTRICT PIN

(a) Using a hexagon wrench, remove the straight screw plug.
(b) Using a pin punch and hammer, drive out the slotted spring pin.



(c) Replace the reverse restrict pin.
(d) Using a pin punch and hammer, drive in the slotted spring pin.
(e) Apply sealant to the screw plug threads.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(f) Using a hexagon wrench, install the straight screw plug.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

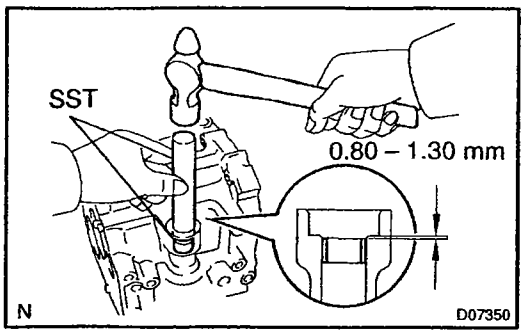


8. IF NECESSARY, REPLACE TRANSMISSION CASE BUSHING

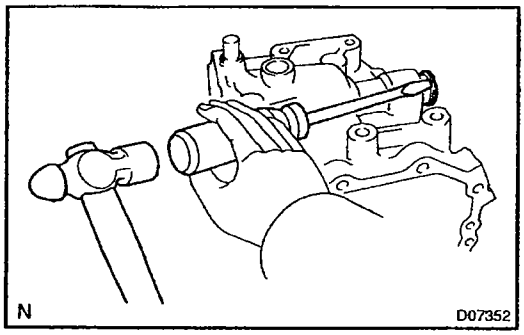
(a) Using a socket wrench (12 mm), extension bar and plastic hammer, drive out the bushing.

NOTICE:

When driving out the bushing, be careful not to damage the transmission case by the socket wrench.

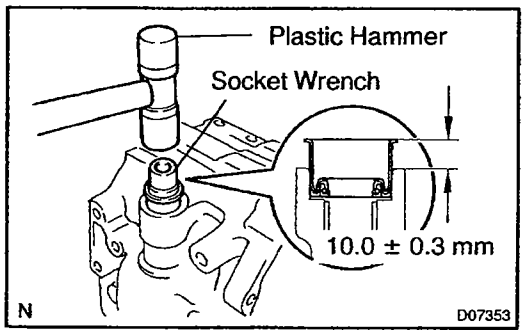


(b) Using SST and a hammer, drive in a new bushing.
SST 09950–60010 (09951–00180), 09950–70010 (09951–07100)
Drive in depth: 0.80 – 1.30 mm (0.0315 – 0.0512 in.)



9. IF NECESSARY, REPLACE TRANSMISSION CASE OIL SEAL

(a) Using a screwdriver and hammer, drive out the oil seal.



(b) Using a socket wrench (17 mm) and plastic hammer, drive in a new oil seal.
Drive in depth: 10.0 ± 0.3 mm (0.394 ± 0.012 in.)

(c) Coat the lip of the oil seal with MP grease.

MX009-03

REASSEMBLY

Reassembly is in the reverse order of disassembly. (See page MX–12)

NOTICE:

When working with FIPG material, you must observe the followings.

- **Using a razor blade and gasket scraper, remove all old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all loose material.**
- **Clean both sealing surfaces with a non–residue solvent.**
- **Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

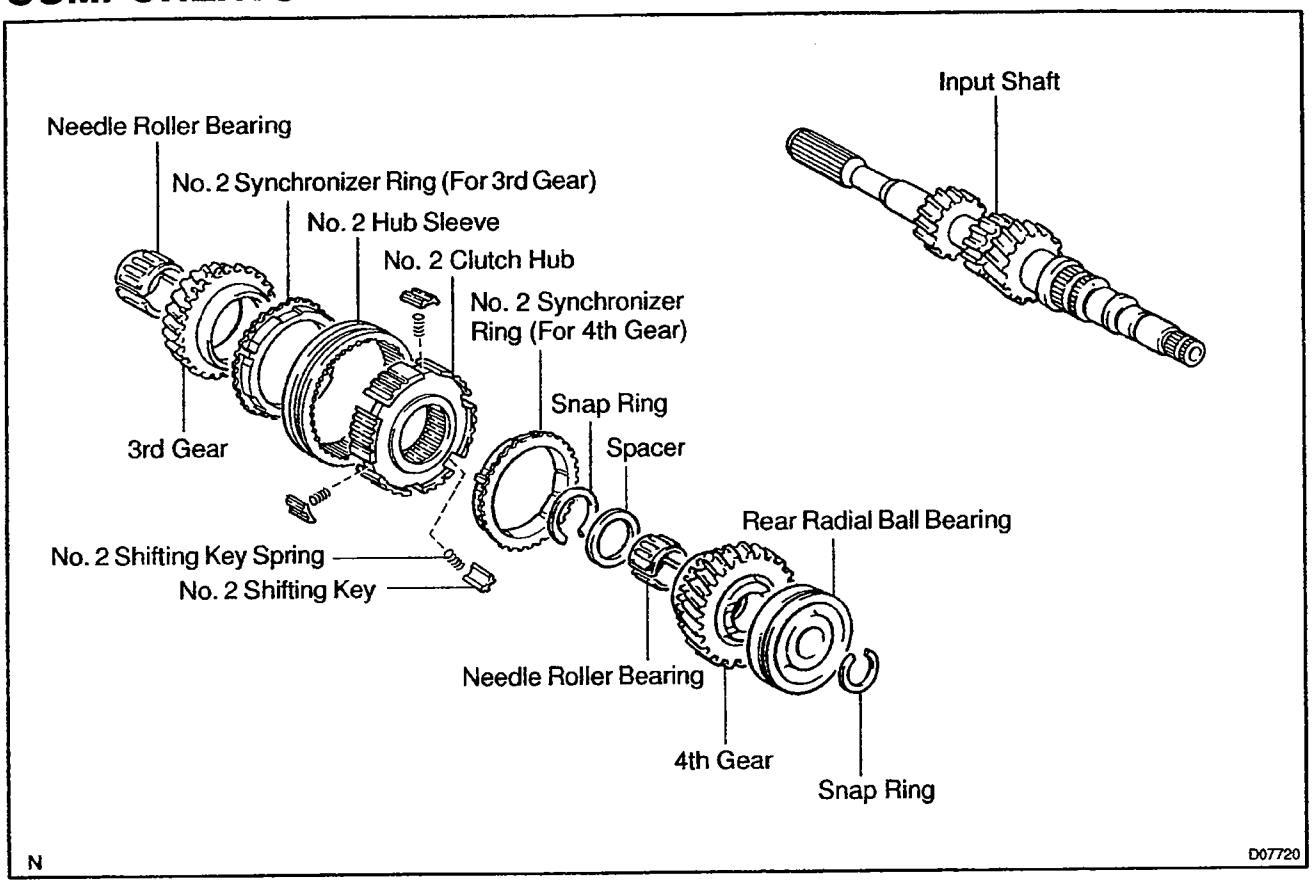
HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

INPUT SHAFT

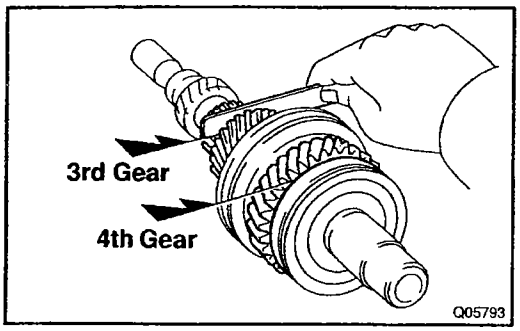
COMPONENTS

MX09K–01



MX09L-01

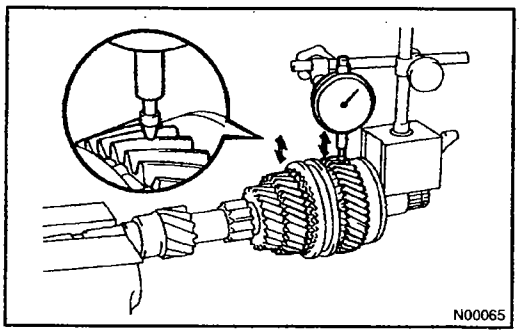
DISASSEMBLY



1. INSPECT 3RD AND 4TH GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:
3rd gear: 0.10 – 0.35 mm (0.0039 – 0.0138 in.)
4th gear: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum clearance:
3rd gear: 0.35 mm (0.0138 in.)
4th gear: 0.55 mm (0.0217 in.)



2. INSPECT 3RD AND 4TH GEARS RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 in.)

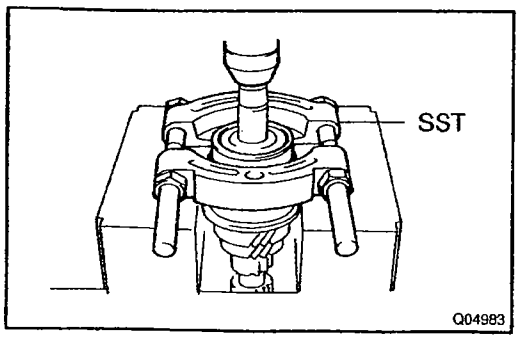
If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

3. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

Take care not to damage the journal surface of the input shaft.



4. REMOVE REAR RADIAL BALL BEARING, 4TH GEAR, NEEDLE ROLLER BEARING, SPACER AND NO. 2 SYNCHRONIZER RING (FOR 4TH GEAR) FROM INPUT SHAFT

(a) Using SST and a press, remove the rear radial ball bearing and 4th gear.
SST 09950–00020

HINT:

Support the input shaft assembly by hand so that it will not be dropped off.

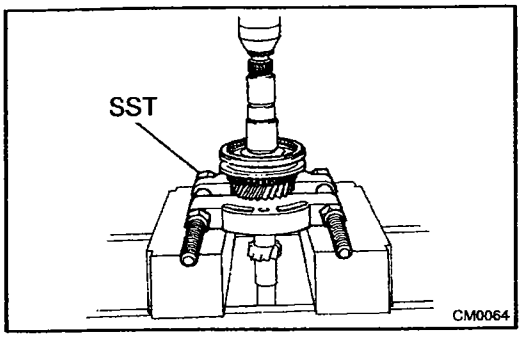
(b) Remove the needle roller bearings, spacer and No. 2 synchronizer ring (for the 4th gear).

5. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

Take care not to damage the journal surface of the input shaft.



6. REMOVE NO. 2 HUB SLEEVE ASSEMBLY, 3RD GEAR, NO. 2 SYNCHRONIZER RING (FOR 3RD GEAR) AND NEEDLE ROLLER BEARING

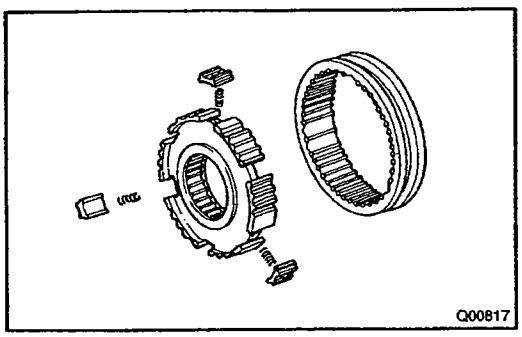
(a) Using SST and a press, remove the No. 2 hub sleeve assembly, 3rd gear and No. 2 synchronizer ring (for the 3rd gear).

SST 09950–00020

HINT:

Support the input shaft by hand so that it will not be dropped off.

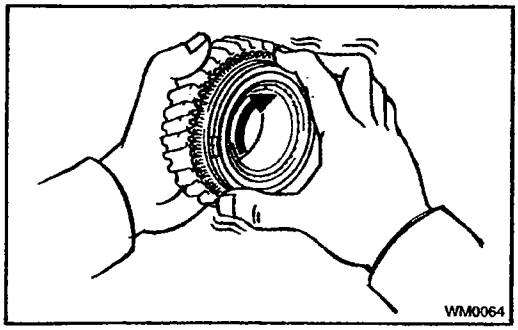
(b) Remove the needle roller bearings.



7. DISASSEMBLE NO. 2 HUB SLEEVE ASSEMBLY

(a) Remove the No. 2 hub sleeve from the No. 2 clutch hub.

(b) Remove the 3 No. 2 shifting keys and No. 2 shifting key springs from the No. 2 clutch hub.



MX09M-01

INSPECTION

1. INSPECT SYNCHRONIZER RING

(a) Check for wear or damage.

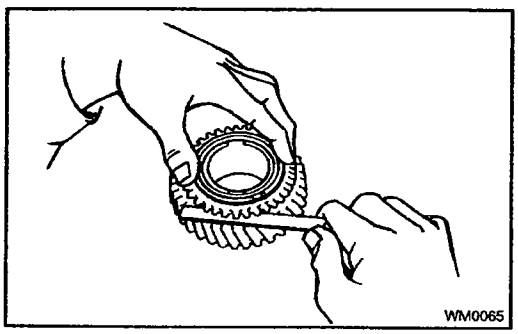
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance:

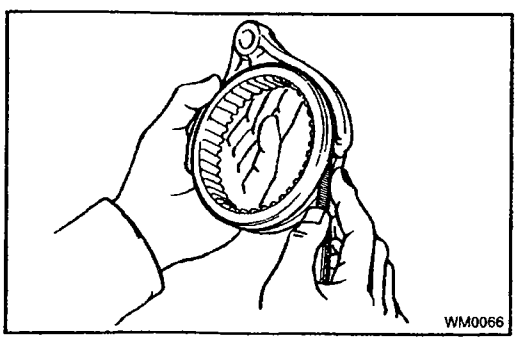
3rd gear: 0.65 mm (0.0256 in.)

4th gear: 0.75 mm (0.0295 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

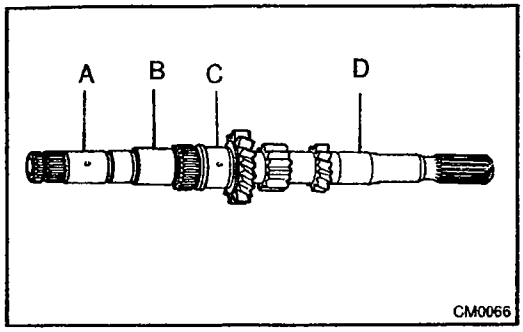


2. INSPECT GEAR SHIFT FORK AND HUB SLEEVE CLEARANCE

Using a feeler gauge, measure the clearance between the hub sleeve and gear shift fork.

Maximum clearance: 0.35 mm (0.014 in.)

If the clearance exceeds the maximum, replace the gear shift fork or hub sleeve.



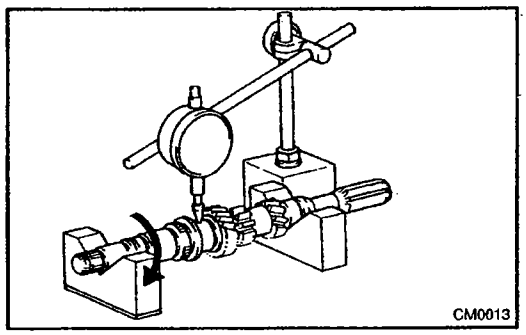
3. INSPECT INPUT SHAFT

(a) Check the input shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

Minimum outer diameter:
Part A: 24.885 mm (0.9797 in.)
Part B: 28.985 mm (1.1411 in.)
Part C: 30.985 mm (1.2199 in.)
Part D: 24.985 mm (0.9837 in.)

If the outer diameter is less than the minimum, replace the input shaft.



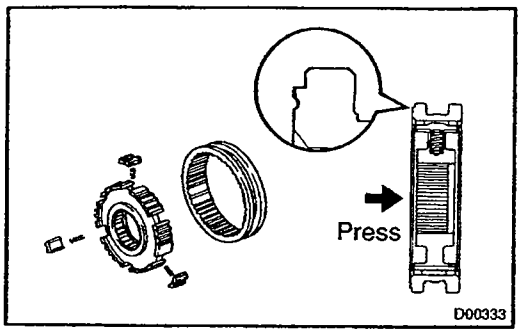
(c) Using a dial indicator, check the shaft runout.

Maximum runout: 0.03 mm (0.0012 in.)

If the runout exceeds the maximum, replace the input shaft.

MX09N-01

REASSEMBLY



Coat all of the sliding and rotating surfaces with gear oil before reassembly.

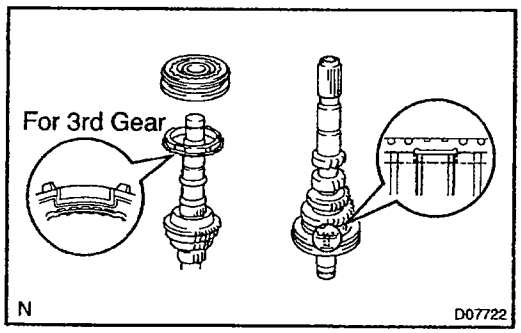
1. ASSEMBLE NO. 2 HUB SLEEVE ASSEMBLY

(a) Install the 3 No. 2 shifting key springs and No. 2 shifting keys to the No. 2 clutch hub.

(b) Install the No. 2 hub sleeve to the No. 2 clutch hub.

NOTICE:

Assemble the No. 2 hub sleeve and No. 2 clutch hub in the direction shown in the illustration.



2. INSTALL NEEDLE ROLLER BEARING, 3RD GEAR, NO. 2 SYNCHRONIZER RING (FOR 3RD GEAR) AND NO. 2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

(a) Apply gear oil to the needle roller bearings and install it.

(b) Install the 3rd gear and No. 2 synchronizer ring (for the 3rd gear).

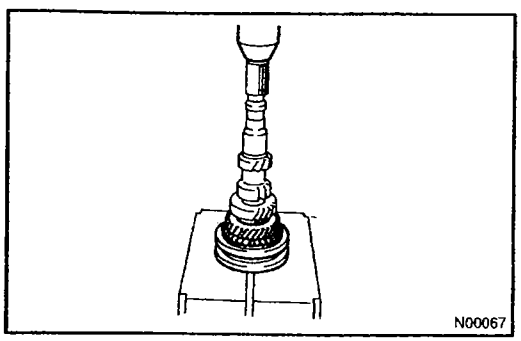
NOTICE:

Distinguish the No. 2 synchronizer ring (for the 3rd gear) by the teeth on the synchronizer ring.

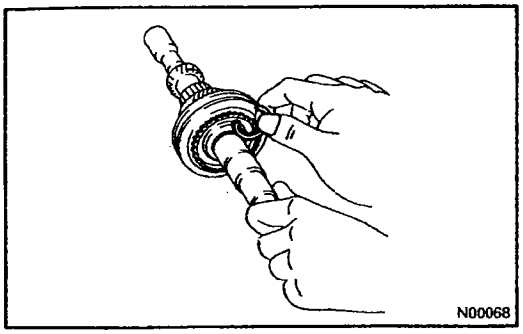
(c) Install the No. 2 hub sleeve assembly so that the No. 2 synchronizer ring slots and No. 2 shifting keys are aligned.

NOTICE:

Be sure to install the No. 2 hub sleeve assembly in the correct direction, as shown in the illustration.



(d) Using a press, install the No. 2 hub sleeve assembly.



3. INSTALL SNAP RING

(a) Select a snap ring from the table below that will make the thrust clearance of the No. 2 clutch hub less than 0.1 mm (0.0039 in.).

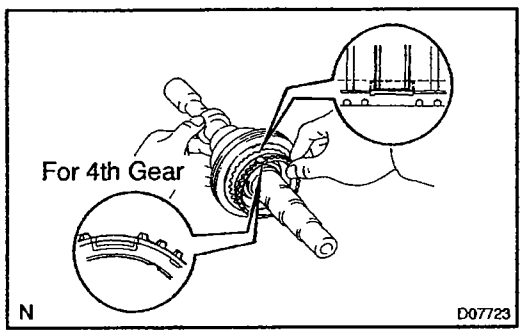
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.30 (0.0906)	3	2.48 (0.0976)
1	2.36 (0.0929)	4	2.54 (0.1000)
2	2.42 (0.0953)	5	2.60 (0.1024)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:

Take care not to damage the journal surface of the input shaft.

4. INSPECT 3RD GEAR THRUST CLEARANCE
(See page MX–27)



5. INSTALL SPACER, NEEDLE ROLLER BEARING, NO. 2 SYNCHRONIZER RING (FOR 4TH GEAR), 4TH GEAR AND REAR RADIAL BALL BEARING

(a) Install the spacer.

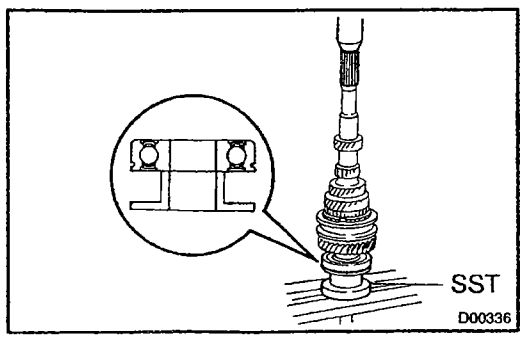
(b) Apply gear oil to the needle roller bearings and install it.

(c) Place the No. 2 synchronizer ring (for the 4th gear) on the No. 2 hub sleeve assembly and align the No. 2 synchronizer ring slots with the No. 2 shifting keys.

(d) Install the 4th gear.

NOTICE:

Distinguish the No. 2 synchronizer ring (for the 4th gear) by the teeth on the synchronizer ring.



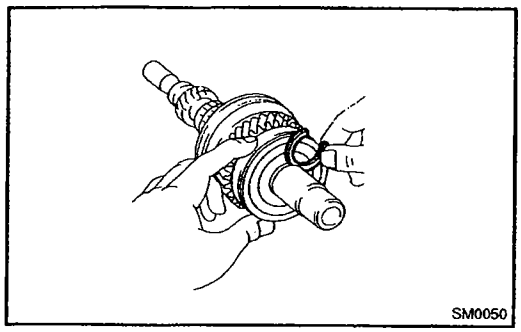
(e) Using SST and a press, install the rear radial ball bearing.
SST 09608–00071

NOTICE:

Be sure to install the rear radial ball bearing in the correct direction, as shown in the illustration.

HINT:

Set SST to the bearing inner race securely.



6. INSTALL SNAP RING

(a) Select a snap ring from the table below that will make the thrust clearance of the rear radial ball bearing less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.29 (0.0902)	D	2.47 (0.0972)
B	2.35 (0.0925)	E	2.53 (0.0996)
C	2.41 (0.0949)	F	2.59 (0.1020)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:

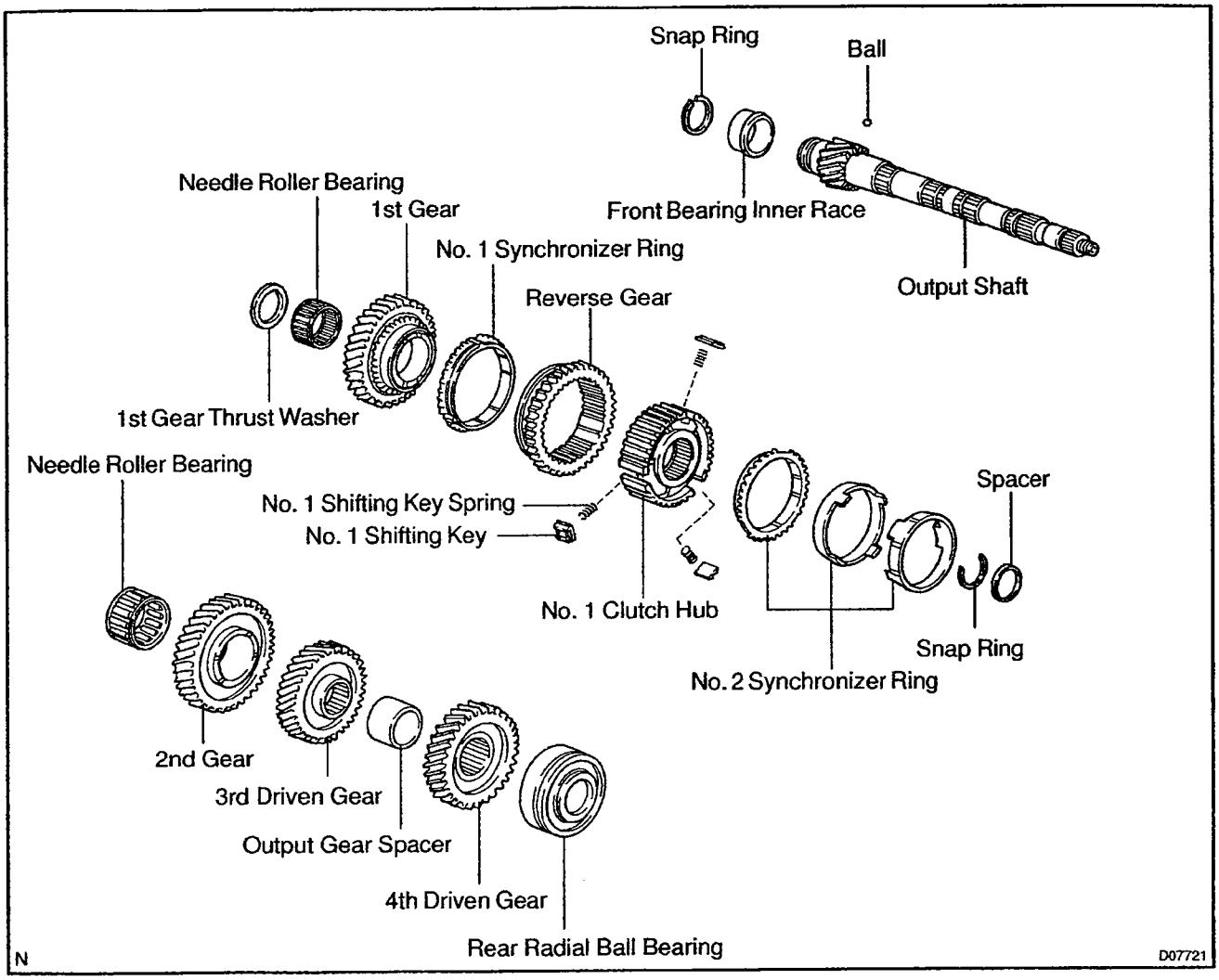
Take care not to damage the journal surface of the input shaft.

7. INSPECT 4TH GEAR THRUST CLEARANCE
(See page MX–27)

OUTPUT SHAFT

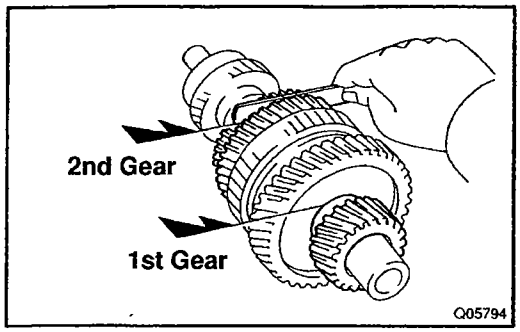
COMPONENTS

MX09O–01



MX09P-01

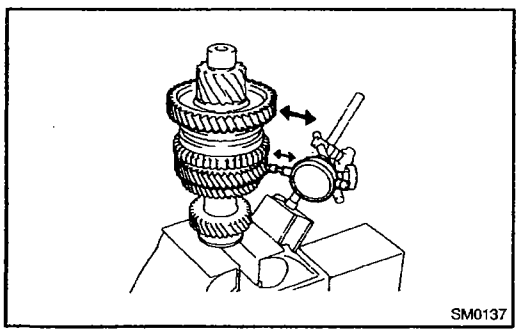
DISASSEMBLY



1. INSPECT 1ST AND 2ND GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:
1st gear: 0.10 – 0.40 mm (0.0039 – 0.0157 in.)
2nd gear: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum clearance:
1st gear: 0.40 mm (0.0157 in.)
2nd gear: 0.55 mm (0.0217 in.)

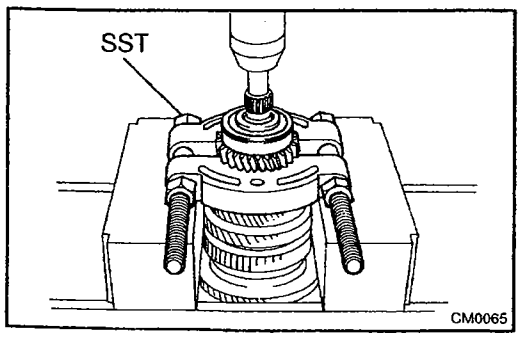


2. INSPECT 1ST AND 2ND GEARS RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 in.)

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

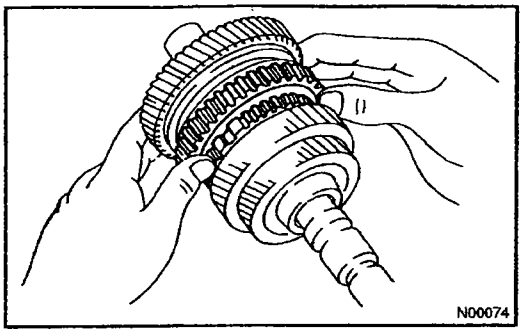


3. REMOVE REAR RADIAL BALL BEARING, 4TH DRIVEN GEAR AND OUTPUT GEAR SPACER FROM OUTPUT SHAFT

(a) Using SST and a press, remove the rear radial ball bearing and 4th driven gear.
SST 09950–00020

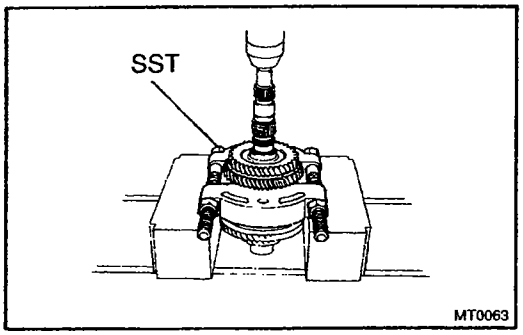
HINT:
Support the output shaft assembly by hand so that it will not be dropped off.

(b) Remove the output gear spacer.



4. REMOVE 3RD DRIVEN GEAR, 2ND GEAR, NEEDLE ROLLER BEARING, SPACER AND NO. 2 SYNCHRONIZER RING

(a) Shift the reverse gear into the 1st gear.



(b) Using SST and a press, remove the 3rd driven gear and 2nd gear.
SST 09950–00020

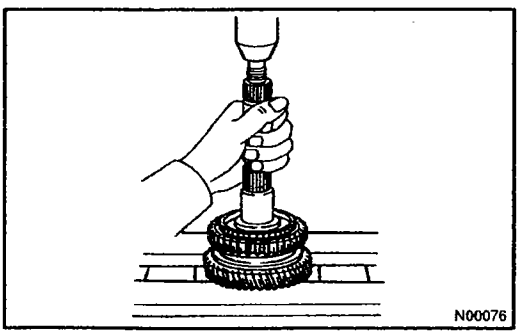
HINT:
Support the output shaft assembly by hand so that it will not be dropped off.

(c) Remove the needle roller bearing, spacer and No. 2 synchronizer rings.

5. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.



6. REMOVE REVERSE GEAR ASSEMBLY, 1ST GEAR, NO. 1 SYNCHRONIZER RING, NEEDLE ROLLER BEARING, 1ST GEAR THRUST WASHER AND BALL

(a) Using a press, remove the reverse gear assembly, 1st gear and No. 1 synchronizer ring.

HINT:
Support the output shaft assembly by hand so that it will not be dropped off.

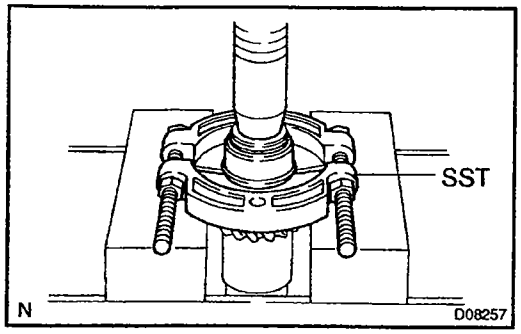
(b) Remove the needle roller bearing and 1st gear thrust washer.

(c) Using a magnetic finger, remove the ball.

7. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.



8. REMOVE FRONT BEARING INNER RACE

Using SST and a press, remove the front bearing inner race.

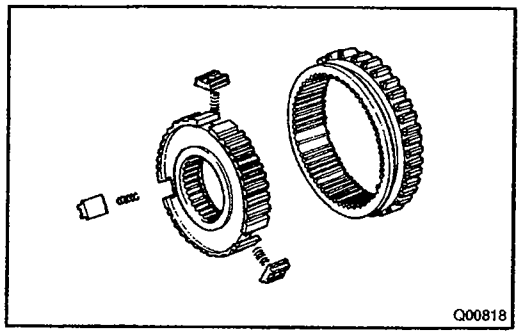
SST 09950–00020

NOTICE:

When replacing the front bearing inner race, replace the output shaft front bearing along with it.

HINT:

Support the output shaft by hand so that it will not be dropped off.



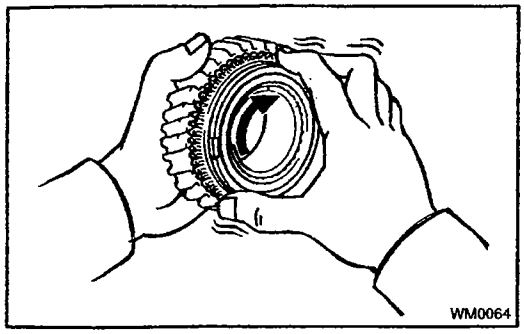
9. DISASSEMBLE REVERSE GEAR ASSEMBLY

(a) Remove the reverse gear from the No. 1 clutch hub.

(b) Remove the 3 No. 1 shifting keys and No. 1 shifting key springs from the No. 1 clutch hub.

MX09Q-01

INSPECTION



1. INSPECT 1ST GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

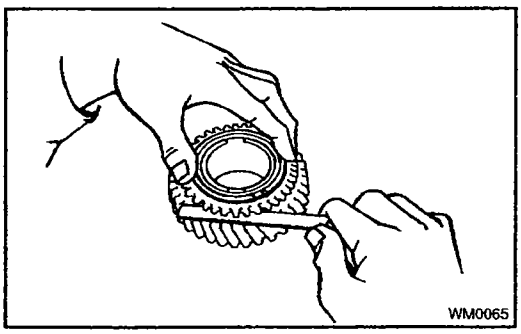
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



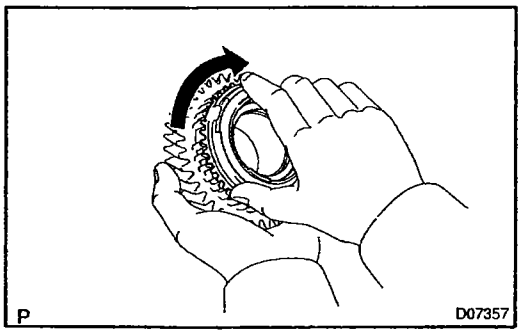
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.75 mm (0.0295 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

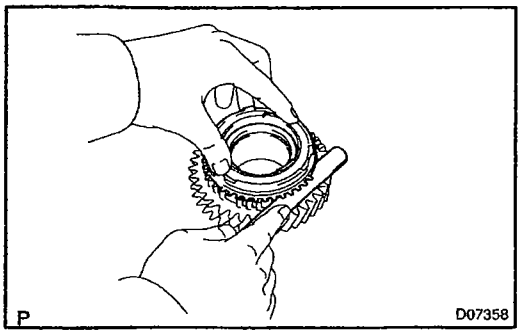


2. INSPECT 2ND GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

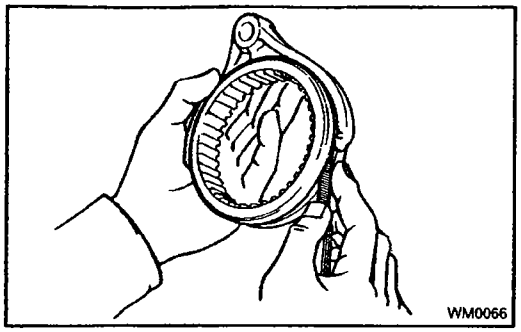
If the braking effect is insufficient, replace the synchronizer ring.



(c) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.70 mm (0.0276 in.)

If the clearance is less than the minimum, replace the synchronizer ring.

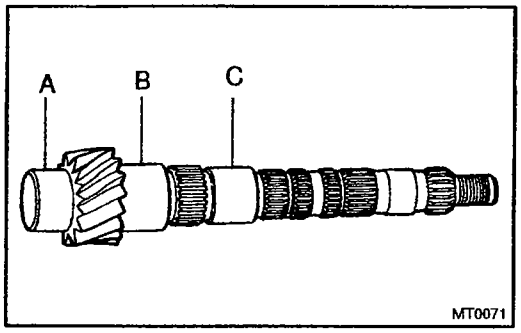


3. INSPECT GEAR SHIFT FORK AND REVERSE GEAR CLEARANCE

Using a feeler gauge, measure the clearance between the reverse gear and gear shift fork.

Maximum clearance: 0.35 mm (0.014 in.)

If the clearance exceeds the maximum, replace the gear shift fork or hub sleeve.



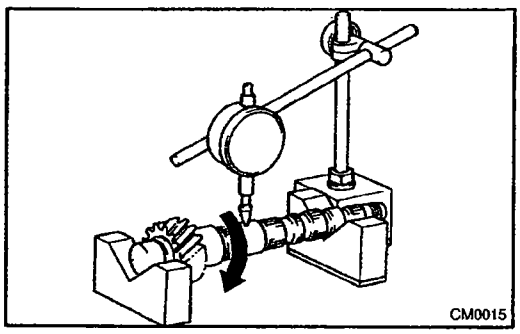
4. INSPECT OUTPUT SHAFT

(a) Check the output shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the output shaft journal surface.

Minimum outer diameter:
Part A: 32.985 mm (1.2986 in.)
Part B: 37.985 mm (1.4955 in.)
Part C: 31.985 mm (1.2592 in.)

If the outer diameter is less than the minimum, replace the output shaft.



(c) Using a dial indicator, check the shaft runout.

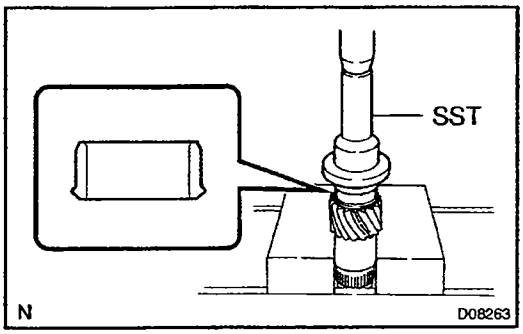
Maximum runout: 0.03 mm (0.0012 in.)

If the runout exceeds the maximum, replace the output shaft.

MX09R-01

REASSEMBLY

HINT:
Coat all of the sliding and rotating surfaces with gear oil before reassembly.



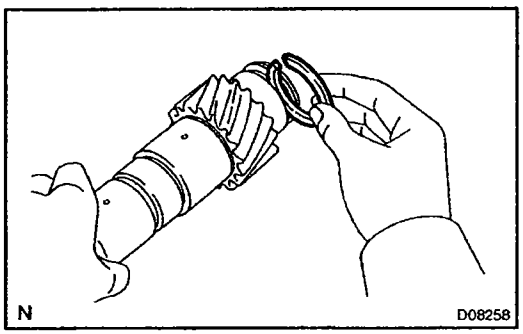
1. INSTALL FRONT BEARING INNER RACE

Using SST and a press, install the front bearing inner race.

SST 09223–50010

NOTICE:

Be sure to install the front bearing inner race in the correct direction, as shown in the illustration.



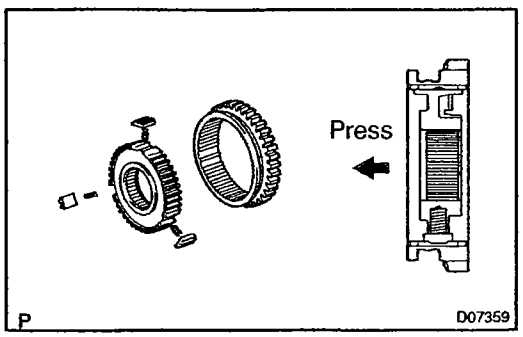
2. INSTALL SNAP RING

(a) Select a snap ring from the table below that will make the thrust clearance of the front bearing inner race less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
7	1.85 (0.0728)	3	2.05 (0.0807)
8	1.90 (0.0748)	4	2.10 (0.0827)
1	1.95 (0.0768)	5	2.15 (0.0846)
2	2.00 (0.0787)	6	2.20 (0.0866)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.



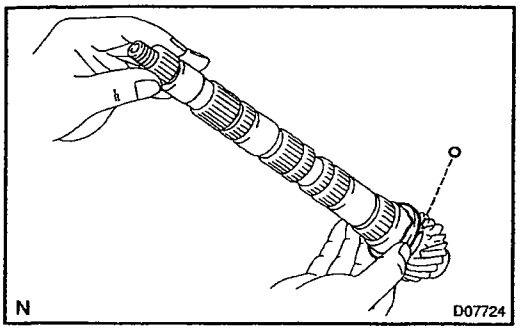
3. ASSEMBLE REVERSE GEAR ASSEMBLY

(a) Install the 3 No. 1 shifting key springs and No. 1 shifting keys to the No. 1 clutch hub.

(b) Install the No. 1 clutch hub to the reverse gear.

NOTICE:

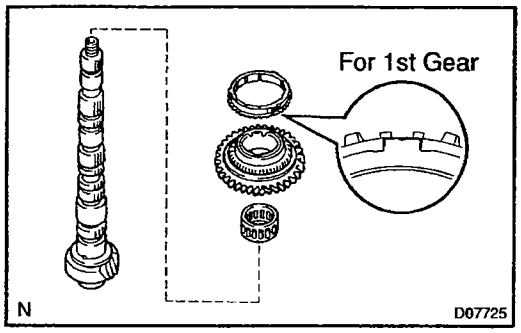
Assemble the No. 1 clutch hub and reverse gear in the direction shown in the illustration.



4. INSTALL BALL, 1ST GEAR THRUST WASHER, NEEDLE ROLLER BEARING, 1ST GEAR, NO. 1 SYNCHRONIZER RING AND REVERSE GEAR ASSEMBLY TO OUTPUT SHAFT

(a) Using a magnetic finger, install the ball to the output shaft.

(b) Fit the 1st gear thrust washer groove securely over the locking ball when installing the thrust on the output shaft.

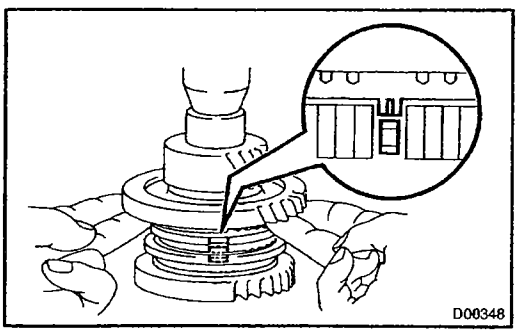


(c) Apply gear oil to the needle roller bearing and install it.

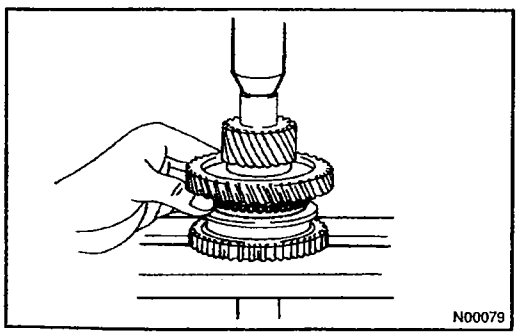
(d) Install the 1st gear and No. 1 synchronizer ring.

NOTICE:

Distinguish the No. 1 synchronizer ring by the teeth on the synchronizer ring.



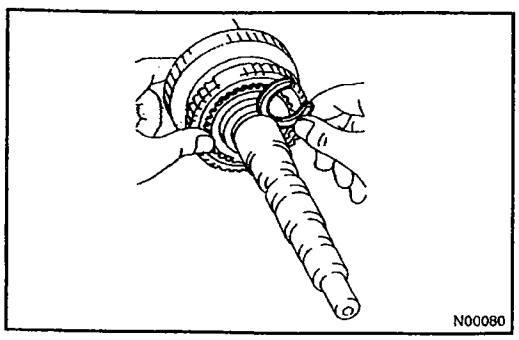
(e) Place the reverse gear assembly and align the No. 1 synchronizer ring slots with the No. 1 shifting keys.



(f) Using a press, install the reverse gear assembly.

NOTICE:

- **Be sure to install the reverse gear assembly in the correct direction, as shown in the illustration.**
- **When installing, make sure that the ball is placed in a groove of the 1st gear thrust washer.**



5. INSTALL SNAP RING

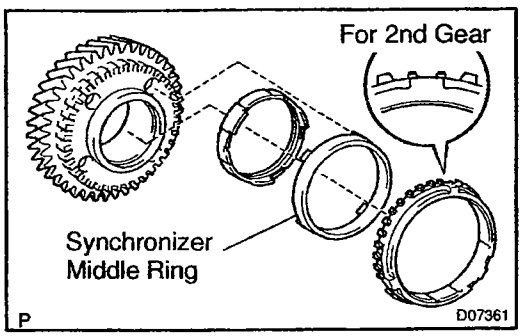
(a) Select a snap ring from the table below that will make the thrust clearance of the No. 1 clutch hub less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.50 (0.0984)	D	2.68 (0.1055)
B	2.56 (0.1008)	E	2.74 (0.1079)
C	2.62 (0.1031)	F	2.80 (0.1102)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.

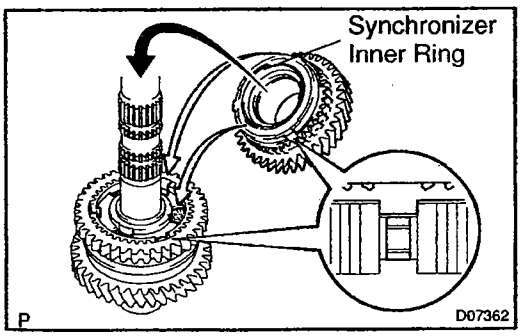
6. **INSPECT 1ST GEAR THRUST CLEARANCE**
(See page MX–35)



7. **INSTALL SPACER, NEEDLE ROLLER BEARING, NO. 2 SYNCHRONIZER RING, 2ND GEAR AND 3RD DRIVEN GEAR**

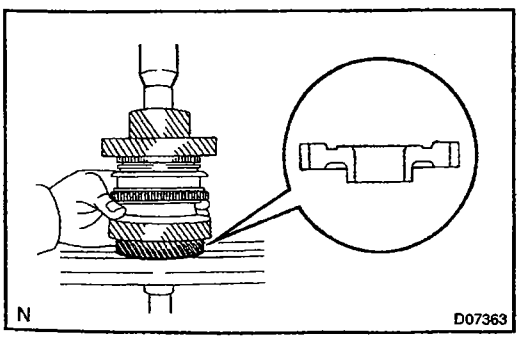
(a) Install the spacer.
(b) Apply gear oil to the needle roller bearing and install it.
(c) Place the No. 2 synchronizer rings on the 2nd gear.

NOTICE:
- **Properly fit the synchronizer middle ring claws into the holes in the 2nd gear.**
- **Distinguish the No. 2 synchronizer ring by the teeth on the synchronizer ring.**



(d) Place the 2nd gear with the No. 2 synchronizer rings and align the No. 2 synchronizer ring slots with the No. 1 shifting keys.

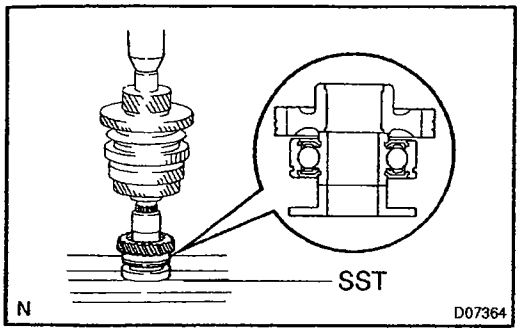
NOTICE:
Fit the synchronizer inner ring claws into the slots in the No. 1 clutch hub.



(e) Using a press, install the 3rd driven gear.

NOTICE:
Be sure to install the 3rd driven gear in the correct direction, as shown in the illustration.

8. **INSPECT 2ND GEAR THRUST CLEARANCE**
(See page MX–35)



9. INSTALL OUTPUT GEAR SPACER, 4TH DRIVEN GEAR AND REAR RADIAL BALL BEARING

(a) Install the output gear spacer.

(b) Using SST and a press, install the 4th driven gear and rear radial ball bearing.

SST 09608–00071

NOTICE:

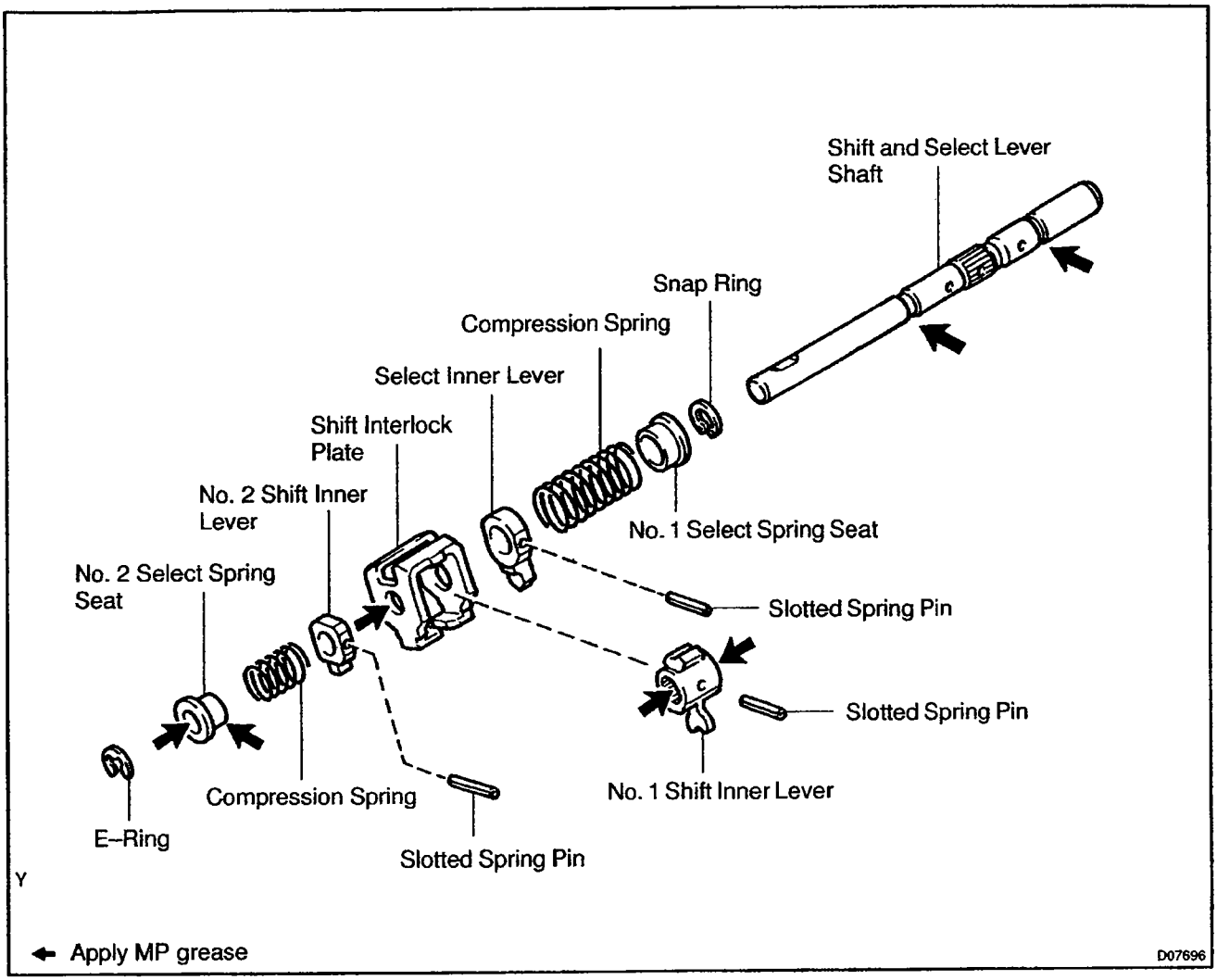
Be sure to install the 4th driven gear and rear radial ball bearing in the correct direction, as shown in the illustration.

HINT:

Set SST to the bearing inner race securely.

SHIFT AND SELECT LEVER SHAFT

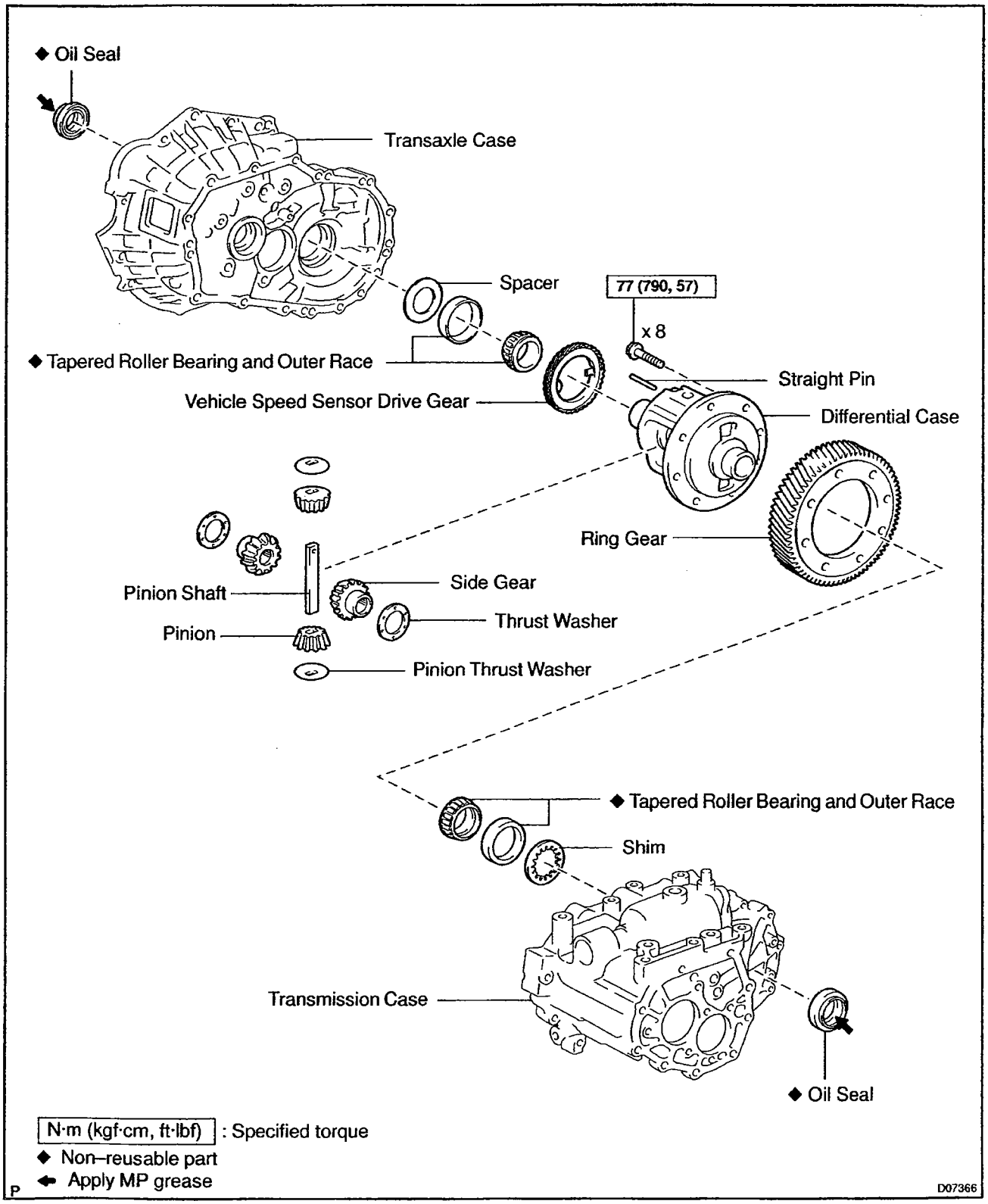
COMPONENTS



DIFFERENTIAL CASE

COMPONENTS

MX09S-01



MX09T–01

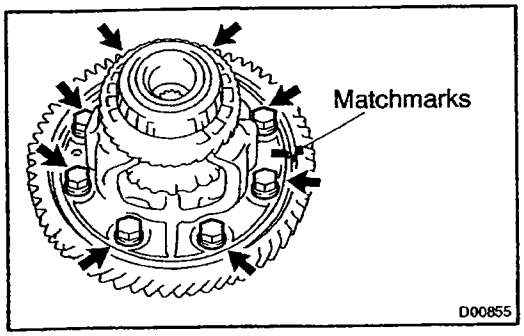
DISASSEMBLY

1. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.

(b) Remove the 8 bolts.

(c) Using a copper hammer, tap on the ring gear to remove it from the differential case.



2. Vehicle speed sensor drive gear side: REMOVE TAPERED ROLLER BEARING FROM DIFFERENTIAL CASE

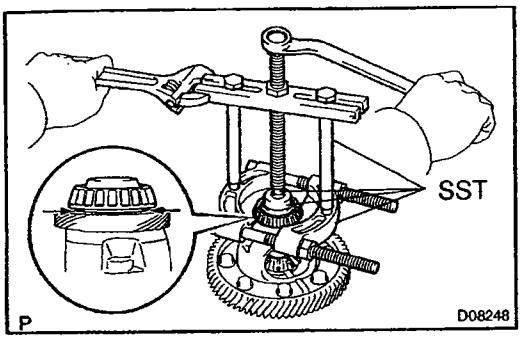
(a) Using SST, remove the tapered roller bearing.

SST 09950–00020, 09950–00030, 09950–40011 (09957–04010), 09950–60010 (09951–00350)

HINT:

Set the claw of SST to the bearing inner race securely.

(b) Remove the vehicle speed sensor drive gear.



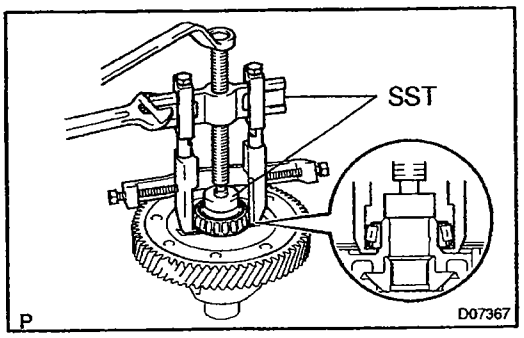
3. Ring gear side: REMOVE TAPERED ROLLER BEARING FROM DIFFERENTIAL CASE

Using SST, remove the tapered roller bearing.

SST 09950–40011, 09950–60010 (09951–00350)

HINT:

Set the claw of SST to the bearing inner race at the position where the differential case is indented.



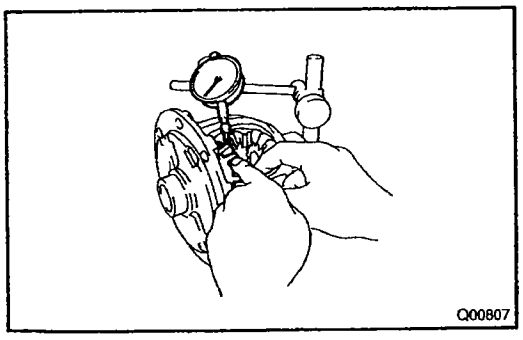
4. INSPECT SIDE GEAR BACKLASH

Using a dial indicator, measure the backlash of one side gear while holding one pinion toward the differential case.

Standard backlash:

0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specification, install the correct thrust washer to the side gears.

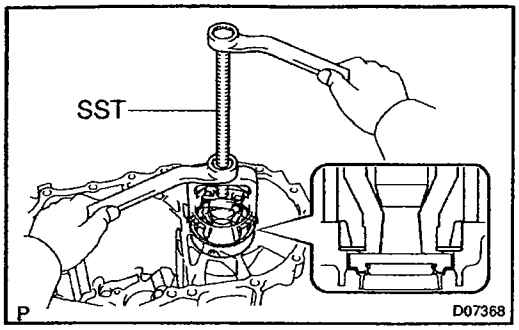


5. DISASSEMBLE DIFFERENTIAL CASE

(a) Using a pin punch and hammer, drive out the straight pin.

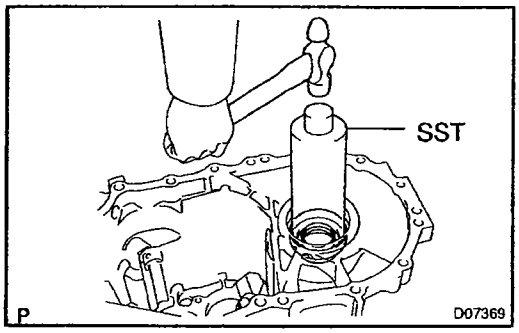
(b) Remove the pinion shaft from the differential case.

(c) Remove the 2 pinions and side gears with the 4 thrust washers from each gear.

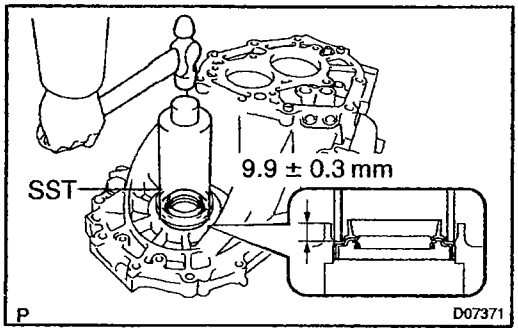


6. Transmission case side:
IF NECESSARY, REPLACE OIL SEAL AND TAPERED ROLLER BEARING OUTER RACE

(a) Using SST, pull out the tapered roller bearing outer race and shim.
SST 09612–65014



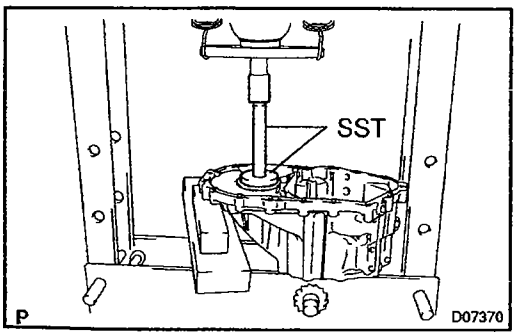
(b) Using SST and a hammer, drive out the oil seal.
SST 09226–10010



(c) Using SST and a hammer, drive in a new oil seal.
SST 09226–10010
Drive in depth: 9.9 ± 0.3 mm (0.390 ± 0.012 in.)

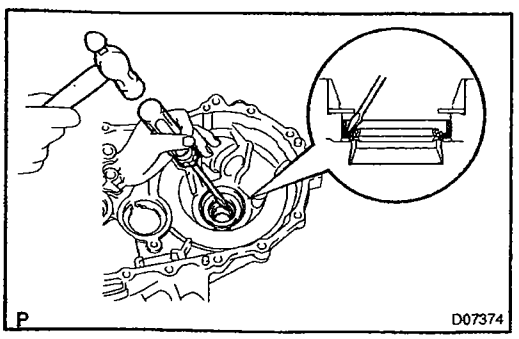
(d) Coat the lip of the oil seal with MP grease.

(e) Place the shim into the differential case.



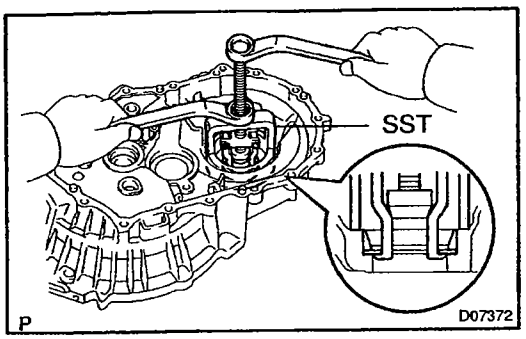
(f) Using SST and a press, install the tapered roller bearing outer race.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)

NOTICE:
When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.



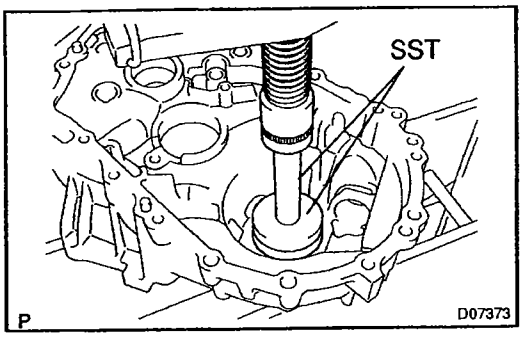
7. Transaxle case side:
IF NECESSARY, REPLACE OIL SEAL AND TAPERED ROLLER BEARING OUTER RACE

(a) Using a screwdriver and hammer, drive out the oil seal.



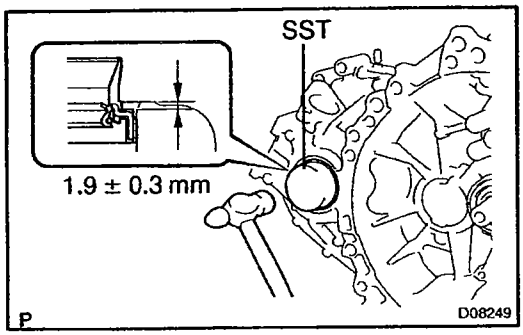
(b) Using SST, pull out the tapered roller bearing outer race and spacer.
SST 09612–65014

(c) Place the spacer into the differential case.



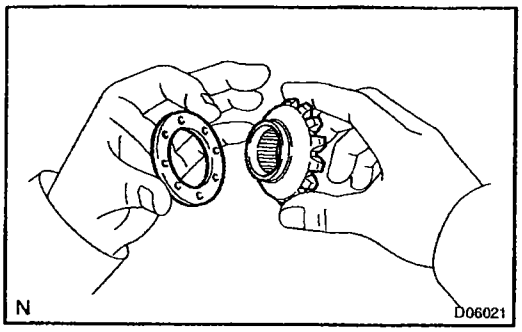
(d) Using SST and a press, install the tapered roller bearing outer race.
SST 09950–60020 (09951–00680), 09950–70010 (09951–07150)

NOTICE:
When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.



(e) Using SST and a hammer, drive in a new oil seal.
SST 09710–28021 (09710–08041)
Drive in depth: 1.9 ± 0.3 mm (0.075 ± 0.012 in.)

(f) Coat the lip of the oil seal with MP grease.



REASSEMBLY

MX09U-01

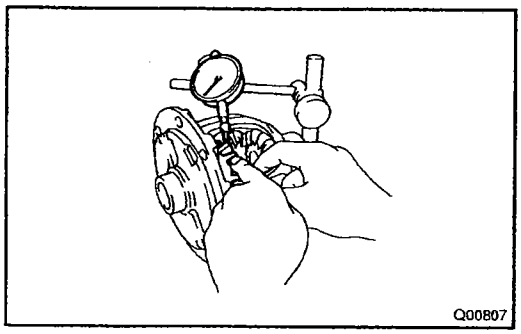
1. ASSEMBLE DIFFERENTIAL CASE

(a) Install the correct thrust washers and side gears.
Refer to the table below, select thrust washers which will ensure that the backlash is within the specification. Try to select washers of the same size for both sides.
Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

Thickness mm (in.)	Thickness mm (in.)
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

(b) Install the thrust washers and side gears in the differential case.

(c) Install the pinion shaft.

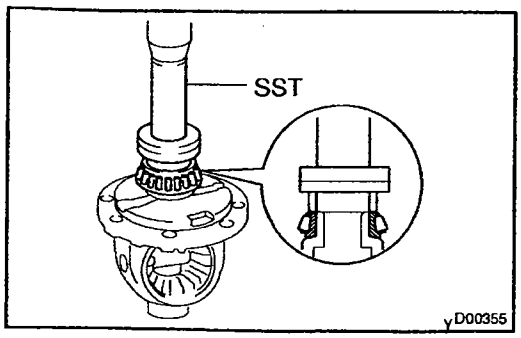


(d) Using a dial indicator, check the side gear backlash.
Measure the side gear backlash while holding one pinion toward the differential case.
Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specification, install a thrust washer of different thickness.

(e) Using a pin punch and hammer, drive in the straight pin through the differential case and hole in the pinion shaft.

(f) Using a chisel and hammer, caulk the pin holes around the circumference of the differential case.

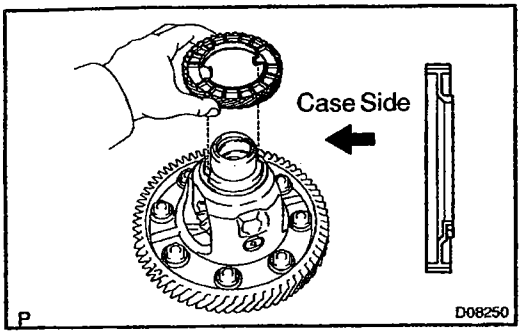


2. Ring gear side: INSTALL TAPERED ROLLER BEARING

Using SST and a press, install the tapered roller bearing.
SST 09350–32014 (09351–32120, 09351–32140)

NOTICE:
When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.

HINT:
Set SST to the bearing inner race securely.

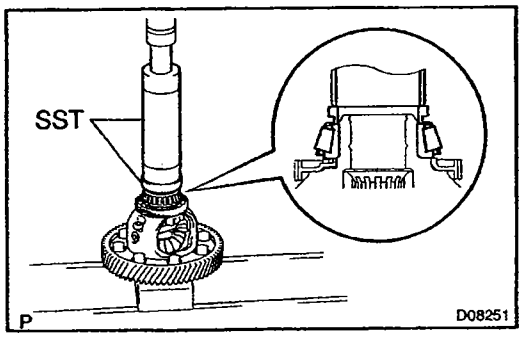


3. Vehicle speed sensor drive gear side: INSTALL TAPERED ROLLER BEARING

(a) Place the vehicle speed sensor drive gear in position to stop it turning, and install the vehicle speed sensor drive gear.

NOTICE:

Be sure to install the vehicle speed sensor drive gear in the correct direction, as shown in the illustration.



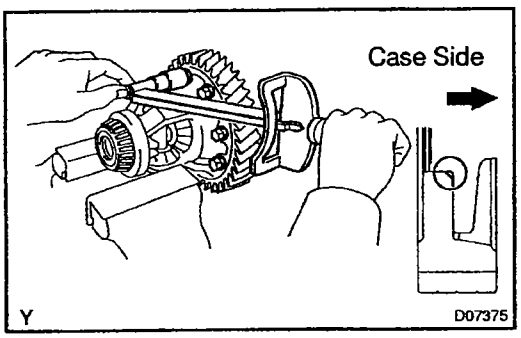
(b) Using SST and a press, install a new side bearing.
SST 09316–60011 (09316–00011), 09350–32014 (09351–32120)

NOTICE:

When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.

HINT:

Set SST to the bearing inner race securely.



4. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear in boiling water.

(c) Carefully take the ring gear out of the water.

(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

HINT:

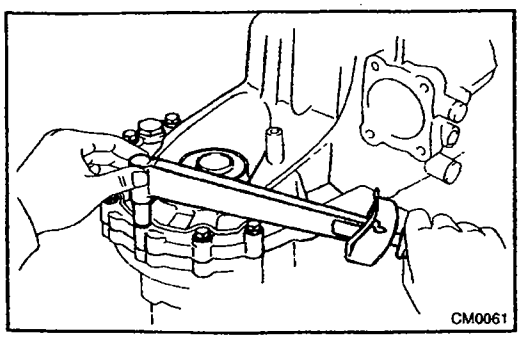
Align the matchmarks on the differential case and contact the ring gear.

(e) Temporarily install the 8 set bolts.

CAUTION:

The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.

(f) After the ring gear has cooled sufficiently, torque the ring gear set bolts uniformly at a time.
Torque: 77 N·m (790 kgf·cm, 57 ft·lbf)



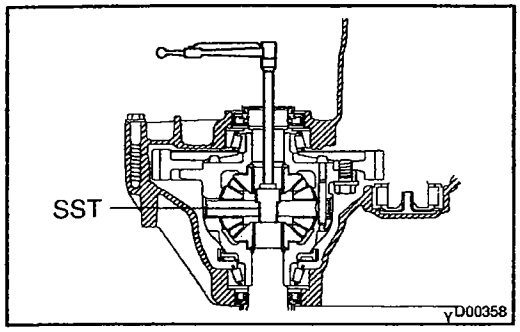
5. INSPECT DIFFERENTIAL TAPERED ROLLER BEARING PRELOAD

NOTICE:

Perform this only when replacing the tapered roller bearing and outer race of the differential case.

(a) Install the differential case assembly to the transaxle case.

(b) Install the transmission case to the transaxle case with the 16 bolts.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



(c) Using SST and a torque wrench, turn the differential case assembly right and left 2 or 3 times to allow the bearings to settle.
SST 09564–32011

(d) Using SST and a torque wrench, measure the preload.
SST 09564–32011
Preload (at starting):
New bearing
0.8 – 1.6 N·m (8 – 16 kgf·cm, 6.9 – 13.9 in.·lbf)
Reused bearing
0.5 – 1.0 N·m (5 – 10 kgf·cm, 4.3 – 8.7 in.·lbf)

If the preload is not within the specification, remove the transmission case side outer race of the tapered roller bearing with SST (See page MX–46). Select an appropriate shim.
HINT:
The preload will change by about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 in.·lbf) corresponding to a change of 0.05 mm (0.0020 in.) in shim thickness.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
AA	2.10 (0.0827)	LL	2.60 (0.1024)
BB	2.15 (0.0846)	MM	2.65 (0.1043)
CC	2.20 (0.0866)	NN	2.70 (0.1063)
DD	2.25 (0.0886)	PP	2.75 (0.1083)
EE	2.30 (0.0906)	QQ	2.80 (0.1102)
FF	2.35 (0.0925)	RR	2.85 (0.1122)
GG	2.40 (0.0945)	SS	2.90 (0.1142)
HH	2.45 (0.0965)	TT	2.95 (0.1161)
JJ	2.50 (0.0984)	UU	3.00 (0.1181)
KK	2.55 (0.1004)	–	–

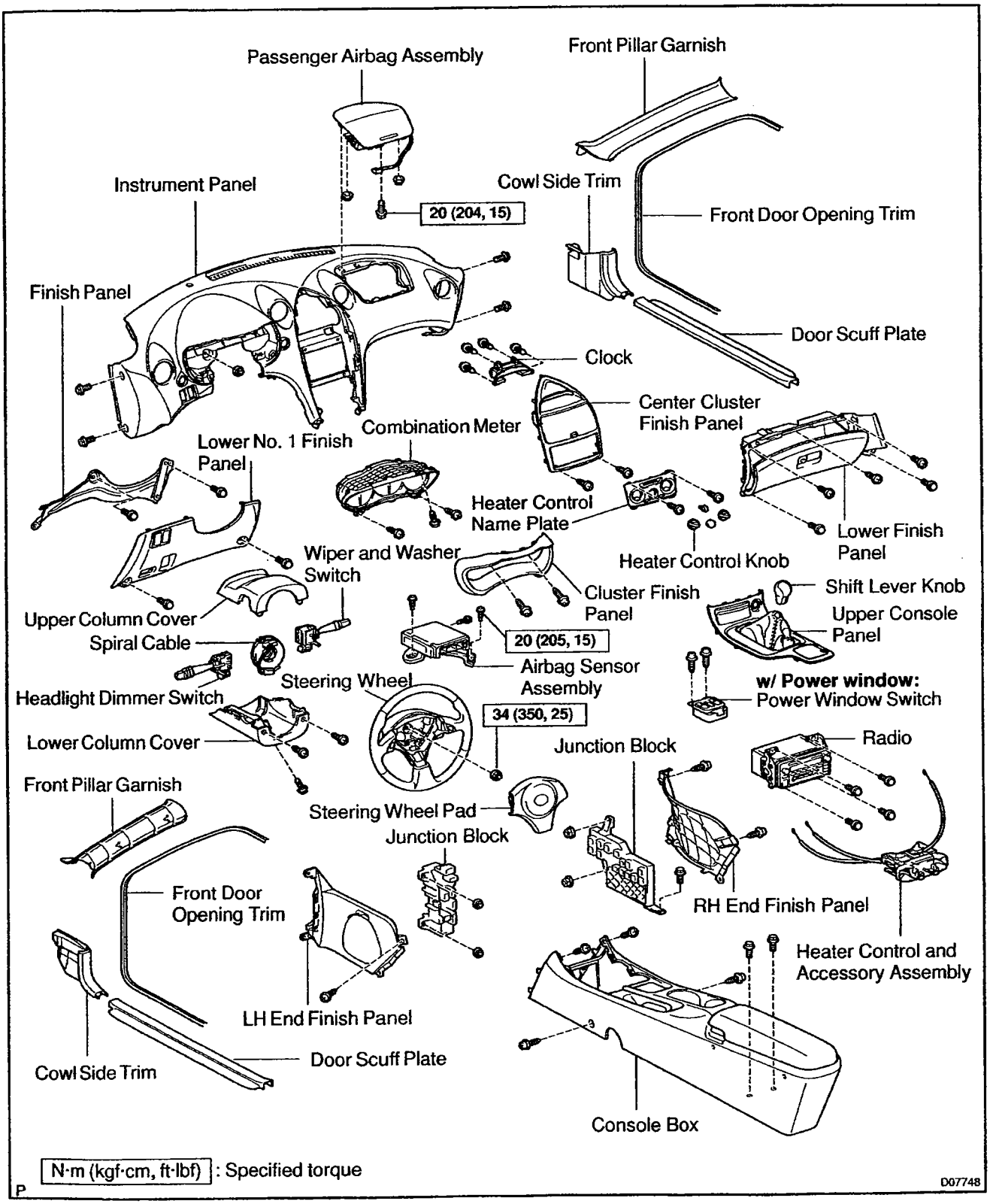
(e) Remove the 16 bolts and transmission case.

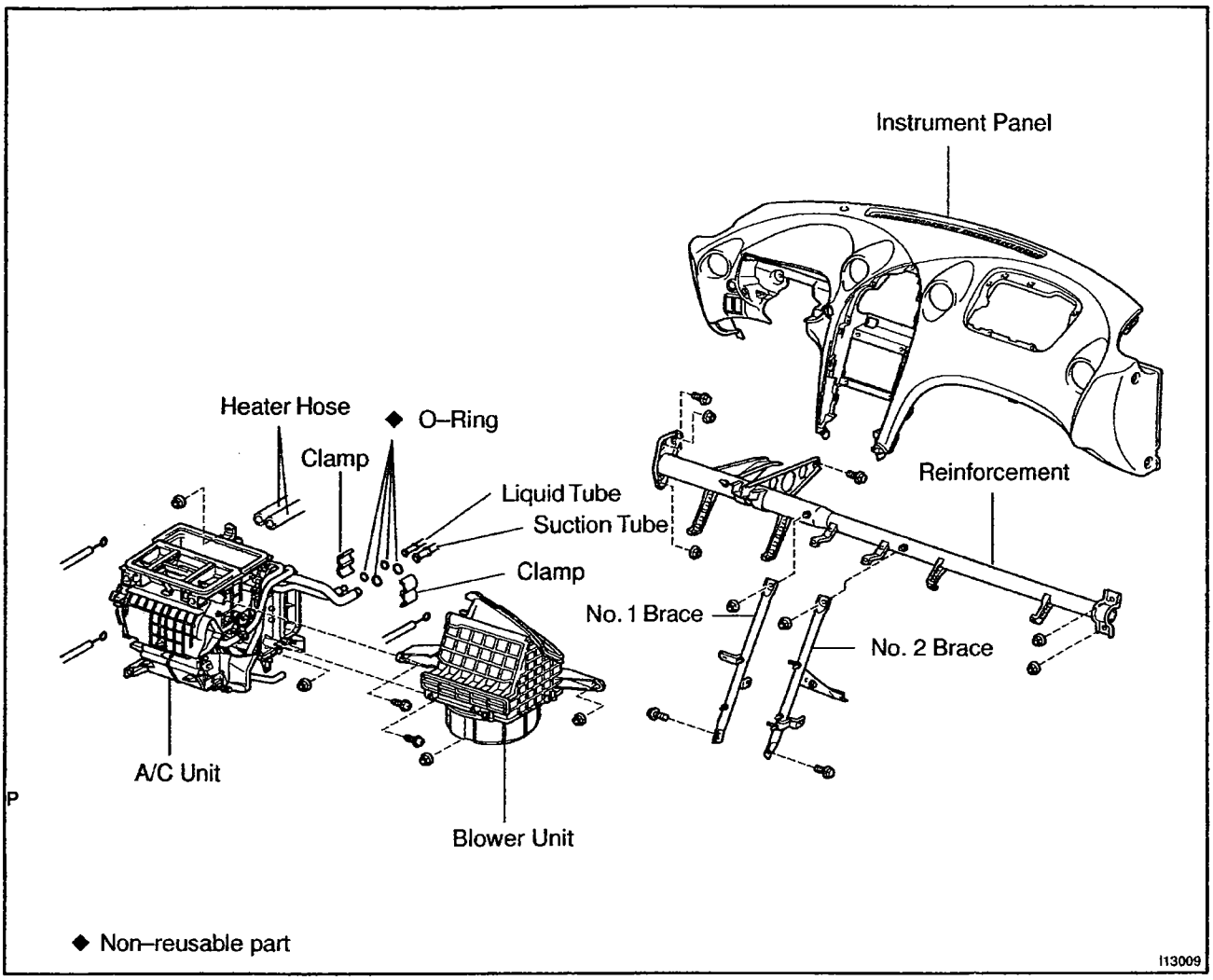
(f) Remove the differential case assembly.

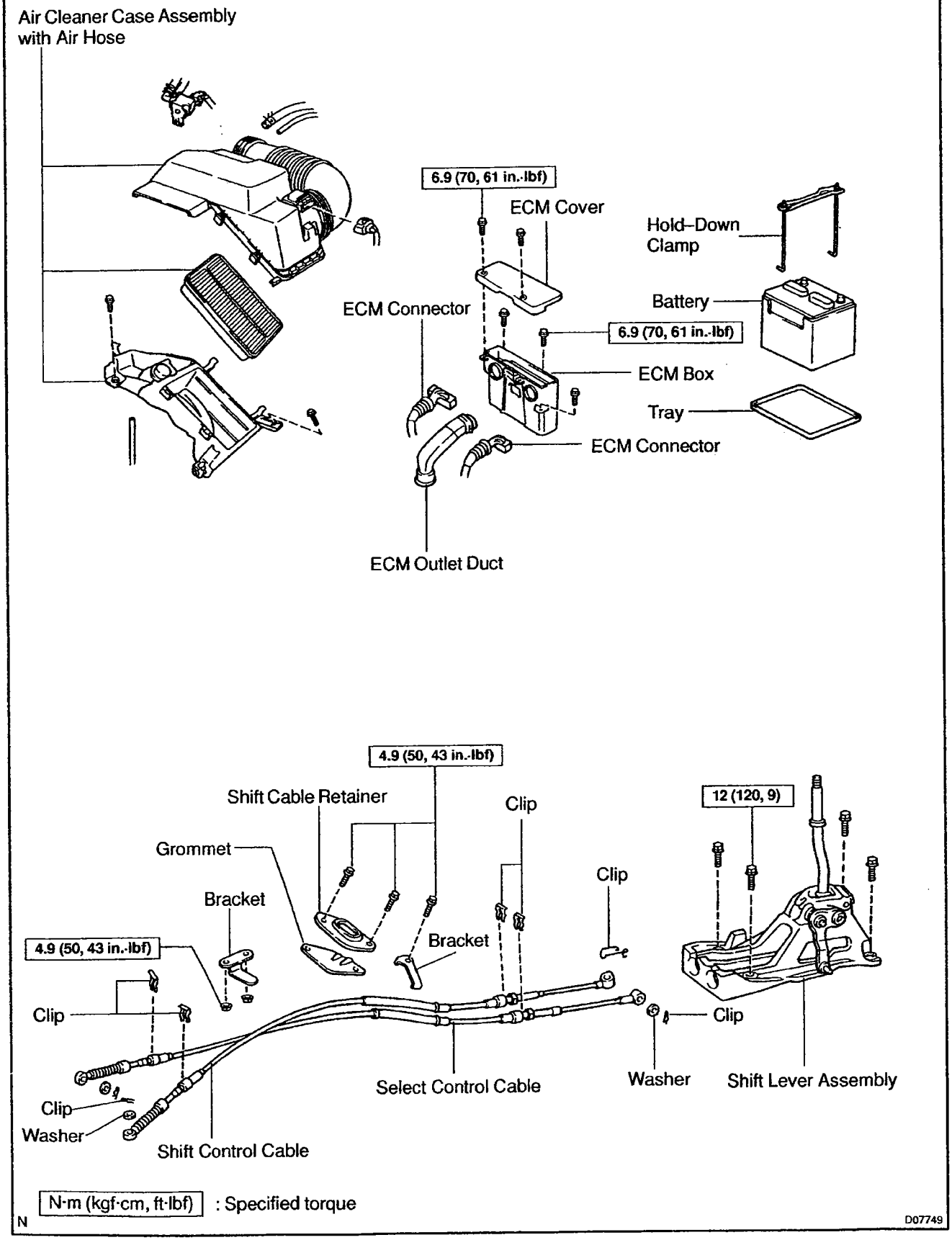
SHIFT LEVER AND CONTROL CABLE

COMPONENTS

MX09V–01




Instrument Panel
Heater Hose
◆ O–Ring
Clamp
Liquid Tube
Suction Tube
Clamp
Reinforcement
No. 1 Brace
No. 2 Brace
A/C Unit
Blower Unit
◆ Non–reusable part
I13009


Air Cleaner Case Assembly with Air Hose
6.9 (70, 61 in.-lbf)
ECM Cover
Hold-Down Clamp
ECM Connector
Battery
6.9 (70, 61 in.-lbf)
ECM Box
Tray
ECM Connector
ECM Outlet Duct
4.9 (50, 43 in.-lbf)
Shift Cable Retainer
Clip
12 (120, 9)
Grommet
Clip
Bracket
Bracket
4.9 (50, 43 in.-lbf)
Clip
Clip
Clip
Select Control Cable
Washer
Shift Lever Assembly
Clip
Washer
Shift Control Cable
N·m (kgf·cm, ft·lbf) : Specified torque
N
D07749

MANUAL TRANSAXLE (C60)

TROUBLESHOOTING MX–1
MANUAL TRANSAXLE UNIT MX–2
MANUAL TRANSAXLE ASSEMBLY MX–9
INPUT SHAFT MX–29
OUTPUT SHAFT MX–37
SHIFT AND SELECT LEVER SHAFT MX–47
DIFFERENTIAL CASE MX–48
REVERSE SHIFT WARNING BUZZER SYSTEM MX–55
SHIFT LEVER AND CONTROL CABLE MX–57

MX

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

MX01B–02

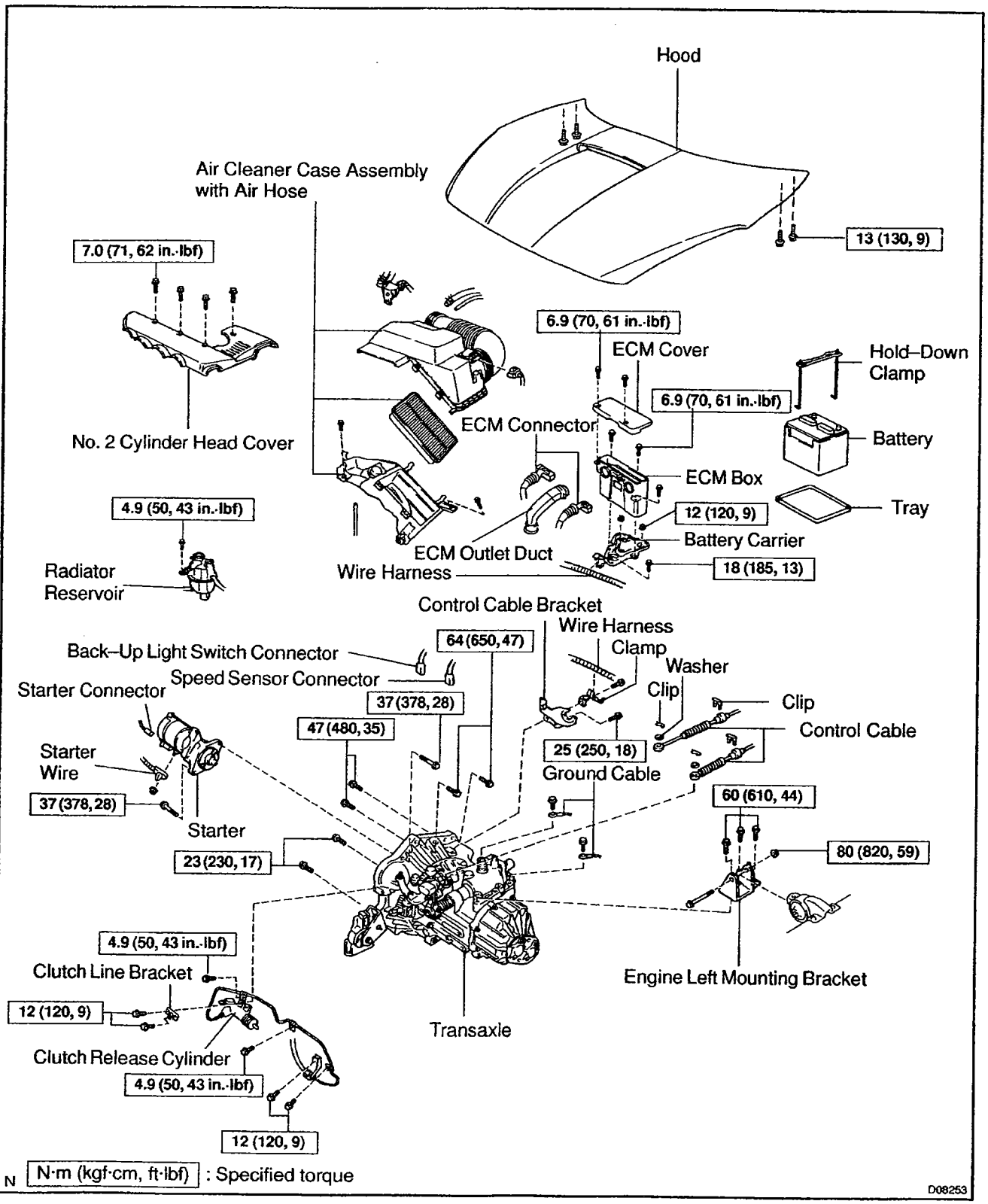
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

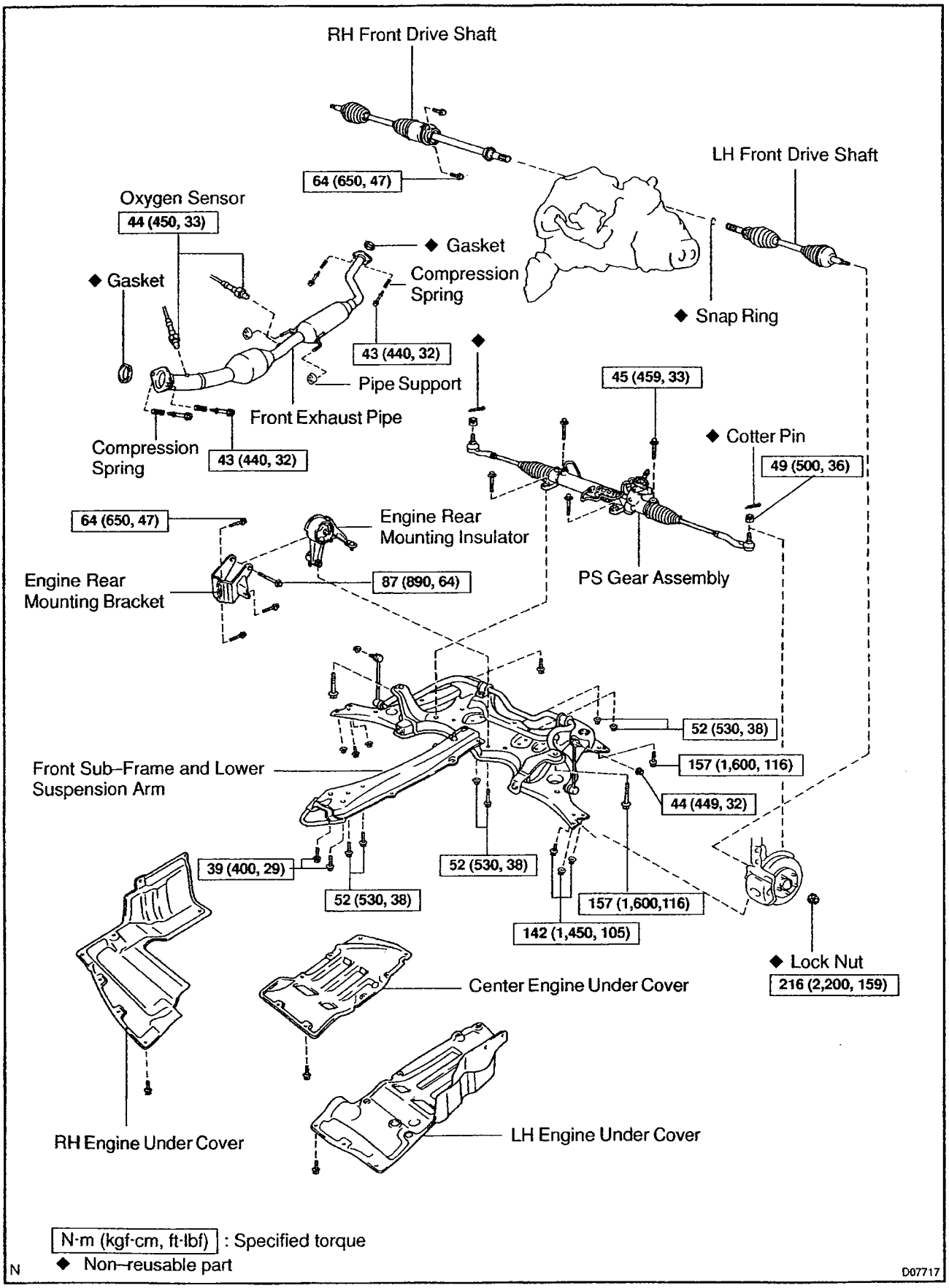
Symptom	Suspect Area	See page
Noise	1. Oil (Level low)	MX–4
	2. Oil (Wrong)	MX–4
	3. Gear (Worn or damaged)	MX–9
	4. Bearing (Worn or damaged)	MX–9
Oil leakage	1. Oil (Level too high)	MX–4
	2. Gasket (Damaged)	MX–9
	3. Oil seal (Worn or damaged)	MX–9
	4. O–Ring (Worn or damaged)	MX–9
Hard to shift or will not shift	1. Control cable (Faulty)	MX–57
	2. Synchronizer ring (Worn or damaged)	MX–24
		MX–32
		MX–41
	3. Shifting key spring (Damaged)	MX–24
		MX–32
		MX–41
Jumps out of gear	1. Locking ball spring (Damaged)	MX–24
	2. Gear shift fork (Worn)	MX–24
	3. Gear (Worn or damaged)	MX–24
	4. Bearing (Worn or damaged)	MX–24
Reverse shift warning buzzer does not sound	1. GAUGE fuse	BE–10
	2. Ignition switch	BE–13
	3. Back–up light switch	MX–55
	4. Reverse shift warning buzzer	MX–55
	5. Wire harness	–

MANUAL TRANSAXLE UNIT

COMPONENTS

MX09X-01





N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

N

D07717

M

MX09Y–01

REMOVAL

1. REMOVE HOOD

HINT:

At the time of installation, please refer to the following item.

Adjust the hood. (See page BO–9)

2. REMOVE NO. 2 CYLINDER HEAD COVER

Remove the 4 bolts and No. 2 cylinder head cover.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

3. DISCONNECT RADIATOR RESERVOIR

Remove the bolt and disconnect the radiator reservoir.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

4. REMOVE BATTERY

5. REMOVE AIR CLEANER CASE ASSEMBLY WITH AIR HOSE AND ECM BOX

(a) Remove the 2 bolts and ECM cover.

Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(b) Disconnect the ECM connectors from the ECM.

(c) Remove the ECM outlet duct.

(d) Remove the air cleaner case assembly with the air hose.

(e) Remove the 3 bolts and ECM box.

Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(f) Disconnect the wire harness, and remove the 2 nuts, bolt and battery carrier.

Torque:

Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)

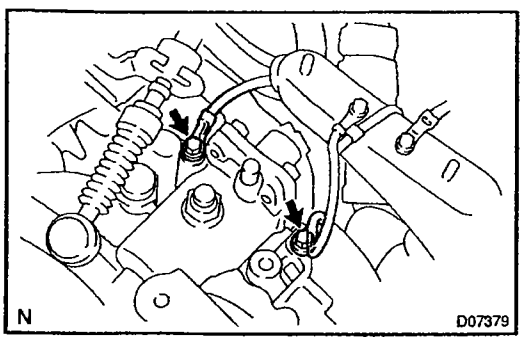
Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)

6. DISCONNECT CONTROL CABLE

(a) Remove the 2 clips and washers.

(b) Remove the 2 clips and disconnect the control cables from the transaxle.

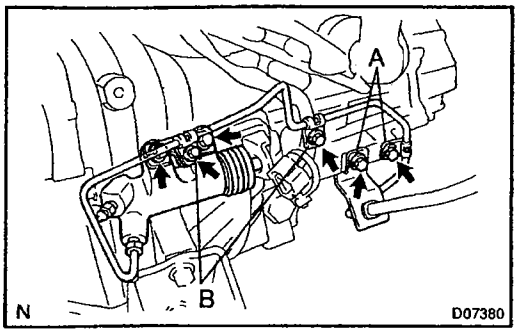
MX



7. DISCONNECT GROUND CABLE

Remove the 2 set bolts of the 2 ground cables from the transaxle.

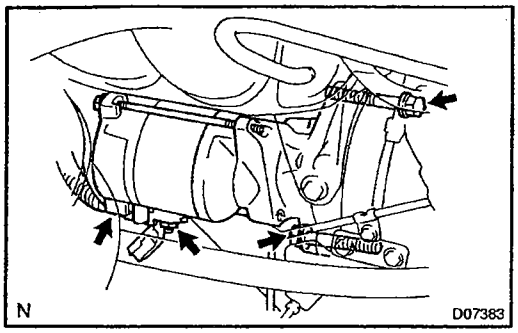
8. DISCONNECT SPEED SENSOR AND BACK–UP LIGHT SWITCH CONNECTORS



9. DISCONNECT CLUTCH RELEASE CYLINDER

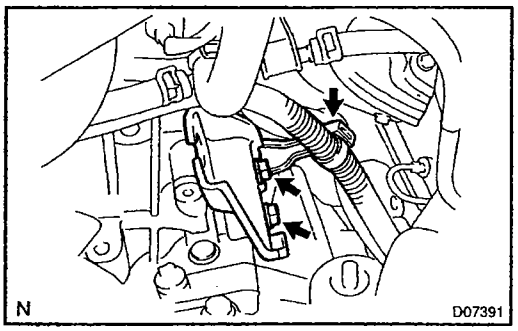
(a) Remove the 4 set bolts of the clutch line.
Torque:
Bolt A: 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt B: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(b) Remove the 2 set bolts of the clutch release cylinder and clutch line bracket.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



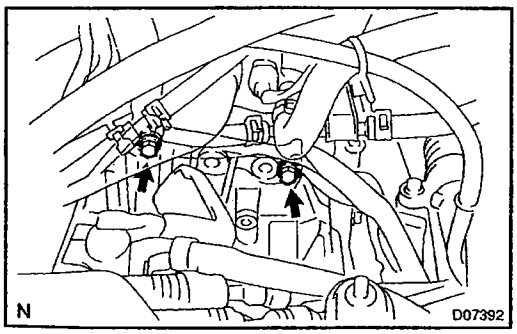
10. REMOVE STARTER

(a) Disconnect the starter connector.
(b) Remove the nut and disconnect the starter wire.
(c) Remove the 2 bolts and starter.
Torque: 37 N·m (378 kgf·cm, 28 ft·lbf)

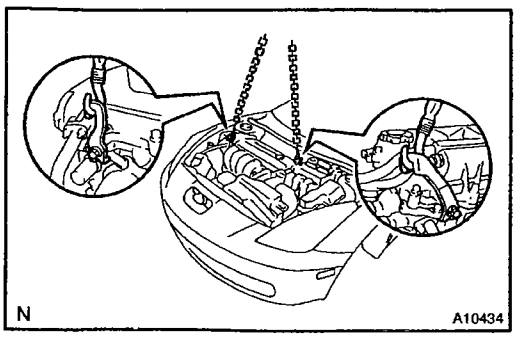


11. REMOVE CONTROL CABLE BRACKET

(a) Disconnect the wire harness from the clamp.
(b) Remove the 2 bolts, clamp and control cable bracket from the transaxle.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



12. REMOVE 2 TRANSAXLE UPPER SIDE MOUNTING BOLTS
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



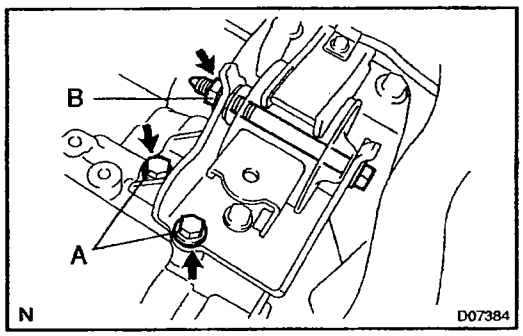
13. ATTACH ENGINE SLING DEVICE TO ENGINE HANGER

(a) Disconnect the 2 PCV hoses.
(b) Install the No. 1 and No. 2 engine hangers in the correct direction.
Parts No.:
No. 1 engine hanger: 12281–88600
No. 2 engine hanger: 12282–88600
Bolt: 91512–61020
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

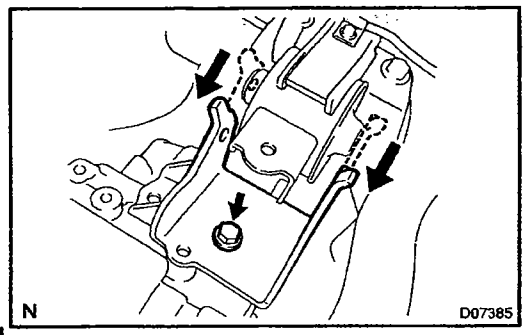
MX

(c) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.



14. REMOVE ENGINE LEFT MOUNTING BRACKET 3 SET BOLTS AND NUT
Torque:
Bolt A: 60 N·m (610 kgf·cm, 44 ft·lbf)
Nut B: 80 N·m (820 kgf·cm, 59 ft·lbf)



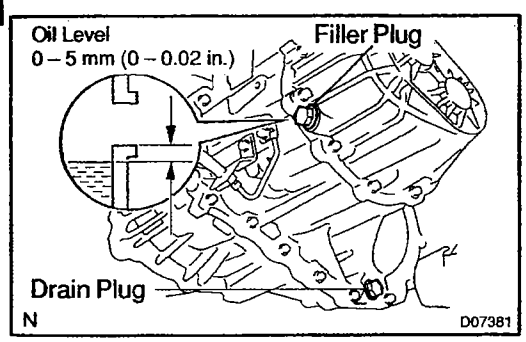
15. REMOVE ENGINE LEFT MOUNTING BRACKET
Lower the transaxle side, and remove the bolt and engine left mounting bracket.
Torque: 60 N·m (610 kgf·cm, 44 ft·lbf)

16. RAISE VEHICLE

CAUTION:
Make sure that the vehicle is securely supported.

17. REMOVE CENTER, LH AND RH ENGINE UNDER COVERS

MX



18. DRAIN TRANSAXLE OIL
Oil grade: API GL–4 or GL–5
Viscosity: SAE 75W–90
Capacity: 2.3 liters (2.4 US qts, 2.0 Imp. qts)
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

19. REMOVE LH AND RH FRONT DRIVE SHAFTS
(See page SA–18)

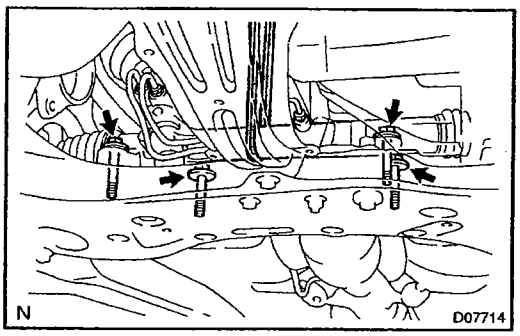
20. REMOVE FRONT EXHAUST PIPE

(a) Disconnect the 2 heated oxygen sensors.
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

HINT:
At the time of installation, please refer to the following items.
- Before installing the heated oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing the heated oxygen sensor, check that the sensor wire is not twisted. If it is twisted, remove the heated oxygen sensor and reinstall it.

(b) Remove the 4 bolts, compression springs and 2 gaskets.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(c) Disconnect the front exhaust pipe from the pipe supports and remove it.



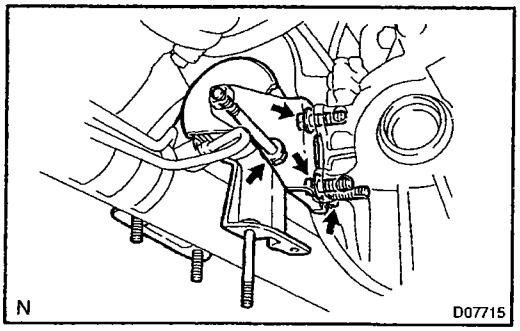
21. REMOVE FRONT SUB–FRAME AND LOWER SUSPENSION ARM

(a) Tie the PS gear assembly to the proper position with a code or an equivalent to suspend the assembly securely.

(b) Remove the 4 set bolts of the PS gear assembly.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

(c) Disconnect the LH and RH stabilizer bar links from the shock absorber. (See page SA–51)

(d) Remove the front sub–frame and lower suspension arm. (See page SA–42)



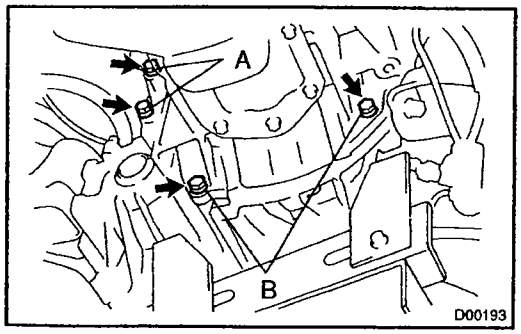
22. REMOVE ENGINE REAR MOUNTING INSULATOR AND BRACKET

(a) Remove the bolt and engine rear mounting insulator.
Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)

(b) Remove the 3 bolts and engine rear mounting bracket.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

23. JACK UP TRANSAXLE SLIGHTLY

Using a transmission jack, support the transaxle.



24. REMOVE 4 TRANSAXLE LOWER SIDE MOUNTING BOLTS
Torque:
Bolt A: 47 N·m (480 kgf·cm, 35 ft·lbf)
Bolt B: 23 N·m (230 kgf·cm, 17 ft·lbf)

25. REMOVE TRANSAXLE

Lower the engine left side and remove the transaxle from the engine.

HINT:

At the time of installation, please refer to the following items.

- Align the input shaft with the clutch disc and install the transaxle to the engine.
- Temporarily tighten the transaxle mounting bolts.

MX

MX01E-02

INSTALLATION

Installation is in the reverse order of removal. (See page MX–4)

HINT:

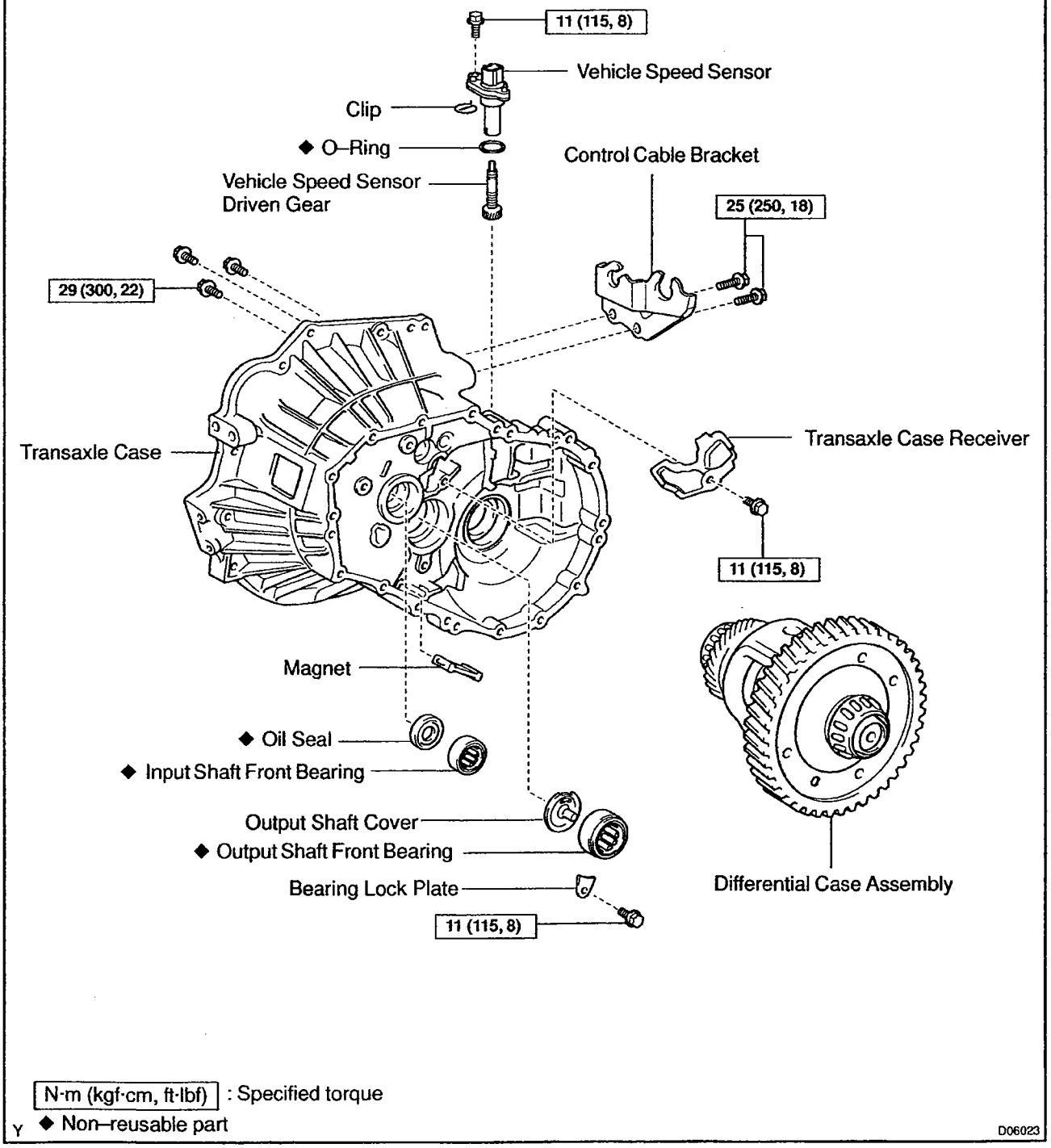
After installation, check and inspect items as follows.

- Front wheel alignment. (See page SA–4)
- Do the road test.

MANUAL TRANSAXLE ASSEMBLY

COMPONENTS

MX01F-02

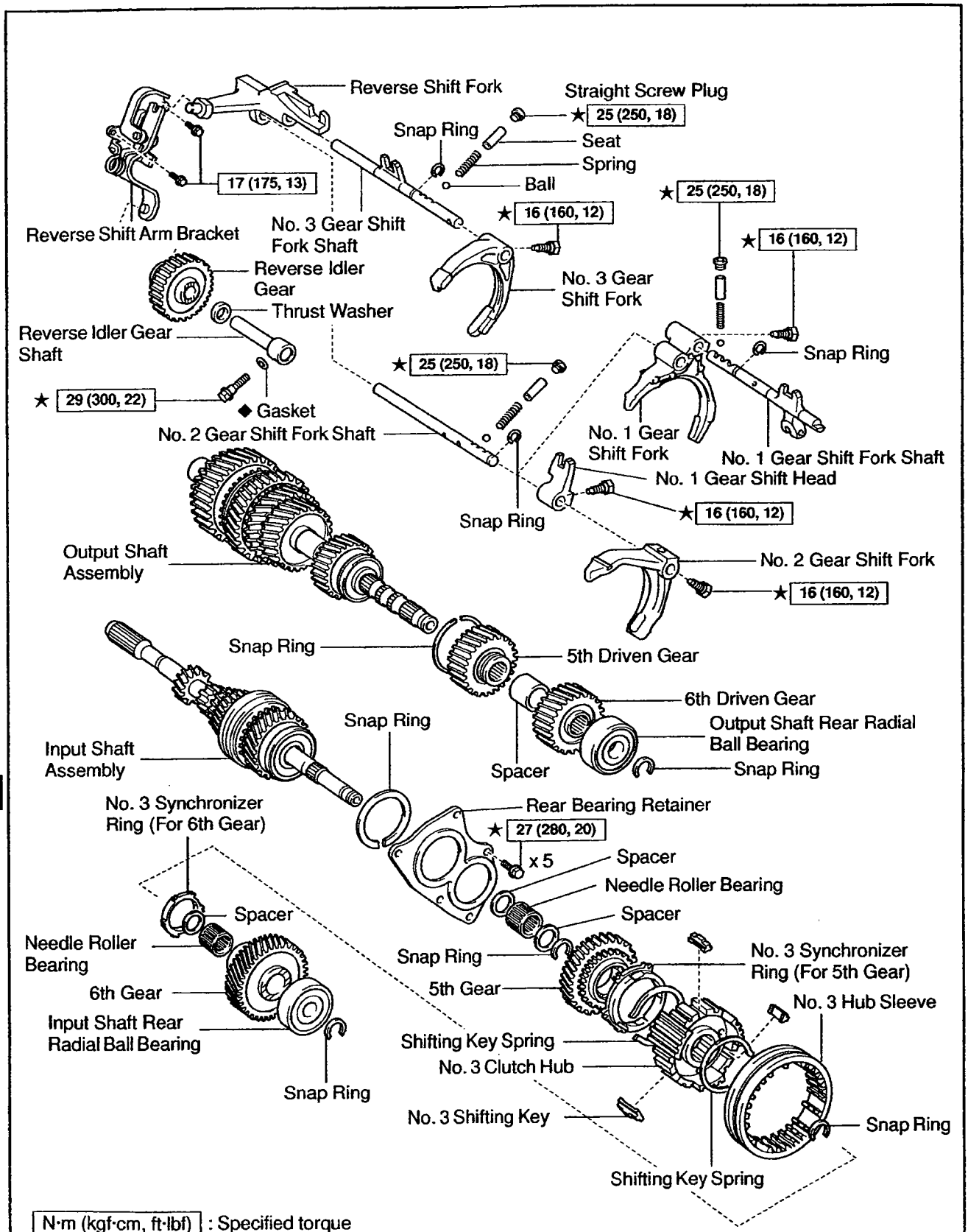


N·m (kgf·cm, ft·lbf) : Specified torque

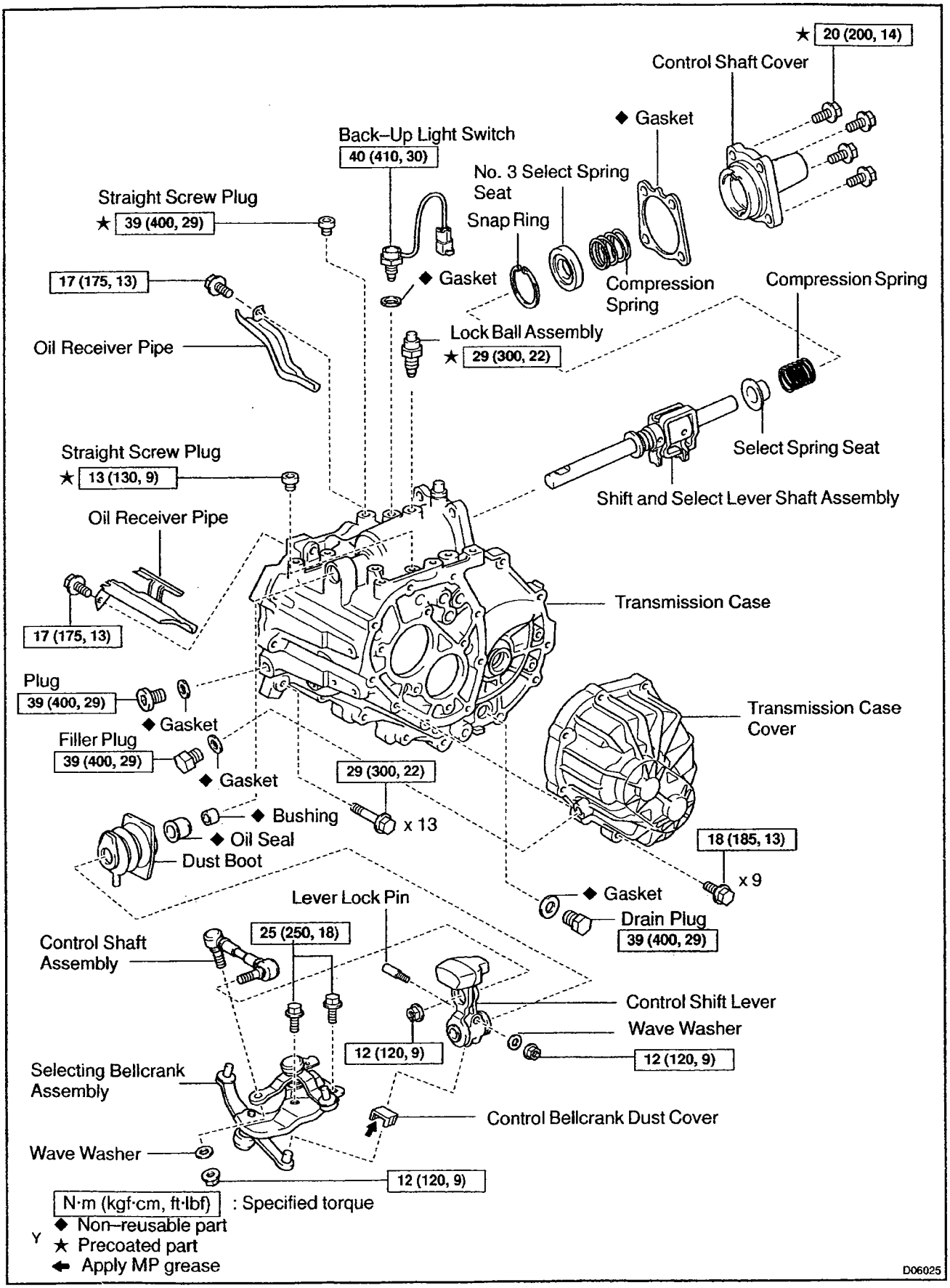
◆ Non–reusable part

D06023

MX


Reverse Shift Fork
Straight Screw Plug
★ 25 (250, 18)
Snap Ring
Seat
Spring
Ball
17 (175, 13)
★ 25 (250, 18)
★ 16 (160, 12)
Reverse Shift Arm Bracket
No. 3 Gear Shift Fork Shaft
★ 16 (160, 12)
Reverse Idler Gear
No. 3 Gear Shift Fork
Thrust Washer
Reverse Idler Gear Shaft
Snap Ring
★ 25 (250, 18)
★ 29 (300, 22)
◆ Gasket
No. 2 Gear Shift Fork Shaft
No. 1 Gear Shift Fork
No. 1 Gear Shift Fork Shaft
No. 1 Gear Shift Head
Snap Ring
★ 16 (160, 12)
Output Shaft Assembly
No. 2 Gear Shift Fork
★ 16 (160, 12)
Snap Ring
5th Driven Gear
6th Driven Gear
Output Shaft Rear Radial Ball Bearing
Snap Ring
Input Shaft Assembly
Spacer
Snap Ring
No. 3 Synchronizer Ring (For 6th Gear)
Rear Bearing Retainer
★ 27 (280, 20)
x 5
Spacer
Needle Roller Bearing
Spacer
Spacer
Needle Roller Bearing
Snap Ring
No. 3 Synchronizer Ring (For 5th Gear)
6th Gear
5th Gear
No. 3 Hub Sleeve
Input Shaft Rear Radial Ball Bearing
Shifting Key Spring
No. 3 Clutch Hub
Snap Ring
No. 3 Shifting Key
Snap Ring
Shifting Key Spring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
D06024

MX

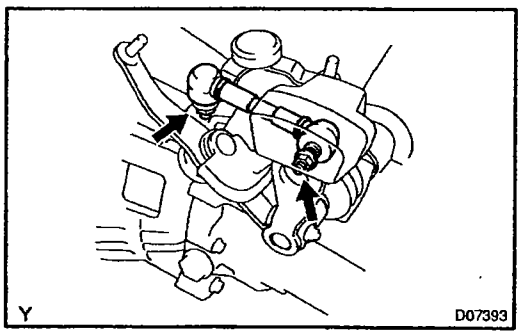

★ 20 (200, 14)
Control Shaft Cover
◆ Gasket
Back–Up Light Switch
40 (410, 30)
No. 3 Select Spring Seat
Snap Ring
Straight Screw Plug
★ 39 (400, 29)
17 (175, 13)
◆ Gasket
Compression Spring
Compression Spring
Oil Receiver Pipe
Lock Ball Assembly
★ 29 (300, 22)
Select Spring Seat
Straight Screw Plug
★ 13 (130, 9)
Shift and Select Lever Shaft Assembly
Oil Receiver Pipe
Transmission Case
17 (175, 13)
Plug
39 (400, 29)
◆ Gasket
Transmission Case Cover
Filler Plug
39 (400, 29)
◆ Gasket
29 (300, 22)
x 13
◆ Bushing
◆ Oil Seal
Dust Boot
18 (185, 13)
x 9
◆ Gasket
Lever Lock Pin
Drain Plug
39 (400, 29)
Control Shaft Assembly
25 (250, 18)
Control Shift Lever
Wave Washer
12 (120, 9)
12 (120, 9)
Selecting Bellcrank Assembly
Control Bellcrank Dust Cover
Wave Washer
12 (120, 9)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
Apply MP grease
D06025

M0082-01

DISASSEMBLY

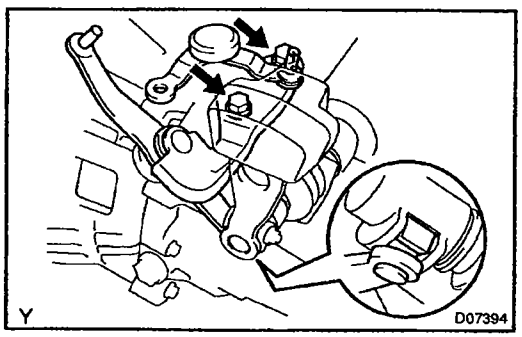
1. **REMOVE FILLER PLUG AND DRAIN PLUG WITH 2 GASKETS**
   Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
2. **REMOVE VEHICLE SPEED SENSOR**
(a) Remove the bolt and vehicle speed sensor.
   Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)
(b) Using a small screwdriver, remove the clip from the vehicle speed sensor.
(c) Remove the vehicle speed sensor driven gear from the speed sensor.
(d) Using a small screwdriver, remove the O–ring from the vehicle speed sensor.
3. **REMOVE BACK–UP LIGHT SWITCH WITH GASKET**
   Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)
4. **REMOVE CONTROL CABLE BRACKET**

Remove the 2 bolts and control cable bracket.
   Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



5. **REMOVE CONTROL SHAFT ASSEMBLY**

Remove the 2 nuts, wave washer and control shaft assembly.
   Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

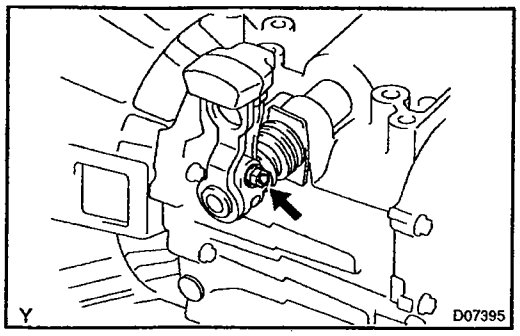


6. **REMOVE SELECTING BELLCRANK ASSEMBLY**
(a) Remove the 2 bolts and selecting bellcrank assembly.
   Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:
At the time of reassembly, please refer to the following item.
Fit the selecting bellcrank assembly pin part with the dust cover into a groove in the control shift lever.

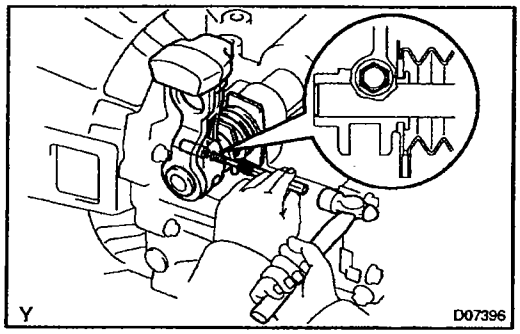
(b) Remove the control bellcrank dust cover from the selecting bellcrank assembly.

NOTICE:
At the time of reassembly, please refer to the following item.
Apply MP grease to the inside circumferential surface of the control bellcrank dust cover.



7. REMOVE CONTROL SHIFT LEVER AND DUST BOOT

(a) Remove the nut and wave washer.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



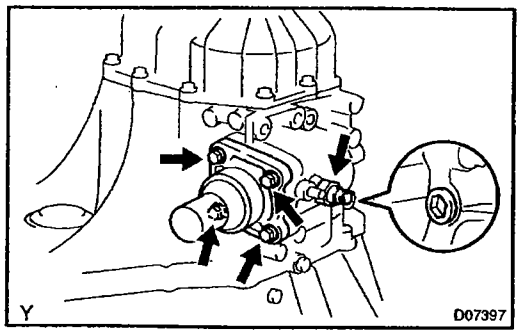
(b) Using a pin punch and hammer, drive out the lever lock pin.

NOTICE:
At the time of reassembly, please refer to the following item.
When fixing the lever lock pin, properly position the shaft groove.

(c) Remove the control shift lever and dust boot.

NOTICE:
At the time of reassembly, please refer to the following items.

- **Install the dust boot into a groove in the control shift lever.**
- **Be sure to install the dust boot in the correct direction, as shown in the illustration.**

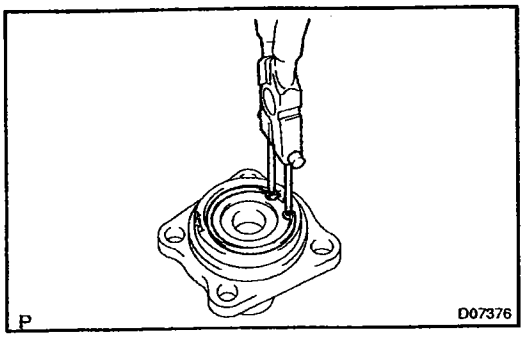


8. REMOVE PLUG, LOCK BALL ASSEMBLY AND CONTROL SHAFT COVER ASSEMBLY

(a) Using a hexagon wrench, remove the plug and gasket.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Remove the lock ball assembly.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

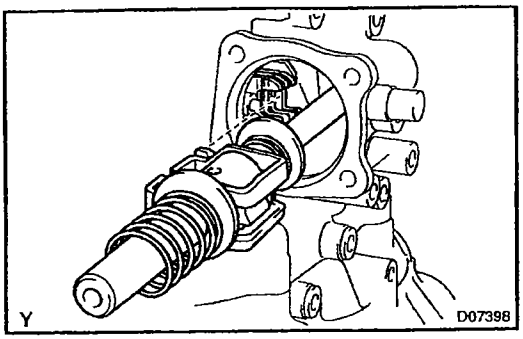
(c) Remove the 4 bolts and control shaft cover assembly with the gasket.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



9. DISASSEMBLE CONTROL SHAFT COVER ASSEMBLY

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the No. 3 select spring seat and compression spring.



10. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY

(a) Remove the shift and select lever shaft assembly.

NOTICE:

At the time of reassembly, please refer to the following item.

Set the claws of the shift interlock plate into the shift head part of the gear shift fork shaft securely.

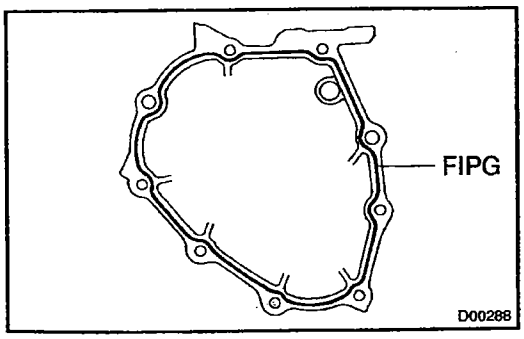
(b) Remove the select spring seat and compression spring from the shift and select lever shaft assembly.

11. REMOVE TRANSMISSION CASE COVER

(a) Remove the 9 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Carefully tap the projection of the transmission case cover with a brass bar and hammer and remove it.



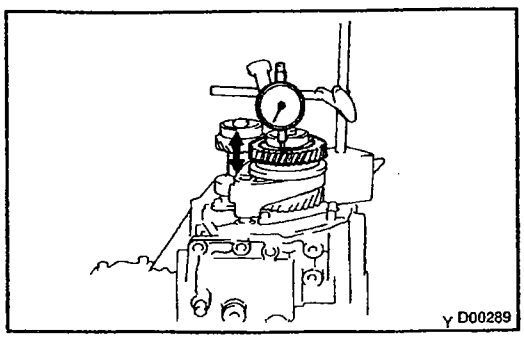
HINT:

At the time of reassembly, please refer to the following item.

Apply FIPG to the transmission case side, as shown in the illustration.

FIPG:

Part No. 08826–00090, THREE BOND 1281 or equivalent



12. INSPECT 6TH GEAR THRUST CLEARANCE

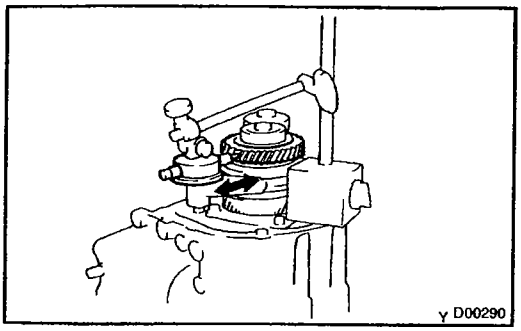
Using a dial indicator, measure the thrust clearance.

Standard clearance:

0.10 – 0.60 mm (0.0039 – 0.0236 in.)

Maximum clearance:

0.60 mm (0.0236 in.)

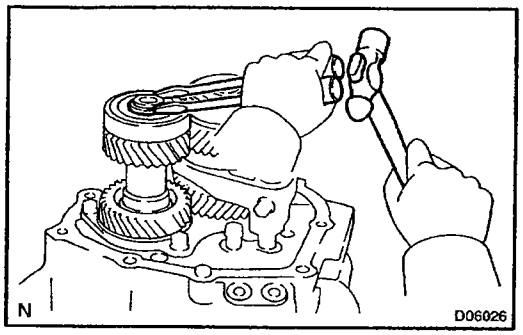


13. INSPECT 6TH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance.

Standard clearance:
0.009 – 0.050 mm (0.0003 – 0.0020 in.)
Maximum clearance:
0.050 mm (0.0020 in.)

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.



14. REMOVE OUTPUT SHAFT REAR RADIAL BALL BEARING, 6TH DRIVEN GEAR AND SPACER

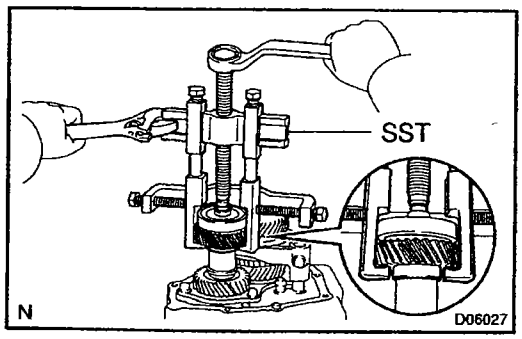
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

At the time of reassembly, please refer to the following item.

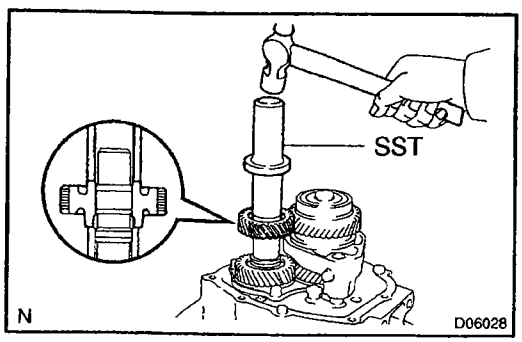
Select a snap ring from the table below that will make the thrust clearance of the output shaft rear radial ball bearing less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
B	2.31 (0.0909)	H	2.67 (0.1051)
C	2.37 (0.0933)	J	2.73 (0.1075)
D	2.43 (0.0957)	K	2.79 (0.1098)
E	2.49 (0.0980)	L	2.85 (0.1122)
F	2.55 (0.1004)	M	2.91 (0.1146)
G	2.61 (0.1028)	–	–



(b) Using SST, remove the rear radial ball bearing and 6th driven gear.

SST 09950–40011 (09951–04010, 09952–04010, 09953–04030, 09954–04010, 09955–04021, 09957–04010, 09958–04011)



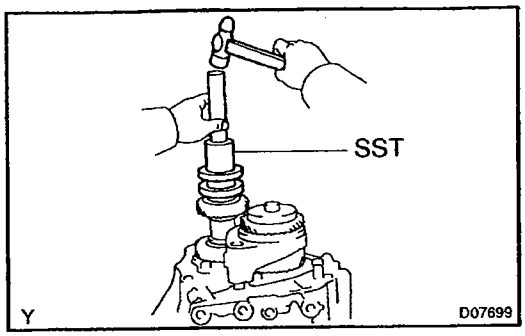
HINT:

At the time of reassembly, please refer to the following items.

- Using SST and a hammer, drive in the 6th driven gear.
  SST 09325–12010

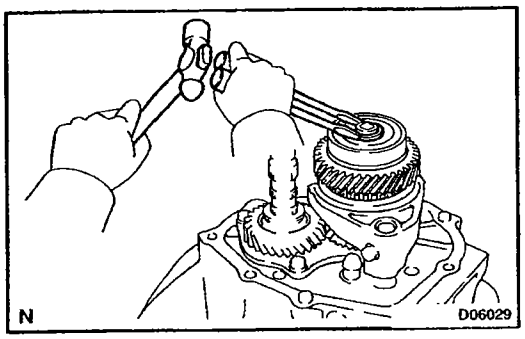
NOTICE:

Be sure to install the 6th driven gear in the correct direction, as shown in the illustration.



- Set SST to the rear radial ball bearing inner race securely, drive in the bearing with a hammer.
  SST 09517–12010

(c) Remove the spacer.

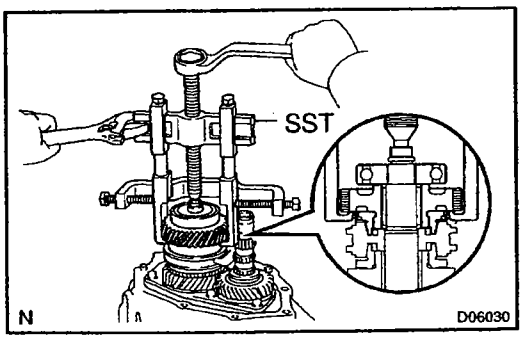


15. REMOVE INPUT SHAFT REAR RADIAL BALL BEARING AND 6TH GEAR

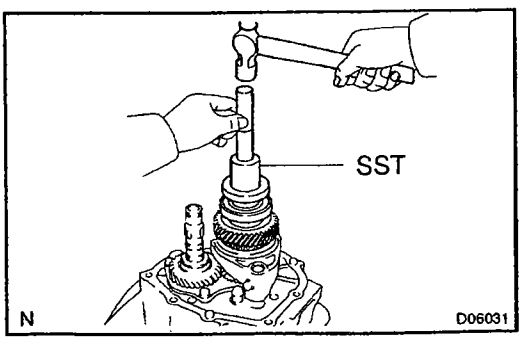
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:
At the time of reassembly, please refer to the following item.
Select a snap ring from the table below that will make the thrust clearance of the No. 3 clutch hub less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	1.70 (0.0669)	G	2.00 (0.0787)
B	1.75 (0.0689)	H	2.05 (0.0807)
C	1.80 (0.0709)	J	2.10 (0.0827)
D	1.85 (0.0728)	K	2.15 (0.0846)
E	1.90 (0.0748)	L	2.20 (0.0866)
F	1.95 (0.0768)	M	2.25 (0.0886)

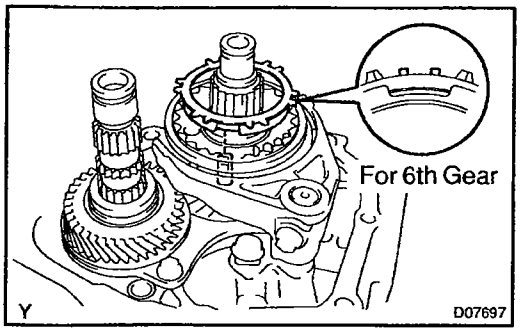


(b) Using SST, remove the rear radial ball bearing and 6th gear.
SST 09950–40011 (09951–04010, 09952–04010, 09953–04030, 09954–04010, 09955–04021, 09957–04010, 09958–04011)



HINT:
At the time of reassembly, please refer to the following item.
Set SST to the rear radial ball bearing inner race securely, drive in the bearing with a hammer.
SST 09517–12010

(c) Remove the needle roller bearing and spacer.

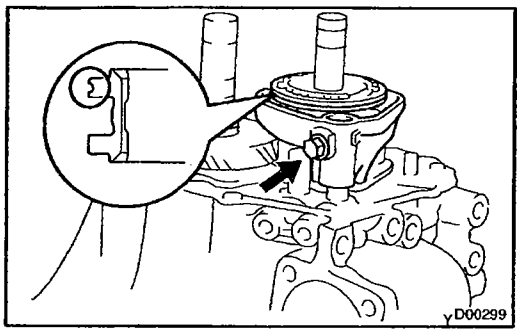


16. REMOVE NO. 3 SYNCHRONIZER RING (FOR 6TH GEAR)

NOTICE:

At the time of reassembly, please refer to the following items.

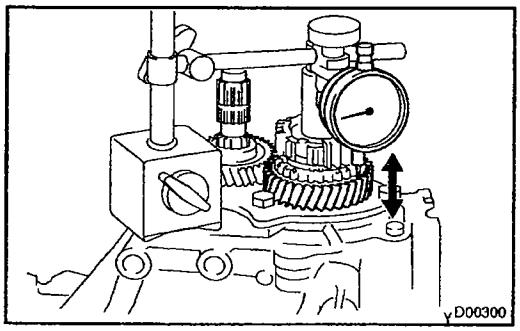
- **Align the No. 3 synchronizer ring slots with the No. 3 shifting keys.**
- **Distinguish the No. 3 synchronizer ring (for the 6th gear) by the teeth on the synchronizer ring.**



17. REMOVE NO. 3 GEAR SHIFT FORK AND NO. 3 HUB SLEEVE

Remove the bolt, No. 3 gear shift fork and No. 3 hub sleeve.

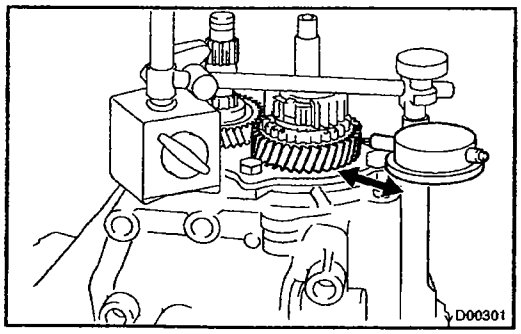
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



18. INSPECT 5TH GEAR THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance.

Standard clearance:
0.10 – 0.62 mm (0.0039 – 0.0244 in.)
Maximum clearance:
0.62 mm (0.0244 in.)

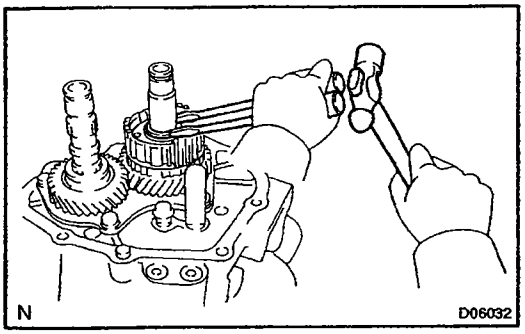


19. INSPECT 5TH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance.

Standard clearance:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
0.056 mm (0.0022 in.)

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.



20. REMOVE 5TH GEAR, NO. 3 SYNCHRONIZER RING (FOR 5TH GEAR) AND NO. 3 CLUTCH HUB ASSEMBLY

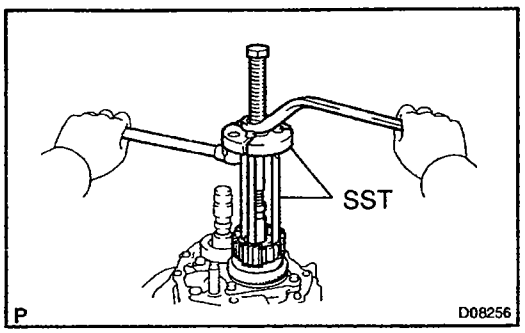
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

At the time of reassembly, please refer to the following item.

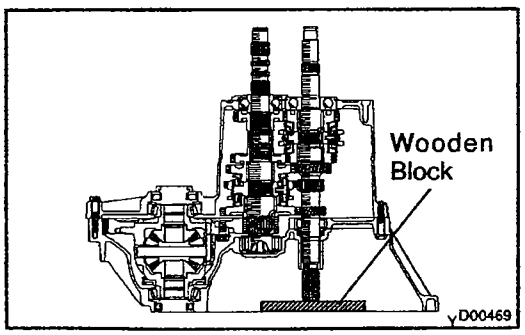
Select a snap ring from the table below that will make the thrust clearance of the No. 3 clutch hub less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	1.75 (0.0689)	F	2.00 (0.0787)
B	1.80 (0.0709)	G	2.05 (0.0807)
C	1.85 (0.0728)	H	2.10 (0.0827)
D	1.90 (0.0748)	J	2.15 (0.0846)
E	1.95 (0.0768)	–	–



(b) Using SST, remove the No. 3 clutch hub assembly.

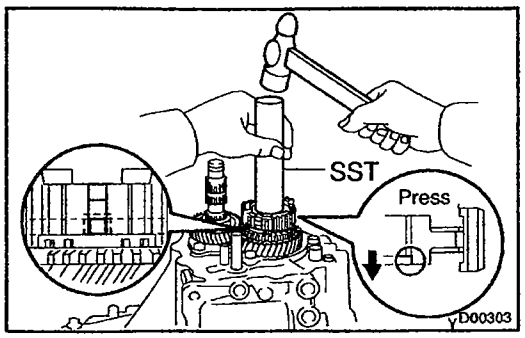
SST 09950–30011 (09951–03010, 09953–03010), 09950–50012 (09954–05030)



HINT:

At the time of reassembly, please refer to the following items.

- Before driving in the No. 3 clutch hub assembly and input shaft rear radial ball bearing, place the suitable sized wooden block on the rear side of the input shaft, as shown in the illustration. When driving them in, fix the input shaft firmly so that it is not pushed downward. Otherwise the input shaft center bearing is overloaded, it might be damaged.

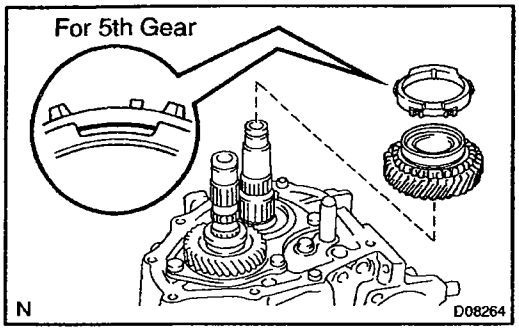


- Using SST and a hammer, drive in the No. 3 clutch hub assembly.

SST 09612–22011

NOTICE:

- **Align the No. 3 synchronizer ring slots with the No. 3 shifting keys.**
- **Be sure to install the No. 3 clutch hub assembly in the correct direction, as shown in the illustration.**



(c) Remove the No. 3 synchronizer ring (for the 5th gear) and 5th gear from the input shaft.

NOTICE:

At the time of reassembly, please refer to the following item.

Distinguish the No. 3 synchronizer ring (for the 5th gear) by the teeth on the synchronizer ring.

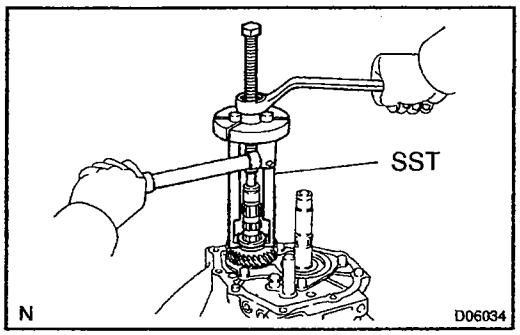
(d) Using 2 screwdrivers and a hammer, tap out the snap ring.

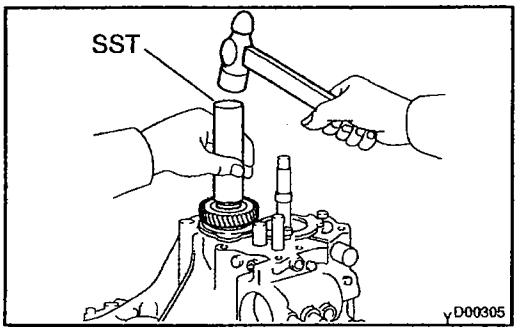
(e) Remove the needle roller bearing and 2 spacers.

21. REMOVE 5TH DRIVEN GEAR

Using SST, remove the 5th driven gear.

SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03021)



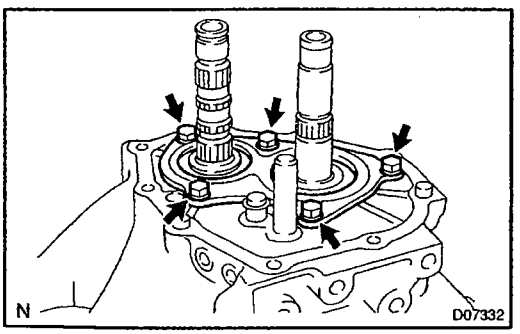


HINT:

At the time of reassembly, please refer to the following item.

Using SST and a hammer, drive in the 5th driven gear.

SST 09612–22011



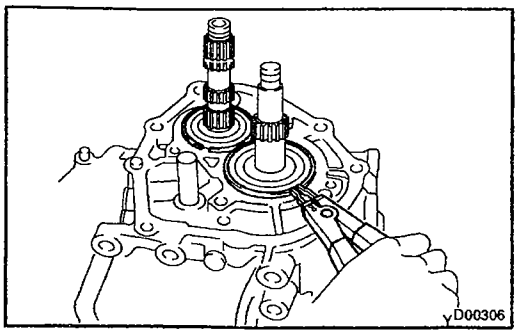
22. REMOVE REAR BEARING RETAINER

Remove the 5 bolts and rear bearing retainer.

Sealant:

Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

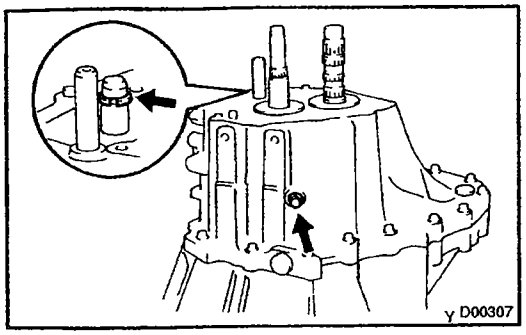


23. REMOVE BEARING SNAP RING

Using a snap ring expander, remove the 2 snap rings.

HINT:

If it is difficult to remove and install the snap rings, pull up the shafts.

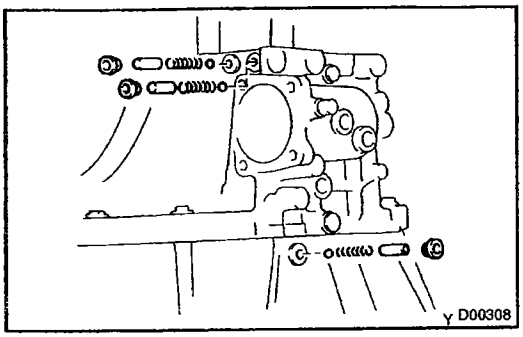


24. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT AND GASKET

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

25. REMOVE SNAP RING FROM NO. 2 SHIFT FORK SHAFT

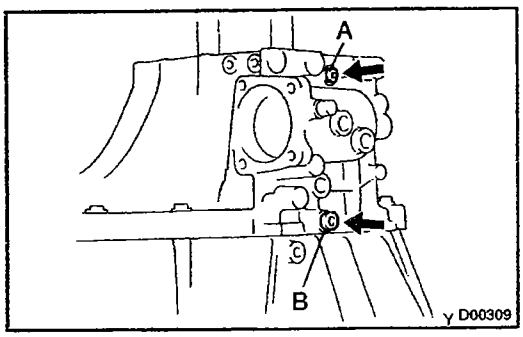
Using 2 screwdrivers and a hammer, tap out the snap ring.



26. REMOVE STRAIGHT SCREW PLUG, SEAT, SPRING AND BALL

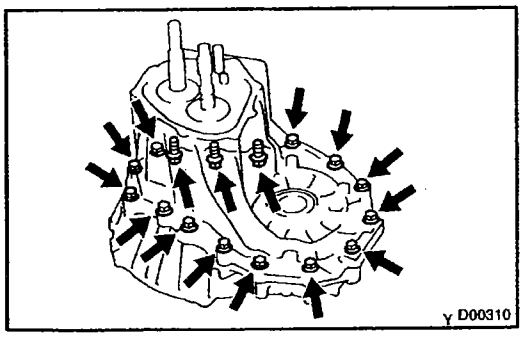
(a) Using a hexagon wrench, remove the 3 straight screw plugs.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Using a magnetic finger, remove the 3 seats, springs and balls.



27. REMOVE STRAIGHT SCREW PLUG

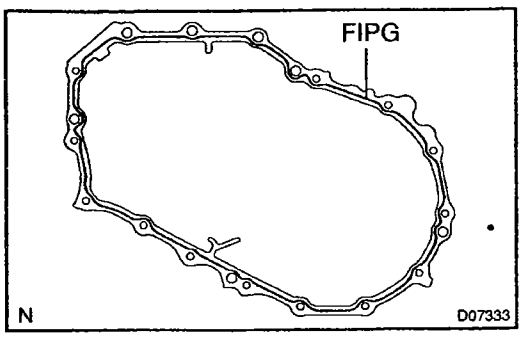
Using a hexagon wrench, remove the 2 straight screw plugs.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque:
Plug A: 13 N·m (130 kgf·cm, 9 ft·lbf)
Plug B: 39 N·m (400 kgf·cm, 29 ft·lbf)



28. REMOVE TRANSMISSION CASE

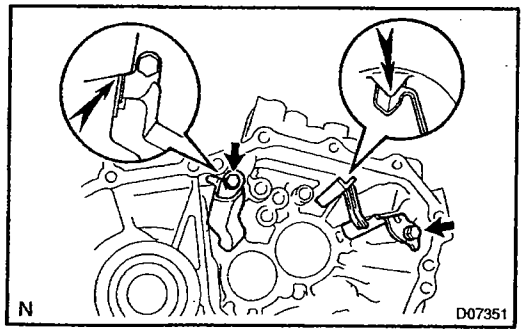
(a) Remove the 16 bolts.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Carefully tap the transmission case with a plastic hammer and remove it.



HINT:
At the time of reassembly, please refer to the following item.
Apply FIPG to the transaxle case side, as shown in the illustration.

FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent



29. REMOVE OIL RECEIVER PIPE

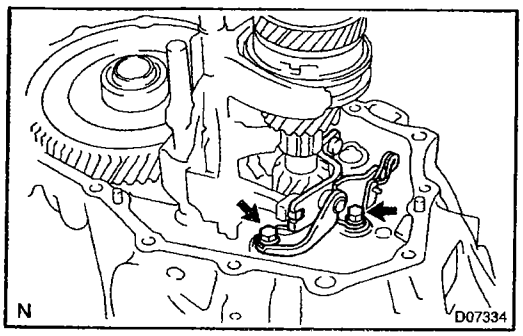
Remove the 2 bolts and oil receiver pipes from the transmission case.

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

NOTICE:

At the time of reassembly, please refer to the following items.

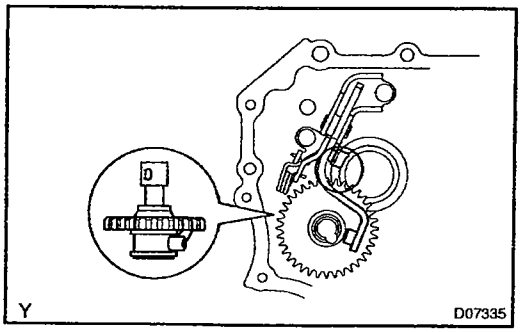
- **Prevent the oil receiver pipes from being deformed.**
- **Install the oil receiver pipes while placing it against the transmission case, as shown in the illustration.**



30. REMOVE REVERSE SHIFT ARM BRACKET

Remove the 2 bolts and reverse shift arm bracket.

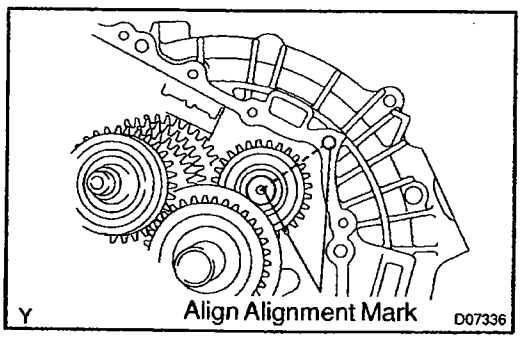
Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)



NOTICE:

At the time of reassembly, please refer to the following items.

- **Set the pin on the top of the reverse shift arm into a groove on the reverse idler gear.**
- **Fit the claw of the reverse shift arm bracket with the notch of the input shaft front bearing.**

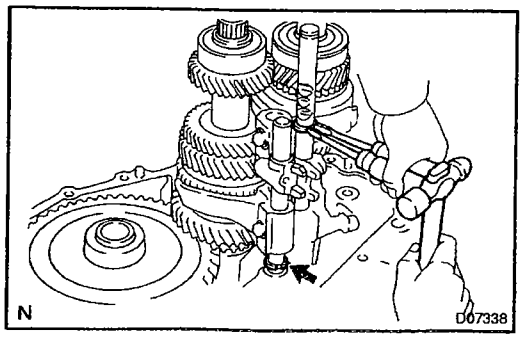


31. REMOVE REVERSE IDLER GEAR, THRUST WASHER AND SHAFT

NOTICE:

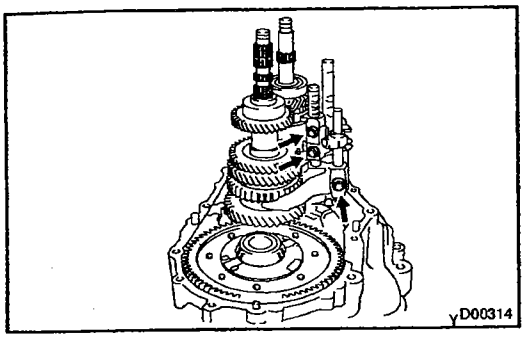
At the time of reassembly, please refer to the following item.

Install the reverse idler gear, thrust washer and shaft, as shown in the illustration.



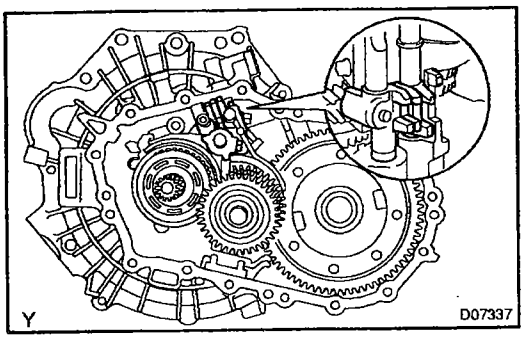
32. REMOVE GEAR SHIFT FORK SHAFT SNAP RING

Using 2 screwdrivers and a hammer, tap out the 2 snap rings from the No. 1 and No. 3 gear shift fork shafts.

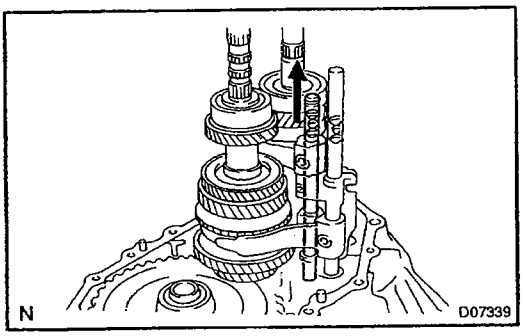


33. REMOVE NO. 1 GEAR SHIFT HEAD, NO. 1 AND NO. 2 GEAR SHIFT FORKS 3 SET BOLTS

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

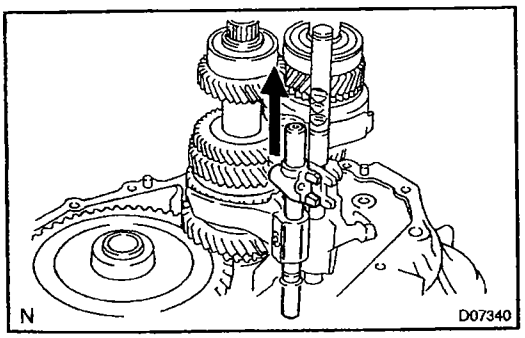


NOTICE:
At the time of reassembly, please refer to the following item.
Make sure that the 3 gear shift heads are positioned, as shown in the illustration.



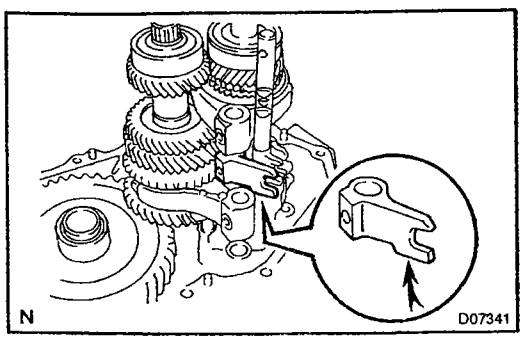
34. REMOVE NO. 2 GEAR SHIFT FORK SHAFT

Remove the No. 2 gear shift fork shaft from the No. 2 gear shift fork, No. 1 gear shift head, No. 1 gear shift fork, reverse shift fork and transaxle case.

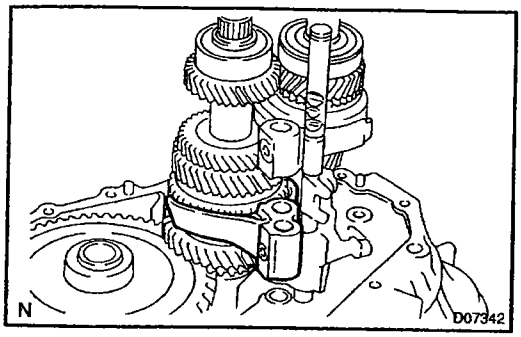


35. REMOVE NO. 1 GEAR SHIFT FORK SHAFT

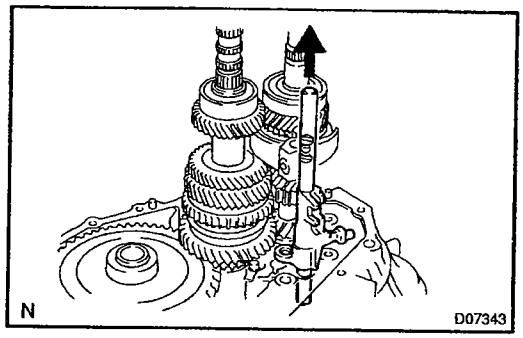
Remove the No. 1 gear shift fork shaft from the No. 1 gear shift fork and transaxle case.



36. REMOVE NO. 1 GEAR SHIFT HEAD



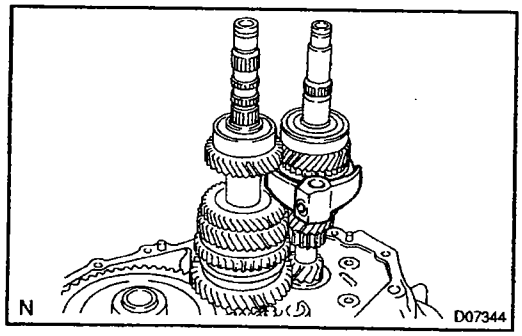
37. **REMOVE NO. 1 GEAR SHIFT FORK FROM REVERSE GEAR GROOVE**



38. **REMOVE NO. 3 GEAR SHIFT FORK SHAFT AND REVERSE SHIFT FORK**

(a) Remove the No. 3 gear shift fork shaft from the reverse shift fork and transaxle case.

(b) Remove the reverse shift fork.



39. **REMOVE NO. 2 GEAR SHIFT FORK FROM NO. 2 HUB SLEEVE GROOVE**

40. **REMOVE INPUT AND OUTPUT SHAFTS TOGETHER FROM TRANSAXLE CASE**

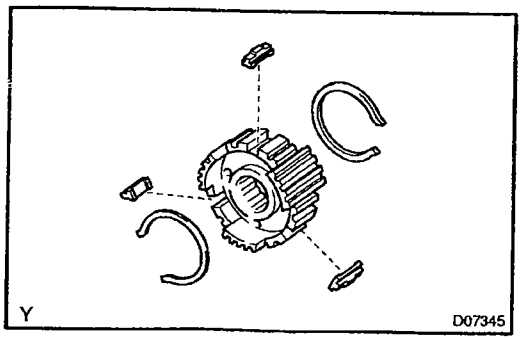
41. **REMOVE DIFFERENTIAL CASE ASSEMBLY**

NOTICE:

At the time of reassembly, please refer to the following item.

Before reassembly, inspect the differential tapered roller bearing preload. (See page MX–52)

42. **REMOVE MAGNET FROM TRANSAXLE CASE**



43. **DISASSEMBLE NO. 3 CLUTCH HUB ASSEMBLY**

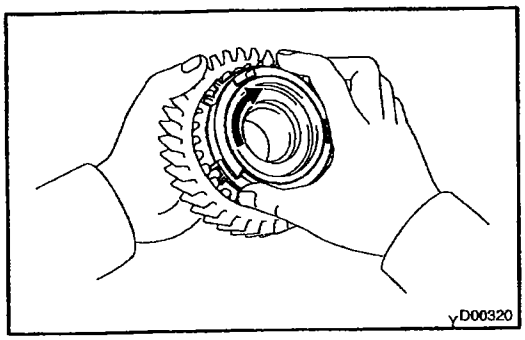
(a) Using a screwdriver, remove the 2 shifting key springs.

NOTICE:

At the time of reassembly, please refer to the following item.

Position the shifting key springs so that their end gaps are not aligned.

(b) Remove the 3 No. 3 shifting keys from the No. 3 clutch hub.



INSPECTION

1. INSPECT 5TH AND 6TH GEARS SYNCHRONIZER RING

(a) Check for wear or damage.

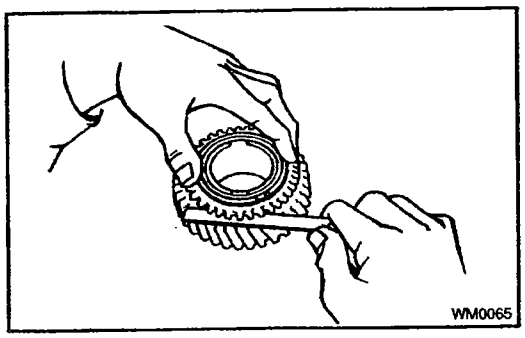
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



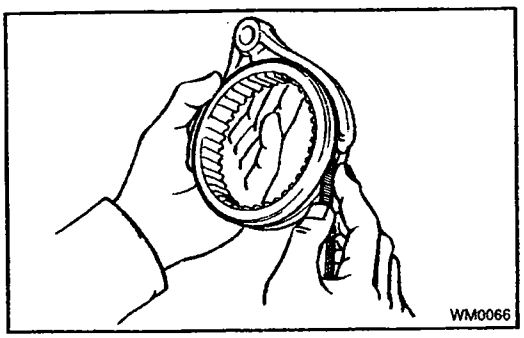
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.75 mm (0.0295 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.



2. INSPECT GEAR SHIFT FORK AND HUB SLEEVE CLEARANCE

Using a feeler gauge, measure the clearance between the hub sleeve and gear shift fork.

Maximum clearance: 0.89 mm (0.035 in.)

If the clearance exceeds the maximum, replace the gear shift fork or hub sleeve.

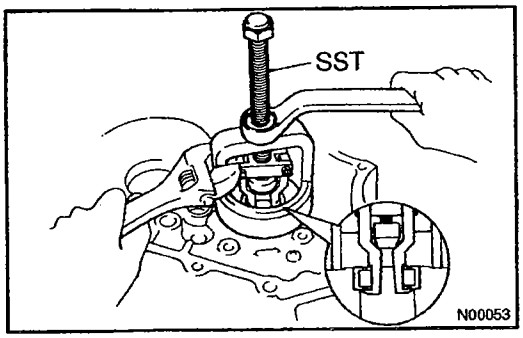
3. REMOVE TRANSAXLE CASE RECEIVER

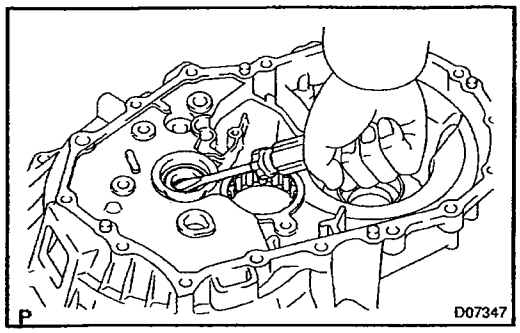
Remove the bolt and transaxle case receiver from the transaxle case.

4. IF NECESSARY, REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL

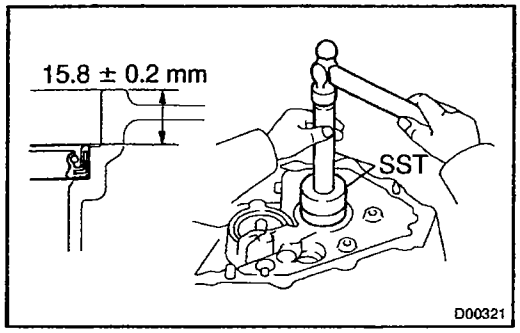
(a) Using SST, remove the input shaft front bearing.

SST 09612–65014



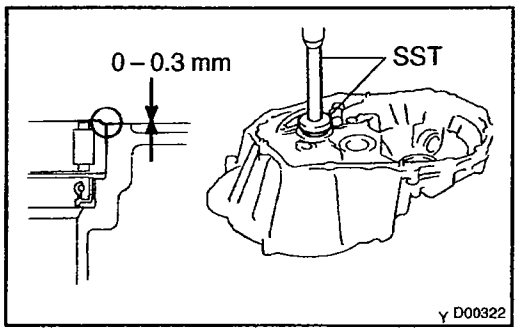


(b) Using a screwdriver, remove the oil seal.



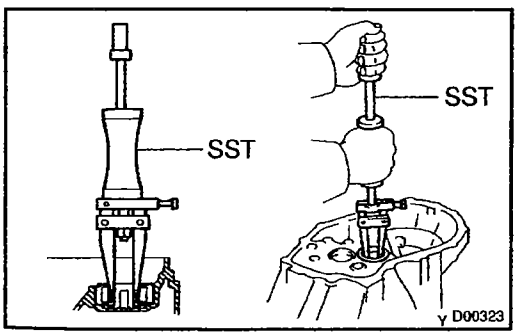
(c) Using SST and a hammer, drive in a new oil seal.
SST 09950–60010 (09951–00360), 09950–70010 (09951–07150)
Drive in depth: 15.8 ± 0.2 mm (0.622 ± 0.008 in.)

(d) Coat the lip of the oil seal with MP grease.



(e) Using SST and a press, install a new input shaft front bearing.
SST 09950–60010 (09951–00400), 09950–70010 (09951–07150)
Drive in depth: 0 – 0.3 mm (0 – 0.012 in.)

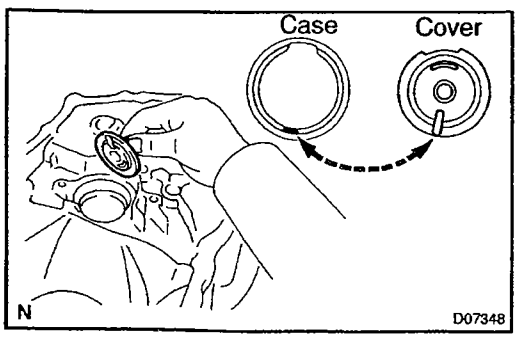
NOTICE:
Be sure to install a new bearing in the correct direction, as shown in the illustration.



5. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING AND OUTPUT SHAFT COVER

(a) Remove the bolt and bearing lock plate.

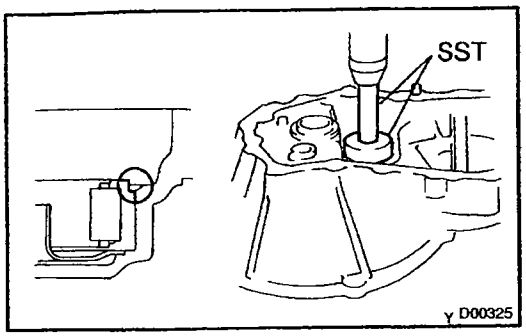
(b) Using SST, pull out the output shaft front bearing.
SST 09308–00010



(c) Remove the output shaft cover.

(d) Install the output shaft cover.

NOTICE:
Install the output shaft cover projection into the case side hollow.



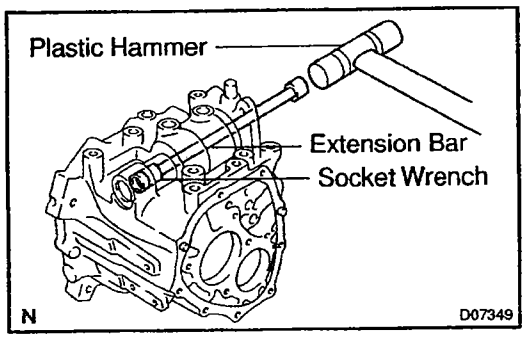
(e) Using SST and a press, install a new output shaft front bearing.
SST 09950–60010 (09951–00560), 09950–70010 (09951–07150)

NOTICE:
Be sure to install a new bearing in the correct direction, as shown in the illustration.

(f) Install the bearing lock plate with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

6. INSTALL TRANSAXLE CASE RECEIVER

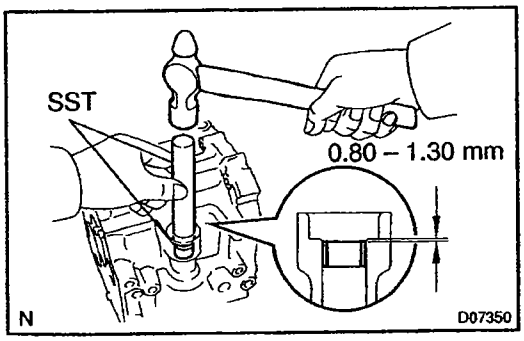
Install the transaxle case receiver to the transaxle case with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)



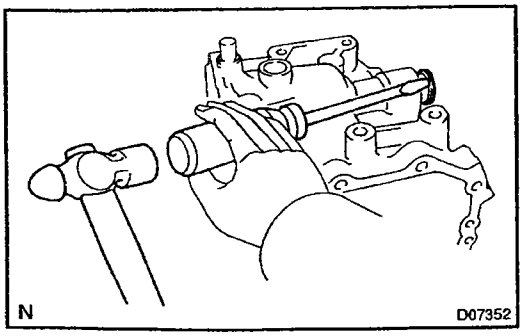
7. IF NECESSARY, REPLACE TRANSMISSION CASE BUSHING

(a) Using a socket wrench (12 mm), extension bar and plastic hammer, drive out the bushing.

NOTICE:
When driving out the bushing, be careful not to damage the transmission case by the socket wrench.

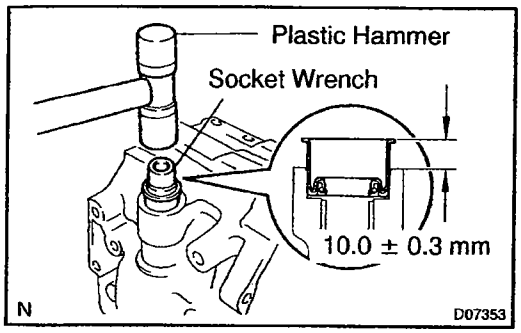


(b) Using SST and a hammer, drive in a new bushing.
SST 09950–60010 (09951–00180), 09950–70010 (09951–07100)
Drive in depth: 0.80 – 1.30 mm (0.0315 – 0.0512 in.)



8. IF NECESSARY, REPLACE TRANSMISSION CASE OIL SEAL

(a) Using a screwdriver and hammer, drive out the oil seal.



(b) Using a socket wrench (17 mm) and plastic hammer, drive in a new oil seal.
Drive in depth: 10.0 ± 0.3 mm (0.394 ± 0.012 in.)

(c) Coat the lip of the oil seal with MP grease.

REASSEMBLY

Reassembly is in the reverse order of disassembly. (See page MX–12)

NOTICE:

When working with FIPG material, you must observe the followings.

- **Using a razor blade and gasket scraper, remove all old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all loose material.**
- **Clean both sealing surfaces with a non–residue solvent.**
- **Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

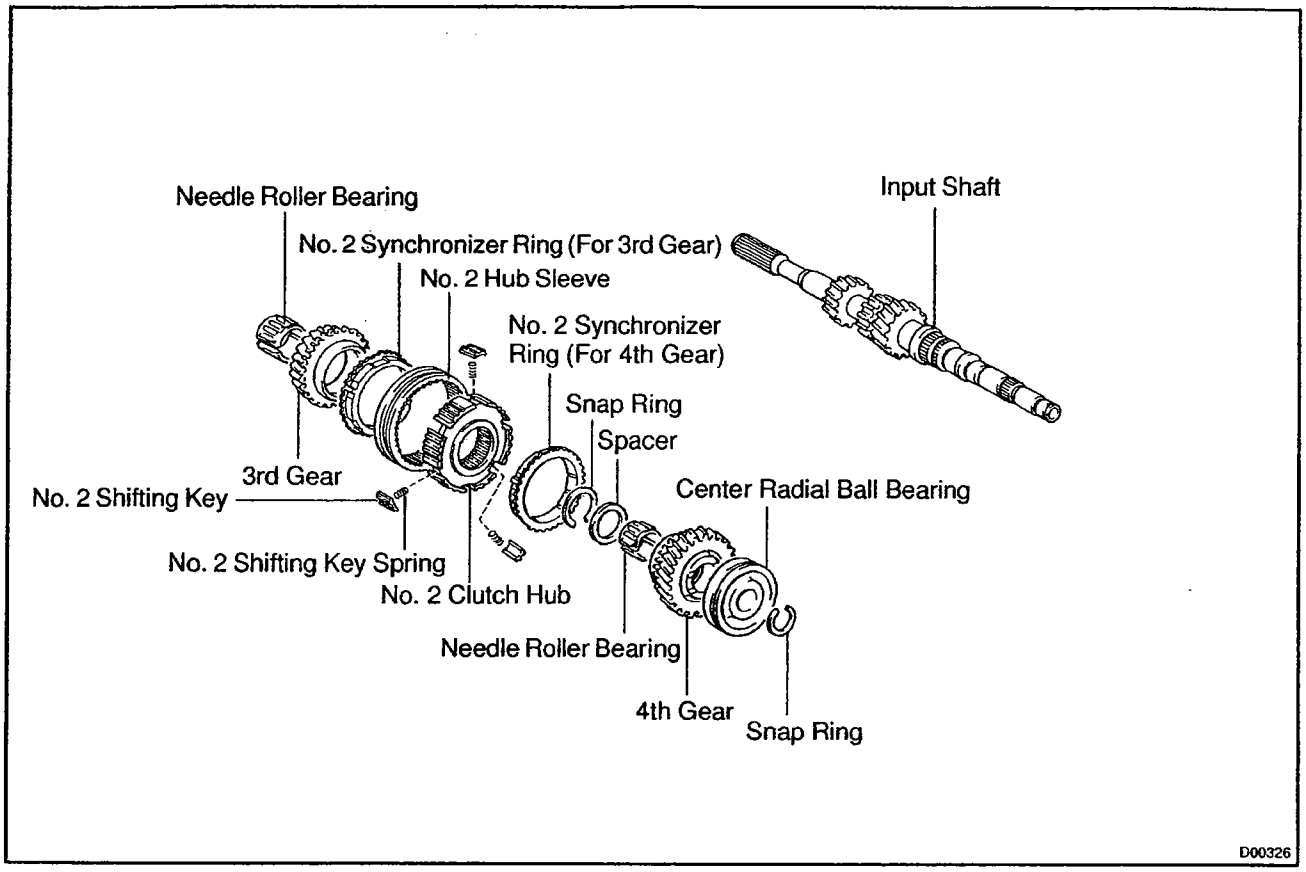
HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

INPUT SHAFT

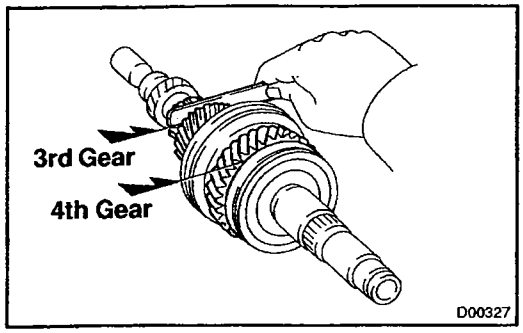
COMPONENTS

MX01J-02



MX01K-02

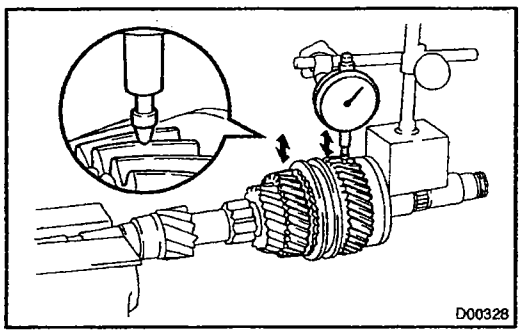
DISASSEMBLY



1. INSPECT 3RD AND 4TH GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:
3rd gear: 0.10 – 0.35 mm (0.0039 – 0.0138 in.)
4th gear: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum clearance:
3rd gear: 0.35 mm (0.0138 in.)
4th gear: 0.55 mm (0.0217 in.)



2. INSPECT 3RD AND 4TH GEARS RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 in.)

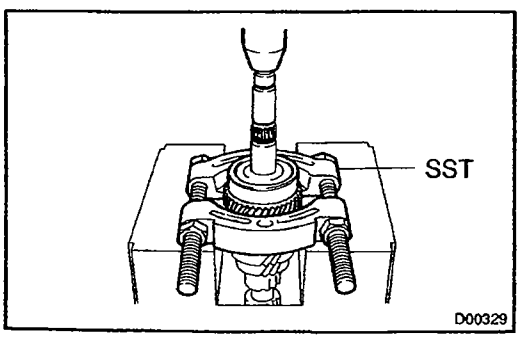
If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

3. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

Take care not to damage the journal surface of the input shaft.



4. REMOVE CENTER RADIAL BALL BEARING, 4TH GEAR, NEEDLE ROLLER BEARING, SPACER AND NO. 2 SYNCHRONIZER RING (FOR 4TH GEAR) FROM INPUT SHAFT

(a) Using SST and a press, remove the center radial ball bearing and 4th gear.
SST 09950–00020

HINT:

Support the input shaft assembly by hand so that it will not be dropped off.

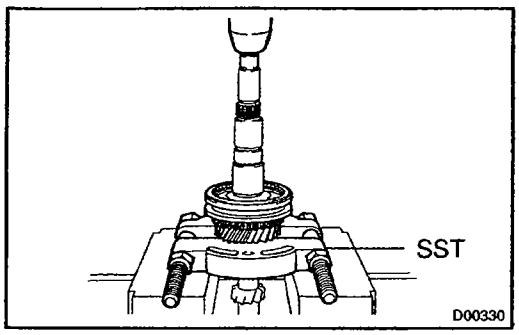
(b) Remove the needle roller bearings, spacer and No. 2 synchronizer ring (for the 4th gear).

5. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

Take care not to damage the journal surface of the input shaft.



6. REMOVE NO. 2 HUB SLEEVE ASSEMBLY, 3RD GEAR, NO. 2 SYNCHRONIZER RING (FOR 3RD GEAR) AND NEEDLE ROLLER BEARING

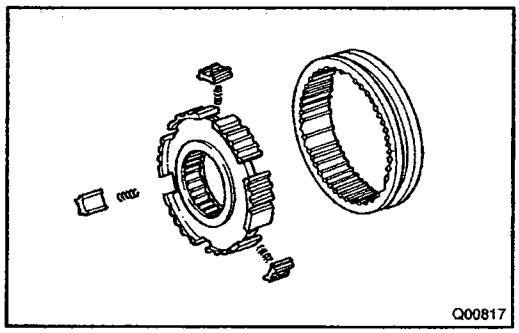
(a) Using SST and a press, remove the No. 2 hub sleeve assembly, 3rd gear and No. 2 synchronizer ring (for the 3rd gear).

SST 09950–00020

HINT:

Support the input shaft by hand so that it will not be dropped off.

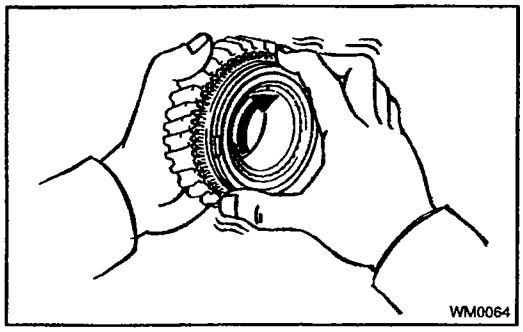
(b) Remove the needle roller bearings.



7. DISASSEMBLE NO. 2 HUB SLEEVE ASSEMBLY

(a) Remove the No. 2 hub sleeve from the No. 2 clutch hub.

(b) Remove the 3 No. 2 shifting keys and No. 2 shifting key springs from the No. 2 clutch hub.



MX01L-02

INSPECTION

1. INSPECT SYNCHRONIZER RING

(a) Check for wear or damage.

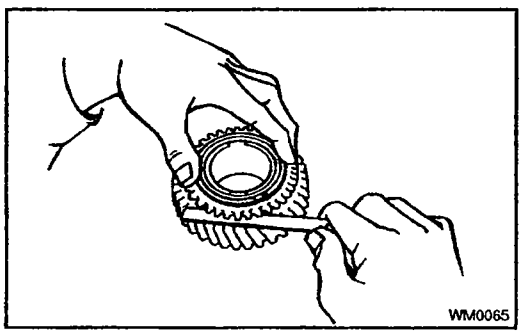
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance:

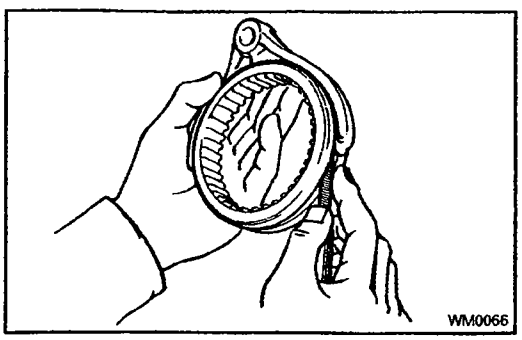
3rd gear: 0.65 mm (0.0256 in.)

4th gear: 0.75 mm (0.0295 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

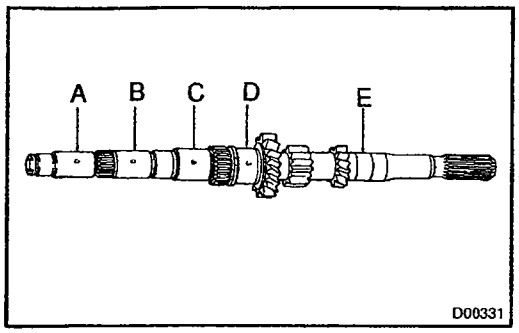


2. INSPECT GEAR SHIFT FORK AND HUB SLEEVE CLEARANCE

Using a feeler gauge, measure the clearance between the hub sleeve and gear shift fork.

Maximum clearance: 0.35 mm (0.014 in.)

If the clearance exceeds the maximum, replace the gear shift fork or hub sleeve.



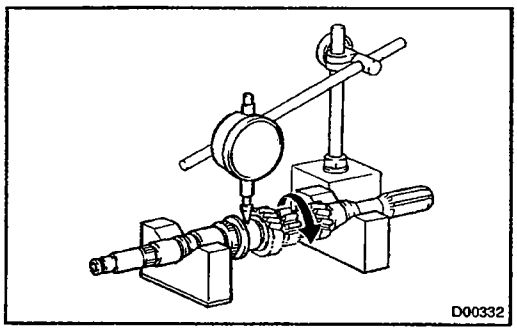
3. INSPECT INPUT SHAFT

(a) Check the input shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

Minimum outer diameter:
Part A: 21.991 mm (0.8658 in.)
Part B: 24.885 mm (0.9797 in.)
Part C: 28.985 mm (1.1411 in.)
Part D: 30.985 mm (1.2199 in.)
Part E: 24.985 mm (0.9837 in.)

If the outer diameter is less than the minimum, replace the input shaft.

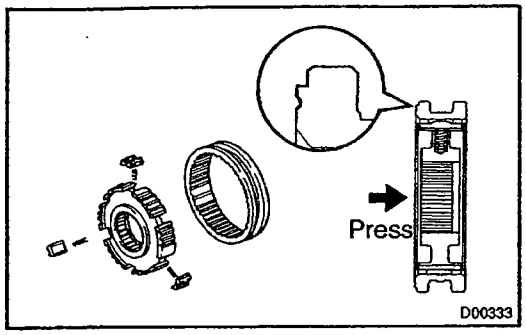


(c) Using a dial indicator, check the shaft runout.
Maximum runout: 0.03 mm (0.0012 in.)

If the runout exceeds the maximum, replace the input shaft.

MX01M-02

REASSEMBLY



HINT:
Coat all of the sliding and rotating surfaces with gear oil before reassembly.

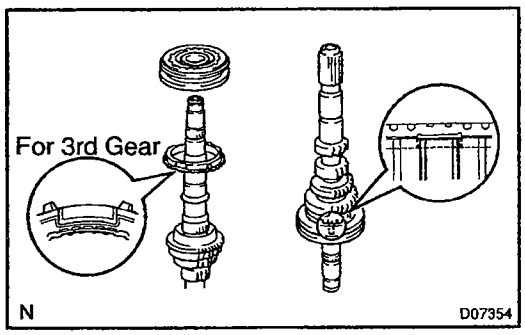
1. ASSEMBLE NO. 2 HUB SLEEVE ASSEMBLY

(a) Install the 3 No. 2 shifting key springs and No. 2 shifting keys to the No. 2 clutch hub.

(b) Install the No. 2 hub sleeve to the No. 2 clutch hub.

NOTICE:

Assemble the No. 2 hub sleeve and No. 2 clutch hub in the direction shown in the illustration.



2. INSTALL NEEDLE ROLLER BEARING, 3RD GEAR, NO. 2 SYNCHRONIZER RING (FOR 3RD GEAR) AND NO. 2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

(a) Apply gear oil to the needle roller bearings and install it.

(b) Install the 3rd gear and No. 2 synchronizer ring (for the 3rd gear).

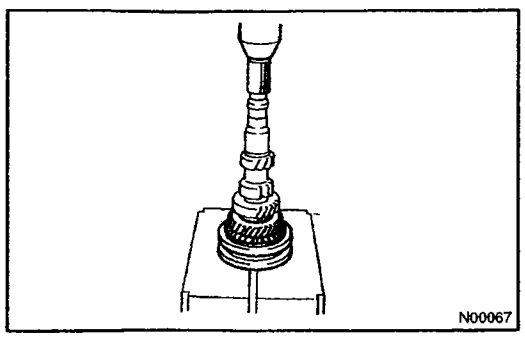
NOTICE:

Distinguish the No. 2 synchronizer ring (for the 3rd gear) by the teeth on the synchronizer ring.

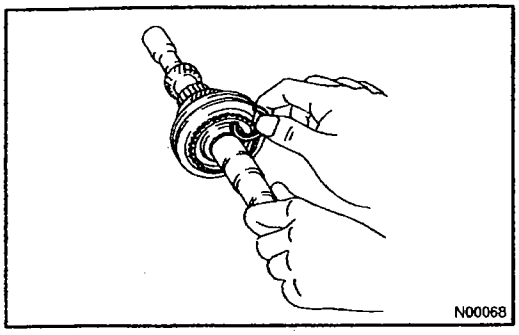
(c) Install the No. 2 hub sleeve assembly so that the No. 2 synchronizer ring slots and No. 2 shifting keys are aligned.

NOTICE:

Be sure to install the No. 2 hub sleeve assembly in the correct direction, as shown in the illustration.



(d) Using a press, install the No. 2 hub sleeve assembly.



3. INSTALL SNAP RING

(a) Select a snap ring from the table below that will make the thrust clearance of the No. 2 clutch hub less than 0.1 mm (0.0039 in.).

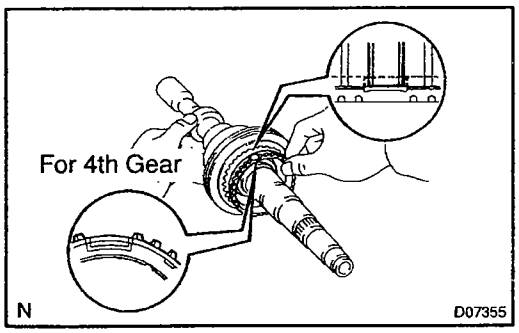
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.30 (0.0906)	3	2.48 (0.0976)
1	2.36 (0.0929)	4	2.54 (0.1000)
2	2.42 (0.0953)	5	2.60 (0.1024)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:

Take care not to damage the journal surface of the input shaft.

4. INSPECT 3RD GEAR THRUST CLEARANCE
(See page MX–30)



5. INSTALL SPACER, NEEDLE ROLLER BEARING, NO. 2 SYNCHRONIZER RING (FOR 4TH GEAR), 4TH GEAR AND CENTER RADIAL BALL BEARING

(a) Install the spacer.

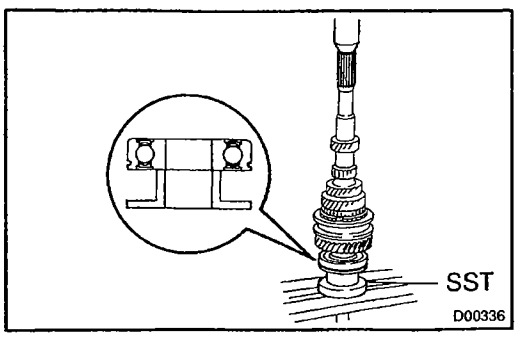
(b) Apply gear oil to the needle roller bearings and install it.

(c) Place the No. 2 synchronizer ring (for the 4th gear) on the No. 2 hub sleeve assembly and align the No. 2 synchronizer ring slots with the No. 2 shifting keys.

(d) Install the 4th gear.

NOTICE:

Distinguish the No. 2 synchronizer ring (for the 4th gear) by the teeth on the synchronizer ring.



(e) Using SST and a press, install the center radial ball bearing.

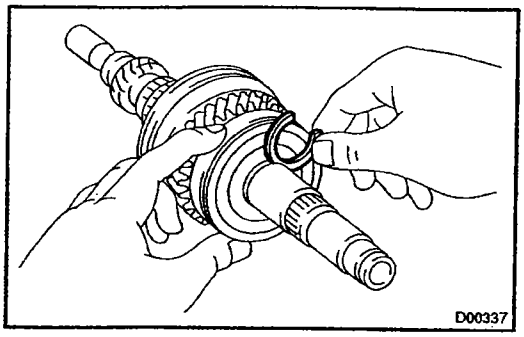
SST 09608–00071

NOTICE:

Be sure to install the center radial ball bearing in the correct direction, as shown in the illustration.

HINT:

Set SST to the bearing inner race securely.



6. INSTALL SNAP RING

(a) Select a snap ring from the table below that will make the thrust clearance of the center radial ball bearing less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.29 (0.0902)	D	2.47 (0.0972)
B	2.35 (0.0925)	E	2.53 (0.0996)
C	2.41 (0.0949)	F	2.59 (0.1020)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:

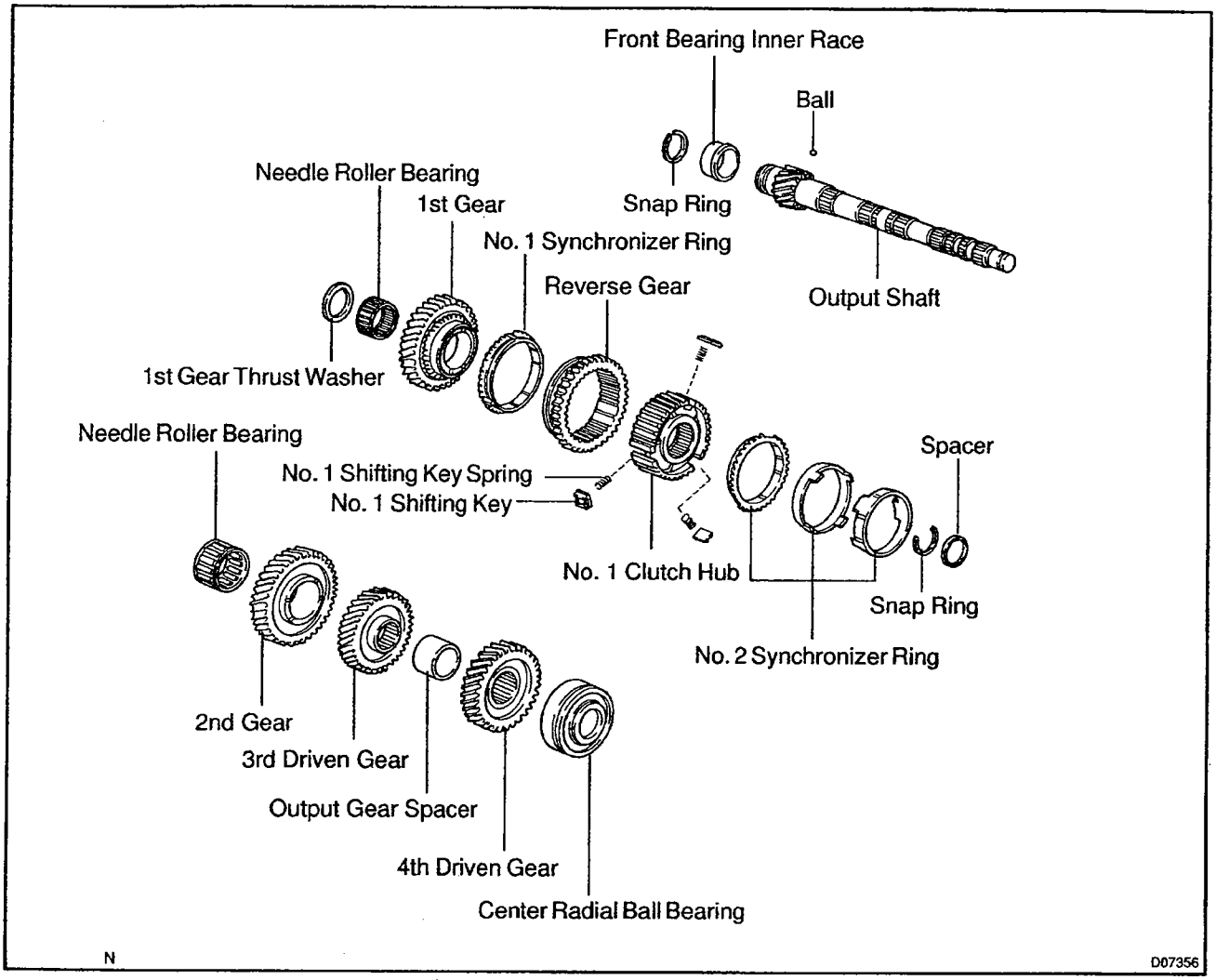
Take care not to damage the journal surface of the input shaft.

7. INSPECT 4TH GEAR THRUST CLEARANCE
(See page MX–30)

OUTPUT SHAFT

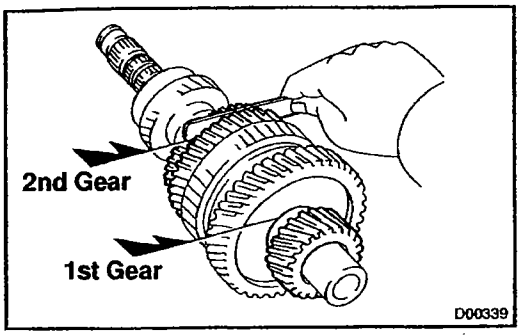
COMPONENTS

MX01N–03



MX0A1–01

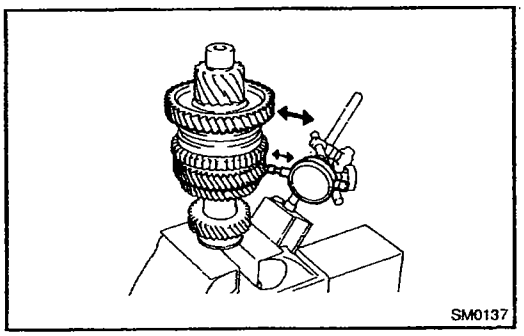
DISASSEMBLY



1. INSPECT 1ST AND 2ND GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:
1st gear: 0.10 – 0.40 mm (0.0039 – 0.0157 in.)
2nd gear: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum clearance:
1st gear: 0.40 mm (0.0157 in.)
2nd gear: 0.55 mm (0.0217 in.)

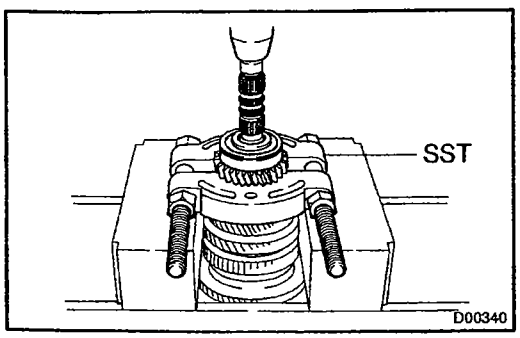


2. INSPECT 1ST AND 2ND GEARS RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 in.)

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

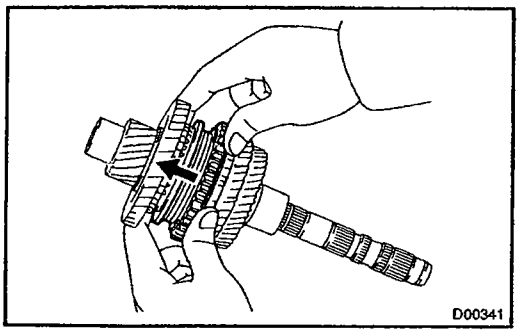


3. REMOVE CENTER RADIAL BALL BEARING, 4TH DRIVEN GEAR AND OUTPUT GEAR SPACER FROM OUTPUT SHAFT

(a) Using SST and a press, remove the center radial ball bearing and 4th driven gear.
SST 09950–00020

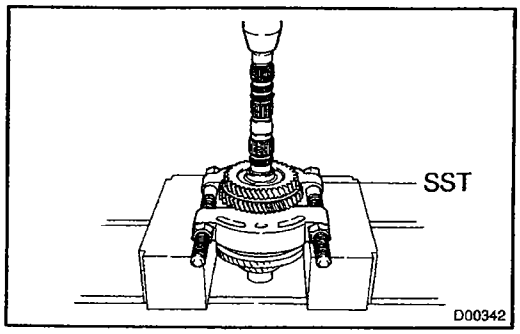
HINT:
Support the output shaft assembly by hand so that it will not be dropped off.

(b) Remove the output gear spacer.



4. REMOVE 3RD DRIVEN GEAR, 2ND GEAR, NEEDLE ROLLER BEARING, SPACER AND NO. 2 SYNCHRONIZER RING

(a) Shift the reverse gear into the 1st gear.



(b) Using SST and a press, remove the 3rd driven gear and 2nd gear.
SST 09950–00020

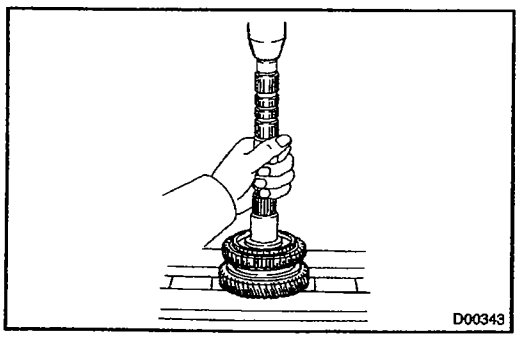
HINT:
Support the output shaft assembly by hand so that it will not be dropped off.

(c) Remove the needle roller bearing, spacer and No. 2 synchronizer rings.

5. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.



6. REMOVE REVERSE GEAR ASSEMBLY, 1ST GEAR, NO. 1 SYNCHRONIZER RING, NEEDLE ROLLER BEARING, 1ST GEAR THRUST WASHER AND BALL

(a) Using a press, remove the reverse gear assembly, 1st gear and No. 1 synchronizer ring.

HINT:
Support the output shaft assembly by hand so that it will not be dropped off.

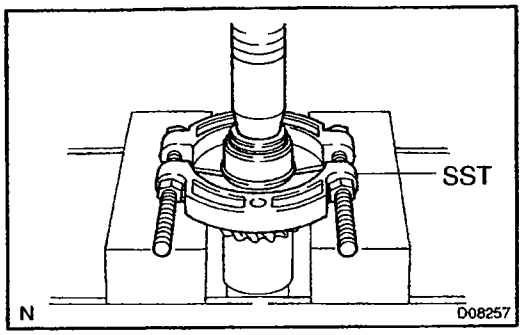
(b) Remove the needle roller bearing and 1st gear thrust washer.

(c) Using a magnetic finger, remove the ball.

7. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.



8. REMOVE FRONT BEARING INNER RACE

Using SST and a press, remove the front bearing inner race.

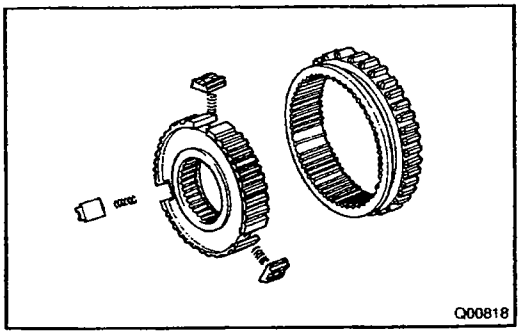
SST 09950–00020

NOTICE:

When replacing the front bearing inner race, replace the output shaft front bearing along with it.

HINT:

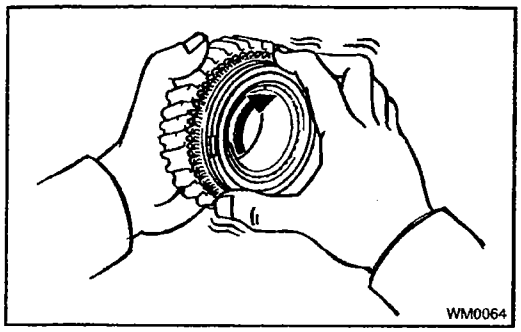
Support the output shaft by hand so that it will not be dropped off.



9. DISASSEMBLE REVERSE GEAR ASSEMBLY

(a) Remove the reverse gear from the No. 1 clutch hub.

(b) Remove the 3 No. 1 shifting keys and No. 1 shifting key springs from the No. 1 clutch hub.



INSPECTION

MX0A2-01

1. INSPECT 1ST GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

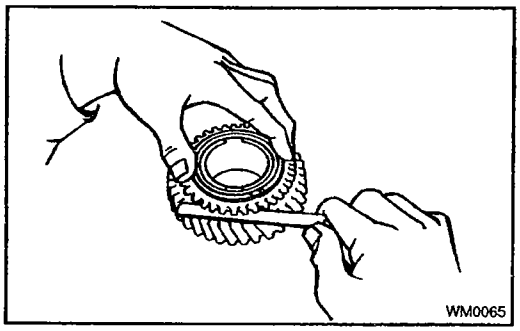
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



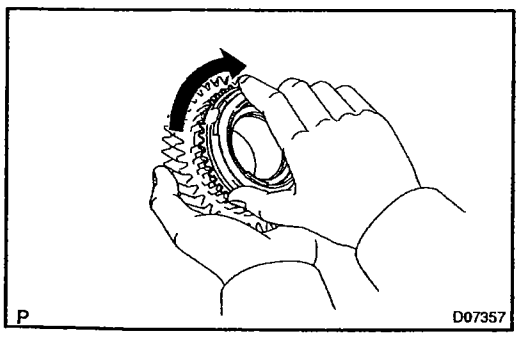
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.75 mm (0.0295 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

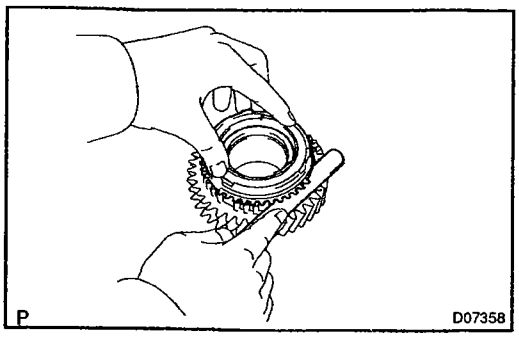


2. INSPECT 2ND GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

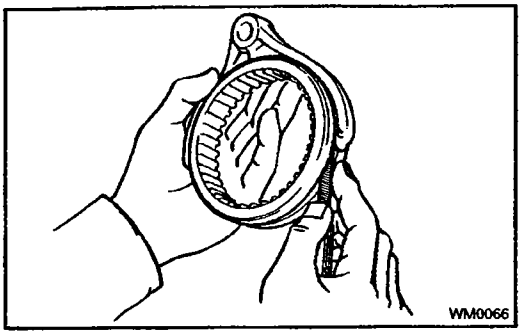
If the braking effect is insufficient, replace the synchronizer ring.



(c) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.70 mm (0.0276 in.)

If the clearance is less than the minimum, replace the synchronizer ring.

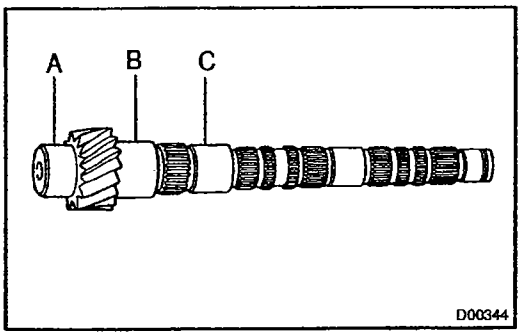


3. INSPECT GEAR SHIFT FORK AND REVERSE GEAR CLEARANCE

Using a feeler gauge, measure the clearance between the reverse gear and gear shift fork.

Maximum clearance: 0.35 mm (0.014 in.)

If the clearance exceeds the maximum, replace the gear shift fork or hub sleeve.



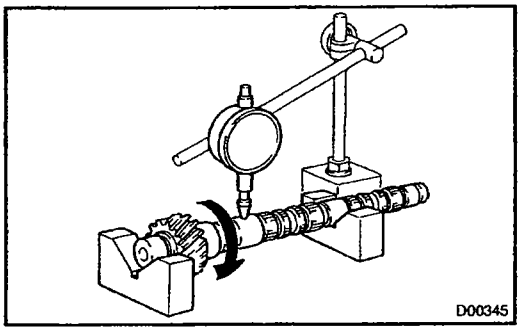
4. INSPECT OUTPUT SHAFT

(a) Check the output shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the output shaft journal surface.

Minimum outer diameter:
Part A: 32.985 mm (1.2986 in.)
Part B: 37.985 mm (1.4955 in.)
Part C: 31.985 mm (1.2592 in.)

If the outer diameter is less than the minimum, replace the output shaft.



(c) Using a dial indicator, check the shaft runout.

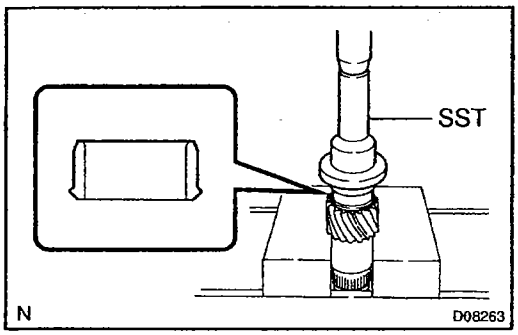
Maximum runout: 0.03 mm (0.0012 in.)

If the runout exceeds the maximum, replace the output shaft.

MXDA3-01

REASSEMBLY

HINT:
Coat all of the sliding and rotating surfaces with gear oil before reassembly.



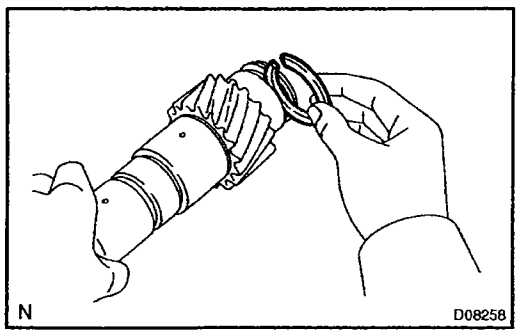
1. INSTALL FRONT BEARING INNER RACE

Using SST and a press, install the front bearing inner race.

SST 09223–50010

NOTICE:

Be sure to install the front bearing inner race in the correct direction, as shown in the illustration.



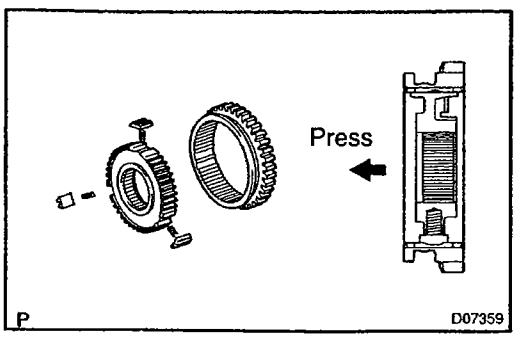
2. INSTALL SNAP RING

(a) Select a snap ring from the table below that will make the thrust clearance of the front bearing inner race less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
7	1.85 (0.0728)	3	2.05 (0.0807)
8	1.90 (0.0748)	4	2.10 (0.0827)
1	1.95 (0.0768)	5	2.15 (0.0846)
2	2.00 (0.0787)	6	2.20 (0.0866)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.



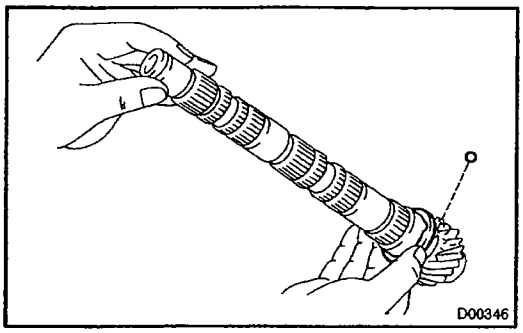
3. ASSEMBLE REVERSE GEAR ASSEMBLY

(a) Install the 3 No. 1 shifting key springs and No. 1 shifting keys to the No. 1 clutch hub.

(b) Install the No. 1 clutch hub to the reverse gear.

NOTICE:

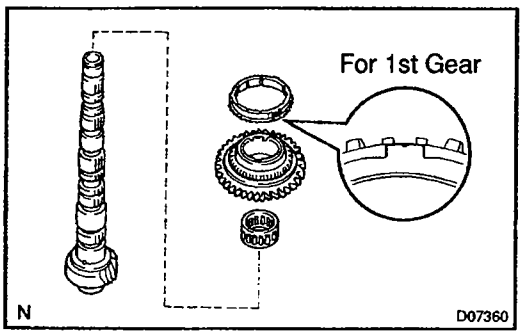
Assemble the No. 1 clutch hub and reverse gear in the direction shown in the illustration.



4. INSTALL BALL, 1ST GEAR THRUST WASHER, NEEDLE ROLLER BEARING, 1ST GEAR, NO. 1 SYNCHRONIZER RING AND REVERSE GEAR ASSEMBLY TO OUTPUT SHAFT

(a) Using a magnetic finger, install the ball to the output shaft.

(b) Fit the 1st gear thrust washer groove securely over the locking ball when installing the thrust on the output shaft.

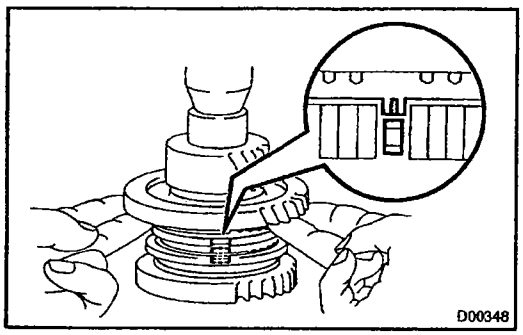


(c) Apply gear oil to the needle roller bearing and install it.

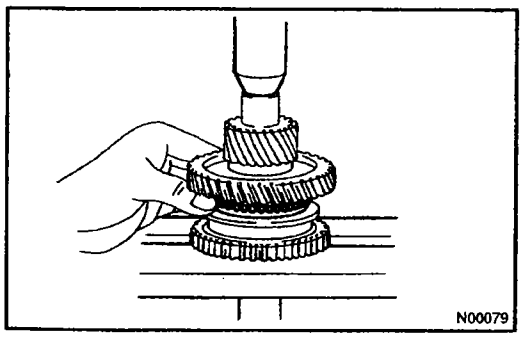
(d) Install the 1st gear and No. 1 synchronizer ring.

NOTICE:

Distinguish the No. 1 synchronizer ring by the teeth on the synchronizer ring.



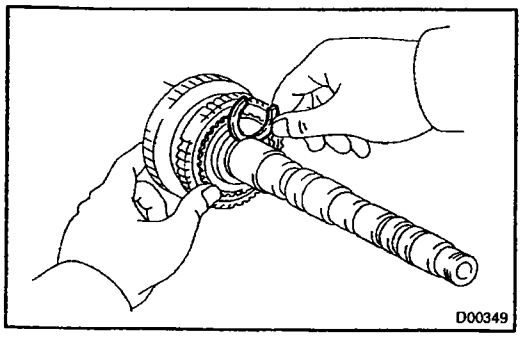
(e) Place the reverse gear assembly and align the No. 1 synchronizer ring slots with the No. 1 shifting keys.



(f) Using a press, install the reverse gear assembly.

NOTICE:

- **Be sure to install the reverse gear assembly in the correct direction, as shown in the illustration.**
- **When installing, make sure that the ball is placed in a groove of the 1st gear thrust washer.**



5. INSTALL SNAP RING

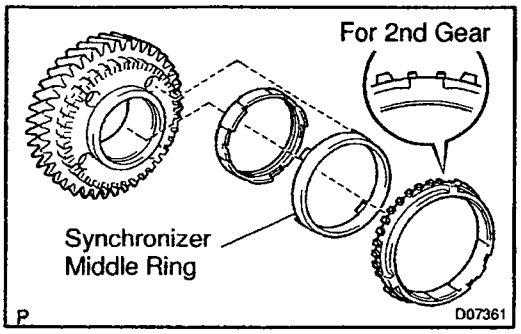
(a) Select a snap ring from the table below that will make the thrust clearance of the No. 1 clutch hub less than 0.1 mm (0.0039 in.).

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.50 (0.0984)	D	2.68 (0.1055)
B	2.56 (0.1008)	E	2.74 (0.1079)
C	2.62 (0.1031)	F	2.80 (0.1102)

(b) Using a screwdriver and hammer, tap in the snap ring.

HINT:
Take care not to damage the journal surface of the output shaft.

6. **INSPECT 1ST GEAR THRUST CLEARANCE (See page MX–38)**

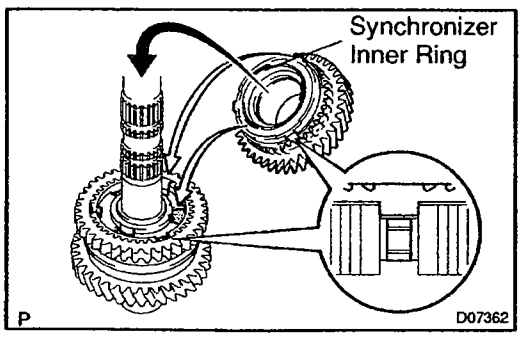


7. **INSTALL SPACER, NEEDLE ROLLER BEARING, NO.2 SYNCHRONIZER RING, 2ND GEAR AND 3RD DRIVEN GEAR**

(a) Install the spacer.
(b) Apply gear oil to the needle roller bearing and install it.
(c) Place the No. 2 synchronizer rings on the 2nd gear.

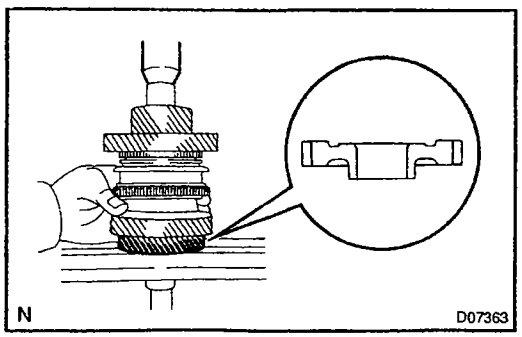
NOTICE:

- **Properly fit the synchronizer middle ring claws into the holes in the 2nd gear.**
- **Distinguish the No. 2 synchronizer ring by the teeth on the synchronizer ring.**



(d) Place the 2nd gear with the No. 2 synchronizer rings and align the No. 2 synchronizer ring slots with the No. 1 shifting keys.

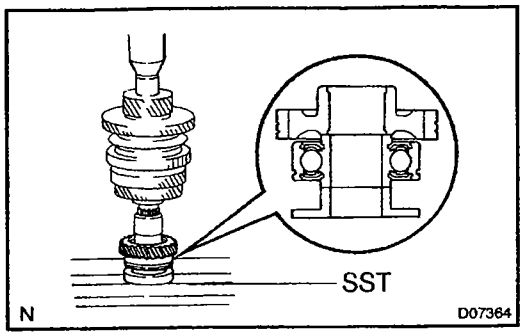
NOTICE:
Fit the synchronizer inner ring claws into the slots in the No. 1 clutch hub.



(e) Using a press, install the 3rd driven gear.

NOTICE:
Be sure to install the 3rd driven gear in the correct direction, as shown in the illustration.

8. **INSPECT 2ND GEAR THRUST CLEARANCE (See page MX–38)**



9. INSTALL OUTPUT GEAR SPACER, 4TH DRIVEN GEAR AND CENTER RADIAL BALL BEARING

(a) Install the output gear spacer.

(b) Using SST and a press, install the 4th driven gear and center radial ball bearing.

SST 09608–00071

NOTICE:

Be sure to install the 4th driven gear and center radial ball bearing in the correct direction, as shown in the illustration.

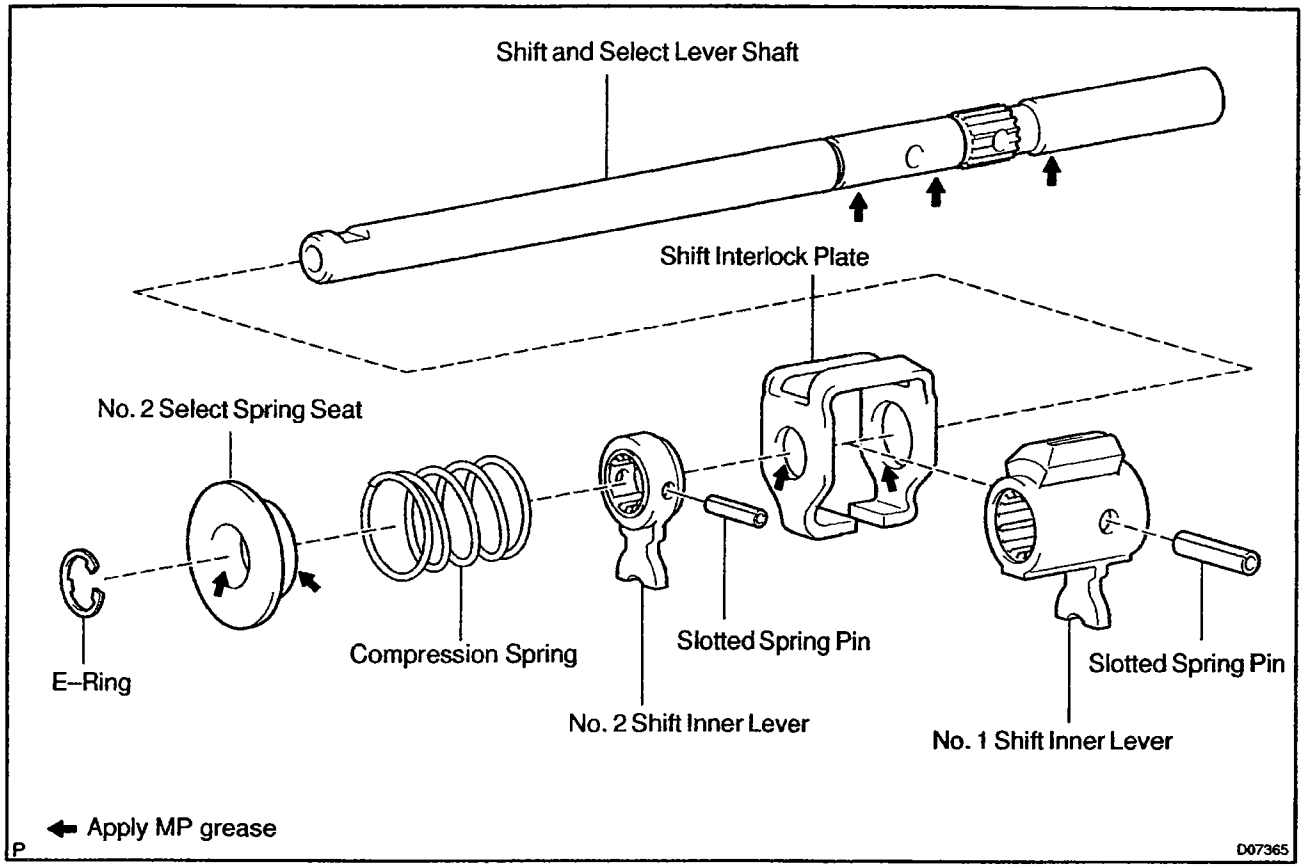
HINT:

Set SST to the bearing inner race securely.

SHIFT AND SELECT LEVER SHAFT

COMPONENTS

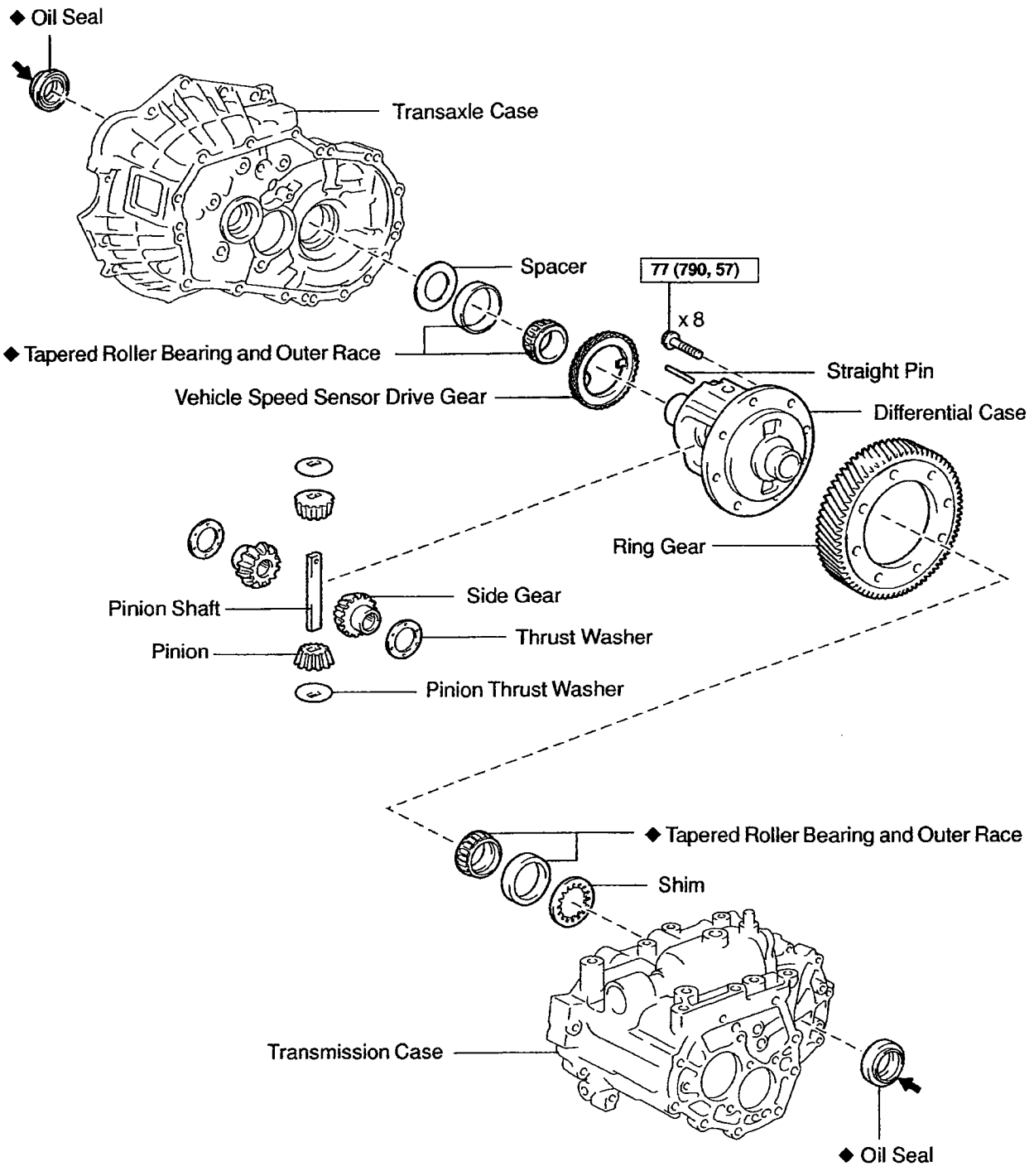
MX01R-02



DIFFERENTIAL CASE

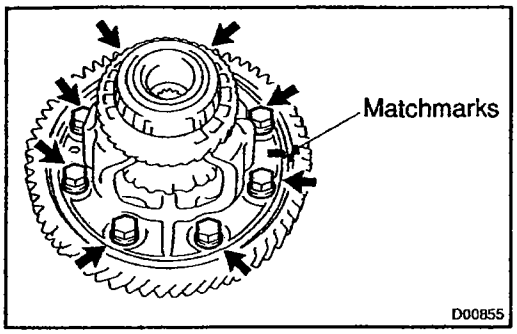
COMPONENTS

MX01S–02



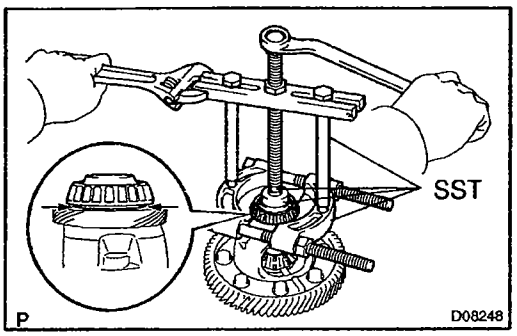
MX0A4–01

DISASSEMBLY



1. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.
(b) Remove the 8 bolts.
(c) Using a copper hammer, tap on the ring gear to remove it from the differential case.

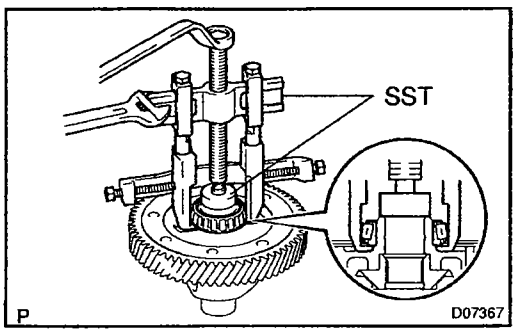


2. Vehicle speed sensor drive gear side: REMOVE TAPERED ROLLER BEARING FROM DIFFERENTIAL CASE

(a) Using SST, remove the tapered roller bearing.
SST 09950–00020, 09950–00030, 09950–40011 (09957–04010), 09950–60010 (09951–00350)

HINT:
Set the claw of SST to the bearing inner race securely.

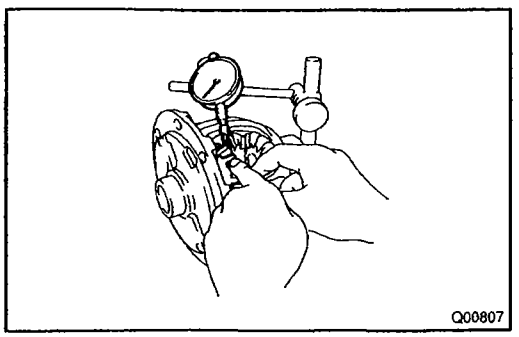
(b) Remove the vehicle speed sensor drive gear.



3. Ring gear side: REMOVE TAPERED ROLLER BEARING FROM DIFFERENTIAL CASE

Using SST, remove the tapered roller bearing.
SST 09950–40011 (09951–04010, 09952–04010, 09953–04020, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00350)

HINT:
Set the claw of SST to the bearing inner race at the position where the differential case is indented.



4. INSPECT SIDE GEAR BACKLASH

Using a dial indicator, measure the backlash of one side gear while holding one pinion toward the differential case.

Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

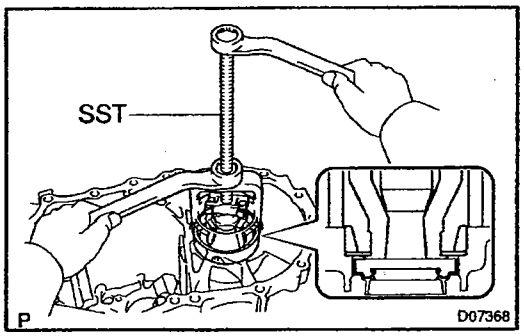
If the backlash is not within the specification, install the correct thrust washer to the side gears.

5. DISASSEMBLE DIFFERENTIAL CASE

(a) Using a pin punch and hammer, drive out the straight pin.

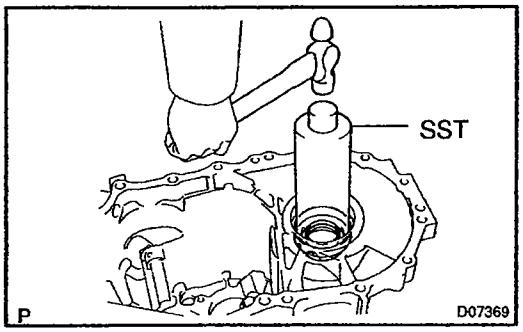
(b) Remove the pinion shaft from the differential case.

(c) Remove the 2 pinions and side gears with the 4 thrust washers from each gear.

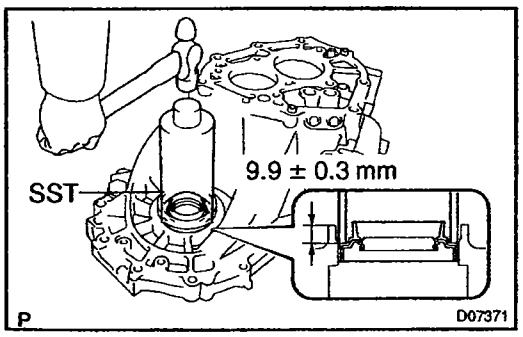


6. Transmission case side:
IF NECESSARY, REPLACE OIL SEAL AND TAPERED ROLLER BEARING OUTER RACE

(a) Using SST, pull out the tapered roller bearing outer race and shim.
SST 09612–65014



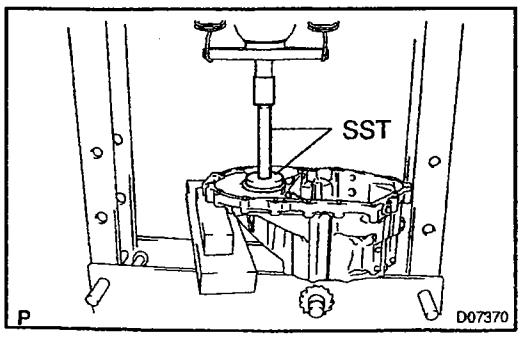
(b) Using SST and a hammer, drive out the oil seal.
SST 09226–10010



(c) Using SST and a hammer, drive in a new oil seal.
SST 09226–10010
Drive in depth: 9.9 ± 0.3 mm (0.390 ± 0.012 in.)

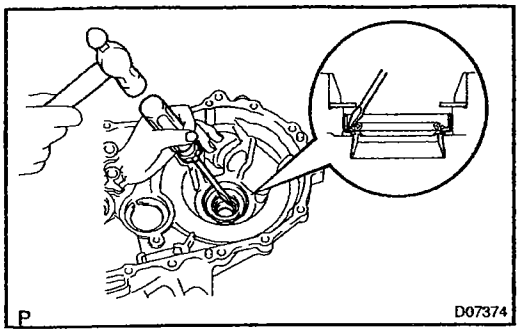
(d) Coat the lip of the oil seal with MP grease.

(e) Place the shim into the differential case.



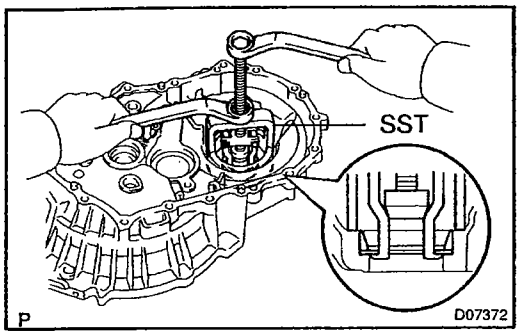
(f) Using SST and a press, install the tapered roller bearing outer race.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)

NOTICE:
When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.



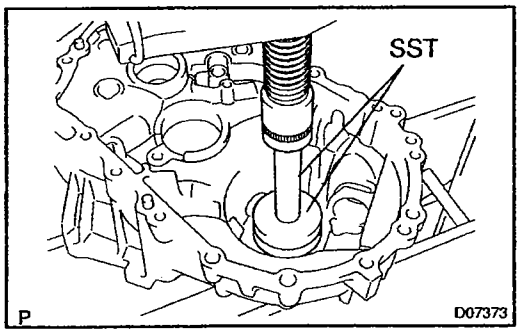
7. Transaxle case side:
IF NECESSARY, REPLACE OIL SEAL AND TAPERED ROLLER BEARING OUTER RACE

(a) Using a screwdriver and hammer, drive out the oil seal.



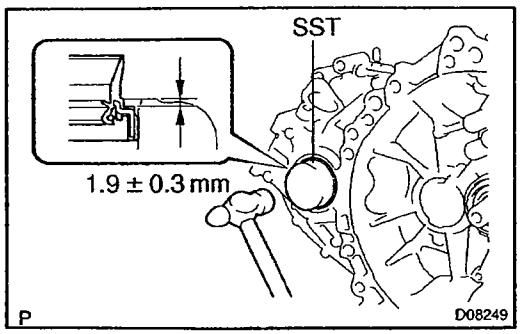
(b) Using SST, pull out the tapered roller bearing outer race and spacer.
SST 09612–65014

(c) Place the spacer into the differential case.



(d) Using SST and a press, install the tapered roller bearing outer race.
SST 09950–60020 (09951–00680), 09950–70010 (09951–07150)

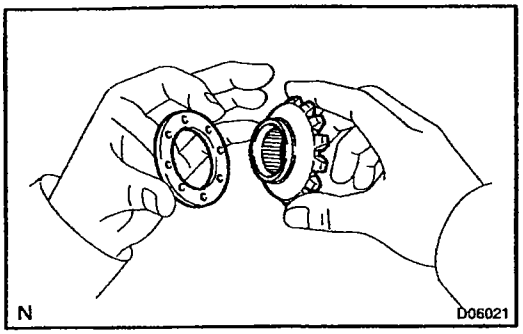
NOTICE:
When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.



(e) Using SST and a hammer, drive in a new oil seal.
SST 09710–28021 (09710–08041)
Drive in depth: 1.9 ± 0.3 mm (0.075 ± 0.012 in.)

(f) Coat the lip of the oil seal with MP grease.

MX01U–02



REASSEMBLY

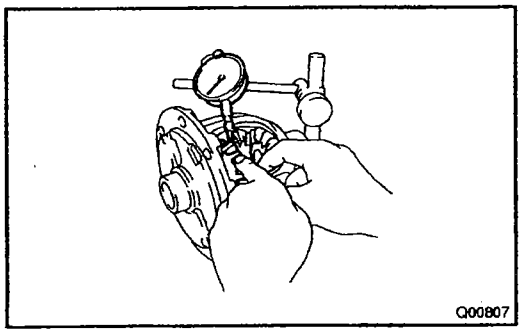
1. ASSEMBLE DIFFERENTIAL CASE

(a) Install the correct thrust washers and side gears.
Refer to the table below, select thrust washers which will ensure that the backlash is within the specification. Try to select washers of the same size for both sides.
Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

Thickness mm (in.)	Thickness mm (in.)
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

(b) Install the thrust washers and side gears in the differential case.

(c) Install the pinion shaft.

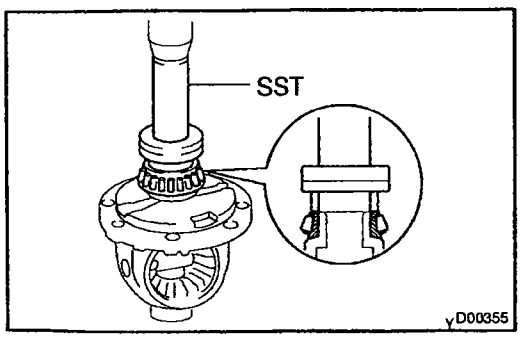


(d) Using a dial indicator, check the side gear backlash.
Measure the side gear backlash while holding one pinion toward the differential case.
Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specification, install a thrust washer of different thickness.

(e) Using a pin punch and hammer, drive in the straight pin through the differential case and hole in the pinion shaft.

(f) Using a chisel and hammer, caulk the pin holes around the circumference of the differential case.

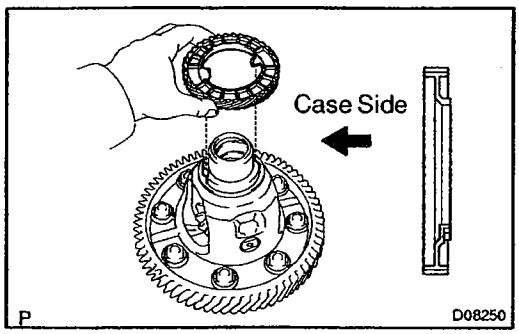


2. Ring gear side: INSTALL TAPERED ROLLER BEARING

Using SST and a press, install the tapered roller bearing.
SST 09350–32014 (09351–32120, 09351–32140)

NOTICE:
When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.

HINT:
Set SST to the bearing inner race securely.

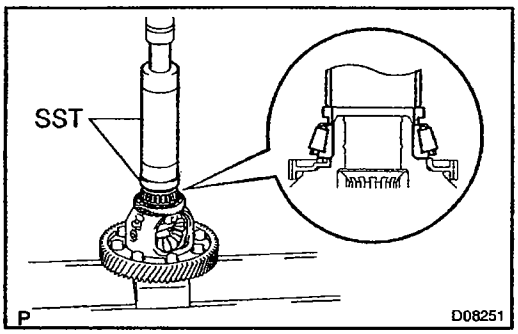


3. Vehicle speed sensor drive gear side: INSTALL TAPERED ROLLER BEARING

(a) Place the vehicle speed sensor drive gear in position to stop it turning, and install the vehicle speed sensor drive gear.

NOTICE:

Be sure to install the vehicle speed sensor drive gear in the correct direction, as shown in the illustration.



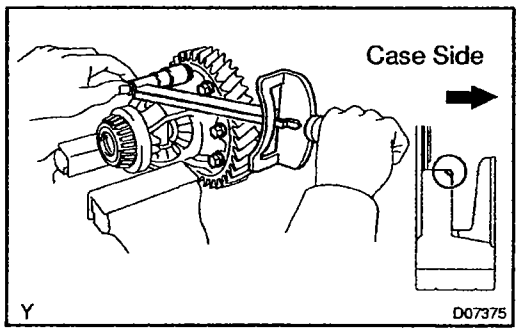
(b) Using SST and a press, install a new side bearing.
SST 09316–60011 (09316–00011), 09350–32014 (09351–32120)

NOTICE:

When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.

HINT:

Set SST to the bearing inner race securely.



4. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surface of the differential case.
(b) Heat the ring gear in boiling water.
(c) Carefully take the ring gear out of the water.
(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

HINT:

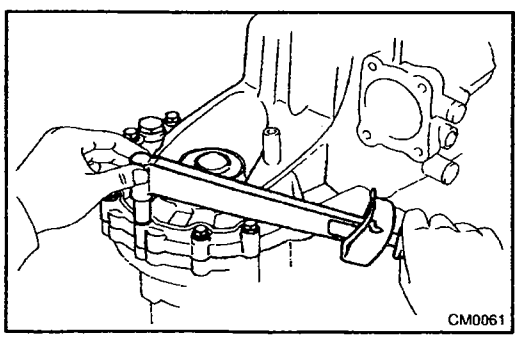
Align the matchmarks on the differential case and contact the ring gear.

(e) Temporarily install the 8 set bolts.

CAUTION:

The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.

(f) After the ring gear has cooled sufficiently, torque the ring gear set bolts uniformly at a time.
Torque: 77 N·m (790 kgf·cm, 57 ft·lbf)

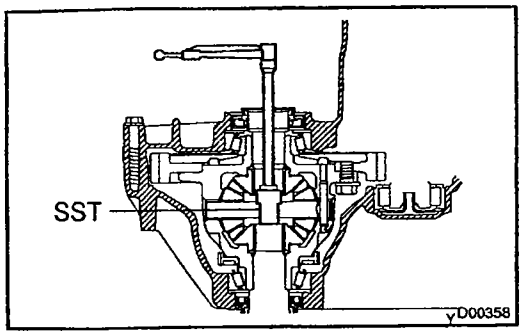


5. INSPECT DIFFERENTIAL TAPERED ROLLER BEARING PRELOAD

NOTICE:

Perform this only when replacing the tapered roller bearing and outer race of the differential case.

(a) Install the differential case assembly to the transaxle case.
(b) Install the transmission case to the transaxle case with the 16 bolts.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



(c) Using SST and a torque wrench, turn the differential case assembly right and left 2 or 3 times to allow the bearings to settle.
SST 09564–32011

(d) Using SST and a torque wrench, measure the preload.
SST 09564–32011
Preload (at starting):
New bearing
0.8 – 1.6 N·m (8 – 16 kgf·cm, 6.9 – 13.9 in.·lbf)
Reused bearing
0.5 – 1.0 N·m (5 – 10 kgf·cm, 4.3 – 8.7 in.·lbf)

If the preload is not within the specification, remove the transmission case side outer race of the tapered roller bearing with SST (See page MX–49). Select an appropriate shim.

HINT:
The preload will change by about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 in.·lbf) corresponding to a change of 0.05 mm (0.0020 in.) in shim thickness.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
AA	2.10 (0.0827)	LL	2.60 (0.1024)
BB	2.15 (0.0846)	MM	2.65 (0.1043)
CC	2.20 (0.0866)	NN	2.70 (0.1063)
DD	2.25 (0.0886)	PP	2.75 (0.1083)
EE	2.30 (0.0906)	QQ	2.80 (0.1102)
FF	2.35 (0.0925)	RR	2.85 (0.1122)
GG	2.40 (0.0945)	SS	2.90 (0.1142)
HH	2.45 (0.0965)	TT	2.95 (0.1161)
JJ	2.50 (0.0984)	UU	3.00 (0.1181)
KK	2.55 (0.1004)	–	–

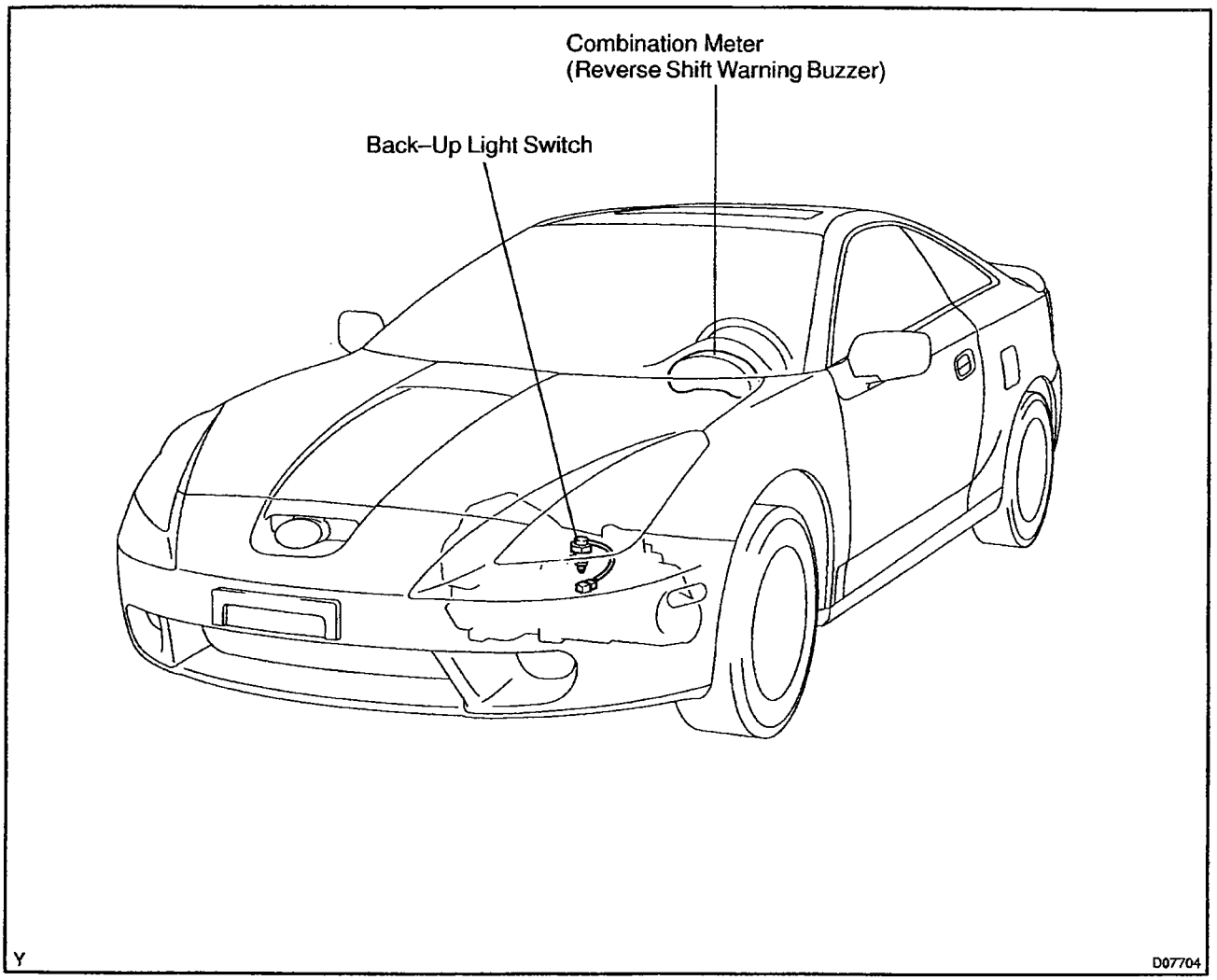
(e) Remove the 16 bolts and transmission case.

(f) Remove the differential case assembly.

REVERSE SHIFT WARNING BUZZER SYSTEM

LOCATION

MX01V-02



MX0A6-01

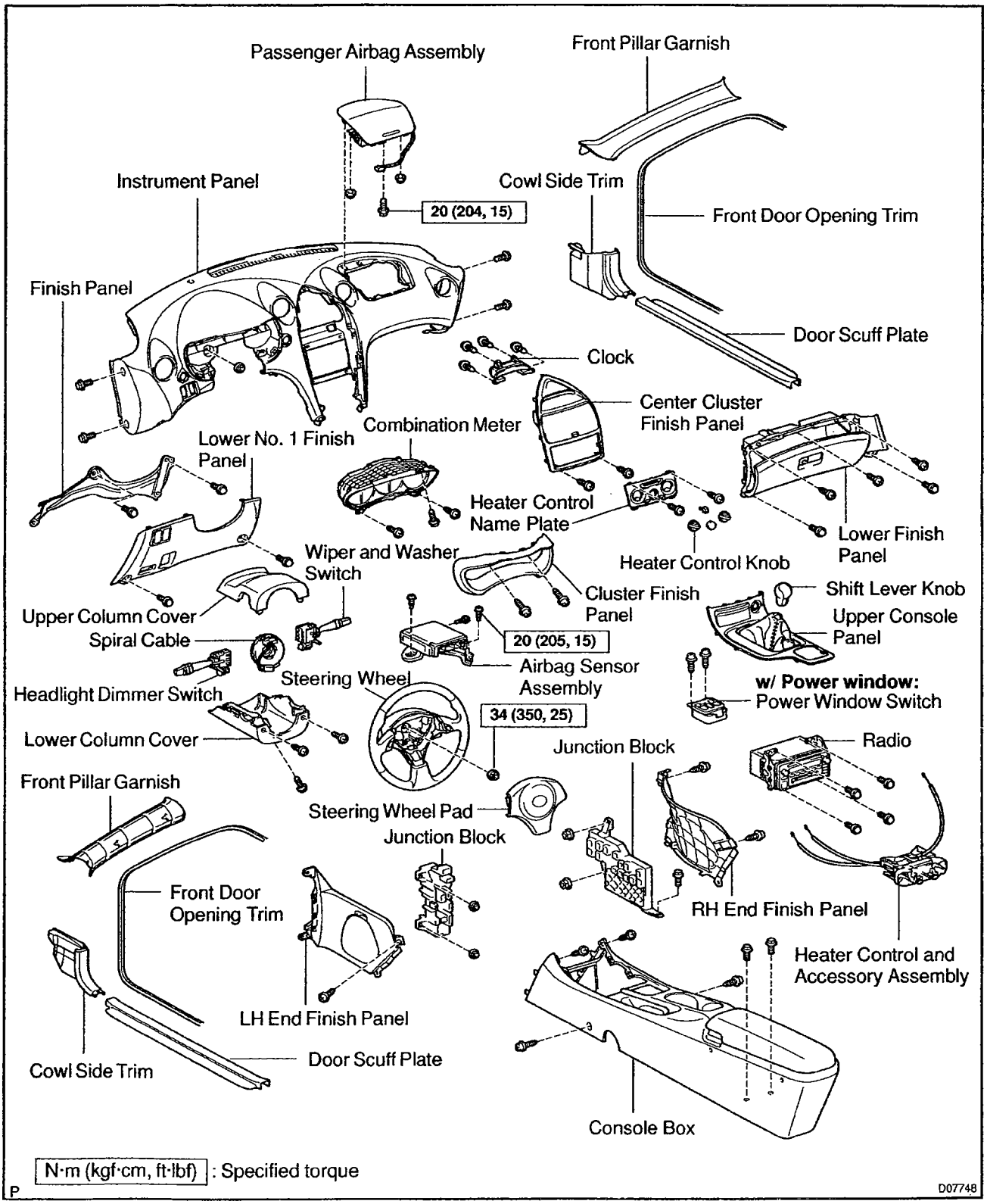
INSPECTION

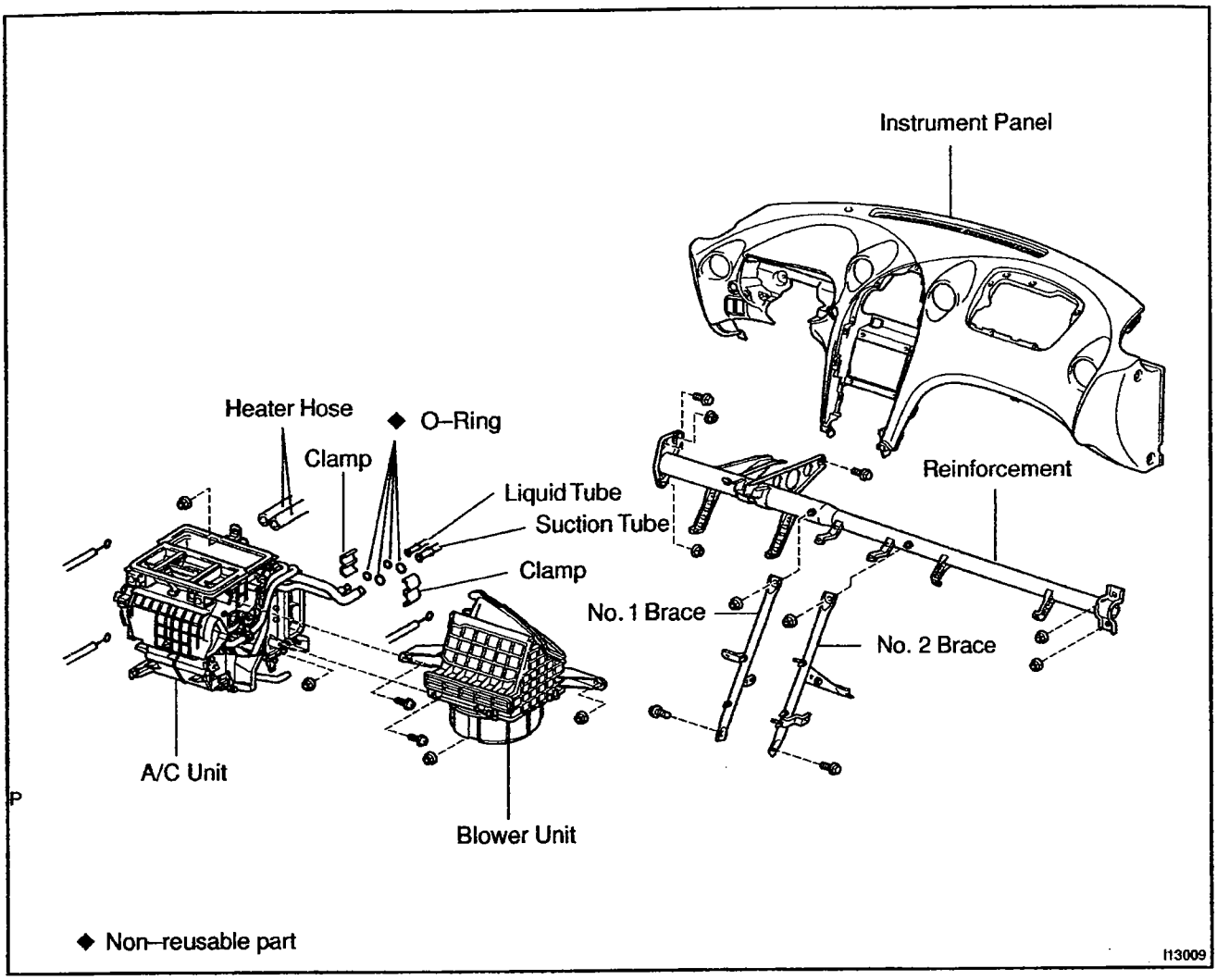
1. INSPECT REVERSE SHIFT WARNING BUZZER SYSTEM (See page BE–46)
2. INSPECT BACK–UP LIGHT SWITCH CONTINUITY (See page BE–30)

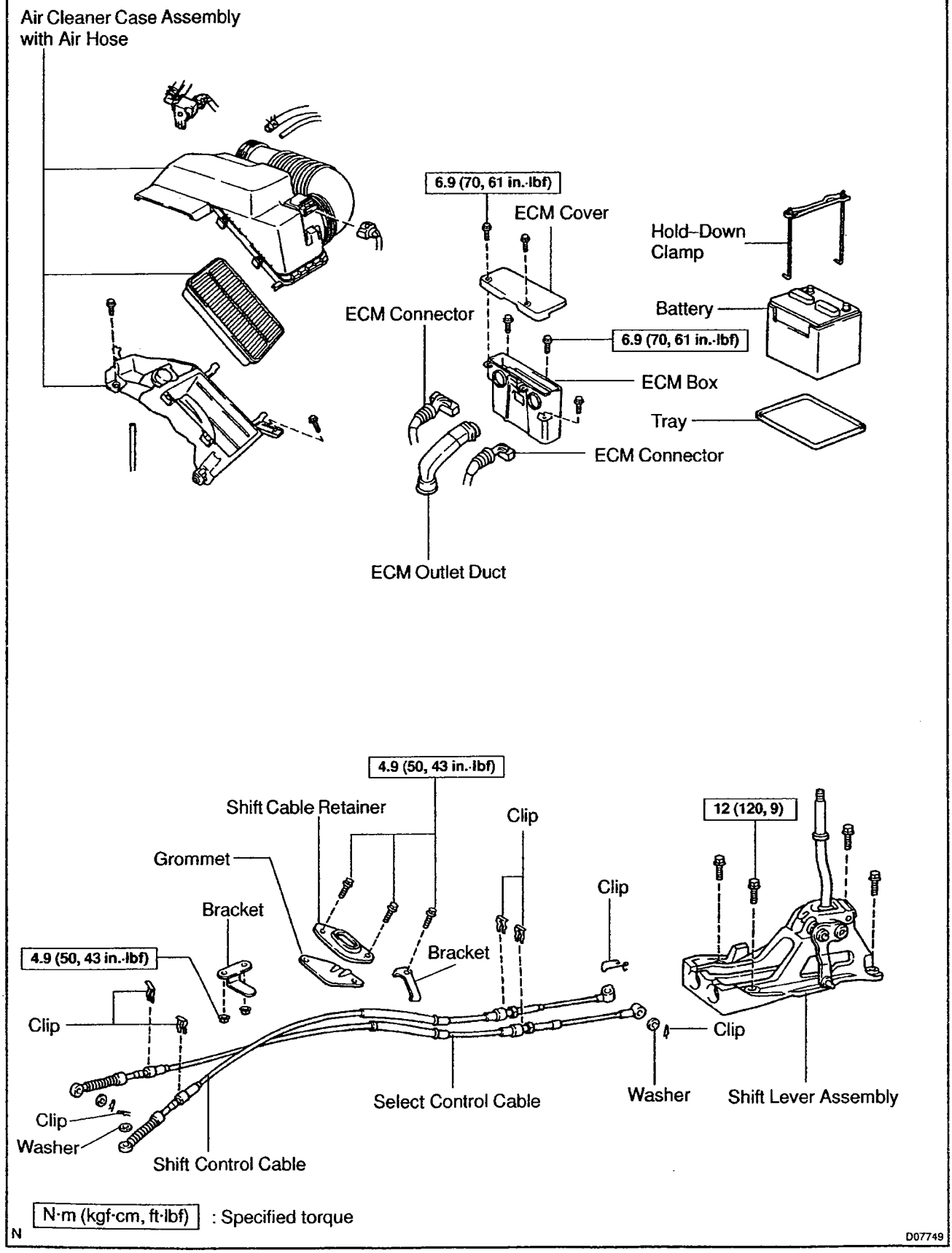
SHIFT LEVER AND CONTROL CABLE

COMPONENTS

MX0A5-01




Instrument Panel
Heater Hose
◆ O–Ring
Clamp
Liquid Tube
Suction Tube
Clamp
Reinforcement
No. 1 Brace
No. 2 Brace
A/C Unit
Blower Unit
◆ Non–reusable part
I13009


Air Cleaner Case Assembly with Air Hose
6.9 (70, 61 in.-lbf)
ECM Cover
Hold-Down Clamp
ECM Connector
Battery
6.9 (70, 61 in.-lbf)
ECM Box
Tray
ECM Connector
ECM Outlet Duct
4.9 (50, 43 in.-lbf)
Shift Cable Retainer
Clip
12 (120, 9)
Grommet
Clip
Bracket
Bracket
4.9 (50, 43 in.-lbf)
Clip
Clip
Clip
Select Control Cable
Washer
Shift Lever Assembly
Clip
Washer
Shift Control Cable
N·m (kgf·cm, ft·lbf) : Specified torque
N
D07749

– MEMO –

AUTOMATIC TRANSAXLE (U240E)

AUTOMATIC TRANSAXLE SYSTEM AX–1
VEHICLE SPEED SENSOR AX–3
SPEED SENSOR AX–4
ATF TEMPERATURE SENSOR AX–6
PARK/NEUTRAL POSITION (PNP) SWITCH AX–8
VALVE BODY ASSEMBLY AX–10
DIFFERENTIAL OIL SEAL AX–14
SHIFT LOCK SYSTEM AX–15
FLOOR SHIFT ASSEMBLY AX–17
AUTOMATIC TRANSAXLE UNIT AX–30
TORQUE CONVERTER CLUTCH AND DRIVE PLATE AX–36

AX

AUTOMATIC TRANSAXLE SYSTEM

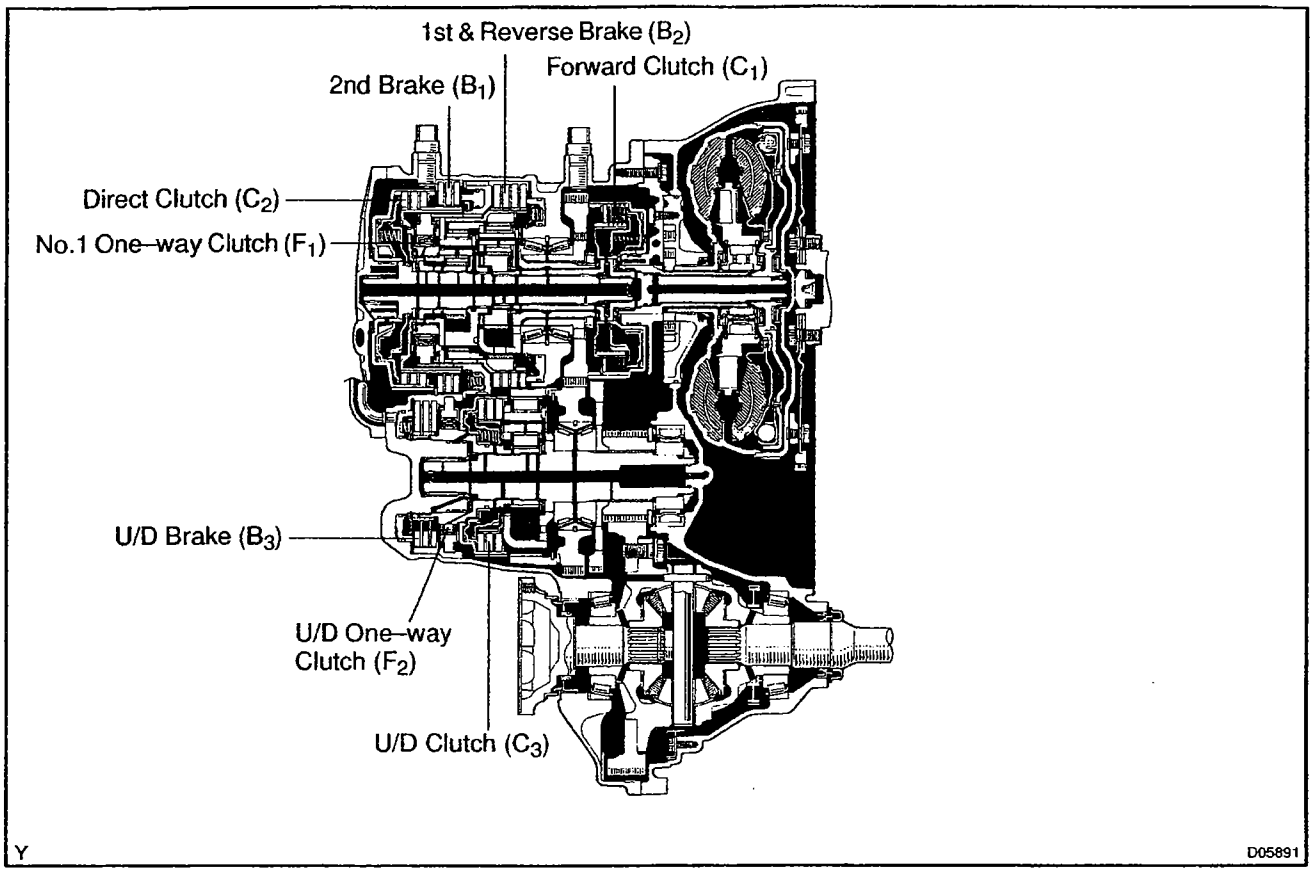
PRECAUTION

AX042-01

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

AX0CM-02

OPERATION



○ ... Operating

Shift lever position	Gear position	C_1	C_2	C_3	B_1	B_2	B_3	F_1	F_2
P	Parking						○		
R	Reverse		○			○	○		
N	Neutral						○		
D	1st	○					○	○	○
	2nd	○			○		○		○
	3rd	○	○				○		○
	O/D	○	○	○					
2	1st	○					○	○	○
	2nd	○			○		○		○
L	1st	○				○	○	○	○

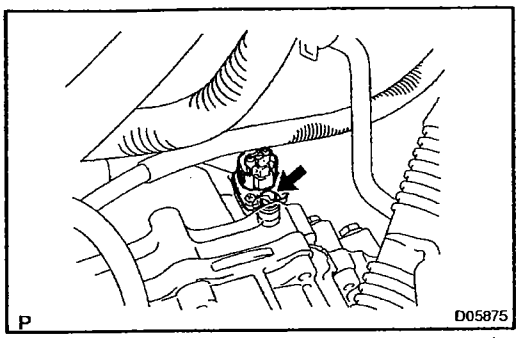
AX

VEHICLE SPEED SENSOR

AX08T-03

ON–VEHICLE REPAIR

1. **REMOVE BATTERY**
2. **REMOVE ECM AND ECM CASE**
3. **REMOVE ECM BRACKET**

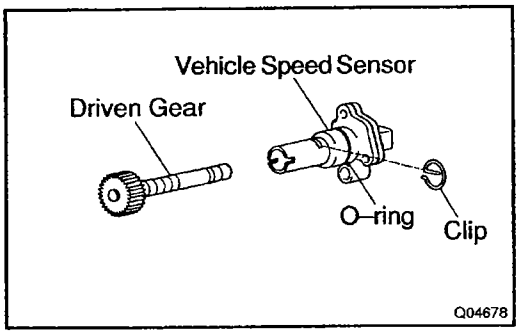


4. **DISCONNECT VEHICLE SPEED SENSOR CONNECTOR**
5. **REMOVE VEHICLE SPEED SENSOR ASSEMBLY**

(a) Remove the bolt and vehicle speed sensor assembly.

(b) Remove the clip and speedometer driven gear from the vehicle speed sensor.

(c) Remove the O–ring from the vehicle speed sensor.



6. **INSTALL VEHICLE SPEED SENSOR ASSEMBLY**

(a) Coat a new O–ring with ATF and install it to the vehicle speed sensor.

(b) Install the speedometer driven gear to the vehicle speed sensor with clip.

(c) Install the vehicle speed sensor assembly with the bolt.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

7. **CONNECT VEHICLE SPEED SENSOR CONNECTOR**
8. **INSTALL ECM BRACKET**
Torque:
Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)
9. **INSTALL ECM AND ECM CASE**
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
10. **INSTALL BATTERY**

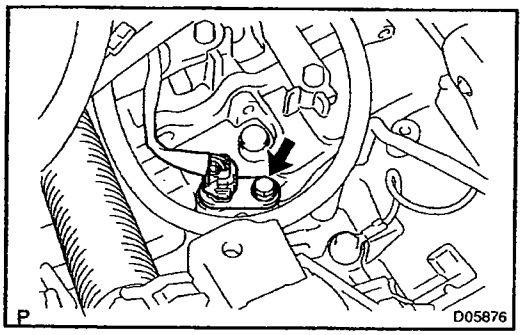
AX

SPEED SENSOR

AX09L-02

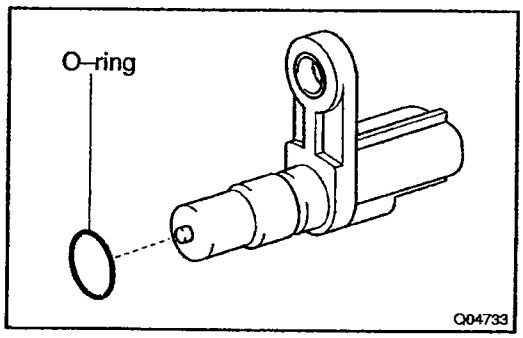
ON–VEHICLE REPAIR

1. **REMOVE BATTERY**
2. **REMOVE ECM AND ECM CASE**
3. **REMOVE ECM BRACKET**



4. **DISCONNECT INPUT TURBINE SPEED SENSOR CONNECTOR**
5. **REMOVE INPUT TURBINE SPEED SENSOR**

(a) Remove the bolt and input turbine speed sensor.



(b) Remove the O–ring from the input turbine speed sensor.

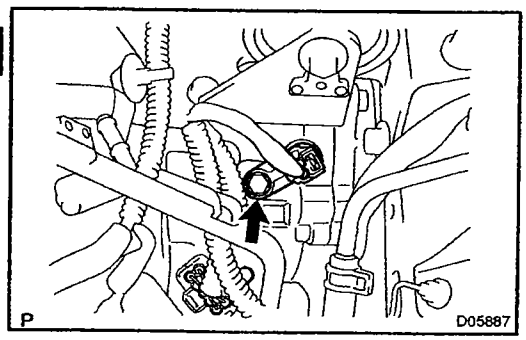
6. **INSTALL INPUT TURBINE SPEED SENSOR**

(a) Coat a new O–ring with ATF and install it to the input turbine speed sensor.

(b) Install the input turbine speed sensor with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

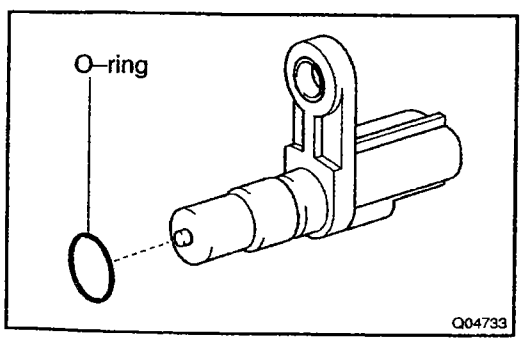
7. **CONNECT INPUT TURBINE SPEED SENSOR CONNECTOR**

AX



8. **DISCONNECT COUNTER GEAR SPEED SENSOR CONNECTOR**
9. **REMOVE COUNTER GEAR SPEED SENSOR**

(a) Remove the bolt and counter gear speed sensor.



(b) Remove the O–ring from the counter gear speed sensor.

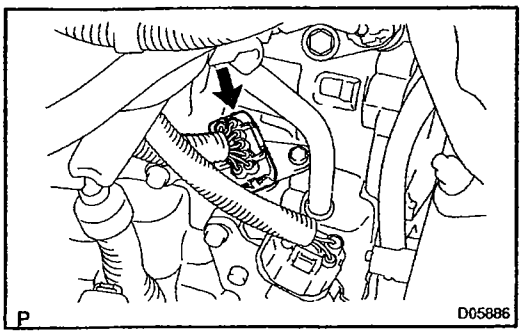
10. **INSTALL COUNTER GEAR SPEED SENSOR**

(a) Coat a new O–ring with ATF and install it to the counter gear speed sensor.

(b) Install the counter gear speed sensor with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

11. **CONNECT COUNTER GEAR SPEED SENSOR CONNECTOR**

12. **INSTALL ECM BRACKET**
    Torque:
    Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
    Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)
13. **INSTALL ECM AND ECM CASE**
    Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
14. **INSTALL BATTERY**

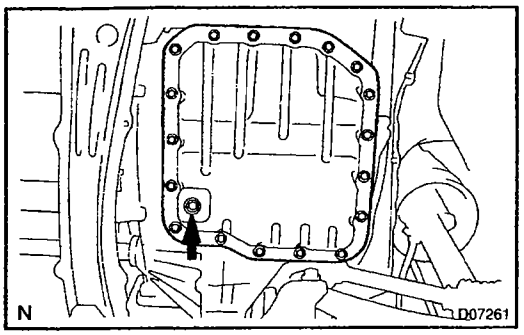


ATF TEMPERATURE SENSOR

AX0KJ–01

ON–VEHICLE REPAIR

1. **DISCONNECT SOLENOID CONNECTOR**
2. **REMOVE LH ENGINE UNDER COVER**

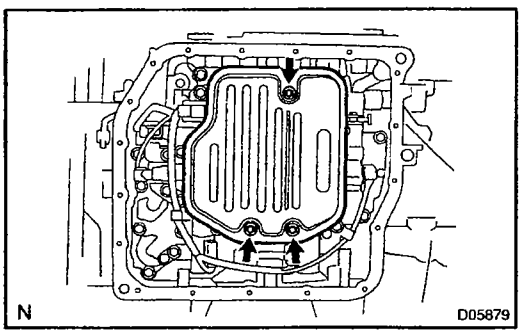


3. **REMOVE DRAIN PLUG AND DRAIN ATF**
4. **REMOVE OIL PAN AND GASKET**

NOTICE:

Some fluid will remain in the oil pan.

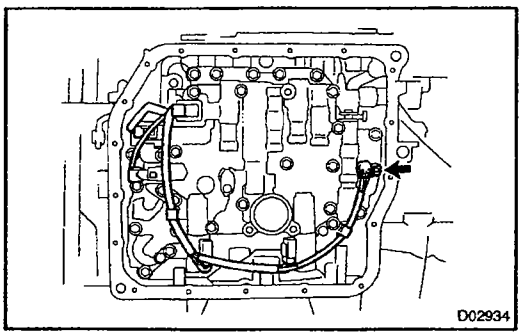
Remove the 18 bolts, and carefully remove the oil pan assembly. Discard the gasket.



5. **REMOVE OIL STRAINER**

(a) Remove the 3 bolts and oil strainer.

(b) Remove the O–ring.



6. **DISCONNECT 5 SHIFT SOLENOID VALVE CONNECTORS**
7. **REMOVE ATF TEMPERATURE SENSOR**

Remove the bolt and lock plate, and remove the ATF temperature sensor.

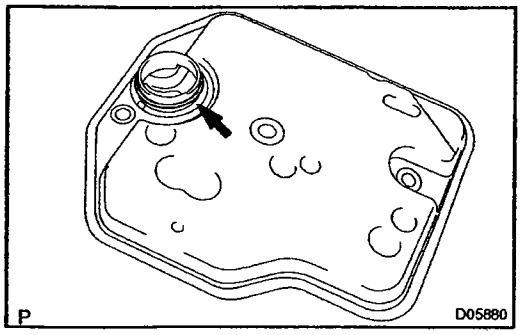
8. **SEPARATE WIRE HARNESS FROM 2 CLAMPS**
9. **CLAMP WIRE HARNESS TO 2 CLAMPS**
10. **INSTALL ATF TEMPERATURE SENSOR**

Install the ATF temperature sensor with the lock plate and bolt.

Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

11. **CONNECT 5 SHIFT SOLENOID VALVE CONNECTORS**

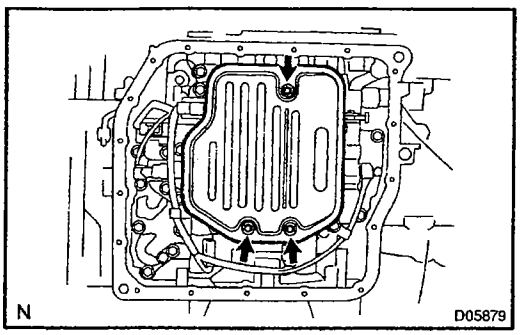
AX



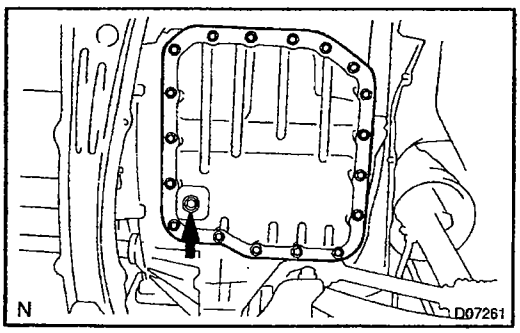
12. INSTALL OIL STRAINER

(a) Coat a new O–ring with ATF.

(b) Install the O–ring to the oil strainer.



(c) Install the oil strainer with the 3 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

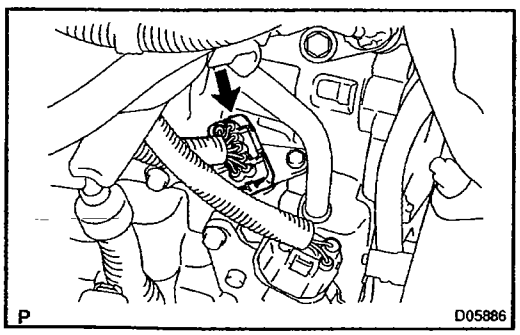


13. INSTALL OIL PAN

Install the oil pan and a new gasket with the 18 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

14. INSTALL DRAIN PLUG

Install a new gasket and drain plug.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

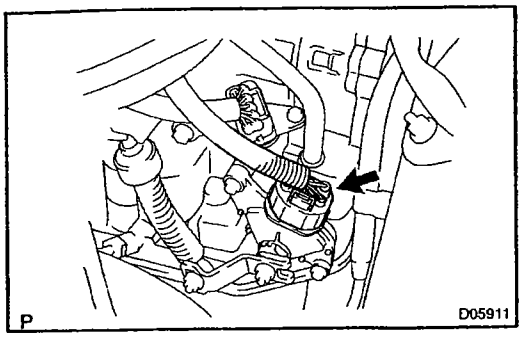


15. CONNECT SOLENOID CONNECTOR

16. FILL ATF AND CHECK ATF LEVEL
(See page DI–157)

17. INSTALL LH ENGINE UNDER COVER

AX

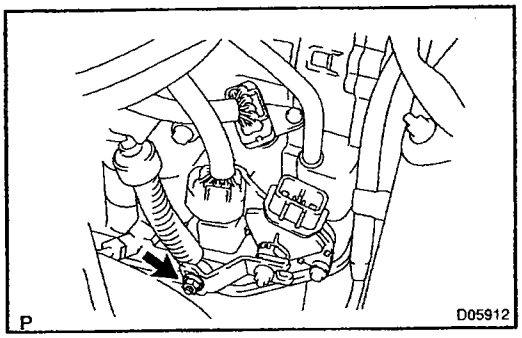


PARK/NEUTRAL POSITION (PNP) SWITCH

AX0KJ–02

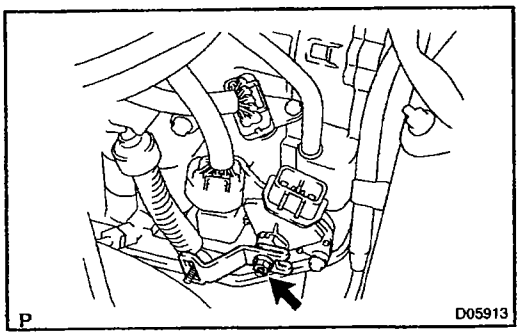
ON–VEHICLE REPAIR

1. **REMOVE AIR CLEANER ASSEMBLY**
2. **DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR**



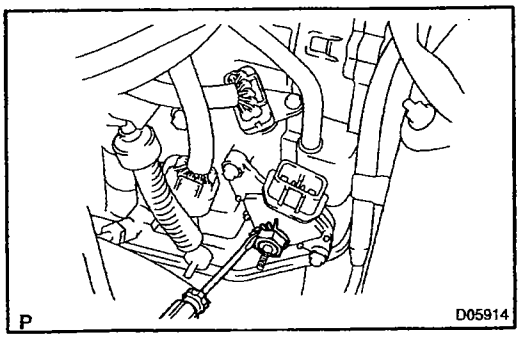
3. **REMOVE PARK/NEUTRAL POSITION SWITCH**

(a) Remove the nut.



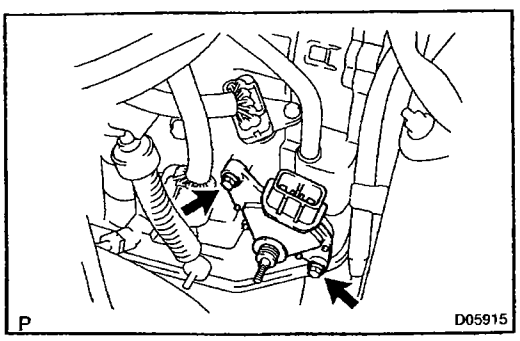
(b) Remove the nut, washer and control shift lever.

AX



(c) Using a screwdriver, pry off the lock plate.

(d) Remove the nut and lock plate.



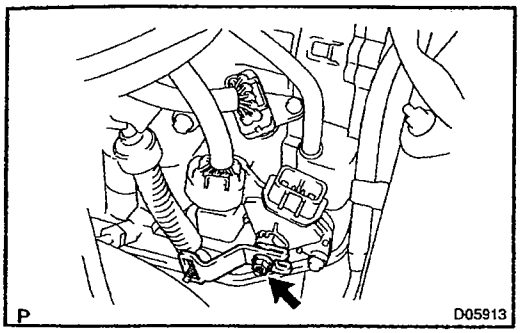
(e) Remove the 2 bolts and pull out the park/neutral position switch.

4. **INSTALL AND ADJUST PARK/NEUTRAL POSITION SWITCH**

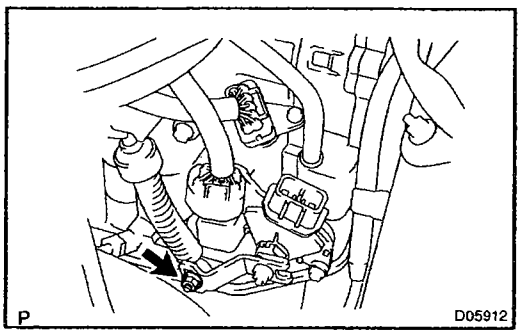
(a) Install the park/neutral position switch with the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Install a new lock plate and nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

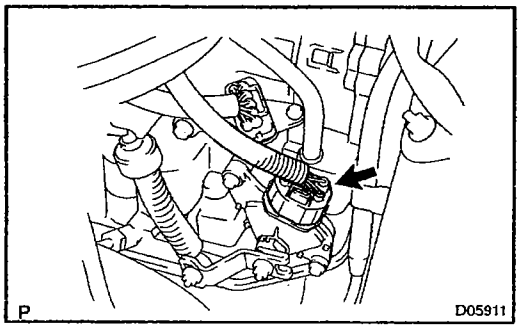
(c) Bend the claws on the lock plate to fix the nut.



(d) Install the control shift lever with the nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



(e) Connect the control cable to the control shaft.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



5. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

6. CHECK PARK/NEUTRAL POSITION OPERATION

Check that the engine can be started with the shift lever only in the N or P position, but not in other position.

If the engine can not be stated not as started above, carry out the adjustment procedure (See page DI–157).

7. INSTALL AIR CLEANER ASSEMBLY

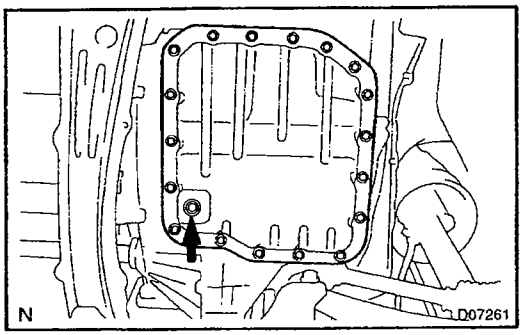
8. TEST DRIVE VEHICLE

VALVE BODY ASSEMBLY

AX0KN-01

ON–VEHICLE REPAIR

1. **REMOVE LH ENGINE UNDER COVER**

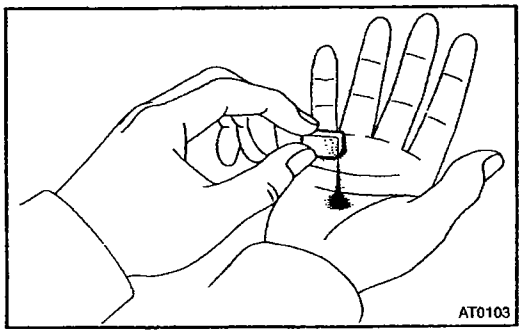


2. **REMOVE DRAIN PLUG AND DRAIN ATF**
3. **REMOVE OIL PAN AND GASKET**

NOTICE:

Some fluid will remain in the oil pan.

Remove the 18 bolts, and carefully remove the oil pan assembly. Discard the gasket.



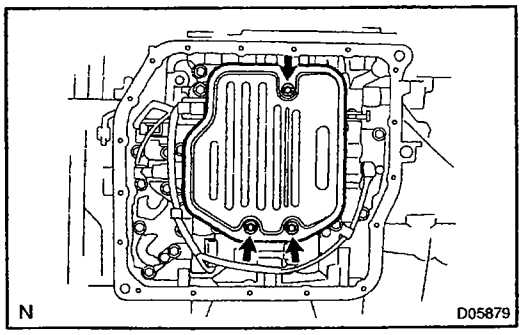
4. **EXAMINE PARTICLES IN OIL PAN**

Remove the magnets and use them to collect any steel chips. Look carefully at the chips and particles in the pan and on the magnet to anticipate what type of wear you will find in the transaxle.

Steel (magnetic)...bearing, gear and plate wear

Brass (non–magnetic)... bushing wear

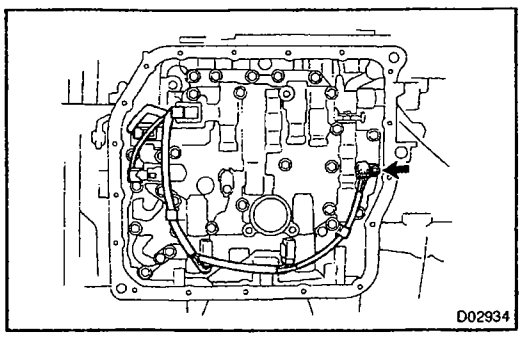
AX



5. **REMOVE OIL STRAINER**

(a) Remove the 3 bolts and oil strainer.

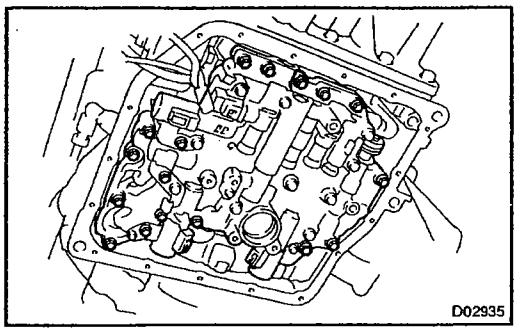
(b) Remove the O–ring.



6. **DISCONNECT 5 SHIFT SOLENOID VALVE CONNECTORS**
7. **REMOVE ATF TEMPERATURE SENSOR**

Remove the bolt and lock plate, and remove the ATF temperature sensor.

8. **SEPARATE WIRE HARNESS FROM 2 CLAMPS**

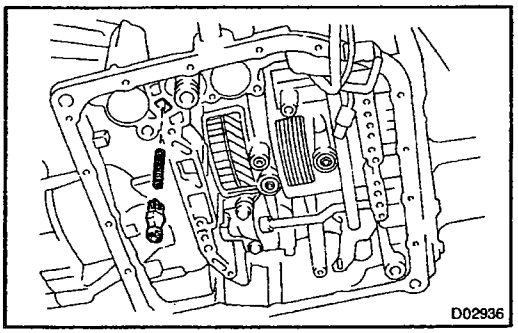


9. REMOVE VALVE BODY

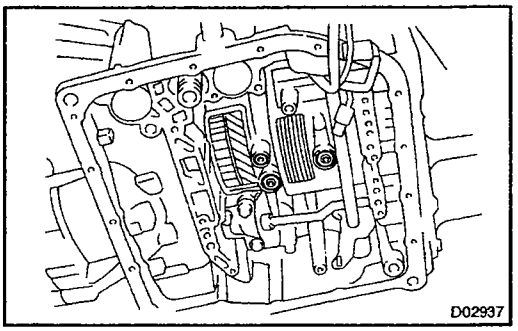
Remove the 17 bolts and valve body.

NOTICE:

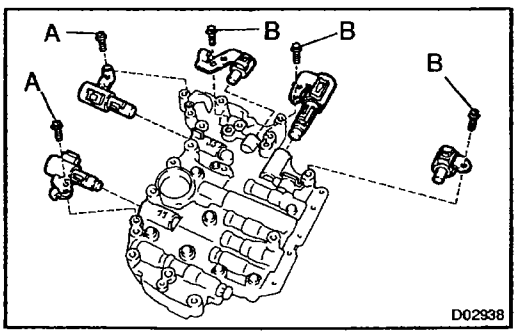
Be careful not to drop the check valve body, spring and accumulator piston.



10. REMOVE CHECK BALL BODY AND SPRING



11. REMOVE 3 APPLY GASKETS



12. REMOVE SHIFT SOLENOID VALVE

Remove the 5 bolts and 5 shift solenoid valves.

13. INSTALL SHIFT SOLENOID VALVE

Install the 5 shift solenoid valves with the 5 bolts.

Torque:

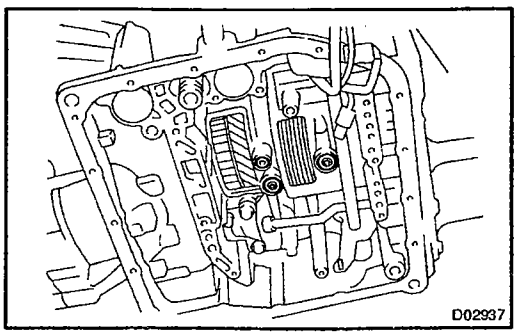
Bolt A: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

Bolt B: 11 N·m (110 kgf·cm, 8 ft·lbf)

Bolt length:

Bolt A: 12 mm (0.47 in.)

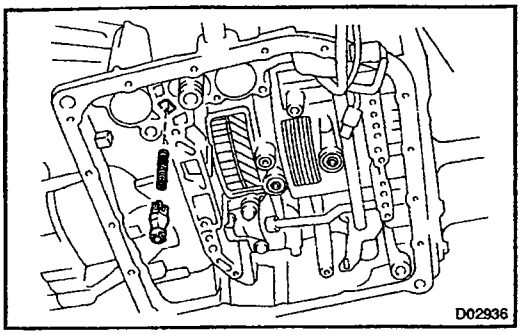
Bolt B: 45 mm (1.77 in.)



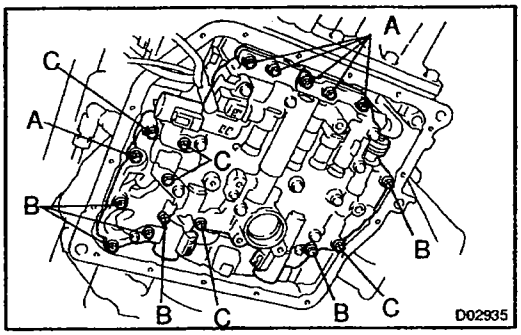
14. INSTALL APPLY GASKET

(a) Coat 3 new apply gaskets with ATF.

(b) Install the gaskets to the transaxle case.



15. INSTALL CHECK VALVE AND SPRING



16. INSTALL VALVE BODY

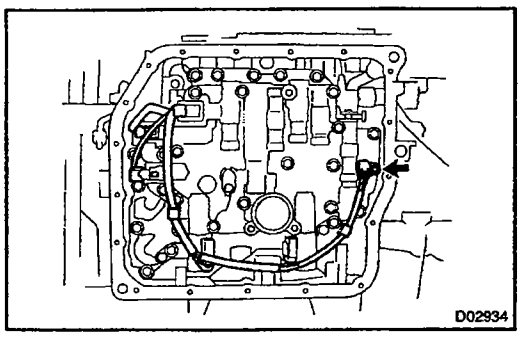
(a) Align the groove of the manual valve with the pin of the manual valve lever.

(b) Temporarily install the valve body with the 17 bolts.
Bolt length:
Bolt A: 25 mm (0.98 in.)
Bolt B: 41 mm (1.61 in.)
Bolt C: 45 mm (1.77 in.)

(c) Check that the manual valve lever contacts the center of the roller at the tip of the detent spring.

(d) Tighten the 17 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

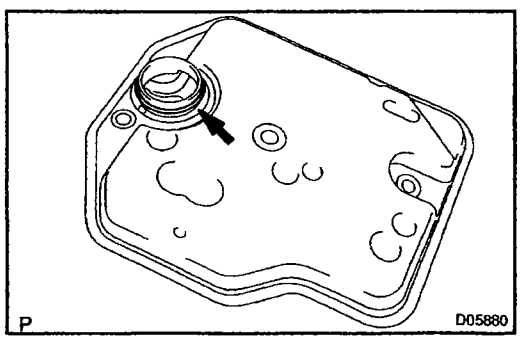
17. CLAMP WIRE HARNESS TO 2 CLAMPS



18. INSTALL ATF TEMPERATURE SENSOR

Install the ATF temperature sensor with the lock plate and bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

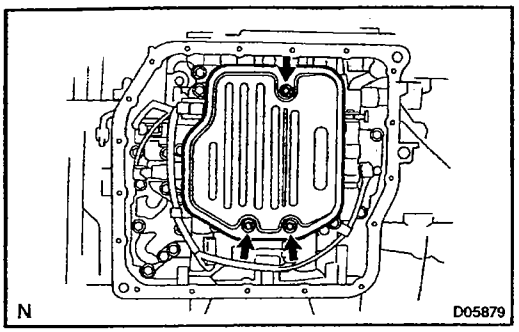
19. CONNECT 5 SHIFT SOLENOID VALVE CONNECTORS



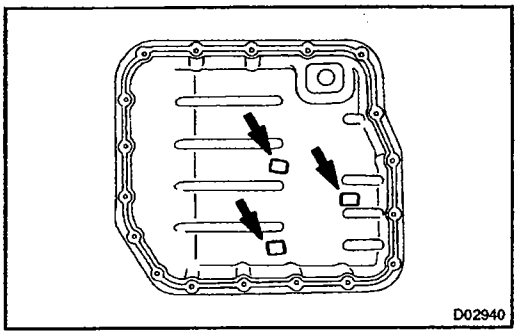
20. INSTALL OIL STRAINER

(a) Coat a new O–ring with ATF.

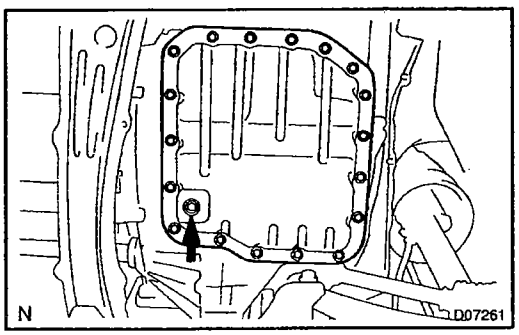
(b) Install the O–ring to the oil strainer.



(c) Install the oil strainer with the 3 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



21. INSTALL MAGNET IN OIL PAN
Install the 3 magnets in the oil pan, as shown in the illustration.

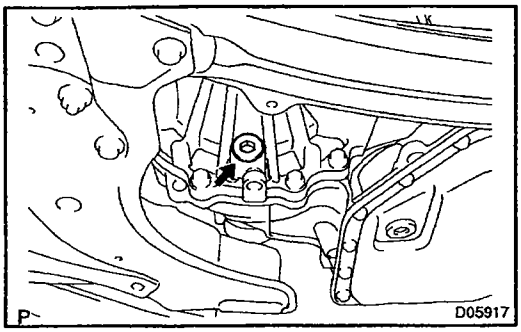


22. INSTALL OIL PAN
Install the oil pan and a new gasket with the 18 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

23. INSTALL DRAIN PLUG
Install a new gasket and drain plug.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

24. FILL ATF AND CHECK ATF LEVEL
(See page DI–157)

25. INSTALL LH ENGINE UNDER COVER

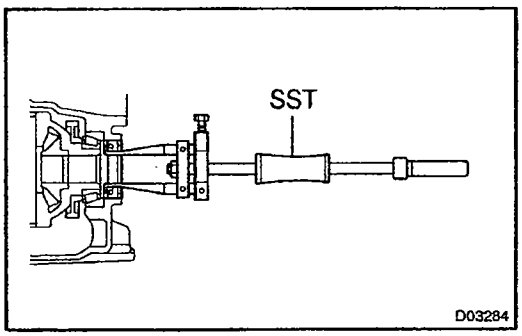


DIFFERENTIAL OIL SEAL

AX09M–02

ON–VEHICLE REPAIR

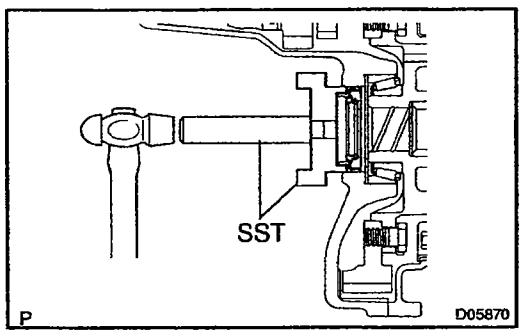
1. **DRAIN ATF FROM FRONT DIFFERENTIAL CASE**
2. **REMOVE LH AND RH DRIVE SHAFTS**
   (See page SA–20)



3. **REMOVE LH AND RH SIDE OIL SEAL**

Using SST, drive out both the side oil seals.

SST 09308–10010



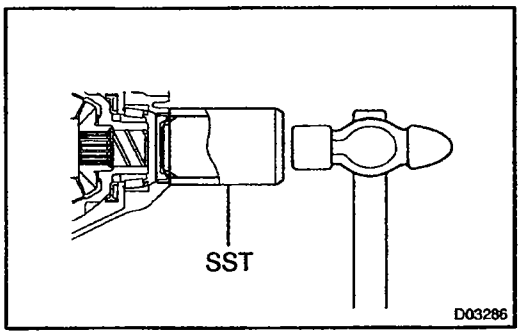
4. **INSTALL LH SIDE OIL SEAL**

(a) Using SST and a hammer, drive in a new oil seal.

SST 09350–32014 (09351–32150), 09950–70010 (09951–07150)

Oil seal drive in depth: 2.7 ± 0.5 mm (0.106 ± 0.020 in.)

(b) Coat the oil seal lip with MP grease.



5. **INSTALL RH SIDE OIL SEAL**

(a) Using SST and a hammer, drive in a new oil seal.

SST 09223–00010

Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.020 in.)

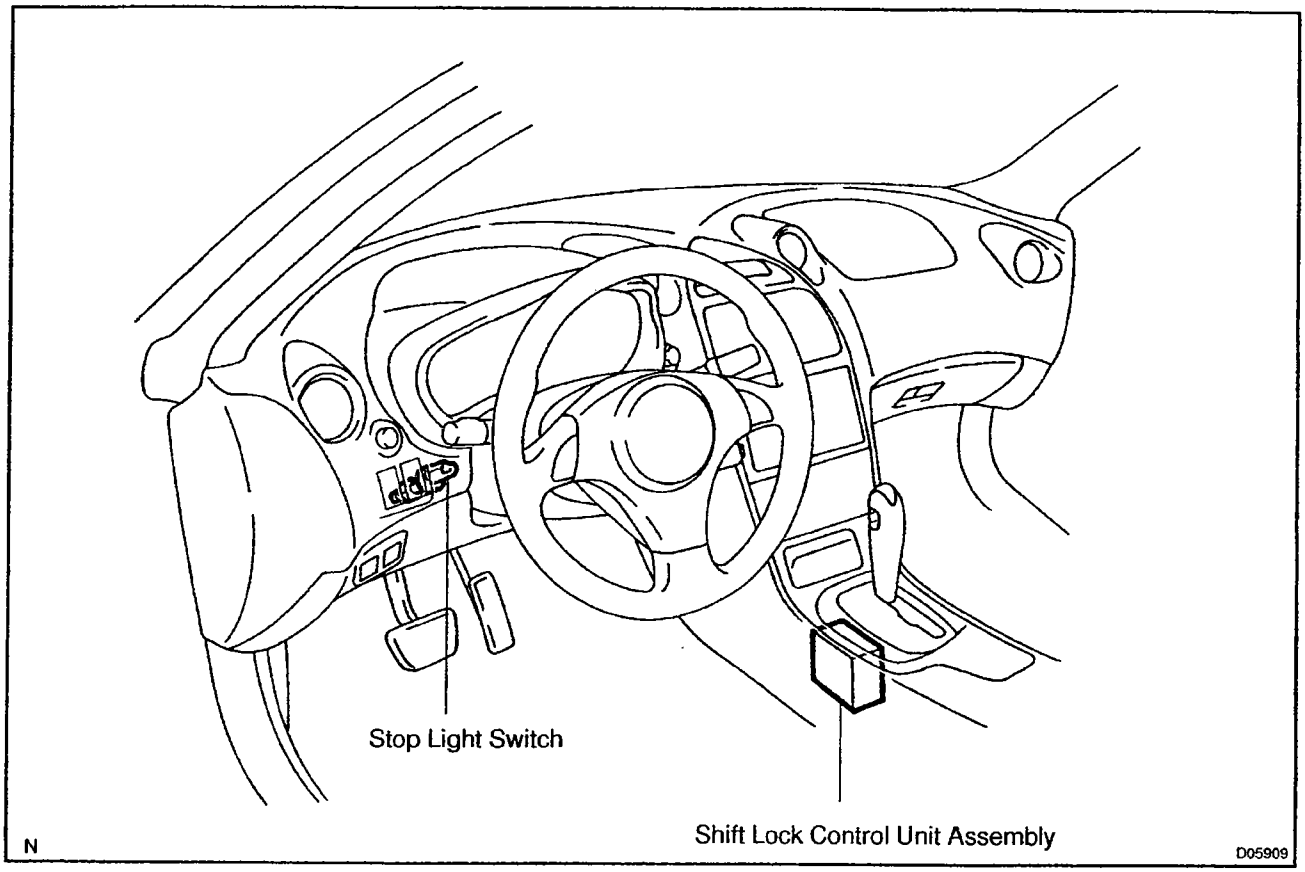
(b) Coat the oil seal lip with MP grease.

6. **INSTALL LH AND RH DRIVE SHAFTS**
   (See page SA–32)
7. **FILL ATF AND CHECK ATF LEVEL**
   (See page DI–157)

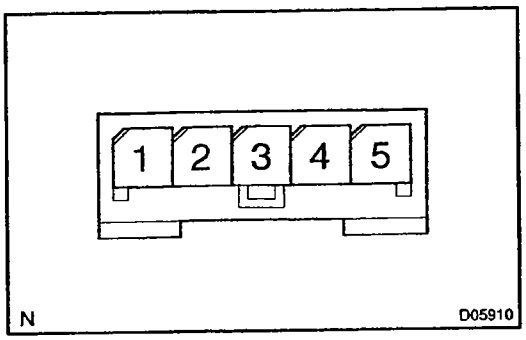
SHIFT LOCK SYSTEM

COMPONENTS

AXOKL–01



AX0K34-01



INSPECTION

INSPECT SHIFT LOCK CONTROL UNIT ASSEMBLY

Using a voltmeter, measure the voltage at each terminal.

HINT:

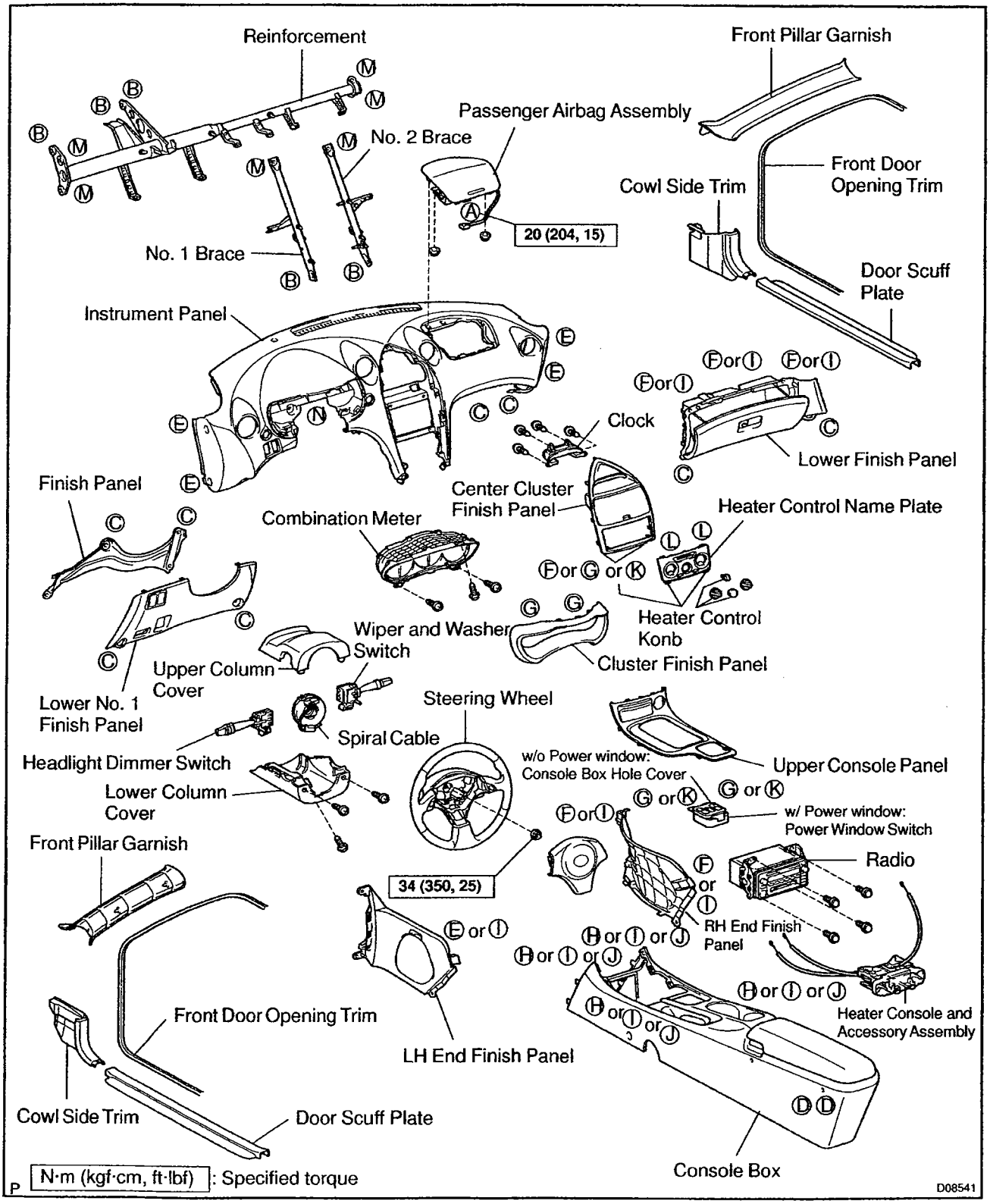
Do not disconnect the shift lock control unit assembly connector.

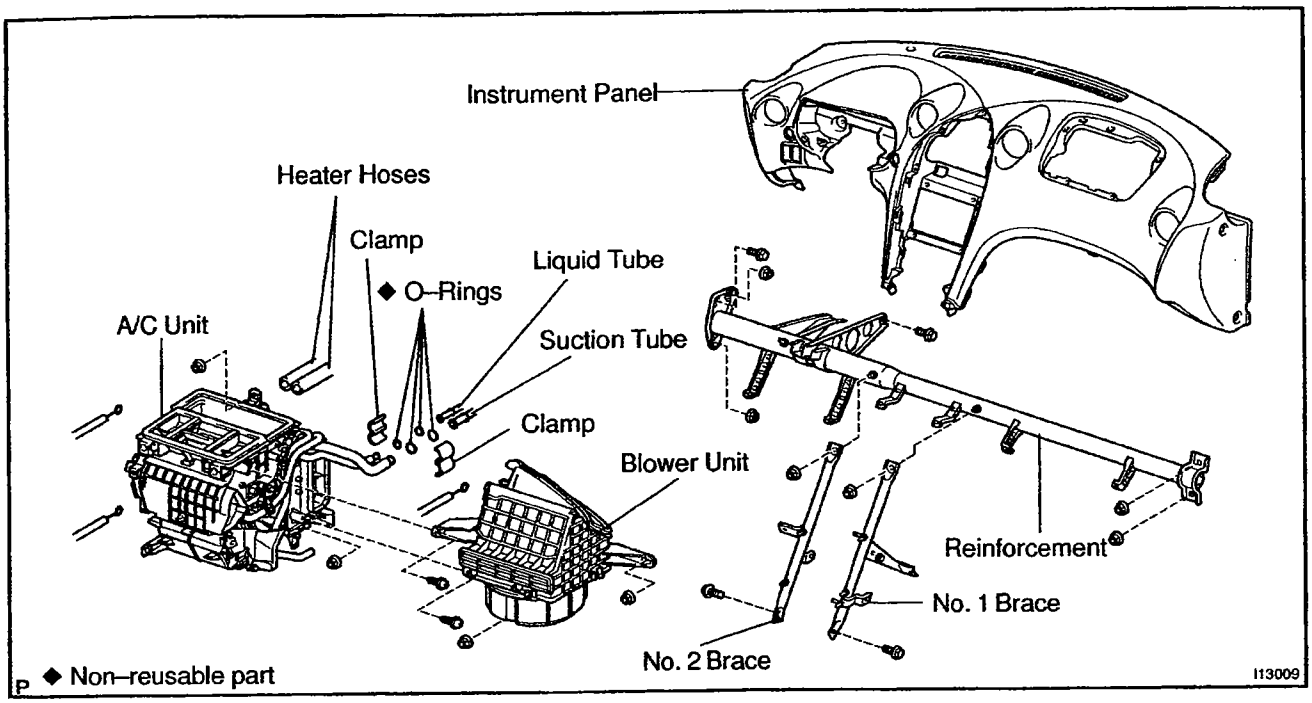
Terminal	Measuring Condition	Voltage (V)
5 – 1 (IG – E)	Ignition switch ON	10 – 14
3 – 1 (STP – E)	Depressing brake pedal	10 – 14

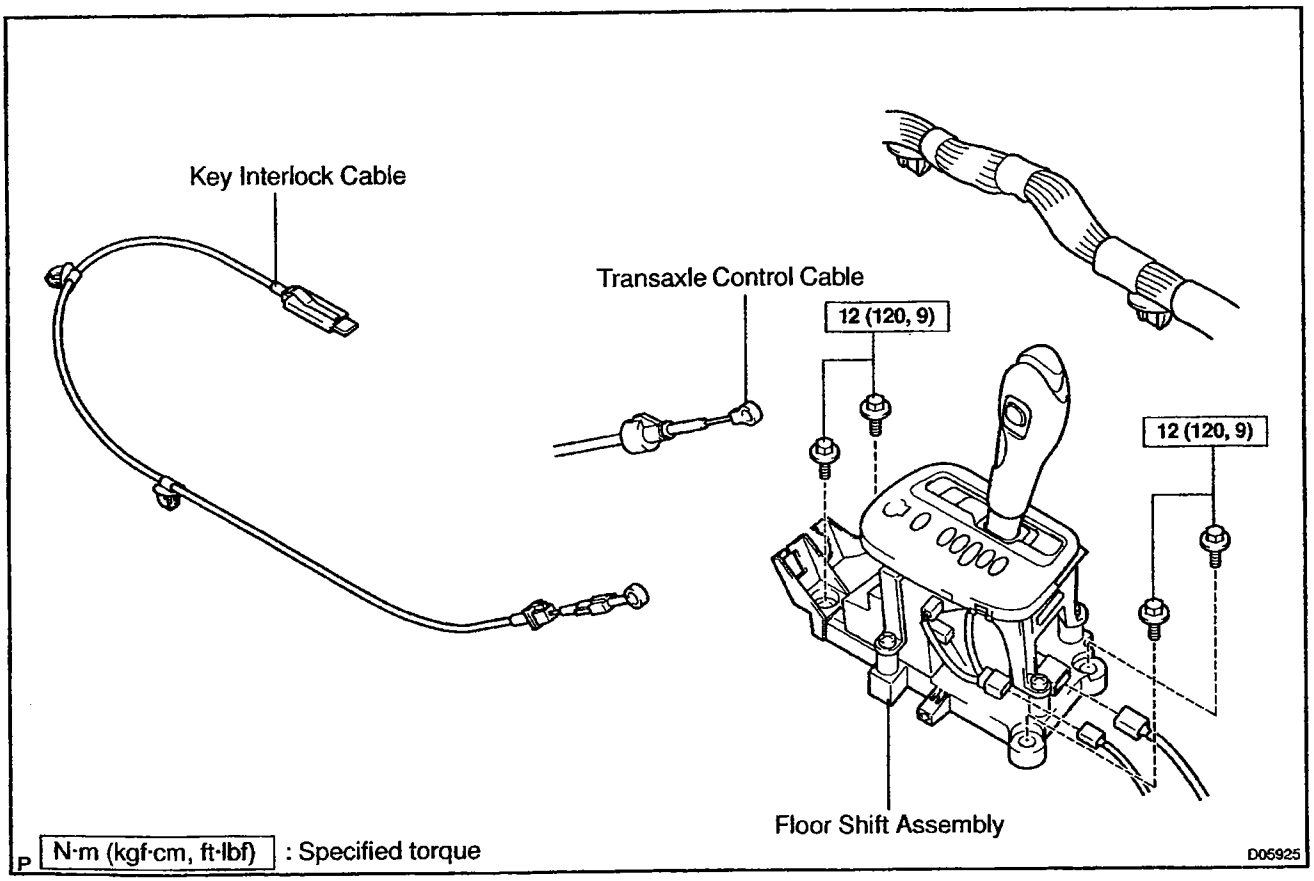
FLOOR SHIFT ASSEMBLY

COMPONENTS

AX0L5-01

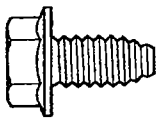
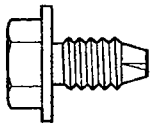
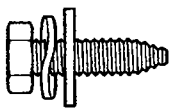
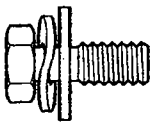
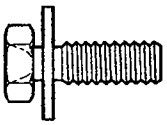
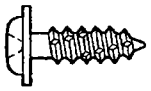
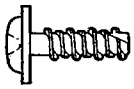
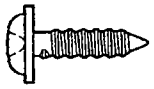
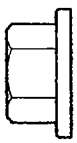
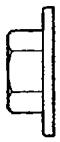



Instrument Panel
Heater Hoses
Clamp
◆ O–Rings
Liquid Tube
A/C Unit
Suction Tube
Clamp
Blower Unit
Reinforcement
No. 1 Brace
No. 2 Brace
P ◆ Non–reusable part
I13009


Key Interlock Cable
Transaxle Control Cable
12 (120, 9)
12 (120, 9)
Floor Shift Assembly
P N·m (kgf·cm, ft·lbf) : Specified torque
D05925

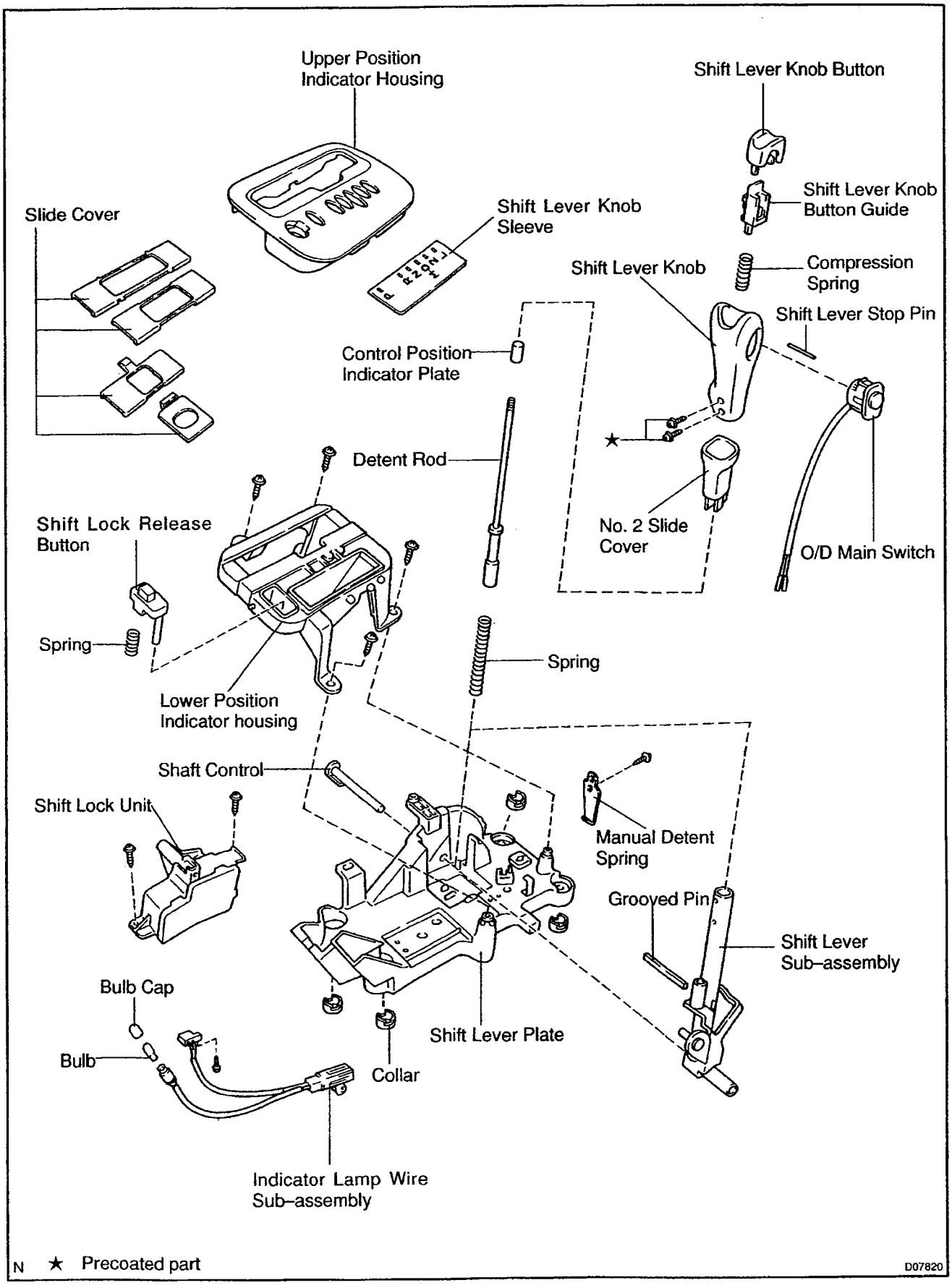
HINT:
Screw shapes and sizes are indicated in the table below. The codes ("A" – "N") correspond to those indicated on the previous page.

mm (in.)

	Shape	Size		Shape	Size		Shape	Size
Ⓐ		ø = 8 (0.32) L = 16 (0.63)	Ⓑ		ø = 8 (0.32) L = 15 (0.59)	Ⓒ		ø = 6 (0.24) L = 22 (0.87)
Ⓓ		ø = 6 (0.24) L = 16 (0.63)	Ⓔ		ø = 6 (0.24) L = 18 (0.71)	Ⓕ		ø = 5.22 (0.2055) L = 16 (0.63)
Ⓖ		ø =5.22 (0.2055) L = 16 (0.63)	Ⓗ		ø = 5 (0.20) L = 18 (0.71)	Ⓘ		ø = 5 (0.20) L = 16 (0.63)
Ⓙ		ø = 5 (0.20) L = 16 (0.63)	Ⓚ		ø = 5 (0.20) L = 14 (0.55)	Ⓛ		ø = 4 (0.16) L = 16 (0.63)
Ⓜ		ø = 8 (0.32)	Ⓝ		ø = 6 (0.24)			

P

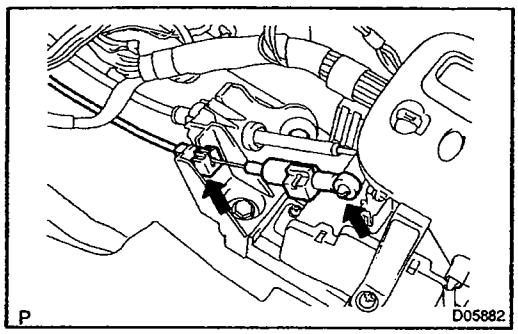
H12659


Upper Position Indicator Housing
Shift Lever Knob Button
Shift Lever Knob Button Guide
Shift Lever Knob Sleeve
Slide Cover
Shift Lever Knob
Compression Spring
Shift Lever Stop Pin
Control Position Indicator Plate
Detent Rod
No. 2 Slide Cover
O/D Main Switch
Shift Lock Release Button
Spring
Spring
Lower Position Indicator housing
Shaft Control
Shift Lock Unit
Manual Detent Spring
Grooved Pin
Shift Lever Sub–assembly
Bulb Cap
Bulb
Collar
Shift Lever Plate
Indicator Lamp Wire Sub–assembly
N ★ Precoated part
D07820

AX0L6-01

REMOVAL

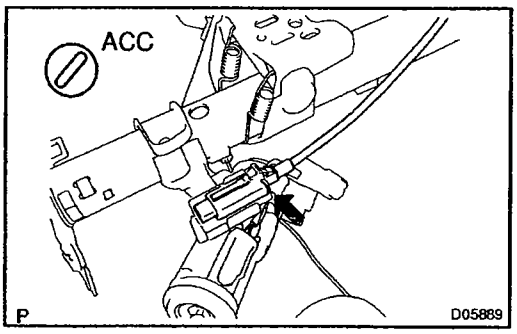
1. **REMOVE INSTRUMENT PANEL (See page BO–79)**
2. **REMOVE AIR CONDITIONING UNIT (See page AC–26)**



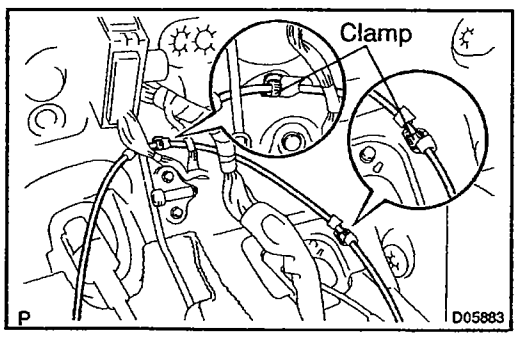
3. **REMOVE KEY INTERLOCK CABLE**

(a) Remove the cable end from the rod of the floor shift assembly.

(b) Pull out the cable while pressing the clip of the key interlock cable.



(c) With the key in ACC, remove the cable cap claw from the key interlock and pull it.

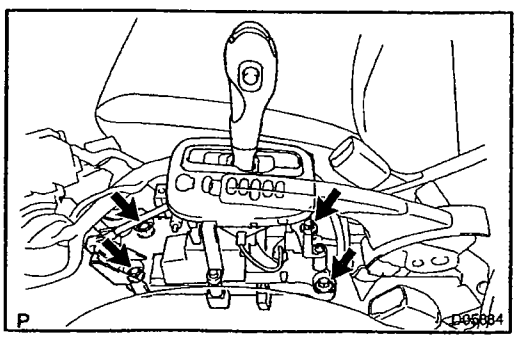


(d) Disconnect the 2 key interlock cable clamps.

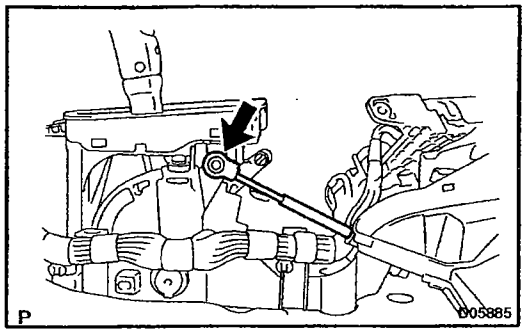
4. **REMOVE FLOOR SHIFT ASSEMBLY**

(a) Disconnect the 2 connectors.

(b) Disconnect the 2 wire harness clamps from the floor shift assembly.



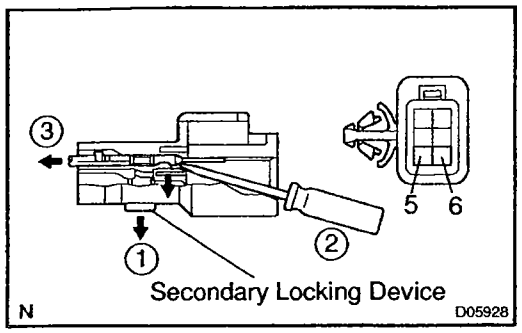
(c) Remove the 4 bolts from the floor shift assembly.



(d) Remove the cable end from the rod of the floor shift assembly.
(e) Pull out the cable while pressing the clip of the transaxle control cable.
(f) Remove the floor shift assembly.

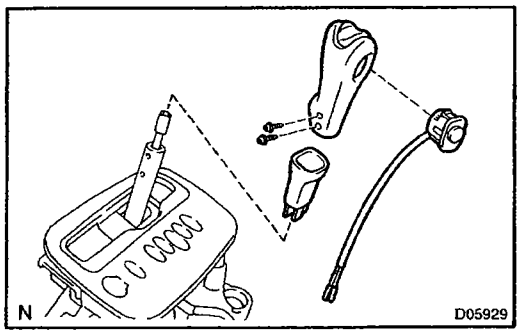
AX0L8-01

DISASSEMBLY



1. REMOVE O/D MAIN SWITCH TERMINAL

(a) Remove the O/D main switch connector from the shift lever plate.
(b) Disengage the secondary locking device.
(c) Release the locking log of the terminals 5 and 6, and pull the terminals out from the rearward.



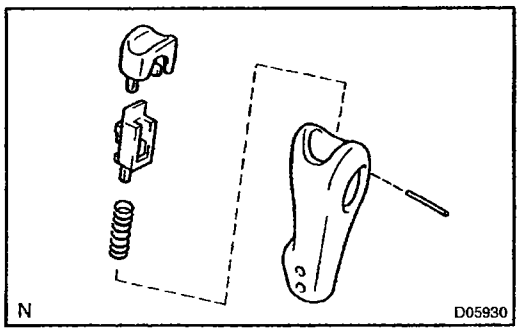
2. REMOVE SHIFT LEVER KNOB SUB–ASSEMBLY

(a) Remove the 2 screws and shift lever knob sub–assembly.

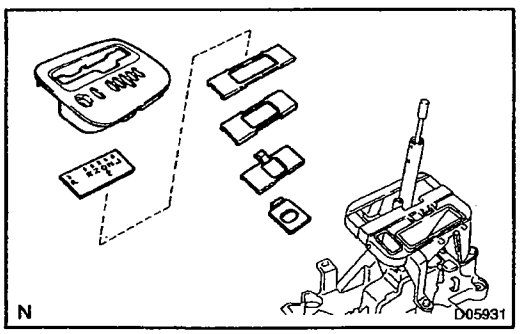
NOTICE:

Pay attention not to apply unnatural load to O/D main switch wire harness.

(b) Remove the O/D main switch.
(c) Remove the No. 2 slide cover.

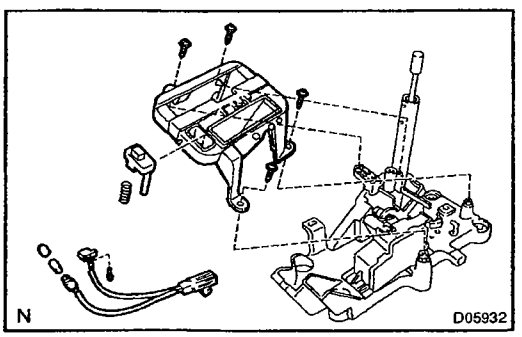


(d) Remove the shift lever stop pin, shift lever knob button, shift lever knob button guide and compression spring.



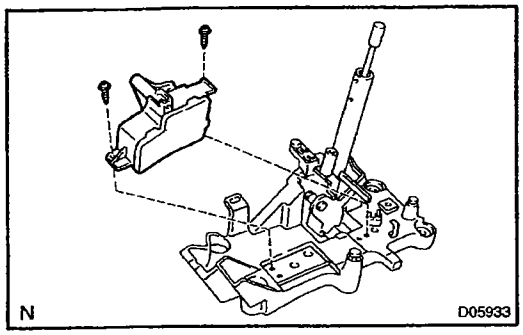
3. REMOVE UPPER POSITION INDICATOR HOUSING

(a) Remove the upper position indicator housing.
(b) Remove the control position indicator plate.
(c) Remove the 4 slide covers from the lower position indicator housing.



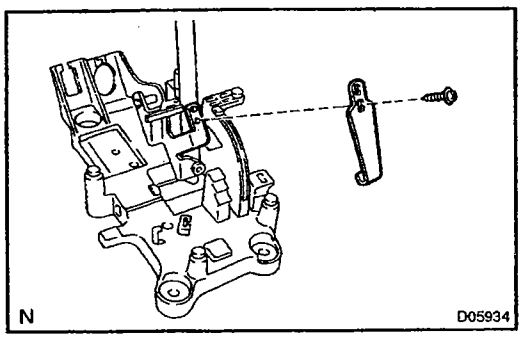
4. REMOVE LOWER POSITION INDICATOR HOUSING

(a) Remove the indicator lamp wire sub–assembly.
(b) Remove the 4 screws and lower position indicator housing.
(c) Remove the bulb cap and bulb from the indicator lamp wire sub–assembly.
(d) Remove the screw and indicator lamp wire sub–assembly.
(e) Remove the shift lock release button and spring.

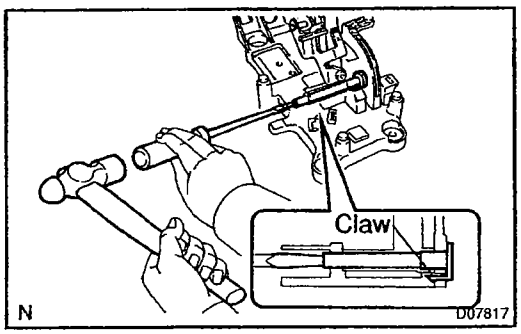


5. REMOVE SHIFT LOCK UNIT

Remove the 2 screws and shift lock unit.

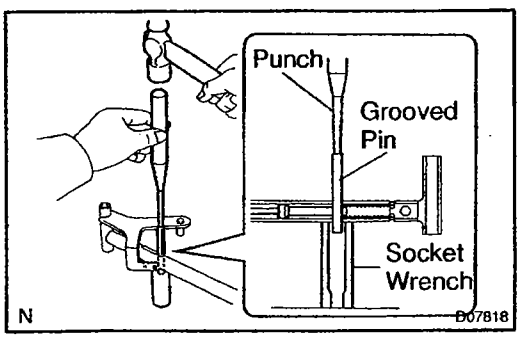


6. REMOVE SCREW AND MANUAL DETENT SPRING



7. REMOVE SHIFT LEVER SUB–ASSEMBLY

Using a screwdriver and hammer, drive off the shaft control while disengaging the claw of the shaft control and remove the shift lever sub–assembly.



8. REMOVE DETENT ROD

(a) Set a 14 mm deep socket wrench.
(b) Using a punch and hammer, remove the grooved pin.
(c) Remove the detent rod and spring.
(d) Remove the shift lever knob sleeve from the detent rod.

9. REMOVE COLLARS

Using a screwdriver and hammer, remove the 4 collars.

AX0L9-01

REASSEMBLY

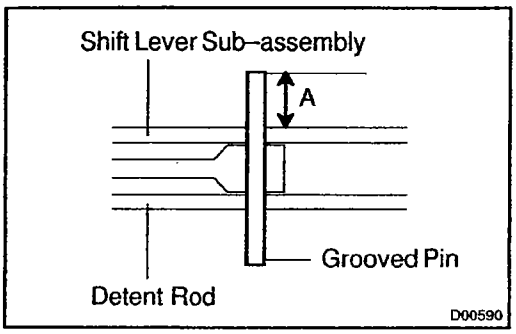
1. INSTALL COLLARS

2. INSTALL DETENT ROD

(a) Install the shift lever knob sleeve to the detent rod.

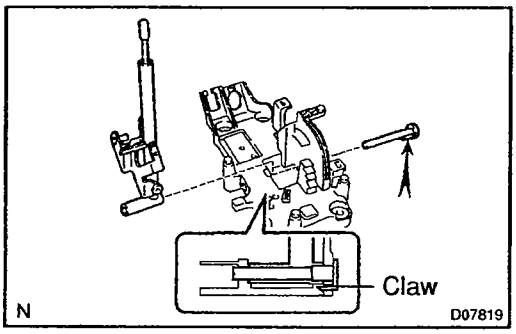
(b) Apply MP grease on the detent rod and spring.

(c) Install the spring and detent rod.



(d) Using a punch and hammer, install the grooved pin to the detent rod pin hole.
A: 8.0 ± 0.2 mm (0.315 ± 0.008 in.)

(e) Check the detent rod operation.



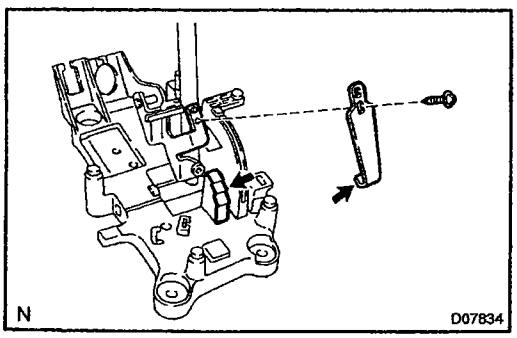
3. INSTALL SHIFT LEVER SUB–ASSEMBLY

(a) Apply MP grease on the spring.

(b) Install the shift lever sub–assembly and shaft control to shift lever plate.

HINT:

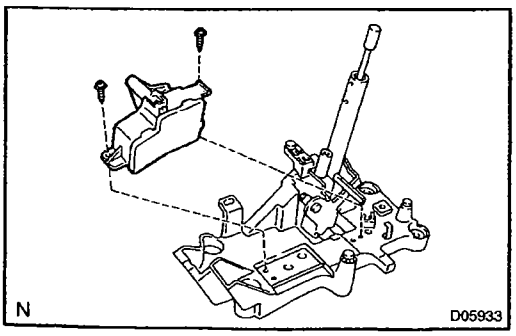
Check that the claw of the shaft control is fit onto the shift lever plate.



4. INSTALL MANUAL DETENT SPRING AND SCREW

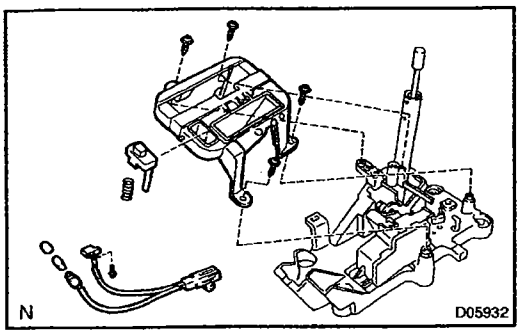
(a) Apply MP grease to the parts indicated by the arrows manual detent spring and shift lever plate in the illustration.

(b) Install the manual detent spring with the screw.



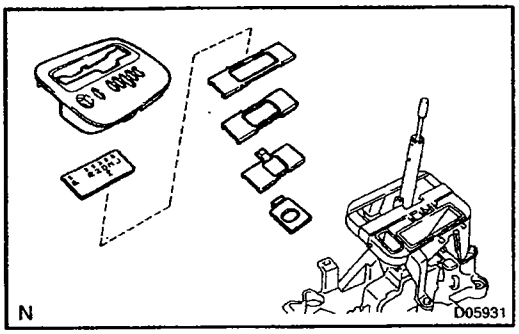
5. INSTALL SHIFT LOCK UNIT

Install the shift lock unit with the 2 screws.



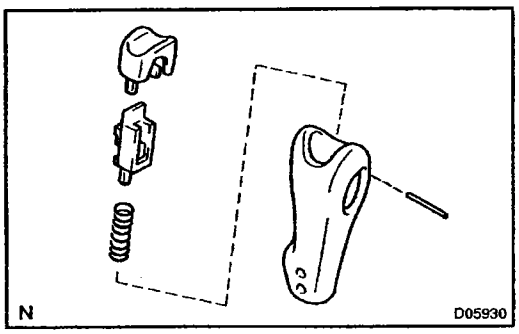
6. INSTALL LOWER POSITION INDICATOR HOUSING

(a) Apply MP grease on the spring.
(b) Install the spring and shift lock release button.
(c) Install the indicator lamp wire sub–assembly with the screw.
(d) Install the bulb and bulb cap to the indicator lamp wire sub–assembly.
(e) Install the lower position indicator housing with the 4 screws.
(f) Install the indicator lamp wire sub–assembly.



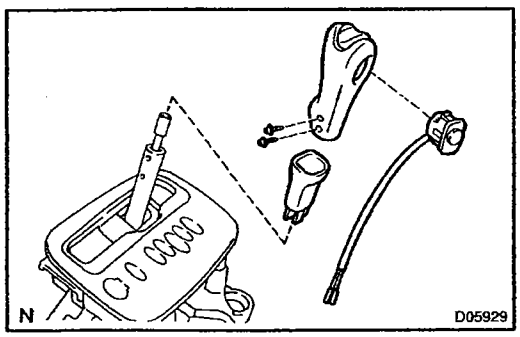
7. INSTALL UPPER POSITION INDICATOR HOUSING

(a) Install the 4 slide covers to the lower position indicator housing, as shown in the illustration.
(b) Install the control position indicator plate.
(c) Install the upper position indicator housing.



8. INSTALL SHIFT LEVER KNOB SUB–ASSEMBLY

(a) Apply MP grease on the compression spring.
(b) Install the compression spring, shift lever knob button guide, shift lever knob button and shift lever stop pin.



(c) Install the No. 2 slide cover.
(d) Install the O/D main switch.
(e) Install the shift lever knob sub–assembly with the 2 screws.

HINT:
Coat the threads of screws with sealant.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

NOTICE:
Make sure not to catch O/D main switch wire harness.

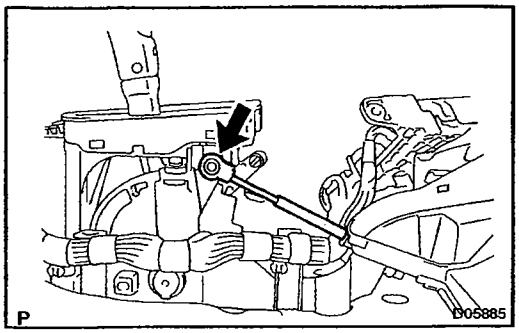
9. INSTALL O/D MAIN SWITCH TERMINAL

(a) Connect the 2 O/D main switch terminals to the connector.
(b) Connect the connector to the shift lever plate.

AX0L7-01

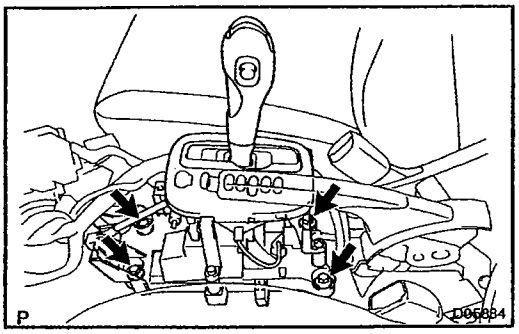
INSTALLATION

1. INSTALL FLOOR SHIFT ASSEMBLY



(a) Pull in the cable while pressing the clip of the transaxle control cable to the floor shift assembly.

(b) Install the cable end from the rod of the floor shift assembly.

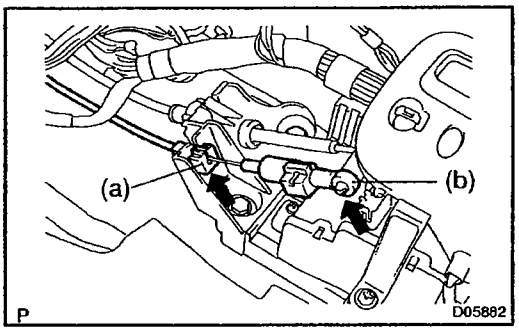


(c) Install the floor shift assembly with the 4 bolts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(d) Connect the 2 wire harness clamps from the floor shift assembly.

(e) Connect the 2 connector.

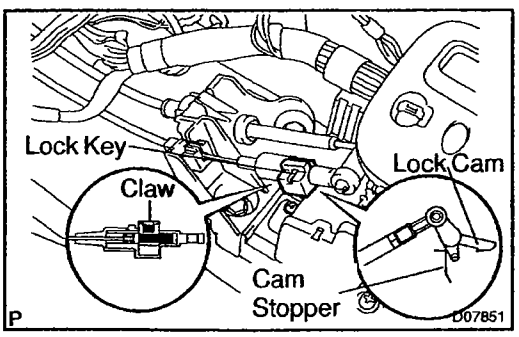
2. INSTALL KEY INTERLOCK CABLE



(a) Pass the key interlock cable end through the hole in the floor shift assembly.

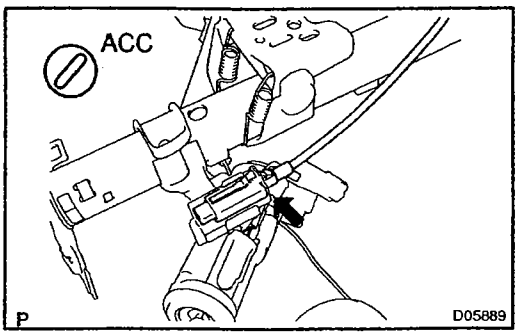
HINT:
Make sure that the claws shown by the arrow in the illustration are locked.

(b) With the shift lever in N position, set the hole of the cable end to the floor shift assembly to assemble them.

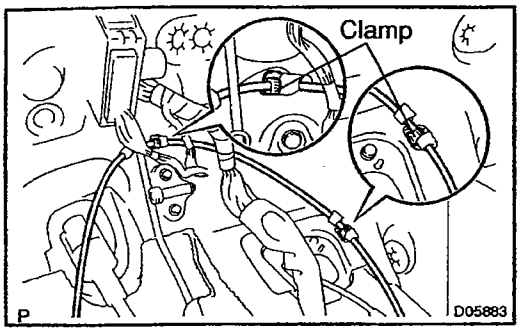


(c) At the time of reassembly:
With the key in ACC, push a claw into lock key.
At this time, be careful not to apply undue force on bending to the cable (Cable length adjustment is completed).

HINT:
Check that the key lock cam is contact with the cam stopper.



(d) With the key in ACC, install the cable cap claw to the key interlock.



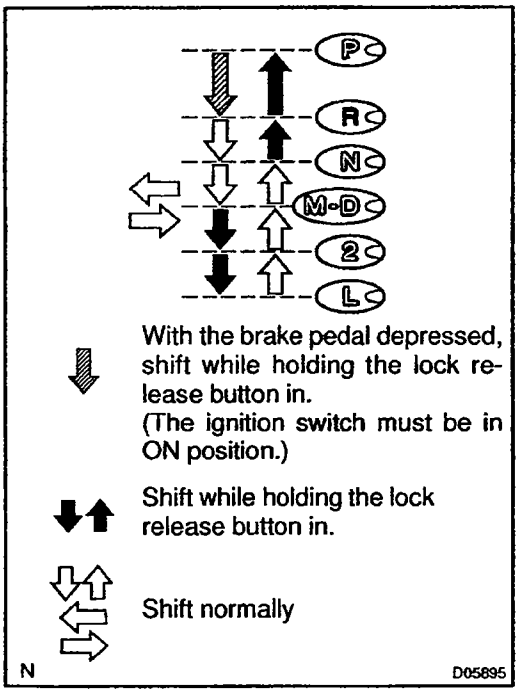
(e) Connect the 2 key interlock cable clamps.
(f) Pull in the cable while pressing the clip of the key interlock cable.

3. INSTALL AIR CONDITIONING UNIT (See page AC–29)

4. INSTALL INSTRUMENT PANEL (See page BO–85)

5. INSPECT KEY INTERLOCK AND SHIFT LOCK OPERATION

(a) Check that a key can be turn from ACC to LOCK only when the shift lever is in P position.
(b) Check that the key cannot be turned to LOCK when the shift lever is position in other than P position.
(c) When the ignition key is in LOCK, check that pressing the shift release button enables the shift lever to shift from P position to other positions.

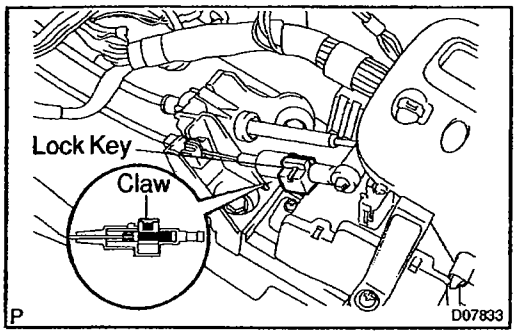


(d) When shifting it to each position, make sure that the shifting lever moves smoothly, can be moderately operated and the position indicator displays correctly.
Positions which can be operated without pressing the shift lever knob button
R → N → D → M → D, L → 2 → D → N
Positions which can be operated only while pressing the shift lever knob button
D → 2 → L, N → R → P
Positions which can be operated only while pressing the shift lever knob button, ignition switch ON and brake pedal depressed
P → R
(e) When starting the engine make sure that the vehicle moves forward when shifting form N to D position, and moves rearward when shifting to R position.

6. ADJUSTMENT IN CASE OF MALFUNCTION

(a) When the key can not be turned from ACC to LOCK even though the shift lever is in P position:
This is the condition where the cable end on the ignition key side is not returned to the position where it can be locked. The condition is caused by undue bending of the cable, rotative resistance of the pin on the shift lever side, or increased resistance due to any reason such as twisting of the cable. Reinstall and readjust the key interlock cable.

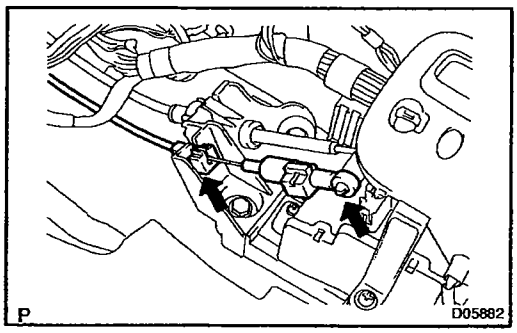
(b) When the key is turned from ACC to LOCK even though the shift lever is in other than P Position:
Since the cable is too long due to improper adjustment at the automatic adjustment part of the key can not be locked. Readjust the key interlock cable.



7. READJUSTMENT OF KEY INTERLOCK CABLE

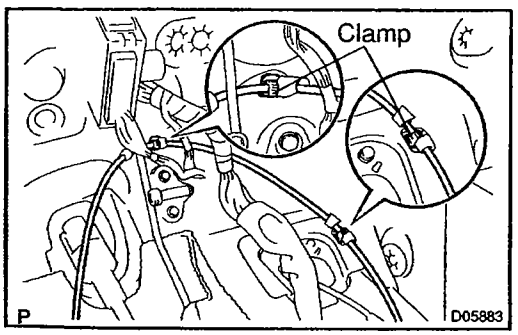
HINT:
Assembly shall be undertaker in the same way as step 2.

(a) Using a screwdriver, unlock the claw of the lock key of the automatic adjustment part.

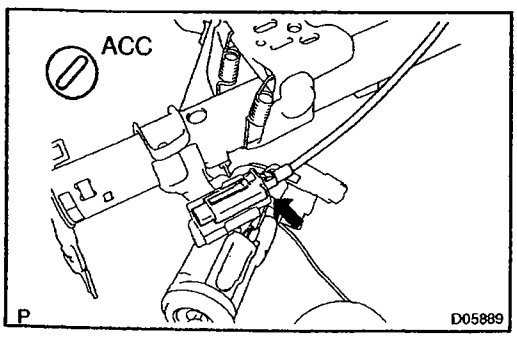


(b) Remove the key interlock cable end from the rod of the floor shift assembly.

(c) Pull out the cable while pressing the clip of the key interlock cable.



(d) Remove the cable clamp from the other.

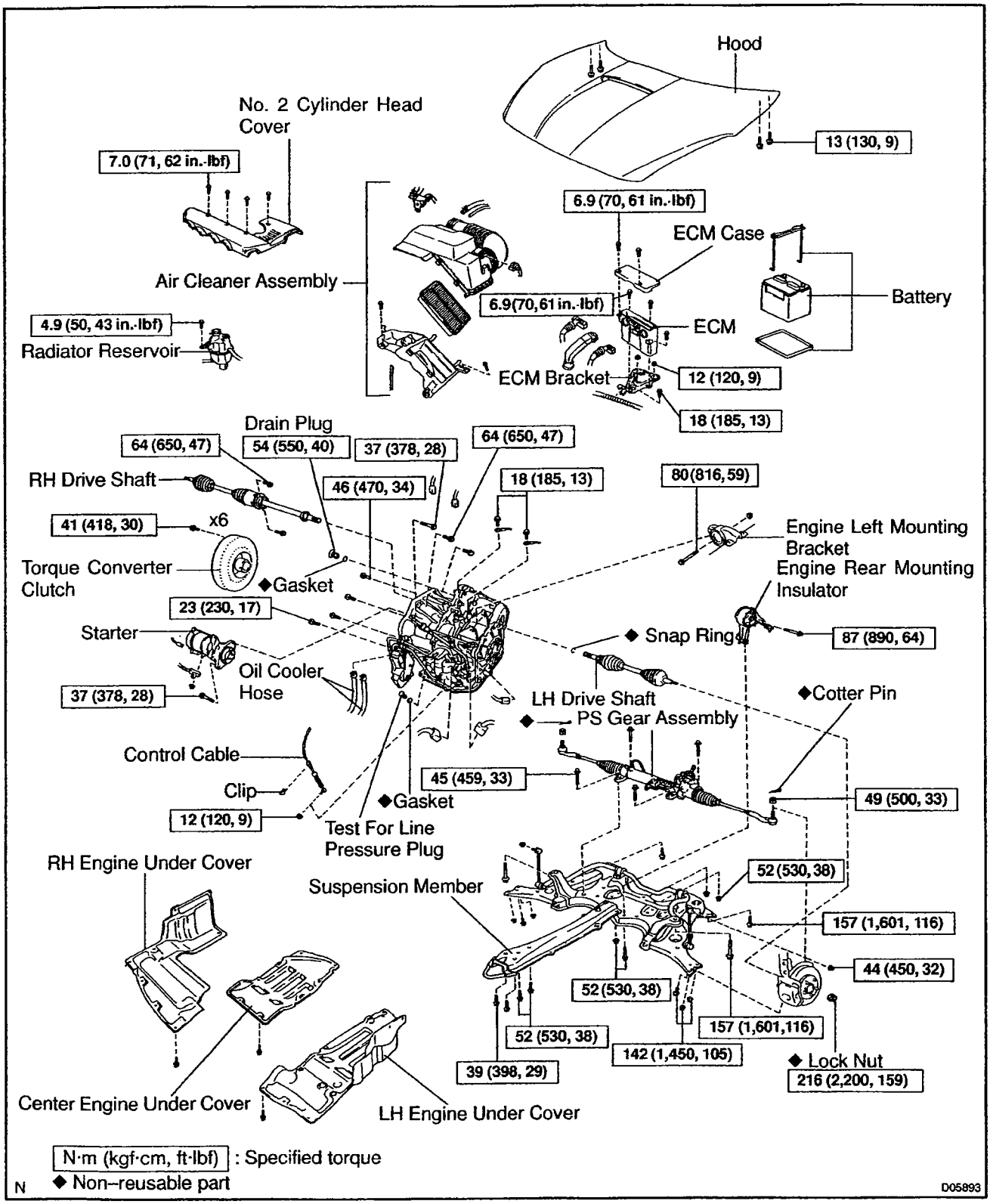


(e) With the key in ACC, install the cable cap claw to the key interlock.

AUTOMATIC TRANSAXLE UNIT

COMPONENTS

AX0KO–01



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

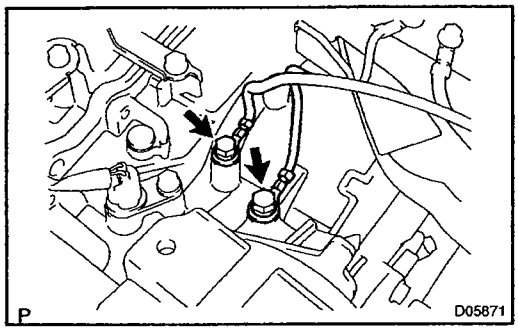
N

D05893

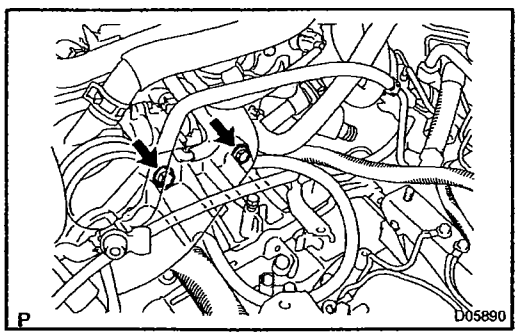
AX0KP-01

REMOVAL

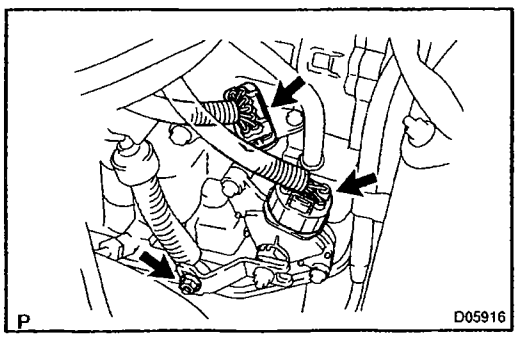
1. **REMOVE HOOD**
   Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
2. **REMOVE BATTERY**
3. **REMOVE ECM AND ECM CASE**
   Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
4. **REMOVE ECM BRACKET**
   Torque:
   Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
   Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)
5. **REMOVE AIR CLEANER ASSEMBLY**
6. **REMOVE NO. 2 CYLINDER HEAD COVER**
   Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)



7. **REMOVE 2 GROUND CABLES**
   Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
8. **DISCONNECT CONTROL CABLE FROM CLAMP**
9. **DISCONNECT INPUT TURBINE SPEED SENSOR CONNECTOR**
10. **DISCONNECT COUNTER GEAR SPEED SENSOR CONNECTOR**
11. **REMOVE VEHICLE SPEED SENSOR CONNECTOR**



12. **REMOVE 2 UPPER SIDE TRANSAXLE MOUNTING BOLTS FROM TRANSAXLE**
    Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



13. **DISCONNECT SOLENOID CONNECTOR AND PARK/NEUTRAL POSITION SWITCH CONNECTOR**

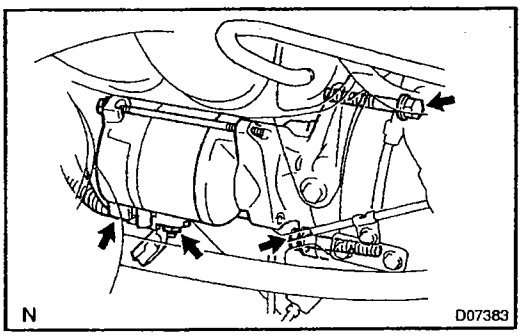
Disconnect the solenoid connector and park/neutral position switch connector.

14. **DISCONNECT CONTROL CABLE**

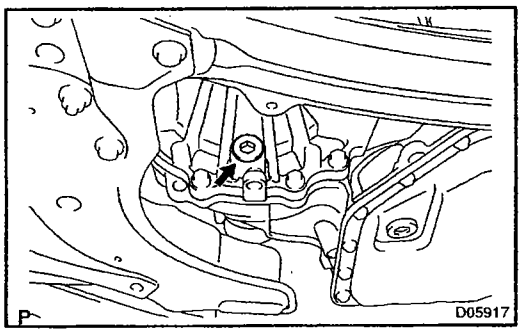
(a) Remove the nut from the control shift lever.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(b) Remove the clip and disconnect the control cable.

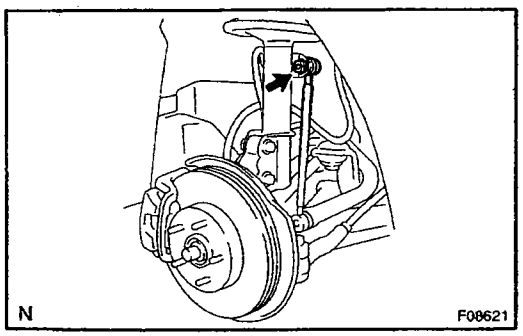
15. **REMOVE BOLT AND DISCONNECT RADIATOR RESERVOIR**
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



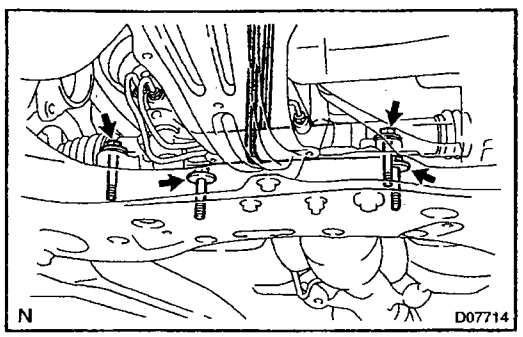
16. **REMOVE STARTER**
(a) Remove the nut and wire, and disconnect the connector.
(b) Remove the 2 bolts and starter.
Torque: 37 N·m (378 kgf·cm, 28 ft·lbf)
17. **REMOVE LH, RH, CENTER ENGINE UNDER COVERS**



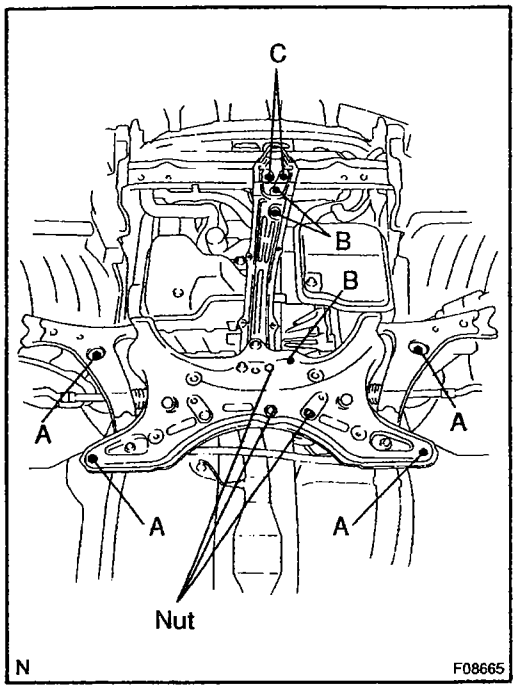
18. **DRAIN ATF FROM FRONT DIFFERENTIAL CASE**
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)
19. **REMOVE LH AND RH DRIVE SHAFTS**
(See page SA–20)



20. **DISCONNECT LH AND RH STABILIZER BAR LINKS FROM SHOCK ABSORBER**
Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)



21. **REMOVE 4 BOLTS AND DISCONNECT PS GEAR ASSEMBLY**
HINT:
Support the PS gear assembly securely.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

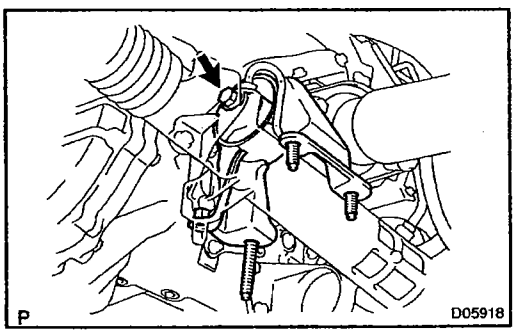


22. REMOVE SUSPENSION MEMBER

(a) Remove the 9 bolts and 3 nuts.

Torque:
Bolt A: 157 N·m (1,601 kgf·cm, 116 ft·lbf)
Bolt B: 52 N·m (530 kgf·cm, 38 ft·lbf)
Bolt C: 39 N·m (398 kgf·cm, 29 ft·lbf)
Nut: 52 N·m (530 kgf·cm, 38 ft·lbf)

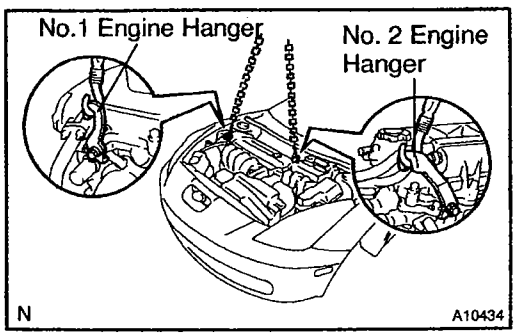
(b) Remove the suspension member.



23. REMOVE ENGINE REAR MOUNTING INSULATOR

Remove the bolt and engine rear mounting insulator.

Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)



24. ATTACH ENGINE SLING DEVICE TO ENGINE HANGERS

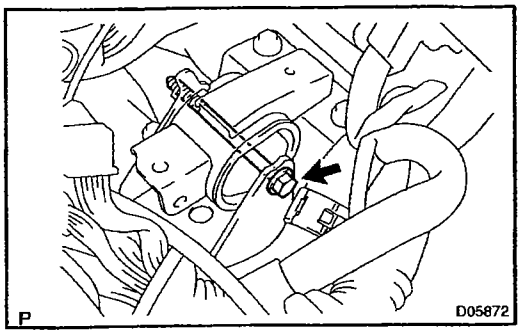
(a) Disconnect the 2 PCV hoses.

(b) Install the No. 1 and No. 2 engine hangers in the correct direction.

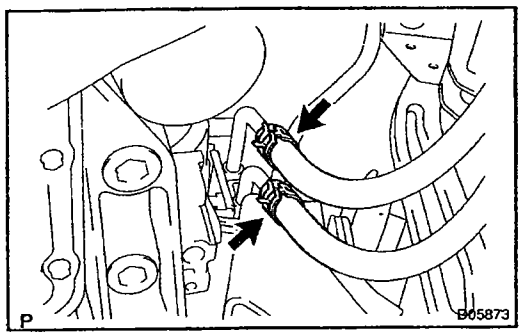
Parts No. :
No. 1 engine hanger: 12281–88600
No. 2 engine hanger: 12282–88600
Bolt: 91512–61020
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(c) Attach the engine chain hoist to the engine hangers.

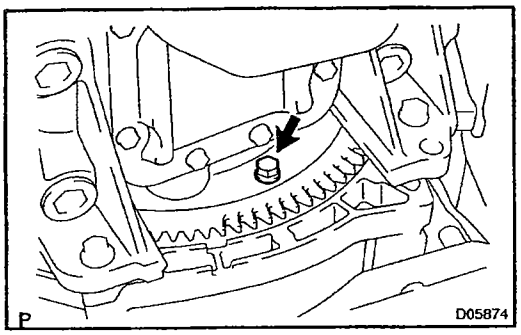
CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.



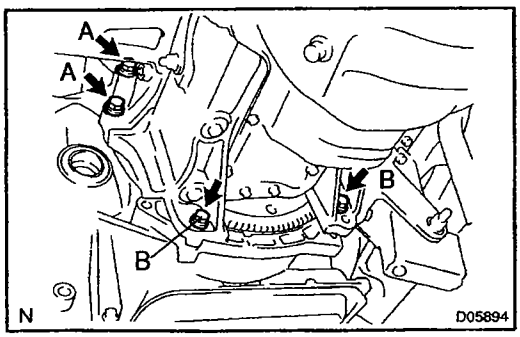
25. REMOVE UPPER SIDE ENGINE LEFT MOUNTING, NUT AND BOLT
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)



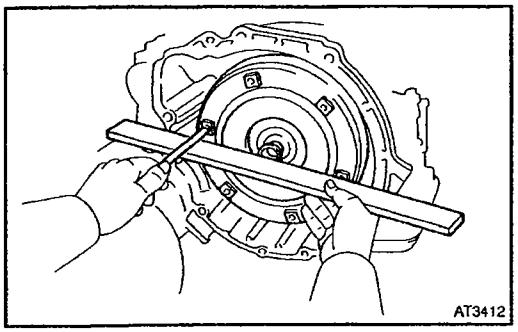
26. REMOVE OIL COOLER HOSE
Loosen the 2 clips and disconnect the 2 oil cooler hoses.
27. SUPPORT TRANSAXLE WITH A JACK



28. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT
Turn the crankshaft to gain access and remove the 6 bolts holding the crankshaft pulley set bolt with a wrench.
Torque: 41 N·m (418 kgf·cm, 30 ft·lbf)
HINT:
At the time of installation, please refer to the following item.
First install black colored bolt and then 5 other bolts.



29. REMOVE TRANSAXLE ASSEMBLY
(a) Remove the 4 bolts.
Torque:
A bolt: 46 N·m (470 kgf·cm, 34 ft·lbf)
B bolt: 23 N·m (230 kgf·cm, 17 ft·lbf)
(b) Separate the transaxle from engine, and lower the transaxle.


AT3412

AX0KQ-01

INSTALLATION

1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure the distance between the installed surface and the front surface of the transaxle housing.

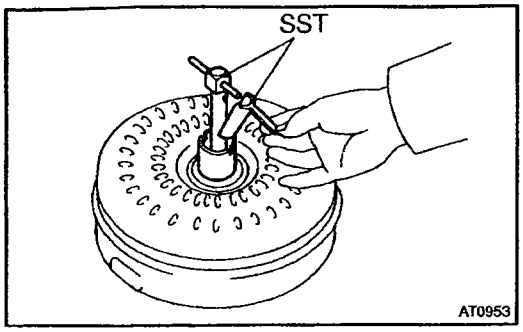
Correct distance: More than 13.3 mm (0.524 in.)

2. TRANSAXLE INSTALLATION

Installation is in the reverse order of removal (See page AX–31).

HINT:

- After installation, adjust the shift control cable and park/neutral position switch (See page DI–157).
- Fill ATF and check the fluid level (See page DI–157).
- Perform the test drive of the vehicle.
- Adjust the hood (See page BO–9).



TORQUE CONVERTER CLUTCH AND DRIVE PLATE

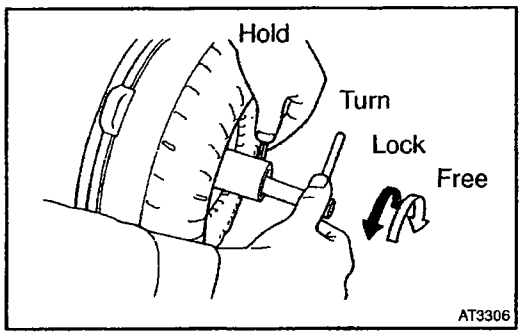
AX09X–02

INSPECTION

1. INSPECT ONE–WAY CLUTCH

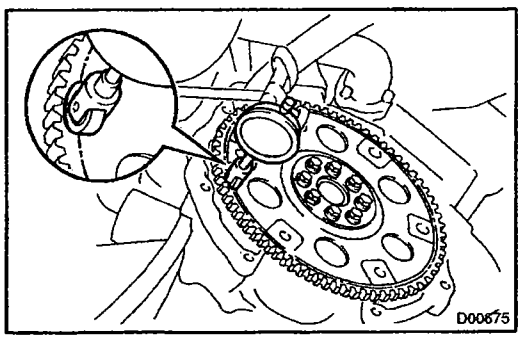
(a) Install SST into the inner race of the one–way clutch.
SST 09350–32014 (09351–32010)

(b) Install SST so that it fits in the notch of the converter hub and outer race of the one–way clutch.
SST 09350–32014 (09351–32020)



(c) With the torque converter clutch setting up on its side, check that the clutch locks when turned counterclockwise, and rotates smoothly clockwise.

If necessary, clean the converter and retest the clutch.
Replace the converter if the clutch still fails the test.



2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

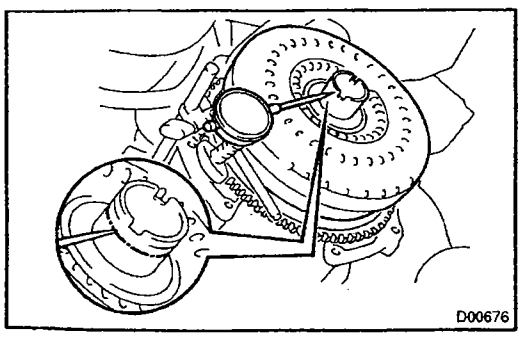
(a) Set up a dial indicator and measure the drive plate runout.

(b) Check the damage of the ring gear.

Maximum runout: 0.20 mm (0.0079 in.)

If the runout is not within the specification or ring gear is damaged, replace the drive plate.

Torque: 88 N·m (897 kgf·cm 65 ft·lbf)



3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

Temporarily mount the torque converter clutch on the drive plate. Set a dial indicator and measure the torque converter clutch sleeve runout.

Maximum runout: 0.30 mm (0.0118 in.)

If the runout is not within the specification, try to correct by reorienting the installation of the converter.

HINT:
Mark the position of the converter clutch to ensure the installation is correctly performed.

– MEMO –

AUTOMATIC TRANSAXLE (U341E)

AUTOMATIC TRANSAXLE SYSTEM AX–1
VEHICLE SPEED SENSOR AX–3
INPUT TURBIN SPEED SENSOR AX–4
ATF TEMPERATURE SENSOR AX–5
PARK/NEUTRAL POSITION (PNP) SWITCH AX–7
VALVE BODY ASSEMBLY AX–9
DIFFERENTIAL OIL SEAL AX–13
SHIFT LOCK SYSTEM AX–14
FLOOR SHIFT ASSEMBLY AX–16
AUTOMATIC TRANSAXLE UNIT AX–30
TORQUE CONVERTER CLUTCH AND DRIVE PLATE AX–36

AX

AUTOMATIC TRANSAXLE SYSTEM

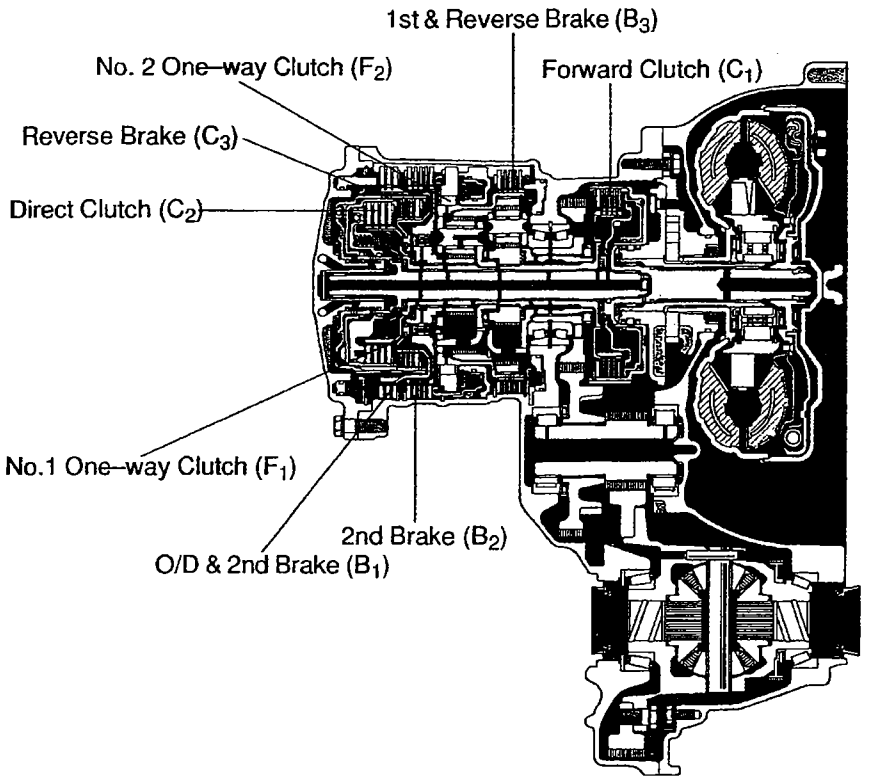
PRECAUTION

AX042-01

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

AX09J–02

OPERATION



○ ... Operating

Shift lever position	Gear position	C_1	C_2	C_3	B_1	B_2	B_3	F_1	F_2
P	Parking								
R	Reverse			○			○		
N	Neutral								
D	1st	○							○
	2nd	○				○		○	
	3rd	○	○			○			
	O/D		○		○	○			
2	1st	○							○
	2nd	○			○	○		○	
L	1st	○					○		○

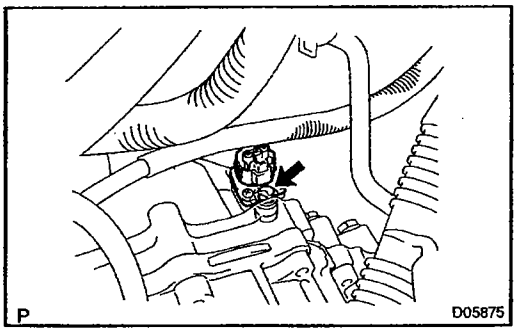
AX

VEHICLE SPEED SENSOR

AX0KU-01

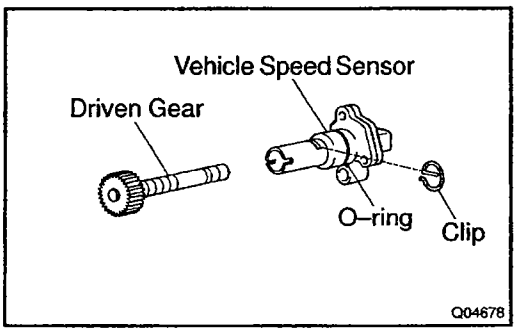
ON–VEHICLE REPAIR

1. **REMOVE BATTERY**
2. **REMOVE ECM AND ECM CASE**
3. **REMOVE ECM BRACKET**



4. **DISCONNECT VEHICLE SPEED SENSOR CONNECTOR**
5. **REMOVE VEHICLE SPEED SENSOR ASSEMBLY**

(a) Remove the bolt and vehicle speed sensor assembly.
(b) Remove the clip and speedometer driven gear from the vehicle speed sensor.
(c) Remove the O–ring from the vehicle speed sensor.



6. **INSTALL VEHICLE SPEED SENSOR ASSEMBLY**

(a) Coat a new O–ring with ATF and install it to the vehicle speed sensor.
(b) Install the speedometer driven gear to the vehicle speed sensor with clip.
(c) Install the vehicle speed sensor assembly with the bolt.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

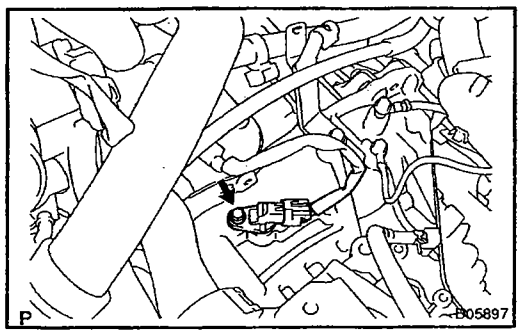
7. **CONNECT VEHICLE SPEED SENSOR CONNECTOR**
8. **INSTALL ECM BRACKET**
Torque:
Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)
9. **INSTALL ECM AND ECM CASE**
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
10. **INSTALL BATTERY**

INPUT TURBIN SPEED SENSOR

AX0PI-01

ON–VEHICLE REPAIR

1. **REMOVE BATTERY**
2. **REMOVE ECM AND ECM CASE**
3. **REMOVE ECM BRACKET**



4. **REMOVE INPUT TURBIN SPEED SENSOR**

(a) Disconnect the connector.

(b) Remove the bolt and input turbin speed sensor.

(c) Remove the O–ring from the input turbin speed sensor.

5. **INSTALL INPUT TURBIN SPEED SENSOR**

(a) Coat a new O–ring with ATF and install it to the input turbin speed sensor.

(b) Install the input turbin speed sensor with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

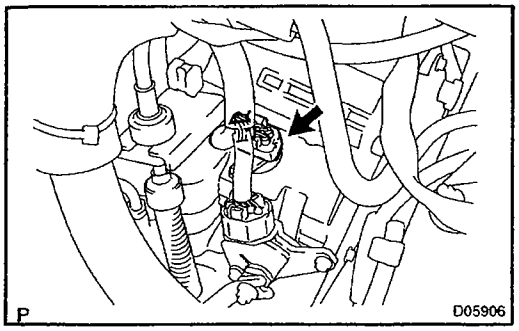
(c) Connect the connector.

6. **INSTALL ECM BRACKET**
Torque:
Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)

7. **INSTALL ECM AND ECM CASE**
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

8. **INSTALL BATTERY**

AX

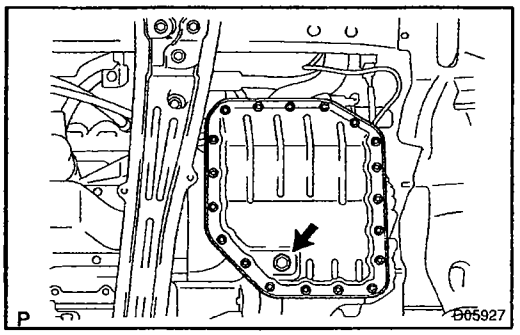


ATF TEMPERATURE SENSOR

AX0KW–01

ON–VEHICLE REPAIR

1. **DISCONNECT SOLENOID CONNECTOR**
2. **REMOVE LH ENGINE UNDER COVER**

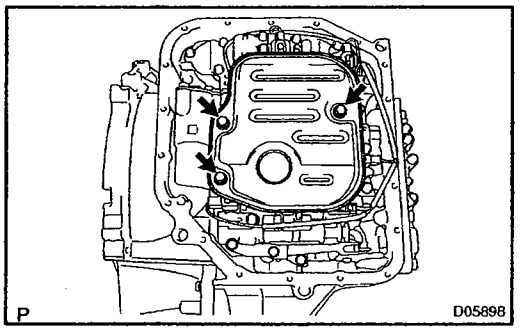


3. **REMOVE DRAIN PLUG AND DRAIN ATF**
4. **REMOVE OIL PAN AND GASKET**

NOTICE:

Some fluid will remain in the oil pan.

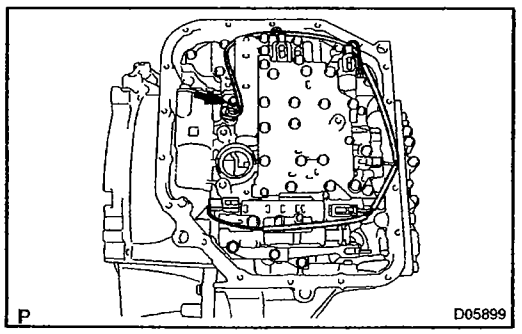
Remove the 19 bolts, and carefully remove the oil pan assembly. Discard the gasket.



5. **REMOVE OIL STRAINER**

(a) Remove the 3 bolts and oil strainer.

(b) Remove the O–ring.



6. **DISCONNECT 5 SHIFT SOLENOID VALVE CONNECTORS**
7. **REMOVE ATF TEMPERATURE SENSOR**

(a) Remove the bolt and lock plate, and remove the ATF temperature sensor.

(b) Remove the O–ring from the ATF temperature sensor.

8. **INSTALL ATF TEMPERATURE SENSOR**

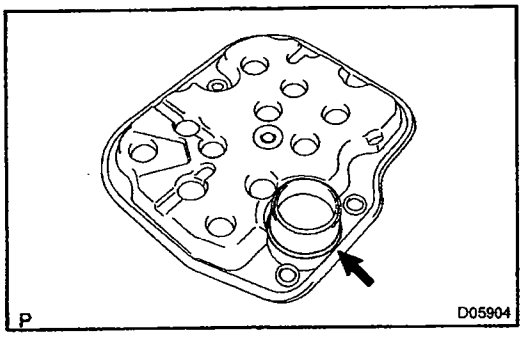
(a) Coat a new O–ring with ATF and it to the direct clutch speed sensor.

(b) Install the ATF temperature sensor with the lock plate and bolt.

Torque: 10 N·m (110 kgf·cm, 8 ft·lbf)

9. **CONNECT 5 SHIFT SOLENOID VALVE CONNECTORS**

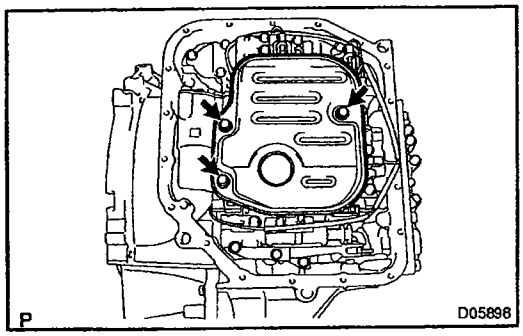
A



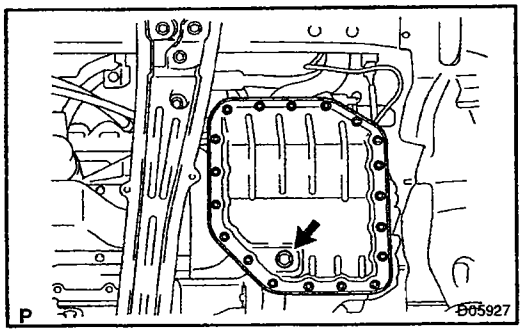
10. INSTALL OIL STRAINER

(a) Coat a new O–ring with ATF.

(b) Install the O–ring to the oil strainer.



(c) Install the oil strainer with the 3 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

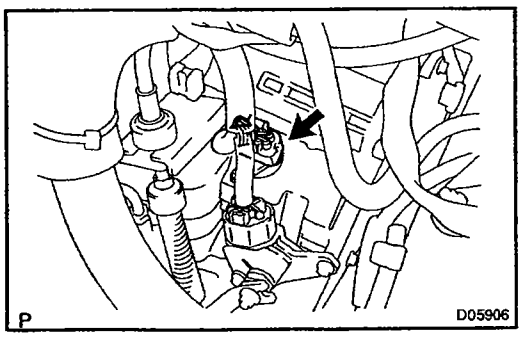


11. INSTALL OIL PAN

Install the oil pan and a new gasket with the 19 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

12. INSTALL DRAIN PLUG

Install a new gasket and drain plug.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

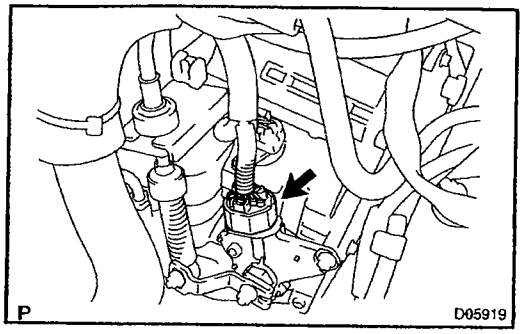


13. CONNECT SOLENOID CONNECTOR

14. FILL ATF AND CHECK ATF LEVEL
(See page DI–220)

15. INSTALL LH ENGINE UNDER COVER

AX

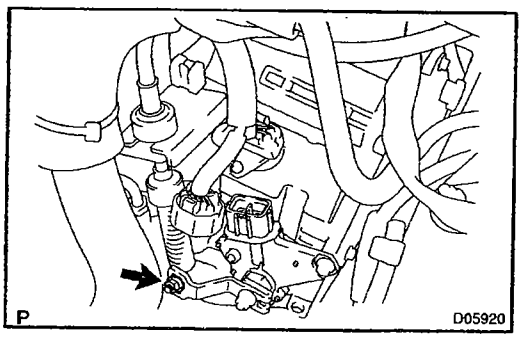


PARK/NEUTRAL POSITION (PNP) SWITCH

ON–VEHICLE REPAIR

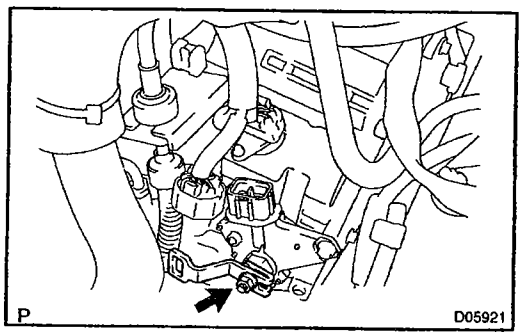
AX01CX–01

1. **REMOVE AIR CLEANER ASSEMBLY**
2. **DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR**

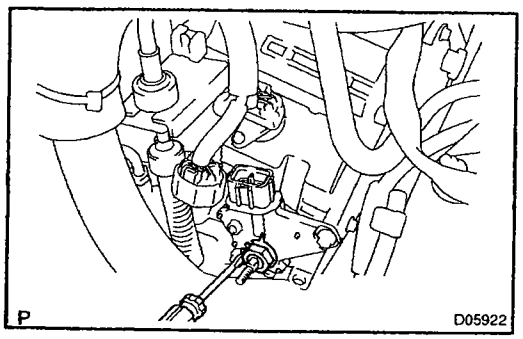


3. **REMOVE PARK/NEUTRAL POSITION SWITCH**

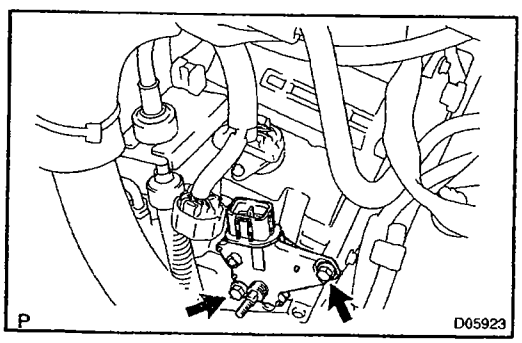
(a) Remove the nut.



(b) Remove the nut, washer and control shift lever.



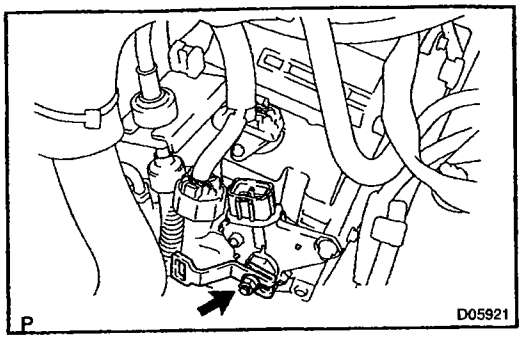
(c) Using a screwdriver, pry off the lock plate.
(d) Remove the nut and lock plate.



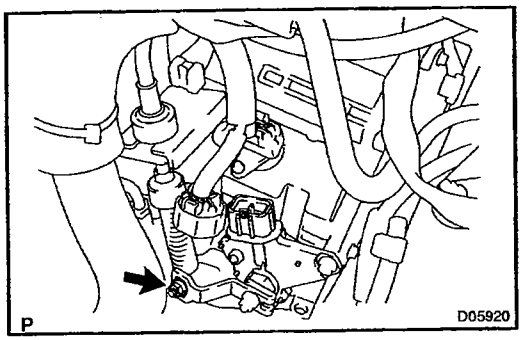
(e) Remove the 2 bolts and pull out the park/neutral position switch.

4. **INSTALL AND ADJUST PARK/NEUTRAL POSITION SWITCH**

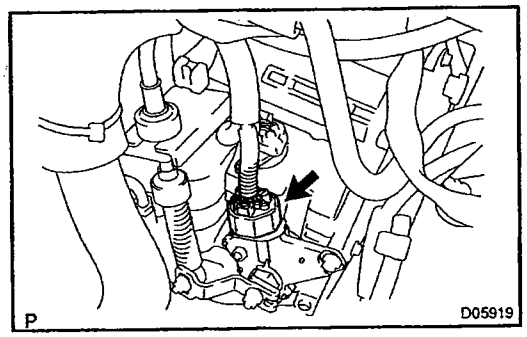
(a) Install the park/neutral position switch with the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(b) Install a new lock plate and nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
(c) Bend the claws on the lock plate to fix the nut.



(d) Install the control shift lever with the nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



(e) Connect the shift control cable to the control shaft.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



5. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

6. CHECK PARK/NEUTRAL POSITION OPERATION

Check that the engine can be started with the shift lever only in the N or P position, but not in other position.

If the engine can not be stated not as started above, carry out the adjustment procedure (See page DI–220).

7. INSTALL AIR CLEANER ASSEMBLY

8. TEST DRIVE VEHICLE

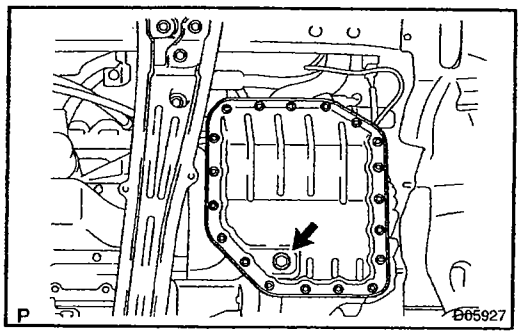
AX

VALVE BODY ASSEMBLY

ON–VEHICLE REPAIR

AX0KK–02

1. REMOVE LH ENGINE UNDER COVER



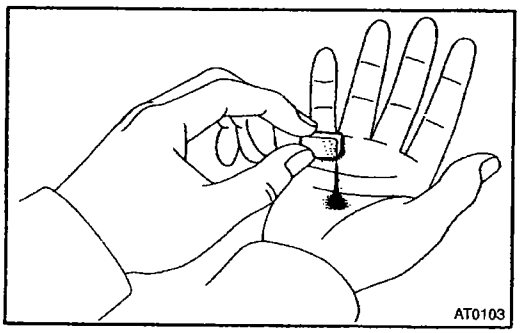
2. REMOVE DRAIN PLUG AND DRAIN ATF

3. REMOVE OIL PAN AND GASKET

NOTICE:

Some fluid will remain in the oil pan.

Remove the 19 bolts, and carefully remove the oil pan assembly. Discard the gasket.

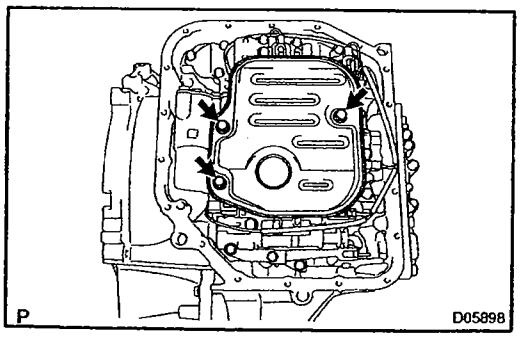


4. EXAMINE PARTICLES IN OIL PAN

Remove the magnets and use them to collect any steel chips. Look carefully at the chips and particles in the pan and on the magnet to anticipate what type of wear you will find in the transaxle.

Steel (magnetic)...bearing, gear and plate wear

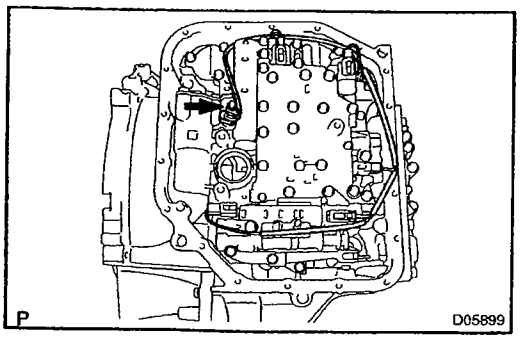
Brass (non–magnetic)... bushing wear



5. REMOVE OIL STRAINER

(a) Remove the 3 bolts and oil strainer.

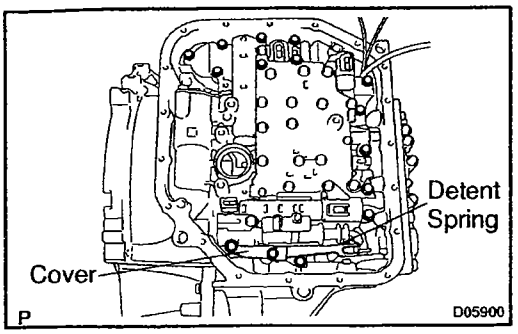
(b) Remove the O–ring.



6. DISCONNECT 5 SHIFT SOLENOID VALVE CONNECTORS

7. REMOVE ATF TEMPERATURE SENSOR

Remove the bolt and lock plate, and remove the ATF temperature sensor.



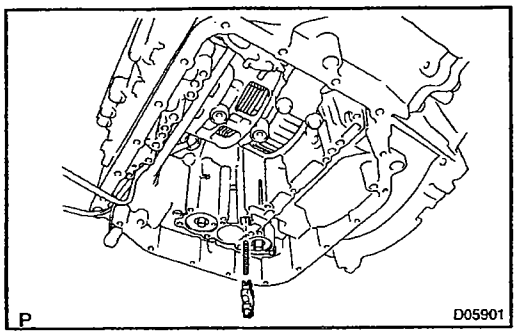
8. REMOVE VALVE BODY

(a) Remove the 3 bolts, cover and detent spring.

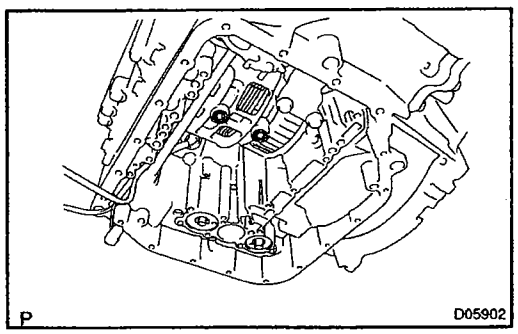
(b) Remove the 12 bolts and valve body.

NOTICE:

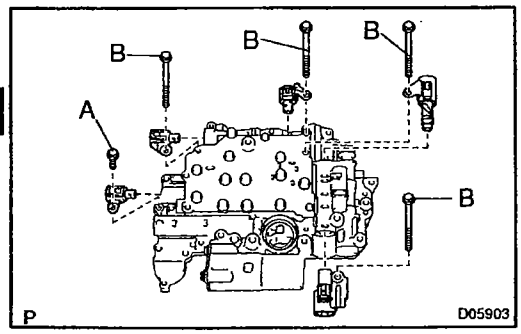
Be careful not to drop the check valve body, spring and accumulator piston.



9. REMOVE CHECK BALL BODY AND SPRING



10. REMOVE 2 APPLY GASKETS



11. REMOVE SHIFT SOLENOID VALVE

Remove the 5 bolts and 5 shift solenoid valves.

12. INSTALL SHIFT SOLENOID VALVE

Install the 5 shift solenoid valves with the 5 bolts.

Torque:

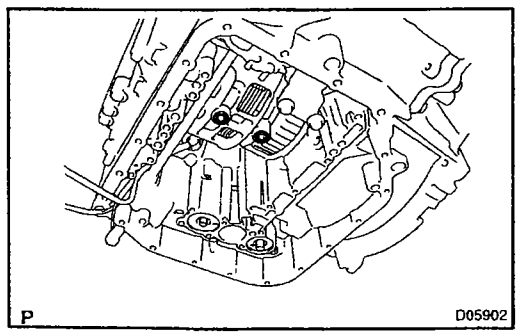
Bolt A: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

Bolt B: 11 N·m (110 kgf·cm, 8 ft·lbf)

Bolt length:

Bolt A: 14 mm (0.55 in.)

Bolt B: 55 mm (2.17 in.)

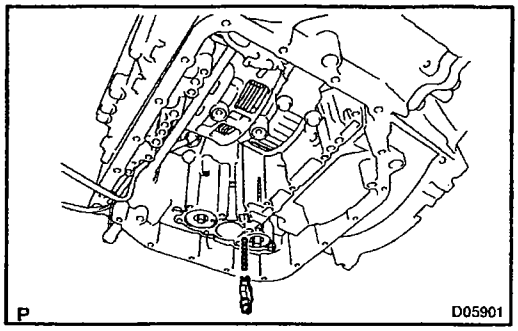


13. INSTALL APPLY GASKET

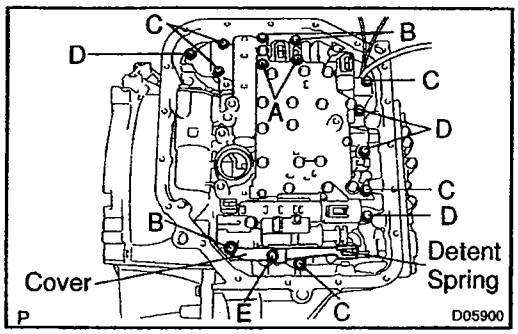
(a) Coat 2 new apply gaskets with ATF.

(b) Install the gaskets to the transaxle case.

AX



14. INSTALL CHECK VALVE AND SPRING



15. INSTALL VALVE BODY

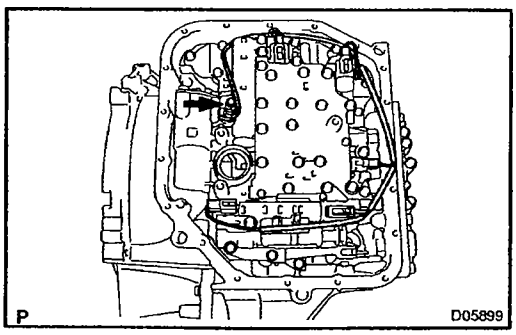
(a) Align the groove of the manual valve with the pin of the manual valve lever.

(b) Temporarily install the valve body with the 12 bolts.
Bolt length:
Bolt A: 55 mm (2.17 in.)
Bolt B: 45 mm (1.77 in.)
Bolt C: 32 mm (1.26 in.)
Bolt D: 22 mm (0.87 in.)

(c) Temporarily install the detent spring and cover with the 3 bolts.
Bolt length:
Bolt B: 45 mm (1.77 in.)
Bolt C: 32 mm (1.26 in.)
Bolt E: 14 mm (0.55 in.)

(d) Check that the manual valve lever contacts the center of the roller at the tip of the detent spring.

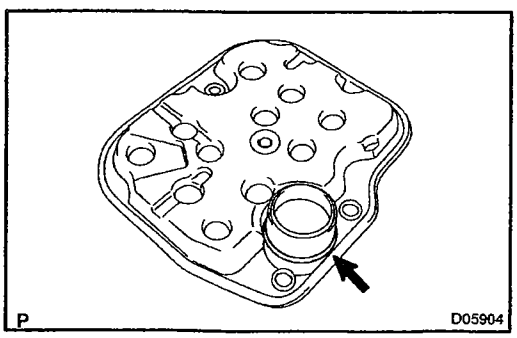
(e) Tighten the 15 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



16. INSTALL ATF TEMPERATURE SENSOR

Install the ATF temperature sensor with the lock plate and bolt.
Torque: 10 N·m (100 kgf·cm, 8 ft·lbf)

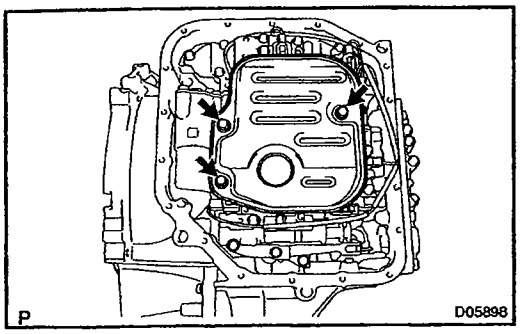
17. CONNECT 5 SHIFT SOLENOID VALVE CONNECTORS



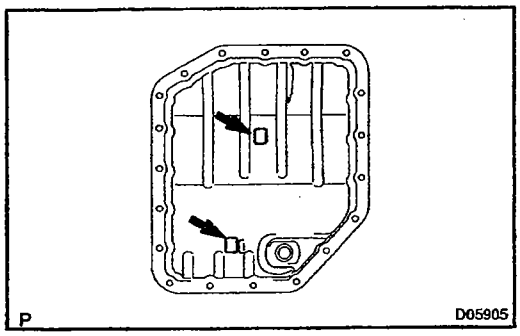
18. INSTALL OIL STRAINER

(a) Coat a new O–ring with ATF.

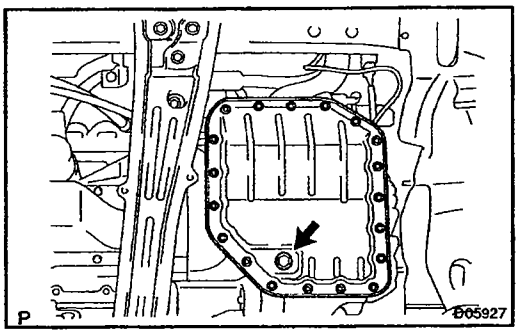
(b) Install the O–ring to the oil strainer.



(c) Install the oil strainer with the 3 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



19. INSTALL MAGNET IN OIL PAN
Install the 2 magnets in the oil pan, as shown in the illustration.



20. INSTALL OIL PAN
Install the oil pan and a new gasket with the 19 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

21. INSTALL DRAIN PLUG
Install a new gasket and drain plug.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

22. FILL ATF AND CHECK ATF LEVEL
(See page DI–220)

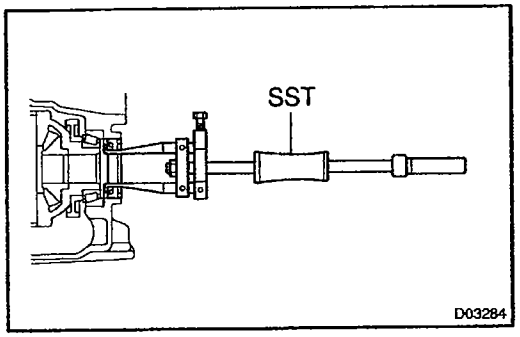
23. INSTALL LH ENGINE UNDER COVER

DIFFERENTIAL OIL SEAL

AX0KZ-01

ON–VEHICLE REPAIR

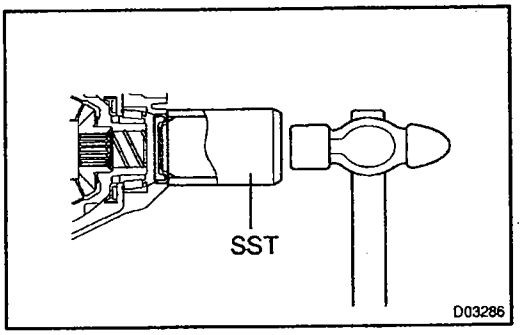
1. **DRAIN ATF FROM FRONT DIFFERENTIAL CASE**
2. **REMOVE LH AND RH DRIVE SHAFTS**
   (See page SA–20)



3. **REMOVE LH AND RH SIDE OIL SEAL**

Using SST, drive out both the side oil seals.

SST 09308–10010



4. **INSTALL LH AND RH SIDE OIL SEAL**

(a) Using SST and a hammer, drive in a new oil seal.

SST 09223–00010

Oil seal drive in depth:

LH side: 2.7 ± 0.5 mm (0.106 ± 0.020 in.)

RH side: 0 ± 0.5 mm (0 ± 0.020 in.)

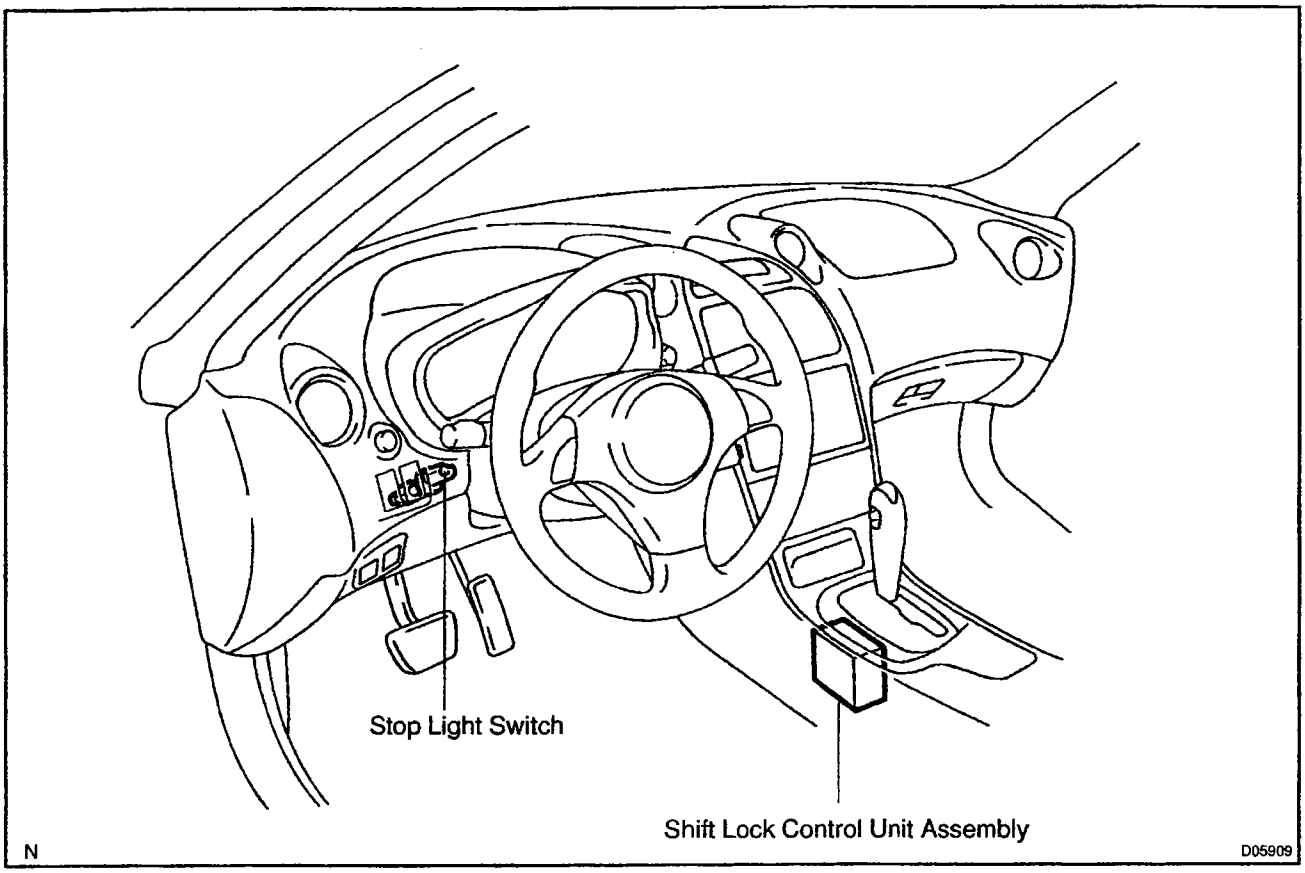
(b) Coat the oil seal lip with MP grease.

5. **INSTALL LH AND RH DRIVE SHAFTS**
   (See page SA–32)
6. **FILL ATF AND CHECK ATF LEVEL**
   (See page DI–220)

SHIFT LOCK SYSTEM

COMPONENTS

AX0LO–01



AX0L1-01

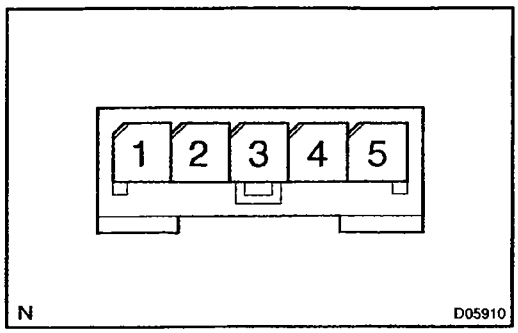
INSPECTION

INSPECT SHIFT LOCK CONTROL UNIT ASSEMBLY

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the shift lock control unit assembly connector.

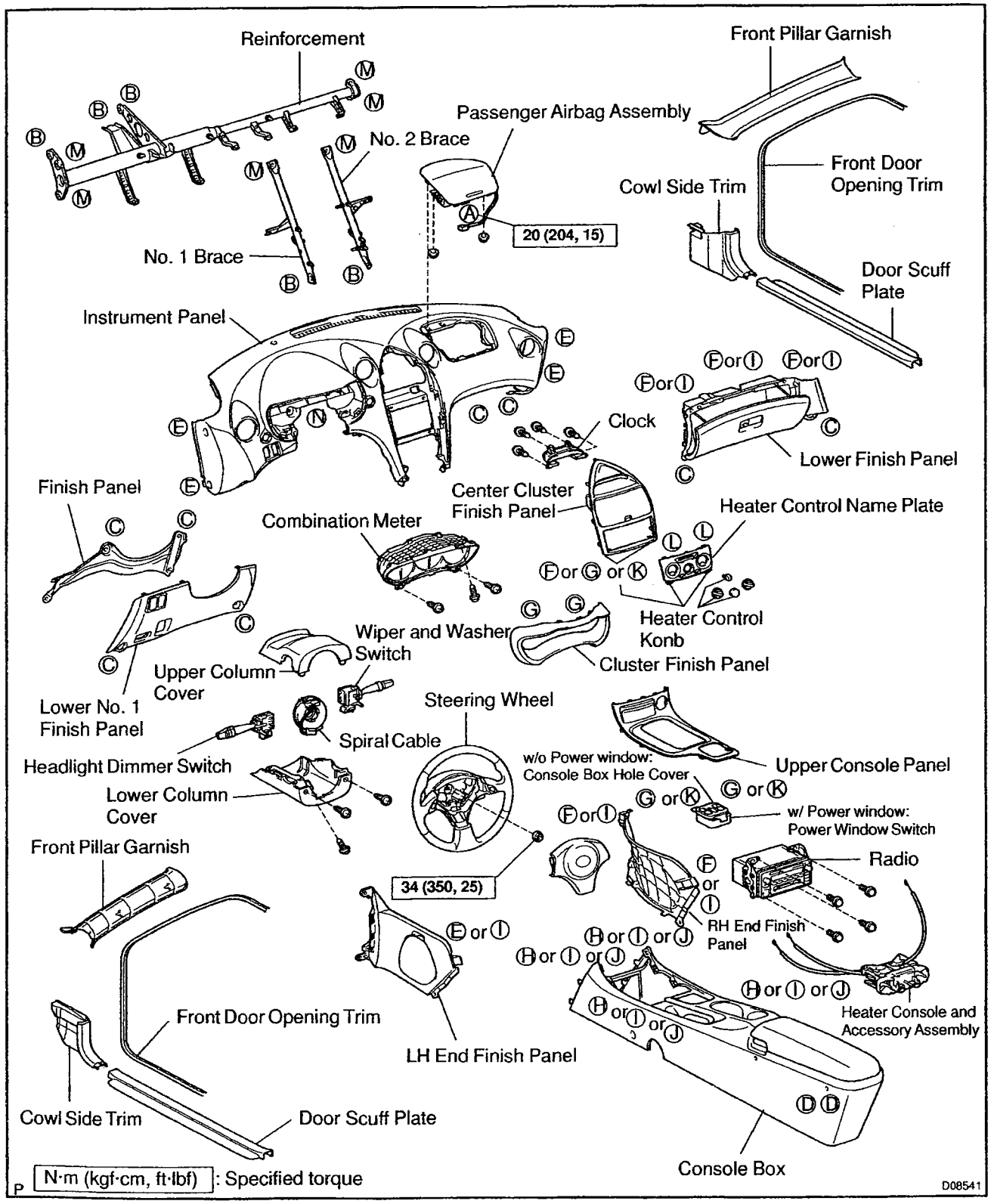


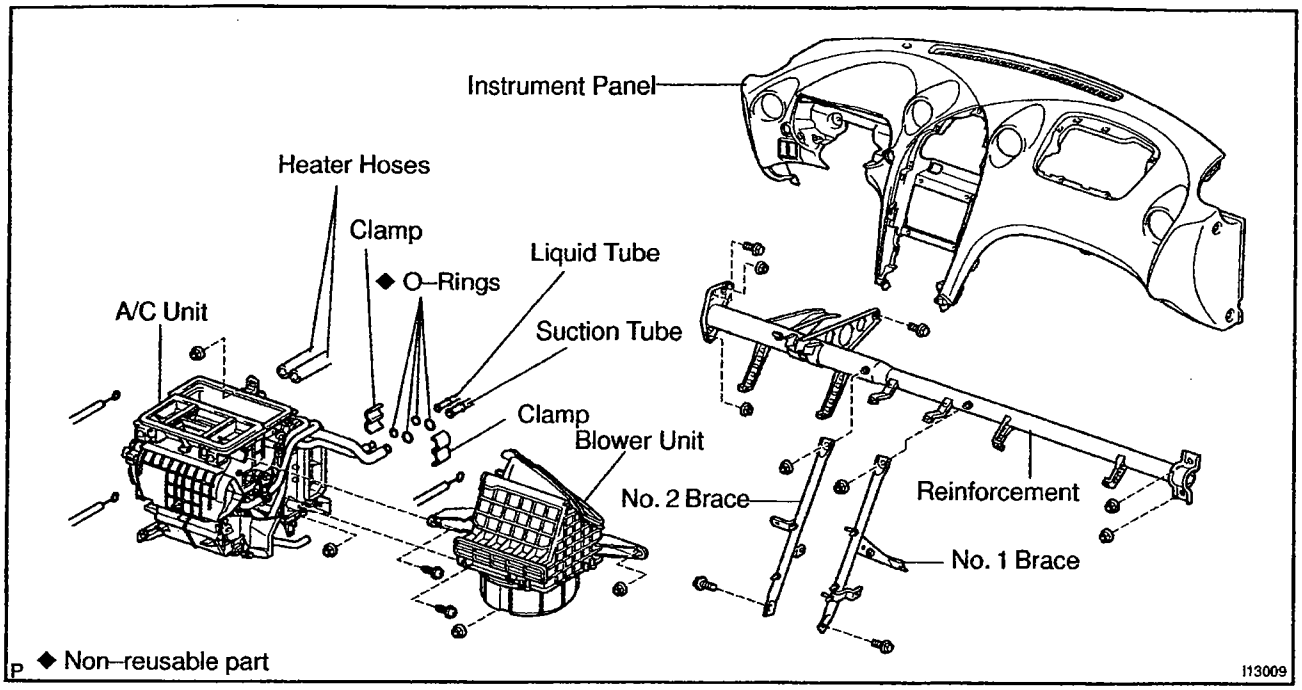
Terminal	Measuring Condition	Voltage (V)
5 – 1 (IG – E)	Ignition switch ON	10 – 14
3 – 1 (STP – E)	Depressing brake pedal	10 – 14

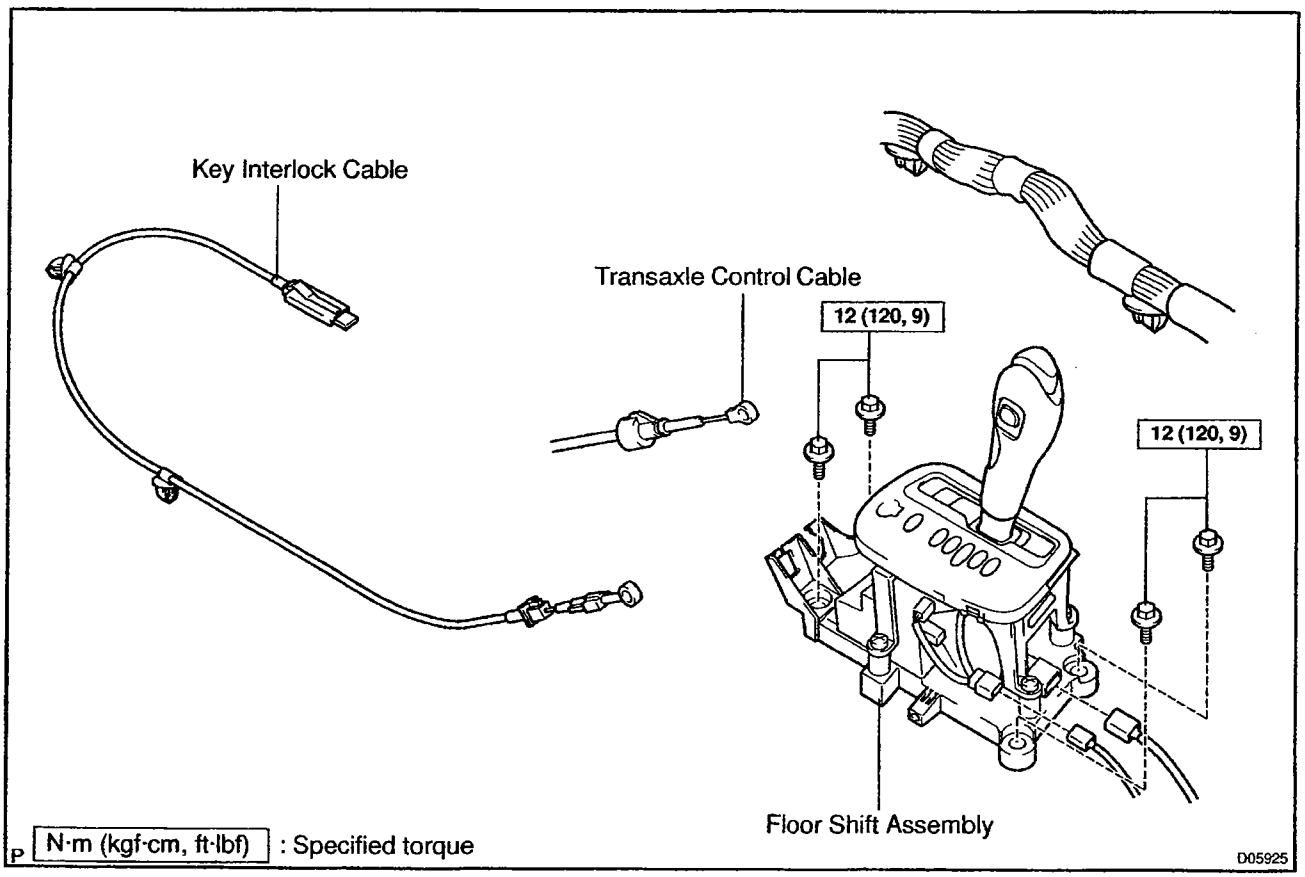
FLOOR SHIFT ASSEMBLY

AX0LB-01

COMPONENTS

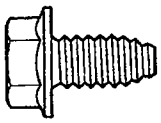
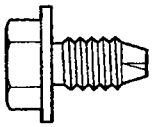
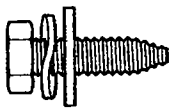
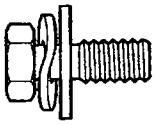
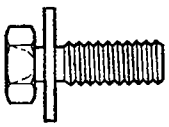
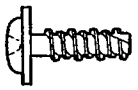
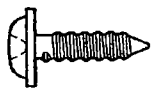
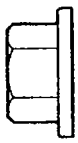
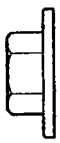



Instrument Panel
Heater Hoses
Clamp
◆ O–Rings
Liquid Tube
A/C Unit
Suction Tube
Clamp
Blower Unit
No. 2 Brace
Reinforcement
No. 1 Brace
◆ Non–reusable part
I13009


Key Interlock Cable
Transaxle Control Cable
12 (120, 9)
12 (120, 9)
Floor Shift Assembly
N·m (kgf·cm, ft·lbf) : Specified torque
D05925

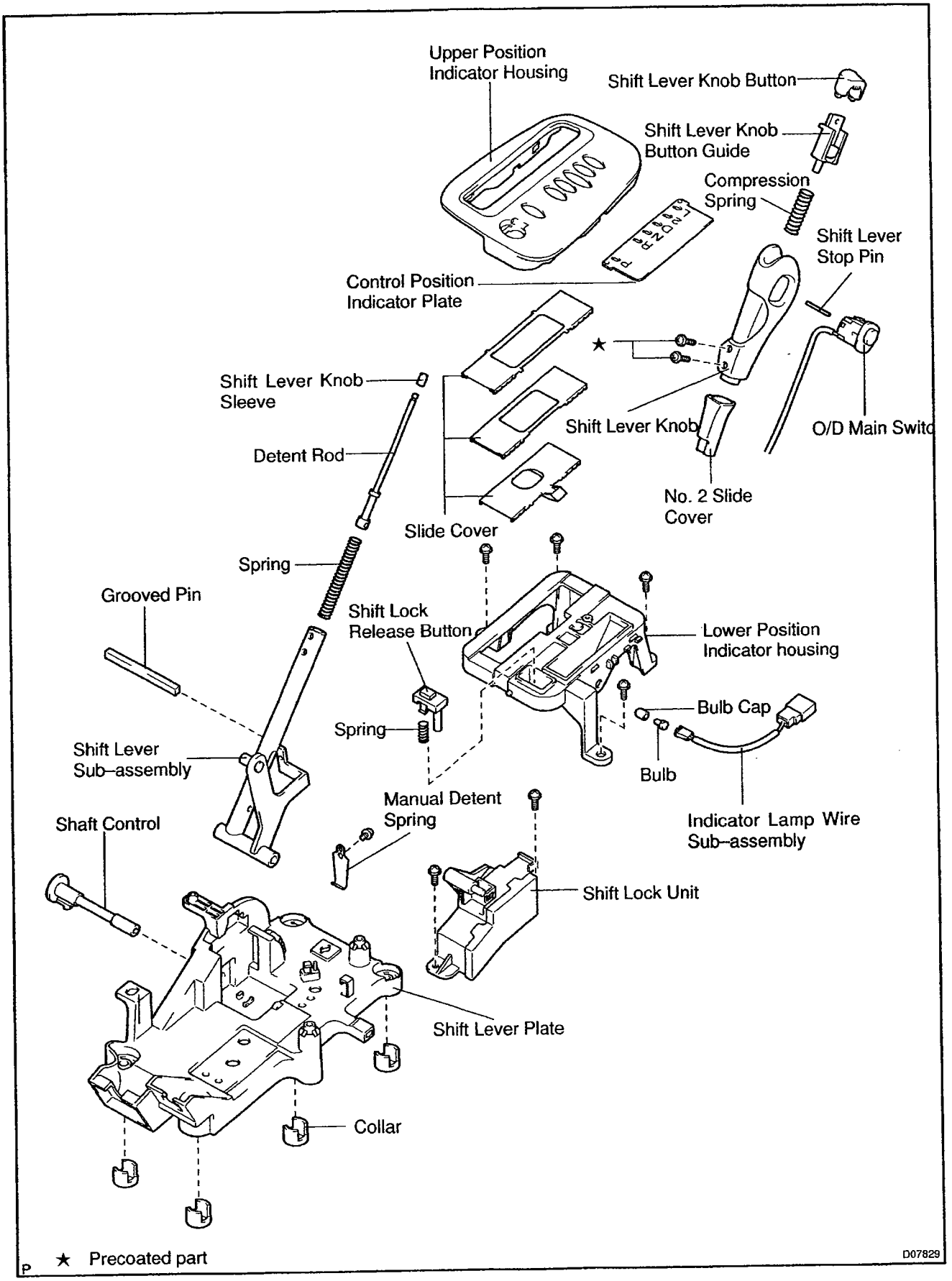
HINT:
Screw shapes and sizes are indicated in the table below. The codes ("A" – "N") correspond to those indicated on the previous page.

mm (in.)

	Shape	Size		Shape	Size		Shape	Size
Ⓐ		ø = 8 (0.32) L = 16 (0.63)	Ⓑ		ø = 8 (0.32) L = 15 (0.59)	Ⓒ		ø = 6 (0.24) L = 22 (0.87)
Ⓓ		ø = 6 (0.24) L = 16 (0.63)	Ⓔ		ø = 6 (0.24) L = 18 (0.71)	Ⓕ		ø = 5.22 (0.2055) L = 16 (0.63)
Ⓖ		ø =5.22 (0.2055) L = 16 (0.63)	Ⓗ		ø = 5 (0.20) L = 18 (0.71)	Ⓘ		ø = 5 (0.20) L = 16 (0.63)
Ⓙ		ø = 5 (0.20) L = 16 (0.63)	Ⓚ		ø = 5 (0.20) L = 14 (0.55)	Ⓛ		ø = 4 (0.16) L = 16 (0.63)
Ⓜ		ø = 8 (0.32)	Ⓝ		ø = 6 (0.24)			

P

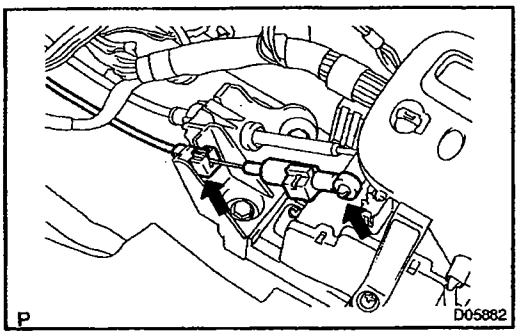
H12659


Upper Position Indicator Housing
Shift Lever Knob Button
Shift Lever Knob Button Guide
Compression Spring
Shift Lever Stop Pin
Control Position Indicator Plate
Shift Lever Knob Sleeve
Detent Rod
Shift Lever Knob
O/D Main Switc
No. 2 Slide Cover
Slide Cover
Spring
Grooved Pin
Shift Lock Release Button
Lower Position Indicator housing
Bulb Cap
Spring
Bulb
Shift Lever Sub–assembly
Manual Detent Spring
Indicator Lamp Wire Sub–assembly
Shaft Control
Shift Lock Unit
Shift Lever Plate
Collar
★ Precoated part
D07829

AX0L6-02

REMOVAL

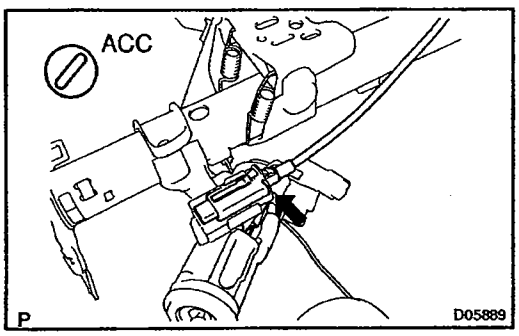
1. **REMOVE INSTRUMENT PANEL (See page BO–79)**
2. **REMOVE AIR CONDITIONING UNIT (See page AC–26)**



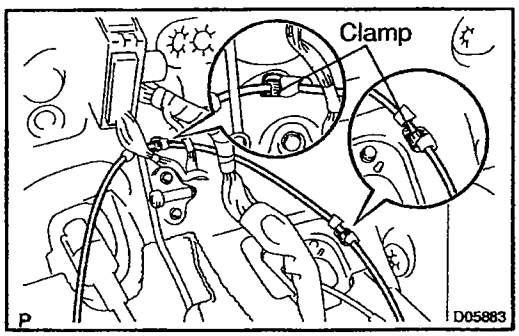
3. **REMOVE KEY INTERLOCK CABLE**

(a) Remove the cable end from the rod of the floor shift assembly.

(b) Pull out the cable while pressing the clip of the key interlock cable.



(c) With the key in ACC, remove the cable cap claw from the key interlock and pull it.

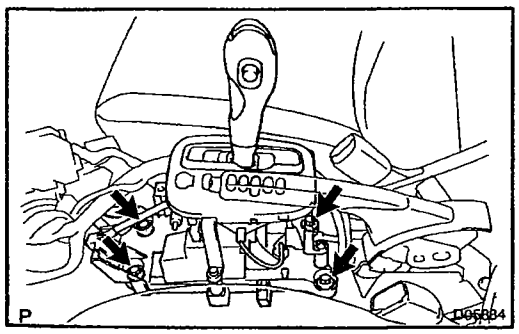


(d) Disconnect the 2 key interlock cable clamps.

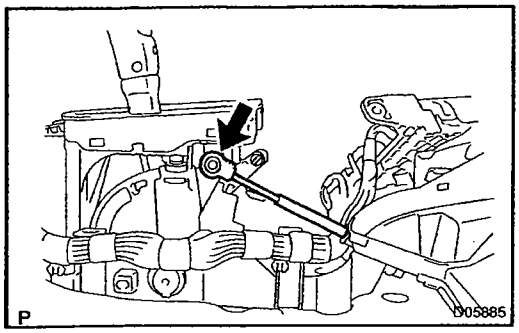
4. **REMOVE FLOOR SHIFT ASSEMBLY**

(a) Disconnect the 2 connectors.

(b) Disconnect the 2 wire harness clamps from the floor shift assembly.



(c) Remove the 4 bolts from the floor shift assembly.



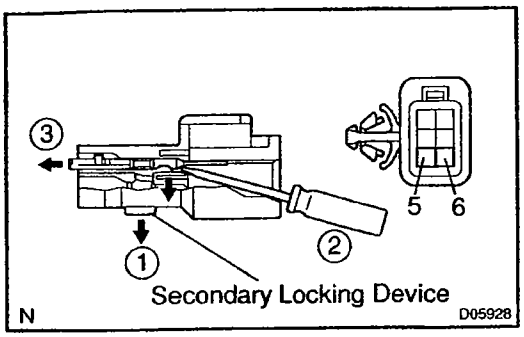
(d) Remove the cable end from the rod of the floor shift assembly.

(e) Pull out the cable while pressing the clip of the transaxle control cable.

(f) Remove the floor shift assembly.

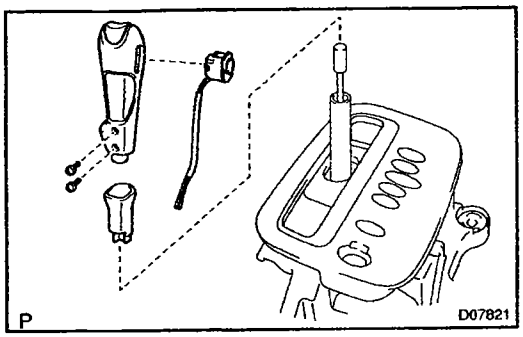
AX0LC-01

DISASSEMBLY



1. REMOVE O/D MAIN SWITCH TERMINAL

(a) Remove the O/D main switch connector from the shift lever plate.
(b) Disengage the secondary locking device.
(c) Release the locking log of the terminals 5 and 6, and pull the terminals out from the rearward.



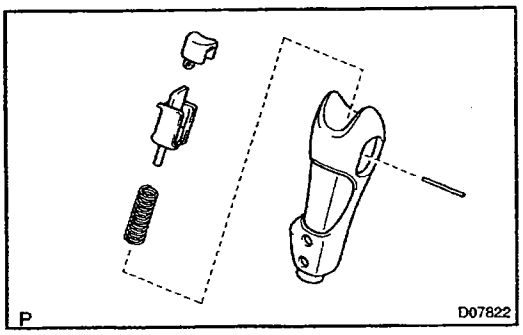
2. REMOVE SHIFT LEVER KNOB SUB–ASSEMBLY

(a) Remove the 2 screws and shift lever knob sub–assembly.

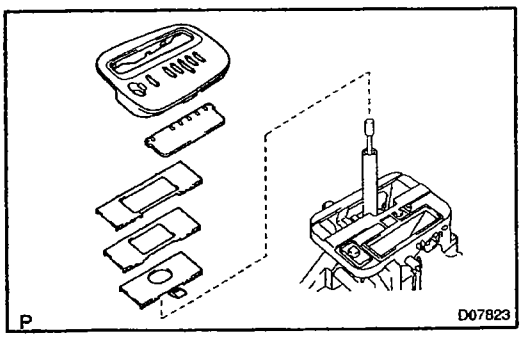
NOTICE:

Pay attention not to apply unnatural load to O/D main switch wire harness.

(b) Remove the O/D main switch.
(c) Remove the No. 2 slide cover.

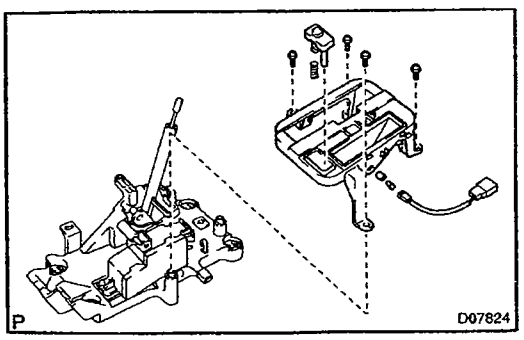


(d) Remove the shift lever stop pin, shift lever knob button, shift lever knob button guide and compression spring.



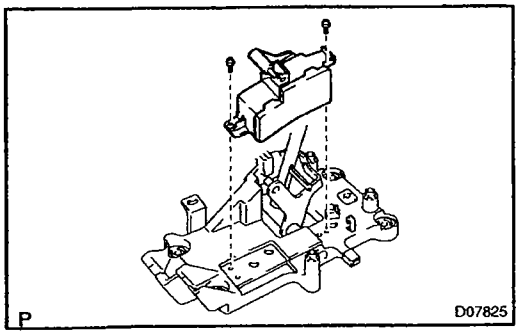
3. REMOVE UPPER POSITION INDICATOR HOUSING

(a) Remove the upper position indicator housing.
(b) Remove the control position indicator plate.
(c) Remove the 3 slide covers from the lower position indicator housing.



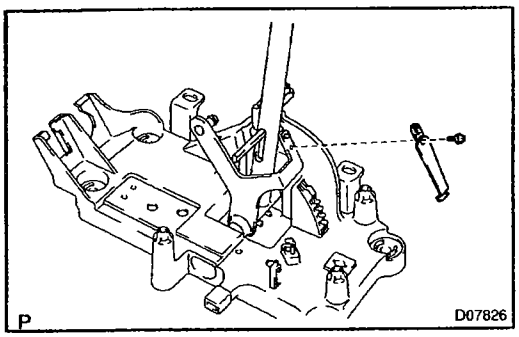
4. REMOVE LOWER POSITION INDICATOR HOUSING

(a) Remove the indicator lamp wire sub–assembly.
(b) Remove the 4 screws and lower position indicator housing.
(c) Remove the bulb cap and bulb from the indicator lamp wire sub–assembly.
(d) Remove the shift lock release button and spring.

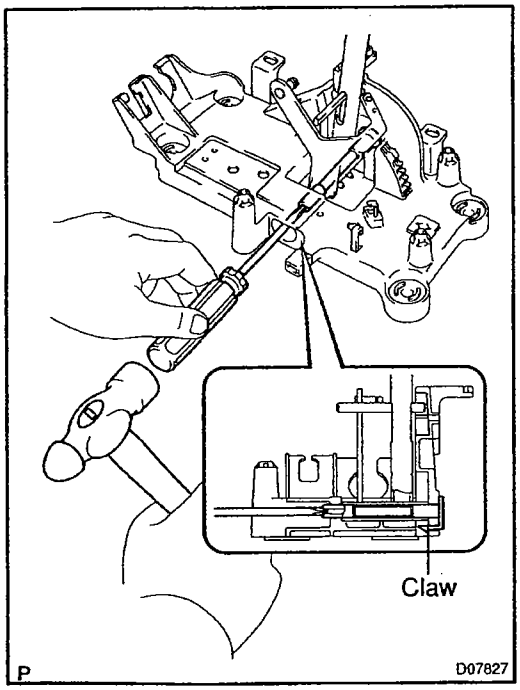


5. REMOVE SHIFT LOCK UNIT

Remove the 2 screws and shift lock unit.

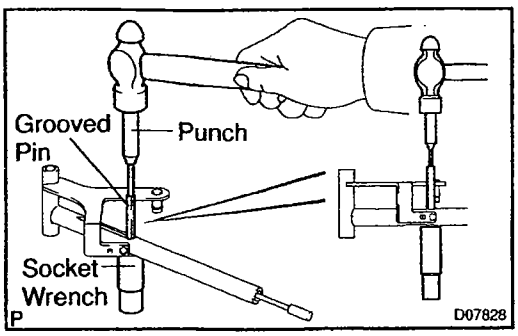


6. REMOVE SCREW AND MANUAL DETENT SPRING



7. REMOVE SHIFT LEVER SUB–ASSEMBLY

Using a screwdriver and hammer, drive off the shaft control while disengaging the claw of the shaft control and remove the shift lever sub–assembly.



8. REMOVE DETENT ROD

(a) Set a 14 mm deep socket wrench.
(b) Using a punch and hammer, remove the grooved pin.
(c) Remove the detent rod and spring.
(d) Remove the shift lever knob sleeve from the detent rod.

9. REMOVE COLLARS

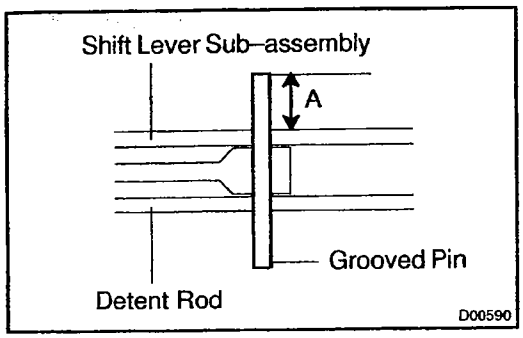
Using a screwdriver and hammer, remove the 4 collars.

AX0LD–01

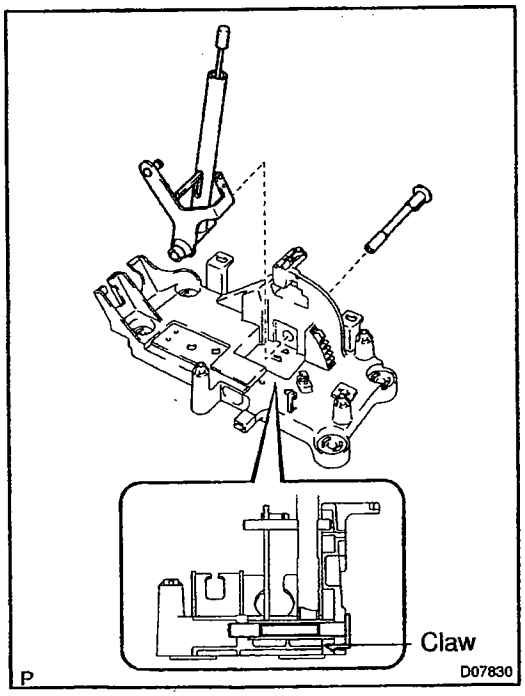
REASSEMBLY

1. **INSTALL 4 COLLARS**
2. **INSTALL DETENT ROD**

(a) Install the shift lever knob sleeve to the detent rod.
(b) Apply MP grease on the detent rod and spring.
(c) Install the spring and detent rod.



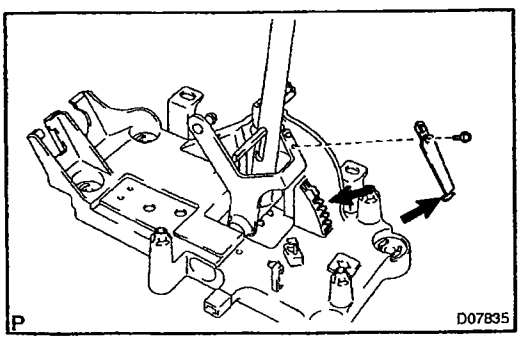
(d) Using a punch and hammer, install the grooved pin to the detent rod pin hole.
A: 8.0 ± 0.2 mm (0.315± 0.008 in.)
(e) Check the detent rod operation.



3. **INSTALL SHIFT LEVER SUB–ASSEMBLY**

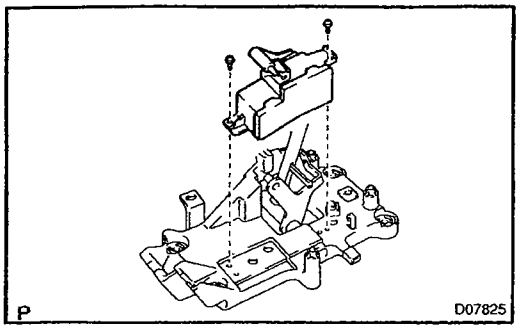
(a) Apply MP grease on the spring.
(b) Install the shift lever sub–assembly and shaft control to shift lever plate.

HINT:
Check that the claw of the shaft control is fit onto the shift lever plate.



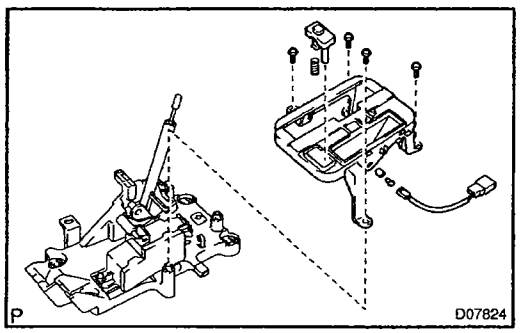
4. **INSTALL MANUAL DETENT SPRING AND SCREW**

(a) Apply MP grease to the parts indicated by the arrows manual detent spring and shift lever plate in the illustration.
(b) Install the manual detent spring with the screw.



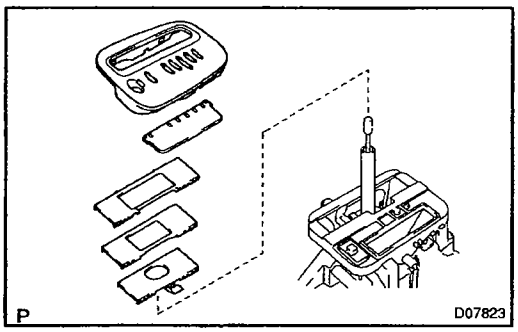
5. INSTALL SHIFT LOCK UNIT

Install the shift lock unit with the 2 screws.



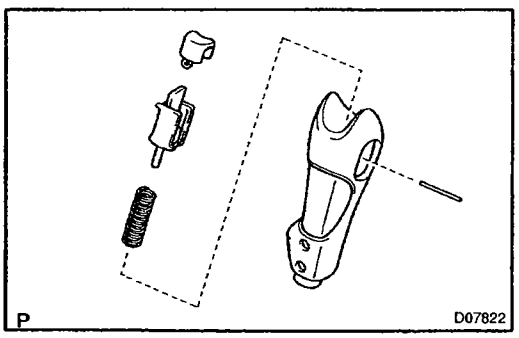
6. INSTALL LOWER POSITION INDICATOR HOUSING

(a) Apply MP grease on the spring.
(b) Install the spring and shift lock release button.
(c) Install the bulb and bulb cap to the indicator lamp wire sub–assembly.
(d) Install the lower position indicator housing with the 4 screws.
(e) Install the indicator lamp wire sub–assembly.



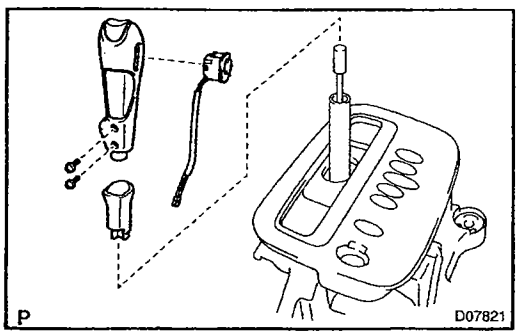
7. INSTALL UPPER POSITION INDICATOR HOUSING

(a) Install the 3 slide covers to the lower position indicator housing, as shown in the illustration.
(b) Install the control position indicator plate.
(c) Install the upper position indicator housing.



8. INSTALL SHIFT LEVER KNOB SUB–ASSEMBLY

(a) Apply MP grease on the compression spring.
(b) Install the compression spring, shift lever knob button guide, shift lever knob button and shift lever stop pin.



(c) Install the No. 2 slide cover.
(d) Install the O/D main switch
(e) Install the shift lever knob sub–assembly with the 2 screws.

HINT:

Coat the threads of screws with sealant.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

NOTICE:

Make sure not to catch O/D main switch wire harness.

9. INSTALL O/D MAIN SWITCH TERMINAL

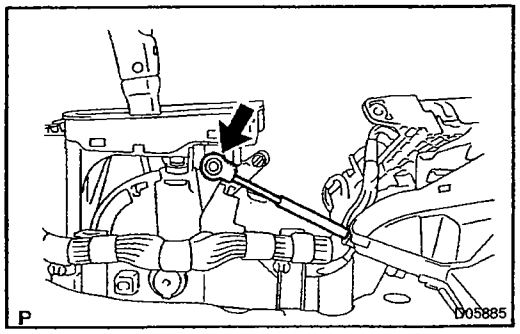
(a) Connect the 2 O/D main switch terminals to the connector.

(b) Connect the connector to the shift lever plate.

AX0L7-02

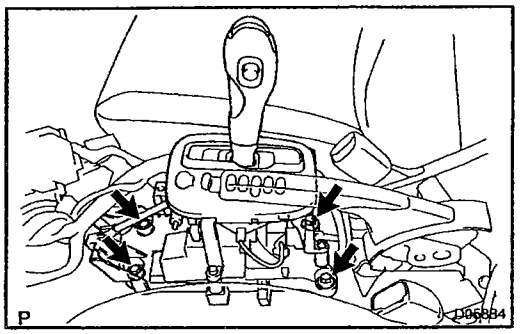
INSTALLATION

1. INSTALL FLOOR SHIFT ASSEMBLY



(a) Pull in the cable while pressing the clip of the transaxle control cable to the floor shift assembly.

(b) Install the cable end from the rod of the floor shift assembly.

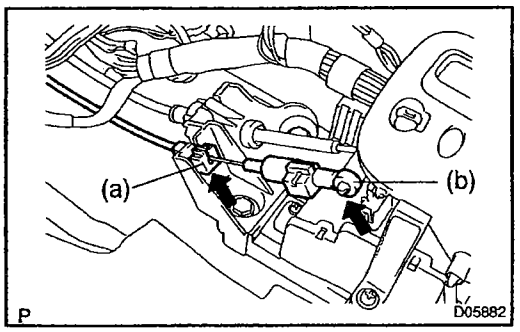


(c) Install the floor shift assembly with the 4 bolts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(d) Connect the 2 wire harness clamps from the floor shift assembly.

(e) Connect the 2 connector.

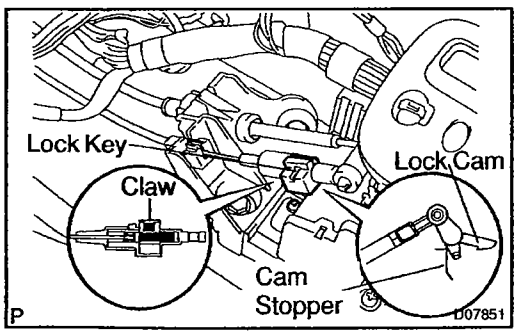
2. INSTALL KEY INTERLOCK CABLE



(a) Pass the key interlock cable end through the hole in the floor shift assembly.

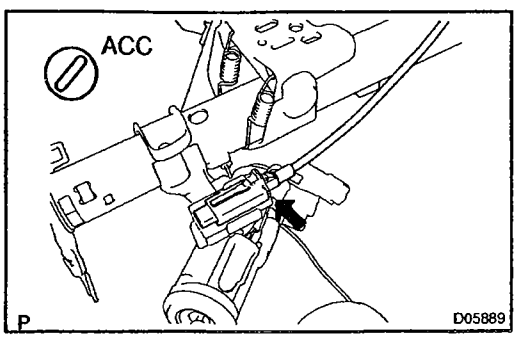
HINT:
Make sure that the claws shown by the arrow in the illustration are locked.

(b) With the shift lever in N position, set the hole of the cable end to the floor shift assembly to assemble them.

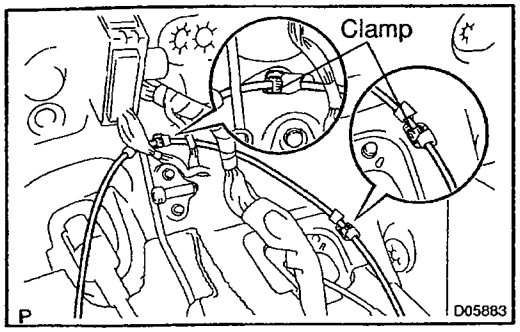


(c) At the time of reassembly:
With the key in ACC, push a claw into lock key.
At this time, be careful not to apply undue force on bending to the cable (Cable length adjustment is completed).

HINT:
Check that the key lock cam is contact with the cam stopper.



(d) With the key in ACC, install the cable cap claw to the key interlock.



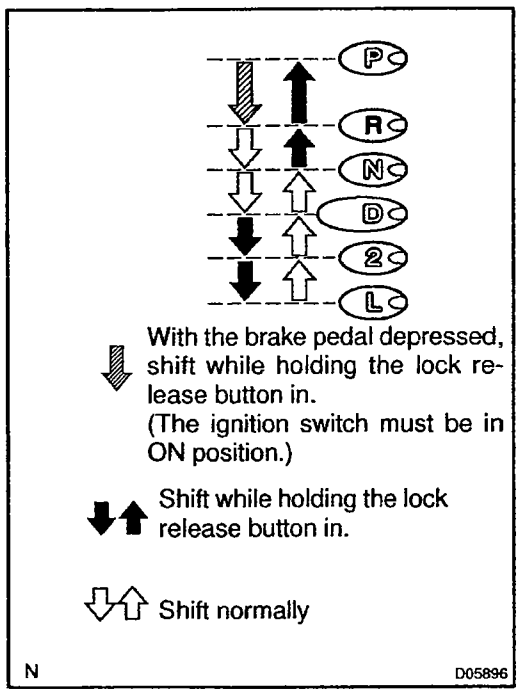
(e) Connect the 2 key interlock cable clamps.
(f) Pull in the cable while pressing the clip of the key interlock cable.

3. INSTALL AIR CONDITIONING UNIT (See page AC–29)

4. INSTALL INSTRUMENT PANEL (See page AC–29)

5. INSPECT KEY INTERLOCK AND SHIFT LOCK OPERATION

(a) Check that a key can be turn from ACC to LOCK only when the shift lever is in P position.
(b) Check that the key cannot be turned to LOCK when the shift lever is position in other than P position.
(c) When the ignition key is in LOCK, check that pressing the shift release button enables the shift lever to shift from P position to other positions.

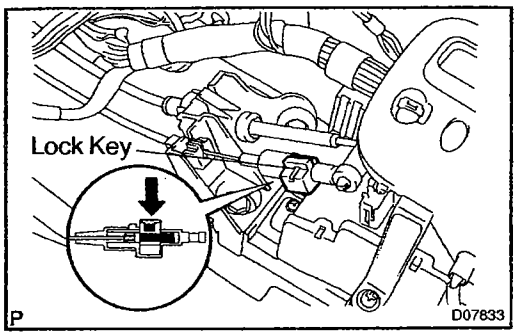


(d) When shifting it to each position, make sure that the shifting lever moves smoothly, can be moderately operated and the position indicator displays correctly.
Positions which can be operated without pressing the shift lever knob button
R → N → D → D, L → 2 → D → N
Positions which can be operated only while pressing the shift lever knob button
D → 2 → L, N → R → P
Positions which can be operated only while pressing the shift lever knob button, ignition switch ON and brake pedal depressed
P → R
(e) When starting the engine make sure that the vehicle moves forward when shifting form N to D position, and moves rearward when shifting to R position.

6. ADJUSTMENT IN CASE OF MALFUNCTION

(a) When the key can not be turned from ACC to LOCK even though the shift lever is in P position:
This is the condition where the cable end on the ignition key side is not returned to the position where it can be locked. The condition is caused by undue bending of the cable, rotative resistance of the pin on the shift lever side, or increased resistance due to any reason such as twisting of the cable. Reinstall and readjust the key interlock cable.

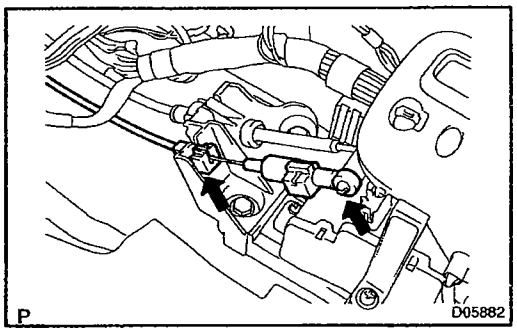
(b) When the key is turned from ACC to LOCK even though the shift lever is in other than P Position:
Since the cable is too long due to improper adjustment at the automatic adjustment part of the key can not be locked. Readjust the key interlock cable.



7. READJUSTMENT OF KEY INTERLOCK CABLE

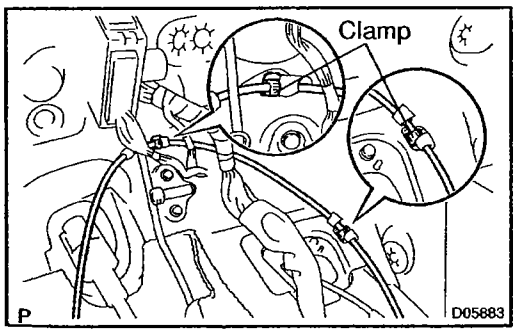
HINT:
Assembly shall be undertaker in the same way as step 2.

(a) Using a screwdriver, unlock the claw of the lock key of the automatic adjustment part.

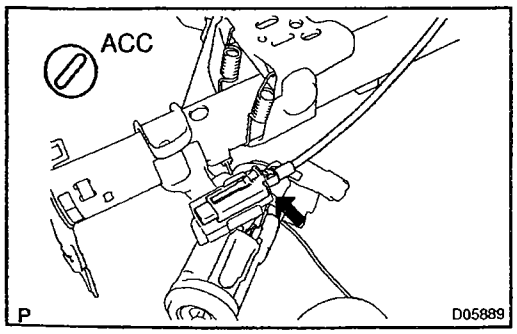


(b) Remove the key interlock cable end from the rod of the floor shift assembly.

(c) Pull out the cable while pressing the clip of the key interlock cable.



(d) Remove the cable clamp from the other.

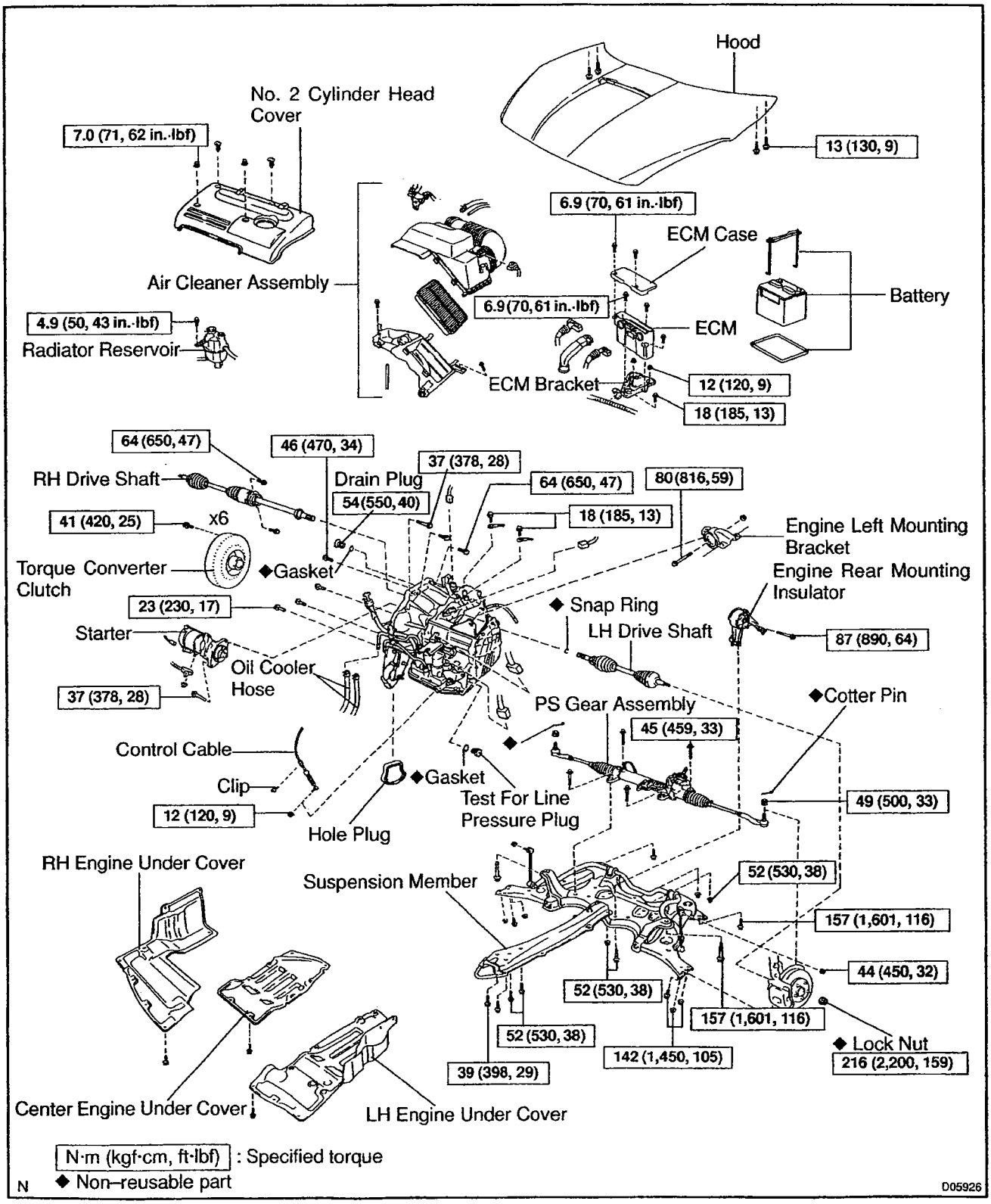


(e) With the key in ACC, install the cable cap claw to the key interlock.

AUTOMATIC TRANSAXLE UNIT

COMPONENTS

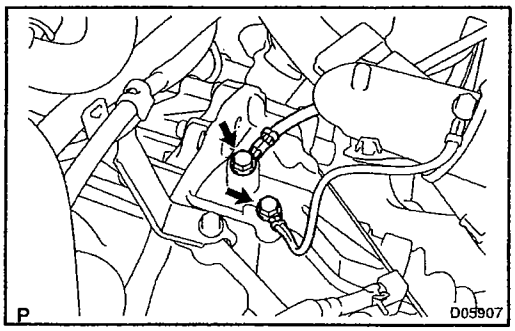
AX0L2-01



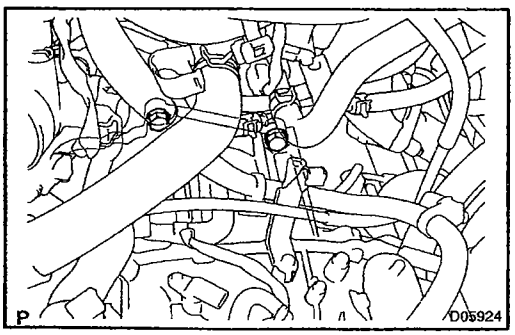
AX0L3-01

REMOVAL

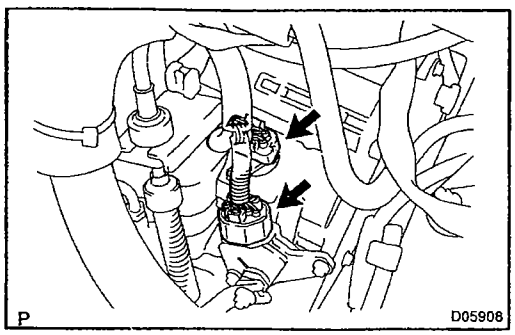
1. **REMOVE HOOD**
   Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
2. **REMOVE BATTERY**
3. **REMOVE ECM AND ECM CASE**
   Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
4. **REMOVE ECM BRACKET**
   Torque:
   Bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)
   Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)
5. **REMOVE AIR CLEANER ASSEMBLY**
6. **REMOVE NO. 2 CYLINDER HEAD COVER**
   Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)



7. **REMOVE 2 GROUND CABLES**
   Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
8. **DISCONNECT CONTROL CABLE FROM CLAMP**
9. **DISCONNECT INPUT TURBINE SPEED SENSOR CONNECTOR**
10. **REMOVE VEHICLE SPEED SENSOR CONNECTOR**



11. **REMOVE 2 UPPER SIDE TRANSAXLE MOUNTING BOLTS FROM TRANSAXLE**
    Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



12. **DISCONNECT SOLENOID CONNECTOR AND PARK/NEUTRAL POSITION SWITCH CONNECTOR**

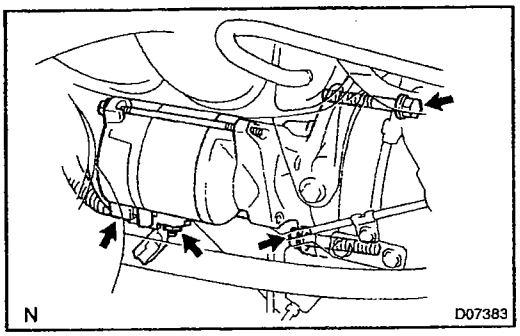
Disconnect the solenoid connector and park/neutral position switch connector.

13. **DISCONNECT CONTROL CABLE**

(a) Remove the nut from the control shift lever.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

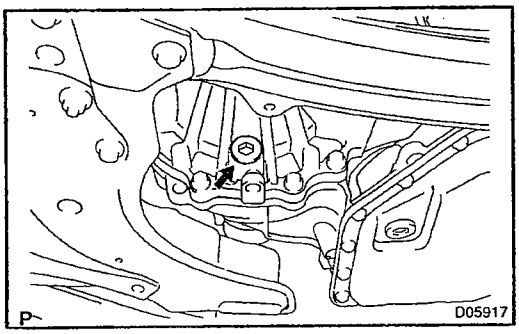
(b) Remove the clip and disconnect the control cable.

14. REMOVE BOLT AND DISCONNECT RADIATOR RESERVOIR
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



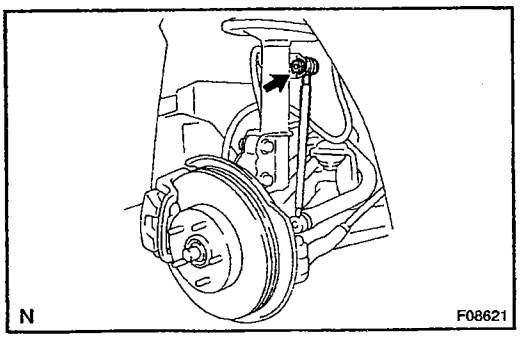
15. REMOVE STARTER
(a) Remove the nut and wire, and disconnect the connector.
(b) Remove the 2 bolts and starter.
Torque: 37 N·m (378 kgf·cm, 28 ft·lbf)

16. REMOVE LH, RH, CENTER ENGINE UNDER COVERS

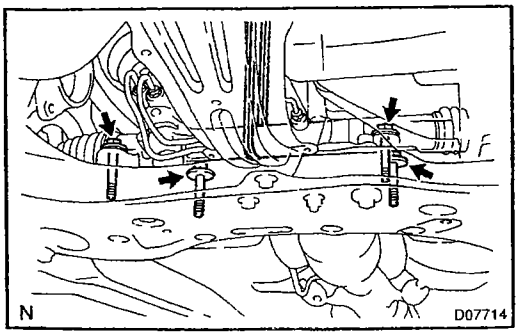


17. DRAIN ATF FROM FRONT DIFFERENTIAL CASE
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)

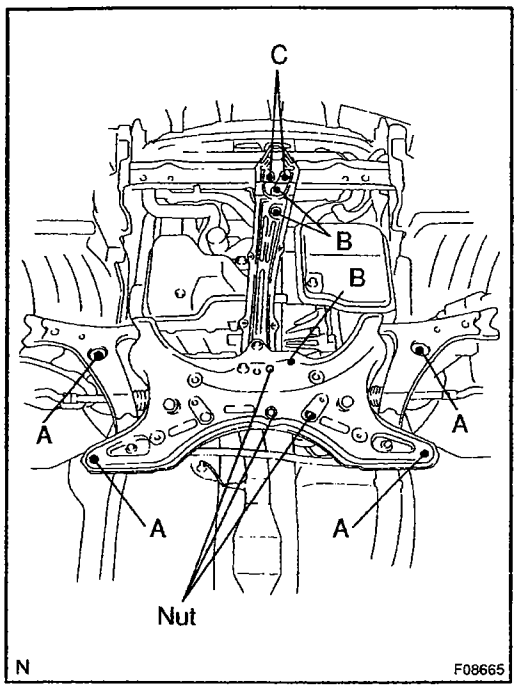
18. REMOVE LH AND RH DRIVE SHAFTS
(See page SA–20)



19. DISCONNECT LH AND RH STABILIZER BAR LINKS FROM SHOCK ABSORBER
Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)



20. REMOVE 4 BOLTS AND DISCONNECT PS GEAR ASSEMBLY
HINT:
Support the PS gear assembly securely.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

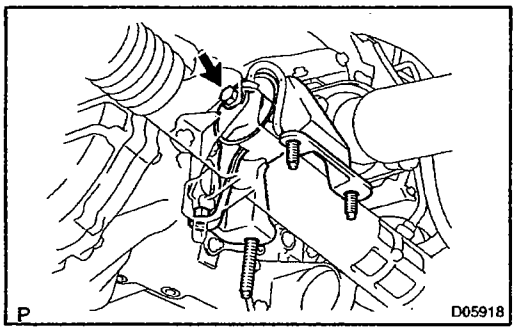


21. REMOVE SUSPENSION MEMBER

(a) Remove the 9 bolts and 3 nuts.

Torque:
Bolt A: 157 N·m (1,601 kgf·cm, 116 ft·lbf)
Bolt B: 52 N·m (530 kgf·cm, 38 ft·lbf)
Bolt C: 39 N·m (398 kgf·cm, 29 ft·lbf)
Nut: 52 N·m (530 kgf·cm, 38 ft·lbf)

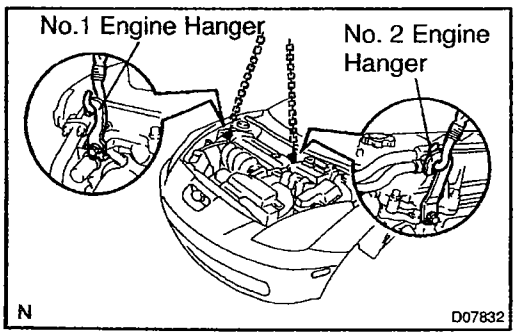
(b) Remove the suspension member.



22. REMOVE ENGINE REAR MOUNTING INSULATOR

Remove the bolt and engine rear mounting insulator.

Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)



23. ATTACH ENGINE SLING DEVICE TO ENGINE HANGERS

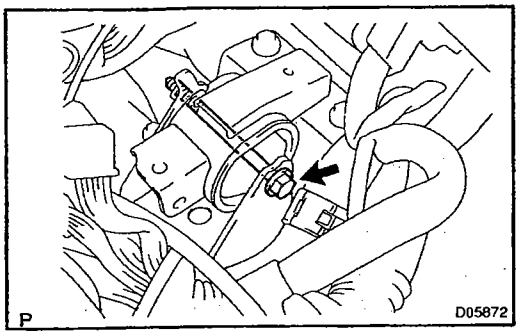
(a) Disconnect the 2 PCV hoses.

(b) Install the No. 1 and No. 2 engine hangers in the correct direction.

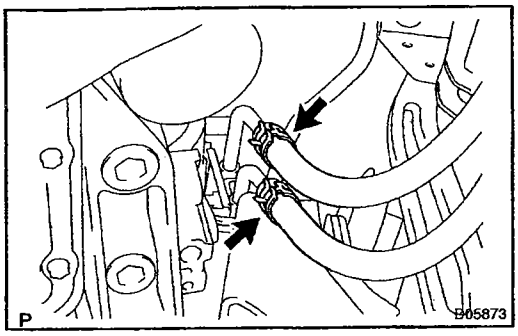
Parts No. :
No. 1 engine hanger: 12281–22021
No. 2 engine hanger: 12281–15040 or 12281–15050
Bolt: 91512–B1016
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(c) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

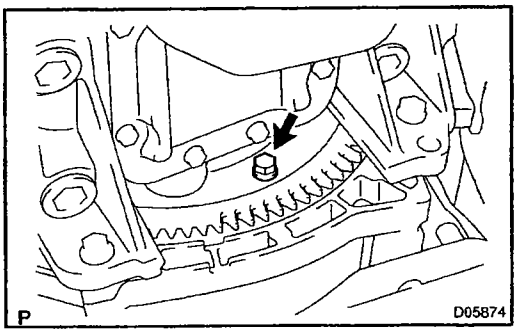


24. REMOVE UPPER SIDE ENGINE LEFT MOUNTING, NUT AND BOLT
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)



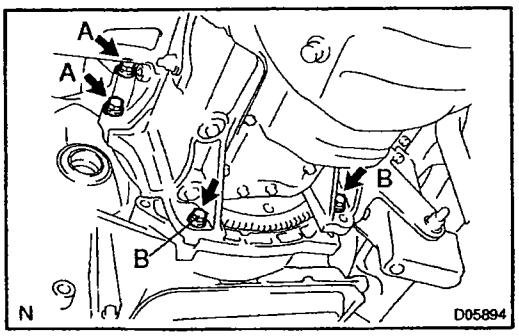
25. REMOVE OIL COOLER HOSE
Loosen the 2 clips and disconnect the 2 oil cooler hoses.

26. SUPPORT TRANSAXLE WITH A JACK

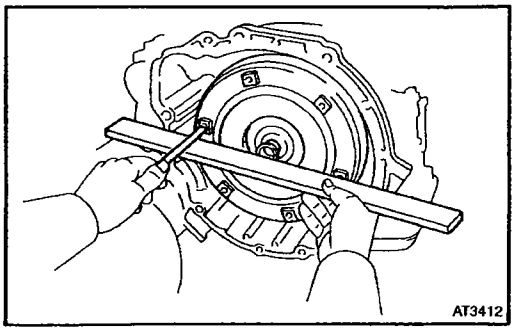


27. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT
(a) Remove the hole plug.
(b) Turn the crankshaft to gain access and remove the 6 bolts holding the crankshaft pulley set bolt with a wrench.
Torque: 41 N·m (420 kgf·cm, 25 ft·lbf)

HINT:
At the time of installation, please refer to the following item.
First install black colored bolt and then 5 other bolts.



28. REMOVE TRANSAXLE ASSEMBLY
(a) Remove the 4 bolts.
Torque:
A bolt: 46 N·m (470 kgf·cm, 34 ft·lbf)
B bolt: 23 N·m (230 kgf·cm, 17 ft·lbf)
(b) Separate the transaxle from engine, and lower the transaxle.



AX0L4-01

INSTALLATION

1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure the distance between the installed surface and the front surface of the transaxle housing.

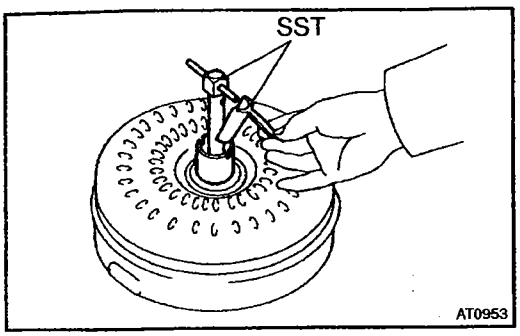
Correct distance: More than 13.3 mm (0.524 in.)

2. TRANSAXLE INSTALLATION

Installation is in the reverse order of removal (See page AX–31).

HINT:

- After installation, adjust the shift control cable and park/neutral position switch (See page DI–220).
- Fill ATF and check the fluid level (See page DI–220).
- Perform the test drive of the vehicle.
- Adjust the hood (See page BO–9).



TORQUE CONVERTER CLUTCH AND DRIVE PLATE

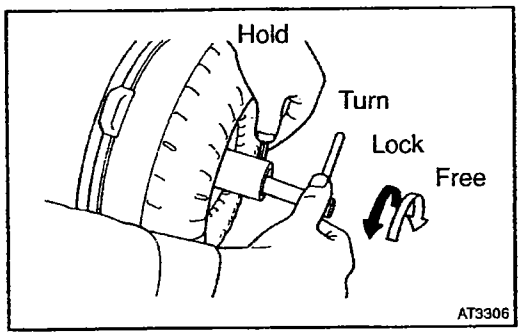
AX09X–03

INSPECTION

1. INSPECT ONE–WAY CLUTCH

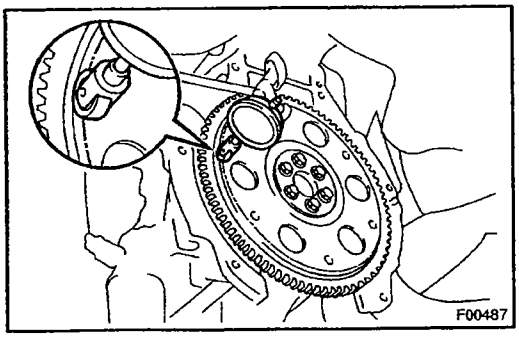
(a) Install SST into the inner race of the one–way clutch.
SST 09350–32014 (09351–32010)

(b) Install SST so that it fits in the notch of the converter hub and outer race of the one–way clutch.
SST 09350–32014 (09351–32020)



(c) With the torque converter clutch setting up on its side, check that the clutch locks when turned counterclockwise, and rotates smoothly clockwise.

If necessary, clean the converter and retest the clutch.
Replace the converter clutch if the clutch still fails the test.



2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

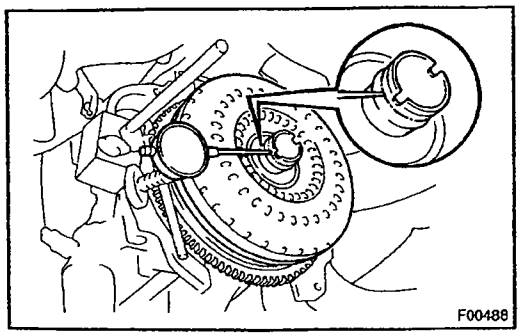
(a) Set up a dial indicator and measure the drive plate runout.

(b) Check the damage of the ring gear.

Maximum runout: 0.20 mm (0.0079 in.)

If the runout is not within the specification or ring gear is damaged, replace the drive plate.

Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)



3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

Temporarily mount the torque converter clutch on the drive plate. Set a dial indicator and measure the torque converter clutch sleeve runout.

Maximum runout: 0.30 mm (0.0118 in.)

If the runout is not within the specification, try to correct by reorienting the installation of the converter.

HINT:
Mark the position of the converter clutch to ensure the installation is correctly performed.

– MEMO –

SUSPENSION AND AXLE

TROUBLESHOOTING	SA–1
TIRE AND WHEEL	SA–2
FRONT WHEEL ALIGNMENT	SA–4
REAR WHEEL ALIGNMENT	SA–8
FRONT AXLE HUB	SA–11
FRONT WHEEL HUB BOLT	SA–17
FRONT DRIVE SHAFT	SA–18
FRONT SHOCK ABSORBER	SA–33
FRONT LOWER SUSPENSION ARM	SA–41
FRONT LOWER BALL JOINT	SA–46
FRONT STABILIZER BAR	SA–50
REAR AXLE CARRIER	SA–54
REAR WHEEL HUB BOLT	SA–60
REAR SHOCK ABSORBER	SA–61
REAR UPPER SUSPENSION ARM	SA–68
REAR LOWER SUSPENSION ARM	SA–71
REAR STABILIZER BAR	SA–75

SA

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SA0CB-05

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Wander/pulls	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheel alignment (Incorrect)	SA–4
		SA–8
	3. Steering linkage (Loose or worn)	–
	4. Hub bearing (Worn)	SA–12
		SA–55
	5. Steering gear (Out of adjustment or broken)	SR–33
	6. Suspension parts (Worn)	–
Bottoming	1. Vehicle (Overloaded)	–
	2. Spring (Weak)	SA–33
		SA–61
	3. Shock absorber (Worn)	SA–36
		SA–64
Sways/pitches	1. Tire (Worn or improperly inflated)	SA–2
	2. Stabilizer bar (Bent or broken)	SA–50
		SA–75
	3. Shock absorber (Worn)	SA–36
		SA–64
Front wheel shimmy	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheel (Out of balance)	SA–2
	3. Shock absorber (Worn)	SA–36
	4. Wheel alignment (Incorrect)	SA–4
	5. Ball joint (Worn)	SA–48
	6. Hub bearing (Worn)	SA–12
	7. Steering linkage (Loose or worn)	–
	8. Steering gear (Out of adjustment or broken)	SR–33
Abnormal tire wear	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheel alignment (Incorrect)	SA–4
	3. Shock absorber (Worn)	SA–36
		SA–64
	4. Suspension parts (Worn)	–

TIRE AND WHEEL

SA1P9-01

INSPECTION

1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

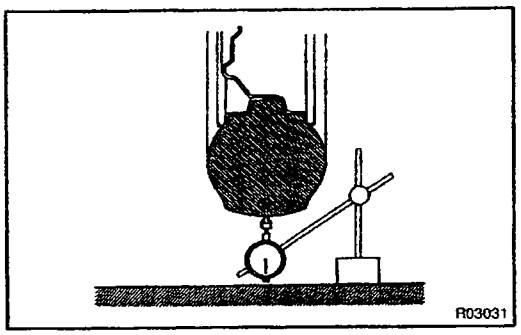
Cold tire inflation pressure

1ZZ–FE engine models:

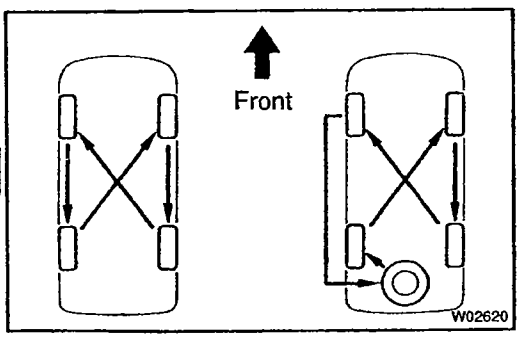
Tire size	Front kPa (kgf/cm², psi)	Rear kPa (kgf/cm², psi)
195/60R15 88H P195/60R15 87H	210 (2.1, 29)	210 (2.1, 29)

2ZZ–GE engine models:

Tire size	Front kPa (kgf/cm², psi)	Rear kPa (kgf/cm², psi)
205/55R15 87V P205/55R15 87V 205/50R16 87V	220 (2.2, 32)	220 (2.2, 32)



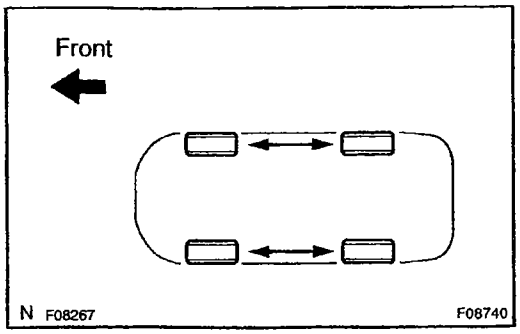
(b) Using a dial indicator, check the tire runout.
Tire runout: 1.0 mm (0.039 in.) or less



2. ROTATING TIRES

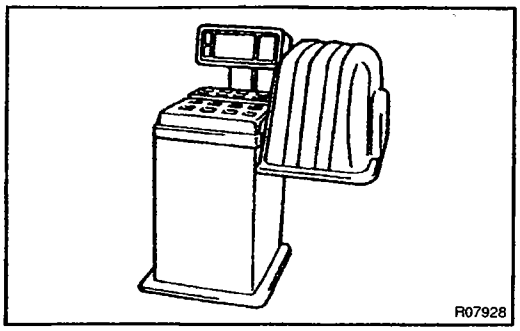
HINT:

See the illustration for where to rotate each tire when you include the spare tire in the rotation and when you do not.



If the rotating direction is specified, do not exchange the tires between the right and left.

SA

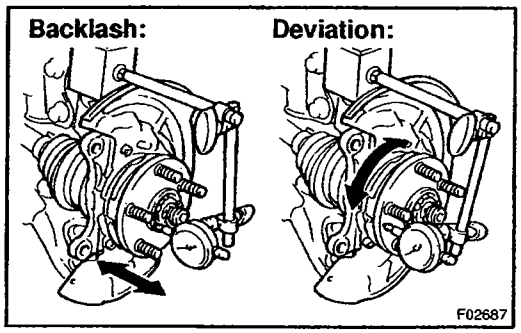


3. INSPECT WHEEL BALANCE

(a) Check and adjust the Off–the–car balance.

(b) If necessary, check and adjust the On–the–car balance.

Imbalance after adjustment: 8.0 g (0.018 lb) or less



4. CHECK WHEEL BEARING LOOSENESS

(a) Using a dial indicator, check the backlash near the center of the axle hub.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

(b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum: 0.07 mm (0.0028 in.)

If the deviation exceeds the maximum, replace the axle hub.

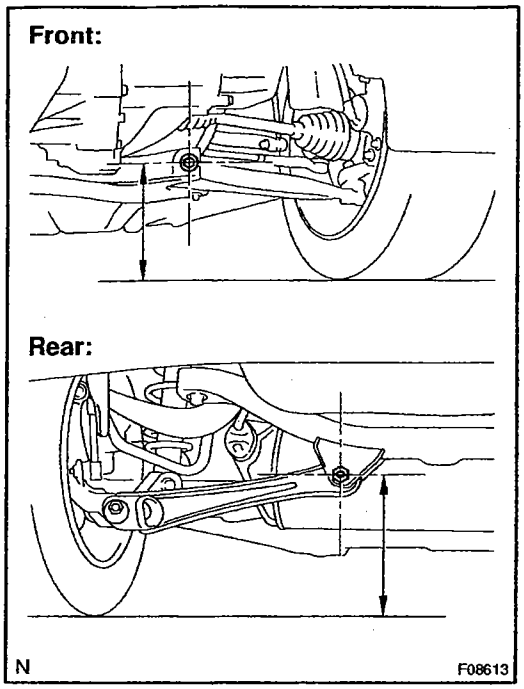
5. CHECK FRONT SUSPENSION FOR LOOSENESS

6. CHECK STEERING LINKAGE FOR LOOSENESS

7. CHECK BALL JOINT FOR LOOSENESS

8. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check that oil leaks
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



FRONT WHEEL ALIGNMENT

SA1CK–04

INSPECTION

1. MEASURE VEHICLE HEIGHT

Vehicle height:

Tire size	Front*1 mm (in.)	Rear*2 mm (in.)
195/60R15, P195/60R15	190 (7.48)	224 (8.82)
205/55R15, P205/55R15	190 (7.48)	226 (8.90)
205/50R16	193 (7.60)	225 (8.86)

*1: Front measuring point

Measure the distance from the ground to the center of the front side lower suspension arm mounting bolt.

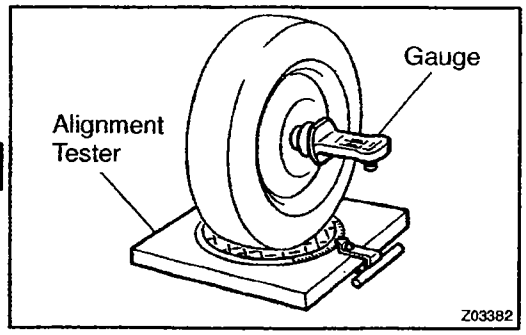
*2: Rear measuring point

Measure the distance from the ground to the center of the rear side lower suspension arm suspension member side set bolt.

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

If the vehicle height is not the specified value, try to adjust it by pushing down on or lifting the body.



SA

2. INSTALL CAMBER–CASTER–KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber, caster and steering axis inclination:

195/60R15, P195/60R15 tire:

Camber	–0°28' ± 45' (–0.47° ± 0.75°)
Right–left error	45' (0.75°) or less
Caster	2°07' ± 45' (2.12° ± 0.75°)
Right–left error	45' (0.75°) or less
Steering axis inclination	13°09' ± 45' (13.15° ± 0.75°)
Right–left error	45' (0.75°) or less

205/55R15, P205/55R15 tire:

Camber Right–left error	–0°25' ± 45' (–0.42° ± 0.75°) 45' (0.75°) or less
Caster Right–left error	2°01' ± 45' (2.02° ± 0.75°) 45' (0.75°) or less
Steering axis inclination Right–left error	13°04' ± 45' (13.07° ± 0.75°) 45' (0.75°) or less

205/50R16 tire:

Camber Right–left error	–0°29' ± 45' (–0.48° ± 0.75°) 45' (0.75°) or less
Caster Right–left error	2°02' ± 45' (2.03° ± 0.75°) 45' (0.75°) or less
Steering axis inclination Right–left error	13°12' ± 45' (13.20° ± 0.75°) 45' (0.75°) or less

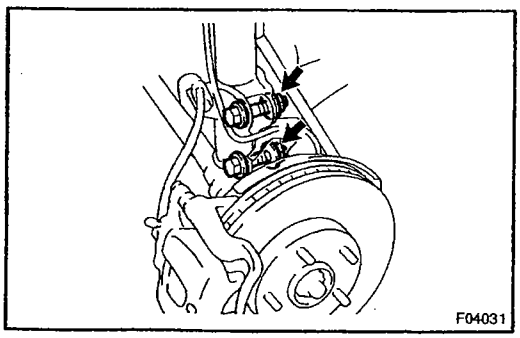
If the caster and steering axis inclination are not within the specified values, after the camber has been correctly adjusted, recheck the suspension parts for damaged and/or worn out parts.

4. ADJUST CAMBER

NOTICE:

After the camber has been adjusted, inspect the toe–in.

(a) Remove the front wheel.

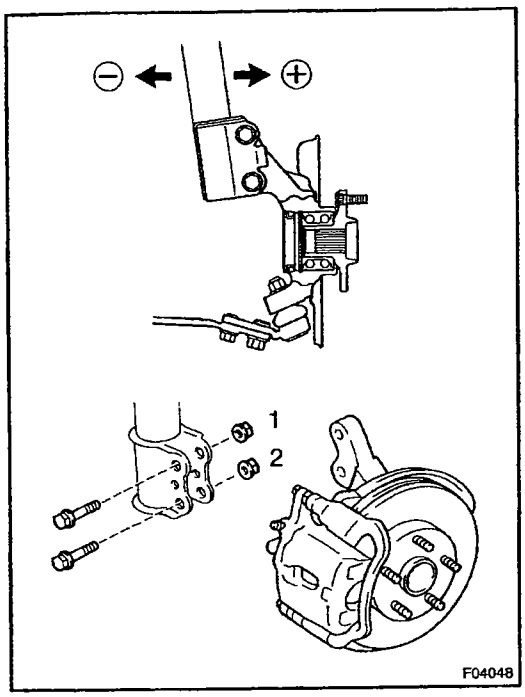


(b) Remove the 2 nuts on the lower side of the shock absorber.

(c) Coat the threads of the nuts with engine oil.

(d) Temporarily install the 2 nuts.

SA



(e) Adjust the camber by pushing or pulling the lower side of the shock absorber in the direction in which the camber adjustment is required.

(f) Tighten the nuts.
Torque: 153 N·m (1,560 kgf·cm, 113 ft·lbf)

(g) Install the front wheel.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(h) Check the camber.

HINT:

- Try to adjust the camber to the center of the specified value.
- Adjusting value for the set bolts is 6' – 30' (0.1° – 0.5°).

If the camber is not within the specified value, using the following table, estimate how much additional camber adjustment will be required, and select the camber adjusting bolt.

Bolt / Adjusting Value	Set Bolt		Adjusting Bolt					
	90105–15001		90105–15004		90105–15005		90105–15006	
			1 Dot		2 Dots		3 Dots	
	11		•11		•11		•11	
	1	2	1	2	1	2	1	2
15'	●			●				
30'	●					●		
45'	●							●
1°00'			●					●
1°15'					●			●
1°30'							●	●

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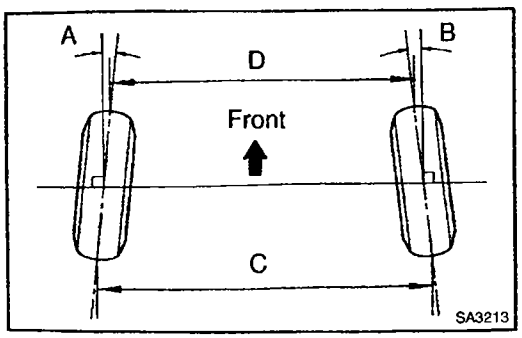
(i) Do the steps mentioned above again. Between step (b) and (c), replace 1 or 2 selected bolts.

HINT:
When replacing the 2 bolts, replace 1 bolt for each time.



5. INSPECT TOE–IN

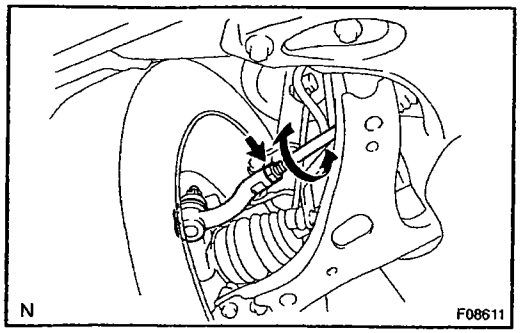
Toe–in:

Toe–in (total)	A + B: 0° ± 12' (0° ± 0.2°) C – D: 0 ± 2 mm (0 ± 0.08 in.)

If the toe–in is not within the specified value, adjust it at the rack ends.

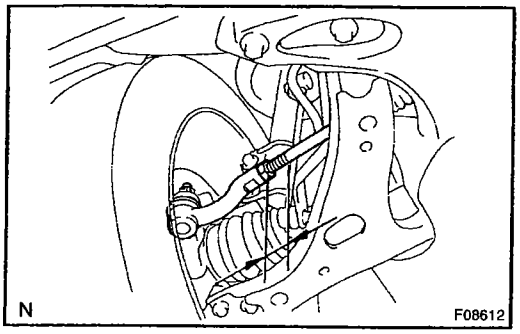
6. ADJUST TOE–IN

(a) Remove the rack boot set clips.



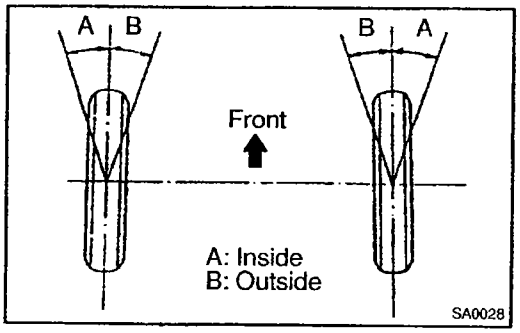
(b) Loosen the tie rod end lock nuts.
(c) Turn the right and left rack ends by an equal amount to adjust the toe–in.

HINT:
Try to adjust the toe–in to the center of the specified value.



(d) Make sure that the lengths of the right and left rack ends are the same.
Rack end length difference: 1.5 mm (0.059 in.) or less
(e) Torque the tie rod end lock nuts.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)
(f) Place the boots on the seats and install the clips.

HINT:
Make sure that the boots are not twisted.



7. INSPECT WHEEL ANGLE

Turn the steering wheel fully, and measure the turning angle.

Wheel turning angle:

195/60R15, P195/60R15 tire:

Inside wheel	38°41' ± 2° (38.68° ± 2°)
Outside wheel: Reference	33°20' (33.33°)

205/55R15, P205/55R15 tire:

Inside wheel	38°46' ± 2° (38.77° ± 2°)
Outside wheel: Reference	33°25' (33.42°)

205/50R16 tire:

Inside wheel	38°38' ± 2° (38.63° ± 2°)
Outside wheel: Reference	33°19' (33.32°)

If the right and left inside wheel angles differ from the specified value, check the right and left rack end lengths.

SA

REAR WHEEL ALIGNMENT

SA1QZ-01

INSPECTION

1. **MEASURE VEHICLE HEIGHT (See page SA–4)**
2. **INSTALL CAMBER–CASTER–KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER**

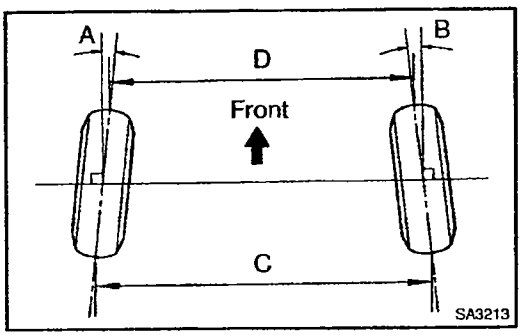
Follow the specific instructions of the equipment manufacturer.

3. **INSPECT CAMBER**

Camber:

Camber	–1°11' ± 45' (–1.18° ± 0.75°)
Right–left error	45' (0.75°) or less

If the camber is not within the specified value, after the toe–in is inspected, see step 5. to adjust.

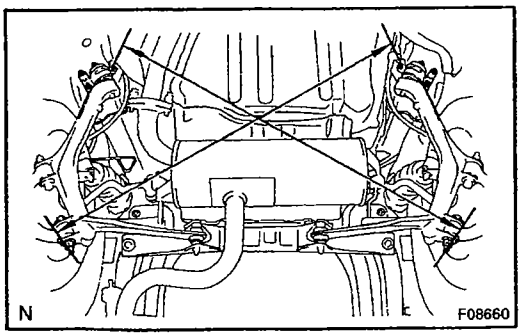


4. **INSPECT TOE–IN**

Toe–in:

Toe–in (total)	A + B: 0°18' ± 12' (0.3° ± 0.2°) C – D: 3 ± 2 mm (0.12 ± 0.08 in.)

If the toe–in is not within the specified value, see step 5. to adjust.



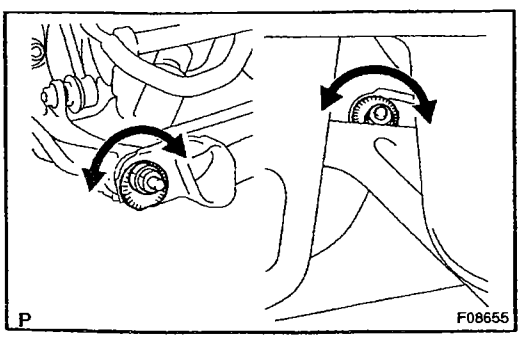
5. **ADJUST CAMBER AND TOE–IN**

(a) Measure the distance from the LH lower suspension arm bracket set bolt to the RH axle carrier rear side set bolt as shown in the illustration.

(b) Employ the same manner to the RH–LH.

Length difference: 6 mm or less

If it exceeds the specified value, adjust it by turning the adjusting cams.



(c) Loosen the upper and lower arm adjusting cam set nuts.

(d) Adjust the camber and toe–in by turning the adjusting cams.

HINT:

Try to adjust the camber and toe–in to the center of the specified values.

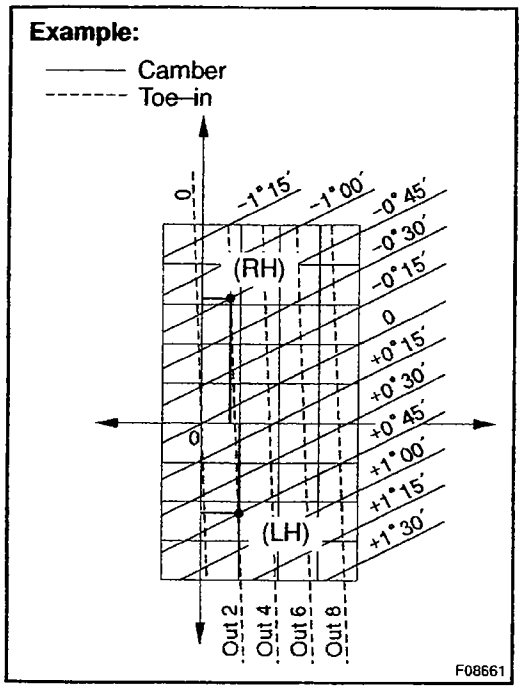
(e) Torque the upper and lower arm adjusting cam set nuts.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

SA

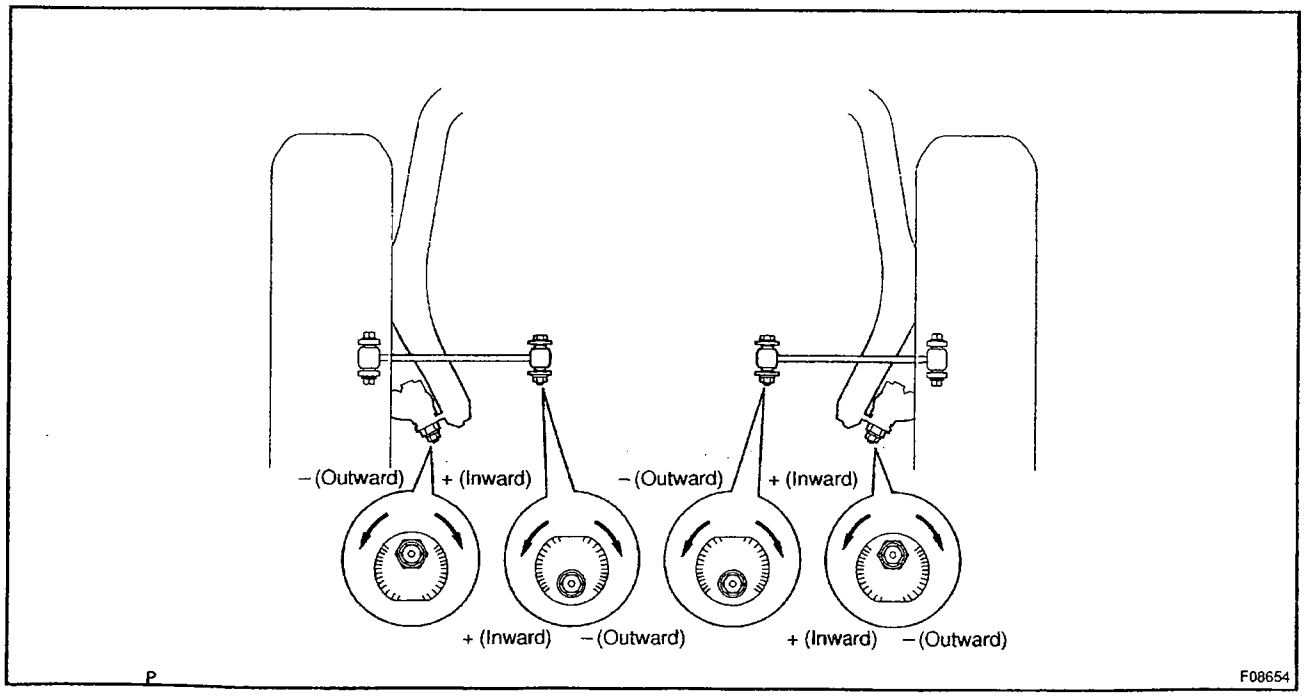
6. HOW TO READ ADJUSTMENT CHART (EXAMPLE)

(a) Measure the present alignment.
Example:
Camber (RH): –0°26' (–0.43°)
Camber (LH): –1°56' (–1.93°)
Toe–in (total): IN 7 mm (0.28 in.)

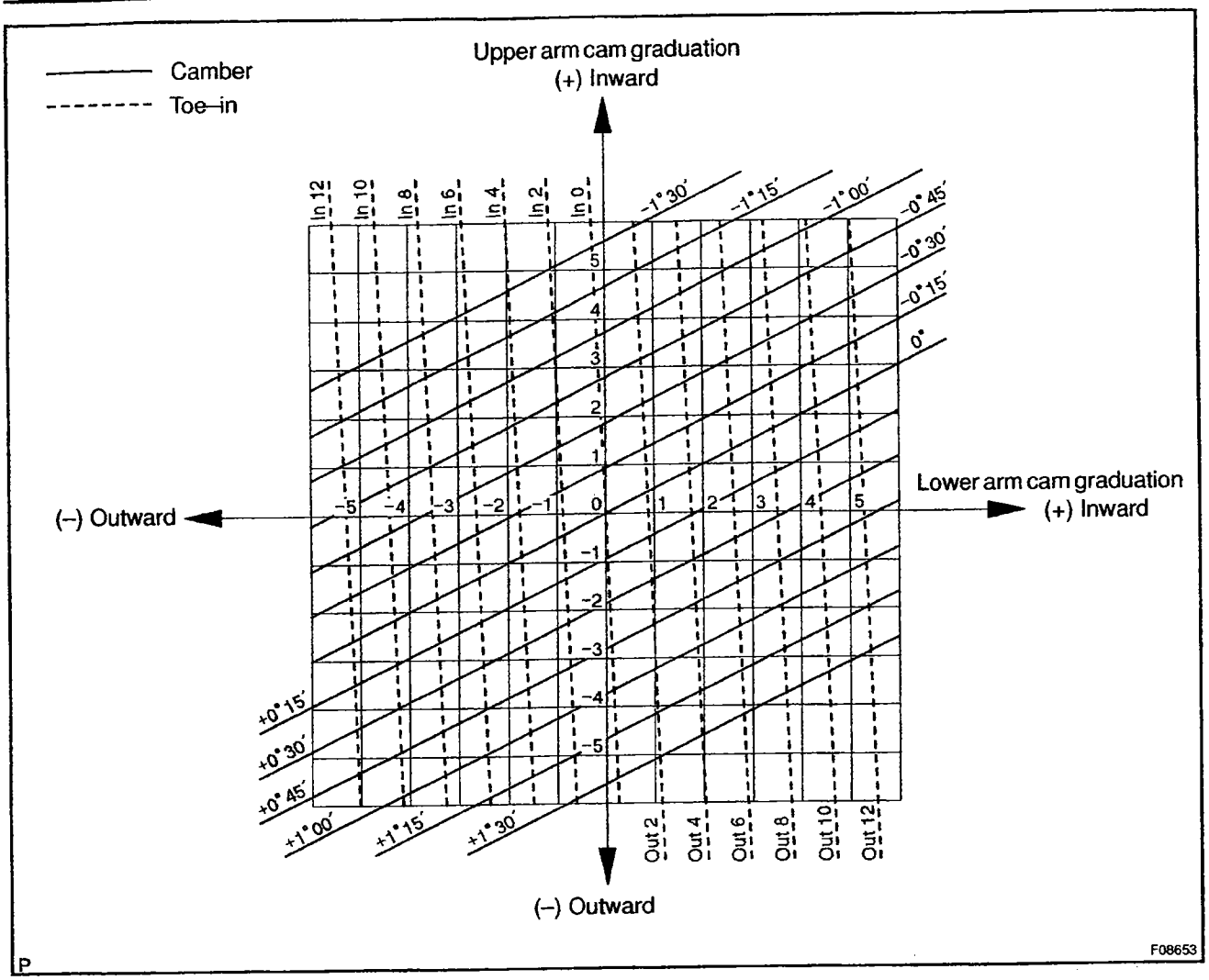


(b) Mark the difference between the standard value (A) and the measured value (B) on the adjustment chart.
Standard value:
Camber: –1°11' (–1.18°)
Toe–in (total): IN 3mm (0.12 in.)
Formula: A – B = C
Camber (RH): –1°11' – (–0°26') = –0°45'
Camber (LH): –1°11' – (–1°56') = 0°45'
Toe–in (total): IN3 – IN7 = OUT 4
Toe–in (each side): OUT 2

(c) As shown in the example chart, read the distance from the marked point to the origin of the chart, and adjust the upper and/or lower arm adjusting cams accordingly
Amount to turn adjusting cams (by graduation):
Upper arm cam (RH): + (Inward) 3.2
Lower arm cam (RH): + (Inward) 0.8
Upper arm cam (LH): – (Outward) 2.3
Lower arm cam (LH): + (Inward) 1.0



SA

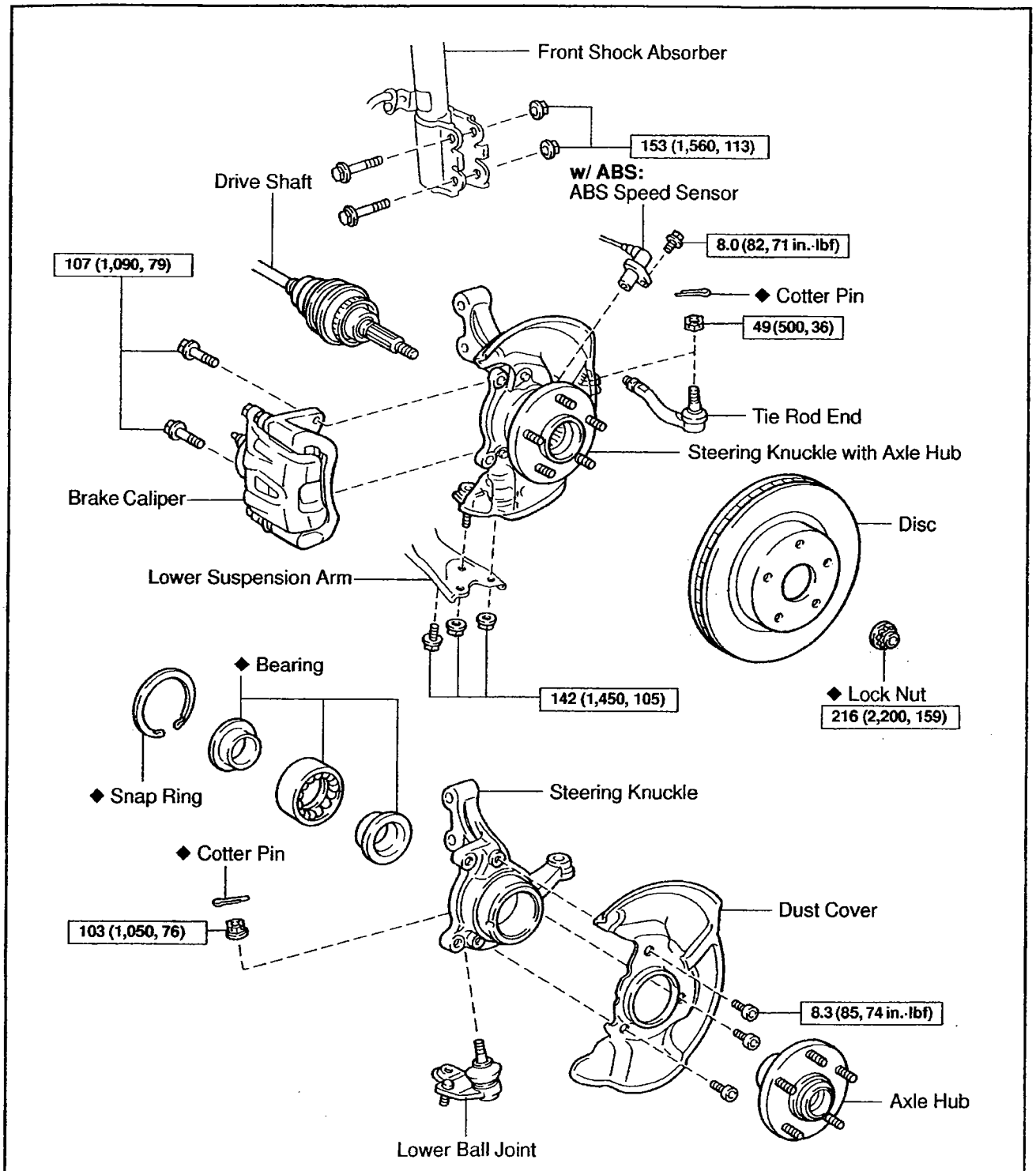

Camber
Toe–in
Upper arm cam graduation
(+) Inward
(–) Outward
Lower arm cam graduation
(+) Inward
(–) Outward
In 12
In 10
In 8
In 6
In 4
In 2
In 0
Out 2
Out 4
Out 6
Out 8
Out 10
Out 12
-1° 30'
-1° 15'
-1° 00'
-0° 45'
-0° 30'
-0° 15'
0°
+0° 15'
+0° 30'
+0° 45'
+1° 00'
+1° 15'
+1° 30'
F08653
P

SA

FRONT AXLE HUB

COMPONENTS

SA07B-06



N·m (kgf·cm, ft·lbf) : Specified torque

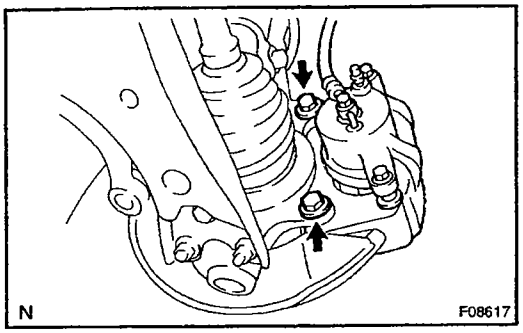
N ◆ Non–reusable part

F08625

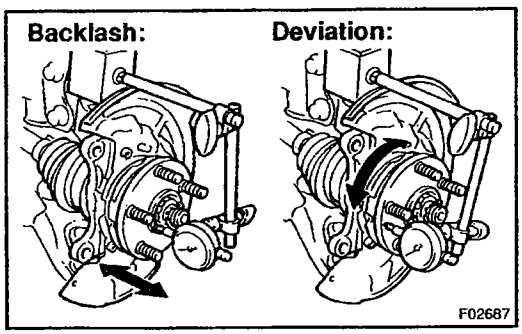
SA1P1–01

REMOVAL

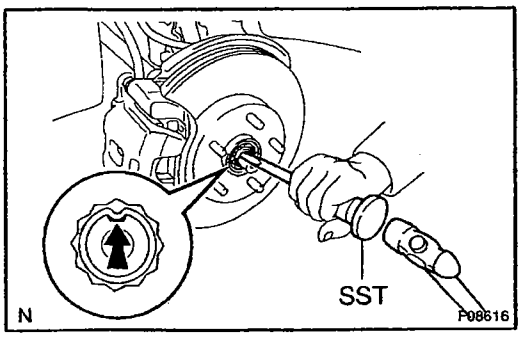
1. **REMOVE FRONT WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



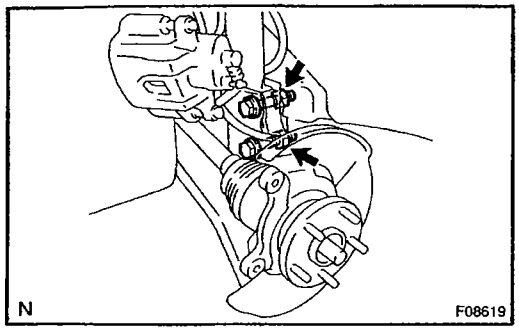
2. **CHECK BEARING BACKLASH AND AXLE HUB DEVIATION**
   (a) Remove the 2 bolts, brake caliper and disc.
   (b) Support the brake caliper securely.



   (c) Using a dial indicator, check the backlash near the center of the axle hub.
   Maximum: 0.05 mm (0.0020 in.)
   If the backlash exceeds the maximum, replace the bearing.
   (d) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.
   Maximum: 0.07 mm (0.0028 in.)
   If the deviation exceeds the maximum, replace the axle hub.
   (e) Install the disc, 2 bolts and brake caliper.
   Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)



3. **REMOVE DRIVE SHAFT LOCK NUT**
   (a) Using SST and a hammer, unstake the staked part of the lock nut.
   SST 09930–00010
   (b) While applying the brakes, remove the nut.
   Torque: 216 N·m (2,200 kgf·cm, 159 ft·lbf)
   (c) Remove the brake caliper and disc.
   (d) Support the brake caliper securely.
4. **w/ ABS:**
   REMOVE ABS SPEED SENSOR
   Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



5. LOOSEN 2 NUTS ON LOWER SIDE OF SHOCK ABSORBER

Torque: 153 N·m (1,560 kgf·cm, 113 ft·lbf)

HINT:

Do not remove the 2 bolts and nuts.

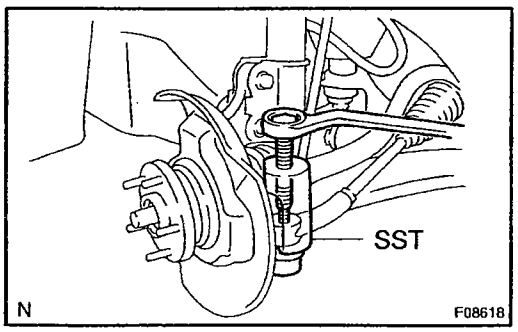
6. DISCONNECT TIE ROD END FROM STEERING KNUCKLE

(a) Remove the cotter pin and nut.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

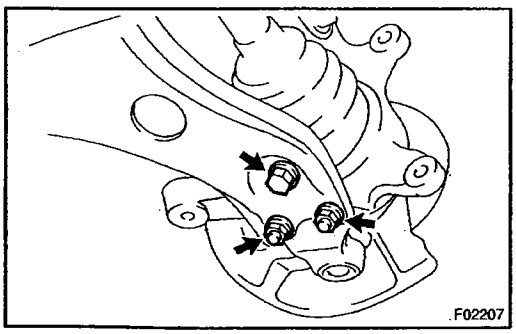
HINT:

At the time of installation, if the holes for a new cotter pin are not aligned, tighten the nut further up to 60°.



(b) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09610–20012



7. DISCONNECT LOWER SUSPENSION ARM FROM LOWER BALL JOINT

Remove the 2 nuts and bolt.

Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

8. REMOVE STEERING KNUCKLE WITH AXLE HUB

(a) Remove the 2 bolts and nuts on the lower side of the shock absorber.

HINT:

At the time of installation, coat the nut's thread with engine oil.

(b) Remove the steering knuckle with the axle hub.

NOTICE:

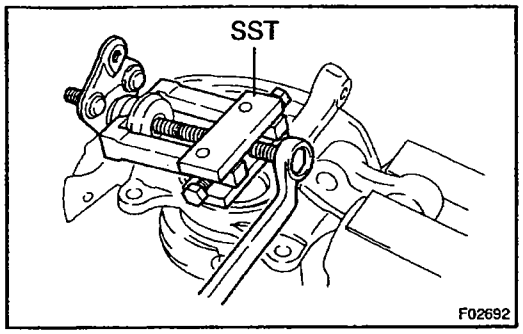
Be careful not to damage the boot and ABS speed sensor rotor.

SA07D–05

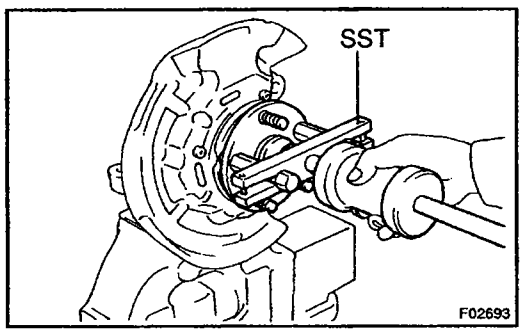
DISASSEMBLY

1. REMOVE LOWER BALL JOINT

(a) Remove the cotter pin and nut.

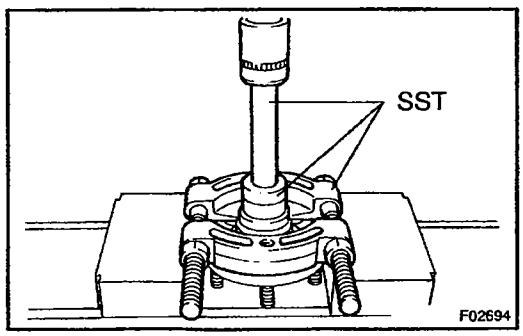


(b) Using SST, remove the lower ball joint.
SST 09628–62011



2. REMOVE AXLE HUB

(a) Using SST, remove the axle hub.
SST 09520–00031 (09520–00040, 09521–00010, 09521–00020)



(b) Using SST and a press, remove the inner race (outside) from the axle hub.
SST 09555–55010, 09950–60010 (09951–00380), 09950–70010 (09951–07150)

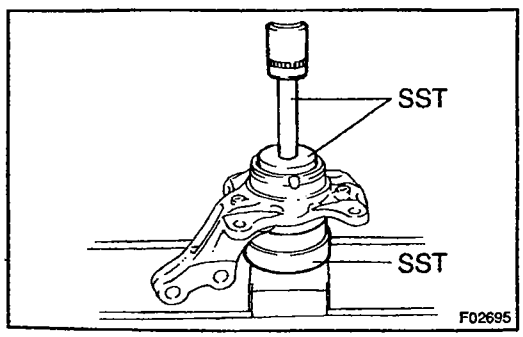
3. REMOVE DUST COVER

Using a torx socket (T30), remove the 3 bolts and dust cover.

4. REMOVE BEARING FROM STEERING KNUCKLE

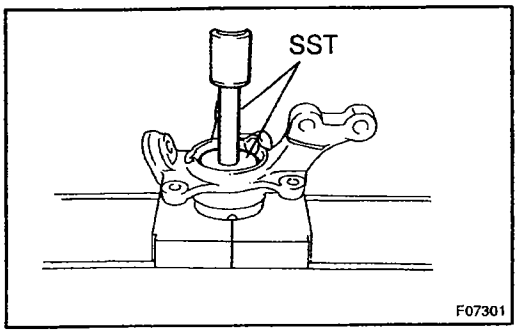
(a) Using snap ring pliers, remove the snap ring.

(b) Place the inner race on the outside of the bearing.



(c) Using SST and a press, remove the bearing.
SST 09527–17011, 09950–60010 (09951–00650), 09950–70010 (09951–07150)

SA103-02



REASSEMBLY

1. INSTALL BEARING

(a) Using SST and a press, install a new bearing to the steering knuckle.

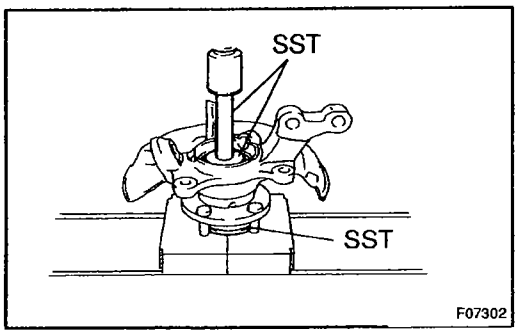
SST 09950–60020 (09951–00730), 09950–70010 (09951–07150)

(b) Using snap ring pliers, install a new snap ring.

2. INSTALL DUST COVER

Place the dust cover and using a torx socket (T30), install the 3 bolts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



3. INSTALL FRONT AXLE HUB

Using SST and a press, install the axle hub.

SST 09608–32010, 09950–60010 (09951–00550) 09950–70010 (09951–07150)

4. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint and tighten the nut.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(b) Install a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

SA07F–05

INSTALLATION

Installation is in the reverse order of removal (See page SA–12).

HINT:

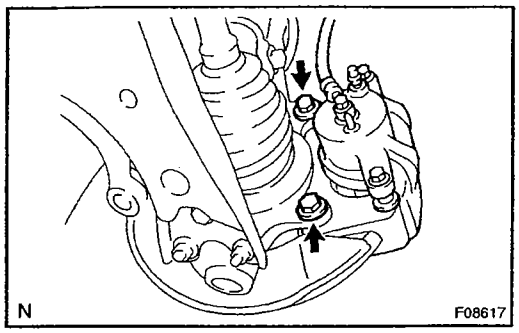
After installation, check the ABS speed sensor signal (See page DI–276) and front wheel alignment (See page SA–4).

FRONT WHEEL HUB BOLT

SA1CN-03

REPLACEMENT

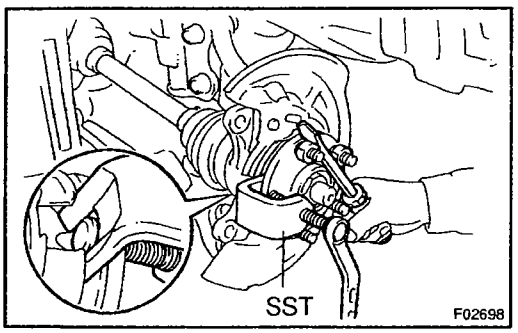
1. REMOVE FRONT WHEEL



2. REMOVE BRAKE CALIPER AND DISC

(a) Remove the 2 bolts, brake caliper and disc.

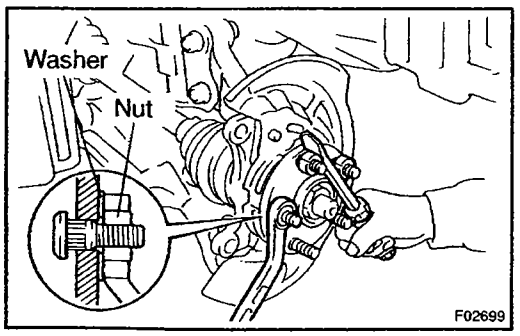
(b) Support the brake caliper securely.



3. REMOVE HUB BOLT

Using SST, 2 nuts and a screwdriver or an equivalent, remove the hub bolt.

SST 09628–10011



4. INSTALL HUB BOLT

(a) Install a washer and nut to a new hub bolt as shown in the illustration.

(b) Using a screwdriver or an equivalent to hold, install the hub bolt by torquing the nut.

(c) Remove the 3 nuts and washer.

5. INSTALL DISC AND BRAKE CALIPER

Install the disc, brake caliper and 2 bolts.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

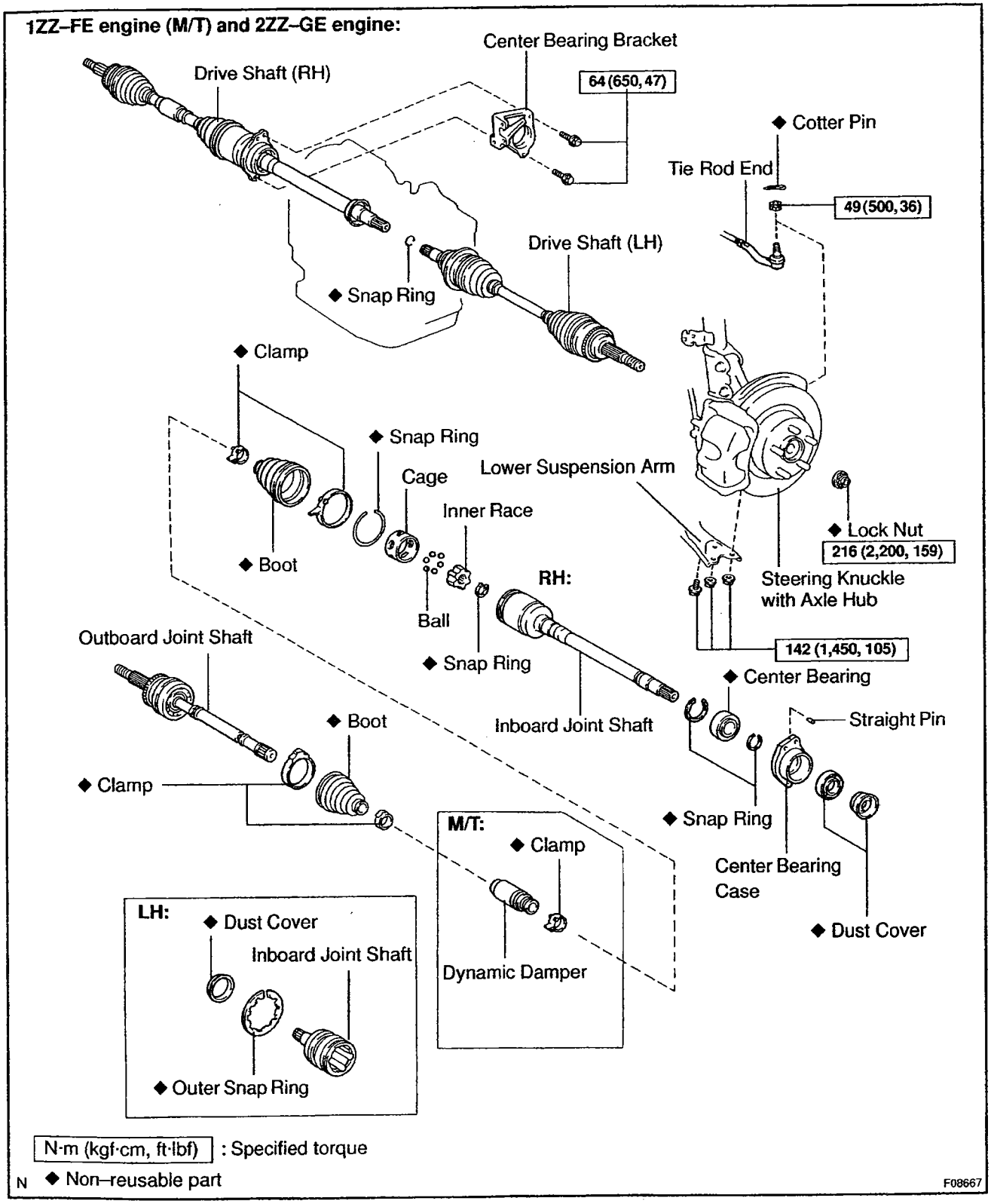
6. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

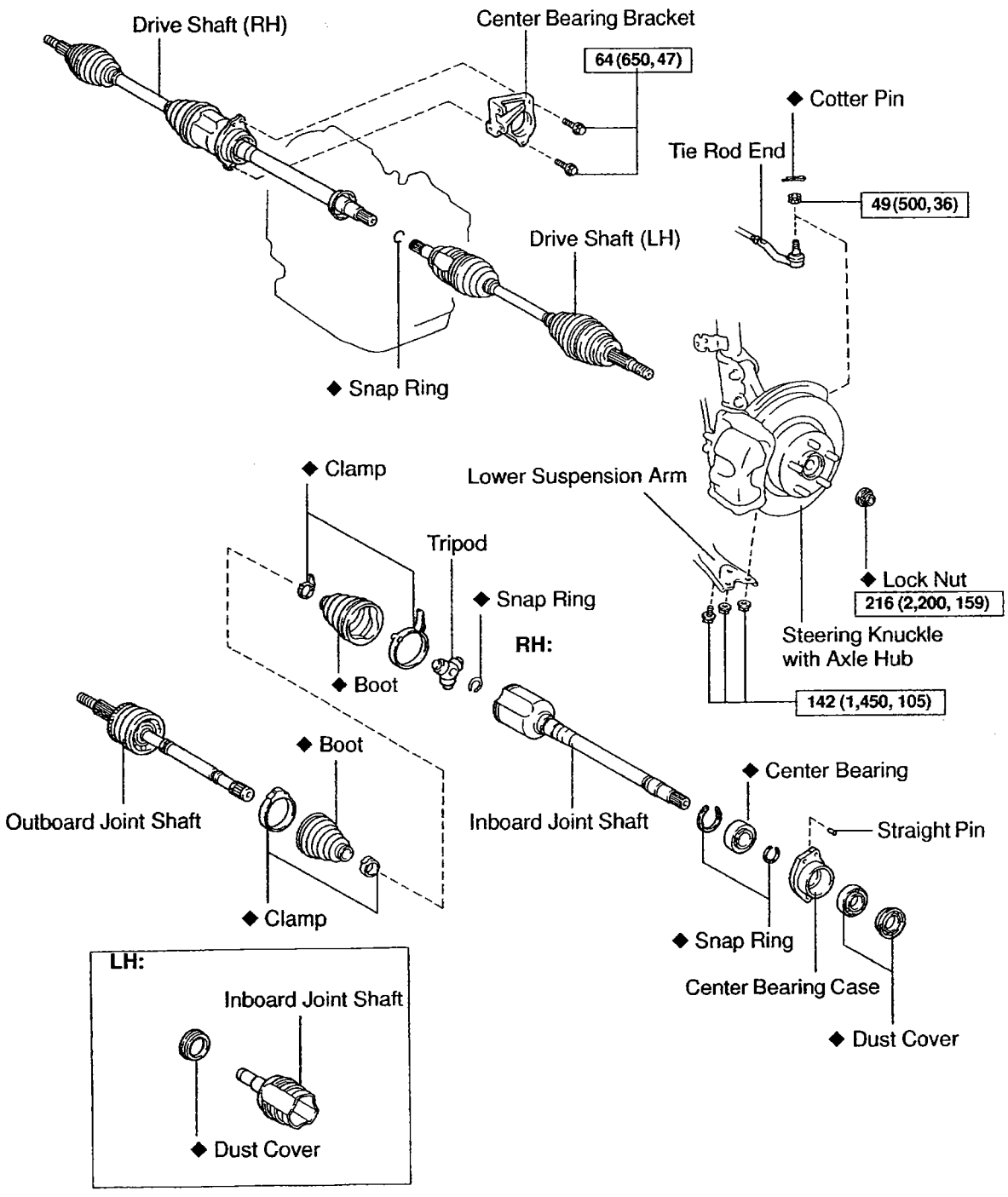
FRONT DRIVE SHAFT

SA0TF–02

COMPONENTS



1ZZ–FE engine (A/T):



N

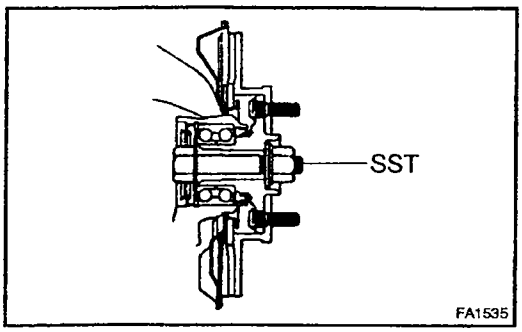
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

F08666

SA1P2-01

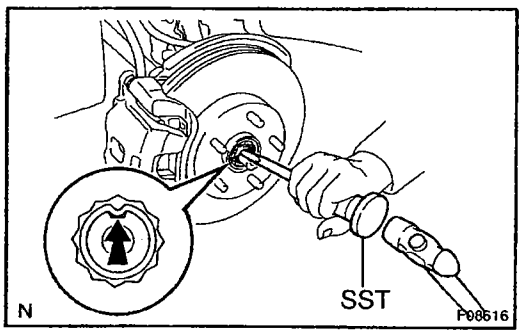
REMOVAL



NOTICE:

- **The hub bearing could be damaged if it is subjected to the vehicle weight, such as when moving the vehicle with the drive shaft removed.**
  Therefore, if it is absolutely necessary to place the vehicle weight on the hub bearing, first support it with the SST.
  SST 09608–16042 (09608–02021, 09608–02041)
- **w/ ABS:**
  After disconnecting the drive shaft from the axle hub, work carefully so as not to damage the ABS speed sensor rotor serrations on the drive shaft.

1. **REMOVE FRONT WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE ENGINE UNDER COVER**
3. **DRAIN GEAR OIL (M/T) OR ATF (A/T)**



4. **REMOVE DRIVE SHAFT LOCK NUT**

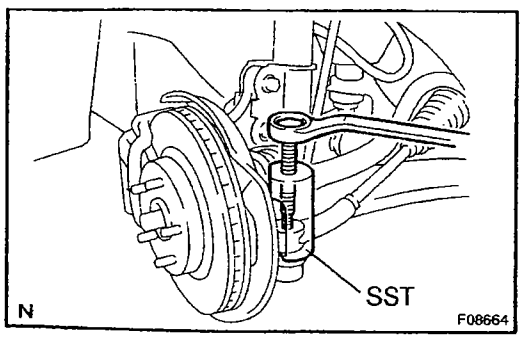
(a) Using SST and a hammer, unstake the staked part of the lock nut.
SST 09930–00010

(b) While applying the brakes, remove the nut.
Torque: 216 N·m (2,200 kgf·cm, 159 ft·lbf)

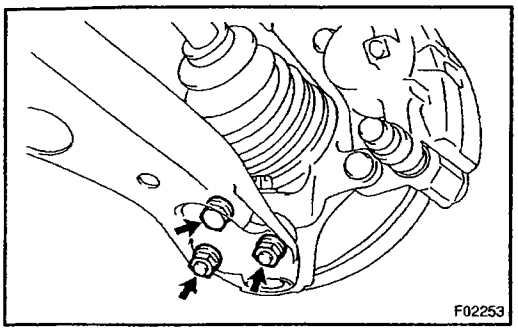
5. **DISCONNECT TIE ROD END FROM STEERING KNUCKLE**

(a) Remove the cotter pin and nut.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:
At the time of installation, if the holes for a new cotter pin are not aligned, tighten the nut further up to 60°.



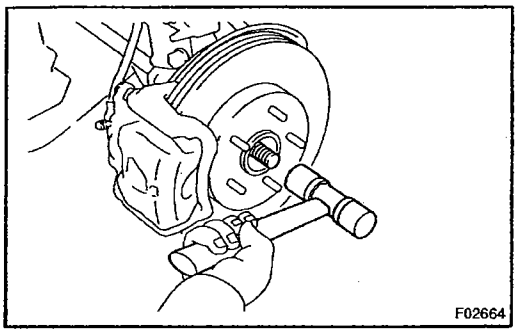
(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09610–20012



6. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM

Remove the 2 nuts and bolt.

Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

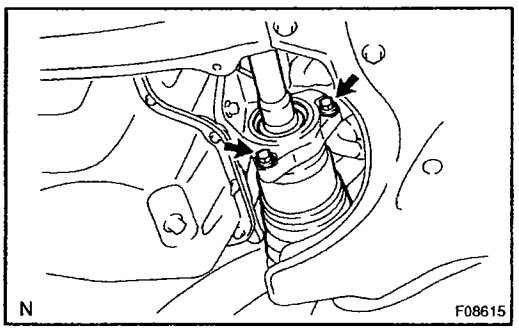


7. DISCONNECT DRIVE SHAFT FROM AXLE HUB

Using a plastic hammer, disconnect the drive shaft from the axle hub.

NOTICE:

Be careful not to damage the boot and ABS speed sensor rotor.



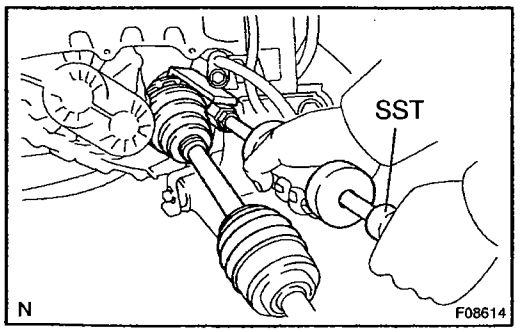
8. RH drive shaft:
REMOVE DRIVE SHAFT

Remove the 2 bolts on the center bearing bracket and pull out the drive shaft together with the center bearing case.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

NOTICE:

Be careful not to damage the oil seal and dust cover.



9. LH drive shaft:
REMOVE DRIVE SHAFT

(a) Using SST, remove the drive shaft.

SST 09520–01010, 09520–24010 (09520–32040)

NOTICE:

Be careful not to damage the oil seal and dust cover.

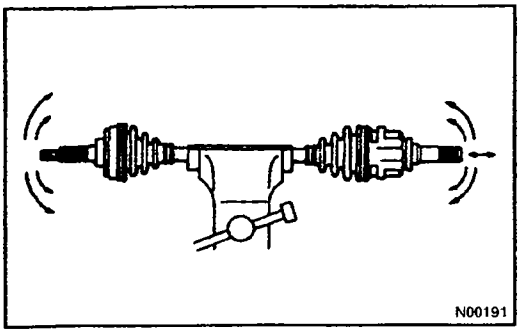
HINT:

At the time of installation, please refer to the following items.

- Apply gear oil to the inboard joint shaft and differential case sliding surfaces.
- Before installing the drive shaft, set the snap ring with its opening side facing downward.
- Whether inboard joint shaft is in contact with pinion shaft or not can be known from the sound or feeling.
- After installation, check that there is 2 – 3 mm (0.08 – 0.12 in.) of play in the axial direction.
- After installation, check that the drive shaft cannot be removed by hand.

(b) Using a screwdriver, remove the snap ring from the inboard joint shaft.

SA1P3-01



DISASSEMBLY

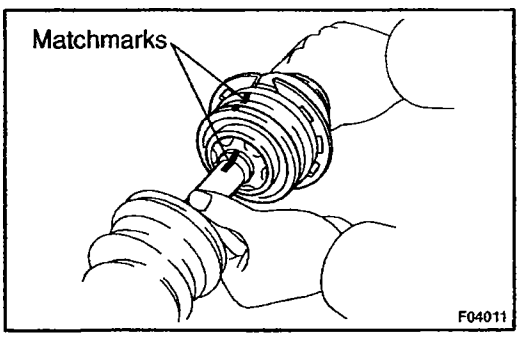
1. 1ZZ–FE engine (M/T) and 2ZZ–GE engine: DISASSEMBLE DRIVE SHAFT

(a) Check the drive shaft.
  (1) Check to see that there is no remarkable play in the outboard joint.
  (2) Check to see that the inboard joint slides smoothly in the thrust direction.
  (3) Check to see that there is no remarkable play in the radial direction of the inboard joint.
  (4) Check the boots for damage.

(b) Remove the inboard and outboard joint boot clamps.
  (1) Using a screwdriver, disclamp the 2 inboard joint boot clamps.
  (2) Using a side cutter, cut the 2 outboard joint boot clamps and remove them.

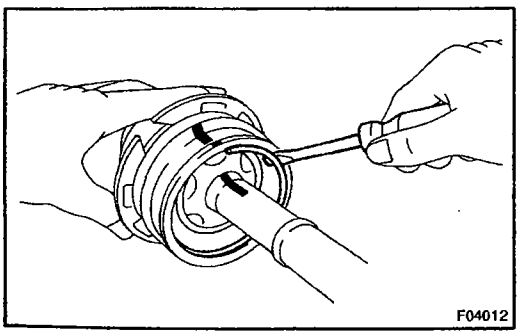
(c) M/T:
Remove the dynamic damper clamp.
Using a screwdriver, disclamp the dynamic damper clamp.

(d) Remove the inboard joint shaft.
  (1) Slide the inboard joint boot toward the outboard joint.

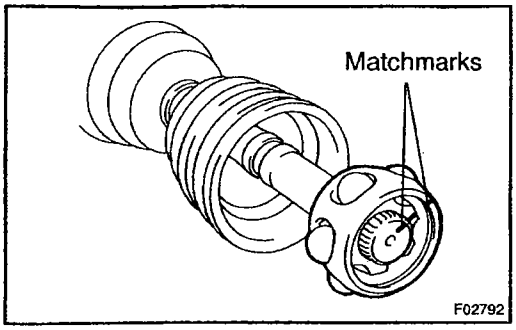


  (2) Place matchmarks on the outboard joint shaft and inboard joint shaft.

NOTICE:
Do not punch the marks.



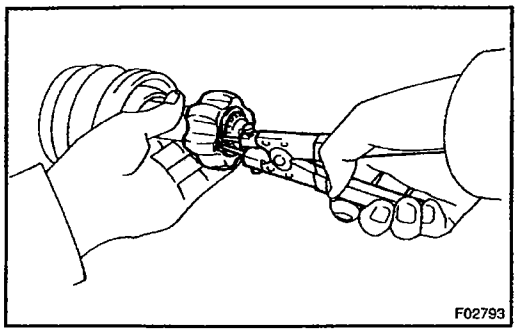
  (3) Using a screwdriver, remove the snap ring.
  (4) Remove the inboard joint shaft from the outboard joint shaft.



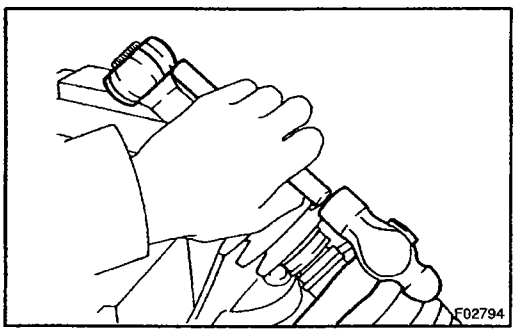
(e) Disassemble the outboard joint shaft.
(1) Place matchmarks on the outboard joint shaft, inner race and cage.

NOTICE:
Do not punch the marks.

(2) Remove the 6 balls.
(3) Slide the cage toward outboard joint.



(4) Using a snap ring expander, remove the snap ring.



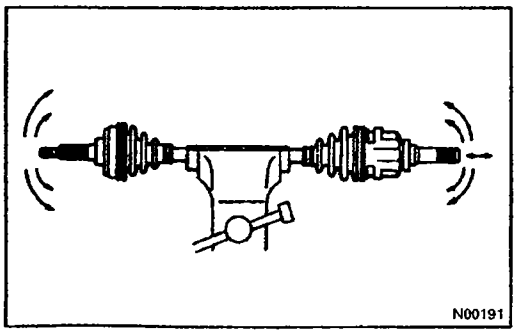
(5) Using a brass bar and hammer, remove the inner race.

NOTICE:
Be careful not to damage the inner race.

(6) Remove the cage.

(f) Remove the dynamic damper (M/T), damper clamp (M/T), inboard and outboard joint boots and inboard joint clamps.

NOTICE:
Do not disassemble the outboard joint.

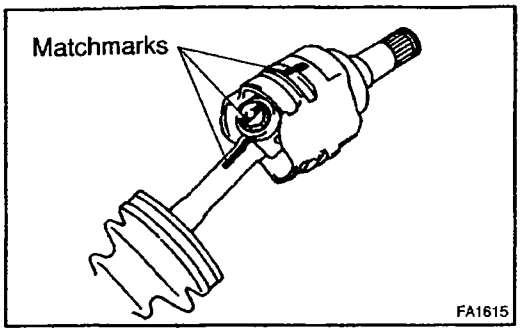


2. 1ZZ–FE engine (A/T):
DISASSEMBLE DRIVE SHAFT

(a) Check the drive shaft.
(1) Check to see that there is no remarkable play in the outboard joint.
(2) Check to see that the inboard joint slides smoothly in the thrust direction.
(3) Check to see that there is no remarkable play in the radial direction of the inboard joint.
(4) Check the boots for damage.

(b) Remove the inboard and outboard joint boot clamps.
(1) Using a screwdriver, disclamp the 2 inboard joint boot clamps.
(2) Using a side cutter, cut the 2 outboard joint boot clamps and remove them.

(c) Remove the inboard joint shaft.
(1) Slide the inboard joint boot toward the outboard joint.



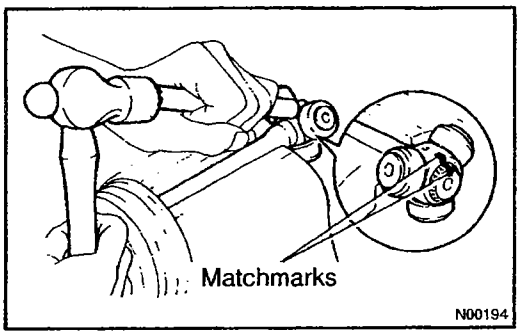
(2) Place matchmarks on the inboard joint shaft, tripod and outboard joint shaft.

NOTICE:
Do not punch the marks.

(3) Remove the inboard joint shaft from the outboard joint shaft.

(d) Remove the tripod.

(1) Using a snap ring expander, remove the snap ring.



(2) Place matchmarks on the outboard joint shaft and tripod.

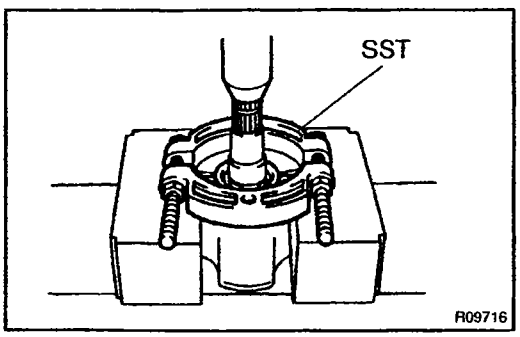
NOTICE:
Do not punch the marks.

(3) Using a brass bar and hammer, remove the tripod from the outboard joint shaft.

NOTICE:
Do not tap the roller.

(e) Remove the inboard and outboard joint boots and inboard joint clamps.

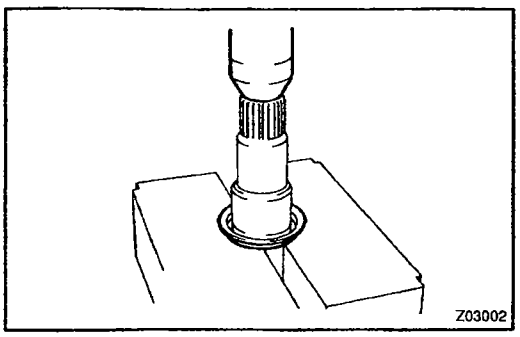
NOTICE:
Do not disassemble the out board joint.



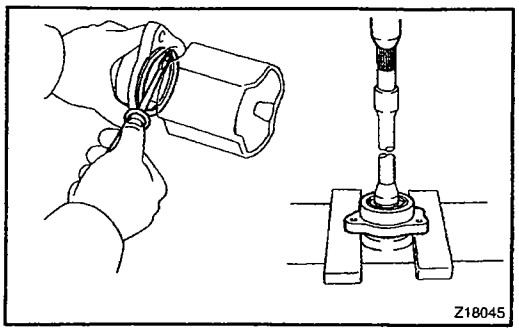
3. DISASSEMBLE INBOARD JOINT SHAFT

(a) LH:
Remove the dust cover.
Using SST and a press, remove the dust cover.
SST 09950–00020

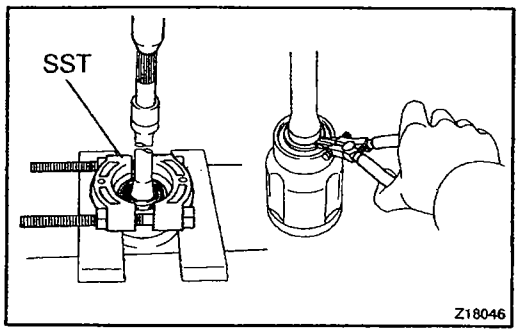
(b) LH shaft of 1ZZ–FE engine (M/T) and 2ZZ–GE engine:
Using a snap ring expander, remove the outer snap ring.



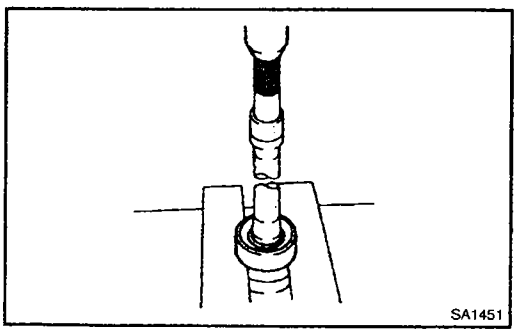
(c) RH:
Remove the transaxle side dust cover.
Using a press, remove the transaxle side dust cover.



(d) RH:
Remove the center bearing.
(1) Using a screwdriver, remove the outside snap ring.
(2) Using a press, remove the center bearing case.
(3) Using a pin punch and hammer, remove the straight pin from the center bearing case.



(4) Using SST and a press, remove the dust cover.
SST 09950–00020
(5) Using a snap ring expander, remove the inside snap ring.

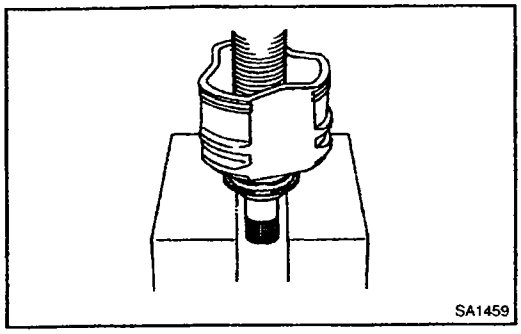


(6) Using a press, remove the center bearing.

SA1P4-01

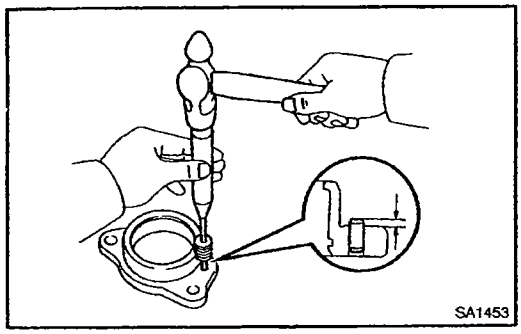
REASSEMBLY

1. REASSEMBLE INBOARD JOINT SHAFT



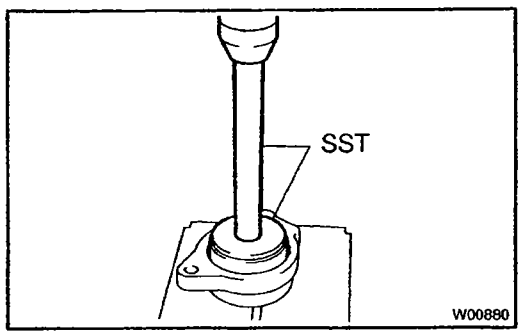
(a) LH:
Install dust cover.
Using a press, install a new dust cover.

(b) LH shaft of 1ZZ–FE engine (M/T) and 2ZZ–GE engine:
Using a snap ring expander, install a new outer snap ring.



(c) RH:
Install center bearing.

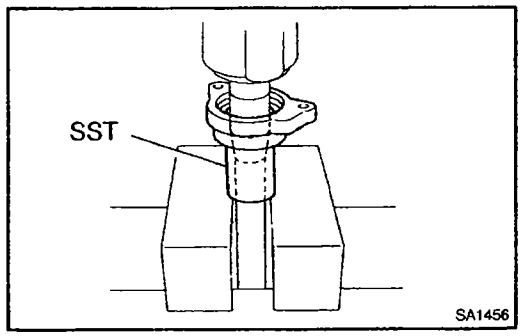
(1) Using a pin punch and hammer, install the straight pin into the center bearing case.



(2) Using SST and a press, install a new center bearing into the bearing case.

SST 09950–60010 (09951–00650),
09950–70010 (09951–07150)

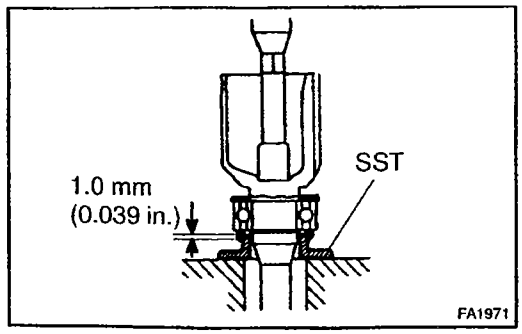
(3) Using a screwdriver, install a new outside snap ring.



(4) Using SST and a press, install the center bearing with the bearing case assembly to the inboard joint shaft.

SST 09710–30021 (09710–03141)

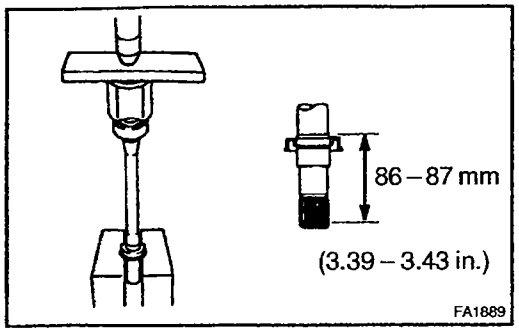
(5) Using a snap ring expander, install a new inside snap ring.



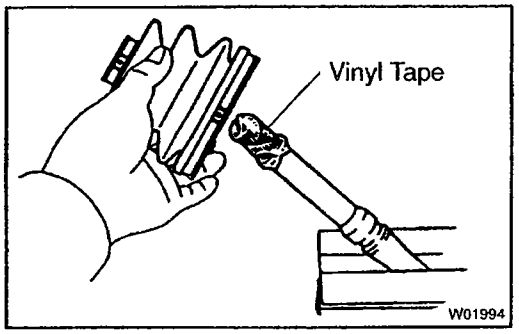
(6) Using SST, an extension bar and press, install a new dust cover.

SST 09506–35010

HINT:
The clearance between the dust cover and bearing should be kept in the ranges as shown in the illustration.



(d) RH:
Install the transaxle side dust cover.
Using a steel plate and press, install a new transaxle side dust cover until the distance from the tip of the inboard joint shaft to the dust cover reaches the specified value, as shown in the illustration.



2. 1ZZ–FE engine (A/T):
REASSEMBLE DRIVE SHAFT

(a) Temporarily install new outboard and inboard joint boots and new clamps.

HINT:
Before installing the boots, wrap the spline of the outboard joint shaft with vinyl tape to prevent them from being damaged.

(1) Place 2 new clamps on a new outboard joint boot and install them to the outboard joint shaft.
(2) Place 2 new clamps on a new inboard joint boot and install them to the outboard joint shaft.

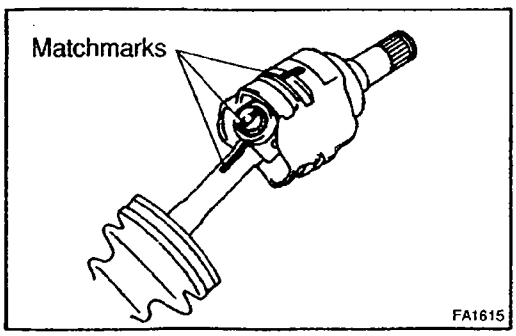
(b) Install the tripod.
(1) Place the beveled side of the tripod axial spline toward the outboard joint.
(2) Align the matchmarks placed before removal.
(3) Using a brass bar and hammer, tap in the tripod to the outboard joint shaft.

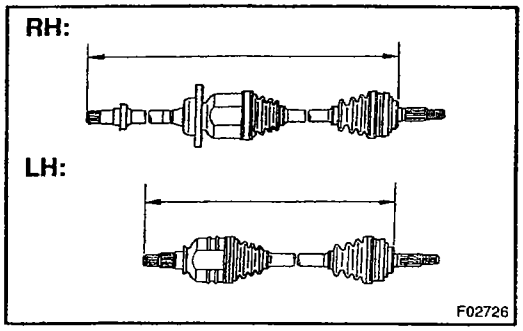
NOTICE:
Do not tap the roller.

(4) Using a snap ring expander, install a new snap ring.

(c) Install the boot to outboard joint.
Before assembling the boot, pack the outboard joint and boot with grease in the boot kit.
Grease capacity: (Color = Yellow ocher)
110 – 120 g (3.9 – 4.2 oz.)

(d) Install the inboard joint shaft to outboard joint shaft.
(1) Pack the inboard joint and boot with grease in the boot kit.
Grease capacity: (Color = Yellow ocher)
180 – 190 g (6.3 –6.7 oz.)
(2) Align the matchmarks placed before removal, and install the inboard joint shaft to the outboard joint shaft.
(3) Temporarily install the boot to the inboard joint.



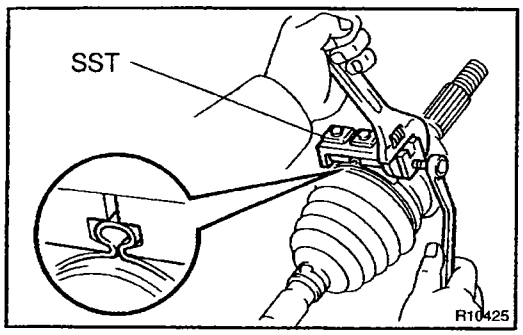


(e) Assemble the boot clamps to both boots.
(1) Make sure that the boots are on the shaft grooves.
(2) Make sure that the boots are not stretched or contracted when the drive shaft is at standard length.

Drive shaft standard length:

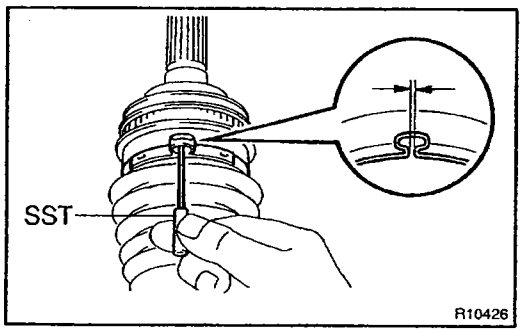
RH	851.0 ± 5.0 mm (33.504 ± 0.197 in.)
LH	565.9 ± 5.0 mm (22.279 ± 0.197 in.)

(3) Bend the band and lock the inboard joint boot clamps with a screwdriver.

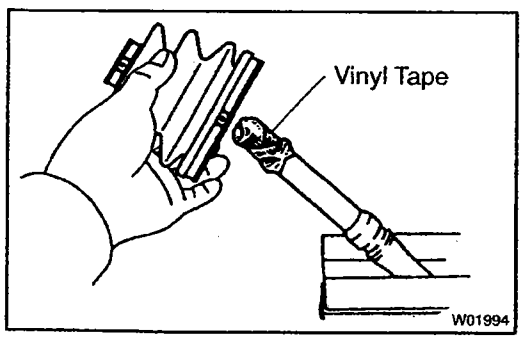


(4) Secure the 2 outboard joint boot clamps onto the boot.
(5) Place SST onto the outboard joint large boot clamp.
SST 09521–24010
(6) Tighten the SST so that the large clamp is pinched.

NOTICE:
Do not overtighten the SST.



(7) Using SST, adjust the clearance of the large clamp.
SST 09240–00020
Clearance: 0.8 mm (0.031 in.) or less
(8) Employ the same manner to the outboard joint small boot clamp.

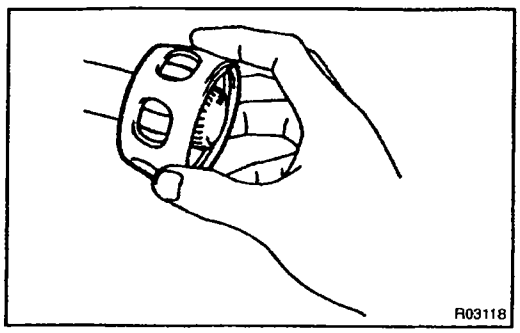


3. 1ZZ–FE engine (M/T) and 2ZZ–GE engine: REASSEMBLE DRIVE SHAFT

(a) Temporarily install dynamic damper (M/T), new outboard and inboard joint boots and new clamps.

HINT:
Before installing the boots, wrap the spline of the outboard joint shaft with vinyl tape to prevent them from being damaged.

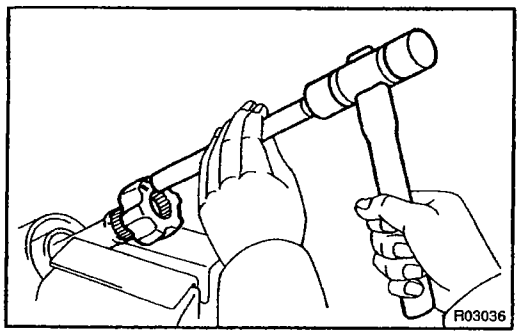
(1) Place 2 new clamps on a new outboard joint boot and install them to the outboard joint shaft.
(2) M/T:
Place new clamp on the dynamic damper and install them to the outboard joint shaft.
(3) Place 2 new clamps on a new inboard joint boot and install them to the outboard joint shaft.



(b) Assemble the outboard joint shaft.
(1) Install the cage to the outboard joint shaft.

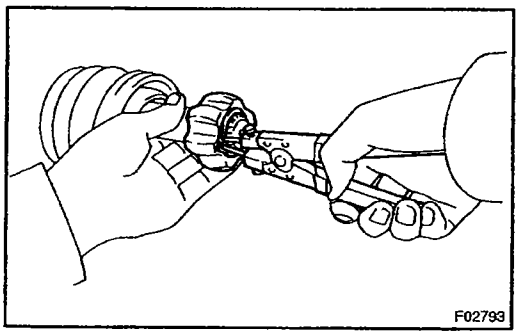
NOTICE:
The side with smaller diameter must face outboard joint.

(2) Align the matchmarks on the inner race and outboard joint shaft.

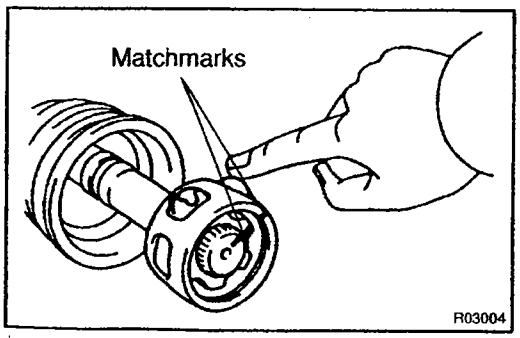


(3) Using a brass bar and hammer, tap in the inner race to the outboard joint shaft.

NOTICE:
Be careful not to damage the inner race.



(4) Using a snap ring expander, install a new snap ring.

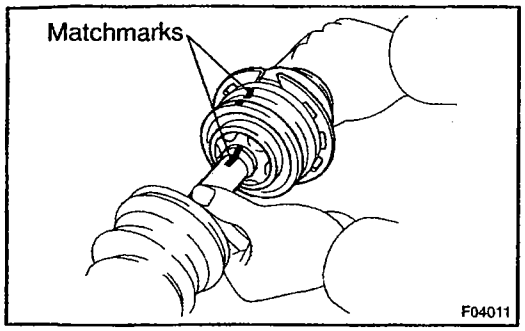


(5) Align the matchmarks on the cage and inner race.
(6) Install the cage to the inner race.
(7) Install the 6 balls.

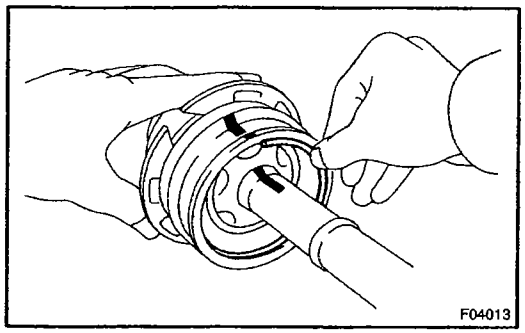
HINT:
Apply grease onto the balls to keep them from falling.

(c) Install the boot to outboard joint.
Before assembling the boot, pack the outboard joint and boot with grease in the boot kit.
Grease capacity: (Color = Black)
115 – 135 g (4.1 – 4.8 oz.)

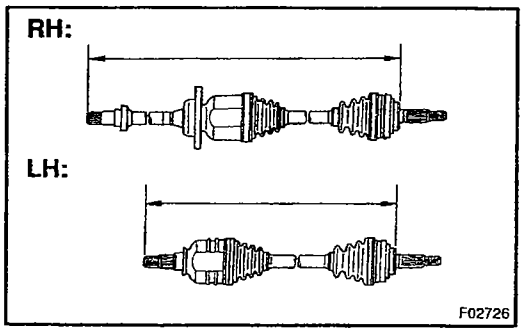
(d) Install the inboard joint shaft to outboard joint shaft.
(1) Before assembling the boot, pack the inboard joint and boot with grease in the boot kit.
Grease capacity: (Color = Gray)
100 – 120 g (3.5 – 4.2 oz.)



(2) Align the matchmarks on the inboard joint shaft and outboard joint shaft.
(3) Install the inboard joint shaft to the outboard joint shaft.



(4) Install a new snap ring.
(5) Temporarily install the boot to the inboard joint shaft.

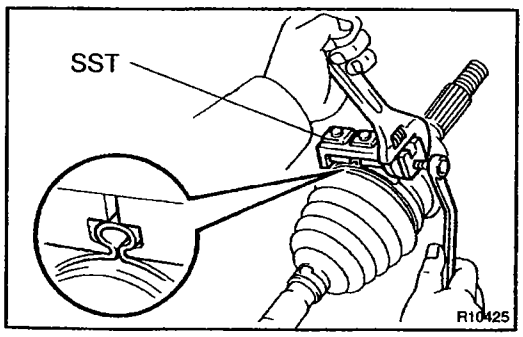


(e) Assemble the boot clamps to both boots.
(1) Make sure that the boots are on the shaft grooves.
(2) Make sure that the boots are not stretched or contracted when the drive shaft is at standard length.

Drive shaft standard length:

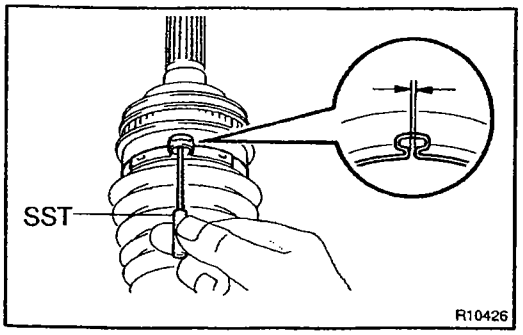
RH	845.5 ± 5.0 mm (33.287 ± 0.197 in.)
LH	563.7 ± 5.0 mm (22.193 ± 0.197 in.)

(3) Bend the band and lock the inboard joint boot clamps with a screwdriver.

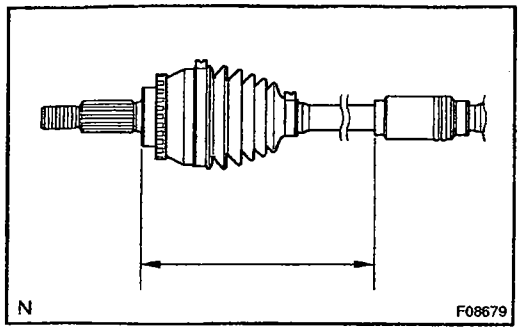


(4) Secure the 2 outboard joint boot clamps onto the boot.
(5) Place SST onto the outboard joint large boot clamp.
SST 09521–24010
(6) Tighten the SST so that the large clamp is pinched.

NOTICE:
Do not overtighten the SST.



(7) Using SST, adjust the clearance of the large clamp.
SST 09240–00020
Clearance: 1.2 – 4.0 mm (0.047 – 0.157 in.)
(8) Employ the same manner to the outboard joint small boot clamp.



(f) M/T:

Assemble the dynamic damper clamp.

(1) Set the dynamic damper distance, as described below.

Distance: 155.0 ± 2.0 mm (6.102 ± 0.079 in.)

(2) Bend the band and lock the dynamic damper clamp with a screwdriver.

4. CHECK DRIVE SHAFT (See page SA–22)

INSTALLATION

Installation is in the reverse order removal (See page SA–20).

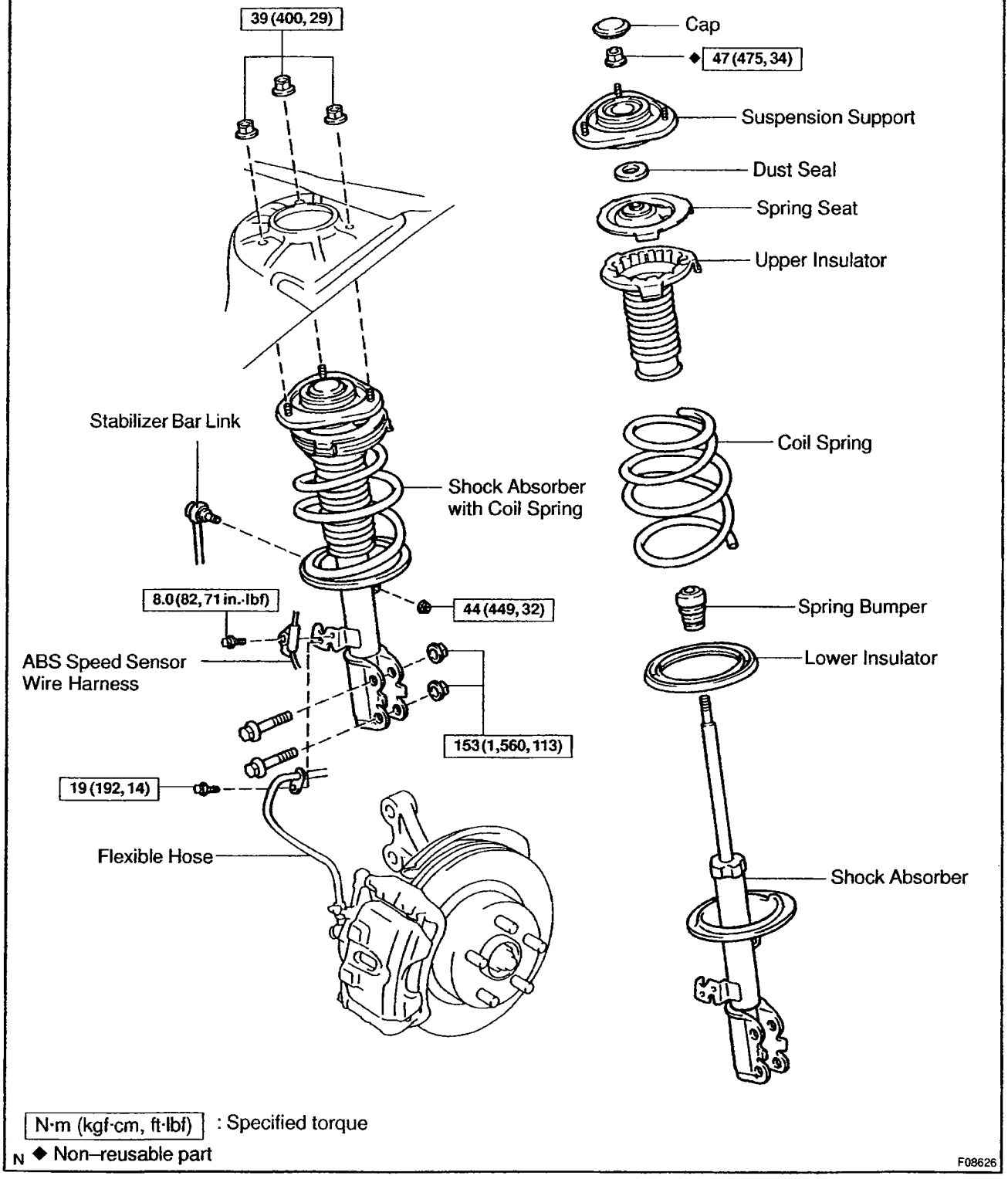
HINT:

After installation, check the ABS speed sensor signal (See page DI–276) and front wheel alignment (See page SA–4).

FRONT SHOCK ABSORBER

COMPONENTS

SA10J-03



N·m (kgf·cm, ft·lbf) : Specified torque

N ◆ Non–reusable part

F08626

SA1P5-01

REMOVAL

1. **REMOVE FRONT WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **DISCONNECT ABS SPEED SENSOR WIRE HARNESS CLAMPS FROM SHOCK ABSORBER**

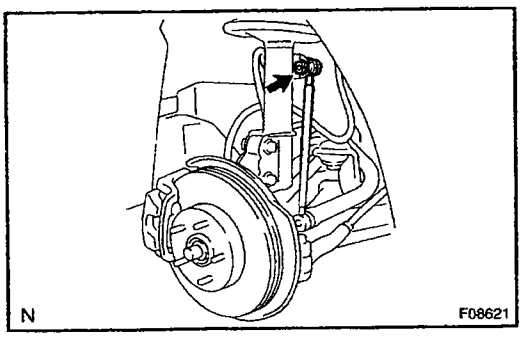
Remove the bolt and disconnect the ABS speed sensor wire harness clamp.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

3. **DISCONNECT FLEXIBLE HOSE**

Remove the bolt and disconnect the flexible hose from the shock absorber bracket.

Torque: 19 N·m (192 kgf·cm, 14 ft·lbf)



4. **DISCONNECT STABILIZER BAR LINK**

Remove the nut and disconnect the stabilizer bar link from the shock absorber.

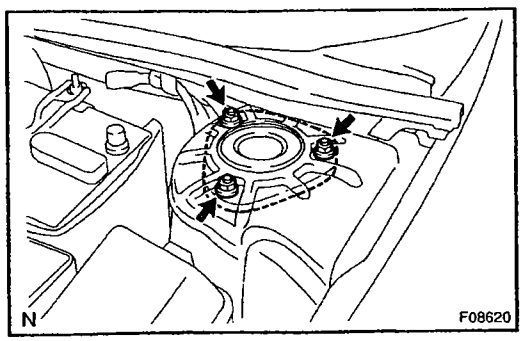
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

5. **REMOVE SHOCK ABSORBER WITH COIL SPRING**

(a) Loosen the 2 nuts on the lower side of shock absorber.
Torque: 153 N·m (1,560 kgf·cm, 113 ft·lbf)

HINT:
Do not remove the 2 bolts.



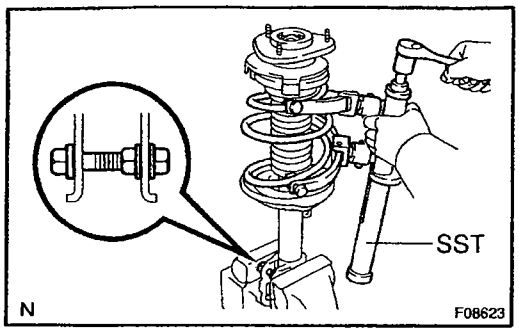
(b) Remove the 3 nuts on the upper side of the shock absorber.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(c) Remove the 2 nuts and bolts on the lower side of shock absorber.

HINT:
At the time of installation, coat the nut's thread with engine oil.

(d) Remove the shock absorber with coil spring.

SA0CS-05



DISASSEMBLY

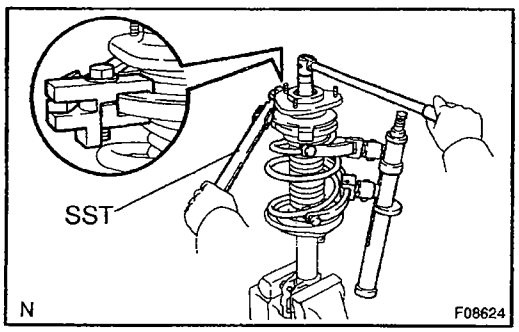
REMOVE COIL SPRING

(a) Install 2 nuts and a bolt to the bracket at the lower side of the shock absorber and secure it in a vise.

(b) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:
Do not use an impact wrench. It will damage the SST.

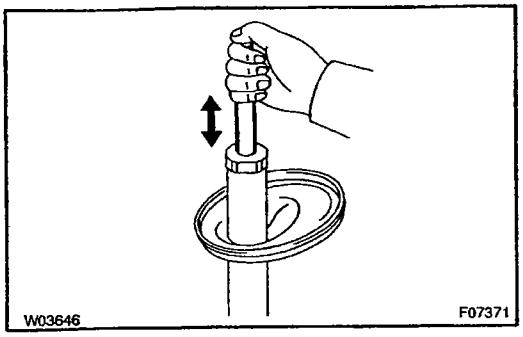
(c) Remove the cap from the suspension support.



(d) Using SST to hold the spring seat, remove the nut.
SST 09729–22031

(e) Remove the suspension support, dust seal, spring seat, upper insulator, coil spring, spring bumper and lower insulator.

SA0CT–05



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber with a new one.

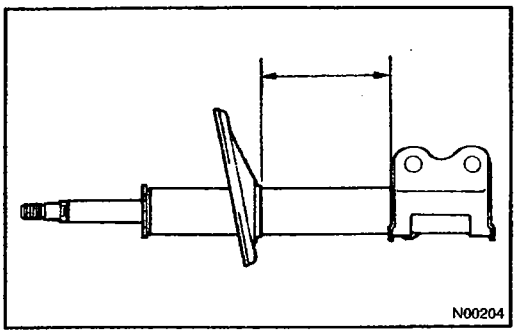
NOTICE:

When disposing of the shock absorber, see DISPOSAL on page SA–37.

SA0L8-05

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD



2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown in the illustration to discharge the gas inside.

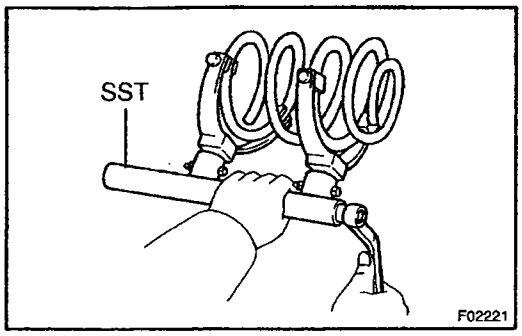
CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**

SA1P6-01

REASSEMBLY

1. **INSTALL LOWER INSULATOR ONTO SHOCK ABSORBER**
2. **INSTALL SPRING BUMPER TO PISTON ROD**



3. **INSTALL COIL SPRING**

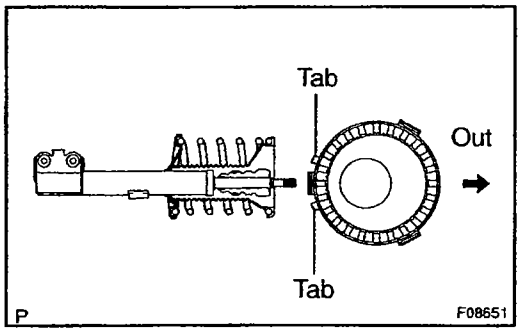
(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

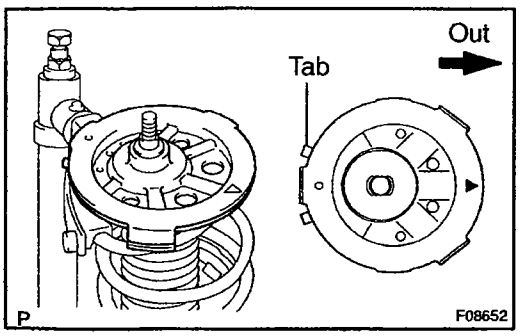
NOTICE:
Do not use an impact wrench. It will damage the SST.

(b) Install the coil spring to the shock absorber.

HINT:
Fit the lower end of the coil spring into the gap of the spring lower seat.

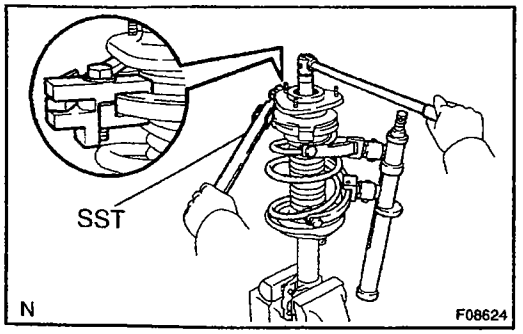
(c) Install the upper insulator as shown in the illustration.





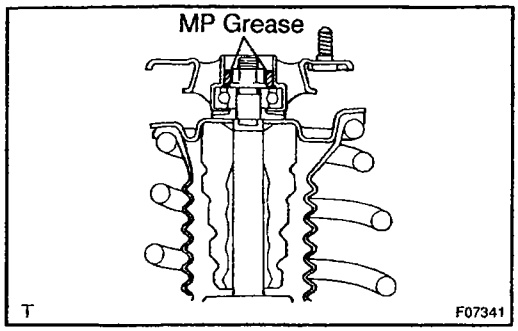
(d) Install the spring seat to the shock absorber with the "△" mark facing to the outside of the vehicle.

(e) Install the dust seal and suspension support.



(f) Using SST to hold the suspension support, install a new nut.
SST 09729–22031
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

(g) Remove the SST.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)



(h) Apply MP grease into the suspension support.
(i) Install the cap.

INSTALLATION

Installation is in the reverse order of removal (See page SA–34).

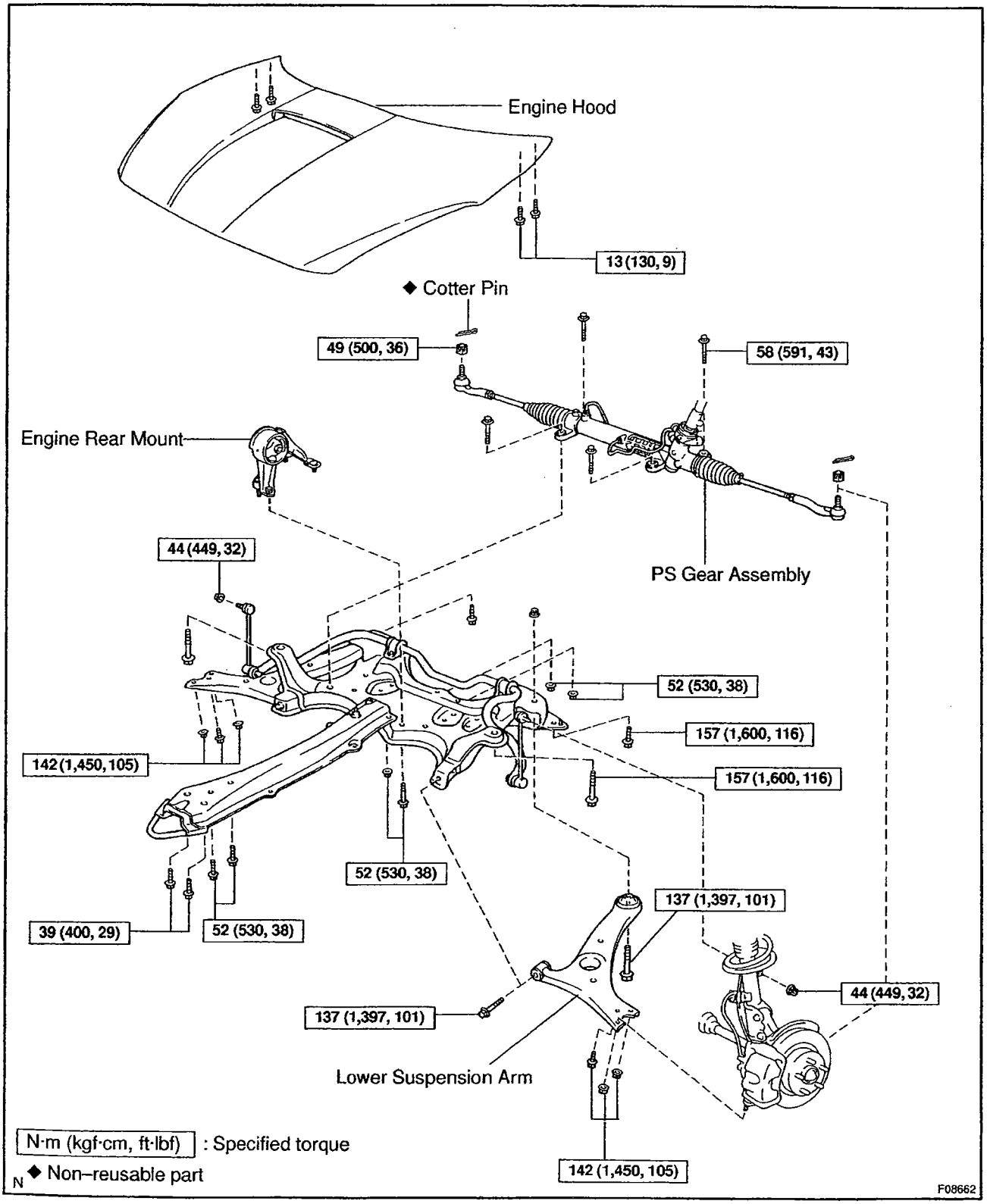
HINT:

After installation, check the front wheel alignment (See page SA–4).

FRONT LOWER SUSPENSION ARM

COMPONENTS

SA1OR-02

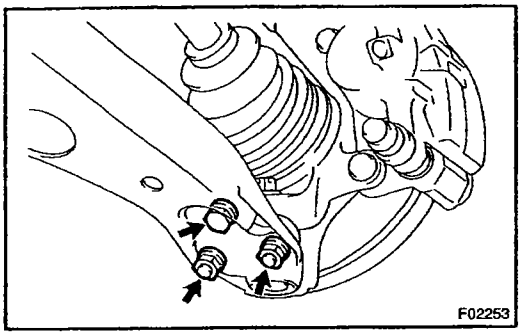


SA1OS-01

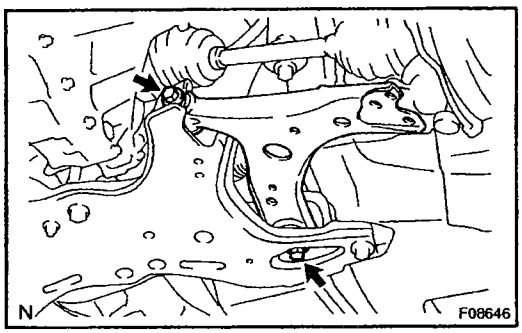
REMOVAL

1. **REMOVE FRONT WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **M/T or A/T RH side:**
   REMOVE LOWER SUSPENSION ARM

(a) Remove the engine under cover.



(b) Remove the bolt and 2 nuts, and disconnect the lower suspension arm from the lower ball joint.
Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)



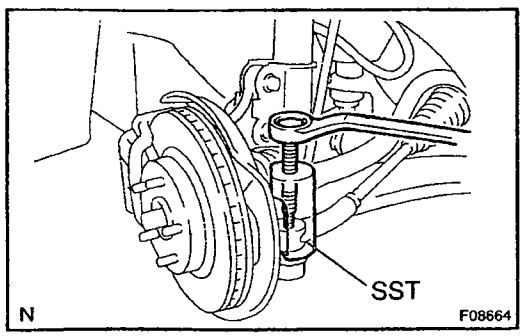
(c) Remove the 2 bolts, nut and lower suspension arm.
Torque: 137 N·m (1,397 kgf·cm, 101 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the bolts.

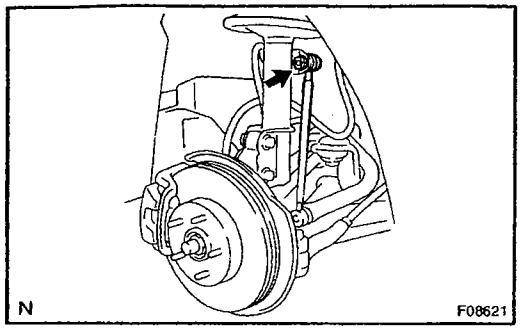
3. **A/T LH side:**
   REMOVE LOWER SUSPENSION ARM

(a) Remove the engine under covers.
(b) Disconnect the RH and LH tie rod ends.
(1) Remove the cotter pin and nut.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:
At the time of installation, if the holes for a new cotter pin are not aligned, tighten the nut further up to 60°.



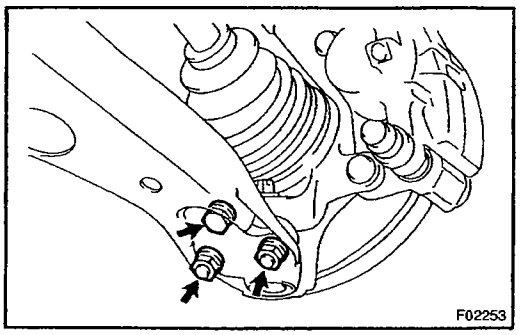
(2) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09610–20012
(3) Employ the same manner described above to the other side.



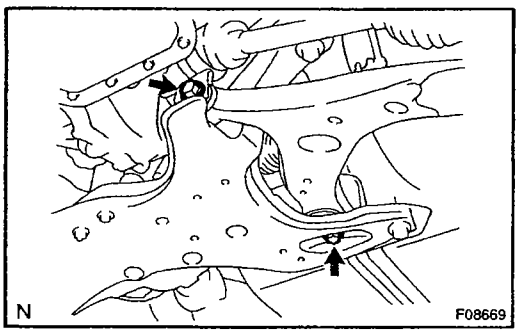
(c) Disconnect the RH and LH stabilizer bar links.
(1) Remove the nut and disconnect the stabilizer bar link from the shock absorber.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

(2) Employ the same manner described above to the other side.



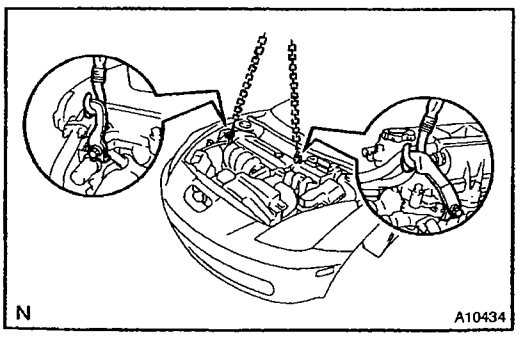
(d) Disconnect the RH and LH lower suspension arms from the lower ball joints.
(1) Remove the bolt and 2 nuts, and disconnect the lower suspension arm from the lower ball joint.
Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)
(2) Employ the same manner described above to the other side.



(e) Loosen the lower suspension arm set bolts.
Torque: 137 N·m (1,397 kgf·cm, 101 ft·lbf)

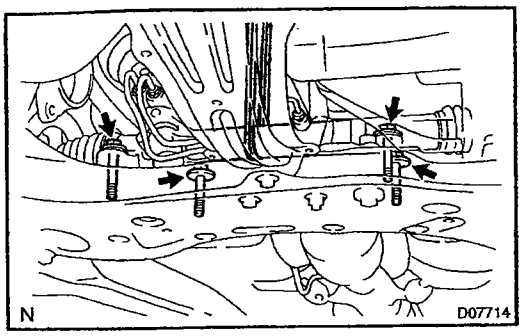
HINT:
At the time of installation, after stabilizing the suspension, torque the bolts.

(f) Remove the engine hood (See page BO–9).

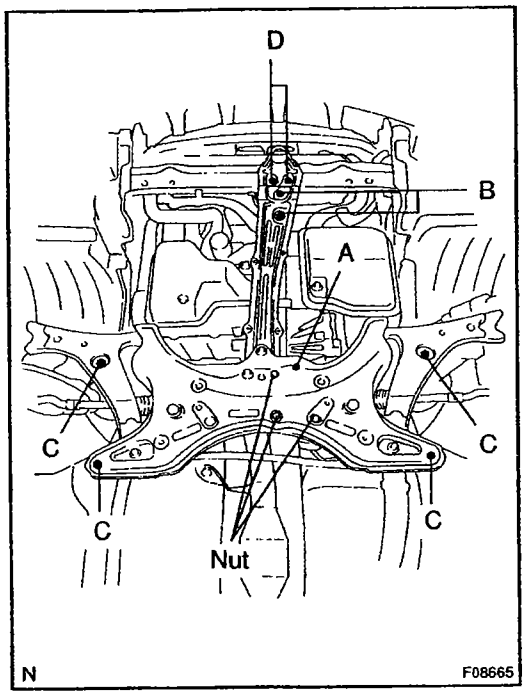


(g) Attach the engine sling device to the engine hangers.
(1) Disconnect the 2 PCV hoses.
(2) Install the No. 1 and No. 2 engine hangers in the correct direction.
Parts No. : (1ZZ–FE engine)
No. 1 engine hanger: 12281–22021
No. 2 engine hanger: 12281–15040 or 12281–15050
Bolt: 91512–B1016
Parts No. : (2ZZ–GE engine)
No. 1 engine hanger: 12281–88600
No. 2 engine hanger: 12282–88600
Bolt: 91512–61020
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)
(3) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.



(h) Disconnect the PS gear assembly from the suspension member.
(1) Remove the 4 set bolts.
Torque: 58 N·m (591 kgf·cm, 43 ft·lbf)
(2) Tie the PS gear assembly to suspend it securely.



(i) Remove the bolt A and 3 nuts, and disconnect the engine rear mount.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)
(j) Remove the 2 bolts (B) and disconnect the engine front mount.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)
(k) Using a transmission jack, support the suspension member.
(l) Remove the 6 bolts (C and D) and lower the suspension member.
Torque:
Bolt C: 157 N·m (1,600 kgf·cm, 116 ft·lbf)
Bolt D: 39 N·m (400 kgf·cm, 29 ft·lbf)
(m) Remove the 2 bolts, nut and lower suspension arm.

SA1OT-01

INSTALLATION

Installation is in the reverse order of removal (See page SA–42).

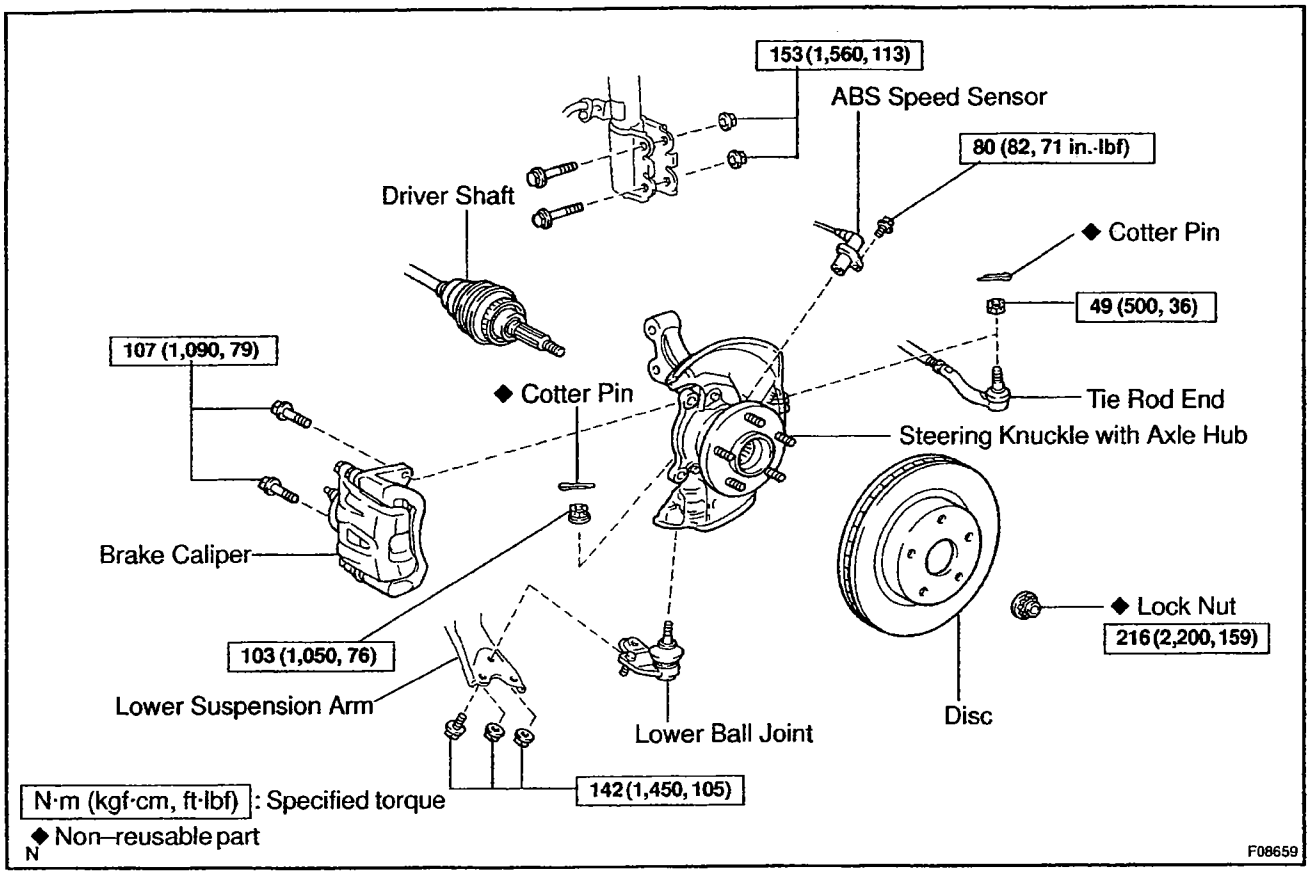
HINT:

After installation, check the front wheel alignment (See page SA–4).

FRONT LOWER BALL JOINT

COMPONENTS

SA07X-07

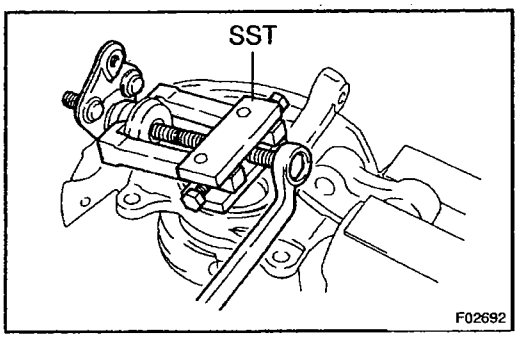


SA07Y–05

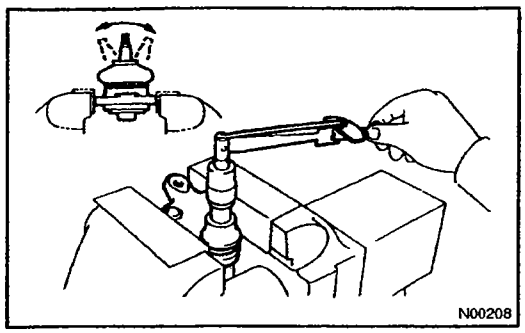
REMOVAL

1. **REMOVE STEERING KNUCKLE WITH AXLE HUB (See page SA–12)**
2. **REMOVE LOWER BALL JOINT**

(a) Remove the cotter pin and nut.



(b) Using SST, remove the lower ball joint.
SST 09628–62011



SA1EP–02

INSPECTION

INSPECT LOWER BALL JOINT FOR ROTATION CONDITION

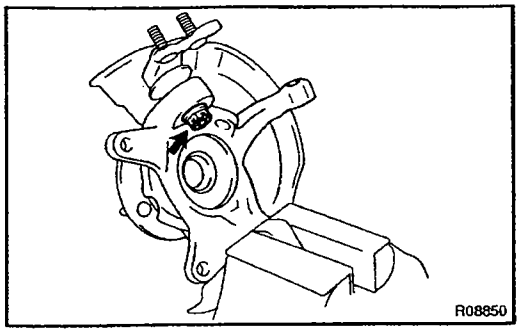
(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously at a rate of 2 – 4 seconds per 1 turn and take the torque reading on the 5th turn.

Turning torque:

1.0 – 4.9 N·m (10 – 50 kgf·cm, 8.7 – 43 in.·lbf)

SA10F-02



INSTALLATION

1. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint and tighten the nut.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(b) Install a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60 °.

2. INSTALL STEERING KNUCKLE WITH AXLE HUB
(See page SA–16)

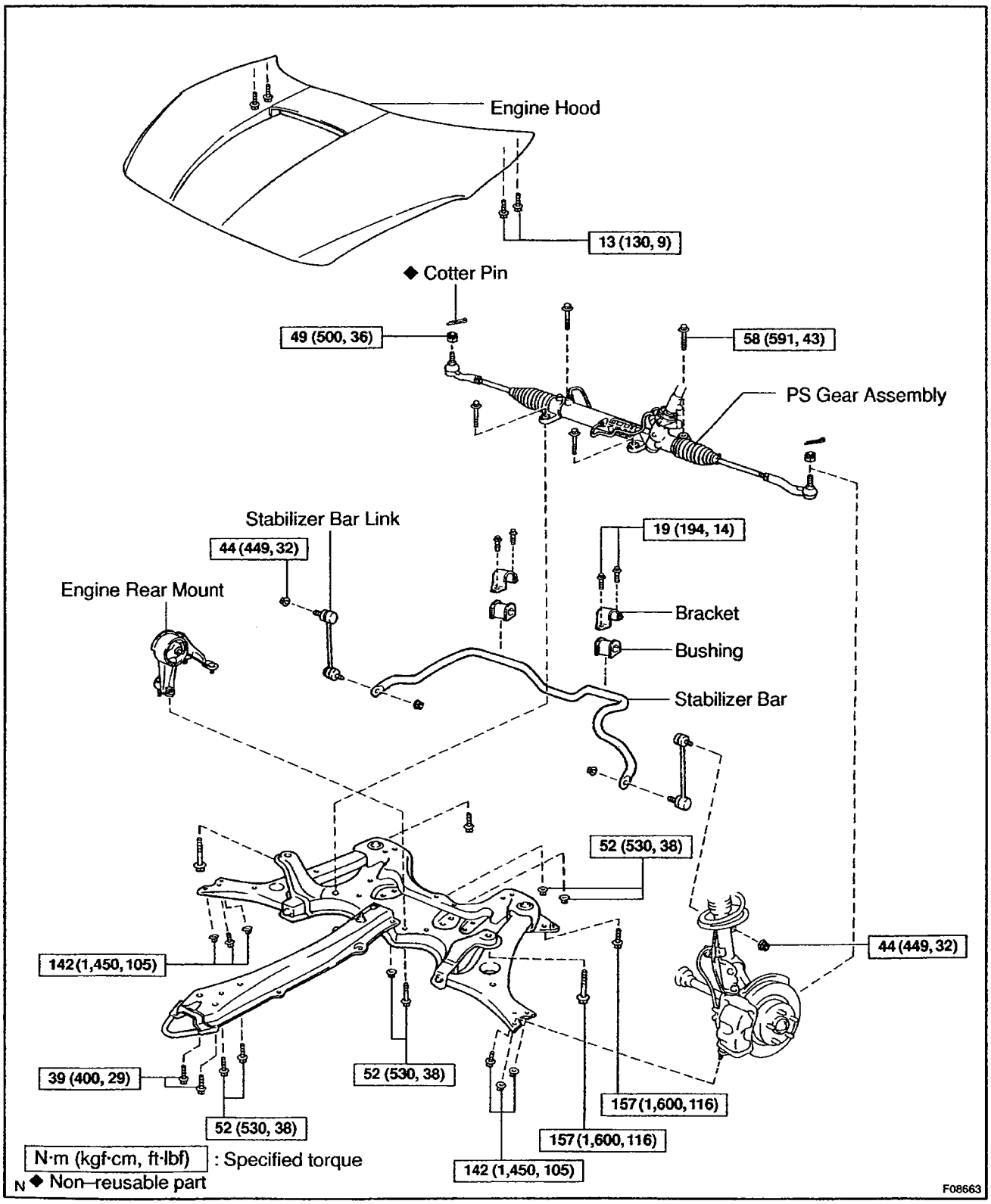
3. CHECK ABS SPEED SENSOR SIGNAL
(See page DI–276)

4. CHECK FRONT WHEEL ALIGNMENT
(See page SA–4)

FRONT STABILIZER BAR

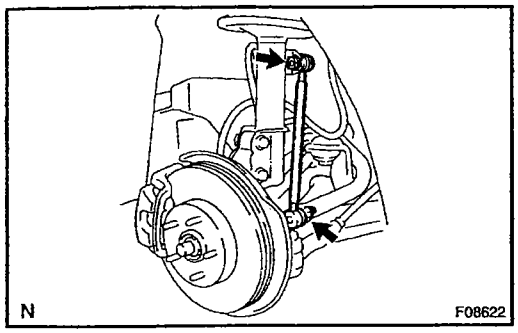
COMPONENTS

SA10H-03



SA10I-03

REMOVAL



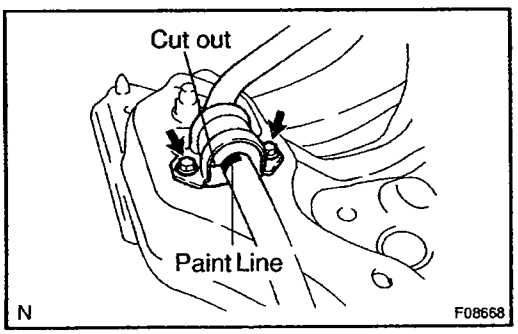
1. REMOVE STABILIZER BAR LINKS

(a) Remove the 2 nuts and stabilizer bar link.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

(b) Employ the same manner described above to the other side.

2. REMOVE FRONT SUSPENSION MEMBER WITH LOWER SUSPENSION ARM (See page SA–42)



3. REMOVE STABILIZER BAR

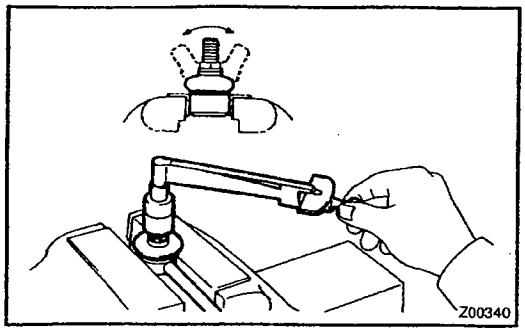
(a) Remove the 2 bolts, bracket and bushing.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

HINT:
At the time of installation, please refer to the following items.

- Install the bushing so that the cutout will face to the rear.
- Install the bushing to the outside of the paint line on the stabilizer bar.

(b) Employ the same manner described above to the other side.

(c) Remove the stabilizer bar.



SA1ET–02

INSPECTION

INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously at a rate of 2 – 4 seconds per 1 turn and take the torque reading on the 5th turn.

Turning torque:
0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.·lbf)

SA04Q-05

INSTALLATION

Installation is in the reverse order of removal (See page SA–51).

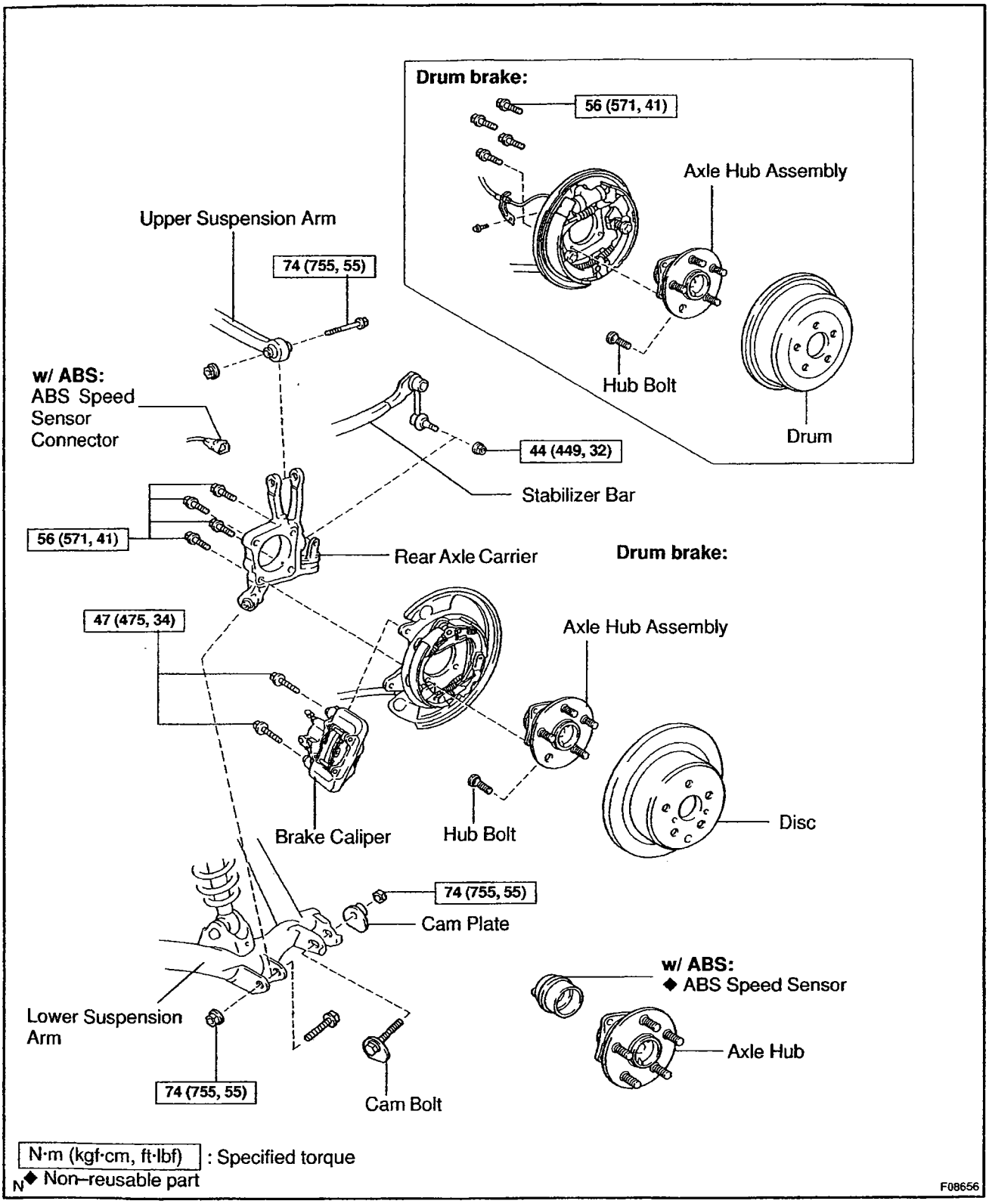
HINT:

After installation, check the front wheel alignment (See page SA–4).

REAR AXLE CARRIER

COMPONENTS

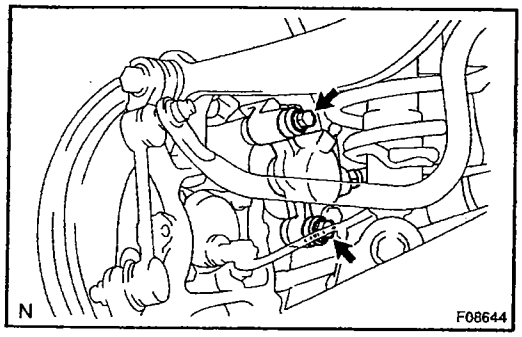
SA1P7-01



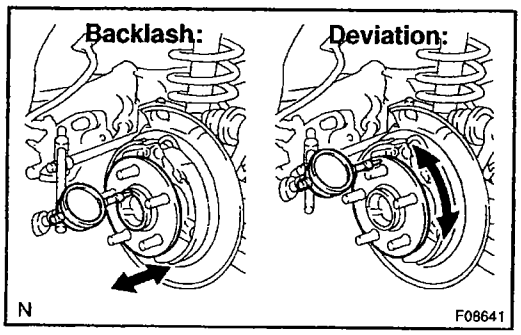
SA1P8-01

REMOVAL

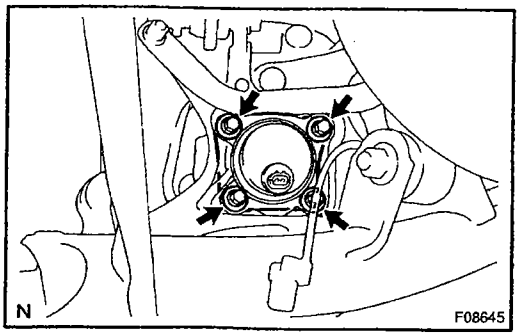
1. **REMOVE REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



2. **w/ Disc brake:**
   REMOVE BRAKE CALIPER AND DISC
(a) Remove the 2 bolts, brake caliper and disc.
   Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)
(b) Support the brake caliper securely.
3. **w/ Drum brake:**
   REMOVE BRAKE DRUM



4. **CHECK BEARING BACKLASH AND AXLE HUB DEVIATION**
(a) Using a dial indicator, check the backlash near the center of the axle hub.
   Maximum: 0.05 mm (0.0020 in.)
If the backlash exceeds the maximum, replace the axle hub.
(b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.
   Maximum: 0.07 mm (0.0028 in.)
If the deviation exceeds the maximum, replace the axle hub.
5. **w/ ABS:**
   DISCONNECT ABS SPEED SENSOR CONNECTOR



6. **REMOVE REAR AXLE HUB**
(a) Remove the 4 bolts and axle hub assembly.
   Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)
(b) Support the backing plate securely.
7. **DISCONNECT STABILIZER BAR LINK**
Remove the nut and disconnect stabilizer bar link.
   Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)
HINT:
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

8. DISCONNECT UPPER SUPPORT SUSPENSION ARM

Remove the bolt and nut, and disconnect the upper suspension arm.

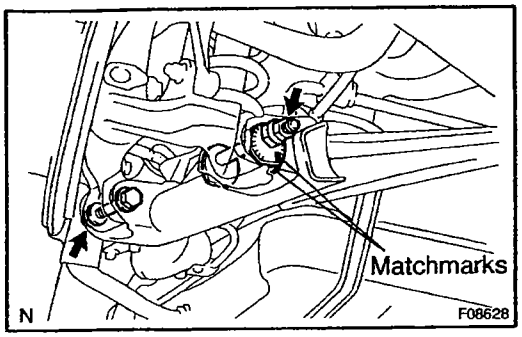
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

NOTICE:

Do not turn the nut.

HINT:

At the time of installation, after stabilizing the suspension, torque the bolt.



9. REMOVE REAR AXLE CARRIER

(a) Remove the front side bolt and nut of the lower suspension arm.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

(b) Place matchmarks on both the cam plate and lower suspension arm.

(c) Remove the nut, cam plate and cam bolt.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

(d) Remove the rear axle carrier.

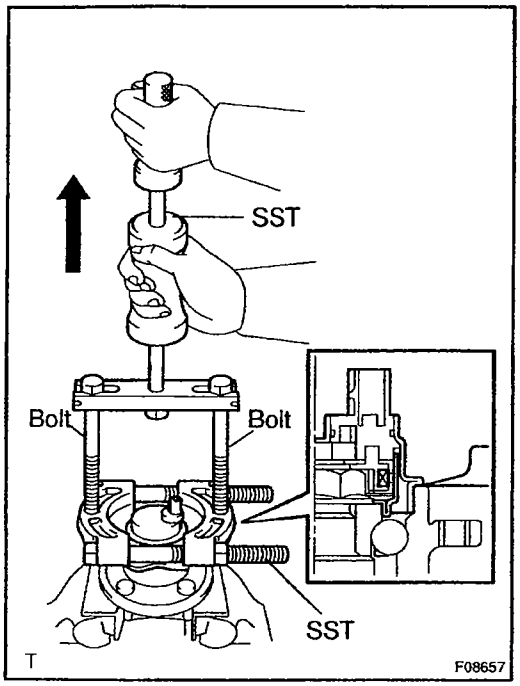
SA1L8-02

DISASSEMBLY

w/ ABS:

REMOVE ABS SPEED SENSOR

(a) Using a pin punch and hammer, drive out the 2 pins and remove the 2 attachments from SST.
SST 09520–00031 (09520–00040, 09521–00020)



(b) Mount the axle hub assembly in a soft jaw vise.

NOTICE:

Replace the axle hub assembly if it is dropped or a strong shock is given to it.

(c) Using SST and 2 bolts (Diameter: 12 mm, Pitch: 1.5 mm), remove the ABS speed sensor.
SST 09520–00031 (09520–00040, 09521–00020), 09950–00020

NOTICE:

- **Do not allow any foreign matter sticking to the sensor rotor.**
- **Pull out the ABS speed sensor straightly not to damage the sensor rotor.**
- **If damage has occurred to the sensor rotor, replace the axle hub assembly.**
- **Do not scratch the contacting surface of the axle hub and speed sensor.**

SA1P9–01

REASSEMBLY

w/ ABS:

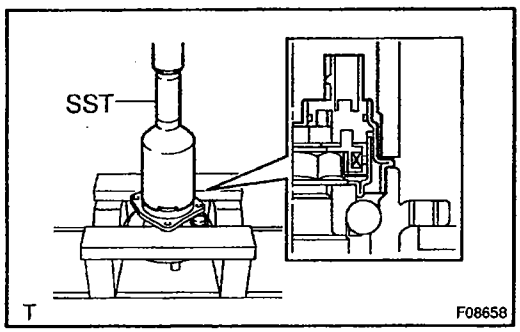
INSTALL NEW ABS SPEED SENSOR

(a) Clean the contacting surface of the axle hub and a new ABS speed sensor.

NOTICE:

Do not allow any foreign matter sticking to the sensor rotor.

(b) Place the ABS speed sensor on the axle hub so that the connector is set at the bottom under the on–vehicle condition.



(c) Using SST and a press, install a new ABS speed sensor to the axle hub.
SST 09214–76011

NOTICE:

- **Do not tap the speed sensor with a hammer directly.**
- **Check that there should be no foreign matter on the speed sensor detection portion.**
- **Press in the ABS speed sensor straightly and slowly.**

SA1PA–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–55).

HINT:

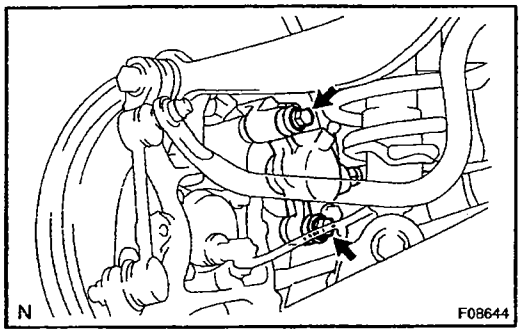
After installation, check the ABS speed sensor signal (See page DI–276) and rear wheel alignment (See page SA–8).

REAR WHEEL HUB BOLT

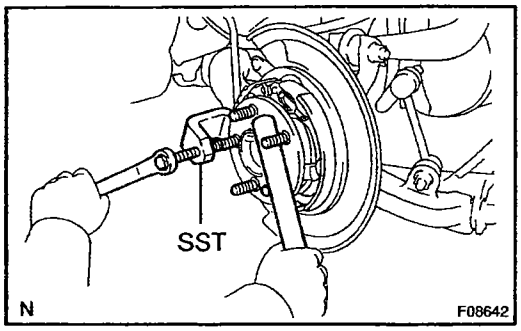
SA1PB-01

REPLACEMENT

1. **REMOVE REAR WHEEL**

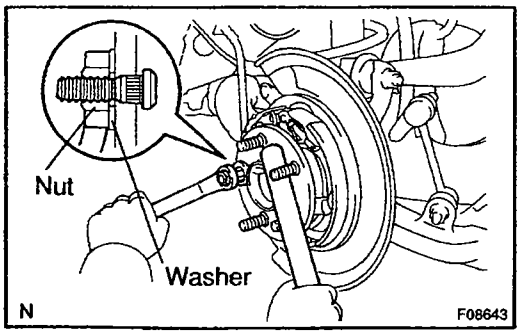


2. **w/ Disc brake:**
   REMOVE BRAKE CALIPER AND DISC
(a) Remove the 2 bolts, brake caliper and disc.
(b) Support the brake caliper securely.
3. **w/ Drum brake:**
   REMOVE BRAKE DRUM



4. **REMOVE HUB BOLT**

Using SST and a brass bar, remove the hub bolt.
SST 09628–10011



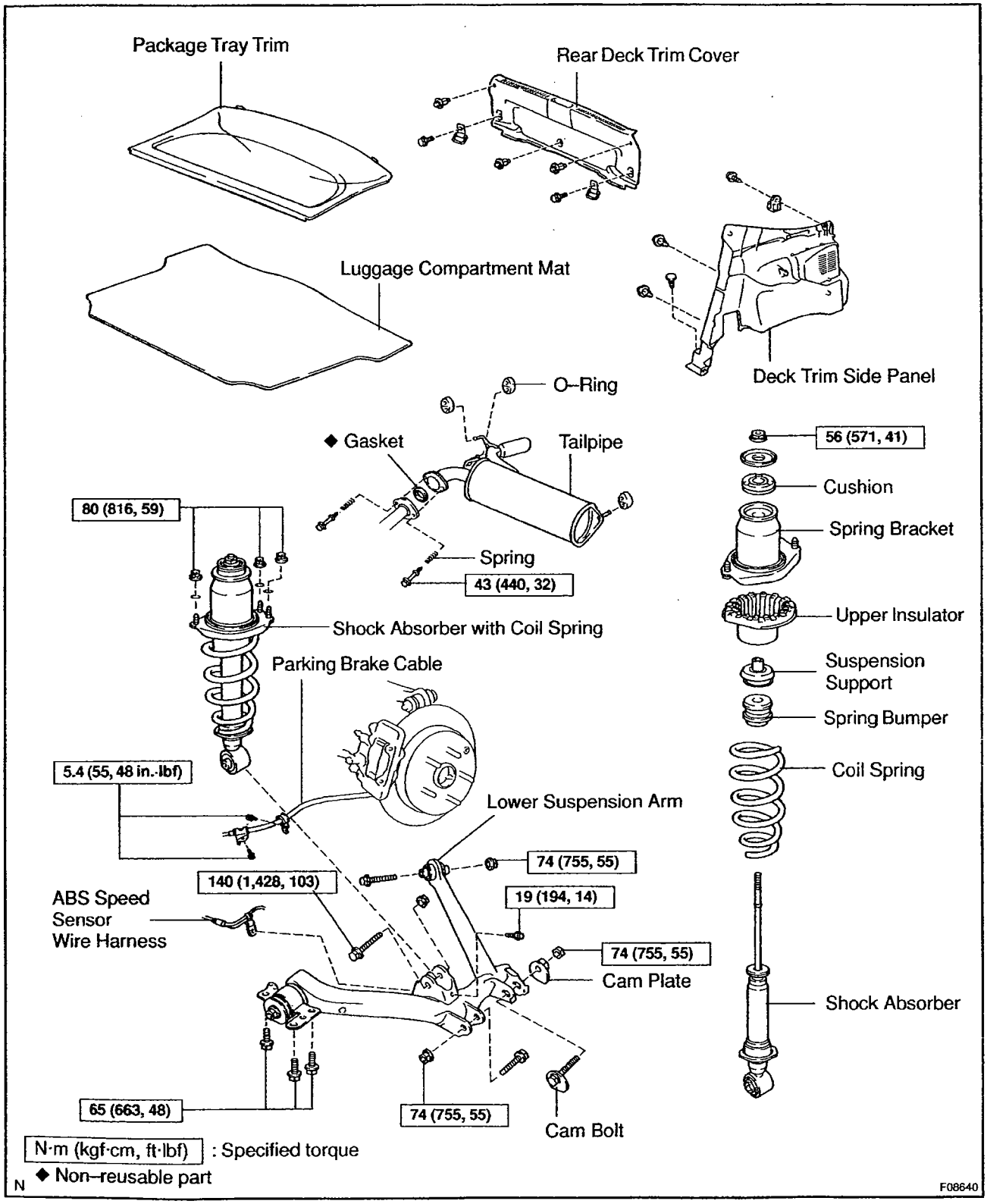
5. **INSTALL HUB BOLT**
(a) Install a washer and nut to a new hub bolt as shown in the illustration.
(b) Using a brass bar to hold, install the hub bolt by torquing the nut.
6. **w/ Drum brake:**
   INSTALL BRAKE DRUM
7. **w/ Disc brake:**
   INSTALL DISC AND BRAKE CALIPER

Install the disc and brake caliper and 2 bolts.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)
8. **INSTALL REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR SHOCK ABSORBER

COMPONENTS

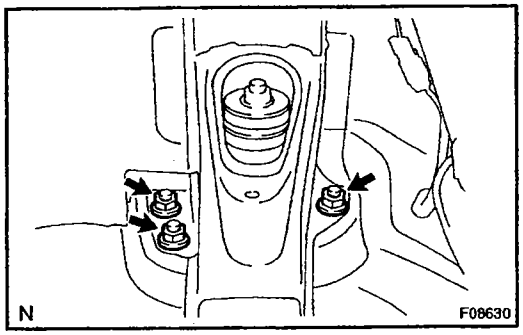
SA1OU-01



SA1OV–01

REMOVAL

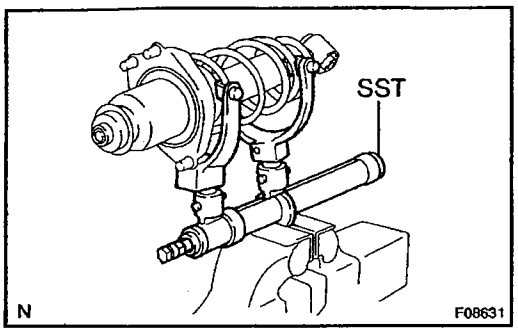
1. **REMOVE REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE PACKAGE TRAY TRIM**
3. **REMOVE LUGGAGE COMPARTMENT MAT**
4. **REMOVE REAR DECK TRIM COVER**
5. **REMOVE DECK TRIM SIDE PANEL**
6. **REMOVE REAR LOWER SUSPENSION ARM**
   (See page SA–72)



7. **REMOVE REAR SHOCK ABSORBER**

Remove the 3 nuts and rear shock absorber.
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

SA1OW-01

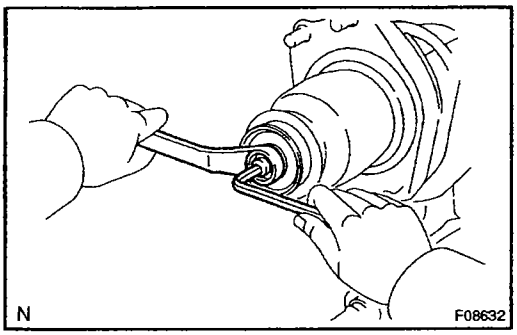


DISASSEMBLY

REMOVE COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

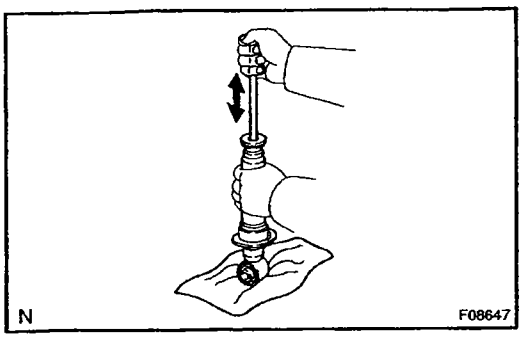
NOTICE:
Do not use an impact wrench. It will damage the SST.



(b) Using a 6 mm hexagon wrench to hold the piston rod, remove the nut.

(c) Remove the washer, cushion, spring bracket, upper insulator, suspension support, spring bumper and coil spring.

SA08C–04



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber with a new one.

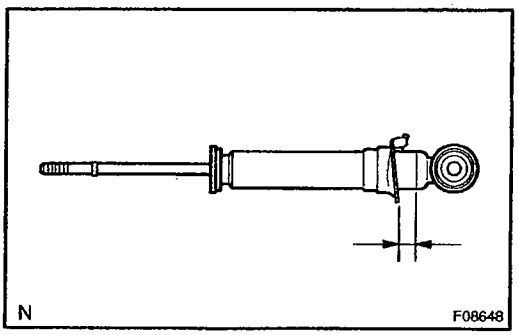
NOTICE:

When disposing of the shock absorber, see DISPOSAL on page SA–65.

SA08D–04

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD

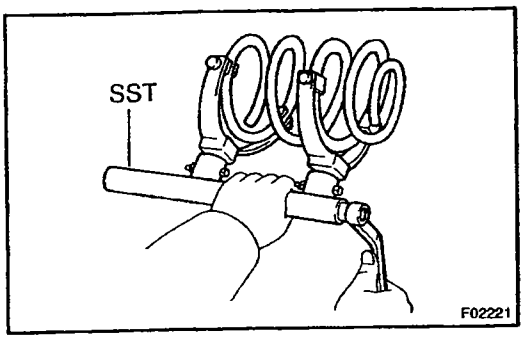


2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown in the illustration to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**



REASSEMBLY

1. INSTALL COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:
Do not use an impact wrench. It will damage the SST.

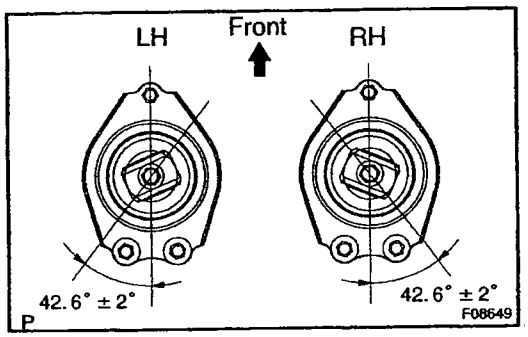
(b) Insert the coil spring to the shock absorber.

HINT:
Fit the lower end of the coil spring into the gap of the spring lower seat.

2. INSTALL SPRING BUMPER AND SUSPENSION SUPPORT

3. INSTALL SPRING BRACKET

(a) Set the upper insulator to the spring bracket.



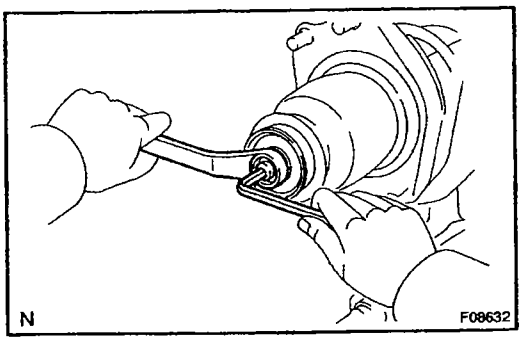
(b) Position the spring bracket with upper insulator as shown in the illustration.

(c) Install the cushion and washer.

(d) Temporarily tighten the center nut.

(e) Remove the SST.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

(f) Recheck the direction of the spring bracket.



(g) Using a 6 mm hexagon wrench to hold the piston rod, tighten the nut.
Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)

SA1OY-01

INSTALLATION

Installation is in the reverse order of removal (See page SA–62).

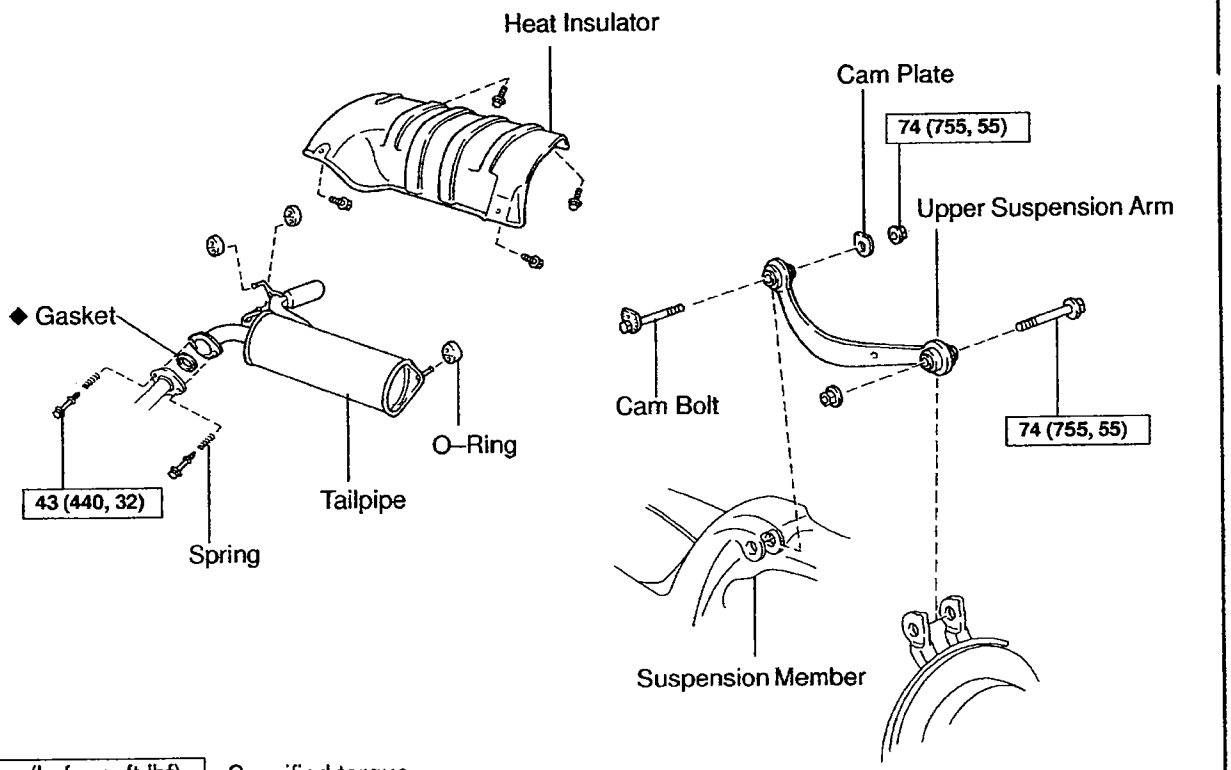
HINT:

After installation, check the rear wheel alignment (See page SA–8).

REAR UPPER SUSPENSION ARM

SA1PC–01

COMPONENTS



N-m (kgf-cm, ft-lbf) : Specified torque
◆ Non–reusable part

F08638

SA1PD–01

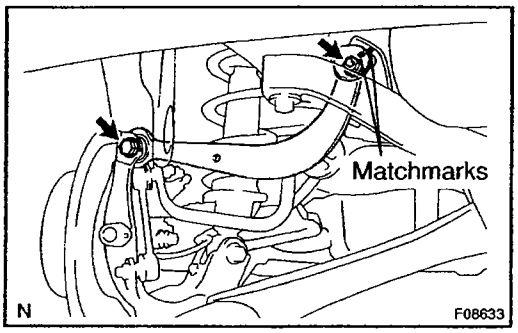
REMOVAL

1. REMOVE REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE TAILPIPE AND HEAT INSULATOR

(a) Remove the 2 bolts, springs, gasket, 3 O–rings and tailpipe.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Remove the 4 bolts and heat insulator.



3. REMOVE UPPER SUSPENSION ARM

(a) Place matchmarks on both the cam plate and suspension member.

(b) Remove the nut, cam plate and cam bolt.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

(c) Remove the bolt, nut and upper suspension arm.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

NOTICE:
Do not turn the nut.

HINT:
At the time of installation, after stabilizing the suspension, torque the bolt.

SA1PE-01

INSTALLATION

Installation is in the reverse order of removal (See page SA–69).

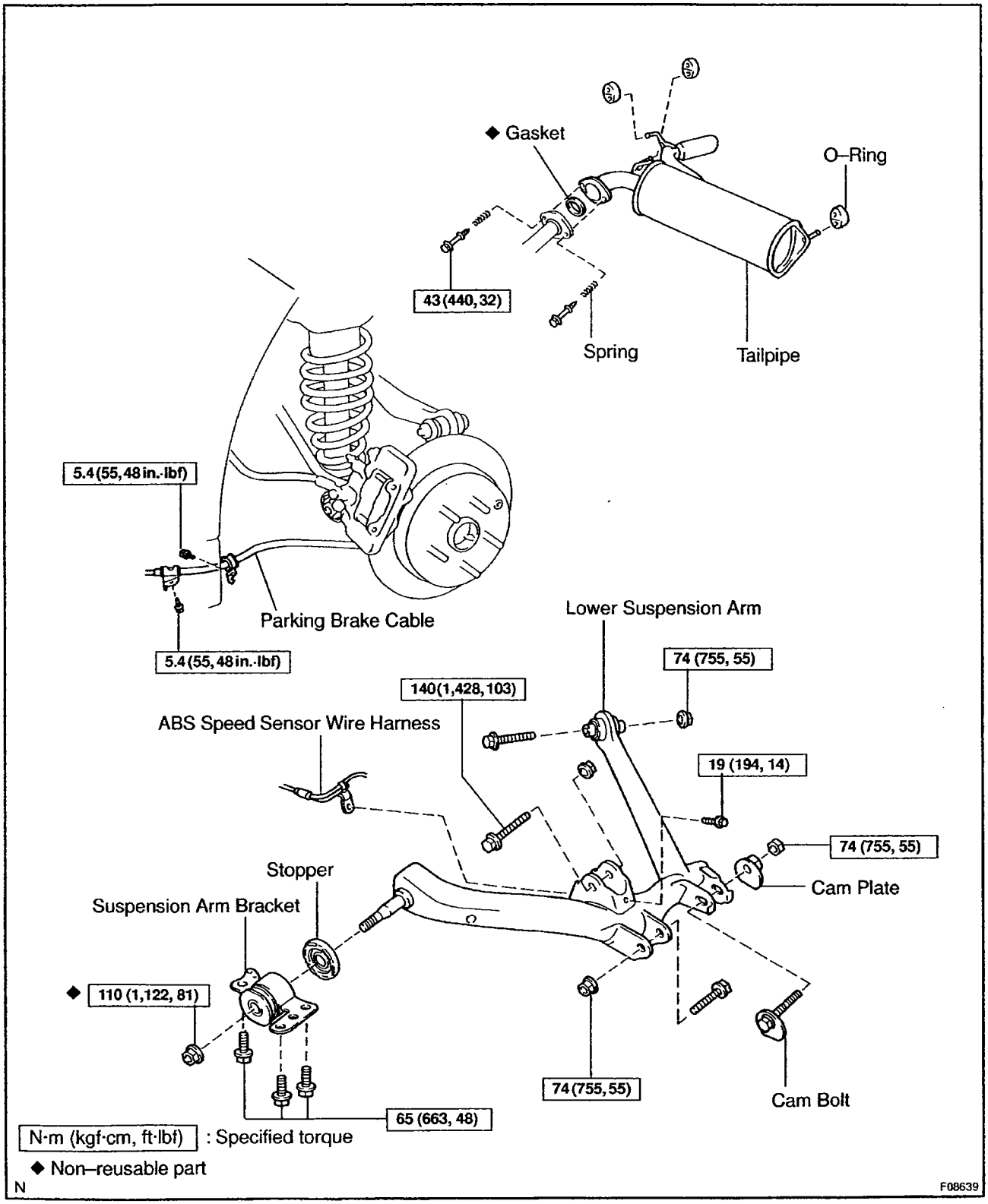
HINT:

After installation, check the rear wheel alignment (See page SA–8).

REAR LOWER SUSPENSION ARM

COMPONENTS

SA1PF–01



SA1PG-01

REMOVAL

1. **REMOVE REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE ABS SPEED SENSOR WIRE HARNESS CLAMP**

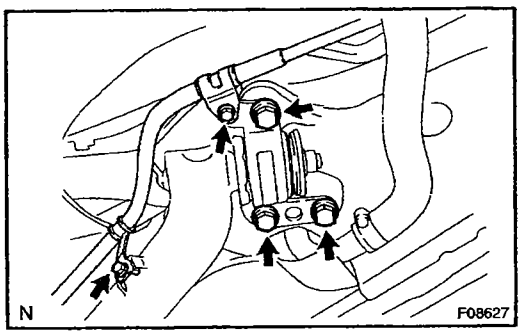
Remove the bolt and disconnect the ABS speed sensor wire harness clamp.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

3. **REMOVE TAILPIPE**

Remove the 2 bolts, springs, gasket, 3 O–rings and tailpipe.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



4. **DISCONNECT PARKING BRAKE CABLE CLAMP**

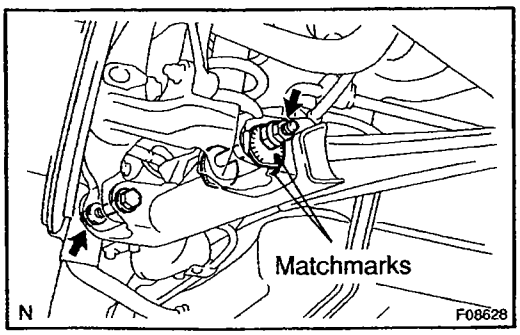
Remove the 2 bolts and disconnect the parking brake cable clamps.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

5. **LOOSEN 3 BOLTS ON FRONT SIDE OF LOWER SUSPENSION ARM**
   Torque: 65 N·m (663 kgf·cm, 48 ft·lbf)

HINT:

- Do not remove the bolts.
- At the time of installation, after stabilizing the suspension, torque the bolts.



6. **DISCONNECT REAR AXLE CARRIER FROM LOWER SUSPENSION ARM**

(a) Remove the front side bolt and nut.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

(b) Place matchmarks on both the cam plate and lower suspension arm.

(c) Remove the nut, cam plate and cam bolt.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

(d) Disconnect the rear axle carrier from the lower suspension arm.

7. DISCONNECT REAR SHOCK ABSORBER

Remove the bolt and nut and disconnect the rear shock absorber.

Torque: 140 N·m (1,428 kgf·cm, 103 ft·lbf)

NOTICE:
Do not turn the nut.

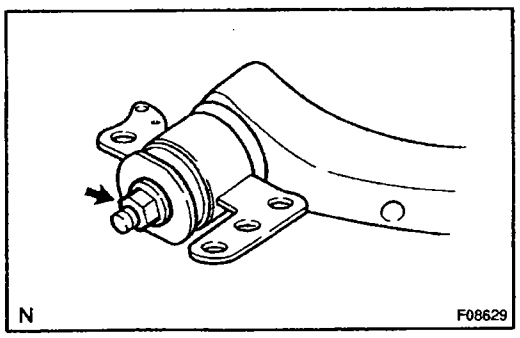
HINT:
At the time of installation, after stabilizing the suspension, torque the bolt.

8. REMOVE LOWER SUSPENSION ARM

(a) Remove the bolt and nut on the rear side of lower suspension arm.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

(b) Remove the front side 3 bolts and lower suspension arm.



9. REMOVE SUSPENSION ARM BRACKET

Remove the nut, suspension arm bracket and stopper.
Torque: 110 N·m (1,122 kgf·cm, 81 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

SA1PH-01

INSTALLATION

Installation is in the reverse order of removal (See page SA–72).

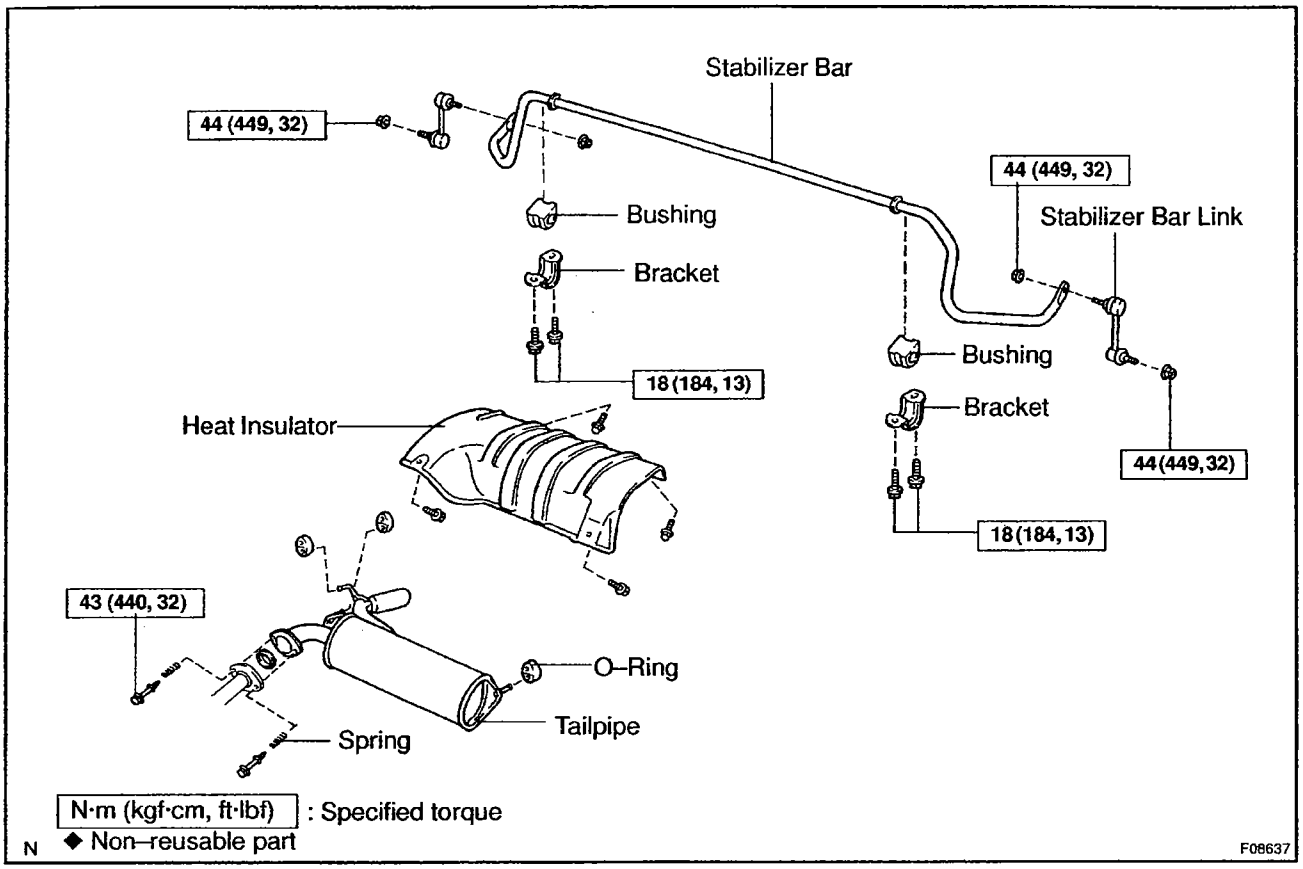
HINT:

After installation, check the rear wheel alignment (See page SA–8).

REAR STABILIZER BAR

COMPONENTS

SA1PI-01



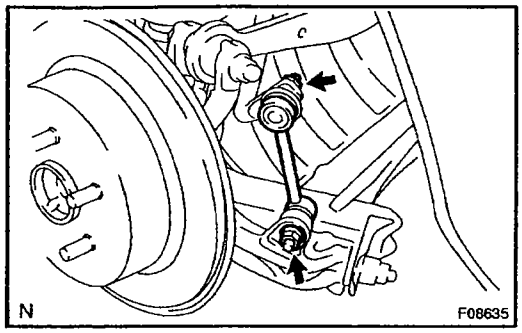
SA1PJ-01

REMOVAL

1. **REMOVE REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE TAILPIPE AND HEAT INSULATOR**

(a) Remove the 2 bolts, springs, gasket, 3 O–rings and tailpipe.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Remove the 4 bolts and heat insulator.

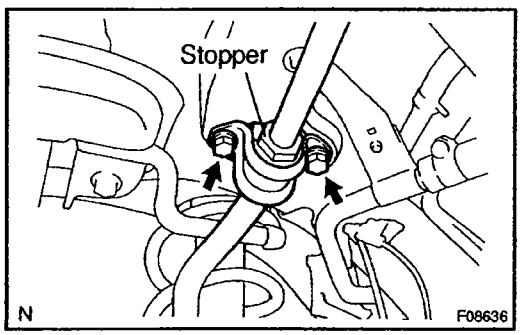


3. **REMOVE STABILIZER BAR LINKS**

(a) Remove the 2 nuts and stabilizer bar link.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

(b) Employ the same manner described above to the other side.



4. **REMOVE STABILIZER BAR BRACKETS AND BUSHINGS**

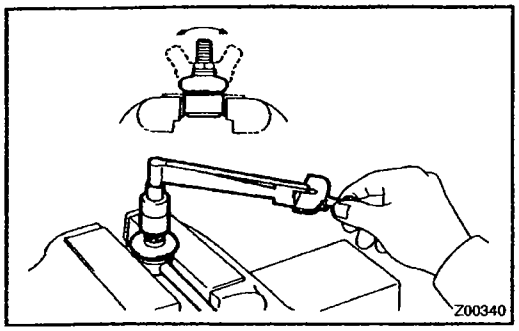
(a) Remove the 2 bolts, bracket and bushing.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

HINT:
At the time of installation, install the bushing to the outside of the stopper on the stabilizer bar.

(b) Employ the same manner described above to the other side.

5. **REMOVE STABILIZER BAR**

SA1FD-02



INSPECTION

INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously at a rate of 2 – 4 seconds per 1 turn and take the torque reading on the 5th turn.

Turning torque:
0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.·lbf)

SA1PK–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–76).

BRAKE

BRAKE SYSTEM	BR–1
TROUBLESHOOTING	BR–2
BRAKE FLUID	BR–4
BRAKE PEDAL	BR–6
PARKING BRAKE LEVER	BR–8
BRAKE MASTER CYLINDER	BR–9
BRAKE BOOSTER ASSEMBLY	BR–13
FRONT BRAKE PAD	BR–17
FRONT BRAKE CALIPER	BR–20
REAR DRUM BRAKE	BR–28
REAR BRAKE PAD	BR–33
REAR BRAKE CALIPER	BR–36
PARKING BRAKE	BR–42
PROPORTIONING VALVE (P VALVE)	BR–47
ABS ACTUATOR	BR–48
FRONT SPEED SENSOR	BR–55
REAR SPEED SENSOR	BR–58

BR

BRAKE SYSTEM

PRECAUTION

BR0PW-01

- **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.**
- **It is very important to keep parts and the area clean when repairing the brake system.**
- **If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.**

TROUBLESHOOTING

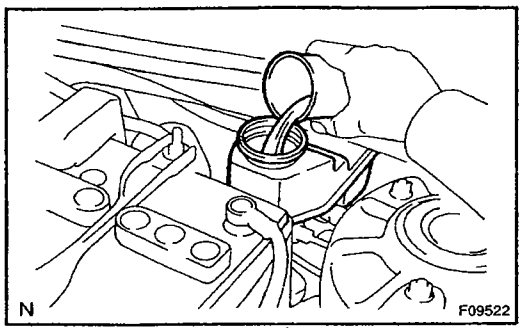
BR0PX–03

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	1. Fluid leaks for brake system	DI–323
	2. Air in brake system	BR–4
	3. Piston seals (Worn or damaged)	BR–20
		BR–36
		BR–28
	4. Rear brake shoe clearance (Out of adjustment)	BR–32
	5. Master cylinder (Faulty)	BR–9
	6. Booster push rod (Out of adjustment)	BR–16
Brake drag	1. Brake pedal freeplay (Minimum)	BR–6
	2. Parking brake lever travel (Out of adjustment)	BR–8
	3. Parking brake wire (Sticking)	–
	4. Rear brake shoe clearance (Out of adjustment)	BR–32
		BR–46
	5. Pad or lining (Cracked or distorted)	BR–17
		BR–33
		BR–28
		BR–42
	6. Piston (Stuck)	BR–20
		BR–36
		BR–28
	7. Piston (Frozen)	BR–20
		BR–36
		BR–28
	8. Anchor, tension or return spring (Faulty)	BR–28
		BR–42
	9. Booster push rod (Out of adjustment)	BR–16
	10.Vacuum leaks for booster system	BR–13
	11.Master cylinder (Faulty)	BR–9
Brake pull	1. Piston (Stuck)	BR–20
		BR–36
		BR–28
	2. Pad or lining (Oily)	BR–17
		BR–33
		BR–28
		BR–42
	3. Piston (Frozen)	BR–20
		BR–36
		BR–28
	4. Disc (Scored)	BR–24
		BR–39
	5. Pad or lining (Cracked or distorted)	BR–17
		BR–33
		BR–28
		BR–42

Hard pedal but brake inefficient	1. Fluid leaks for brake system	DI–323
	2. Air in brake system	BR–4
	3. Pad or lining (Worn)	BR–17
		BR–33
		BR–28
		BR–42
	4. Pad or lining (Cracked or distorted)	BR–17
		BR–33
		BR–28
		BR–42
	5. Rear brake shoe clearance (Out of adjustment)	BR–32
		BR–46
	6. Pad or lining (Oily)	BR–17
		BR–33
		BR–28
		BR–42
	7. Pad or lining (Glazed)	BR–17
		BR–33
		BR–28
		BR–42
	8. Disc (Scored)	BR–24
		BR–39
	9. Booster push rod (Out of adjustment)	BR–16
	10.Vacuum leaks for booster system	BR–13
Noise from brakes	1. Pad or lining (Cracked or distorted)	BR–17
		BR–33
		BR–28
		BR–42
	2. Installation bolt (Loose)	BR–20
		BR–36
	3. Disc (Scored)	BR–24
		BR–39
	4. Pad support plate (Loose)	BR–17
	5. Sliding pin (Worn)	BR–20
	6. Pad or lining (Dirty)	BR–17
		BR–33
		BR–28
		BR–42
	7. Pad or lining (Glazed)	BR–17
		BR–33
		BR–28
		BR–42
	8. Anchor, tension or return spring (Faulty)	BR–28
		BR–42
	9. Anti–squeal shim (Damaged)	BR–17
		BR–33
	10.Shoe hold–down spring (Damaged)	BR–28
		BR–42



BRAKE FLUID

BR0PY-02

BLEEDING

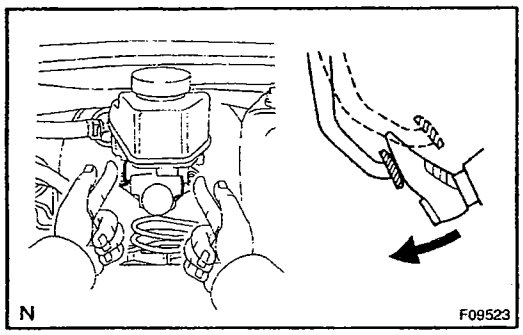
HINT:

If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the brake system.

NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. **FILL BRAKE RESERVOIR WITH BRAKE FLUID**
   Fluid: SAE J1703 or FMVSS No. 116 DOT3
2. **REMOVE BATTERY**



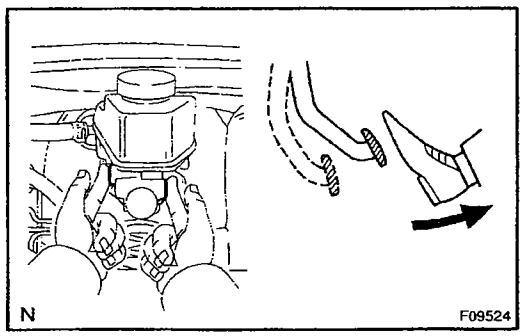
3. **BLEED MASTER CYLINDER**

HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

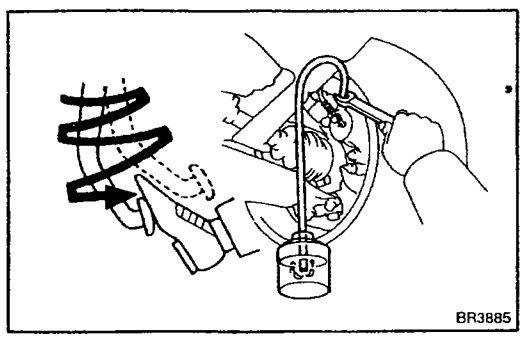
(a) Disconnect the brake lines from the master cylinder.
SST 09023–00100

(b) Slowly depress the brake pedal and hold it.



(c) Block off the outlet plug with your finger and release the brake pedal.

(d) Repeat (b) and (c) 3 or 4 times.



4. **BLEED BRAKE LINE**

(a) Connect the vinyl tube to the caliper.

(b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.

(c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

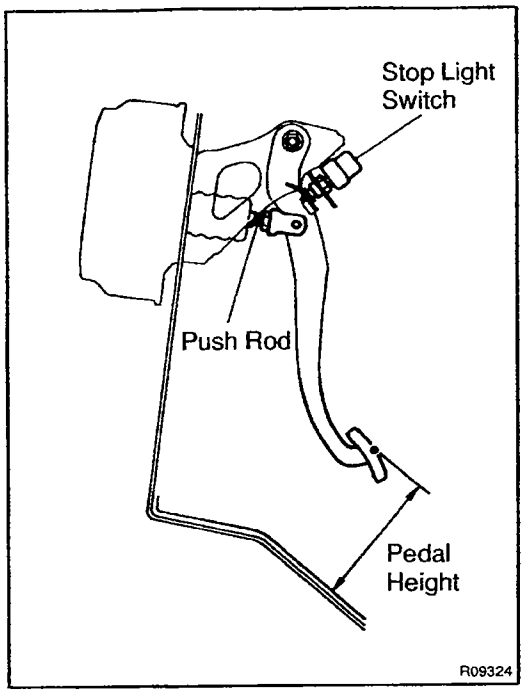
(d) Repeat (b) and (c) until all the air in the fluid has been bled out.

(e) Repeat the above procedure to bleed the air out of the brake line for each wheel.

5. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.

Fluid: SAE J1703 or FMVSS No. 116 DOT3



BRAKE PEDAL

BR0PZ-02

ON–VEHICLE INSPECTION

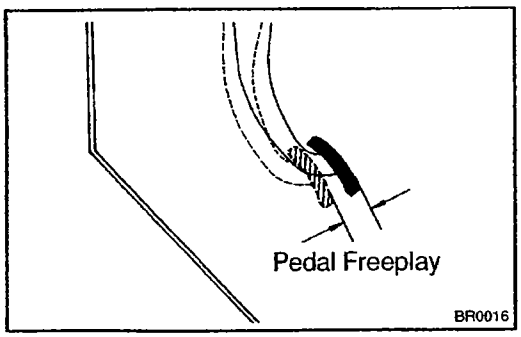
1. **CHECK PEDAL HEIGHT**

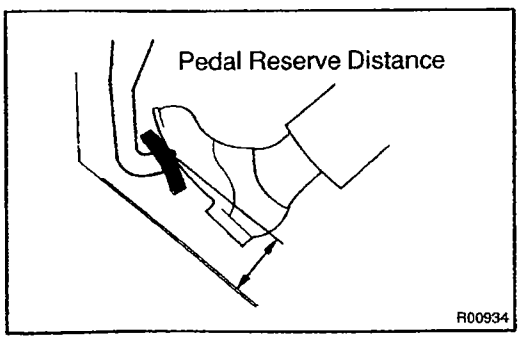
Pedal height from asphalt sheet:
139.8 – 149.8 mm (5.504 – 5.898 in.)

If the pedal height is incorrect, adjust it.

2. **IF NECESSARY, ADJUST PEDAL HEIGHT**

(a) Remove the lower No. 1 panel and finish panel.
(b) Disconnect the connector from the stop light switch.
(c) Loosen the stop light switch lock nut and remove the stop light switch.
(d) Loosen the clevis lock nut.
(e) Adjust the pedal height by turning the pedal push rod.
(f) Tighten the clevis lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
(g) Install the stop light switch.
(h) Connect the connector to the stop light switch.
(i) Push the brake pedal in 5 – 15 mm (0.20 – 0.59 in.), turn the stop light switch to lock the nut in the position where the stop light goes off.
(j) Push the brake pedal in 5 – 15 mm (0.20 – 0.59 in.), check that stop light lights up.
(k) After adjusting the pedal height, check the pedal freeplay.





3. **CHECK PEDAL FREEPLAY**

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
(b) Push in the pedal until the beginning of the resistance is felt. Measure the distance, as shown.
Pedal freeplay: 1 – 6 mm (0.04 – 0.24 in.)

If incorrect, check the stop light switch clearance.
If the clearance is OK, then troubleshoot the brake system.

Stop light switch clearance:
0.5 – 2.4 mm (0.020 – 0.094 in.)

4. **CHECK PEDAL RESERVE DISTANCE**

Release the parking brake lever.
With engine running, depress the pedal and measure the pedal reserve distance, as shown.

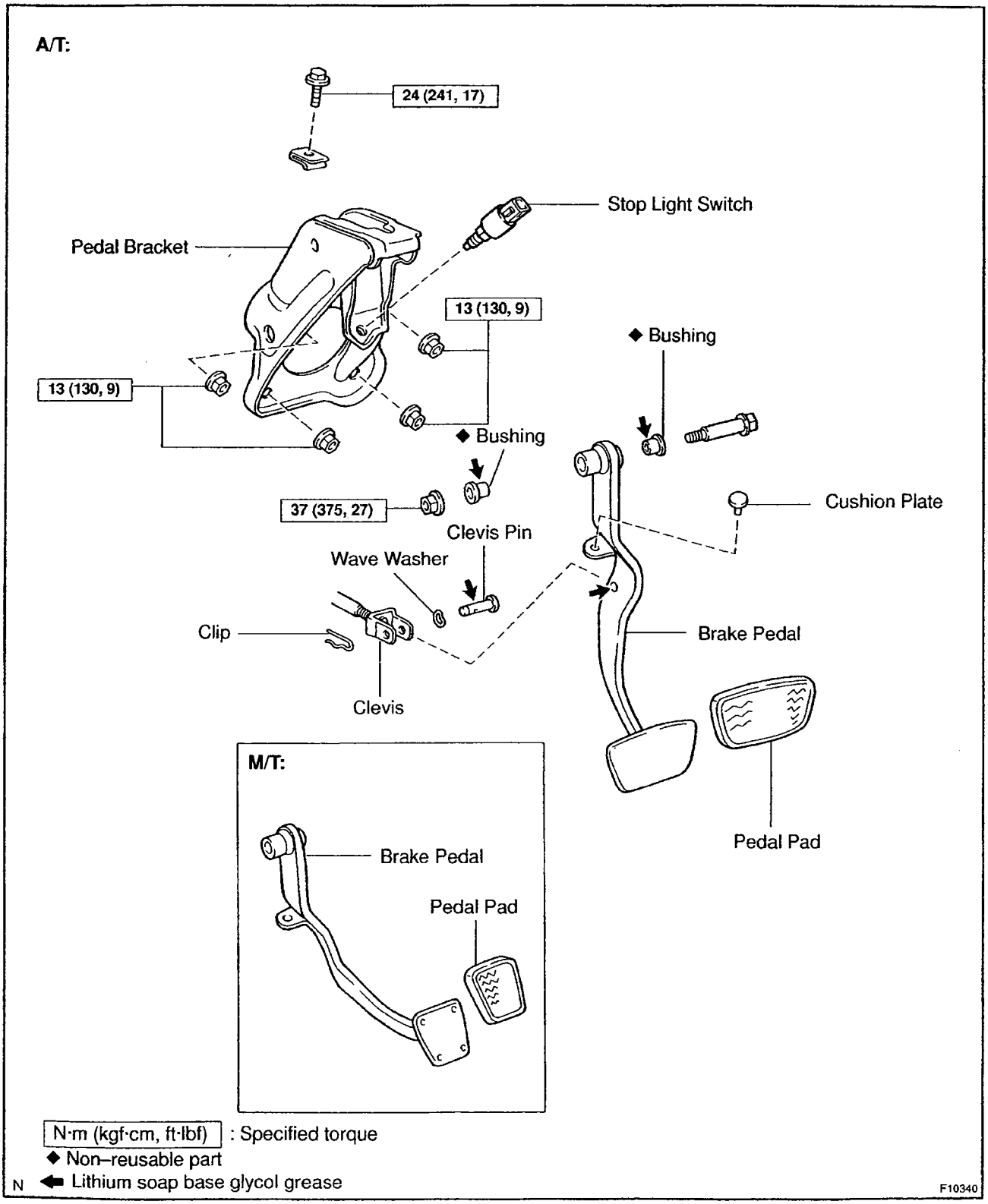
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf): More than 85 mm (3.35 in.)

If incorrect, troubleshoot the brake system.

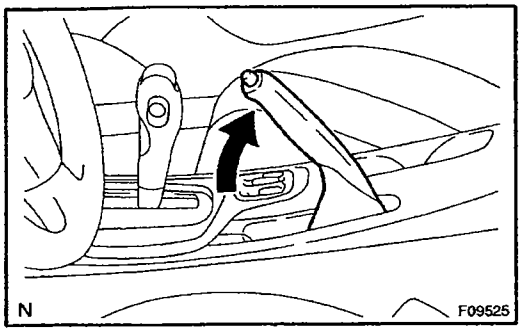
BR

BR145-01

COMPONENTS



BR



PARKING BRAKE LEVER

8R0Q0-02

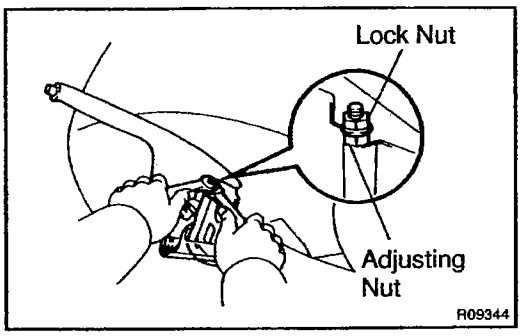
ON–VEHICLE INSPECTION

1. CHECK PARKING BRAKE LEVER TRAVEL

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 196 N (20 kgf, 44.1 lbf): 7 – 8 clicks

If incorrect, adjust the parking brake.



2. IF NECESSARY, ADJUST PARKING BRAKE

HINT:

Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted. For shoe clearance adjustment, see step 1 on page BR–45 or see step 2 on page BR–32.

(a) Remove the console box.

(b) Loosen the lock nut and turn the adjusting nut until the lever travel is correct.

(c) Tighten the lock nut.

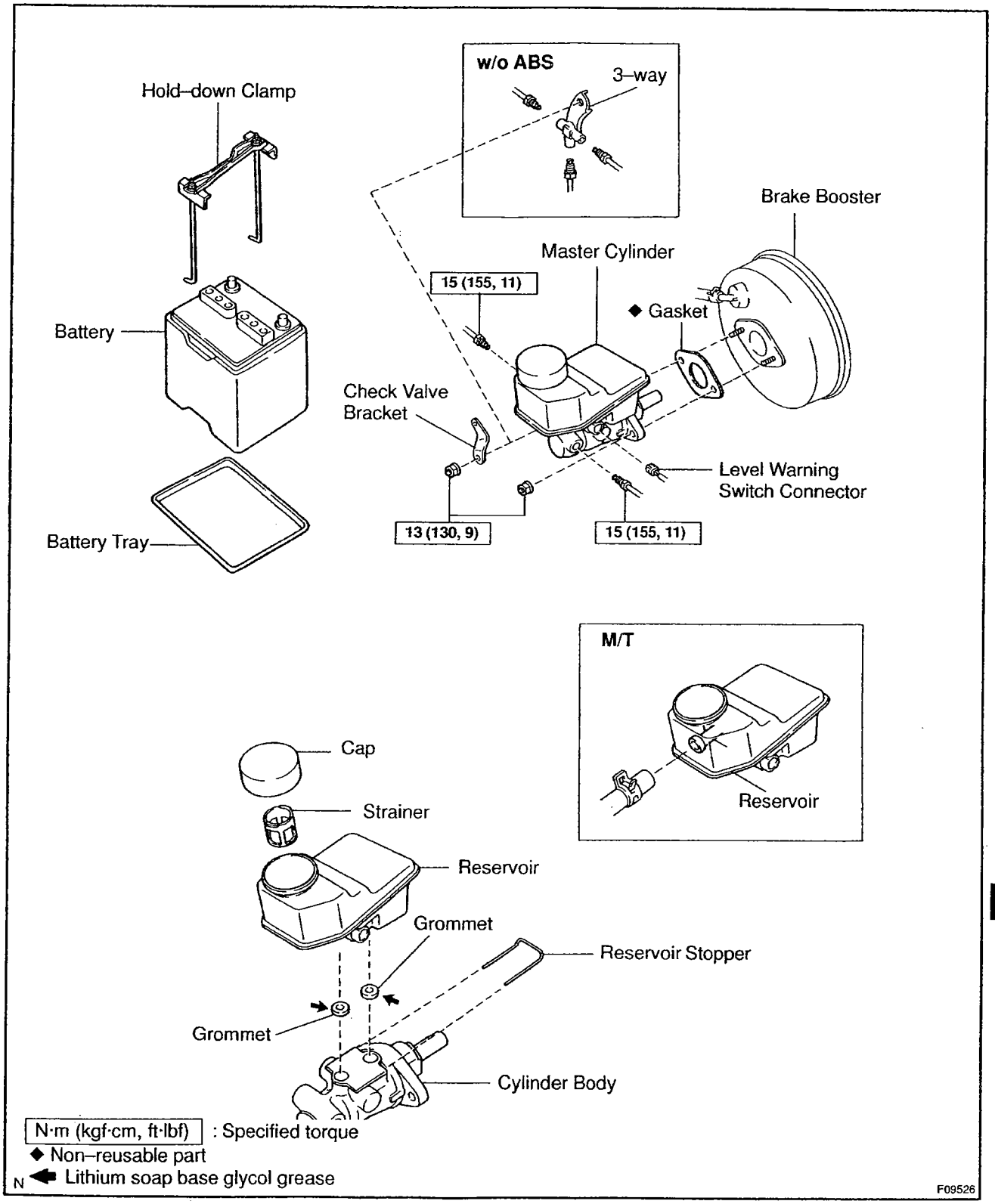
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(d) Install the console box.

BRAKE MASTER CYLINDER

COMPONENTS

BR0Q1-02



F09526

BR

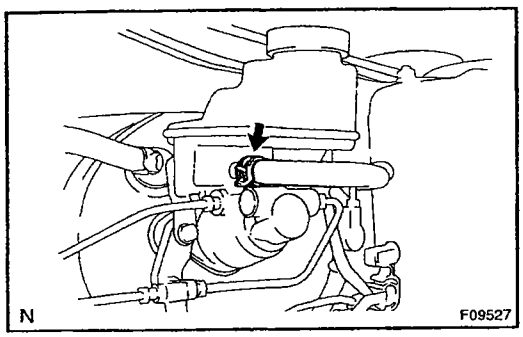
BR0Q2-02

REMOVAL

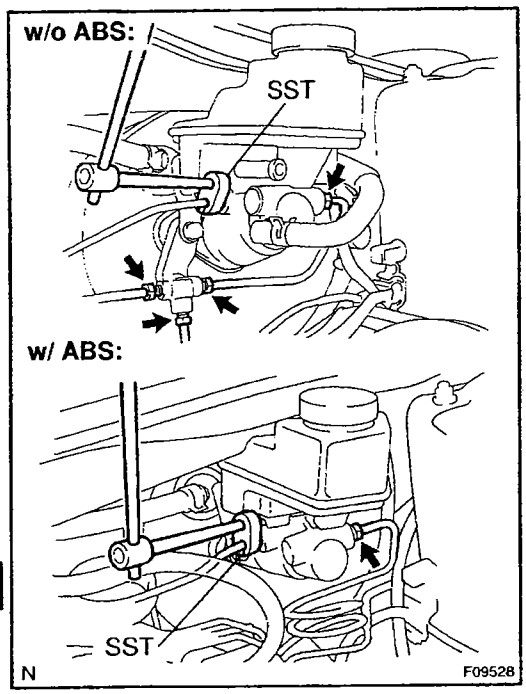
1. REMOVE BATTERY
2. DISCONNECT LEVEL WARNING SWITCH CONNECTOR
3. DRAW OUT FLUID WITH SYRINGE

NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.



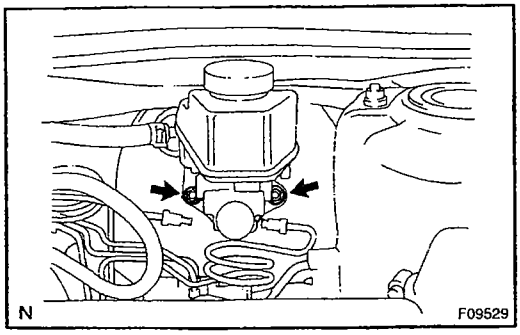
4. M/T:
   DISCONNECT RESERVOIR HOSE



5. DISCONNECT BRAKE LINE

(a) w/o ABS:
Using SST, disconnect the 5 brake lines from the master cylinder and 3–way union.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

(b) w/ ABS:
Using SST, disconnect the 2 brake lines from the master cylinder.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



6. REMOVE MASTER CYLINDER

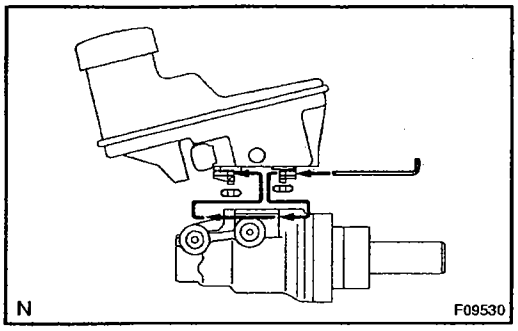
(a) Remove the 2 mounding nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(b) w/o ABS:
Pull out the check valve bracket, 3–way and master cylinder.

(c) w/ ABS:
Pull out the check valve bracket and master cylinder.

(d) Remove the gasket from the master cylinder.

BR



7. REMOVE RESERVOIR

(a) Pull out the reservoir stopper.

HINT:

At the time of installation, make sure to insert the reservoir stopper through holes of the reservoir and the master cylinder groove.

(b) Remove the reservoir and 2 grommets.

(c) Remove the cap and strainer from the reservoir.

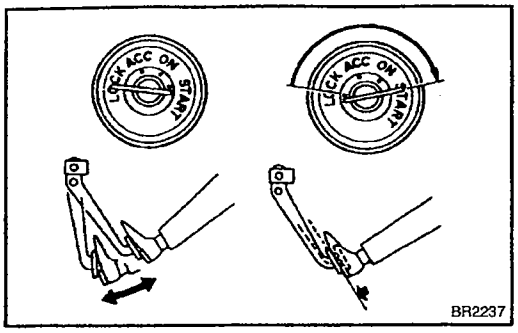
BR0AJ–03

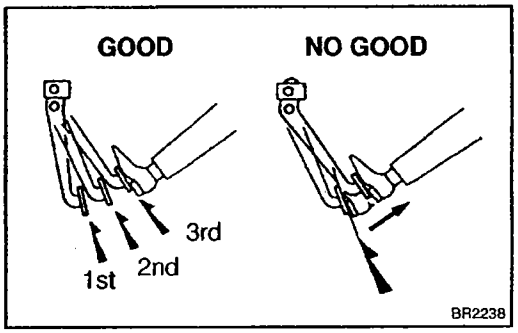
INSTALLATION

Installation is in the reverse order of removal (See page BR–10).

HINT:

- Before installation, adjust length of brake booster push rod (See page BR–16).
- After installation, fill the brake reservoir with brake fluid, bleed the brake system (See page BR–4), and check for leaks.
- Check and adjust brake pedal (See page BR–6).





BRAKE BOOSTER ASSEMBLY

BR0O7-01

ON–VEHICLE INSPECTION

1. OPERATING CHECK

(a) Depress the brake pedal several times with the engine off and check that there is no change in the pedal reserve distance.

(b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.

2. AIR TIGHTNESS CHECK

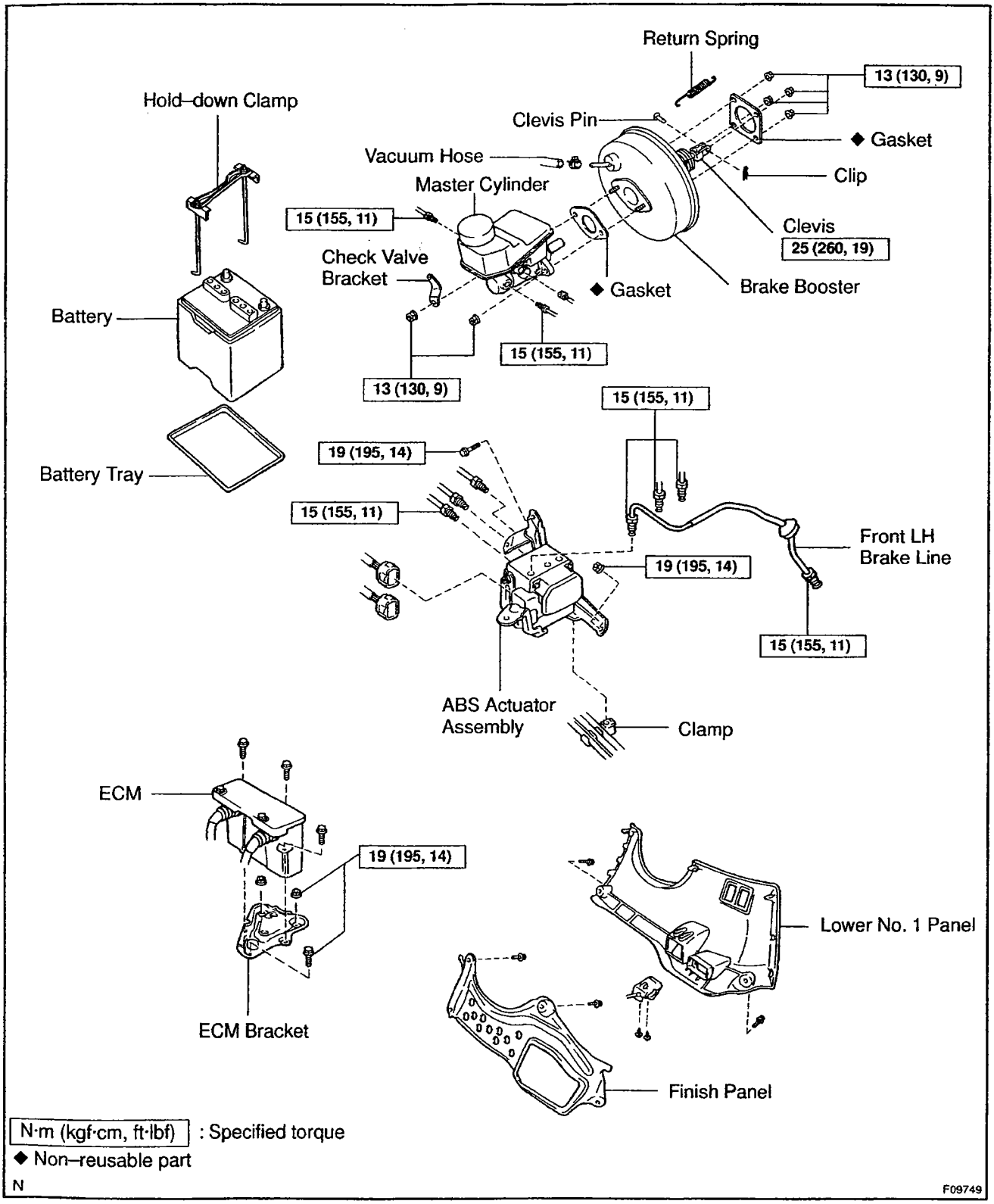
(a) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

If the pedal goes down farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air tight.

(b) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed. If there is no change in the pedal reserve travel after holding the pedal for 30 seconds, the booster is air tight.

BR0O8-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

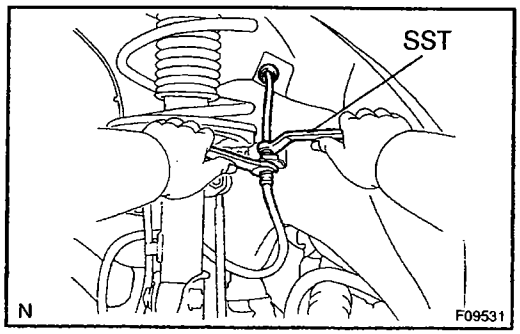
N

F09749

BR145-01

REMOVAL

1. **REMOVE FRONT LH WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE MASTER CYLINDER (See page BR–10)**
3. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**
4. **w/ ABS:**
   REMOVE ABS ACTUATOR ASSEMBLY
   (See page BR–53)



5. **REMOVE FRONT LH BRAKE LINE**

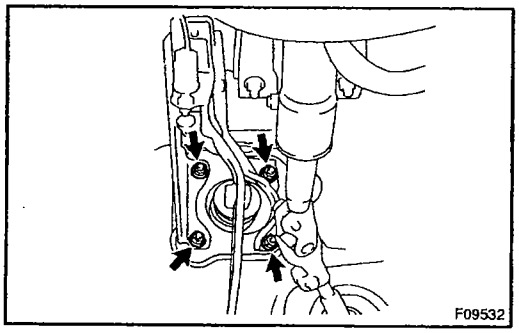
(a) Using SST and spanner, disconnect the brake line from the flexible hose of front LH brake.
SST 09751–36011

(b) Pull out the brake line with the grommet from the body.

6. **REMOVE BRAKE BOOSTER**

(a) Remove the lower No. 1 panel and finish panel.

(b) Remove the return spring, clip and clevis pin.



(c) Remove the clevis and 4 nuts.

(d) Pull out the brake booster and gasket.

BR147-01

INSTALLATION

1. **INSTALL BRAKE BOOSTER**

(a) Install a new gasket and brake booster with 4 nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(b) Install the clevis, and torque the lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

(c) Install the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.

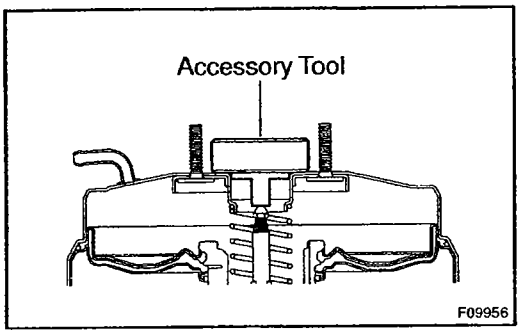
(d) Install the pedal return spring.

2. **INSTALL FRONT LH BRAKE LINE**

(a) Insert the brake line with the grommet into the body, and install the grommet to the body.

(b) Using SST and spanner, connect the brake line to the flexible hose of front LH brake.
SST 09751–36011
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

3. **w/ ABS:**
INSTALL ABS ACTUATOR ASSEMBLY (See page BR–54)



4. **When replacing the brake master cylinder only:**
ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD

(a) Apply chalk to the tip of an accessory tool.

(b) Place the accessory tool to the brake booster.

(c) Measure the clearance between the brake booster push rod and accessory tool.
Clearance: 0 mm (0 in.)

HINT:

Adjust the clearance in following cases:

- If there is a clearance between the accessory tool and the shell of the booster (floating accessory tool), the clearance is small.
- If the chalk does not stick on the tip of the push rod, the clearance is large.

(d) If the clearance is outside of the specified range, depress the brake pedal and adjust the length of the protruding push rod of the brake booster.

NOTICE:

Make an adjustment with the booster having no vacuum. (Depress the brake pedal several times with the engine stopped.)

5. **CONNECT VACUUM HOSE TO BRAKE BOOSTER**
6. **INSTALL MASTER CYLINDER (See page BR–12)**
7. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)**
8. **CHECK FOR FLUID LEAKAGE**
9. **CHECK AND ADJUST BRAKE PEDAL**

(a) Check and adjust the brake pedal (See page BR–6).

(b) Install the finish panel and lower No. 1 panel.

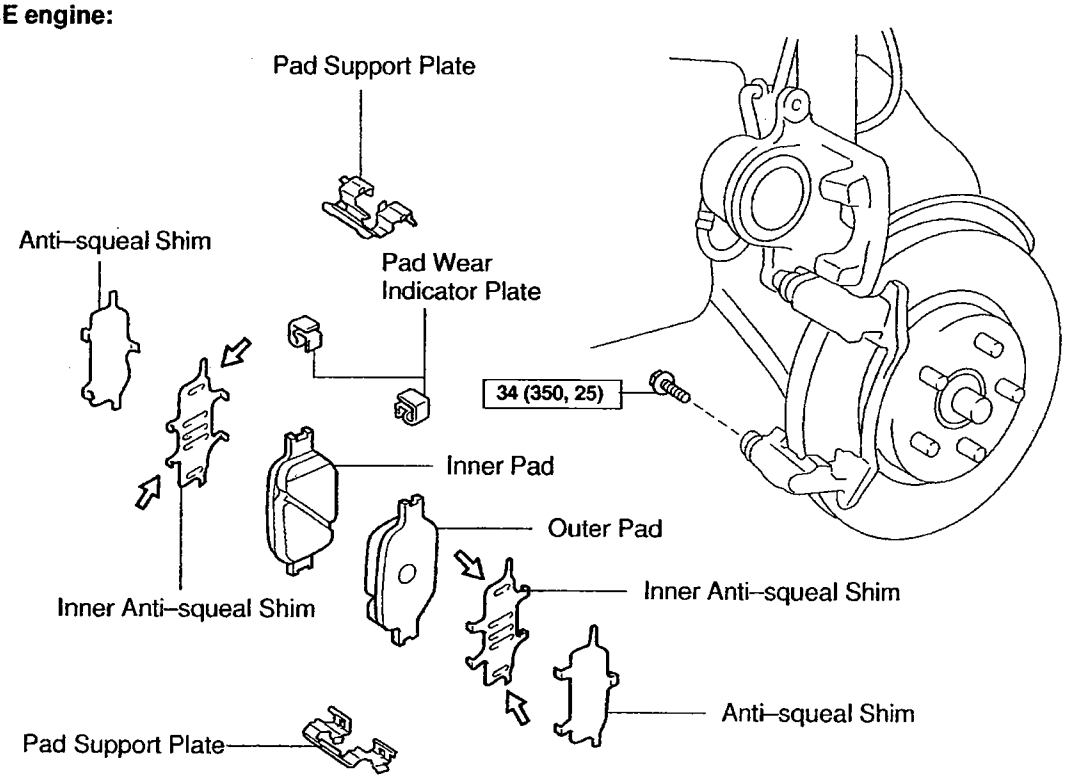
10. **DO OPERATIONAL CHECK (See page BR–13)**

FRONT BRAKE PAD

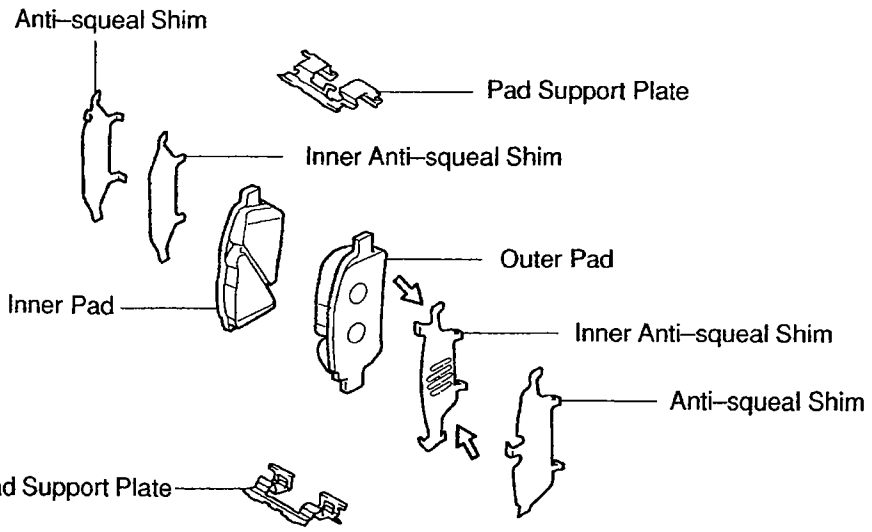
COMPONENTS

BR0OB–02

2ZZ–GE engine:



1ZZ–FE engine:



N·m (kgf·cm, ft·lbf) : Specified torque

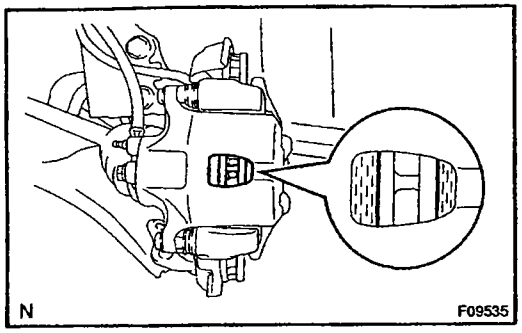
⇦ Disc brake grease

N

F09534

BR148-01

REPLACEMENT

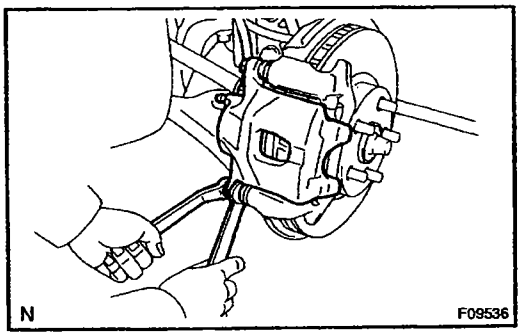


1. REMOVE FRONT WHEEL

2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace the pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. LIFT UP CALIPER

(a) Hold the sliding pin and remove the bottom side installation bolt.

HINT:

Do not disconnect the flexible hose from the brake caliper.

(b) Lift up the caliper and suspend it securely.

4. REMOVE 2 PADS WITH 4 ANTI–SQUEAL SHIMS AND PAD WEAR INDICATOR PLATES

5. REMOVE 2 PAD SUPPORT PLATE

NOTICE:

The support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

6. CHECK DISC THICKNESS AND RUNOUT

(See page BR–24)

7. INSTALL PAD SUPPORT PLATES

Install the 2 pad support plates.

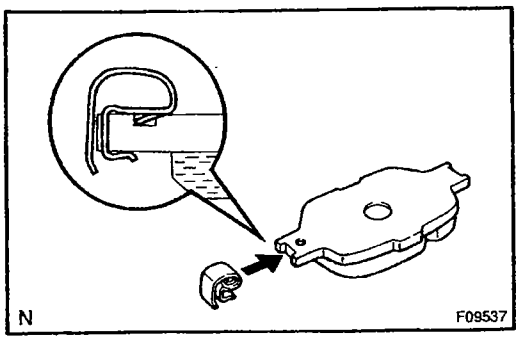
NOTICE:

Do not assemble the upper and lower pad support plates in reverse.

8. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti–squeal shims and wear indicator plates must be replaced together with the pads.



(a) 2ZZ–GE engine:
Install a pad wear indicator plate on the each pad.

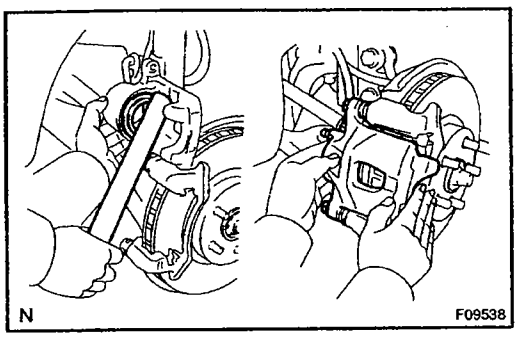
(b) 2ZZ–GE engine:
Apply disc brake grease to both sides of each inner anti–squeal shim (See page BR–17).

(c) 1ZZ–FE engine:
Apply disc brake grease to both sides of the inner anti–squeal shim position outside (See page BR–17).

(d) Install the 2 anti–squeal shims on each pad.

(e) Install the pads with the pad wear indicator plate facing upward.

NOTICE:
There should be no oil or grease adhering to the friction surfaces of the pads or the disc.



9. INSTALL CALIPER

(a) Draw out a small amount of brake fluid from the reservoir.

(b) Press in the piston with a hammer handle or similar implement.

HINT:
If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

(c) Install the caliper.

(d) Hold the sliding pin and torque the installation bolts.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

10. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

11. DEPRESS BRAKE PEDAL SEVERAL TIMES

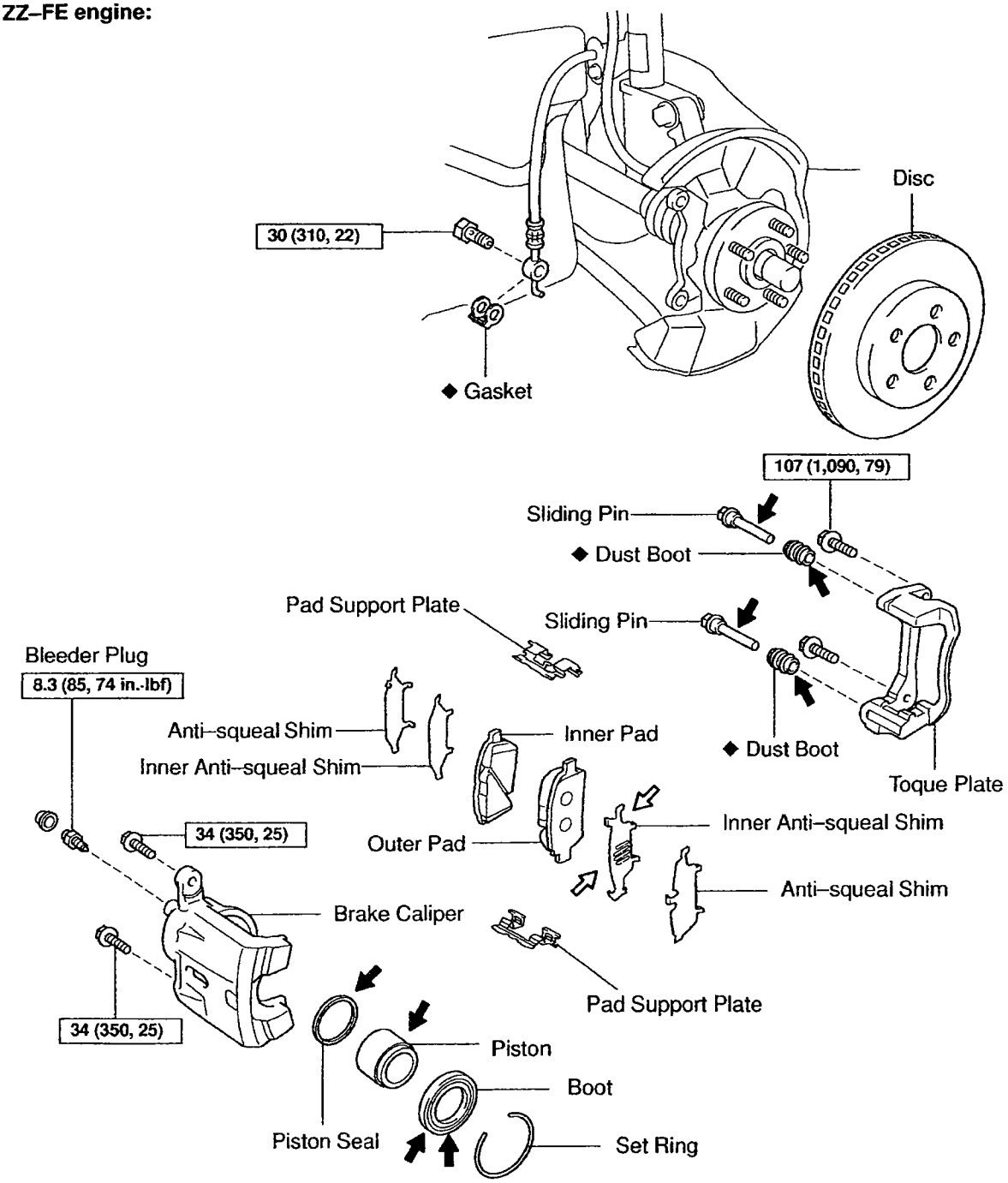
12. CHECK THAT FLUID LEVEL IS AT MAX LINE

FRONT BRAKE CALIPER

COMPONENTS

BR149-01

1ZZ–FE engine:

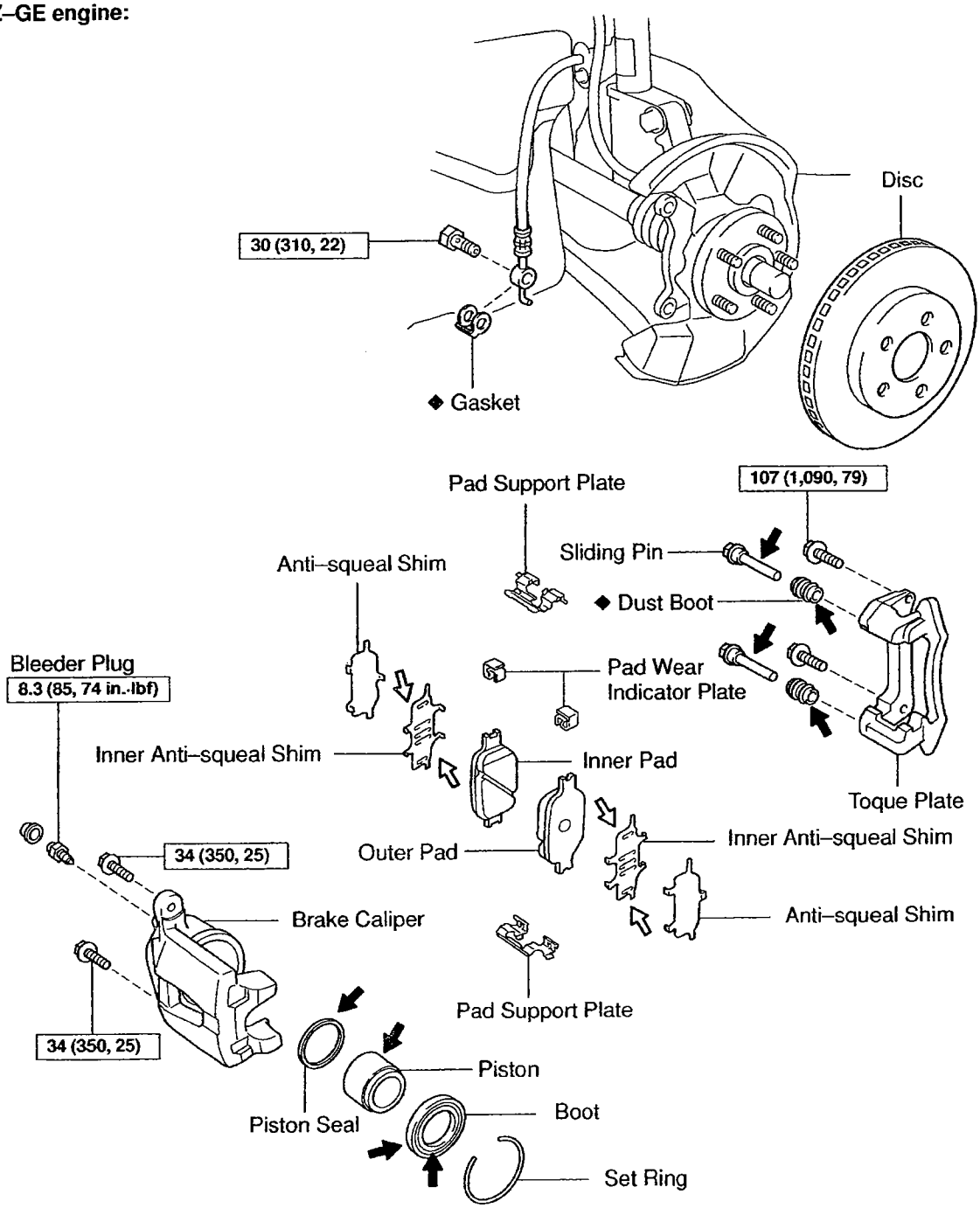


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
➡ Lithium soap base glycol grease
⇨ Disc brake grease

N

F09701

2ZZ–GE engine:



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
➡ Lithium soap base glycol grease
⇨ Disc brake grease

N

F09702

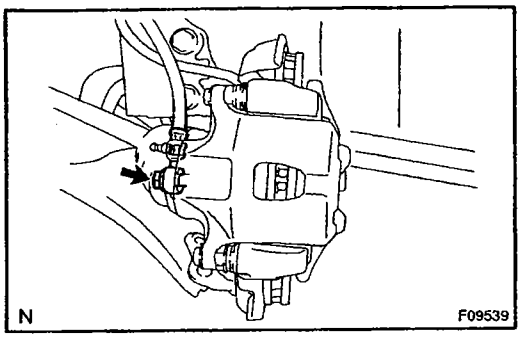
BR0QE-02

REMOVAL

1. REMOVE FRONT WHEEL

Remove the wheel and temporarily fasten the disc with hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



2. DISCONNECT FLEXIBLE HOSE

(a) Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper.

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

HINT:

At the time of installation, install the flexible hose lock securely in the lock hole in the caliper.

(b) Use a container to catch the brake fluid as it drains out.

3. REMOVE CALIPER

(a) Hold the sliding pin and remove the 2 installation bolts.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

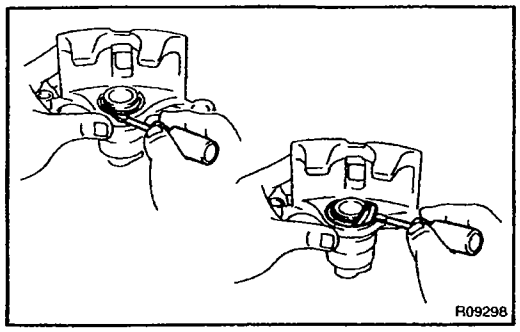
(b) Remove the caliper from the torque plate.

4. REMOVE 2 PADS WITH ANTI–SQUEAL SHIMS

5. REMOVE 2 PAD SUPPORT PLATES

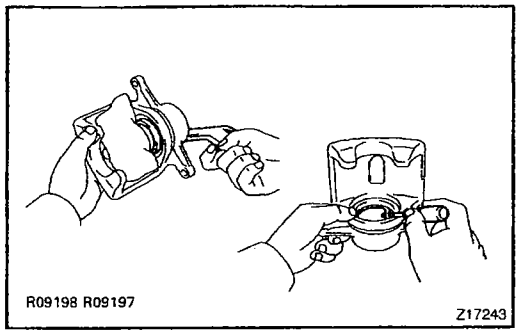
BR0CF-02

DISASSEMBLY


R09298

1. REMOVE SET RING AND CYLINDER BOOT

Using a screwdriver, remove the set ring and cylinder boot from the caliper.


R09198 R09197 Z17243

2. REMOVE PISTON

(a) Place a piece of cloth or similar, between the piston and the caliper.

(b) Use compressed air to remove the piston from the cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.

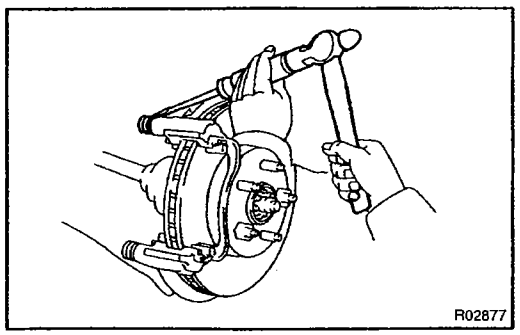
3. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.

4. REMOVE SLIDING PINS AND DUST BOOTS

(a) Remove the 2 sliding pins from the torque plate.

(b) 1ZZ–FE engine:
Remove the 2 dust boots.


R02877

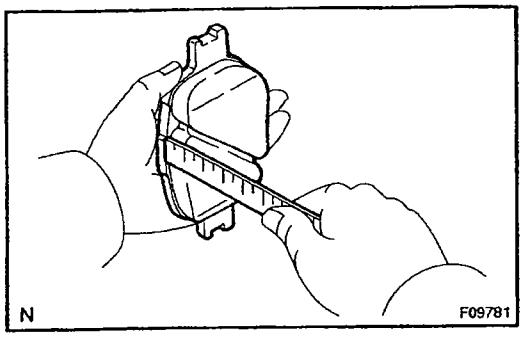
(c) 2ZZ–GE engine:
Using a screwdriver and hammer, tap out the 2 dust boots.

HINT:

At the time of reassembly, use a 19 mm socket wrench and tap in 2 new dust boots into the torque plate.

NOTICE:

At the time of reassembly, check that the metal plate portion of the dust boot fits snugly in the torque plate.



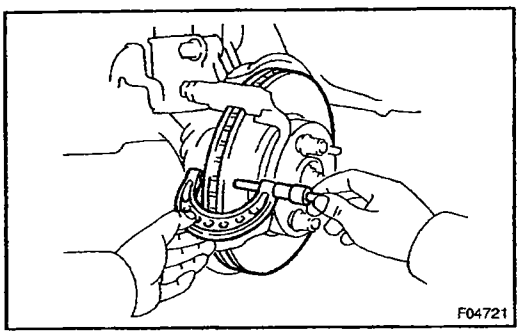
INSPECTION

1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness:
1ZZ–FE engine: 11.0 mm (0.433 in.)
2ZZ–GE engine: 11.5 mm (0.453 in.)
Minimum thickness:
1.0 mm (0.039 in.)

Replace the pad if the pad's thickness is at the minimum thickness or less, or if the pad has severe, uneven wear.

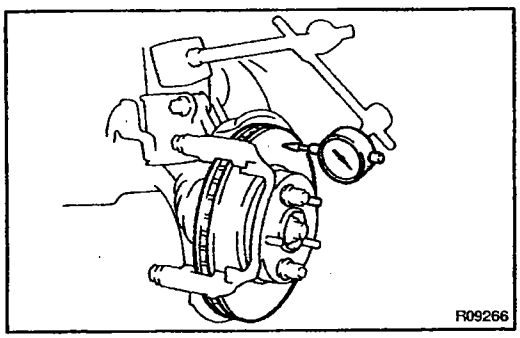


2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 25.0 mm (0.984 in.)
Minimum thickness: 23.0 mm (0.906 in.)

Replace the disc if the disc's thickness is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is badly scored or worn unevenly.

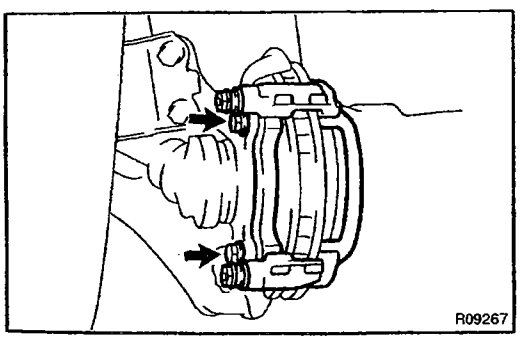


3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page SA–12). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On–car" brake lathe.



4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the 2 bolts and torque plate from the knuckle.
(b) Remove the hub nuts and the disc. Reinstall the disc in the position turned 1/5 from its original position on the hub. Install and torque the hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(c) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

(d) If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.

(e) If the minimum runout recorded in (b) and (c) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 3.

(f) Install the torque plate and torque the mounting bolts.
Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

BR00H-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–23).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by arrows (See page BR–20).

BR0QH-02

INSTALLATION

Installation is in the reverse order of removal (See page BR–22).

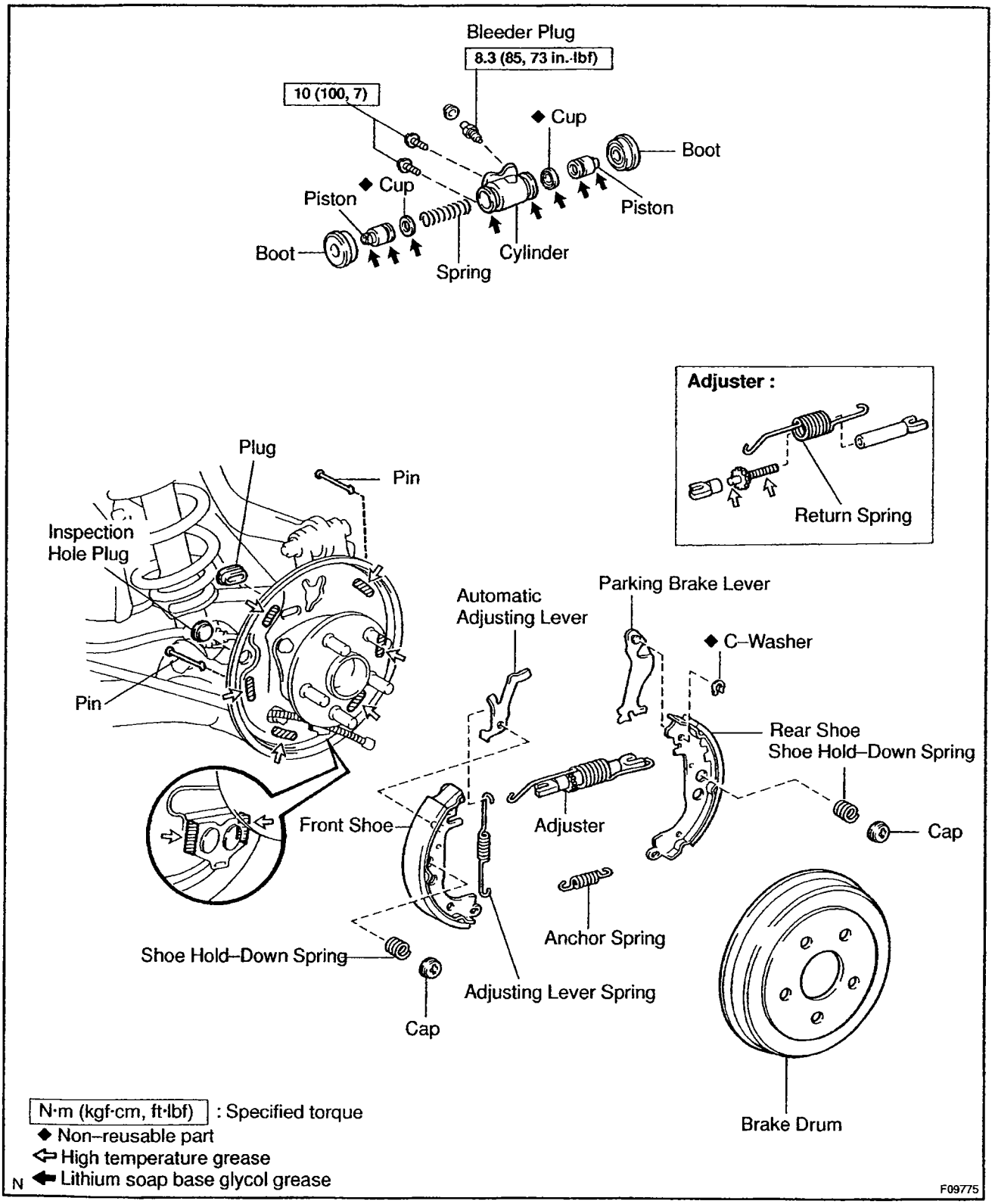
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR–4).
- Check for leaks.

REAR DRUM BRAKE

COMPONENTS

BR14A–01



BR148-01

REMOVAL

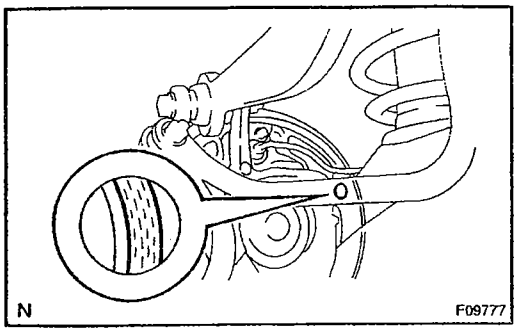
1. INSPECT SHOE LINING THICKNESS

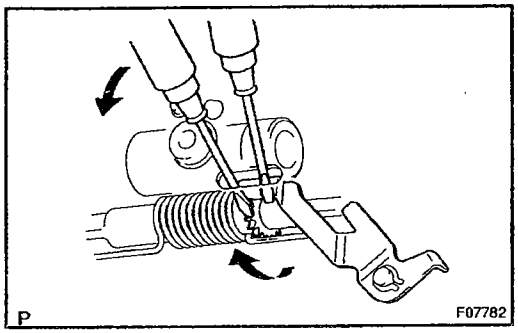
Remove the inspection hole plug, and check the shoe lining thickness through the hole.

If less than minimum, replace the shoes.

Minimum thickness: 1.0 mm (0.039 in.)

2. REMOVE REAR WHEEL





3. REMOVE BRAKE DRUM

(a) Release the parking brake lever, and remove the brake drum.

HINT:

If the brake drum cannot be removed easily, do the following steps.

(b) Remove the plug and insert a screwdriver through the hole in the backing plate.

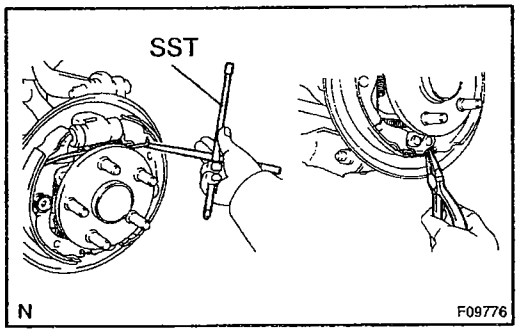
(c) Using another screwdriver, reduce the brake shoe adjuster by turning the adjusting wheel.

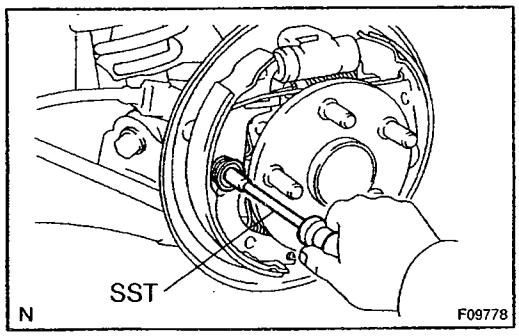
4. REMOVE FRONT SHOE

(a) Using SST, disconnect the adjuster spring from the rear shoe.

SST 09703–30010

(b) Using needle–nose pliers, remove the anchor spring.





(c) Using SST, remove the cap, shoe hold–down spring and pin from the front shoe.

SST 09718–00010

(d) Remove the adjuster and adjuster spring together with the front shoe.

(e) Remove the adjuster together with the adjuster spring from the front shoe.

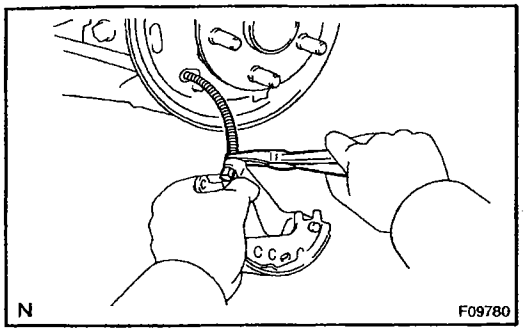
(f) Using needle–nose pliers, remove the adjusting lever spring.

(g) Remove the automatic adjusting lever from the front shoe.

5. REMOVE REAR SHOE

(a) Using SST, remove the cap, shoe hole–down spring and pin.

SST 09718–00010

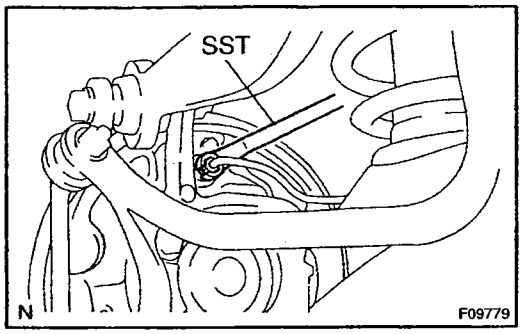


(b) Using needle–nose pliers, disconnect the parking brake cable from the parking brake lever, and remove the rear shoe.

6. REMOVE PARKING BRAKE LEVER

(a) Remove the C–washer.

(b) Remove the parking lever from the rear shoe.



7. REMOVE WHEEL CYLINDER

(a) Using SST, disconnect the brake line. Use container to catch the brake fluid.

SST 09751–36011

Torque:15 N·m (155 kgf·cm, 11 ft·lbf)

(b) Remove the 2 bolts and the wheel cylinder.

Torque:10 N·m (100 kgf·cm, 7 ft·lbf)

8. DISASSEMBLE WHEEL CYLINDER

(a) Remove the 2 boots from the wheel cylinder.

(b) Remove the 2 pistons from the wheel cylinder.

(c) Remove the spring from the wheel cylinder.

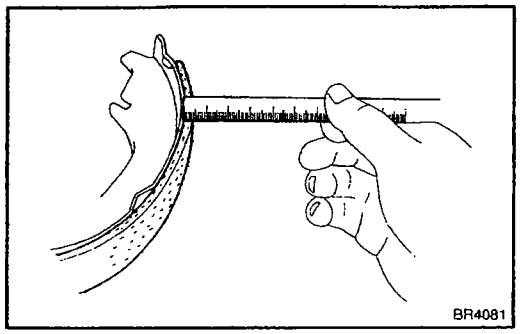
(d) Remove the 2 piston cups from each piston.

BR0RX-05

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the shoe lining thickness.

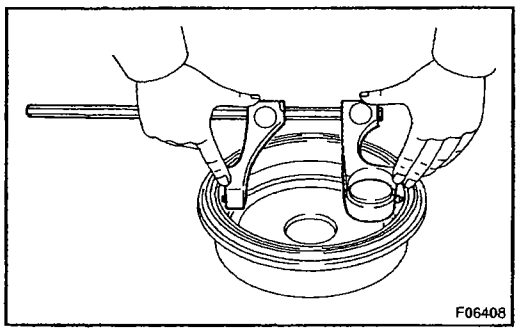
Standard thickness: 4.0 mm (0.157 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the thickness is less than the minimum or shoe lining shows signs of uneven wear, replace the brake shoes.

HINT:

If a brake shoes needs replacing, the brake shoes must be replaced as a set



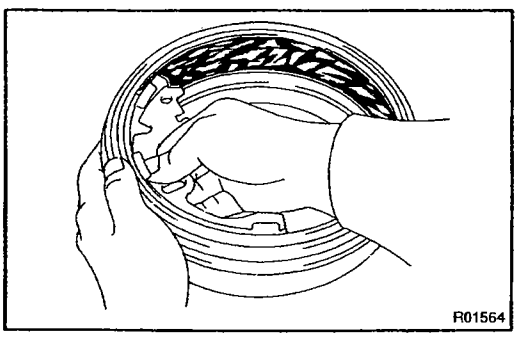
3. MEASURE BRAKE DRUM INSIDE DIAMETER

Using a brake drum gauge or equivalent, measure the inside diameter of the drum.

Standard inside diameter: 200.0 mm (7.874 in.)

Maximum inside diameter: 201.0 mm (7.913 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.



4. INSPECT REAR BRAKE LINING AND DRUM FOR PROPER CONTACT

If the contact between the brake lining and drum is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.

BR11H-02

INSTALLATION

Installation is in the reverse order of removal (See page BR–29).

NOTICE:

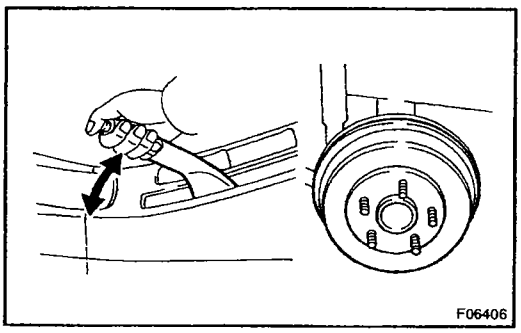
Apply lithium soap base glycol grease and high temperature grease to the parts indicated by the arrows (See page BR–28).

1. CHECK OPERATION OF AUTOMATIC ADJUSTING MECHANISM

(a) Move the parking brake lever of the rear shoe back and forth. Check that the adjuster turns.

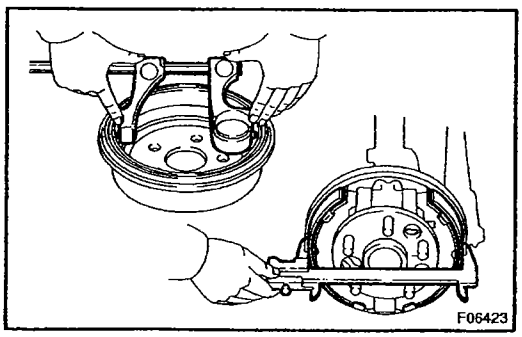
If the adjuster does not turn, check for incorrect installation of the rear brake.

(b) Adjust the adjuster length to the as short as possible.



(c) Install the brake drum.

(d) Pull the parking brake lever all the way up until a clicking sound can no longer be heard.



2. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

(a) Remove the brake drum.

(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

Shoe clearance: 0.6 mm (0.024 in.)

If incorrect, check the parking brake system.

(c) Install the brake drum.

3. FILL BRAKE RESERVOIR WITH BRAKE FLUID

4. BLEED BRAKE SYSTEM (See page BR–4)

5. CHECK FOR LEAKS

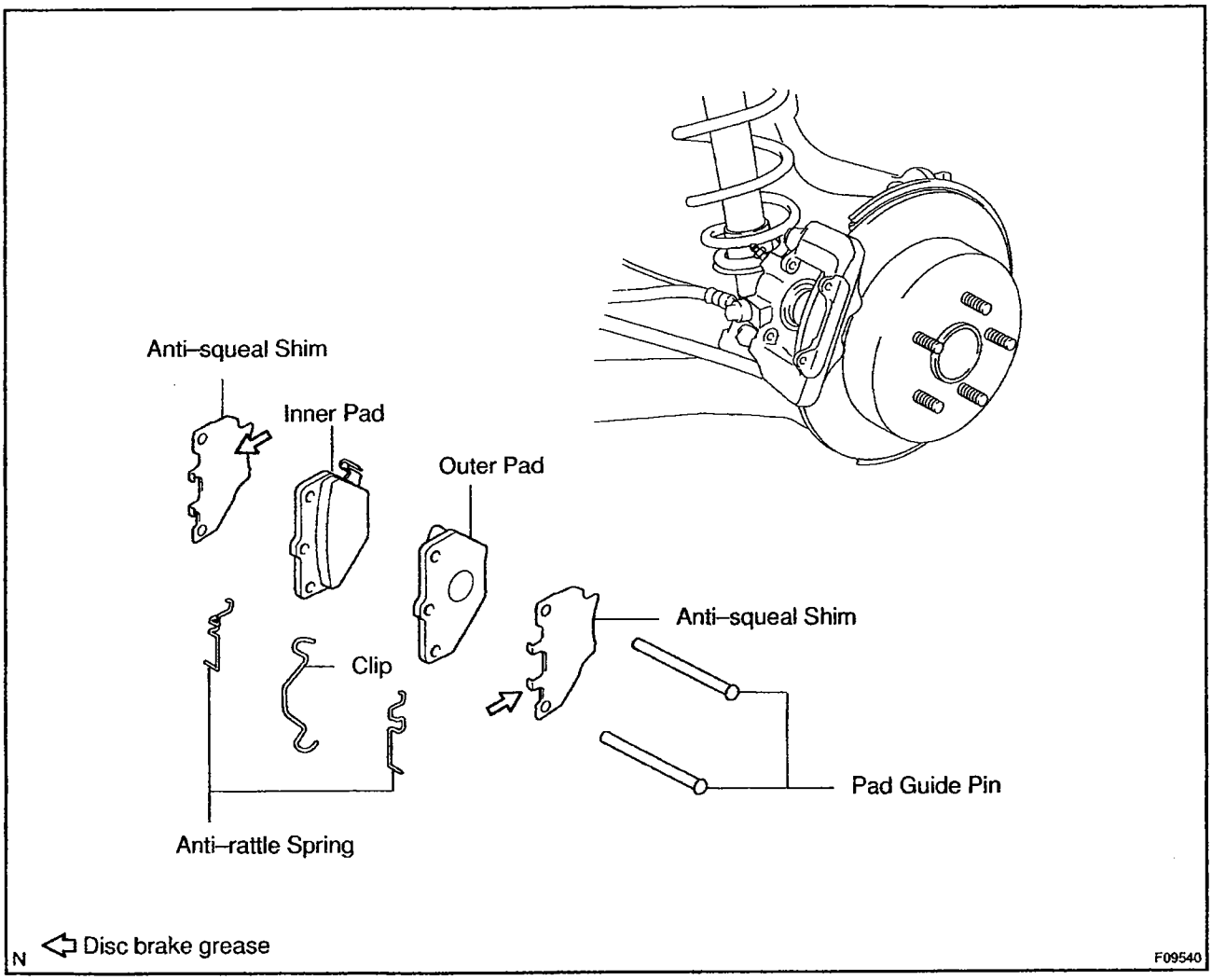
6. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR BRAKE PAD

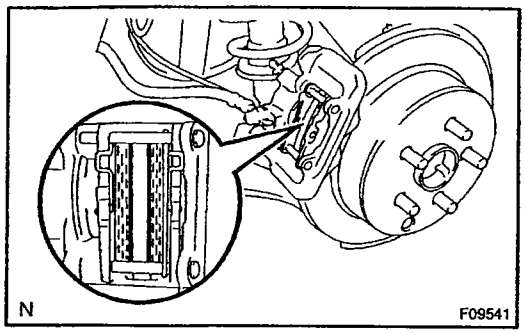
COMPONENTS

BR0QJ-03



BR14C-01

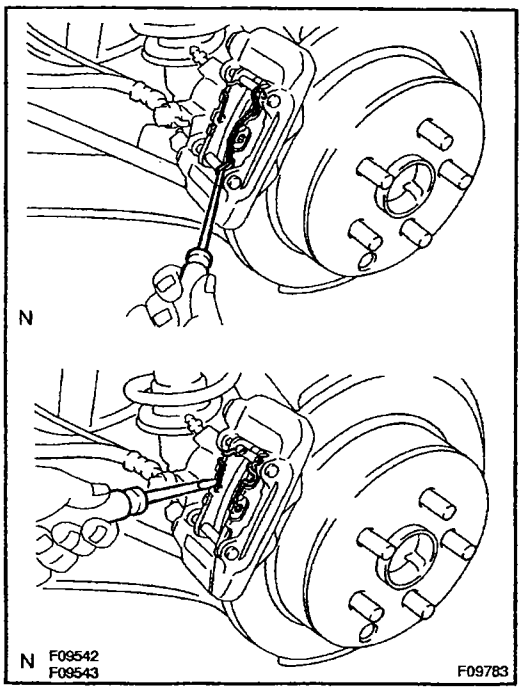
REPLACEMENT



1. **REMOVE REAR WHEEL**
2. **INSPECT PAD LINING THICKNESS**

Check the pad thickness.

Minimum thickness: 1.0 mm (0.039 in.)



3. **REMOVE CLIP, 2 ANTI–RATTLE SPRINGS AND 2 PAD GUIDE PINS**

(a) Using a screwdriver, remove the clip and 2 anti–rattle springs.

NOTICE:

- **Do not deform the clip and anti–rattle spring.**
- **The clip and anti–rattle spring can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.**

(b) Remove the 2 pad guide pins.

4. **REMOVE PADS AND ANTI–SQUEAL SHIMS**

(a) Remove the 2 pads.

(b) Remove the anti–squeal shim from each pad.

5. **CHECK DISC THICKNESS AND RUNOUT**
(See page BR–39)

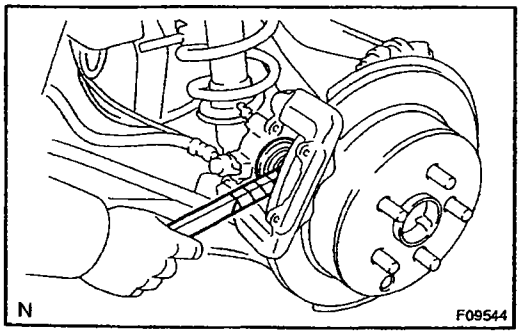
6. **INSTALL NEW PADS**

NOTICE:

When replacing worn pads, the anti–squeal shims must be replaced together with the pads.

(a) Apply disc brake grease to inside of anti–squeal shims (See page BR–33).

(b) Install the anti–squeal shim on each pad.



(c) Draw out a small amount of brake fluid from the reservoir.

(d) Press in the piston with a hammer handle or equivalent.

HINT:

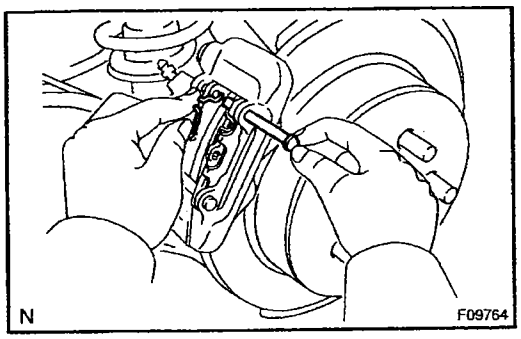
- Tape the hammer handle before use.
- If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

(e) Install the inner pad with the pad wear indicator plats facing upward, and install the outer pad.

NOTICE:
There should be no oil or grease adhering to the friction surfaces of the pads and the disc.

7. INSTALL 2 PAD GUIDE PINS, 2 ANTI–RATTLE SPRINGS AND CLIP

(a) Install the 2 anti–rattle springs on the each pad.



(b) While pressing the anti–rattle spring, and install the pad guide pin.

(c) Install the clip to the pad guide pin.

8. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

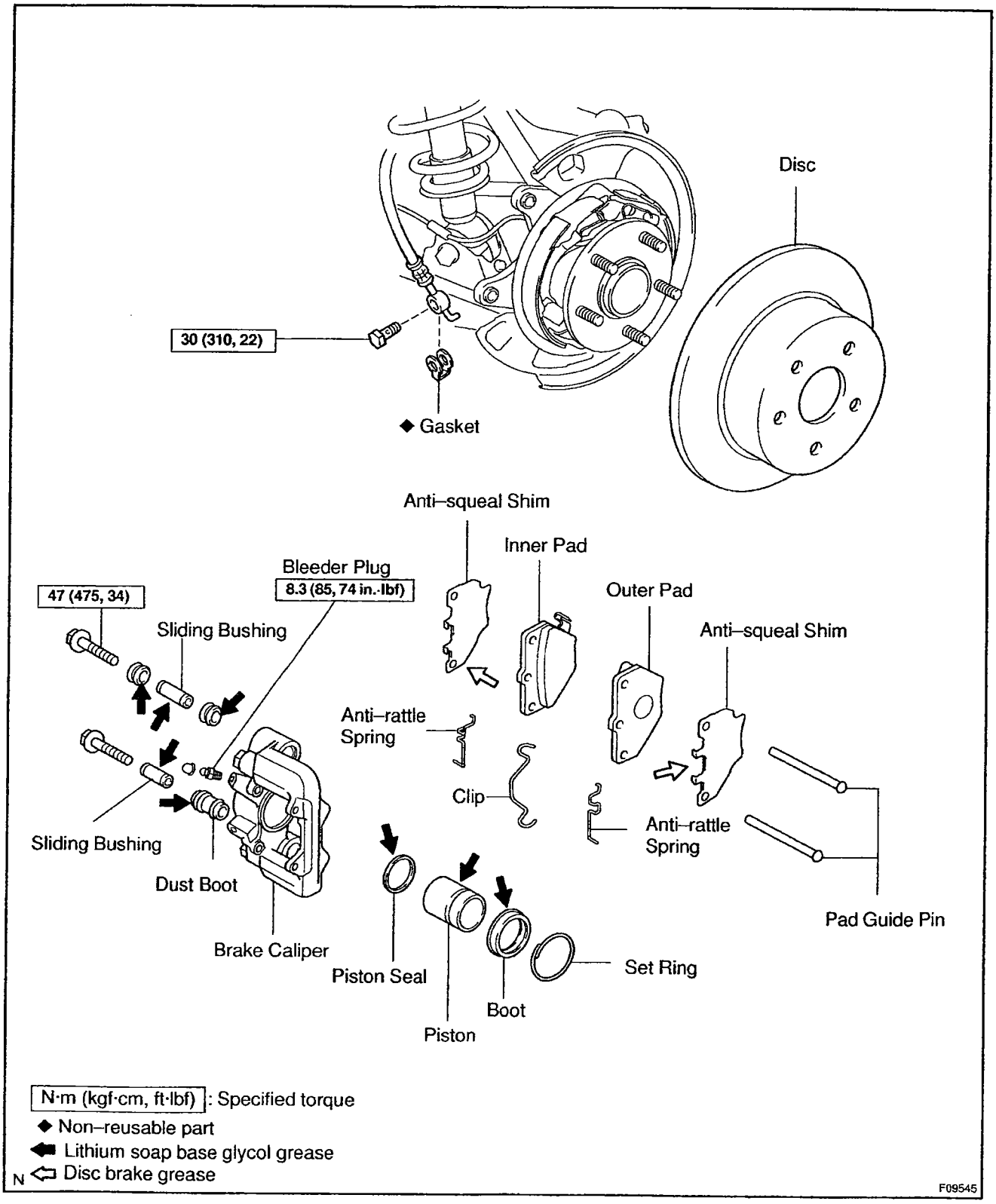
9. DEPRESS BRAKE PEDAL SEVERAL TIMES

10. CHECK THAT FLUID LEVEL IS AT MAX LINE

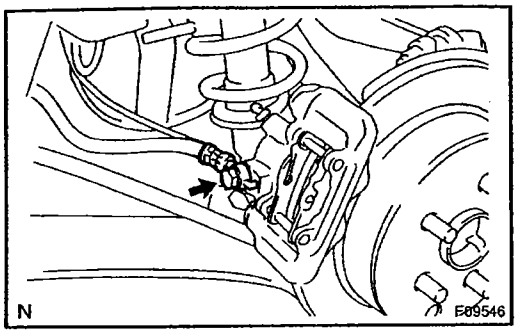
REAR BRAKE CALIPER

COMPONENTS

BR0OL–03



BR14D-01



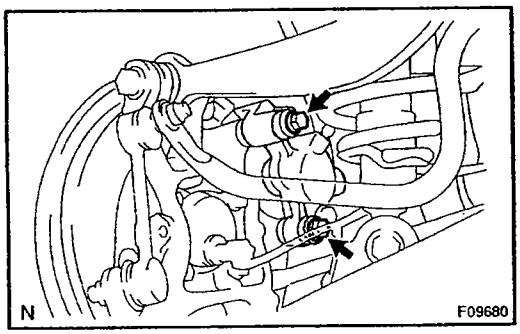
REMOVAL

1. **REMOVE REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **DISCONNECT FLEXIBLE HOSE**

(a) Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper.
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

HINT:
At the time of installation, insert the flexible hose lock securely in the lock hole in the caliper.

(b) Use a container to catch the brake fluid as it drains out.



3. **REMOVE CALIPER**

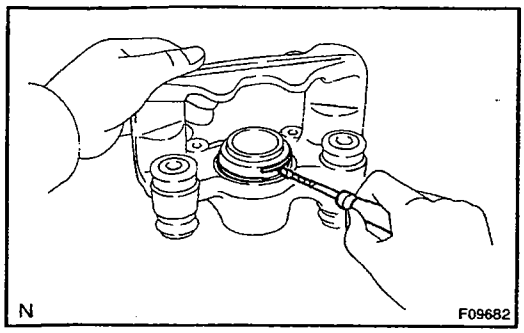
(a) Remove the 2 installation bolts and caliper.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

(b) Remove the caliper from the torque plate.

4. **REMOVE 2 PADS WITH ANTI–SQUEAL SHIMS**

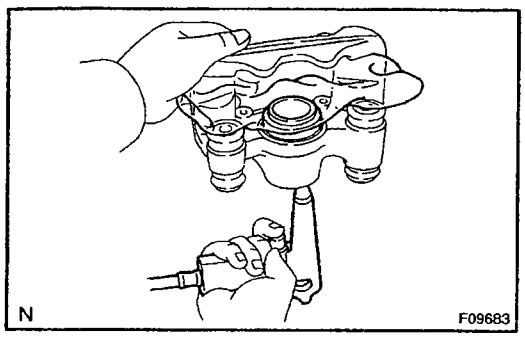
BR14E-01

DISASSEMBLY



1. REMOVE SET RING AND CYLINDER BOOT

Using a screwdriver, remove the set ring and cylinder boot.



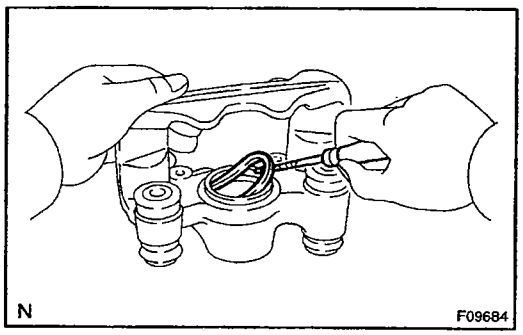
2. REMOVE PISTON

(a) Put a piece of cloth or an equivalent between the piston and caliper.

(b) Use compressed air to remove the piston from the cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.



3. REMOVE PISTON SEAL FROM CYLINDER

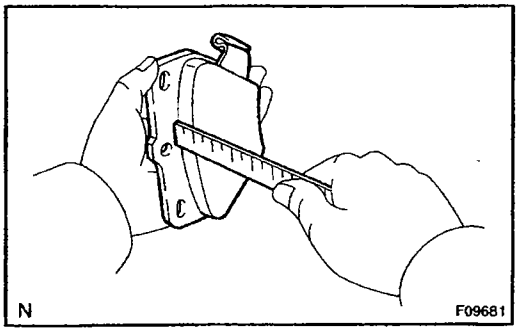
Using a screwdriver, remove the piston seal.

4. REMOVE 2 SLIDING BUSHINGS AND 3 DUST BOOTS

BR14F-01

INSPECTION

1. MEASURE PAD LINING THICKNESS



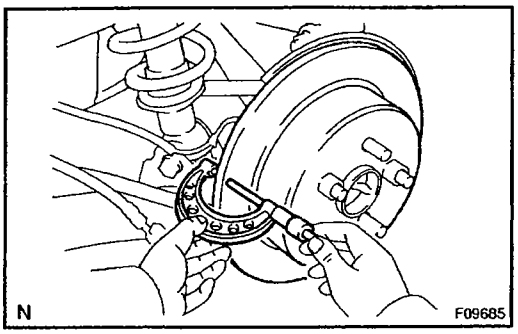
Using a ruler, measure the pad lining thickness.

Standard thickness: 10.0 mm (0.394 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the pad's thickness is at the minimum thickness or less, or if the pad has severe, uneven wear.

2. MEASURE DISC THICKNESS



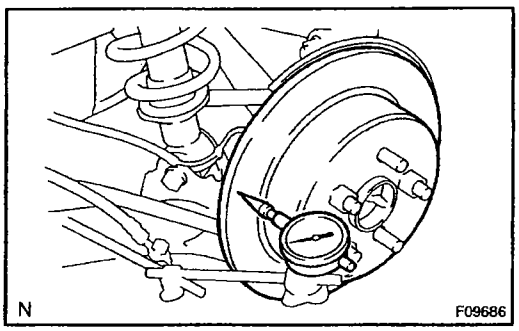
Using a micrometer, measure the disc thickness.

Standard thickness: 9.0 mm (0.354 in.)

Minimum thickness: 7.5 mm (0.295 in.)

Replace the disc if the disc's thickness is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is scored or worn unevenly.

3. MEASURE DISC RUNOUT



Using a dial indicator, measure disc runout at a position 10 mm (0.39 in.) from the outside edge.

Maximum disc runout: 0.15 mm (0.0059 in.)

If the disc's runout is at the maximum value or greater, check the bearing play is in the axial direction and check the axle hub runout (See page SA–55). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On–car" brake lathe.

4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the hub nuts and the disc. Reinstall the disc in the position turned 1/5 from its original position on the hub. Install and torque the hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(b) Repeat (a) until the disc has been installed on the 3 remaining hub positions.

(c) If the minimum runout recorded in (a) and (b) is less than 0.15 mm (0.0059 in.), install the disc in that position.

(d) If the minimum runout recorded in (a) and (b) is greater than 0.15 mm (0.0059 in.), replace the disc and repeat step 3.

BR0QP–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–38).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR–36).

BR0B7-03

INSTALLATION

Installation is in the reverse order of removal (See page BR–37).

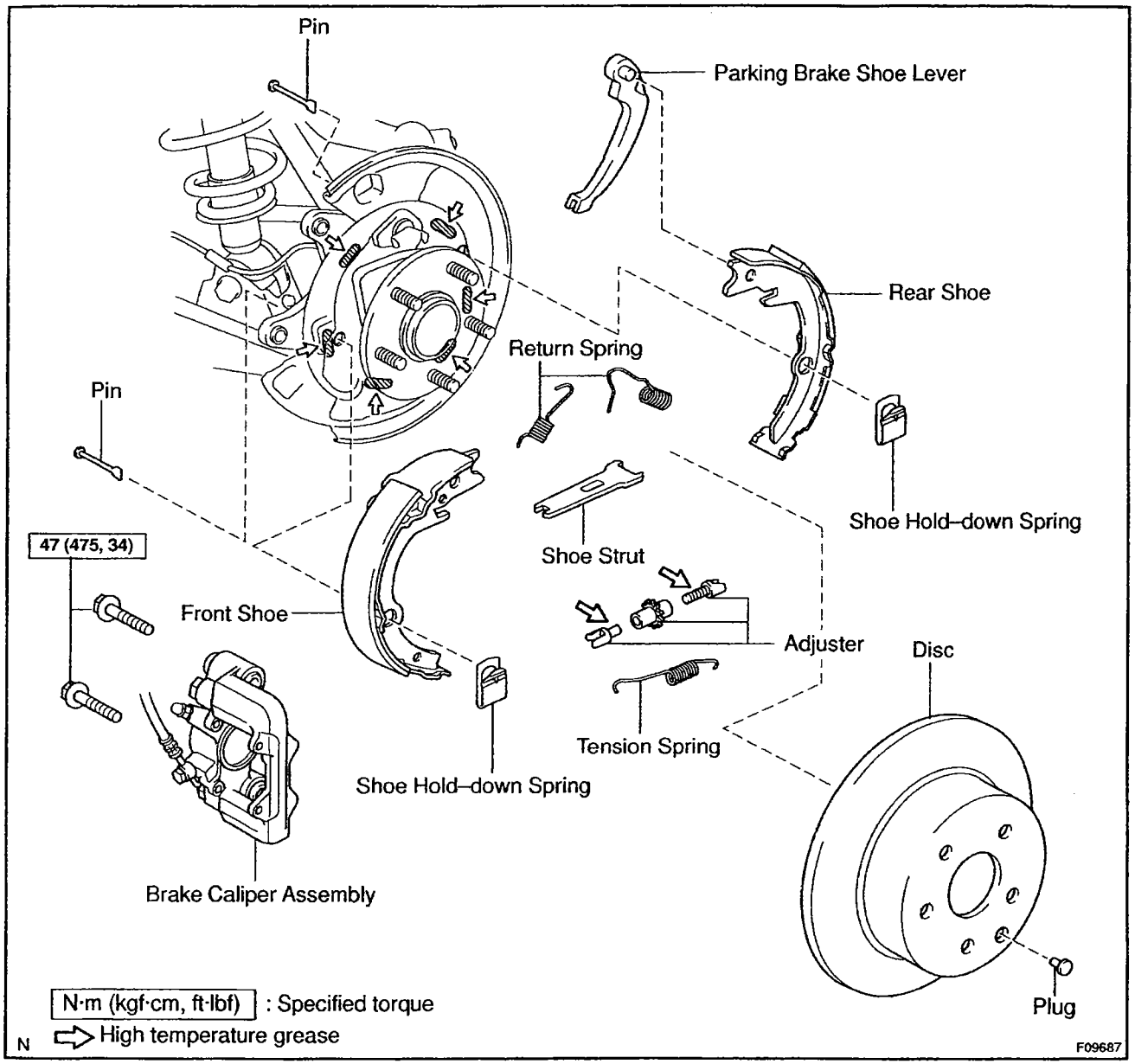
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed the brake system (See page BR–4).
- Check for leaks.

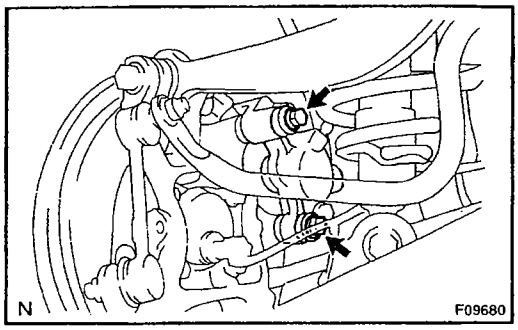
PARKING BRAKE

COMPONENTS

BR0QR-03



BR0QS-03



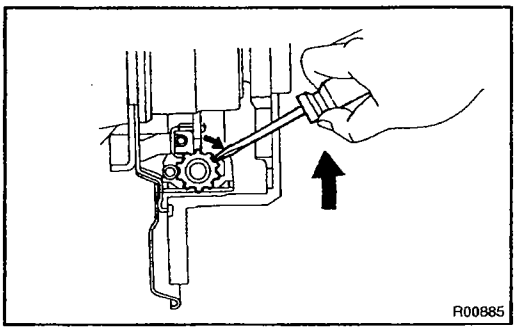
DISASSEMBLY

1. **REMOVE REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE REAR DISC BRAKE ASSEMBLY**

(a) Remove the 2 installation bolts and rear brake caliper.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

HINT:
Do not disconnect the flexible hose from the brake caliper.

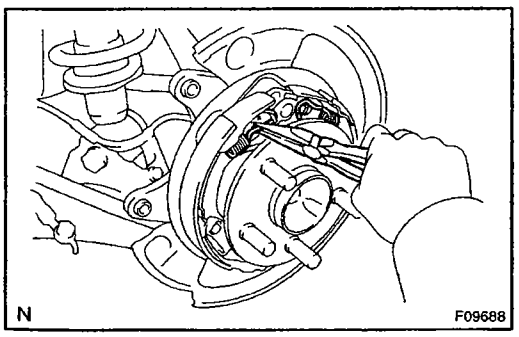
(b) Suspend the disc brake securely. Ensure that the hose is not stretched.



3. **REMOVE DISC**

Release the parking brake lever, and remove the disc.

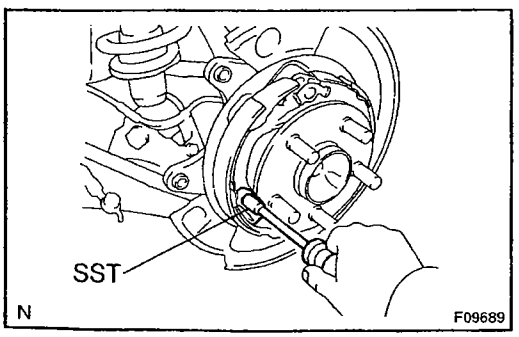
HINT:
If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.



4. **REMOVE SHOE RETURN SPRINGS AND TENSION SPRING**

Using needle–nose pliers, remove the 2 shoe return springs and tension spring.

5. **REMOVE SHOE STRUT**



6. **REMOVE FRONT SHOE AND ADJUSTER**

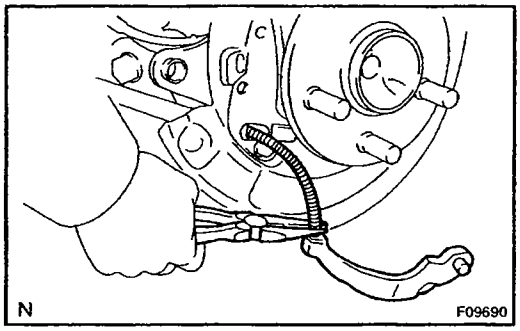
(a) Using SST, remove the shoe hold–down spring and pin from the front shoe.
SST 09718–00010

(b) Remove the front shoe and adjuster.

7. REMOVE REAR SHOE

(a) Using SST, remove the shoe hold–down spring and pin from the rear shoe.
SST 09718–00010

(b) Disconnect the rear shoe from the parking brake shoe lever, and remove rear shoe.



8. REMOVE PARKING BRAKE SHOE LEVER

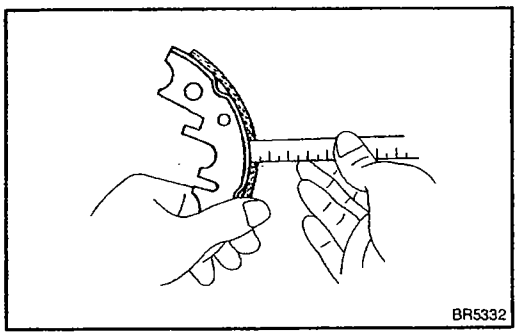
Using needle–nose pliers, disconnect the parking brake cable from the parking brake shoe lever.

BR14G-01

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



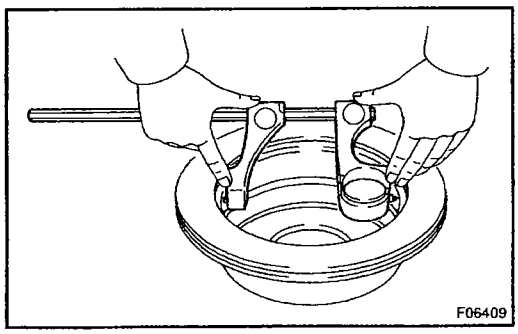
2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness: 2.0 mm (0.079 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is severe, uneven wear, replace the brake shoe.



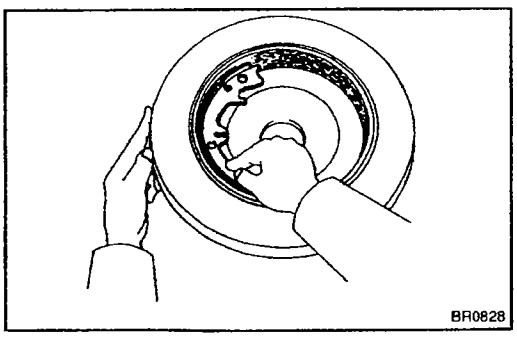
3. MEASURE DISC INSIDE DIAMETER

Using a brake drum gauge or equivalent, measure the inside diameter of the disc.

Standard inside diameter: 173.0 mm (6.811 in.)

Maximum inside diameter: 174.0 mm (6.850 in.)

Replace the disc if the inside diameter is at the maximum value or more. Replace the disc or grind it with a lathe if the disc is scored or is worn unevenly.



4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and the brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.

BR0OU–03

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–43).

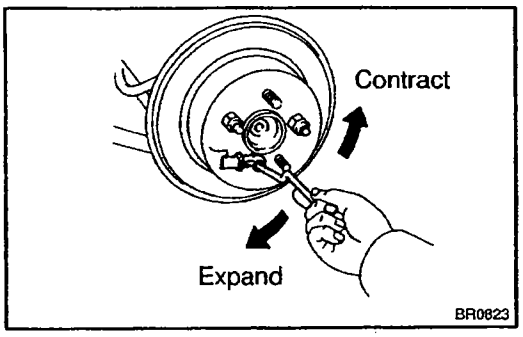
NOTICE:

Apply high temperature grease to the parts indicated by the arrows (See page BR–42).

1. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the hub nuts.

(b) Remove the hole plug.



(c) Turn the adjuster and expand the shoes until the disc locks.

(d) Return the adjuster 8 notches.

(e) Install the hole plug.

2. SETTLING PARKING BRAKE SHOES AND DISC

(a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.

(b) With the parking brake release button pushed in, pull on the lever with 98 N (10 kgf, 19.8 lbf) of force.

(c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.

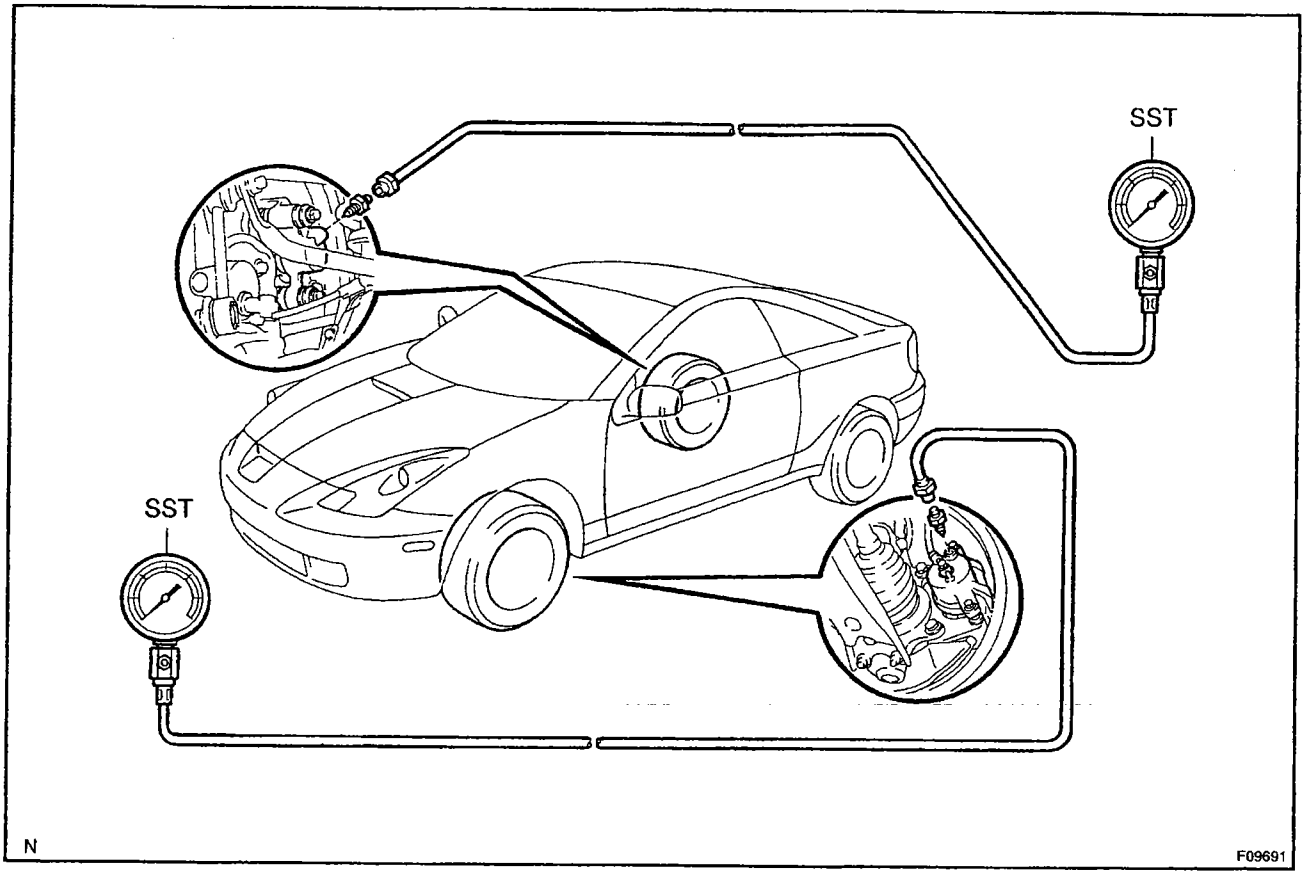
(d) Repeat this procedure 2 or 3 times.

3. CHECK AND ADJUST PARKING BRAKE LEVER TRAVEL (See page BR–8)

PROPORTIONING VALVE (P VALVE)

ON–VEHICLE INSPECTION

BR0CV-02



1. **INSTALL LSPV GAUGE (SST) AND BLEED AIR**
   SST 09709–29018
2. **BLEED AIR FROM FLUID PRESSURE GAUGE**
3. **RAISE MASTER CYLINDER PRESSURE AND CHECK REAR WHEEL CYLINDER OR REAR BRAKE CALIPER PRESSURE**

1ZZ–FE engine:

Master cylinder fluid pressure	Rear wheel cylinder fluid pressure
2.94 kPa (30 kgf/cm^2, 427 psi)	2.94 kPa (30 kgf/cm^2, 427 psi)
7.85 kPa (80 kgf/cm^2, 1,138 psi)	4.75 kPa (48.5 kgf/cm^2, 689 psi)

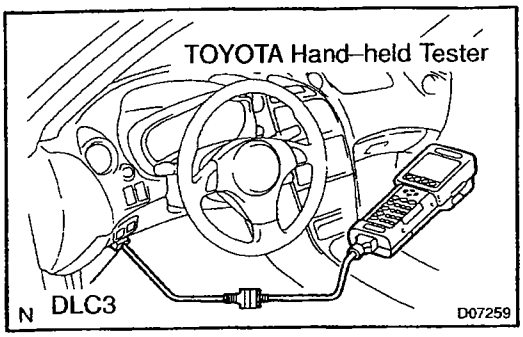
2ZZ–GE engine:

Master cylinder fluid pressure	Rear brake caliper fluid pressure
1.96 kPa (20 kgf/cm^2, 284 psi)	1.96 kPa (20 kgf/cm^2, 284 psi)
7.85 kPa (80 kgf/cm^2, 1,138 psi)	5.61 kPa (57.2 kgf/cm^2, 813 psi)

When inspecting the fluid pressure, inspect the left font and right rear together, and the right front and left rear together.

If the rear fluid pressure is incorrect, replace the P valve assembly.

4. **BLEED BRAKE SYSTEM (See page BR–4)**
5. **CHECK FOR LEAKS**



ABS ACTUATOR

BR0CW-02

ON–VEHICLE INSPECTION

1. IN CASE OF USING TOYOTA HAND–HELD TESTER:

(a) Connect the TOYOTA hand–held tester to the DLC3.
(b) Start the engine and run it at idle.
(c) Select the ACTIVE TEST mode on the TOYOTA hand–held tester.

HINT:
Please refer to the TOYOTA hand–held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

(a) With the motor relay ON, check the actuator motor operation noise.
(b) Turn the motor relay OFF.
(c) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
(d) With the motor relay ON, check that the pedal does not pulsate.

NOTICE:
Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:
Never turn ON the solenoid which is not described below.

(a) With the brake pedal depressed, perform the following operations.
(b) Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:
Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(c) Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.
(d) Turn the motor relay ON, and check that the pedal returns.

NOTICE:
Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

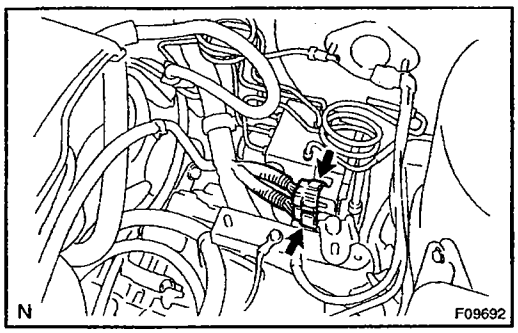
As in the same procedure, check the solenoids of other wheels.
HINT:
Left front wheel: SFLH, SFLR
Right rear wheel: SRRH, SRRR
Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page DI–276)

6. IN CASE OF NOT USING TOYOTA HAND–HELD TESTER:

HINT:

Using the ABS actuator checker (SST), check the operation of the actuator. If the actuator does not operate, check the operation of sub–wire harness G according to the instructions on pages DI–300 and DI–295. If the solenoid and/or pump motor relay are abnormal, replace the relay and inspect the actuator operation again.



7. INSPECT BATTERY POSITIVE VOLTAGE

Battery positive voltage: 10 – 14 V

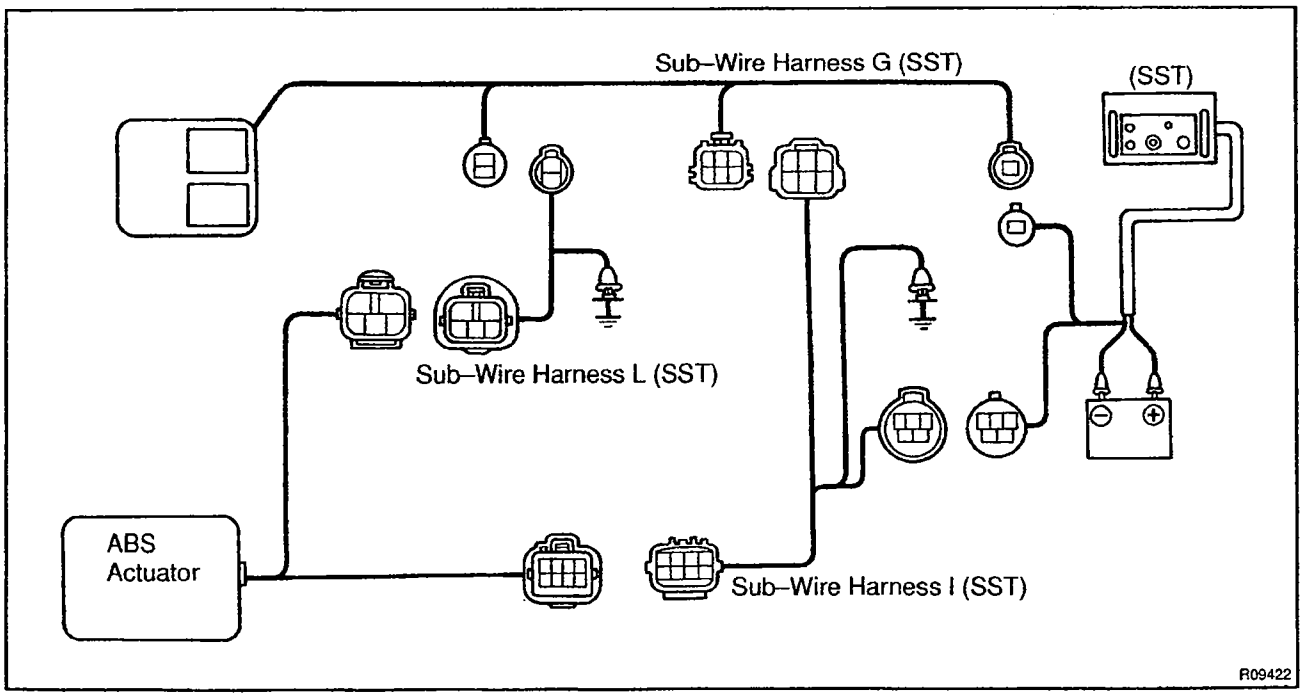
8. DISCONNECT CONNECTORS

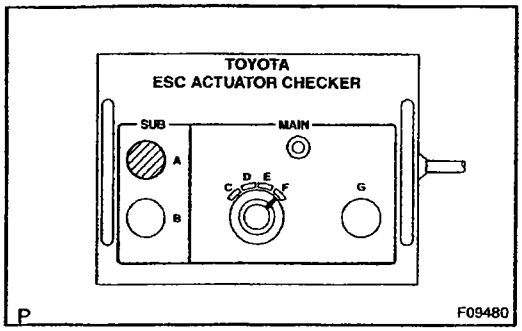
Disconnect the 2 connectors from the actuator.

9. CONNECT ACTUATOR CHECKER (SST)

(a) Connect the actuator checker (SST) to the actuator side wire harness via the sub–wire harness (SST), as shown.
SST 09990–00150, 09990–00250, 09990–00300, 09990–00360

(b) Connect the red cable of the checker to the battery positive (+) terminal and black cable to the negative (–) terminal. Connect the black cable of the sub–wire harness to the battery negative (–) terminal or body ground.





10. INSPECT ABS ACTUATOR OPERATION OF REAR LH WHEEL

HINT:

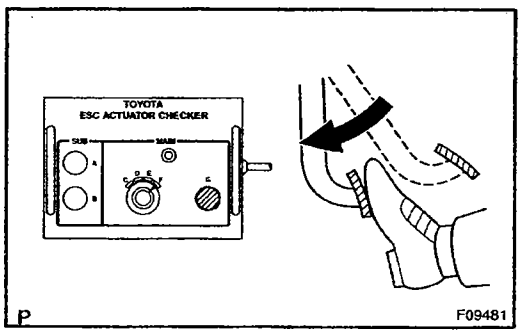
The functions of the ABS actuator checker switches are shown in the table below.

A	Motor ON/OFF
B	Front LH solenoid ON/OFF
C	–
D	Rear RH solenoid
E	Front RH solenoid
F	Rear LH solenoid
G	Solenoid ON/OFF

(a) Start the engine and run it at idle.

(b) Turn select switch of the actuator checker to the "F" position.

(c) Push and hold in the "A" switch for a few seconds. Make sure that you can hear the motor running.



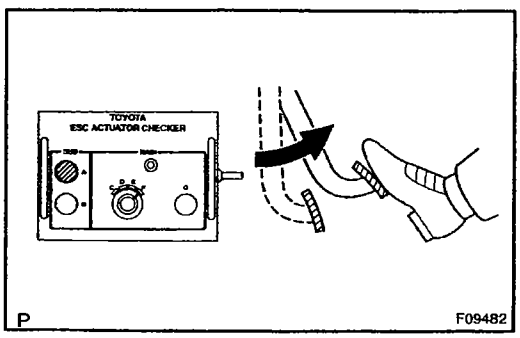
(d) Depress the brake pedal and hold it until step (g) is completed.

(e) Push and hold in the "G" switch for a few seconds, and check that the brake pedal does not go down.

NOTICE:

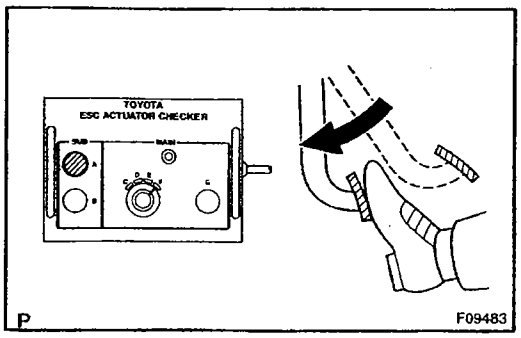
Do not keep the "G" switch pushed down for more than 10 seconds.

(f) Release the "G" switch and check that the pedal goes down.



(g) Push the "A" switch and check that the pedal returns.

(h) Release the brake pedal.



(i) Push and hold in the "A" switch for a few seconds.

(j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the "A" switch for a few seconds and check that the brake pedal does not pulsate.

(k) Release the brake pedal.

11. INSPECT FOR OTHER WHEELS

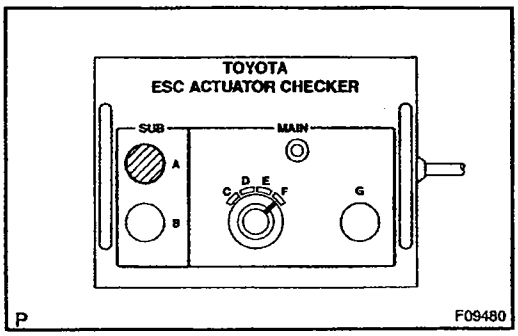
(a) Turn the selector switch to "E" position (for front RH wheel).

(b) Repeating (c) to (j) to the step 4, check the actuator operation similarly.

(c) Similarly, inspect "front LH" and "rear RH" wheel.

HINT:

When inspecting the "front LH" wheel, push the "B" switch instead of the POWER SWITCH. This makes it possible to inspect wherever the selector switch position indicates.



12. PUSH MOTOR SWITCH

(a) Push and hold in the "A" switch for a few seconds.

(b) Stop the engine.

13. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

(a) Disconnect the actuator checker (SST) and 3 sub–wire harness (SST) from the actuator.

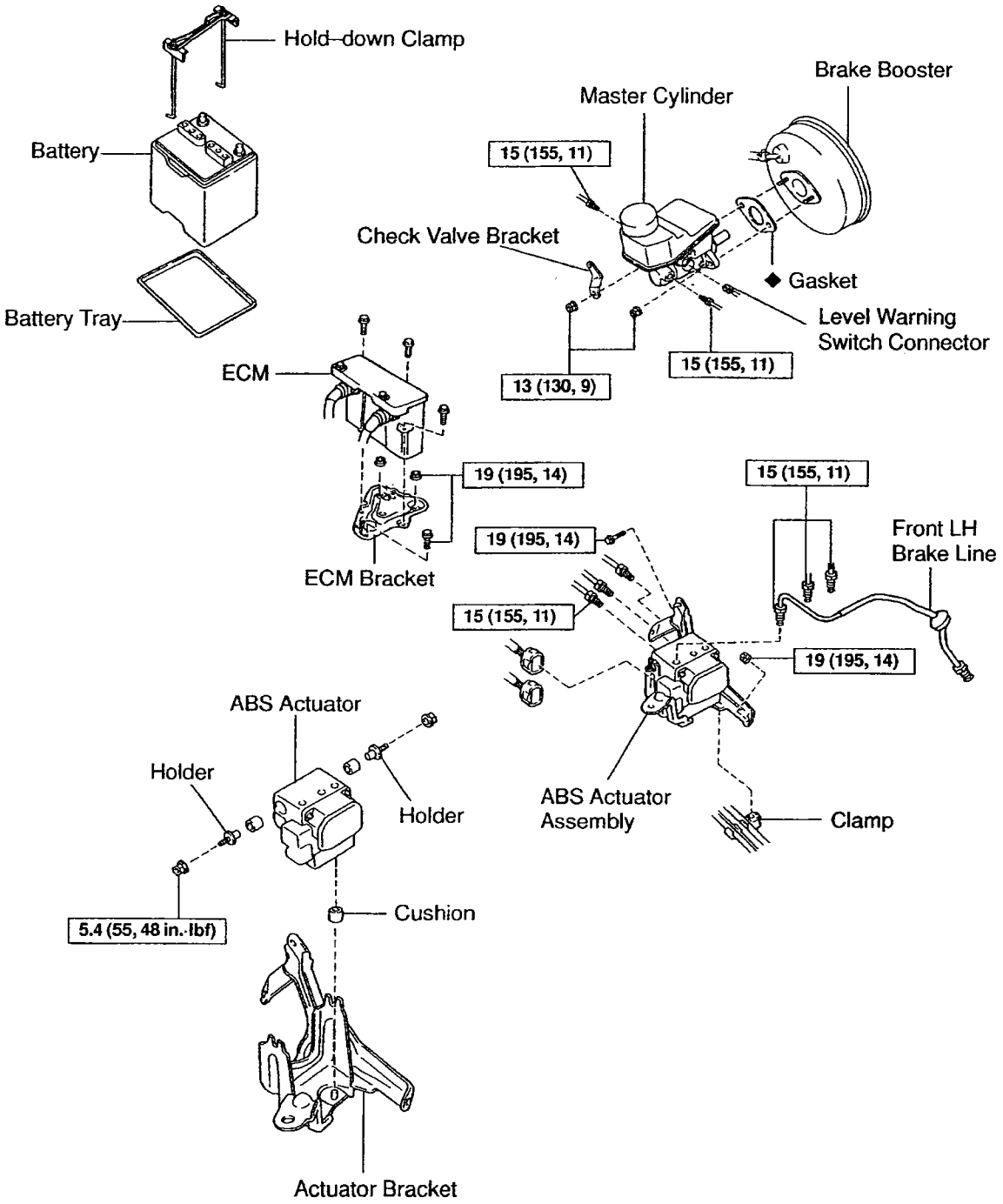
SST 09990–00150, 09990–00250, 09990–00300, 09990–00360

(b) Connect the actuator connectors.

(c) Clear the DTC (See page DI–276).

BR0CX-02

COMPONENTS



N-m (kgf-cm, ft-lbf) : Specified torque

◆ Non–reusable part

N

F09693

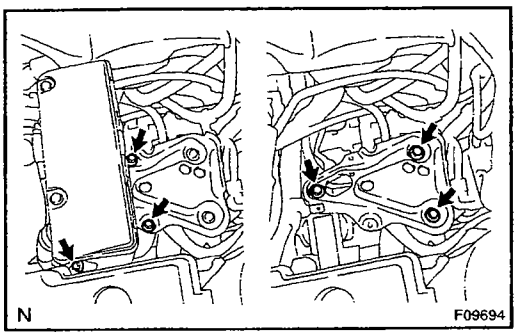
BR14H-01

REMOVAL

1. REMOVE BATTERY

Remove the hold–down clamp, battery and battery tray.

2. REMOVE MASTER CYLINDER (See page BR–10)



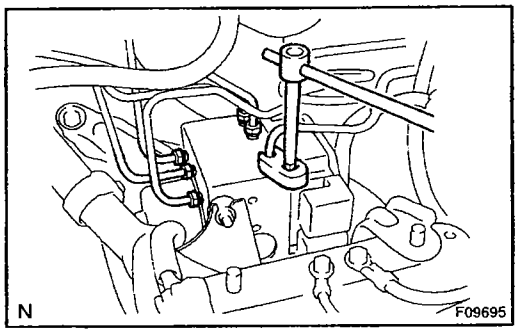
3. REMOVE ECM AND ECM BRACKET

(a) Remove the 3 bolts, and move the ECM aside.

(b) Disconnect the harness clamp, and remove the bolt, 2 nuts and ECM bracket.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

4. DISCONNECT 2 CONNECTORS

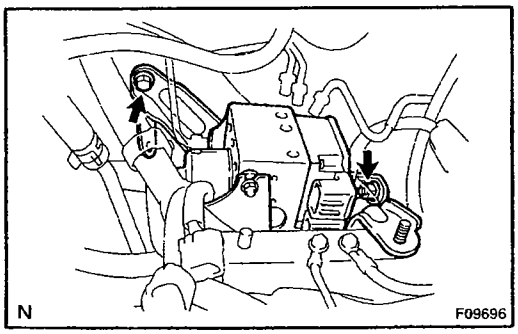


5. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



6. REMOVE ABS ACTUATOR

(a) Disconnect the hose clamp from the actuator bracket under side.

(b) Remove the bolt, nut and ABS actuator assembly.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

(c) Remove the 2 nuts and ABS actuator from the actuator bracket.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(d) Remove the 2 holders and 3 cushions from the ABS actuator.

INSTALLATION

BR0QZ-02

Installation is in the reverse order of removal (See page BR–53).

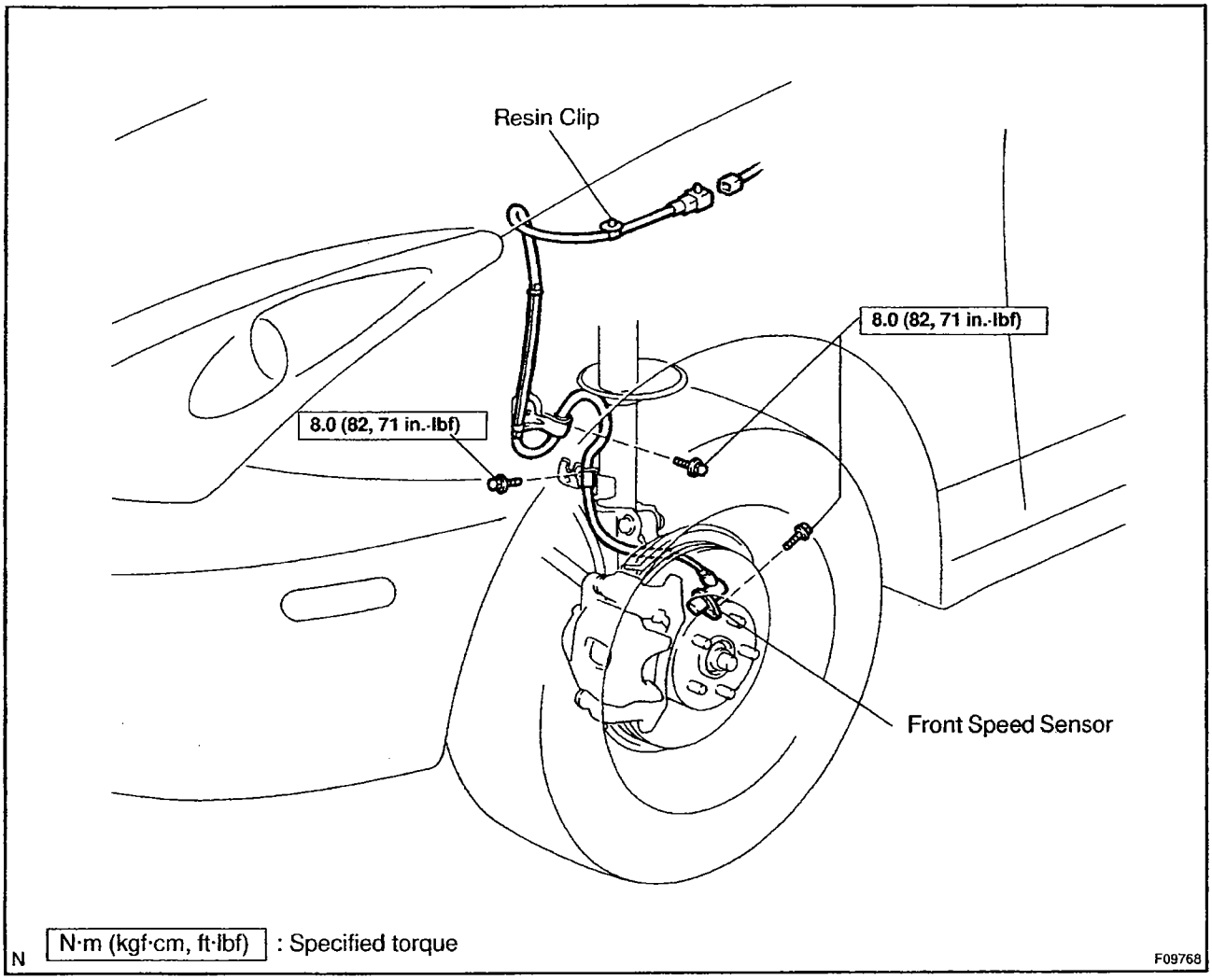
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR–4).
- Check for leaks.

FRONT SPEED SENSOR

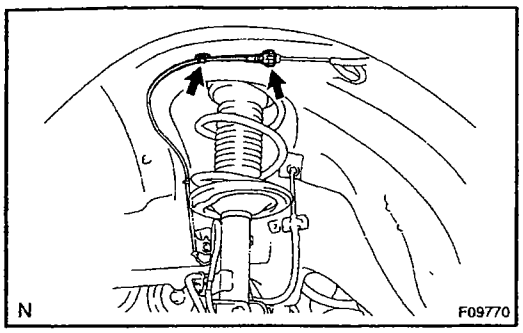
COMPONENTS

BR0R0-02



BR0R1-02

REMOVAL

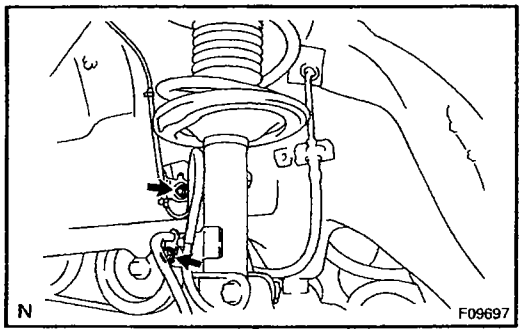


1. DISCONNECT SPEED SENSOR CONNECTOR

(a) Remove the front wheel.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

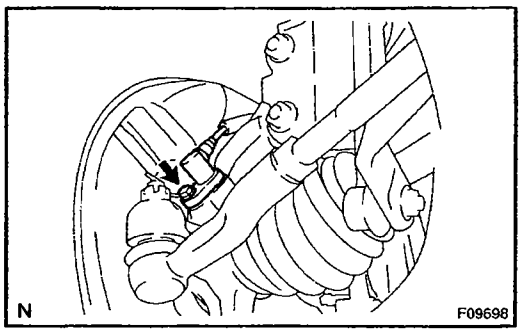
(b) Remove the fender liner.

(c) Disconnect the speed sensor connector and resin clip.



2. REMOVE SPEED SENSOR

(a) Remove the 2 clamp bolts holding the sensor harness from the body and shock absorber.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



(b) Remove the speed sensor installation bolt from the steering knuckle.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:

At the time of installation, please refer to the following item.

- **There are no foreign objects on the sensor or the part of the knuckle to which the sensor is to be installed.**
- **The sensor is installed flat against the knuckle when you tighten the bolt.**

8R0R2-02

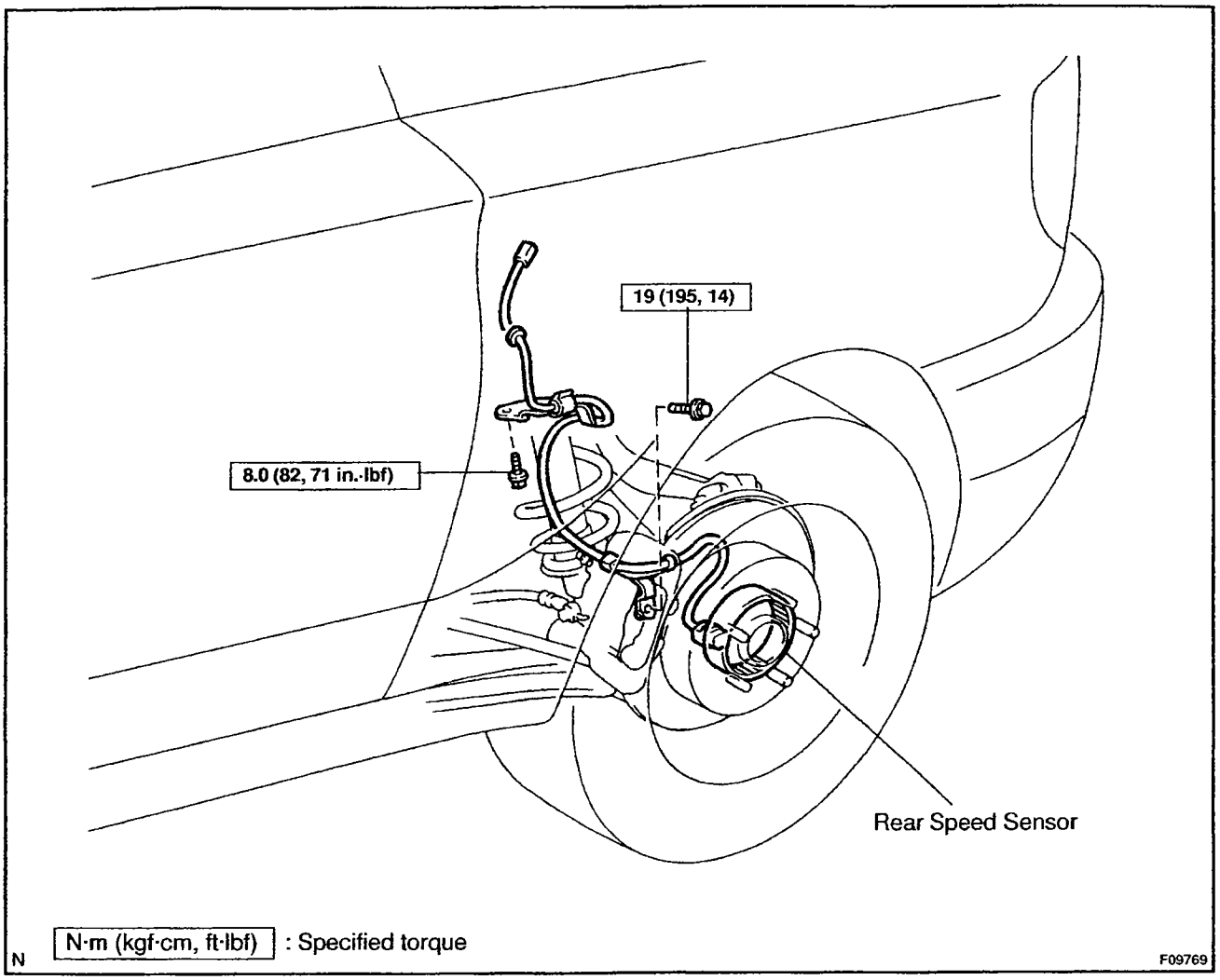
INSTALLATION

Installation is in the reverse order of removal (See page BR–56).
AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page DI–276)

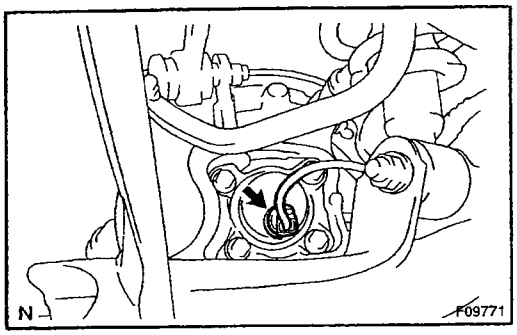
REAR SPEED SENSOR

COMPONENTS

BR0R3-02



8R14I-01



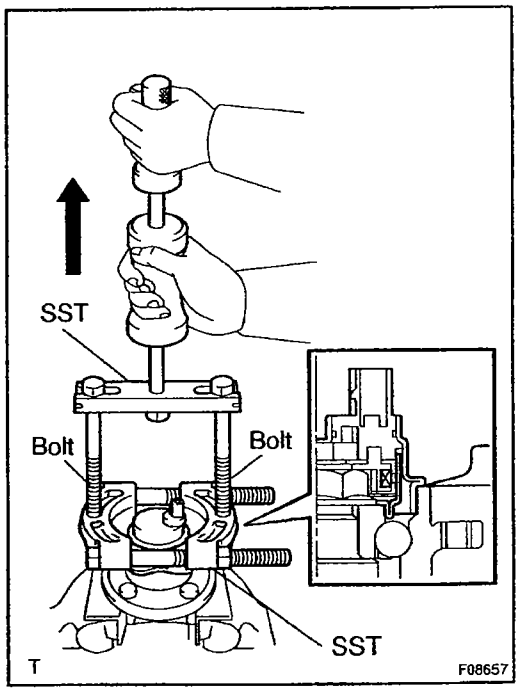
REMOVAL

1. **REMOVE REAR WHEEL**
2. **DISCONNECT SPEED SENSOR CONNECTOR**

Disconnect the connector from the speed sensor.

3. **REMOVE SPEED SENSOR WITH REAR AXLE HUB (See Page SA–55)**
4. **REMOVE SPEED SENSOR**

(a) Using a pin punch and hammer, drive out the 2 pins and remove the 2 attachments from SST.
SST 09520–00031



(b) Mount the rear axle hub in a soft jaw vise.

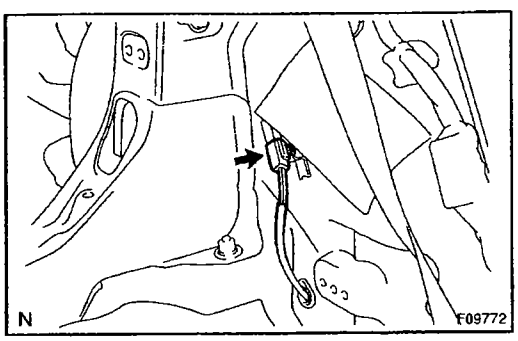
NOTICE:

Replace the axle hub assembly if it is dropped or a strong shock is given to it.

(c) Using SST and 2 bolts (Diameter: 12 mm, Pitch: 1.5 mm), remove the speed sensor.
SST 09520–00031 (09520–00040, 09521–00020), 09950–00020

NOTICE:

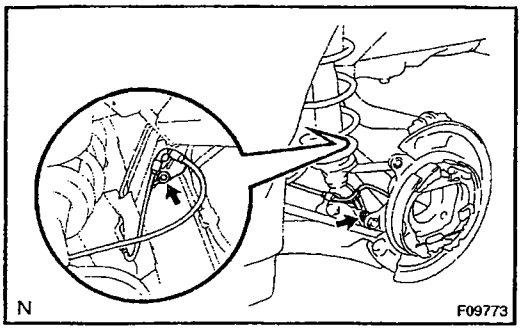
- **If a damage is inflicted to the sensor rotor, replace the axle hub assembly.**
- **Do not scratch the contacting surface of axle hub and speed sensor.**



5. **IF NECESSARY, REPLACE SPEED SENSOR WIRE HARNESS**

(a) Remove the seat cushion, seatback and quarter trim (See page BO–88).

(b) Disconnect the speed sensor wire harness connector.



(c) Remove the 2 clamp bolts holding the sensor harness from the lower arm and body.
Torque:
Lower arm side: 19 N·m (195 kgf·cm, 14 ft·lbf)
Body side: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(d) Replace the sensor wire harness with the grommet.

BR14J-01

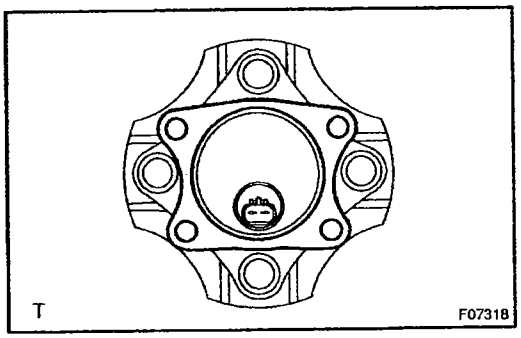
INSTALLATION

1. INSTALL NEW SPEED SENSOR

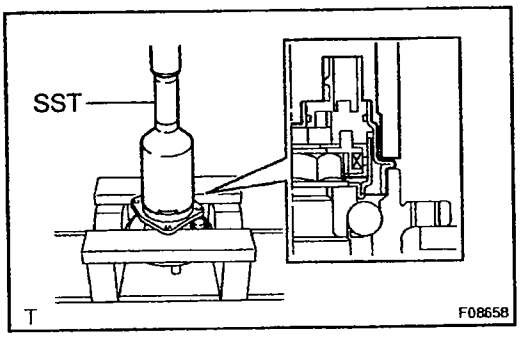
(a) Clean the contacting surface of the axle hub and a new speed sensor.

NOTICE:

Do not stick any foreign objects to the sensor rotor.



(b) Place the speed sensor on the axle hub so that the connector makes the most downward position under the on–vehicle condition.



(c) Using SST and a press, install a new speed sensor to the axle hub.

SST 09214–76011

NOTICE:

- **Do not tap the speed sensor with a hammer directly.**
- **Check that there should be no foreign objects on the speed sensor detection portion.**
- **Press in the speed sensor straight and slowly.**

2. INSTALL SPEED SENSOR WITH REAR AXLE
(See page SA–59)

3. CONNECT SPEED SENSOR CONNECTOR

4. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

5. CHECK SPEED SENSOR SIGNAL (See page DI–276)

– MEMO –

STEERING

STEERING SYSTEM	SR–1
TROUBLESHOOTING	SR–2
DRIVE BELT	SR–3
POWER STEERING FLUID	SR–4
STEERING WHEEL	SR–8
TILT STEERING COLUMN	SR–9
POWER STEERING VANE PUMP	SR–22
POWER STEERING GEAR	SR–33

SR

STEERING SYSTEM

PRECAUTION

SR06F–02

- **Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.**
- **The CELICA is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.**

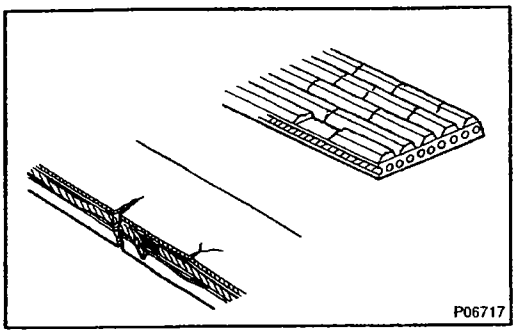
TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SR08G-03

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	SA–2
	2. Power steering fluid level (Low)	SR–5
	3. Drive belt (Loose)	SR–3
	4. Front wheel alignment (Incorrect)	SA–4
	5. Steering system joints (Worn)	–
	6. Suspension arm ball joints (Worn)	SA–48
	7. Steering column (Binding)	–
	8. Power steering vane pump	SR–22
	9. Power steering gear	SR–33
Poor return	1. Tires (Improperly inflated)	SA–2
	2. Front wheel alignment (Incorrect)	SA–4
	3. Steering column (Binding)	–
	4. Power steering gear	SR–33
Excessive play	1. Steering system joints (Worn)	–
	2. Suspension arm ball joints (Worn)	SA–48
	3. Intermediate shaft, Sliding yoke (Worn)	–
	4. Front wheel bearing (Worn)	SA–12
	5. Power steering gear	SR–33
Abnormal noise	1. Power steering fluid level (Low)	SR–5
	2. Steering system joints (Worn)	–
	3. Power steering vane pump	SR–22
	4. Power steering gear	SR–33



DRIVE BELT

SR08H-03

INSPECTION

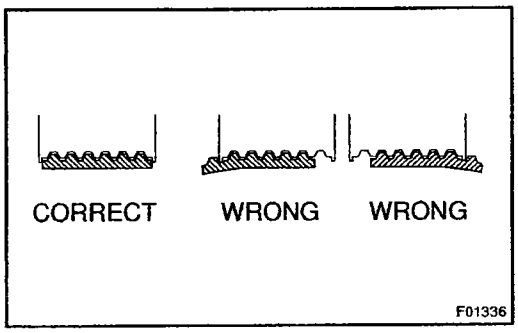
INSPECT DRIVE BELT

Visually check the drive belt for excessive wear, frayed cords, etc.

If any defect has been found, replace the drive belt.

HINT:

- Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the drive belt, it should be replaced.



- After installing a drive belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the drive belt has not slipped out of the groove on the bottom of the pulley.

S

POWER STEERING FLUID BLEEDING

SR09I-03

1. **CHECK FLUID LEVEL (See page SR–5)**
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**
3. **TURN STEERING WHEEL**

With the engine stopped, turn the steering wheel slowly from lock to lock several times.

4. **LOWER VEHICLE**
5. **START ENGINE**

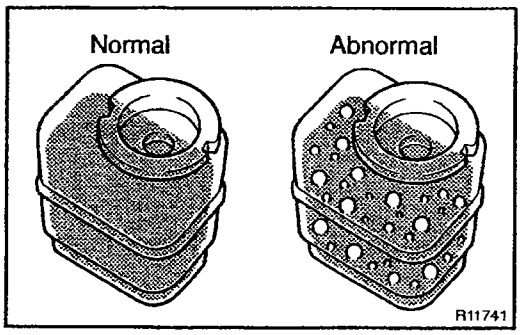
Run the engine at idle for a few minutes.

6. **TURN STEERING WHEEL**

(a) With the engine idling, turn the steering wheel to left or right full lock position and keep it there for 2–3 seconds, then turn the steering wheel to the opposite full lock position and keep it there for 2–3 seconds.

(b) Repeat (a) several times.

7. **STOP ENGINE**

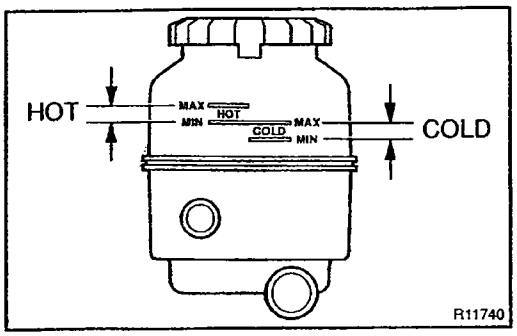


8. **CHECK FOR FOAMING OR EMULSIFICATION**

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. **CHECK FLUID LEVEL (See page SR–5)**

SR08J-03



INSPECTION

1. CHECK FLUID LEVEL

(a) Keep the vehicle level.

(b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

Fluid: ATF DEXRON® II or III

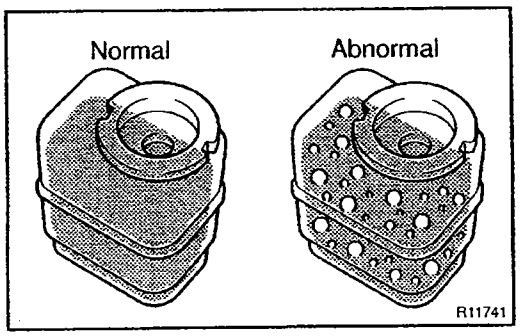
HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

(c) Start the engine and run it at idle.

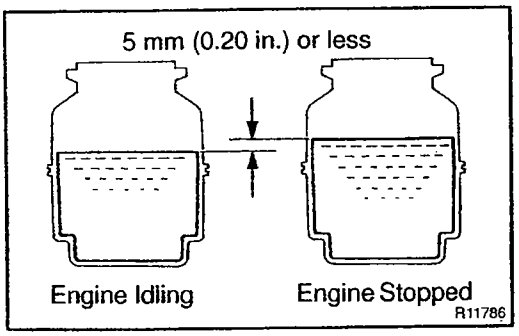
(d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80°C (176°F)



(e) Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system (See page SR–4).



(f) With the engine idling, measure the fluid level in the oil reservoir.

(g) Stop the engine.

(h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed power steering system (See page SR–4).

(i) Check the fluid level.

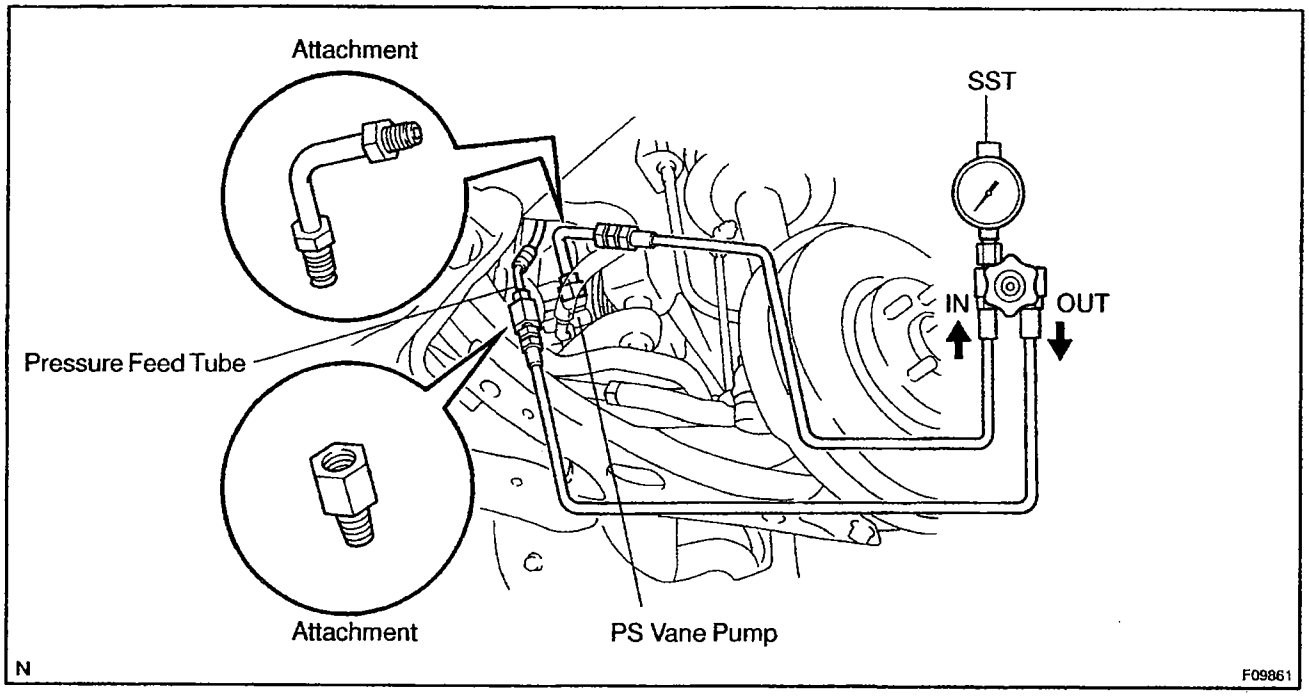
SR

2. CHECK STEERING FLUID PRESSURE

(a) Disconnect the pressure feed tube from the PS vene pump (See page SR–24).

(b) Connect SST, as shown in the illustration below.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

NOTICE:
Check that the valve of the SST is in the open position.

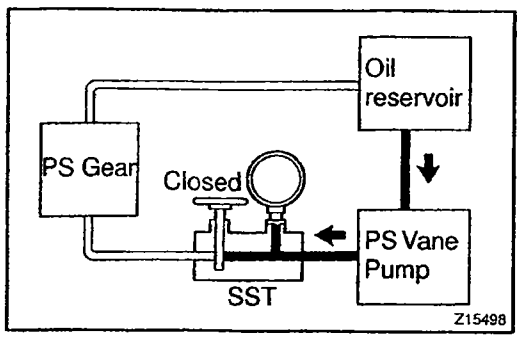


(c) Bleed the power steering system (See page SR–4).

(d) Start the engine and run it at idle.

(e) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 °C (176 °F)

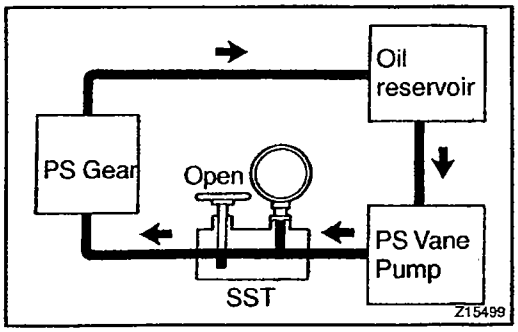
SR



(f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Minimum fluid pressure:
7,355 kPa (75 kgf/cm², 1,067 psi)

NOTICE:

- **Do not keep the valve closed for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

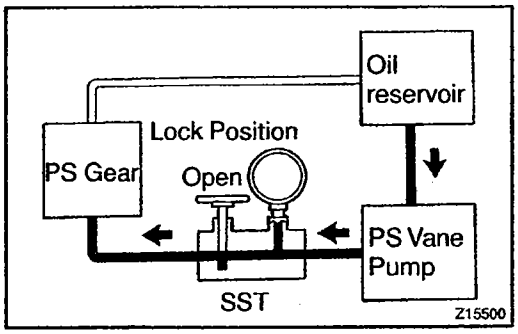


(g) With the engine idling, open the valve fully.

(h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Difference fluid pressure:
490 kPa (5 kgf/cm^2, 71 psi) or less

NOTICE:
Do not turn the steering wheel.



(i) With the engine idling and valve fully opened, turn the steering wheel to full lock.

Minimum fluid pressure:
7,355 kPa (75 kgf/cm^2, 1,067 psi)

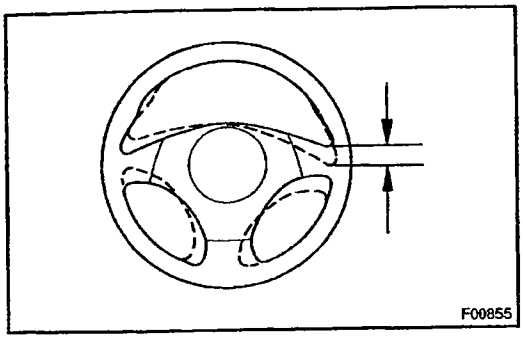
NOTICE:
- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

(j) Disconnect the SST.

SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

(k) Connect the pressure feed tube to the PS vane pump (See page SR–32).

(l) Bleed the power steering system (See page SR–4).



STEERING WHEEL

SR08K–03

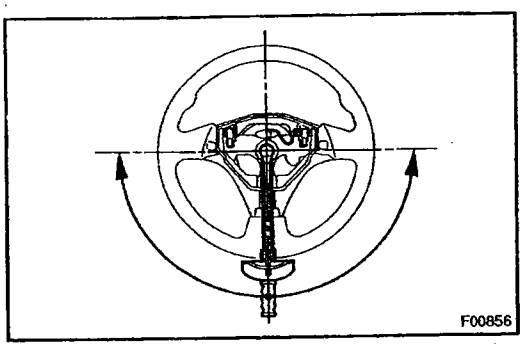
INSPECTION

1. CHECK STEERING WHEEL FREEPLAY

(a) Stop the vehicle and face the tires straight ahead.

(b) Rock the steering wheel gently up and down with a finger lightly, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)



2. CHECK STEERING EFFORT

(a) Center the steering wheel.

(b) Remove the steering wheel pad (See page SR–11).

(c) Start the engine and run it at idle.

(d) Measure the steering effort in both directions.

Steering effort (Reference):
6.5 N·m (65 kgf·cm, 58 in.·lbf)

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

(e) Install the steering wheel set nut.

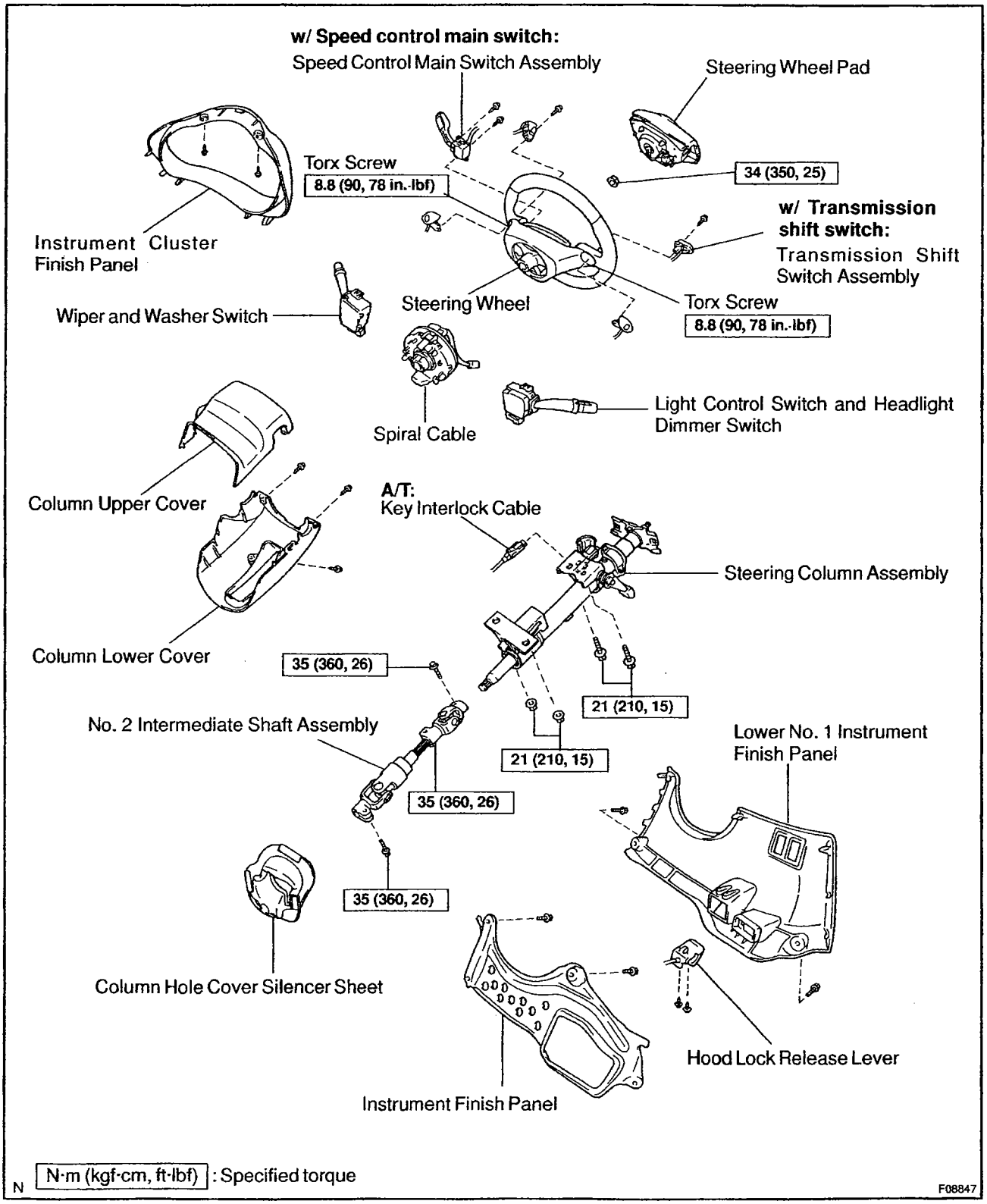
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(f) Install the steering wheel pad (See page SR–19).

TILT STEERING COLUMN

COMPONENTS

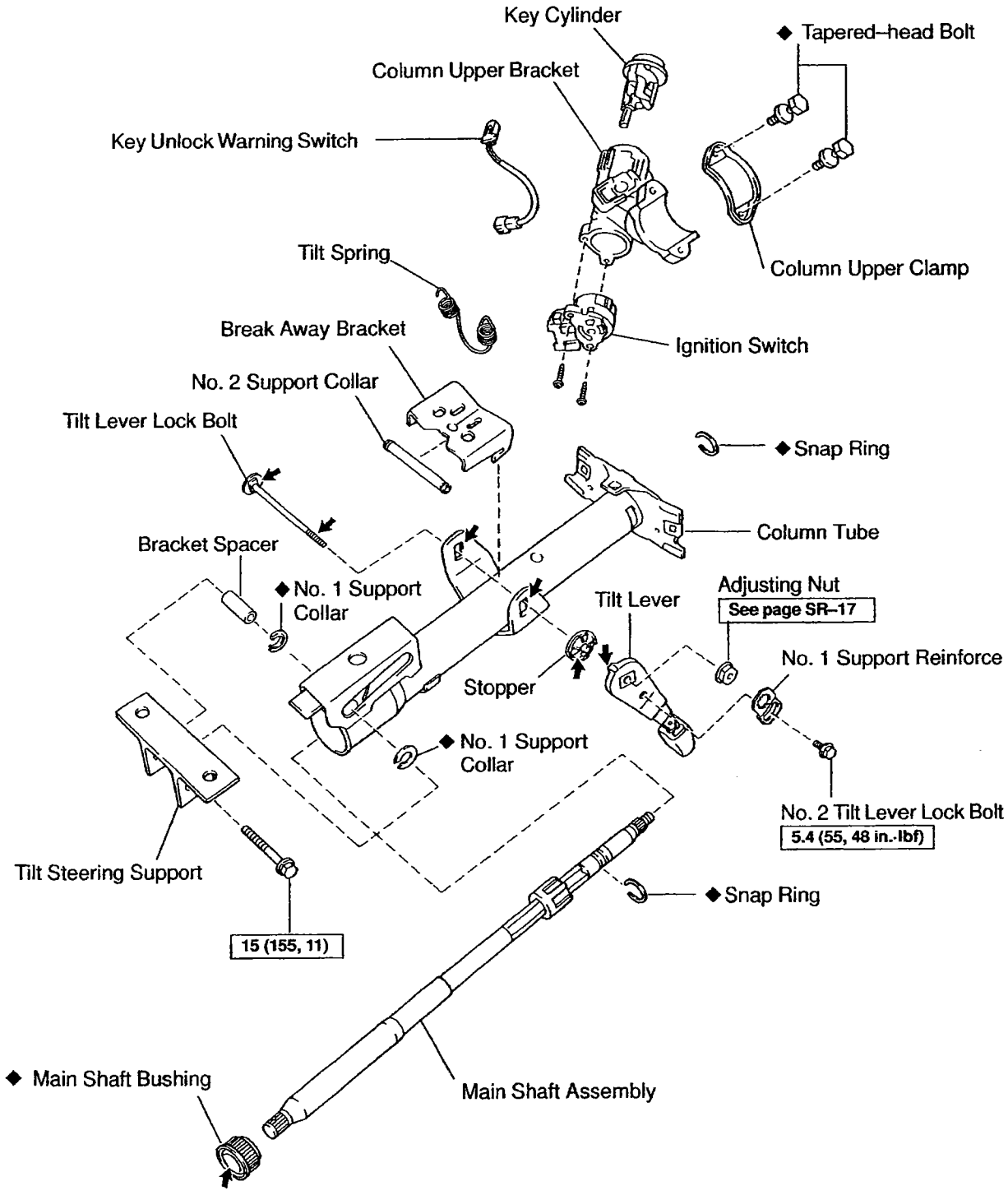
SRDVK-01



N·m (kgf-cm, ft-lbf) : Specified torque

F08847

SR



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⬅ Molybdenum disulfide lithium base grease

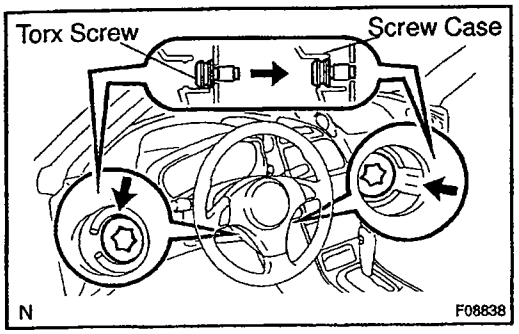
N

F09905

SR

SR0YL-01

REMOVAL



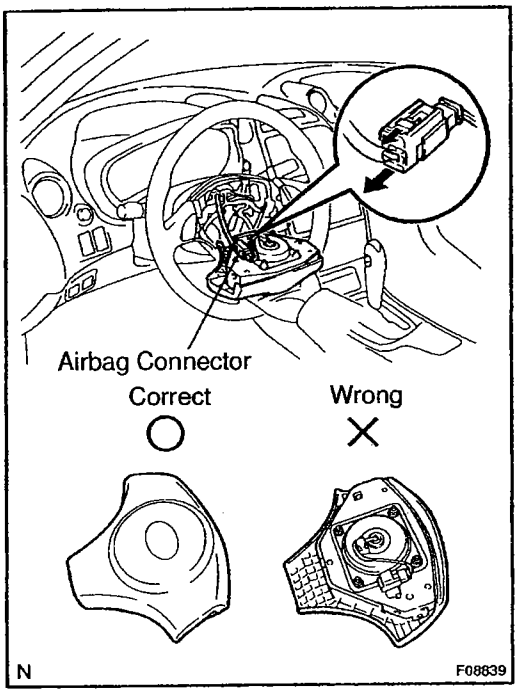
1. REMOVE STEERING WHEEL PAD

NOTICE:

If the airbag connector is disconnected with the ignition switch at ON, DTCs will be recorded.

(a) Place the front wheels facing straight ahead.

(b) Using a torx socket wrench, loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.



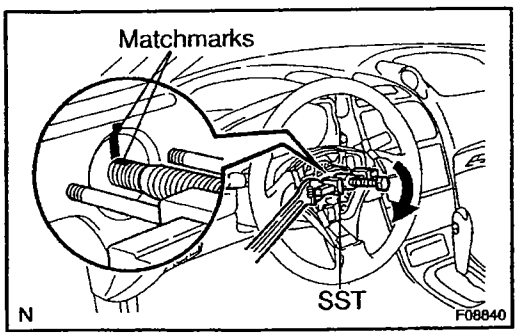
(c) Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

CAUTION:

- **When storing the wheel pad, keep the upper surface of the pad facing upward.**
- **Never disassemble the wheel pad.**

NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



2. REMOVE STEERING WHEEL

(a) Disconnect the connector.

(b) Remove the steering wheel set nut.

(c) Place matchmarks on the steering wheel and main shaft assembly.

(d) Using SST, remove the steering wheel.

SST 09950–50012 (09951–05010, 09952–05010, 09953–05020, 09954–05020)

3. REMOVE LOWER NO. 1 INSTRUMENT FINISH PANEL

(a) Remove the 2 screws and disconnect the hood lock release lever.

(b) Remove the 2 bolts and lower No. 1 instrument finish panel.

(c) Disconnect the connector.

4. REMOVE INSTRUMENT FINISH PANEL

Remove the 2 bolts and instrument finish panel.

5. REMOVE INSTRUMENT CLUSTER FINISH PANEL

Remove the 2 screws and instrument cluster finish panel.

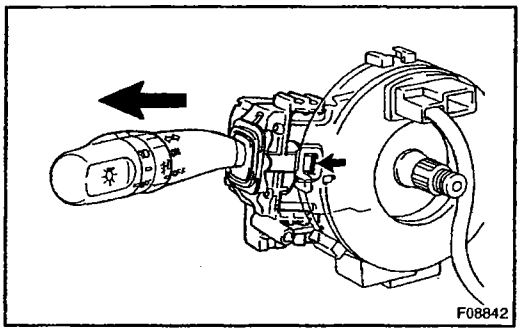
6. REMOVE COLUMN UPPER AND LOWER COVERS

Remove the 3 screws, column upper and lower covers.

7. REMOVE SPIRAL CABLE, LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH AND WIPER AND WASHER SWITCH

(a) Disconnect the 3 connectors from the spiral cable, light control switch and headlight dimmer switch and wiper and washer switch.

(b) Disconnect the airbag connector from the spiral cable.



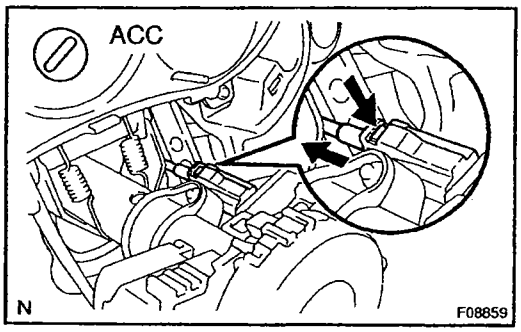
(c) Push the claw and pull out the light control switch and headlight dimmer switch.

(d) Employ the same manner described above to the wiper and washer switch.

(e) Remove the spiral cable.

NOTICE:

Do not disassemble the spiral cable or apply oil to it.

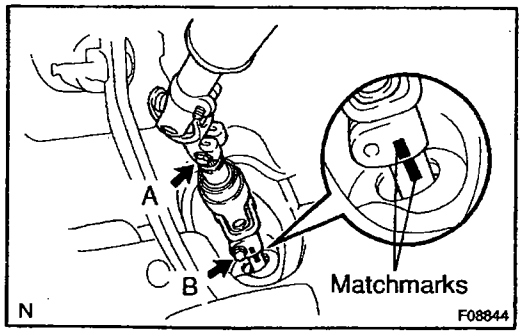


8. A/T:

REMOVE KEY INTERLOCK CABLE

With the key in ACC, push the claw and pull out the key interlock cable.

9. REMOVE COLUMN HOLE COVER SILENCER SHEET



10. DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY

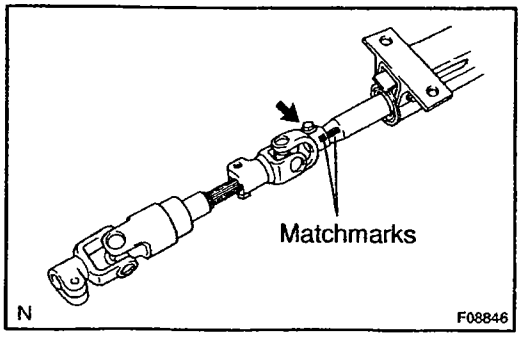
(a) Place matchmarks on the No. 2 intermediate shaft assembly and intermediate extension.

(b) Loosen the bolt A and remove the bolt B, then disconnect the No. 2 intermediate shaft assembly.

11. REMOVE STEERING COLUMN ASSEMBLY

(a) Disconnect the connectors.

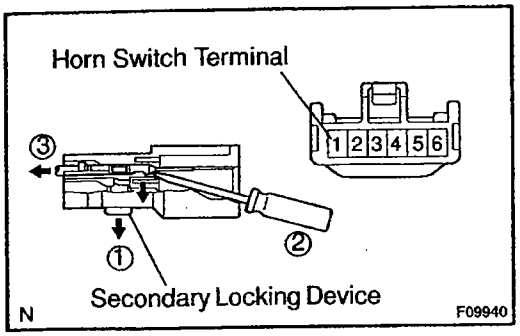
(b) Remove the 2 bolts, nuts and steering column assembly.



12. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Place matchmarks on the No. 2 intermediate shaft assembly and main shaft assembly.

(b) Remove the bolt and No. 2 intermediate shaft assembly.



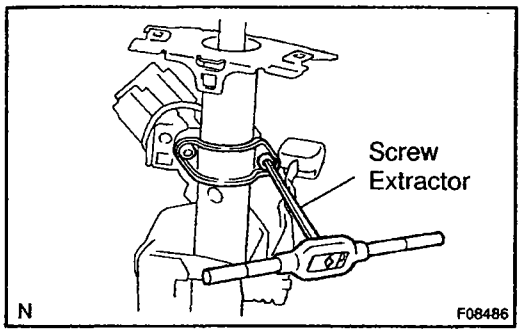
13. **w/ Transmission shift switch:**
REMOVE TRANSMISSION SHIFT SWITCH ASSEMBLY FROM STEERING WHEEL
(a) Remove the 2 screws.
(b) Disengage the secondary locking device of the connector.
(c) Release the locking lug of the terminal 1 (horn switch terminal), and pull the terminal out of the rear.
(d) Remove the transmission shift switch assembly.

14. **w/ Speed control main switch:**
REMOVE SPEED CONTROL MAIN SWITCH ASSEMBLY FROM STEERING WHEEL
(a) Remove the 2 screws.
(b) Disengage the secondary locking device of the connector.
(c) Release the locking lug of the terminal 1 (horn switch terminal), and pull the terminal out of the rear.
(d) Remove the speed control main switch assembly.

15. **w/ Transmission shift switch and speed control main switch:**
REMOVE TRANSMISSION SHIFT SWITCH ASSEMBLY AND SPEED CONTROL MAIN SWITCH ASSEMBLY FROM STEERING WHEEL
(a) Remove the 2 screws from the transmission shift switch assembly.
(b) Remove the 2 screws from the speed control main switch assembly.
(c) Disengage the secondary locking device of the connector.
(d) Release the locking lug of the terminal 1 (horn switch terminal), and pull the terminal out of the rear.
(e) Remove the transmission shift switch assembly and speed control main switch assembly.

SR0YM-01

DISASSEMBLY



1. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

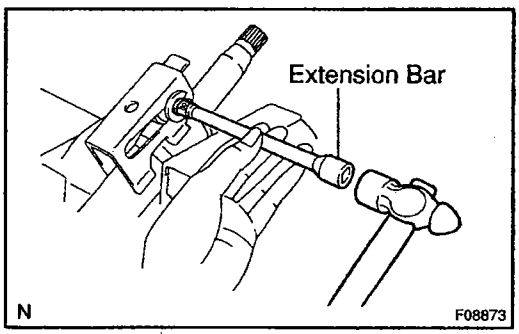
(a) Using a centering punch, mark the center of the 2 tapered–head bolts.

(b) Using a 3 – 4 mm (0.12 – 0.16 in.) drill, drill into the 2 bolts.

(c) Using a screw extractor, remove the 2 bolts, column upper bracket and column upper clamp.

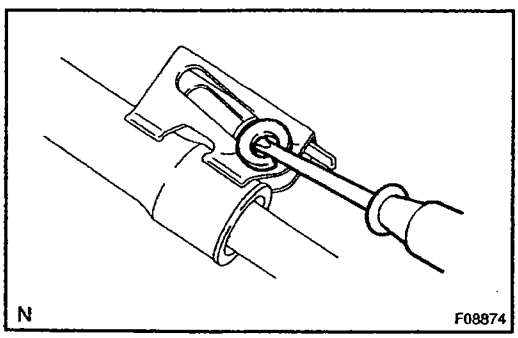
2. REMOVE TILT STEERING SUPPORT

Remove the bolt and tilt steering support.



3. REMOVE BRACKET SPACER AND 2 NO. 1 SUPPORT COLLARS

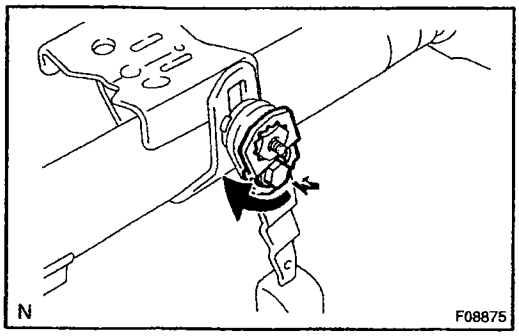
(a) Using an extension bar and a hammer, tap out the bracket spacer.



(b) Using a screwdriver, remove the 2 No. 1 support collars.

4. REMOVE TILT LEVER AND BREAK AWAY BRACKET

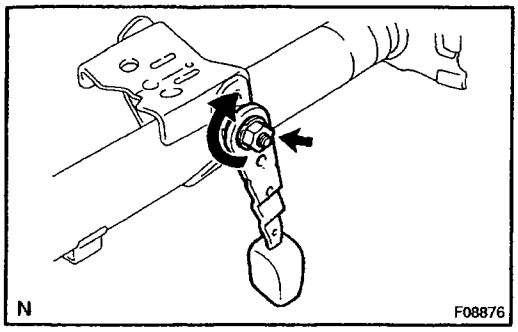
(a) Remove the tilt spring.



(b) Remove the No. 2 tilt lever lock bolt and No. 1 support reinforce.

HINT:

This bolt is left–handed one.

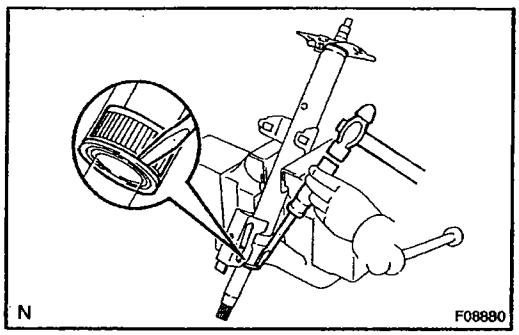


(c) Remove the adjusting nut, tilt lever, stopper, tilt lever lock bolt and break away bracket.

HINT:

This nut is left–handed one.

(d) Remove the No. 2 support collar from the break away bracket.



5. REMOVE MAIN SHAFT BUSHING

Using a screwdriver and hammer, tap out the main shaft bushing.

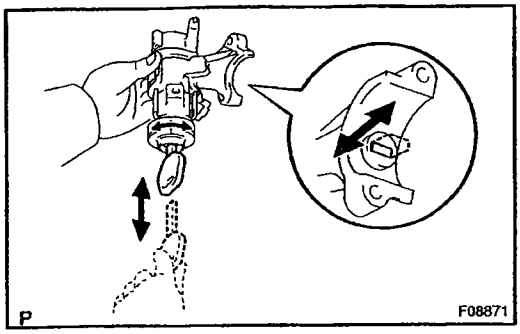
6. REMOVE MAIN SHAFT ASSEMBLY

(a) Using a snap ring expander, remove the snap ring on the upper side.

(b) Remove the main shaft assembly.

(c) Using a snap ring expander, remove the snap ring on the lower side.

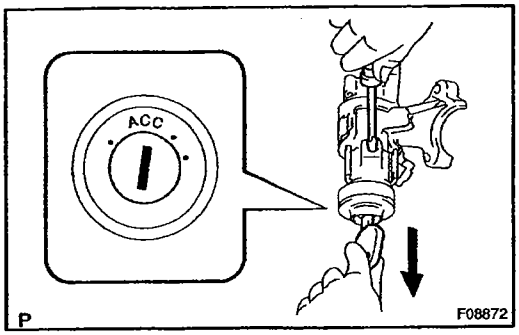
SR0VN-02



INSPECTION

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

(a) Place the ignition key at the ACC position.

(b) Push down the stop pin with a screwdriver, and pull out the cylinder.

(c) Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH (See page BE–14)

4. IF NECESSARY, REPLACE IGNITION SWITCH

(a) Remove the 2 screws and ignition switch from the column upper bracket.

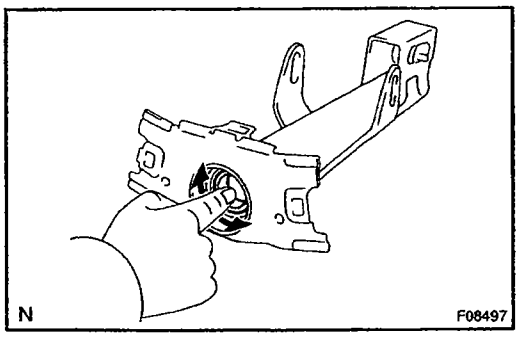
(b) Install a new ignition switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH (See page BE–14)

6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

(a) Slide the key unlock warning switch out of the column upper bracket.

(b) Slide a new key unlock warning switch in the column upper bracket.



7. INSPECT BEARING

Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the column tube.

SR0VO-02

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

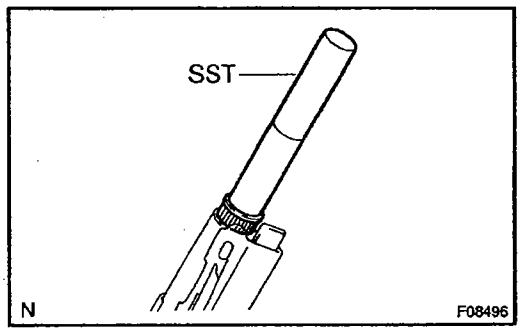
1. **COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE**
(See page SR–9)

2. **INSTALL MAIN SHAFT ASSEMBLY**

(a) Using a snap ring expander, install a new snap ring on the lower side.

(b) Install the main shaft assembly.

(c) Using a snap ring expander, install a new snap ring on the upper side.



3. **INSTALL MAIN SHAFT BUSHING**

(a) Coat a new bushing with molybdenum disulfide lithium base grease.

(b) Using SST and a hammer, tap in the main shaft bushing.
SST 09608–04031

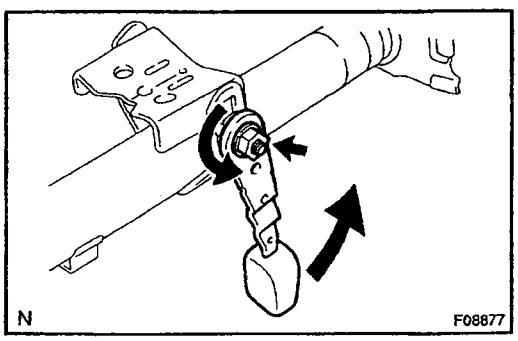
4. **INSTALL BREAK AWAY BRACKET AND TILT LEVER**

(a) Install the No. 2 support collar to the break away bracket.

(b) Install the break away bracket, tilt lever lock bolt, stopper and tilt lever.

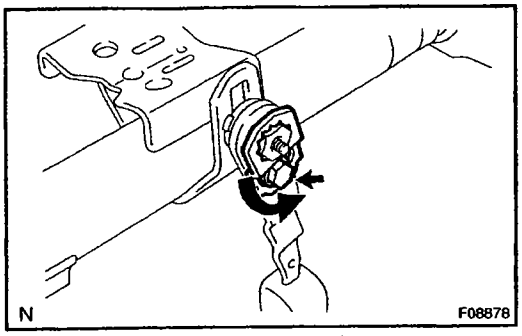
HINT:

Align the holes in the column tube with the projections of the tilt lever lock bolt and stopper.



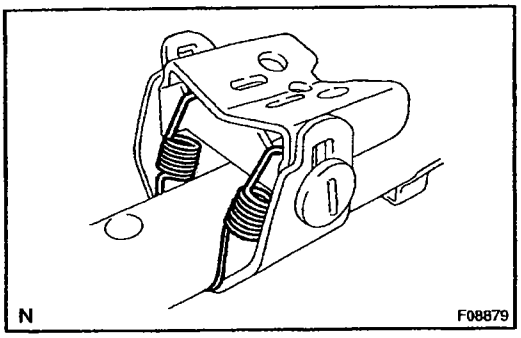
(c) Install the adjusting nut by rotating it counterclockwise in the specified torque so that the locking load (load applied to when a knob is operated) of the tilt lever will be 38 – 82 N (3.9 – 8.4 kgf, 8.5 – 18.4 lbf).

Torque: 9 N·m – 14 N·m (90 kgf·cm – 145 kgf·cm, 80 in.·lbf – 10 ft·lbf)

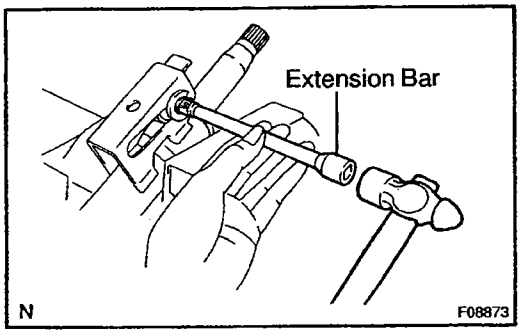


(d) Install the No. 1 support reinforce with the No. 2 tilt lever lock bolt by turning it counterclockwise.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

HINT:
Align the No. 1 support reinforce with the nut to eliminate looseness by turning the No. 1 support reinforce counterclockwise a little, then torque the No. 2 tilt lever lock bolt.



(e) Install the tilt spring.



5. INSTALL 2 NO. 1 SUPPORT COLLARS AND BRACKET SPACER

(a) Install 2 new No. 1 support collars.

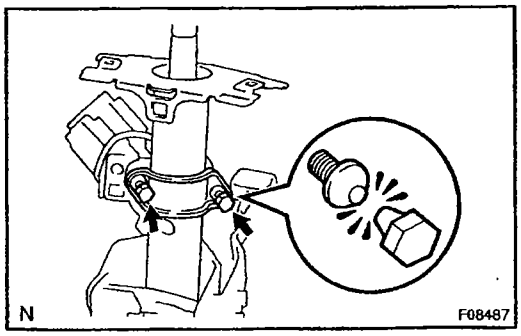
HINT:
Install the white support collar to the RH side, black support collar to the LH side.

(b) Using an extension bar and a hammer, drive in the bracket spacer.

6. INSTALL TILT STEERING SUPPORT

Install the tilt steering support with the bolt.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

NOTICE:
Make sure that the tilt steering support is installed facing in the correct direction.

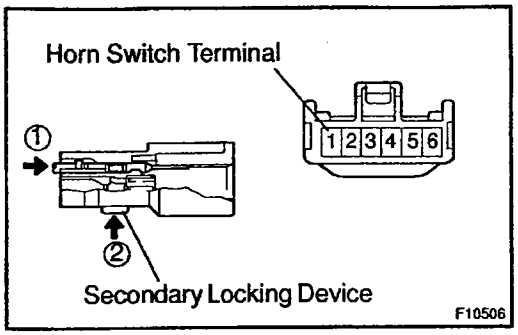


7. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Install the column upper bracket and column upper clamp with 2 new tapered–head bolts.

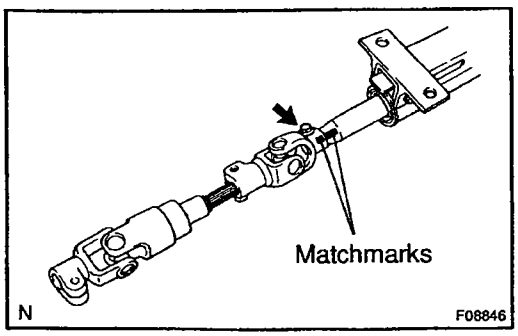
(b) Tighten the 2 tapered–head bolts until the bolt heads break off.

SR0YN-01

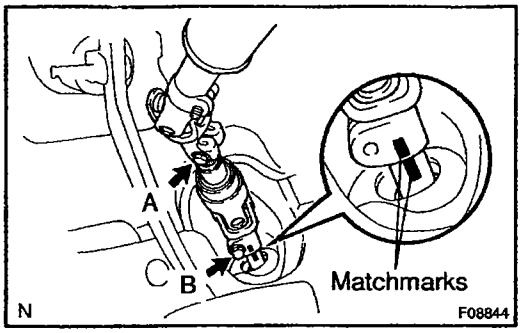


INSTALLATION

1. **w/ Transmission shift switch:**
   INSTALL TRANSMISSION SHIFT SWITCH ASSEMBLY TO STEERING WHEEL
   (a) Install the transmission shift switch assembly.
   (b) Push the terminal 1 (horn switch terminal) into the connector.
   (c) Engage the secondary locking device of the connector.
   (d) Install the 2 screws.
2. **w/ Speed control main switch:**
   INSTALL SPEED CONTROL MAIN SWITCH ASSEMBLY TO STEERING WHEEL
   (a) Install the speed control main switch assembly.
   (b) Push the terminal 1 (horn switch terminal) into the connector.
   (c) Engage the secondary locking device of the connector.
   (d) Install the 2 screws.
3. **w/ Transmission shift switch and speed control main switch:**
   INSTALL TRANSMISSION SHIFT SWITCH ASSEMBLY AND SPEED CONTROL MAIN SWITCH ASSEMBLY TO STEERING WHEEL
   (a) Install the transmission shift switch assembly and speed control main switch assembly.
   (b) Push the terminal 1 (horn switch terminal) into the connector.
   (c) Engage the secondary locking device of the connector.
   (d) Install the 2 screws to the transmission shift switch assembly.
   (e) Install the 2 screws to the speed control main switch assembly.



4. **INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY**
   (a) Align the matchmarks on the No. 2 intermediate shaft assembly and main shaft assembly.
   (b) Install the No. 2 intermediate shaft assembly with the bolt.
   Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)
5. **INSTALL STEERING COLUMN ASSEMBLY**
   (a) Install the steering column assembly with the 2 bolts and nuts.
   Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
   (b) Connect the connectors.



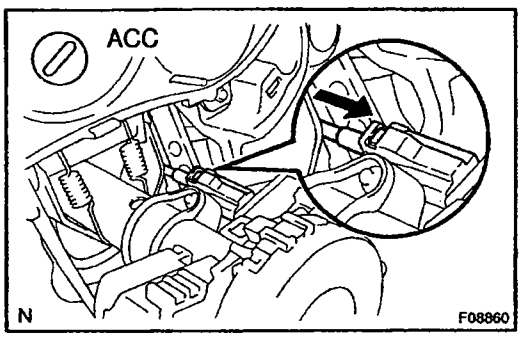
6. CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the No. 2 intermediate shaft assembly and intermediate extension.

(b) Install the bolt B.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

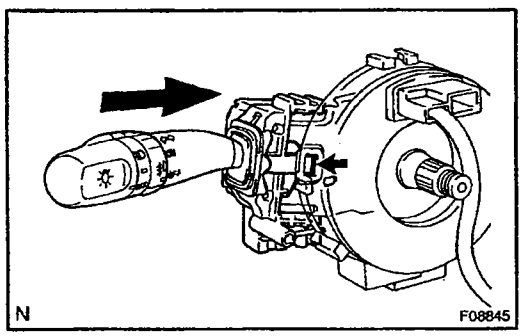
(c) Torque the bolt A.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

7. INSTALL COLUMN HOLE COVER SILENCER SHEET



8. A/T:
INSTALL KEY INTERLOCK CABLE

With the key in ACC, push into the key interlock cable and install it.



9. INSTALL LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH, WIPER AND WASHER SWITCH AND SPIRAL CABLE

(a) Install the spiral cable.

(b) Push into the light control switch and headlight dimmer switch until the claw is latched.

(c) Employ the same manner described above to the wiper and washer switch.

(d) Connect the airbag connector to the spiral cable.

(e) Connect the 3 connectors to the spiral cable, light control switch and headlight dimmer switch and wiper and washer switch.

10. INSTALL COLUMN UPPER AND LOWER COVERS

Install the column upper and lower covers with the 3 screws.

11. INSTALL INSTRUMENT CLUSTER FINISH PANEL

Install the instrument cluster finish panel with the 2 screws.

12. INSTALL INSTRUMENT FINISH PANEL

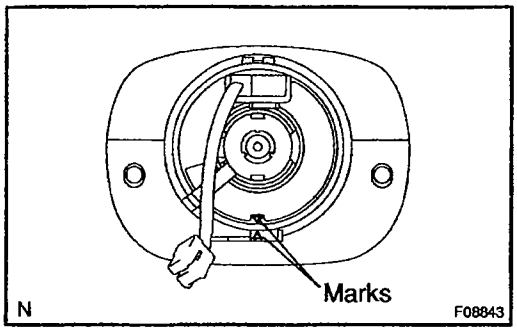
Install the instrument finish panel with the 2 bolts.

13. INSTALL LOWER NO. 1 INSTRUMENT FINISH PANEL

(a) Connect the connector .

(b) Install the lower No. 1 instrument finish panel with the 2 bolts.

(c) Connect the hood lock release lever and install the 2 screws.



14. CENTER SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.

(b) Turn the cable counterclockwise by hand until it becomes harder to turn.

(c) Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to either left or right of the center.

15. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and main shaft assembly.

(b) Install the steering wheel set nut.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

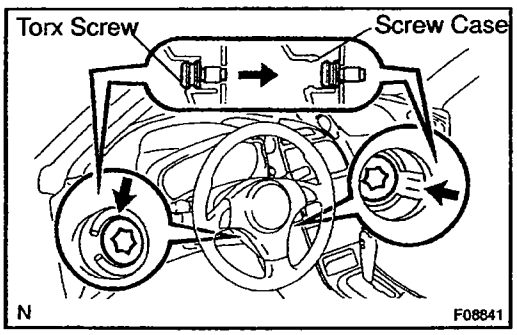
(c) Connect the connector.

16. INSTALL STEERING WHEEL PAD

NOTICE:

- **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**
- **Make sure the wheel pad is installed with the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and that they are not pinched between other parts.**

(a) Connect the airbag connector.



(b) Install the steering wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

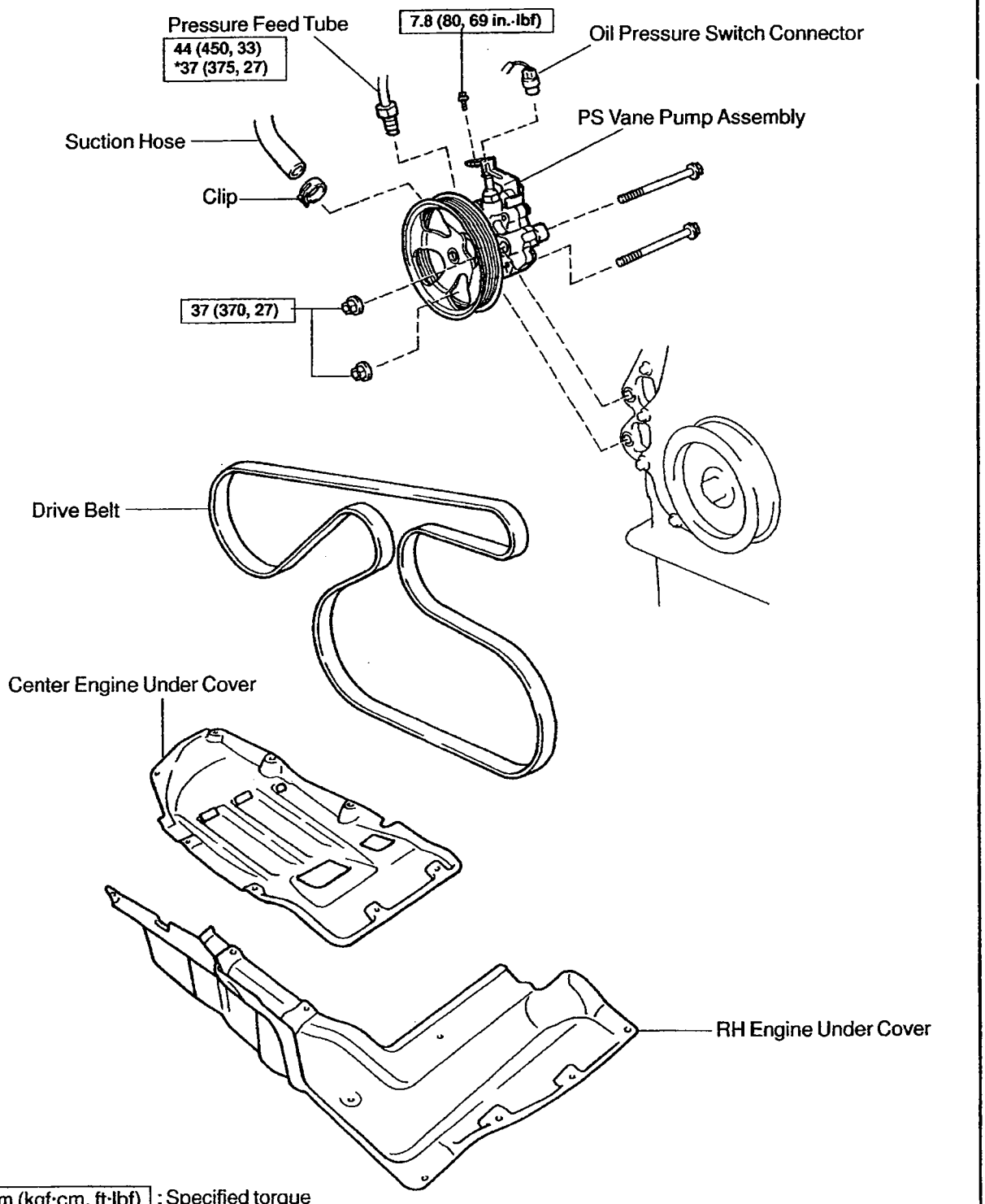
(c) Using a torx socket wrench, torque the 2 screws.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

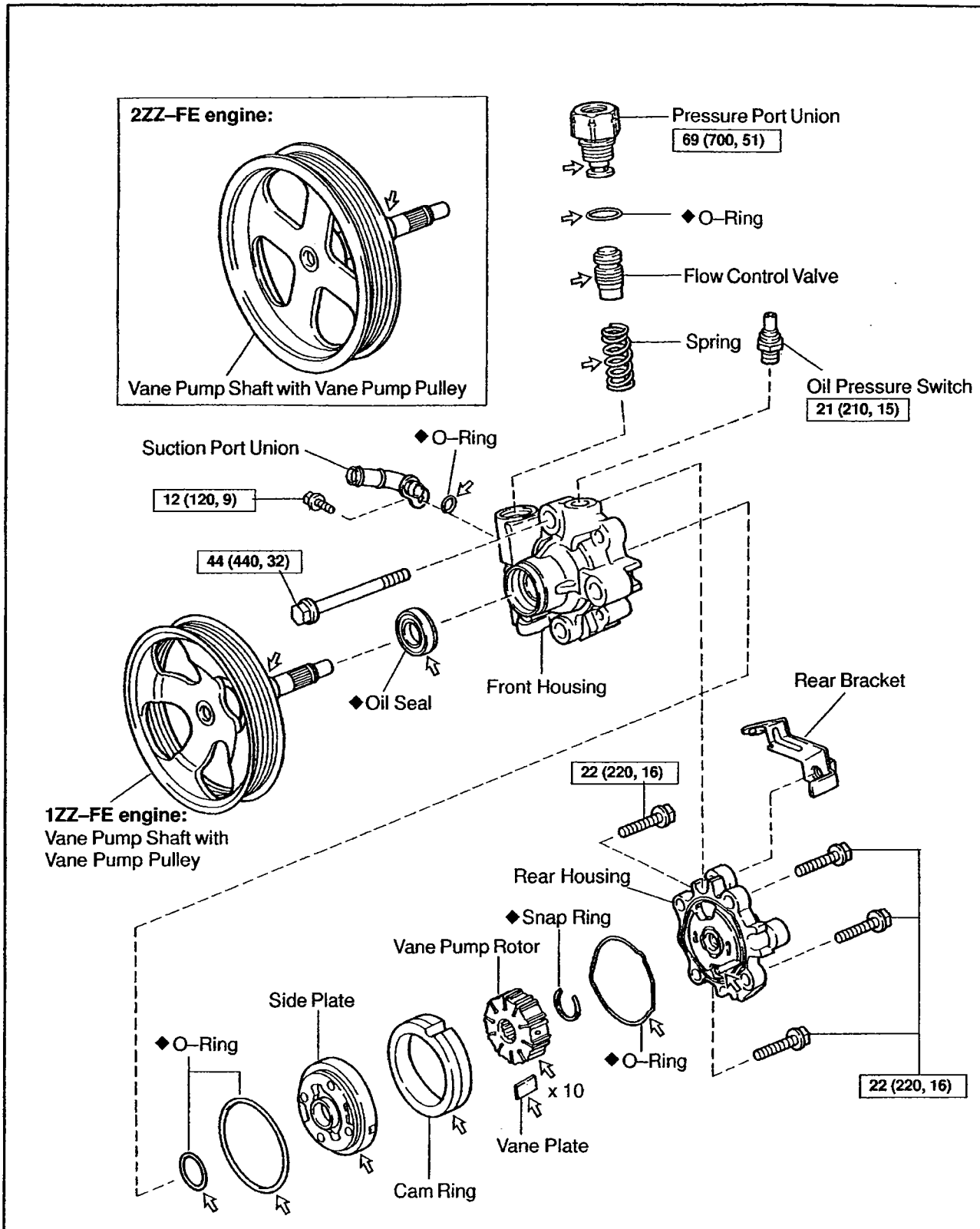
17. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP

COMPONENTS

SR0YO–01





N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⇦ Power steering fluid

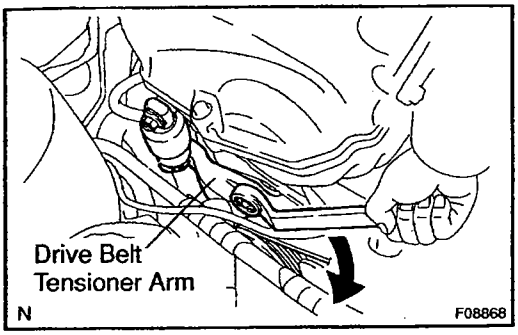
N

F09872

SR0YP–01

REMOVAL

1. REMOVE RH AND CENTER ENGINE UNDER COVERS



2. REMOVE DRIVE BELT

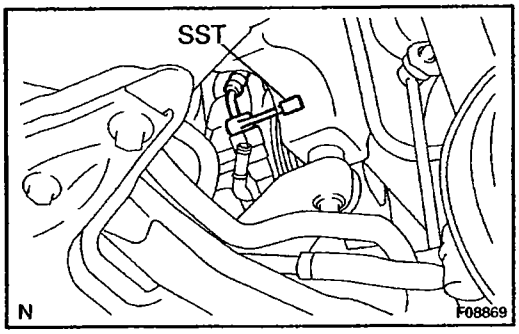
Loosen the drive belt tension by turning the drive belt tensioner arm clockwise, and remove the drive belt.

3. DISCONNECT SUCTION HOSE

Remove the clip and disconnect the suction hose.

NOTICE:

Take care not to spill fluid on the drive belt.



4. DISCONNECT PRESSURE FEED TUBE

(a) Using SST, disconnect the pressure feed tube.
SST 09631–22020

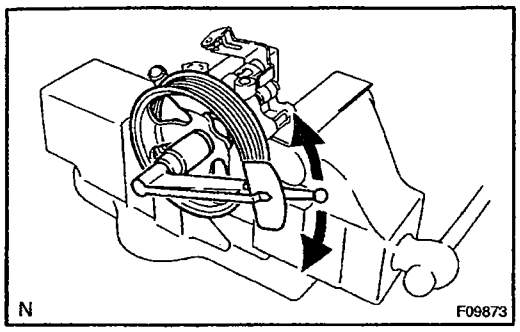
(b) Remove the bolt and disconnect the pressure feed tube clamp.

5. DISCONNECT OIL PRESSURE SWITCH CONNECTOR

6. REMOVE PS VANE PUMP ASSEMBLY

Remove the 2 pump assembly set bolts, nuts and PS vane pump assembly.

SR0VS-02



DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. MEASURE PS VANE PUMP ROTATING TORQUE

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less

2. REMOVE SUCTION PORT UNION

(a) Remove the bolt and suction port union.

(b) Remove the O–ring from the suction port union.

3. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

(a) Remove the pressure port union, flow control valve and spring.

(b) Remove the O–ring from the pressure port union.

4. REMOVE OIL PRESSURE SWITCH

NOTICE:

Be careful not to drop the oil pressure switch.

If the oil pressure switch is dropped or strongly damaged, replace it with a new one.

5. REMOVE REAR HOUSING

(a) Remove the bolt and rear bracket.

(b) Remove the 4 bolts and rear housing.

(c) Remove the O–ring from the rear housing.

6. REMOVE CAM RING, 10 VANE PLATES, VANE PUMP ROTOR AND SIDE PLATE

(a) Remove the cam ring and 10 vane plates.

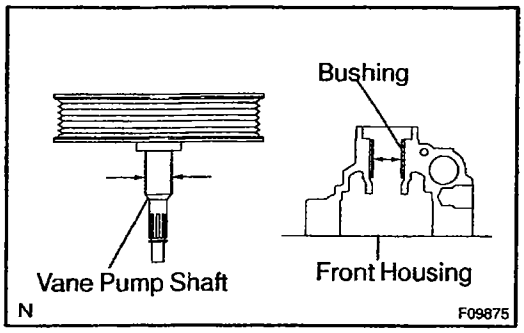
NOTICE:

Take care not to drop the vane plate.

(b) Using a screwdriver, remove the snap ring, vane pump rotor and side plate.

(c) Remove the 2 O–rings from the side plate.

7. REMOVE VANE PUMP SHAFT WITH VANE PUMP PULLEY



SR0VT-02

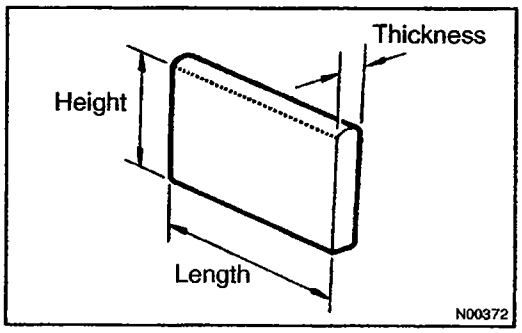
INSPECTION

1. MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

Using a micrometer and a caliper gauge, measure the oil clearance.

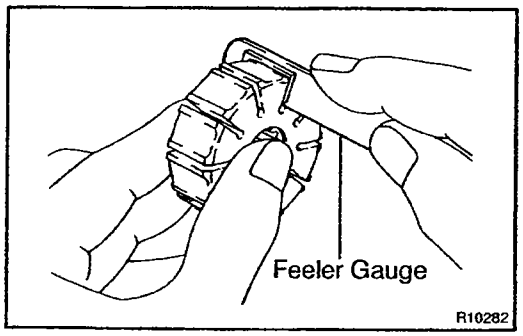
Standard clearance:
0.021 – 0.043 mm (0.0008 – 0.0017 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the front housing and vane pump shaft.

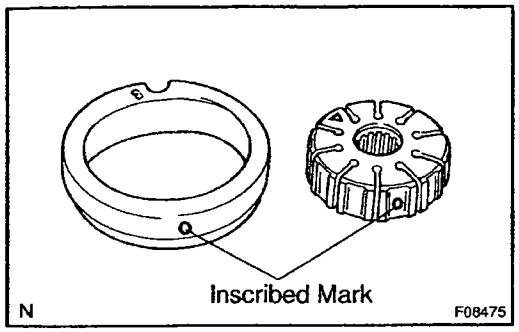


2. INSPECT VANE PUMP ROTOR AND VANE PLATES

(a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.
Minimum height: 7.6 mm (0.299 in.)
Minimum thickness: 1.405 mm (0.0553 in.)
Minimum length: 11.993 mm (0.4722 in.)



(b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.
Maximum clearance: 0.03 mm (0.0012 in.)



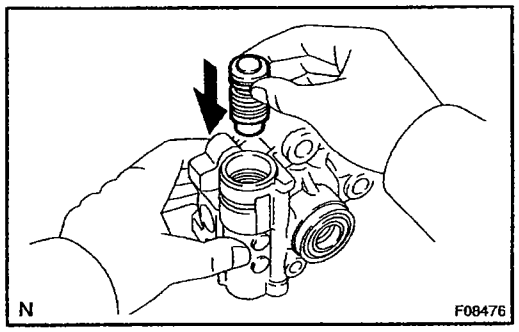
If it is more than the maximum, replace the vane plate and/or vane pump rotor with the one having the same mark stamped on the cam ring.

Inscribed mark: 0, 1, 2, 3, or 4

HINT:

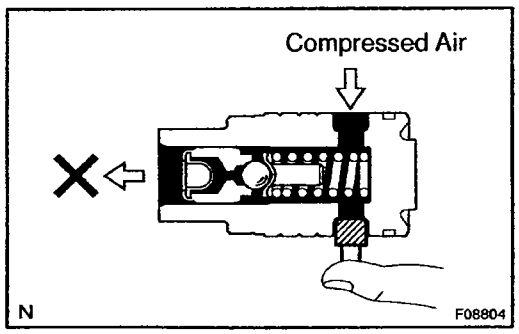
There are 5 vane plate lengths corresponding to the following vane pump rotor and cam ring marks:

Vane pump rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
0	44345 – 32100	12.001 – 12.003 (0.47248 – 0.47256)
1	44345 – 32110	11.999 – 12.001 (0.47240 – 0.47248)
2	44345 – 32120	11.997 – 11.999 (0.47232 – 0.47240)
3	44345 – 32130	11.995 – 11.997 (0.47224 – 0.47232)
4	44345 – 32140	11.993 – 11.995 (0.47216 – 0.47224)

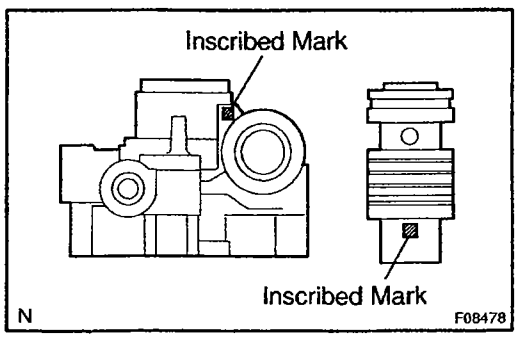


3. INSPECT FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the valve hole of the front housing by its own weight.

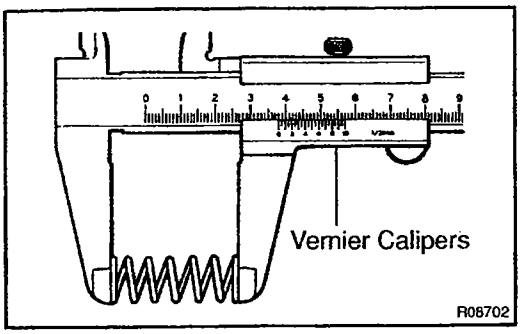


(b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 – 490 kPa (4 – 5 kgf/cm^2, 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end hole.



If necessary, replace the flow control valve with the one having the same letter as inscribed on the front housing.

Inscribed mark: A, B, C, D, E or F



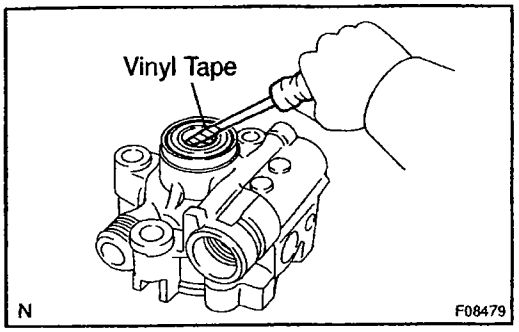
4. INSPECT SPRING

Using vernier calipers, measure the free length of the spring.

Minimum free length: 35.8 mm (1.409 in.)

If it is not within the specification, replace the spring.

SR0VU-02



REPLACEMENT

NOTICE:

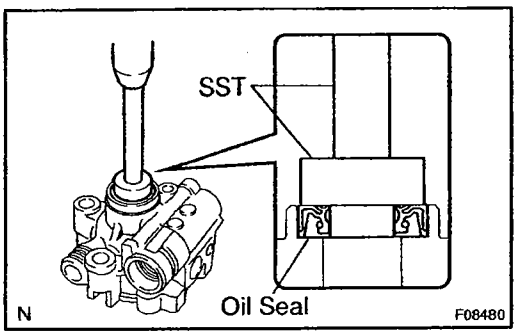
When using a vise, do not overtighten it.

IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

NOTICE:

Be careful not to damage the bushing of the front housing.



(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00280),
09950–70010 (09951–07100)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

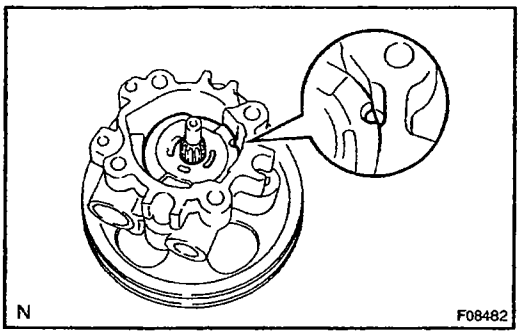
SR0VV–02

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR–22)**
2. **INSTALL VANE PUMP SHAFT WITH VANE PUMP PULLEY**



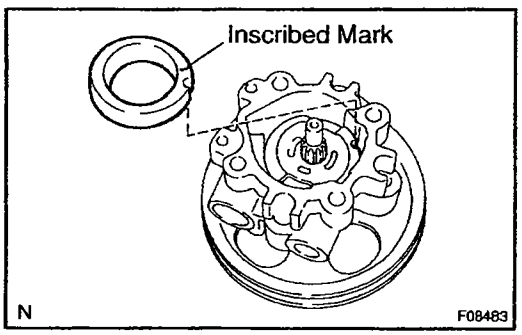
3. **INSTALL SIDE PLATE**

(a) Coat 2 new O–rings with power steering fluid, and install them to the side plate.

(b) Align the dent of the side plate with the dent of the front housing, and install the side plate.

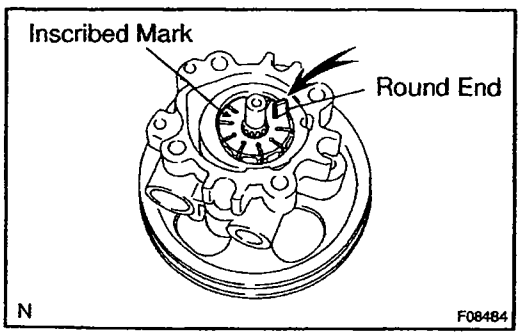
NOTICE:

Make sure that the side plate is installed facing in the correct direction.



4. **INSTALL CAM RING**

Align the dent of the cam ring with the dent of the side plate, and install the cam ring with the inscribed mark facing outward.



5. **INSTALL VANE PUMP ROTOR**

(a) Install the vane pump rotor with the inscribed mark facing outward.

(b) Install a new snap ring to the vane pump shaft.

6. **INSTALL 10 VANE PLATES**

Install the 10 vane plates with the round end facing outward.

7. **INSTALL REAR HOUSING**

(a) Coat a new O–ring with power steering fluid, and install it to the rear housing.

(b) Align the straight pin of the rear housing with the dents of the cam ring, side plate and front housing, and install the rear housing with the 4 bolts.

Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)

(c) Install the rear bracket with the bolt.

Torque: 44 N·m (440 kgf·cm, 32 ft·lbf)

8. **INSTALL OIL PRESSURE SWITCH**

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

9. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

(a) Install the spring.

(b) Install the flow control valve facing in the correct direction (See page SR–22).

(c) Coat a new O–ring with power steering fluid, and install it to the pressure port union.

(d) Install the pressure port union.
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

10. INSTALL SUCTION PORT UNION

(a) Coat a new O–ring with power steering fluid, and install it to the suction port union.

(b) Install the suction port union with the bolt.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

11. MEASURE PS VANE PUMP ROTATING TORQUE
(See page SR–25)

SR0YQ-01

INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

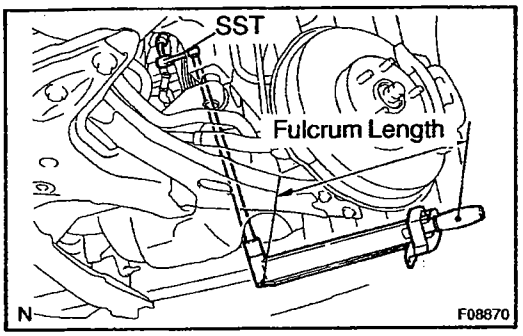
Install the PS vane pump assembly with the 2 pump assembly set bolts and nuts.

Torque: 37 N·m (370 kgf·cm, 27 ft·lbf)

2. CONNECT OIL PRESSURE SWITCH CONNECTOR

NOTICE:

Be careful to prevent oil from being attached to the connector.



3. CONNECT PRESSURE FEED TUBE

(a) Connect the pressure feed tube clamp with the bolt.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(b) Using SST, connect the pressure feed tube.

SST 09631–22020

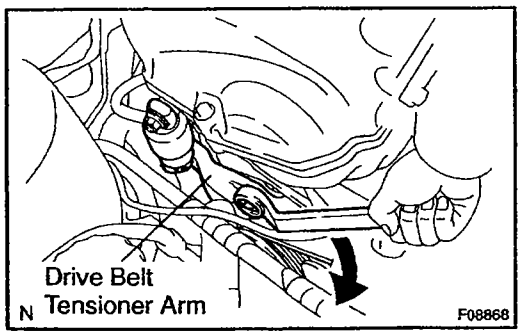
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

HINT:

- Use a torque wrench with a fulcrum length of 345 mm (11.81 in).
- This torque value is effective in case that SST is parallel to a torque wrench.

4. CONNECT SUCTION HOSE

Connect the suction hose with the clip.



5. INSTALL DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner arm clockwise, and install the drive belt.

6. INSTALL RH AND CENTER ENGINE UNDER COVERS

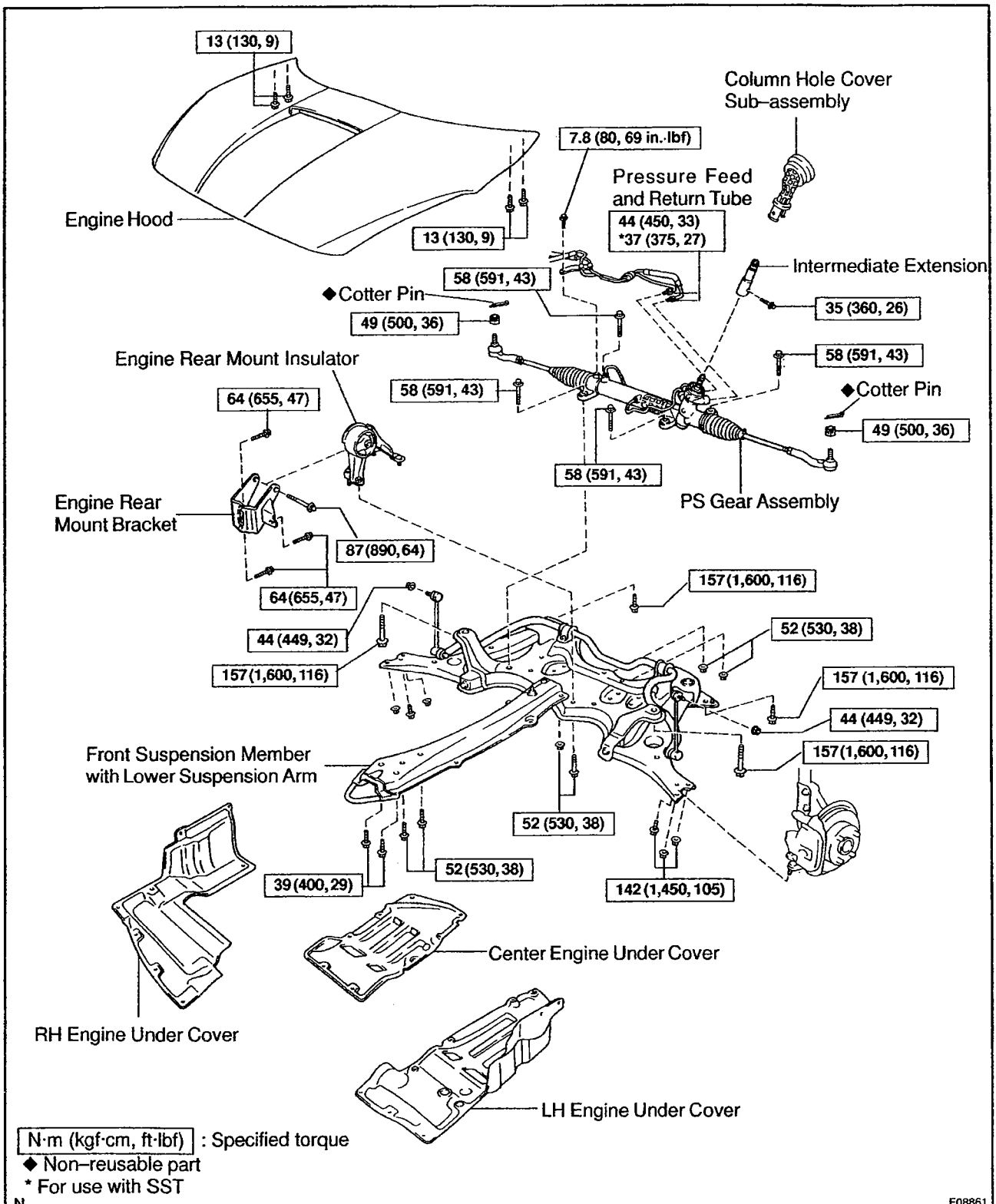
7. BLEED POWER STEERING SYSTEM

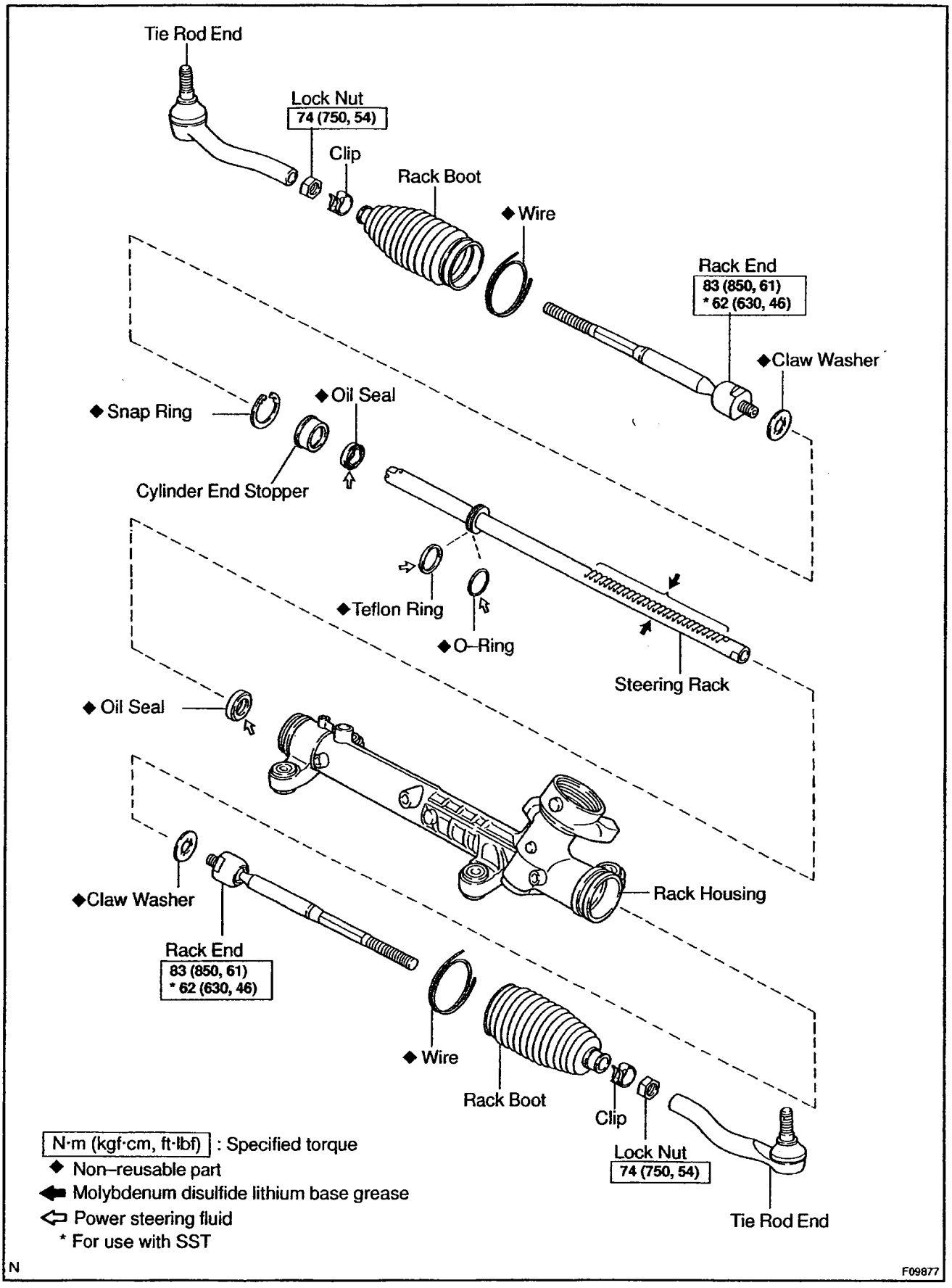
(See page SR–4)

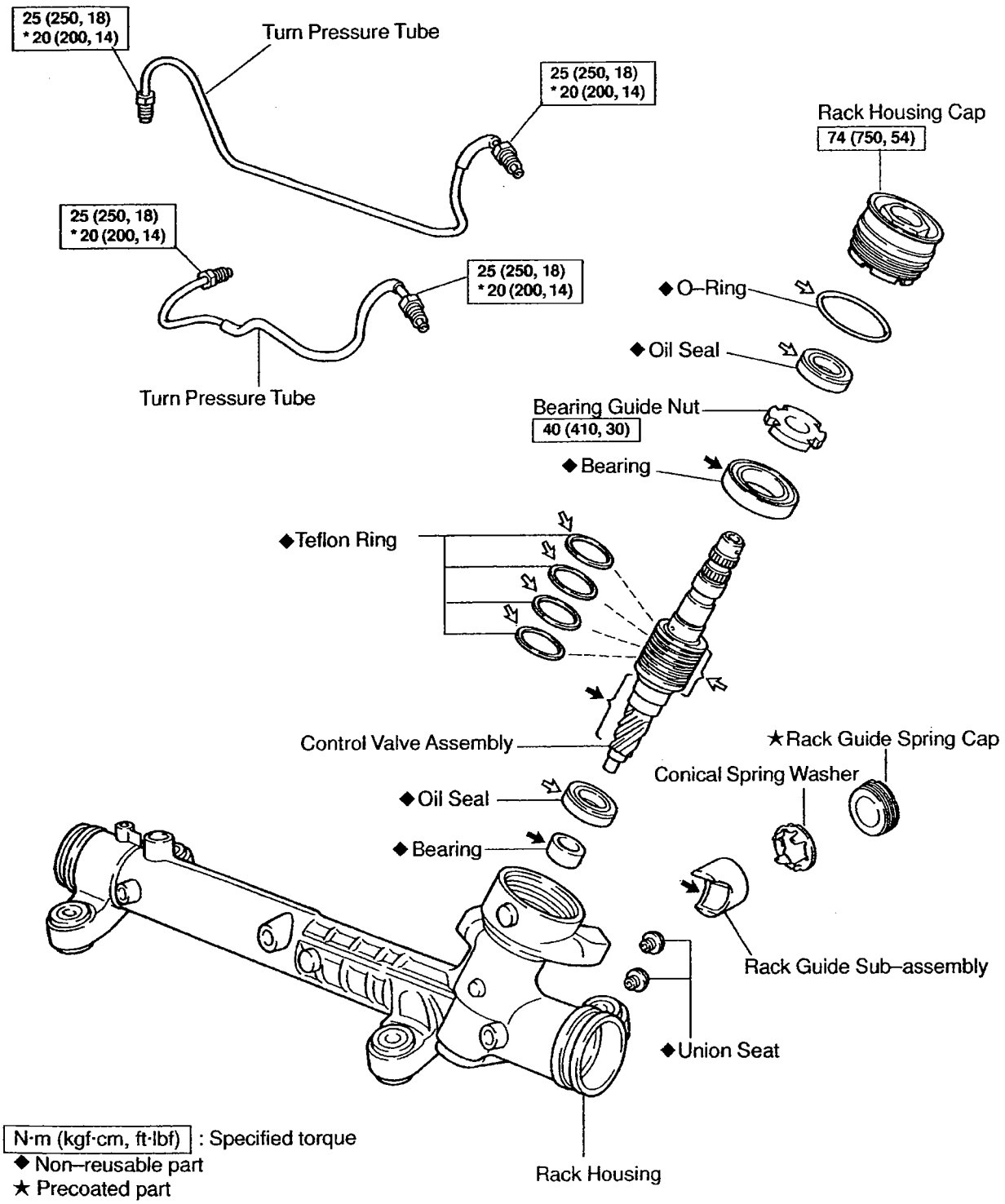
POWER STEERING GEAR

COMPONENTS

SR0YX–01




Tie Rod End
Lock Nut
74 (750, 54)
Clip
Rack Boot
◆Wire
Rack End
83 (850, 61)
* 62 (630, 46)
◆Claw Washer
◆Snap Ring
◆Oil Seal
Cylinder End Stopper
◆Teflon Ring
◆O–Ring
Steering Rack
◆Oil Seal
Rack Housing
◆Claw Washer
Rack End
83 (850, 61)
* 62 (630, 46)
◆Wire
Rack Boot
Clip
Lock Nut
74 (750, 54)
Tie Rod End
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Molybdenum disulfide lithium base grease
Power steering fluid
* For use with SST
N
F09877



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
⬅ Molybdenum disulfide lithium base grease
⇦ Power steering fluid
* For use with SST

F10504

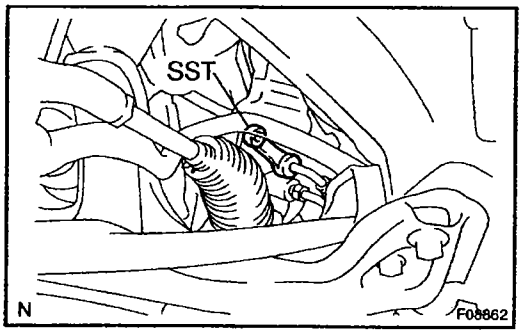
SR0YR-01

REMOVAL

NOTICE:

Remove the steering wheel assembly before the steering gear removal, because there is possibility of breaking of the spiral cable.

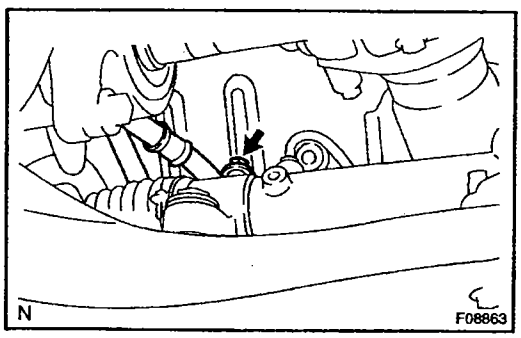
1. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
2. **REMOVE STEERING WHEEL PAD (See page SR–11)**
3. **REMOVE STEERING WHEEL (See page SR–11)**
4. **REMOVE RH, CENTER AND LH ENGINE UNDER COVERS**
5. **DISCONNECT RH AND LH TIE ROD ENDS (See page SA–12)**
6. **DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See page SR–11)**



7. **DISCONNECT PRESSURE FEED AND RETURN TUBES**

Using SST, disconnect the pressure feed and return tubes.

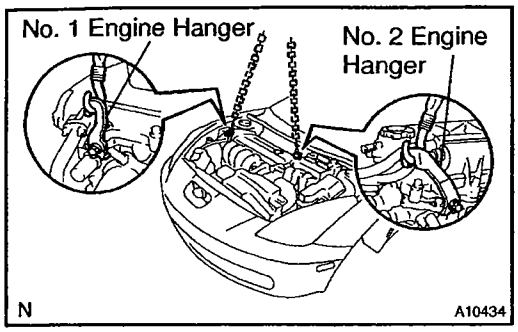
SST 09631–22020



8. **DISCONNECT TUBE CLAMP**

Remove the bolt and disconnect the tube clamp.

9. **DISCONNECT COLUMN HOLE COVER SUB–ASSEMBLY**
10. **REMOVE ENGINE HOOD (See page BO–9)**



11. ATTACH ENGINE SLING DEVICE TO ENGINE HANGERS

(a) Remove the 4 bolts and No. 2 cylinder head cover.

(b) Disconnect the PCV hoses from the cylinder head cover.

(c) Install the No. 1 and No. 2 engine hangers in the correct direction.

1ZZ–FE Engine:
Part No.:
No. 1 engine hanger: 12281–22021
No. 2 engine hanger: 12281–15040 or 12281–15050
Bolt: 91512–B1016
Torque: 38 N·m (388 kgf·cm, 28 ft·lbf)
2ZZ–FE Engine:
Part No.:
No. 1 engine hanger: 12281–88600
No. 2 engine hanger: 12282–88600
Bolt: 91512–61020
Torque: 38 N·m (388 kgf·cm, 28 ft·lbf)

(d) Attach the engine sling device to the engine hangers.

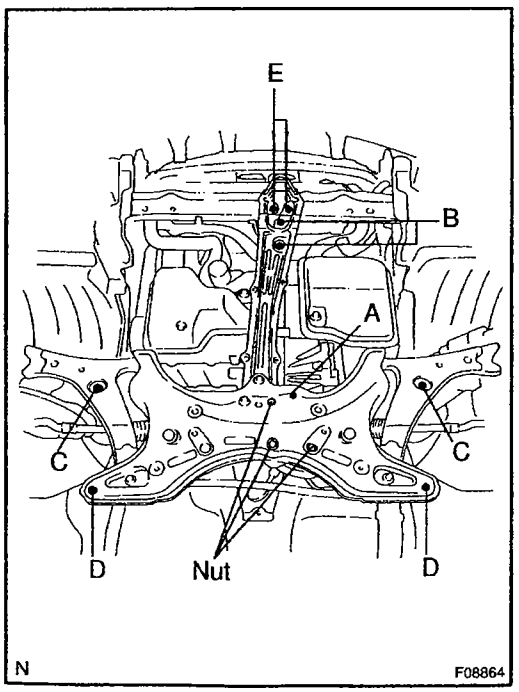
CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

12. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM (See page SA–42)

13. DISCONNECT STABILIZER BAR

(a) Remove the nut and disconnect the stabilizer bar.

(b) Employ the same manner described above to the other side.



14. DISCONNECT ENGINE REAR MOUNT INSULATOR AND FRONT SUSPENSION MEMBER

Remove the bolt (bolt A) and 3 nuts, and disconnect the engine rear mount insulator and front suspension member.

15. DISCONNECT ENGINE FRONT MOUNT INSULATOR AND FRONT SUSPENSION MEMBER

Remove the 2 bolts (bolt B) and disconnect the engine front mount insulator and front suspension member.

16. SUPPORT FRONT SUSPENSION MEMBER WITH LOWER SUSPENSION ARM

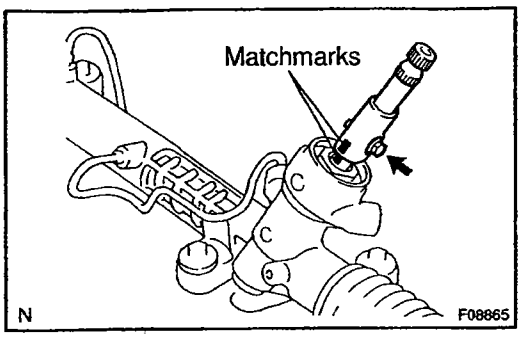
Using a transmission jack, support the front suspension member with lower suspension arm.

17. REMOVE FRONT SUSPENSION MEMBER WITH LOWER SUSPENSION ARM AND PS GEAR ASSEMBLY

Remove the 6 bolts (bolt C, D and E) and front suspension member with lower suspension arm and PS gear assembly.

18. REMOVE PS GEAR ASSEMBLY

(a) Remove the 4 bolts and PS gear assembly from the front suspension member.



(b) Place matchmarks on the intermediate extension and control valve shaft.
(c) Remove the bolt and intermediate extension.

19. REMOVE ENGINE REAR MOUNT INSULATOR AND ENGINE REAR MOUNT BRACKET

(a) Remove the through bolt and engine rear mount insulator.
(b) Remove the 3 bolts and engine rear mount bracket.

SR0YS-01

DISASSEMBLY

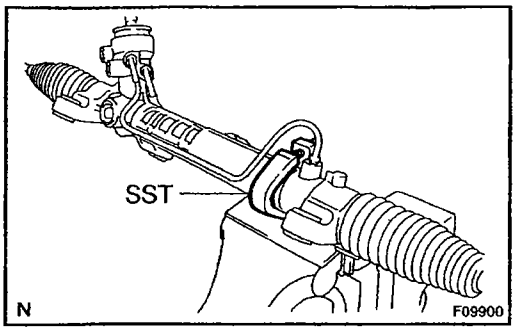
NOTICE:

When using a vise, do not overtighten it.

1. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the PS gear assembly in a vise.

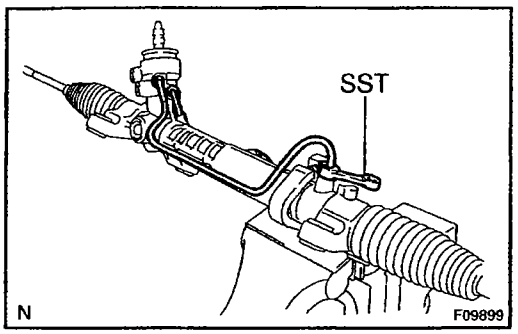
SST 09612–00012



2. REMOVE 2 TURN PRESSURE TUBES

Using SST, remove the 2 turn pressure tubes.

SST 09633–00020

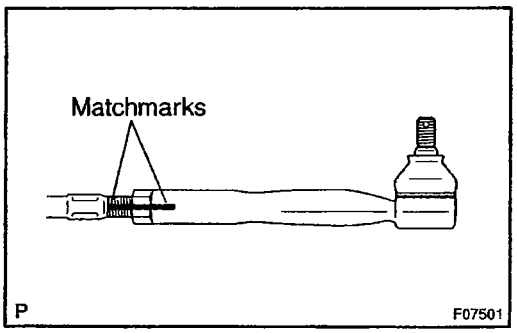


3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Place matchmarks on the tie rod end and rack end.

(b) Loosen the lock nut, and remove the tie rod end and lock nut.

(c) Employ the same manner described above to the other side.



4. REMOVE RH AND LH CLIPS, WIRES AND RACK BOOTS

(a) Using needle nose pliers, loosen the wire.

(b) Remove the clip, wire and rack boot.

NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH rack boots.

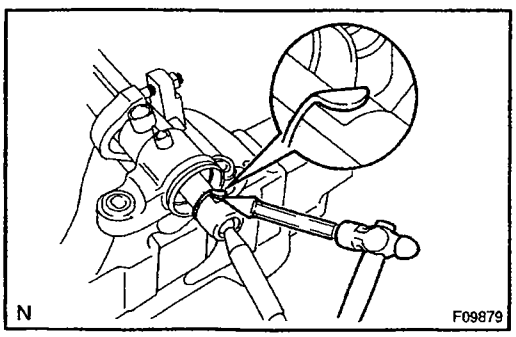
(c) Employ the same manner described above to the other side.

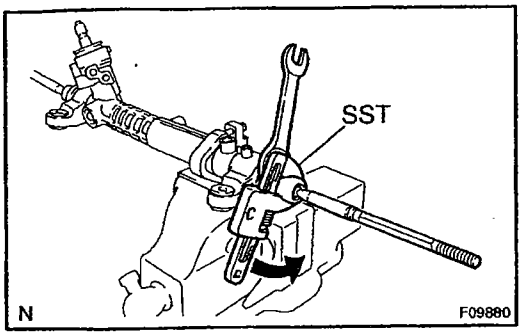
5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

(a) Using a chisel and a hammer, unstake the washer.

NOTICE:

Avoid any impact on the steering rack.





(b) Using a spanner, hold the steering rack steadily and using SST, remove the rack end.
SST 09922–10010

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Mark the RH and LH rack ends.

(c) Remove the claw washer.
(d) Employ the same manner described above to the other side.

6. REMOVE RACK GUIDE SPRING CAP, CONICAL SPRING WASHER AND RACK GUIDE SUB–ASSEMBLY

7. REMOVE RACK HOUSING CAP

(a) Remove the rack housing cap.
(b) Remove the O–ring from the rack housing cap.

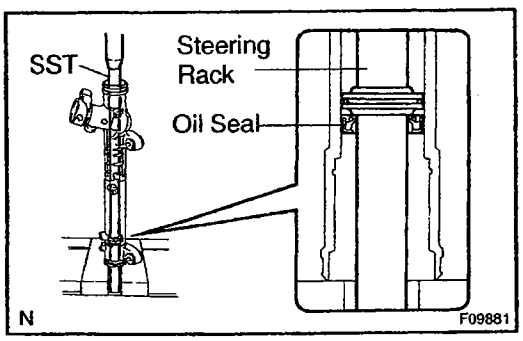
8. REMOVE CONTROL VALVE ASSEMBLY

Pull out the control valve assembly.

NOTICE:
Be careful not to damage the oil seal lip.

9. REMOVE CYLINDER END STOPPER

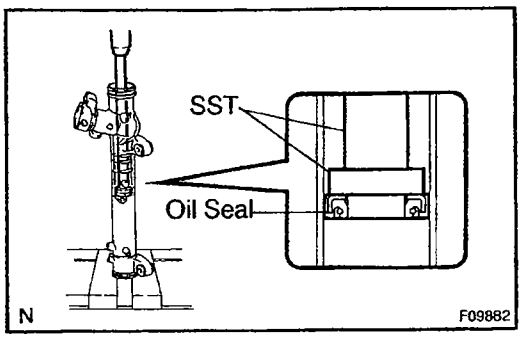
(a) Using snap ring pliers, remove the snap ring.
(b) Pull out the cylinder end stopper.



10. REMOVE STEERING RACK AND OIL SEAL

Using SST, press out the steering rack and oil seal.
SST 09950–70010 (09951–07200)

NOTICE:
Take care not to drop the steering rack.

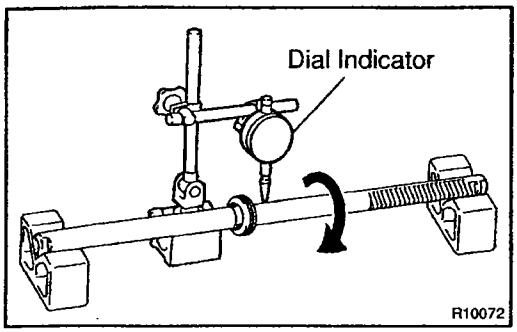


11. REMOVE OIL SEAL

Using SST, press out the oil seal.
SST 09950–60010 (09951–00280),
09950–70010 (09951–07360)

NOTICE:
Do not damage the rack housing.

SR0YT-01



INSPECTION

NOTICE:

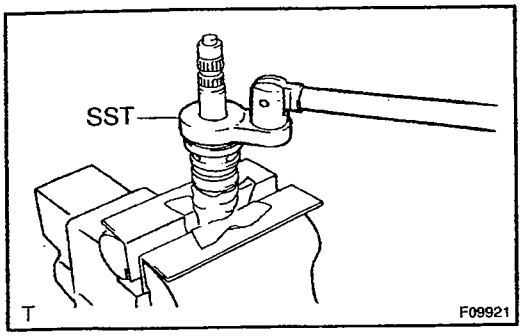
When using a vise, do not overtighten it.

INSPECT STEERING RACK

(a) Using a dial indicator, check the rack for runout, teeth wear and damage.
Maximum runout: 0.1 mm (0.004 in.)

(b) Check the back surface for wear and damage.

SR0YU–01



REPLACEMENT

NOTICE:

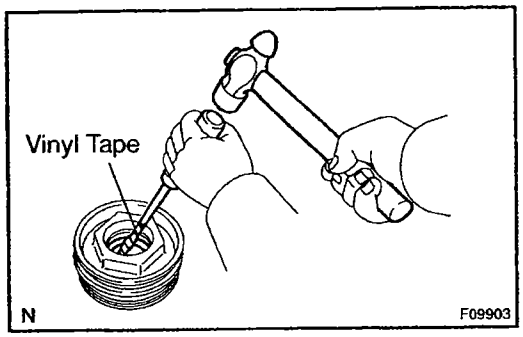
When using a vise, do not overtighten it.

1. IF NECESSARY, REPLACE BEARING

(a) Using SST, remove the bearing guide nut and bearing.
SST 09617–35020

(b) Coat a new bearing with molybdenum disulfide lithium base grease.

(c) Install the bearing and using SST, install the bearing guide nut.
SST 09617–35020
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

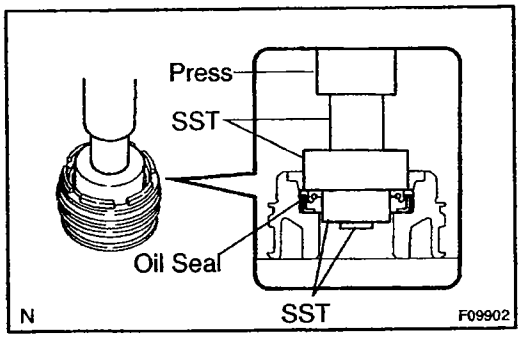


2. IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

NOTICE:

Be careful not to damage the rack housing cap.

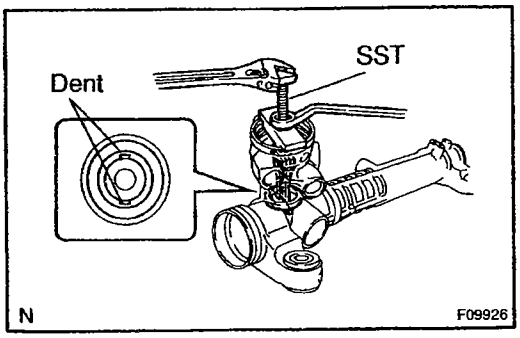


(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.
SST 09950–60010 (09951–00210, 09951–00340, 09952–06010), 09950–70010 (09951–07100)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.



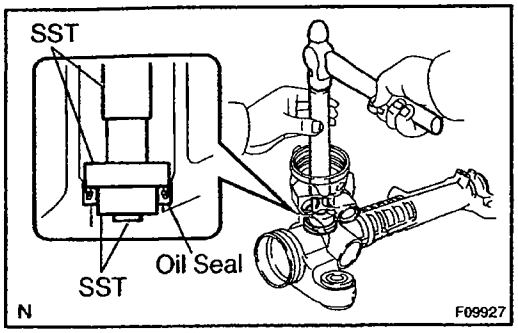
3. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST, remove the oil seal.
SST 09612–20010

NOTICE:

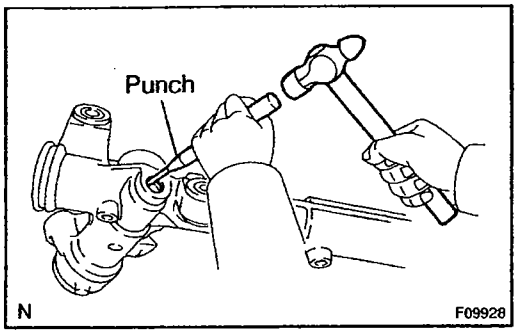
Be careful not to damage the rack housing.

(b) Coat a new oil seal lip with power steering fluid.



(c) Using SST and a hammer, tap in the oil seal.
SST 09950–60010 (09951–00240, 09951–00350, 09952–06010), 09950–70010 (09951–07150)

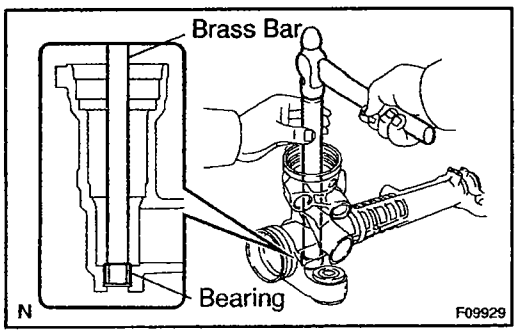
NOTICE:
Make sure that the oil seal is installed facing in the correct direction.



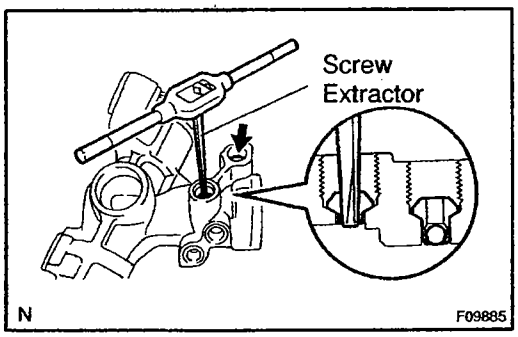
4. IF NECESSARY, REPLACE BEARING

(a) Using a punch and a hammer, tap out the bearing.

(b) Coat a new bearing with molybdenum disulfide lithium base grease.

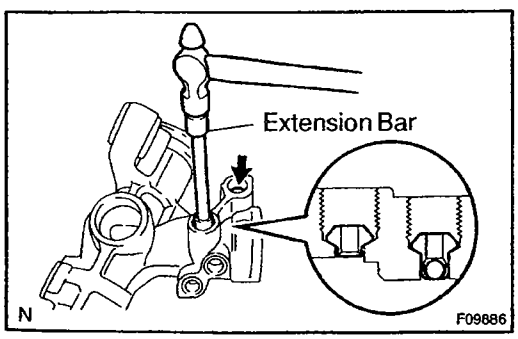


(c) Using a brass bar and a hammer, tap in the bearing.



5. IF NECESSARY, REPLACE 2 UNION SEATS

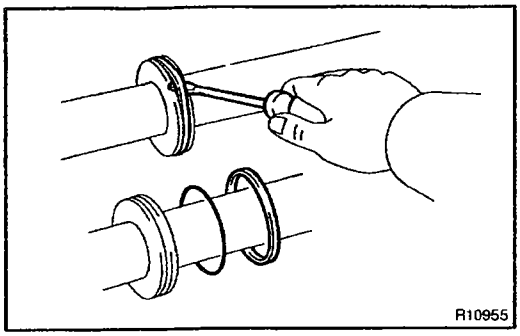
(a) Using a screw extractor, remove the union seat from the rack housing.



(b) Using a hammer and an extension bar, lightly tap in a new union seat.

NOTICE:
Before installing the union seat, remove the dust sticking to the rack housing.

(c) Employ the same manner described above to the other side.



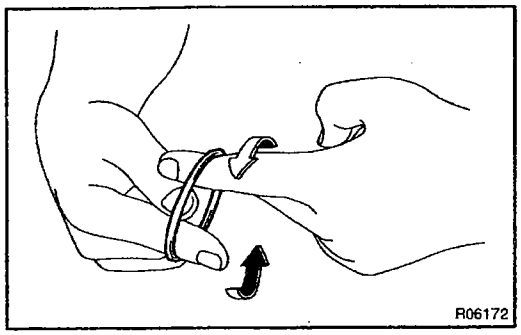
6. IF NECESSARY, REPLACE TEFLON RING AND O–RING

(a) Using a screwdriver, remove the teflon ring and O–ring from the steering rack.

NOTICE:

Be careful not to damage the groove for the teflon ring.

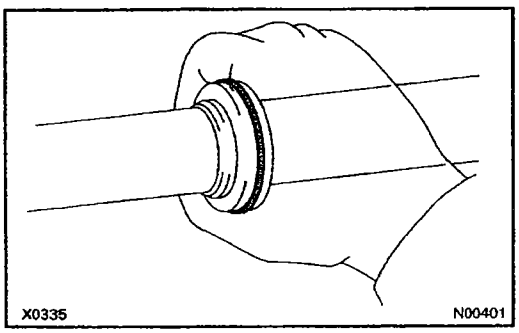
(b) Coat a new O–ring with power steering fluid and install it to the steering rack.



(c) Expand a new teflon ring with your fingers.

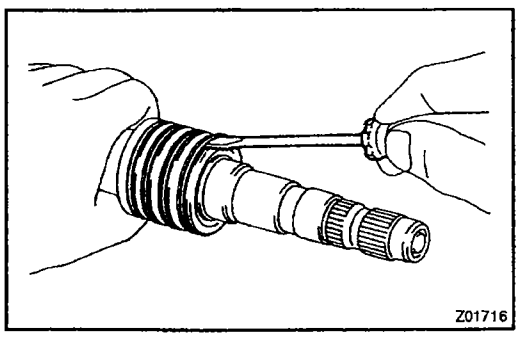
NOTICE:

Be careful not to overexpand the teflon ring.



(d) Coat the teflon ring with power steering fluid.

(e) Install the teflon ring to the steering rack and settle it down with your fingers.



7. IF NECESSARY, REPLACE 4 TEFLON RINGS

(a) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the teflon rings.

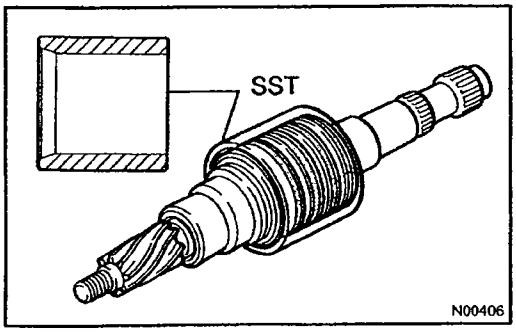
(b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon ring.

(c) Coat the teflon rings with power steering fluid.

(d) Install the teflon rings to the control valve assembly and settle them down with your fingers.



(e) Carefully slide the tapered end of SST over the teflon rings until they fit to the control valve assembly.
SST 09631–20081

NOTICE:
Be careful not to damage the teflon rings.

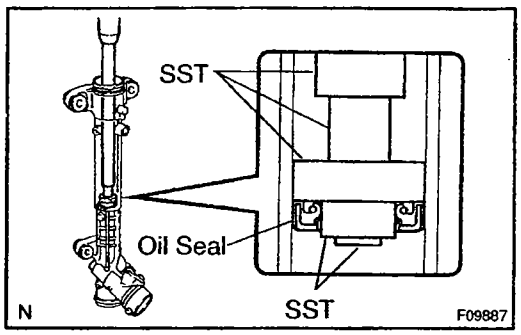
SR0YY-01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR–33)**



2. **INSTALL OIL SEAL**

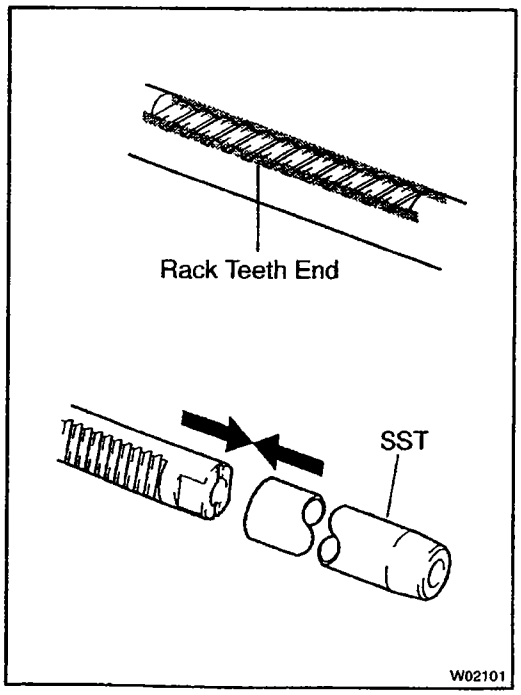
(a) Coat a new oil seal lip with power steering fluid.

(b) Install the oil seal to SST, and press them into the rack housing.

SST 09950–60010 (09951–00240, 09951–00400, 09952–06010), 09950–70010 (09951–07360)

NOTICE:

- **Make sure that the oil seal is installed facing in the correct direction.**
- **Take care that the oil seal does not get reversed as you install it.**



3. **INSTALL STEERING RACK**

(a) Install SST to the rack.

SST 09631–20051

HINT:

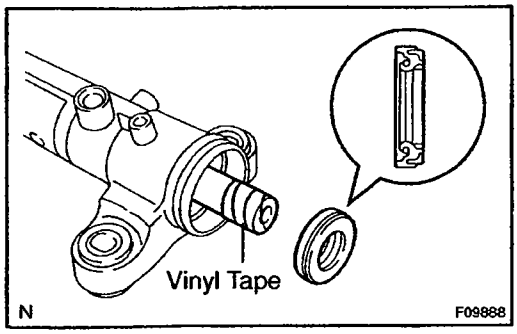
If necessary, scrape the burrs off the rack teeth end and burnish.

(b) Coat SST with power steering fluid.

(c) Install the steering rack into the rack housing.

(d) Remove the SST.

SST 09631–20051



4. INSTALL OIL SEAL

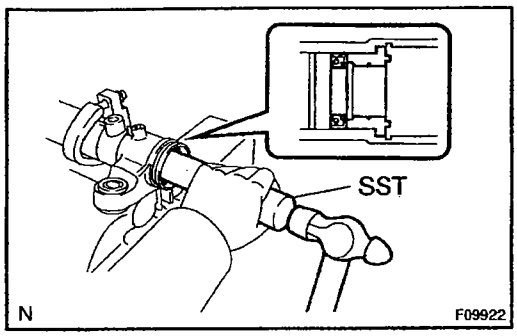
(a) Coat a new oil seal lip with power steering fluid.

(b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.

(c) Install the oil seal by pushing it into the rack housing without tilting.

NOTICE:

- **Make sure that the oil seal is installed facing in the correct direction.**
- **Be careful not to damage the oil seal lip.**

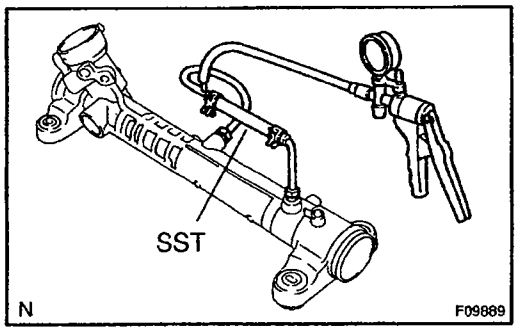


5. INSTALL CYLINDER END STOPPER

(a) Using SST and a hammer, drive in the cylinder end stopper.

SST 09612–22011

(b) Using snap ring pliers, install a new snap ring to the rack housing.



6. AIR TIGHTNESS TEST

(a) Install SST to the rack housing.

SST 09631–12071

(b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.

(c) Check that there is no change in the vacuum.

If there is a change in the vacuum, check the installation of the oil seals.

7. INSTALL CONTROL VALVE ASSEMBLY

NOTICE:

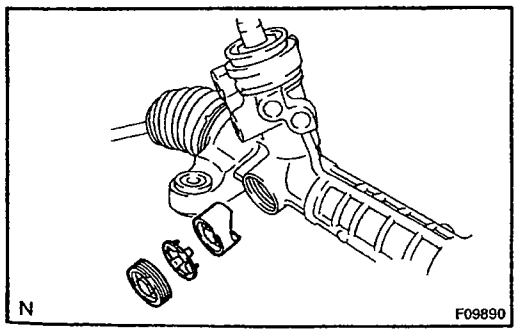
Be careful not to damage the teflon rings and oil seal lips.

8. INSTALL RACK HOUSING CAP

(a) Coat a new O–ring with power steering fluid, and install it to the rack housing cap.

(b) Install the rack housing cap.

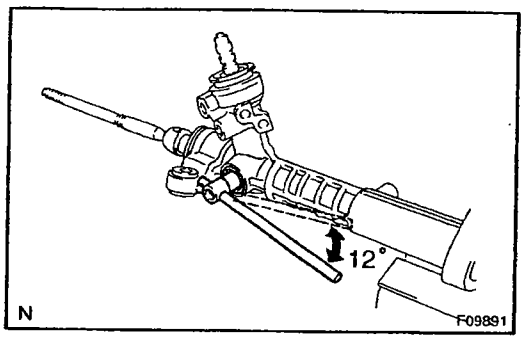
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



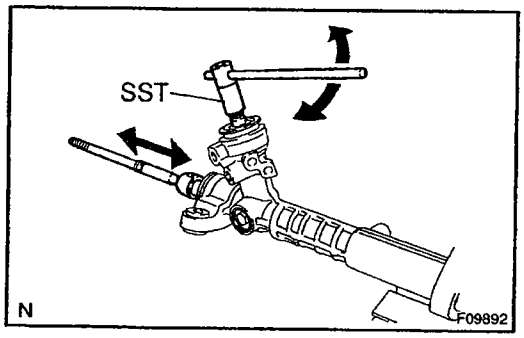
9. INSTALL RACK GUIDE SUB–ASSEMBLY, CONICAL SPRING WASHER AND RACK GUIDE SPRING CAP

(a) Install the rack guide sub–assembly and conical spring washer.

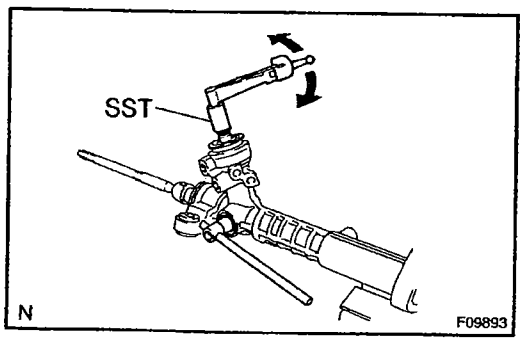
(b) Apply sealant to 2 or 3 threads of the rack guide spring cap.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(c) Temporarily install the rack guide spring cap.



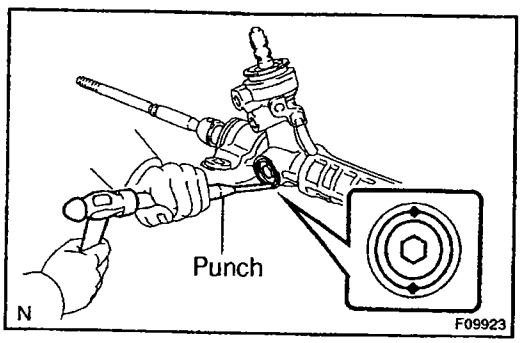
10. ADJUST TOTAL PRELOAD
(a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.
(b) Torque the rack guide spring cap.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)
(c) Return the rack guide spring cap 12°.



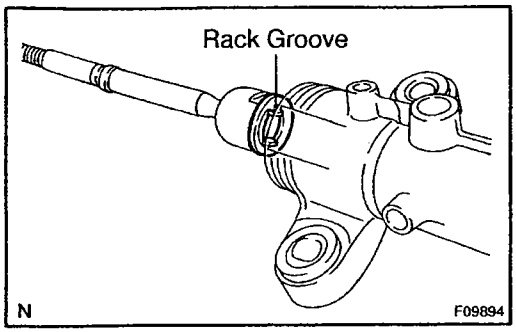
(d) Using SST, turn the control valve shaft right and left 1 or 2 times.
SST 09616–00010
(e) Loosen the rack guide spring cap until the rack guide spring is not functioning.



(f) Using SST and torque wrench, tighten the rack guide spring cap until the preload is within the specification.
SST 09616–00010
Preload (turning):
0.9 – 1.3 N·m (9 – 13 kgf·cm, 8.0 – 11.5 in.·lbf)



(g) Using a punch and a hammer, stake 2 parts in opposing positions on the rack guide spring cap.
(h) Recheck the total preload.
Preload (turning):
0.9 – 1.3 N·m (9 – 13 kgf·cm, 8.0 – 11.5 in.·lbf)
(i) Remove the RH and LH rack ends.

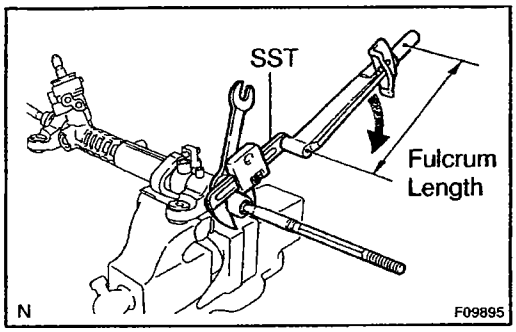


11. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

(a) Install a new claw washer, and temporarily install the rack end.

HINT:

Align the claws of the claw washer with the steering rack grooves.



(b) Using a spanner, hold the steering rack steadily and using SST, torque the rack end.

SST 09922–10010

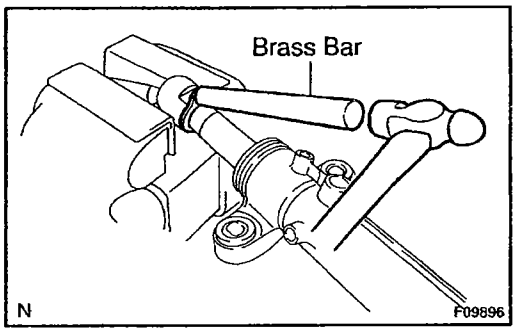
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

NOTICE:

Use SST 09922–10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).

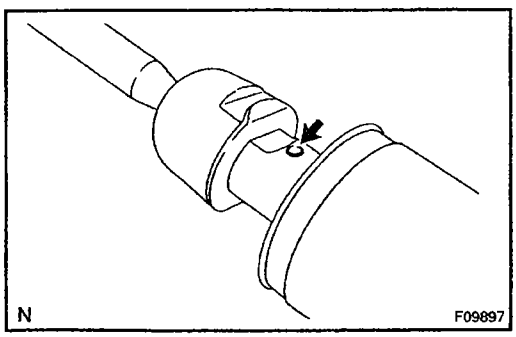


(c) Using a brass bar and a hammer, stake the washer.

NOTICE:

Avoid any impact on the steering rack.

(d) Employ the same manner described above to the other side.



12. INSTALL RH AND LH RACK BOOTS, WIRES AND CLIPS

(a) Ensure that the steering rack hole is not clogged with grease.

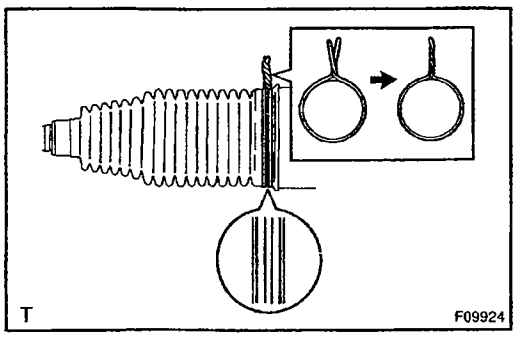
HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.

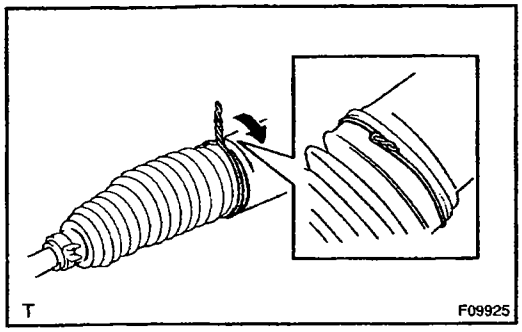
(b) Install the boot, clip and a new wire.

NOTICE:

Be careful not to damage or twist the boot.

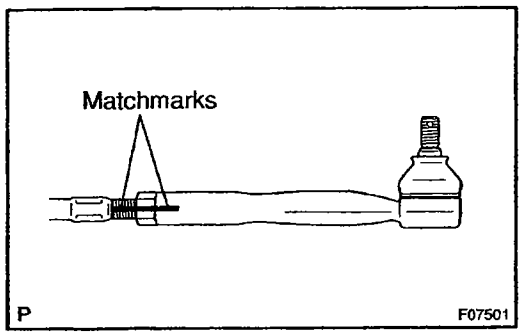


(c) After winding and tightening the wire around the circumference of the boot twice, twist it several times, and install it.



(d) As shown in the illustration, bend the wire to the circular direction to prevent damage to the boot.

(e) Employ the same manner described above to the other side.

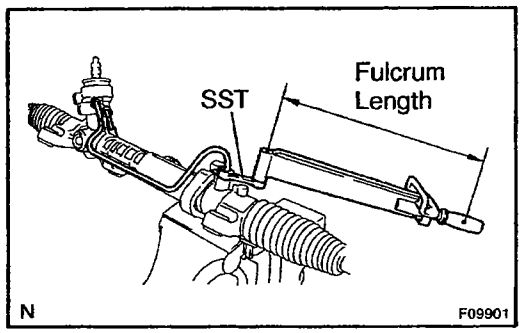


13. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

(b) After adjusting toe–in, torque the nut
(See page SA–4).
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

(c) Employ the same manner described above to the other side.



14. INSTALL 2 TURN PRESSURE TUBES

Using SST, install the 2 turn pressure tubes.

SST 09633–00020

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

HINT:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

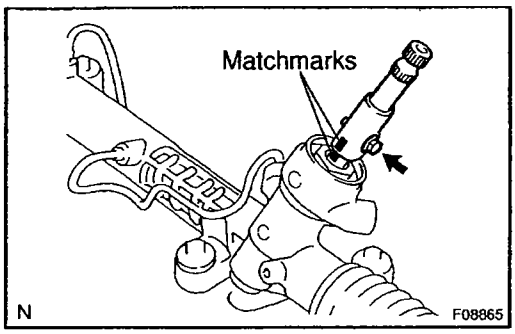
SR0YW-01

INSTALLATION

1. **INSTALL ENGINE REAR MOUNT INSULATOR AND ENGINE REAR MOUNT BRACKET**

(a) Install the engine rear mount bracket with the 3 bolts.
Torque: 64 N·m (655 kgf·cm, 47 ft·lbf)

(b) Install the engine rear mount insulator with the through bolt.
Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)

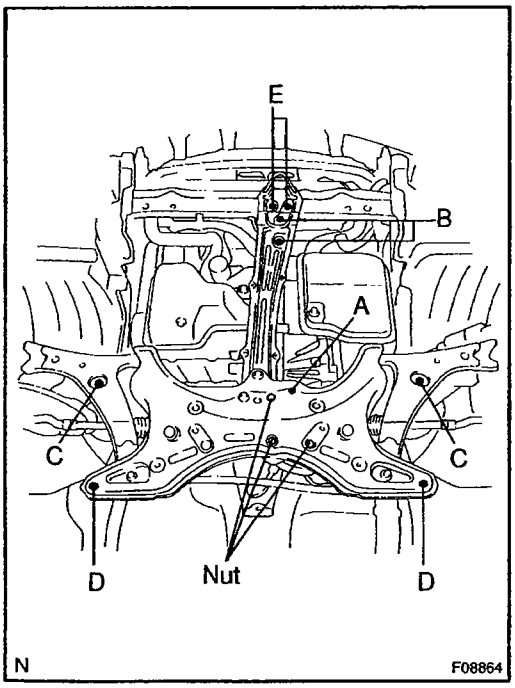


2. **INSTALL PS GEAR ASSEMBLY**

(a) Align the matchmarks on the intermediate extension and control valve shaft.

(b) Install the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Install the PS gear assembly with the 4 bolts to the front suspension member.
Torque: 58 N·m (591 kgf·cm, 43 ft·lbf)



3. **INSTALL FRONT SUSPENSION MEMBER WITH LOWER SUSPENSION ARM AND PS GEAR ASSEMBLY**

Install the front suspension member with lower suspension arm and PS gear assembly with the 6 bolts (bolt C, D and E).
Torque:
Bolt C: 157 N·m (1,600 kgf·cm, 116 ft·lbf)
Bolt D: 157 N·m (1,600 kgf·cm, 116 ft·lbf)
Bolt E: 39 N·m (400 kgf·cm, 29 ft·lbf)

4. **CONNECT ENGINE FRONT MOUNT INSULATOR AND FRONT SUSPENSION MEMBER**

Connect the engine front mount insulator and front suspension member with the 2 bolts (bolt B).
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

5. **CONNECT ENGINE REAR MOUNT INSULATOR AND FRONT SUSPENSION MEMBER**

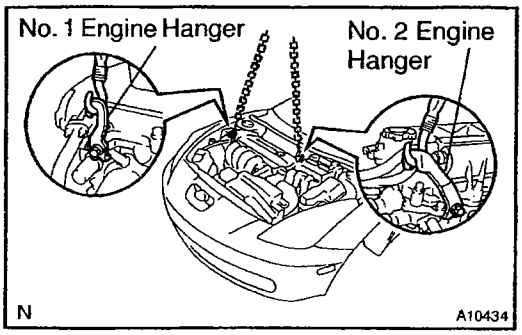
Connect the engine rear mount insulator and front suspension member with the bolt (bolt A) and 3 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

6. **CONNECT STABILIZER BAR**

(a) Connect the stabilizer bar with the nut.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

(b) Employ the same manner described above to the other side.

7. **CONNECT LOWER BALL JOINT TO LOWER SUSPENSION ARM (See page SA–45)**



8. DISENGAGE ENGINE SLING DEVICE FROM ENGINE HANGERS

(a) Disengage the engine sling device from the engine hangers.

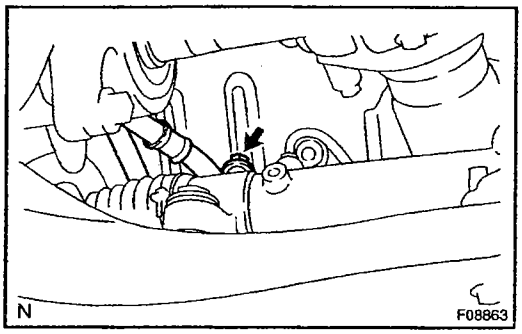
(b) Remove the No. 1 and No. 2 engine hangers.

(c) Connect the PCV hoses to the cylinder head cover.

(d) Install the No. 2 cylinder head cover with the 4 bolts.

9. INSTALL ENGINE HOOD (See page BO–9)

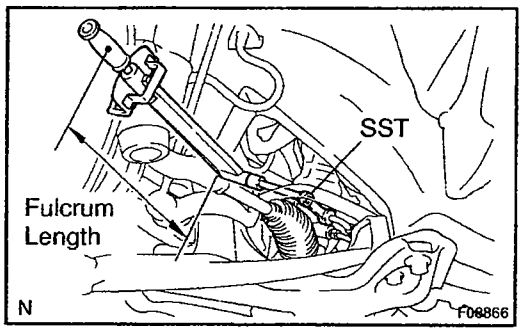
10. CONNECT COLUMN HOLE COVER SUB–ASSEMBLY



11. CONNECT TUBE CLAMP

Connect the tube clamp with the bolt.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)



12. CONNECT PRESSURE FEED AND RETURN TUBES

Using SST, connect the pressure feed and return tubes.

SST 09631–22020

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

HINT:

- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

13. CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See page SR–19)

14. CONNECT RH AND LH TIE ROD ENDS (See page SA–16)

15. INSTALL RH, CENTER AND LH ENGINE UNDER COVERS

16. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

17. CENTER SPIRAL CABLE (See page SR–19)

18. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and steering column main shaft.

(b) Temporarily tighten the steering wheel set nut.

19. BLEED POWER STEERING SYSTEM (See page SR–4)

20. **CHECK STEERING WHEEL CENTER POINT**
21. **TORQUE STEERING WHEEL SET NUT**
    Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
22. **INSTALL STEERING WHEEL PAD (See page SR–19)**
23. **CHECK FRONT WHEEL ALIGNMENT**
    (See page SA–4)

– MEMO –

SUPPLEMENTAL RESTRAINT SYSTEM

SRS AIRBAG RS–1
STEERING WHEEL PAD AND
SPIRAL CABLE RS–12
FRONT PASSENGER
AIRBAG ASSEMBLY RS–26
SIDE AIRBAG ASSEMBLY RS–39
AIRBAG SENSOR ASSEMBLY RS–52
FRONT AIRBAG SENSOR RS–57
SIDE AIRBAG SENSOR ASSEMBLY RS–62
DOOR SIDE AIRBAG SENSOR RS–67
WIRE HARNESS AND CONNECTOR RS–72

RS

SRS AIRBAG

PRECAUTION

RS0JO-01

CAUTION:

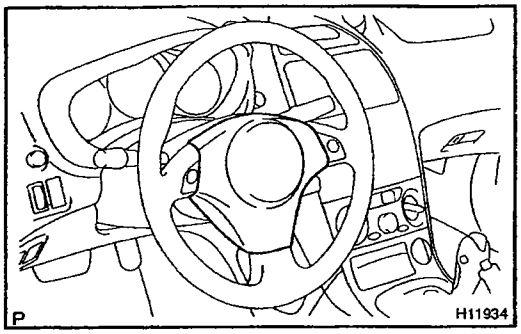
- The CELICA is equipped with SRS, which comprises a driver airbag, front passenger airbag and side airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible that the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedures described in the repair manual.
- Work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
  (The SRS is equipped with a back–up power source so that if work is started within 90 seconds from disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
- Do not expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor side airbag sensor assembly or door side airbag sensor directly to hot air or flames.

NOTICE:

- Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor, side airbag sensor assembly and door side airbag sensor should be inspected.
  (See page RS–14, RS–28, RS–42, RS–54, RS–59, RS–64 and RS–69)
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never disassemble and repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor, side airbag sensor assembly or door side airbag sensor in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor, side airbag sensor assembly or door side airbag sensor has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace it with new one.
- Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- After work on the SRS is completed, perform the SRS warning light check (See page DI–326).
- When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. To avoid erasing the memory in each memory system, never use a back– up power supply from outside the vehicle.
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

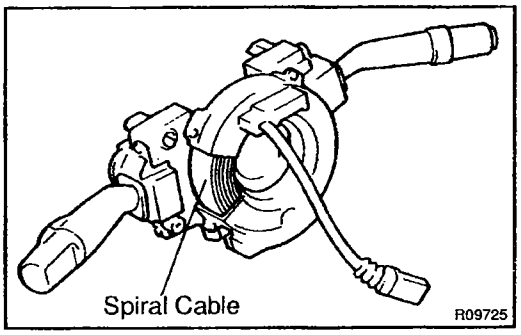
RS0JP-01

OPERATION



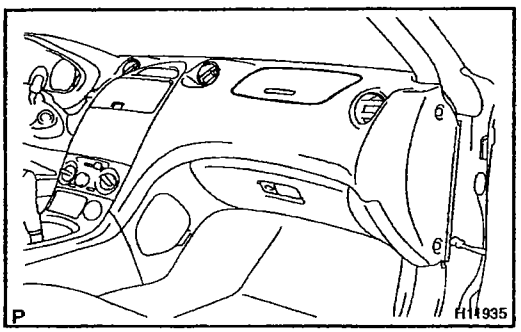
1. STEERING WHEEL PAD (with AIRBAG)

The inflater and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



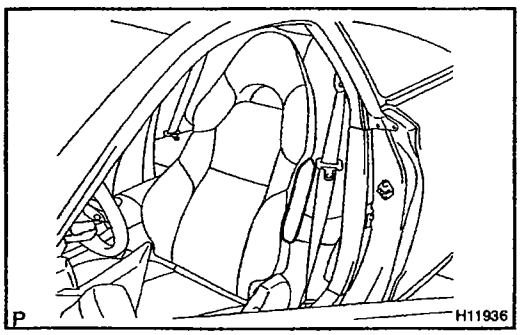
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



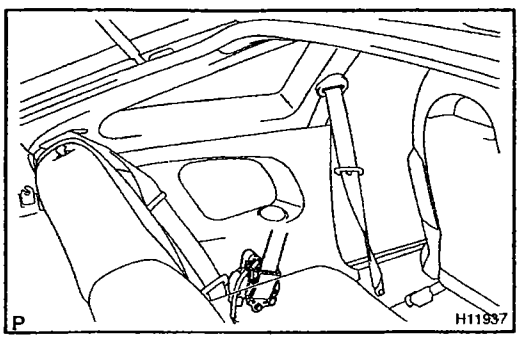
3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflater and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



4. SIDE AIRBAG ASSEMBLY

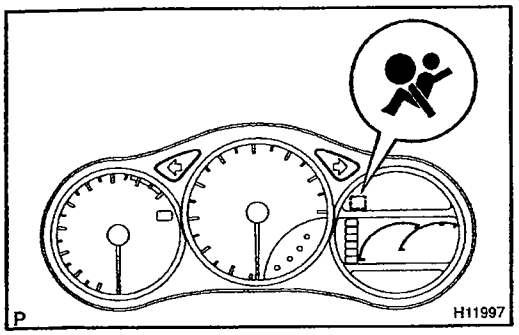
The inflater and bag of the SRS side airbag are stored in the side airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the side airbag sensor assembly.



5. SEAT BELT PRETENSIONER

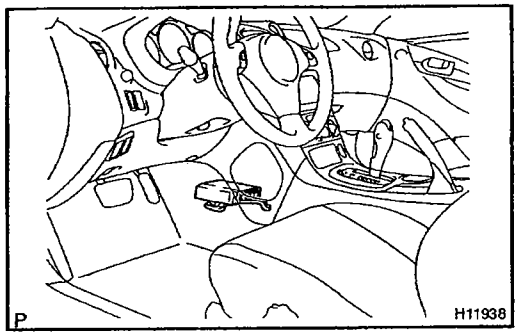
The seat belt pretensioner system is a component of the front seat outer belt. The pretensioner contains a squib, gas generator, wire, piston, etc., and operates in the event of a frontal collision. The seat belt pretensioner cannot be disassembled.

RS



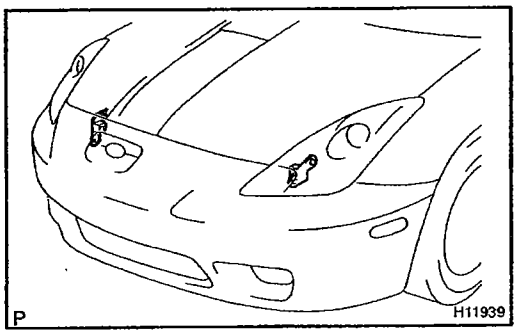
6. SRS WARNING LIGHT

The SRS warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the airbag sensor assembly self–diagnosis. In normal operation conditions when the ignition switch is turned to the ON position, the light goes on for about 6 seconds and then goes off.



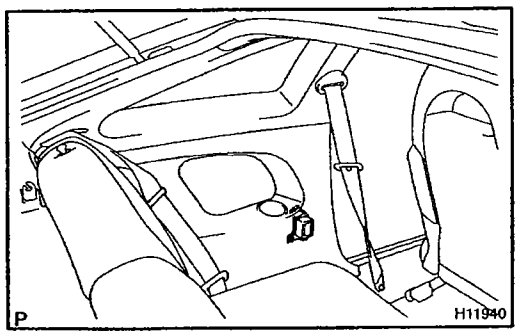
7. AIRBAG SENSOR ASSEMBLY

The airbag sensor assembly is mounted on the floor inside the lower center finish panel. The airbag sensor assembly consists of an airbag sensor, safing sensor, diagnosis circuit, ignition control, drive circuit, etc. It receives signals from the airbag sensor, front airbag sensor, side airbag sensor assembly and door side airbag assembly and judges whether the SRS must be activated or not. The airbag sensor assembly cannot be disassembled.



8. FRONT AIRBAG SENSOR

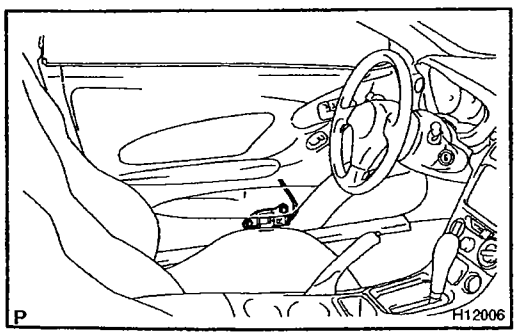
The front airbag sensor is mounted inside each of the side members. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit, contact is made in the sensor, sending a signal to the airbag sensor assembly. The front airbag sensor cannot be disassembled.



9. SIDE AIRBAG SENSOR ASSEMBLY

The side airbag sensor assembly is mounted in the LH and RH center pillars. The side airbag sensor assembly consists of a lateral deceleration sensor, safing sensor, diagnosis circuit, etc. It sends signals to the airbag sensor assembly to judge whether the SRS side airbag must be activated or not. The side airbag sensor assembly cannot be disassembled.

RS



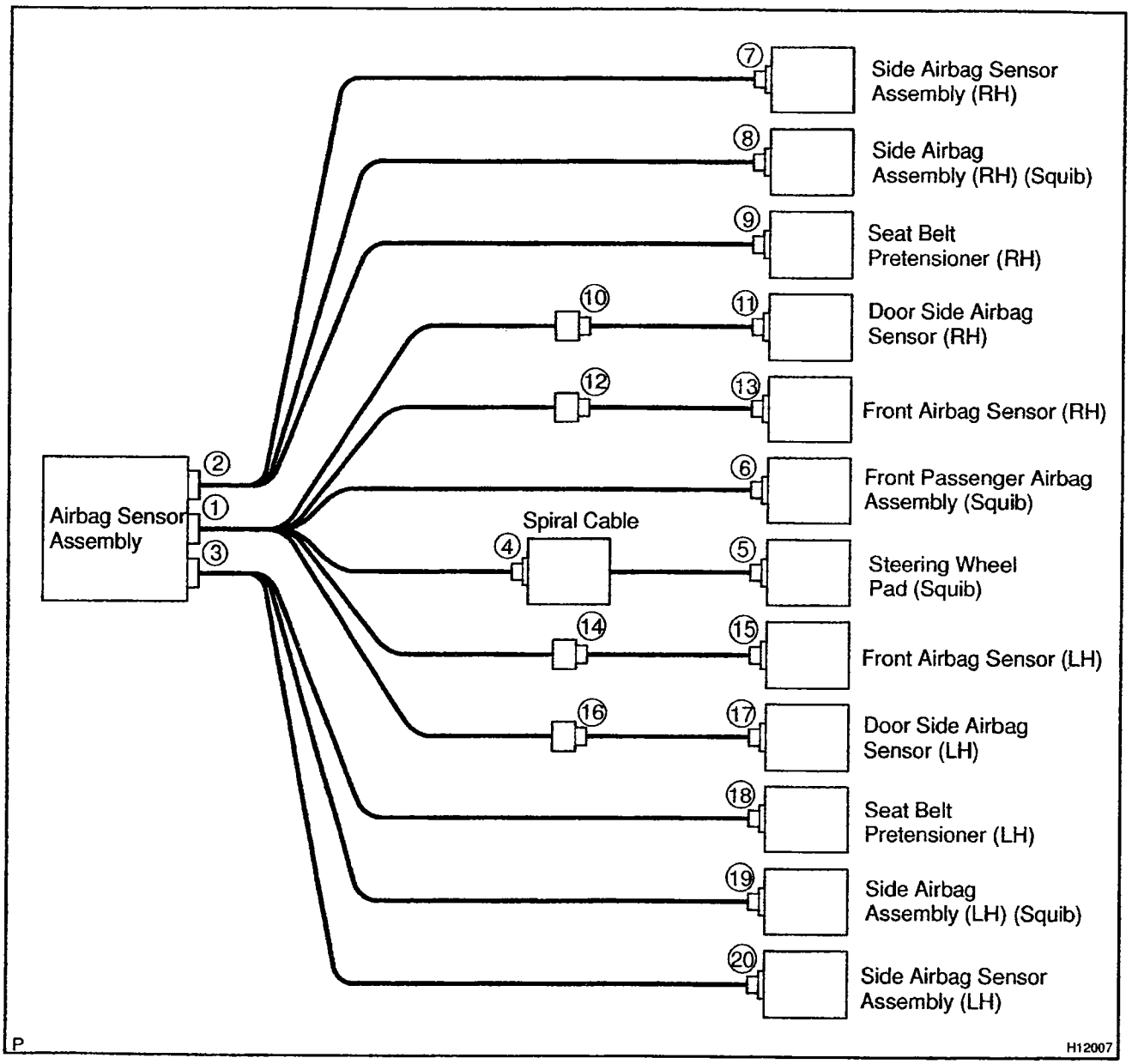
10. DOOR SIDE AIRBAG SENSOR

The door side airbag sensor is mounted on each of the door inside panel. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit, contact is made in the sensor, sending a signal to the airbag sensor assembly. The door side airbag sensor cannot be disassembled.

11. SRS CONNECTORS

HINT:

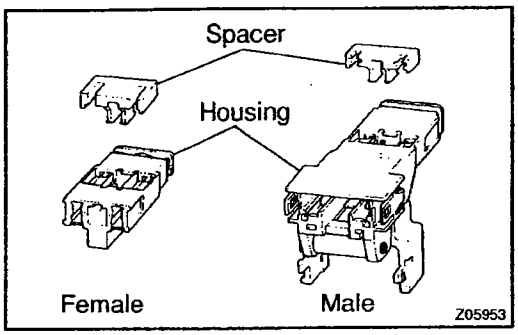
SRS connectors are located as shown in the following illustration.



RS

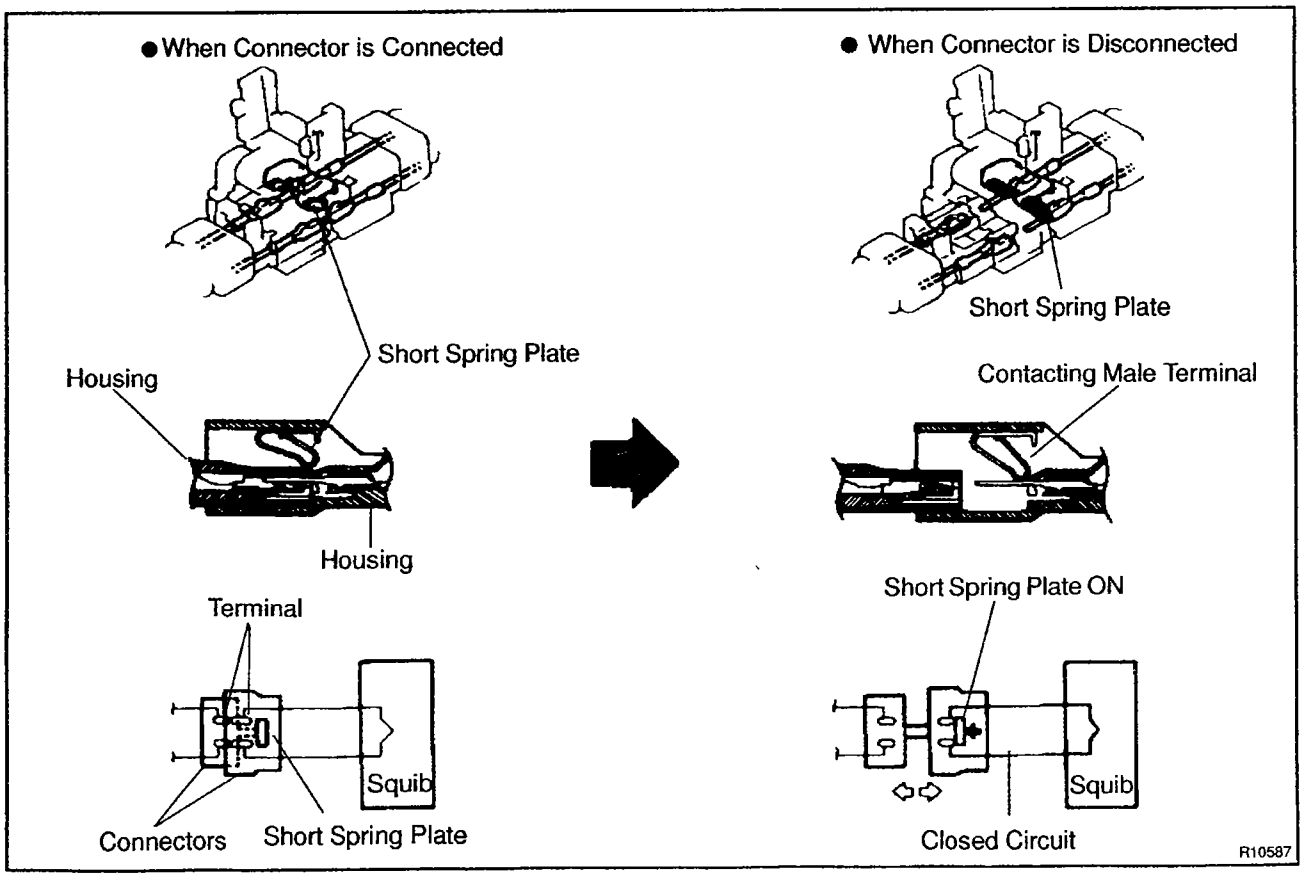
No.	Item	Application
(1)	Terminal Twin–Lock Mechanism	Connectors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
(2)	Airbag Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 5, 6, 8, 19
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3

(a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for the SRS are used in the locations shown on the previous page to ensure high reliability. These connectors use durable gold–plated terminals.



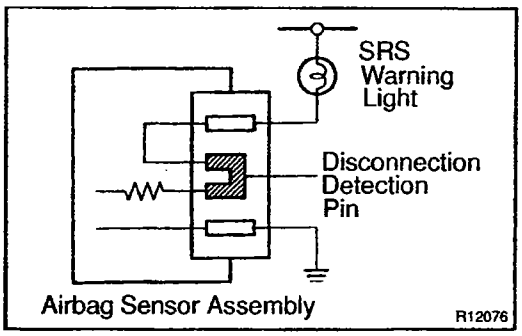
(1) Terminal Twin–Lock Mechanism
Each connector has a two–piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.

(2) Airbag Activation Prevention Mechanism
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects positive (+) terminal and negative (–) terminal of the squib.

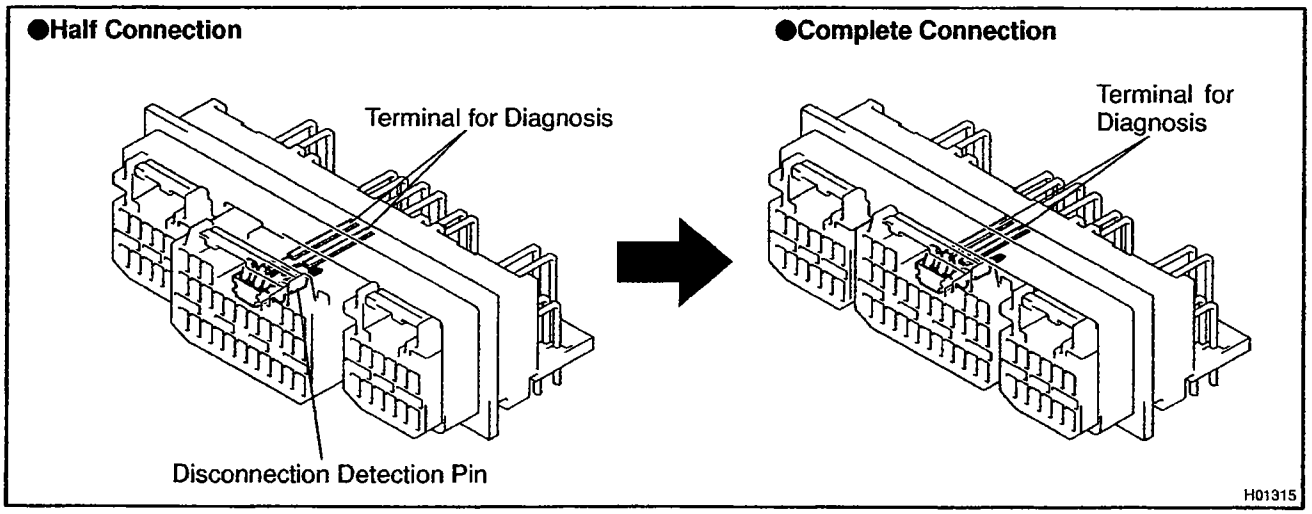


RS

HINT:
The type of connector is shown in the diagram on the previous page.

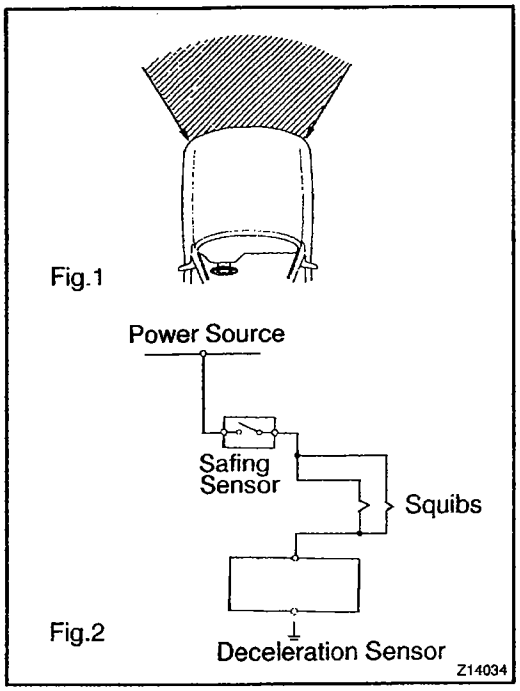


(3) Electrical Connection Check Mechanism
This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects with the diagnosis terminals when the connector housing lock is locked.

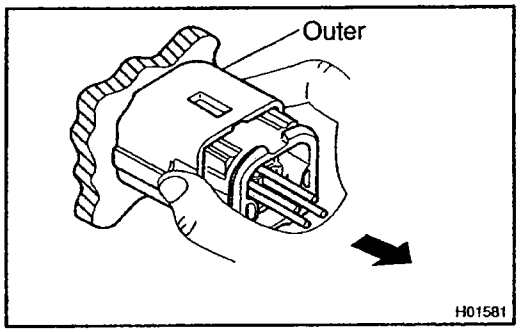


HINT:
The illustration shows connectors "1", "2" and "3" in step 11.

RS



(b) When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than the predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensor. As illustrated in Fig. 2, ignition is caused when current flows to the squib, which happens when a safing sensor and the deceleration sensor go on simultaneously. When a deceleration force acts on the sensors, 2 squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver airbag and front passenger airbag rapidly increases the pressure inside the bags, breaking open the steering wheel pad and instrument panel.
Bag inflation then ends, and the bags deflate as the gas is discharged through discharge holes at the bag's rear or side.

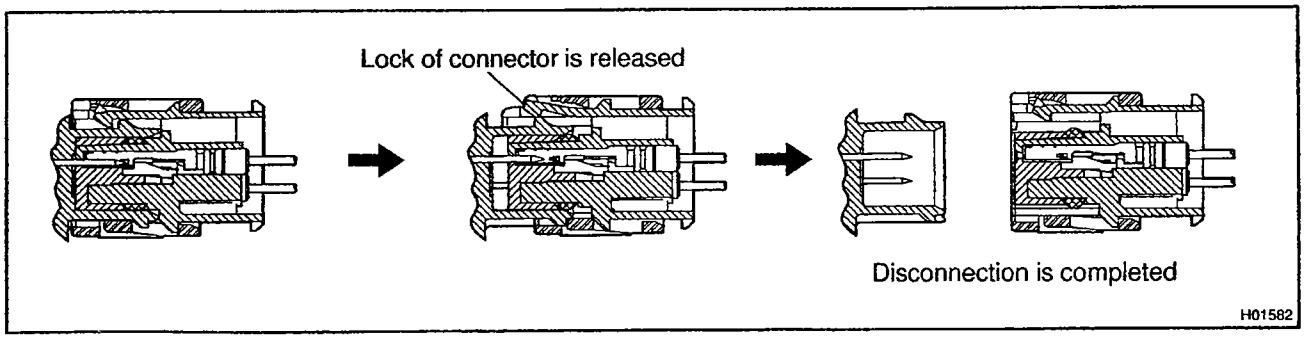


12. DISCONNECTION OF CONNECTORS FOR FRONT AIRBAG SENSOR, SIDE AIRBAG SENSOR AND DOOR SIDE AIRBAG SENSOR

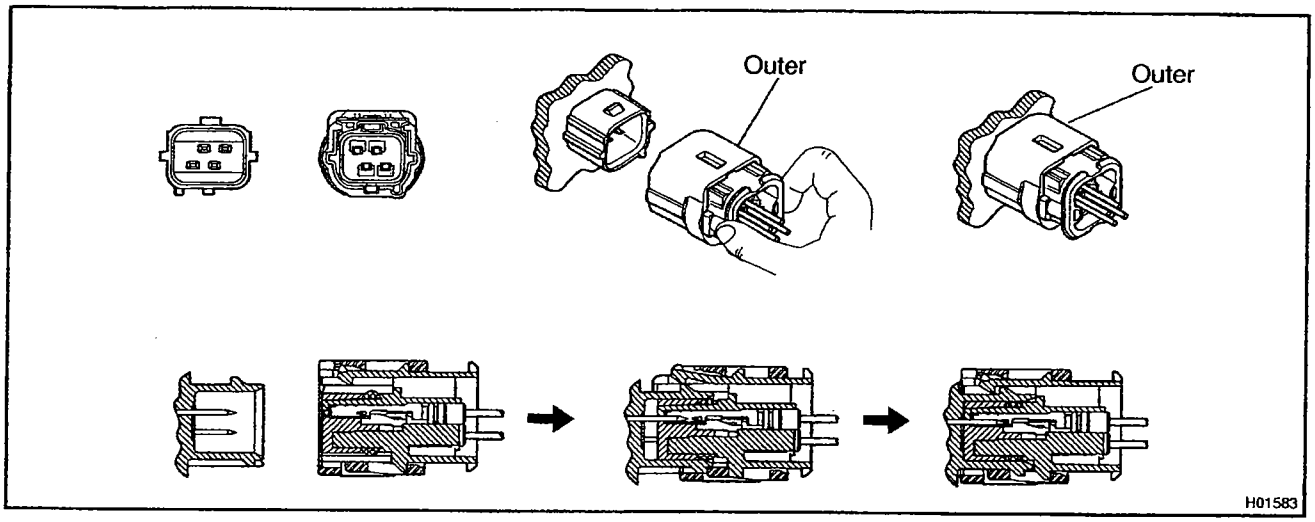
(a) While holding both flank sides of the outer, slide the outer to the direction shown by an arrow.

(b) Lock of the connectors is released, then disconnect the connectors.

HINT:
Be sure to hold both flank sides of the outer. If holding the top and bottom sides, it will obstruct disconnection.



13. CONNECTION OF CONNECTORS FOR FRONT AIRBAG SENSOR, SIDE AIRBAG SENSOR AND DOOR SIDE AIRBAG SENSOR



(a) Align the male connector (of the side of sensor) and female connector in the same direction as shown in the illustration and fit in them without rubbing.

(b) As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops half way, connectors will separate.

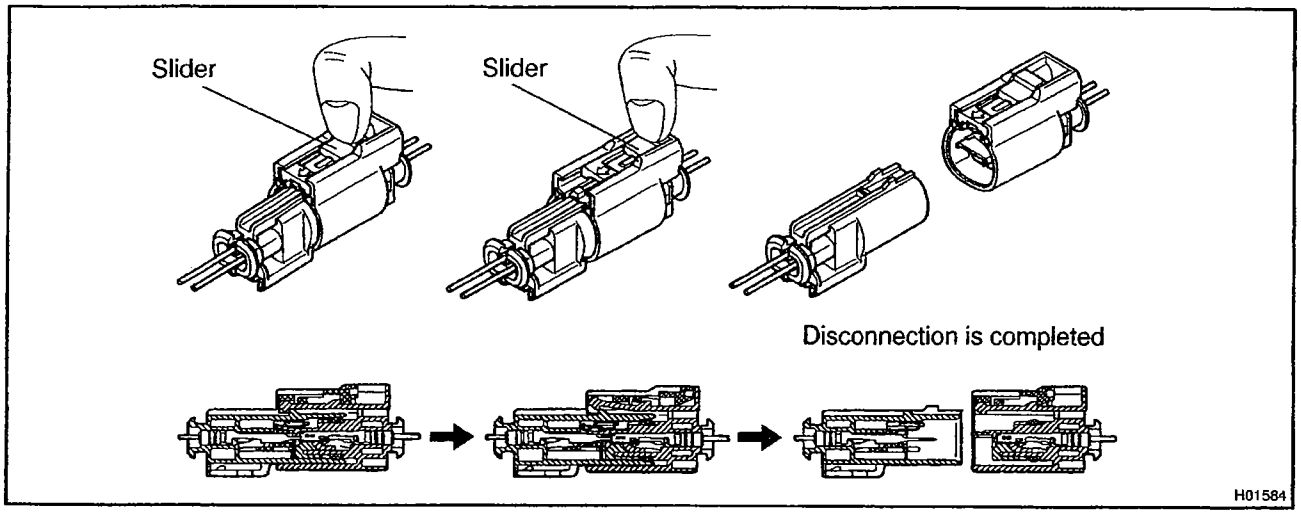
(c) Be sure to insert until they are locked. After fitting in, pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

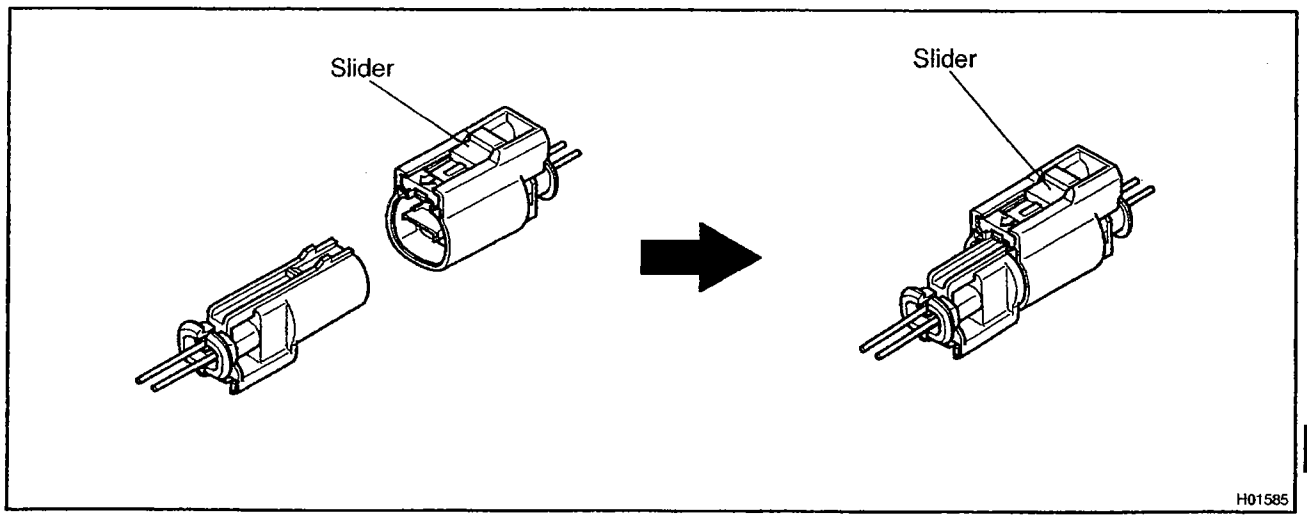
- Do not fit in while holding the outer.
- When fitting in, the outer slides. Do not touch it.

14. DISCONNECTION OF SIDE AIRBAG CONNECTOR

(a) Place a finger on the slider.
(b) Slide the slider to release lock.
(c) Disconnect the connector.



15. CONNECTION OF SIDE AIRBAG CONNECTOR



RS

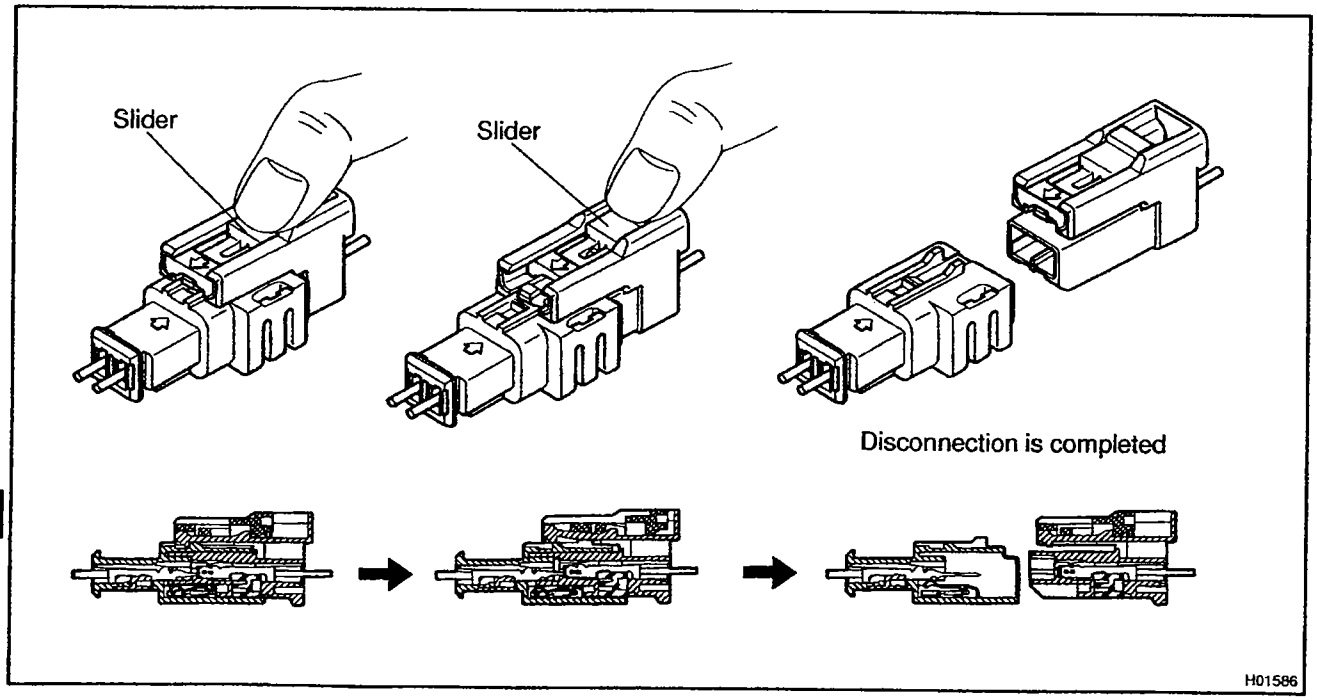
(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.
(b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.

16. DISCONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY

(a) Place a finger on the slider.
(b) Slide the slider to release lock.
(c) Disconnect the connector.



RS

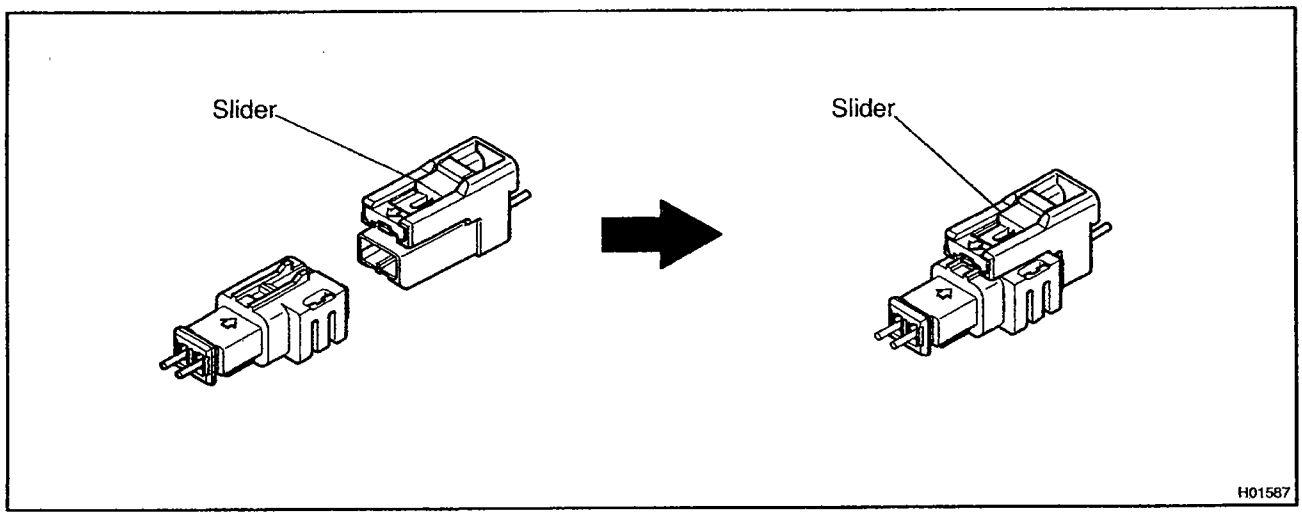
17. CONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY

(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.

(b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

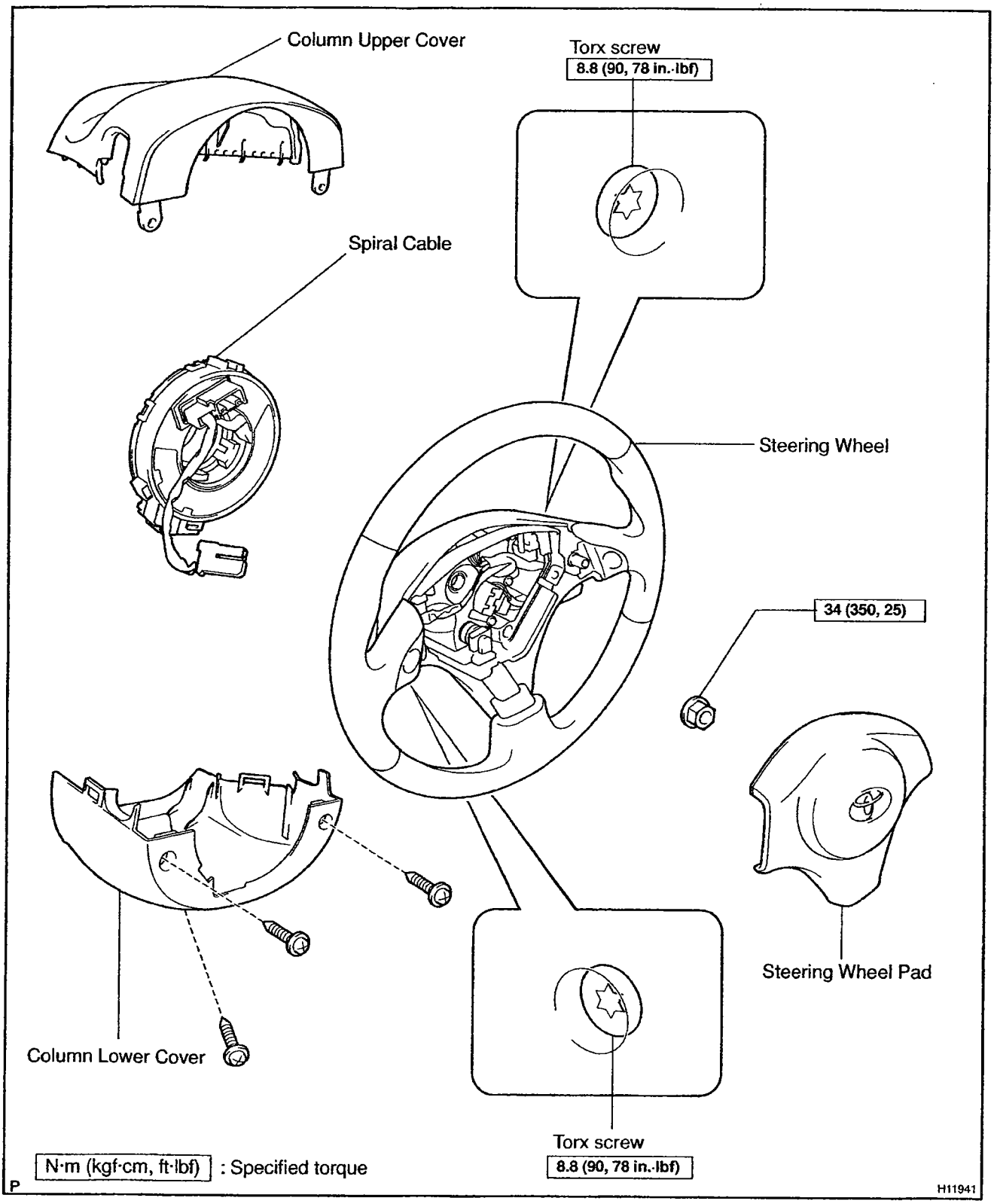
- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



STEERING WHEEL PAD AND SPIRAL CABLE

COMPONENTS

RS0JQ-01

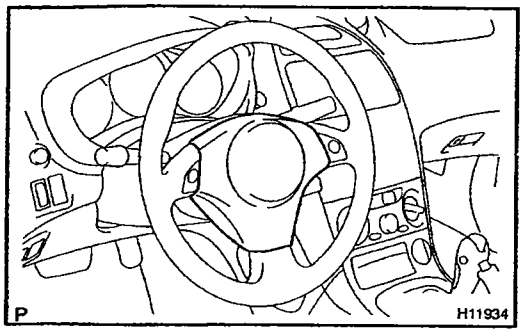


REMOVAL

HINT:

For step 1 to 4, refer to page SR–11.

1. **REMOVE STEERING WHEEL PAD**
2. **REMOVE STEERING WHEEL**
3. **REMOVE UPPER AND LOWER COLUMN COVERS**
4. **REMOVE SPIRAL CABLE**



RS0JS-01

INSPECTION

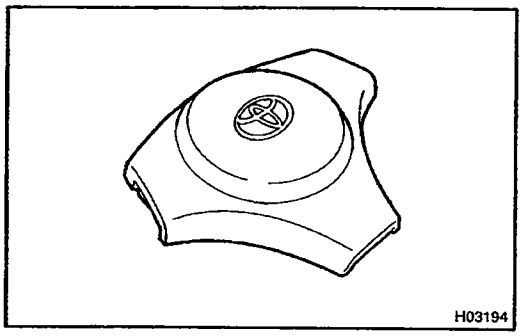
1. **Vehicle not involved in collision:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).

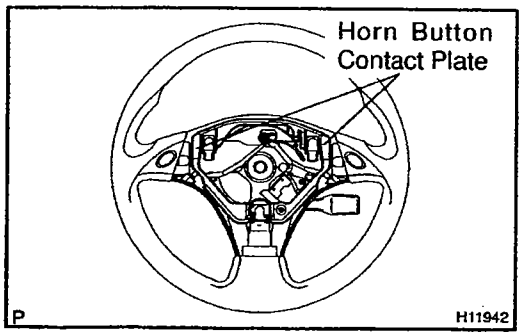
(b) Do a visual check which includes the following item with the steering wheel pad (with airbag) installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.

2. **Vehicle involved in collision and airbag is not deployed:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).



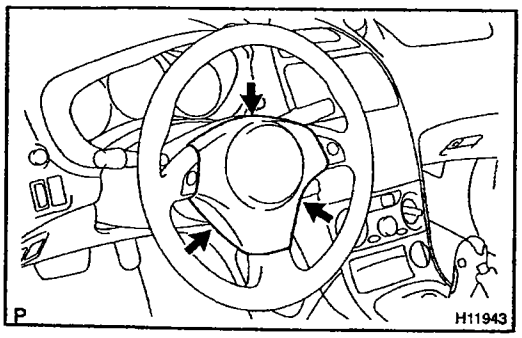
(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
- Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
- Check cuts and cracks in wire harness, and chipping in connectors.



- Check the deformation of the horn button contact plate of the steering wheel.

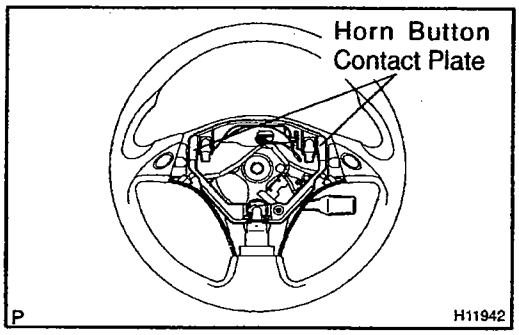
CAUTION:
For removal and installation of the steering wheel pad, see page SR–11 and SR–19, be sure to follow the correct procedure.

HINT:
- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly with a new one.
- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.



3. **Vehicle involved in collision and airbag is deployed: INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

(a) Do a diagnostic system check (See page DI–326).



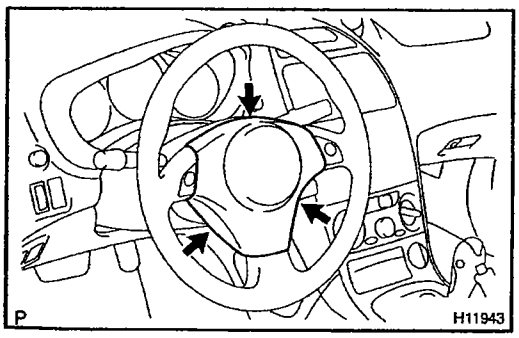
(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check the deformation on the horn button contact plate of the steering wheel.
- Check the damage on the spiral cable connector and wire harness.

CAUTION:
For removal and installation of the steering wheel pad, see page SR–11 and SR–19, and be sure to follow the correct procedure.

HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly with a new one.



- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

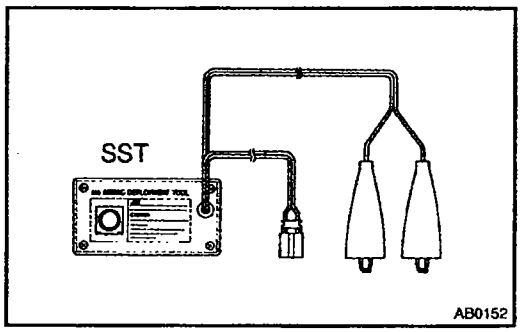
RSOJT–01

DISPOSAL

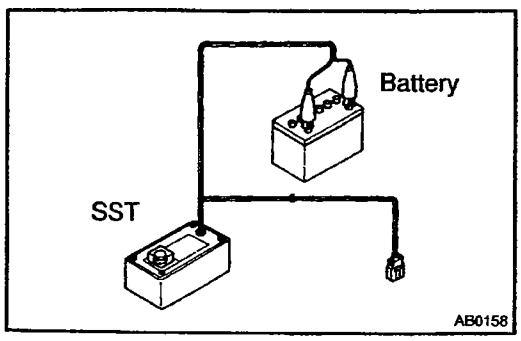
HINT:
When scrapping vehicle equipped with an SRS or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- **Never dispose of a steering wheel pad which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors and where it will not create a nuisance to nearby residents.**

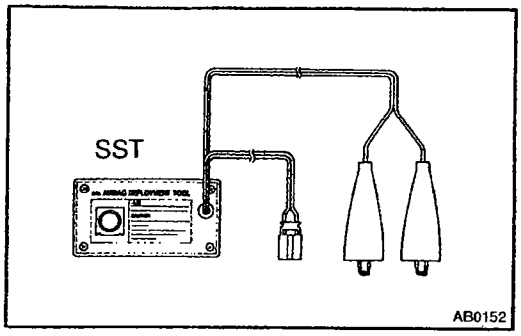


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082–00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.**
- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:
Have a battery ready as the power source to deploy the airbag.

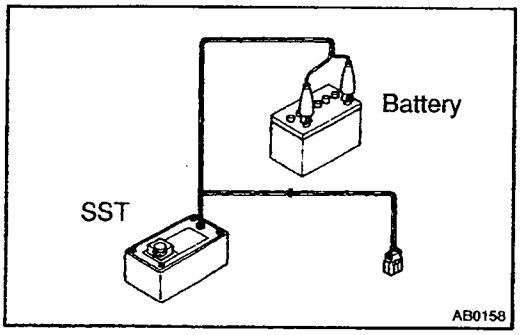


(a) Check functioning of the SST.

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

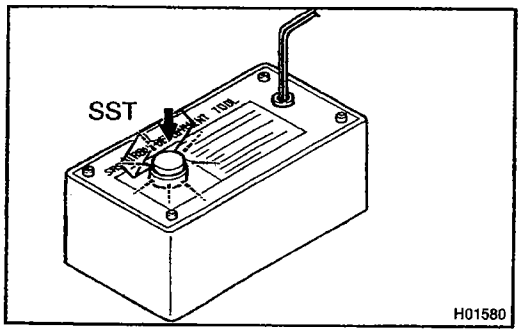
SST 09082–00700



(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

HINT:

Do not connect the yellow connector which will be connected with the supplemental restraint system.

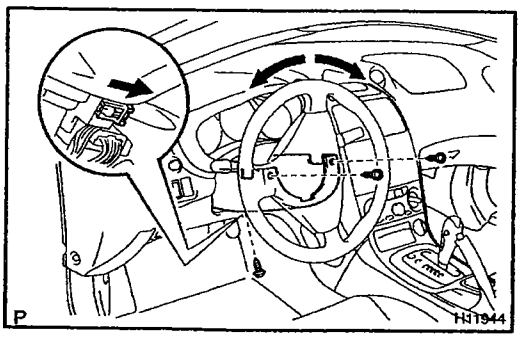


(2) Press the SST activation switch, and check that the LED of the SST activation switch lights up.

CAUTION:

If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

(3) Disconnect the SST from the battery.



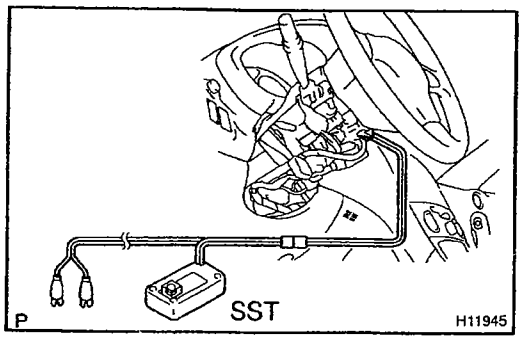
(b) Install the SST.

CAUTION:

Check that there is no looseness in the steering wheel and steering wheel pad.

(1) While turning the steering wheel right / left, remove the 3 screws and column lower cover.

(2) Disconnect the airbag connector of the spiral cable.

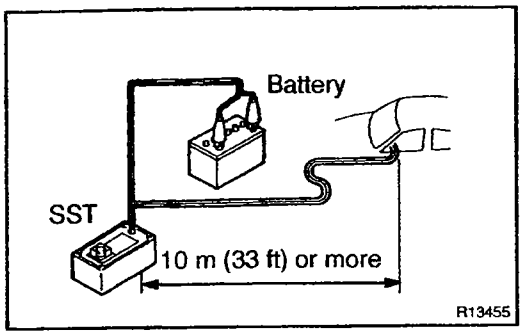


(3) Connect the connectors of the 2 SST to the airbag connector of the spiral cable.

SST 09082–00700, 09082–00760

NOTICE:

To avoid damaging the connector of the SST and wire harness, do not lock the secondary lock of the twin lock.



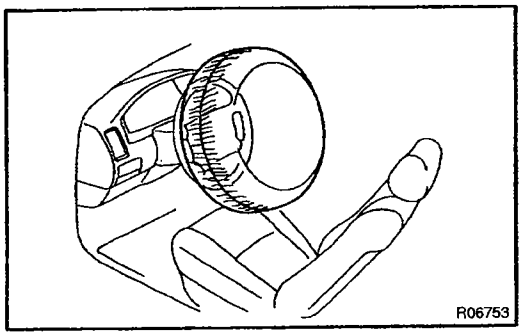
(4) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(5) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(6) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (–) terminal.



(c) Deploy the airbag.

(1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**
- **When scrapping a vehicle, deploy the airbag and scrap the vehicle with the steering wheel pad still installed.**
- **When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.**

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

2. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD ONLY

NOTICE:

- **When disposing of the steering wheel pad (with airbag) only, never use the customers vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

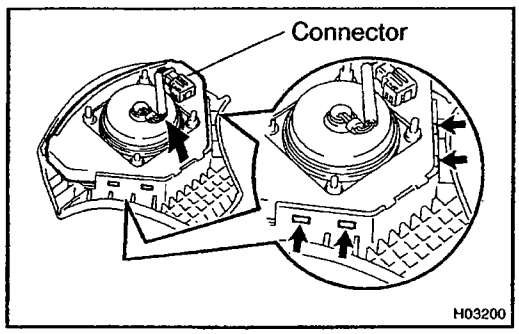
HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Remove the steering wheel pad (See page SR–11).

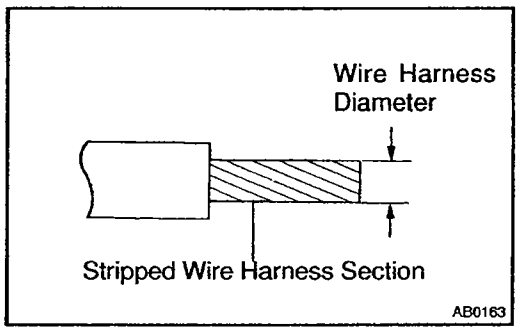
CAUTION:

- **When removing the steering wheel pad, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
- **When storing the steering wheel pad, keep the upper surface of the pad facing upward.**



(b) Remove the connector on the steering wheel pad rear surface.

(c) Remove the steering wheel pad cover.



(d) Using a service–purpose wire harness tie down the steering wheel pad to the disc wheel.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in^2. or more)

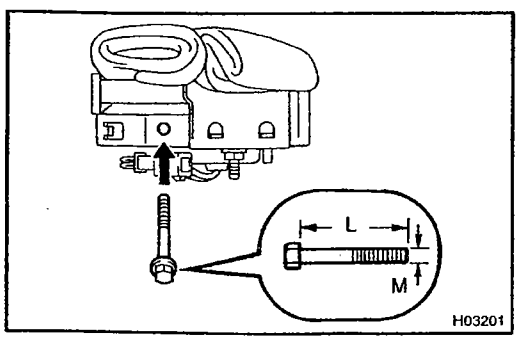
CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm^2 (0.0019 in^2.).

HINT:

To calculate the square of the stripped wire harness section:

Square = 3.14 x (Diameter)^2 divided by 4



(1) Install the 2 bolts with washers in the 2 bolt holes in the steering wheel pad.

Bolt:

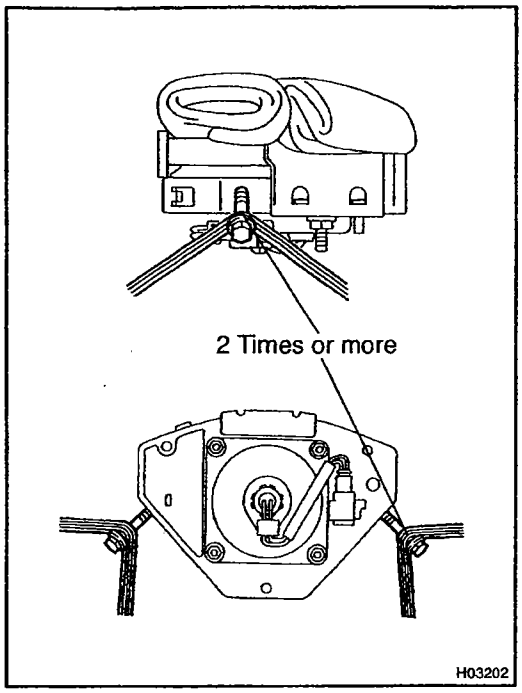
L: 35. mm (1.387 in.)

M: 6.0 mm (0.236 in.)

Pitch: 1.0 mm (0.039 in.)

NOTICE:

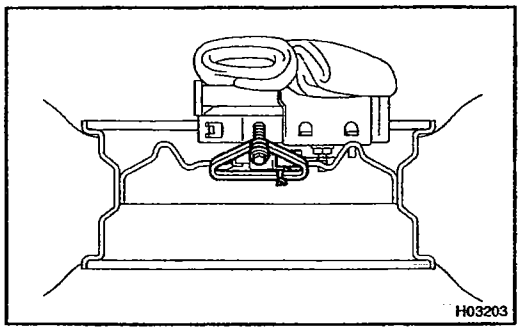
- **Tighten the bolts by hand until the bolts become difficult to turn.**
- **Do not tighten the bolts too much.**



(2) Using 3 wire harness, wind the wire harness at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.

CAUTION:

- **Tightly wind the wire harness around the bolts so that there is no slack.**
- **If there is slackness in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed. This is highly dangerous.**



(3) Face the upper surface of the steering wheel pad upward. Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes. Position the steering wheel pad connector so that it hangs downward through a hub hole in the disc wheel.

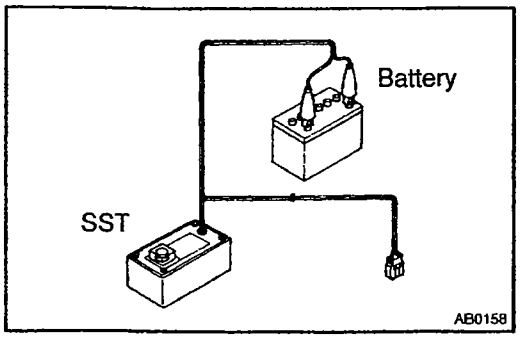
CAUTION:

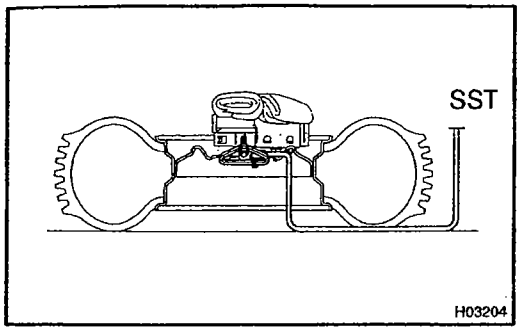
- **Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free due to the shock from the airbag deploying.**
- **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock from the airbag deploying and the steering wheel pad will be thrown into the air.**

NOTICE:

The disc wheel will be marked by airbag deployment, so when disposing of the airbag use a redundant disc wheel.

(e) Check functioning of the SST (See step 1–(a)).
SST 09082–00700





(f) Install the SST.

CAUTION:

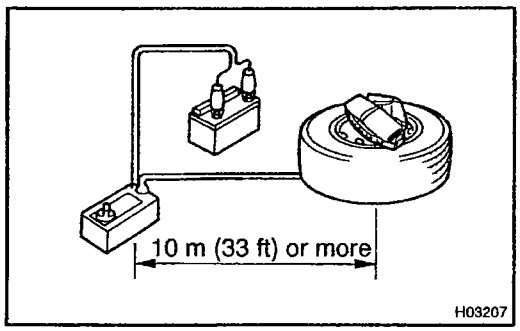
Place the disc wheel on the level ground.

(1) Connect the connectors of the 2 SST to the steering wheel pad connector.

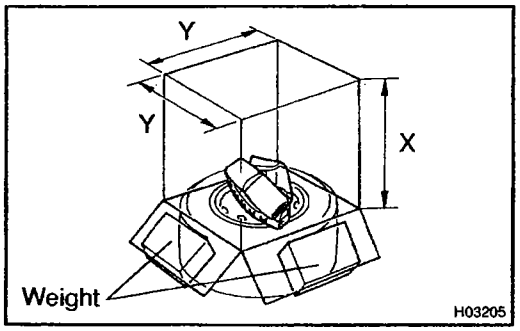
SST 09082–00700, 09082–00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the disc wheel.



(2) Move the SST to at least 10 m (33 ft) away from the steering wheel pad tied down on the disc wheel.



(g) Cover the steering wheel pad with a cardboard box or tires.

- Covering method using a cardboard box:
  Cover the steering wheel pad with the cardboard box and weight the cardboard box down in 4 places with at least 190 N (20 kg, 44 lb).

Size of cardboard box:

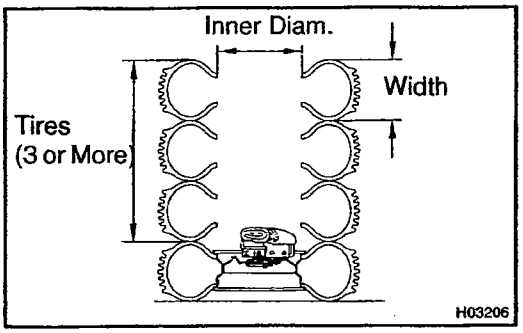
Must exceed the following dimensions:

X = 460 mm (18.11 in.)

Y = 650 mm (25.59 in.)

NOTICE:

- **When dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire to which the steering wheel pad is tied, X should be the following size.**
  X = 460 mm (18.11 in.) + width of tire
- **If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.**



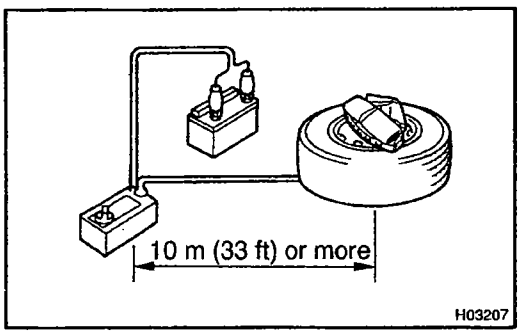
- Covering method using tires:
  Place at least 3 tires without disc wheel on top of the disc wheel with tire to which the steering wheel pad is tied.

Tire size: Must exceed the following dimensions–
Width: 185 mm (7.87 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:
Do not use tires with disc wheels.

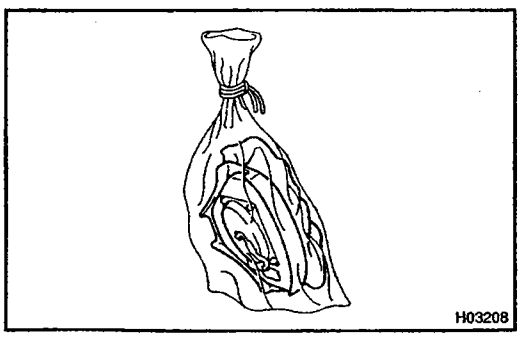
NOTICE:
The tires may be marked by the airbag deployment, so use the redundant tires.

(h) Deploy the airbag.
  (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.



  (2) Check that no one is within 10 m (33 ft) area around the disc wheel which the steering wheel pad is tied to.
  (3) Press the SST activation switch and deploy the airbag.

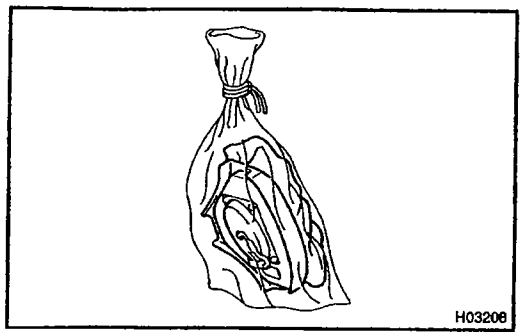
HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.



(i) Dispose of the steering wheel pad (with airbag).

CAUTION:
- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**

  (1) Remove the steering wheel pad from the disc wheel.
  (2) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



3. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD WITH AIRBAG DEPLOYED IN COLLISION

Dispose of the steering wheel pad (with airbag).

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **When moving a vehicle for scrapping which has a steering wheel pad with the deployed airbag, use gloves and safety glasses.**
- **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**

(1) Remove the steering wheel pad from the steering wheel (See page SR–11).

(2) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS0JU–01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

Case	Replacing part
If the airbag has been deployed.	Steering wheel pad
If the steering wheel pad has been found to be faulty in troubleshooting.	Steering wheel pad
If the spiral cable has been found to be faulty in troubleshooting.	Spiral cable
If the steering wheel pad has been found to be faulty during checking items (See page RS–14).	Steering wheel pad
If the steering wheel has been found to be faulty during checking items (See page RS–14).	Steering wheel
If the spiral cable has been found to be faulty during checking items (See page RS–14).	Spiral cable
If the steering wheel pad has been dropped.	Steering wheel pad

CAUTION:

For removal and installation of the steering wheel pad, see page SR–11 and SR–19. Be sure to follow the correct procedure.

INSTALLATION

HINT:

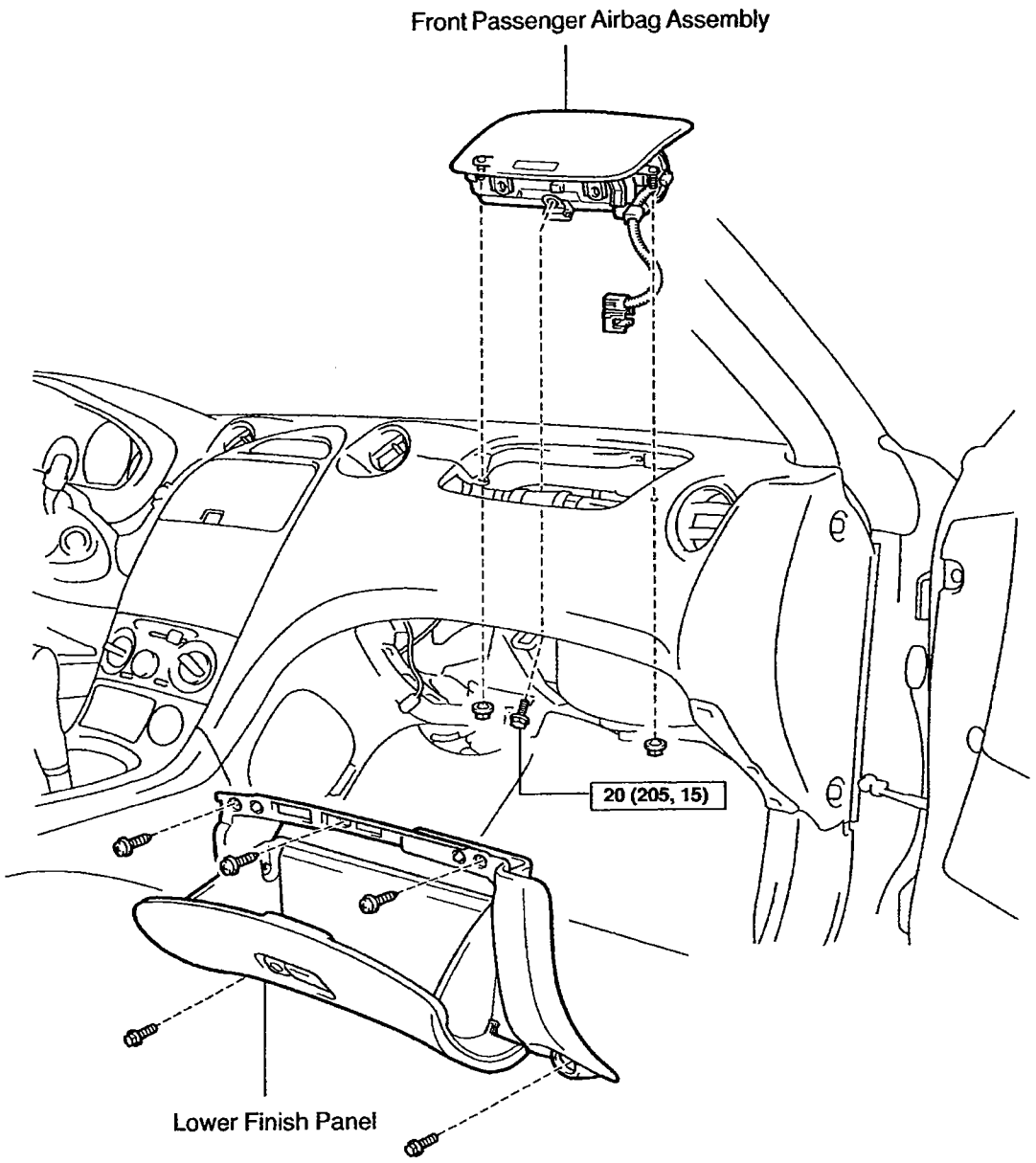
For step 1 to 4, refer to page SR–19.

1. **INSTALL SPIRAL CABLE**
2. **INSTALL UPPER AND LOWER COLUMN COVERS**
3. **INSTALL STEERING WHEEL**
4. **INSTALL STEERING WHEEL PAD**

FRONT PASSENGER AIRBAG ASSEMBLY

RSOJW-01

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

P

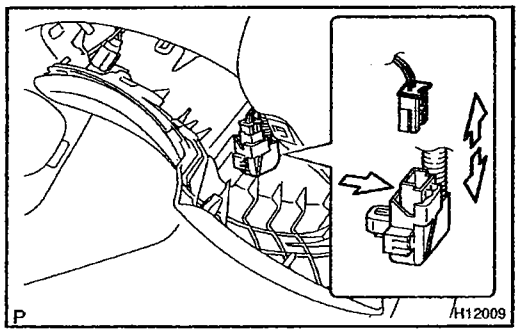
H11957

RS0JX-01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected and the ignition switch is in ON position, DTCs will be recorded.**
- **Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.**



1. DISCONNECT AIRBAG CONNECTOR

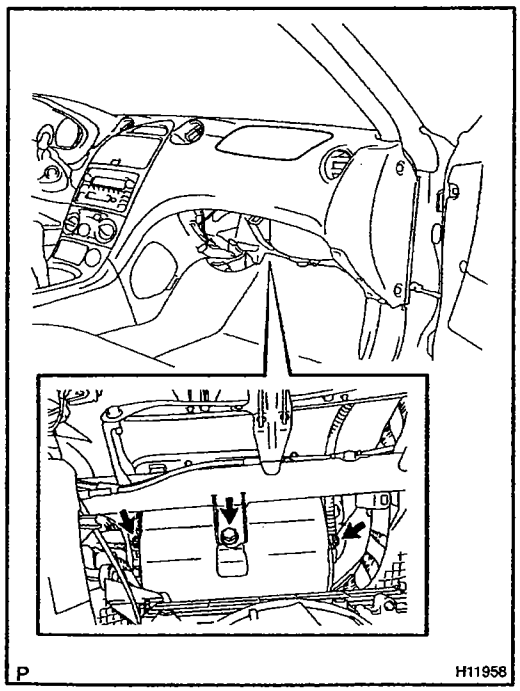
(a) Remove the 3 screws, 2 bolts and lower finish panel.

(b) Remove the connector cover from the lower finish panel.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(c) Disconnect the airbag connector.



2. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

Remove the bolt and 2 nuts.

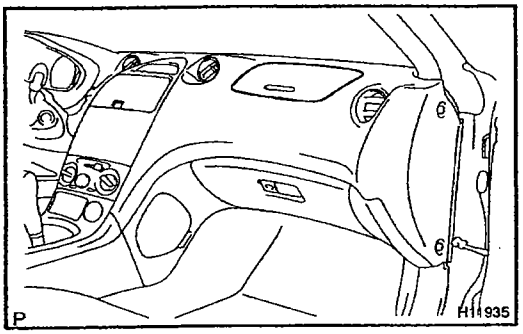
CAUTION:

- **Do not store the front passenger airbag assembly with the airbag deployment side facing downward.**
- **Never disassemble the front passenger airbag assembly.**

NOTICE:

When removing the front passenger airbag assembly, take care not to damage the wire harness.

RS0JY-01



INSPECTION

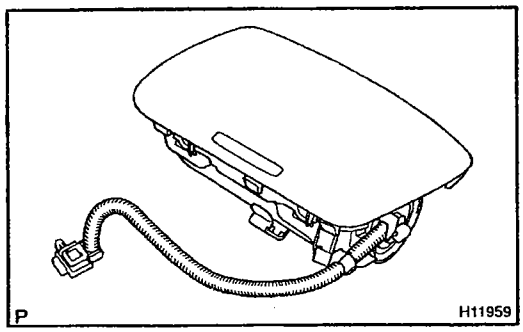
1. **Vehicles not involved in collision:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).

(b) Do a visual check which includes the following item with the front passenger airbag assembly installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly and instrument panel.

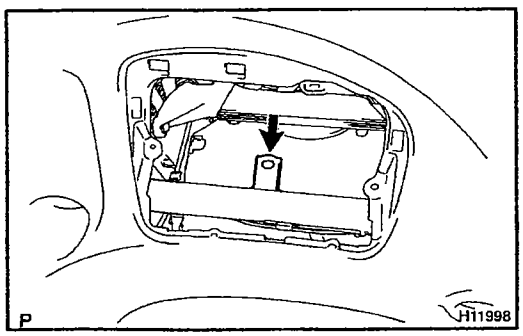
2. **Vehicle involved in a collision and airbag is not deployed:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).



(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.

- Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly.
- Check cuts and cracks in wire harness, and for chipping in connectors.



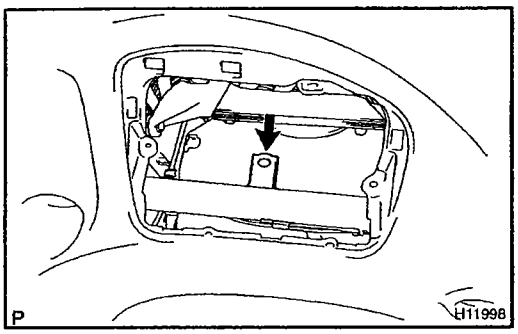
- Check the deformation or cracks on the instrument panel and instrument panel reinforcement.

CAUTION:
For removal and installation of the front passenger airbag assembly, see page RS–27 and RS–38, and be sure to follow the correct procedure.

HINT:
If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

3. Vehicle involved in a collision and airbag is deployed: INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).



(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.

- Check the deformation or cracks on the instrument panel and instrument panel reinforcement.
- Check the damage on the connector and wire harness.

CAUTION:
For removal and installation of the front passenger airbag assembly, see page SR–11 and SR–19, and be sure to follow the correct procedure.

HINT:
If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

RS0JZ-01

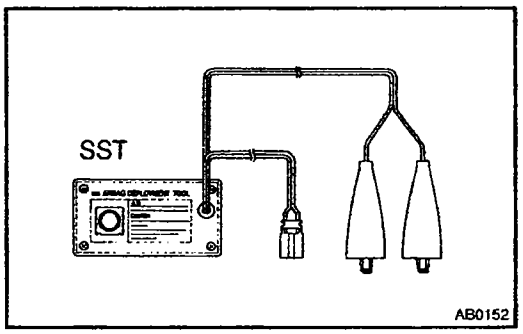
DISPOSAL

HINT:

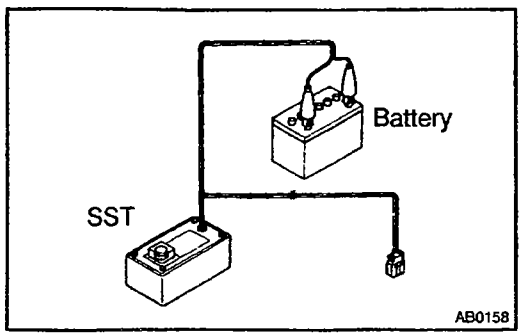
When scrapping vehicle equipped with an SRS or disposing of a front passenger airbag assembly, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- **Never dispose of a front passenger airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors and where it will not create a nuisance to nearby residents.**



- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082–00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the front passenger airbag assembly.**
- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with the deployed airbag.**

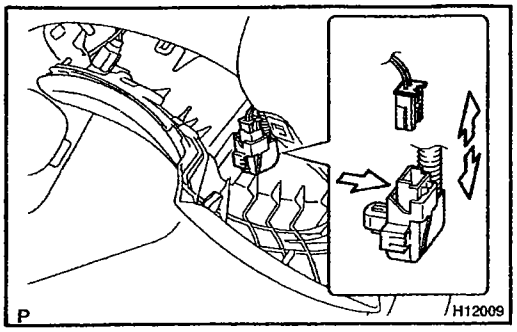


1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Check functioning of the SST (See step 1–(a) on page RS–16).
SST 09082–00700



(b) Disconnect the airbag connector.

(1) Using a screwdriver, pry out the glove compartment door finish plate inside the lower panel.

HINT:

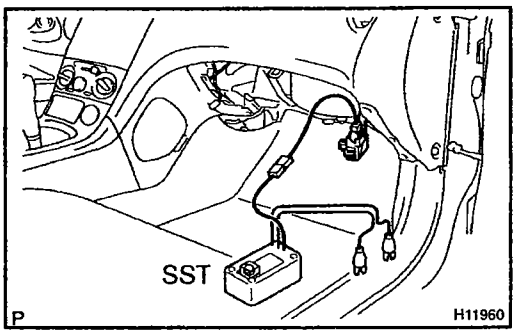
Tape the screwdriver tip before use.

(2) Remove the connector from the glove compartment door finish plate.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(3) Disconnect the airbag connector.



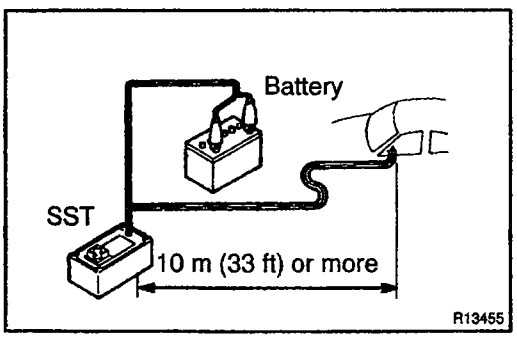
(c) Install the SST.

(1) Connect the connectors of the 2 SST to the front passenger airbag assembly connector.

SST 09082–00700, 09082–00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



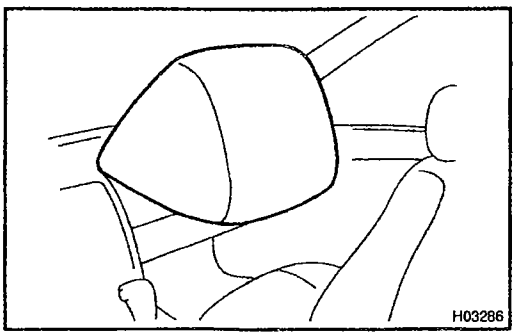
(2) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (–) terminal.



(d) Deploy the airbag.

(1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling the front passenger airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to the front passenger airbag assembly with the deployed airbag.**
- **When scrapping a vehicle, deploy the airbag and scrap the vehicle with the front passenger airbag assembly still installed.**
- **When moving a vehicle for scrapping which has the front passenger airbag assembly with the deployed airbag, use gloves and safety glasses.**

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

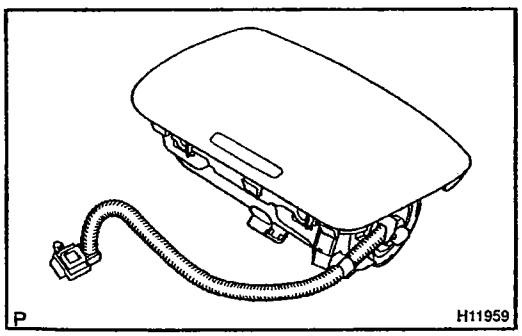
2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY ONLY

NOTICE:

- **When disposing of the front passenger airbag assembly only, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

HINT:

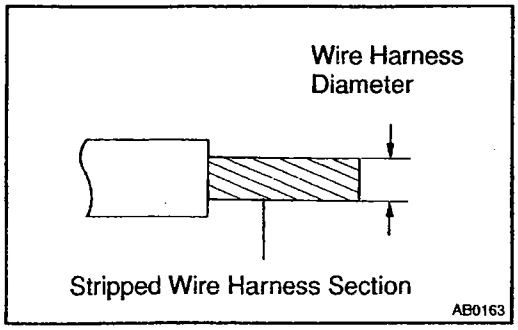
Have a battery ready as the power source to deploy the airbag.



(a) Remove the front passenger airbag assembly (See page RS–27).

CAUTION:

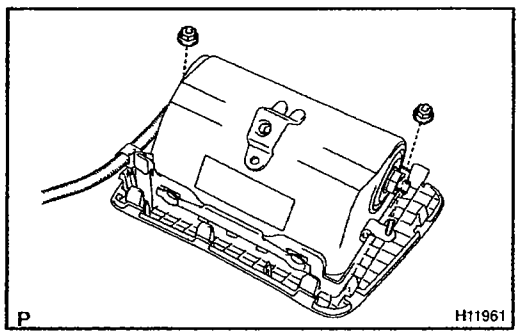
- **When removing the front passenger airbag assembly, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
- **When storing the front passenger airbag assembly, keep the upper surface of the airbag deployment side facing upward.**



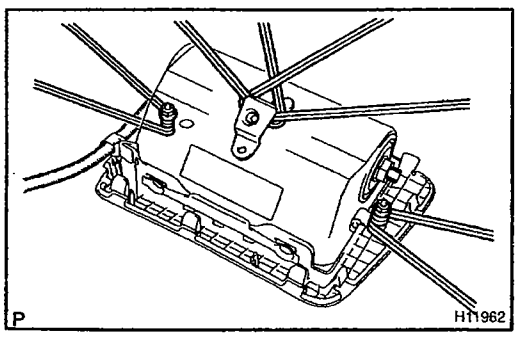
(b) Using a service–purpose wire harness, tie down the front passenger airbag assembly to the tire.
Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in.^{2} or more)

CAUTION:
If the front passenger airbag assembly is tied down with too thin wire harness, it may snap. This is highly dangerous. Always use a wire harness which is at least 1.25 mm^2 (0.0019 in^2.).

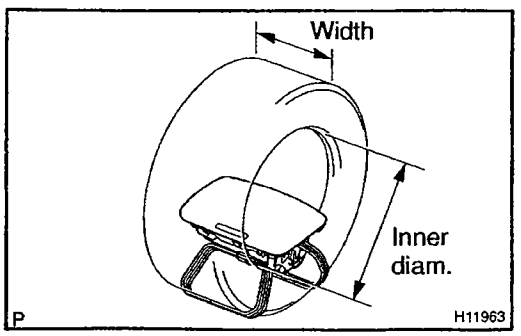
HINT:
To calculate the square of the stripped wire harness section:
Square = 3.14 X (Diameter)^2 divided by 4



(1) Install the 2 nuts on the front passenger airbag assembly.



(2) Wind the wire harness around the bolts, and pass the wire harness though the installation holes.



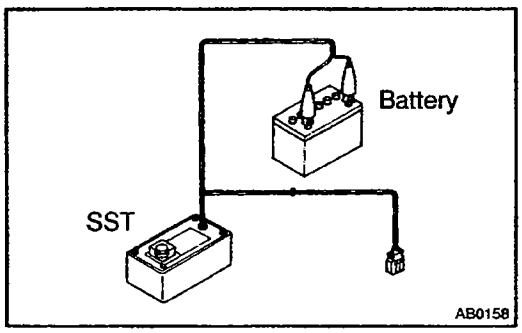
(3) Position the front passenger airbag assembly inside the tire with the airbag deployment side facing inside.
Tire size: Must exceed the following dimensions–
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:

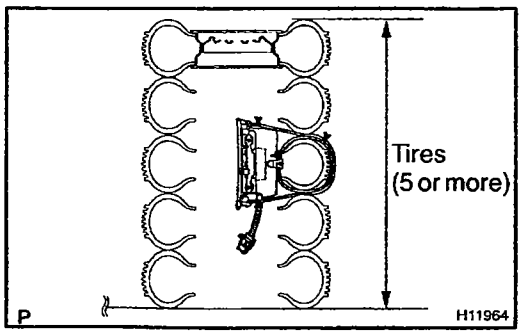
- **Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the front passenger airbag assembly coming free due to the shock from the airbag deploying.**
- **Always tie down the front passenger airbag assembly with the airbag deployment side facing inside.**

NOTICE:

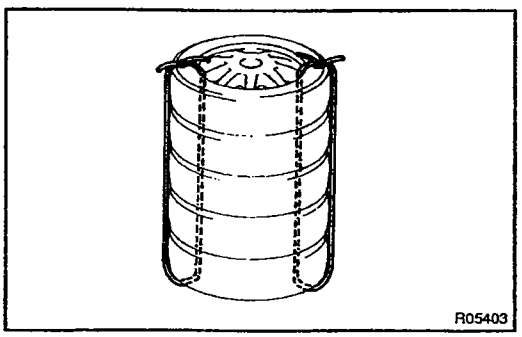
The tire will be marked by the airbag deployment, so when disposing of the airbag use a redundant tire.



(c) Check functioning of the SST (See step 1–(a) on page RS–16).
SST 09082–00700



(d) Place the tires.
(1) Place at least 2 tires under the tire to which the front passenger airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the front passenger airbag assembly is tied. The top tire should have the wheel installed.



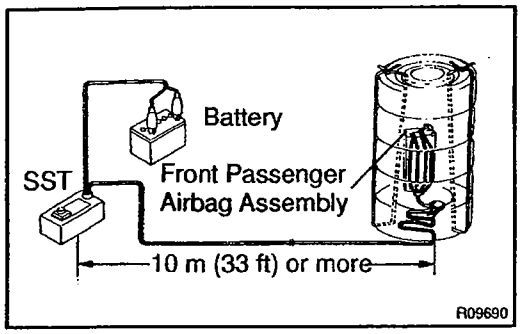
(3) Tie the tires together with 2 wire harness.

CAUTION:

Make sure that the wire harness is tight. It is very dangerous if loose wire harnesses result in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Provide at least 1 m (3 ft) of slack for the wire harness.



(e) Install the SST.
Connect the connectors of the 2 SST to the front passenger airbag assembly connector.
SST 09082–00700, 09082–00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tires.

(f) Deploy the airbag.
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
(2) Check that no one is within 10 m (33 ft) area around the tire which the front passenger airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.

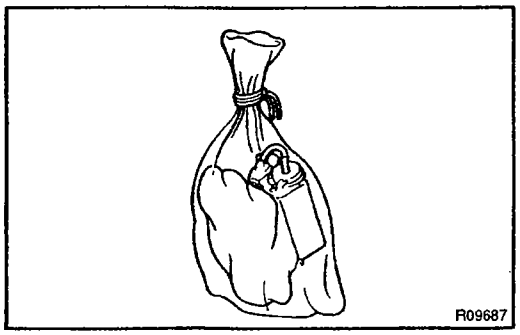
HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.

(g) Dispose of the front passenger airbag assembly.

CAUTION:

- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with the deployed airbag.**

(1) Remove the front passenger airbag assembly from the tire.
(2) Place the front passenger airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



3. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY WITH AIRBAG DEPLOYED IN COLLISION

Dispose of the front passenger airbag assembly.

CAUTION:

- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with the deployed airbag.**

(1) Remove the front passenger airbag assembly from the instrument panel (See page RS–27).

(2) Place the front passenger airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way so as other general parts disposal.

RS0K0-01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

Case	Replacing part
If the airbag has been deployed.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty in trouble-shooting.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty during checking items (See page RS–28).	Front passenger airbag assembly
If the instrument panel has been found to be faulty during checking items (See page RS–28).	Instrument panel
If the instrument panel reinforcement has been found to be faulty during checking items (See page RS–28).	Instrument panel reinforcement
If the front passenger airbag assembly has been dropped.	Front passenger airbag assembly

CAUTION:

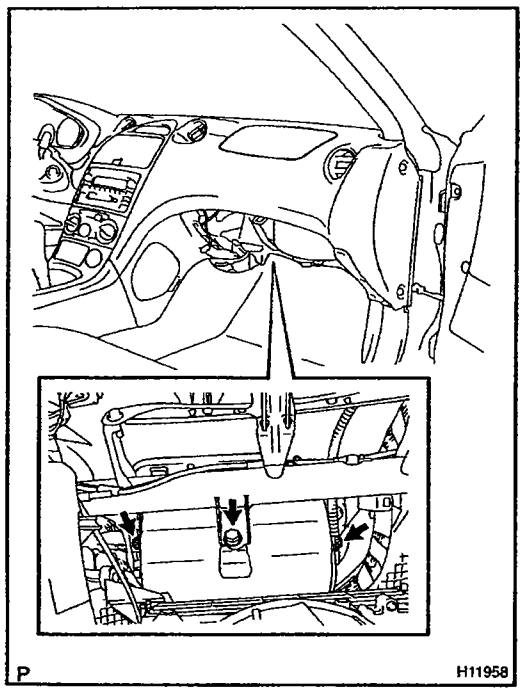
For replacement of the front passenger airbag assembly, see page RS–27 and RS–38. Be sure to follow the correct procedure.

RS0K1-01

INSTALLATION

NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



1. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

(a) Install the front passenger airbag assembly with the 2 nuts.

(b) Install the bolt.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

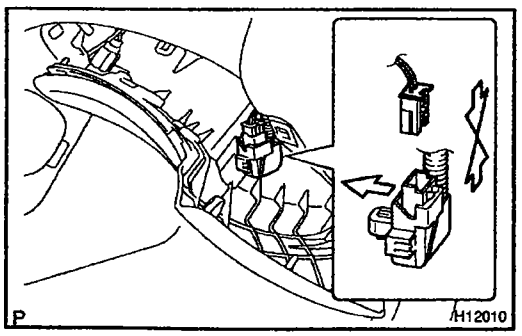
CAUTION:

- **When installing the front passenger airbag assembly, take care that the wiring does not interfere with other parts and is not pinched between other parts.**
- **Make sure that no foreign objects are trapped between the airbag bag and within the module.**

NOTICE:

If the front passenger airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front passenger airbag assembly with a new one.

(c) Install the airbag wire harness clamp.



2. CONNECT AIRBAG CONNECTOR

(a) Connect the airbag connector.

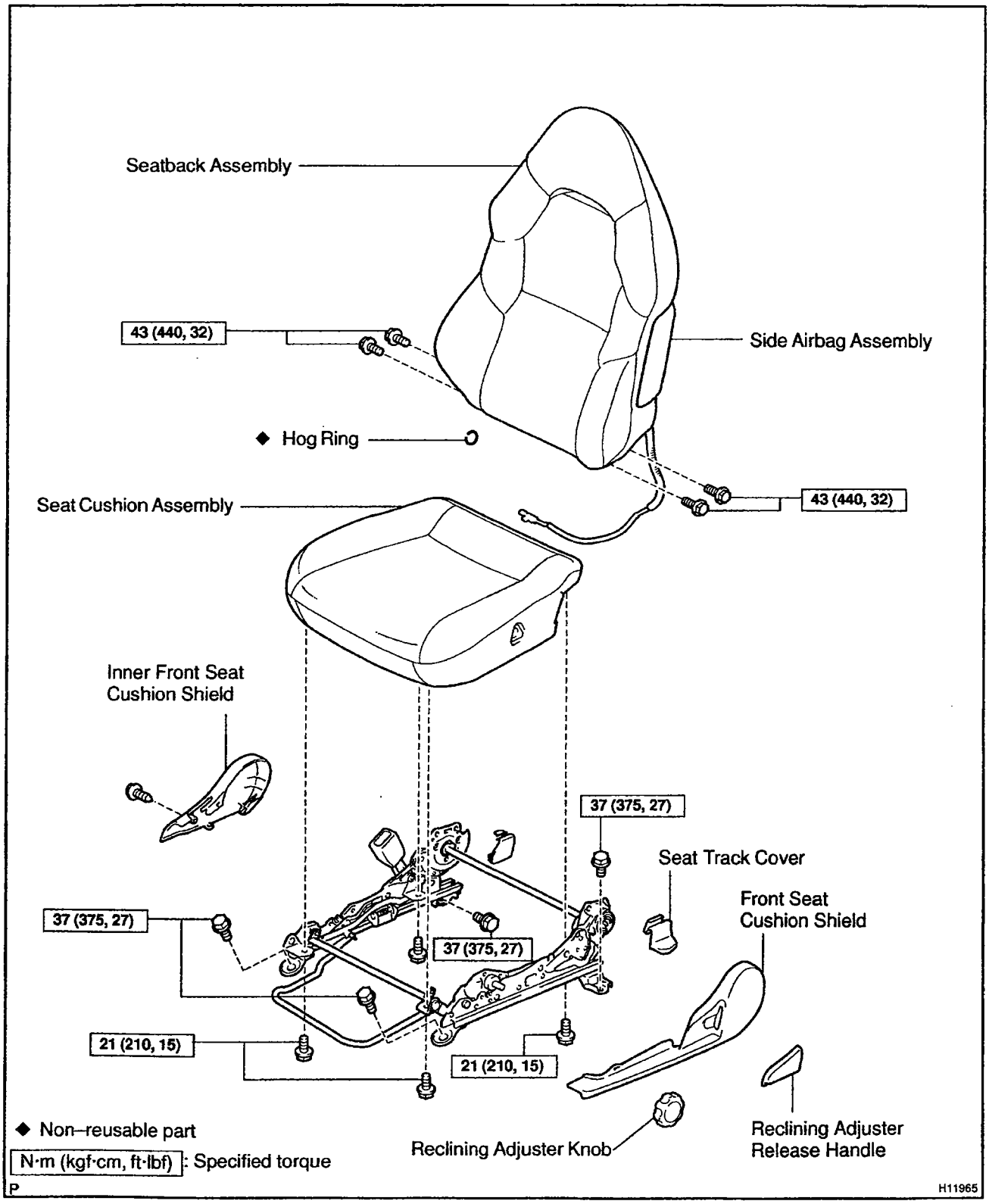
(b) Install the connector cover to the lower finish panel.

(c) Install the lower finish panel with the 3 screws and 2 bolts.

SIDE AIRBAG ASSEMBLY

COMPONENTS

RS0K2-01

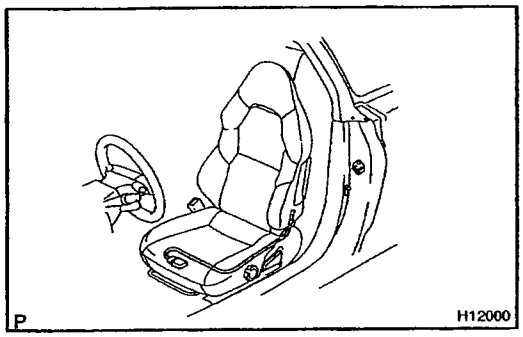


RS0K3-01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.**
- **Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.**



1. REMOVE FRONT SEAT

(a) Remove the 2 seat track covers and 4 bolts.

(b) Disconnect the side airbag connector.

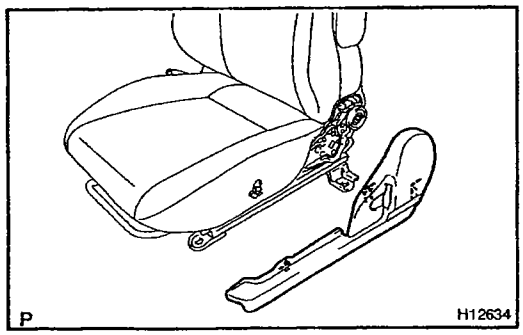
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

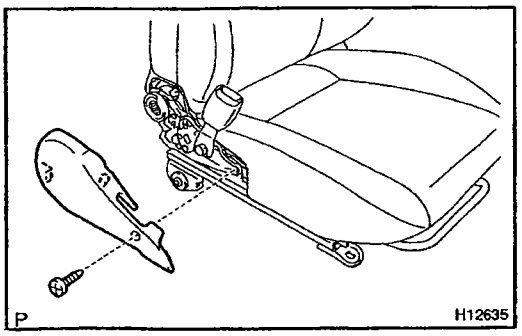
(c) Remove the front seat.

2. REMOVE RECLINING ADJUSTER RELEASE HANDLE

3. REMOVE RECLINING ADJUSTER KNOB



4. REMOVE FRONT SEAT CUSHION SHIELD



5. REMOVE INNER FRONT SEAT CUSHION SHIELD

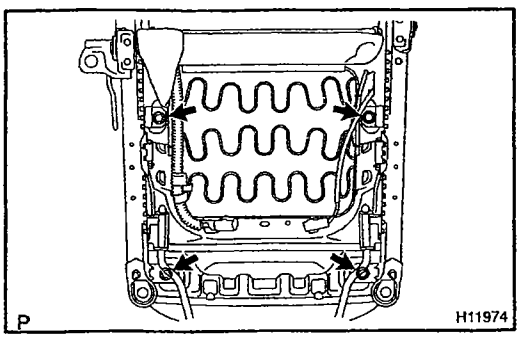
Remove the screw and inner front seat cushion shield

6. REMOVE SEAT CUSHION ASSEMBLY

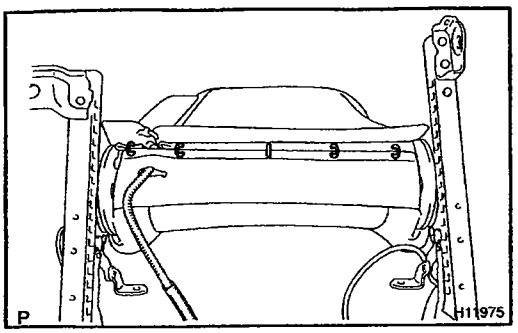
(a) Remove the wire harness from the seat cushion assembly.

NOTICE:

When handling the airbag wire harness, take care not to damage the airbag wire harness.

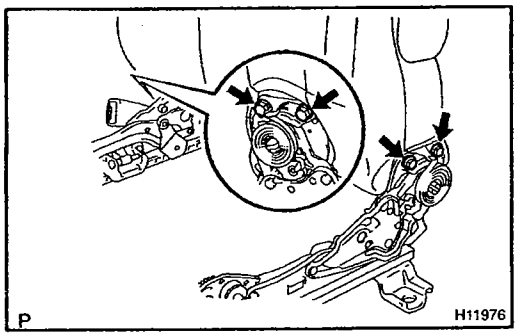


(b) Remove the 4 bolts and seat cushion assembly.



7. REMOVE SEATBACK ASSEMBLY

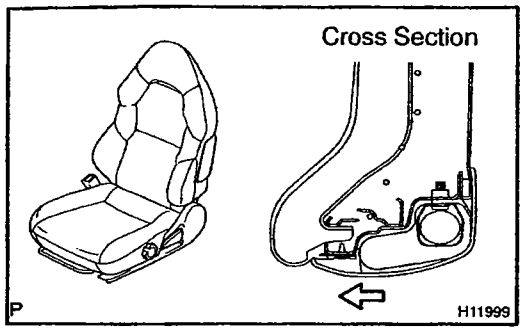
(a) Remove the hog rings of the seatback frame, as shown in the illustration.



(b) Remove the 4 bolts and seatback assembly.

CAUTION:

Do not store the seatback assembly with the airbag deployment side facing downward.



RS0K4-01

INSPECTION

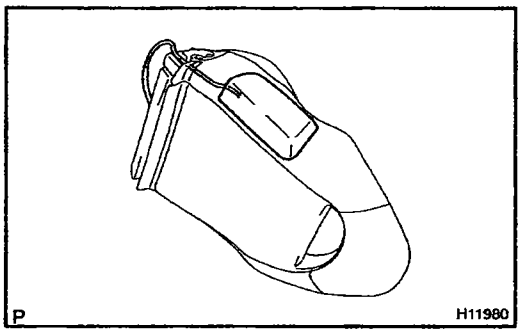
1. **Vehicles not involved in collision:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).

(b) Do a visual check which includes the following item with the seatback assembly installed in the vehicle.
Check that there are no cuts and cracks of the outside of side airbag assembly.

2. **Vehicle involved in a collision and airbag is not deployed:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).



(b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.
- Check cuts and cracks of the side airbag assembly.
- Check cuts and cracks in wire harness, and chipping in connectors.

CAUTION:
For removal and installation of the seatback assembly, see page RS–40 and RS–50. Be sure to follow the correct procedure.

3. **Vehicle involved in a collision and airbag is deployed:**
   INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Do a diagnostic system check (See page DI–326).

(b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.
- Check the seatback installation part of the seat adjuster.
- Check the damage to the connector and wire harness.

CAUTION:
For removal and installation of the seatback assembly, see page RS–40 and RS–50. Be sure to follow the correct procedure.

HINT:
If the seat adjuster is deformed, never repair it. Always replace it with new one.

RS0K5-01

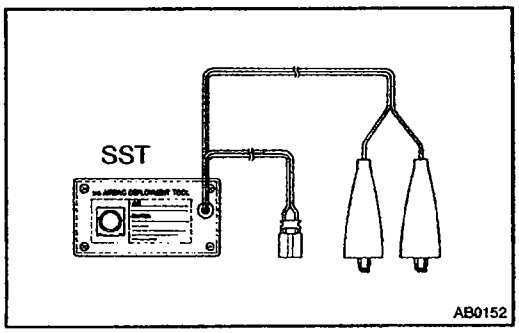
DISPOSAL

HINT:

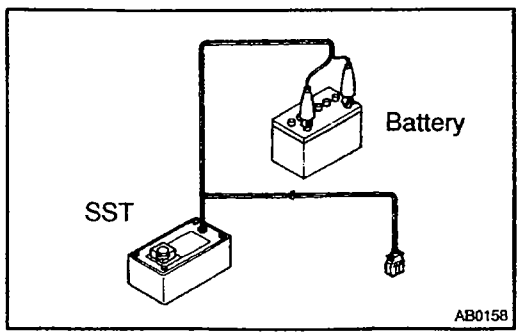
When scrapping vehicles equipped with an SRS or disposing of the side airbag assembly always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- **Never dispose of a side airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors and where it will not create a nuisance to nearby residents.**



- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool), perform the operation in a place away from electrical noise.**
  SST 09082–00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assembly.**
- **The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a side airbag assembly with the deployed airbag.**

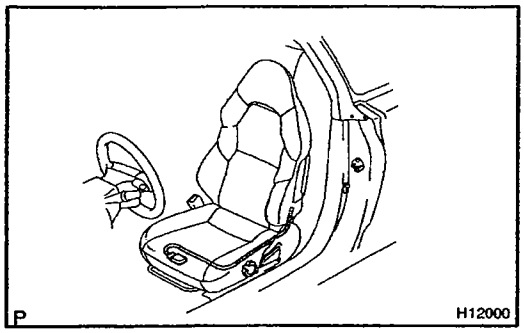


1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

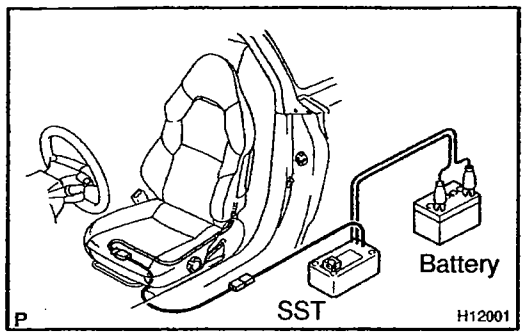
(a) Check functioning of the SST (See step 1–(a) on page RS–16).
SST 09082–00700



(b) Disconnect the side airbag connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



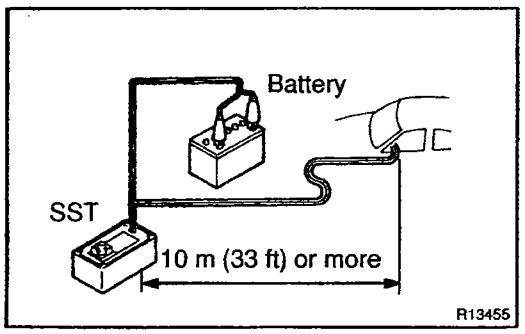
(c) Install the SST.

(1) Connect the connectors of the 2 SST to the airbag connector.

SST 09082–00700, 09082–00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



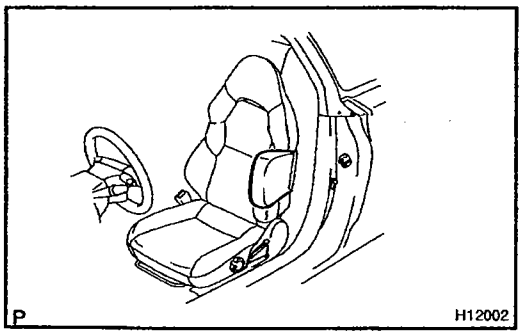
(2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.



(d) Deploy the airbag.

(1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling the side airbag assembly with the deployed airbag.**
- **Do not apply water, etc. to the side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **When scrapping a vehicle, deploy the airbag and scrap the vehicle with the side airbag assembly still installed.**

HINT:
The airbag deploys simultaneously as the LED of SST activation switch lights up.

2. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY

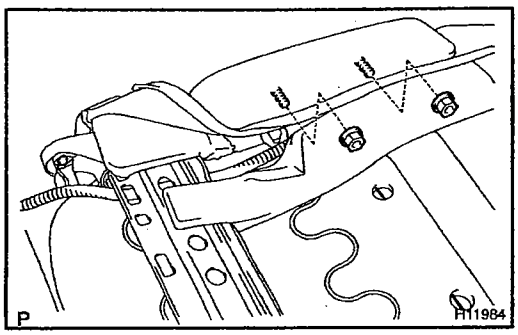
NOTICE:

- **When disposing of the side airbag assembly only, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

HINT:
Have a battery ready as the power source to deploy the airbag.

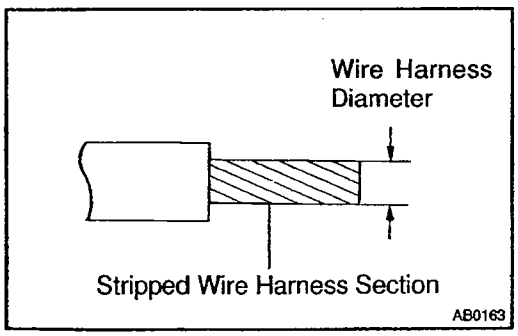
(a) Remove the seatback assembly (See page RS–40).

(b) Open the fastener of the seatback cover.



(c) Remove the side airbag assembly from the seatback assembly.

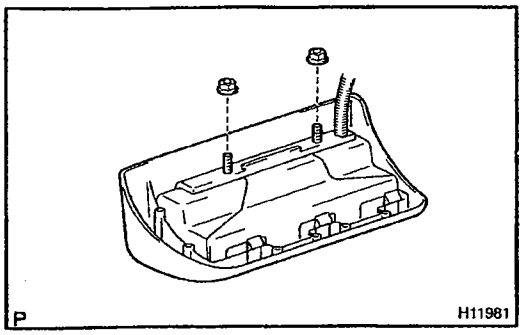
CAUTION:
When storing the side airbag assembly, keep the upper surface of the airbag deployment side facing upward.



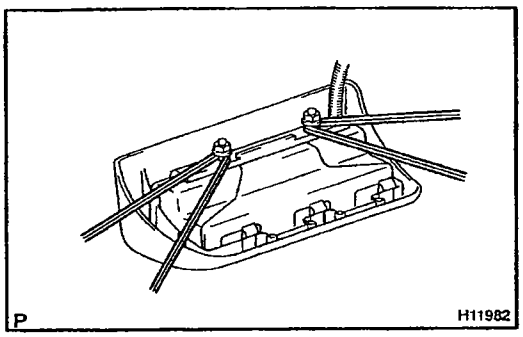
(d) Using a service–purpose wire harness, tie down the side airbag assembly to the tire.
Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in^2. or more)

CAUTION:
If a wire harness which is too thin or some other thing is used to tie down the side airbag assembly, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm^2 (0.0019 in^2.).

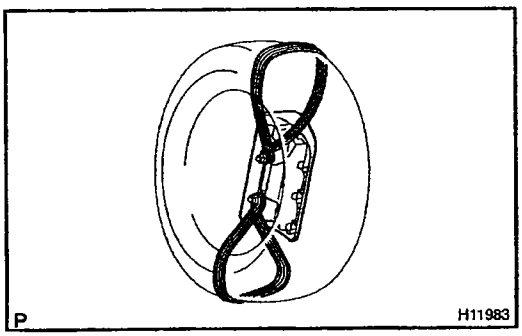
HINT:
To calculate the square of the stripped wire harness section–
Square = 3.14 x (Diameter)^2 divided by 4



(1) Install the 2 nuts to the side airbag assembly.



(2) Wind the wire harness around the stud bolts of the side airbag assembly as shown in the illustration.



(3) Position the side airbag assembly inside the tire with the airbag deployment direction facing inside.

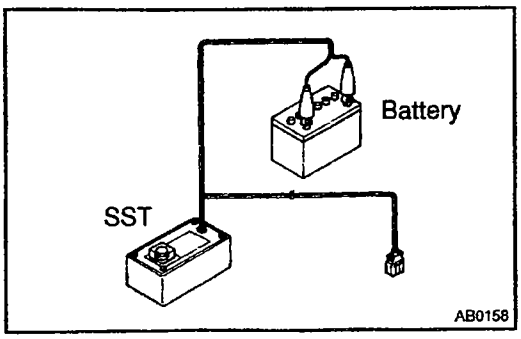
Tire size: Must exceed the following dimensions–
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:

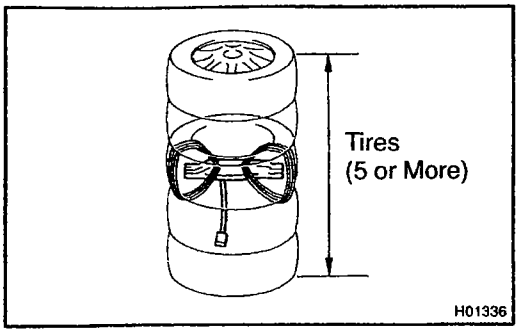
- **Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the side airbag assembly coming free due to the shock from the airbag deploying.**
- **Always tie down the side airbag assembly with the airbag deployment side facing inside.**

NOTICE:

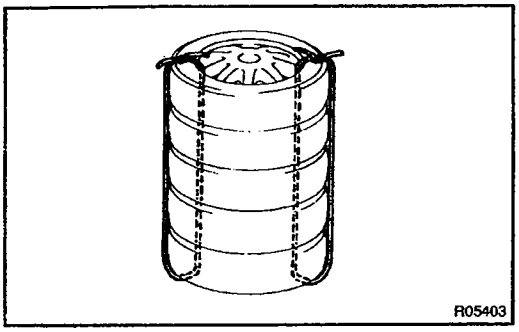
The tire will be marked by the airbag deployment, so when disposing of the airbag use a redundant tire.



(e) Check functioning of the SST (See step 1–(a) on page RS–16).
SST 09082–00700



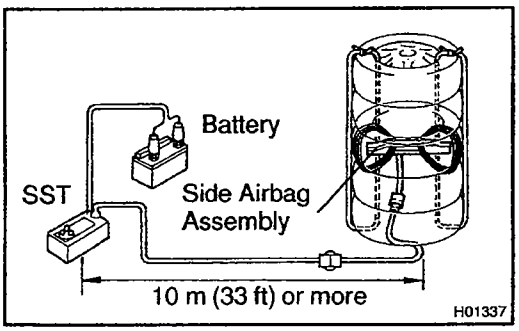
(f) Place the tires.
(1) Place at least 2 tires under the tire to which the side airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the side airbag assembly is tied. The top tire should have the wheel installed.



(3) Tie the tires together with 2 wire harness.

CAUTION:
Make sure that the wire harness are tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deploying.

HINT:
Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.

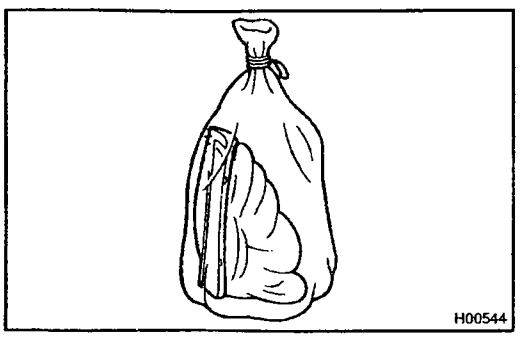


(g) Install the SST.
Connect the connectors of the 2 SST to the side airbag assembly connector.
SST 09082–00700, 09082–00750

NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.

(h) Deploy the airbag.
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
(2) Check that no one is within 10 m (33 ft) area around the tire which the side airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.

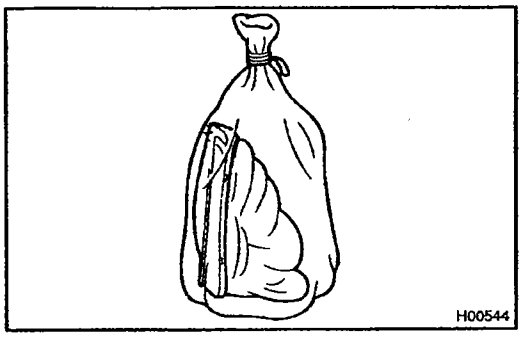
HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.



(i) Dispose of the side airbag assembly.

CAUTION:
- **The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a side airbag assembly with the deployed airbag.**
- **Do not apply water etc. to a side airbag assembly with the deployed airbag.**

- **Always wash your hands with water after completing the operation.**
  (1) Remove the side airbag assembly from the tire.
  (2) Place the side airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



3. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY WITH AIRBAG DEPLOYED IN COLLISION

Dispose of the side airbag assembly.

CAUTION:

- **The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a side airbag assembly with the deployed airbag.**
- **Do not apply water etc. to a side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
  (1) Remove the side airbag assembly from the seat (See page RS–40 and see step 2).
  (2) Place the side airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS0K6–01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the seatback assembly.

Case	Replacing part
If the side airbag has been deployed.	Seatback assembly
If the side airbag assembly has been found to be faulty in troubleshooting.	Seatback assembly
If the side airbag assembly has cuts during checking items (See page RS–42).	Seatback assembly
If the side airbag assembly has been found to be faulty during checking items (See page RS–42).	Seatback assembly
If the seatback assembly has been dropped.	Seatback assembly

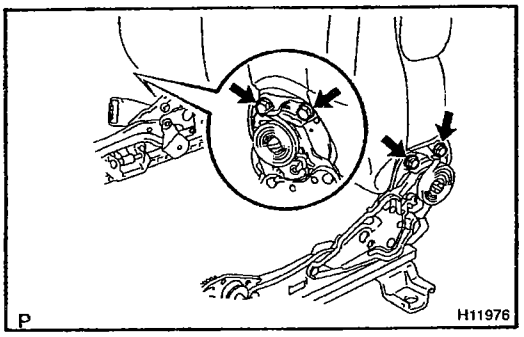
CAUTION:

For removal and installation of the seatback assembly, see page RS–40 and RS–50. Be sure to follow the correct procedure.

RS0K7-01

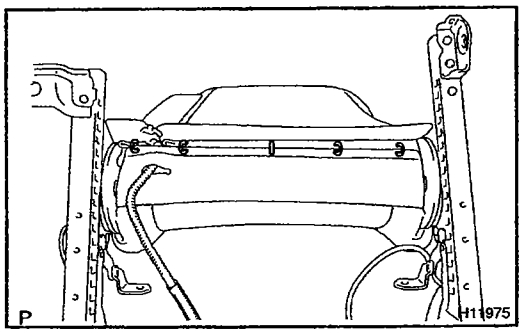
INSTALLATION

NOTICE:
Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



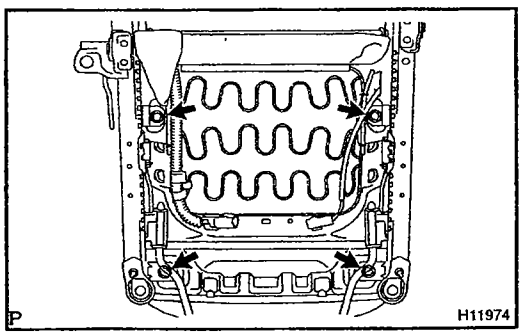
1. INSTALL SEATBACK ASSEMBLY

(a) Install the seatback assembly to the seat adjuster with the 4 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



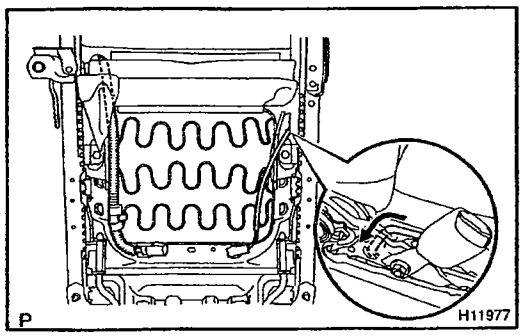
(b) Install 5 new hog rings.

HINT:
When installing the hog rings, take care to prevent wrinkles as little as possible.

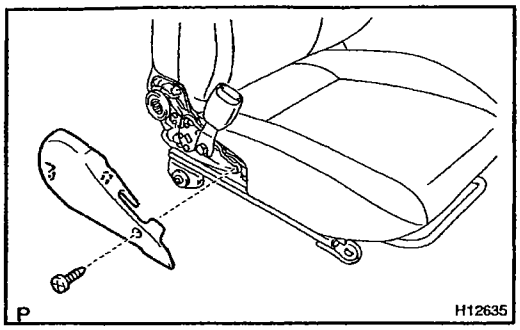


2. INSTALL SEAT CUSHION ASSEMBLY

(a) Install the seat cushion assembly with the 4 bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

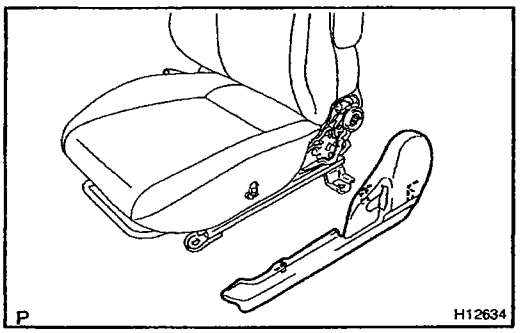


(b) Install the wire harness to the seat cushion assembly.



3. INSTALL INNER FRONT SEAT CUSHION SHIELD

Install the inner front seat cushion shield with the screw.



4. INSTALL FRONT SEAT CUSHION SHIELD

5. INSTALL RECLINING ADJUSTER KNOB

6. INSTALL RECLINING ADJUSTER RELEASE HANDLE

7. INSTALL FRONT SEAT

NOTICE:

When mounting the seat to the vehicle, take care not to damage the airbag wire harness.

(a) Connect the side airbag connector.

(b) Slide the front seat to the most front position.

NOTICE:

Make sure that seat adjuster locks.

(c) Without holding the seat track handle, mount the seat to the vehicle.

HINT:

If holding the seat track handle, the adjusted rearmost position slip off.

(d) Tighten the bolts on the front side temporarily, from the bolt on the inner side tighten them completely.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

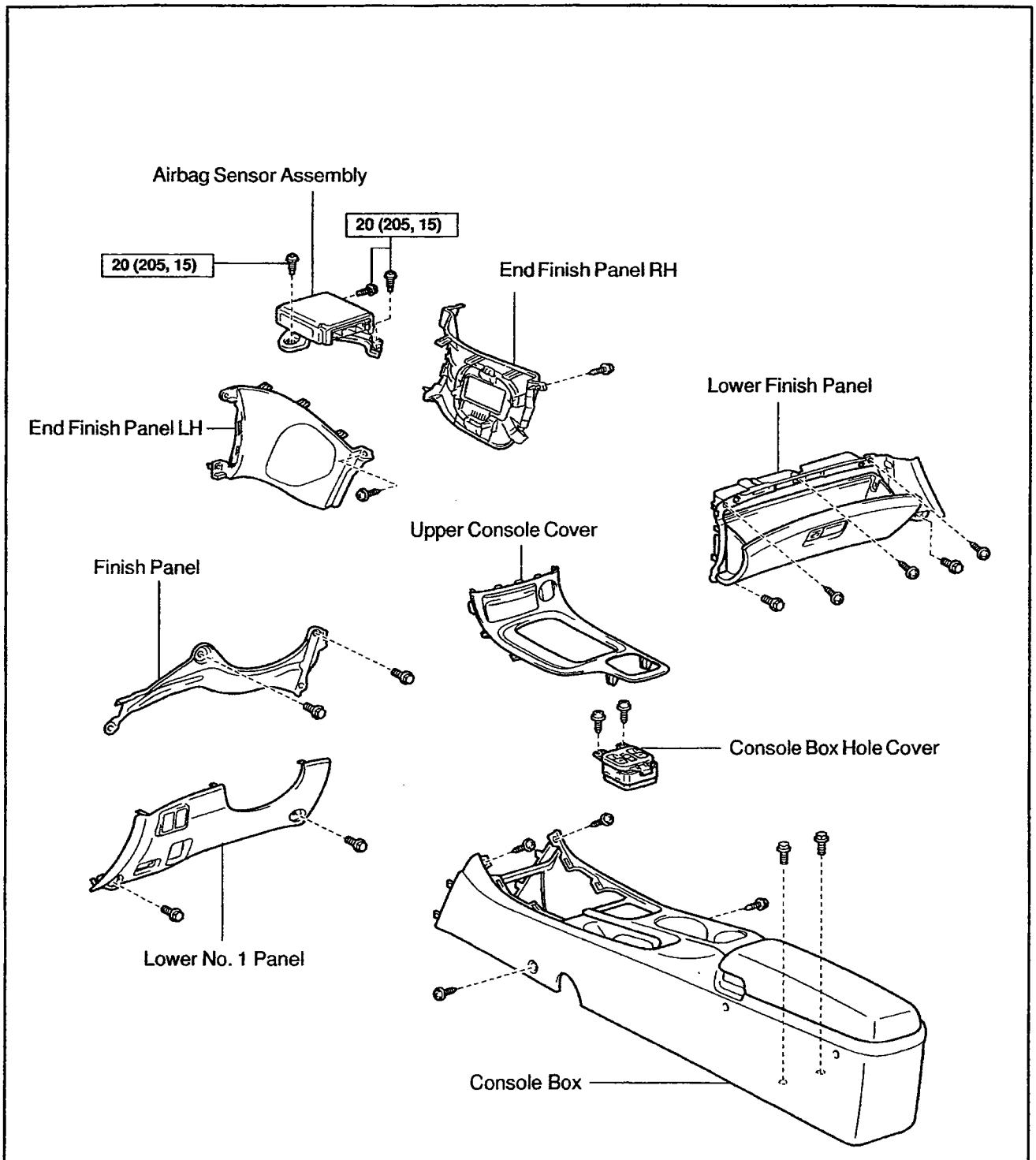
(e) Slide the seat to the most front position to install the bolts on the rear side.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

(f) Install the 2 seat track covers.

AIRBAG SENSOR ASSEMBLY

COMPONENTS

RS0K8-01



N·m (kgf·cm, ft·lbf) : Specified torque

P

H11985

RS0K9-01

REMOVAL

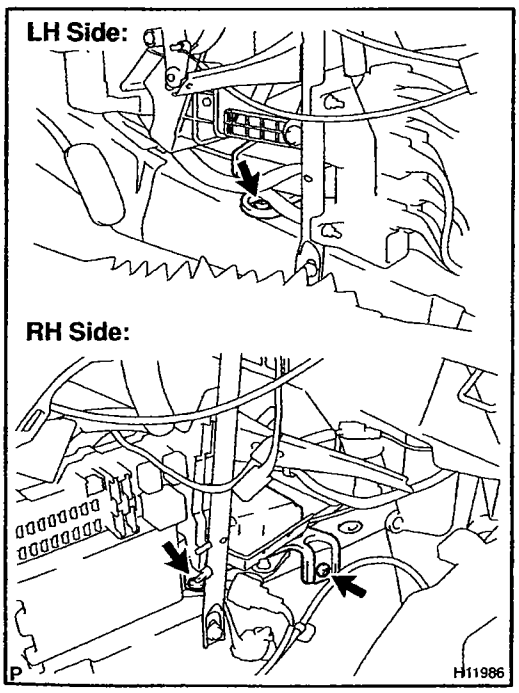
NOTICE:

Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary.
(If the IC terminals are touched, the IC may be destroyed by static electricity.)

HINT:

For step 1 to 8, refer to page BO–79.

1. **REMOVE LOWER FINISH PANEL**
2. **REMOVE LOWER NO. 1 PANEL**
3. **REMOVE FINISH PANEL**
4. **REMOVE UPPER CONSOLE COVER**
5. **REMOVE CONSOLE BOX HOLE COVER**
6. **REMOVE CONSOLE BOX**
7. **REMOVE END FINISH PANEL LH**
8. **REMOVE END FINISH PANEL RH**



9. **REMOVE AIRBAG SENSOR ASSEMBLY**

(a) Disconnect the airbag sensor connectors.

NOTICE:

Disconnect the connectors with the airbag sensor assembly installed.

(b) Using a torx wrench, remove the 3 screws and airbag sensor assembly.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

RS0KA-01

INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check (See page DI–326).

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check (See page DI–326).

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly (See page DI–326).

RS0KB-01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the airbag sensor assembly.

- If the SRS has been deployed in a collision.
- If the airbag sensor assembly has been found to be faulty in troubleshooting.
- If the airbag sensor assembly has been dropped.

CAUTION:

For removal and installation of the airbag sensor assembly, see page RS–53 and RS–56. Be sure to follow the correct procedure.

RS0KG-01

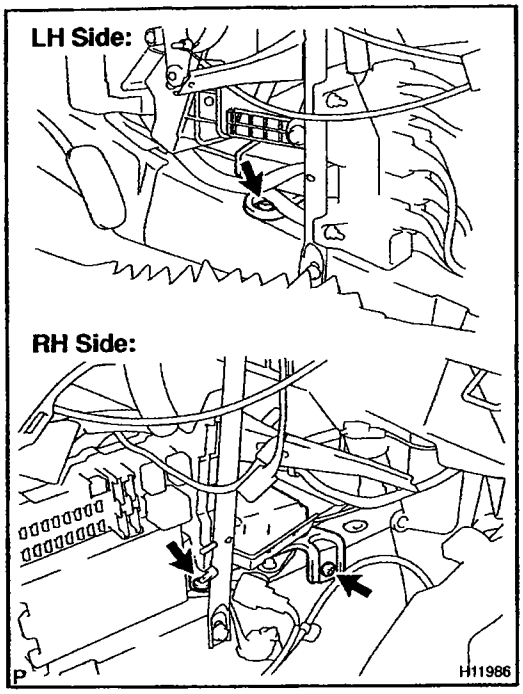
INSTALLATION

NOTICE:

- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**

HINT:

For step 2 to 9, refer to page BO–85.



1. INSTALL AIRBAG SENSOR ASSEMBLY

(a) Using a torx wrench, install the airbag sensor assembly with the 3 screws.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(b) Connect the airbag sensor connectors.

NOTICE:

- **Connection of the connector is done after the sensor assembly has been installed.**
- **Make sure the sensor assembly is installed with the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the senor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installing, shake the sensor assembly to check that there is no looseness.**

2. INSTALL END FINISH PANEL RH

3. INSTALL END FINISH PANEL LH

4. INSTALL CONSOLE BOX

5. INSTALL CONSOLE BOX HOLE COVER

6. INSTALL UPPER CONSOLE COVER

7. INSTALL FINISH PANEL

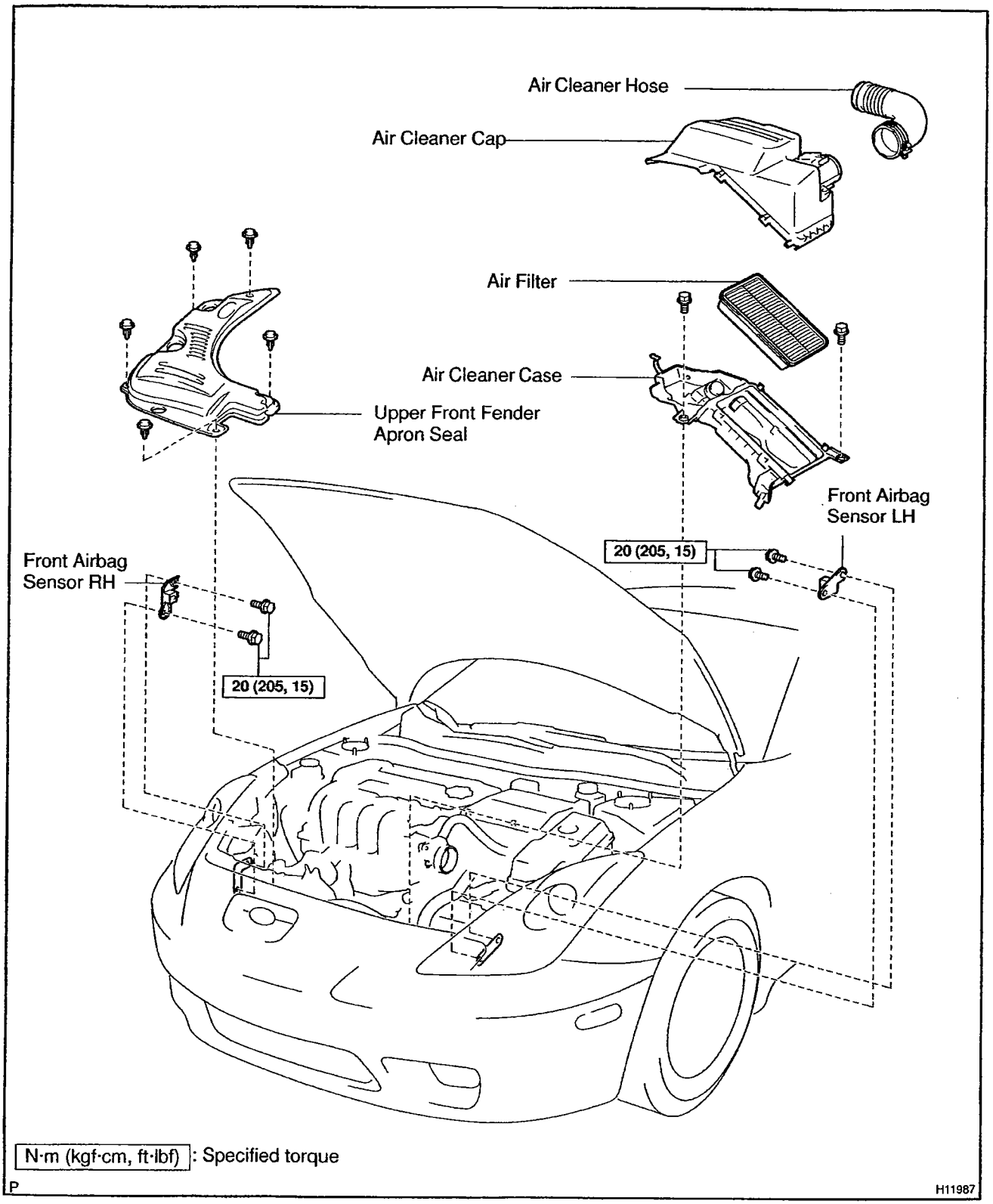
8. INSTALL LOWER NO. 1 PANEL

9. INSTALL LOWER FINISH PANEL

FRONT AIRBAG SENSOR

COMPONENTS

RS0KD–01

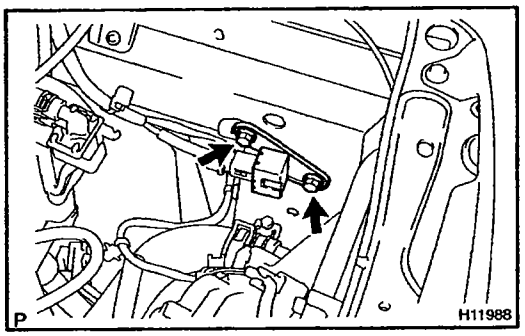


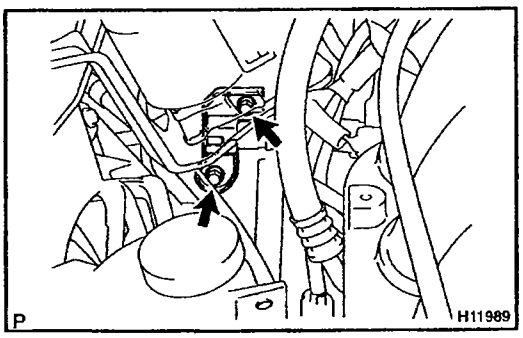
RS0KE-01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch at ON position, DTCs will be recorded.**
- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the sensor involved in a collision when the SRS has deployed.**
- **Never repair a sensor in order to reuse it.**





1. LH:

REMOVE FRONT AIRBAG SENSOR

(a) Remove the air cleaner hose.
(b) Remove the air cleaner cap.
(c) Remove the air filter.
(d) Remove the 2 bolts and air cleaner case.
(e) Disconnect the connector.

NOTICE:

Disconnect the connector with sensor assembly installed.

(f) Remove the 2 bolts and front airbag sensor LH.

2. RH:

REMOVE FRONT AIRBAG SENSOR

(a) Remove the 5 clips and upper front fender apron seal.
(b) Disconnect the connector.

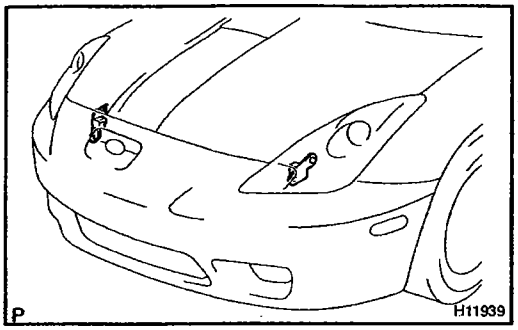
NOTICE:

Disconnect the connector with sensor assembly installed.

(c) Remove the 2 bolts and front airbag sensor RH.

RS0KF–01

INSPECTION



1. VEHICLES NOT INVOLVED IN COLLISION

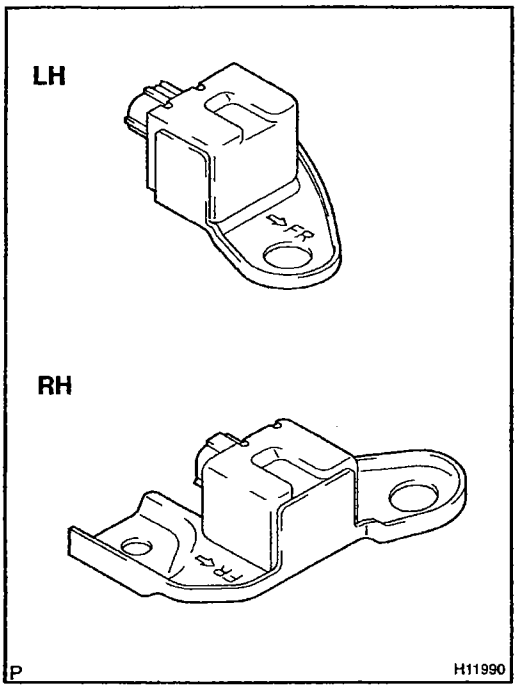
Do a diagnostic system check (See page DI–326).

2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check (See page DI–326).

(b) If the front fender of the car or its periphery is damaged, do a visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:

- Check the bracket deformation.
- Check the paint peeling off the bracket.
- Check the cracks, dents or chips in the case.
- Check the cracks, dents, chipping and scratches in the connector.
- Check the peeling off of the label or damage to the serial number.



RS01O–18

REPLACEMENT

REPLACEMENT REQUIREMENTS

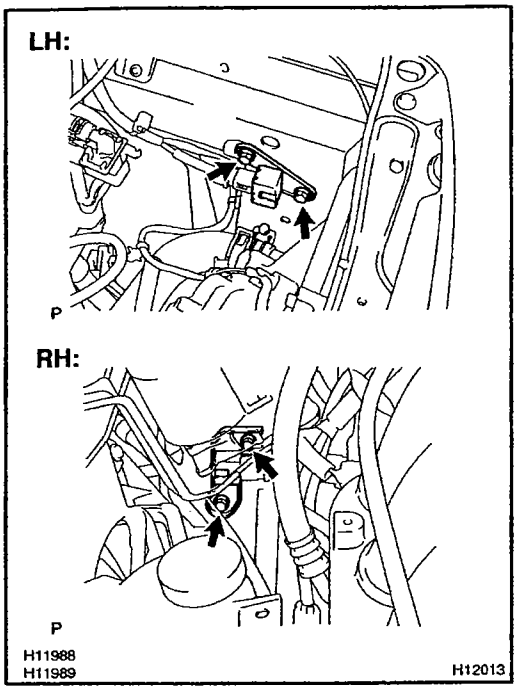
In the following cases, replace the front airbag sensor.

- If the SRS has been deployed in a collision. (Replace both the left and right airbag sensors.)
- If the front airbag sensor has been found to be faulty in troubleshooting.
- If the front airbag sensor has been found to be faulty during checking items (See page RS–59)
- If the front airbag sensor has been dropped.

CAUTION:

For removal and installation of the front airbag sensor, see page RS–58 and RS–61. Be sure to follow the correct procedure.

RS0KH–01



INSTALLATION

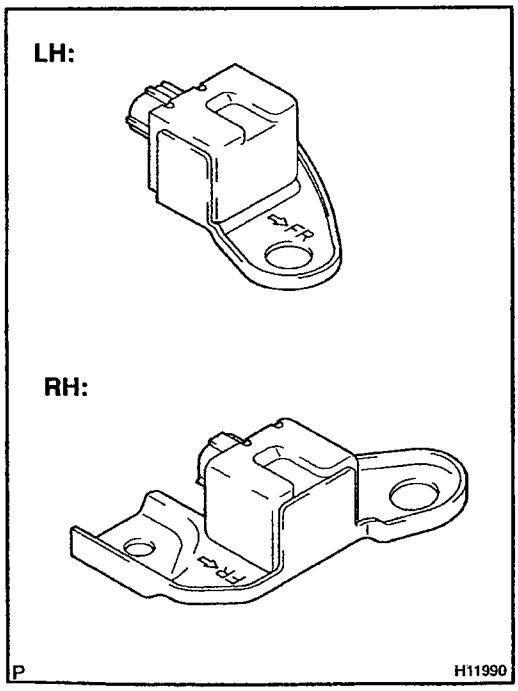
1. INSTALL FRONT AIRBAG SENSOR LH AND RH

(a) Install the front airbag sensors with the 4 bolts.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(b) Connect the front airbag sensor connector.

NOTICE:

- **Connection of the connector is done after the sensor assembly has been installed.**
- **Make sure the sensor is installed with the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, brackets or connector, replace the removed sensor with a new one.**
- **The front sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnostic system.**



HINT:

Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.

2. INSTALL HEAD LIGHT

Install head lights with the 4 bolts and 2 screws (See page BE–20).

3. INSTALL AIR CLEANER CASE

Install the air cleaner case with the 2 bolts.

4. INSTALL AIR FILTER

5. INSTALL AIR CLEANER CAP

6. INSTALL AIR CLEANER HOSE

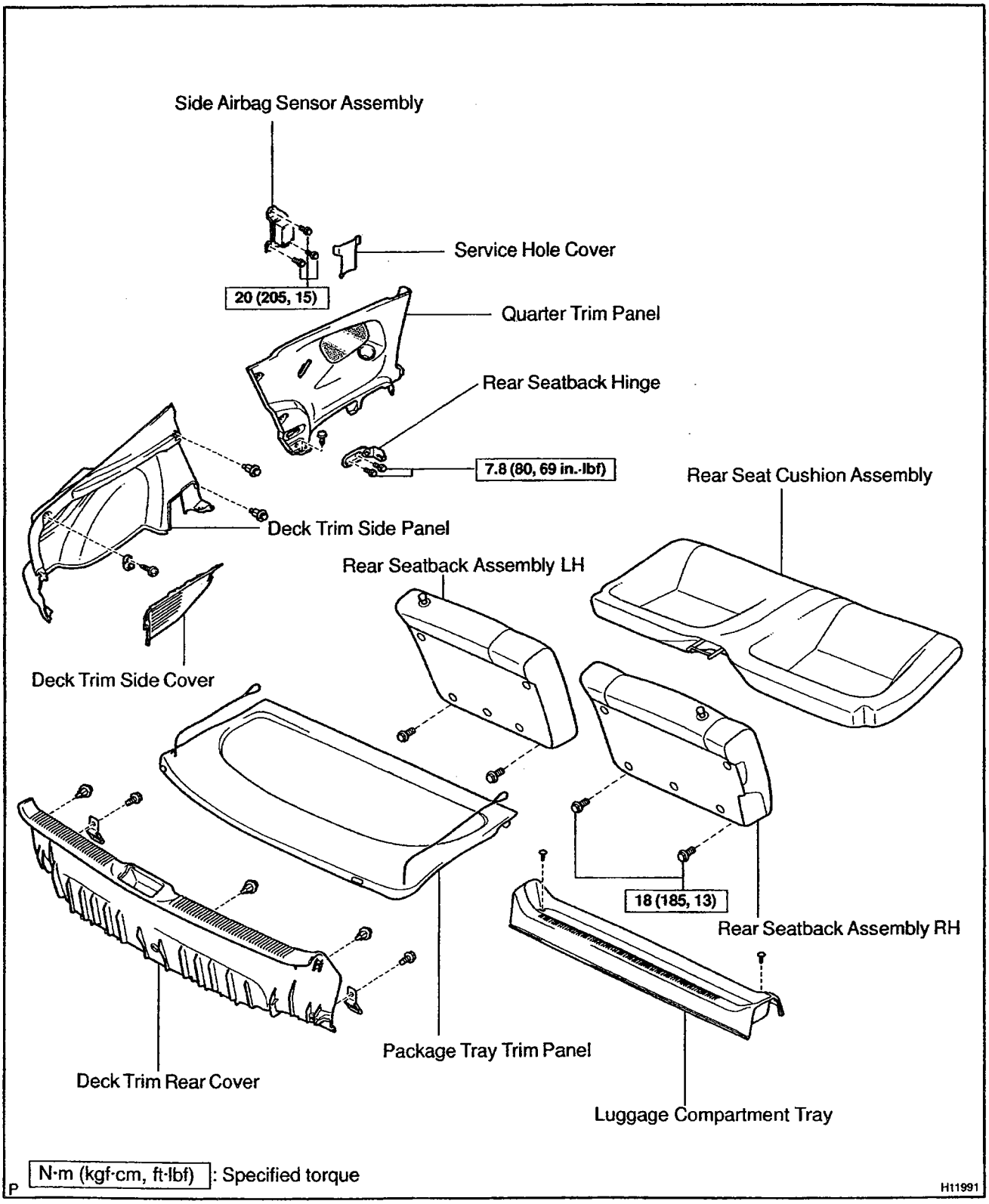
7. INSTALL UPPER FRONT FENDER APRON SEAL

Install the upper front fender apron seal with the 5 clips.

SIDE AIRBAG SENSOR ASSEMBLY

COMPONENTS

RS0K1-01



RS0KJ-01

REMOVAL

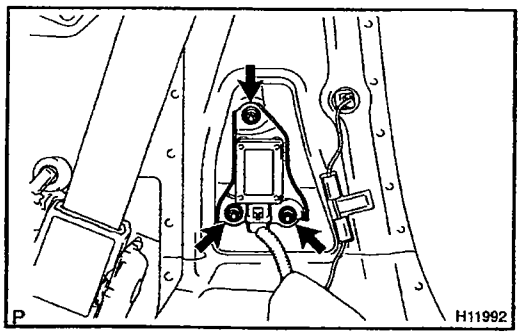
NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch at ON position, DTCs will be recorded.**
- **Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)**

HINT:

For step 1 to 9, refer to page BO–88.

1. **REMOVE PACKAGE TRAY TRIM PANEL**
2. **REMOVE REAR SEATBACK ASSEMBLY LH AND RH**
3. **REMOVE REAR SEAT CUSHION ASSEMBLY**
4. **REMOVE DECK TRIM REAR COVER**
5. **REMOVE DECK TRIM SIDE COVER**
6. **REMOVE DECK TRIM SIDE PANEL**
7. **REMOVE LUGGAGE COMPARTMENT TRAY**
8. **REMOVE REAR SEATBACK HINGE**
9. **REMOVE QUARTER TRIM PANEL**



10. **REMOVE SIDE AIRBAG SENSOR ASSEMBLY**

(a) Remove the cover.

(b) Disconnect the connector.

NOTICE:

Remove the connector with the sensor assembly installed.

(c) Remove the 3 nuts and side airbag sensor assembly.

RS0KK-01

INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check (See page DI–326).

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check (See page DI–326).

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the side airbag sensor assembly (See page DI–326).

RS0KL-01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the side airbag sensor assembly.

- If the side airbag assembly has been deployed in a collision.
- If the side airbag sensor assembly has been found to be faulty in troubleshooting.
- If the side airbag sensor assembly has been dropped.

CAUTION:

For removal and installation of the side airbag sensor assembly, see page RS–63 and RS–66. Be sure to follow the correct procedure.

RS0IOA-01

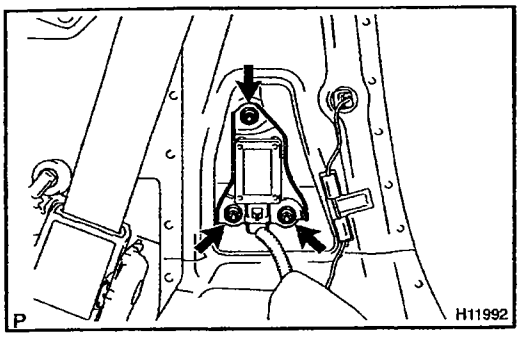
INSTALLATION

NOTICE:

- **Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.**
- **Never reuse the side airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**

HINT:

For step 2 to 10, refer to page BO–91.



1. INSTALL SIDE AIRBAG SENSOR

(a) Install the side airbag assembly with 3 screws.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(b) Connect the connector.

NOTICE:

- **Connection of the connector is done after the sensor assembly has been installed.**
- **Make sure the sensor assembly is installed with the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installation, shake the sensor assembly to check that there is no looseness.**

(c) Install the cover.

2. INSTALL QUATER TRIM PANEL

3. INSTALL REAR SEAT BACK HINGE
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

4. INSTALL LUGGAGE COMPARTMENT TRAY

5. INSTALL DECK TRIM SIDE PANEL

6. INSTALL DECK TRIM SIDE COVER

7. INSTALL DECK TRIM REAR COVER

8. INSTALL REAR SEAT CUSHION ASSEMBLY

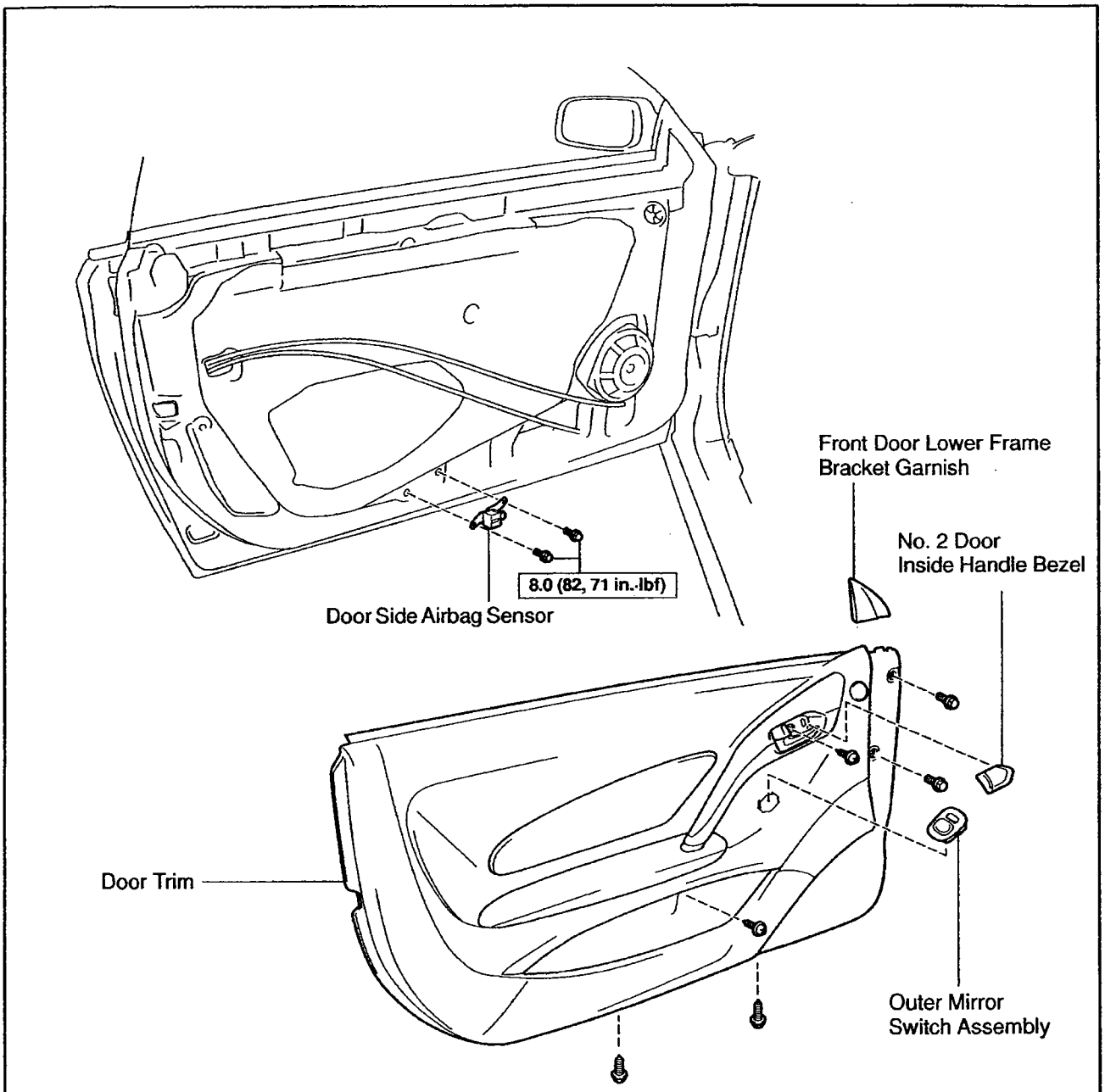
9. INSTALL REAR SEATBACK ASSEMBLY LH AND RH
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

10. INSTALL PACKAGE TRAY TRIM PANEL

DOOR SIDE AIRBAG SENSOR

COMPONENTS

RS0KN-01



N·m (kgf·cm, ft·lbf) : Specified torque

P

H11993

RS0KO-01

REMOVAL

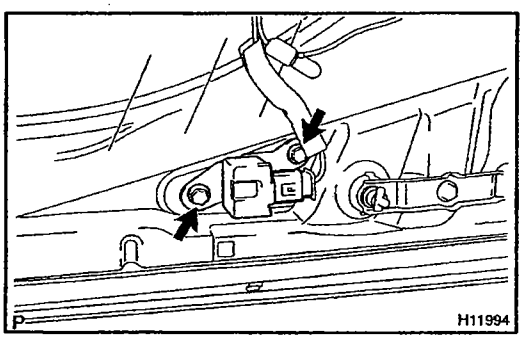
NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch at ON position, DTCs will be recorded.**
- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the sensor involved in a collision when the SRS has deployed.**
- **Never repair a sensor in order to reuse it.**

HINT:

For step 1 to 4, refer to page BO–11.

1. **REMOVE NO. 2 DOOR INSIDE HANDLE BEZEL**
2. **REMOVE OUTER MIRROR SWITCH ASSEMBLY**
3. **REMOVE FROMT DOOR LOWER FRAME BRACKET GARNISH**
4. **REMOVE DOOR TRIM**



5. **REMOVE DOOR SIDE AIRBAG SENSOR**

(a) Disconnect the door side airbag sensor connector.

NOTICE:

Disconnect the connector with sensor assembly installed.

(b) Remove the 2 bolts and door side airbag sensor.

RS0KP-01

INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

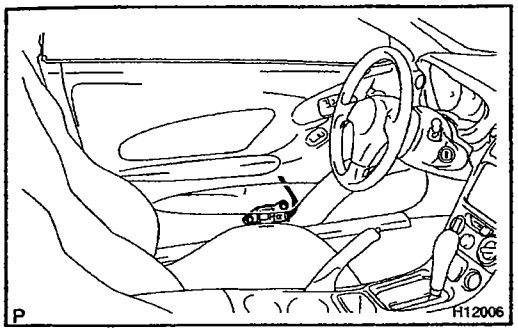
Do a diagnostic system check (See page DI–326).

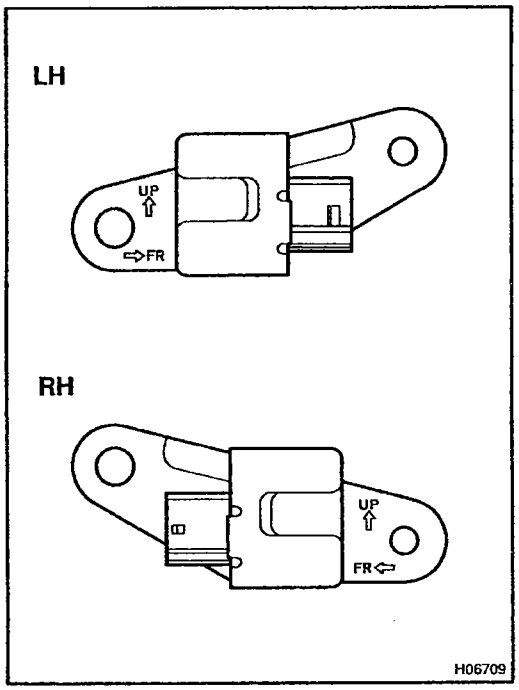
2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check (See page DI–326).

(b) If the front door or its periphery is damaged, do a visual check for damage to the door side airbag sensor, which includes the following items even if the airbag was not deployed:

- Check the bracket deformation.
- Check the paint peeling off the bracket.
- Check the cracks, dents or chips in the case.
- Check the cracks, dents, chipping and scratches in the connector.
- Check the peeling off of the label or damage to the serial number.





RS0KQ–01

REPLACEMENT

REPLACEMENT REQUIREMENTS

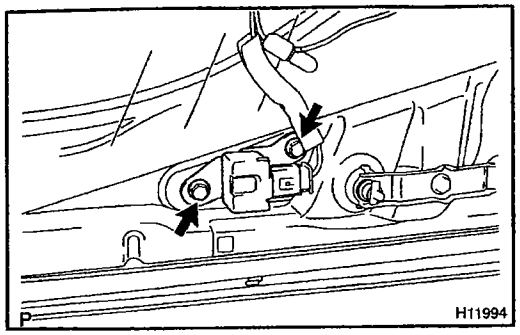
In the following cases, replace the front airbag sensor.

- If the side airbag assembly has been deployed in a collision.
- If the door side airbag sensor has been found to be faulty in troubleshooting.
- If the door side airbag sensor has been found to be faulty during checking items (See page RS–59).
- If the door side airbag sensor has been dropped.

CAUTION:

For removal and installation of the door side airbag sensor, see page RS–68 and RS–71. Be sure to follow the correct procedure.

RS0KR-01



INSTALLATION

HINT:

For step 2 to 5, refer to page BO–21.

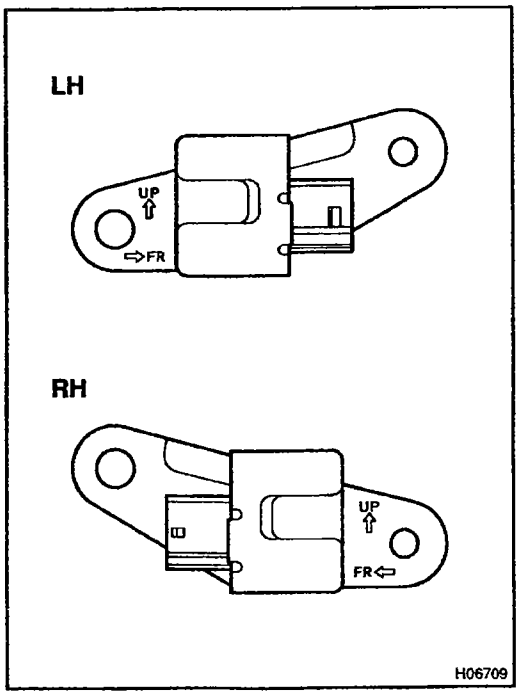
1. INSTALL DOOR SIDE AIRBAG SENSOR

(a) Install the door side airbag sensor with the 2 bolts.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:

- **Connection of the connector is done after the sensor has been installed.**
- **Make sure the sensor is installed with the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, brackets or connector, replace the removed sensor with new one.**
- **The door side airbag sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnostic system.**



HINT:

Install the door side airbag sensor with the arrow on the sensor facing toward the front of the vehicle.

(b) Connect the front airbag sensor connector.

2. INSTALL DOOR TRIM

3. INSTALL FRONT DOOR LOWER FRAME BRACKET GARNISH

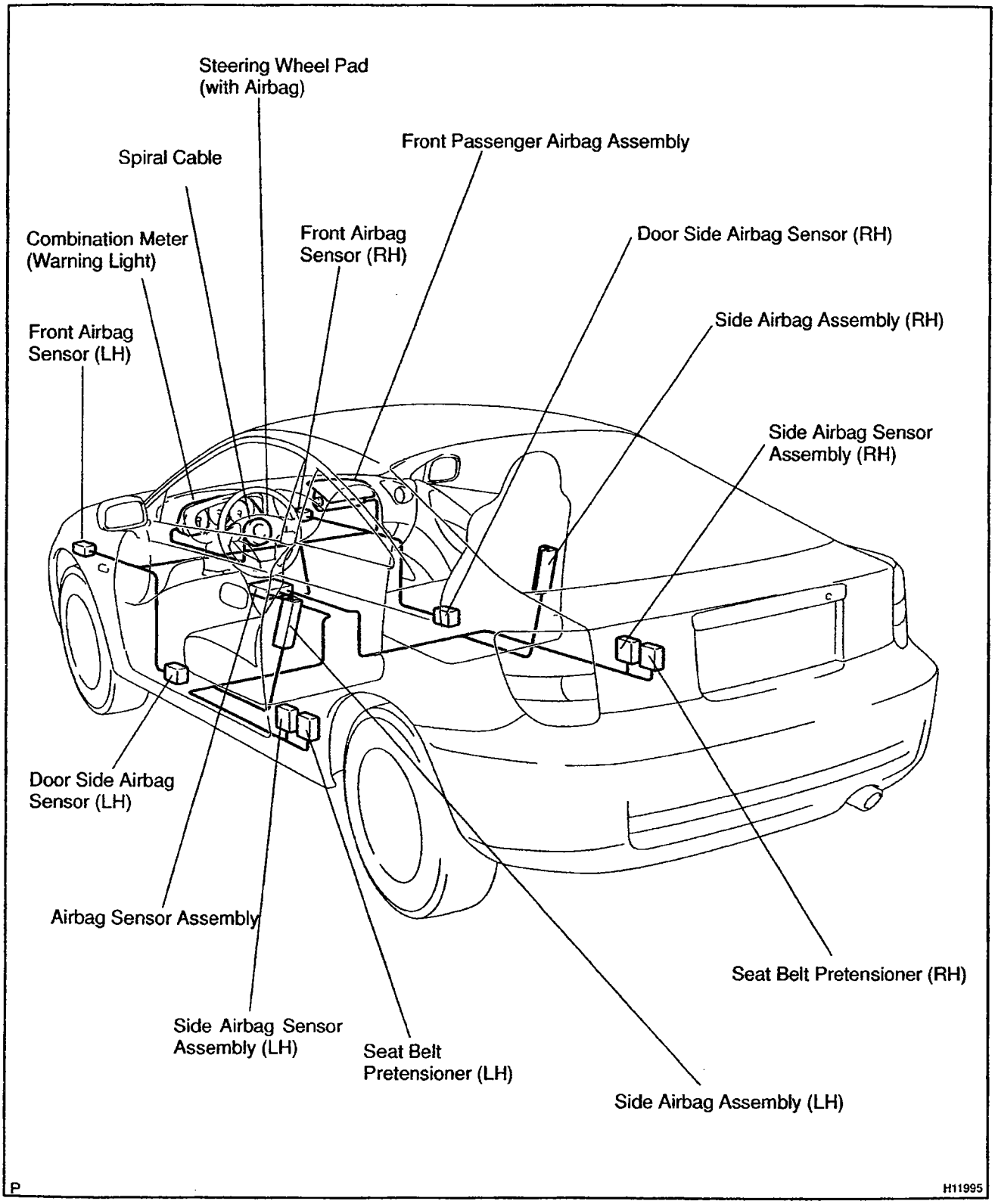
4. INSTALL OUTER MIRROR SWITCH ASSEMBLY

5. INSTALL NO. 2 DOOR INSIDE HANDLE BEZEL

WIRE HARNESS AND CONNECTOR

LOCATION

RS0KS-01



RS0KT-01

INSPECTION

HINT:

The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color.

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check (See page DI–326).

2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check (See page DI–326).

(b) Check breaks in all wires of the SRS wire harness, and exposed conductors.

(c) Check to see if the SRS wire harness connectors are cracked or chipped.

RS0KU–01

REPLACEMENT

In the following cases,replace the wire harness or connector.

- If any part of the SRS wire harness or any connector has been found to be faulty in troubleshooting.
- If any part of the SRS wire harness or any connector has been found to be faulty during checking items (See page RS–73).

CAUTION:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

BODY ELECTRICAL

BODY ELECTRICAL SYSTEM	BE–1
TROUBLESHOOTING	BE–2
POWER SOURCE	BE–10
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH	BE–13
HEADLIGHT AND TAILLIGHT SYSTEM	BE–15
FOG LIGHT SYSTEM	BE–22
TURN SIGNAL AND HAZARD WARNING SYSTEM	BE–25
INTERIOR LIGHT SYSTEM	BE–27
BACK–UP LIGHT SYSTEM	BE–30
STOP LIGHT SYSTEM	BE–32
WIPER AND WASHER SYSTEM	BE–34
COMBINATION METER	BE–39
ELECTRIC TENSION REDUCER SYSTEM	BE–52
DEFOGGER SYSTEM	BE–54
POWER WINDOW CONTROL SYSTEM	BE–58
POWER DOOR LOCK CONTROL SYSTEM	BE–62
WIRELESS DOOR LOCK CONTROL SYSTEM	BE–67
SLIDING ROOF SYSTEM	BE–82
POWER MIRROR CONTROL SYSTEM	BE–85
AUDIO SYSTEM	BE–88
ANTENNA	BE–119
CLOCK	BE–122
HORN SYSTEM	BE–125

BE

BODY ELECTRICAL SYSTEM

PRECAUTION

BE00M-02

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case.

Don't touch the glass part of a bulb with bare hands.

2. SRS (SUPPLEMENTAL RSTRAINT SYSTEM)

The CELICA is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag, failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. AUDIO SYSTEM

If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to note the stations and reset them after the battery terminal is reconnected.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BE0ON-02

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH:

Symptom	Suspect Area	See page
Ignition switch is not set to each position.	1. Ignition Switch	BE–14
"Key unlock warning system" does not operate.	1. GAUGE Fuse	BE–10
	2. Key Unlock Warning Switch	BE–14
	3. Door Courtesy Switch	BE–28
	4. Body Control System	DI–535
	5. Combination Meter	–
	6. Wire Harness	–

HEADLIGHT AND TAILLIGHT SYSTEM

Symptom	Suspect Area	See page
Headlight does not light.(Taillight is normal.)	1. HEAD Fuse (LH, RH)	BE–10
	2. Headlight Relay	BE–17
	3. Headlight Dimmer Switch	BE–17
	4. Light Control Switch	BE–17
	5. Body Control System	DI–535
	6. Headlight Bulb	–
	7. Wire Harness	–
Headlight does not light. (Taillight does not light up.)	1. Light Control Switch	BE–17
	2. Body Control System	DI–535
	3. Headlight Bulb	–
	4. Wire Harness	–
Only one side light does not light.	1. HEAD Fuse	BE–10
	2. Headlight Bulb	–
	3. Wire Harness	–
"Lo–Beam" does not light.	1. Light Control Switch	BE–17
"Lo–Beam" does not light. (ALL)	1. Headlight Dimmer Switch	BE–17
	2. Body Control System	BE–17
	3. Wire Harness	–
"Lo–Beam" does not light. (ONE SIDE)	1. HEAD LO (LH) Fuse	BE–10
	2. HEAD LO (RH) Fuse	BE–10
	3. Headlight Bulb	–
	4. Wire Harness	–
"Hi–Beam" does not light. (ALL)	1. Headlight Dimmer Switch	BE–17
	2. Body Control System	DI–535
	3. Wire Harness	–
"Hi–Beam" does not light. (ONE SIDE)	1. HEAD HI (LH) Fuse	BE–10
	2. HEAD HI (RH) Fuse	BE–10
	3. Headlight Bulb	–
	4. Wire Harness	–
"Flash" does not light.	1. Headlight Dimmer Switch	BE–17
	2. Body Control System	DI–535
	3. Wire Harness	–
"Light–on warning System" does not operate	1. GAUGE Fuse	BE–10
	2. Door courtesy Switch (Driver's)	BE–28
	3. Body Control System	DI–535
	4. Combination Meter	–
	5. Wire Harness	–

"Automatic light control system" does not operate.	1. ECU–IG Fuse 2. DOME Fuse 3. Automatic Light Control Sensor 4. Light Control Switch 5. Door Courtesy Switch 6. Body Control System 7. Wire Harness	BE–10 BE–10 BE–17 BE–17 BE–28 DI–535 –
Headlight does not light with light control SW in HEAD.	1. Light Control Switch 2. Body Control System 3. Wire Harness	BE–17 DI–535 –
Headlight does not go out with light control SW in OFF.	1. Headlight Relay 2. Body Control System 3. Wire Harness	BE–17 DI–535 –
Taillight does not light with light control SW in TAIL.	1. Taillight Relay 2. Light Control Switch 3. Body Control System	BE–17 BE–17 DI–535
Taillight does not go out with light control SW in OFF.	1. Taillight Relay 2. Light Control Switch 3. Body Control System 4. Wire Harness	BE–17 BE–17 DI–535 –
Headlight does not light with engine running and light control SW in OFF.	1. GAUGE Fuse 2. Generator L Terminal 3. Parking Brake Switch 4. Body Control System 5. Wire Harness	BE–10 CH–10 BE–46 DI–535 –

FOG LIGHT SYSTEM

Symptom	Suspect Area	See page
Front fog light does not light with light control switch at HEAD. (Headlight is normal.)	1. FOG Fuse 2. Front Fog Light Relay 3. Front Fog Light Switch 4. Wire Harness	BE–10 BE–23 BE–23 –
Front fog light does not light with light control switch at HEAD. (Headlight does not light up.)	1. Headlight and Taillight System 2. Wire Harness	BE–2 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptom	Suspect Area	See page
"Hazard" and "Turn" do not light up.	1. Hazard Warning Switch 2. Turn Signal Flasher 3. Wire Harness	BE–26 BE–26 –
The flashing frequency is abnormal.	1. Bulb 2. Turn Signal Flasher 3. Wire Harness	– BE–26 –
Hazard warning light does not light up. (Turn is normal.)	1. HAZARD Fuse 2. Wire Harness	BE–10 –
Hazard warning light does not light up in one direction.	1. Hazard Warning Switch 2. Wire Harness	BE–26 –
Turn signal does not light up. (Combination meter, wiper and washer do not operate.)	1. Ignition Switch 2. TURN Fuse 3. Turn Signal Switch 4. Wire Harness	BE–14 BE–10 BE–26 –

Turn signal does not light up. (Combination meter, wiper and washer are normal.)	1. TURN Fuse 2. Turn Signal Switch 3. Wire Harness	BE–10 BE–26 –
Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE–26 –
Only one bulb does not light up.	1. Bulb 2. Wire Harness	– –

INTERIOR LIGHT SYSTEM

Symptom	Suspect Area	See page
Only one light does not light up.	1. Bulb 2. Wire Harness	– –
Front interior light does not light up.	1. Bulb 2. Map Light Assembly 3. Wire Harness	– BE–28 –
Rear interior light does not light up.	1. Bulb 2. DOME Fuse 3. Luggage compartment courtesy switch 4. Wire Harness	– BE–10 BE–28 –
The illumination does not fade out when all the doors are closed.	1. Courtesy Switch 2. Body Control System 3. Wire Harness	BE–28 DI–535 –
The illumination does not fade out immediately when the ignition switch is turned to ACC or ON within 15 seconds after all the doors are closed.	1. Ignition Switch 2. RADIO NO. 2 Fuse 3. GAUGE Fuse 4. Body Control System 5. Wire Harness	BE–14 BE–10 BE–10 DI–535 –
The illumination does not fade out immediately when all the doors are locked within 15 seconds after they are closed.	1. Door Unlock Detection Switch 2. Body Control System 3. Wire Harness	BE–63 DI–535 –

BACK–UP LIGHT SYSTEM

Symptom	Suspect Area	See page
Back–up light does not light up.	1. GAUGE Fuse 2. Back–up Light Switch (M/X) 3. Park/Neutral Position Switch (A/X) 4. Bulb 5. Wire Harness	BE–10 BE–31 DI–202 DI–261 – –
Back–up light remains always ON.	1. Wire Harness	–
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse 2. Stop Light Switch 3. Bulb 4. Wire Harness	BE–10 BE–33 – –
Stop light remains always ON.	1. Stop Light Switch 2. Wire Harness	BE–33 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

WIPER AND WASHER SYSTEM

Symptom	Suspect Area	See page
Wipers and washers do not operate.	1. WIPER Fuse 2. Ignition Switch 3. Wiper and Washer Switch 4. Wire Harness	BE–10 BE–14 BE–35 –
Front wiper does not operate.	1. Front Wiper and Washer Switch 2. Front Wiper Motor 3. Wire Harness	BE–35 BE–35 –
Rear wiper does not operate.	1. Rear Wiper and Washer Switch 2. Rear Wiper Motor and Relay 3. Wire Harness	BE–35 BE–35 –
Front washer does not operate.	1. Front Wiper and Washer Switch 2. Washer Motor 3. Wire Harness	BE–35 BE–35 –
Rear washer does not operate.	1. Rear Wiper and Washer Switch 2. Washer Motor 3. Wire Harness	BE–35 BE–35 –

Meter, Gauges and Illumination:
COMBINATION METER

Symptom	Suspect Area	See page
Tachometer, fuel gauge and engine coolant temperature gauge do not operate.	1. GAUGE Fuse 2. Meter Circuit 3. Wire Harness	BE–10 BE–42 –
Speedometer does not operate.	1. Vehicle Speed Sensor 2. Meter Circuit 3. Wire Harness	BE–46 BE–42 –
Tachometer does not operate.	1. Igniter 2. ECM 3. Meter Circuit 4. Wire Harness	DI–114 DI–1 BE–42 –
Fuel gauge does not operate or abnormal operation.	1. Fuel Receiver Gauge 2. Fuel Sender Gauge 3. Meter Circuit 4. Wire Harness	BE–46 BE–46 BE–42 –
Engine coolant temperature gauge does not operate or abnormal operation.	1. Engine Coolant Temperature Receiver Gauge 2. Engine Coolant Temperature Sender Gauge 3. Meter Circuit 4. Wire Harness	BE–46 BE–46 BE–42 –
All illumination lights do not light up.	1. TAIL Fuse (I/P J/B) 2. Light Control Rheostat 3. Meter Circuit 4. Wire Harness	BE–10 BE–46 BE–42 –
Only one illumination light does not light up.	1. LED 2. Meter Circuit	– BE–42

Warning Lights:
COMBINATION METER

Symptom	Suspect Area	See page
Warning lights do not light up. (Except discharge and door open.)	1. Bulb or LED	–
	2. IGN Fuse	BE–10
	3. Ignition Switch	BE–14
	4. Meter Circuit	BE–42
	5. Generator	CH–10
	6. Wire Harness	–
Brake warning Light does not light up.	1. LED	–
	2. Brake Fluid Level Warning Switch	BE–46
	3. Parking Brake Switch	BE–46
	4. Meter Circuit	BE–42
	5. Wire Harness	–
Seat belt warning light does not light up.	1. LED	–
	2. Seat Belt Buckle Switch	BE–46
	3. Body Control System	DI–535
	4. Meter Circuit	BE–42
	5. Wire Harness	–
Low oil pressure warning light does not light up.	1. LED	–
	2. Low Oil Pressure Warning Switch	BE–46
	3. Meter Circuit	BE–42
	4. Wire Harness	–
Door open warning light does not light up.	1. LED	–
	2. DOME Fuse	BE–10
	3. Door Courtesy Switch	BE–28
	4. Luggage Room Light Switch	BE–28
	5. Body Control System	DI–535
	6. Meter Circuit	BE–42
	7. Wire Harness	–

Indicator Lights:
COMBINATION METER

Symptom	Suspect Area	See page
SRS indicator light does not light up.	1. LED	–
	2. Airbag Sensor Assembly	DI–324
	3. Wire Harness	–
ABS indicator light does not light up.	1. LED	–
	2. Wire Harness	–
Malfunction indicator light does not light up.	1. LED	–
	2. ECM	DI–1
	3. Wire Harness	–
A/T shift position indicator light does not light up.	1. LED or LCD	–
	2. Park/Neutral Position Switch	DI–202 DI–261
	3. Light Control Rheostat	BE–46
	4. Meter Circuit	BE–42
	5. Wire Harness	–
O/D OFF indicator light does not light up.	1. LED or LCD	–
	2. O/D Main Switch	DI–206 DI–268
	3. ECM	DI–1
	4. Meter Circuit	BE–42
	5. Wire Harness	–

BE

Turn indicator light does not light up.	1. Bulb 2. Turn Signal and Hazard Warning System 3. Meter Circuit 4. Wire Harness	– BE–2 BE–42 –
High beam indicator light does not light up.	1. Bulb 2. Headlight and Taillight System 3. Meter Circuit 4. Wire Harness	– BE–2 BE–42 –
CRUISE indicator light does not light up.	1. LED 2. Cruise Control ECU 3. Meter Circuit 4. Wire Harness	– DI–483 BE–42 –

DEFOGGER SYSTEM

Symptom	Suspect Area	See page
All defogger systems do not operate.	1. HTR Fuse (I/P J/B) 2. DEF Fuse (I/P J/B) 3. Defogger Relay (I/P J/B) 4. Defogger Switch 5. Wire Harness	BE–10 BE–10 BE–55 BE–55 –
Rear window defogger does not operate.	1. Defogger Wires 2. Wire Harness	BE–55 –

ELECTRIC TENSION REDUCER SYSTEM

Symptom	Suspect Area	See page
Tension reducer does not operate. (Driver's and Passenger's.)	1. GAUGE Fuse 2. Wire Harness	BE–10 –
Tension reducer does not operate. (Only one side.)	1. Buckle Switch 2. Tension Reducer Solenoid 3. Wire Harness	BE–53 BE–53 –

POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
Power window does not operate.	1. POWER Fuse 2. GAUGE Fuse 3. Ignition Switch 4. Power Window Master Switch 5. Wire Harness	BE–10 BE–10 BE–14 BE–59 –
"One touch power window system" does not operate.	1. Power Window Master Switch	BE–59
Only one window glass does not move.	1. Power Window Master Switch 2. Power Window Motor 3. Wire Harness	BE–59 BE–59 –
"Window lock system" does not operate.	1. Power Window Master Switch	BE–59
Illumination does not light up.	1. Power Window Master Switch	BE–59

POWER DOOR LOCK CONTROL SYSTEM

Symptom	Suspect Area	See page
"Door lock control system" does not operate.(ALL)	1. Body Control System 2. DOOR Fuse 3. GAUGE Fuse 4. Wire Harness 5. Other Parts	DI–535 BE–10 BE–10 – –
Malfunction in Door Lock / Unlock. (Using door manual switch.)	1. Door Lock Control Switch 2. Body Control System 3. Wire Harness 4. Other Parts	BE–63 DI–535 – –
Malfunction in Door Lock / Unlock. (Using door manual switch and key.)	1. Wire Harness 2. Other Parts	– –
Malfunction in Door Lock / Unlock. (Using key.)	1. Door Unlock Detection Switch 2. Body Control System 3. Wire Harness 4. Other Parts	BE–63 DI–535 – –
Fault in 2 – Operation unlock function of driver's side door key lock and unlock switch.	1. Door Unlock Detection Switch 2. Body Control System 3. Wire Harness 4. Other Parts	BE–63 DI–535 – –
Fault in key confine prevention operation.	1. Door Unlock Detection Switch 2. Door Courtesy Switch 3. Door Lock Control Switch 4. Body Control System 5. Wire Harness 6. Other Parts	BE–63 BE–28 BE–63 DI–535 – –
Only one door lock does not operate.	1. Door Lock Motor 2. Wire Harness	BE–63 –

WIRELESS DOOR LOCK CONTROL SYSTEM:

HINT:

- Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system, power slide door control system and theft deterrent system are operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system, power slide door control system and theft deterrent system are operating normally.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, check and replace the Wireless Door Lock Receiver as the last step.

Symptom	Suspect Area	See page
All functions of wireless door lock control system do not operate.	1. Door Courtesy Switch 2. Door Key Lock and Unlock Switch 3. Key Unlock Warning Switch 4. Wireless Door Lock Receiver 5. Body Control System 6. Wire Harness	BE–28 BE–63 BE–14 BE–73 DI–535 –
Only door unlock operation is not possible (Lock operation is possible).	1. Door key Lock and Unlock Switch 2. Door Unlock Detection Switch 3. Wireless Door Lock Receiver 4. Body Control System 5. Wire Harness	BE–63 BE–63 BE–73 DI–535 –
Only door lock operation is not possible (Unlock operation is possible).	1. Door key Lock and Unlock Switch 2. Wireless Door Lock Receiver 3. Wire Harness	BE–63 BE–73 –

Only key confinement prevention function is not possible.	1. Key Unlock Warning Switch 2. Wireless Door Lock Receiver 3. Wire Harness	BE–14 BE–73 –
• Wireless door lock function operates even when each door is opened. • Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system.	1. Door Courtesy Switch 2. Wireless Door Lock Receiver 3. Wire Harness	BE–28 BE–73 –
Wireless door lock functions incorrectly. (Although one door is unlocked, when the transmitter switch is pressed, all doors are unlocked.)	1. Door Unlock Detection Switch 2. Wireless Door Lock Receiver 3. Wire Harness	BE–63 BE–73 –
Warning operation will not be performed even if the panic button is pressed.	4. Wireless Door Lock Receiver 5. Wire Harness	BE–73 –

SLIDING ROOF SYSTEM

Symptom	Suspect Area	See page
Sliding roof system does not operate.	1. GAUGE Fuse (I/P J/B) 2. POWER Fuse (I/P J/B) 3. Sliding Roof Control Assembly 4. Sliding Roof Switch 5. Wire Harness	BE–10 BE–10 BE–84 BE–84 –
Sliding roof system operates abnormally.	1. Sliding Roof Control Assembly 2. Sliding Roof Switch 3. Wire Harness	BE–84 BE–84 –
Sliding roof system stops operation half way.	1. Sliding Roof Control Assembly 2. Sliding Roof Switch	BE–84 BE–84
"Key–off Sliding Roof" operation does not operate.	1. POWER Fuse 2. GAUGE Fuse 3. Ignition Switch 4. Door Courtesy Switch 5. Body Control System 6. Wire Harness	BE–10 BE–10 BE–14 BE–28 DI–535 –

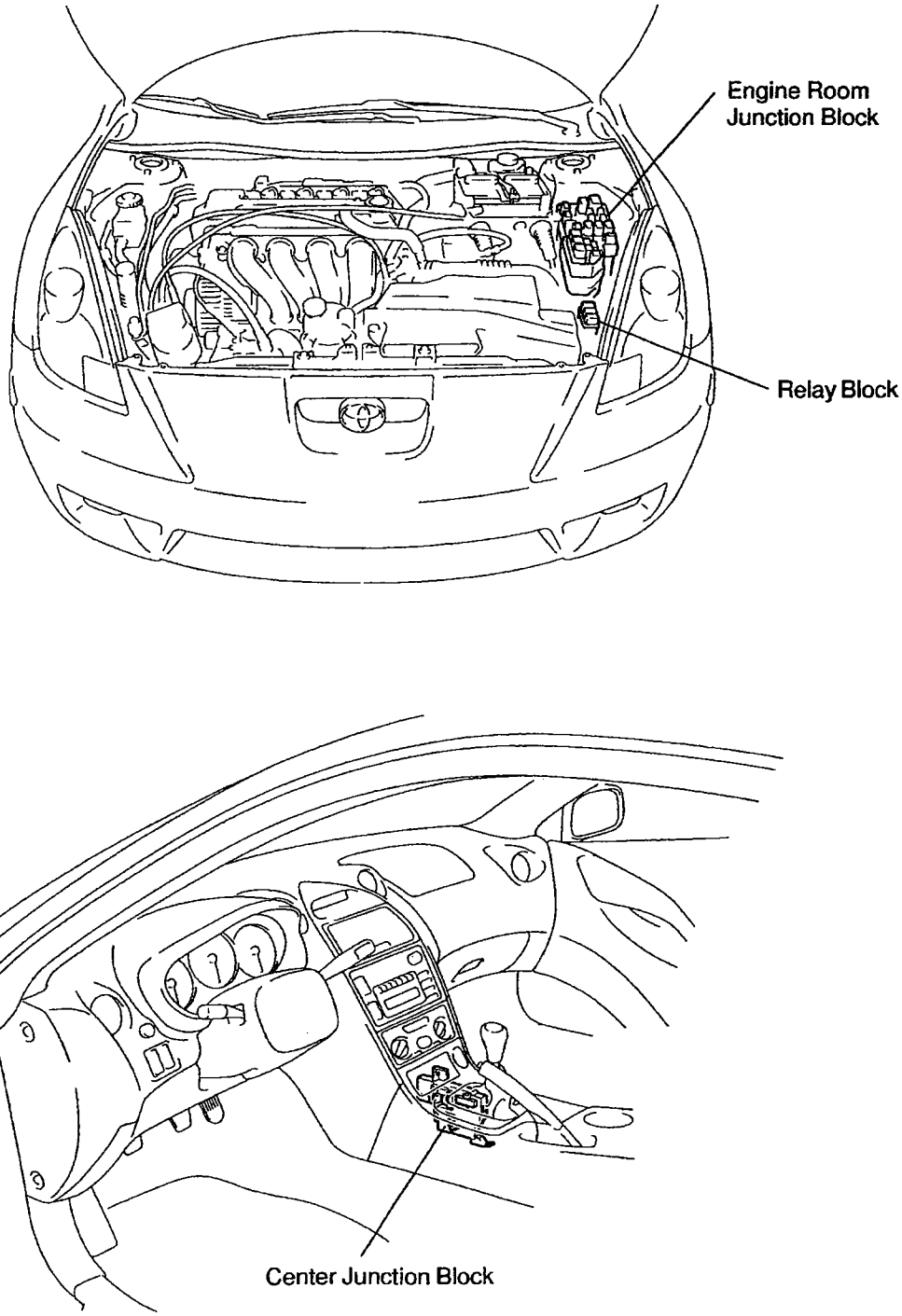
POWER MIRROR CONTROL SYSTEM

Symptom	Suspect Area	See page
Mirror does not operate.	1. CIG & RAD Fuse 2. Mirror Switch 3. Mirror Motor	BE–10 BE–86 BE–86
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness	BE–86 BE–86 –

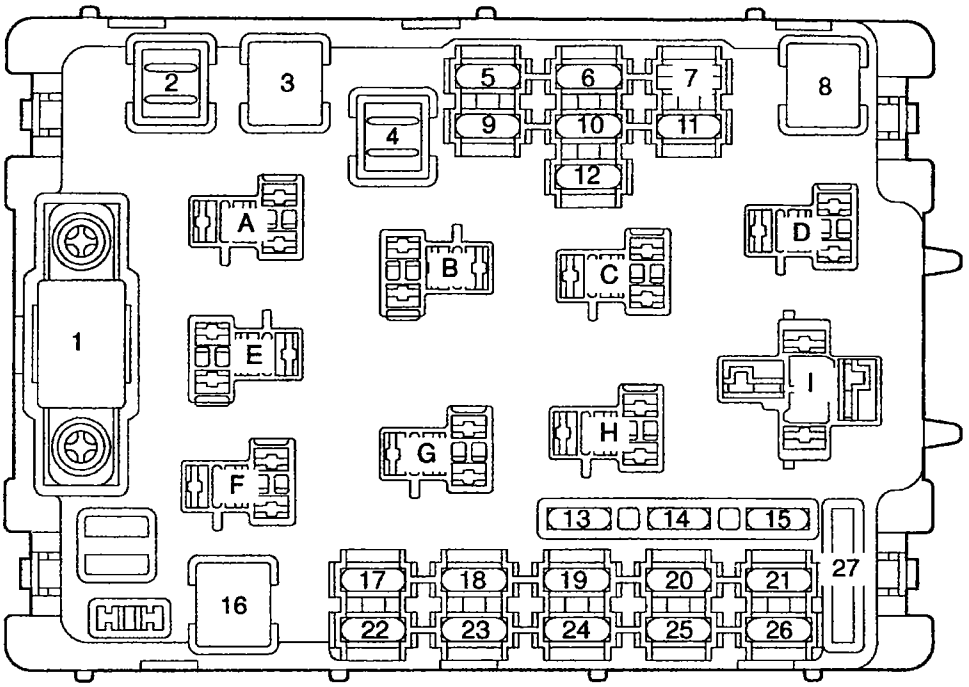
POWER SOURCE

LOCATION

BE1CX-01



ENGINE ROOM JUNCTION BLOCK



FUSES

1. FL ALT	120 A
2. CDS	30 A
3.ABS NO. 1	40 A
4. RDI	30 A
5. HEAD LH–LWR	10 A
6. HEAD RH–UPR	20 A
7. MMT	30 A
8. HTR	50 A
9. ABS NO. 2	25 A
10. –	–
11. HEAD LH–UPR	10 A
12. HEAD RH–LWR	10 A
13. SPARE	10 A
14. SPARE	15 A
15. SPARE	30 A
16. MAIN	40 A
17. IG2	15 A
18. ST	7.5 A
19. EFI NO. 2	7.5 A
20. EFI NO. 1	7.5 A
21. HORN	10 A
22. HAZ	15 A
23. AM2	7.5 A
24. EFI	15 A
25. DCC	25 A
26. ALT–S	7.5 A
27. SPARE	7.5 A

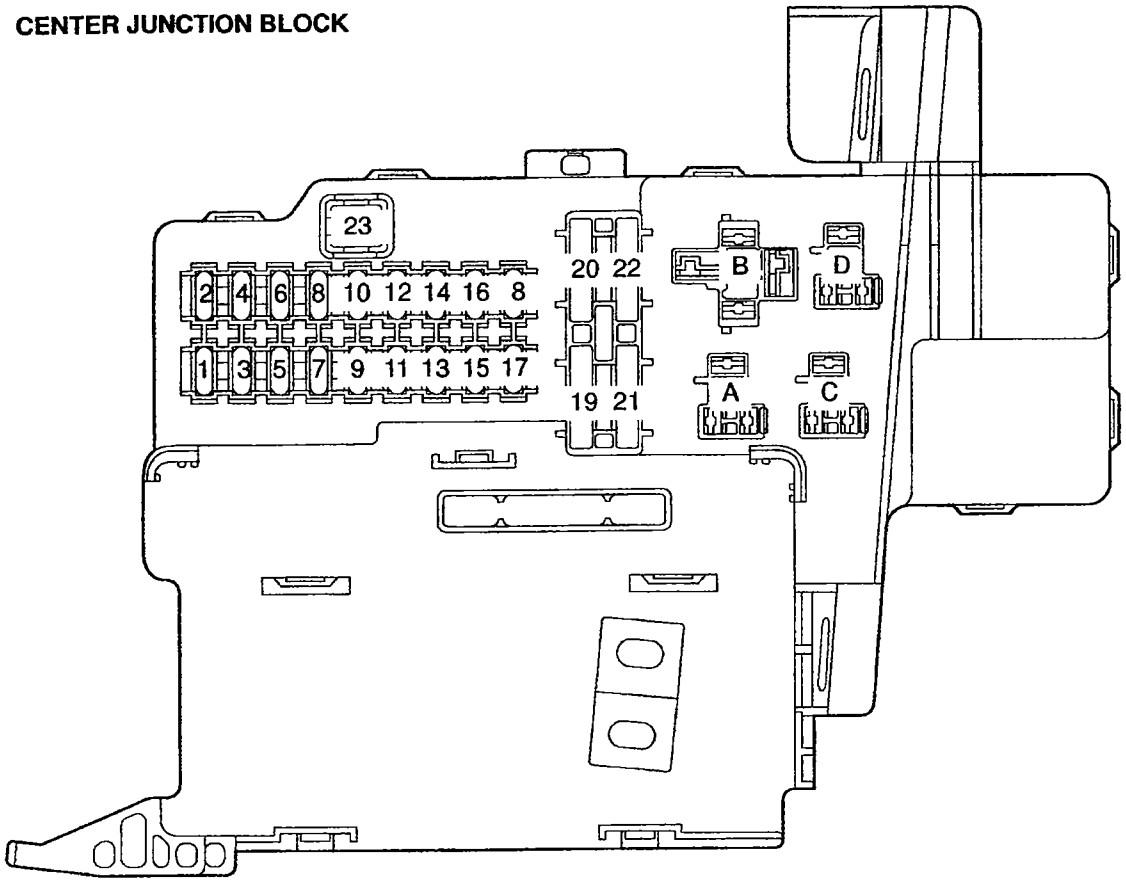
RELAYS

A. FAN NO. 2 Relay
B. FAN NO. 1 Relay
C. Circuit Opening Relay
D. Horn Relay
E. FAN NO. 3 Relay
F. Magnetic Clutch Relay
G. IG2 Relay
H. EFI Relay
I. Headlight Control Relay

N

I11732

CENTER JUNCTION BLOCK



FUSES

1. CIG	15 A
2. S/ROOF	15 A
3. AM1	25 A
4. FL P/W	20 A
5. DOOR	20 A
6. STOP	10 A
7. FR FOG	15 A
8. SRS–IG	7.5 A
9. OBD	7.5 A
10. WSHER	15 A
11. WIPER	25 A
12. RADID	15 A
13. RR WIPER	10 A
14. TURN	7.5 A
15. –	–
16. HTR	10 A
17. FR R/W	20 A
18. TAIL	10 A
19. MULTI–FUSE	5 A (ABS–IG, WARNING, FAN RLY, C/C ECU–IG)
20. MULTI–FUSE	7.5 A (DOME, MPX–B, ECU–B)
21. MULTI–FUSE	5 A (BODY ECU–IG, BK–UP LP, TENS RDC, DEF RLY)
22. MULTI–FUSE	7.5 A (ECU ACC, PANEL2, PANEL1)
23.DEF	30 A

RELAYS

A. –
B. IG1 Relay
C. Defogger Relay
D. Taillight Control Relay

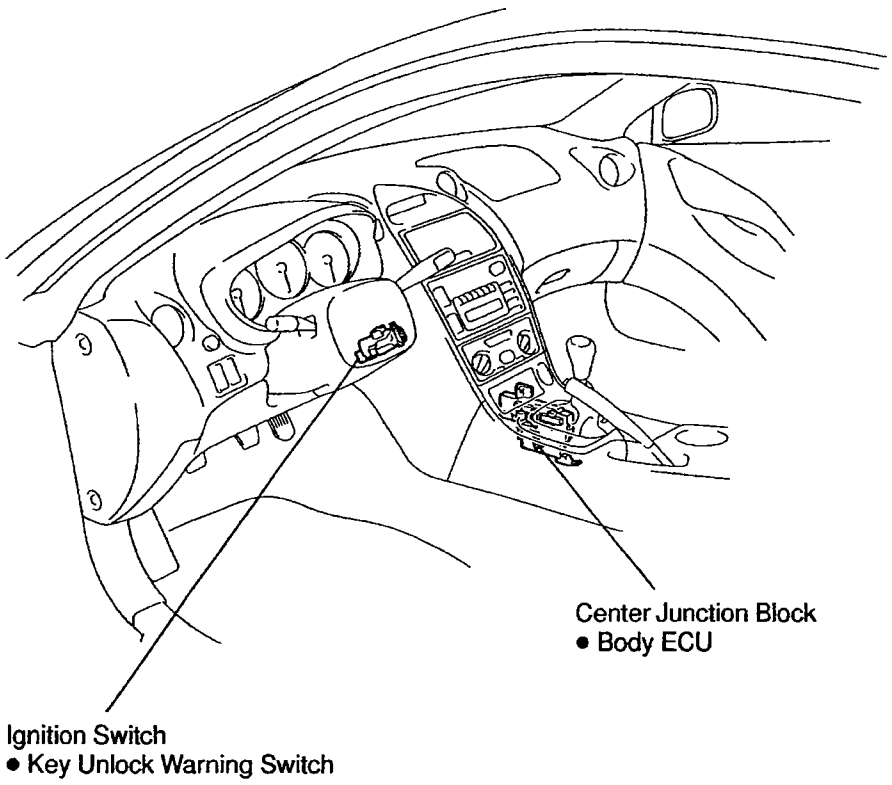
N

I11731

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

LOCATION

BE0OP–02



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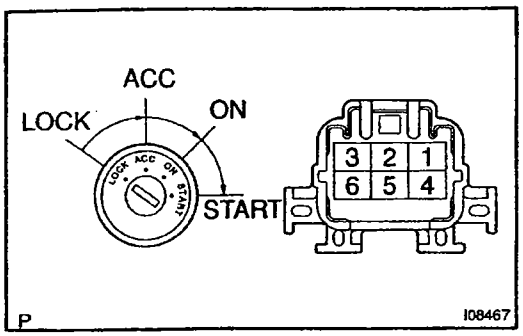
I13314

BE0OO-02

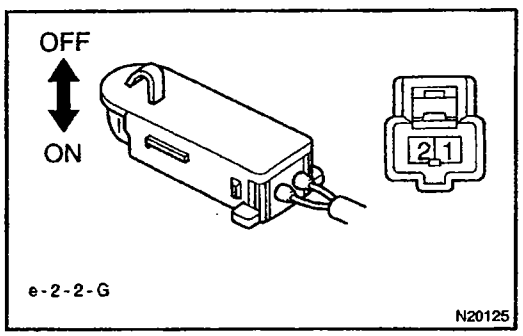


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
ACC	1 – 3	Continuity
ON	1 – 2 – 3 5 – 6	Continuity
START	1 – 2 4 – 5 – 6	Continuity

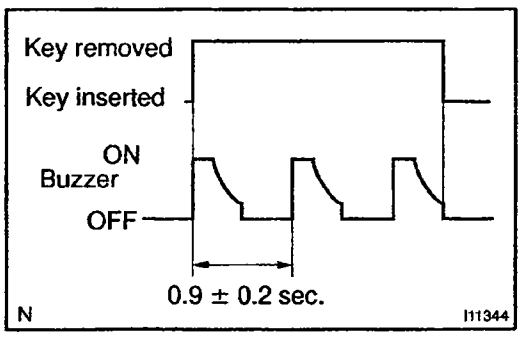
If continuity is not as specified, replace the switch.



2. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Key removed)	–	No continuity
ON (Key set)	1 – 2	Continuity

If continuity is not as specified, replace the switch.



3. INSPECT KEY UNLOCK WARNING BUZZER

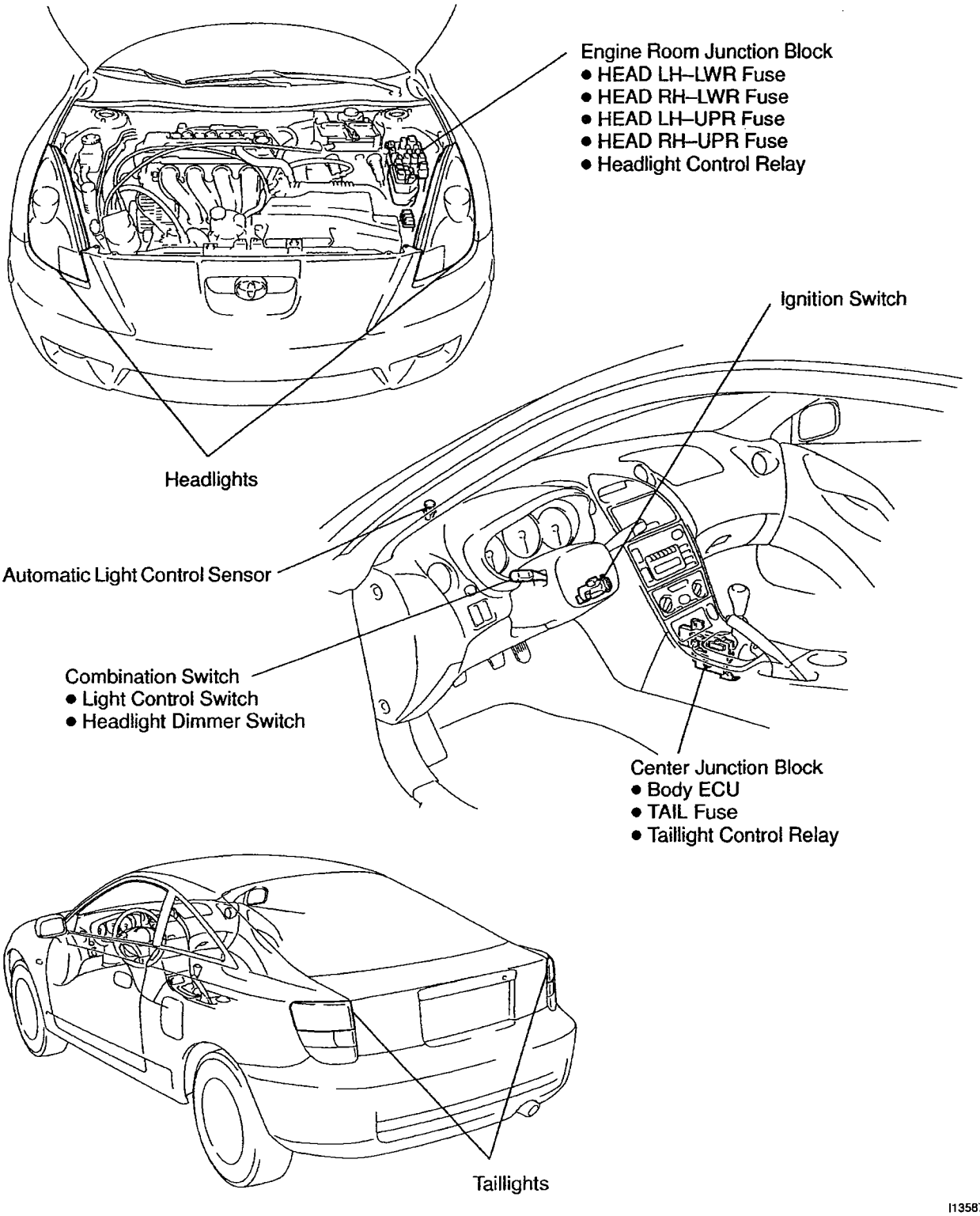
Check that the buzzer sound when driver's door is opened and key inserted.

If operation is not as specified, replace the combination meter. (See page BE–42)

HEADLIGHT AND TAILLIGHT SYSTEM

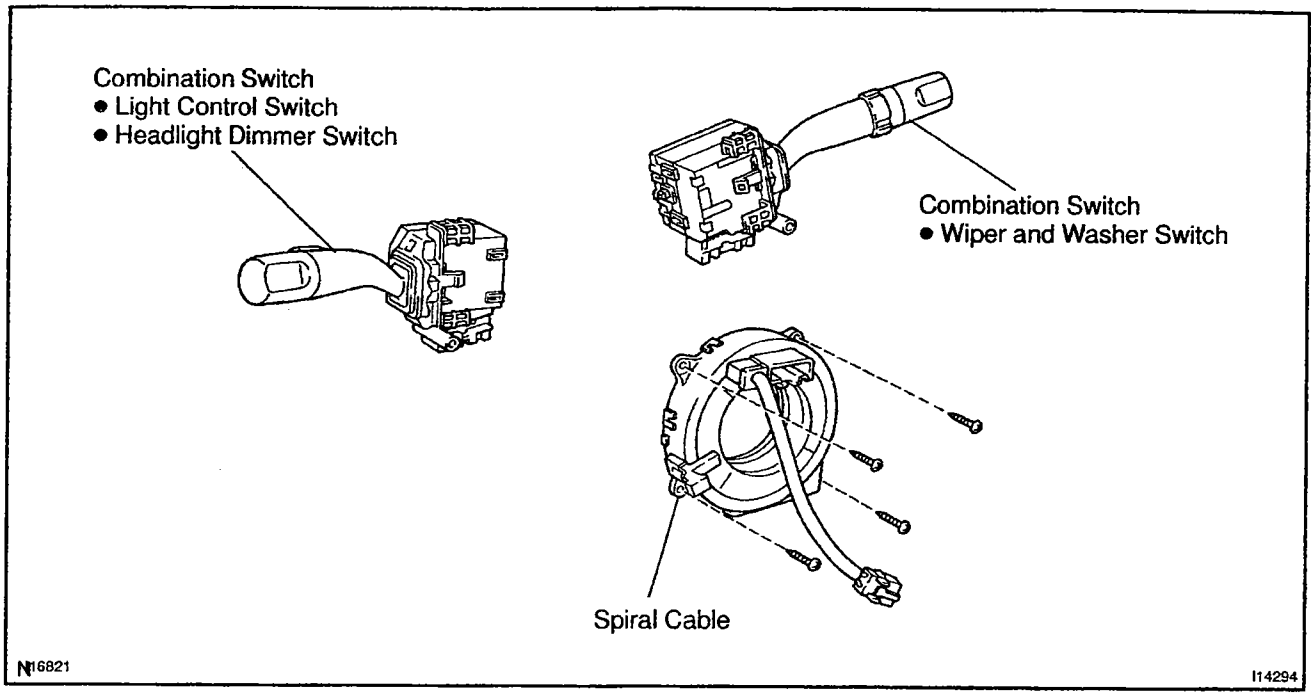
BE0OR-02

LOCATION



COMPONENTS

BE0G5-02



BE0OT–02

INSPECTION

1. INSPECT LIGHT CONTROL SWITCH CONTINUITY

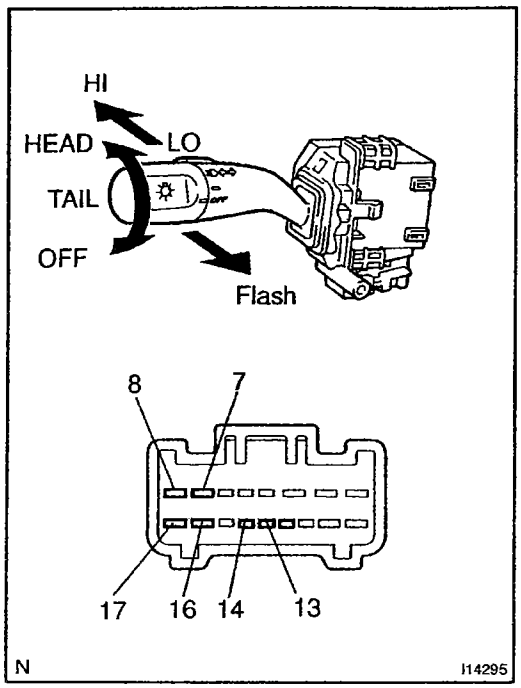
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	14 – 16	Continuity
HEAD	13 – 14 – 16	Continuity

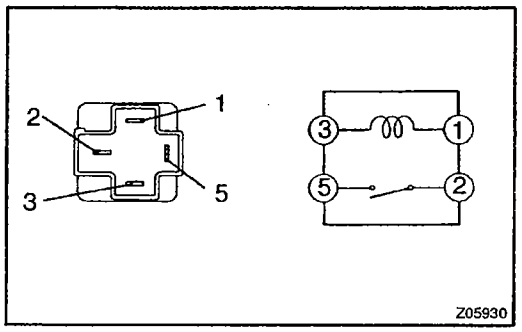
If continuity is not as specified, replace the switch.

2. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	16 – 17	Continuity
High beam	7 – 16	Continuity
Flash	7 – 8 – 16	Continuity

If continuity is not as specified, replace the switch.

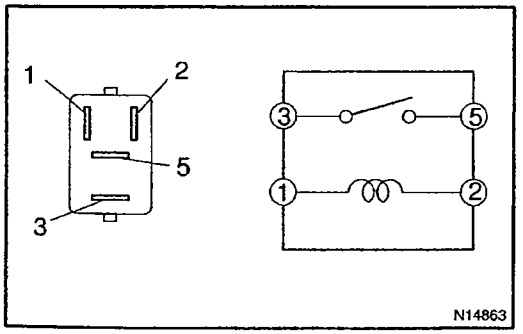




3. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 3	Continuity
Apply B+ between terminals 1 and 2.	2 – 5	Continuity

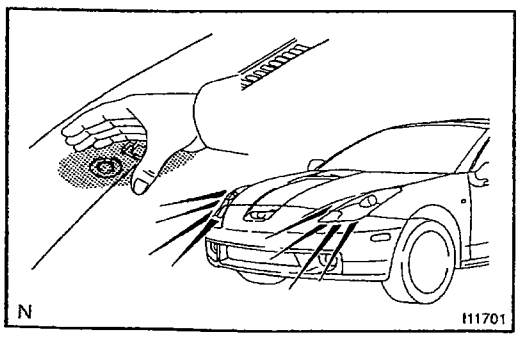
If continuity is not as specified, replace the relay.



4. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

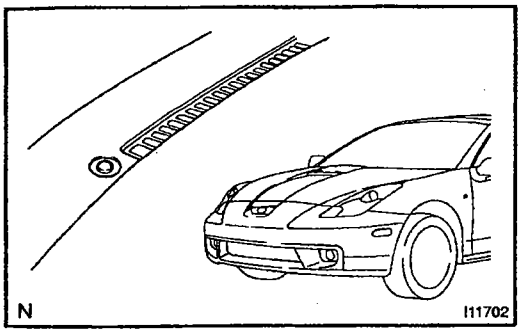
Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.



5. w/ Automatic light control system: INSPECT AUTOMATIC LIGHT CONTROL

(a) Turn the ignition switch ON and engine running.
(b) Turn the light control switch to OFF.
(c) Parking brake lever released.
(d) Gradually cover the top of the sensor.
(e) Verify that the accessory lights and the headlights turn ON. (Daytime running lights ON)

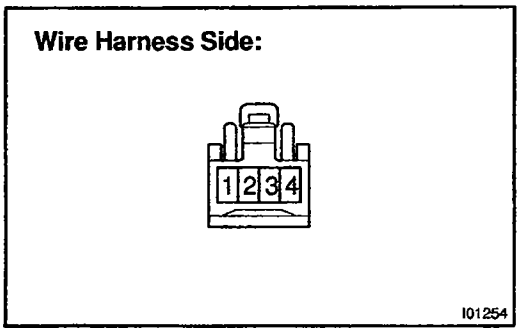


6. w/ Automatic light control system:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Gradually expose the sensor.
(b) Verify that the headlights and the accessory lights turn OFF.

7. w/ Automatic light control system:
INSPECT LIGHT–OFF CONDITION

(a) Turn the ignition switch ON.
(b) Gradually cover the top of the sensor.
Lights auto ON:
(c) Verify that the lights will go out when light control switch position is OFF or the area surrounding the sensor gets bright.

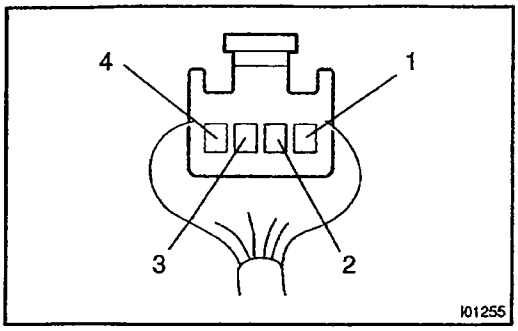


8. w/ Automatic light control system:
INSPECT SENSOR CIRCUIT

(a) Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage
4 – Ground	Ignition switch LOCK or ACC	No voltage
4 – Ground	Ignition switch ON	5.2 – 9.0 V

If circuit is as specified, perform the inspection on the following page.
If the circuit is not as specified, inspect the circuit connected to other parts.



(b) Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side.

HINT:

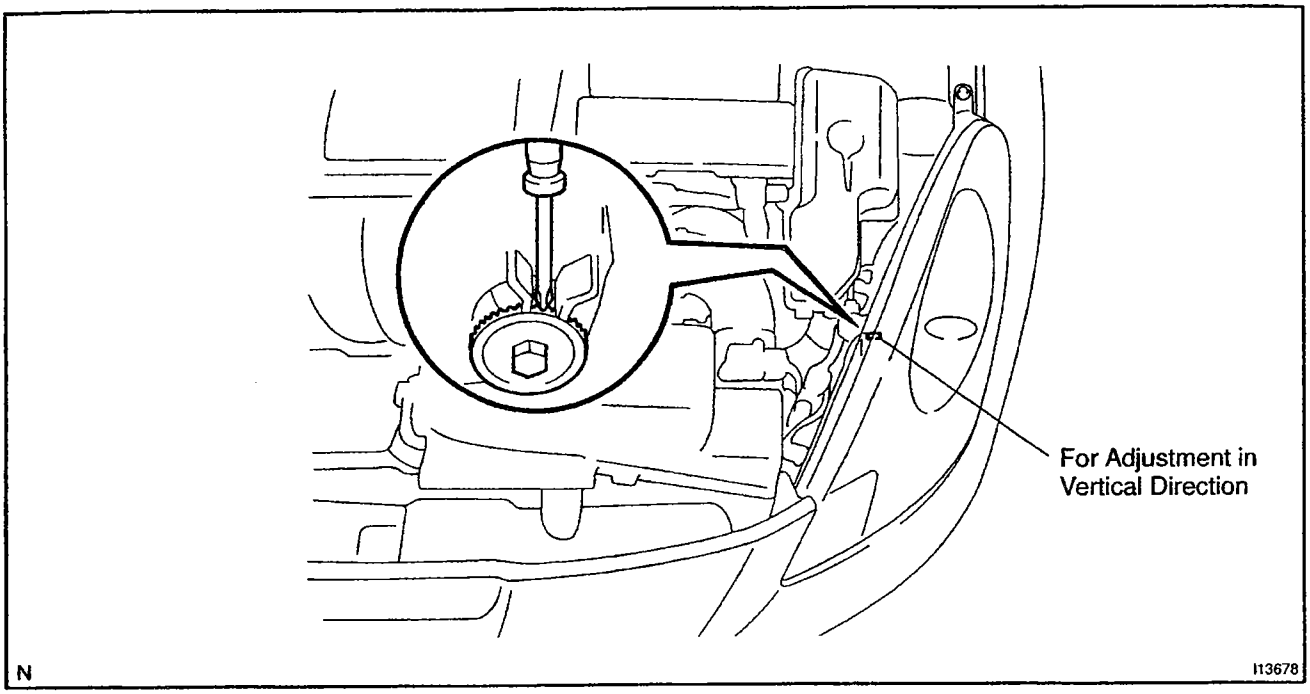
- Ignition switch ON.
- Light control switch OFF.
- Vehicle's surroundings are bright.

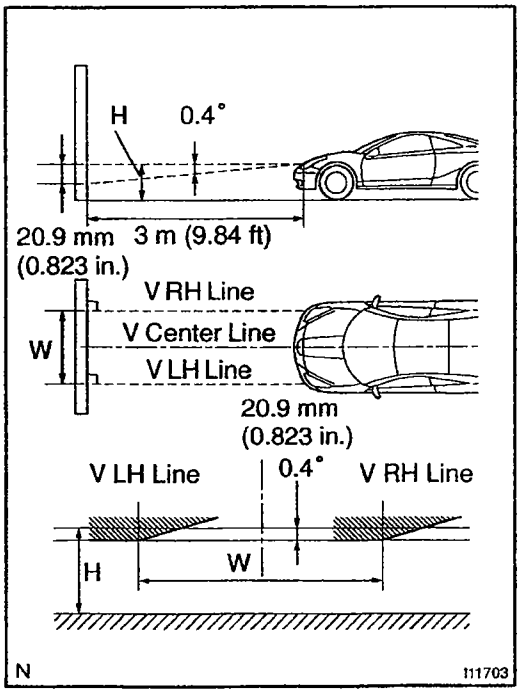
Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	9.5 V or more
Vehicle is under the direct sun light. (Sensor is not covered)		Taillight and Headlight are ON.

If circuit is as specified, try replacing the sensor with a new one.
If the circuit is not as specified, inspect the circuit connected to other parts.

BE1CY-01

ADJUSTMENT





ADJUST HEADLIGHT AIM ONLY

(a) Put the vehicle below conditions.
- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.
- Tire inflation pressure is the specified value.

(b) Prepare the thick white colored paper.

(c) Stand the paper perpendicularly and ensure the distance from it to the head lights is 3 m (9.84 ft).

(d) Ensure that the center line of vehicle and the paper are at a 90 degree angle as shown in the illustration.(H line)

(e) Draw a horizontal line on the paper where the head lights (low beam center mark) of the vehicle are to be.

(f) Draw a vertical line on the paper where the center line of the vehicle is to be. (V center line)

(g) Draw the vertical lines on the paper where the headlights (low beam center marks) of the vehicle are to be.(V RH and LH lines)

(h) Take an appropriate measure to avoid affecting the other light.

NOTICE:

- **Disconnect the connector of the other light to avoid heat affection from the light because the other lens of the head light assembly is made of synthetic resin. When connecting the connector again take care not to make the aiming out of adjustment.**
- **When covering the headlight, finish it within 3 minutes.**

(i) Turn the headlights ON.

(j) Check that the head lights light up the paper as shown in the illustration.

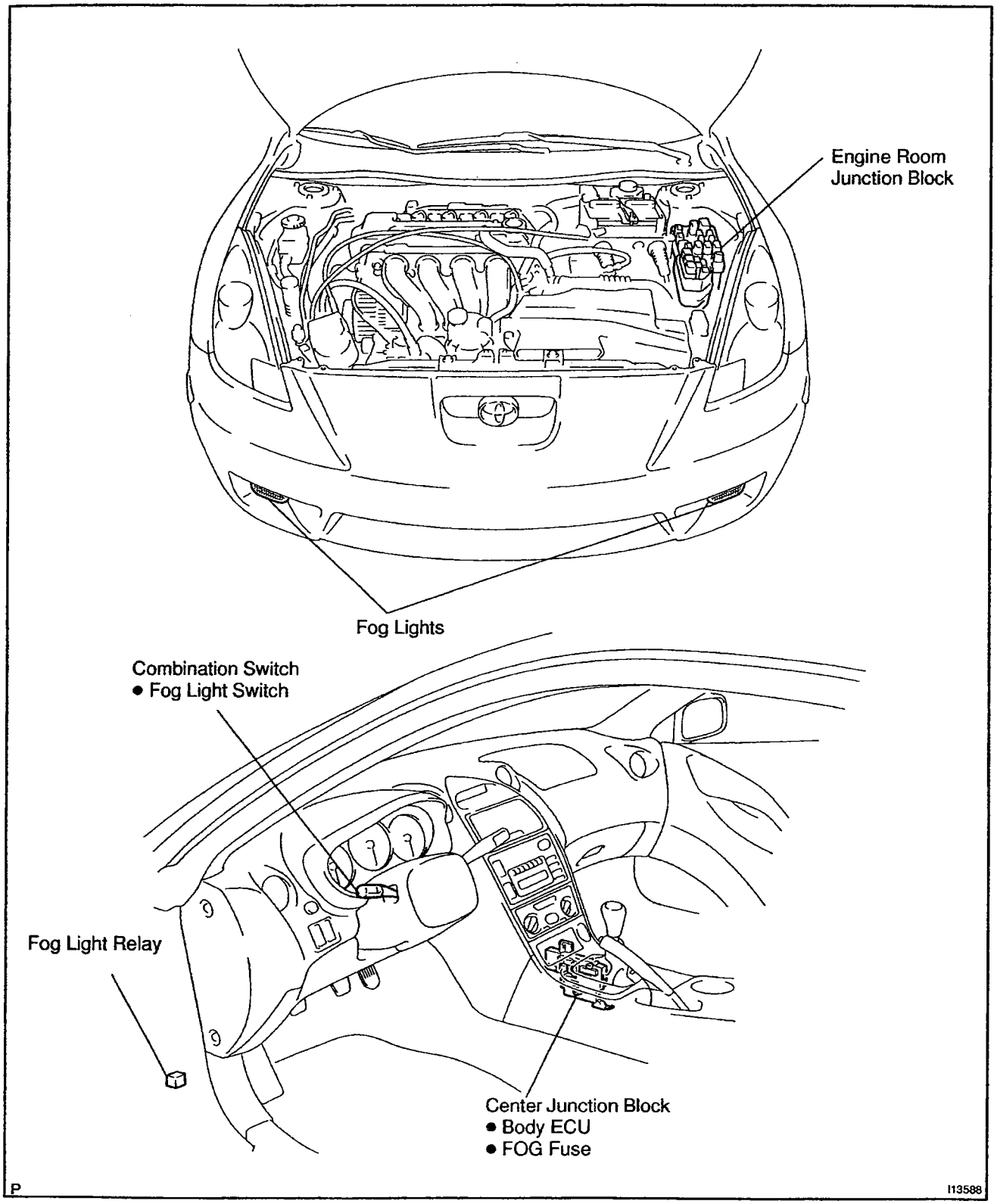
HINT:

As shown in the illustration, adjust aiming of the LH and RH lights respectively.

FOG LIGHT SYSTEM

LOCATION

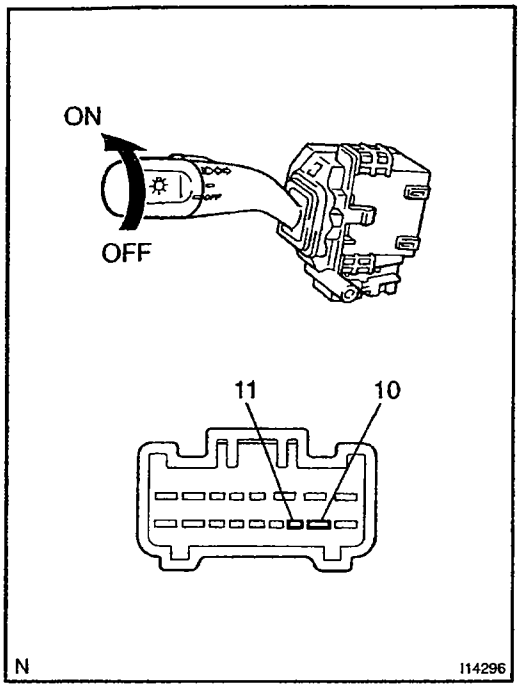
BE0OV–02



BE0OW-02

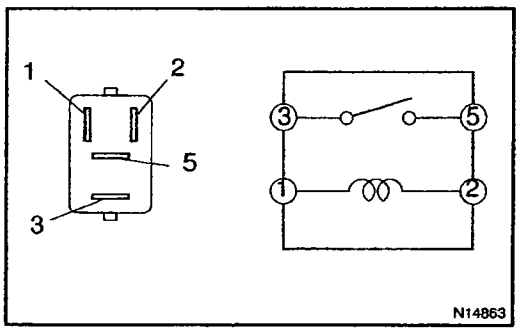
INSPECTION

1. INSPECT FRONT FOG LIGHT SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	10 – 11	Continuity

If continuity is not as specified, replace the switch.

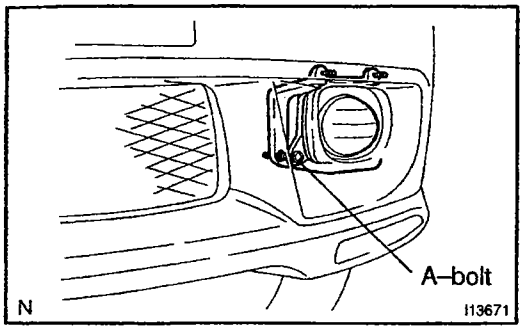


2. INSPECT FRONT FOG LIGHT RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

BE0OX–02



ADJUSTMENT

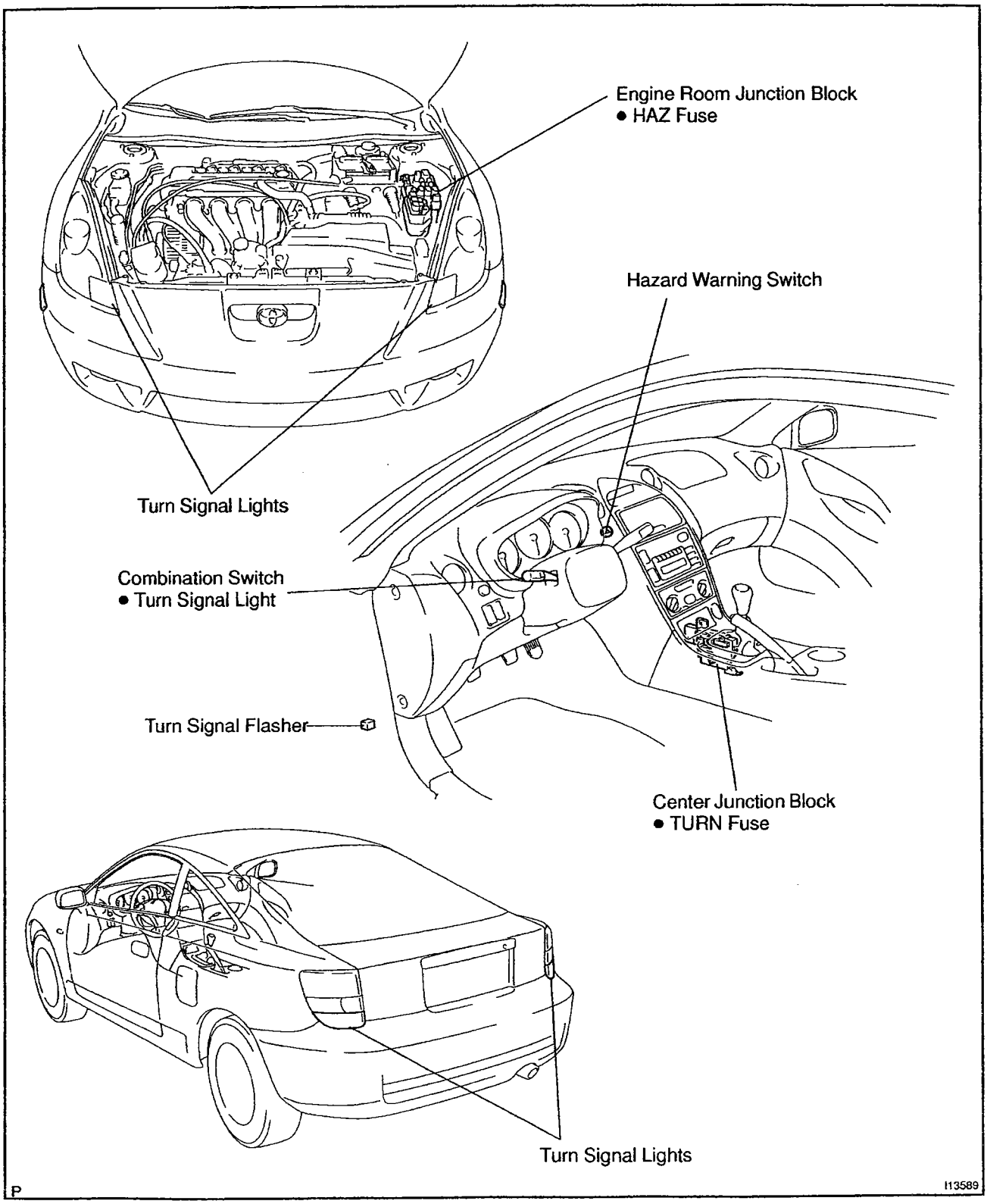
ADJUST FOG LIGHT AIM

A–bolt: Vertical Direction

TURN SIGNAL AND HAZARD WARNING SYSTEM

LOCATION

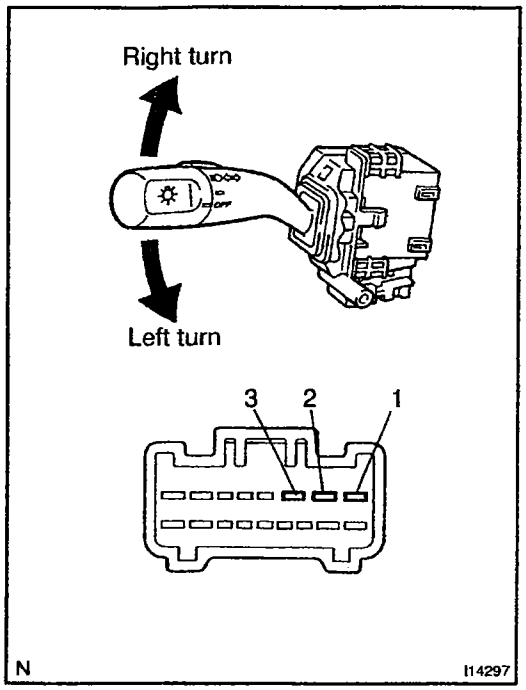
BE0OY–02



BE0OZ-02

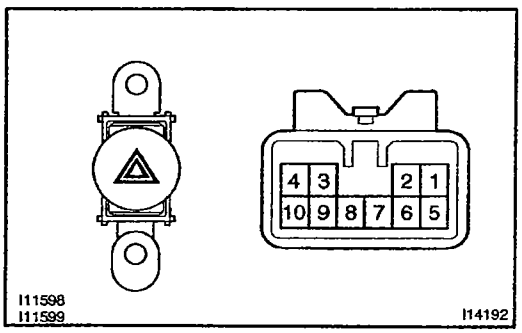
INSPECTION

1. INSPECT TURN SIGNAL SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
Left turn	1 – 2	Continuity
Neutral	–	No continuity
Right turn	2 – 3	Continuity

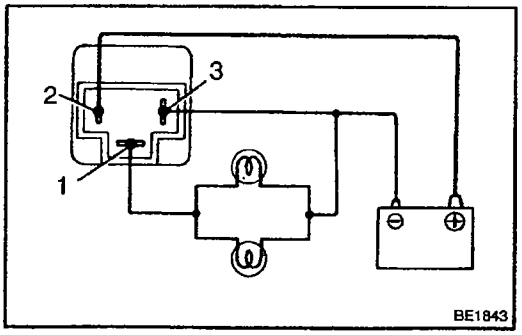
If continuity is not as specified, replace the switch.



2. INSPECT HAZARD WARNING SWITCH CONTINUITY

Condition	Tester connection	Specified condition
OFF	5 – 7	Continuity
ON	5 – 6, 1 – 2 – 4	Continuity
Illumination circuit	8 – 9	Continuity

If continuity is not as specified, replace the switch.



3. INSPECT TURN SIGNAL FLASHER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3.

(b) Connect the 2 turn signal light bulbs parallel to each other to terminals 1 and 3, check that the bulbs flash.

HINT:

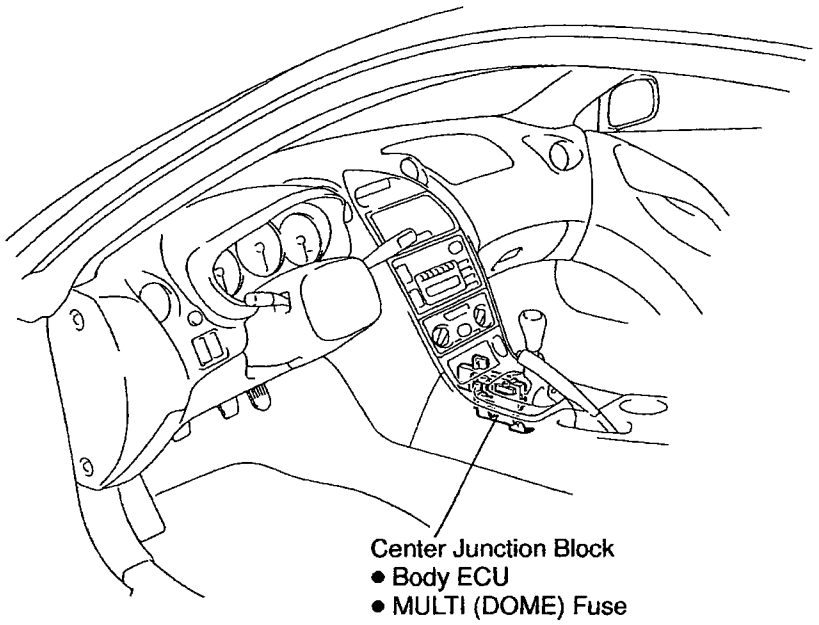
- The turn signal lights should flash 60 or 120 times per minute.
- If one of the front or rear turn signal lights has an open circuit, the number of flashers will be more than 140 per minute.

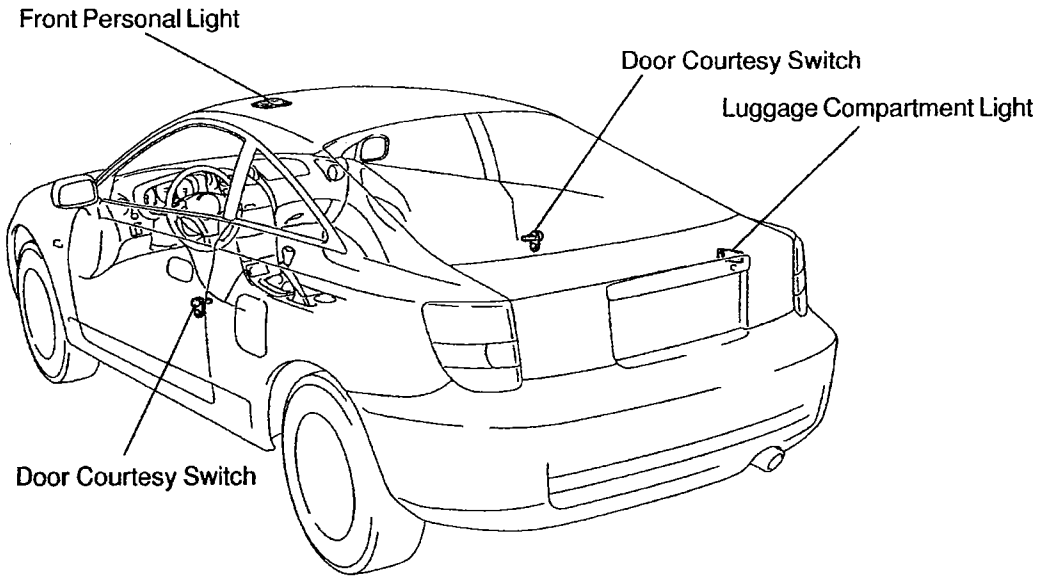
If operation is not as specified, replace the flasher.

INTERIOR LIGHT SYSTEM

LOCATION

BE0P0-02

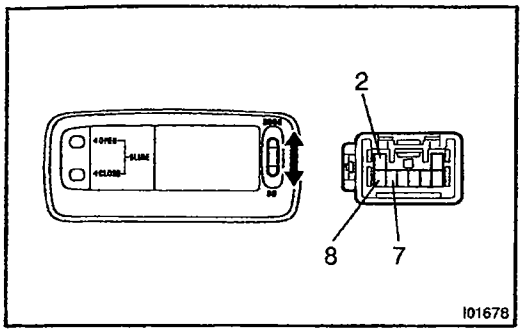




I13603

BE1CZ–01

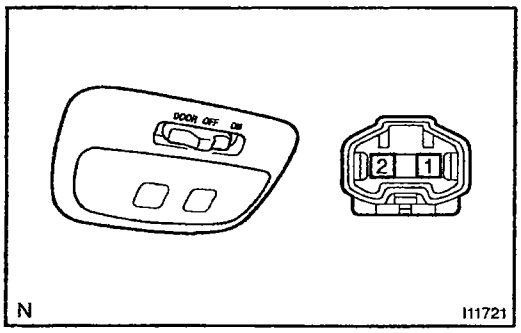
INSPECTION



1. w/ Sliding roof:
INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
DOOR	2 – 7	Continuity
ON	2 – 8	Continuity

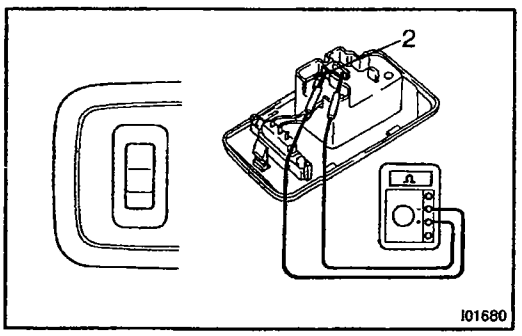
If continuity is not as specified, replace the light assembly or bulb.



2. w/o Sliding roof:
INSPECT FRONT PERSONAL LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the light assembly or bulb.

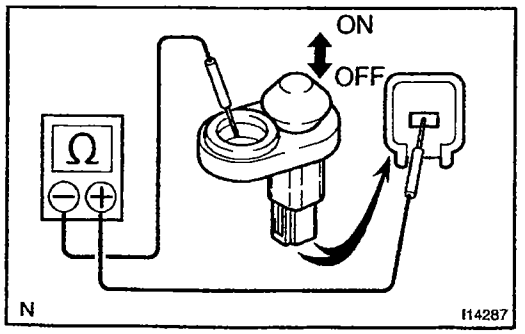


3. INSPECT REAR ROOM LIGHT CONTINUITY

(a) Disconnect the connector from the room light.

(b) Turn the room light switch ON, check that continuity exists between terminal 1 and 2.

If continuity is not as specified, replace the light assembly or bulb.

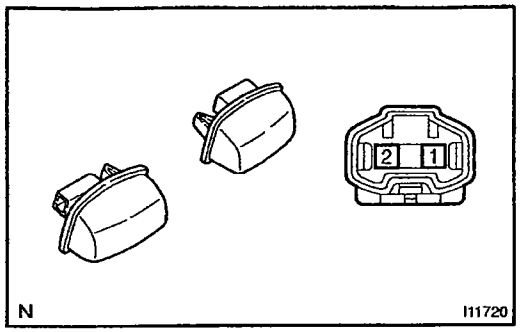


4. INSPECT DOOR COURTESY SWITCH CONTINUITY

(a) Check that continuity exists between terminals and the switch body with the switch ON (Switch pin released: opened door).

(b) Check that no continuity exists between terminals and the switch body with the switch OFF (Switch pin pushed in: closed door).

If operation is not as specified, replace the switch.



5. INSPECT LICENCE PLATE LIGHT CONTINUITY

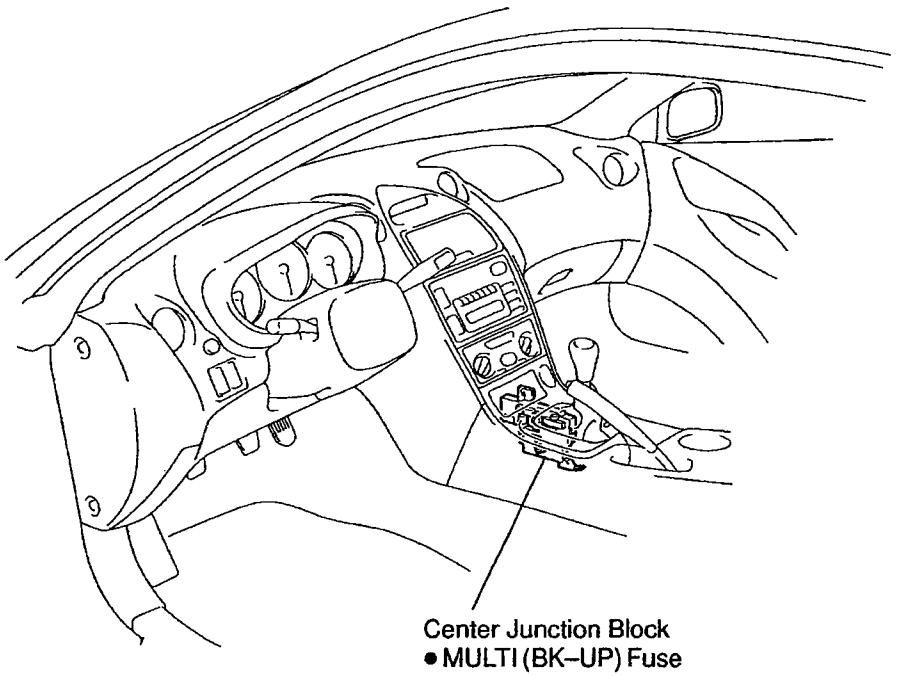
Using an ohmmeter, check that continuity exists between terminals.

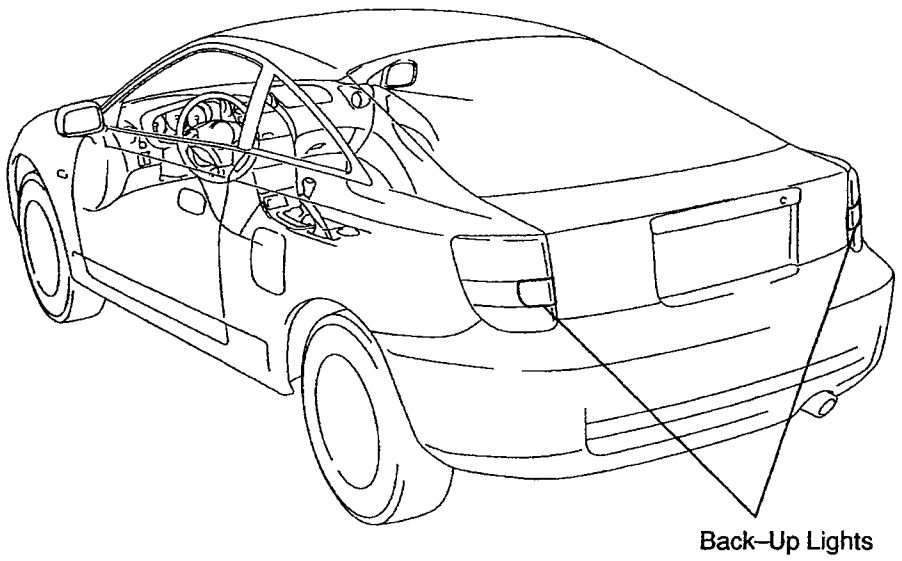
If continuity is not as specified, replace the light assembly or bulb.

BACK–UP LIGHT SYSTEM

LOCATION

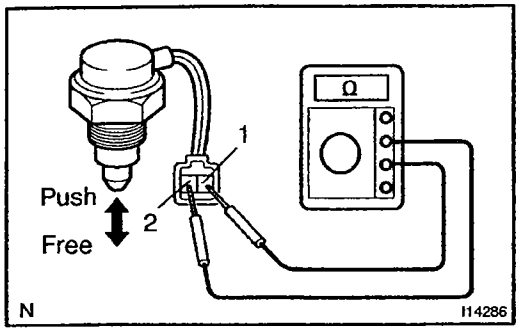
8E0P2-02





P

I13590



8E0P3-02

INSPECTION

1. INSPECT BACK–UP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Free	1 – 2	No continuity
Push	1 – 2	Continuity

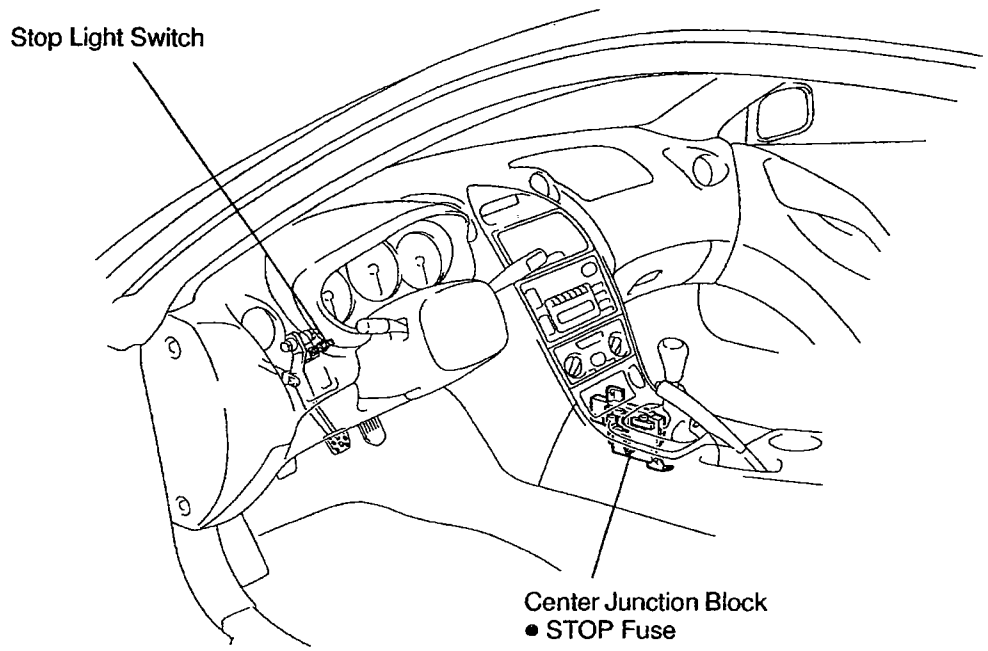
If continuity is not as specified, replace the switch.

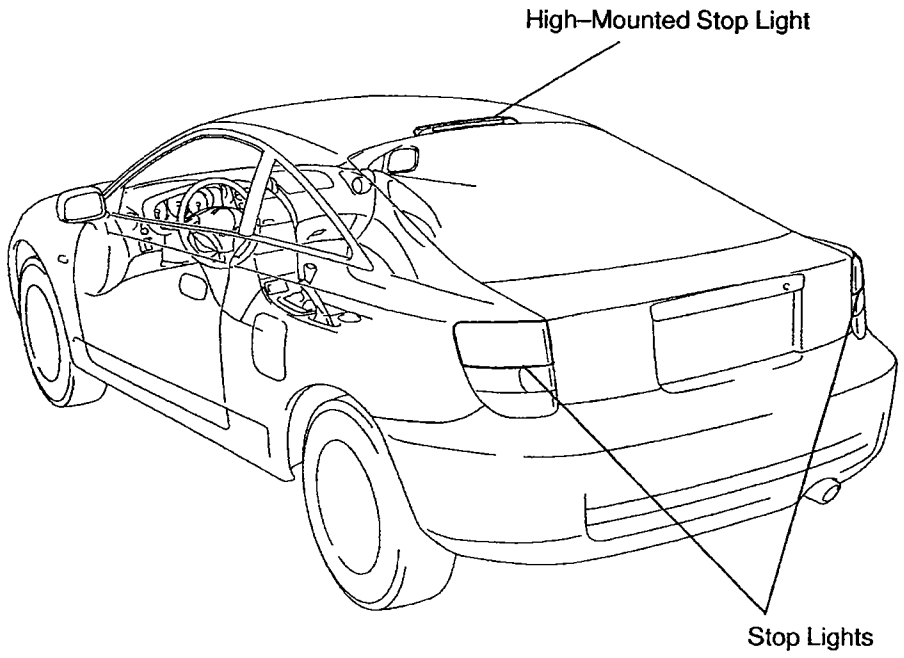
2. INSPECT PARK/NEUTRAL POSITION SWITCH CONTINUITY (See page DI–202, DI–261)

STOP LIGHT SYSTEM

LOCATION

BE0P4–02





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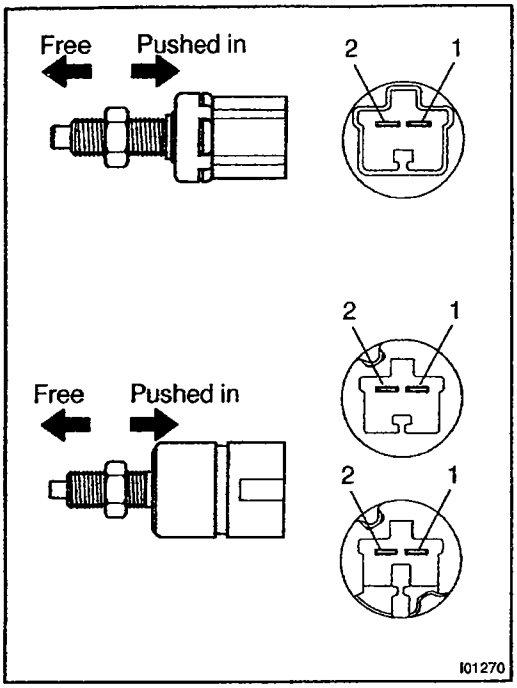
I13601

BE1D0-01

INSPECTION

INSPECT STOP LIGHT SWITCH CONTINUITY

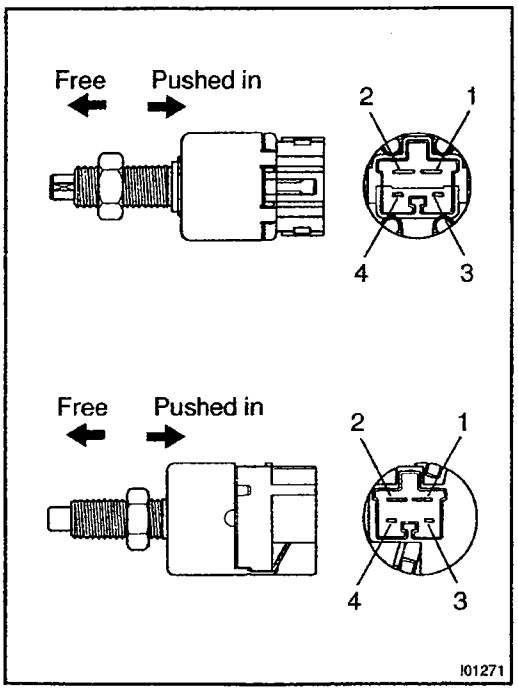
w/o cruise control system:



Switch position	Tester connection	Specified condition
Switch pin pushed in (Pedal released)	–	No continuity
Switch pin free (Pedal depressed)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

w/ cruise control system:



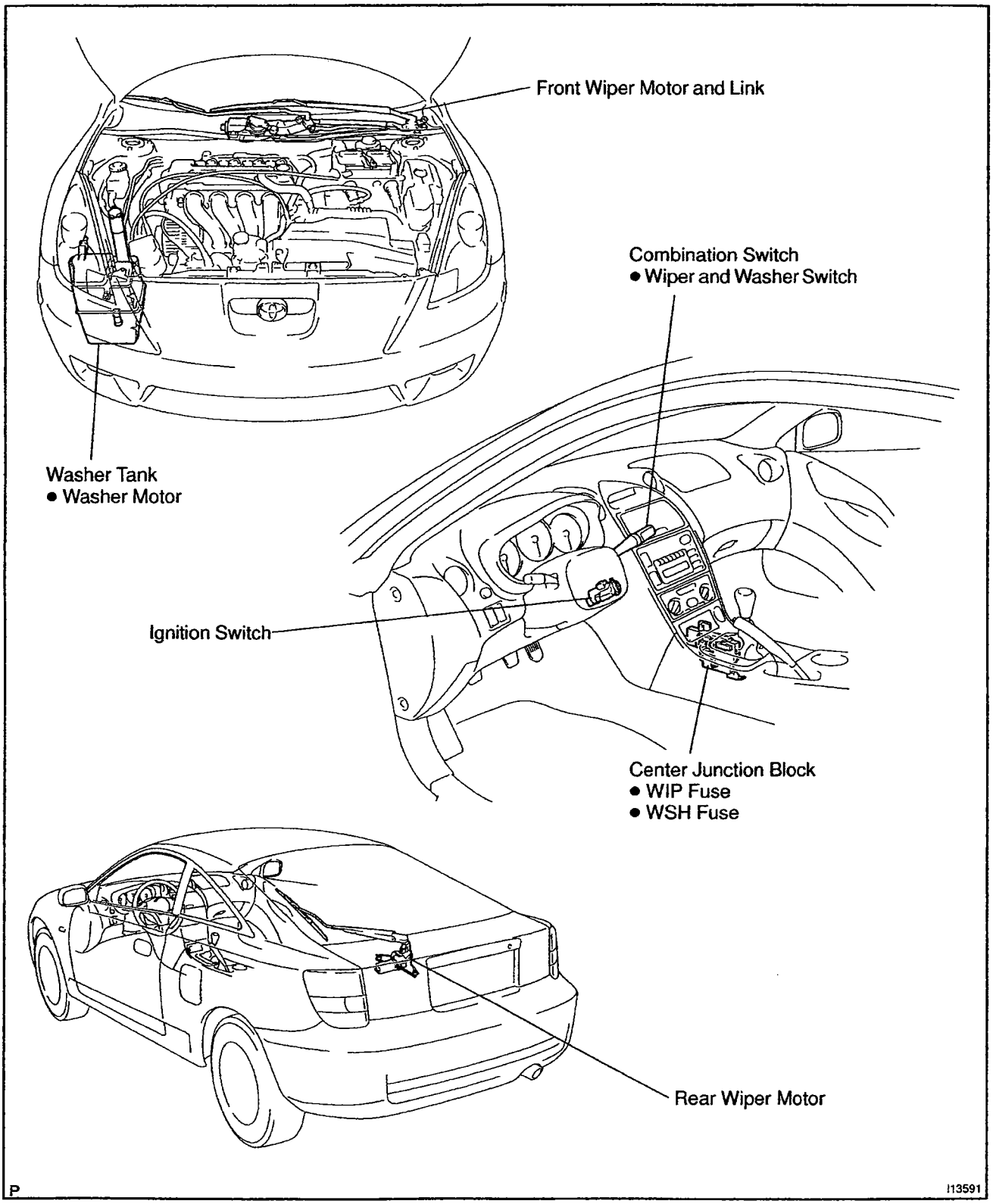
Switch position	Tester connection	Specified condition
Switch pin pushed in (Pedal released)	–	No continuity
Switch pin free (Pedal depressed)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

WIPER AND WASHER SYSTEM

LOCATION

BE0P5-02



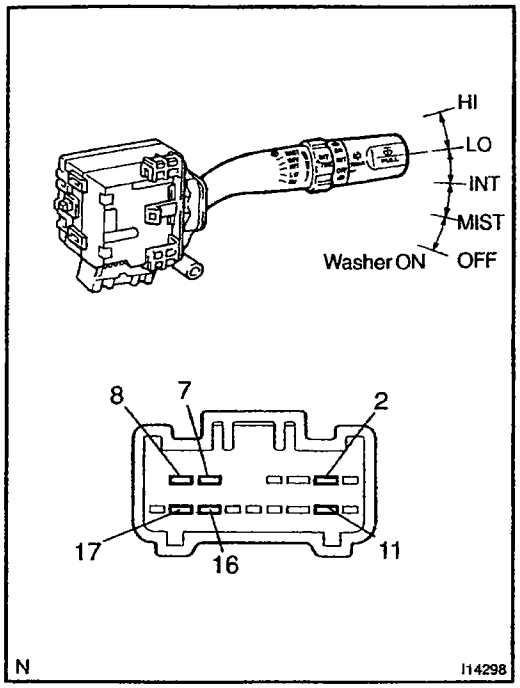
BE0P7-02

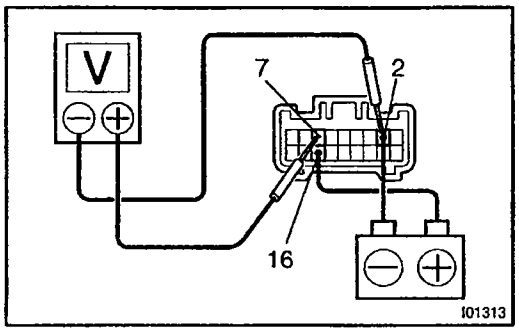
INSPECTION

1. INSPECT FRONT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	7 – 16	Continuity
MIST (w/ Mist wiper)	7 – 17	Continuity
INT (w/ Intermittent wiper)	7 – 16	Continuity
LO	7 – 17	Continuity
HI	8 – 17	Continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.





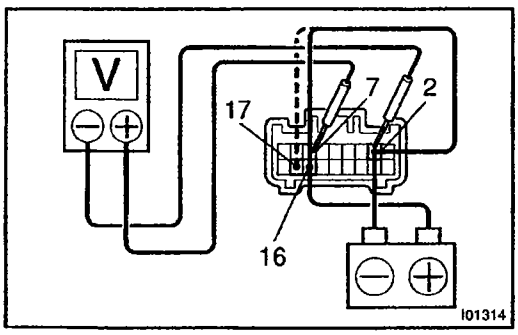
2. INSPECT FRONT WIPER INTERMITTENT OPERATION

(a) Turn the wiper switch to INT position.

(b) Turn the intermittent time control switch to FAST position.

(c) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

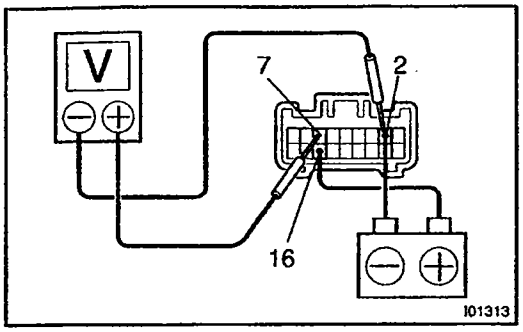
(d) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2, check that the meter needle indicates battery voltage.



(e) After connecting terminal 16 to terminal 17, connect to terminal 2 to terminal 17, check the voltage rises from 0 volts to battery voltage with in the times, as shown in the table.

INT time control switch position	**Voltage**
FAST	Approx. 1 ~ 3 sec. ←Battery voltage ←0 Volt
SLOW	Approx. 10 ~ 15 secs. ←Battery voltage ←0 Volt

If operation is not as specified, replace the wiper and washer switch.

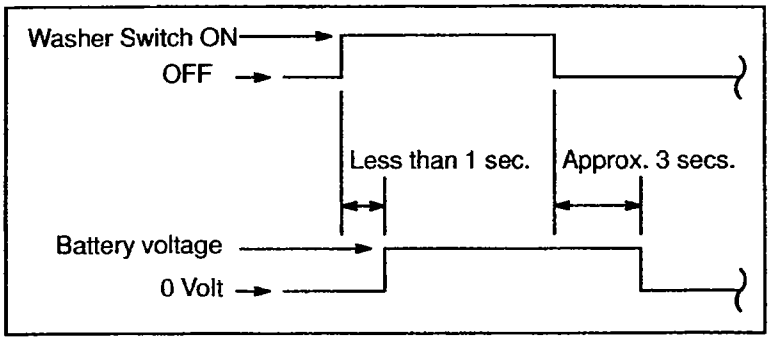


3. INSPECT FRONT WASHER LINKED OPERATION

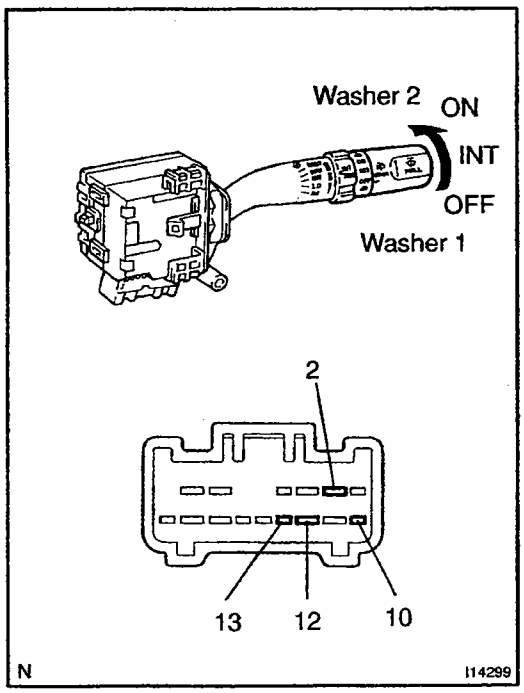
(a) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

(b) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2.

(c) Push in the washer switch, and check that the voltage changes, as shown in the table.



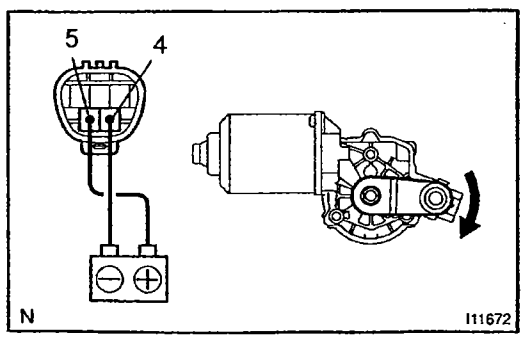
If operation is not as specified, replace the wiper and washer switch.



4. INSPECT REAR WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Washer 1	2 – 12	Continuity
OFF	–	No continuity
INT	2 – 13	Continuity
ON	2 – 10	Continuity
Washer 2	2 – 10 – 12	Continuity

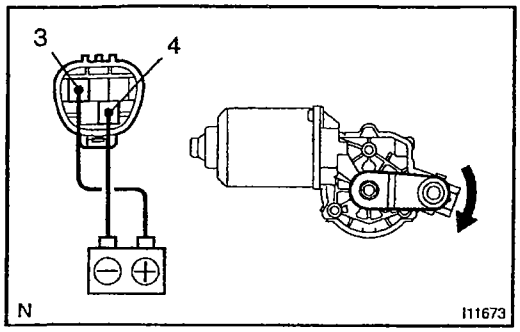
If continuity is not as specified, replace the switch.



5. Low Speed: INSPECT FRONT WIPER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 4, check that the motor operates at low speed.

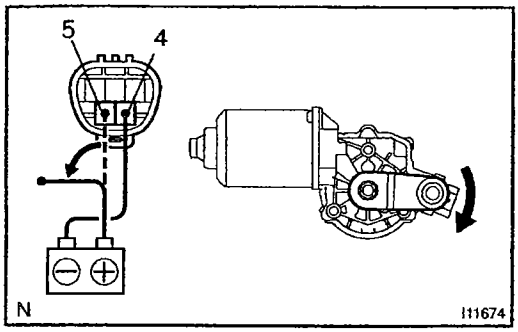
If operation is not as specified, replace the motor.



6. High Speed:
INSPECT FRONT WIPER MOTOR OPERATION

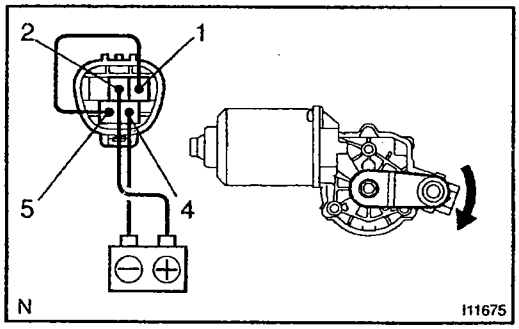
Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 4, check that the motor operates at high speed.

If operation is not as specified, replace the motor.



7. Stopping at Stop Position:
INSPECT FRONT WIPER MOTOR OPERATION

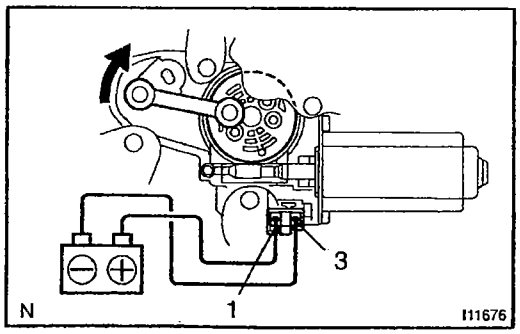
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 5.



(b) Connect terminals 1 and 5.

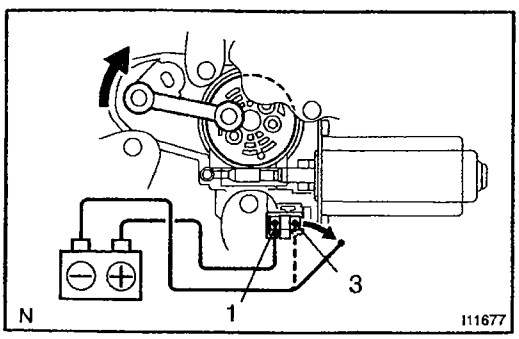
(c) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 4, check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.



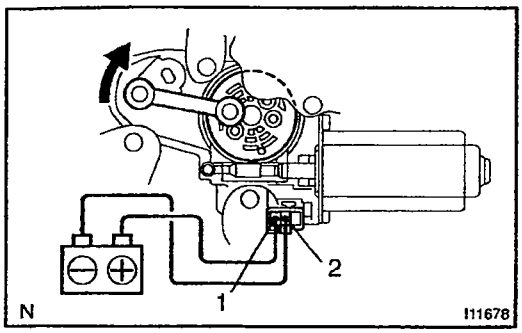
8. INSPECT REAR WIPER MOTOR AND RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, and the negative (–) lead to terminal 3 and the motor body, check that the motor operates.



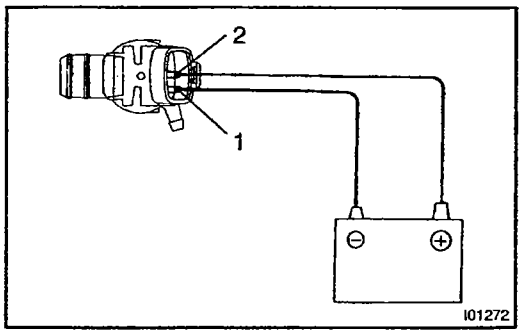
(b) Disconnect the negative (–) lead from terminal 3, check that the motor stops running at the stop position.

If operation is not as specified, replace the motor and relay.



9. Intermittent:
INSPECT REAR WIPER MOTOR AND RELAY OPERATION

Connect the positive (+) lead from the battery to terminal 1, and the negative (–) lead to terminal 2 and the motor body, check that the motor operates intermittently for 9 – 15 seconds.
If operation is not as specified, replace the motor and relay.



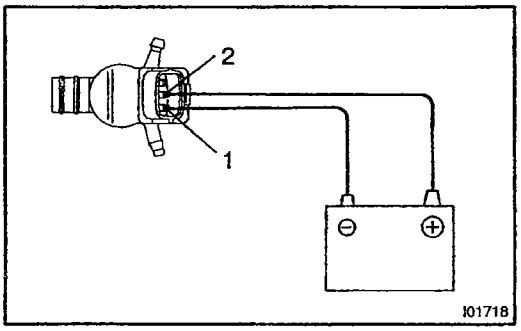
10. w/o Rear wiper:
INSPECT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



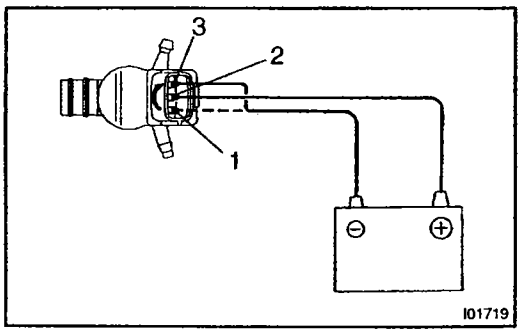
11. w/ Rear wiper:
INSPECT FRONT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



12. w/ Rear wiper:
INSPECT REAR WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, check that the motor operates.

NOTICE:

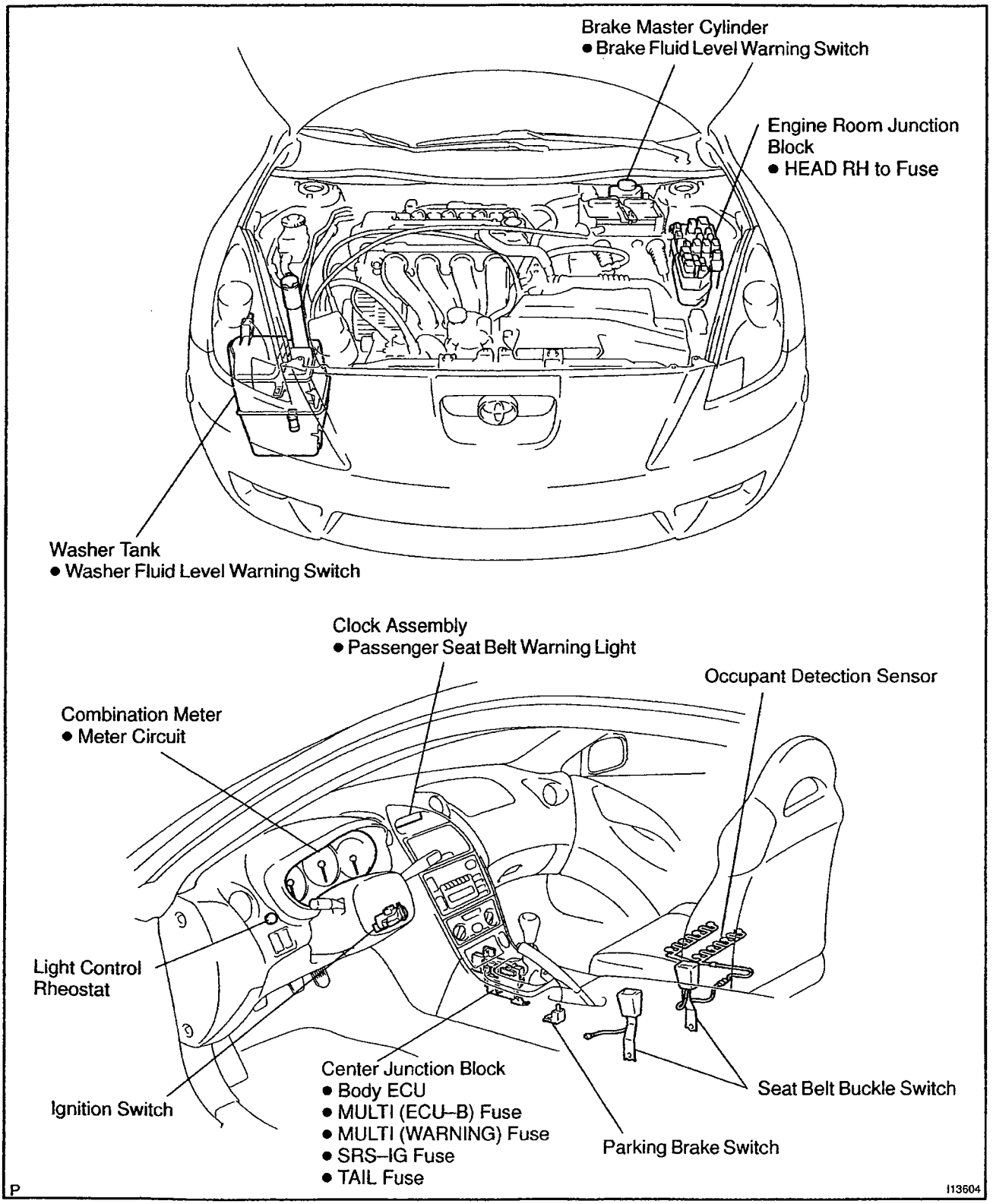
These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

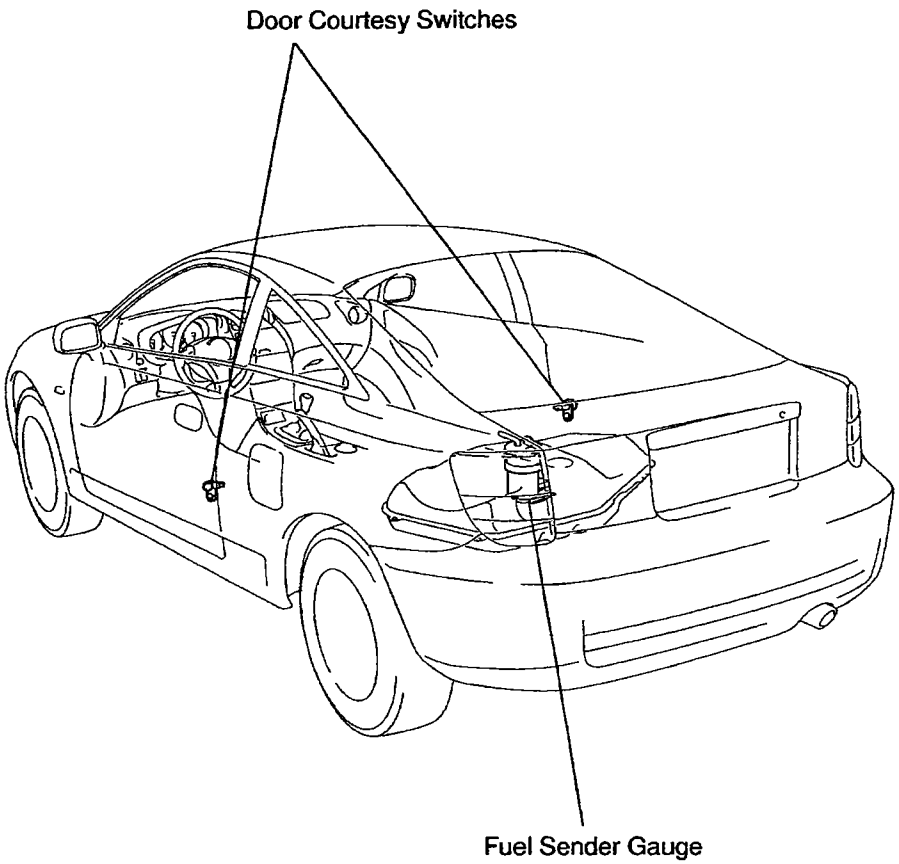
If operation is not as specified, replace the motor.

COMBINATION METER

LOCATION

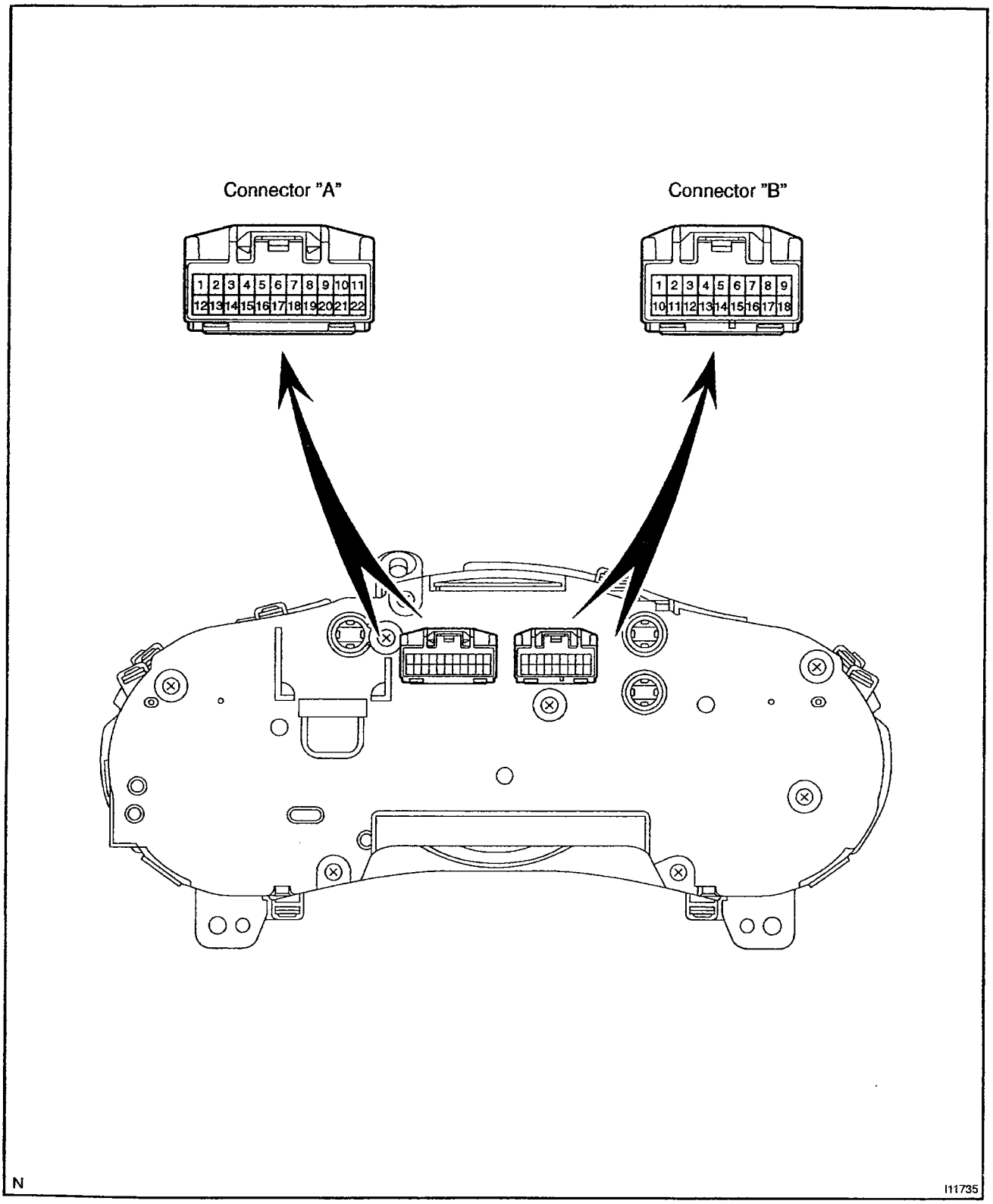
BE1D1–01



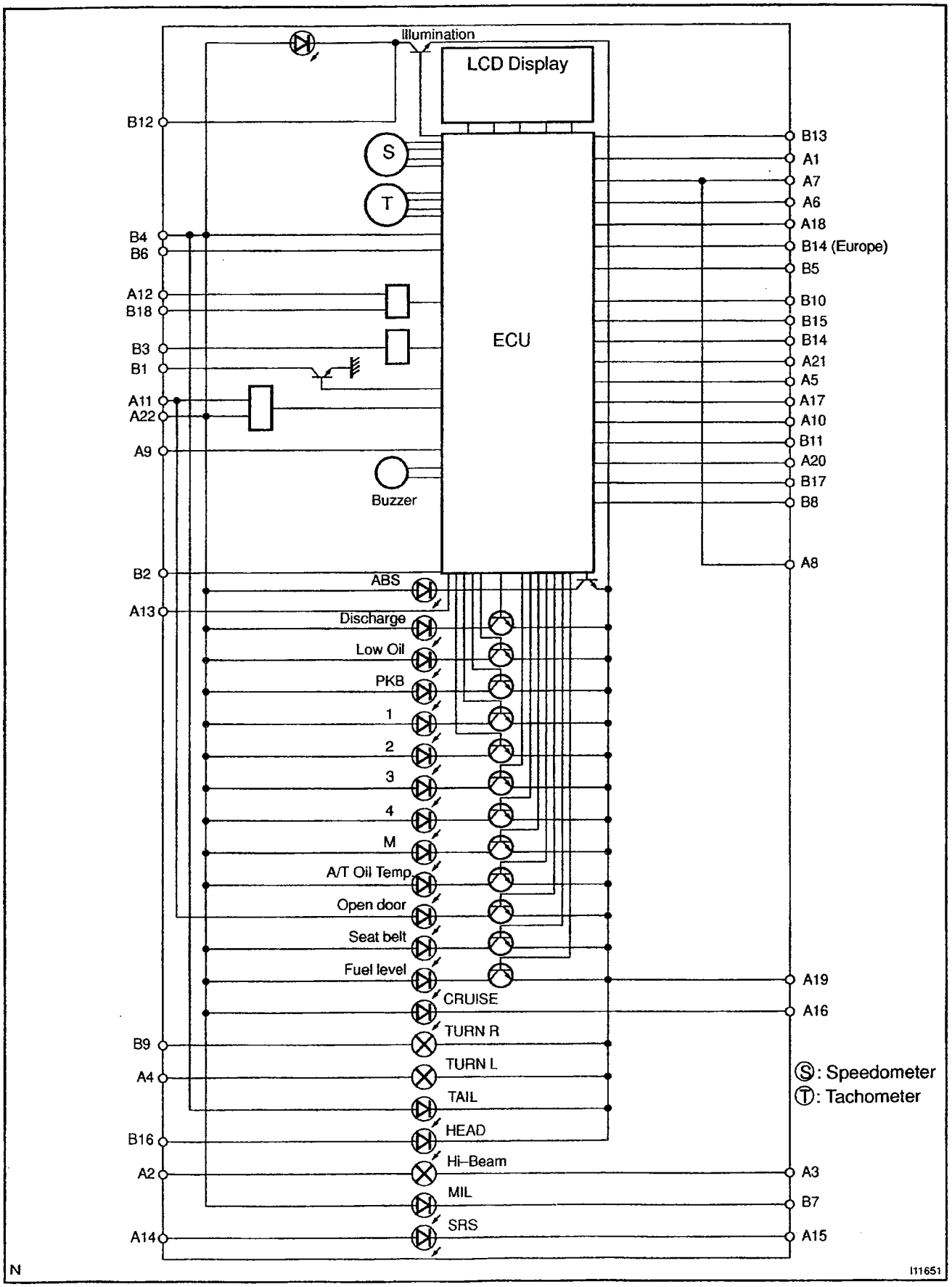


P

I13605


Connector "A"
Connector "B"
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
N
I11735

CIRCUIT

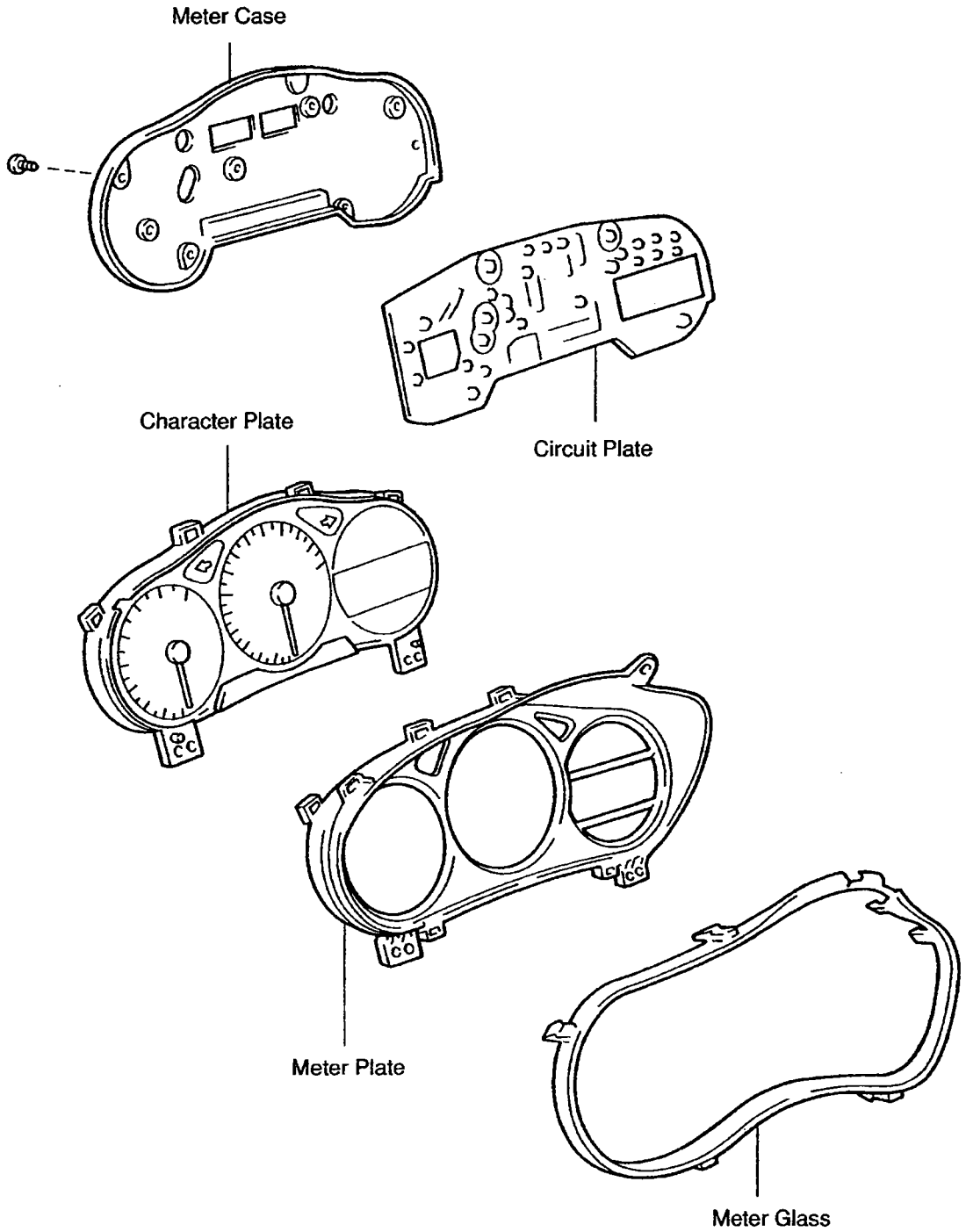

Illumination
LCD Display
ECU
S
T
Buzzer
B12
B4
B6
A12
B18
B3
B1
A11
A22
A9
B2
A13
B9
A4
B16
A2
A14
B13
A1
A7
A6
A18
B14 (Europe)
B5
B10
B15
B14
A21
A5
A17
A10
B11
A20
B17
B8
A8
A19
A16
A3
B7
A15
ABS
Discharge
Low Oil
PKB
1
2
3
4
M
A/T Oil Temp
Open door
Seat belt
Fuel level
CRUISE
TURN R
TURN L
TAIL
HEAD
Hi–Beam
MIL
SRS
Ⓢ: Speedometer
Ⓣ: Tachometer
N
I11651

No.		Wiring connector side
A	1	Sport mode switch
	2	Headlight dimmer switch
	3	Headlight
	4	Turn signal switch (Left side)
	5	Light control rheostat
	6	Evaporator temp. sensor
	7	Ground
	8	Ground
	9	Speed control unit
	10	Ground
	11	ECU–B Fuse
	12	ECM (MPX circuit)
	13	Heater main relay
	14	SRS Fuse
	15	Airbag sensor assembly
	16	Cruise control ECU
	17	Light control rheostat
	18	Evaporator temp. sensor
	19	Ground
	20	Speed sensor (SI terminal)
	21	Back–up light switch
	22	WARNING Fuse
B	1	Generator
	2	Clock (Passenger seat belt warning)
	3	Body ECU
	4	TAIL Fuse
	5	A/C ECU
	6	ECM (Tacho signal)
	7	ECM
	8	ABS ECU (Parking brake switch signal)
	9	Turn signal switch (Right side)
	10	A/C control panel (A/C switch indicator)
	11	ABS ECU
	12	Automatic light control sensor
	13	O/D off switch
	14	Front defogger switch
	15	A/C switch
	16	HEAD RH–LO Fuse
	17	ABS ECU
	18	ECM (MPX circuit)

MPX: Multiplex communication
Temp. : Temperature

BE1D2-01

COMPONENTS



N

I11729

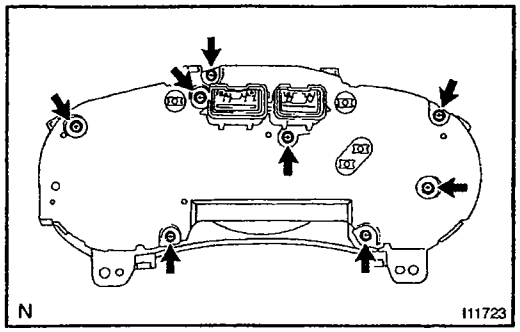
BE1D3-01

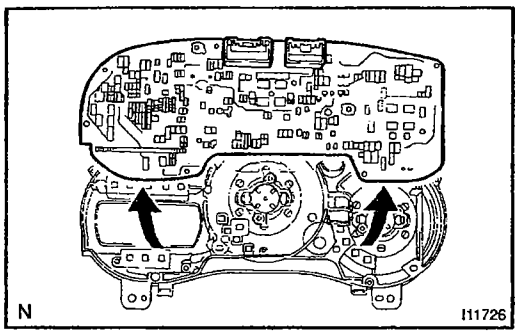
DISASSEMBLY

COMBINATION METER COVER:

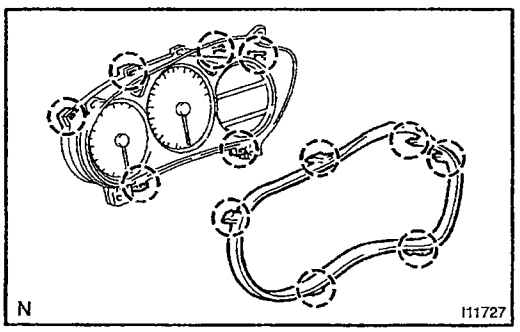
(a) Remove the 8 screws.

(b) Remove the combination meter cover.

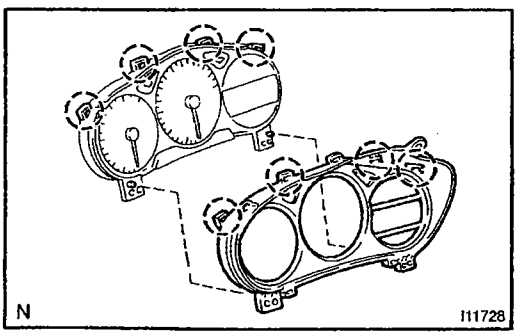




(c) Remove the meter circuit plate.



(d) Remove the 6 clips and the meter glass.



(e) Remove the 4 clips and the meter plate.

BE1D4–01

INSPECTION

1. INSPECT SPEEDOMETER ON–VEHICLE

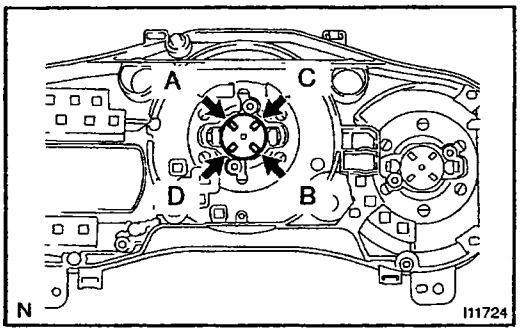
Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT:

Tire wear and tire over or under inflation will increase the indication error.

If error is excessive, replace the speedometer.

USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	19 – 22	20	18 – 23
40	39 – 42.5	40	40 – 44
60	59.5 – 63.5	60	60 – 64.5
80	80 – 85	80	80 – 85
100	100 – 105.5	100	100 – 105
120	120 – 125.5	120	120 – 125.5
		140	140 – 146
		160	160 – 167

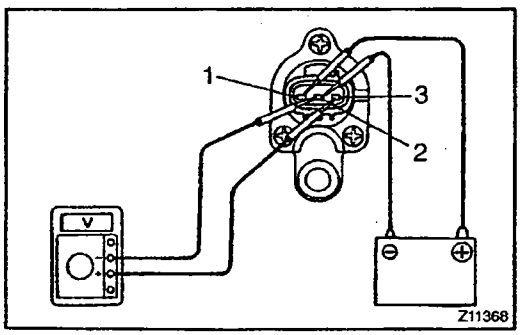


2. INSPECT SPEEDOMETER RESISTANCE

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	250
C – D	250

If resistance value is not as specified, replace the meter.



3. INSPECT VEHICLE SPEED SENSOR OPERATION

(a) Connect the positive (+) lead from battery to terminal 1 and negative (–) lead to terminal 2.

(b) Connect the positive (+) lead from tester to terminal 3 and negative (–) lead to terminal 2.

(c) Rotate shaft.

(d) Check that there is voltage change from approx. 0 V to 11 V or more between terminals 2 and 3.

HINT:

The voltage change should be 4 times for every revolution of the speed sensor shaft.

If operation is not as specified, replace the sensor.

4. INSPECT TACHOMETER ON–VEHICLE

(a) Connect a tune–up test tachometer, and start the engine.

NOTICE:

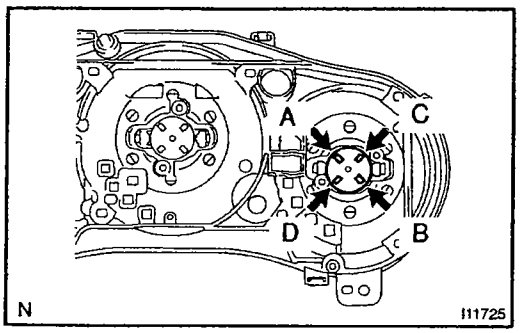
Reversing the connection of the tachometer will damage the transistors and diodes inside.

(b) Compare the tester indications with tachometer indications.

RPM (DC 13.5 V, 25 °C (77 °F))

Standard indication	Allowable range
700	700 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,800 – 6,200
7,000	6,800 – 7,200

If error is excessive, replace the tachometer.

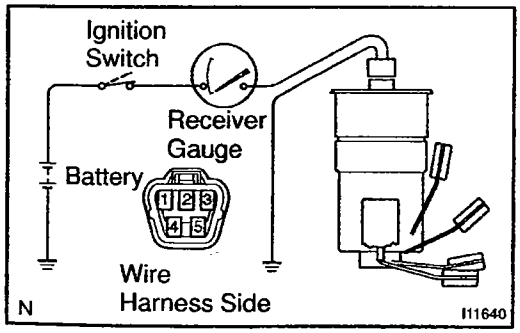


5. INSPECT TACHOMETER RESISTANCE

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	250
C – D	250

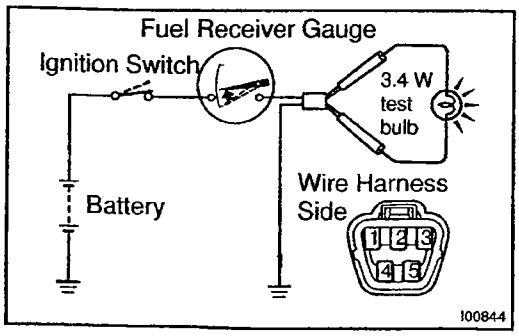
If resistance value is not as specified, replace the meter.



6. INSPECT FUEL RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge assembly.

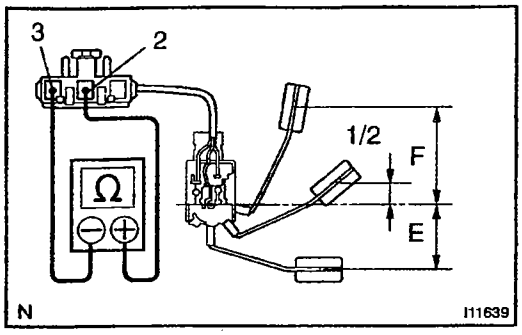
(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.



(c) Connect terminals 2 and 3 of the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and receiver gauge needle indicators EMPTY.

If operation is not as specified, inspect the sender gauge resistance.



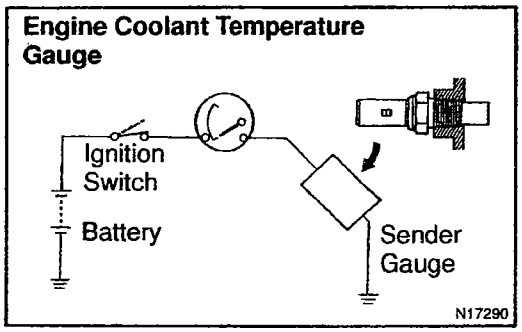
7. INSPECT FUEL SENDER GAUGE RESISTANCE

Measure the resistance between terminals 2 and 3 for each float position.

Float position: mm (in.)	Resistance (Ω)
F: Approx. 75.9 (2.99)	Approx. 3.0
1/2: Approx. 17.2 (0.68)	Approx. 31.6
E: Approx. 50.8 (2.00)	Approx. 110.0

If resistance value is not as specified, replace the sender gauge.

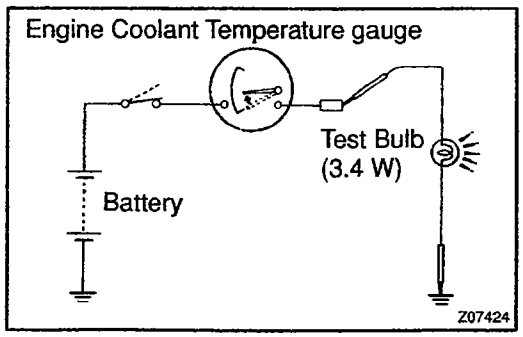
If resistance value is as specified, replace the combination meter.



8. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates COOL.

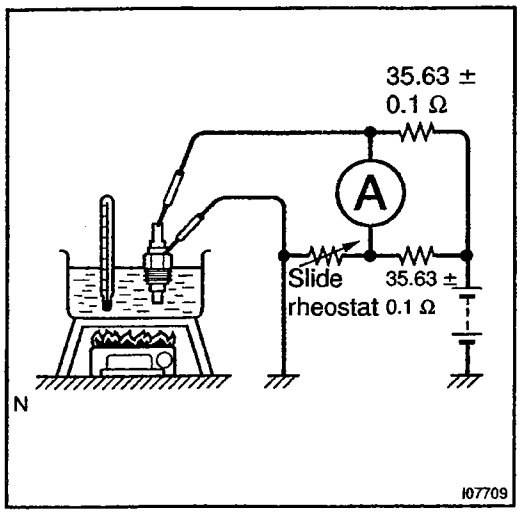


(c) Ground terminal of the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves toward the hot side.

If operation is not as specified, inspect the sender gauge.

Then recheck the system.



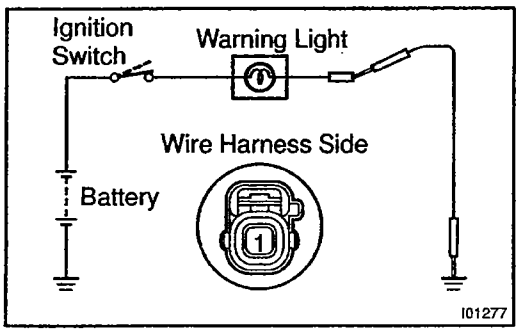
9. INSPECT ENGINE COOLANT TEMPERATURE SENDER GAUGE RESISTANCE

Connect the wire harness as shown in the illustration, and adjust the ammeter pointer to indicate "0" using the slide rheostat, then read the rheostat indication.

Temperature °C (°F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2

If resistance value is not as specified, replace the engine coolant temperature sender gauge.

If resistance value is as specified, replace the combination meter.

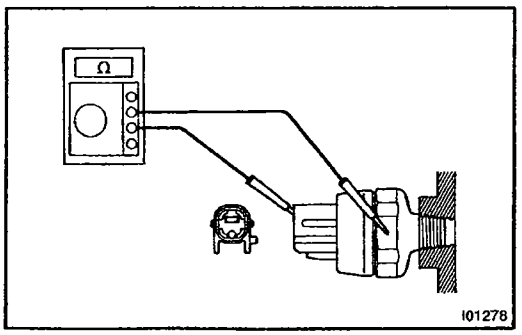


10. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal of the wire harness side connector.

(b) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb or inspect wire harness.



11. INSPECT LOW OIL PRESSURE SWITCH CONTINUITY

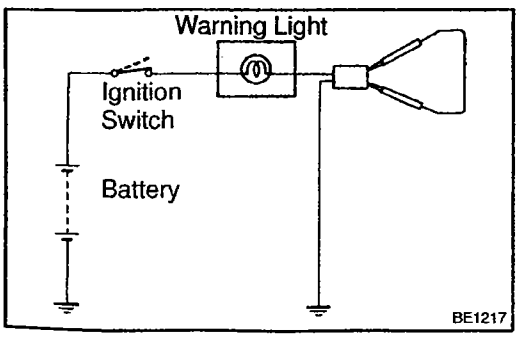
(a) Check that continuity exists between terminal and ground with the engine stopped.

(b) Check that no continuity exists between terminal and ground with the engine running.

HINT:

Oil pressure should be over 24.5 kPa (0.25 kgf/cm^2, 3.55 psi)

If operation is not as specified, replace the switch.



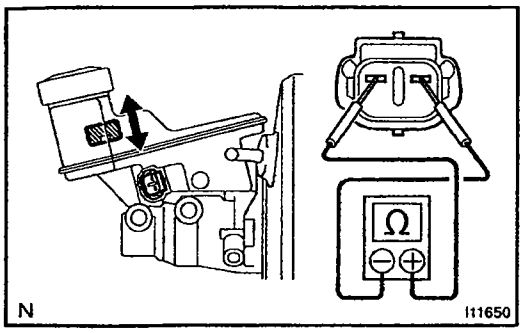
12. INSPECT BRAKE WARNING SYSTEM LIGHT

(a) Disconnect the connector from the brake fluid warning switch.

(b) Connect terminals of the wire harness side of the level warning switch connector.

(c) Start the engine, check that the warning light lights up.

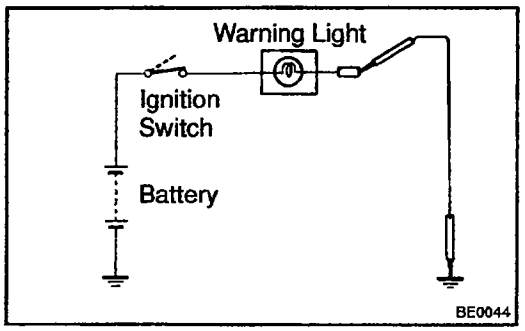
If the warning light does not light up, test the bulb or wire harness.



13. INSPECT BRAKE FLUID LEVEL WARNING SWITCH CONTINUITY

(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the connector.
(c) Check that no continuity exists between terminals with the switch OFF (float up).
(d) Use syphon, etc. to take fluid out of the reservoir tank.
(e) Check that continuity exists between terminals with the switch ON (float down).
(f) Pour the fluid back in the reservoir tank.

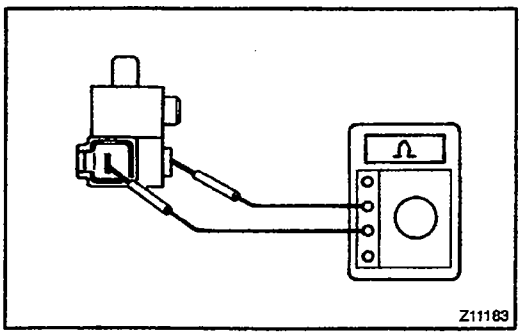
If operation is not as specified, replace the switch.



14. INSPECT PARKING BRAKE WARNING LIGHT

(a) Disconnect the connector from the parking brake switch.
(b) Ground terminal of the wire harness side connector.
(c) Start the engine, check that the warning light lights up.

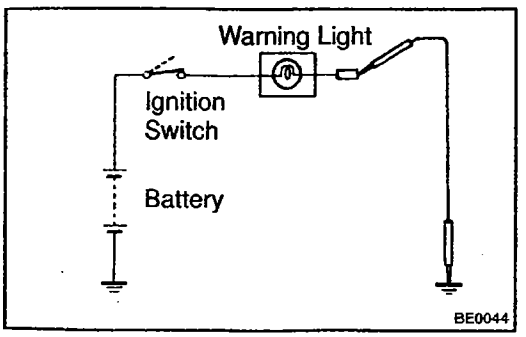
If the warning light does not light up, test the bulb or inspect wire harness.



15. INSPECT PARKING BRAKE SWITCH CONTINUITY

(a) Check that continuity exists between terminal and switch body with the switch ON (switch pin released).
(b) Check that no continuity exists between terminal and switch body with the switch OFF (switch pin pushed in).

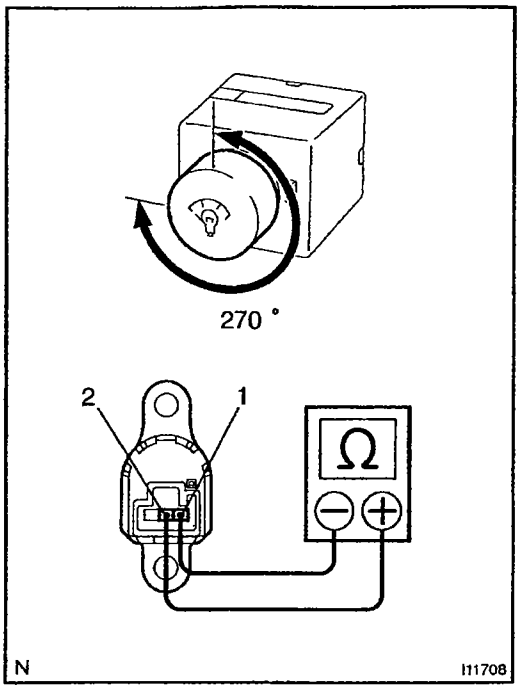
If operation is not as specified, replace the switch or inspect ground point.



16. INSPECT OPEN DOOR WARNING LIGHT

Disconnect the connector from the door courtesy switch, and ground terminal 1 of the wire harness side connector and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.



17. INSPECT LIGHT CONTROL RHEOSTAT OPERATION

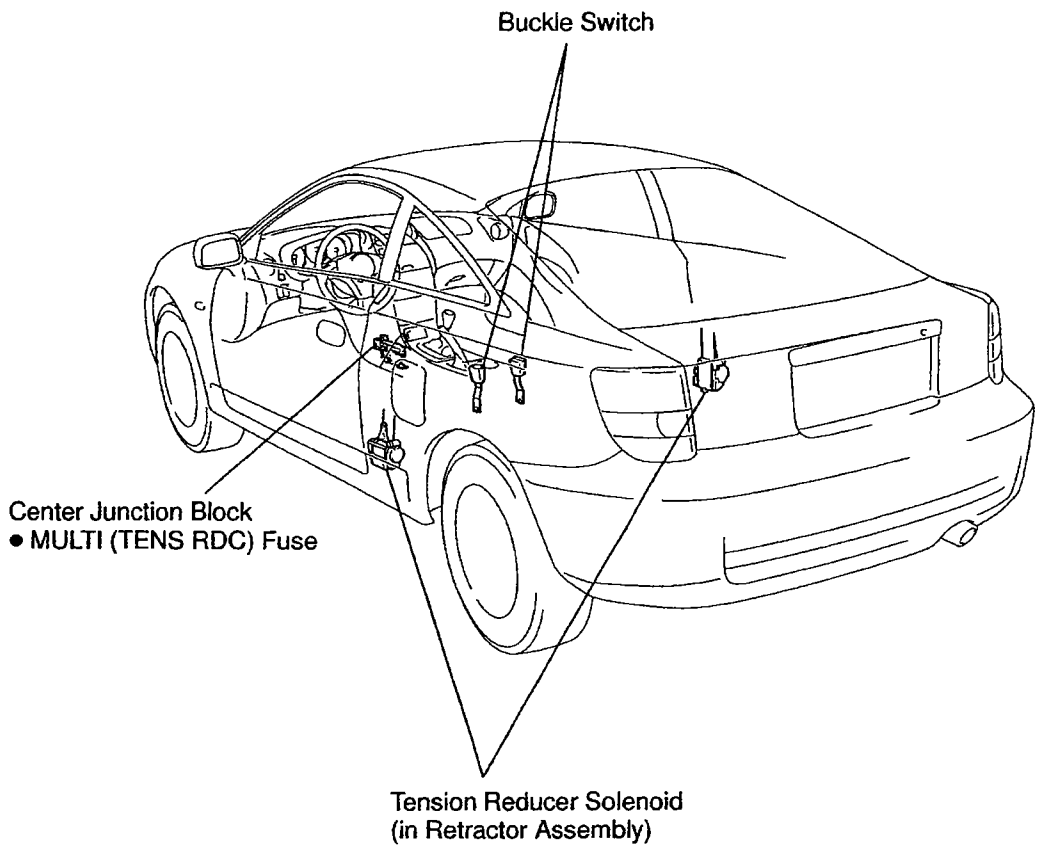
Gradually, turn the rheostat knob from the bright side to dark side and check that the resistance decreases from 10 kΩ to 0 Ω between terminal 2 and 1. (Rheostat knob turned to clockwise)

If operation is not as specified, replace the rheostat light control.

ELECTRIC TENSION REDUCER SYSTEM

LOCATION

BE0PB-02



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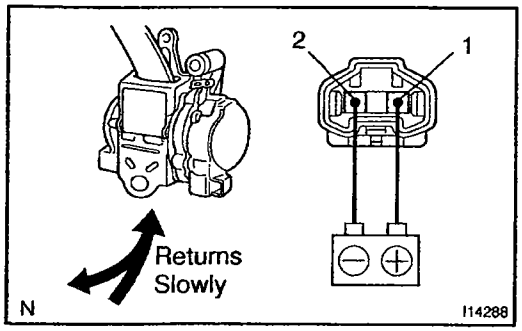
I13594

BE0PC-02

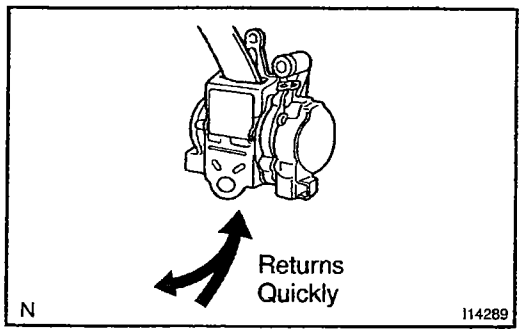
INSPECTION

1. INSPECT TENSION REDUCER SOLENOID OPERATION



(a) Connect the positive (+) lead from the battery to terminal 1, and the negative (–) lead to terminal 2.

(b) Pull the belt upward and check that the belt is slowly retracted when released.



(c) Disconnect the lead from the battery.

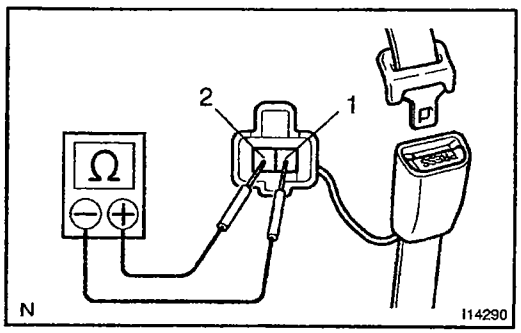
(d) Pull the belt upward and check that the belt is retracted more quickly when released than in (b).

HINT:

Do not tilt the retractor.

If the operation is not as specified, replace the front seat outer belt assembly.

2. INSPECT BUCKLE SWITCH CONTINUITY



(a) Check that continuity exists between terminals of the switch side connector with the switch ON (belt fastened).

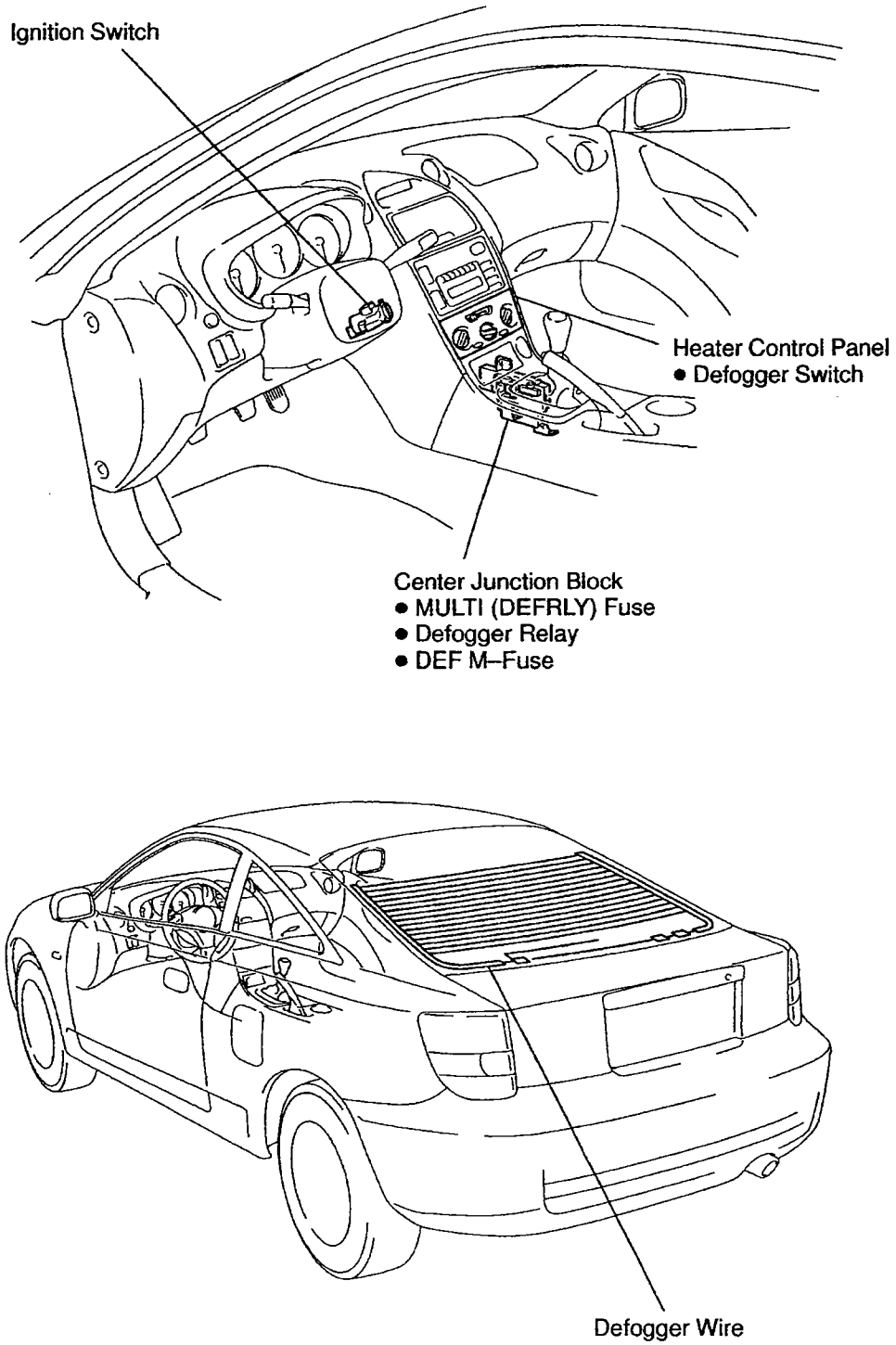
(b) Check that no continuity exists between terminals of the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the seat belt inner.

DEFOGGER SYSTEM

BE0PD-02

LOCATION

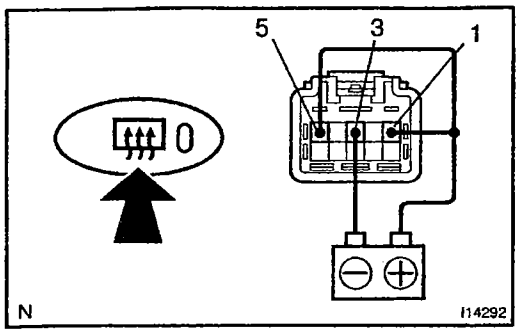


P

113602

BE1DS-01

INSPECTION



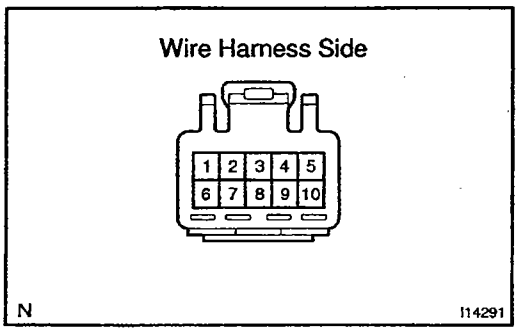
1. INSPECT DEFOGGER TIMER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 3.

(b) Connect the positive (+) lead from the battery to terminal 5 through a 3.4 W test bulb.

(c) Turn the defogger switch ON and check that the indicator light and test bulb light up for 12 for 18 minutes, then the indicator light and test bulb lights go out.

If operation is not as specified, replace the switch.



2. INSPECT DEFOGGER SWITCH CIRCUIT

Connector disconnected:

Disconnect the connector from the switch and inspect the connector on wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
5 – Ground	Ignition switch LOCK or ACC	No voltage
5 – Ground	Ignition switch ON	Battery positive voltage

If the circuit is not as specified, replace the switch.

3. INSPECT DEFOGGER SWITCH CIRCUIT

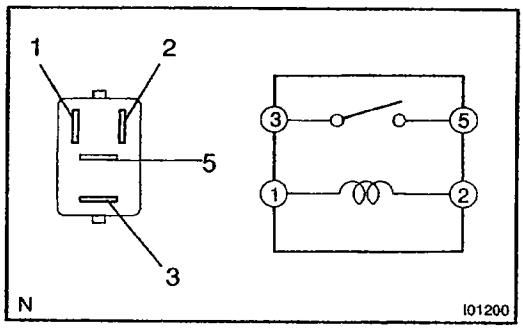
Connector connected:

Connect the connector from the switch and inspect the wire harness side connector from the back side, as shown in the chart.

Tester connection	Condition	Specified condition
5 – Ground	Ignition switch ON and defogger switch OFF	Battery positive voltage
5 – Ground	Ignition switch ON and defogger switch ON	No voltage

If the circuit is not as specified, try replacing the switch with a new one.

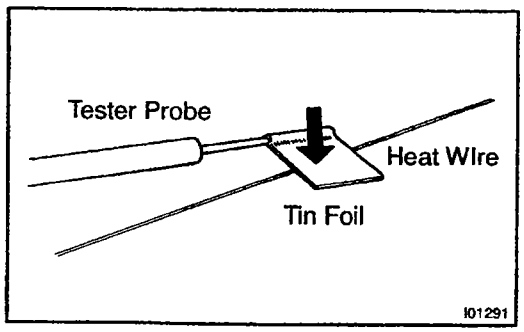
If the circuit is not as specified, inspect the circuit connected to other parts.



4. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.



5. INSPECT DEFOGGER WIRE

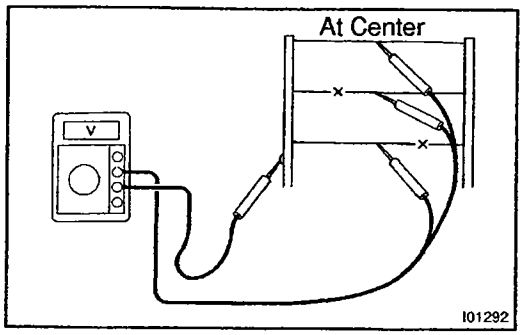
NOTICE:

- **When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wind a piece of tin foil around the top of the negative probe and press the foil against the wire with your finger, as shown.**

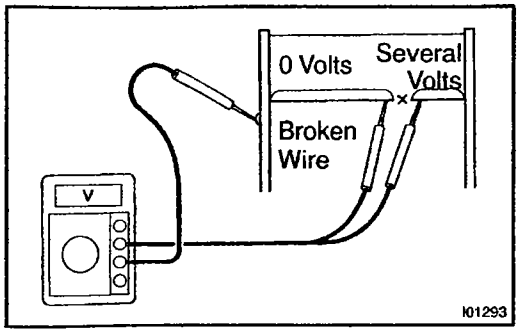
(a) Turn the ignition switch ON.

(b) Turn the defogger switch ON.

(c) Inspect the voltage at the center of each heat wire, as shown.



Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire



HINT:

If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.

(d) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.

(e) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.

(f) The point where the voltmeter deflects from zero to several V is the place where the heat wire is broken.

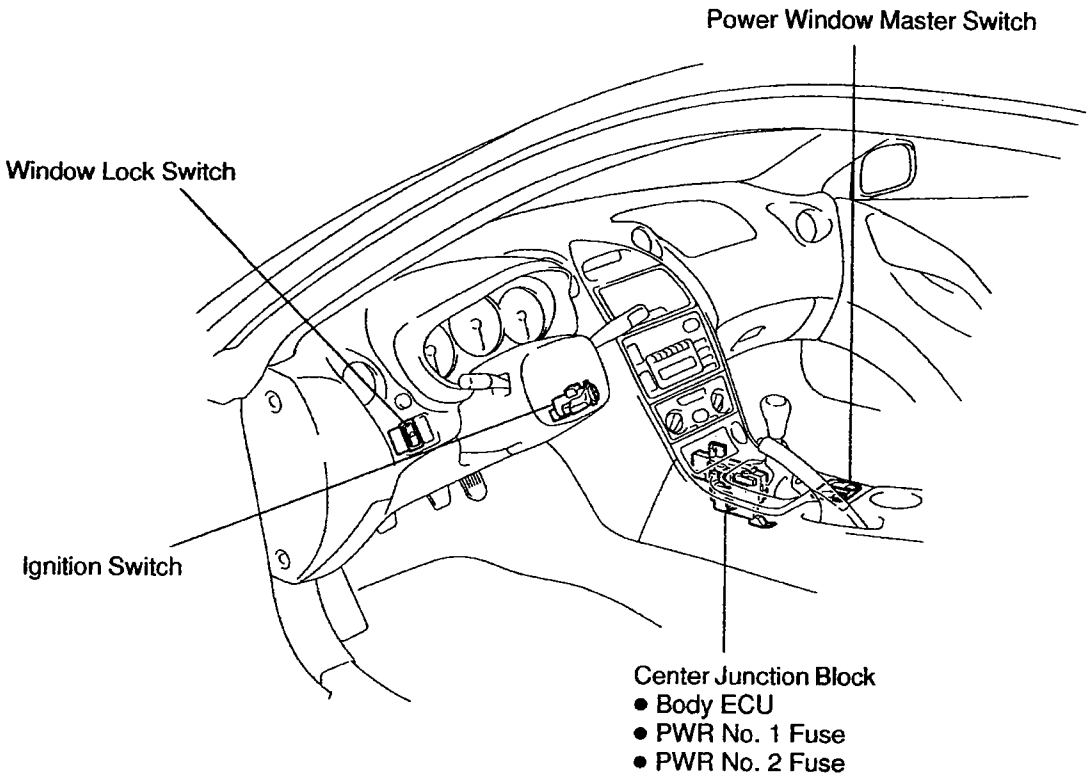
HINT:

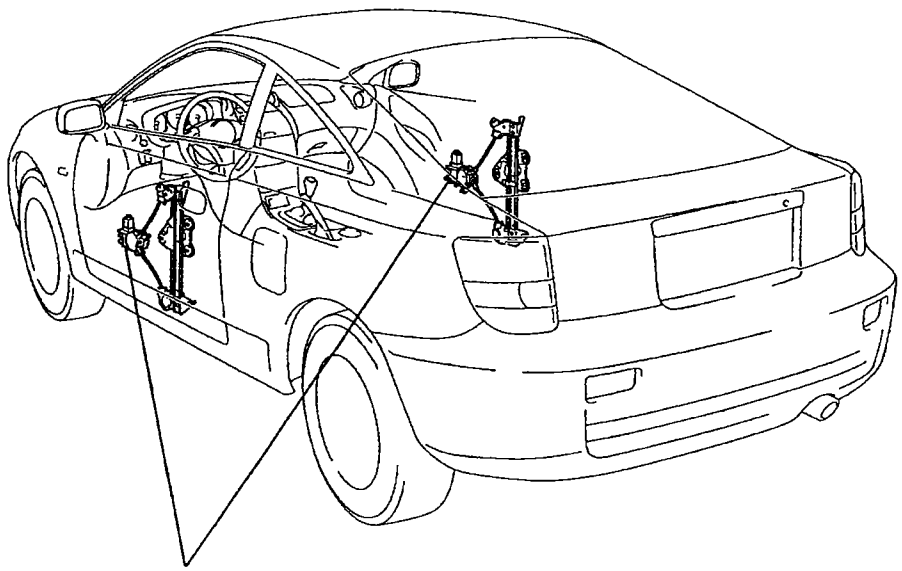
If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually increases to about 12 V as the meter probe is moved to the other end.

POWER WINDOW CONTROL SYSTEM

LOCATION

BE0PF-02





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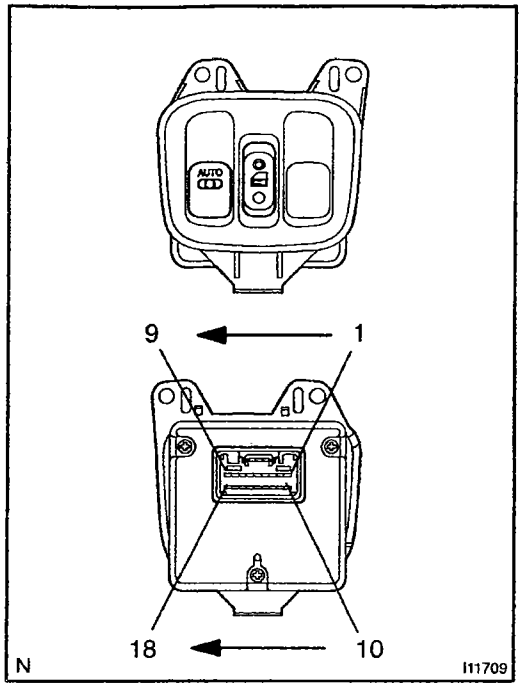
I13600

BE1D6-01

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY



Driver's switch:

Switch position	Tester connection	Specified condition
UP	2 – 9, 17 – 18	Continuity
OFF	9 – 17, 17 – 18	Continuity
DOWN	2 – 18, 9 – 17	Continuity
DOWN AUTO	2 – 18, 9 – 17	Continuity

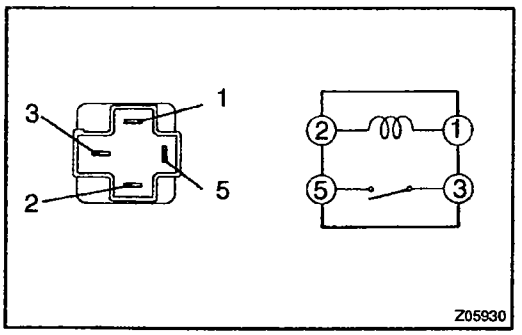
Passenger's switch (Window unlock):

Switch position	Tester connection	Specified condition
UP	1 – 11, 10 – 17	Continuity
OFF	1 – 17, 10 – 17	Continuity
DOWN	10 – 11, 1 – 17	Continuity

Passenger's switch (Window lock):

Switch position	Tester connection	Specified condition
UP	1 – 11	Continuity
OFF	1 – 10	Continuity
DOWN	10 – 11	Continuity

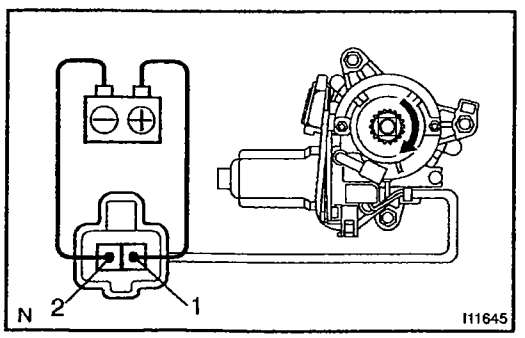
If continuity is not as specified, replace the switch.



2. INSPECT POWER MAIN RELAY CONTINUITY

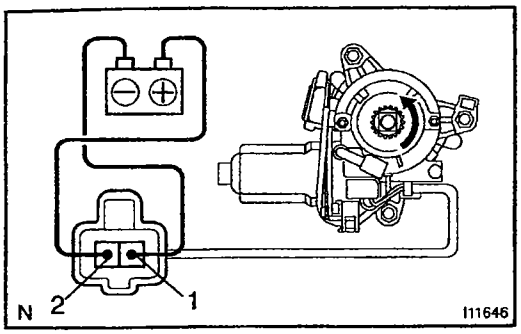
Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.



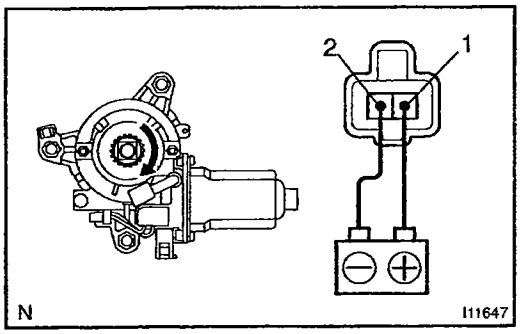
3. Driver's door: INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.



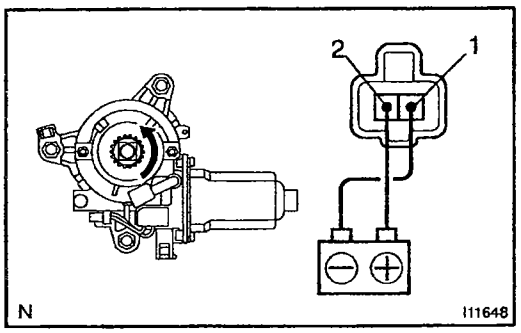
(b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.



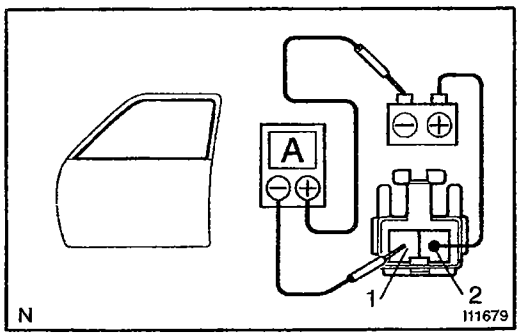
4. Passenger's door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.



(b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.



5. Driver's door:
INSPECT PTC OPERATION

(a) Disconnect the connector from the window motor.

(b) Connect the positive (+) lead from the ammeter to terminal 1 of the wire harness side connector and the negative (–) lead to negative terminal of the battery.

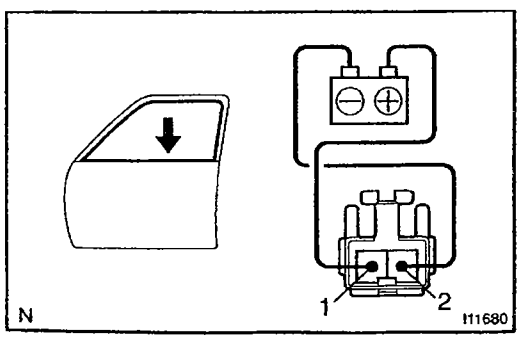
(c) Connect the positive (+) lead from the battery to terminal 2 of the wire harness side connector, and raise the window to the fully closed position.

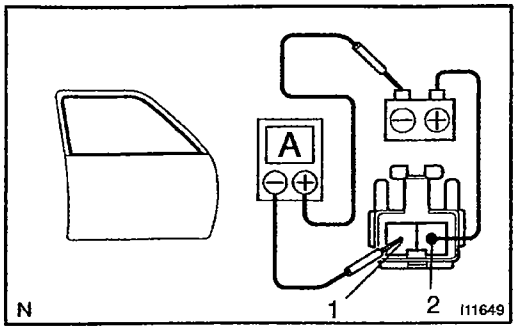
(d) Continue to apply voltage, check that the current changes from approximately 14 A to less than 1 A within 4 to 90 seconds.

(e) Disconnect the leads from terminals.

(f) Approximately 90 seconds later, connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the window begins to descend.

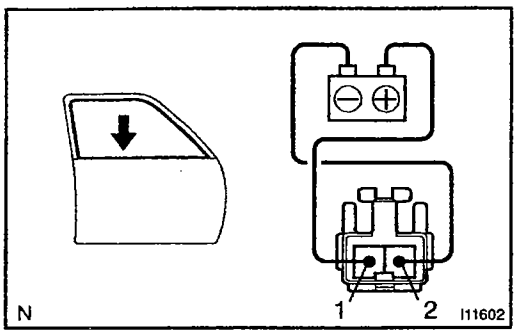
If operation is not as specified, replace the motor.





6. Passenger's door:
INSPECT PTC OPERATION

(a) Disconnect the connector from the power window switch.
(b) Connect the positive (+) lead from the ammeter to terminal 1 of the wire harness side connector and the negative (–) lead to negative terminal of the battery.
(c) Connect the positive (+) lead from the battery to terminal 2 of the wire harness side connector, and raise the window to the fully closed position.



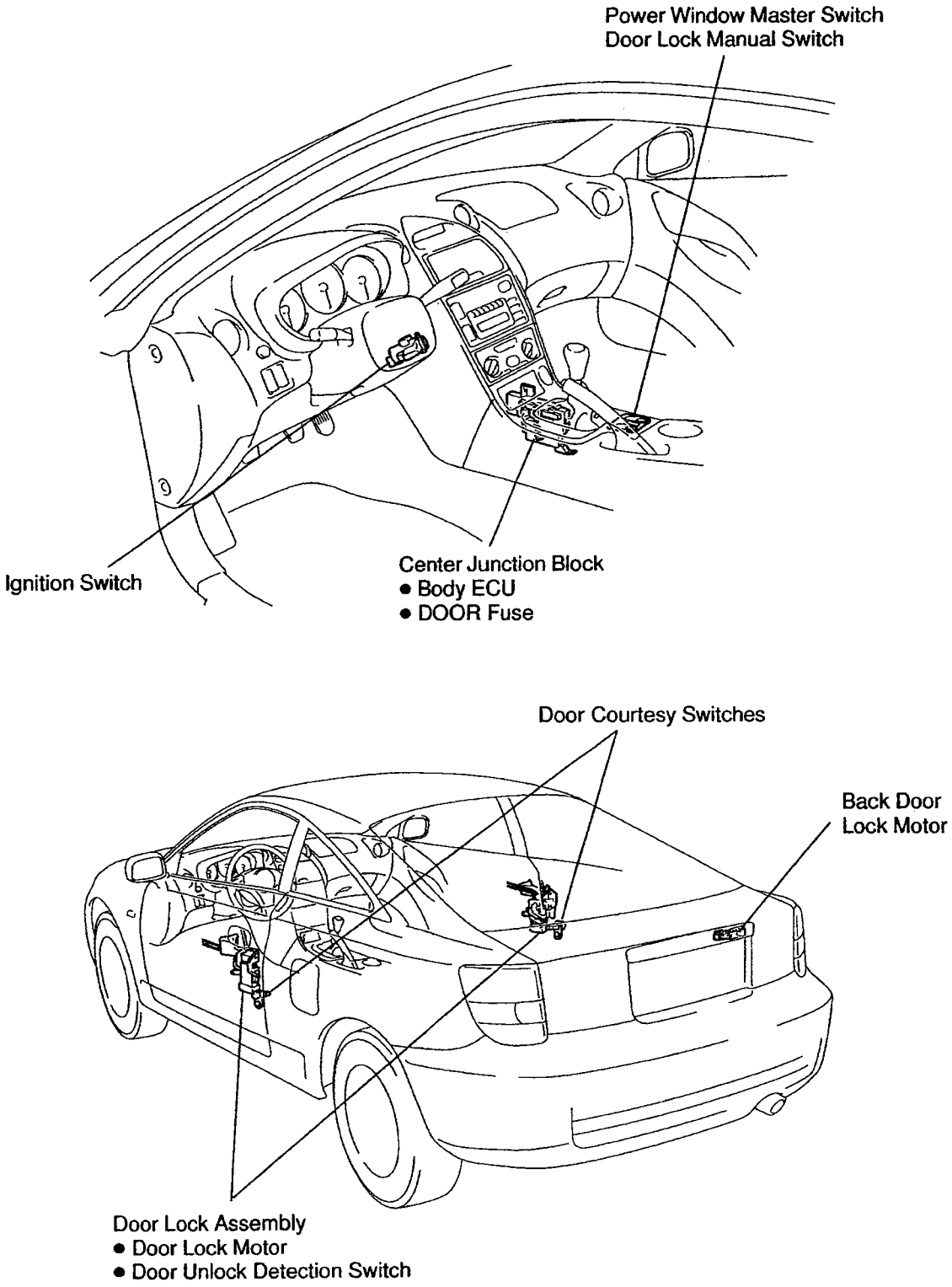
(d) Continue to apply voltage, check that the current changes from approximately 14 A to less than 1 A within 4 to 90 seconds.
(e) Disconnect the leads from terminals.
(f) Approximately 90 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the window begins to descend.

If operation is not as specified, replace the motor.

POWER DOOR LOCK CONTROL SYSTEM

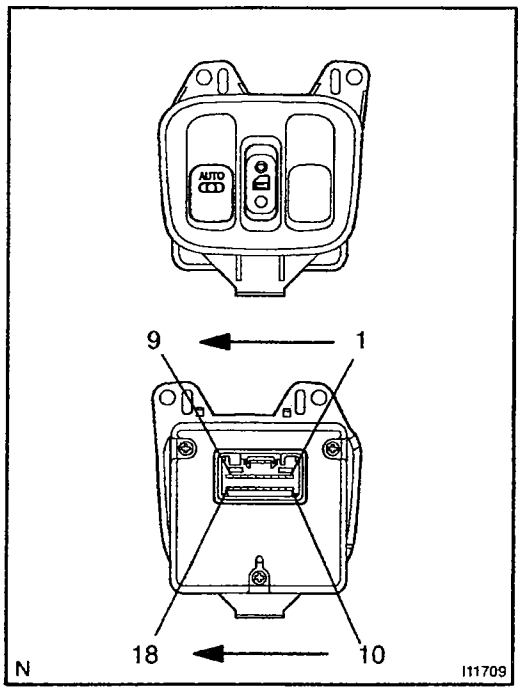
LOCATION

BE0PH-02



BE1D7-01

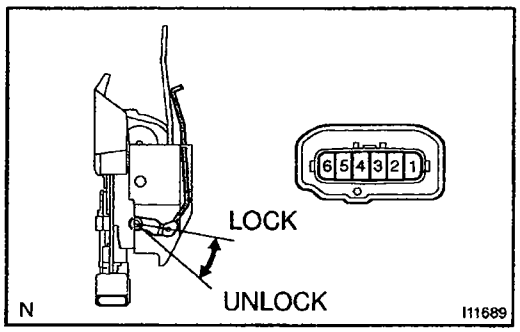
INSPECTION



1. Master switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	5 – 17	Continuity
OFF	–	No continuity
UNLOCK	6 – 17	Continuity

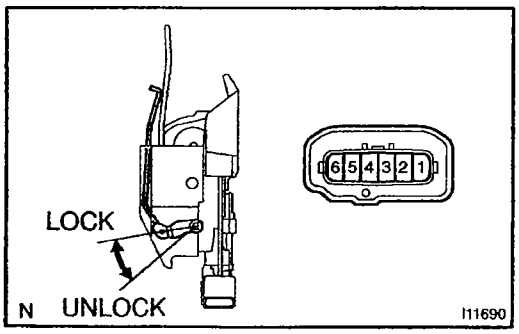
If continuity is not as specified, replace the switch.



2. Driver's door:
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	3 – 5	Continuity
OFF	–	No continuity
UNLOCK	3 – 6	Continuity

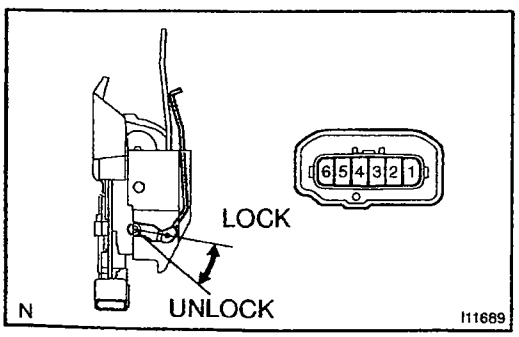
If continuity is not as specified, replace the switch.



3. Passenger's door:
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	2 – 4	Continuity
OFF	–	No continuity
UNLOCK	1 – 4	Continuity

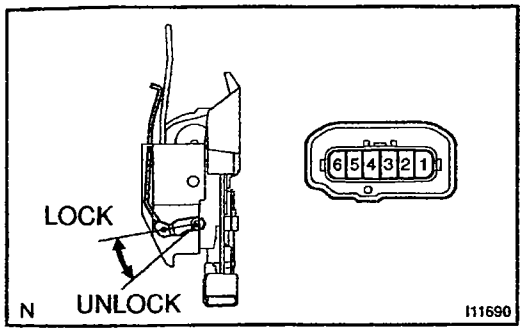
If continuity is not as specified, replace the switch.



4. Driver's door:
INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	3 – 4	Continuity

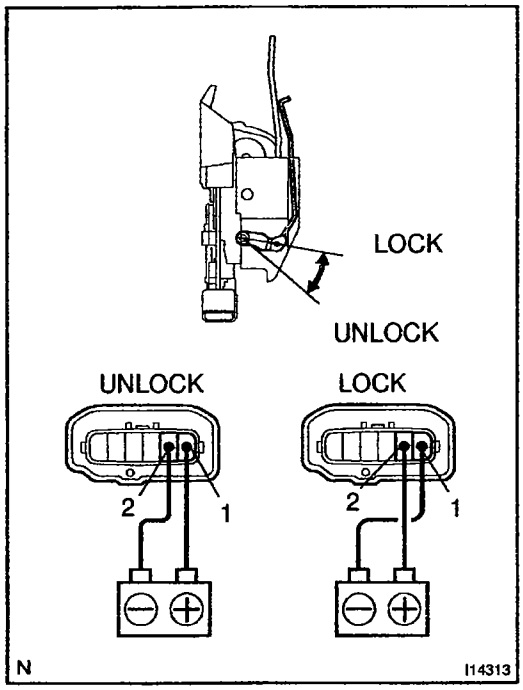
If continuity is not as specified, replace the switch.



5. Passenger's door:
INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	3 – 4	Continuity

If continuity is not as specified, replace the switch.

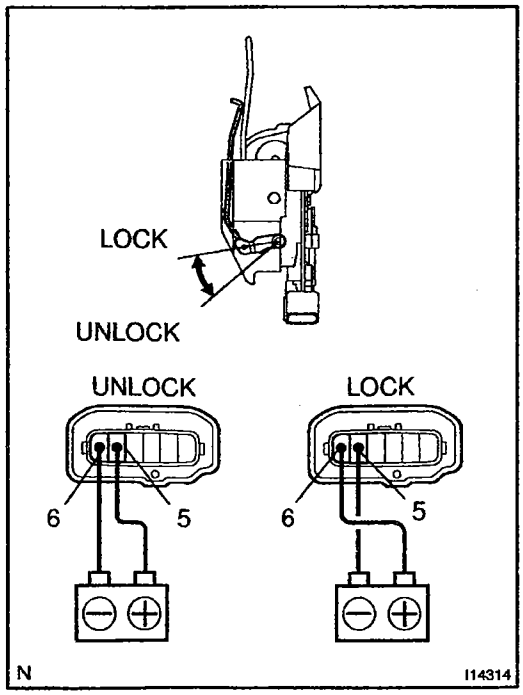


6. Driver's door:
INSPECT DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

(b) Reverse the polarity and check that the door lock link moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

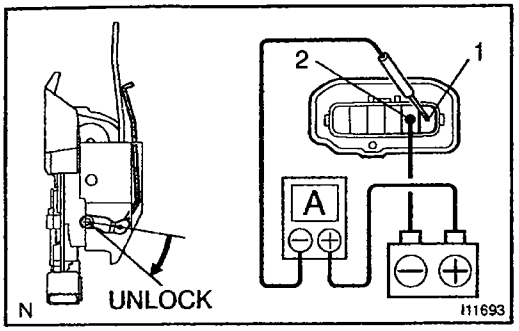


7. Passenger's door:
INSPECT DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6, and check that the door lock link moves to UNLOCK position.

(b) Reverse the polarity and check that the door lock link moves to LOCK position.

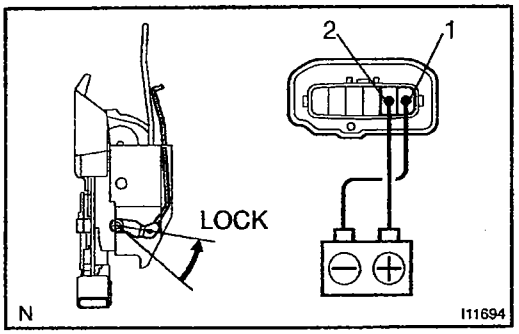
If operation is not as specified, replace the door lock assembly.



8. INSPECT DRIVER'S DOOR PTC THERMISTOR OPERATION

(a) Connect the negative (–) lead from the battery to terminal 2.

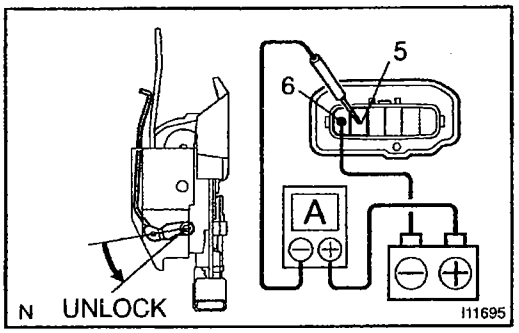
(b) Connect the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the door lock moves to the LOCK position.

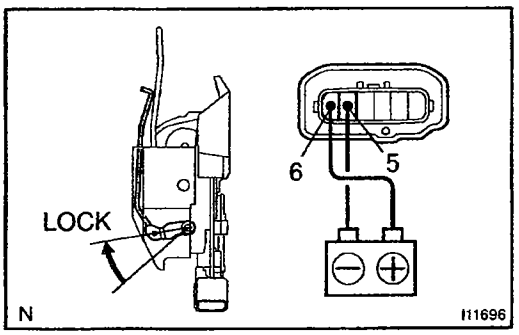
If operation is not as specified, replace the door lock assembly.



9. INSPECT PASSENGER'S DOOR PTC THERMISTOR OPERATION

(a) Connect the negative (–) lead from the battery to terminal 6.

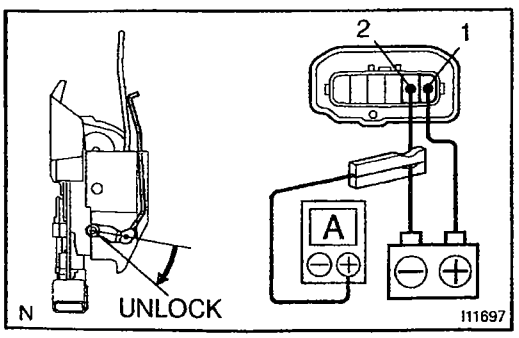
(b) Connect the positive (+) lead from the ammeter to terminal 5 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 5, and check that the door lock moves to the LOCK position.

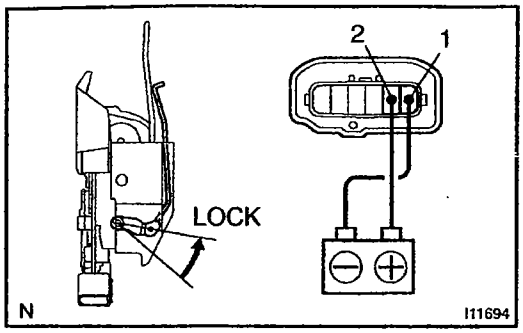
If operation is not as specified, replace the door lock assembly.



10. INSPECT DRIVER'S DOOR PTC THERMISTOR OPERATION

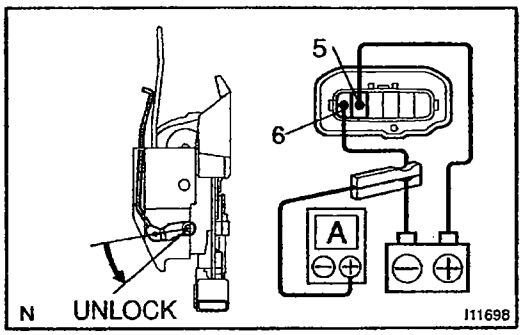
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.

(b) Attach a current–measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



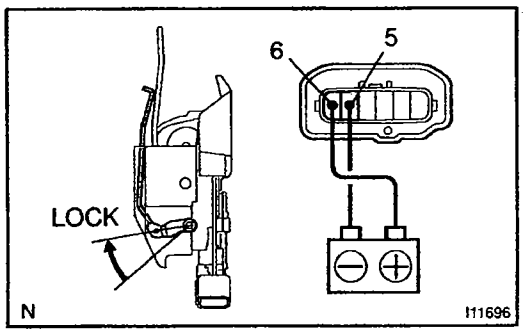
(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.



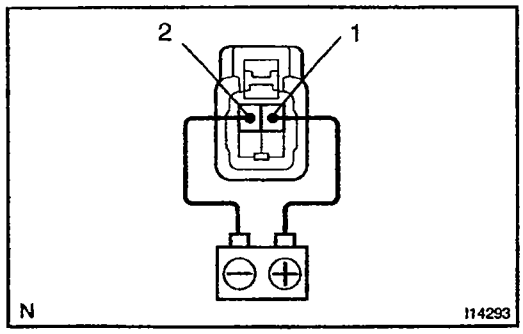
11. INSPECT PASSENGER'S DOOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6.
(b) Attach a current–measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.



12. INSPECT BACK DOOR LOCK MOTOR OPERATION

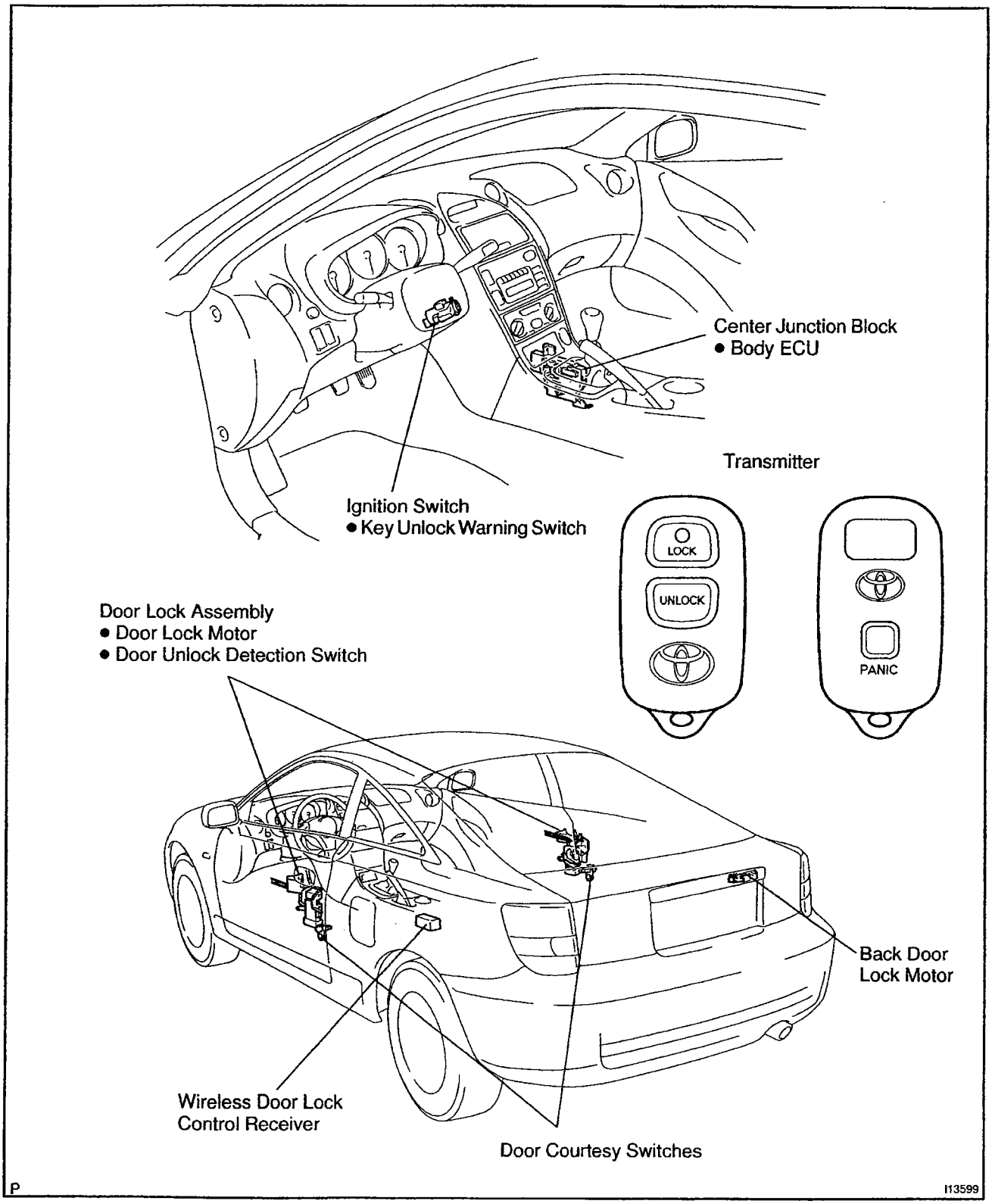
Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

If operation is not as specified, replace the door lock assembly.

WIRELESS DOOR LOCK CONTROL SYSTEM

LOCATION

BE1D8-01



PRE–CHECK

Only wireless function (Remote control) will not operate.
(If a new transmitter or a transmitter of the same type that works properly with the vehicle is not available.)

Make the vehicle in the initialized condition:
The initialized condition is the condition when the following conditions are satisfied.
(1) Key plate has not been inserted in the ignition key cylinder.
(2) All the doors are closed. (Door warning light is off.)
(3) All the doors are locked.

Basic function check:

Under the standard operation, when repeating the operation of UNLOCK and LOCK switch 3 times or more alternately, check the UNLOCK–LOCK operation from 3rd time onward.
- Following procedures are standard operation.

(1) Keep about 1 M away to the right direction from the outside handle of a driver's seat.
(2) Face the transmitter toward the vehicle and press one of transmitter switches for about 1 sec.

Yes

Normal
<Reference>
- Operative distance may differ according to an operator, the way of holding the transmitter or position.
- Because weak electric wave is used, when there is strong wave or noise in the used frequency ,operation distance might be shortened.

No

Transmitter battery check:

Replace the transmitter battery with a new or normal one and check UNLOCK–LOCK function works under the standard operation.
<Reference>
• The battery should be replaced by only the shops with sufficient skill as new normal battery is necessary.
• Battery quality can be judged by checking the remnant volume of the battery.

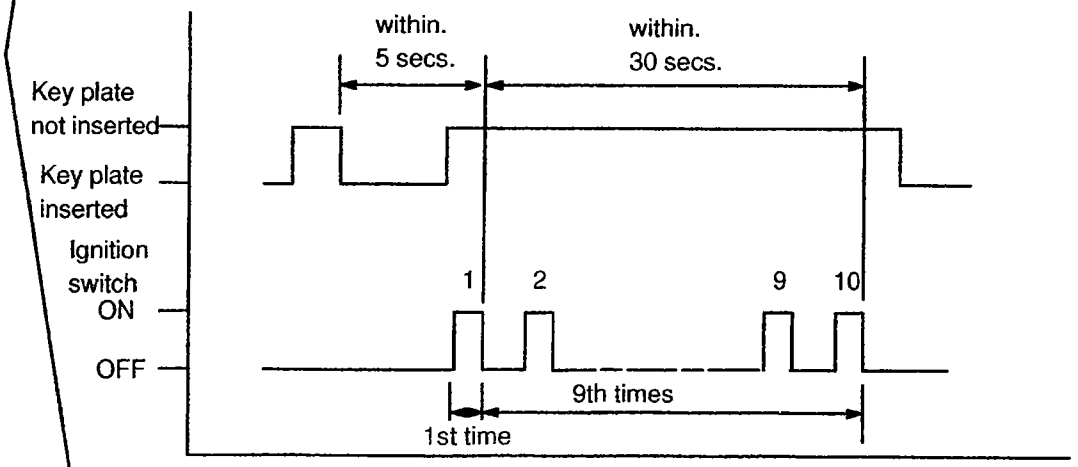
Yes → Battery faulty.

No

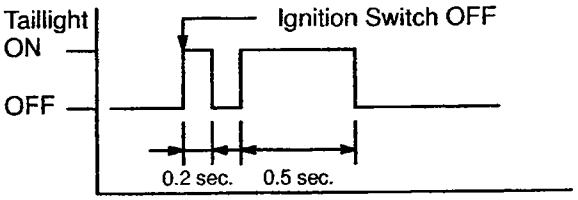
Make the vehicle be in the initialized condition.

Inspection start by using self diagnostic mode:

Enter into the self diagnostic mode.
If operating door control receiver in the order of 1 through 2, the mode turns to diagnostic mode.
(1) Insert the key plate in the ignition key cylinder and pull out, then insert it again and turn ignition switch OFF → ON → OFF once within 5 seconds after pulling out.
(2) After completing the procedure within 30 seconds, turn the ignition switch OFF → ON → OFF 9 times.
HINT:
In the case that either of (1) and (2) conditions is not satisfied, transfer to normal mode.
<Reference>
When completing self diagnostic mode, turn the ignition switch ON.
LOCK and UNLOCK operation is not performed under the self diagnostic mode.



Diagnostic mode operation confirmation:
Check the taillight lights up soon after the input operation of self diagnostic mode.



<Reference>
• Taillight light up should be maximum despite the controller.

No

Is the method to input the diagnostic mode correct?

(Not enter in diagnostic mode)

No

Yes

Is the function of operation confirmation taillight normal?

No

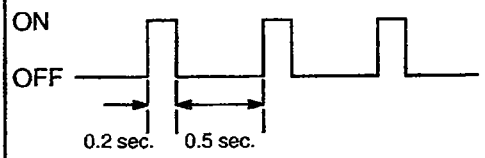
Yes

Taillight faulty.

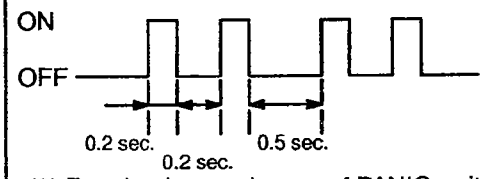
Yes

Confirmation of diagnostic mode:
Check taillight light up when pressing on each switch of transmitter.

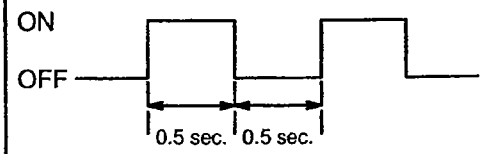
(1) Received normal wave of LOCK switch.



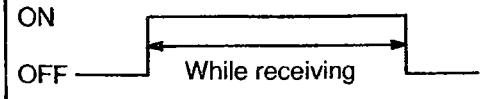
(2) Received normal wave of UNLOCK switch.



(3) Received normal wave of PANIC switch.



(4) Compatibility of the recognition code or out from synchronization of rolling code.*.

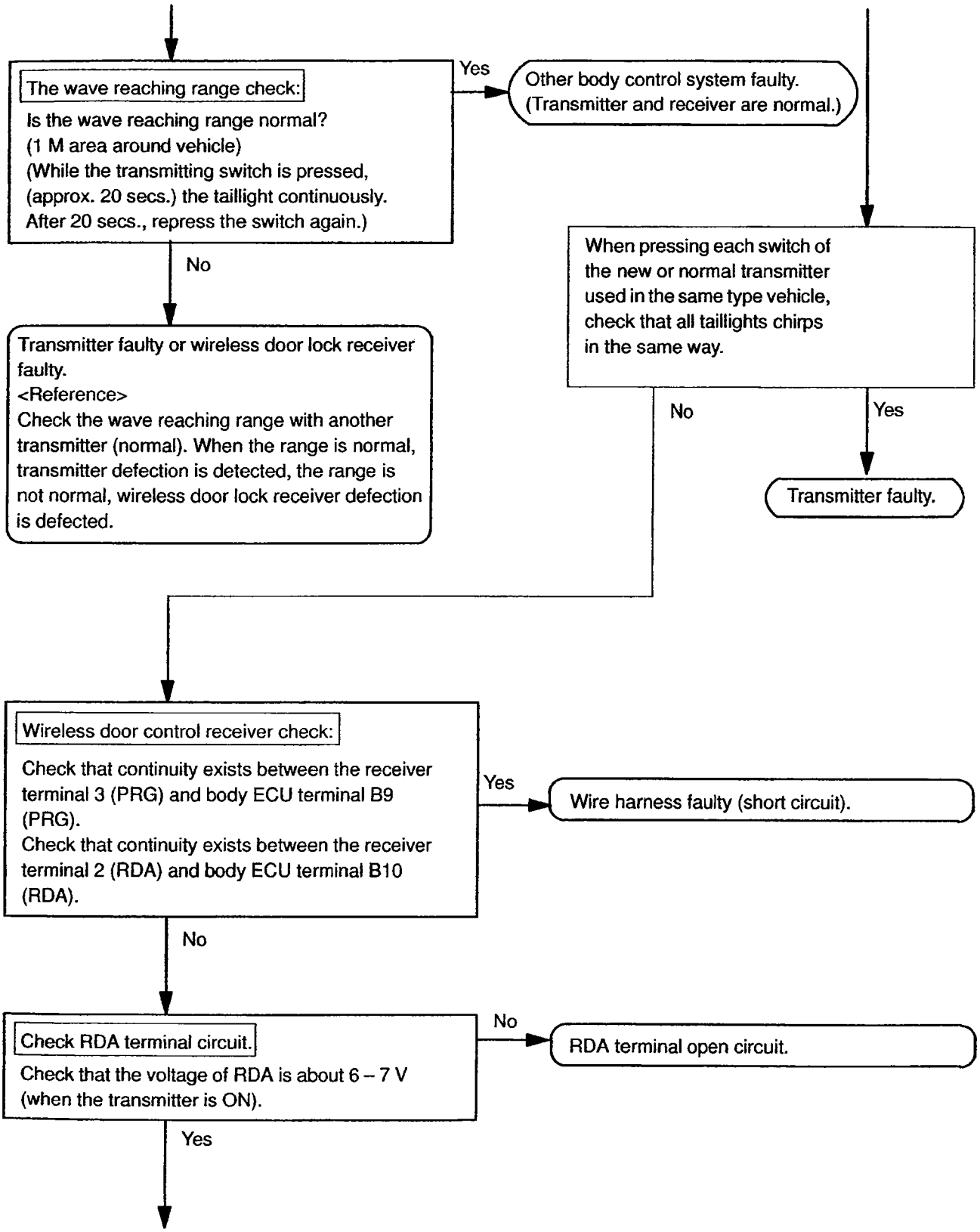


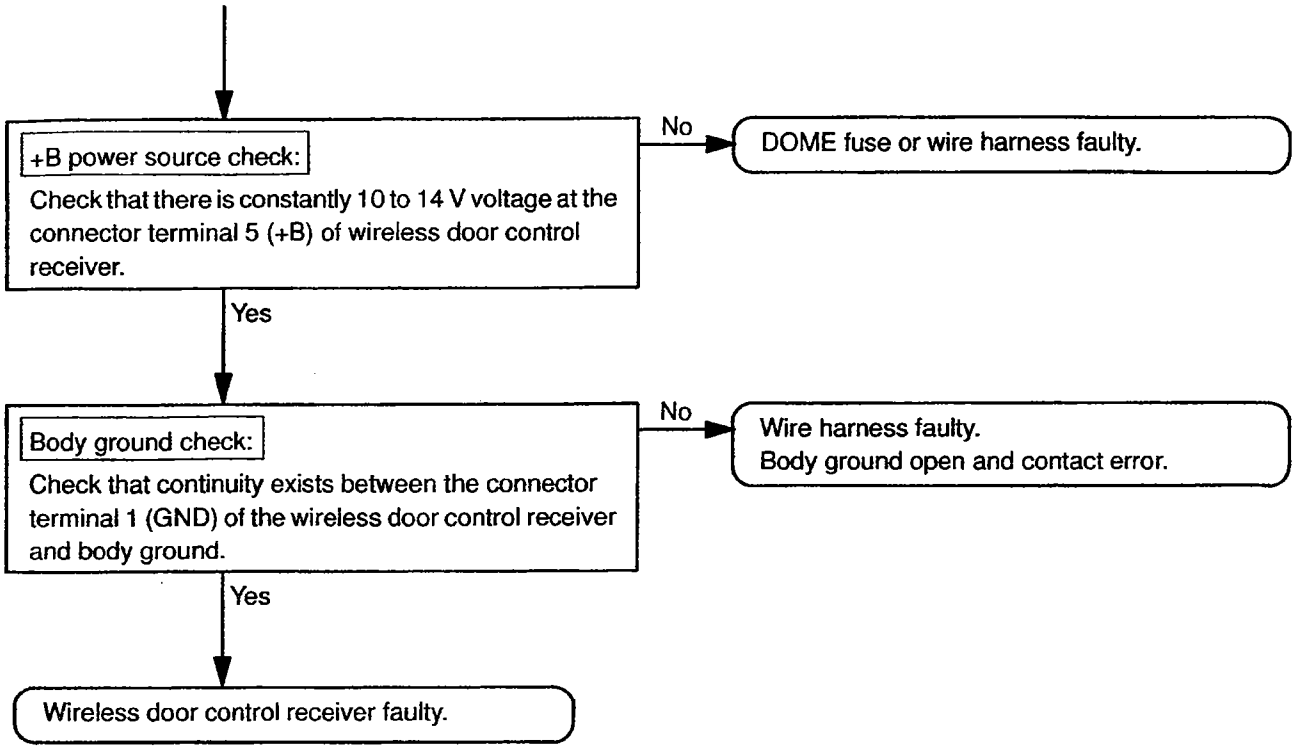
No response

Transmitter faulty or wireless door lock receiver faulty.
<Reference>
• Use another (normal) transmitter and check with the diagnostic mode and in the case that the check result shows the transmitter faulty, it can be judged that wireless door lock receiver is normal.

In case of taillight outputs from (1) – (3)

In case of taillight outputs of (4)


The wave reaching range check:
Is the wave reaching range normal?
(1 M area around vehicle)
(While the transmitting switch is pressed, (approx. 20 secs.) the taillight continuously. After 20 secs., repress the switch again.)
Yes
Other body control system faulty. (Transmitter and receiver are normal.)
No
Transmitter faulty or wireless door lock receiver faulty.
<Reference>
Check the wave reaching range with another transmitter (normal). When the range is normal, transmitter defection is detected, the range is not normal, wireless door lock receiver defection is defected.
When pressing each switch of the new or normal transmitter used in the same type vehicle, check that all taillights chirps in the same way.
No
Yes
Transmitter faulty.
Wireless door control receiver check:
Check that continuity exists between the receiver terminal 3 (PRG) and body ECU terminal B9 (PRG).
Check that continuity exists between the receiver terminal 2 (RDA) and body ECU terminal B10 (RDA).
Yes
Wire harness faulty (short circuit).
No
Check RDA terminal circuit.
Check that the voltage of RDA is about 6 – 7 V (when the transmitter is ON).
No
RDA terminal open circuit.
Yes


+B power source check:
Check that there is constantly 10 to 14 V voltage at the connector terminal 5 (+B) of wireless door control receiver.
No
DOME fuse or wire harness faulty.
Yes
Body ground check:
Check that continuity exists between the connector terminal 1 (GND) of the wireless door control receiver and body ground.
No
Wire harness faulty.
Body ground open and contact error.
Yes
Wireless door control receiver faulty.

BE0OJ-08

INSPECTION

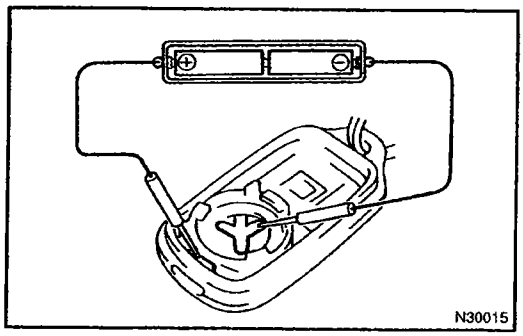
1. INSPECT WIRELESS DOOR LOCK TRANSMITTER OPERATION

HINT:

Refer to "Wireless door lock control receiver and transmitter replacement" on page BE–77.

(a) Using a screwdriver, remove the screw and cover.

(b) Remove the battery (lithium battery).



(c) Install a new or normal battery (lithium battery).

HINT:

When a new or normal battery can not be obtained, connect 2 new 1.5 V batteries in series, connect the battery (+) to the battery receptacle side terminal and battery (–) to the bottom terminal, then apply 3 V voltage to the transmitter.

(d) In the location where is approx. 1 M away from driver's outside handle in the right direction, and check the transmitter operation when pressing transmission switch on the surface of the transmitter body.

Standard:

Remote control of vehicle door lock can be operated.

HINT:

- The minimum operation distance differs according to operator, the way of holding, and location.
- As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.

(e) Install the battery (lithium battery).

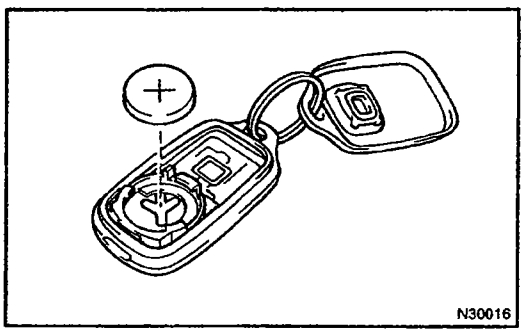
(f) Install a cover so that O–ring is not distorted or slipped off.

(g) Using a screwdriver, tighten the screw.

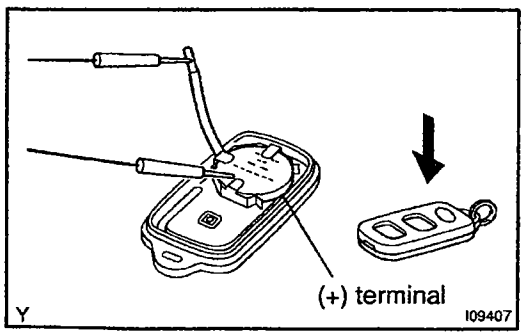
2. CHECK BATTERY CAPACITY

HINT:

- Make sure to use the TOYOTA electrical tester.
- With the battery unloaded, judge can not be made whether the battery is available or not on the test.
- When the transmitter is faulty, the energy amount left in the battery might not be checked correctly.
- On the lithium battery used for the transmitter, the voltage more than 2.5 V with the battery unloaded is shown on the tester until the energy is completely consumed. Accordingly when inspecting the energy amount left in the battery, it is necessary to measure the voltage when the battery is loaded. (1.2 kΩ).



(a) Remove the screw and cover using a (–) driver.
(b) Remove the battery (lithium battery) from the transmitter.
(c) Connect the lead to the (–) terminal of the transmitter and install the battery.

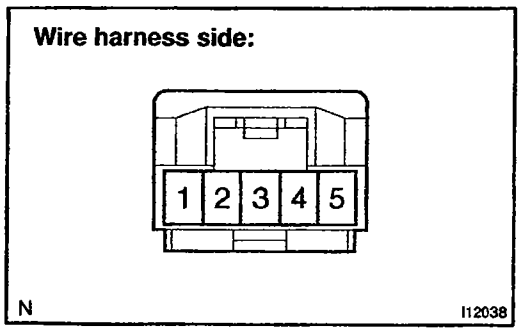


(d) Connect the (+) tester to the (+) battery (lithium battery), and (–) tester to the lead respectively.
(e) Press one of the transmitting switches on the transmitter for approx. 1 second.
(f) Press the transmitting switch on the transmitter again to check the voltage.
Standard: 2.1 V or more

HINT:

- When the temperature of the battery is low, the judge can not be made correctly.
  When the outcome of the test is less than 2.1 V, conduct the test again after leaving the battery in the place at 18 °C for more than 30 minutes.
- By auto power off function, the voltage becomes no load voltage (more than 2.5 V) condition after 20 seconds from the switch was pressed.
  Make sure to read the voltage before of it.
- High voltage might be shown 1 to 2 times after leaving the battery, judge should be made with the voltage shown at the 3rd time or later.

(g) Disconnect the lead.
(h) Set the battery (lithium battery) in the transmitter.
(i) Install the cover, so that the O–ring is not distorted or slipped off.
(j) Using a screwdriver, tighten the screw.

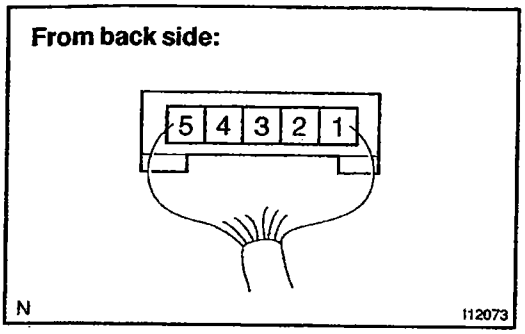


3. INSPECT WIRELESS DOOR LOCK CONTROL RECEIVER CIRCUIT

(a) Disconnect the connector from the receiver and inspect the connector on the wire harness side, as shown below.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
5 – Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuit connected to other parts.



(b) Connect the wire harness side connector to the receiver and inspect the wire harness side connector from the back side, as shown below.

Tester connection	Condition	Specified condition
3 – Ground	Normal mode	10 – 14 V
2 – Ground	Ignition switch position OFF Key removed Transmitter ON	About 6 – 7 V

If circuit is as specified, replace the receiver.
If the circuit is not as specified, inspect the circuit connected to other parts.

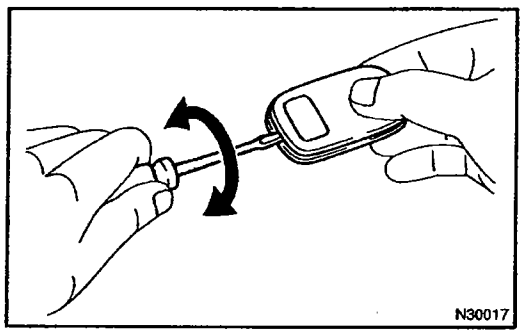
BE1D9-01

REPLACEMENT

1. REPLACE TRANSMITTER (LITHIUM) BATTERY

NOTICE:

Special caution should be taken for handling each component as they are precision electronic components.



(a) Using a screwdriver, remove the cover.

NOTICE:

Do not pry out the cover forcibly.

HINT:

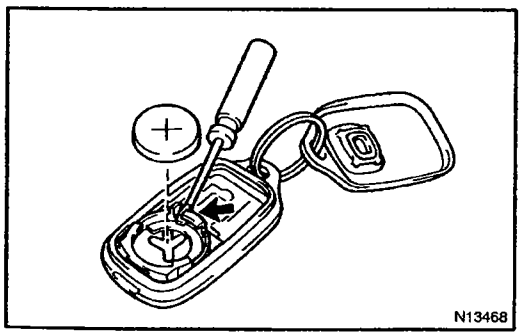
Push the cover with a finger as shown in the illustration, so that there becomes clearance, then pry out the cover from that clearance.

(b) Remove the transmitter.

(c) Remove the battery (lithium battery).

NOTICE:

- **Do not push the terminals with a finger.**
- **If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.**



(d) Install a battery (lithium battery) as shown in the illustration.

NOTICE:

Face the battery upward. Take care not to deform the terminals.

(e) Assemble the transmitter to the key plate and the cover.

2. REPLACE DOOR CONTROL RECEIVER AND TRANSMITTER

NOTICE:

When replacing the door control receiver and transmitter, registration of recognition code is necessary because they are provided as single components.

(a) Select which operation mode should be performed from the following modes.
- Add mode
- Rewrite mode
- Prohibition mode
- Confirmation mode

HINT:
- The add mode is used to retain codes already registered while you register new recognition codes. This mode is used when adding a transmitter. However, if the number of registered codes exceeds 4 codes, previously registered codes are correspondingly erased in order, starting from the first registered code.
- The rewrite mode is used to erase all previously registered codes and register only new recognition codes.
- The prohibition mode is used to erase all registered codes and cancels the wireless door lock function. Use this mode when the transmitter is lost.
- The confirmation mode is for confirming how many recognition codes are already registered before you register additional recognition codes.

(b) Follow the chart on the following pages to register the transmitter recognition code at the wireless door lock control receiver.

HINT:
- When procedure is out of the specified, the operation returns to normal operation.
- Maximum 4 recognition codes can be registered.

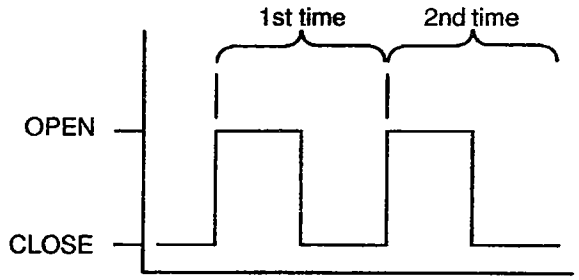
Start registration of recognition code

The vehicle should be in the following conditions.
- The key is not inserted in the ignition key cylinder.
- Driver's door is OPEN. (Other doors are CLOSED)
- Driver's door is UNLOCKED.

Insert the key into the ignition key cylinder, then pull it out. (Reform this twice within 5 seconds)

Within 40 secs.

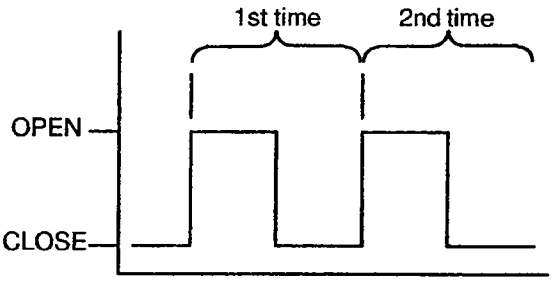
Open and close the door (manual operation) 2 times.



Insert the key into the ignition key cylinder, then pull it out.

Within 40 secs.

Again open and close the door (manual operation) 2 times.

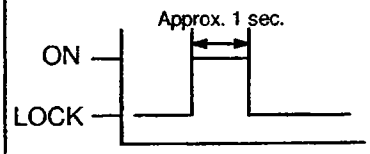


Close the all door and insert the key into the ignition key cylinder.

Turn the ignition switch from ON to LOCK at approx. 1 sec. interval 1 to 5 times to select the mode.

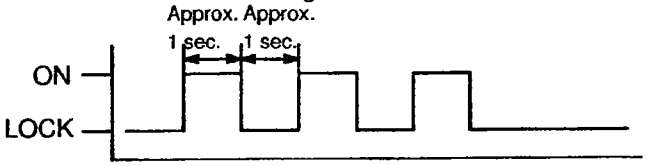
Add mode

ON – LOCK change occurs 1 time



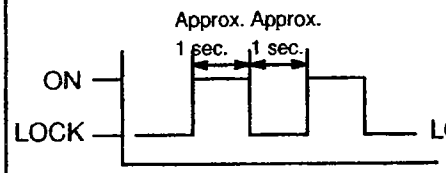
Confirmation mode

ON – LOCK change occurs 3 times



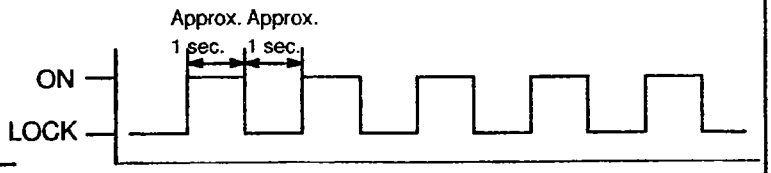
Rewrite mode

ON – LOCK change occurs 2 times



Prohibition mode

ON – LOCK change occurs 5 times



Pull out the key from the ignition key cylinder.

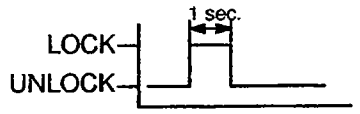
When add mode or rewrite mode is selected.

Door control relay automatically performs the LOCK–UNLOCK operation once or twice at 1 sec. interval to inform the operator that either the add mode or rewrite mode has been selected.

Within 3 secs.

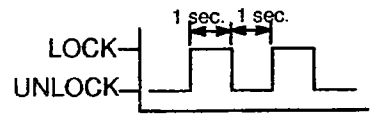
LOCK–UNLOCK occurs once

Indicates that add mode has been selected.



LOCK–UNLOCK occurs twice

Indicates that rewrite mode has been selected.



When prohibition mode is selected. / When confirmation mode is selected.

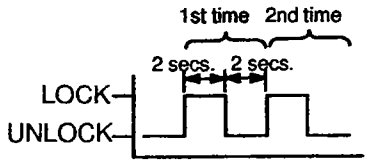
Door control relay automatically performs the LOCK–UNLOCK operation 1 to 4 times at 2 sec. interval to inform the operator of the number of the registered codes.

HINT:

When the number of the registered code is 0, the operation is automatically performed 5 times.

Example:

When the operation is performed twice, it directs that 2 types of recognition code have been registered.

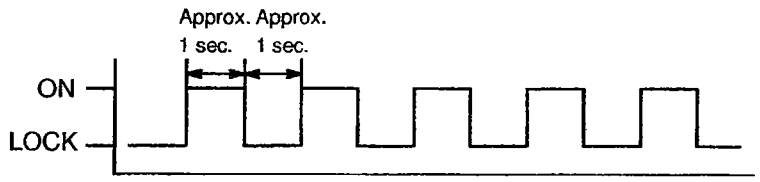


Registration of recognition code (Confirmation mode and prohibition mode) is completed.

When prohibition mode is selected.

Within 40 secs.

Door control relay performs LOCK–UNLOCK operation 5 times at a 1 sec. interval to inform the operator that prohibition mode has been selected.



Press the lock and unlock switches on the transmitter switch simultaneously for more than between 1 sec. or more and 1.5 sec. below.

Within 3 secs.

Press either one of 2 switches on the transmitter.

Within 3 secs.

Door control relay automatically performs LOCK–UNLOCK operation once or twice at a 1 sec. interval to inform the operator that the receiver has received the signal from the transmitter.

LOCK–UNLOCK occurs once

Registration of recognition code is completed

LOCK–UNLOCK occurs twice

Registration of recognition code has not been completed.

- Recognition code received first time and second time did not match.
- When selecting add mode, a registered recognition code was received.

If LOCK–UNLOCK operation can not be performed at all, the mode returns to the normal mode, then start with "Start registration of recognition code".

Proceed to finish registration

Proceed to continue registration

Within 40 secs.

If even one of the following conditions is satisfied, registration of recognition codes is completed.

- 40 secs. elapses since the door control relay response.
- The driver's door is opened.
- The key plate is inserted in the ignition key cylinder.
- 4 type recognition codes are registration at one time.

Registration of recognition codes (add mode or rewrite mode) is completed.

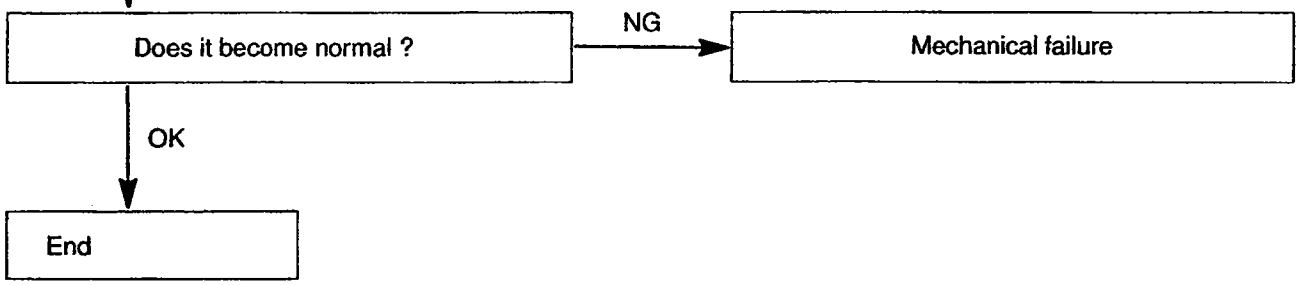
SLIDING ROOF SYSTEM

TROUBLESHOOTING

BED09-05

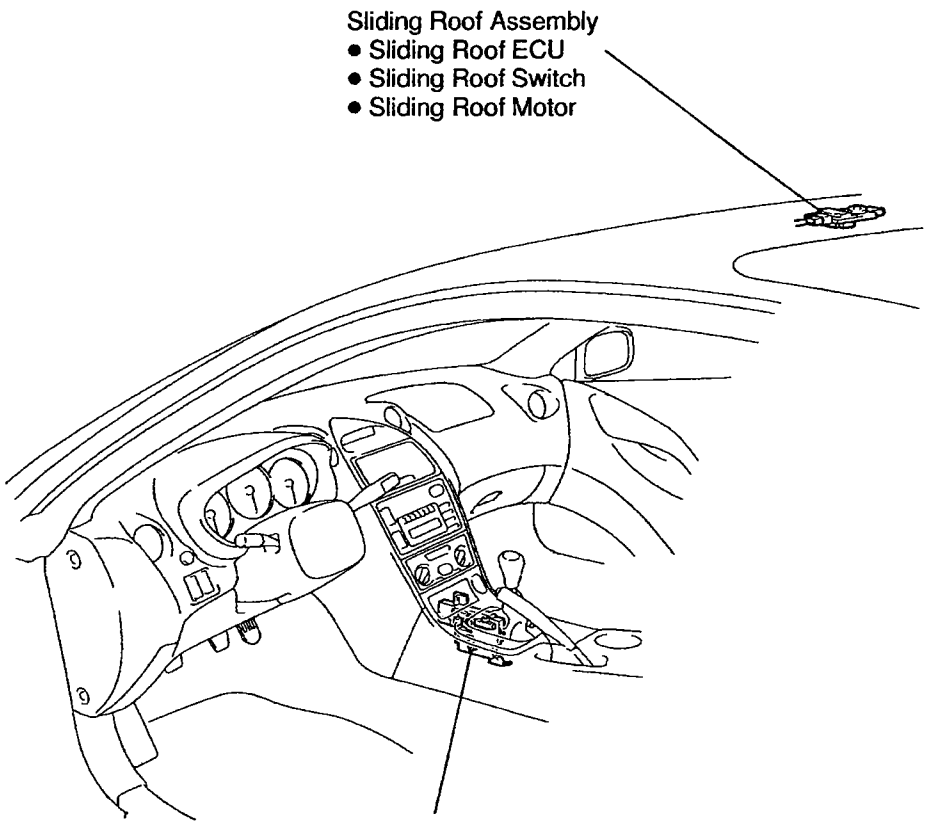
Sliding roof cannot be closed and neverses in error for some reason.

1. Operate the corresponding switch continuously for 10 sec, or more from the starting point of the reverse motion.
2. This shifts it to the manual operatiion in which the jam protection system is prohibited. (with the ignition ON)
3. In the manual operation, close the sliding roof completely and stop the motion.
4. The fully closed position will be detected by ECU.(Initialization).



BE0PJ-02

LOCATION



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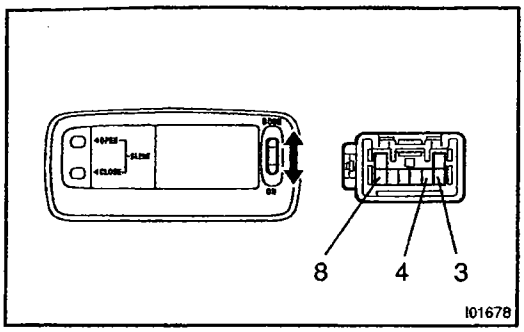
BE1DA–01

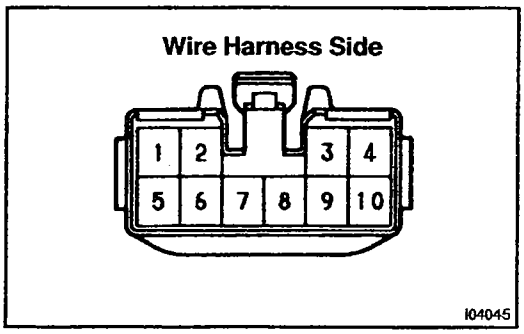
INSPECTION

1. INSPECT SLIDING ROOF SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
OPEN	3 – 8	Continuity
OFF	–	No continuity
CLOSE	4 – 8	Continuity

If continuity is not as specified, replace the switch.



2. INSPECT SLIDING ROOF CONTROL ASSEMBLY CIRCUIT

Disconnect the connector from the ECU and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
2 – Ground	Ignition switch LOCK or ACC	No voltage*
2 – Ground	Ignition switch ON	Battery positive voltage
5 – Ground	Constant	Battery positive voltage
7 – Ground	Constant	Continuity
6 – Ground	Constant	No continuity
8 – Ground	Ignition switch LOCK or ACC	No voltage
8 – Ground	Ignition switch ON	Battery positive voltage
9 – Ground	Sliding roof control switch CLOSE/DOWN	No continuity
9 – Ground	Sliding roof control switch OPEN/UP	Continuity
10 – Ground	Sliding roof control switch OPEN/UP	No continuity
10 – Ground	Sliding roof control switch CLOSE/DOWN	Continuity

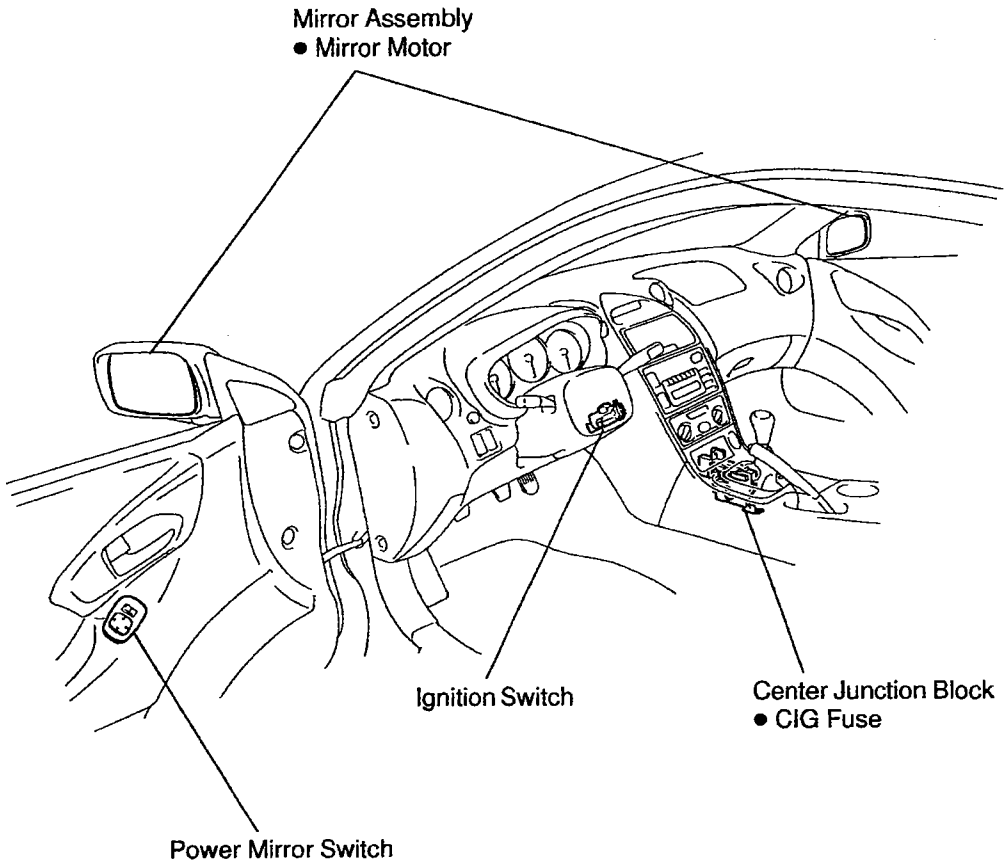
*: Exceptions: During 43 second period after ignition switch ON → OFF (ACC) or until driver of passenger door in opened after ignition switch ON → OFF (ACC).

If circuit is as specified, replace the assembly.

POWER MIRROR CONTROL SYSTEM

BE0PL-02

LOCATION



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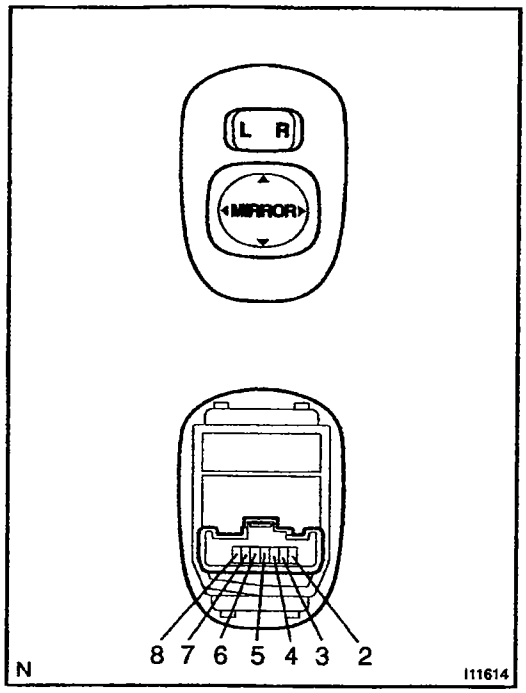


INSPECTION

BE1DB-01

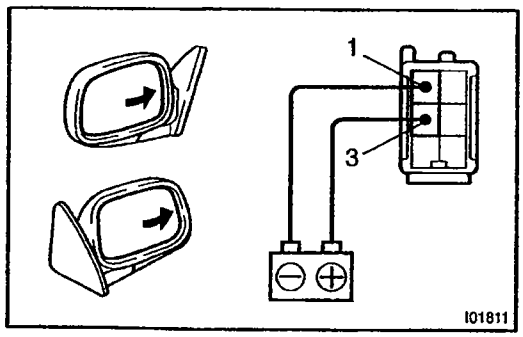
1. INSPECT LEFT SIDE MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	4 – 8 6 – 7	Continuity
DOWN	4 – 7 6 – 8	Continuity
LEFT	5 – 8 6 – 7	Continuity
RIGHT	5 – 7 6 – 8	Continuity

2. INSPECT RIGHT SIDE MIRROR SWITCH CONTINUITY

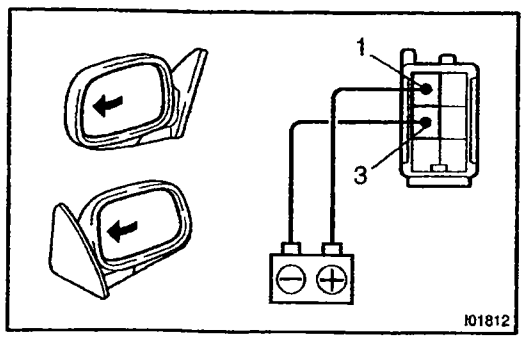
Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	3 – 8 6 – 7	Continuity
DOWN	3 – 7 6 – 8	Continuity
LEFT	2 – 8 6 – 7	Continuity
RIGHT	2 – 7 6 – 8	Continuity

If continuity is not as specified, replace the switch.
If continuity is as specified, inspect the switch circuit.

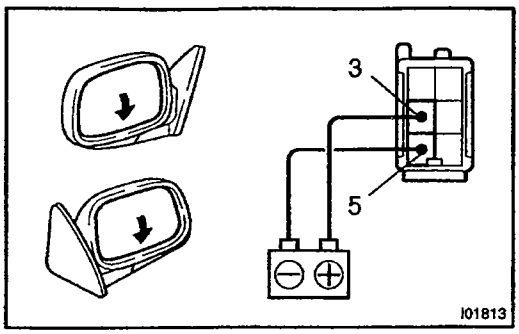


3. INSPECT MIRROR MOTOR OPERATION

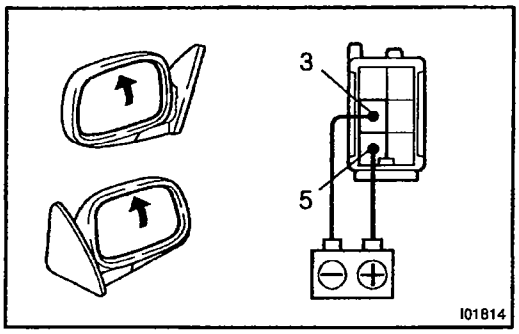
(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 1, and check that the mirror turns right side.



(b) Reverse the polarity, and check that the mirror turns left side.



(c) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 5, and check that the mirror turns to the downward.



(d) Reverse the polarity, and check that the mirror turns to the upward.

If operation is not as specified, replace the mirror assembly.

AUDIO SYSTEM

DESCRIPTION

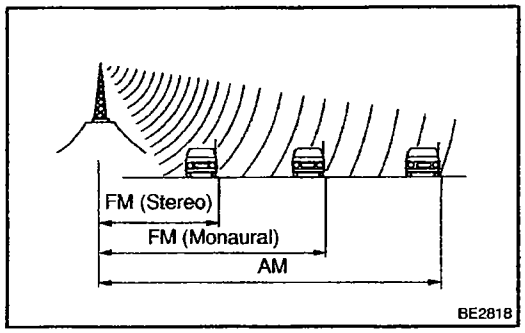
BE1DC-01

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ⟷		FM ⟷	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

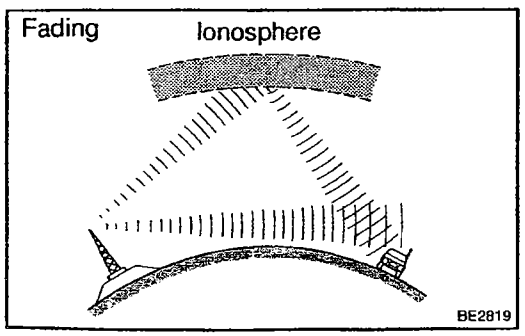


2. SERVICE AREA

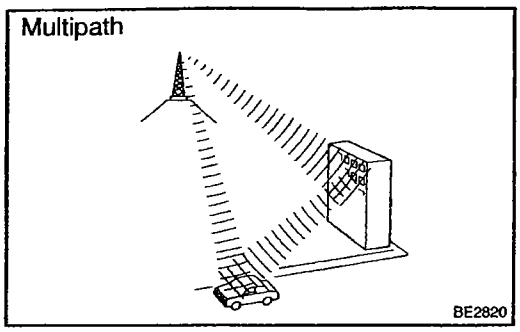
There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even through AM comes in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") easily.

3. RECEPTION PROBLEMS

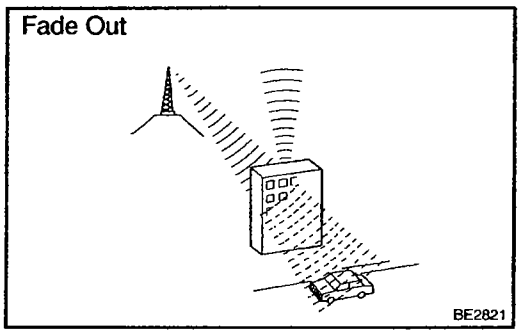
Besides the problem of static, there are also the problems called "fading", "multipath" and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.



- Fading
  Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle's antenna directly. This type of interference is called "fading".



- Multipath
  One type of interference caused by bouncing of radio waves off obstructions is called "multipath". Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



- Fade Out
  Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstructions. This is called "fade out".

4. NOISE PROBLEMS

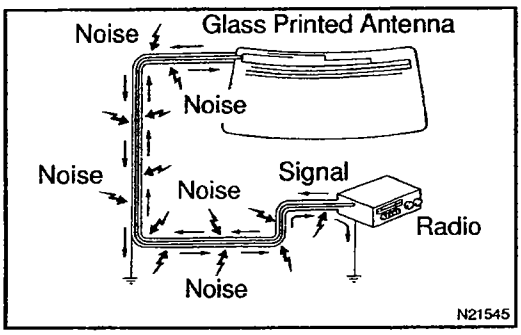
(a) Questionnaire for noise:
It is very important for noise troubleshooting to have good understanding of the claims from the customers, so that make the best use of following quenstionnaire and diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a case that the same program is broadcasted from each local station and that may be the case you are listening to different station if the program is the same.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving and at a specific place.	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

HINT:
In the case that the noise occurrence condition does not meet any of the above quenstionnaire, check based on the "Trouble Phenomenon".
Refer to previous page for multipath and fading.

(b) Matters that require attention when checking:

- Noise coming into the radio usually has no harm for practical use as the noise protection is taken and it is hardly thinkable for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
- Check if all the regular noise prevention parts are properly installed and if there is any installation of non–authorized parts and non–authorized wiring.
- If you leave the radio out of tune (not tuning), it is easy to diagnose the phenomenon as noise occurs frequently.



(c) Antenna and noise:

Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent these noises from mixing into the radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire. This shield wire shelters the noise and transmits it to the ground, thus preventing noise from mixing in. If this shield wire has grounding failure, that causes noise.

5. COMPACT DISC PLAYER

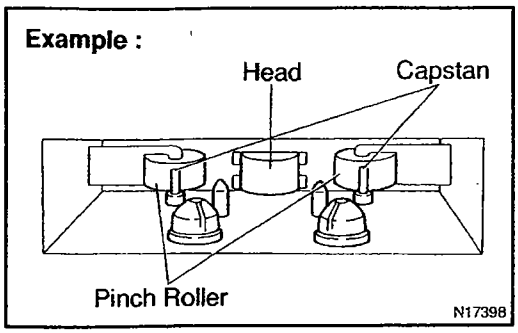
Compact Disc Players use a laser beam pick–up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc.

HINT:

Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.

NOTICE:

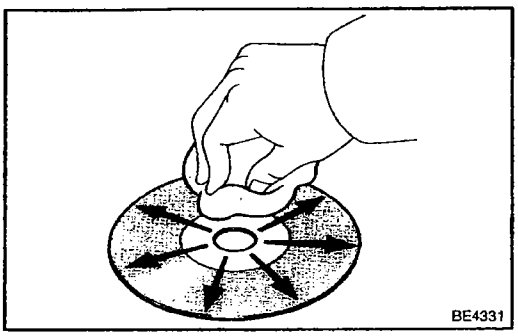
CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. Tape Player/Head Cleaning:
MAINTENANCE

(a) Raise the cassette door with your finger.
Next, using a pencil or similar object, push in the guide.

(b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. CD Player/Disc Cleaning:
MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti–static preservative.

8. OUTLINE OF AVC–LAN

(a) What is AVC–LAN?

AVC–LAN is the abbreviation, which stands for Audio Visual Communication–Local Area Network. This is a unified standard co–developed by 6 audio manufactures associated with Toyota Motor Corporation.

The Unified standard covers signals, such as audio signal, visual signal, signal for switch indication and communication signal.

(b) Objectives

Recently the car audio system has been rapidly developed and functions have been changed drastically. The conventional system has been switched to the multi–media type such as a navigation system. At the same time the level of customers needs to audio system has been upgraded. This lies behind this standardization.

The concrete objectives are explained below.

(1) When products by different manufactures were combined together, there used to be a case that malfunction occurred such as sound did not come out. This problem has been resolved by standardization of signals.

(2) Various types of after market products have been able to add or replace freely.

(3) Because of the above (2), each manufacture has become able to concentrate on developing products in their strongest field. This has enabled many types of products provided inexpensively.

(4) Conventionally, a new product developed by a manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy compatible products provided for them timely.

(c) The above descriptions are the objectives to introduce AVC–LAN. By this standardization, development of new products will no longer cause systematic errors. Thus, this is very effective standard for a product in the future.

HINT:

- When +B short or GND short is detected in AVC–LAN circuit, communication stops. Accordingly the audio system does not function normally.
- When audio system is not equipped with a navigation system, audio head unit is the master unit. (When audio system is equipped with a navigation system, navigation ECU is the master unit.)
- The car audio system using AVC–LAN circuit has a diagnosis function.
- Each product has its own specified numbers called physical address. Numbers are also allotted to each function in one product, which are called logical address.

9. DIAGNOSIS FUNCTION

Error codes over tuner and connected equipment are displayed on the screen of tuner.

(a) Diagnosis start–up

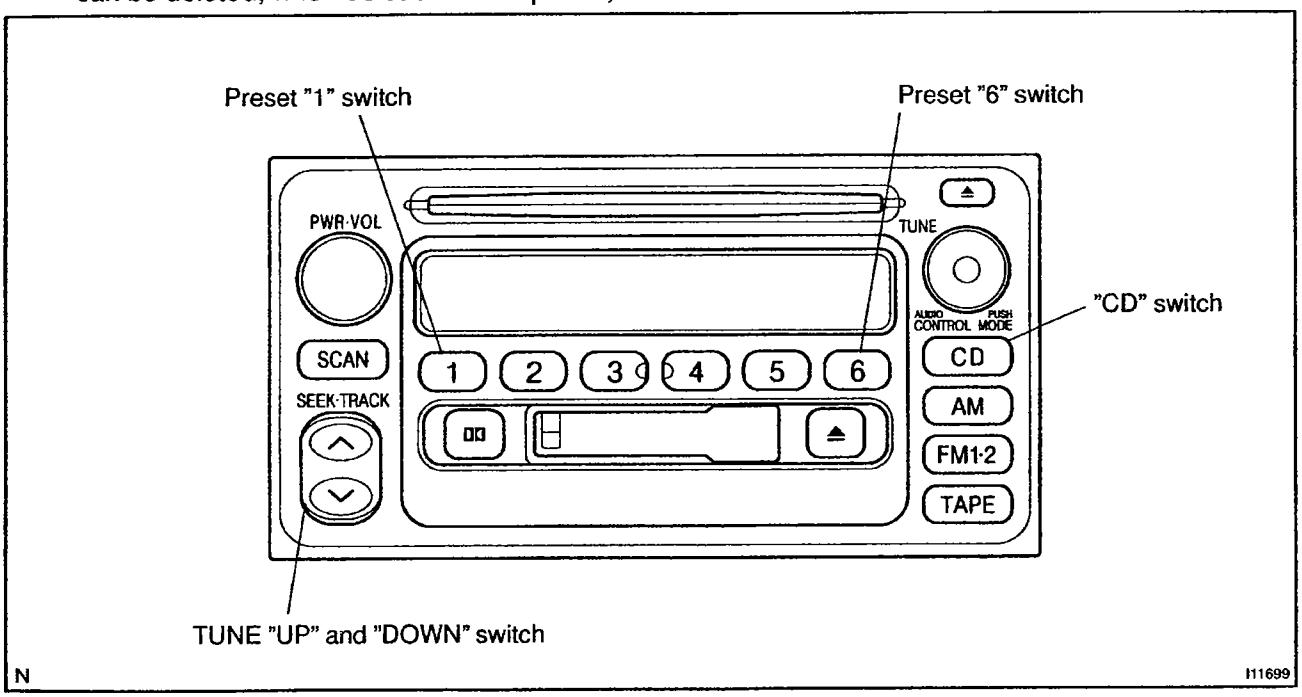
For shifting to diagnosis mode, push "CD" switch 3 times with pressing "1" and "6" of PRESET switch at the same time while the audio power is OFF and ACC is ON.

To exit from diagnosis mode, press "CD" switch for 2 seconds or turn the ignition key OFF.

(When "1–190" is displayed, the mode is transferred to LAN check mode.)

(b) LAN check

When starting up the diagnosis mode, the mode turns to LAN check mode, the screen displays the code numbers (physical address) of tuner and connected equipment. Smaller codes are displayed in order, displayed code numbers are switched by operating TUNE "UP" or "DOWN" switch. In LAN check mode, by pressing "5" of PRESET switch for more than 2 secs., diagnosis memory of each equipment can be deleted, when deletion is completed, the mode returns to LAN check mode.



Code No. (physical address) List

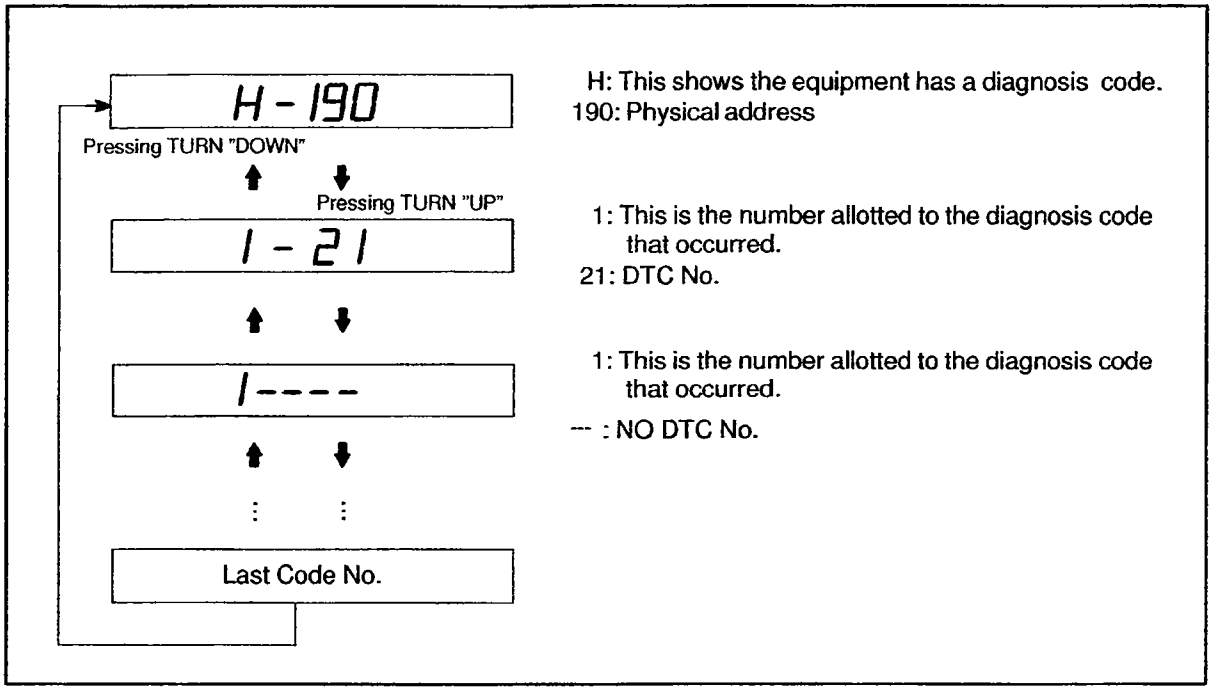
Code No. (physical address)	Equipment name
190	Radio receiver assembly (Audio head unit)

(c) System check

- When pressing "1" of PRESET switch in LAN check mode, the mode turns to the system check mode, the system performs self diagnosis of connected equipment and displays the results.("SYS" (showing the system is under detection) is displayed.)
- Perform the operation shown in the following illustration, then read the result of the inspection.

HINT:

- It sometimes takes approx. 40 secs. till the system inspection is completed.
- The chart below is an example of when diagnosis code "21" appears on the physical address (190) equipment. (ROM error occurs on the radio receiver.)
- The smaller code numbers (physical address) are displayed in order (code No., diagnosis code, support code of diagnosis code (object equipment)).
- When no error is detected in the system, "00" is displayed.
- When an error code is detected, up to 6 codes per one system are displayed. Pressing TUNE "UP" or "DOWN" switches the display.
- In the system check mode, when pressing "6" of PRESET switch the mode returns to LAN check mode.



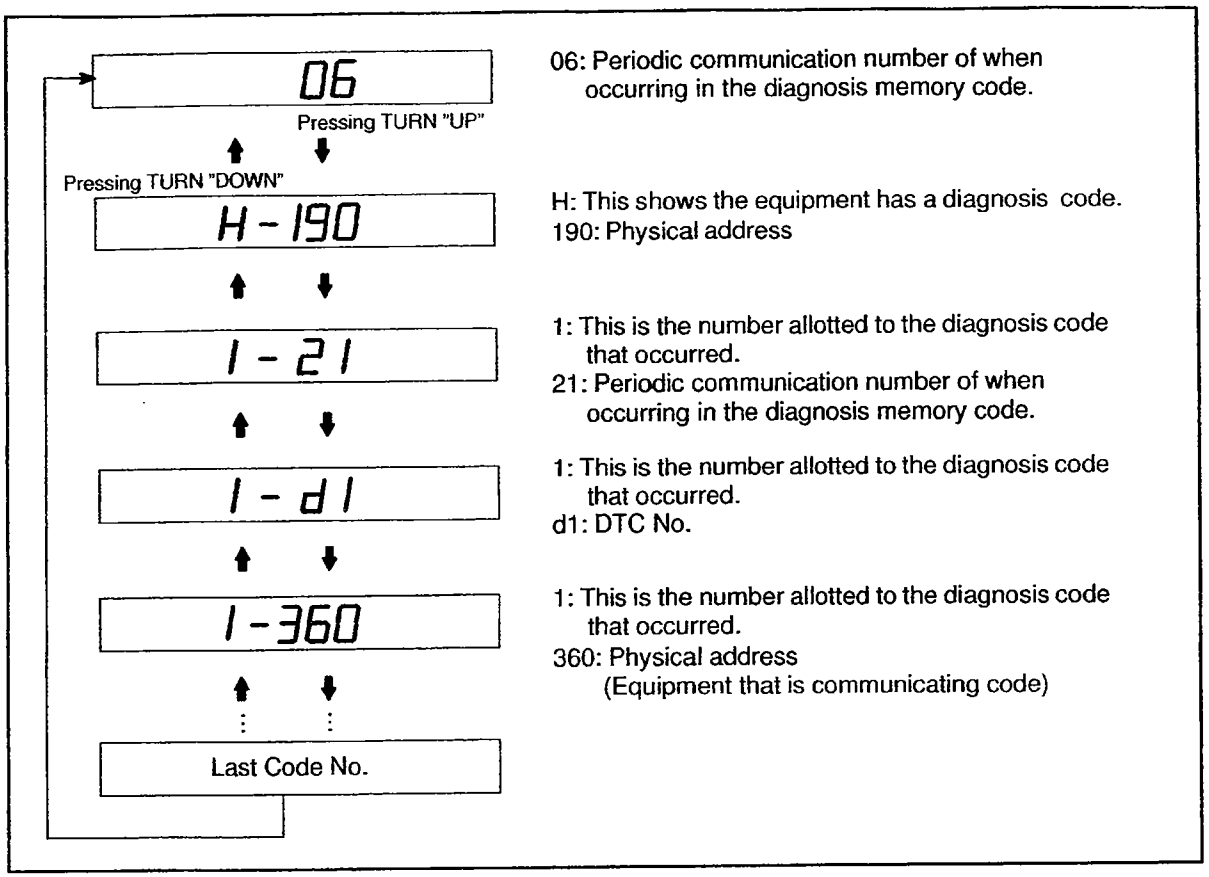
(d) Diagnosis memory

(1) In LAN check mode, when pressing "2" of PRESET switch the mode turns to the diagnosis memory mode. ("CODE" is displayed.)
The results of self diagnosis performed over tuner and connected equipment are memorized and displayed.

(2) Perform the operation shown in the following illustration, then read the result of the inspection.

HINT:

- The smaller code numbers (physical address) are displayed in order (code No. , periodic communication number when error occurs, diagnosis code, and support code of diagnosis code (object equipment)).
- When no error is detected in the system, "00" is displayed. When an error code is detected, up to 6 codes per one system are displayed. Pressing TUNE "UP" or "DOWN" switches the display. Each diagnosis code is same as code in the system check mode.
- When pressing "6" of PRESET switch, the mode returns to LAN check mode.
- The following illustration below is an example of when diagnosis code "D1" appears on the code (190) and (240 or 360) equipment. (Communication error occurs between the radio receiver and CD changer.)



(e) Diagnosis memory clear
   (1) After error is fixed, start up the diagnosis mode.
   (2) Continue pressing preset switch "5" for 2 secs. (CLr is displayed.)
   (3) Press the preset switch "2" and transfer to the diagnosis memory mode and check that the normal code (00) is output.

10. DIAGNOSIS CODE LIST

- If there is "O" in the column of system check, an error can be detected when the mode is switched to the system check mode.
- If there is "O" in the column of diagnosis mode, each unit is monitoring whether or not it has failure. In case of detecting failure, it memorizes DTC.

Parts Name	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
Head Unit (190)	42	FM tuner error	There is an error in FM tuner.	Radio receiver check.	X	○
	50	Cassette error	There is an error in cassette deck.		X	○
	51	Cassette eject error	Cassette can not be ejected from Head Unit.		X	○
	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.	Radio receiver check. Wire harness and connecter check.	○	○
	D2	Periodic communication no response	Error in periodic communication.	• Wire harness and connector	X	○
	FF	Diagnosis no response	Result of diagnosis is not issued from start to finish.	Radio receiver check.	○	X
AMP (440)	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.	Stereo component amplifier check.	○	○
	D4	Periodic communication error	Connection confirmation has not come from the equipment that is communicating	• Radio receiver check. • Wire harness check.	X	○

BE1CC-01

TROUBLESHOOTING

NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT:

This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

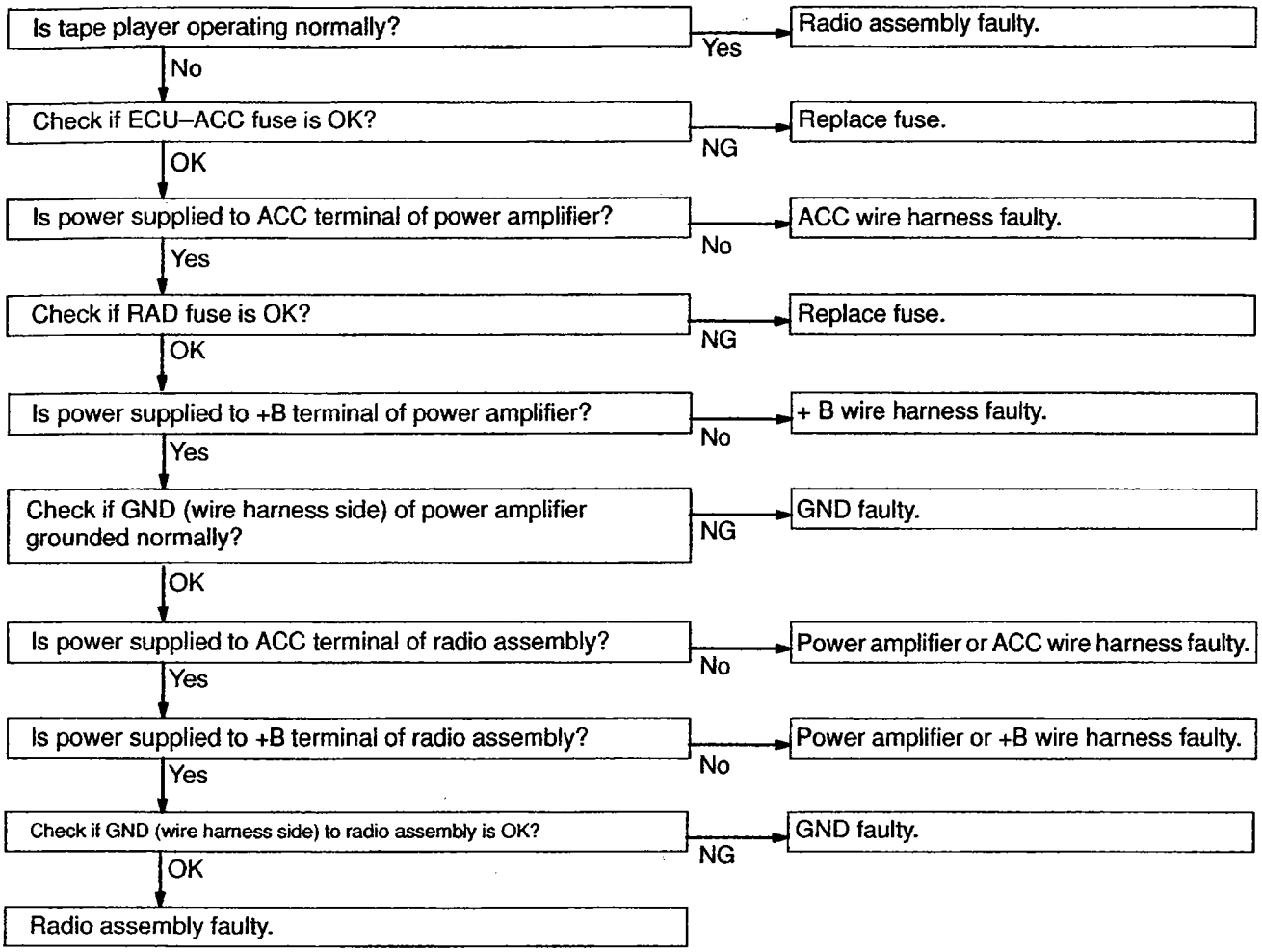
Always inspect the trouble taking the following items into consideration.

- Open or short circuit of the wire harness
- Connector or terminal connection fault

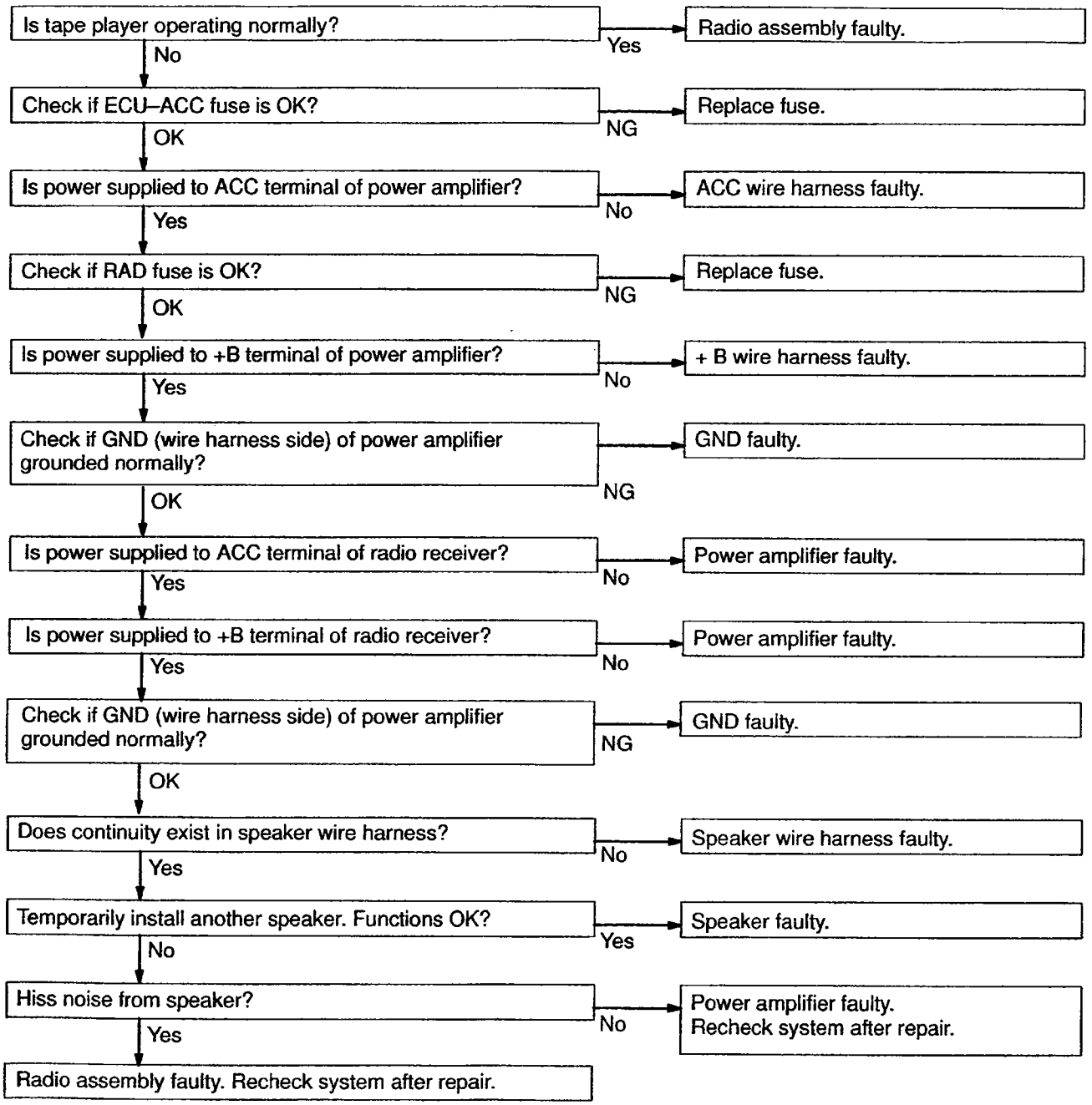
	Problem	No.
Radio	Radio not operating when power switch turned to 'ON'.	1
	Display indicates when power switch turned to 'ON', but no sound (including 'noise') is produced.	2
	Noise present, but AM – FM not operating.	3
	Any speaker does not work.	4
	Any AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserted, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto–reverse.	14
	Cassette tape will not eject.	15
CD Player	CD cannot be inserted.	16
	CD inserted, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Power Amplifier	No power coming in.	23
	Power coming in, but power amplifier not operating.	24
	Any speaker does not work.	25
Noise	Noise occurs	26
	Noise produced by vibration or shock while driving.	27
	Noise produced when engine starts.	28

The term "AM" includes LW,MW and SW, and the term "FW" includes UKW.

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO "ON"



2	Radio	DISPLAY INDICATES WHEN POWER SWITCH TURNED TO "ON", BUT NO SOUND (INCLUDING "NOISE") IS PRODUCED



3	Radio	NOISE PRESENT, BUT AM–FM NOT OPERATING

Go to No.25

If radio side faulty. → Radio faulty.

4	Radio	ANY SPEAKER DOSE NOT WORK

Is tape player operating normally?
- Yes → Radio assembly faulty.
- No ↓

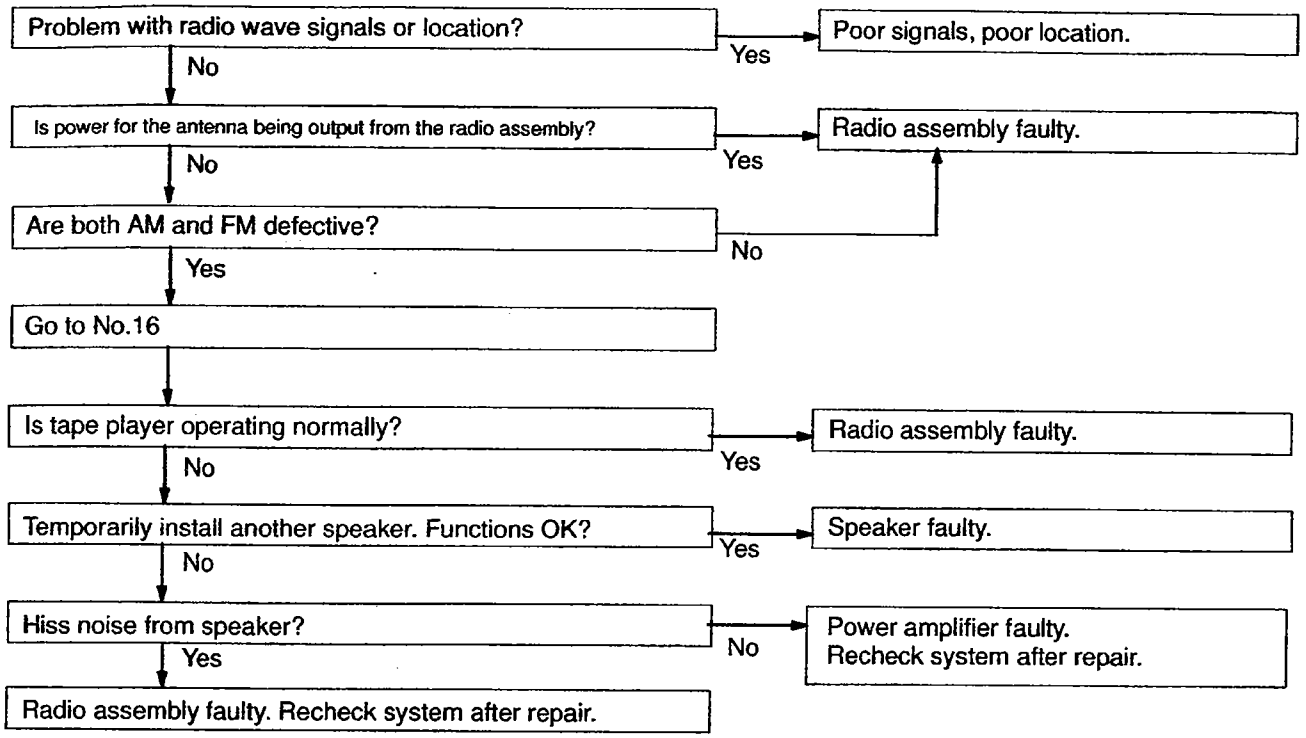
Is hiss noise produced by non–functioning speaker?
- Yes → Radio assembly faulty. Recheck system after repair.
- No ↓

Does continuity exist in speaker wire harness?
- No → Speaker wire harness faulty.
- Yes ↓

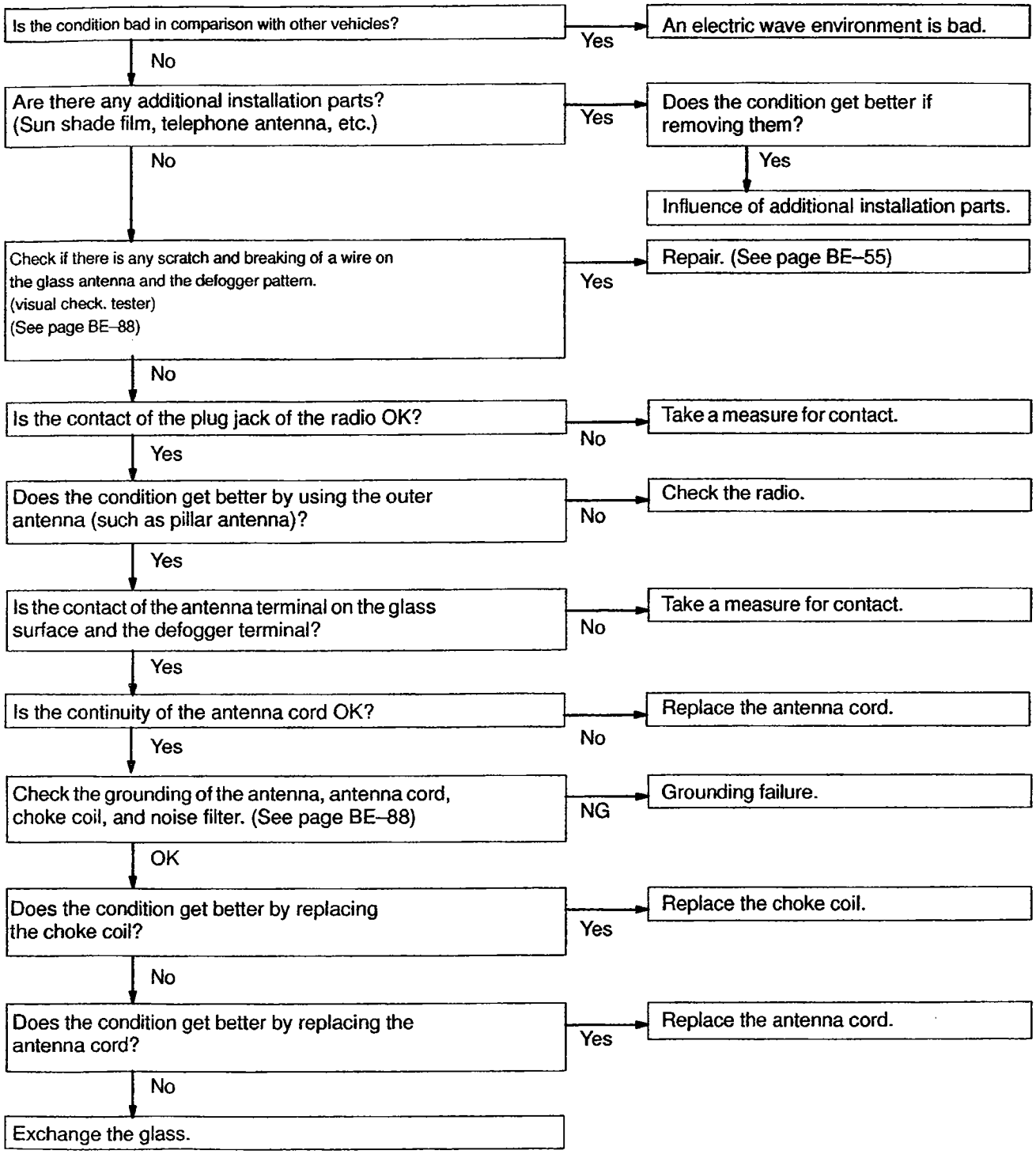
Temporarily install another speaker? Functions OK?
- Yes → Speaker faulty.
- No ↓

Power amplifier faulty. Recheck system after repair.

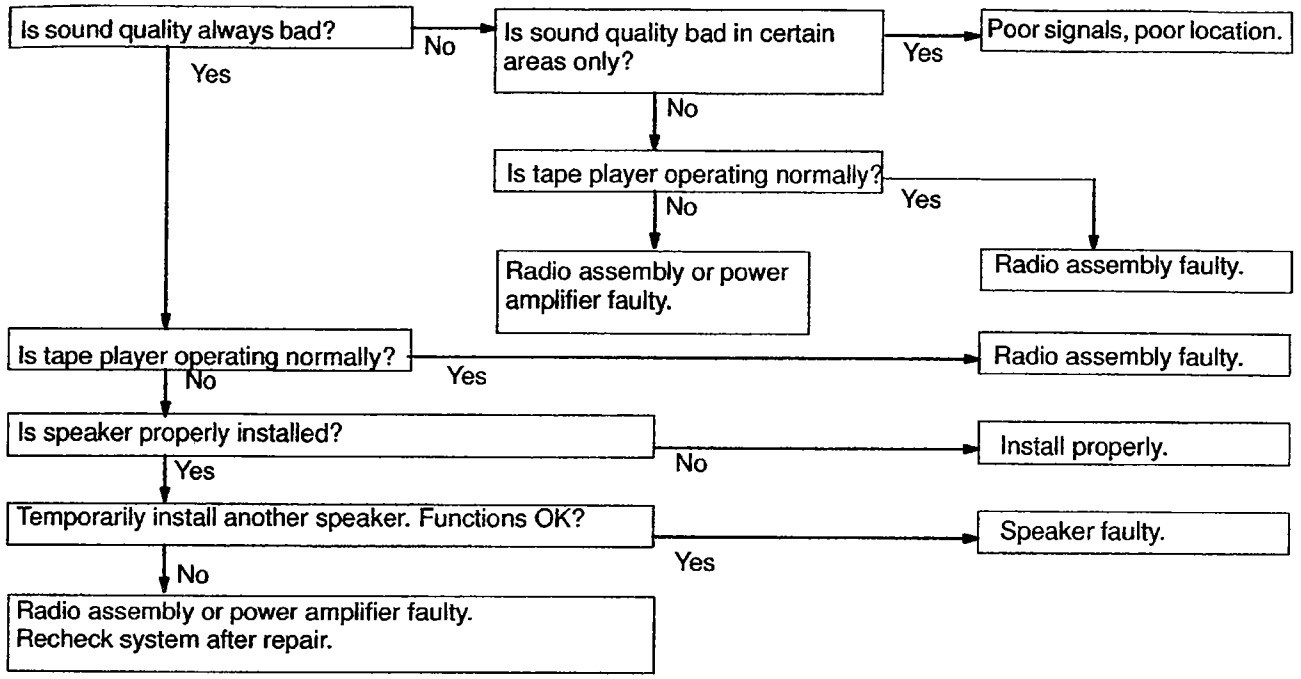
5	Radio	ANY AM OR FM DOES NOR WORK FEW PRESET TUNING BANDS



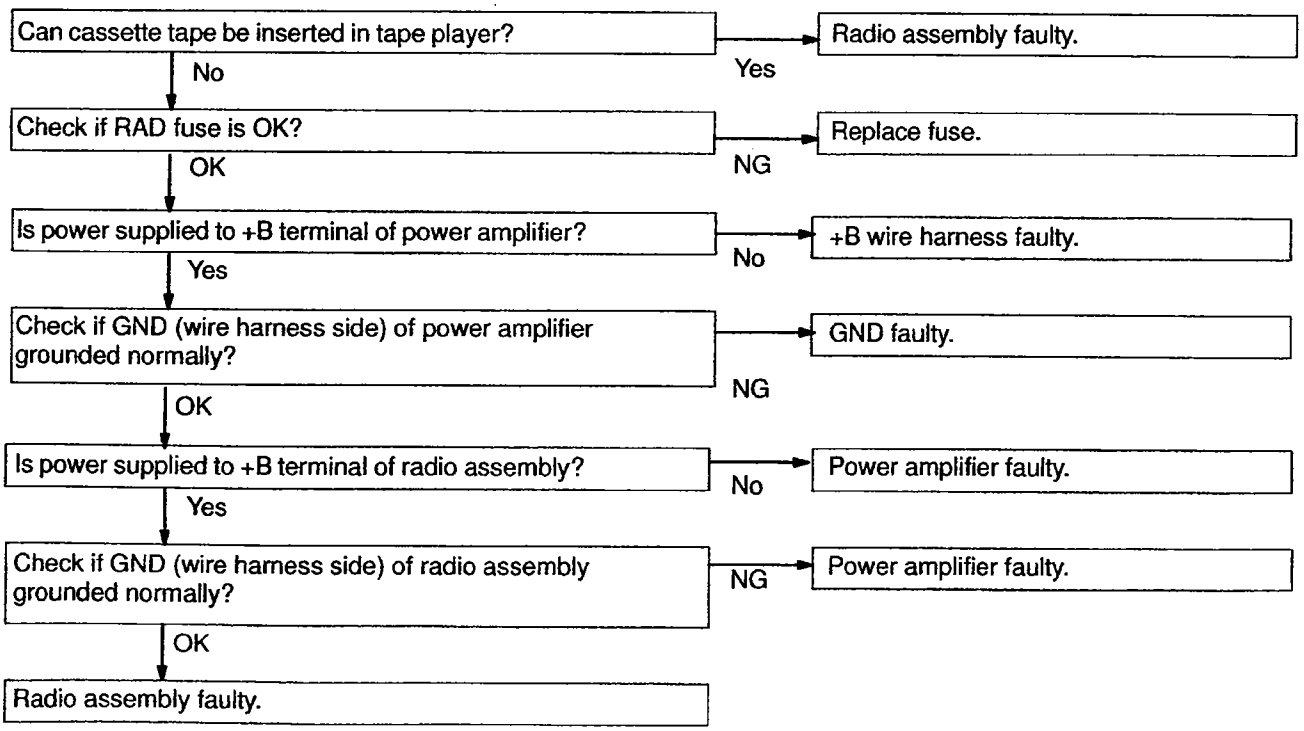
6	Radio	POOR RECEPTION



7	Radio	SOUND QUALITY POOR



8	Radio	PRESET MEMORY DISAPPEARS



9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED

Is there a foreign object inside tape player?
- Yes → Remove foreign object.
- No ↓

Is auto search button radio operating normally?
- Yes → Radio assembly faulty.
- No ↓

Check if RAD fuse is OK?
- NG → Replace fuse.
- OK ↓

Is power supplied to +B terminal of power amplifier?
- No → +B wire harness faulty.
- Yes ↓

Check if GND (wire harness side) of power amplifier grounded normally?
- NG → GND faulty.
- OK ↓

Is power supplied to +B terminal of radio assembly?
- No → Power amplifier faulty.
- Yes ↓

Check if GND (wire harness side) of radio assembly grounded normally?
- NG → Power amplifier faulty.
- OK ↓

Radio assembly faulty.

10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER

Is radio operating normal?
- Yes → Radio assembly faulty.
- No ↓

Check if ECU–ACC fuse is OK?
- NG → Replace fuse.
- OK ↓

Is power supplied to ACC terminal of power amplifier?
- No → ACC wire harness faulty.
- Yes ↓

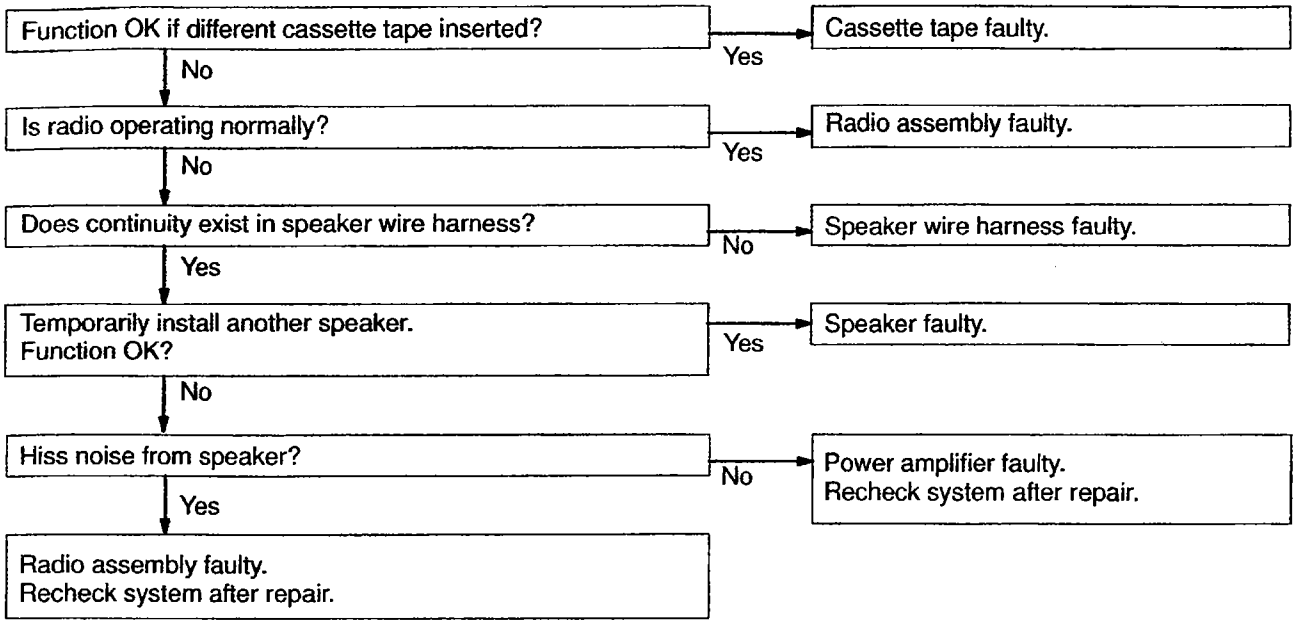
Check if RAD fuse is OK?
- NG → Replace fuse.
- OK ↓

Is power supplied to +B terminal of radio assembly?
- No → +B wire harness faulty.
- Yes ↓

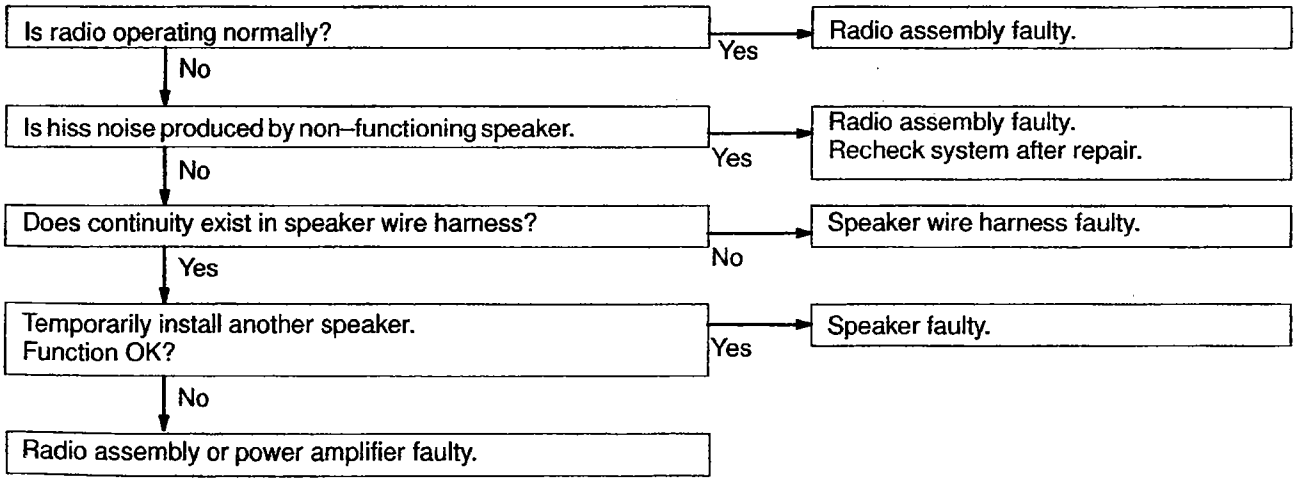
Is power supplied to ACC terminal of radio assembly?
- No → Power amplifier faulty.
- Yes ↓

Radio assembly faulty.

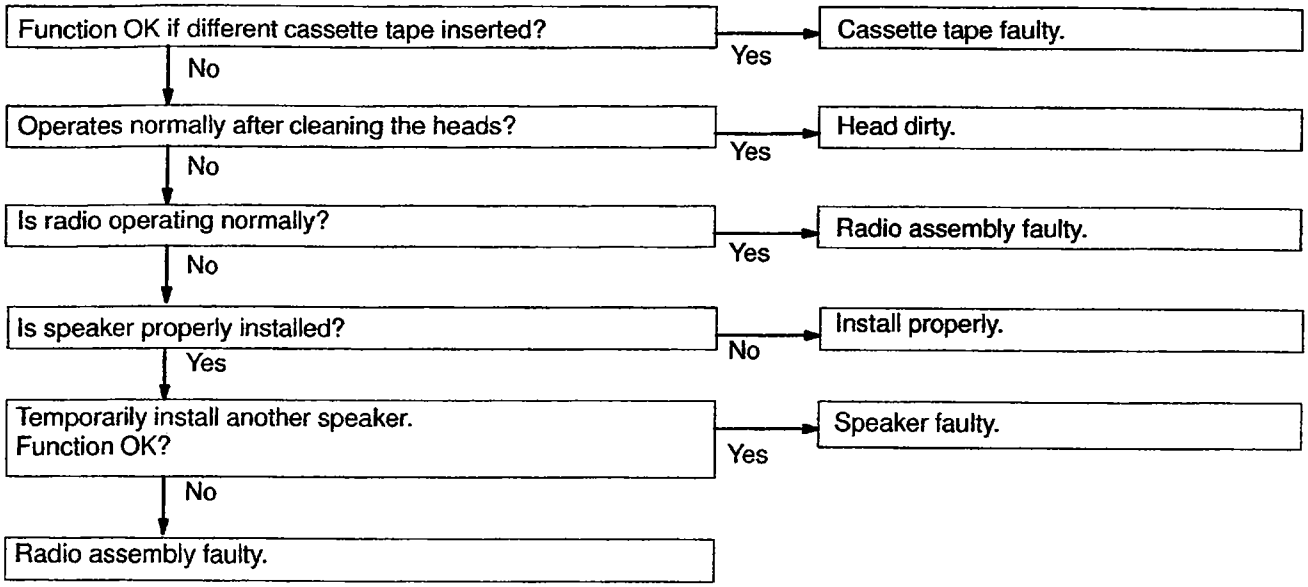
11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING



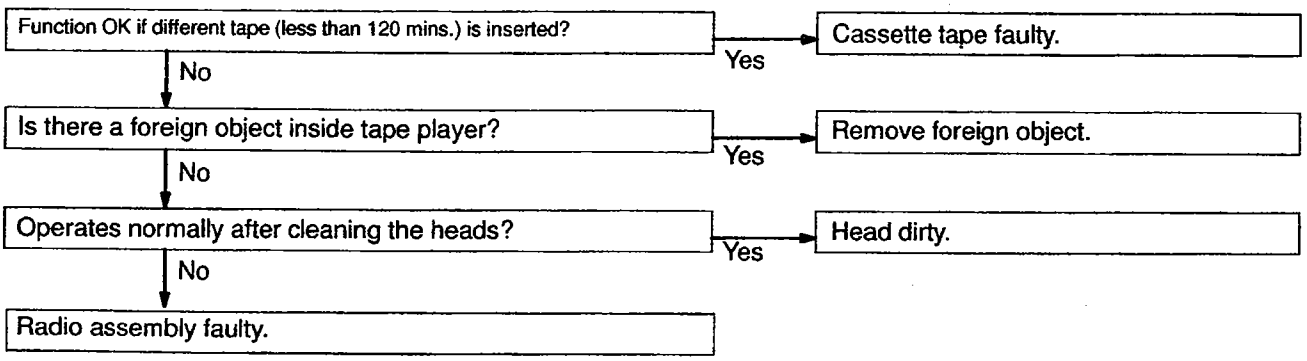
12	Tape Player	ANY SPEAKER DOES NOT WORK



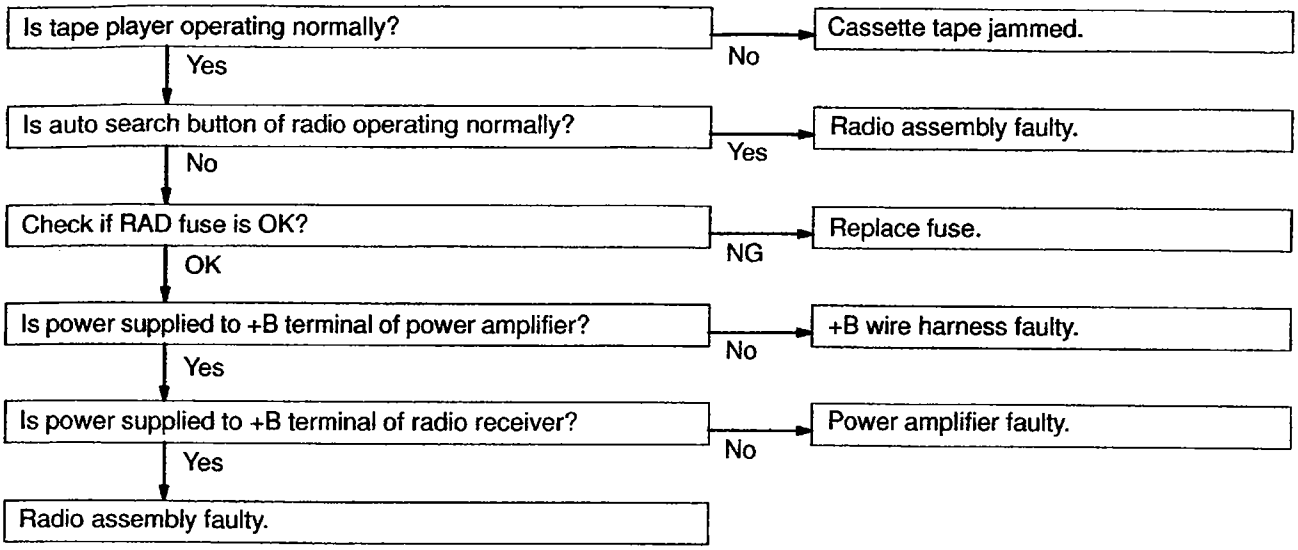
13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)



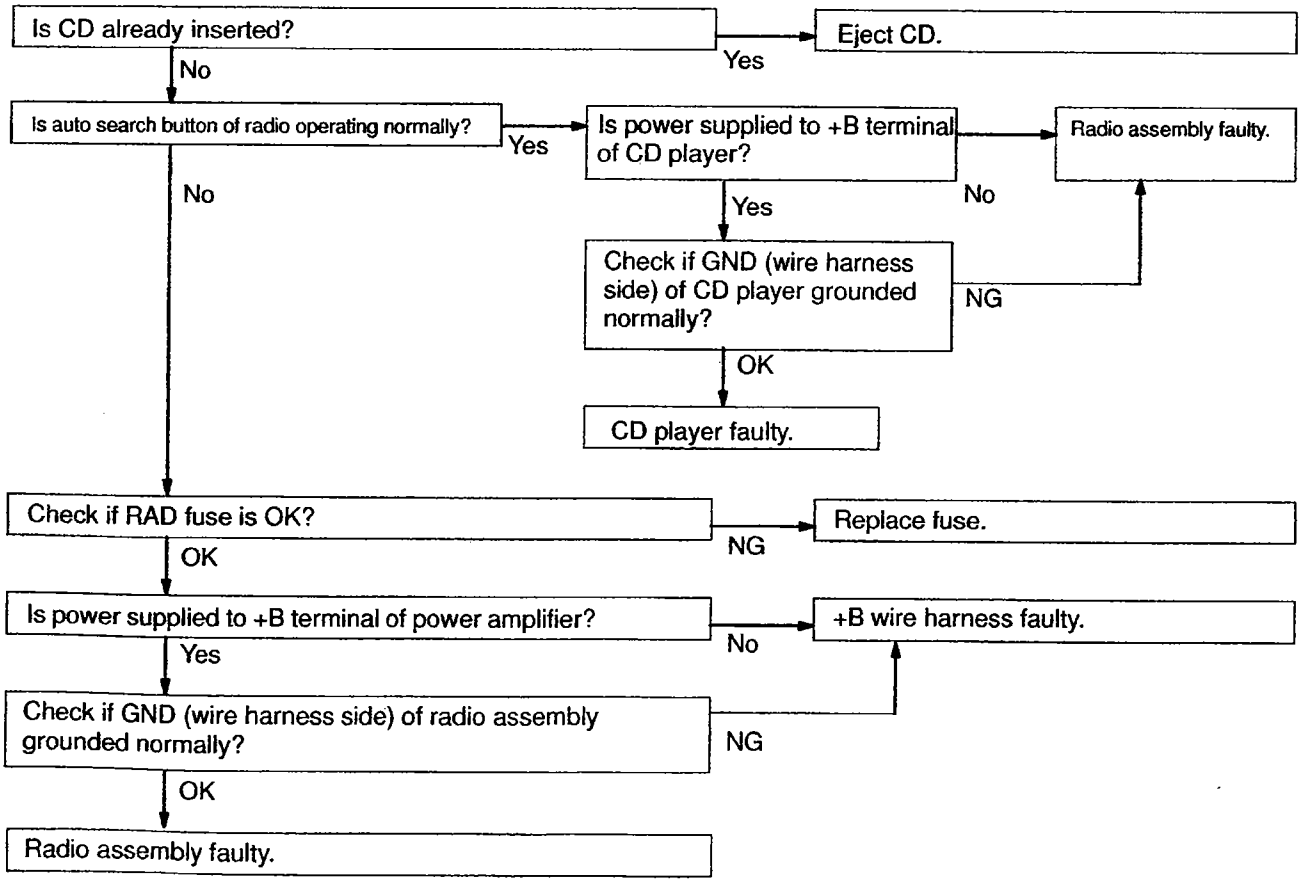
14	Tape Player	TAPE JAMMED MALFUNCTION WITH TAPE SPEED OR AUTO–REVERSE



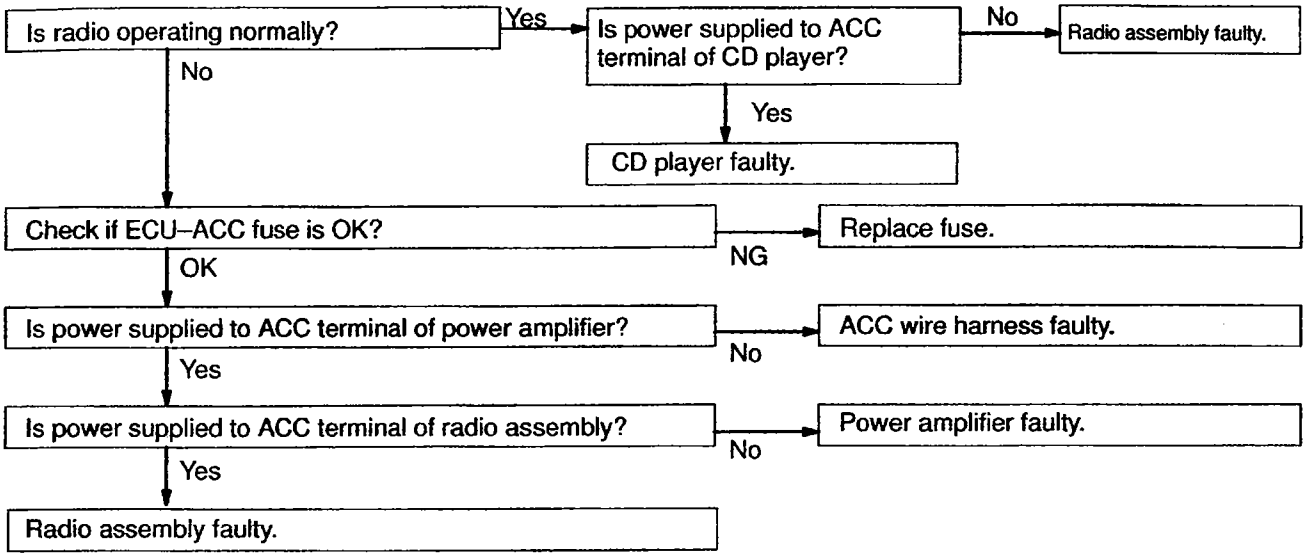
15	Tape Player	CASSETTE TAPE WILL NOT BE EJECTED



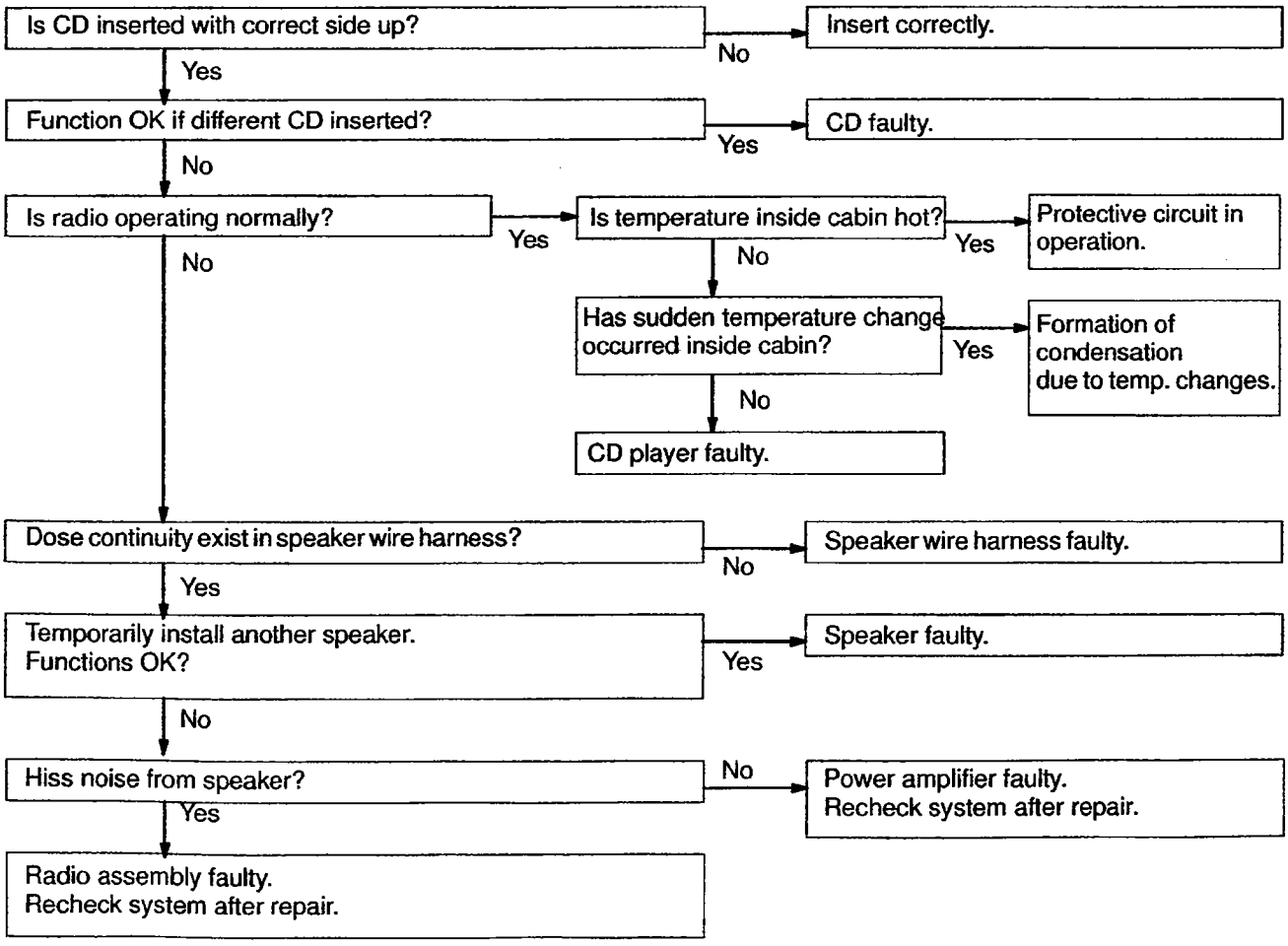
16	CD Player	CD CANNOT BE INSERTED



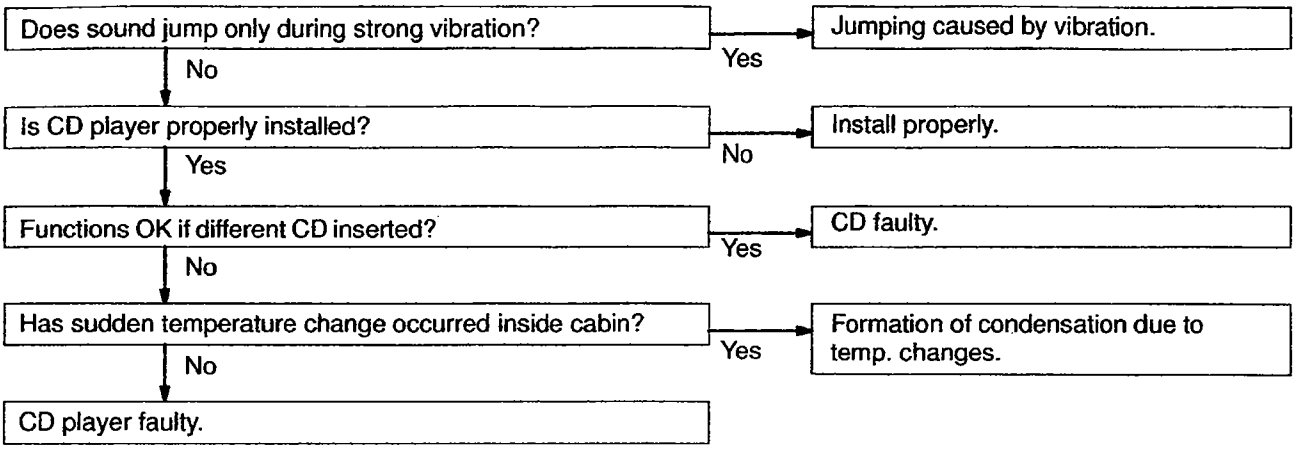
17	CD Player	CD INSERTED, BUT NO POWER



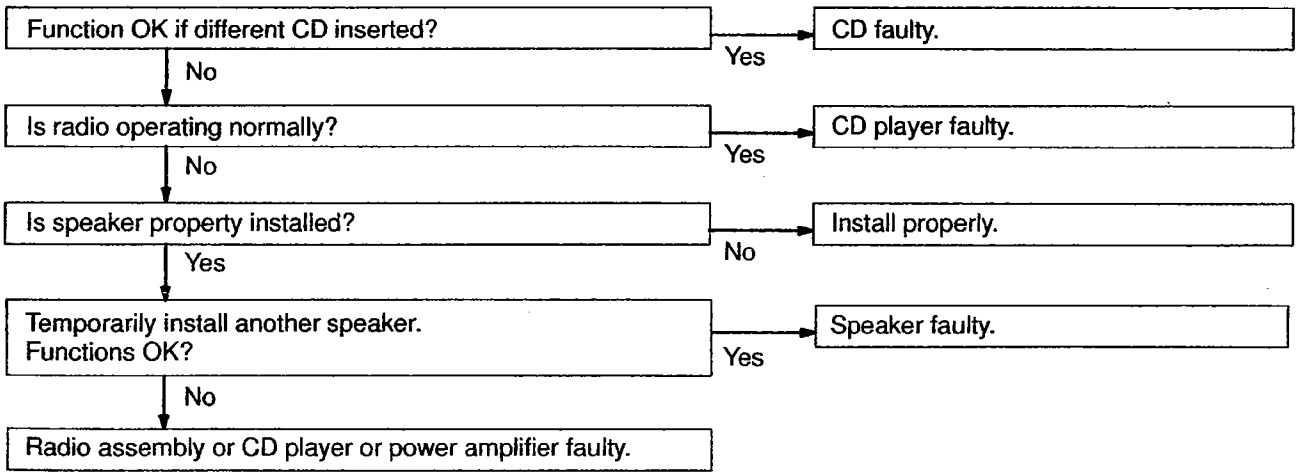
18	CD Player	POWER COMING IN, BUT CD PLAYER NOT OPERATING



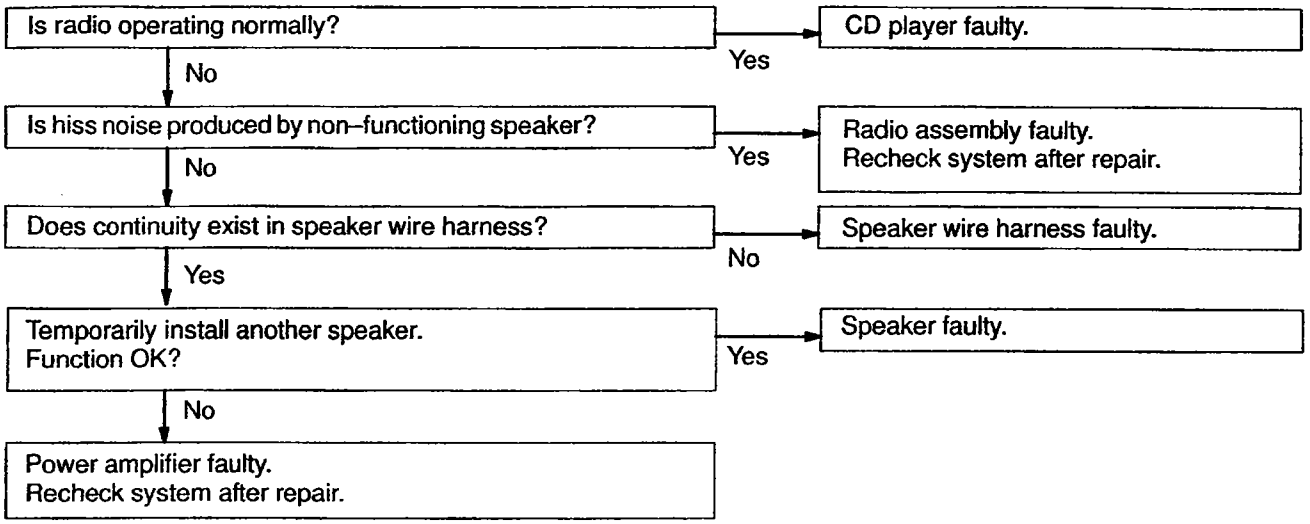
19	CD Player	SOUND JUMPS



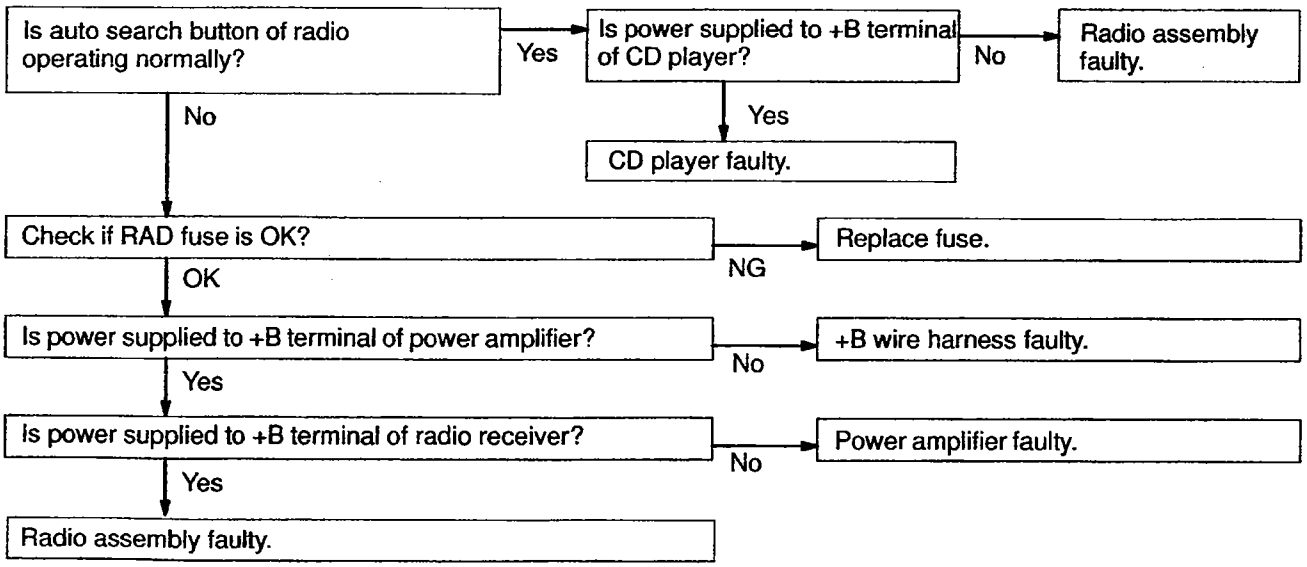
20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)



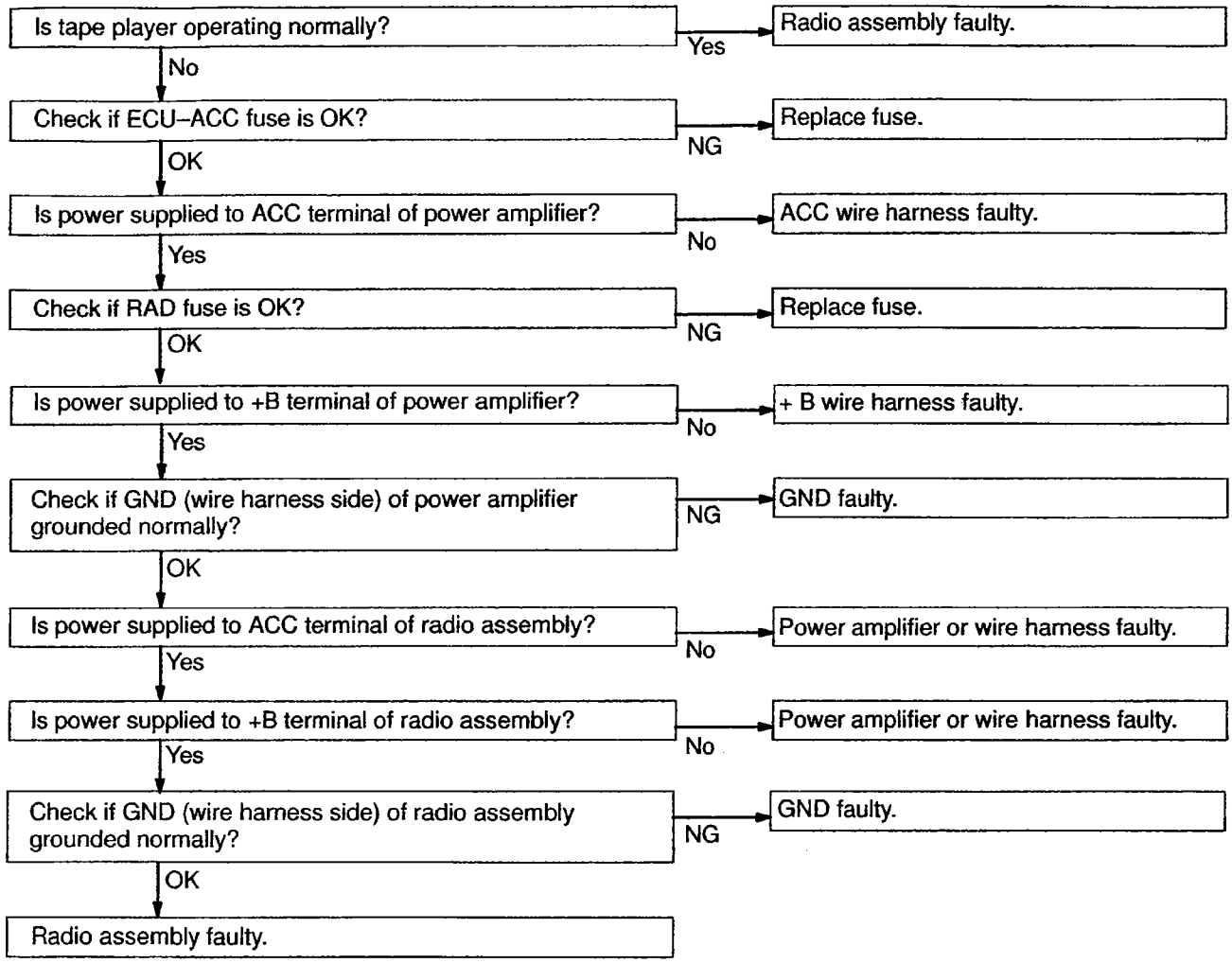
21	CD Player	ANY SPEAKER DOES NOT WORK



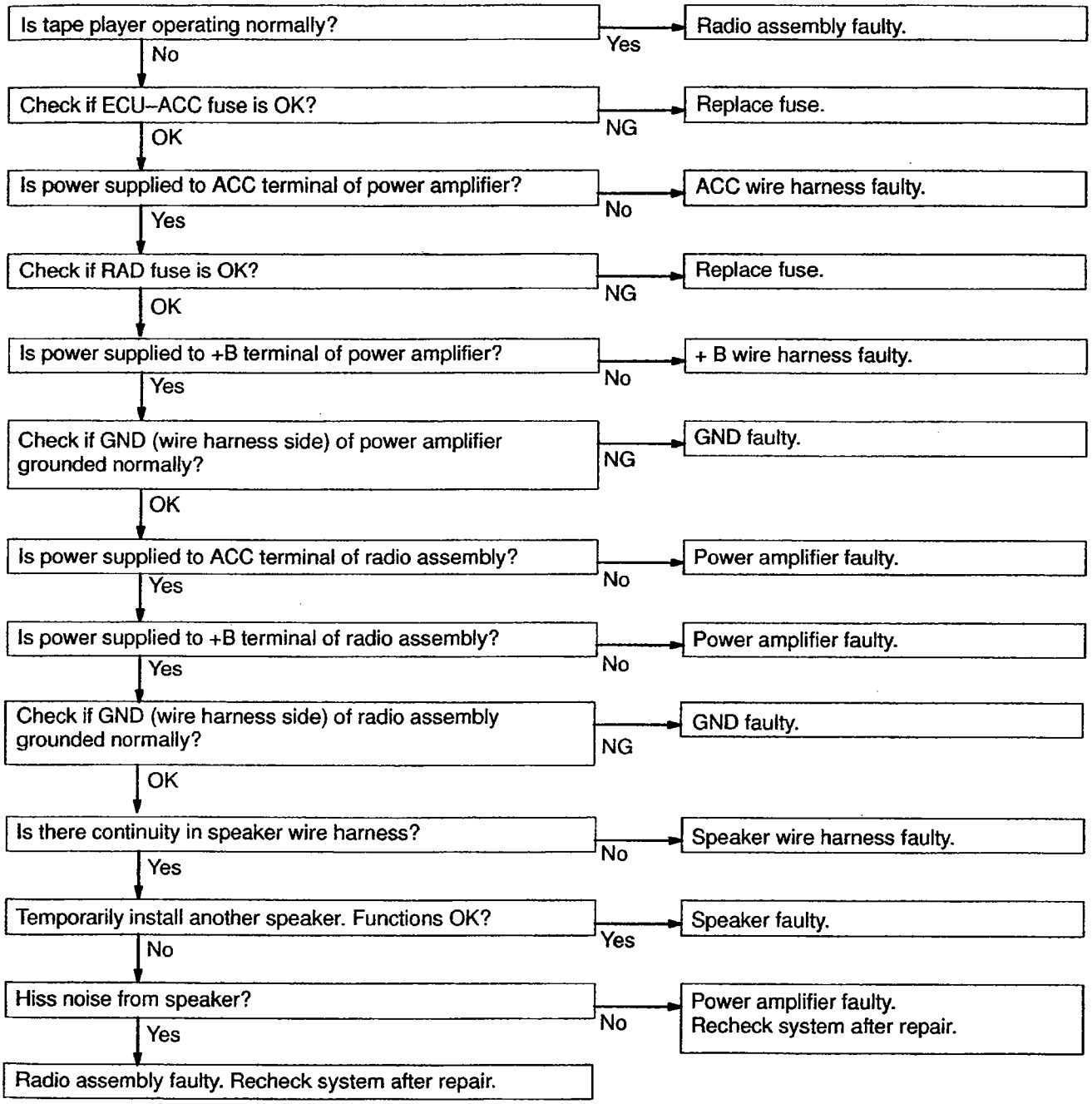
22	CD Player	CD WILL NOT BE EJECTED



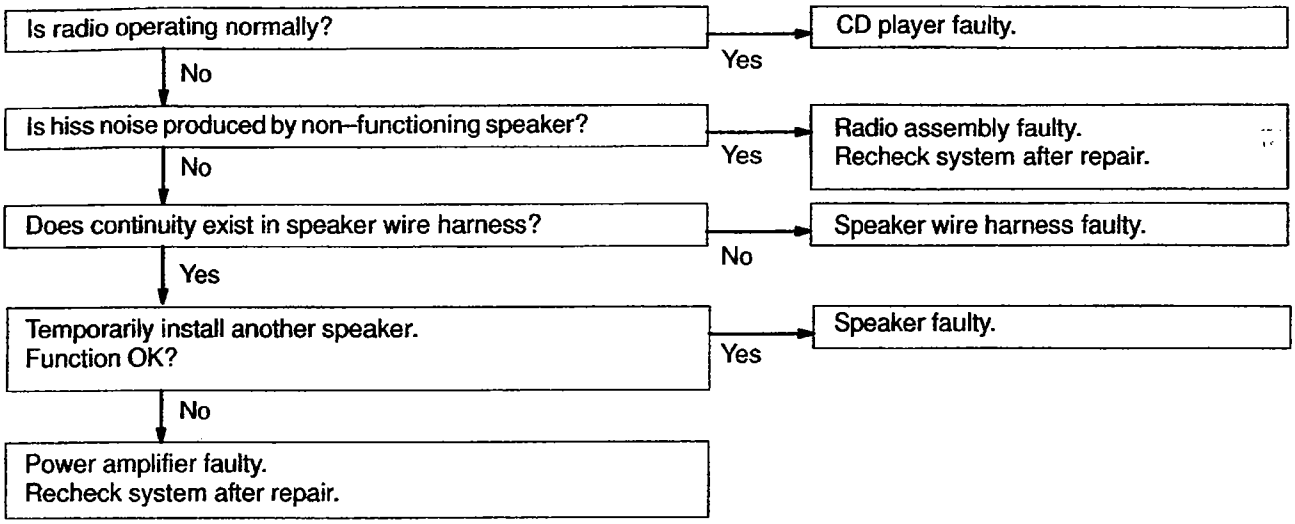
23	Power Amplifier	NO POWER COMING IN



24	Power Amplifier	POWER COMIMG IN, BUT WOOFER (POWER) AMPLIFIER NOT OPERATING



25	Power Amplifier	ANY SPEAKER DOES NOT WORK



26	Noise	NOISE OCCURS

Does the noise occur only in the radio?
- No (It occurs in the cassette and CD.) → Refer to No.27.
- Yes ↓

Does the noise occur in a particular place?
- Yes → An electric environment.
- No ↓

Is there any additional installation part around the glass imprinted antenna? (Sun shade film, telephone antenna etc.)
- Yes → Does the noise stop by removing it?
  - → Influence of the film or the noise radiation of the additional installation part.
- No ↓

Does the noise occur even pulling out the antenna cord from the radio?
- Yes → Check the radio.
- No ↓

Does the noise occur even after pulling out the antenna terminal on the glass surface?
- Yes → Noise mixing into the antenna cable.
- No ↓

Isn't there any adhesive (Butyl rubber) stuck on the bases of the antenna terminal, defogger terminal and bus bar?
- Yes → Failure of glass installation. Must plane the butyl rubber.
- No ↓

Does the noise occur even after pulling out the defogger terminal?
- Yes → Interfering noise from the defogger line and choke coil.
- No ↓

Check the grounding of the antenna, antenna cord, coke coil, and noise filter. (See page BE–88)
- NG → Grounding failure.
- OK ↓

Does the condition get better by replacing the choke coil?
- Yes → Replace the choke coil.
- No ↓

Does the condition get better by replacing the antenna cord.
- Yes → Replace the antenna cord.
- No ↓

Noise rediates directly to the antenna from the generation source.

27	Noise	NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING

Is speaker properly installed?
- No → Install properly.
- Yes ↓

Is speaker properly installed?
- No → Install properly.
- Yes ↓

With vehicles stationary lightly tap each system. Is noise produced?
- Yes → Each system faulty.
- No ↓

Noise is produced from static eletricity accumulating in the vehicle body.

28	Noise	NOISE PRODUCED WHEN ENGINE STARTS

Whistling noise which becomes high–pitched when accelerator strongly depressed, disappears shortly after engine stops.
- Yes → Generator noise.
- No ↓

Whining noise occurs when A/C is operating.
- Yes → A/C noise.
- No ↓

Scratching noise occurs during sudden acceleration, driving on rough roads or when ignition switch is turned ON.
- Yes → Fuel gauge noise.
- No ↓

Clicking sound is heard when horn button is pressed, then released. Whirring/grating sound is heard when pushed continuously.
- Yes → Horn noise.
- No ↓

Murmuring sound stops when engine stops.
- Yes → Ignition noise.
- No ↓

Tick–tack noise occurs in co–ordination with blinking offlasher.
- Yes → Turn signal noise.
- No ↓

Noise occurs during window washer operation.
- Yes → Washer noise.
- No ↓

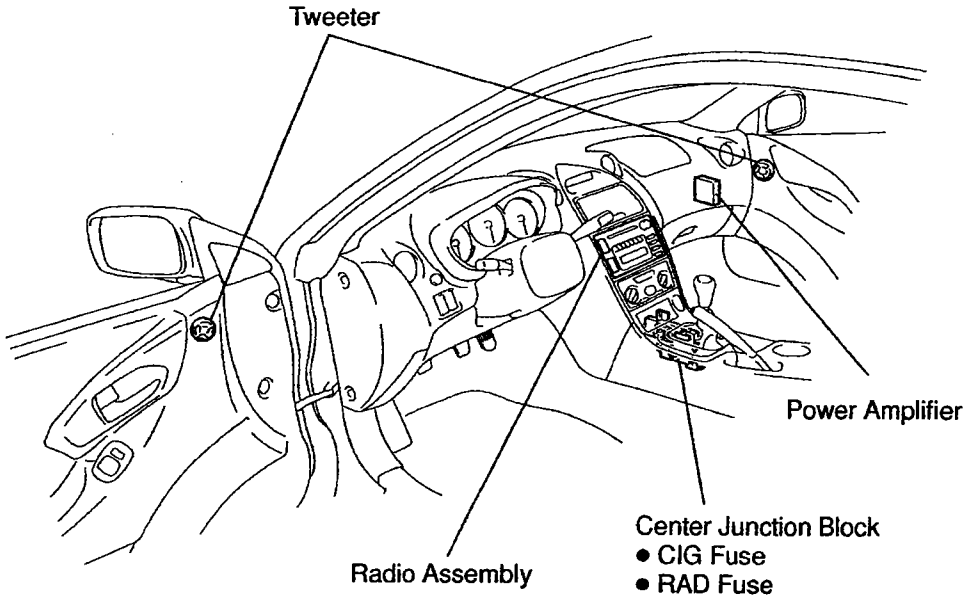
Scratching noise occurs while engine is running, and continues a while even after engine stops.
- Yes → Engine coolant temp. gauge noise.
- No ↓

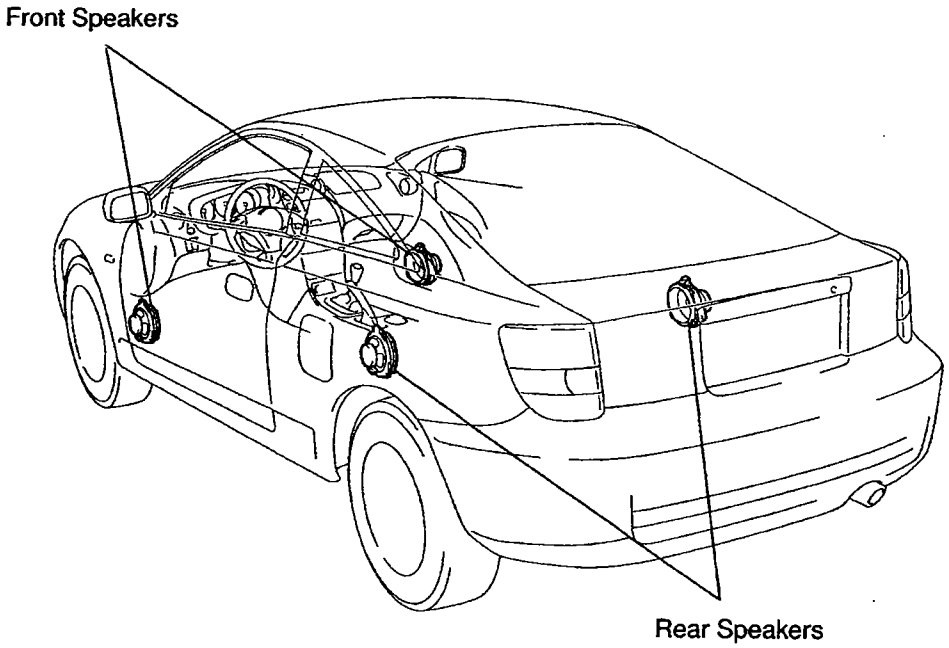
Scraping noise in line with wiper beat.
- Yes → Wiper noise.
- No ↓

Other type of noise

LOCATION

BEOPP-02





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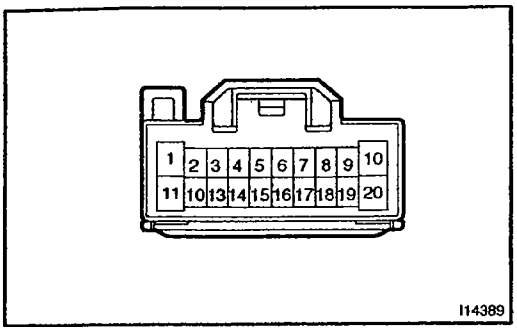
I13595

BE16M-02



INSPECTION

1. 8 speaker type:

INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

Connect the connector from radio receiver assembly and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground (+B)	Constant	Battery positive voltage
2 – Ground (ILL+)	Light control switch TAIL or HEAD	Battery positive voltage
3 – Ground (AMP+)	Radio power switch ON	Battery positive voltage
7 – Ground (MUTE)	Audio sounding	1 V or below
8 – Ground (FR)	Audio sounding	5 – 7 V
9 – Ground (FL)	Audio sounding	5 – 7 V
10 – Ground (SGD3)	Constant	Continuity
11 – Ground (ACC)	Ignition switch ACC	Battery positive voltage
16 – Ground (SGND)	Constant	Continuity
17 – Ground (BEEP)	Audio sounding	–
18 – Ground (RR)	Audio sounding	5 – 7 V
19 – Ground (RL)	Audio sounding	5 – 7 V
20 – Ground (GND)	Constant	Continuity

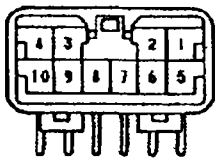
If the circuit is not as specified, inspect the circuits connected to other parts.

2. 4 speaker and 6 speaker type:
INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

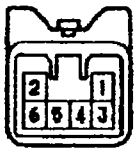
Connect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Radio Receiver Side

Connector "A"



Connector "B"



I12416

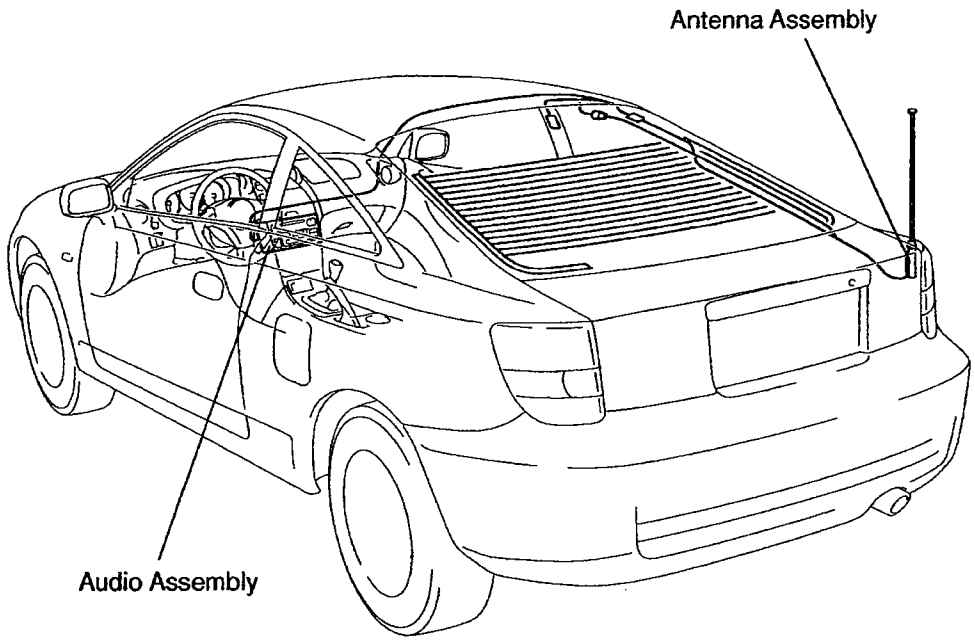
Tester connection	Condition	Specified condition
A1 – Ground (FR+)	Audio sounding	5 – 7 V
A2 – Ground (FL+)	Audio sounding	5 – 7 V
A3 – Ground (ACC)	Ignition switch ACC	Battery positive voltage
A4 – Ground (+B)	Constant	Battery positive voltage
A5 – Ground (FR–)	Audio sounding	5 – 7 V
A6 – Ground (FL–)	Audio sounding	5 – 7 V
A7 – Ground (E)	Constant	Continuity
A10 – Ground (ILL+)	Light control switch TAIL or HEAD	Battery positive voltage
B1 – Ground (RR+)	Audio sounding	5 – 7 V
B2 – Ground (RL+)	Audio sounding	5 – 7 V
B3 – Ground (RR–)	Audio sounding	5 – 7 V
B6 – Ground (RL–)	Audio sounding	5 – 7 V

If the circuit is not as specified, inspect the circuits connected to other parts.

ANTENNA

LOCATION

BE1DE-01



P

I13596

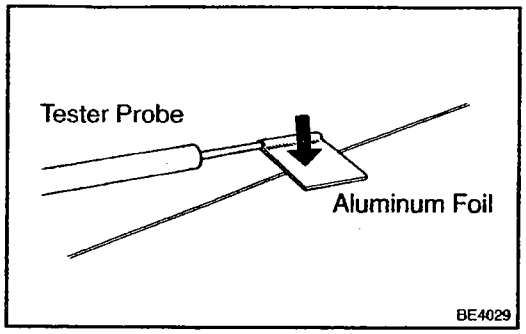
BE060-08

INSPECTION

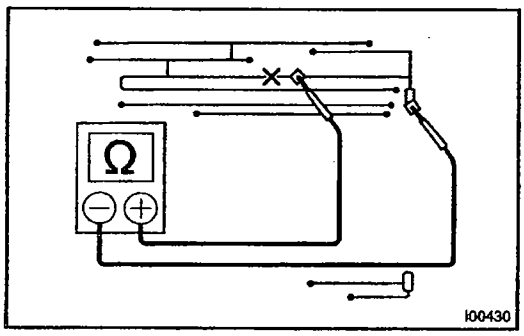
1. GLASS PRINTED ANTENNA INSPECTION PROCEDURE

NOTICE:

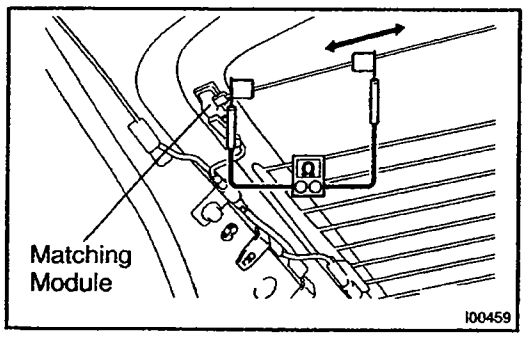
- **When cleaning the glass, use soft dry cloth, and wipe the glass in the direction of the wire.**
  Take care not to damage the wires.
- **Do not use detergents or glass cleaners with abrasive ingredients.**



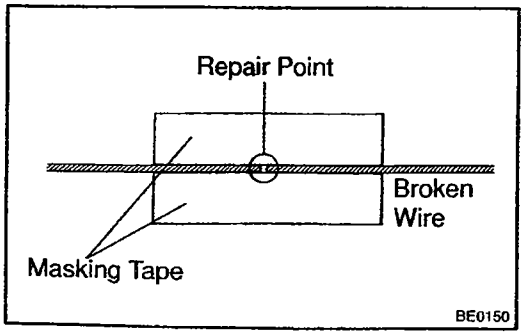
NOTICE:
In order not to damage the glass printed antenna, wrap up the tip of the tester stick with aluminum foil as shown in the illustration and check by holding the aluminum foil with a finger.



By placing and moving the tester stick along the glass printed antenna, check if continuity exists.



HINT:
Matching module is built in the bus bar of the glass printed antenna (main terminal side) of CELICA and no continuity exists between the terminal and the antenna. Therefore, for the continuity checking of the glass printed antenna on the main antenna side of CELICA, place one probe of the tester on the position beside the bus bar (position shown in the illustration) and check by making the other probe of the tester move along.

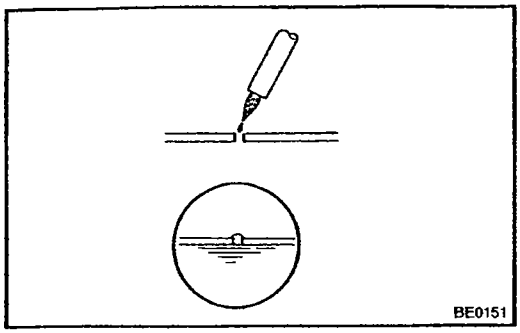


2. GLASS PRINTED ANTENNA REPAIR PROCEDURE

(a) Clean the broken wire tips with grease, wax and silicone remover.

(b) Place the masking tape along both sides of the wire for repair.

(c) Thoroughly mix the repair agent (Dupont paste No. 4817).



(d) Using a fine tip brush, apply a small amount of the agent to the wire.

(e) After a few minutes, remove the masking tape.

CLOCK

TROUBLESHOOTING

BE0G0-05

HINT:

Troubleshoot the clock according to the table below.

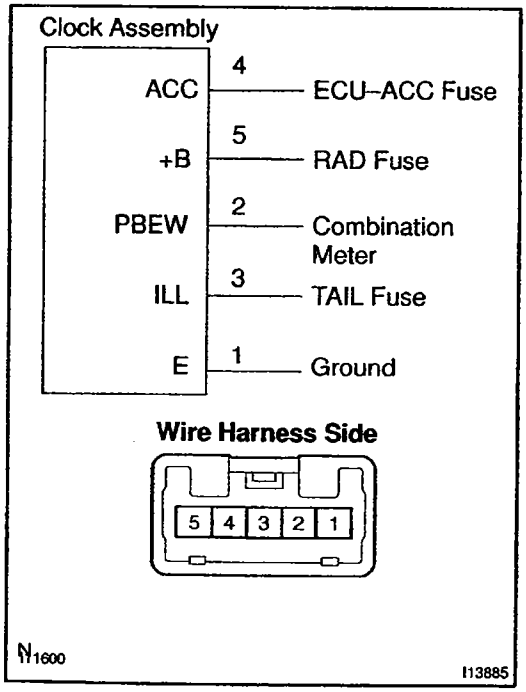
Troubleshooting	No.
Passenger seat belt warning light does not light up.	1
Clock will not operate	1
Clock loses or gains time	2

± 1.5 seconds / day

1. INSPECT CLOCK CIRCUIT

2. TROUBLESHOOTING NO.1

1	**PASSENGER SEAT BELT WARNING LIGHT DOES NOT OPERATE**
	CLOCK WILL NOT OPERATE



(a) Turn ignition switch ON.

(b) Check that the battery positive voltage is 10 – 16 V.

If voltage is not as specified, replace the battery.

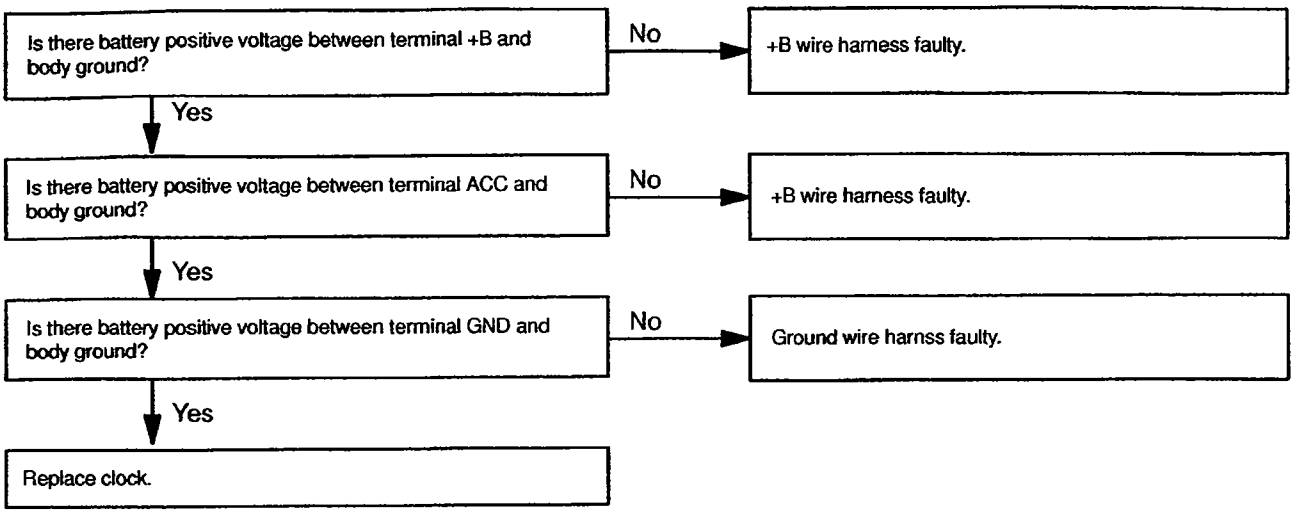
(c) Check that the RAD and ECU–ACC fuses are not blown.

If the fuse is blown, replace the fuse and check for short.

(d) Troubleshoot the clock as follows.

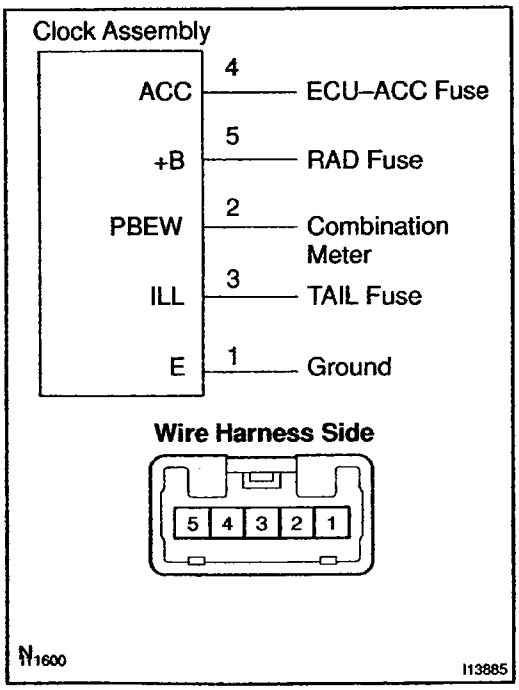
HINT:

Inspect the connector on the wire harness side.



3. TROUBLESHOOTING NO.2

2	**CLOCK LOSES OR GAINS TIME**



(a) Turn ignition switch ON.

(b) Check that the battery positive voltage is 10 – 16 V.

If voltage is not as specified, replace the battery.

(c) Inspect the error of the clock.

Allowable error (per day): ± 1.5 seconds

If the error exceeds the allowable error, replace the clock.

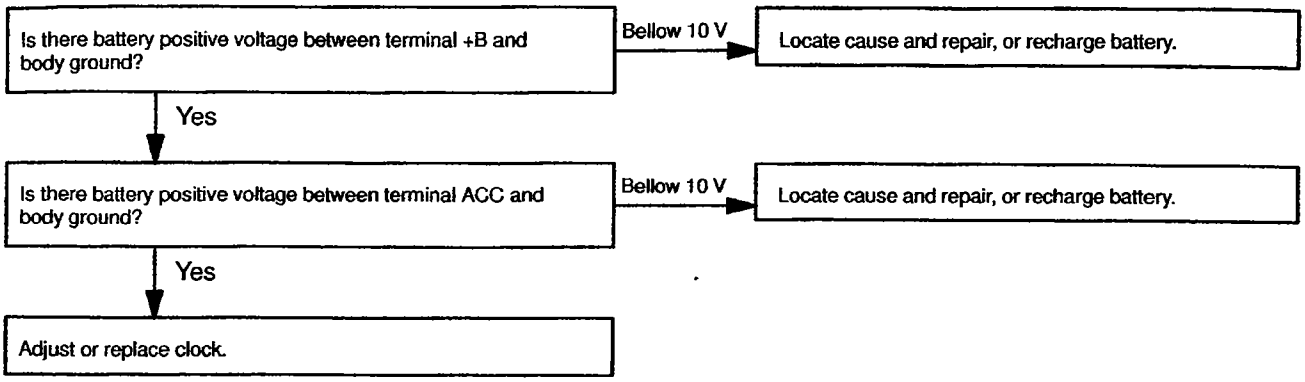
(d) Check that the clock adjusting button is sticking in position and has failed to return.

If the error exceeds the allowable error, replace the clock.

(e) Troubleshoot the clock as follows.

HINT:

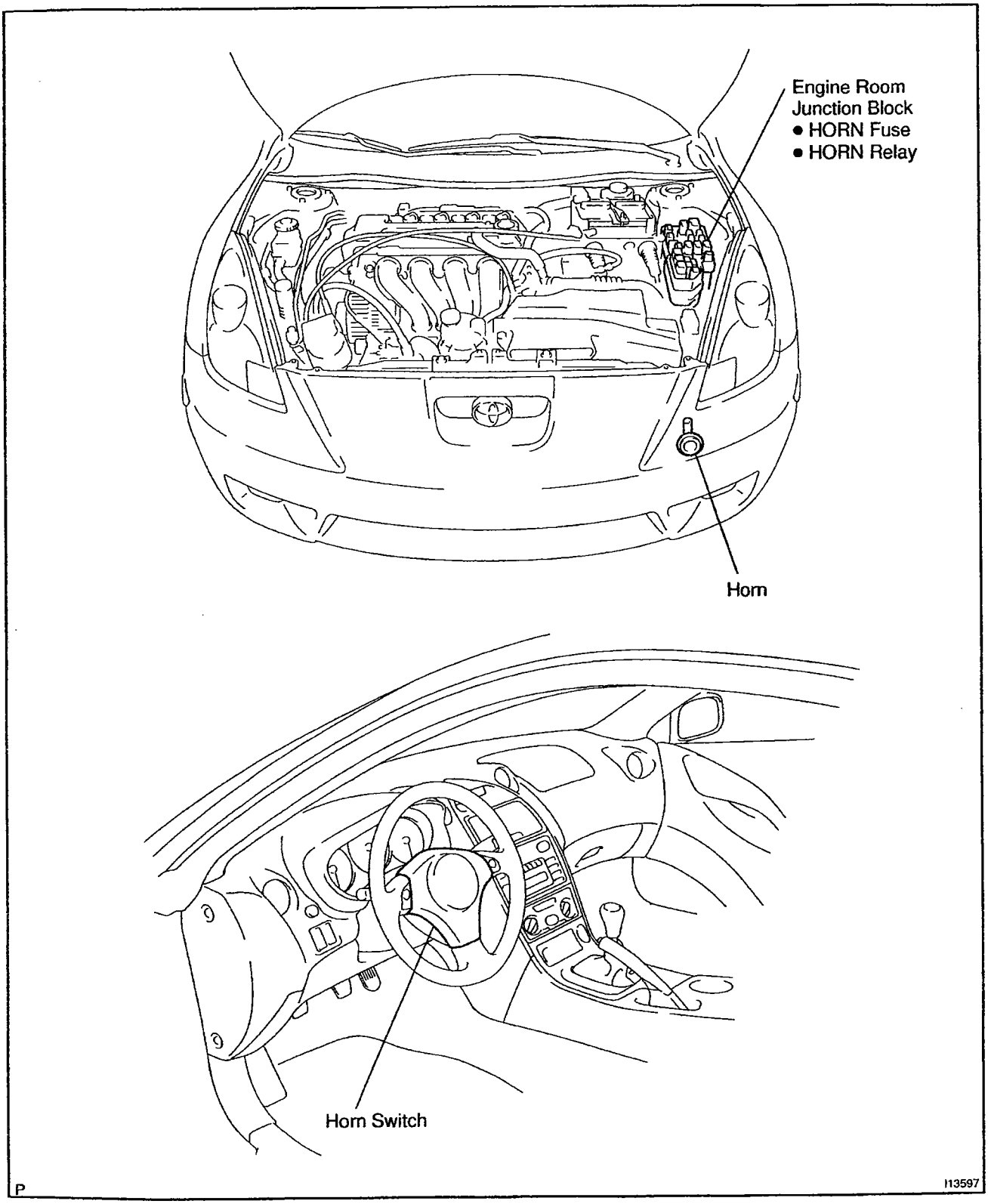
Inspect the connector on the wire harness side.

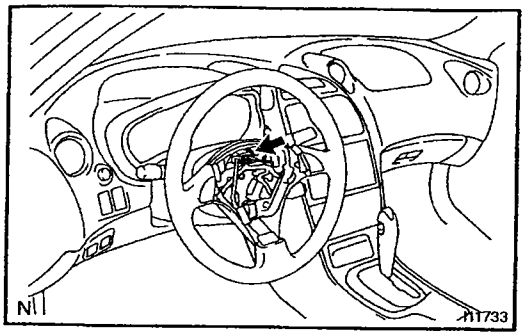

Is there battery positive voltage between terminal +B and body ground?
Bellow 10 V
Locate cause and repair, or recharge battery.
Yes
Is there battery positive voltage between terminal ACC and body ground?
Bellow 10 V
Locate cause and repair, or recharge battery.
Yes
Adjust or replace clock.

HORN SYSTEM

BE0FY-10

LOCATION





INSPECTION

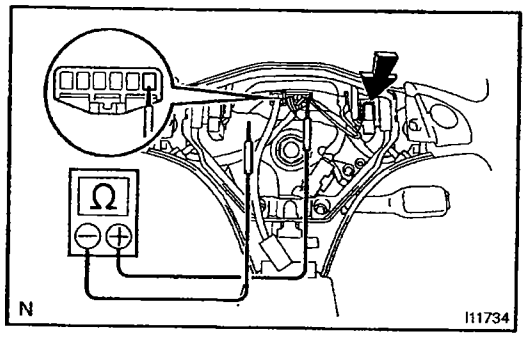
BE0FZ-09

1. INSPECT HORN SWITCH

(a) Disconnect the negative (–) terminal from the battery.
(b) Remove the left and right covers from the steering wheel.
(c) Using a torx socket wrench, loosen the 2 bolts.
(d) Pull up the horn pad and place it on the steering column, as shown.

HINT:
Do not disconnect the connector from the horn pad.

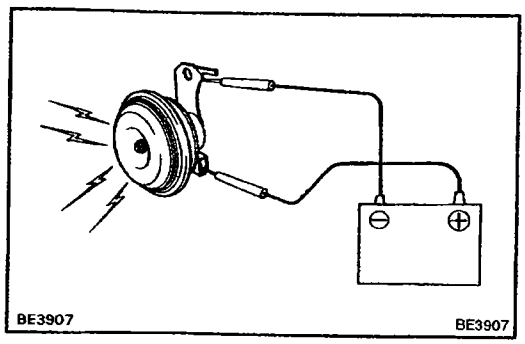
(e) Disconnect the connector from the slip ring.



(f) Check that no continuity exists between terminal 6 of the connector and body ground.
(g) Check that continuity exists between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

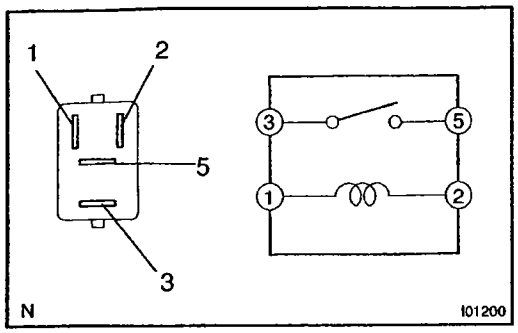
(h) Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.
Torque: 7.1 N·m (72 kgf·cm, 62 in.·lbf)
(i) Install the left and right covers.
(j) Connect the negative (–) terminal to the battery.



2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (–) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.



3. INSPECT HORN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

– MEMO –

BODY

CLIP	BO–1
SRS AIRBAG	BO–3
FRONT BUMPER	BO–4
REAR BUMPER	BO–5
HEADLIGHT	BO–6
HOOD	BO–9
FRONT DOOR	BO–10
BACK DOOR	BO–22
BACK DOOR STAY	BO–27
FRONT WIPER AND WASHER	BO–28
REAR WIPER AND WASHER	BO–33
ROOF DRIP SIDE MOULDING	BO–38
ROOF SIDE MOULDING	BO–42
SIDE MUD GUARD	BO–46
WINDSHIELD	BO–47
QUARTER WINDOW GLASS	BO–55
BACK DOOR GLASS	BO–64
SLIDING ROOF	BO–69
INSTRUMENT PANEL	BO–76
ROOF HEADLINING	BO–86
FRONT SEAT	BO–92
REAR SEAT	BO–101
SEAT BELT	BO–106
SEAT BELT PRETENSIONER	BO–109

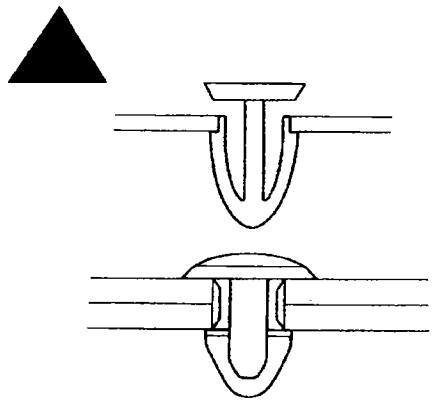
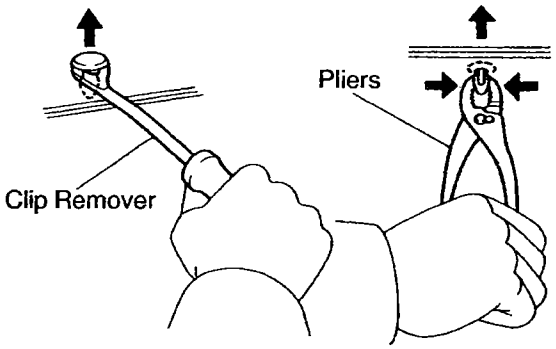
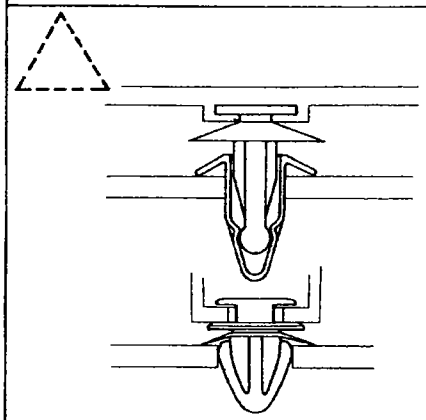
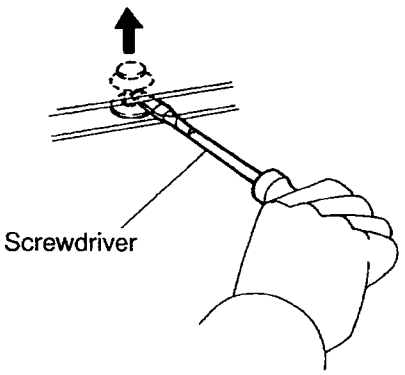
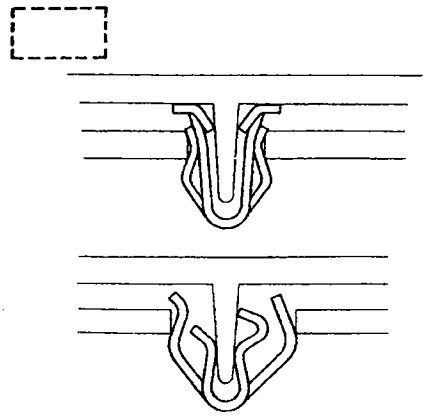
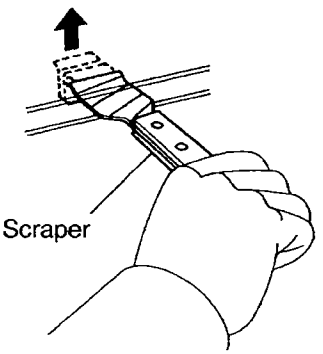
BO

CLIP

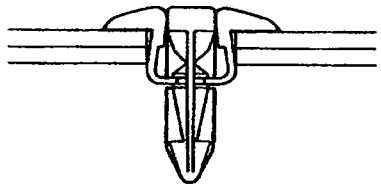
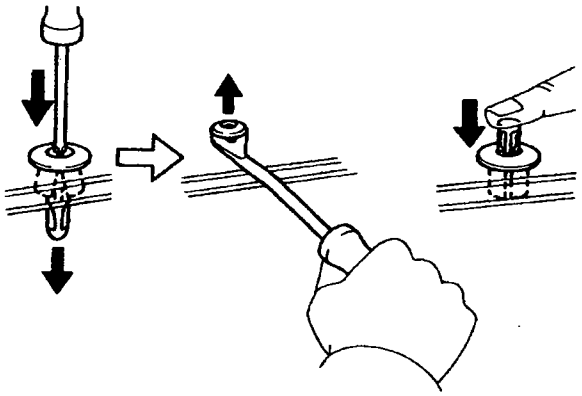
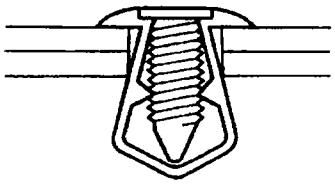
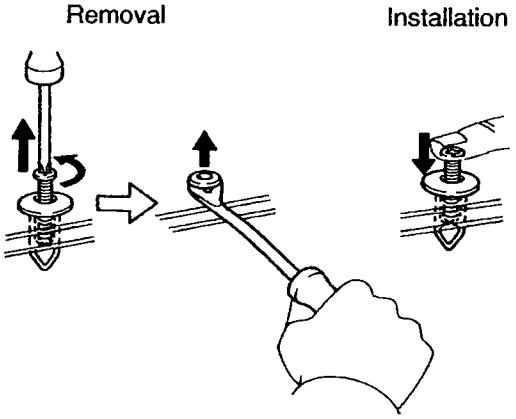
REPLACEMENT

B00ZO-03

The removal and installation methods of typical clips used in body parts are shown in the table below.
HINT:
If the clip is damaged during the operation, always replace it with a new clip.

Shape (Example)	Removal/Installation
	
	
	

V00005

Shape (Example)	Removal/Installation
	
	

V00012

SRS AIRBAG

PRECAUTION

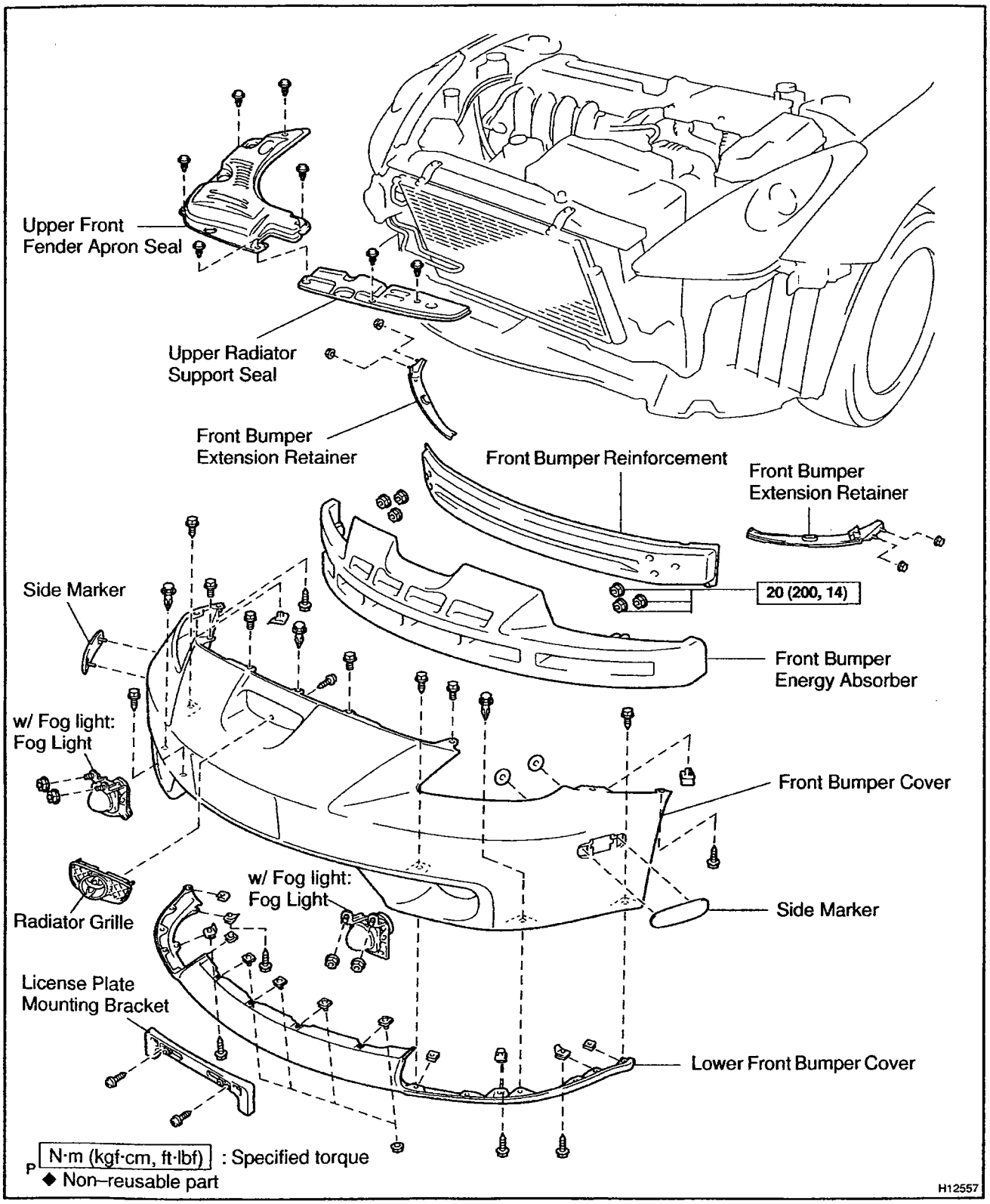
BO0ZP-03

The CELICA is equipped with an SRS (Supplemental Restraint System) such as the driver airbag, front passenger airbag, side airbag and seat belt pretensioner. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

FRONT BUMPER

COMPONENTS

BO1DG-02

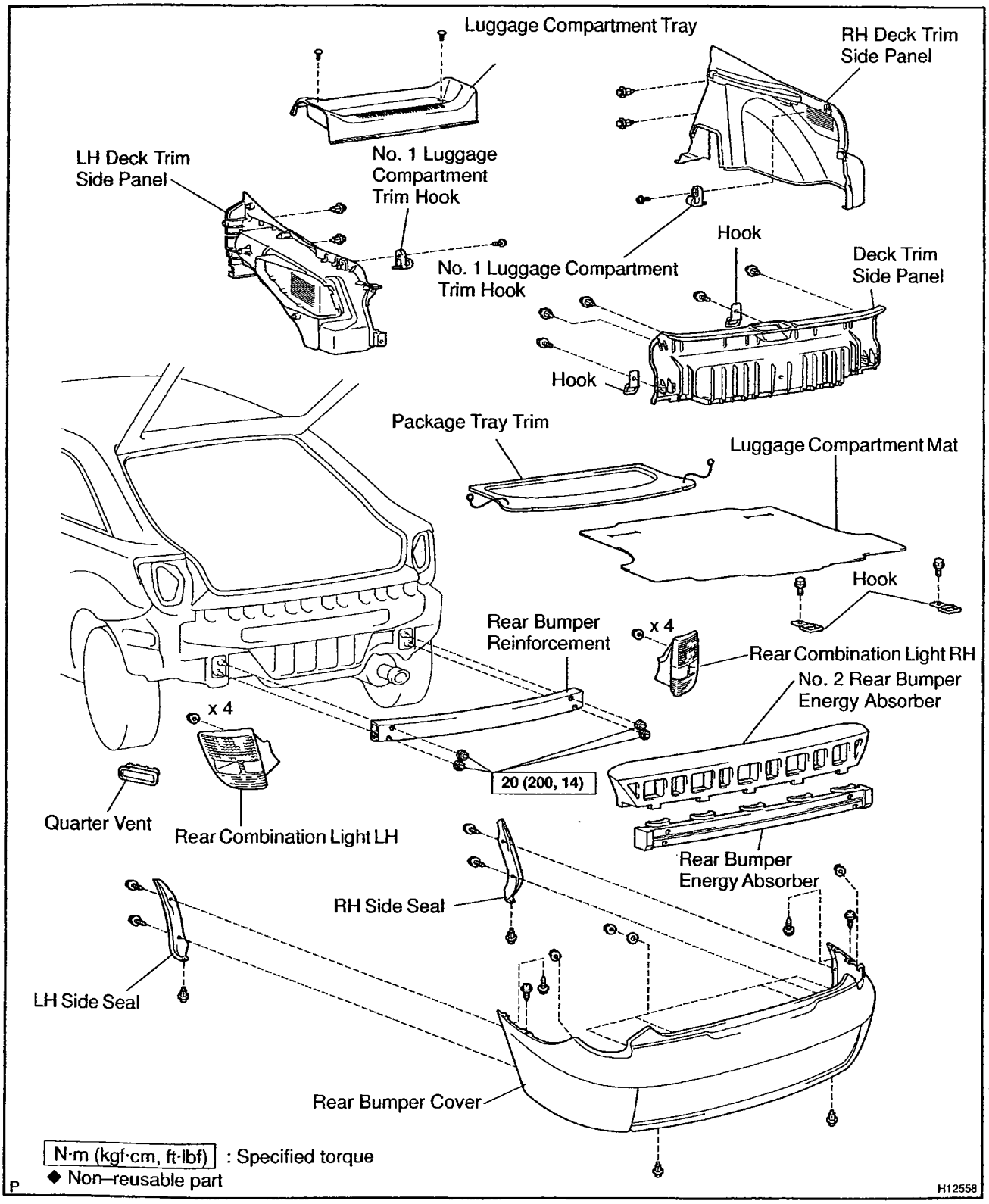


BO

REAR BUMPER

COMPONENTS

BO1DH-02

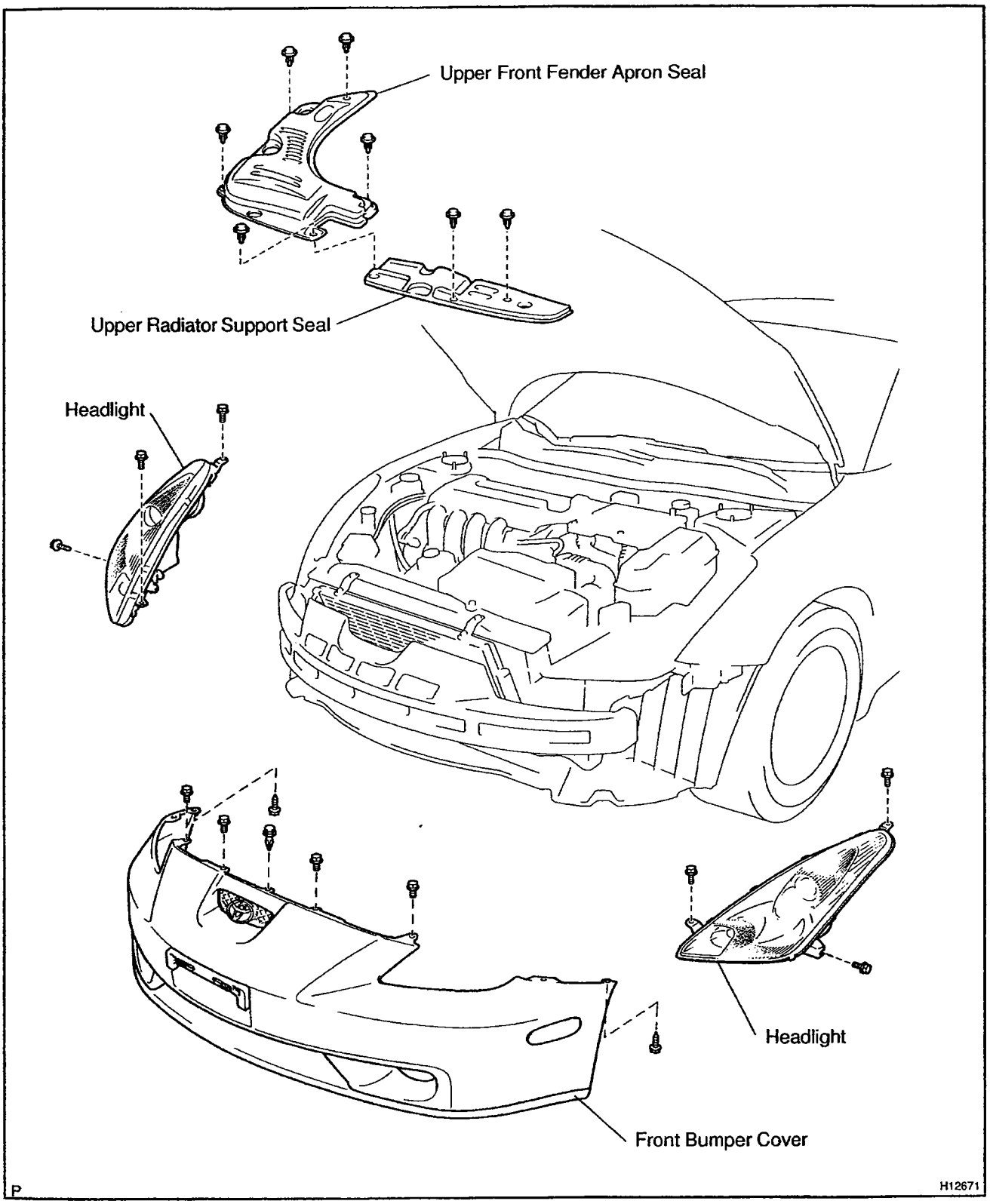


BO

HEADLIGHT

COMPONENTS

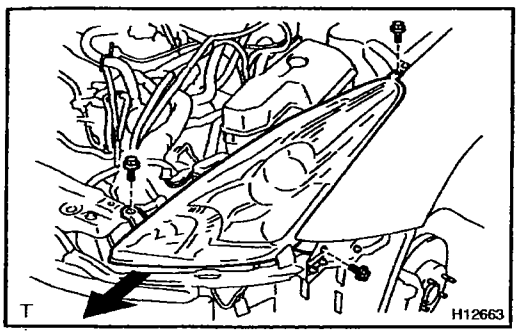
BO2N8-01



BO2NC-01

REMOVAL

1. **REMOVE UPPER FRONT FENDER APRON SEAL**
2. **REMOVE UPPER RADIATOR SUPPORT SEAL**
3. **REMOVE FRONT BUMPER COVER**
   (See page BO–4)

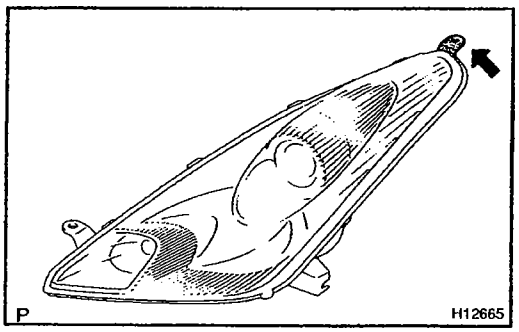


4. **REMOVE HEADLIGHT**

(a) Remove the 3 bolts.

(b) Disconnect the connectors, then remove the headlight as shown in the illustration.

(c) Employ the same manner described above to the other side.



HINT:

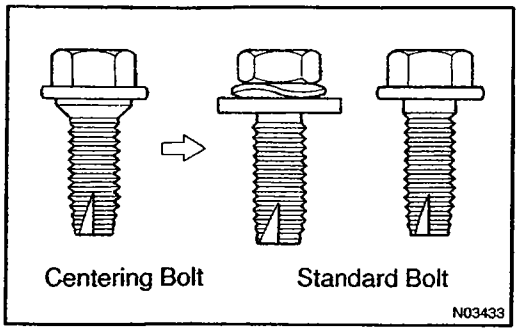
At the time of installation, please refer to the following item.

If the shown part of the headlight is damaged, the headlight can be reinstalled to the body by installing a bracket to it.

INSTALLATION

B02ND-01

Installation is in the reverse order of removal (See page BO–6).



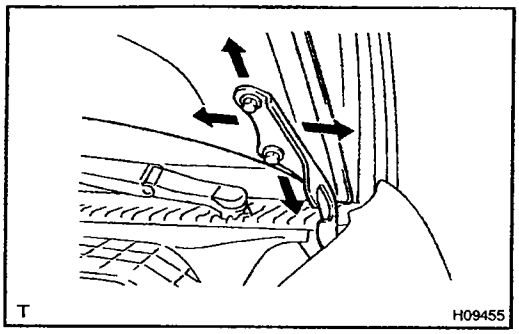
HOOD

ADJUSTMENT

BO2NE-01

HINT:

Since the centering bolt is used as the hood hinge and lock set bolt, the hood cannot be adjusted with it on. Substitute the standard bolt for the centering bolt.

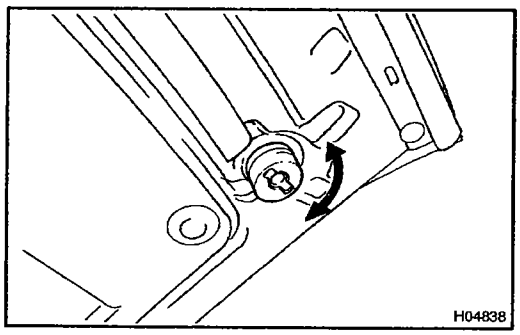


1. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/LIGHT DIRECTIONS

(a) Adjust the hood by loosening the hood side hinge bolts.

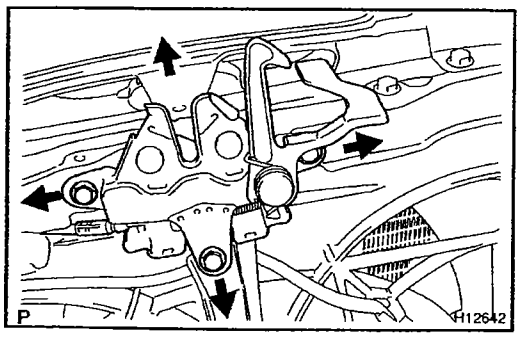
(b) Tighten the loosened bolts again.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



2. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



3. ADJUST HOOD LOCK

(a) Remove the upper front fender opron seal.

(b) Remove the upper radiator support seal.

(c) Remove the radiator reservoir.

(d) Adjust the hood lock by loosening the bolts.

(e) Tighten the loosened bolts again.

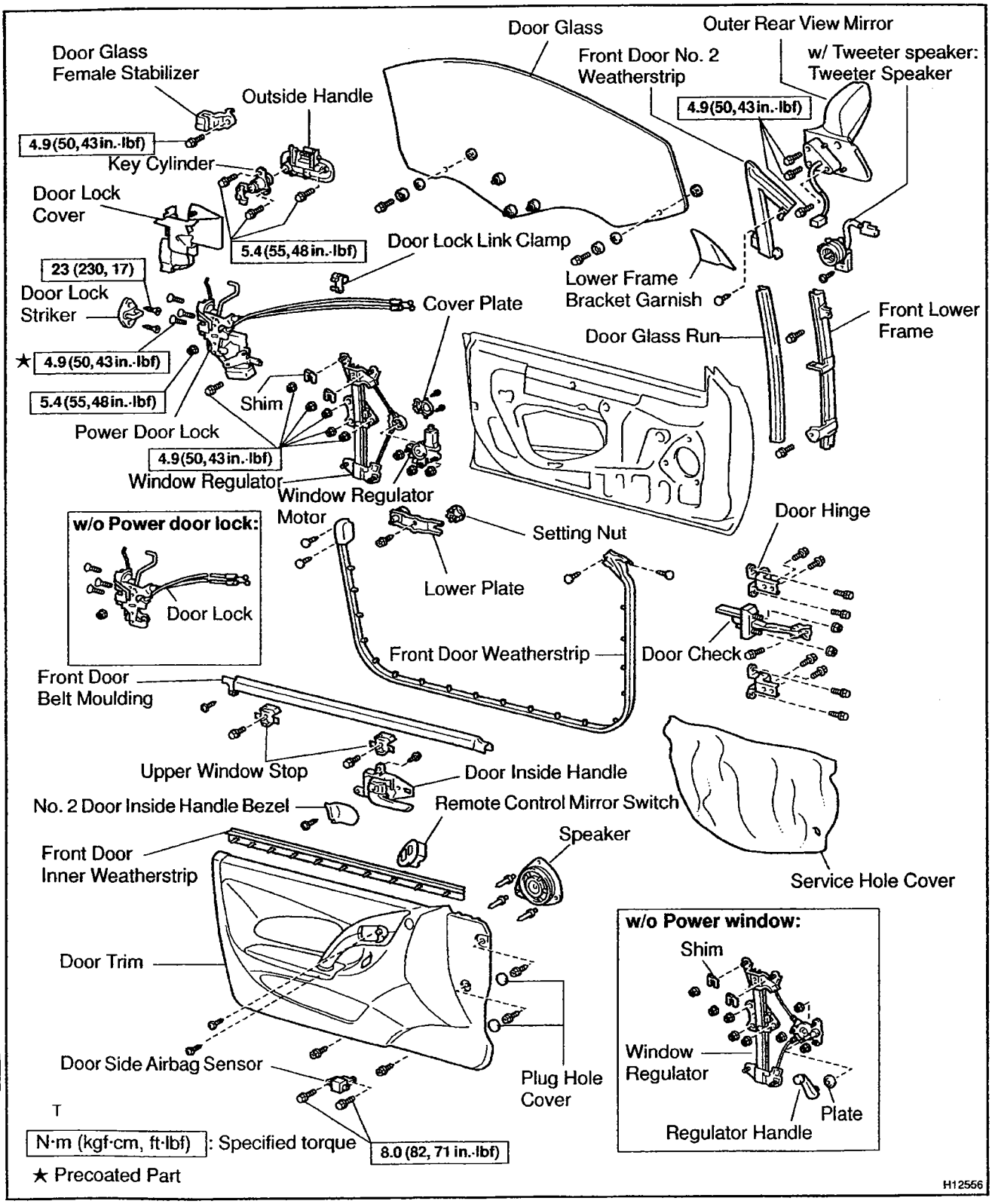
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(f) Reinstall the removed parts.

FRONT DOOR

COMPONENTS

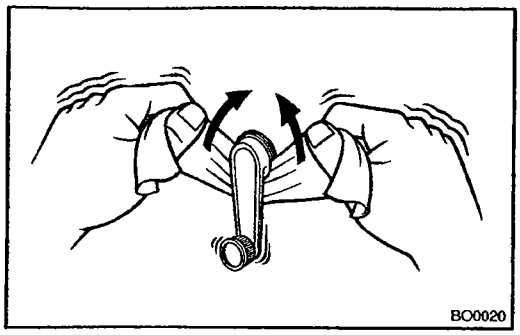
BO1DJ-02



BO

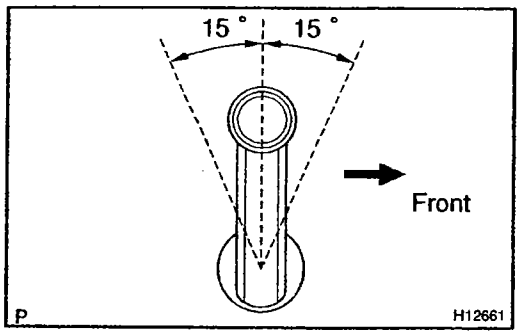
BC2DJ-01

DISASSEMBLY



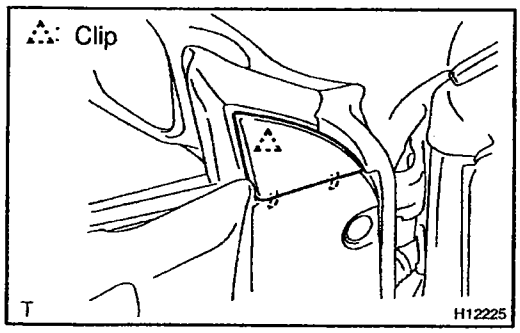
1. w/o Power window:
REMOVE REGULATOR HANDLE

Pull off the snap ring with a shop rag and remove the regulator handle and plate.



HINT:

- At the time of reassembly, please refer to the following item.
- With door window fully closed, install the plate and regulator handle with the snap ring in the position within ± 15° as shown in the illustration.

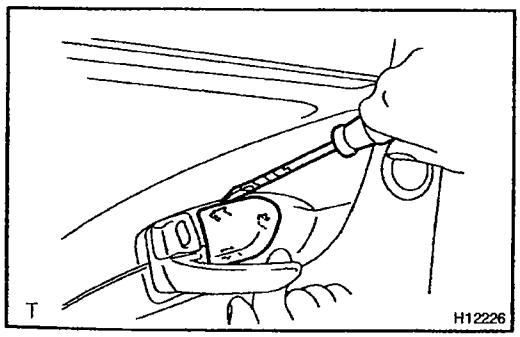


2. REMOVE LOWER FRAME BRACKET GARNISH

Using a screwdriver, remove the lower frame bracket garnish.

HINT:

Tape the screwdriver tip before use.

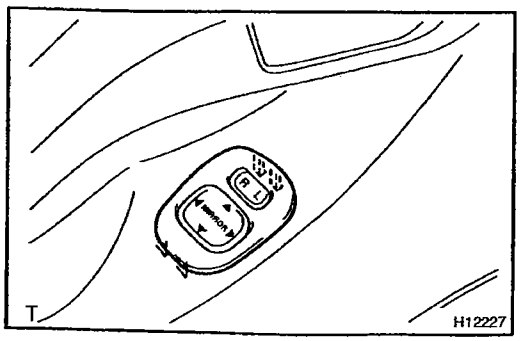


3. REMOVE NO. 2 DOOR INSIDE HANDLE BEZEL

Using a screwdriver, remove the No. 2 door inside handle bezel.

HINT:

Tape the screwdriver tip before use.

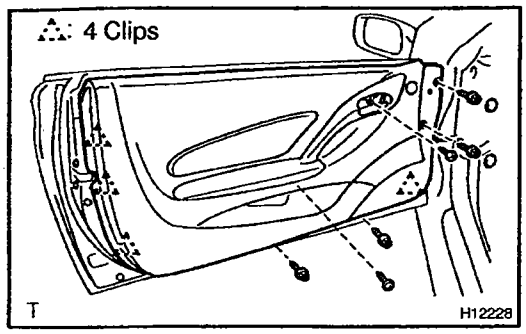


4. REMOVE REMOTE CONTROL MIRROR SWITCH

Using a screwdriver, remove the remote control mirror switch, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.



5. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the 2 plug hole covers.

HINT:

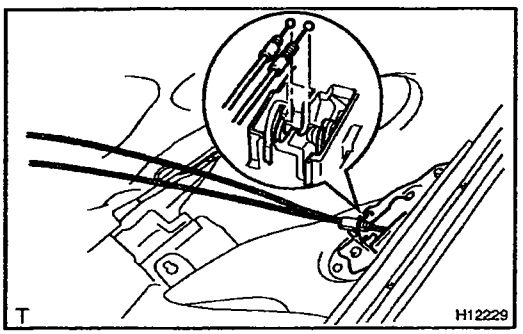
Tape the screwdriver tip before use.

(b) Remove the 6 screws.

(c) Insert a screwdriver between the door panel and door trim to pry the trim out.

HINT:

Tape the screwdriver tip before use.



(d) Pull the trim upward to remove it, then disconnect the locking cable and open cable from the door inside handle.

HINT:

- At the time of reassembly, please refer to the following items.
- Check that a ball at the end of the locking cable is pressed. (The cable should be locked.)
- Turn the locking knob of the inside handle fully to the lock side and install the locking cable.

(e) Remove the screw and door inside handle from the door trim.

(f) Using a screwdriver, remove the front door inner weather-strip from the door trim.

6. REMOVE DOOR SIDE AIRBAG SENSOR

NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch in ON or ACC position, DTCs will be recorded.**
- **Never use SRS parts removed from another vehicle. When replacing parts, replace them with new ones.**
- **Never reuse the sensor involved in a collision where the SRS has deployed.**
- **Never repair a sensor in order to reuse it.**

Disconnect the connector, then remove the 2 bolts and door side airbag sensor.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:

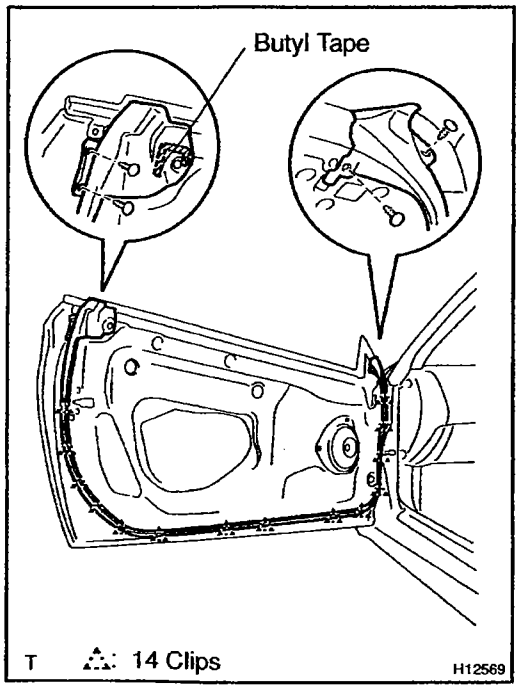
- **At the time of reassembly, please refer to the following items.**
- **Make sure the sensor is installed in the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or any other defects are identified in the case, brackets or connector, replace the sensor. Always replace the set bolts with new ones.**
- **The sensor set bolts have been anti–rust treated. When the sensor is removed, always replace the set bolts with new ones.**
- **After installation, shake the sensor to check that there is no looseness.**

- **The sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If not, a malfunction code may be detected by the diagnostic system.**

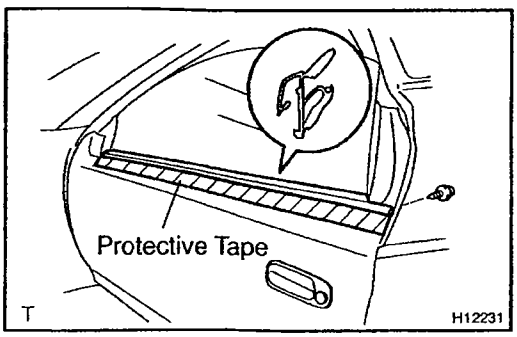
7. **REMOVE OUTSIDE REAR VIEW MIRROR**
   Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)
8. **w/ Tweeter speaker:**
   REMOVE TWEETER SPEAKER
9. **REMOVE SERVICE HOLE COVER**

NOTICE:
Do not tear the cover.
HINT:

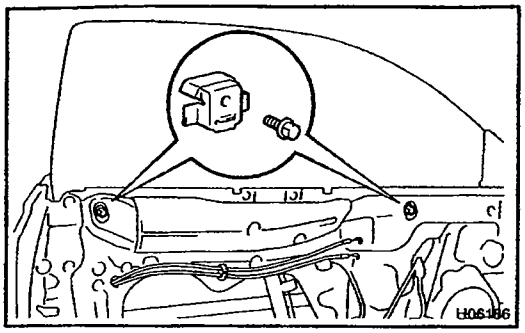
- At the time of reassembly, please refer to the following item.
- Bring out the 2 cables and wire harness through the slits of service hole cover.



10. **REMOVE FRONT DOOR WEATHERSTRIP**
(a) Using a clip remover, remove the 4 clips.
HINT:
Tape the screwdriver tip before use.
(b) Using a clip remover, remove the front door weatherstrip.
HINT:
Tape the screwdriver tip before use.



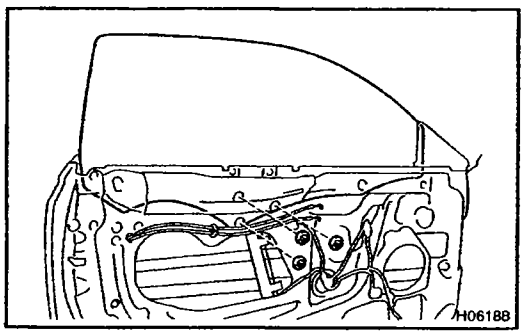
11. **REMOVE FRONT DOOR BELT MOULDING**
(a) Remove the screw.
(b) Using a moulding remover, remove the front door belt moulding.



12. REMOVE UPPER WINDOW STOPS

Remove the 2 bolts and 2 upper window stops.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)



13. REMOVE DOOR GLASS

(a) Close the door glass until the nuts appear in the service hole.

(b) Remove the 3 nuts.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

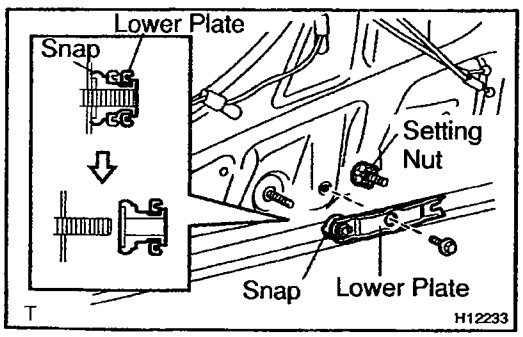
(c) Take the door glass out of the panel carefully.

NOTICE:

Be careful not to drop the door glass.

HINT:

- At the time of reassembly, please refer to the following item.
- Insert a shop rag inside the panel to prevent the glass from being scratched.



14. REMOVE WINDOW REGULATOR

(a) Remove the bolt of lower plate.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(b) Unlock the snap by pulling the lower plate.

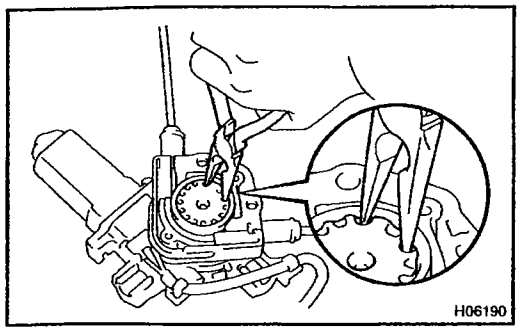
(c) Remove the snap and lower plate from the stud bolt of lower bracket.

(d) Remove the setting nut.

(e) w/ Power window:
Disconnect the connector.

(f) Remove the 5 nuts and window regulator.

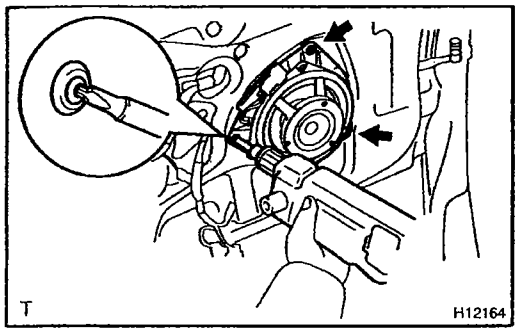
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



15. w/ Power window:
If replacing the window regulator:
REMOVE WINDOW REGULATOR FROM MOTOR

(a) Remove the 2 screws and cover plate.
(b) Using needle nose pliers, remove the drum and wire guide from the motor.

NOTICE:
Do not use a screwdriver etc. to remove them.



16. REMOVE SPEAKER

(a) Using a rivet cutter and drill, drill out the rivets and remove the speaker.

HINT:
Even if flanges are taken off, continue drilling and push out remaining flangments with the drill.

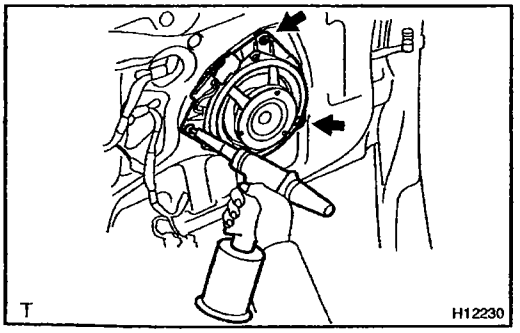
(b) Disconnect the connector.
(c) Using a vacuum cleaner, remove the drilled rivets and the associated metallic dust from the inside of the door panel.

CAUTION:
Do not touch the cut rivets and rivet cutter as they will be not.

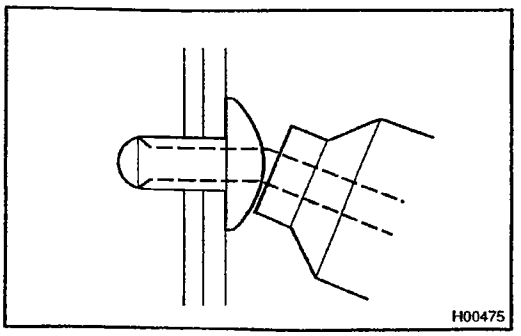
NOTICE:

- **Do not jiggle the rivet cutter while cutting.**
- **Otherwise you may enlarge the rivet hole or damage the rivet cutter.**

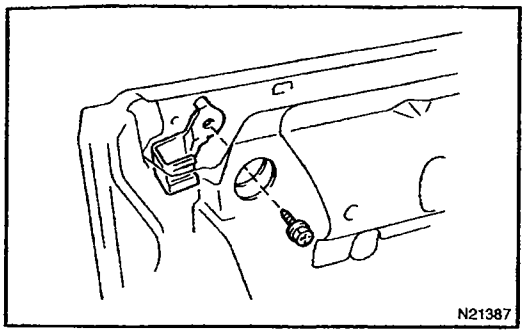
HINT:
Do not drill the door inner hole.



HINT:
At the time of reassembly, please refer to the following item.
Using an air riveter, strike rivets into the door panel to install the speaker to the door panel.



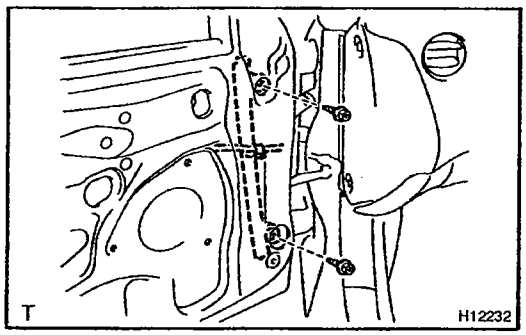
NOTICE:
At the time of reassembly, please refer to the following item.
If the rivets are not positioned perpendicular to the assembled surface the mandrel will be bent. If the trigger is pulled in this condition, the air riveter may be also damaged.



17. REMOVE DOOR GLASS FEMALE STABILIZER

Remove the screw and door glass female stabilizer.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



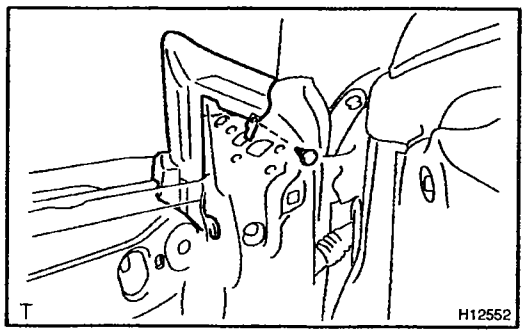
18. REMOVE FRONT LOWER FRAME

(a) Remove the 2 screws.

(b) Disengage the clamp of door wire harness from the front lower frame.

(c) Remove the front lower frame through the service hole.

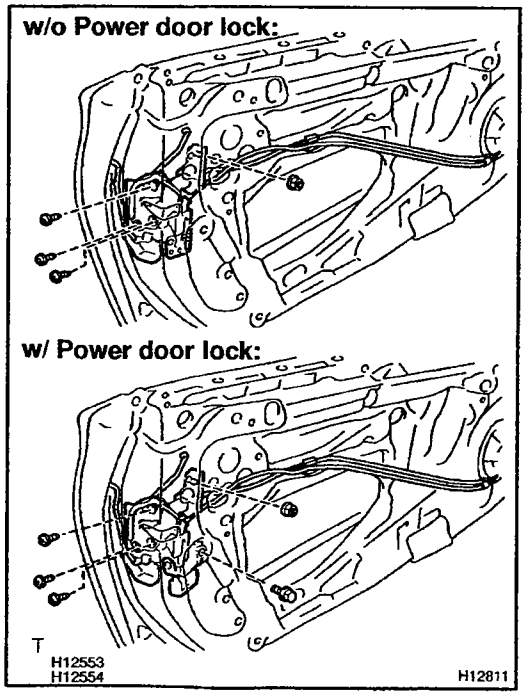
(d) Remove the door glass run from the lower frame.



19. REMOVE FRONT DOOR NO. 2 WEATHERSTRIP

(a) Using a clip remover, remove the clip.

(b) Remove the front door No. 2 weatherstrip.



20. REMOVE DOOR LOCK

(a) Disconnect the 2 links from the outside handle and key cylinder.

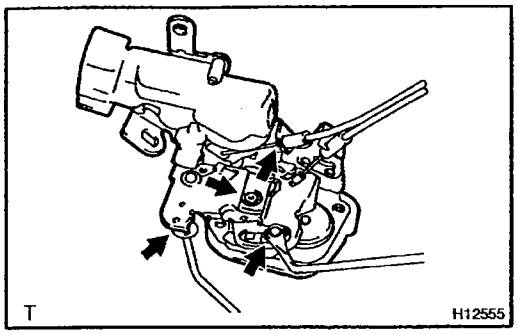
(b) w/o Power door lock:
Remove the nut and 3 screws.
Torque:
Nut: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
Screw: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(c) w/ Power door lock:
Disconnect the connector and remove the bolt, nut and 3 screws.
Torque:
Nut: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
Bolt, Screw: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

HINT:

- At the time of reassembly, please refer to the following item.
- Apply adhesive to 3 screws.
  Part No. 08833–00070, THREE BOND 1324 or equivalent

(d) Remove the door lock through the service hole.
(e) Remove the door lock link clamp.



HINT:

- At the time of reassembly, please refer to the following item.
- Apply MP grease to the sliding and rotating parts of the door lock.

21. REMOVE OUTSIDE HANDLE

(a) Remove the 2 bolts and outside handle with key cylinder.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(b) Remove the bolt and key cylinder from the outside handle.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

BO1DL-02

INSPECTION

INSPECT FRONT DOOR GLASS

Check the following. If the conditions are not met, readjust the glass.

(1) When you close the door with the glass fully closed, the a–a, b–b, c–c sections are in the same condition as shown in the illustration.

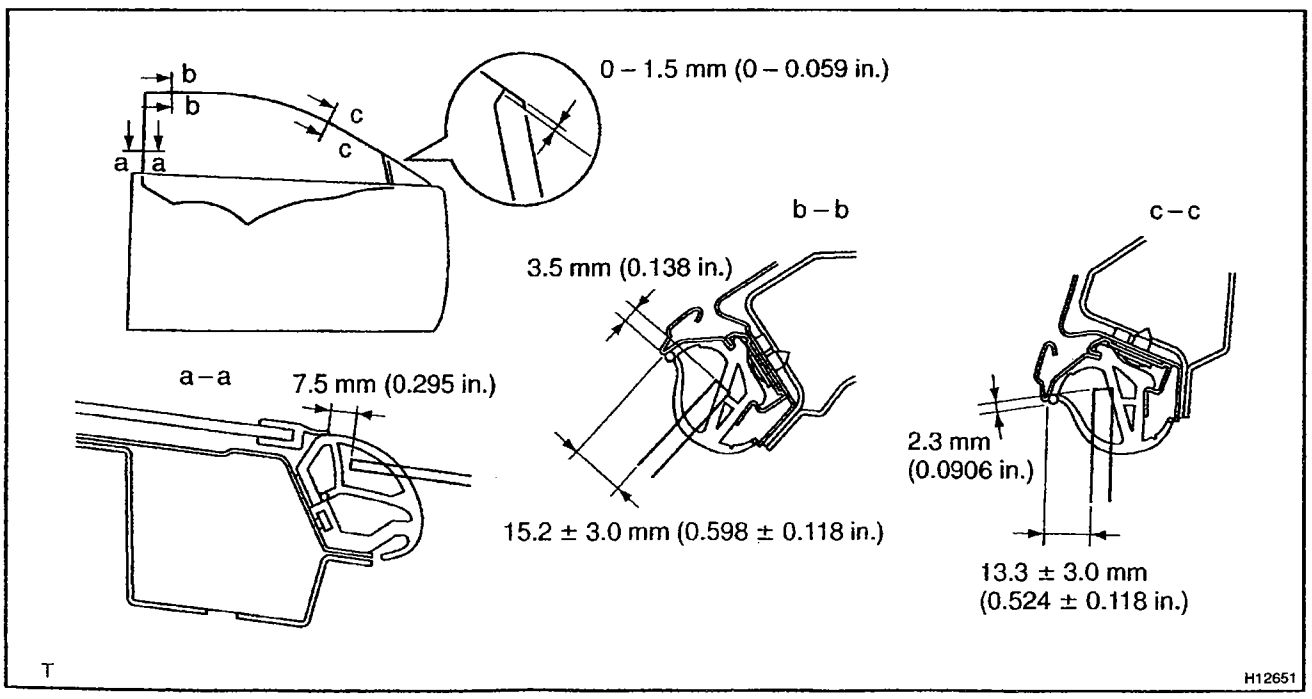
(2) When you close the door with the glass fully closed, check that the weatherstrip is not pinched and that the door glass is not in contact with the roof drip moulding.

(3) When the door glass is fully closed, check that the outside edge of the door glass is in contact with the weatherstrip at the front pillar and roof side and that the edge of the glass cannot be seen.

(4) Check that the door glass is not loose when it is half open.

(5) When the door glass is rising up, check that the door glass and roof side weatherstrip are parallel and that the door glass contacts the 2 upper stops.

(6) Check that the door glass moves up and down smoothly over all areas.



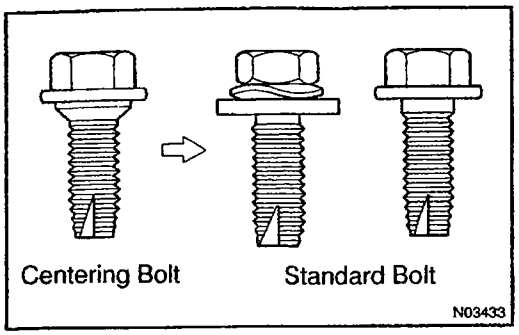
BO1DM-02

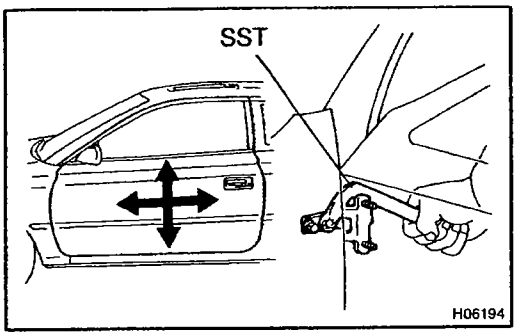
ADJUSTMENT

1. FRONT DOOR ADJUSTMENT

HINT:

Since the centering bolt is used as the door side hinge bolt, the door hinge cannot be adjusted with it on. Substitute the bolt with washer for the centering bolt.



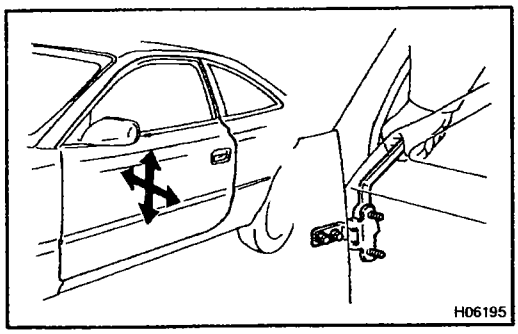


(a) Adjust the front door in forward/rearward and vertical directions.

Using SST, adjust the door by loosening the body side hinge bolts.

SST 09812–00010

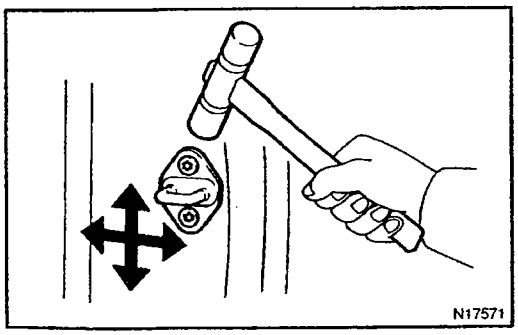
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)



(b) Adjust the front door in left/right and vertical directions.

Adjust the door by loosening the door side hinge bolts.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)



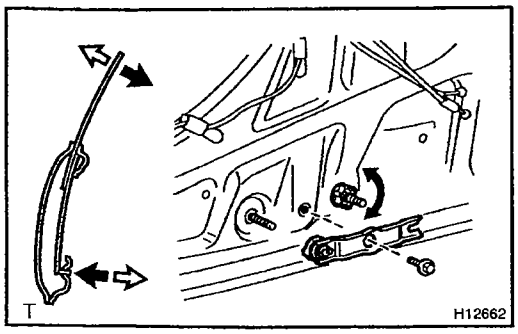
(c) Adjust front door lock striker.

(1) Check that the door fit and door lock linkages are adjusted correctly.

(2) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a hammer.

(3) Tighten the striker mounting screws again.

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)



2. ADJUST FRONT DOOR GLASS

(a) Adjust the upper part of the glass inward/outward.

(1) Remove the bolt and lower plate.

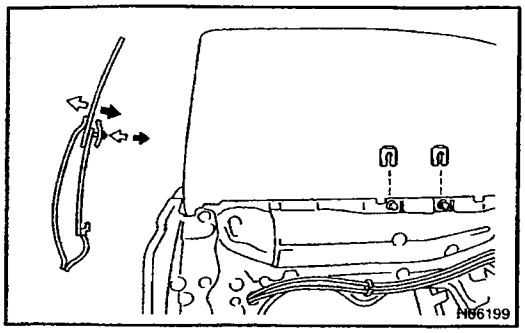
(2) Pull the lower plate so that the snap is unlocked.

(3) Remove the snap and lower plate.

(4) Adjust the glass by turning the setting nut.

(5) Reinstall the lower plate, snap and bolt.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

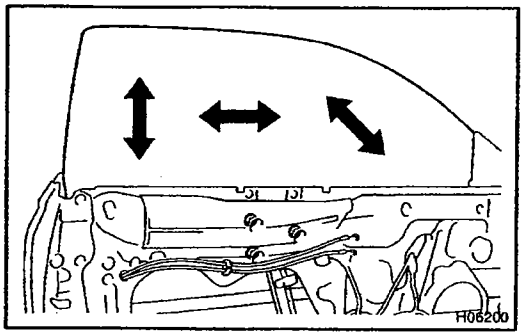


(b) Adjust the lower part of the glass inward/outward.
(1) Loosen the 2 nuts on the top of the window regulator.
(2) Insert the shim to adjust the glass position (inside/outside).

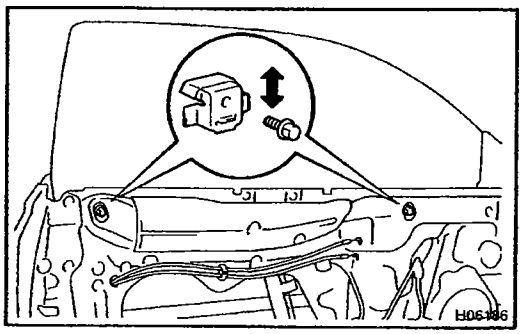
Shim thickness:
1.0 mm (0.039 in.)
2.0 mm (0.079 in.)

(3) Tighten the nuts.

Torque: 8.3 N·m (85 kgf·cm, 69 in.·lbf)



(c) Adjust the glass to the proper position (forward/rearward).
Loosen the 3 nuts of the carrier plate for adjustment.



(d) Adjust the glass to the proper position vertically.(With the glass fully closed).
Adjust the door window upper stops.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

BO2OK–01

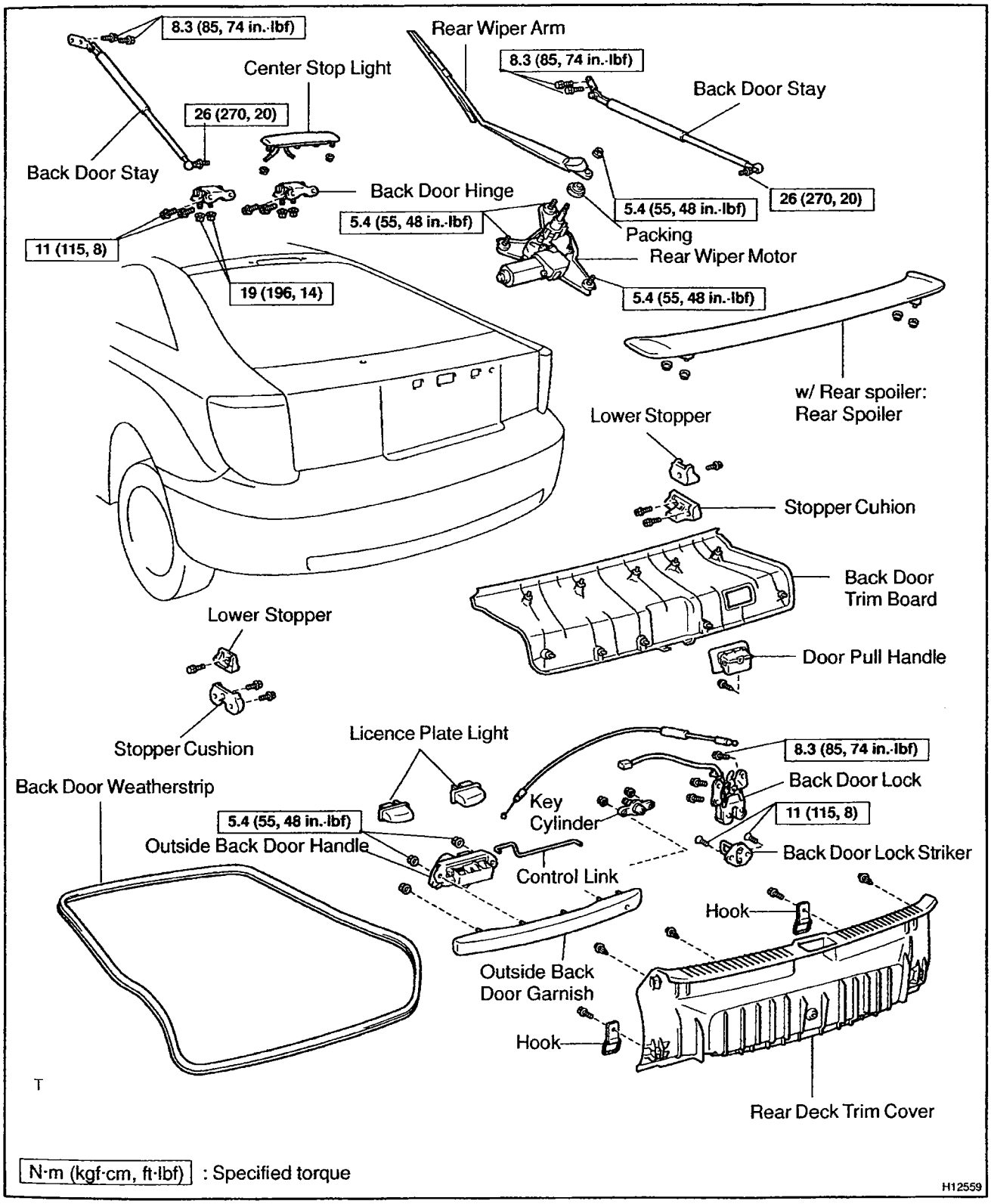
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–11).

BACK DOOR

COMPONENTS

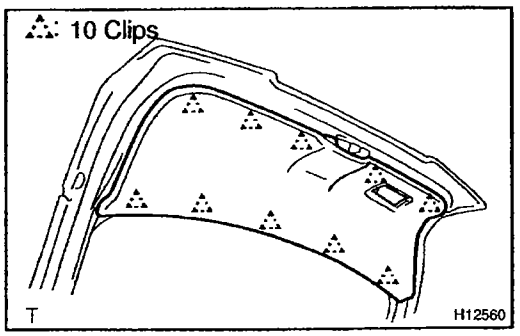
BO1DO-02



BO20L-01

DISASSEMBLY

1. **w/ Rear spoiler:**
   REMOVE REAR SPOILER
2. **REMOVE DOOR PULL HANDLE**



3. **REMOVE BACK DOOR TRIM BOARD**

Using a screwdriver, remove the back door trim board.

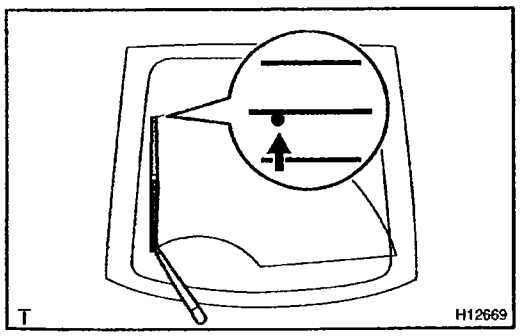
HINT:

Tape the screwdriver tip before use.

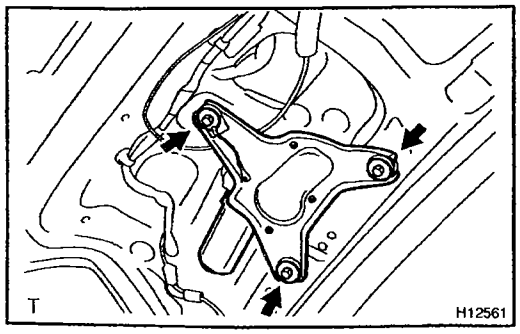
4. **REMOVE REAR WIPER ARM**

HINT:

- At the time of reassembly, please refer to the following items
- Operate the wiper motor once and turn the wiper switch OFF.
- Install the rear wiper arm and tighten the nut by hand.



- Adjust the installation position fo the wiper arm at a point in defogger pattern.
- Tighten the nut.
  Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

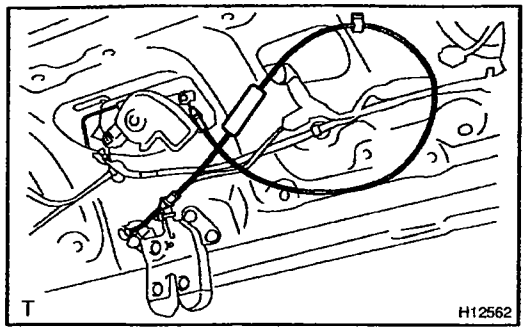


5. **REMOVE REAR WIPER MOTOR**

(a) Disconnect the connector.

(b) Unfasten the 3 bolts and remove the rear wiper motor.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) Remove the packing.



6. REMOVE CONTROL CABLE

(a) Disconnect the cable from the back door lock.
(b) Disconnect the cable from the outside back door handle.
(c) Remove the clamp and control cable.

7. REMOVE BACK DOOR LOCK

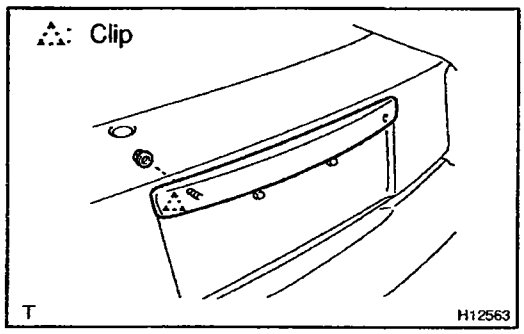
(a) Remove the wire harness clamp from the door lock.
(b) Remove the 3 bolts and back door lock.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(c) Disconnect the connector.

8. REMOVE KEY CYLINDER

(a) Disconnect the control link.
(b) Remove the 2 nuts and key cylinder.

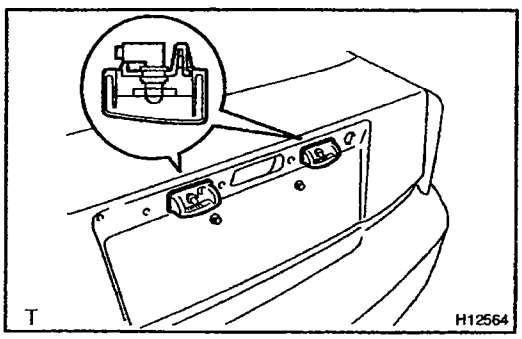
9. REMOVE OUTSIDE BACK DOOR HANDLE

(a) w/ Power door lock:
Disconnect the connector.
(b) Remove the 2 nuts and outside back door handle.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(c) Remove the control link from the outside back door handle.



10. REMOVE OUTSIDE BACK DOOR GARNISH

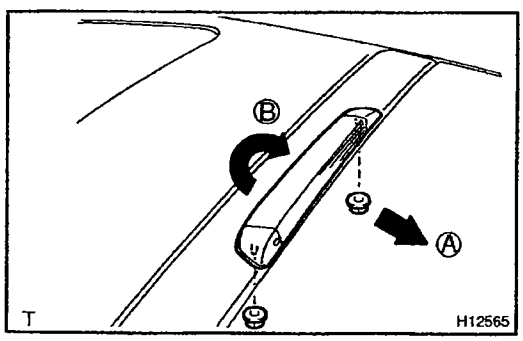
(a) Remove the nut.
(b) Remove the outside back door garnish by compressing clip from the inside to disengage them.



11. REMOVE LICENSE PLATE LIGHTS

(a) Disconnect the connectors.
(b) Using a screwdriver, remove the license plate lights.

HINT:
Tape the screwdriver tip before use.



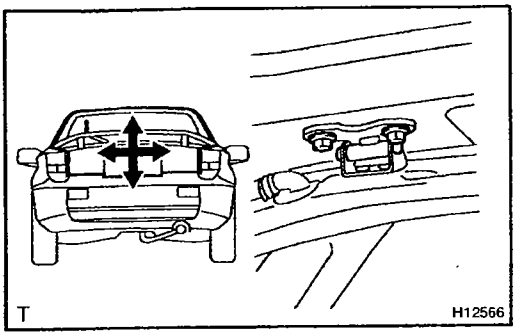
12. REMOVE CENTER STOP LIGHT

(a) Remove the 2 nuts.
(b) Disconnect the connector and washer hose, then remove the center stop light in order A, B as shown in the illustration..

13. REMOVE BACK DOOR WEATHERSTRIP

BO2OM-01

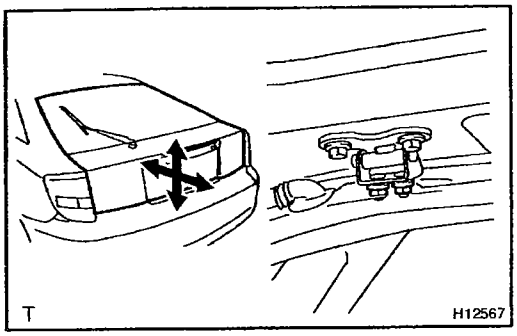
ADJUSTMENT



1. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

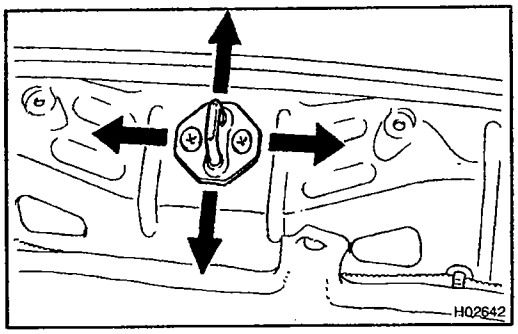
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)



2. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

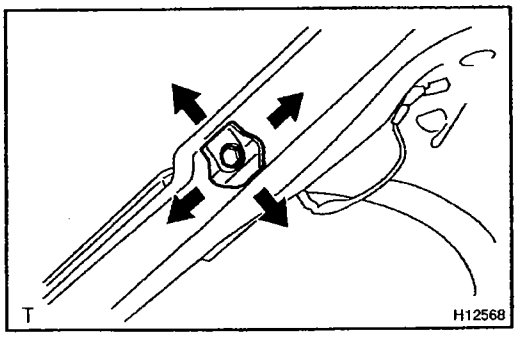
Loosen the body side hinge bolts and nuts to adjust.

Torque: 19 N·m (196 kgf·cm, 14 ft·lbf)



3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door linkages are adjusted correctly.
(b) Remove the luggage compartment mat.
(c) Remove the 2 hooks and rear deck trim cover.
(d) Loosen the striker mounting screws.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)
(e) Using a plastic hammer, tap the striker to adjust.
(f) Reinstall the rear deck trim cover and 2 hooks.



4. ADJUST LOWER STOPPER

Loosen the stopper mounting bolts to adjust.

BO2ON-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–23).

BACK DOOR STAY

REPLACEMENT

BO2NF–01

1. REMOVE BACK DOOR STAY

(a) Remove the bolt and back door stay from the back door panel.

HINT:

While supporting the back door with your hand, remove the back door stay.

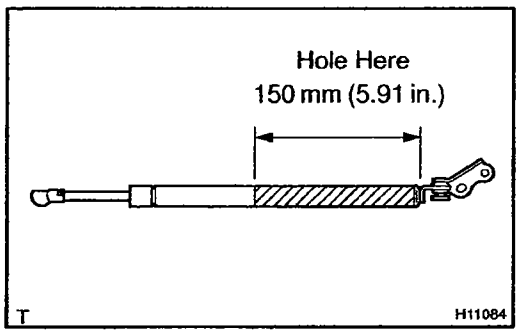
(b) Remove the 2 bolts and back door stay from the body.

2. IF NECESSARY, REPLACE BACK DOOR STAY

NOTICE:

When handling the back door stay

- **Do not disassemble the back door stay because the cylinder is filled with pressurized gas.**



- **If the back door stay is to be replaced, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the bottom of the back door stay as shown in the illustration to completely release the high–pressure gas before disposing of it.**
- **When drilling, chips may fly out so work carefully.**
- **The gas is colorless, odorless and non–toxic.**
- **When working, handle the back door stay carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.**
- **Do not turn the piston rod and cylinder with the back door stay fully extended.**

3. INSTALL BACK DOOR STAY

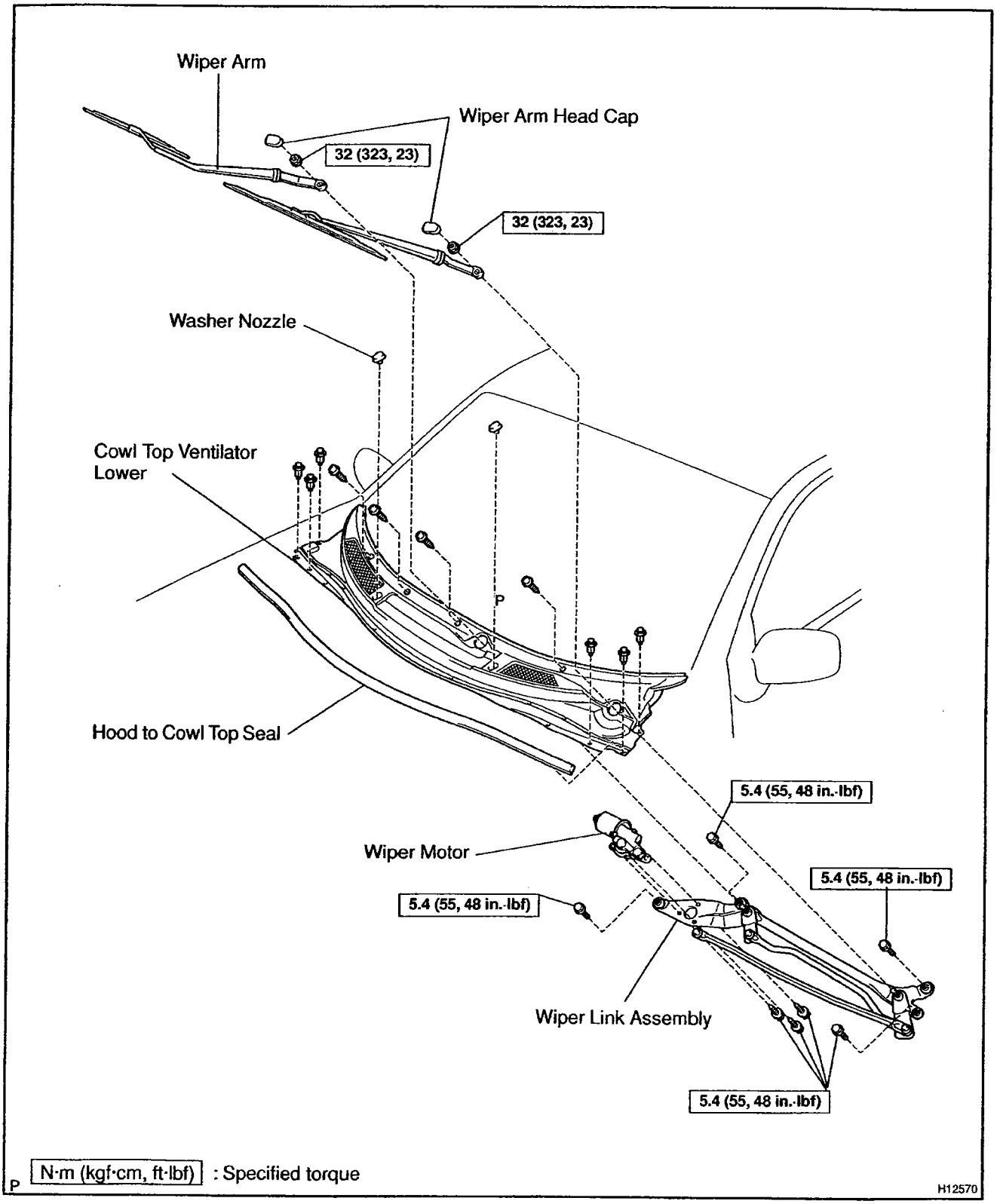
(a) Install the 2 bolts and back door stay to the body.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

(b) Install the bolt and back door stay to the back door panel.
Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)

FRONT WIPER AND WASHER

COMPONENTS

BO1DT-02



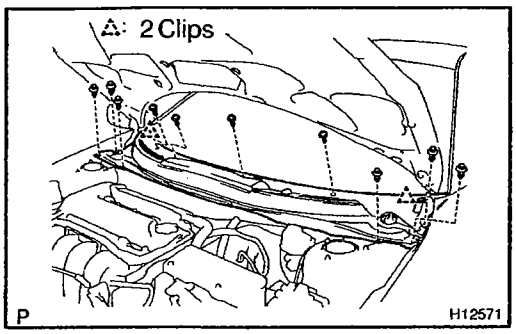
BO2NG-01

REMOVAL

1. REMOVE WIPER ARMS

Remove the 2 wiper arm head caps, 2 nuts and 2 wiper arms.

2. REMOVE HOOD TO COWL TOP SEAL



3. REMOVE COWL TOP VENTILATOR LOUVER

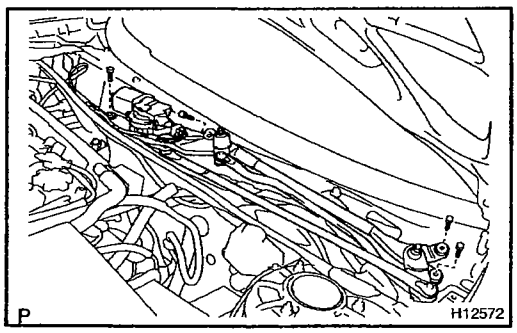
(a) Remove the 4 screws and 6 clips.

(b) Using a screwdriver, remove the cowl top ventilator louver, then disconnect the washer hoses.

HINT:

Tape the screwdriver tip before use.

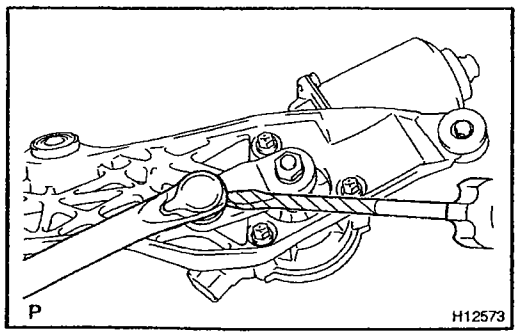
(c) Remove the 2 washer nozzles from the cowl top ventilator louver.



4. REMOVE WIPER MOTOR AND LINK ASSEMBLY

(a) Disconnect the connector.

(b) Remove the 4 bolts and wiper motor and link assembly.

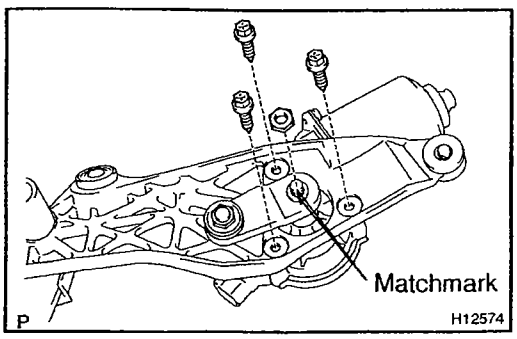


5. REMOVE WIPER MOTOR

(a) Using a screwdriver, disconnect the wiper link from the motor.

HINT:

Tape the screwdriver tip before use.

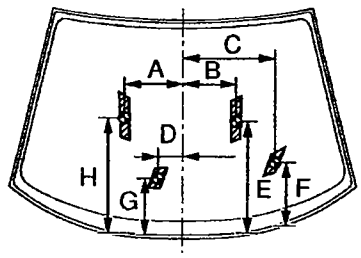


(b) Remove the nut.

(c) Place the matchmarks on the wiper link and motor.

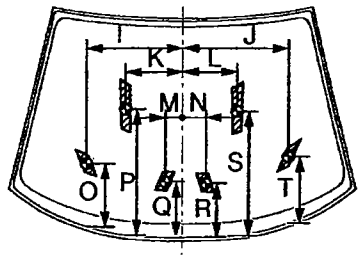
(d) Remove the 3 screws and wiper motor from the wiper link.

2 Jet nozzle:



T

3 Jet nozzle:



T H12667
H12668

H13146

BO2NH-01

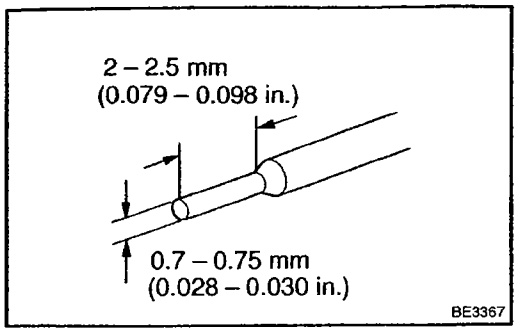
INSPECTION

INSPECT WASHER NOZZLE

While operating the washer check whether the point where the washer fluid hits the windshield and the surge area are within the range indicated by the hatched line.

A: 241.9 mm (9.524 in.)
B: 219.6 mm (8.646 in.)
C: 381.2 mm (15.008 in.)
D: 102.8 mm (4.047 in.)
E: 467.9 mm (18.421 in.)
F: 265.6 mm (10.457 in.)
G: 236.3 mm (9.303 in.)
H: 475.0 mm (18.701 in.)
I: 39 mm (15.524 in.)
J: 439.6 mm (17.307 in.)
K: 237.3 mm (9.343 in.)
L: 225.2 mm (8.866 in.)
M: 69.8 mm (2.748 in.)
N: 94.4 mm (3.717 in.)
O: 258.2 mm (10.165 in.)
P: 517.5 mm (20.374 in.)
Q: 234.2 mm (9.220 in.)
R: 228.3 mm (8.988 in.)
S: 513.3 mm (20.209 in.)
T: 276.6 mm (10.890 in.)

BO1DW-02



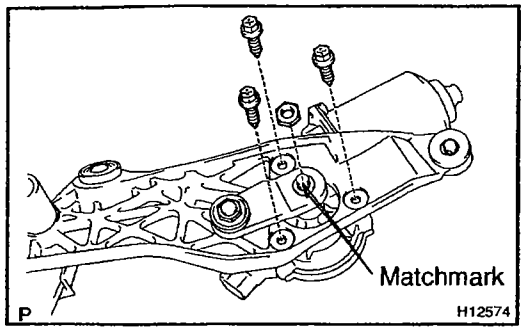
ADJUSTMENT

ADJUST FRONT WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the windshield.

BO2NI-01

INSTALLATION

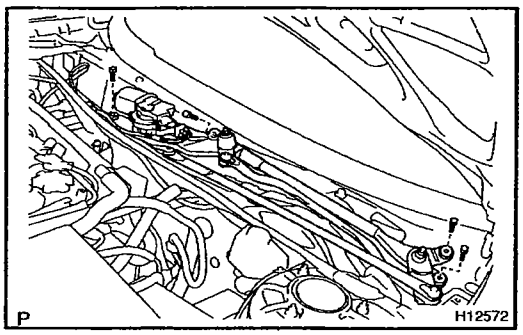


1. INSTALL WIPER MOTOR

(a) Install the wiper motor with the 3 screws to the wiper link.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Align the matchmarks on the wiper link and wiper motor, then install the nut.

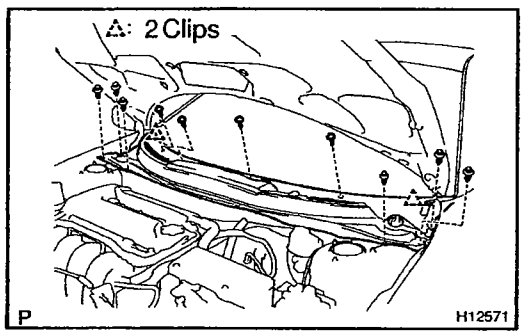
(c) Connect the wiper link to the wiper motor.



2. INSTALL WIPER MOTOR AND LINK ASSEMBLY

(a) Install the wiper motor and link assembly with the 4 screws.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Connect the connector.



3. INSTALL COWL TOP VENTILATOR LOUVER

(a) Install the 2 washer nozzle to the cowl top ventilator louver.

(b) Connect the washer hose, then install the cowl top ventilator louver with the 4 screws and 6 clips.

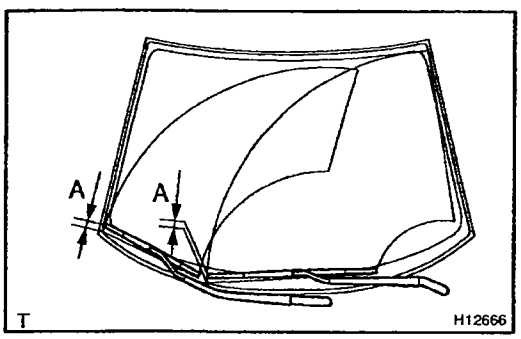
HINT:
Check that the 2 clips on the back side of the cowl top ventilator louver are surely fixed to the body.

4. INSTALL HOOD TO COWL TOP SEAL

5. INSTALL WIPER ARMS

(a) Operate the wipers once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the nuts by hand.



(c) Adjust the installation positions of the wiper arms to the positions as shown in the illustration.
A:30 ± 7.5 mm (1.18 ± 0.295 in.)

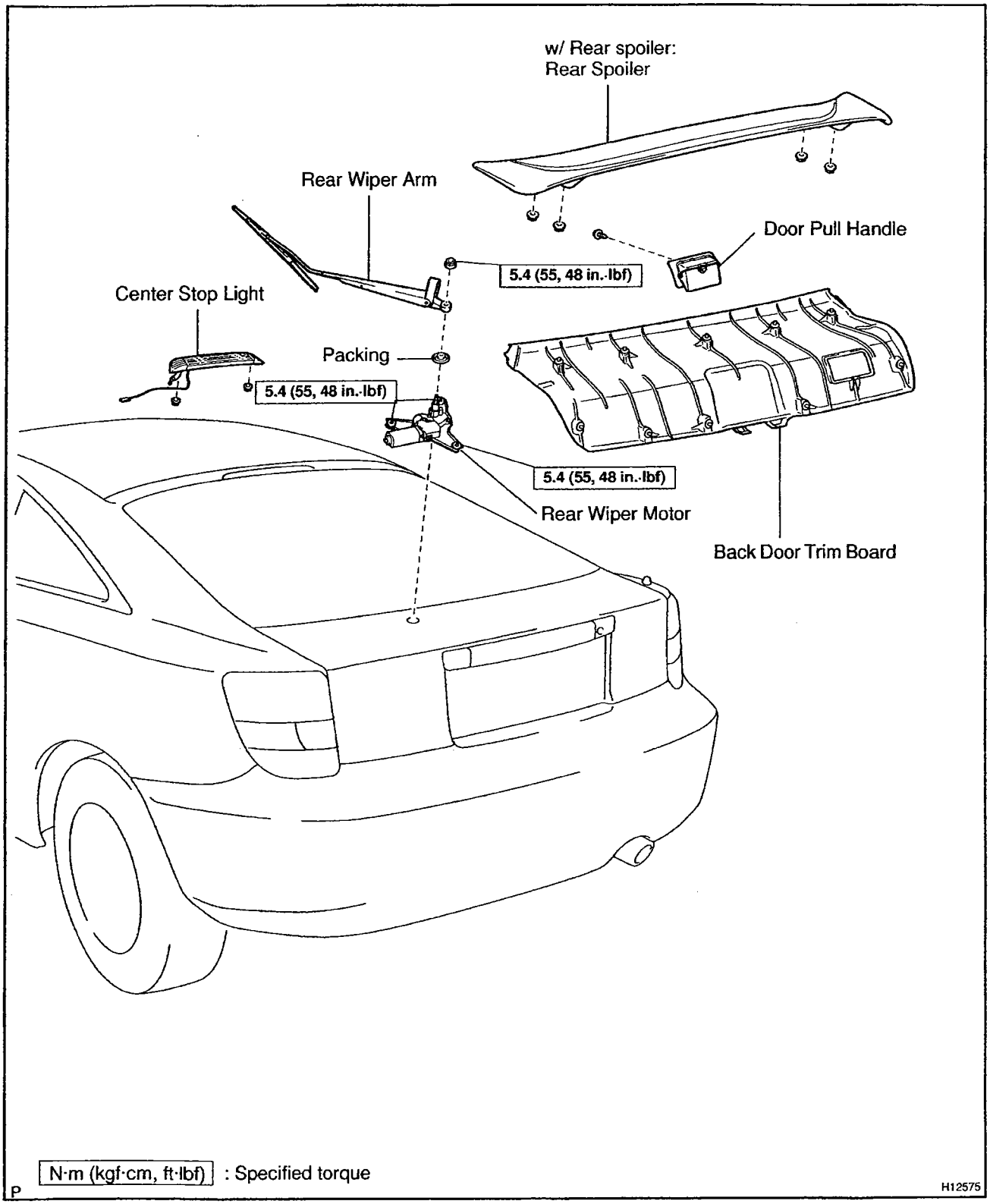
(d) Torque the nuts.
Torque: 32 N·m (323 kgf·cm, 23 ft·lbf)

(e) Install the 2 wiper and head caps.

REAR WIPER AND WASHER

COMPONENTS

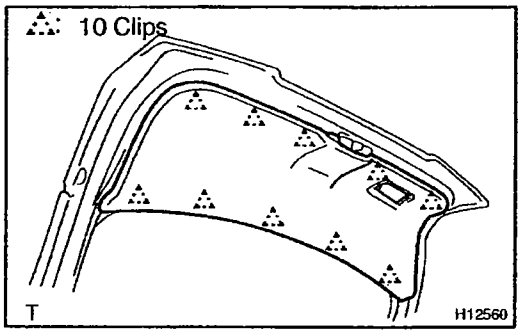
BO1DY–02



BO2NU-01

REMOVAL

1. **w/ Rear spoiler:**
   REMOVE REAR SPOILER
2. **REMOVE DOOR PULL HANDLE**



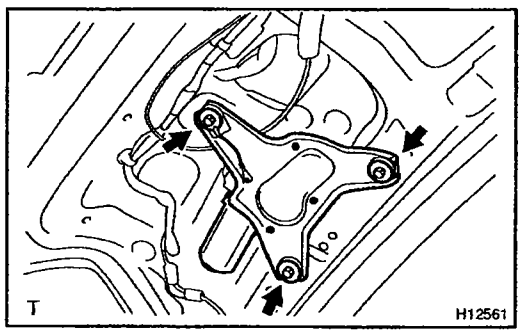
3. **REMOVE BACK DOOR TRIM BOARD**

Using a screwdriver, remove the back door trim board.

HINT:

Tape the screwdriver tip before use.

4. **REMOVE REAR WIPER ARM**

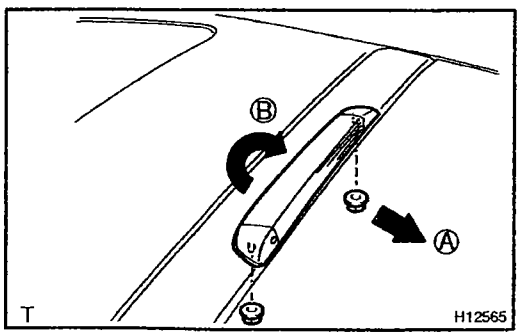


5. **REMOVE REAR WIPER MOTOR**

(a) Disconnect the connector.

(b) Unfasten the 3 bolts and remove the rear wiper motor.

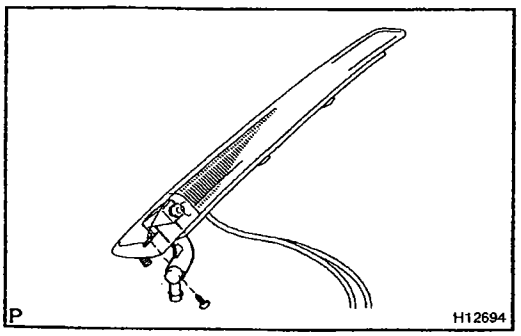
(c) Remove the packing.



6. **REMOVE REAR WASHER NOZZLE**

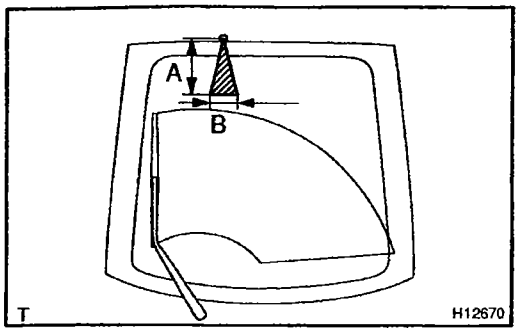
(a) Remove the 2 nuts.

(b) Disconnect the connector and washer hose, then remove the center stop light in order A, B as shown in the illustration.



(c) Remove the screw and rear washer nozzle from the center stop light.

BO1E0-02



INSPECTION

INSPECT WASHER NOZZLE

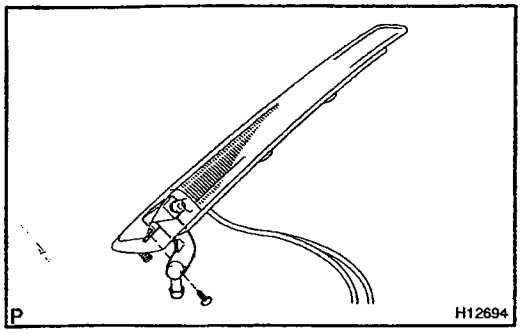
While operating the washer, check if the upper point where the washer fluid hits the back door glass and surge area are within range indicated by the hatched line.

A: 205 mm (8.07 in.)

B: 105 mm (4.13 in.)

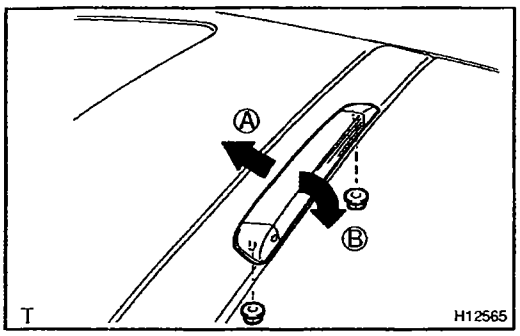
BO2NK-01

INSTALLATION

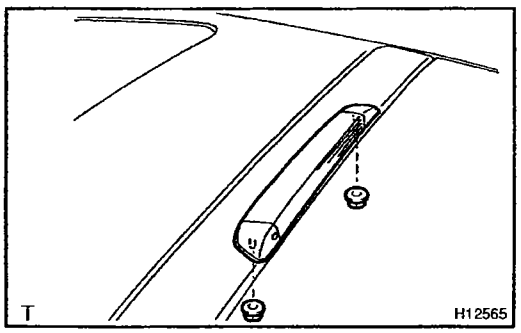


1. INSTALL REAR WASHER NOZZLE

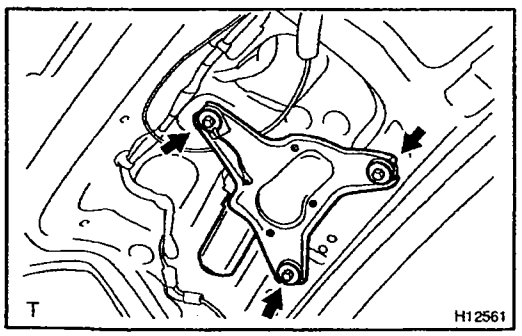
(a) Install the rear wiper nozzle to the center step light with the screw.



(b) Connect hte connector and wsher hose, then install the center stop light with the 2 nuts in order A, B as shown in the illustration.



(c) Connect the connector and washer hose, then install the center stop light with the 2 nuts.



2. INSTALL REAR WIPER MOTOR

(a) Install the packing.

(b) Install the rear wiper motor and fasten the 3 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) Connect the connector.

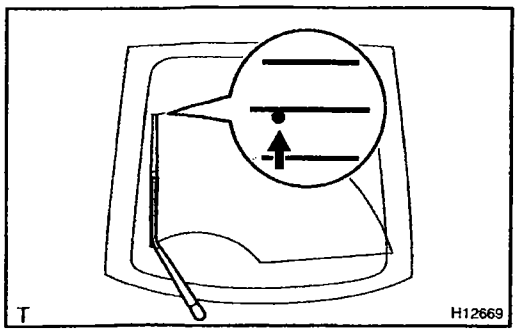
3. INSTALL BACK DOOR TRIM BOARD

4. INSTALL DOOR PULL HANDLE

5. INSTALL REAR WIPER ARM

(a) Operate the wiper motor once and turn the wiper switch OFF.

(b) Install the rear wiper arm and tighten the nut by hand.



(c) Adjust the installation position of the wiper arm at a point in defogger pattern.

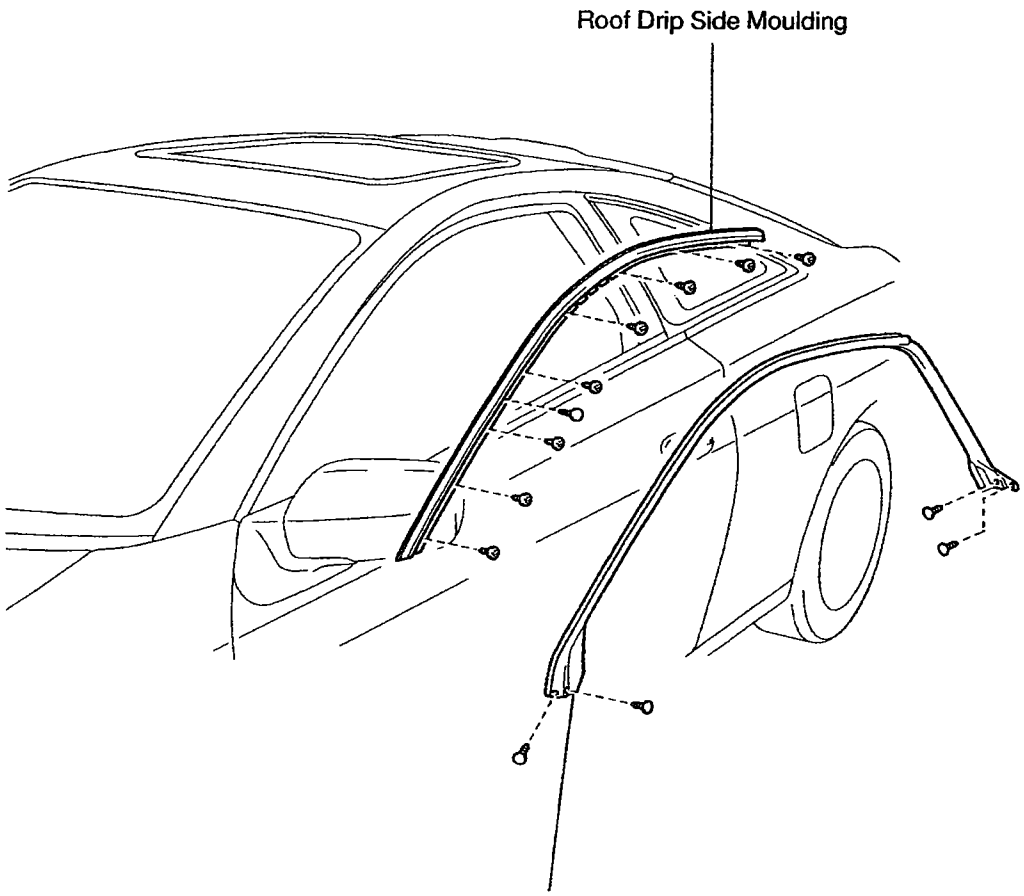
(d) Tighten the nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

6. w/ Rear spoiler:
REMOVE REAR SPOILER

ROOF DRIP SIDE MOULDING

COMPONENTS

BO2NL–01



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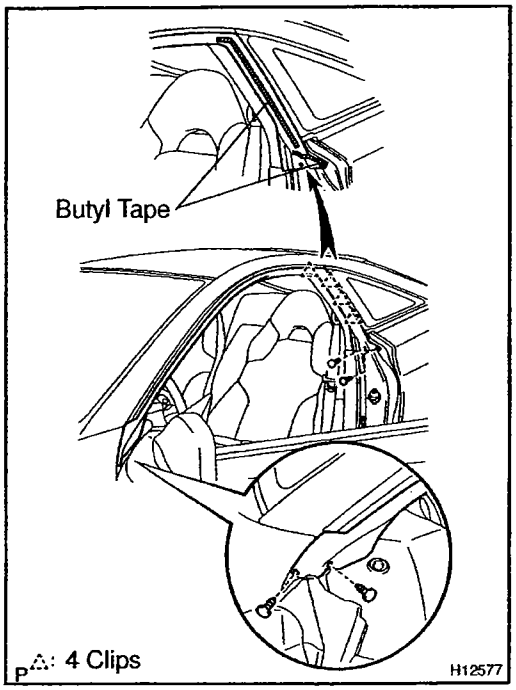
H12576

BO2NM-01

REMOVAL

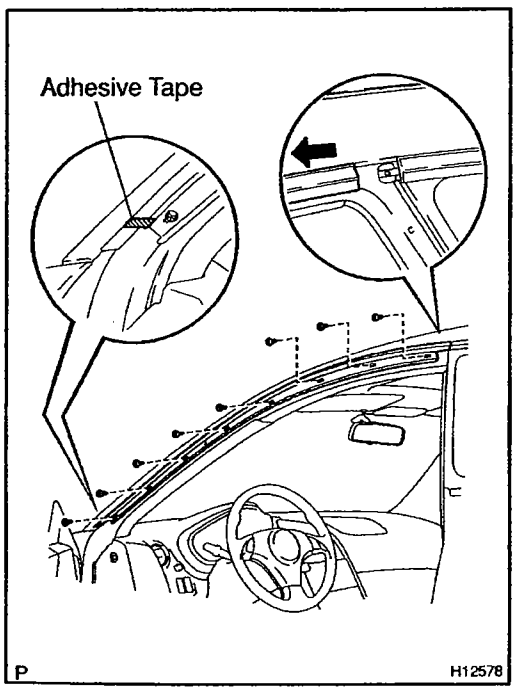
1. REMOVE ROOF SIDE RAIL WEATHERSTRIP

(a) Using a clip remover, remove the 4 clips.
(b) Remove the roof side rail weatherstrip.



2. REMOVE ROOF DRIP SIDE MOULDING

Remove the 8 screws and roof drip side moulding.



BO2NN-01

INSTALLATION

1. CLEAN BODY MOUNTING SURFACE

(a) Using a heat light, heat the body mounting surface to 40 – 60 °C (104 – 140 °F).

NOTICE:

Do not heat the body excessively.

(b) Remove the adhesive tape from the body.

(c) Wipe off stains with cleaner.

2. If reusing the moulding:
CLEAN MOULDING

(a) Using a heat light, heat the moulding to 20 – 30 °C (68 – 86 °F).

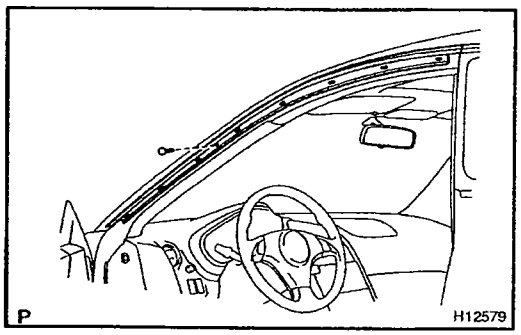
NOTICE:

Do not heat the moulding excessively.

(b) Remove the adhesive tape from the moulding.

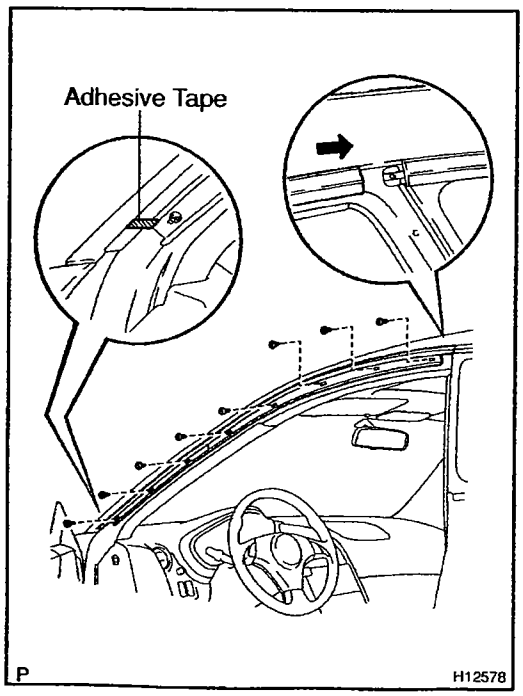
(c) Wipe off stains with cleaner.

(d) Apply a new adhesive tape to the moulding.



3. INSTALL ROOF DRIP SIDE MOULDING

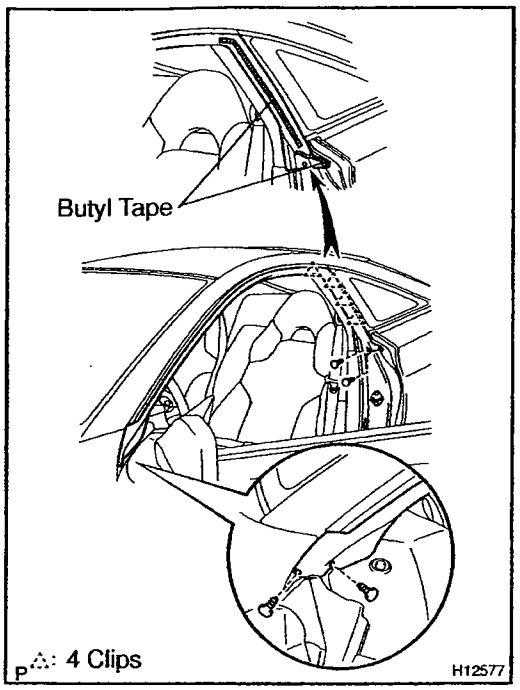
(a) If using a new moulding;
Secure the roof drip side moulding with the clip for temporary attachment.



(b) Install the roof drip side moulding with the 8 screws.

HINT:

When installing the moulding, tighten the screws from the rear side to the front side of the moulding.



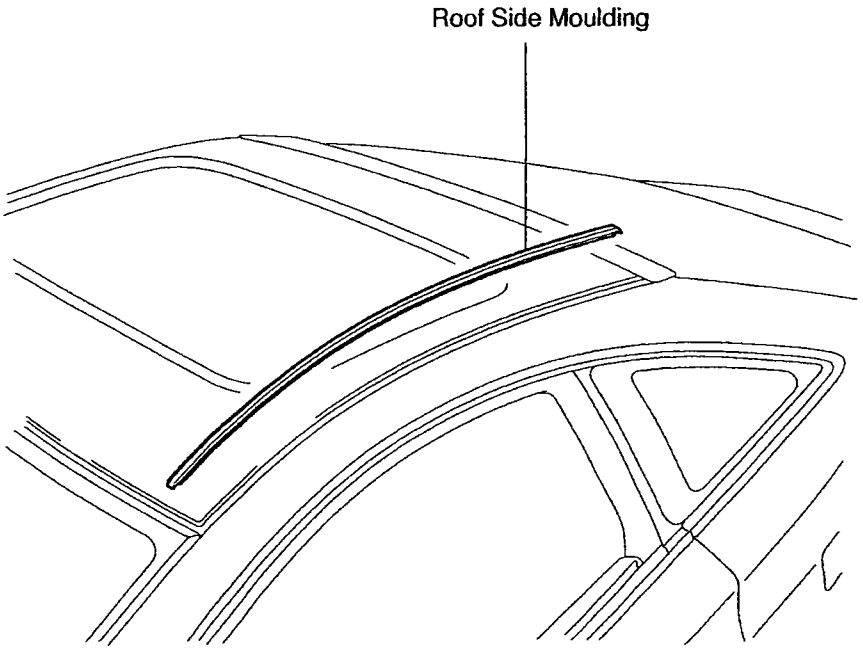
4. INSTALL ROOF SIDE RAIL WEATHERSTRIP

Install the roof side rail weatherstrip with the 4 clips as shown in the illustration.

ROOF SIDE MOULDING

COMPONENTS

BO2NO–01



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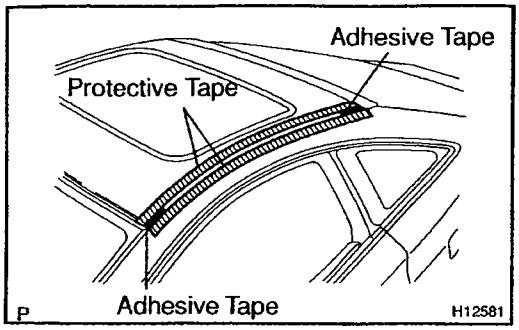
BO2NP-01

REMOVAL



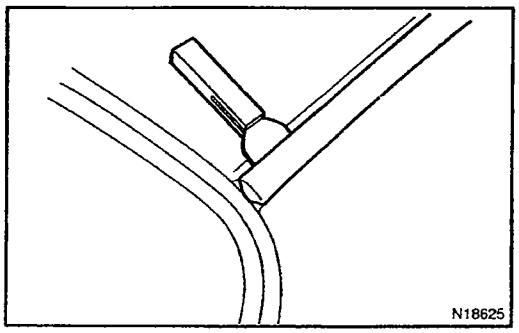
1. REMOVE ENDS OF MOULDING

(a) Apply protective tape to the outer surface as shown in the illustration to keep the surface from being scratched.

(b) Using a heat light, heat the moulding to 20 – 30 °C (68 – 86 °F).

NOTICE:

Do not heat the moulding excessively.



(c) Using a scraper, pull off the roof side moulding from the front end and rear end.

HINT:

Tape the screwdriver tip before use.

2. REMOVE MOULDING AND ADHESIVE

(a) Pull off the moulding by cutting the adhesive with a knife at the front and rear ends.

(b) Remove the moulding.

NOTICE:

Do not damage the body with the knife.

BO2NQ-01

INSTALLATION

1. CLEAN CONTRACT SURFACE OF BODY

(a) Using a heat light, heat the moulding surface to 40 – 60 °C (104 – 140 °F).

NOTICE:

Do not heat the body excessively.

(b) Using a knife, cut away any rough areas on the body.

NOTICE:

Be careful not to damage the body.

(c) Wipe off stains with cleaner.

2. If reusing the moulding:

CLEAN MOULDING

(a) Using a heat light, heat the moulding surface to 20 – 30 °C (68 – 86 °F).

NOTICE:

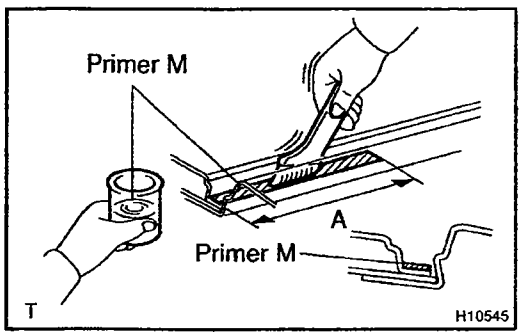
Do not heat the moulding excessively.

(b) Using a knife, cut the remaining adhesive from the moulding.

NOTICE:

Be careful not to damage the moulding.

(c) Wipe off stains with cleaner.



3. COAT CONTRACT SURFACE OF BODY WITH PRIMER "M"

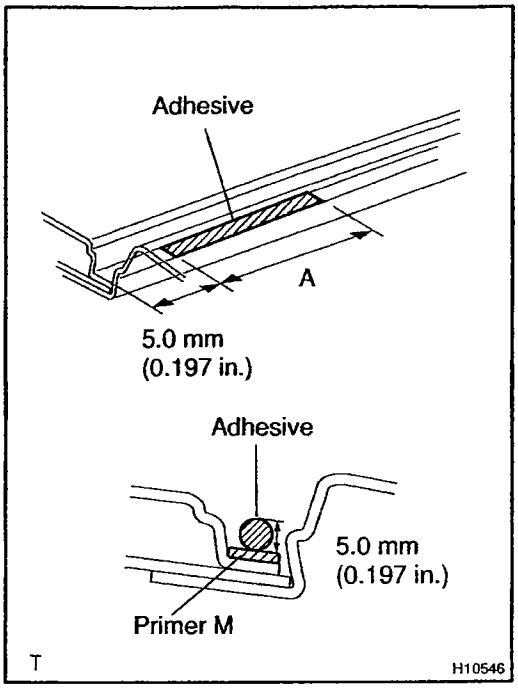
Using a brush, coat the contact surface on the body with Primer M as shown in the illustration.

Front and rear end:

A: 66 mm (2.60 in.)

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



4. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent

HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35 °C (95 °F)	15 minutes
20 °C (68 °F)	100 minutes
5 °C (41 °F)	8 hours

(b) Load the cartridge into the sealer gun.

(c) Apply adhesive to the hatched area in the illustration for both front and rear of the vehicle.
Front and rear end:
A: 50 mm (1.97 in.)

HINT:
When removing the moulding, apply adhesive well to the part where the body sealer is removed.

5. INSTALL MOULDING

Push the moulding to the body.

NOTICE:

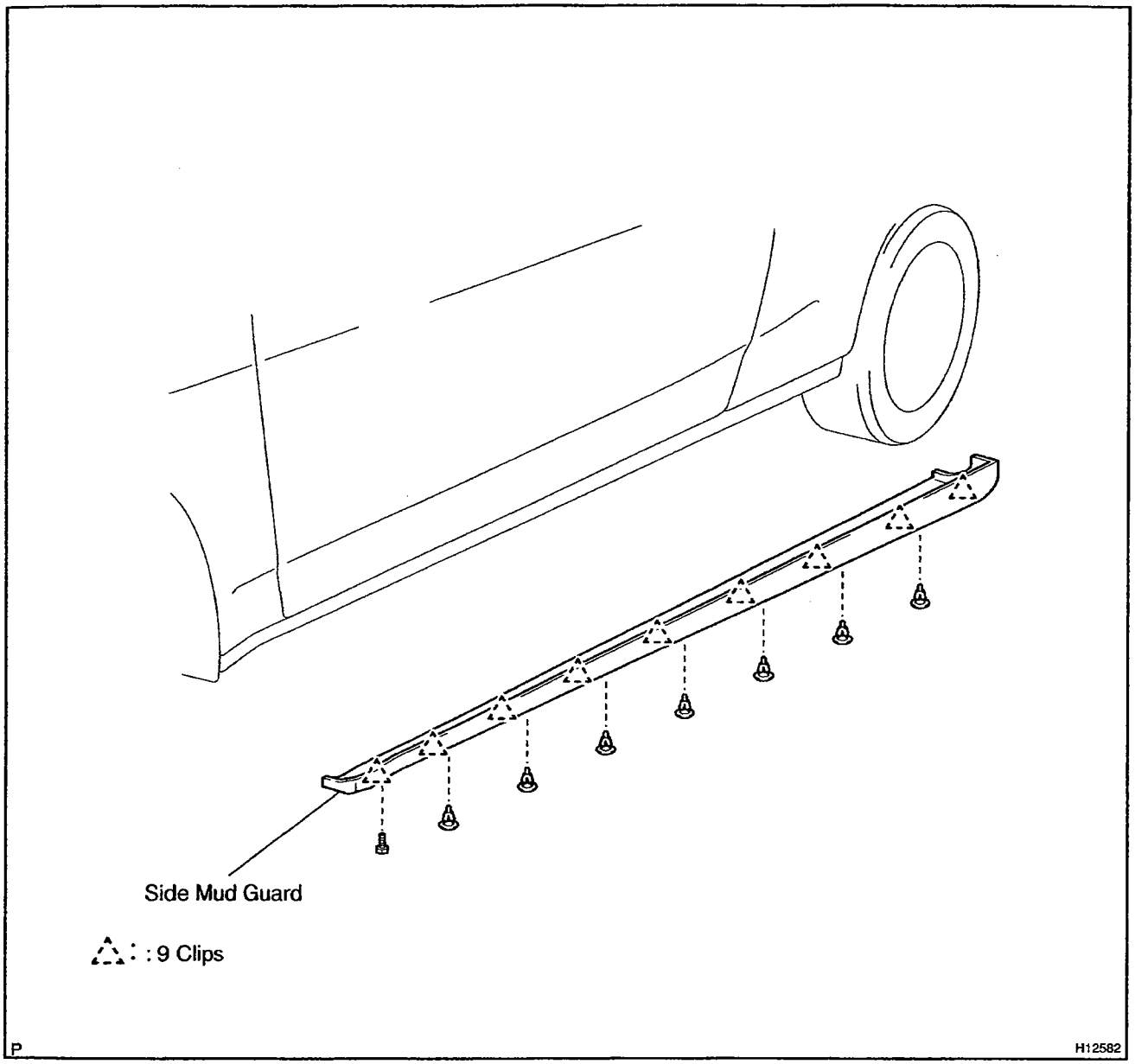
- **Make sure that the body and moulding are heated to the proper temperature.**
- **Do not depress the adhesive coated parts excessively but just hold them down with your thumb.**
- **Scrape off any overflowing adhesive with a plastic spatula and clean the surface with a dry rag.**
- **Take care not to drive the vehicle during the time described in the table below.**

Temperature	Minimum time prior to driving the vehicle
35 °C (95 °F)	1.5 hours
20 °C (68 °F)	5 hours
5 °C (41 °F)	24 hours

SIDE MUD GUARD

COMPONENTS

BO1E6-02



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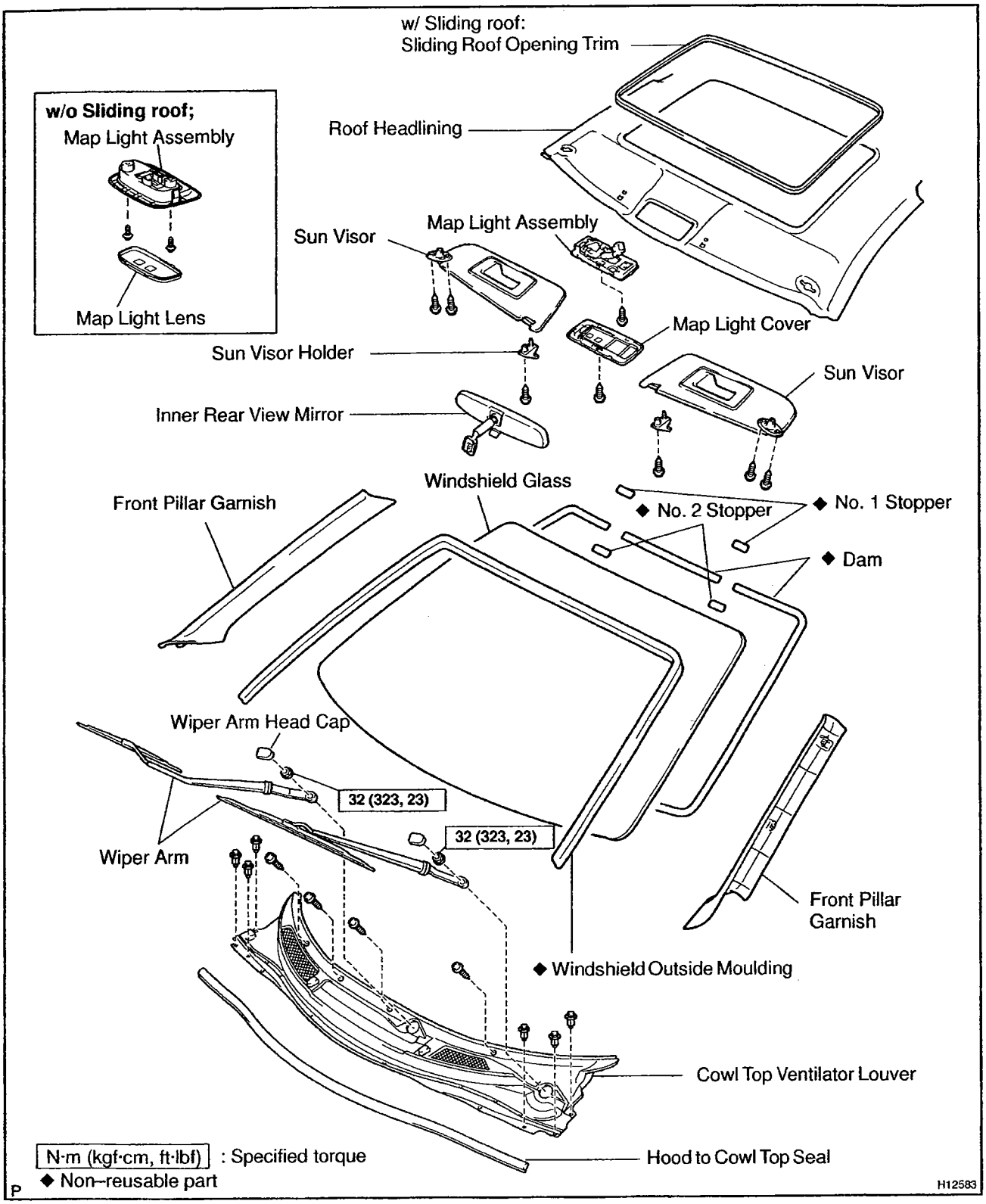
H12582

WINDSHIELD

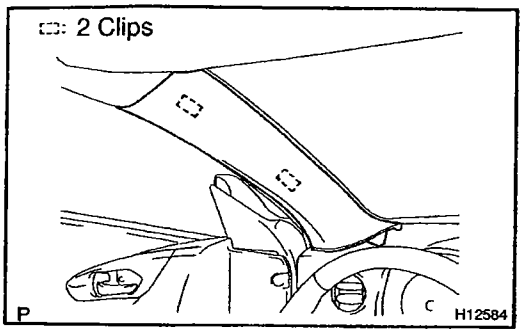
COMPONENTS

BO1ES-02



BO2NR-01

REMOVAL



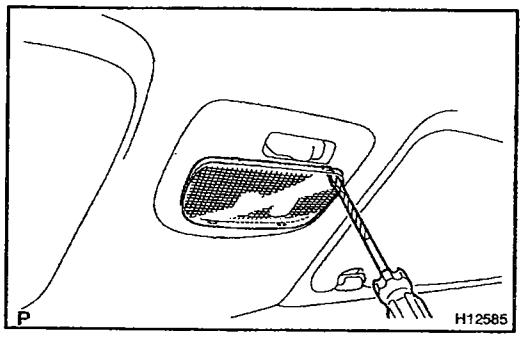
1. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



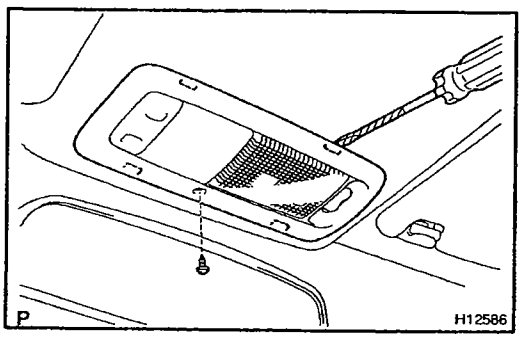
2. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a screwdriver, remove the lens.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws and map light assembly, then disconnect the connector.



3. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

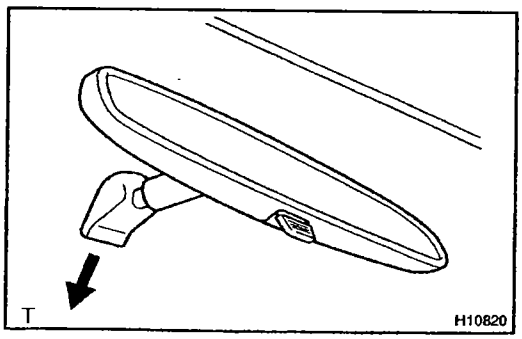
(a) Remove the screw.

(b) Using a moulding remover, remove the cover.

(c) Remove the screw and map light assembly, then disconnect the connector.

4. REMOVE SUN VISORS

5. REMOVE SUN VISOR HOLDERS



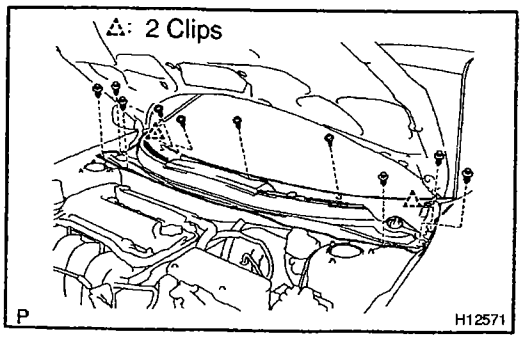
6. REMOVE INNER REAR VIEW MIRROR

Remove the inner rear view mirror as shown in the illustration.

7. REMOVE WIPER ARMS

Remove the 2 wiper arm head caps, 2 nuts and 2 wiper arms.

8. REMOVE HOOD TO COWL TOP SEAL



9. REMOVE COWL TOP VENTILATOR LOUVER

(a) Remove the 4 screws and 6 clips.

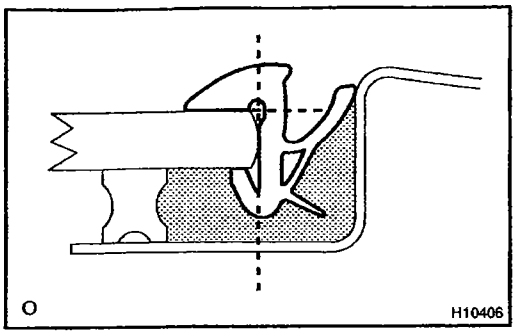
(b) Using a screwdriver, remove the cowl top ventilator louver, then disconnect the washer hoses.

HINT:

Tape the screwdriver tip before use.

10. w/ Sliding roof:
REMOVE SLIDING ROOF OPENING TRIM

11. PULL DOWN FRONT PART OF ROOF HEADLINING



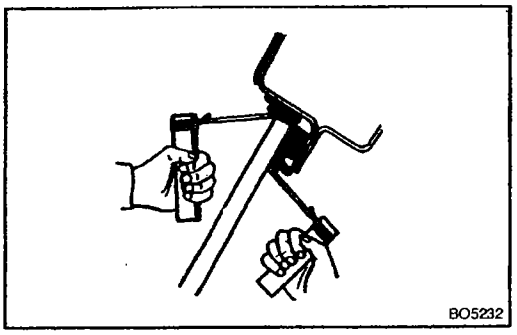
12. REMOVE WINDSHIELD OUTSIDE MOULDING

(a) Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

(b) Remove the remaining moulding.



13. REMOVE WINDSHIELD GLASS

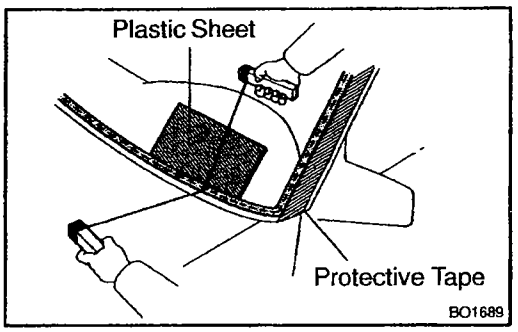
(a) Insert a piano wire between body and glass and let it pass through.

(b) Tie both wire ends to wooden blocks or similar objects.

(c) w/ Front window defogger:
Disconnect the connector.

NOTICE:

Be careful not to damage the wire harness.



(d) Cut the adhesive by pulling the piano wire around it.

NOTICE:

When separating the glass, take care not to damage the paint and exterior ornaments. To prevent the safety pad from being scratched when removing the windshield, place a plastic sheet between the piano wire and safety pad.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

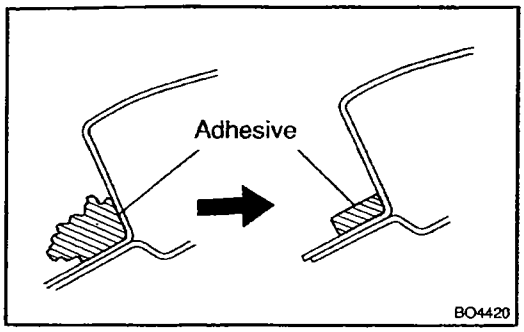
(e) Remove the glass.

NOTICE:

Leave the adhesive on the body as much as possible when cutting off the glass.

BO2NS-01

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

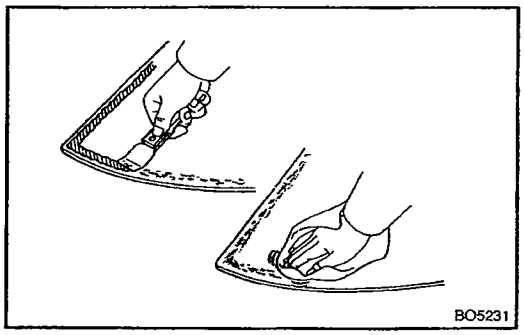
HINT:

Leave the adhesive on the body as much as possible.

(b) Clean the cut surface of the adhesive with a shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. CLEAN REMOVED GLASS

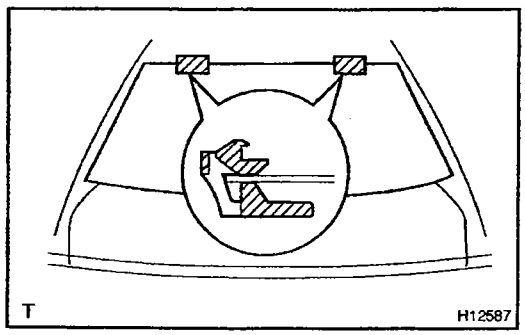
(a) Remove the damaged No.2 stoppers and dams.

(b) Using a scraper, remove the adhesive sticking to the glass.

(c) Clean the glass with cleaner.

NOTICE:

- **Be careful not to damage the glass.**
- **Do not touch the glass face after cleaning it.**



3. w/ No. 1 Stopper:
REPLACE NO. 1 STOPPERS

(a) Remove the damaged stoppers.

(b) Cut off the old adhesive around the stopper installation area.

NOTICE:

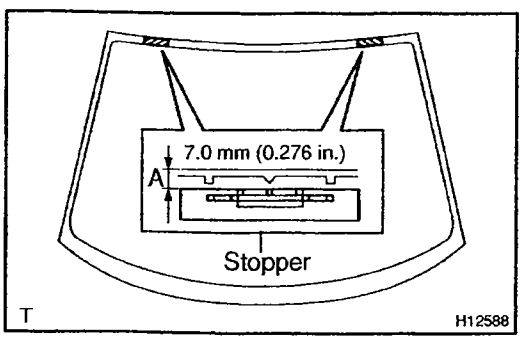
Be careful not to damage the body.

(c) Clean the installation area.

(d) Attach new stoppers to the body so that the notches on the body will align with the stoppers as shown in the illustration.

HINT:

Make sure that the stoppers are installed facing the correct direction.



4. INSTALL NEW NO. 2 STOPPERS

Attach new stoppers to the glass so that the ceramic notches on the glass will align with the stoppers as shown in the illustration.

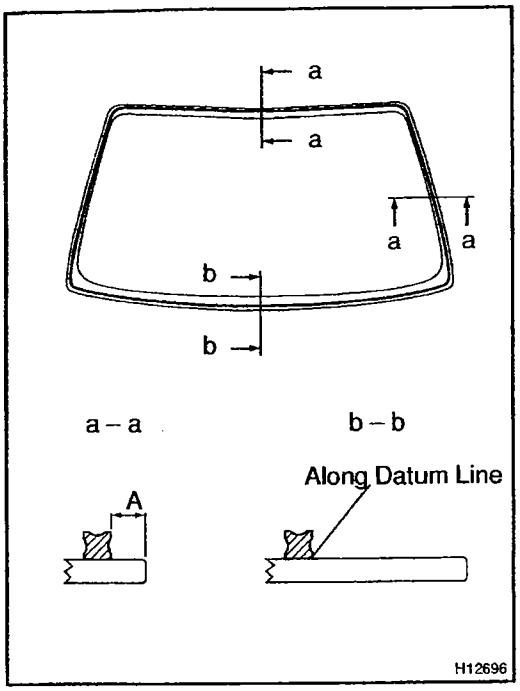
HINT:

Make sure that the stoppers are installed facing the correct direction.

A:

w/ No. 1 stopper: 7.7 ± 0.5 (0.303 ± 0.020 in.)

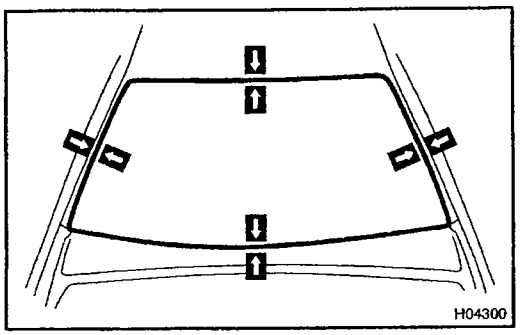
w/o No. 1 stopper: 9.0 ± 0.5 (0.354 ± 0.020 in.)



5. INSTALL NEW DAMS

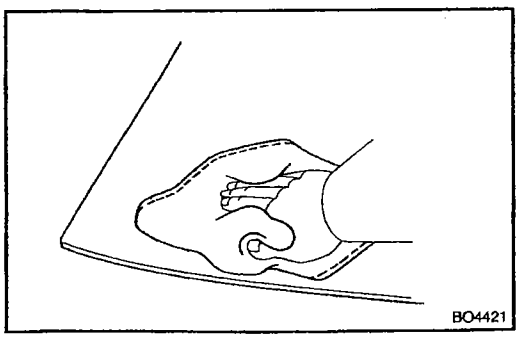
Install new dams with double–stick tape as shown in the illustration.

A: 7.0 mm (0.276 in.)



6. POSITION GLASS

(a) Place the glass in the correct position.
(b) Check that all contacting parts of the glass rim are set perfectly even.
(c) Place reference marks on the glass and body.
(d) Remove the glass.

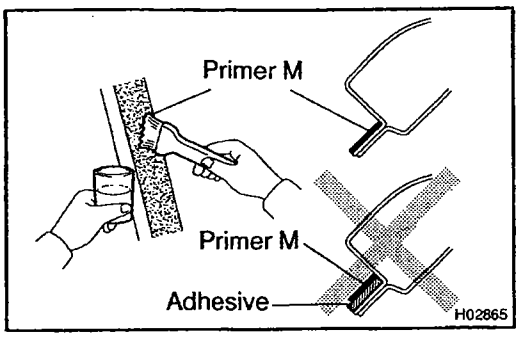


7. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.

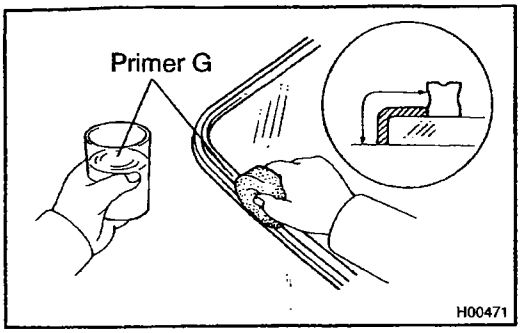


8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Allow 3 minutes or more to dry the primer coated surface.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



9. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Allow 3 minutes or more to dry the primer coated surface.**
- **Do not keep any of the opened Primer G for later use.**

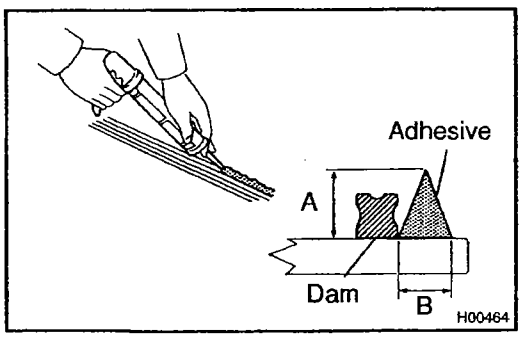
10. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent

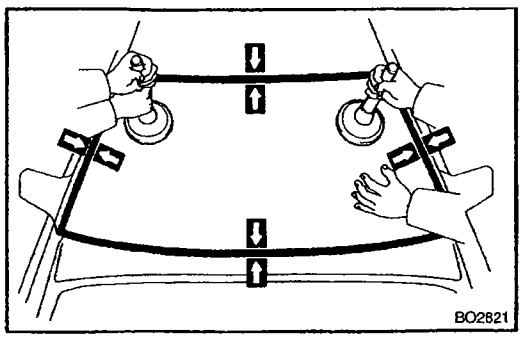
HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35 °C (95 °F)	15 minutes
20 °C (68 °F)	100 minutes
5 °C (41 °F)	8 hours

(b) Load the cartridge into the sealer gun.



(c) Coat the glass with adhesive as shown in the illustration.
A: 12.5 mm (0.492 in.)
B: 8.0 mm (0.315 in.)

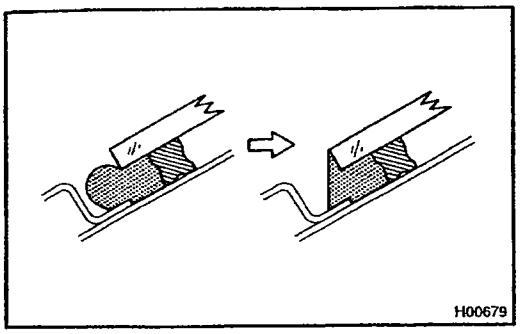


11. INSTALL WINDSHIELD GLASS AND MOULDING

(a) Install the glass, aligning the reference marks using a suction rubber.

HINT:
Check to see that the stoppers are attached to the body correctly.

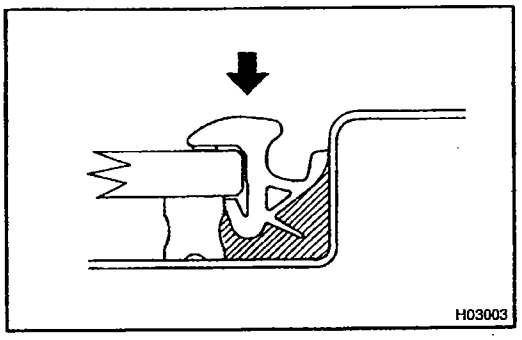
(b) Lightly press the glass front surface for close contact.



(c) Correct insufficient or protruded adhesive agent using a spatula.

HINT:

Apply the adhesive agent up to the windshield glass edge.



(d) Install a new windshield moulding to the windshield glass before the adhesive agent hardens.

HINT:

Install the moulding, aligning the center of moulding with the center of body.

(e) Remove any excessive adhesive agent before it hardens.

(f) Hold the glass and moulding in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:

Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35 °C (95 °F)	1.5 hours
20 °C (68 °F)	5 hours
5 °C (41 °F)	24 hours

12. INSPECT FOR LEAK AND REPAIR

NOTICE:

Conduct a leak test after the hardening time has elapsed.

13. INSTALL FRONT SIDE OF ROOF HEADLINING

14. INSTALL COWL TOP VENTILATOR LOUVER

HINT:

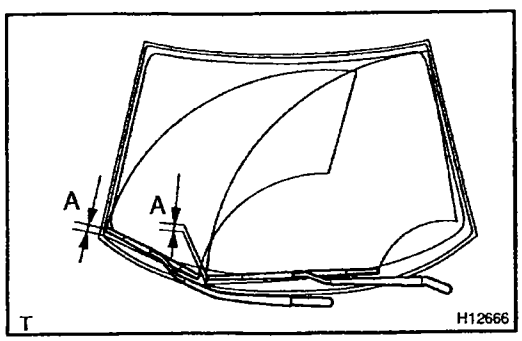
Check that the 2 clips on the back side of the cowl louver are surely fixed to the body.

15. INSTALL HOOD TO COWL TOP SEAL

16. INSTALL WIPER ARMS

(a) Operate the wiper motor once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the nuts by hand.



(c) Adjust the installation positions of the wiper arms to the positions as shown in the illustration.

A: 30 ± 7.5 mm (1.8 ± 0.295 in.)

(d) Torque the nuts.

Torque: 32 N·m (323 kgf·cm, 23 ft·lbf)

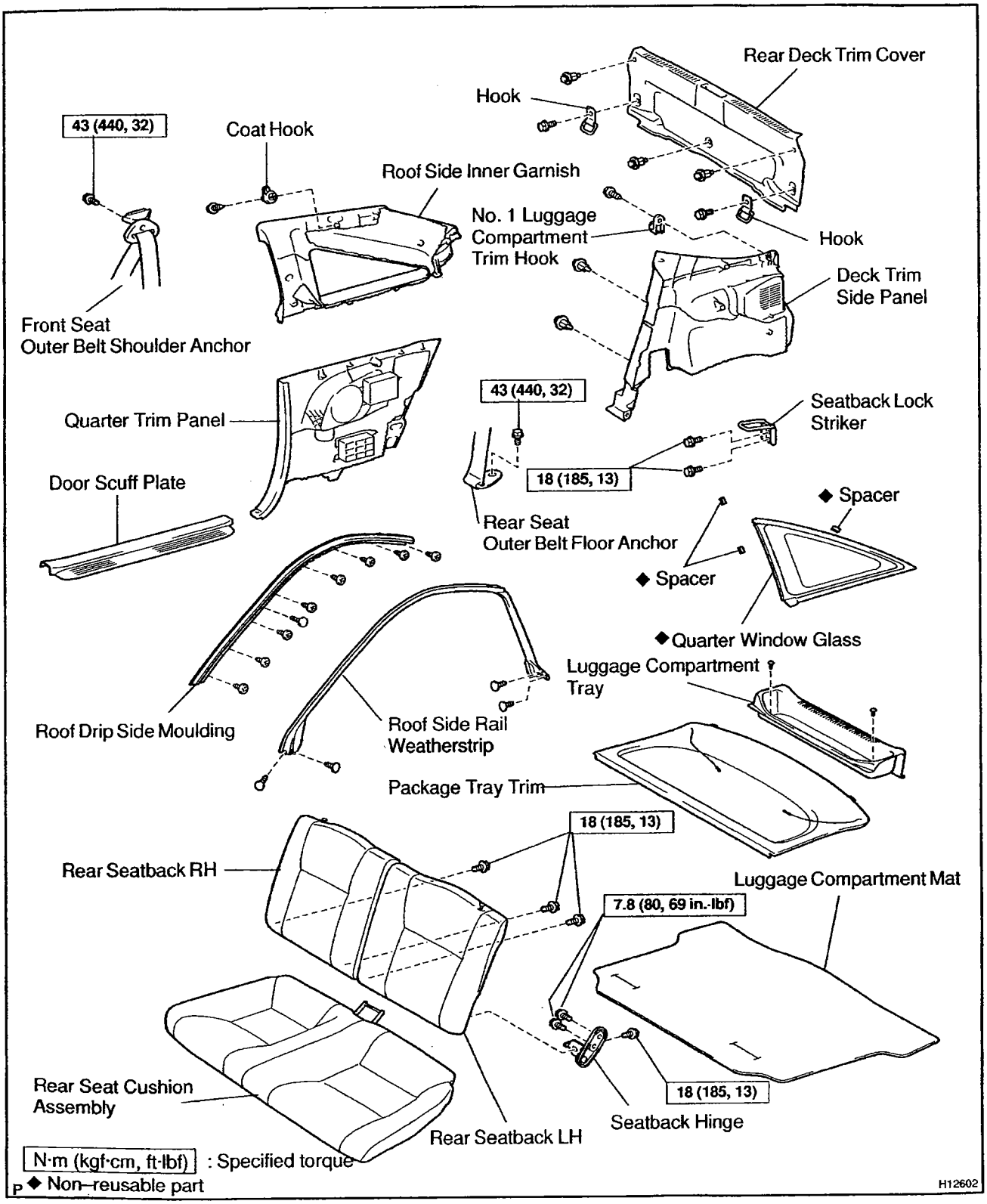
(e) Install the 2 wiper arm head caps.

17. INSTALL INNER REAR VIEW MIRROR
18. INSTALL SUN VISOR HOLDERS
19. INSTALL SUN VISOR
20. INSTALL MAP LIGHT ASSEMBLY
21. INSTALL FRONT PILLAR GARNISH

QUARTER WINDOW GLASS

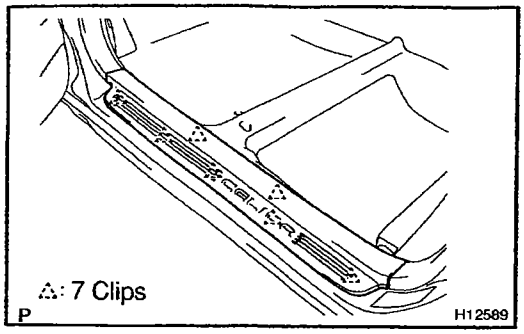
COMPONENTS

BO2NT–01



BO2NU-01

REMOVAL



1. REMOVE DOOR SCUFF PLATE

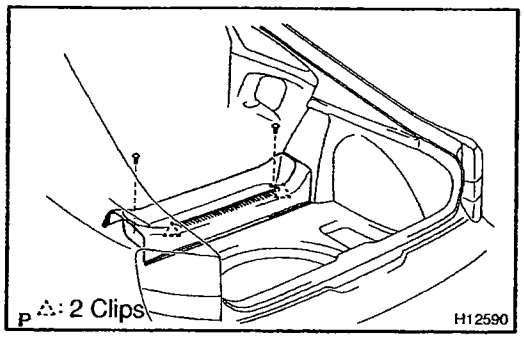
Using a screwdriver, remove the door scuff plate.

HINT:

Tape the screwdriver tip before use.

2. REMOVE PACKAGE TRAY TRIM

3. REMOVE REAR SEAT (See page BO–102)



4. REMOVE LUGGAGE COMPARTMENT TRAY

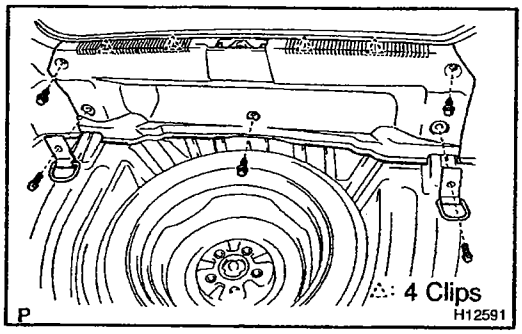
(a) Using a clip remover, remove the 2 clips.

(b) Using a screwdriver, remove the luggage compartment tray.

HINT:

Tape the screwdriver tip before use.

5. REMOVE LUGGAGE COMPARTMENT MAT



6. REMOVE REAR DECK TRIM COVER

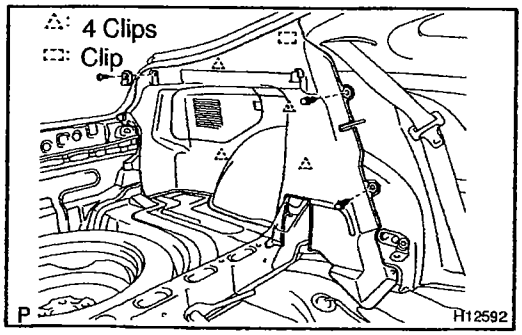
(a) Remove the 2 bolts and 2 hooks.

(b) Remove the 3 clips.

(c) Using a screwdriver, remove the rear deck trim cover.

HINT:

Tape the screwdriver tip before use.



7. REMOVE DECK TRIM SIDE PANEL

(a) Remove the screw and No. 1 luggage compartment trim hook.

(b) RH side:
Using a screwdriver, remove the rear room light, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

(c) Remove the 2 clips.

(d) Using a screwdriver, remove the deck trim side panel.

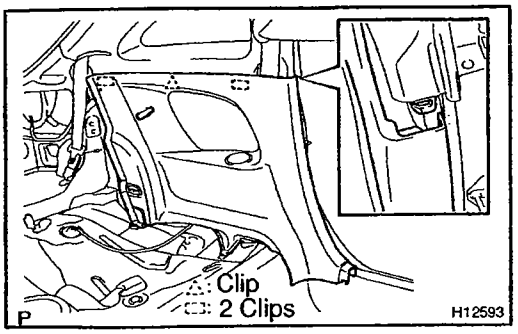
HINT:

Tape the screwdriver tip before use.

8. REMOVE REAR SEATBACK HINGE

9. REMOVE REAR SEATBACK LOCK STRIKER

10. REMOVE REAR SEAT OUTER BELT FLOOR ANCHOR



11. REMOVE QUARTER TRIM PANEL

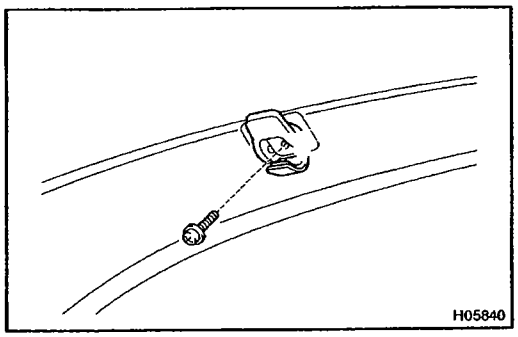
Using a screwdriver, remove the quarter trim panel.

HINT:

Tape the screwdriver tip before use.

12. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR

Torque: 42 N·m (430 kgf·cm, 31ft·lbf)



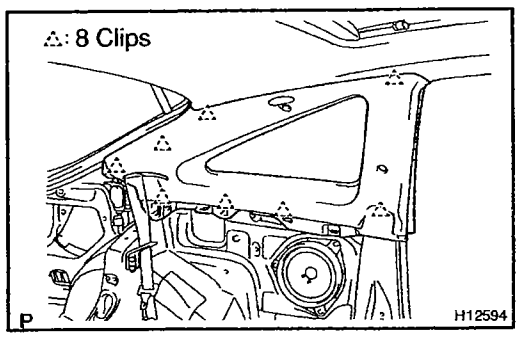
13. REMOVE ROOF SIDE INNER GARNISH

(a) Using a screwdriver, open the cap of coat hook.

HINT:

Tape the screwdriver tip before use.

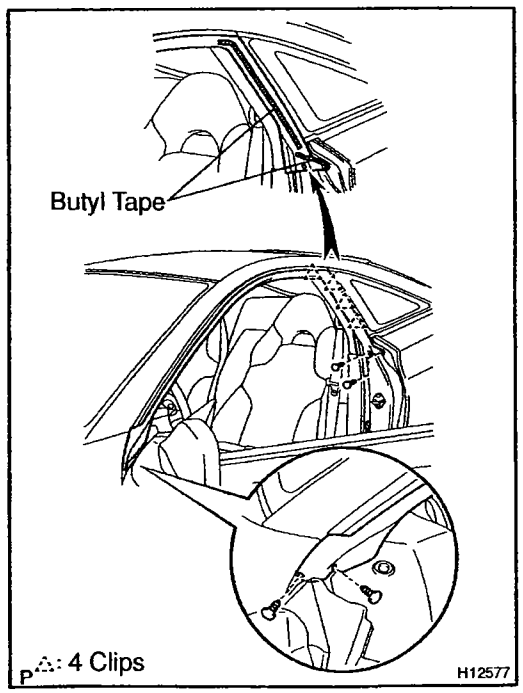
(b) Remove the screw and coat hook.



(c) Using a screwdriver, remove the roof side inner garnish.

HINT:

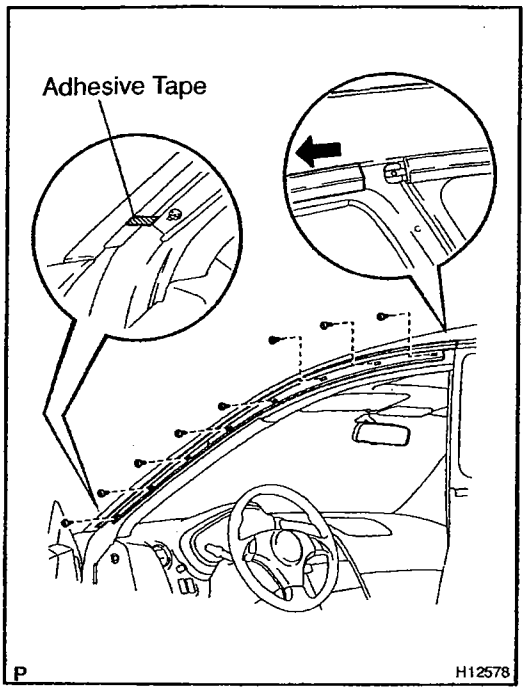
Tape the screwdriver tip before use.



14. REMOVE ROOF SIDE RAIL WEATHERSTRIP

(a) Using a clip remover, remove the 4 clips.

(b) Remove the roof side rail weatherstrip.



15. REMOVE ROOF DRIP SIDE MOULDING

Remove the 8 screws and roof drip side moulding.

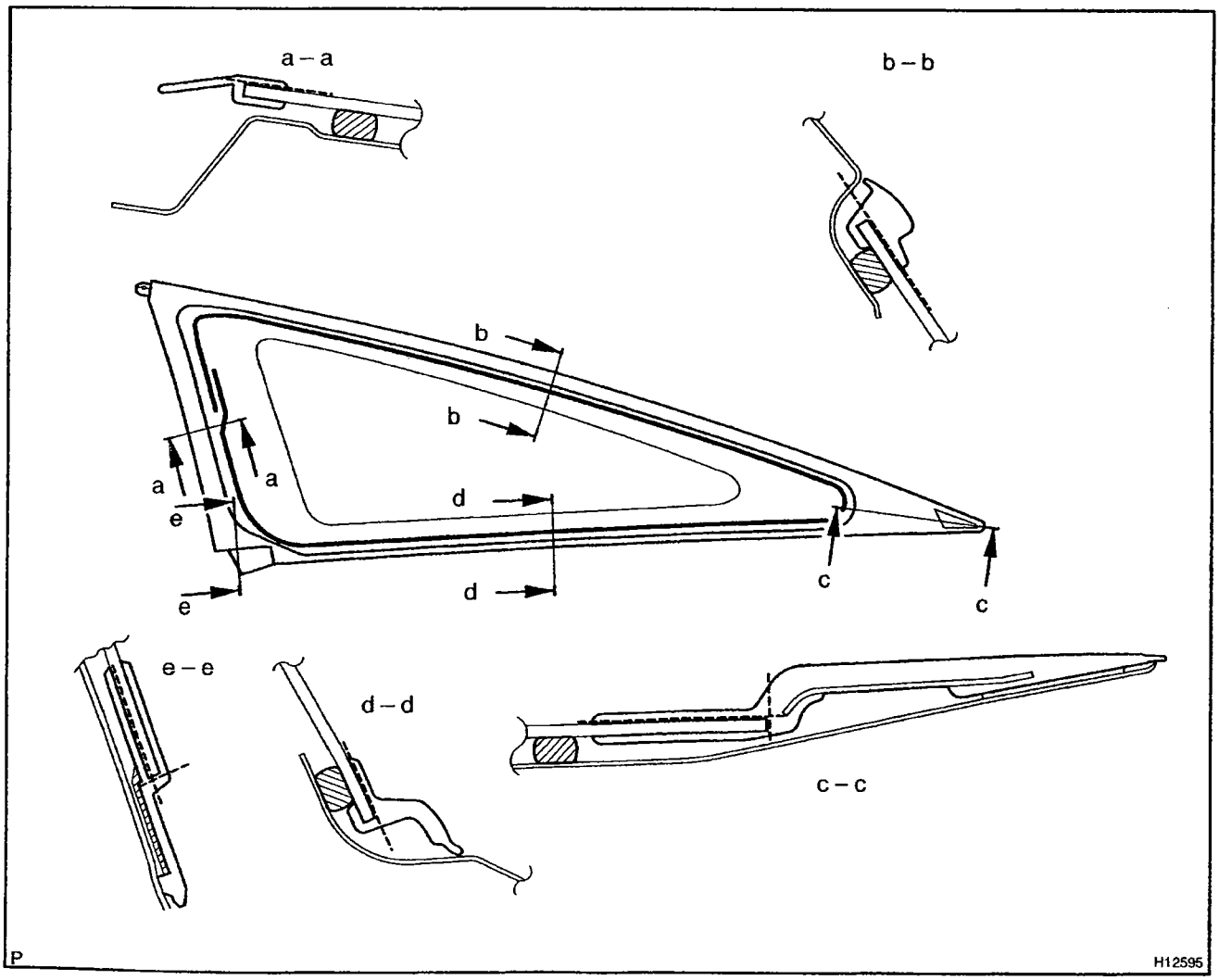
16. REMOVE QUARTER WINDOW GLASS

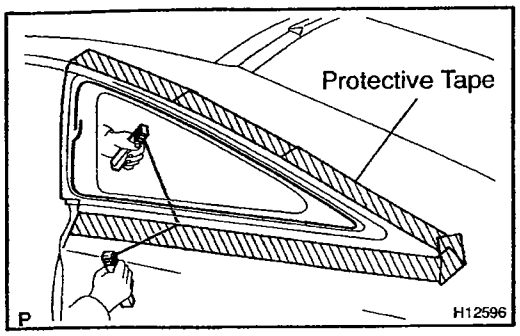
(a) Using a knife, cut off the moulding as shown in the below illustration.

NOTICE:

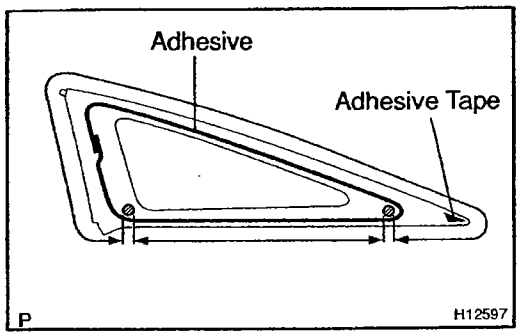
Do not damage the body with the knife.

(b) Remove the remaining moulding.

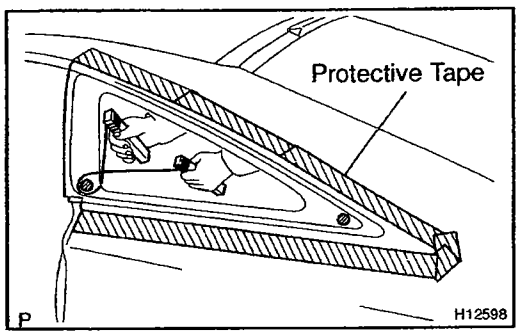




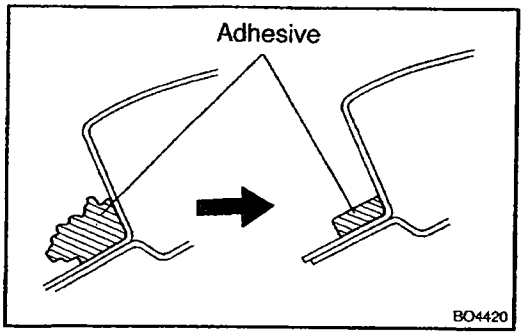
(c) Insert a piano wire between body and glass and let it pass through.
(d) Tie both wire ends to wooden blocks or similar objects.
HINT:
Apply protective tape to the outer surface to keep the surface from being scratched.
NOTICE:
When separating the glass, take care not to damage the paint and exterior.



(e) Cut the adhesive by pulling the piano wire around it.
HINT:
Cut the adhesive areas as shown in the illustration, leaving the adhesive where the clips are.



(f) Push the piano wire through as shown in the illustration, cut off the adhered part to the clips.
(g) Remove the glass.
NOTICE:
Leave the adhesive on the body as much as possible when cutting off the glass.



INSTALLATION

BO2NV-01

1. CLEAN AND SHAPE CONTACT SURFACE OF BODY PANEL

(a) Using a knife, cut away any rough areas on the body.

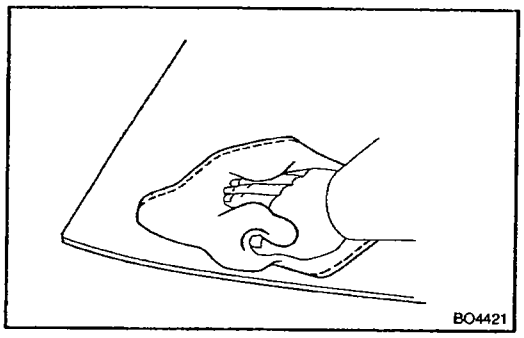
HINT:

Leave the adhesive on the body as much as possible.

(b) Clean the cut surface of the adhesive with a shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.

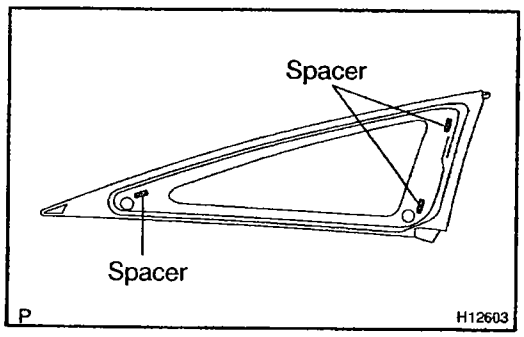


2. CLEAN CONTACT SURFACE OF NEW GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

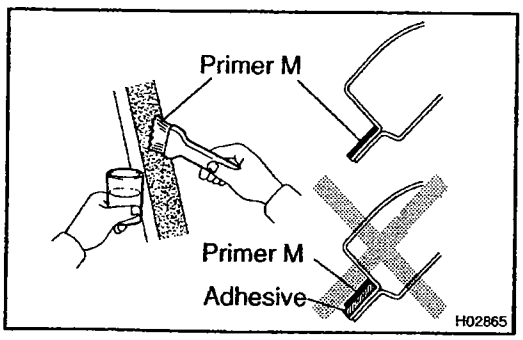
NOTICE:

Do not touch the glass face after cleaning it.



3. INSTALL NEW SPACERS

Install the new spacers to the quarter window glass as shown in the illustration.



4. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Allow 3 minutes or more to dry the primer coated surface.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**

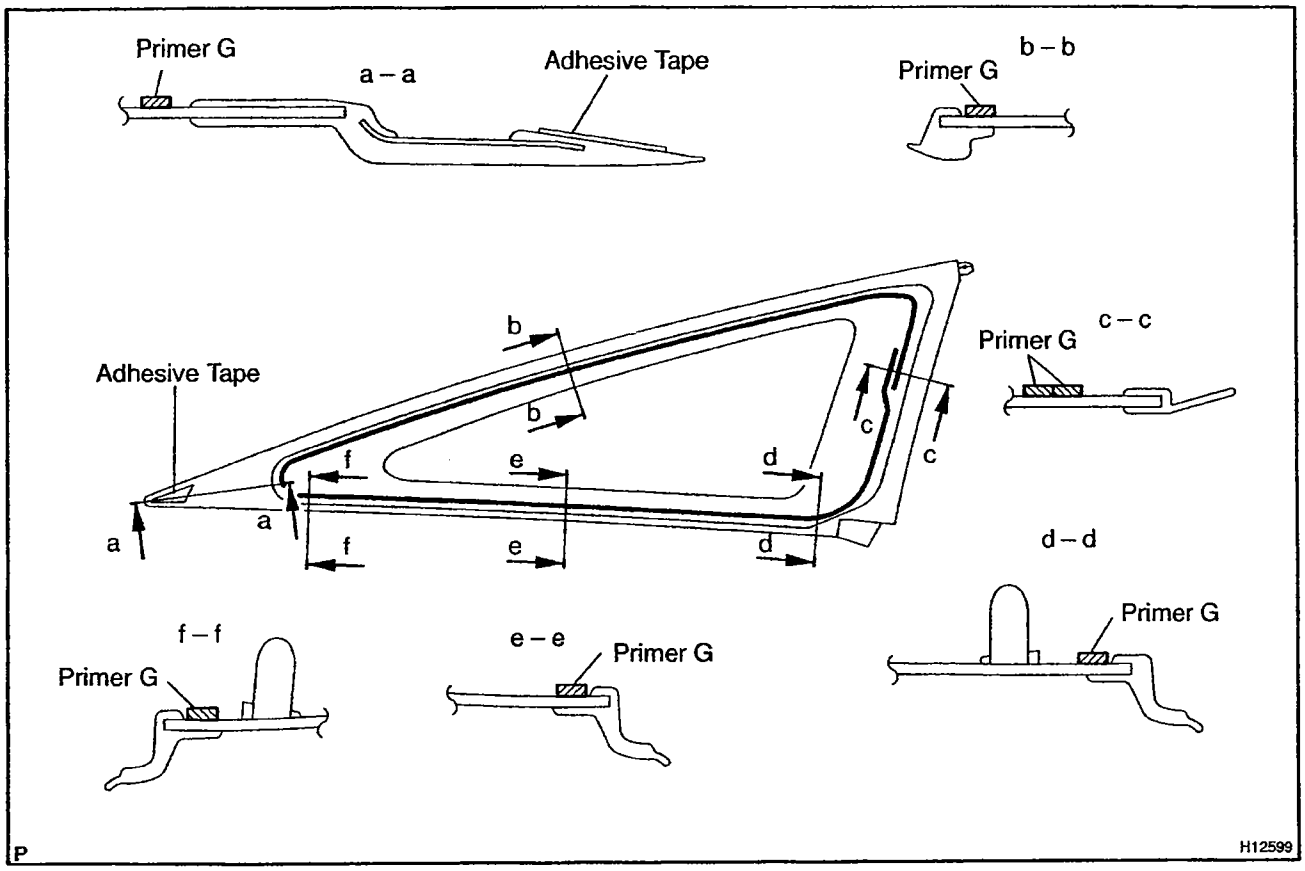
5. COAT CONTACT SURFACE OF NEW GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Allow 3 minutes or more to dry the primer coated surface.**
- **Do not keep any of the opened Primer G for later use.**



6. APPLY ADHESIVE

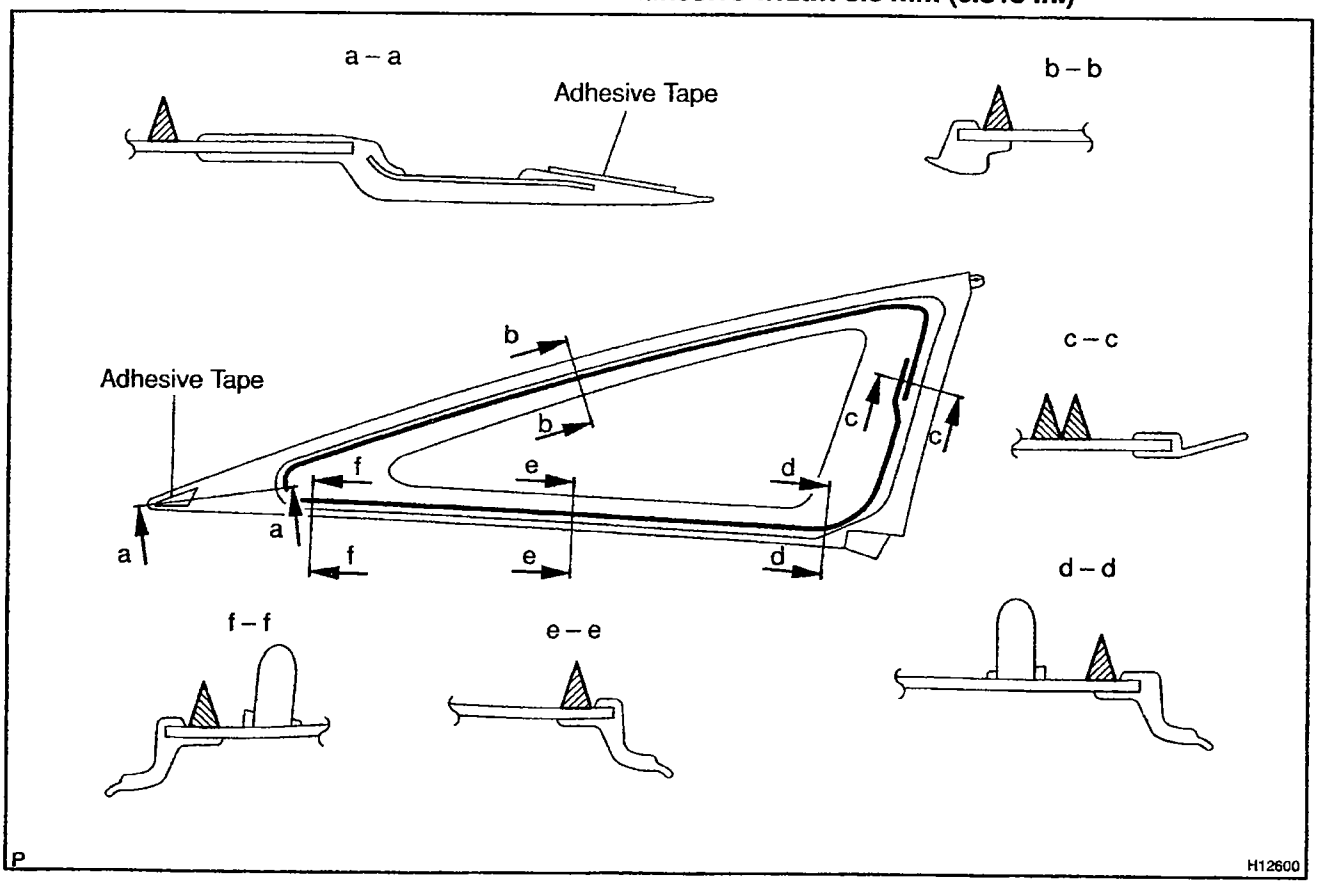
(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent.

HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35°C (95°F)	15 minutes
20°C (68°F)	100 minutes
5°C (41°F)	8 hours

(b) Load the cartridge into the sealer gun.

(c) Coat the new glass with adhesive as shown in the illustration.
Adhesive height: 12.0 mm (0.472 in.)
Adhesive width: 8.0 mm (0.315 in.)



7. INSTALL NEW GLASS

(a) Install new glass to the body.

(b) Hold the glass in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:

Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35°C (95°F)	1.5 hours
20°C (68°F)	5 hours
5°C (41°F)	24 hours

8. INSPECT FOR LEAK AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.

Part No. 08833–00030 or equivalent.

9. INSTALL ROOF DRIP SIDE MOULDING (See page BO–40)

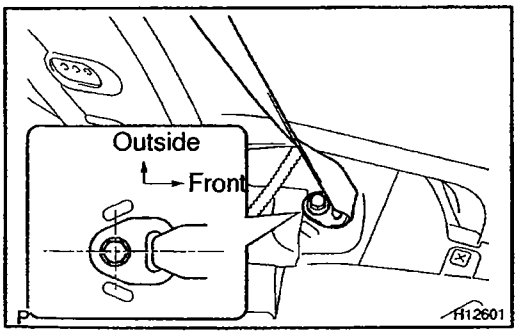
10. INSTALL ROOF SIDE RAIL WEATHERSTRIP (See page BO–40)

11. INSTALL ROOF SIDE INNER GARNISH

12. INSTALL FRONT SEAT OUTER BELT SHOULDER ANCHOR

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

13. INSTALL QUARTER TRIM PANEL



14. INSTALL REAR SEAT OUTER BELT FLOOR ANCHOR

Install the rear seat outer belt floor anchor with the bolts as shown in the illustration.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

15. INSTALL REAR SEATBACK LOCK STRIKER

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

16. INSTALL REAR SEATBACK HINGE

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

17. INSTALL DECK TRIM SIDE PANEL

18. INSTALL REAR DECK TRIM COVER

19. INSTALL LUGGAGE COMPARTMENT MAT

20. INSTALL PACKAGE TRAY TRIM

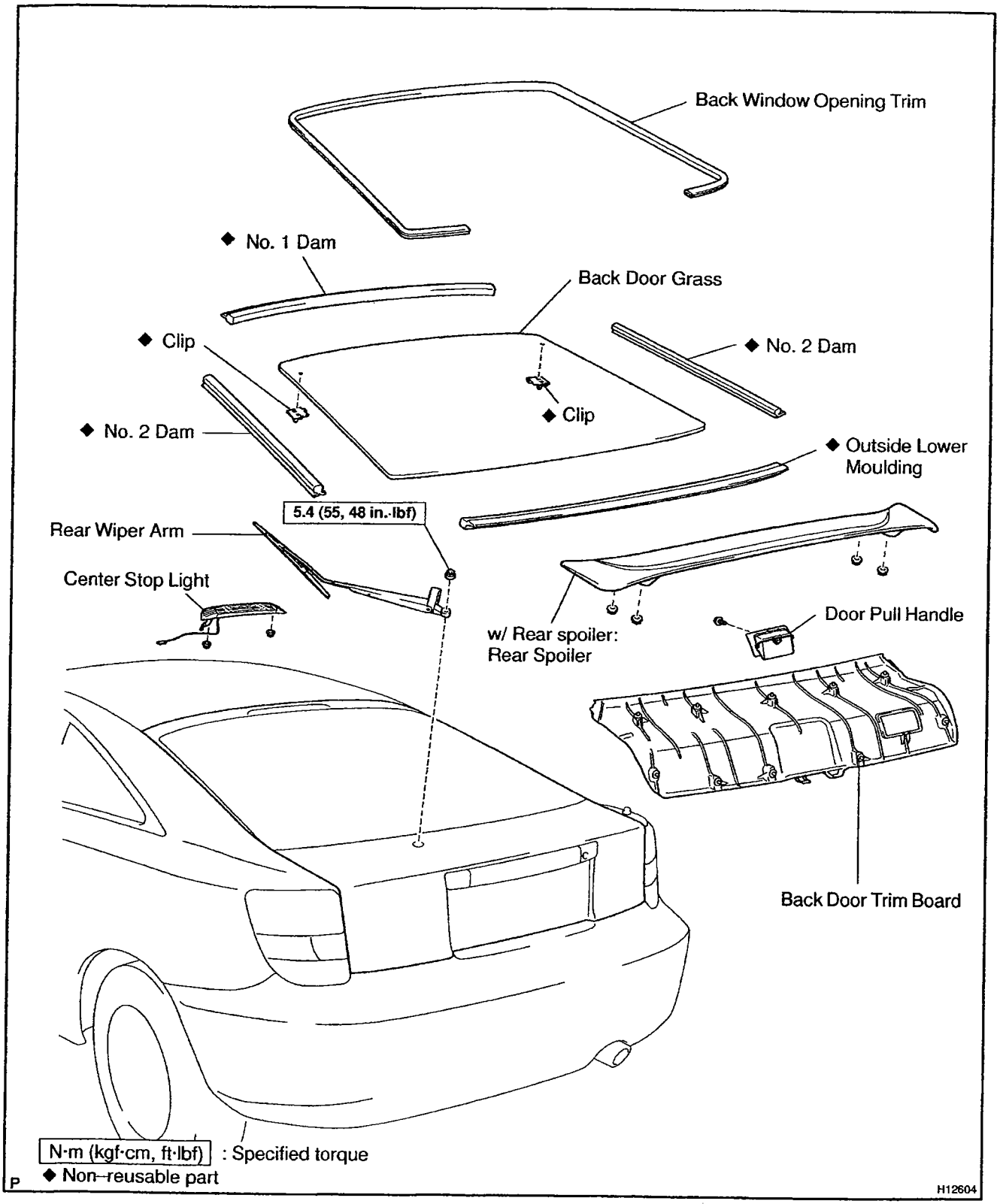
21. INSTALL REAR SEAT (See page BO–105)

22. INSTALL DOOR SCUFF PLATE

BACK DOOR GLASS

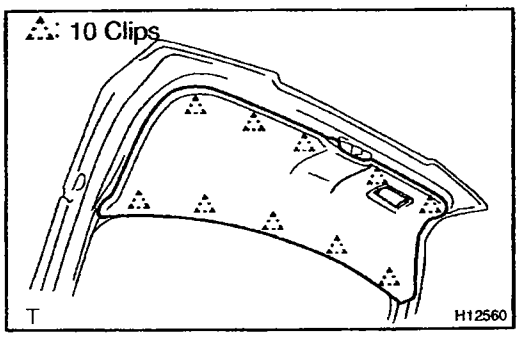
COMPONENTS

BO1EL-02



REMOVAL

1. **w/ Rear spoiler:**
   REMOVE REAR SPOILER
2. **REMOVE REAR WIPER ARM**
3. **REMOVE DOOR PULL HANDLE**

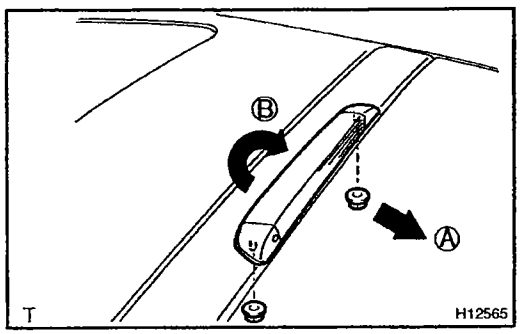


4. **REMOVE BACK DOOR TRIM BOARD**

Using a screwdriver, remove the back door trim board.

HINT:

Tape the screwdriver tip before use.

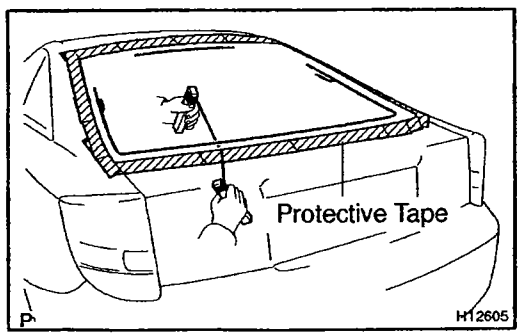


5. **REMOVE CENTER STOP LIGHT**

(a) Remove the 2 nuts.

(b) Disconnect the connector and washer hose, then remove the center stop light in order A, B as shown in the illustration..

6. **REMOVE BACK WINDOW OPENING TRIM**



7. **REMOVE BACK DOOR GLASS**

(a) Insert a piano wire between body and glass and let it pass through.

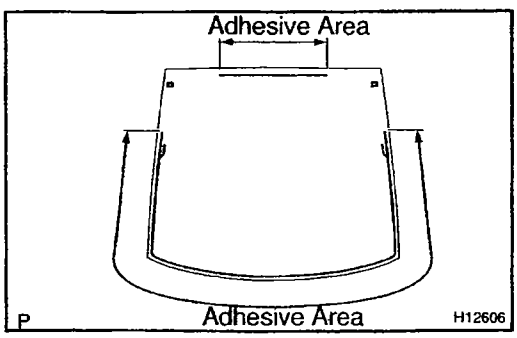
(b) Tie both wire ends to wooden blocks or similar object.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

NOTICE:

When separating the glass, take care not to damage the paint and exterior.



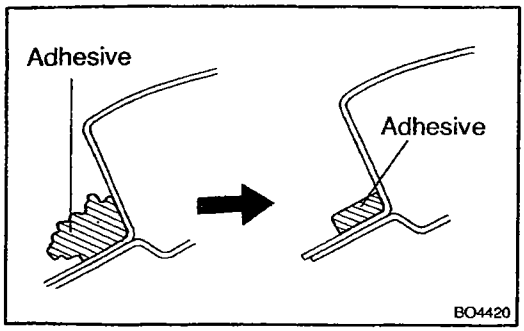
(c) Cut the adhesive by pulling the piano wire around it.

HINT:

Cut the adhesive areas as shown in the illustration.

BO2NX-01

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

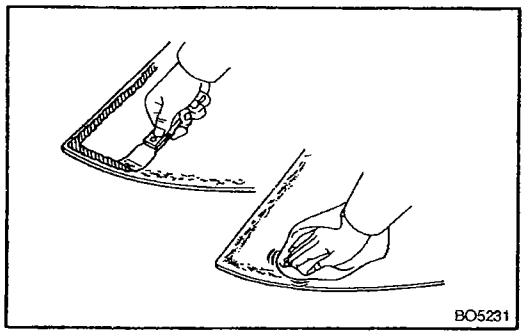
HINT:

Leave the adhesive on the body as much as possible.

(b) Clean the cutting surface of the adhesive with a shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. CLEAN REMOVED GLASS

(a) Place marks for installing new clips to the glass.

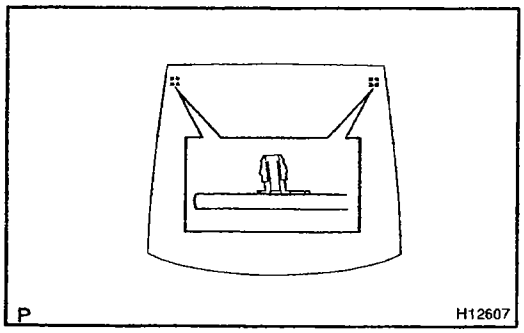
(b) Remove the damaged clips and dams.

(c) Using a scraper, remove the adhesive sticking to the glass.

(d) Clean the glass with cleaner.

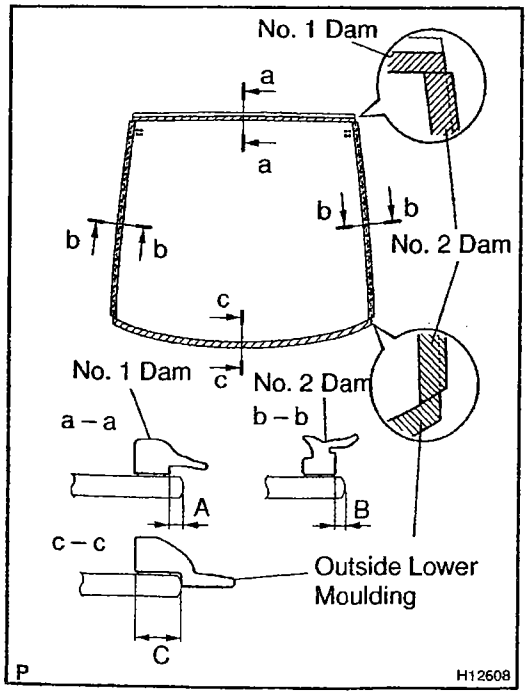
NOTICE:

- **Do not touch the glass after cleaning it.**
- **Be careful not to damage the glass.**



3. If reusing the glass: INSTALL NEW CLIPS

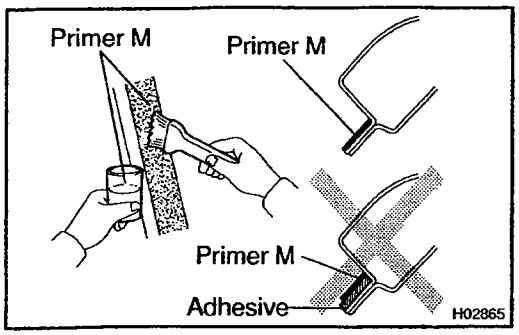
Install new clips onto the glass.



4. INSTALL NEW DAMS AND OUTSIDE LOWER MOULDING

Install new dams and outside lower moulding with adhesive tape as shown in the illustration.

A: 2.5 mm (0.098 in.)
B: 1.7 mm (0.067 in.)
C: 7.5 mm (0.295 in.)

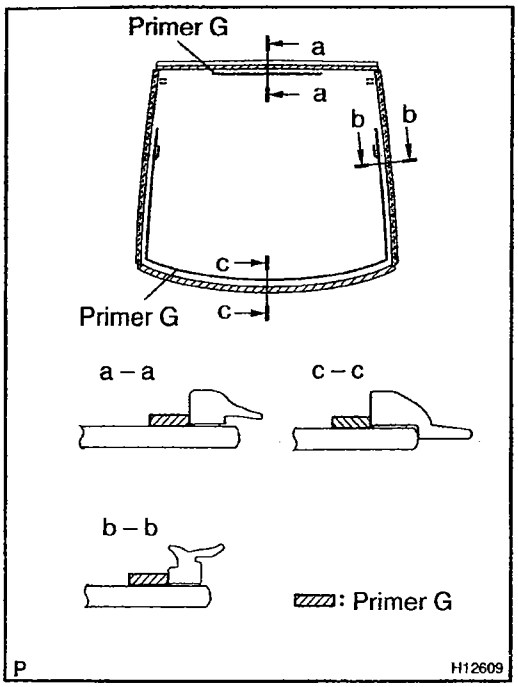


5. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Allow 3 minutes or more to dry the primer coated surface.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



6. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Allow 3 minutes or more to dry the primer coated surface.**
- **Do not keep any of the opened Primer G for later use.**

7. APPLY ADHESIVE

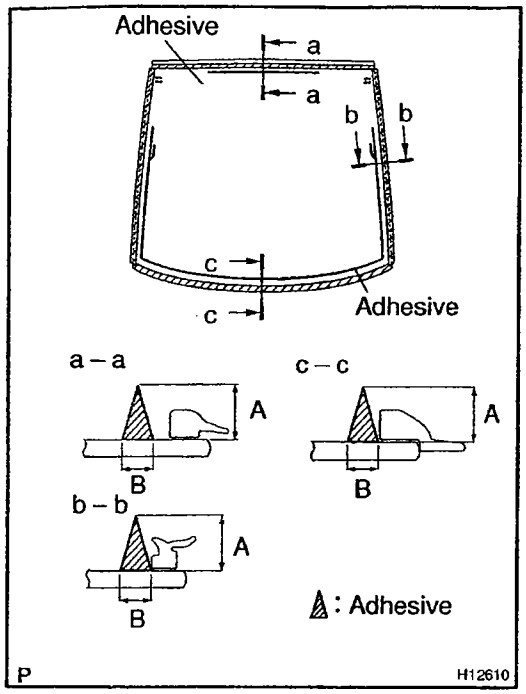
(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent

HINT:

After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35°C (95°F)	15 minutes
20°C (68°F)	100 minutes
5°C (41°F)	8 hours

(b) Load the cartridge into the sealer gun.



(c) Coat the glass with adhesive as shown in the illustration.
A: 12.0 mm (0.472 in.)
B: 8.0 mm (0.315 in.)

8. INSTALL BACK DOOR GLASS

(a) Install the back door glass to the back door.

HINT:

Confirm that the dams is attached to the back door panel.

(b) Hold the back door glass in place securely with a protective tape or equivalent until the adhesive hardenes.

NOTICE:

Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35°C (95°F)	1.5 hours
20°C (68°F)	5 hours
5°C (41°F)	24 hours

9. INSPECT FOR LEAKS AND REPAIR

NOTICE:

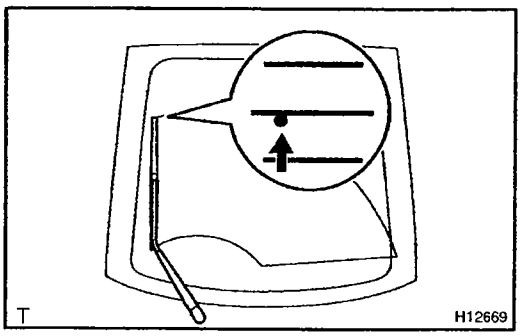
Conduct a leak test after the hardening time has elapsed.

10. INSTALL BACK WINDOW OPENING TRIM

11. INSTALL CENTER STOP LIGHT

12. INSTALL BACK DOOR TRIM BOARD

13. INSTALL DOOR PULL HANDLE



14. INSTALL REAR WIPER ARM

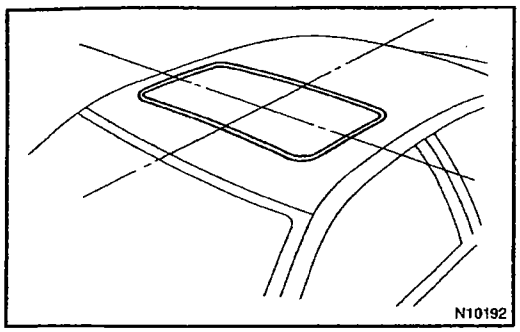
(a) Operate the wiper motor once and turn the wiper switch OFF.

(b) Install the rear wiper arm and tighten the nut by hand.

(c) Adjust the installation position of the wiper arm at a point in defogger pattern.

(d) Tighten the nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

15. w/ Rear spoiler:
REMOVE REAR SPOILER



SLIDING ROOF

ON–VEHICLE INSPECTION

BO2NY-01

INSPECT SLIDING ROOF GLASS ALIGNMENT

(a) Start the engine and check the operation time of the sliding roof.
Operation time:
Approx. 6 secs.

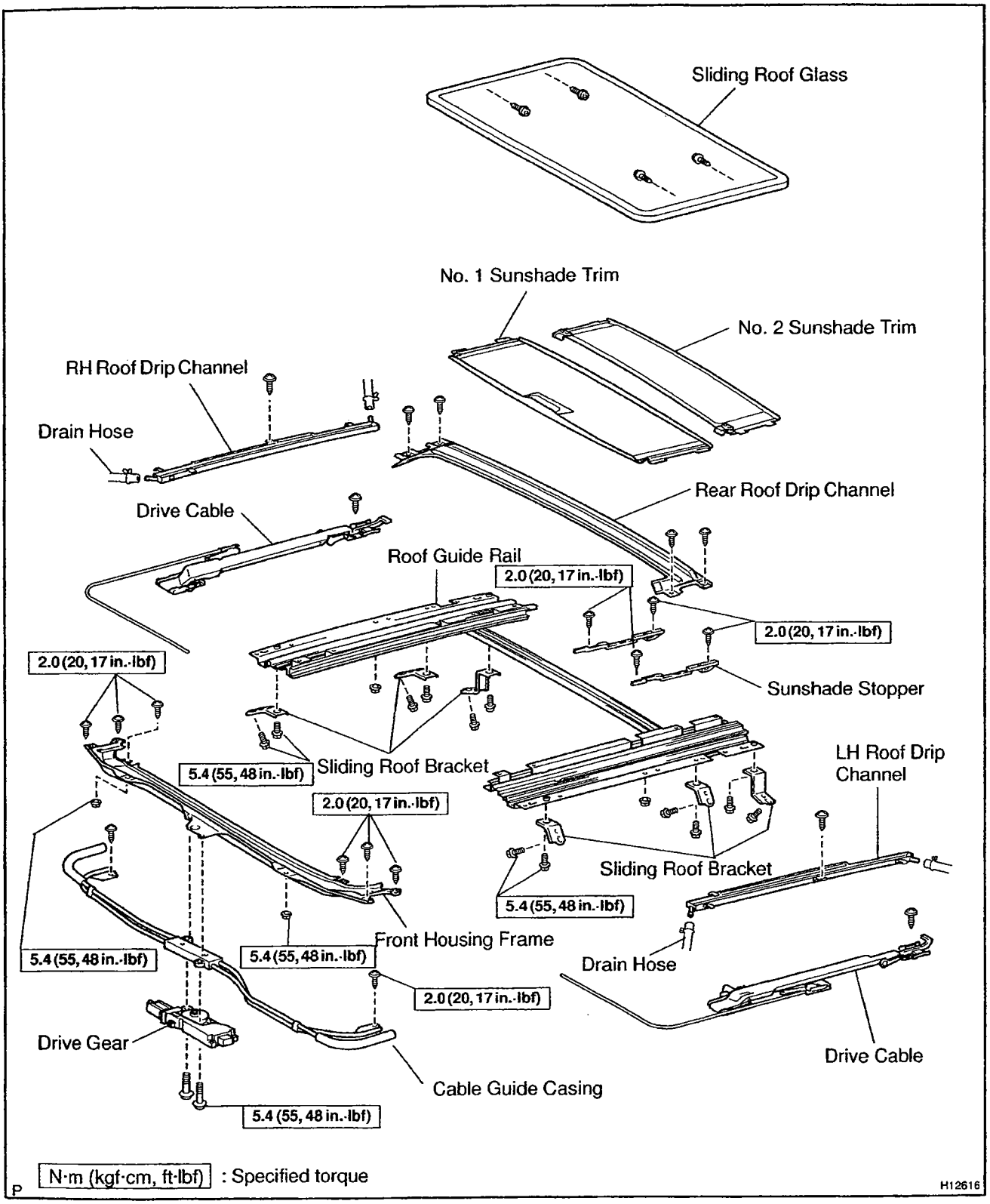
(b) Check for abnormal noise or binding during operation.

(c) With the sliding roof fully closed, check for water leakage.

(d) Check for a difference in level between the sliding roof weatherstrip and roof panel.
Except rear end:
0 ± 1.5 mm (0 ± 0.059 in.)
Rear end:
0 + 1.5 mm (0 + 0.059 in.)
0 – 1.0 mm (0 – 0.039 in.)

BO2NZ-01

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

P

H12616

BO200-01

REMOVAL

1. REMOVE ROOF HEADLINING
(See page BO–88)

2. REMOVE SLIDING ROOF GLASS

(a) Remove the 4 screws.

(b) Pull the glass upward to remove it.

3. REMOVE DRIVE GEAR

NOTICE:

Remove the drive gear with the sliding roof fully closed.

(a) Remove the 2 screws and room light bracket.

(b) Disconnect the connector.

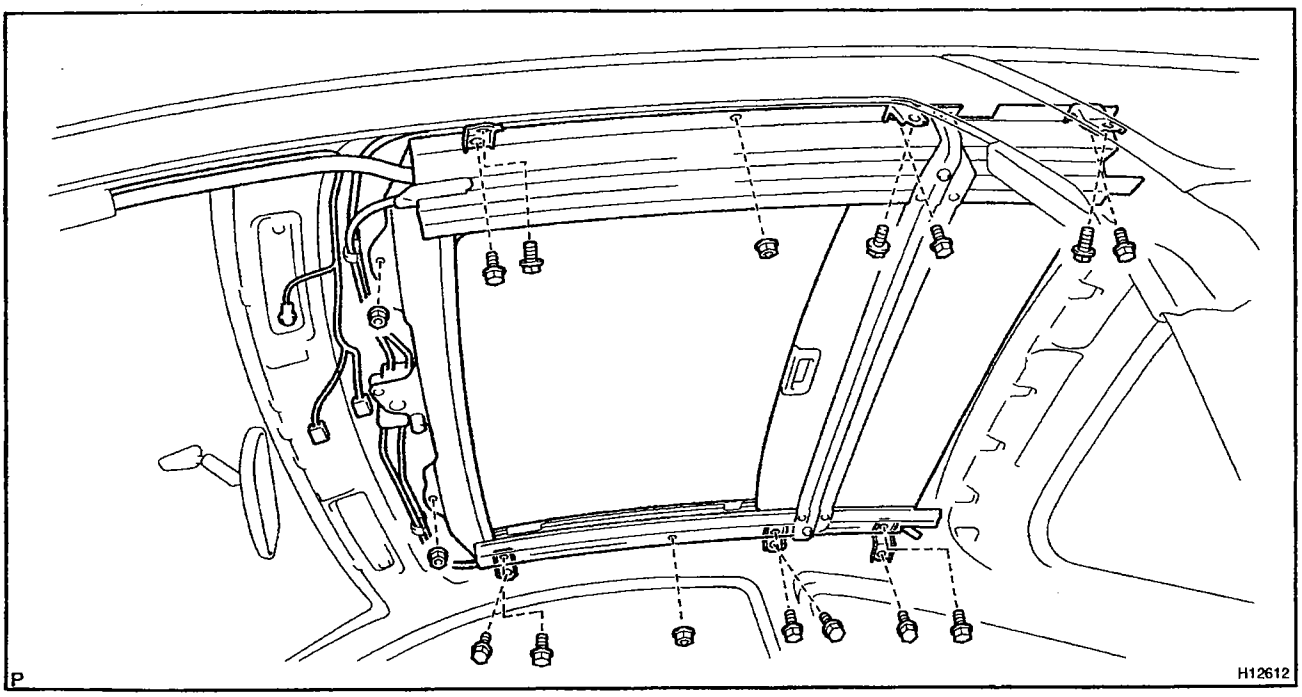
(c) Remove the 2 bolts and drive gear.
Torque: 5.4 N·m (55 kgf·cm, 48 ft·lbf)

4. REMOVE SLIDING ROOF HOUSING

(a) Disconnect the 4 drain hoses from the housing.

(b) Remove the 12 bolts and 6 brackets.
Torque: 5.4 N·m (55 kgf·cm, 48 ft·lbf)

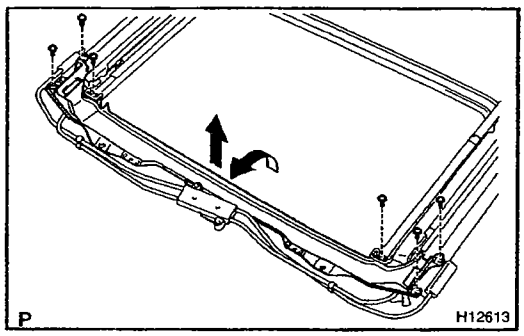
(c) Remove the 4 nuts, then remove the housing.
Torque: 5.4 N·m (55 kgf·cm, 48 ft·lbf)



BO2O1-01

DISASSEMBLY

1. **REMOVE SUNSHADE STOPPERS**
   Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)
2. **REMOVE NO. 1 AND NO. 2 SUNSHADE TRIMS**

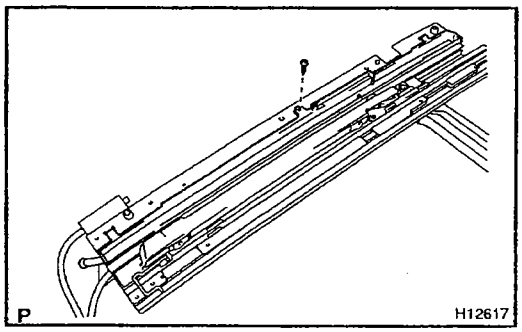


3. **REMOVE FRONT HOUSING FRAME**

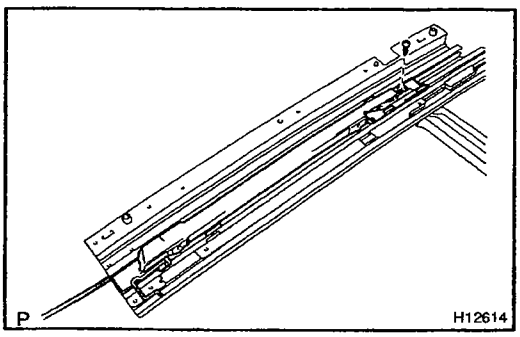
Remove the 6 screws and front housing frame as shown in the illustration.

Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)

4. **REMOVE REAR ROOF DRIP CANNEL**



5. **REMOVE LH AND RH ROOF DRIP CHANNEL**
6. **REMOVE CABLE GUIDE CASING**
   Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)



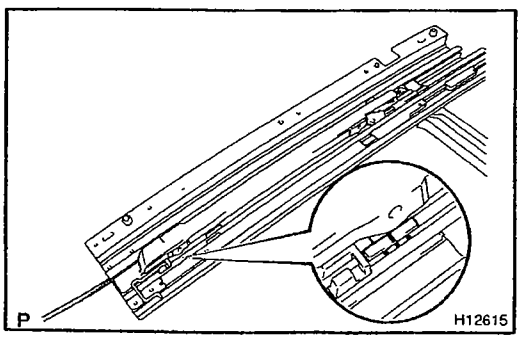
7. **REMOVE DRIVE CABLE**

(a) Remove the screw.
(b) Slide the drive cable rearward, then remove it.
(c) Employ the same manner described above to the other side.

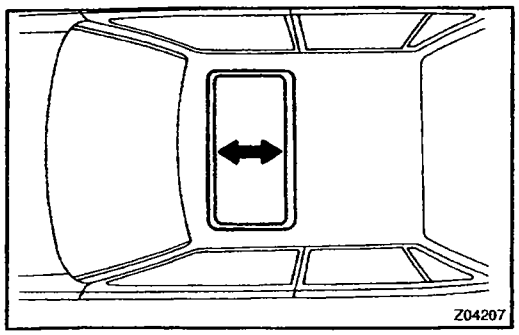
HINT:

At the time of reassembly, please refer to the following items.

- Adjust the drive cable to a closed and tilted down position.



- Slide the cable forward or backward to align the 2 marks as shown in the illustration.



BO2O2-01

ADJUSTMENT

1. ADJUST SLIDING ROOF GLASS FORWARD OR REARWARD

(a) Loosen the sliding roof glass installation bolts.

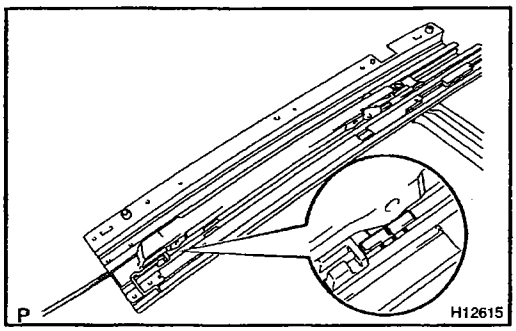
(b) Adjust the slide roof glass forward or rearward.

2. ADJUST SLIDING ROOF GLASS IN CLEARANCE (Difference in left and right clearance)

(a) When the front or rear alignment is not correct, remove the drive gear and sliding roof glass, then adjust the drive cables.

NOTICE:

Remove the drive gear with the sliding roof fully closed.



(b) Adjust by sliding the cables forward or rearward to align the 2 marks as shown in the illustration.

(c) Install the drive gear and sliding roof glass.

BO203-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–72).

INSTALLATION

Installation is in the reverse order of removal (See page BO–88).

HINT:

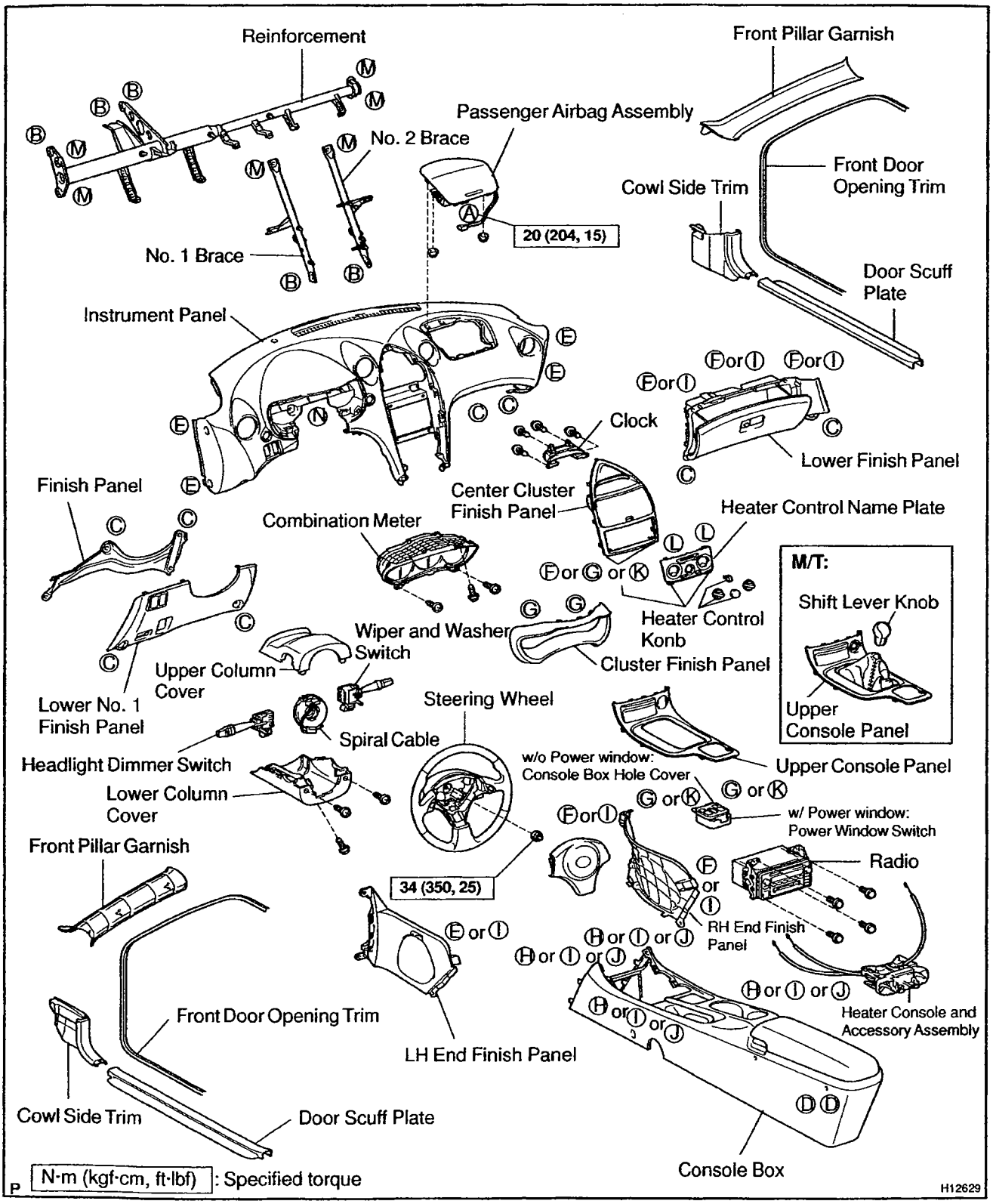
After installing the sliding roof, sliding roof need to be re–initialized.

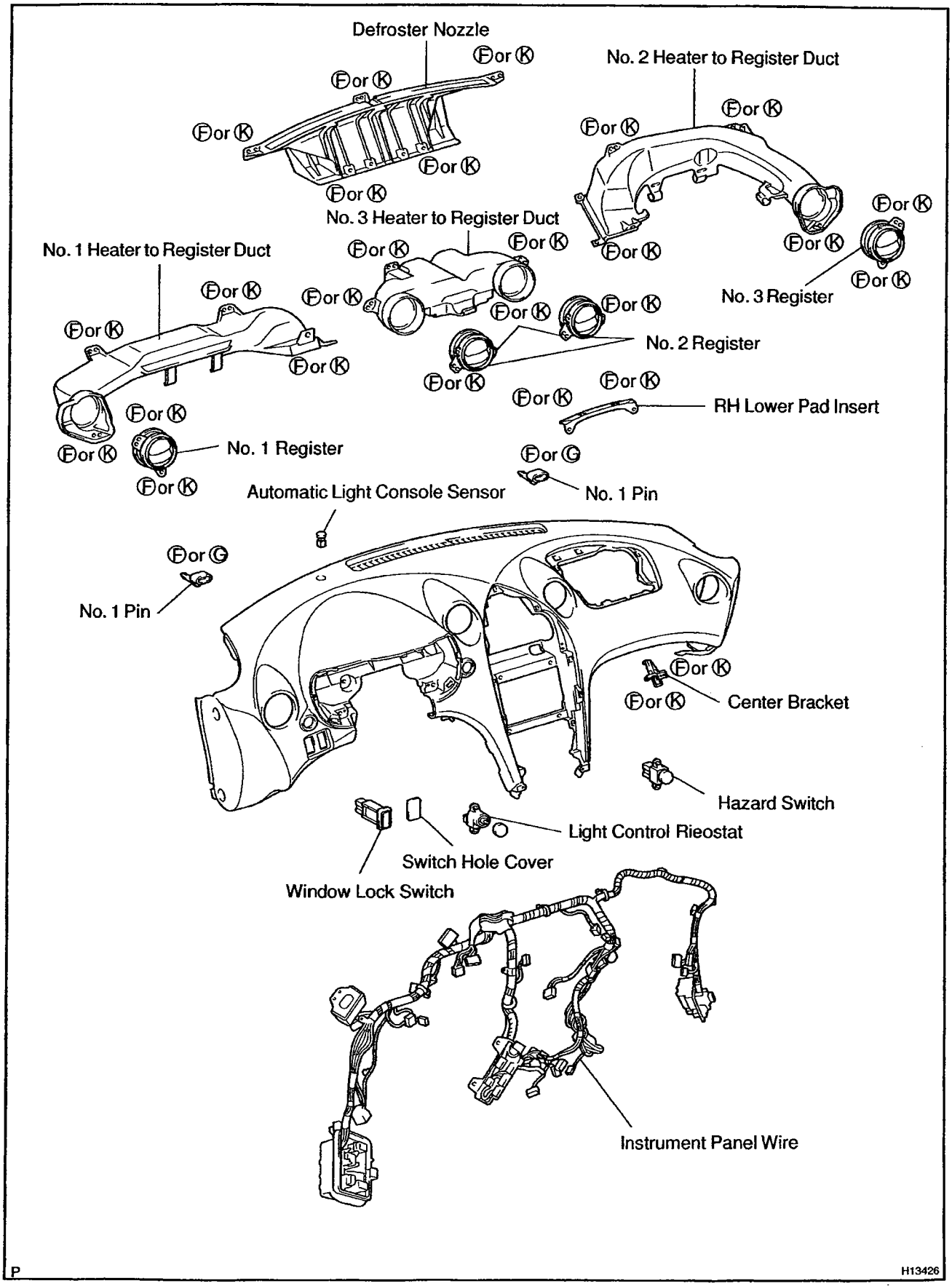
Refer to BE–84.

INSTRUMENT PANEL

COMPONENTS

BO1EV–02




Defroster Nozzle
Ⓕor Ⓚ
No. 2 Heater to Register Duct
No. 3 Heater to Register Duct
No. 1 Heater to Register Duct
No. 3 Register
No. 2 Register
RH Lower Pad Insert
No. 1 Register
Ⓕor Ⓖ
No. 1 Pin
Automatic Light Console Sensor
Center Bracket
Hazard Switch
Light Control Rieostat
Switch Hole Cover
Window Lock Switch
Instrument Panel Wire

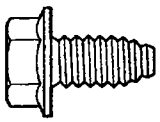
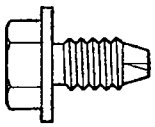
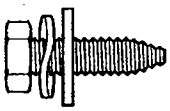
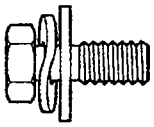
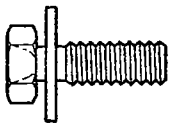
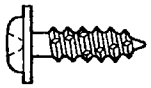
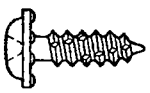
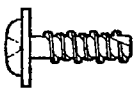
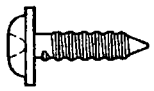
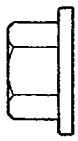
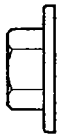
P

H13426

HINT:

Screw shapes and sizes are indicated in the table below. The codes ("A" – "N") correspond to those indicated on the previous page.

mm (in.)

	Shape	Size		Shape	Size		Shape	Size
Ⓐ		ø = 8 (0.32) L = 16 (0.63)	Ⓑ		ø = 8 (0.32) L = 15 (0.59)	Ⓒ		ø = 6 (0.24) L = 22 (0.87)
Ⓓ		ø = 6 (0.24) L = 16 (0.63)	Ⓔ		ø = 6 (0.24) L = 18 (0.71)	Ⓕ		ø = 5.22 (0.2055) L = 16 (0.63)
Ⓖ		ø =5.22 (0.2055) L = 16 (0.63)	Ⓗ		ø = 5 (0.20) L = 18 (0.71)	Ⓘ		ø = 5 (0.20) L = 16 (0.63)
Ⓙ		ø = 5 (0.20) L = 16 (0.63)	Ⓚ		ø = 5 (0.20) L = 14 (0.55)	Ⓛ		ø = 4 (0.16) L = 16 (0.63)
Ⓜ		ø = 8 (0.32)	Ⓝ		ø = 6 (0.24)			

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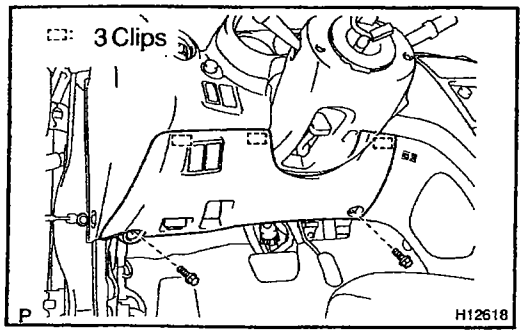
BO205-01

REMOVAL

1. **REMOVE STEERING WHEEL PAD AND STEERING WHEEL (See page SR–11)**
2. **REMOVE DOOR SCUFF PLATE**
3. **REMOVE COWL SIDE TRIM**



4. **REMOVE LOWER NO. 1 FINISH PANEL**

(a) Remove the 2 screws and hood lock release lever.

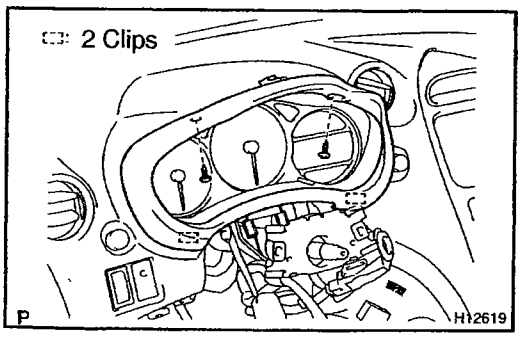
(b) Remove the 2 bolts.

(c) Using a screwdriver, remove the lower No. 1 finish panel.

HINT:

Tape the screwdriver tip before use.

5. **REMOVE FINISH PANEL**
6. **REMOVE COLUMN COVERS (See page SR–11)**
7. **REMOVE SPIRAL CABLE (See page SR–11)**
8. **REMOVE WIPER AND WASHER SWITCH AND LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH (See page SR–11)**



9. **REMOVE CLUSTER FINISH PANEL**

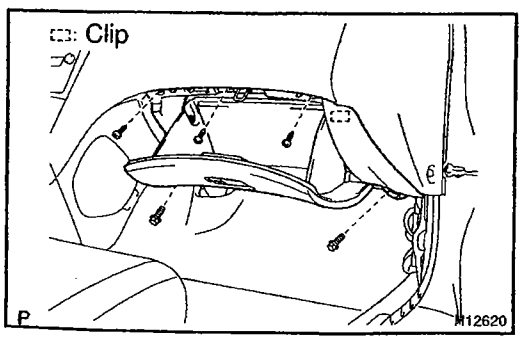
(a) Remove the 2 screws.

(b) Using a screwdriver, remove the cluster finish panel.

HINT:

Tape the screwdriver tip before use.

10. **REMOVE COMBINATION METER**



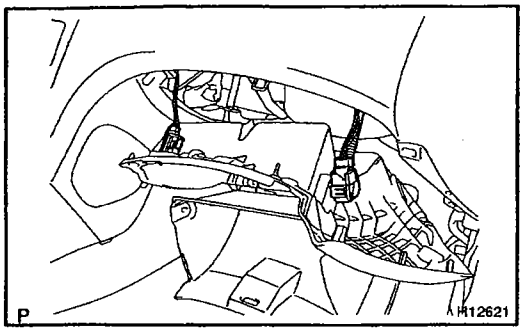
11. **REMOVE LOWER FINISH PANEL**

(a) Remove the 2 bolts and 3 screws.

(b) Using a screwdriver, disconnect the lower finish panel.

HINT:

Tape the screwdriver tip before use.



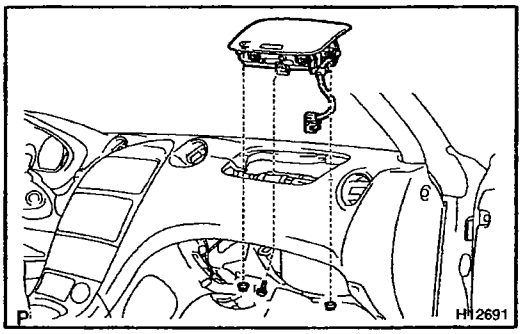
(c) Using a clip remover, disengage the airbag connector clamp.
(d) Disconnect the connector, then remove the lower finish panel.

12. DISCONNECT PASSENGER AIRBAG CONNECTOR

Disconnect the passenger airbag connector.

NOTICE:

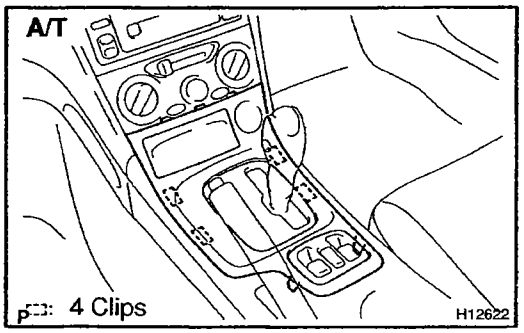
When disconnecting the airbag connector, take care not to damage the airbag wire harness.



13. REMOVE PASSENGER AIRBAG ASSEMBLY

Remove the bolt, 2 nuts, and passenger airbag assembly.

Torque:
Bolt: 20 N·m (204 kgf·cm, 15 ft·lbf)



14. REMOVE UPPER CONSOLE PANEL

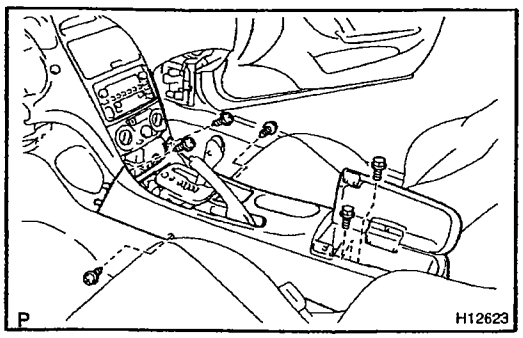
(a) M/T:
Remove the shift lever knob.
(b) Using a screwdriver, remove the upper console panel, the disconnect the connector.

HINT:

Tape the screwdriver tip before use.

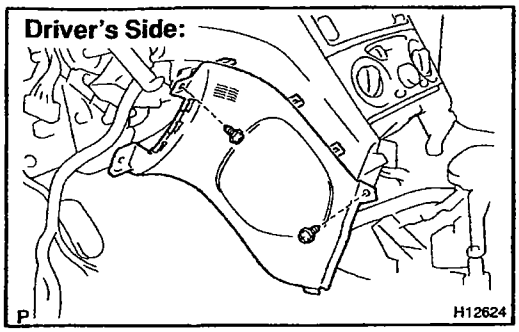
15. w/ Power window:
REMOVE POWER WINDOW CONTROL SWITCH

16. w/o Power window:
REMOVE CONSOLE BOX HOLE COVER



17. REMOVE CONSOLE BOX

(a) Remove the box bottom mat.
(b) Remove the 2 bolts, 4 screws and console box.



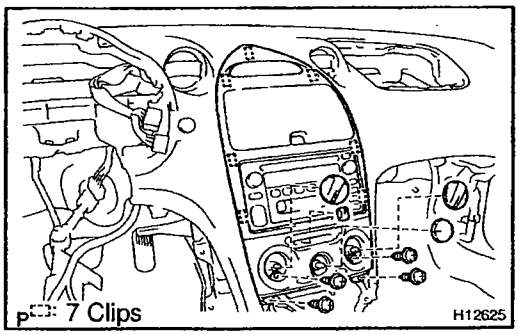
18. REMOVE END FINISH PANELS

(a) Driver's side:
Remove the 2 screws.

(b) Passenger's side:
Remove the screws.

(c) Using a screwdriver, remove the end finish panels.

HINT:
Tape the screwdriver tip before use.



19. REMOVE CENTER CLUSTER FINISH PANEL WITH HEATER CONTROL NAME PLATE

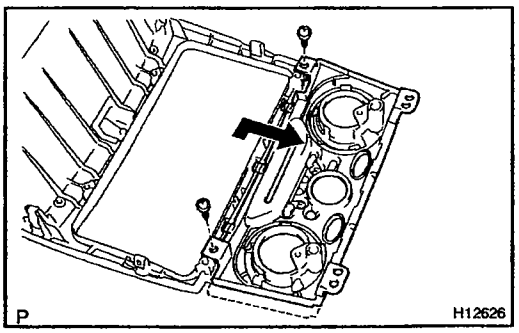
(a) Remove the heater control knobs.

(b) Remove the 4 screws.

(c) Using a screwdriver, remove the center cluster finish panel with heater control name plate, then disconnect the connector.

HINT:
Tape the screwdriver tip before use.

(d) Remove the 4 screws and clock from the center cluster finish panel.



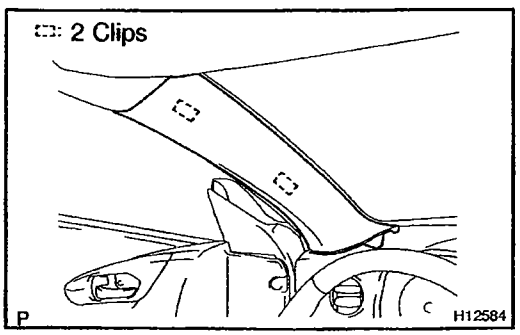
(e) Remove the 2 screws and heater control name plate from the center cluster finish panel as shown in the illustration.

20. w/ Radio:
REMOVE RADIO

21. w/o Radio:
REMOVE STEREO OPENING COVER ASSEMBLY

22. REMOVE HEATER CONTROL AND ACCESSORY ASSEMBLY (See page AC–66)

23. REMOVE STEERING COLUMN (See page SR–11)



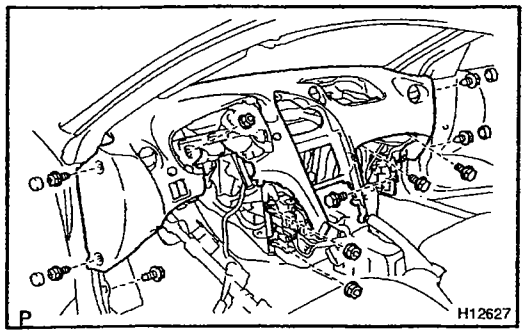
24. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

HINT:
Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

25. REMOVE FRONT DOOR OPENING TRIM



26. REMOVE INSTRUMENT PANEL

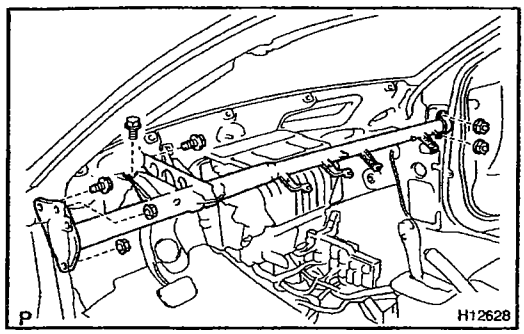
(a) Disconnect the connectors.
(b) Disengage the wire harness clamps.
(c) Remove the J/B set bolts and nuts.
(d) Using a screwdriver, remove the 4 caps.

HINT:

Tape the screwdriver tip before use.

(e) Remove the 2 bolts, nut, 4 screws and instrument panel.

27. REMOVE NO. 1 AND NO. 2 BRACE



28. REMOVE REINFORCEMENT

(a) w/ ABS:
Remove the 2 nuts and ABS ECU.
(b) Remove the 3 bolts, 4 nuts and reinforcement.

BO2O6-01

DISASSEMBLY

1. REMOVE NO. 1 PINS
2. REMOVE INSTRUMENT PANEL WIRE
3. REMOVE DEFROSTER NOZZLE
4. REMOVE NO. 1 HEATER TO REGISTER DUCT
5. REMOVE NO. 2 HEATER TO REGISTER DUCT
6. REMOVE NO. 3 HEATER TO REGISTER DUCT
7. REMOVE AUTOMATIC LIGHT CONTROL SENSOR
8. REMOVE LIGHT CONTROL RHEOSTAT
9. REMOVE HAZARD SWITCH
10. REMOVE WINDOW LOCK SWITCH
11. REMOVE SWITCH HOLE COVER
12. REMOVE NO. 1 RESISTER
13. REMOVE NO. 2 RESISTERS
14. REMOVE NO. 3 RESISTERS
15. REMOVE RH LOWER PAD INSERT
16. REMOVE CENTER BRACKET

BO207-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–83).

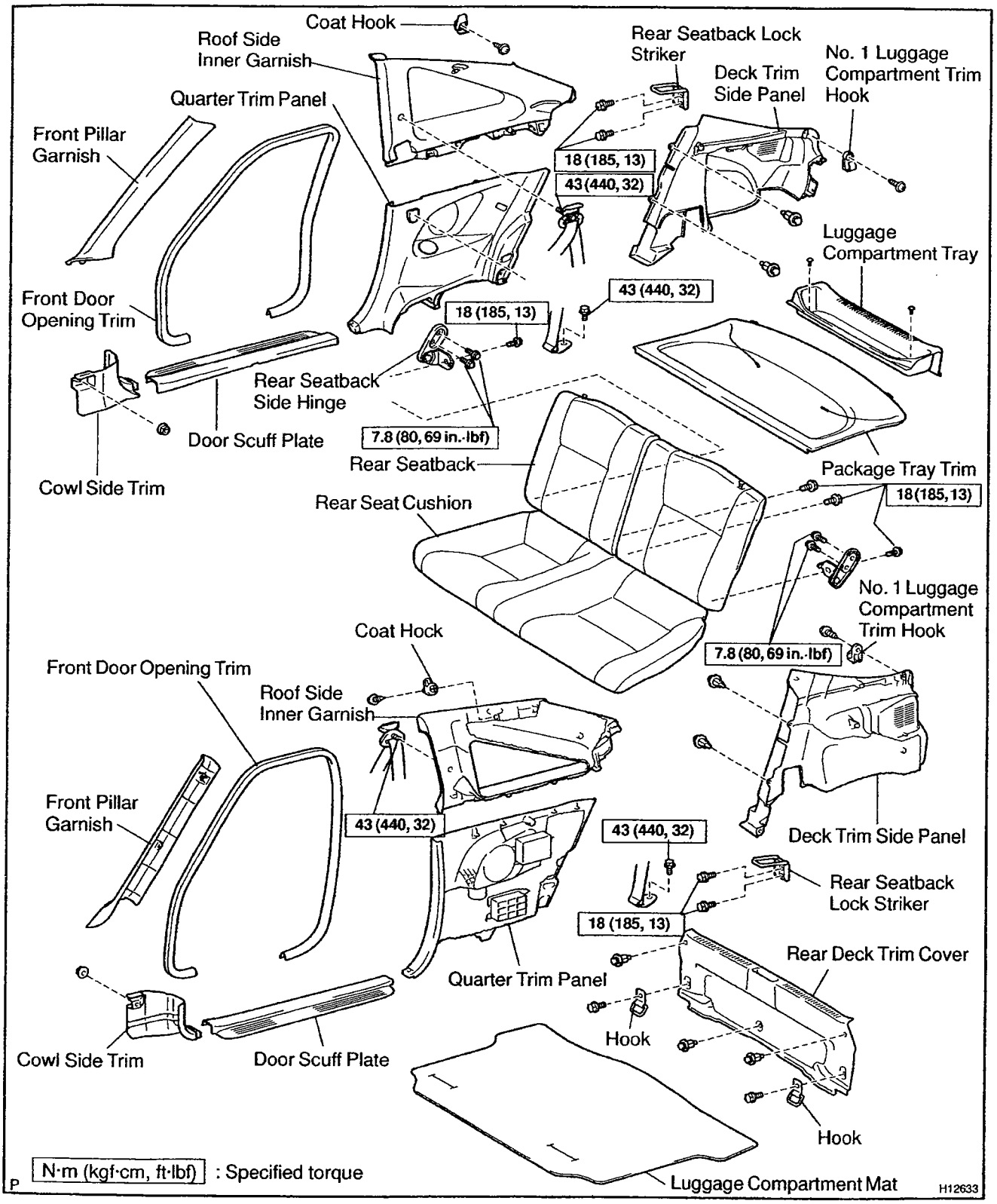
INSTALLATION

Installation is in the reverse order of removal (See page BO–79).

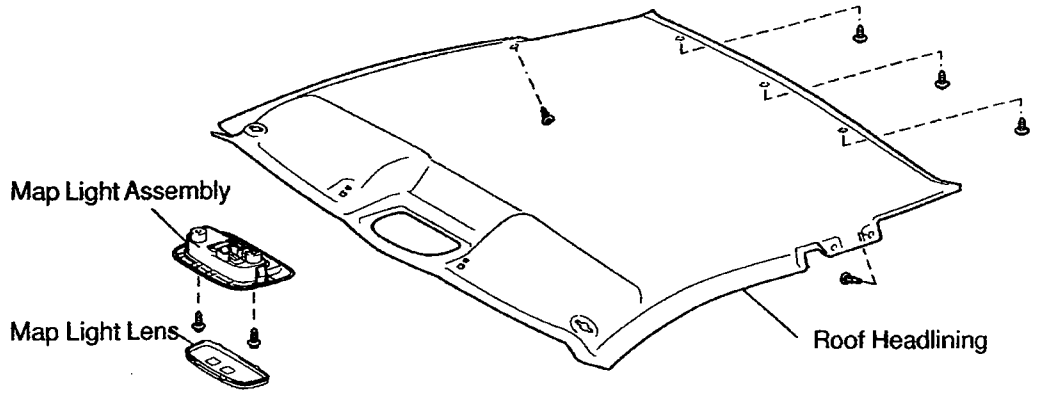
ROOF HEADLINING

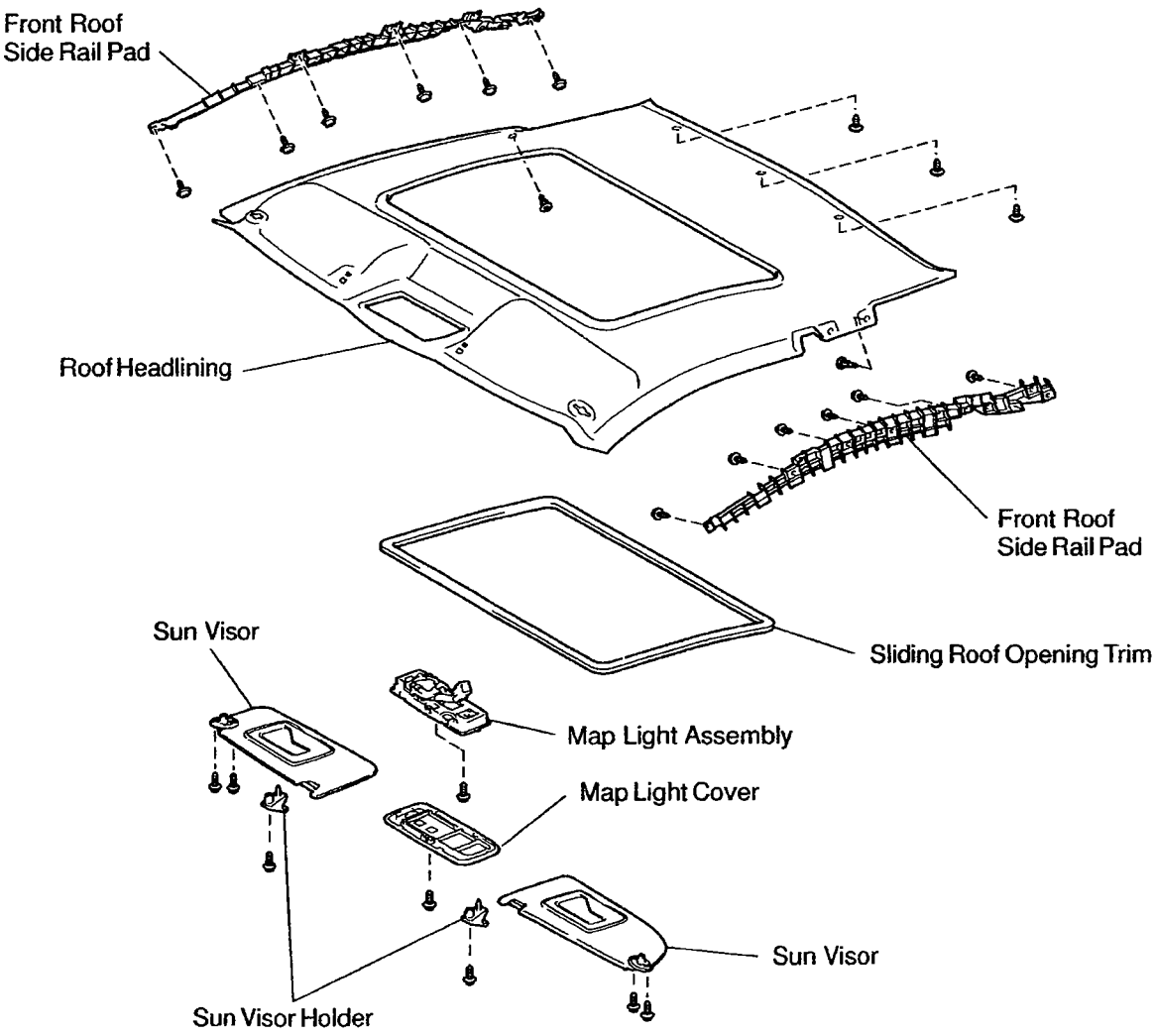
COMPONENTS

BO2O9-01



w/o Sliding roof:

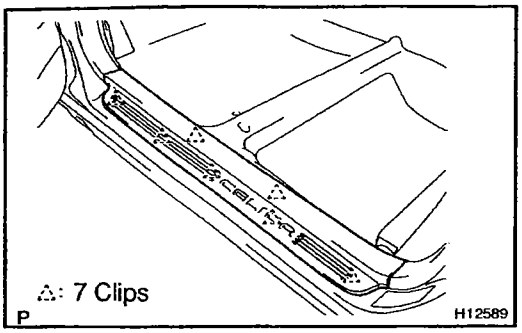




H12652

BO20A-01

REMOVAL



1. REMOVE DOOR SCUFF PLATE

(a) Using a screwdriver, remove the door scuff plate.

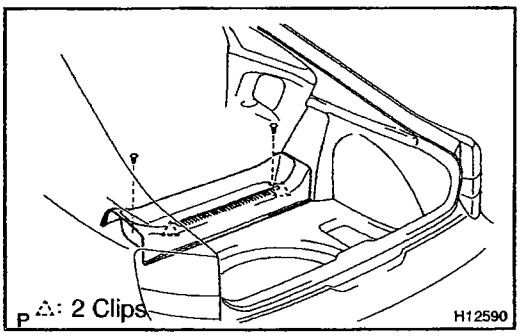
HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

2. REMOVE PACKAGE TRAY TRIM

3. REMOVE REAR SEAT (See page BO–102)



4. REMOVE LUGGAGE COMPARTMENT TRAY

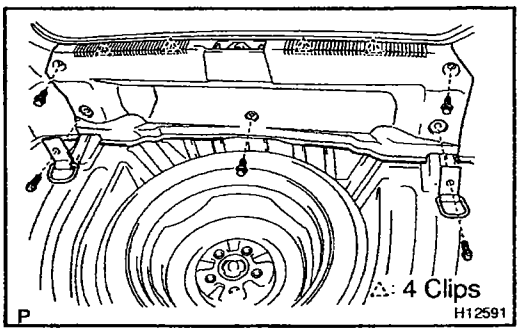
(a) Using a clip remover, remove the 2 clips.

(b) Using a screwdriver, remove the luggage compartment tray.

HINT:

Tape the screwdriver tip before use.

5. REMOVE LUGGAGE COMPARTMENT MAT



6. REMOVE REAR DECK TRIM COVER

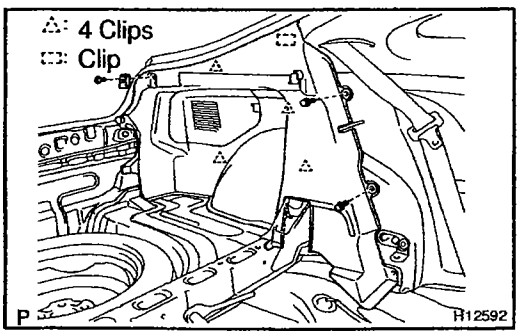
(a) Remove the 2 bolts and 2 hooks.

(b) Remove the 3 clips.

(c) Using a screwdriver, remove the rear deck trim cover.

HINT:

Tape the screwdriver tip before use.



7. REMOVE DECK TRIM SIDE PANEL

(a) Remove the screw and No. 1 luggage compartment trim hook.

(b) RH side:

Using a screwdriver, remove the rear room light, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

(c) Remove the 2 clips.

(d) Using a screwdriver, remove the deck trim side panel.

HINT:

Tape the screwdriver tip before use.

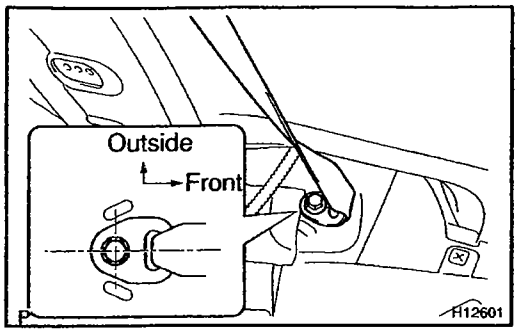
(e) Employ the same manner described above to the other side.

8. REMOVE REAR SEATBACK HINGES

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

9. REMOVE REAR SEATBACK LOCK STRIKERS

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



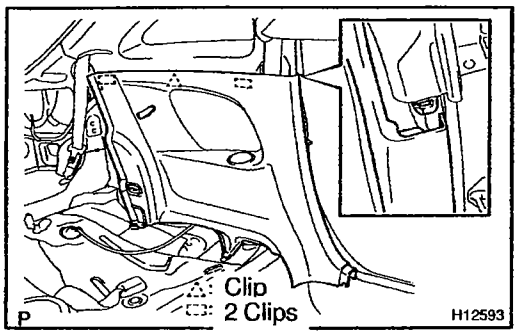
10. REMOVE REAR SEAT OUTER BELT FLOOR ANCHORS

HINT:

At the time of installation, please refer to the following item.

Install the rear seat outer belt floor anchor as shown in the illustration.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



11. REMOVE QUARTER TRIM PANEL

(a) Using a screwdriver, remove the quarter trim panel.

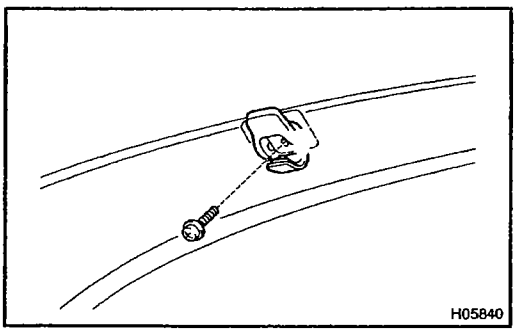
HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

12. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



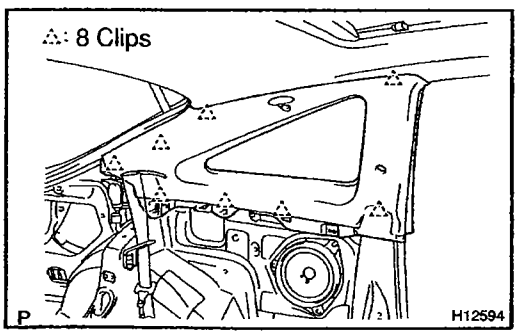
13. REMOVE ROOF SIDE INNER GARNISH

(a) Using a screwdriver, open the cap of coat hook.

HINT:

Tape the screwdriver tip before use.

(b) Remove the screw and coat hook.

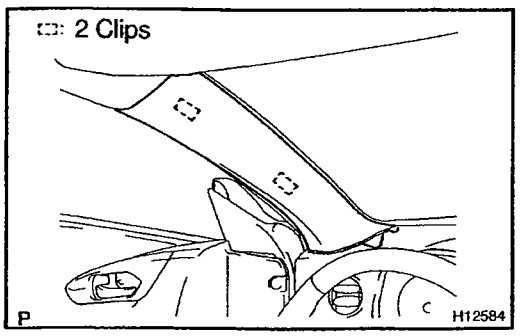


(c) Using a screwdriver, remove the roof side inner quarter.

HINT:

Tape the screwdriver tip before use.

(d) Employ the same manner described above to the other side.



14. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

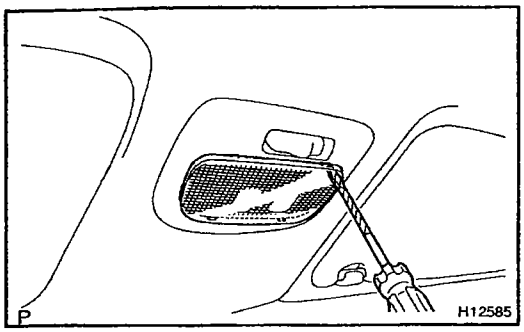
HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

15. REMOVE COWL SIDE TRIMS

16. REMOVE FRONT DOOR OPENING TRIMS



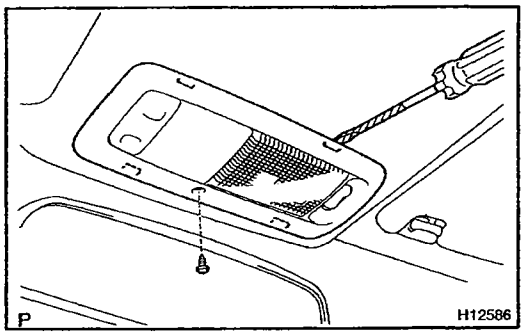
17. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a screwdriver, remove the lens.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws and map light assembly, then disconnect the connector.



18. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Remove the screw.

(b) Using a moulding remover, remove the cover.

(c) Remove the screw and map light assembly, then disconnect the connector.

19. w/ Sliding roof:
REMOVE SUN ROOF OPENING TRIM MOULDING

20. REMOVE SUN VISORS

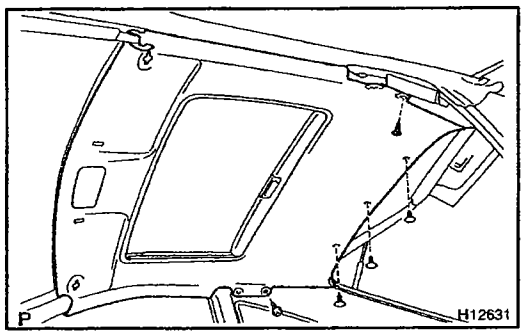
21. REMOVE SUN VISOR HOLDERS

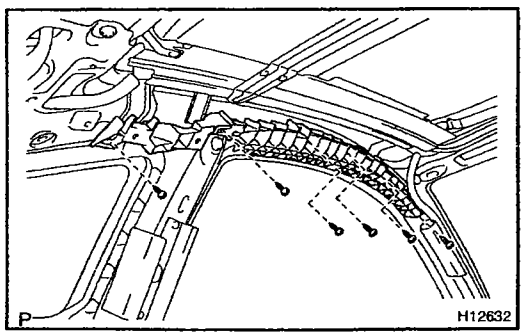
22. REMOVE ROOF HEADLINING

(a) Using a clip remover, remove the 5 clips.

(b) Remove the roof headlining.

23. REMOVE CLIP STOPPERS





24. REMOVE FRONT ROOF SIDE RAIL PAD

(a) Remove the 6 screws and front roof side rail pad.

(b) Employ the same manner described above to the other side.

BO20B-01

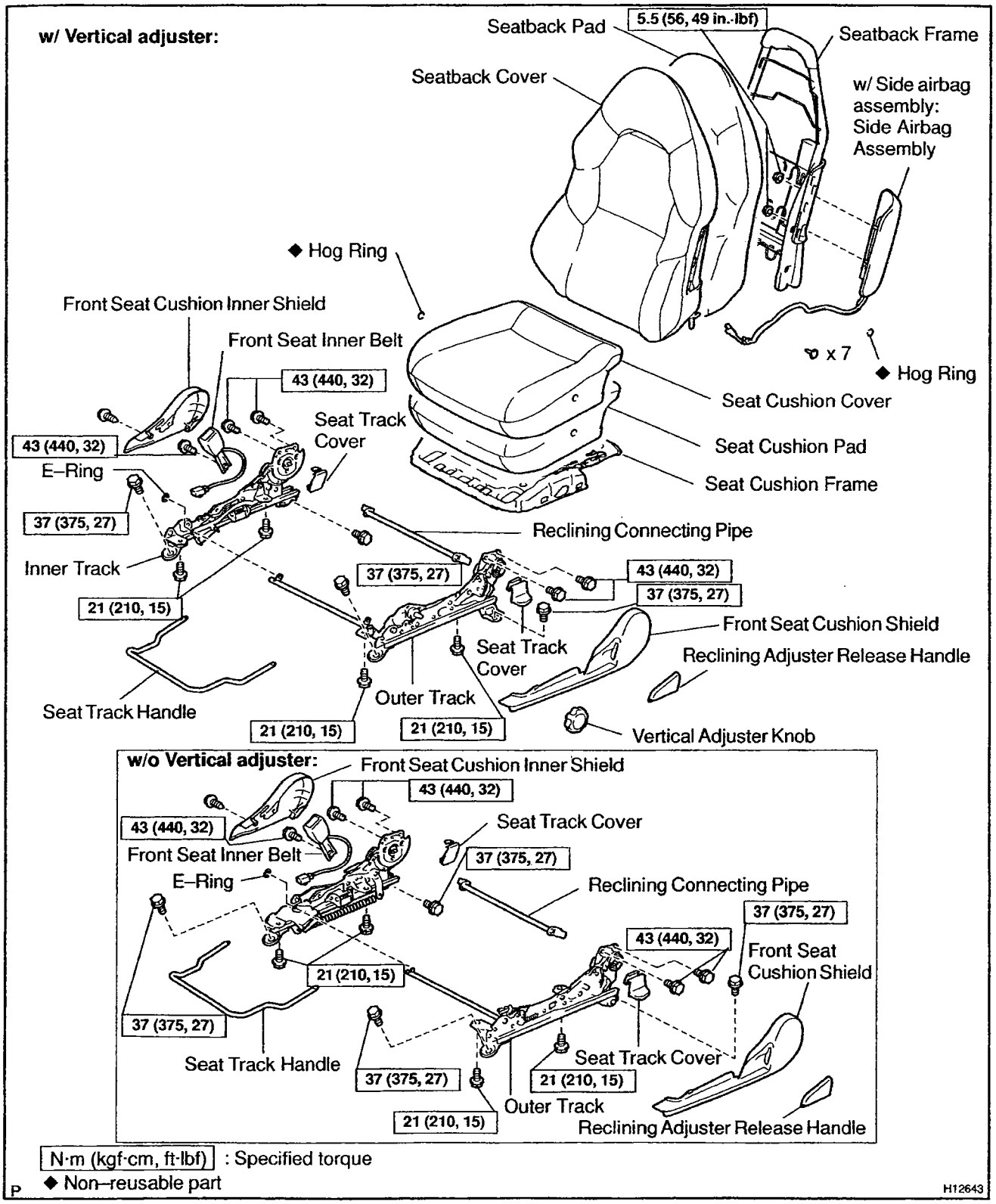
INSTALLATION

Installation is in the reverse order of removal (See page BO–88).

FRONT SEAT

COMPONENTS

BO1F6-02



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

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H12643

BO1F7-02

REMOVAL

1. REMOVE SEAT TRACK COVERS

Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdriver tip before use.

2. REMOVE FRONT SEAT

(a) Remove the 4 bolts.

(b) Disconnect the connectors.

(c) Remove the front seat.

NOTICE:

Be careful not to damage the body.

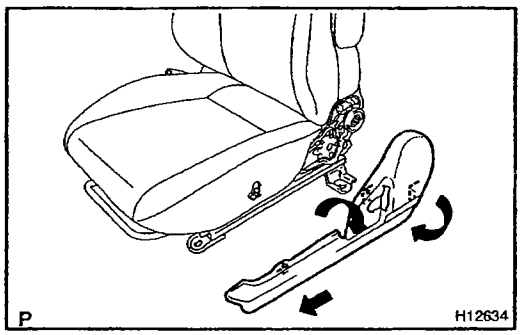
BO2OC-01

DISASSEMBLY

1. w/ Vertical adjuster:
REMOVE VERTICAL ADJUSTER KNOB

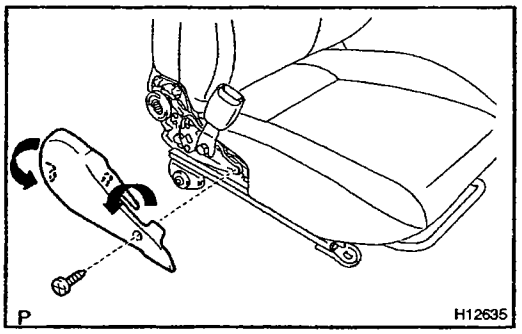
Using a screwdriver, remove the clip and vertical adjuster knob.
HINT:
Tape the screwdriver tip before use.

2. REMOVE RECLINING ADJUSTER RELEASE HANDLE



3. REMOVE FRONT SEAT CUSHION SHIELD

Remove the front seat cushion shield as shown in the illustration.

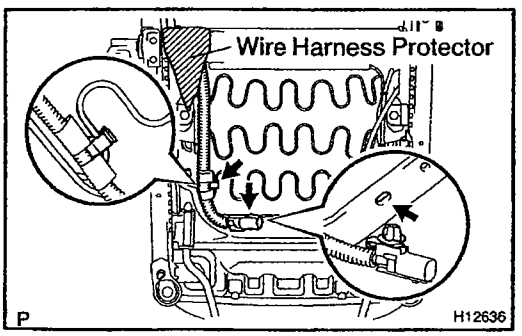


4. REMOVE FRONT SEAT CUSHION INNER SHIELD

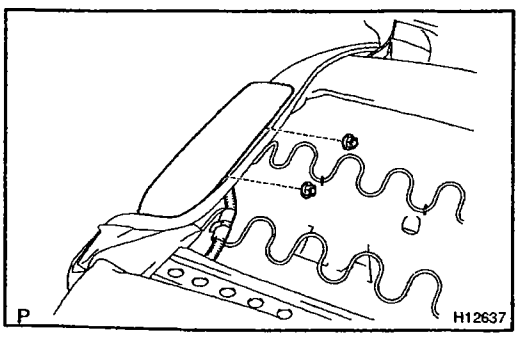
Remove the screw and front seat cushion inner shield as shown in the illustration.

5. REMOVE SEATBACK ASSEMBLY

(a) Remove the hog rings.
(b) Zip the seatback cover open.

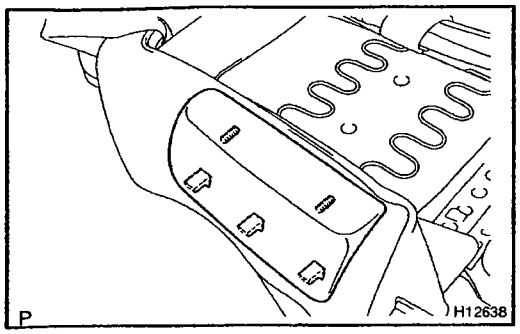


(c) w/ Side airbag assembly:
Turn over the wire harness protector as shown in the illustration.
(d) w/ Side airbag assembly:
Disengage the side airbag wire harness from the seat cushion frame.
(e) w/ Side airbag assembly:
Pull out the side airbag wire harness from the slit of seatback cover.
(f) Remove the 4 bolts and seatback assembly.



6. REMOVE SEATBACK COVER

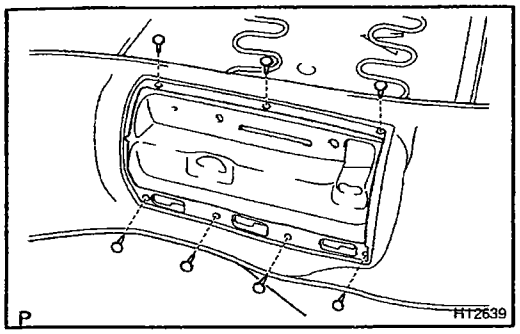
(a) w/ Side airbag assembly:
Disengage the clamp of side airbag wire harness, then remove the 2 nuts.



(b) w/ Side airbag assembly:
Remove the side airbag assembly as shown in the illustration.

CAUTION:

- **Do not store the side airbag assembly with the airbag deployment side facing down.**
- **Never disassemble the side airbag assembly.**



(c) w/ Side airbag assembly:
Using a clip remover, remove the 7 clips.
(d) Remove the seatback frame.
(e) Remove the seatback cover from the seatback cushion.

7. REMOVE FRONT SEAT INNER BELT

8. REMOVE SEAT CUSHION ASSEMBLY

(a) Remove the 4 bolts and seat cushion assembly.
(b) Remove the hog rings.
(c) Disengage the seat cushion cover hooks and remove the seat cushion frame.
(d) Remove the seat cushion cover from the seat cushion pad.

9. REMOVE SEAT TRACK HANDLE

Using a screwdriver, remove the seat track handle.
HINT:
Tape the screwdriver tip before use.

10. REMOVE RECLINING CONNECTING PIPE

11. DISASSEMBLE OUTER AND INNER TRACK

(a) Using a screwdriver, remove the E–ring.
(b) Disassemble the outer track and inner track.

BO1F9-02

INSPECTION

INSPECT RECLINING LOCK POSITION AND SLIDING LOCK POSITION SLIPPING OFF

(a) When reclining the seat, inspect that the outer and inner recliners are released at the same time.

HINT:

When the reclining lock position slips off, disassemble the seat to adjust the position.

(b) When sliding the seat, inspect that the outer and inner tracks are locked at the same time.

HINT:

When sliding lock positions slip off, loosen the bolts to adjust the position.

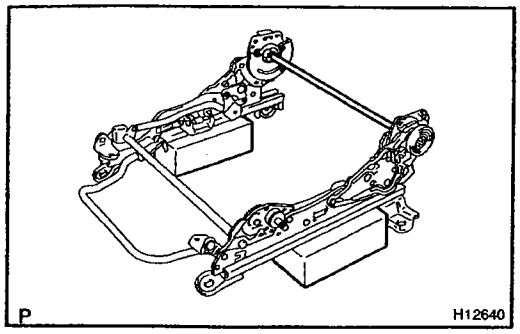
BO200-01

REASSEMBLY

1. ASSEMBLE OUTER TRACK AND INNER TRACK

Assemble the outer track and inner track with a new E–ring.

2. INSTALL SEAT TRACK HANDLE



3. INSTALL RECLINING CONNECTING PIPE

(a) Adjust the reclining lock positions of the seat adjusters.

(b) Slide the seat adjusters to the most front position.

(c) Place the adjusters on a spacer to adjust the seat rail in parallel and install the connecting pipe.

HINT:

When installing the connecting pipe while raising up the adjusters, the lock position adjusted in 3–(a) may become detached. When this happens, a lock error will occur.

4. INSTALL SEAT CUSHION ASSEMBLY

(a) Install the seat cushion cover to the seat cushion pad with new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as much as possible.

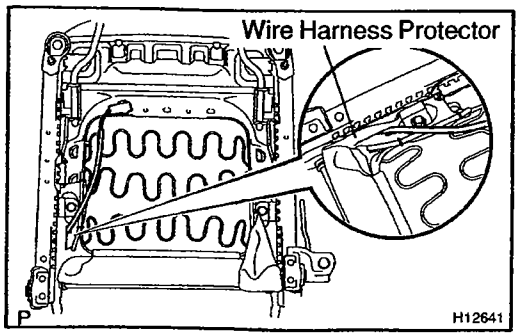
(b) Install the seat cushion frame to the seat cushion cover with pad.

(c) Engage the seat cushion hooks and install new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as much as possible.

(d) Install the seat cushion assembly with the 4 bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



5. INSTALL FRONT SEAT INNER BELT

(a) Pass the wire harness of front seat inner belt through the wire harness protector of seat cushion assembly and install the front seat inner belt.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Install the front seat inner belt wire harness to the seat cushion frame.

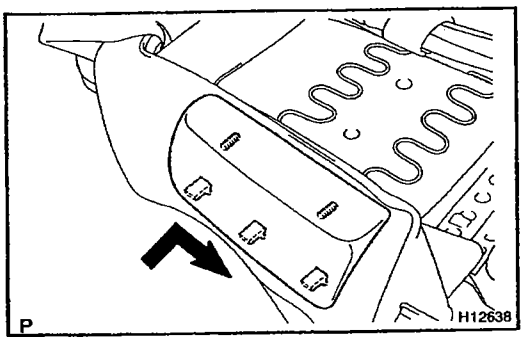
6. INSTALL SEATBACK COVER

(a) Install the seatback cover to the seat cushion pad with new hog rings.

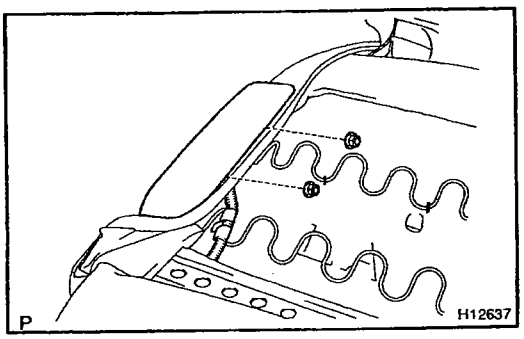
HINT:
When installing the hog rings, take care to prevent wrinkles as much as possible.

(b) Install the seatback frame to the seatback cover with pad.

(c) w/ Side airbag assembly:
Install the 7 clips.



(d) w/ Side airbag assembly:
Install the side airbag assembly as shown in the illustration.



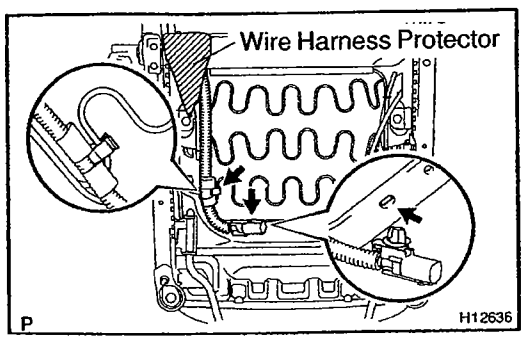
(e) w/ Side airbag assembly:
Install the 2 nuts, then engage the clamp of side airbag wire harness.
Torque:5.5 N·m (56 kgf·cm, 49 in.·lbf)

7. INSTALL SEATBACK ASSEMBLY

(a) Install the seatback assembly with the 4 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) w/ Side airbag assembly:
Insert the side airbag wire harness into the slit of seatback cover.

(c) w/ Side airbag assembly:
Engage the side airbag wire harness to the seat cushion frame.



(d) w/ Side airbag assembly:
Replace the wire harness protector as shown in the illustration.

(e) Zip the seatback cover closed.

(f) Install new hog rings.

HINT:
When installing the hog rings, take care to prevent wrinkles as much as possible.

8. INSTALL FRONT SEAT INNER SHIELD
9. INSTALL FRONT SEAT CUSHION SHIELD
10. INSTALL RECLINING ADJUSTER RELEASE HANDLE
11. w/ Vertical adjuster:
    INSTALL VERTICAL ADJUSTER KNOB

BO1FB-02

INSTALLATION

INSTALL FRONT SEAT

(a) Mount the front seat to the vehicle.

NOTICE:

Be careful not to damage the body.

(b) Connect the connectors.

(c) Slide the front seat to the most front position.

(d) Tighten the bolts on the rear side temporarily, starting from the bolt on the inner side tighten them completely.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

(e) Slide the seat to the most rear position to install the bolts on the front side.

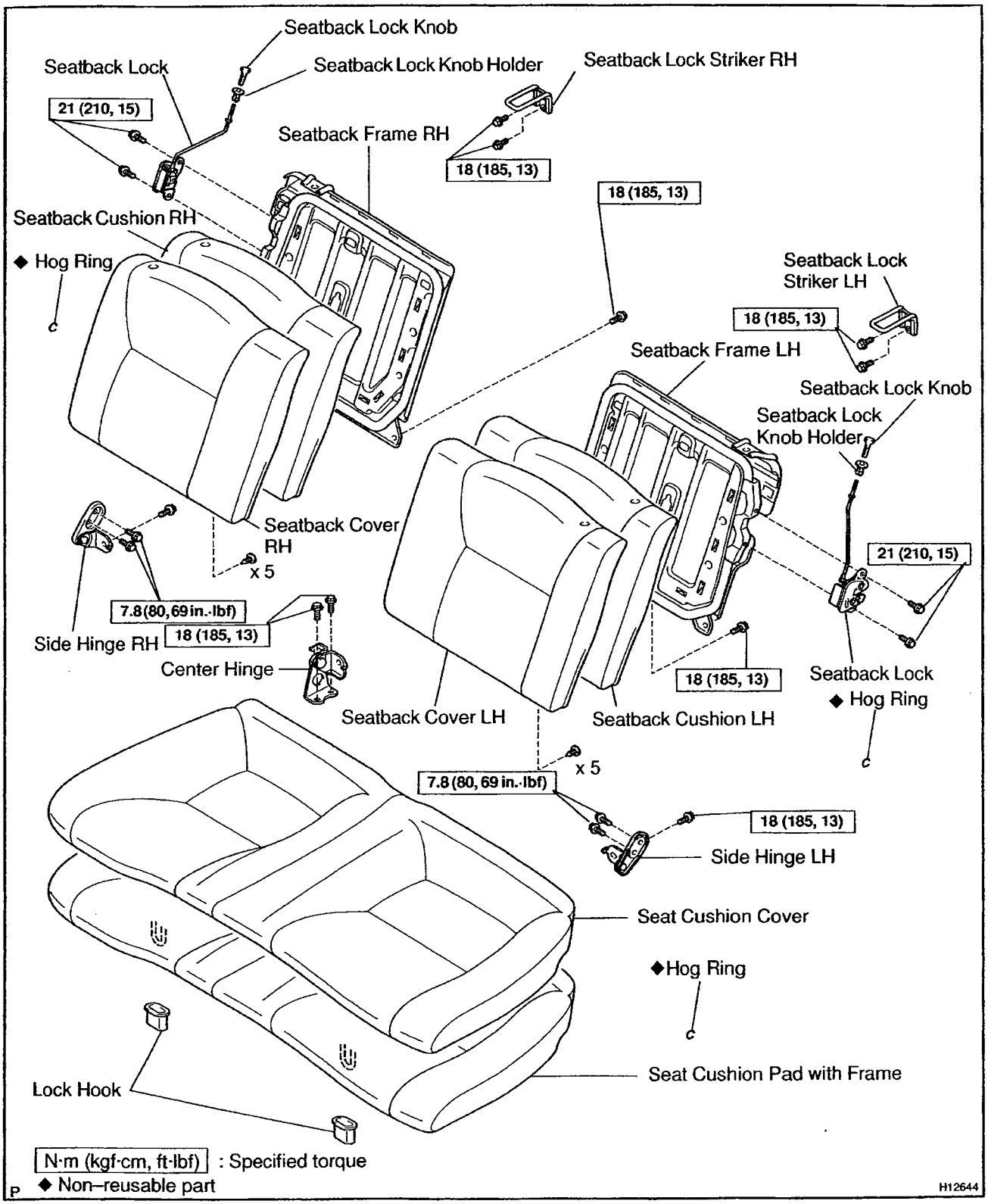
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

(f) Install the seat track covers.

REAR SEAT

COMPONENTS

BO1FC-02



BO1FD-02

REMOVAL

1. **REMOVE SEATBACK ASSEMBLY LH AND RH**

(a) Release the seatback assembly LH and RH.

(b) Remove the 4 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Remove the seatback assembly LH and RH.

2. **REMOVE SEAT CUSHION ASSEMBLY**

3. **REMOVE SIDE HINGE LH AND RH**

Torque: 7.8 N·m (80 kgf·cm, 69 ft·lbf)

4. **REMOVE CENTER HINGE**

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

5. **REMOVE SEATBACK LOCK STRIKER (See page BO–88)**

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

B01FE-02

DISASSEMBLY

1. REMOVE SEATBACK LOCK KNOBS

2. REMOVE SEATBACK LOCK KNOB HOLDERS

3. REMOVE SEATBACK FRAME

(a) Using a clip remover, remove the 5 clips.

(b) Turn over the seatback cover, then remove the hog rings.

(c) Remove the seatback frame from the seatback cover with pad.

(d) Employ the same manner described above to the other side.

4. REMOVE SEATBACK LOCK

(a) Remove the 2 bolts and seatback lock.

(b) Employ the same manner described above to the other side.

5. REMOVE SEATBACK COVER

(a) Remove the hog rings and seatback cover from the seatback pad.

(b) Employ the same manner described above to the other side.

6. REMOVE SEATBACK CUSHION COVER

Remove the hog rings and seat cushion cover from the seat cushion frame with pad.

BO1FF-02

REASSEMBLY

1. INSTALL SEAT CUSHION COVER

Install the seat cushion cover with new hog ring to the seat cushion frame with pad.

HINT:

When installing hog rings, take care to prevent wrinkles as little as possible.

2. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog ring to the seatback pad.

HINT:

When installing hog rings, take care to prevent wrinkles as little as possible.

(b) Employ the same manner described above to the other side.

3. INSTALL SEATBACK LOCKS

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

4. INSTALL SEATBACK FRAME

(a) Install the seatback frame to the seatback cover with pad.

(b) Install new hog rings.

HINT:

When installing hog rings, take care to prevent wrinkles as little as possible.

(c) Install the 5 clips.

(d) Employ the same manner described above to the other side.

5. INSTALL SEATBACK LOCK KNOB HOLDERS

6. INSTALL SEATBACK LOCK KNOB

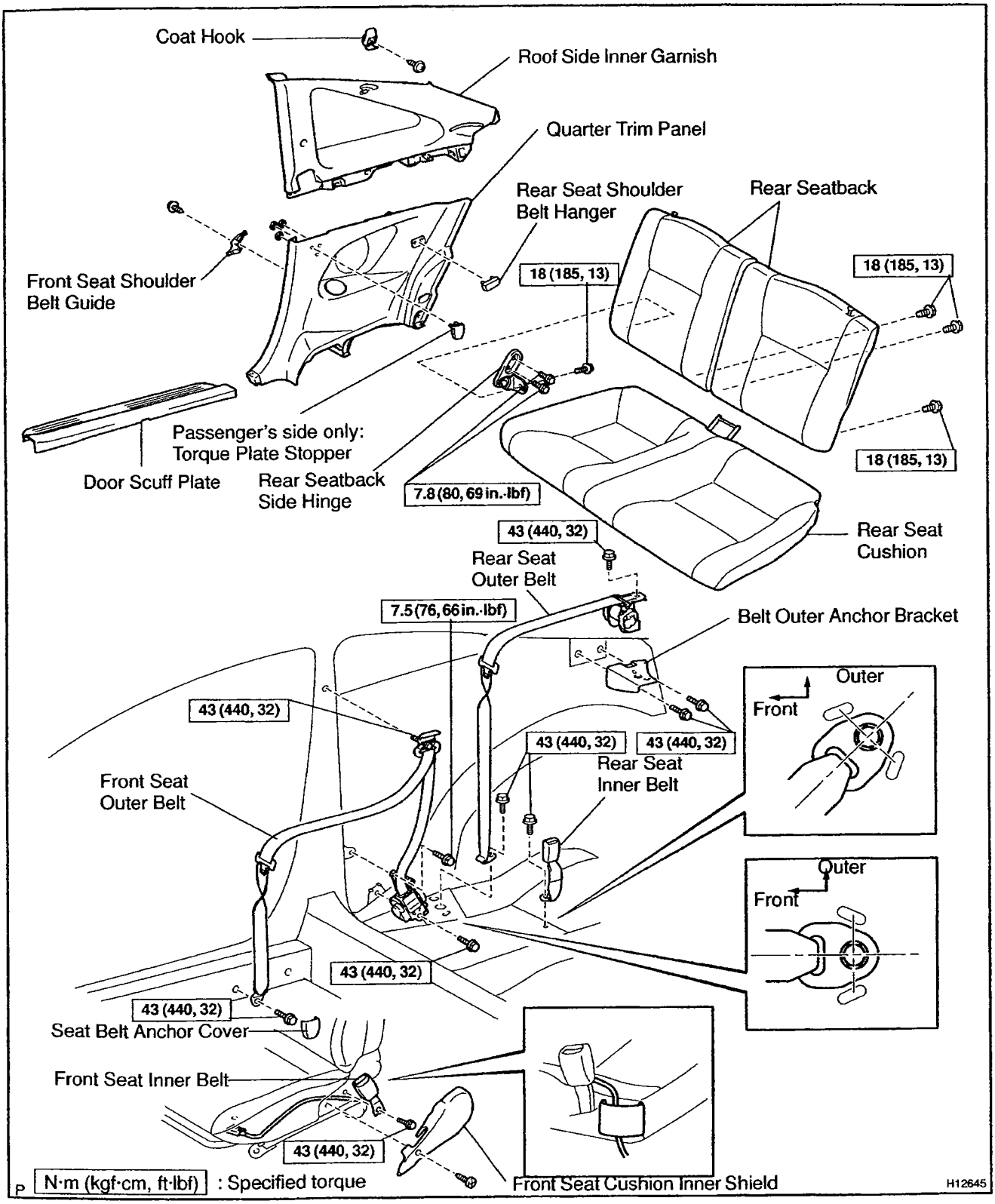
INSTALLATION

Installation is in the reverse order of removal (See page BO–102).

SEAT BELT

COMPONENTS

BO1RH-02



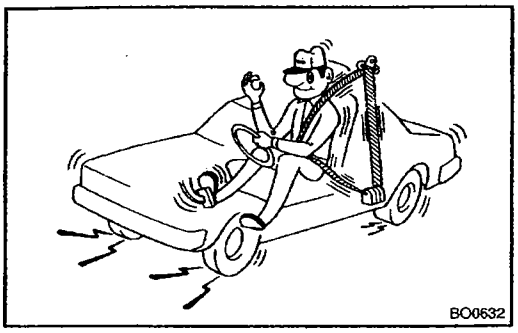
801FI-02

INSPECTION

CAUTION:
Replace the seat belt assembly (outer belt, inner belt, bolts, nuts or sill–bar) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

1. RUNNING TEST (IN SAFE AREA)

(a) Fasten the front seat belts.

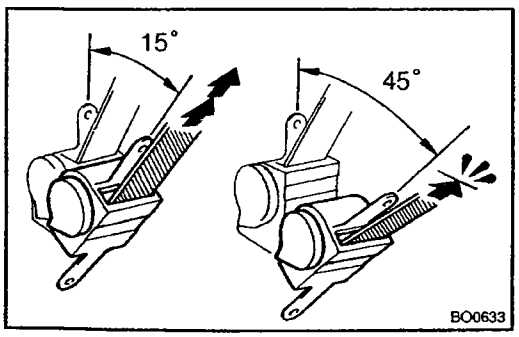

BO0632

(b) Drive the car at 10 mph (16 km/h) and slam on the brakes. Check that the belt locks and cannot be extended at this time.

HINT:
Conduct this test in a safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly, verify the proper operation before installation.

2. Driver's Seat Belt (ELR):
STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.
(b) Remove the locking retractor assembly.
(c) Tilt the retractor slowly.



BO0633

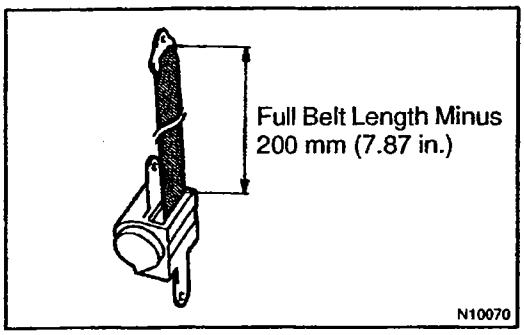
(d) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out over 45 degrees of tilt.

If a problem is found, replace the assembly.

3. Except Driver's Seat Belt (ELR/ALR):
STATIC TEST

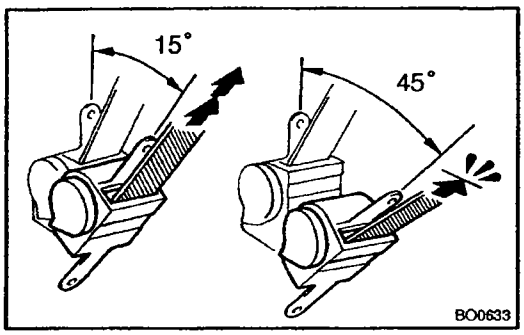
(a) Make sure that the belt locks when pulled out quickly.
(b) Remove the locking retractor assembly.
(c) Pull out the whole belt and measure the length of the whole belt.
Then retract the belt slightly and pull it out again.
(d) Make sure that the belt cannot be extended further.

If a problem is found, replace the assembly.



(e) Retract the whole belt, then pull out the belt until 200 mm (7.87 in.)of belt remains retracted.

(f) Tilt the retractor slowly.



(g) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.

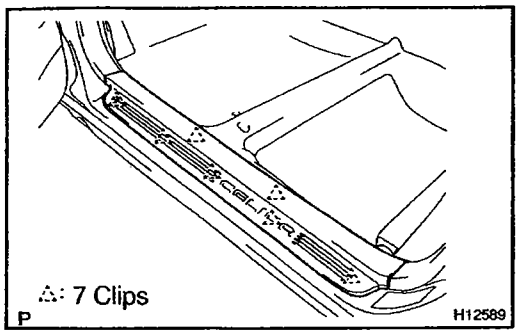
SEAT BELT PRETENSIONER

BO2OE-01

REMOVAL

NOTICE:

- **If the wiring connector of the seat belt pretensioner is disconnected with the ignition switch at ON diagnostic trouble codes will be recorded.**
- **Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.**



1. REMOVE DOOR SCUFF PLATE

Using a screwdriver, remove the door scuff plate.

HINT:

Tape the screwdriver tip before use.

2. REMOVE PACKAGE TRAY TRIM

3. REMOVE REAR SEAT (See page BO–102)

4. REMOVE LUGGAGE COMPARTMENT TRAY

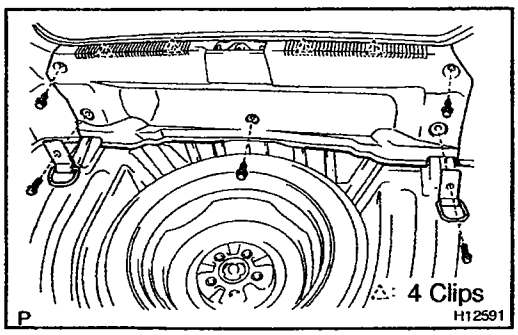
(a) Using a clip remover, remove the 2 clips.

(b) Using a screwdriver, remove the luggage compartment tray.

HINT:

Tape the screwdriver tip before use.

5. REMOVE LUGGAGE COMPARTMENT MAT



6. REMOVE REAR DECK TRIM COVER

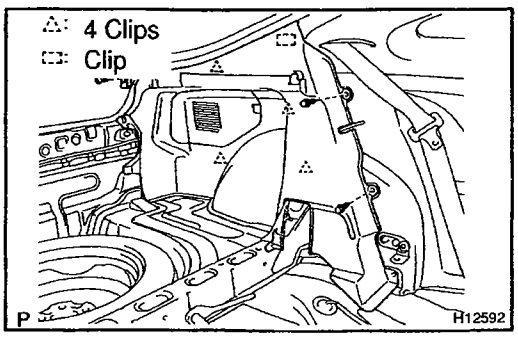
(a) Remove the 2 bolts and 2 hooks.

(b) Remove the 3 clips.

(c) Using a screwdriver, remove the rear deck trim cover.

HINT:

Tape the screwdriver tip before use.



7. REMOVE DECK TRIM SIDE PANEL

(a) Remove the screw and No. 1 luggage compartment trim hook.

(b) RH side:

Using a screwdriver, remove the rear room light, then disconnect the connector.

HINT:

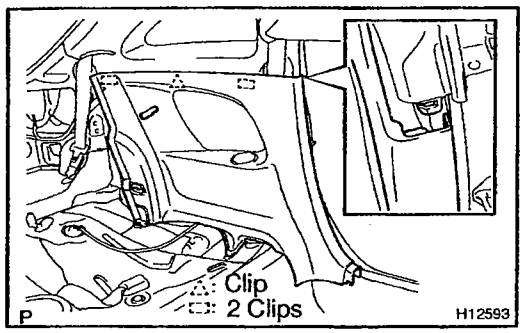
Tape the screwdriver tip before use.

(c) Remove the 2 clips.
(d) Using a screwdriver, remove the deck trim side panel.
HINT:
Tape the screwdriver tip before use.

8. REMOVE REAR SEATBACK HINGE

9. REMOVE REAR SEATBACK LOCK STRIKER

10. REMOVE REAR SEAT OUTER BELT FLOOR ANCHORS



11. REMOVE QUARTER TRIM PANEL

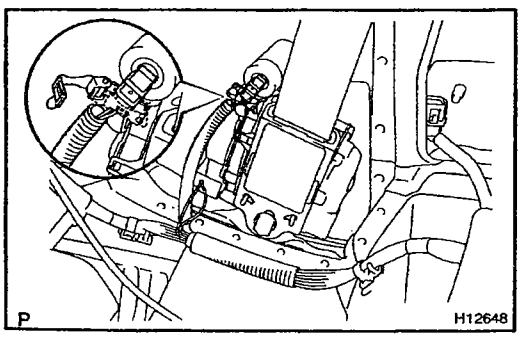
Using a screwdriver, remove the quarter trim panel.
HINT:
Tape the screwdriver tip before use.

12. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR

13. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHOR

14. REMOVE RETRACTOR OF FRONT SEAT OUTER BELT

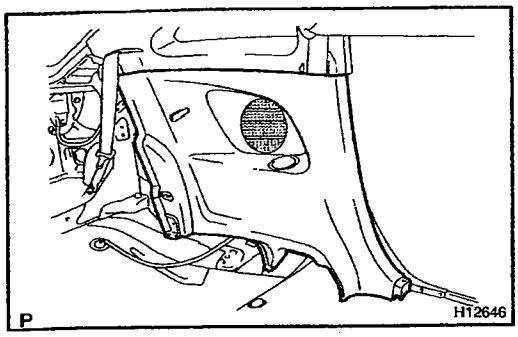
CAUTION:
Never disassemble the front seat outer belt.
NOTICE:
When removing the retractor of front seat outer belt, take care not to pull the seat belt pretensioner wire harness.



(a) Disconnect the pretensioner connector as shown in the illustration.

CAUTION:
When removing the seat belt pretensioner, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

(b) Disconnect the connector.
(c) Remove the 2 bolts and retractor of front seat outer belt.



INSPECTION

1. PRETENSIONER IS NOT ACTIVATED

(a) Perform a diagnostic system check (See page DI–326).

(b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.

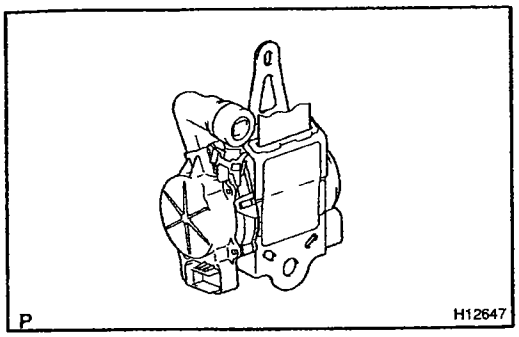
- Check for cuts and cracks in, or marked discoloration on the quarter trim panel.
- Check for cuts and cracks in wire harness, and for chipping in connectors.
- Check for deformation of the quarter panel.

CAUTION:

For removal and installation of the front seat outer belt, see page BO–109 and BO–118.

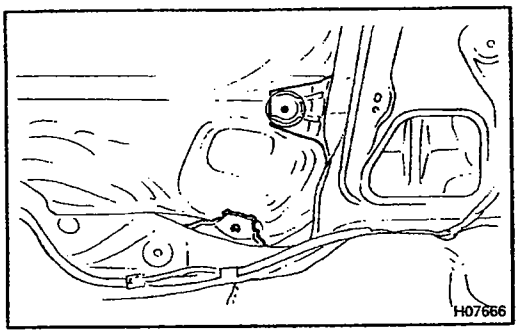
2. PRETENSIONER IS ACTIVATED

(a) Perform a diagnostic system check (See page DI–326).



(b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.

- Check for deformation of the quarter panel.
- Check for damage on the connector and wire harness.

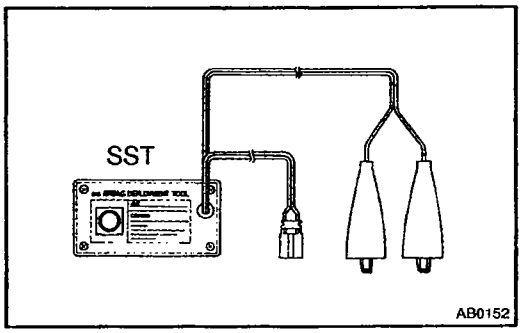


BO20G-01

DISPOSAL

HINT:

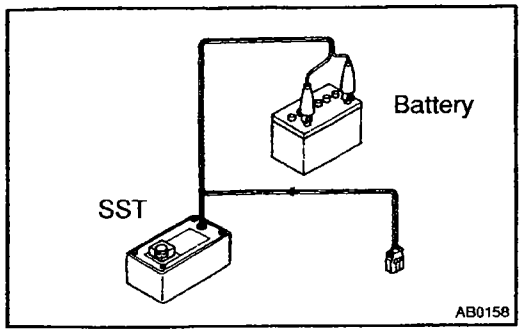
When scrapping vehicles equipped with a seat belt pretensioner or disposing of a front seat outer belt (with seat belt pretensioner) always first activate the seat belt pretensioner in accordance with the procedure described below. If any abnormality occurs in the seat belt pretensioner operation, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A.,INC. When disposing of a front seat outer belt (with seat belt pretensioner) activated in a collision, follow the same procedure given in step 1–(e) in "DISPOSAL".



CAUTION:

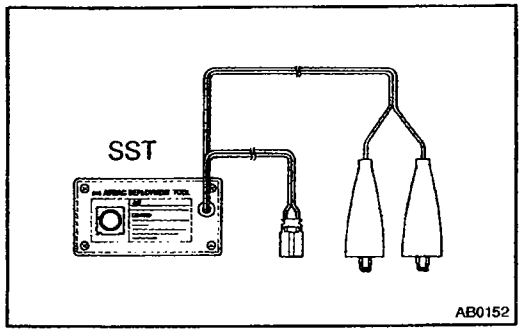
- **Never dispose of front seat outer belt which has an inactivated pretensioner.**
- **The seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation out–of–door and where it will not create a nuisance to nearby residents.**
- **When activating the seat belt pretensioner, always use the specified SST. (SRS Airbag Deployment Tool) Perform the operation in a place away from electrical noise.**

  SST 09082–00700, 09082–00740
- **When activating a front seat outer belt (with seat belt pretensioner), perform the operation at least 10 m (33 ft) away from the front seat outer belt.**
- **Use gloves and safety glasses when handling a front seat outer belt with activated pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with activated pretensioner.**



1. SEAT BELT PRETENSIONER ACTIVATION WHEN SCRAPPING VEHICLE

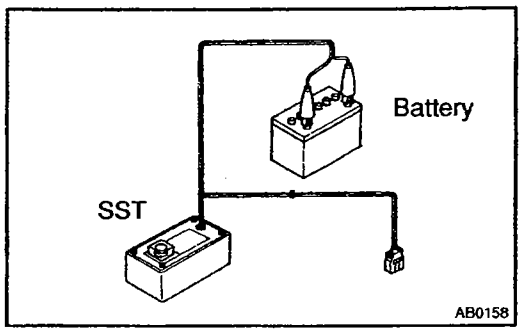
HINT:
Have a battery ready as the power source to activate the seat belt pretensioner.



(a) Check functioning of SST.

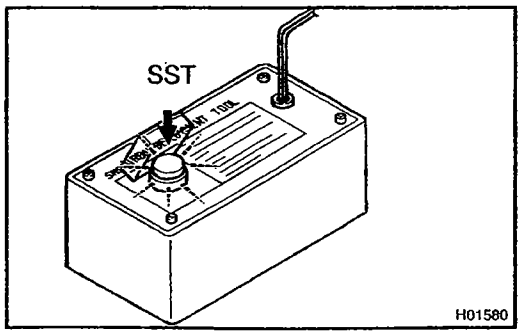
CAUTION:
When activating the seat belt pretensioner, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082–00700, 09082–00740



(1) Connect the SST to the battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

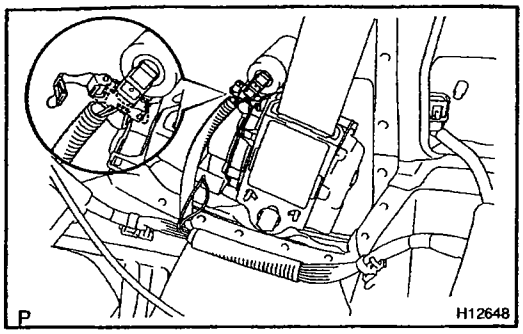
HINT:
Do not connect the yellow connector which will be connected with the seat belt pretensioner.



(2) Check functioning of SST.
Press the SST activation switch, and check the LED of the SST activation switch lights up.

CAUTION:
If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

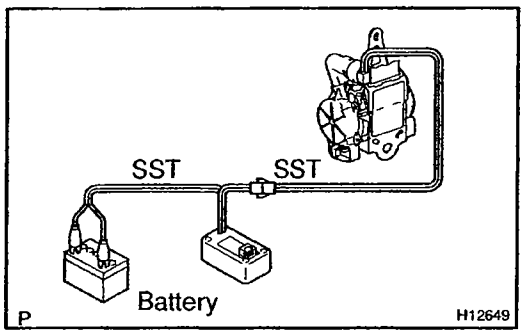
(b) Disconnect the pretensioner connector.
(1) Remove the door scuff plate.
(2) Remove the package tray trim.
(3) Remove the rear seat (See page BO–102).
(4) Remove the luggage compartment trim.
(5) Remove the luggage compartment mat.
(6) Remove the rear deck trim cover.
(7) Remove the deck trim side panel.
(8) Remove the seatback hinge.
(9) Remove the seatback lock striker.
(10) Remove the rear seat outer belt floor anchor.
(11) Remove the quarter trim panel.



(12) Disconnect the pretensioner connector as shown in the illustration.

(c) Install the SST.

(1) Buckle the front seat belt and check that there is no looseness and slack in the front seat inner belt and front seat outer belt.

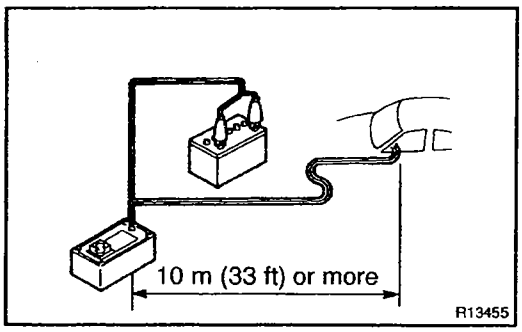


(2) Connect the 2 SST, then connect them to the seat belt pretensioner.

SST 09082–00700, 09082–00740

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.

(4) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (–) terminal.

(d) Activate the seat belt pretensioner.

(1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around of the vehicle.

(2) Press the SST activation switch and activate the seat belt pretensioner.

HINT:

The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.

(e) Dispose of front seat outer belt (with seat belt pretensioner).

CAUTION:

- **The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a front seat outer belt with activated seat belt pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with activated seat belt pretensioner.**

HINT:
When scrapping a vehicle, activate the seat belt pretensioner and scrap the vehicle with activated front seat outer belt still installed.

2. ACTIVATION WHEN DISPOSING OF FRONT SEAT OUTER BELT ONLY

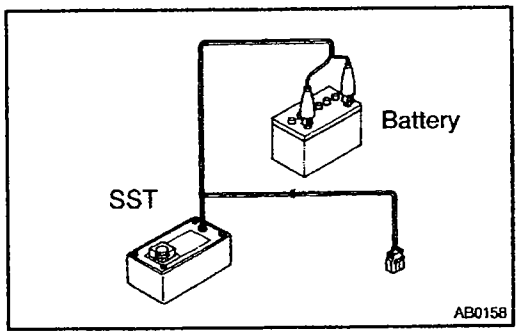
NOTICE:

- **When disposing of the front seat outer belt (with seat belt pretensioner) only, never use the customer's vehicle to activate the seat belt pretensioner.**
- **Be sure to follow the procedure given on the next page when activating the seat belt pretensioner.**

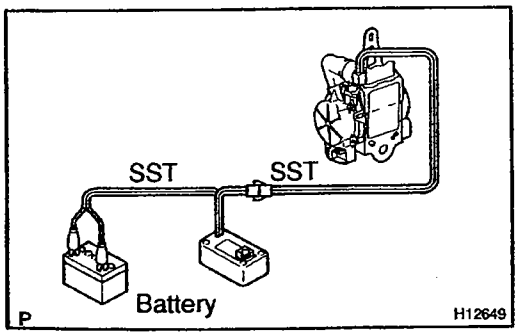
HINT:
Have a battery ready as the power source when activating the seat belt pretensioner.

(a) Remove the front seat outer belt (See page BO–109).

HINT:
Cut the belt near the seat belt retractor.

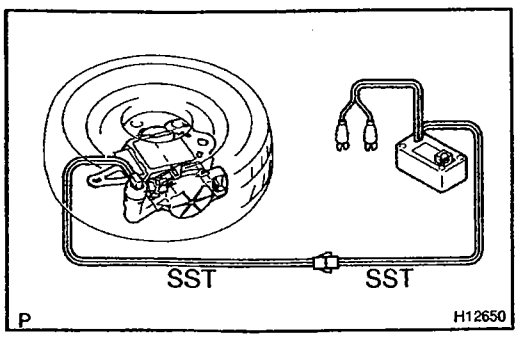


(b) Check functioning of SST (See step 1–(a)).
SST 09082–00700, 09082–00740



(c) Install the SST.
(1) Connect the 2 SST, then connect them to the seat belt pretensioner.
SST 09082–00700, 09082–00740

NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(2) Place the front seat outer belt on the ground and cover it with the disc wheel with tire.

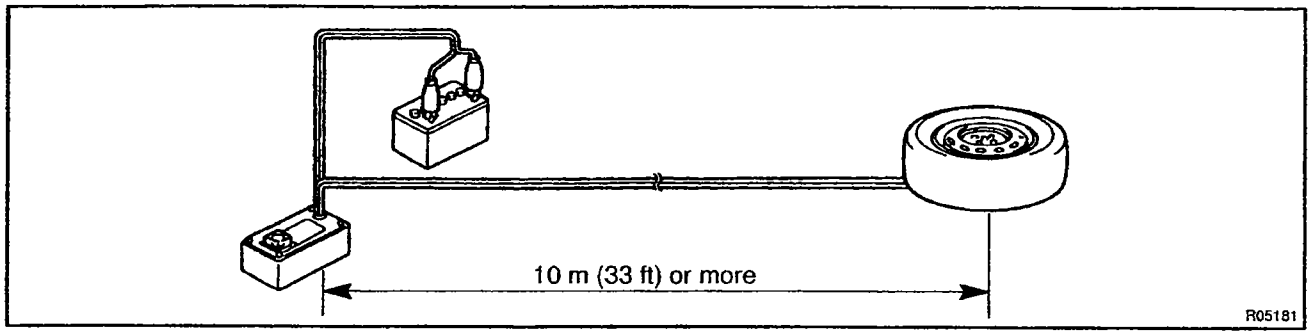
NOTICE:
Place the front seat outer belt as shown in the illustration.

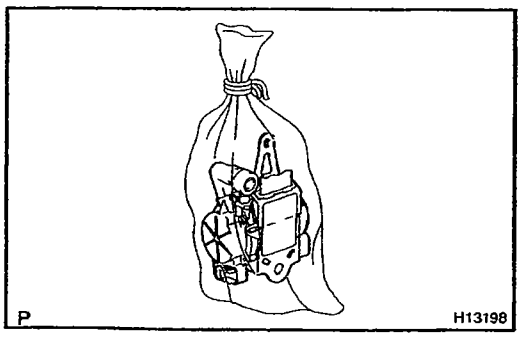
(3) Move the SST as least 10 m (33 ft) away from the disc wheel.

NOTICE:
Take care not to damage the SST wire harness.

(d) Activate the seat belt pretensioner.
(1) Connect the SST red clip to the battery positive (+) terminal and black clip to the battery negative (–) terminal.
(2) Check that no one is within 10 m (33 ft) area around the disc wheel.
(3) Press the SST activation switch and activate the seat belt pretensioner.

HINT:
The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.





(e) Dispose of front seat outer belt (with seat belt pretensioner).

CAUTION:
- **The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a front seat outer belt with activated seat belt pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with activated seat belt pretensioner.**

(1) Remove the disc wheel and SST.
(2) Place the front seat outer belt in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts.

BO2OH-01

REPLACEMENT

REPLACE REQUIREMENTS

In the following cases, replace the seat belt pretensioner.

- If the seat belt pretensioner has been activated.
- If the seat belt pretensioner has been found to be faulty in troubleshooting.
- If the front seat outer belt has been found to be faulty during checking in items 1–(b) or 2–(b).
- If the front seat outer belt has been dropped.

CAUTION:

For removal and installation of the seat belt pretensioner, see page BO–109 and BO–118.

Be sure to follow the correct procedure.

BO20I-01

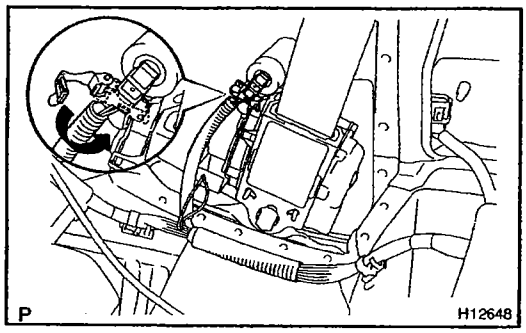
INSTALLATION

NOTICE:

- **Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.**
- **Make sure that the front seat outer belt is installed with the specified torque.**
- **If the front seat outer belt has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front seat outer belt with a new one.**
- **When installing the front seat outer belt, take care that the wiring does not interfere with other parts and is not pinched between other parts.**

1. **INSTALL RETRACTOR OF FRONT SEAT OUTER BELT**

(a) Install the retractor of front seat outer belt with the 2 bolts.
Torque:
Upper bolt: 7.5 N·m (76 kgf·cm, 66 in.·lbf)
Lower bolt: 43 N·m (440 kgf·cm, 32 ft·lbf)



(b) Connect the pretensioner connector as shown in the illustration.

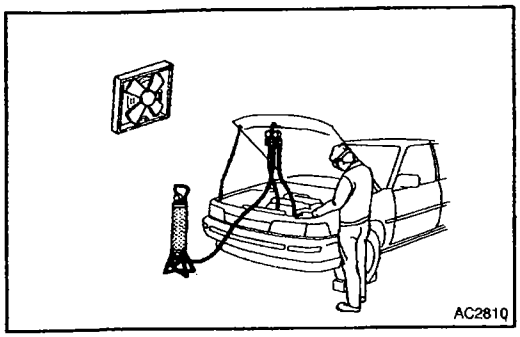
(c) Connect the retractor switch connector.

2. **INSTALL FRONT SEAT OUTER BELT SHOULDER ANCHOR**
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
3. **INSTALL FRONT SEAT OUTER BELT FLOOR ANCHOR**
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
4. **INSTALL QUARTER TRIM PANEL**
5. **INSTALL REAR SEAT OUTER BELT FLOOR ANCHOR**
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
6. **INSTALL REAR SEATBACK LOCK STRIKER**
7. **INSTALL REAR SEATBACK HINGE**
8. **INSTALL DECK TRIM SIDE PANEL**
9. **INSTALL REAR DECK TRIM COVER**
10. **INSTALL LUGGAGE COMPARTMENT MAT**
11. **INSTALL LUGGAGE COMPARTMENT TRAY**
12. **INSTALL REAR SEAT (See page BO–105)**
13. **INSTALL PACKAGE TRAY TRIM**
14. **INSTALL DOOR SCUFF PLATE**

AIR CONDITIONING

AIR CONDITIONING SYSTEM AC–1
TROUBLESHOOTING AC–14
DRIVE BELT AC–16
MANIFOLD GAUGE SET AC–19
REFRIGERANT LINE AC–21
AIR CONDITIONING UNIT AC–24
BLOWER UNIT AC–30
COMPRESSOR AND
MAGNETIC CLUTCH AC–35
CONDENSER AC–43
BLOWER MOTOR AC–48
BLOWER RESISTOR AC–49
THERMISTOR AC–50
PRESSURE SWITCH AC–51
HEATER MAIN RELAY AC–54
MAGNETIC CLUTCH RELAY AC–55
COOLING FAN RELAY AC–56
CONDENSER FAN AC–57
AIR CONDITIONING AMPLIFIER AC–60
HEATER CONTROL ASSEMBLY AC–65
ENGINE COOLANT
TEMPERATURE (ECT) SWITCH AC–72
AIR REFINER FILTER AC–73

AC

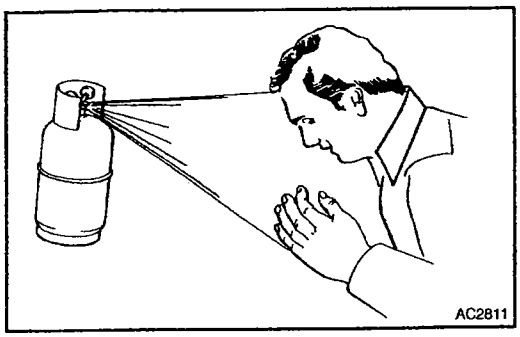


AIR CONDITIONING SYSTEM

AC0C1-06

PRECAUTION

1. **DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR WEAR EYE PROTECTION**
2. **ALWAYS WEAR EYE PROTECTION**



3. **BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN**

If liquid refrigerant gets in your eyes or on your skin.

(a) Wash the area with lots of cool water.

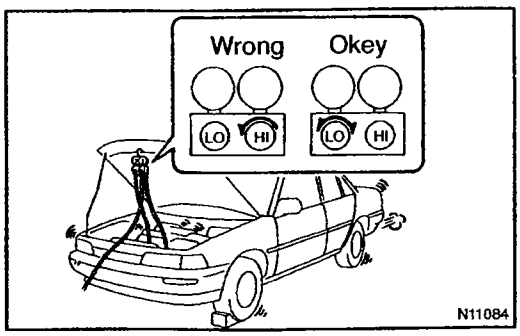
CAUTION:

Do not rub your eyes or skin.

(b) Apply clean petroleum jelly to the skin.

(c) Go immediately to a physician or hospital for professional treatment.

4. **NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME**
5. **BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPLY PHYSICAL SHOCKS TO IT**



6. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERATION SYSTEM**

If there is not enough refrigerant in the refrigerant system oil lubrication will be insufficient and compressor burnout may occur, so that care to avoid this, necessary care should be taken.

7. **DO NOT OPEN PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATE**

If the high pressure valve is opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the only low pressure valve.

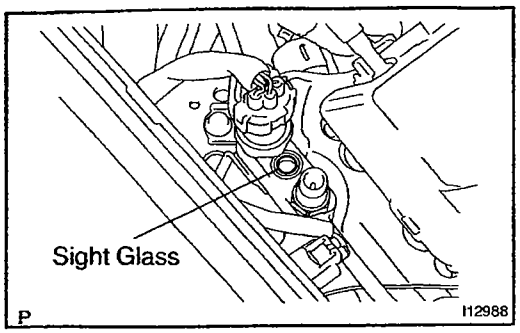
8. **BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT**

If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating etc.

9. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The CELICA is equipped with an SRS (Supplemental Restraint System) such as the driver and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices tn the RS section.

AC2GT–01



ON–VEHICLE INSPECTION

1. INSPECT REFRIGERANT VOLUME

Observe the sight glass on the liquid tube.

Test conditions:

- Running engine at 1,500 rpm
- Blower speed control switch at "HI" position
- A/C switch ON
- Temperature control dial at "COOL" position
- Fully open the doors

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient*	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present in sight glass	None, sufficient or too much	Refer item 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
4	Temperature between compressor inlet and outlet is noticeably different	Correct or too much	Refer to items 5 and 6
5	Immediately after air conditioning is turned off, refrigerant in sight glass stays clear	Too much	(1) Discharge refrigerant (2) Evacuate air and charge proper amount or purified refrigerant
6	When air conditioning is turned off, refrigerant foams and then stays clear	Correct	–

*: Bubbles in the sight glass with ambient temperatures higher than usual can be considered normal if cooling is sufficient.

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

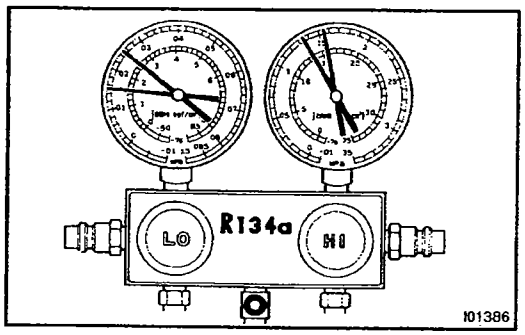
This is a method in witch the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when the these conditions are established.

Test conditions:

- Temperature at the air inlet with the switch set at RECURC is 30 – 35 °C (86 – 95 °F)
- Engine running at 1500 rpm
- Blower speed control switch at "HI" position
- Temperature control dial at "COOL" position

HINT:

It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.



(1) Normally functioning refrigeration system.

Gauge reading:

Low pressure side:

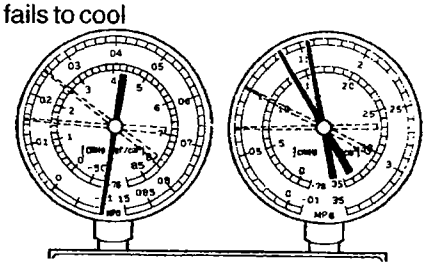
0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm^2)

High pressure side:

1.37 – 1.57 MPa (14 – 16 kgf/cm^2)

(2) Moisture present in refrigeration system.

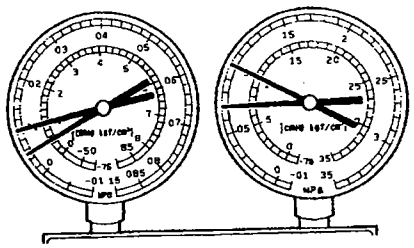
Condition : Periodically cools and then fails to cool



Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	• Drier in oversaturected state • Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace condenser (2) Remove moisture in cycle through repeatedly evacuating air (3) Charge proper amount of new refrigerant

(3) Insufficient cooling

Condition: Insufficient cooling

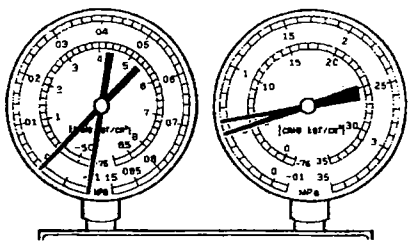


I01388

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure low on both low and high pressure sides • Bubbles seen in sight glass continuously • Insufficient cooling performance	Gas leakage at some place in refrigeration system	• Insufficient refrigerant in system • Refrigerant leaking	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Charge proper amount of refrigerant (3) If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

(4) Poor circulation of refrigerant

Condition: Insufficient cooling



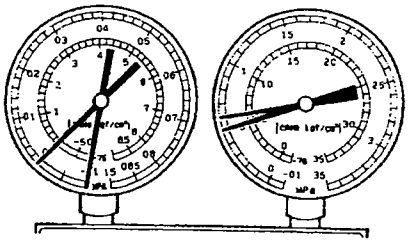
I01389

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure low in both low and high pressure sides • Frost on tube from condenser to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace condenser

AC

(5) Refrigerant does not circulate

Condition: Does not cool (Cools from time to time in some cases)

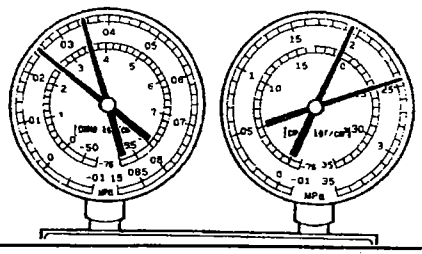


I01449

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Vacuum indicated on low pressure side, very low pressure indicated on high pressure side • Frost or dew seen on piping before and after receiver/ drier or expansion valve	• Refrigerant flow obstructed by moisture or dirt in refrigeration system • Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	(1) Check expansion valve (2) Clean out dirt in expansion valve by blowing with air (3) Replace condenser (4) Evacuate air and charge new refrigerant to proper amount (5) For gas leakage from expansion valve, replace expansion valve

(6) Refrigerant overcharged or insufficient cooling of condenser

Condition: Insufficient cooling



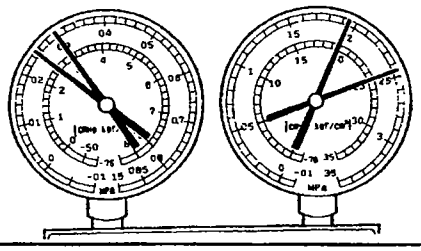
I01390

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • No sir bubbles seen through the sight glass even when the engine rpm is lowered	• Unable to develop sufficient performance due to excessive • Insufficient cooling of condenser	• Excessive refrigerant in cycle→refrigerant overcharged • Condenser cooling insufficient→condenser fins clogged of cooling fan faulty	(1) Clean condenser (2) Check cooling fan with fluid coupling operation (3) If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant

AC

(7) Air present in refrigeration system

Condition: Insufficient cooling



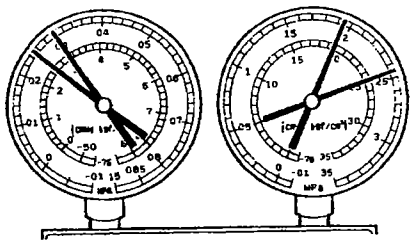
NOTE : These gauge indications are shown when the refrigeration system has been opens and the refrigerant charged without vacuum purging.

I01392

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • The low pressure piping hot to the touch • Bubbles seen in sight glass	Air entered in refrigeration system	• Air present in refrigeration system • Insufficient vacuum purging	(1) Check compressor oil to see if it is see if it is dirty or insufficient (2) Evacuate air and charge new refrigerant

(8) Expansion valve improperly

Condition: Insufficient cooling

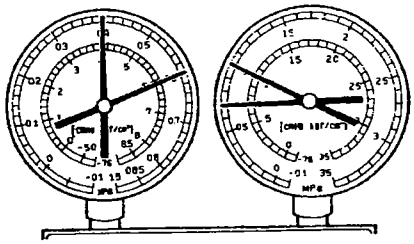


I01450

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • Frost or large amount of dew on piping on low pressure side	Trouble in expansion valve	• Excessive refrigerant in low pressure piping • Expansion valve opened too wide	Check expansion valve Replace if defective

(9) Defective compression compressor

Condition : Does not cool



I01393

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on low high pressure sides • Pressure too low to on high pressure side	Internal leak in compressor	• Compression defective • Valve leaking or broken sliding parts	Repair or replace compressor

3. INSPECT IDLE–UP SPEED

(a) Warm up engine.

(b) Inspect idle–up speed when the these conditions are established.

- Warm up engine
- Blower speed control switch at "HI" position
- A/C switch ON
- Temperature control dial at "COOL" position

1ZZ–FE engine models (M/T):

Magnetic clutch condition	Idle–up speed
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	900 ± 50 rpm

If idle speed is not as specified, check Idle control system.

1ZZ–FE engine models (A/T):

Magnetic clutch condition	Idle–up speed
Magnetic clutch not engaged	750 ± 50 rpm
Magnetic clutch engaged	900 ± 50 rpm

If idle speed is not as specified, check Idle control system.

2ZZ–FE engine models (M/T):

Magnetic clutch condition	Idle–up speed
Magnetic clutch not engaged	750 ± 50 rpm
Magnetic clutch engaged	850 ± 50 rpm

If idle speed is not as specified, check Idle control system.

2ZZ–FE engine models (A/T):

Magnetic clutch condition	Idle–up speed
Magnetic clutch not engaged	650 ± 50 rpm
Magnetic clutch engaged	850 ± 50 rpm

If idle speed is not as specified, check Idle control system.

4. INSPECT FOR LEAKAGE OF REFRIGERANT

(a) Perform in these conditions:
- Stop engine.
- Secure good ventilation (If not the gas leak detector may react to volatile gases witch are not refrigerant, such as evaporated gasoline and exhaust gas.)
- Repeat the test 2 or 3 times.
- Make sure that there is some refrigerant remaining in the refrigeration system.
  When compressor is OFF: approx. 392 – 588 kPa (4 – 6 kgf/ cm^2, 57 – 85 psi)

(b) Bring the gas leak detector close to the drain hose before performing the test.

HINT:
- After the blower motor stopped, leave the cooling unit for more than 15 minutes.
- Expose the gas leak detector sensor the under the drain hose.
- When bring the gas leak detector close to the drain hose, make sure that the gas leak detector does not react to the volatile gases.

If such reaction is unavoidable, the vehicle must be lifted up.

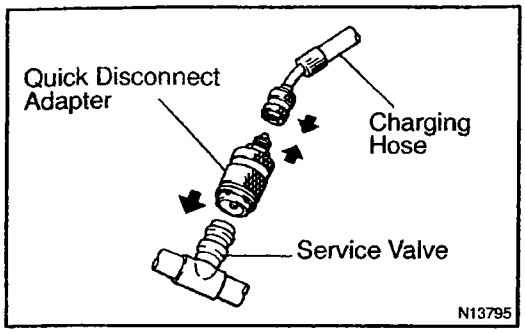
(c) If gas leak is not detected on the drain hose, remove the blower resistor from the cooling unit. Then insert the gas leak detector sensor into the unit and perform the test.

(d) Disconnect the connector and leave the pressure switch for approx. 20 minutes. Then bring the gas leak detector close to the pressure switch and perform the test.

(e) Bring the gas leak detector close to the refrigerant lines and perform the test.

AC0C4–05

EVACUATING



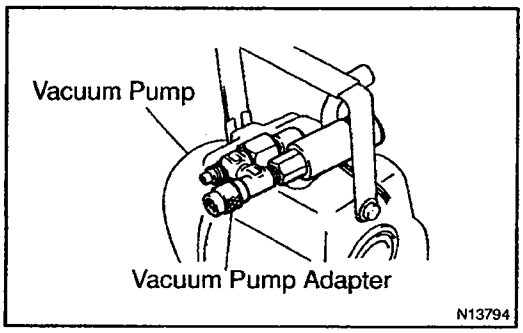
1. CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES

2. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES

3. SET ON MANIFOLD GAUGE SET

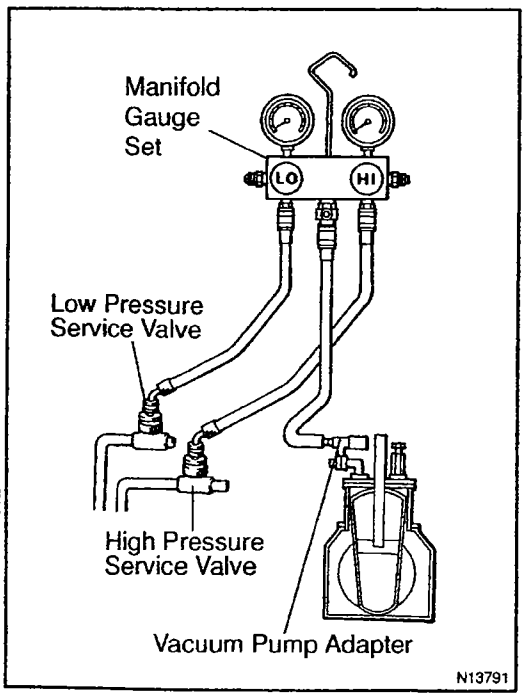
(a) Close both hand valves of manifold gauge set.

(b) Connect the quick disconnect adapters to the service valves.



4. EVACUATE AIR FROM REFRIGERATION SYSTEM

(a) Connect the vacuum pump adapter to the vacuum pump.



(b) Connect the center hose of the manifold gauge set to the vacuum pump adapter.

(c) Open both the high and low hand valves and run the vacuum pump.

(d) After 10 minutes or more, check that the low pressure gauge indicates 750 mmHg (30 in. Hg) or more.

HINT:

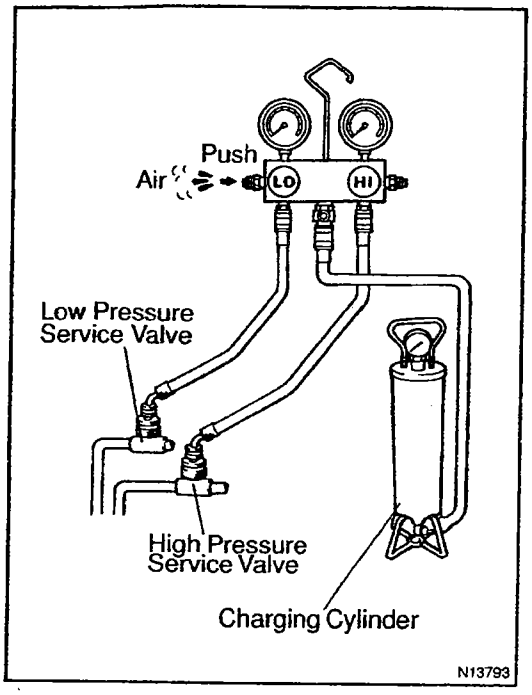
If the reading 750 mmHg (30 in. Hg) or more, close both hand valves of manifold gauge set and stop the vacuum pump.

Check the system for leaks and repair necessary.

(e) Close both the high and low hand valves and stop the vacuum pump.

(f) Leave the system in this condition for 5 minutes or more and check that there is no gauge indicator.

AC



CHARGING

AC2GU-01

1. INSTALL CHARGING CYLINDER

HINT:

When handling the charging cylinder, always follow the directions given in the instruction manual.

(a) Charge the proper amount of refrigerant into the charging cylinder.

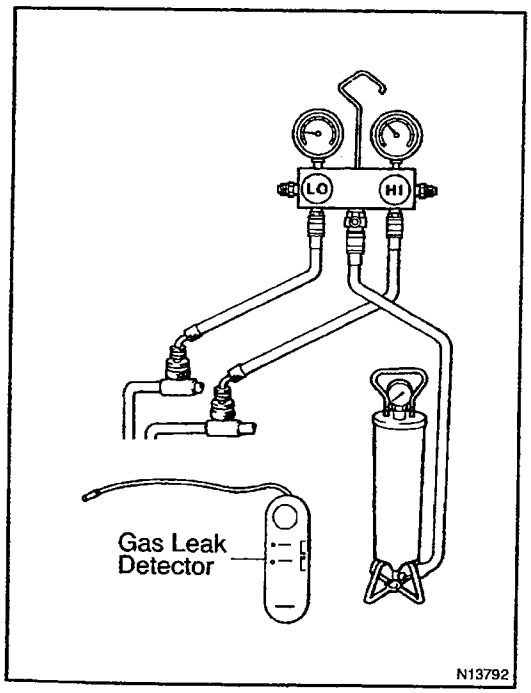
(b) Connect the center hose to the charging cylinder.

CAUTION:

Do not open both high and low hand valves of manifold gauge set.

(c) Open the valve of charging cylinder.

(d) Press the valve core on the side of manifold gauge and expel the air inside of the center hose.



2. INSPECT REFRIGERATION SYSTEM FOR LEAKS

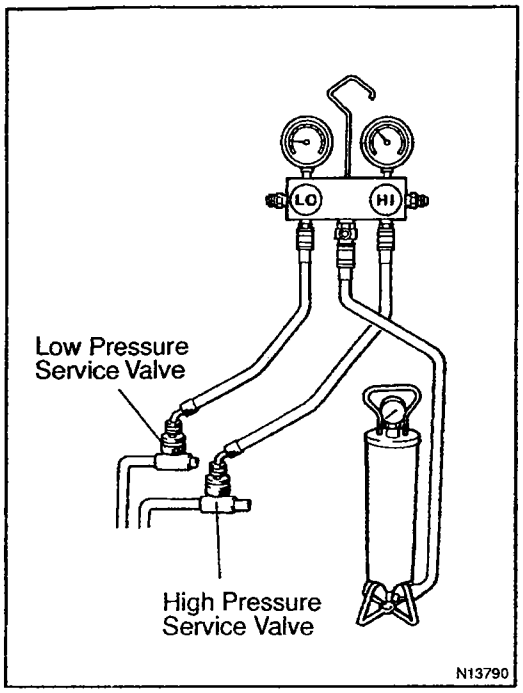
(a) Open the high pressure hand valve and charge refrigerant.

(b) When the low pressure gauge indicates 98 kPa (1 kgf/cm^2, 14 psi) close the high pressure hand valve.

(c) Using a gas leak detector, check the system for leakage.

CAUTION:

Use the refrigerant recovery/ recycling machine to recover the refrigerant whenever replacing parts.



3. CHARGE REFRIGERANT INTO REFRIGERANT SYSTEM

If there is no leak after refrigerant leak check, charge the proper amount of refrigerant into refrigeration system.

CAUTION:

- **Never run the engine when charging the system through the high pressure side.**
- **Do not open the low pressure hand valve when the system is being charged with liquid refrigerant.**

(a) Open the high pressure hand valve fully.

(b) Charge specified amount of refrigerant, then close the high pressure hand valve.

HINT:

A fully charged system is indicated by the sight glass being free of any bubbles.

(c) Charge partially refrigeration system with refrigerant.

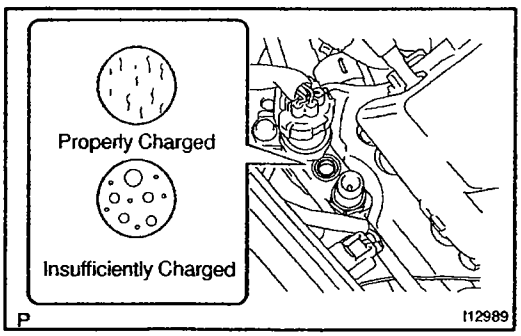
(1) Set vehicle in these condition:

- Running engine at 1,500 rpm
- Blower speed control switch: "HI"
- Temperature control selector: "MAX. COOL"
- Air inlet control selector: "RECIRC"
- Fully open doors (Sliding roof: closed)

(2) Open the low pressure hand valve.

CAUTION:

Do not open the high pressure hand valve.

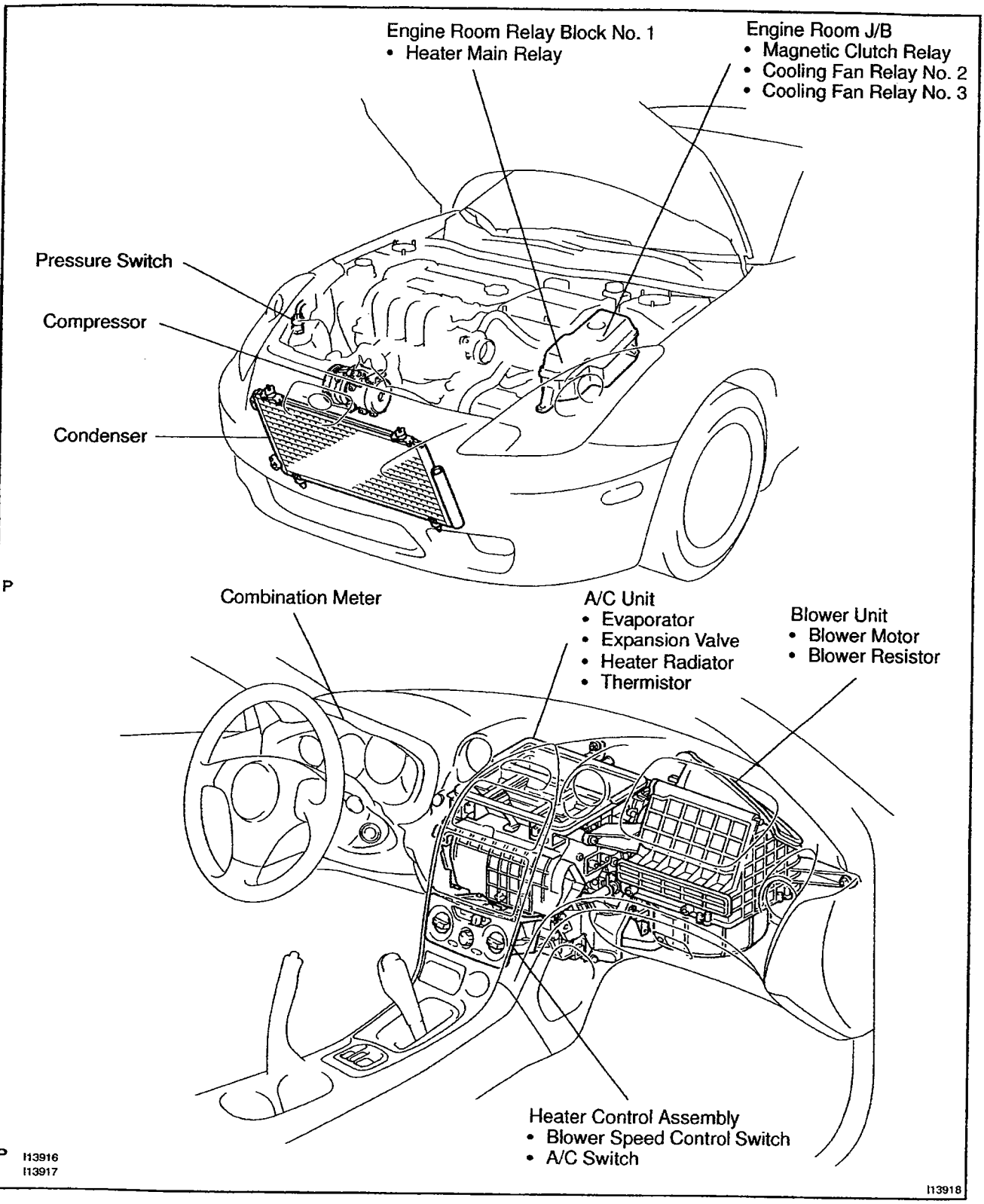


(d) Charge refrigerant until bubbles disappear and check the pressure on the gauge through the sight glass.

(e) Replenishment to be 100 ± 50 g after bubbles disapper.

LOCATION

AC0C6-06



TROUBLESHOOTING

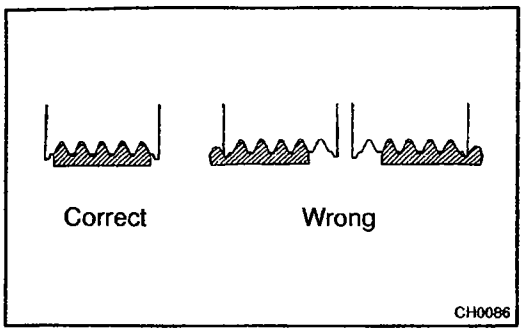
AC1FO-02

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
No blower operation	1. HTR Fuse	–
	2. Heater main relay	AC–54
	3. Blower motor	AC–48
	4. Blower resistor	AC–49
	5. Blower speed control switch	AC–68
	6. Wire harness	–
No blower control	1. Blower motor	AC–48
	2. Blower resistor	AC–49
	3. Blower speed control switch	AC–68
	4. Wire harness	–
No air temperature	1. Engine coolant volume	–
	2. Heater control assembly	AC–65
No compressor operation	1. Refrigerant volume	AC–3
	2. A.C Fuse	–
	3. Magnetic clutch	AC–35
	4. Compressor lock sensor	AC–35
	5. Compressor	AC–35
	6. Pressure switch	AC–51
	7. Heater main relay	AC–54
	8. Blower speed control switch	AC–68
	9. Heater control assembly	AC–65
	10. Thermistor	AC–50
	11. Wire harness	–
No cool air comes out	1. Refrigerant volume	AC–3
	2. Refrigerant pressure	AC–3
	3. Drive belt	AC–16
	4. Magnetic clutch	AC–35
	5. Compressor lock sensor	AC–35
	6. Pressure switch	AC–51
	7. Thermistor	AC–50
	8. Heater control assembly	AC–65
	9. Wire harness	–
Insufficient cooling	1. Refrigerant volume	AC–3
	2. Drive belt	AC–16
	3. Magnetic clutch	AC–35
	4. Compressor	AC–35
	5. Condenser	AC–43
	6. Expansion Valve	AC–24
	7. Evaporator	AC–28
	8. Refrigerant lines	AC–21
	9 Pressure switch	AC–51
	10. A/C amplifier	AC–68
	11. Heater control assembly	AC–65
No engine idle–up when A/C switch ON	1. Heater control assembly	AC–65
	2. Engine (and ECT) ECU	–
	3. Idle control system	–
	4. Wire harness	–
No air inlet control	1. Heater control assembly	AC–65
	2. Wire harness	–

No mode control	1. Heater control assembly 2. Wire harness	AC–65 –
Blinking of A/C indicator	1. Compressor 2. Drive belt 3. Compressor lock sensor 4. Heater control assembly	AC–35 AC–16 AC–35 AC–65
Brightness does not change when light control switch is turned	1. Headlight and taillight system 2. Heater control assembly	BE–17 AC–65



DRIVE BELT

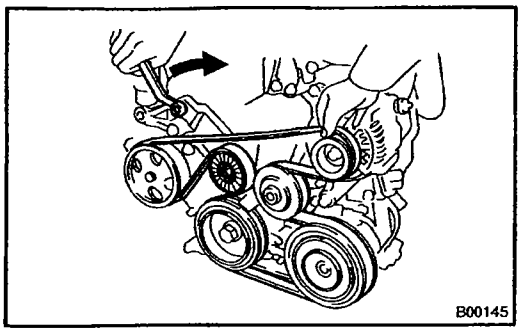
ON–VEHICLE INSPECTION

AC2GV–01

INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that the drive belt fits properly in the ribbed grooves.

AC1FP-02

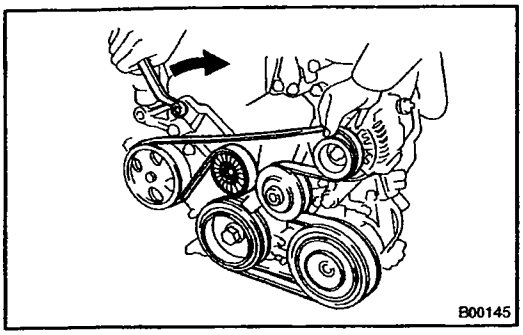


REMOVAL

REMOVE DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner arm clockwise, and remove the drive belt.

AC1FQ-02

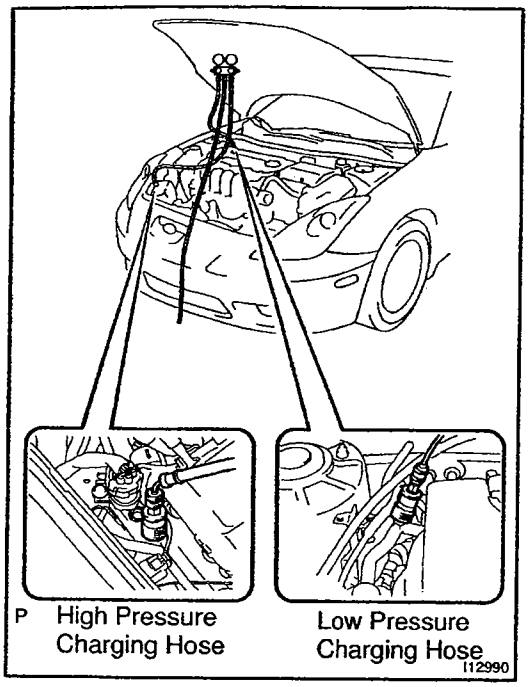


INSTALLATION

1. INSTALL DRIVE BELT

Turning the drive belt tensioner arm clockwise, and install the drive belt.

2. CHECK DRIVE BELT INSTALLING CONDITION



MANIFOLD GAUGE SET

SET ON

AC0CA-04

1. CONNECT CHARGE HOSE TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

CAUTION:

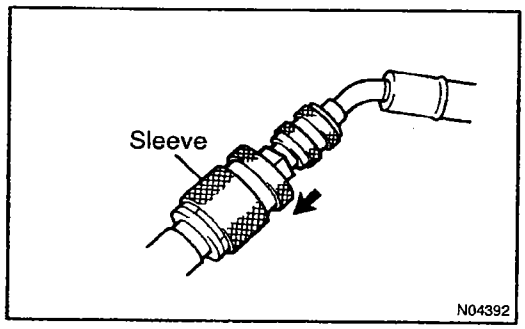
Do not connect the wrong hoses.

2. CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES

Tighten the nuts by hand.

3. CLOSE BOTH HAND VALVE OF MANIFOLD GAUGE SET

4. REMOVE CAPS FROM SERVICE VALVE ON REFRIGERANT LINE



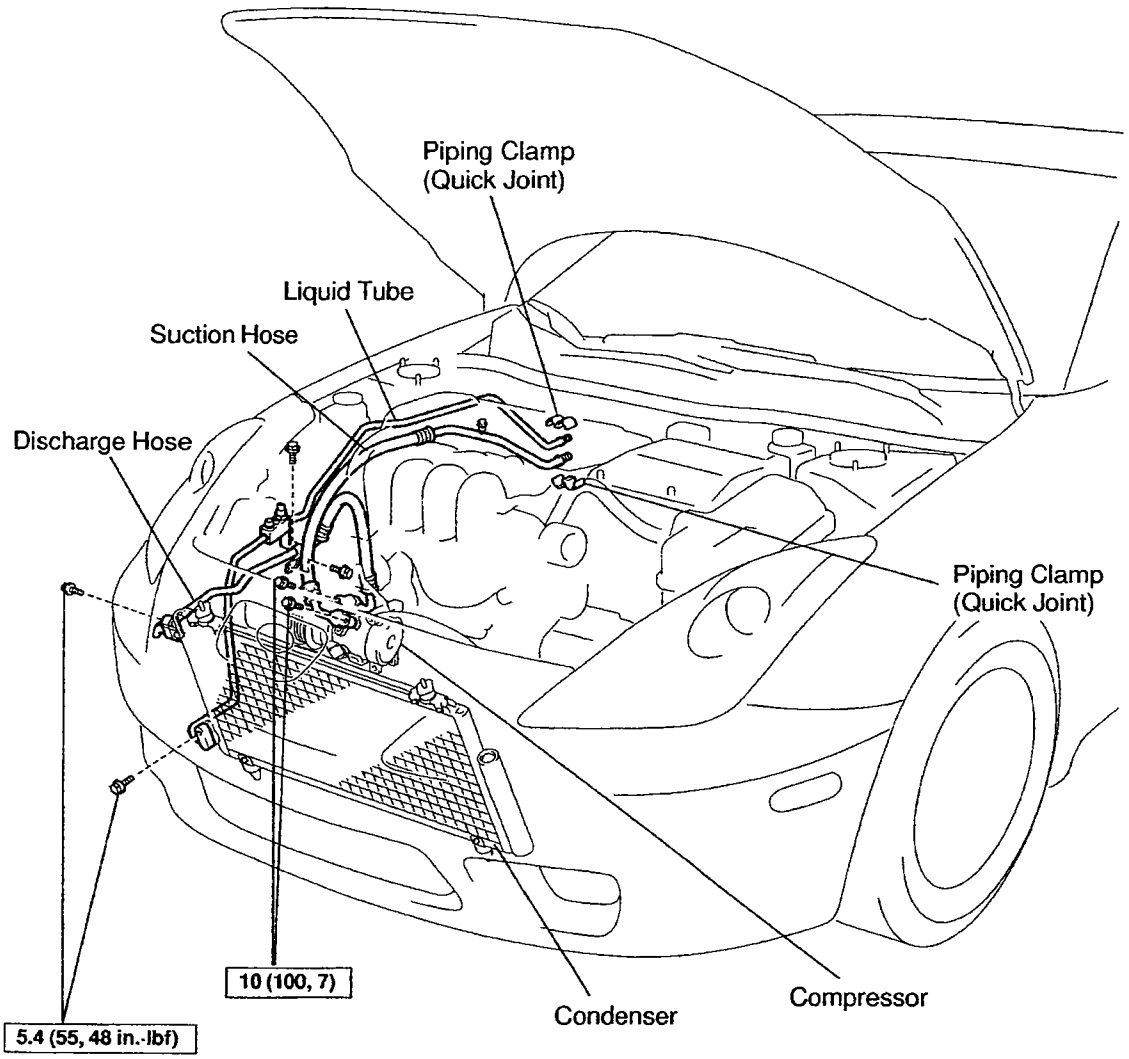
5. CONNECT QUICK DISCONNECT ADAPTER TO SERVICE VALVES

HINT:

Push the quick disconnect adapter onto the service valve, then slide, then slide the sleeve of the quick disconnect adapter downward to lock it.

AC1FR-02

LOCATION



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

P

I13908

AC1FS-02

REPLACEMENT

1. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**
2. **REPLACE FAULTY TUBE OR HOSE**

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

3. **TORQUE CONNECTIONS TO SPECIFIED TORQUE**

NOTICE:

Connections should not be torqued tighter than the specified torqued.

Part tightened	N·m	kgf·cm	ft·lbf
Condenser x Discharge tube	5.4	55	48 in.·lbf
Condenser x Liquid tube	5.4	55	48 in.·lbf
Compressor x Discharge tube	10	100	7
Compressor x Suction tube	10	100	7
Expansion valve x Evaporator	5.4	55	48 in.·lbf

4. **EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT**
   Specified amount: 430 ± 30 g (15.17 ± 1.06 oz.)
5. **INSPECT FOR LEAKAGE OF REFRIGERANT**

Using a gas leak detector, check for leakage of refrigerant.

6. **INSPECT AIR CONDITIONING OPERATION**

AIR CONDITIONING UNIT

ON–VEHICLE INSPECTION

AC2GW–01

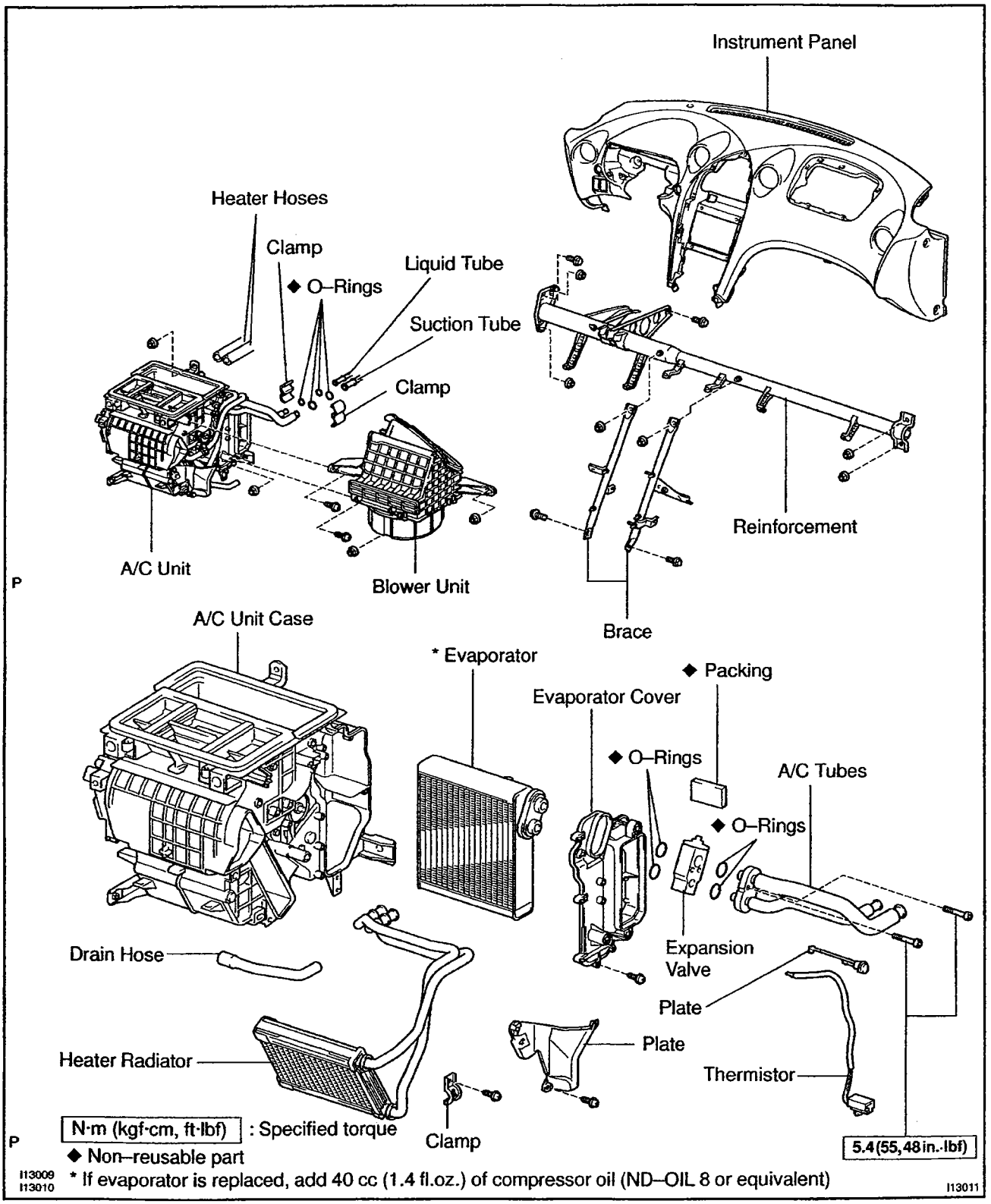
INSPECT FOR LEAKAGE OF REFRIGERANT

(a) Remove the glove compartment door (See page BO–79).
(b) Remove the blower unit.
(c) Using a gas leak detector, check for leakage of refrigerant.

If there is leakage, check the tightening torque at the joints or check the evaporator, expansion valve, A/C tube and O–rings.

AC2GX-01

COMPONENTS



AC2GY-01

REMOVAL

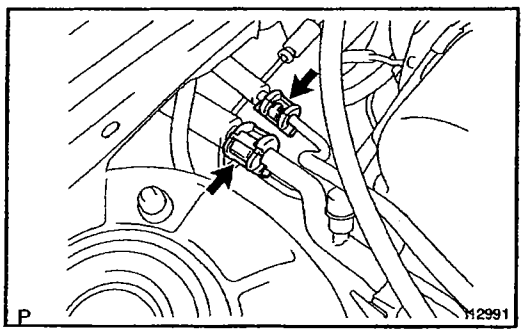
1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:
At the time of installation, please refer to the following item.
Evacuate air from refrigeration system.
Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 430 ± 30 g (15.17 ± 1.06 oz.)

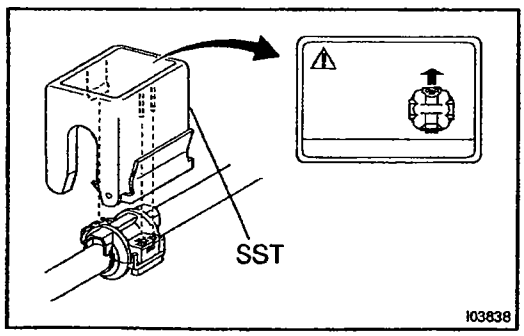
2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:
It is not necessary to drain out all coolant.



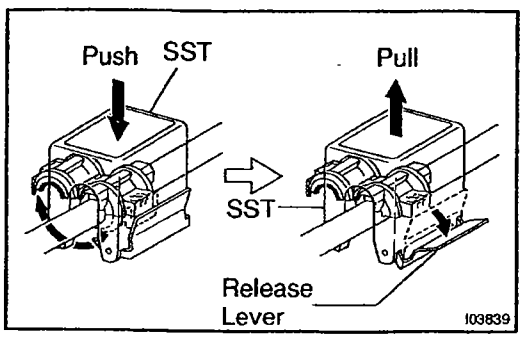
3. DISCONNECT LIQUID TUBE AND SUCTION HOSE

(a) Using SST, remove the 2 piping clamps.
SST 09870–00015 (Suction tube)
09870–00025 (Liquid tube)



(1) Insert SST to piping clamp.

HINT:
Confirm the direction of the piping clamp claw and SST using the illustration showing on the caution label.



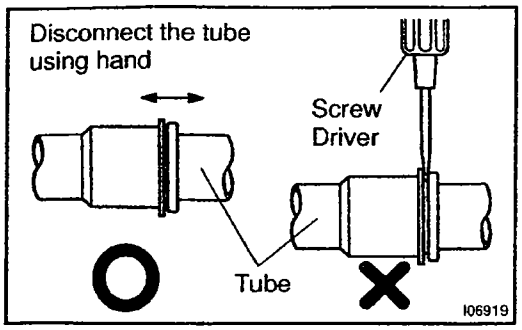
(2) Push down SST and release the clamp lock.

NOTICE:

Be careful not to deform the tubes, when pushing SST.

(3) Pull SST slightly and push the release lever, then remove the piping clamp with SST.
(4) Remove the piping clamp from SST.

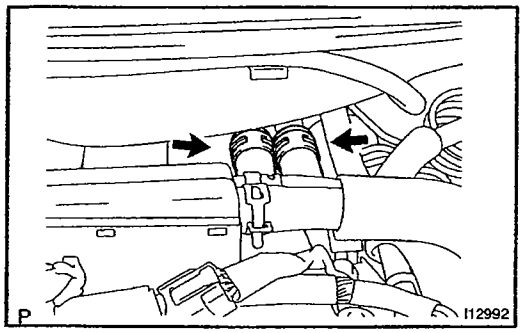
(b) Disconnect the both tubes.



NOTICE:

- **Do not use tools like screwdriver to remove the tube.**
- **Cap the open fittings immediately to keep moisture or dirt out of the system.**

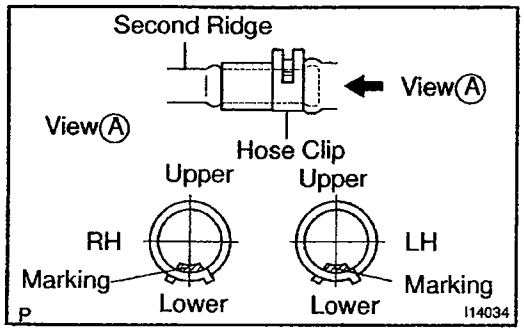
4. **REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See page BO–79)**



5. **DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES**

(a) Using pliers, grip the claw of the hose clip and slide the hose clip along the hose.

(b) Disconnect the heater hoses.

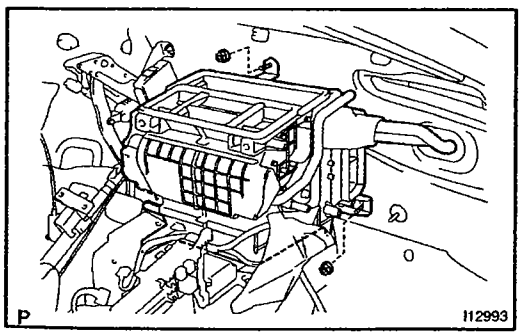


HINT:

At the time of installation, please refer to the following item.

Push the water hose onto the heater radiator pipe as far as second ridge on the pipe and install the hose clip.

6. **REMOVE BLOWER UNIT (See page AC–31)**



7. **REMOVE A/C UNIT**

(a) Disconnect the connectors.

(b) Remove the 2 nuts and A/C unit.

AC2GZ–01

INSPECTION

1. INSPECT EVAPORATOR

(a) Check evaporator fins for blockage.

If the fins are clogged, clean them with compressed air.

NOTICE:

Never use water to clean the evaporator.

(b) Check fitting for cracks or scratches.

If necessary, repair or replace.

2. INSPECT HEATER RADIATOR

Inspect fins for blockage.

If the fins are clogged, clean them with compressed air.

AC2H0-01

INSTALLATION

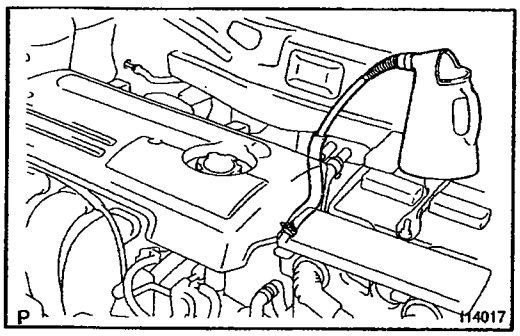
Installation is in the reverse order of removal (See page AC–26).

HOWEVER, NOTE THAT THE FOLLOWING PROCEDURES SHOULD BE SURELY CONDUCTED

(a) Remove the joint of the heater outlet hose from the heater pipe.

HINT:

Do not detach the other joint on the engine side.



(b) Hold the removed heater hose with the end facing up, pour LLC into the hose.

(c) Pour LLC until it flows into the reverse tank from the hose at the bottom.

(d) When this happens, stop pouring and reinstall the heater hose to the heater pipe.

(e) Perform air bleeding in the same manner when LLC is replaced (See page CO–2).

HINT:

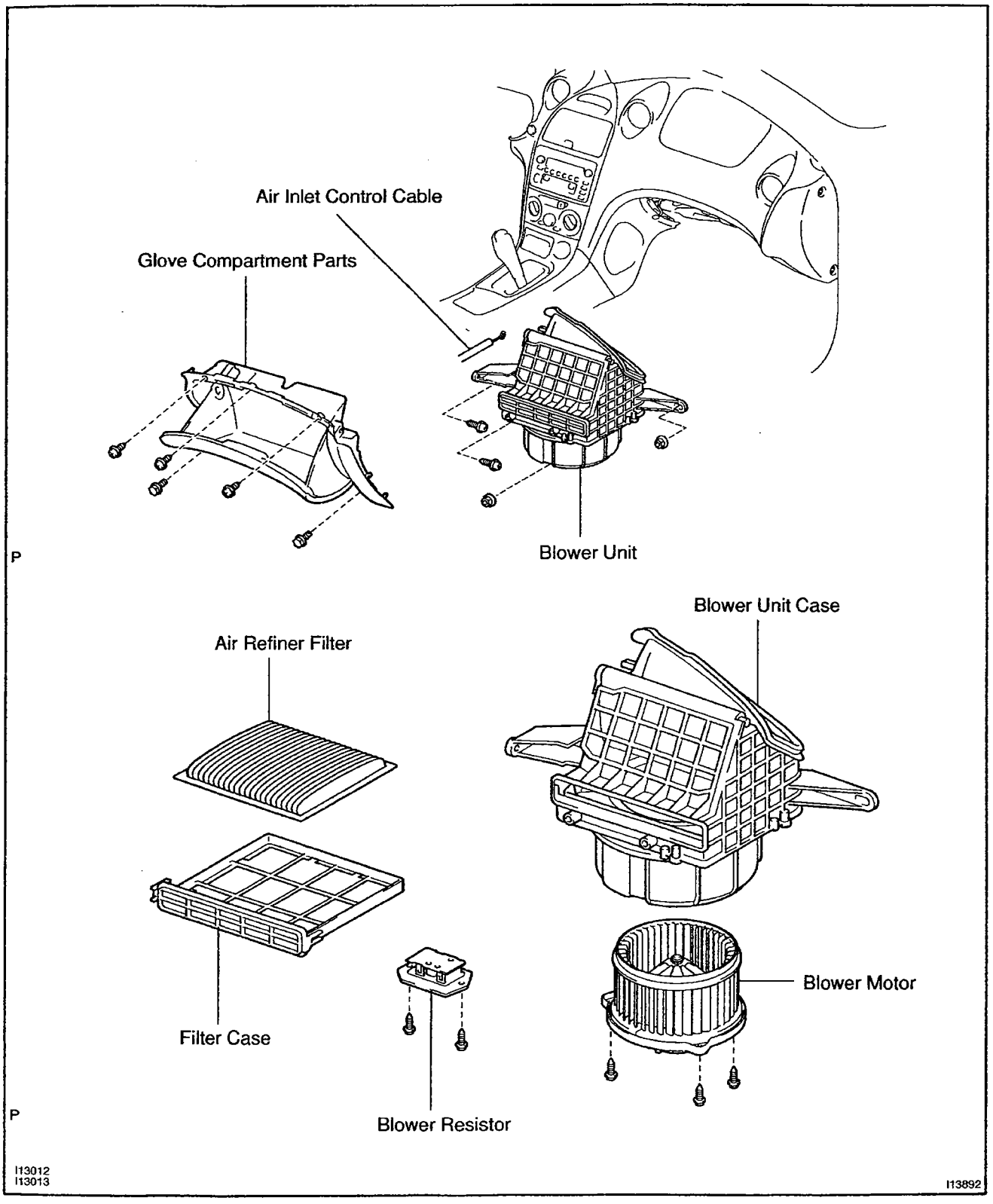
Note that the amount of LLC removed from the heater parts should be added.

Additional amount (example):
Heater core: approx. 350 cc
Heater pipe: approx. 200 cc
Heater hose: approx. 70 cc

BLOWER UNIT

COMPONENTS

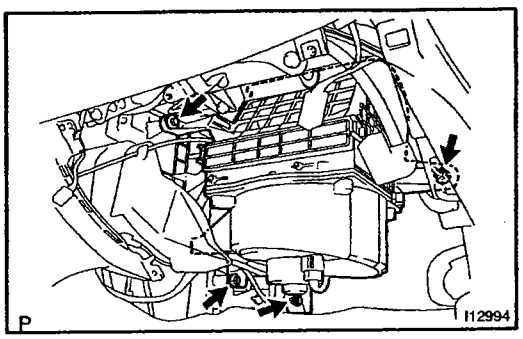
AC1GS–02



AC1G6-02

REMOVAL

1. **REMOVE GLOVE COMPARTMENT PARTS**
   (See page BO–79)

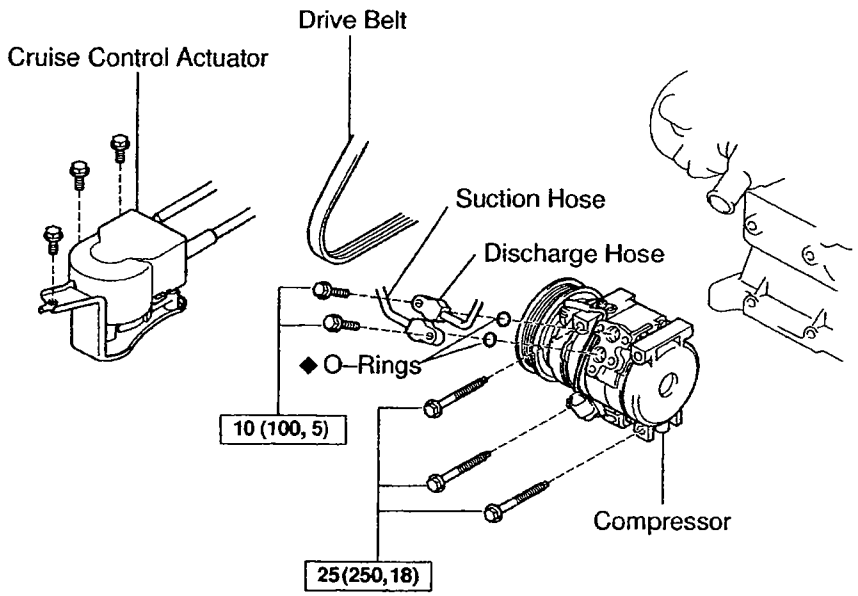


2. **REMOVE BLOWER UNIT**

(a) Disconnect the connector and air inlet control cable.
(b) Remove wire harness clamp.
(c) Remove the 2 screws, 2 nuts and the blower unit.

COMPONENTS

AC1GB-02



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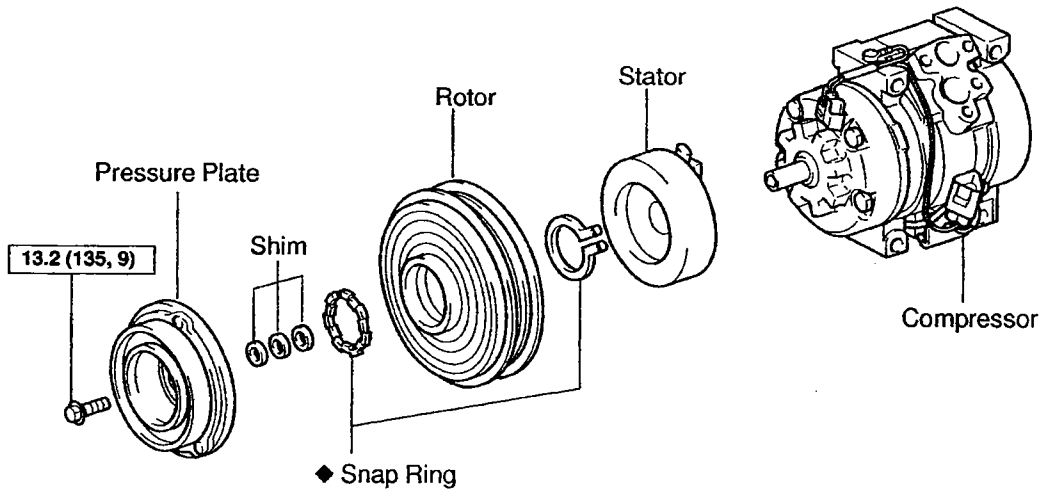

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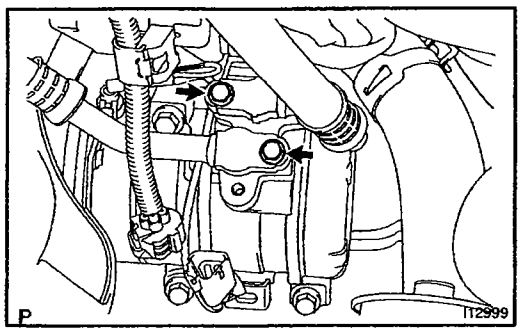
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

I13913
I13914
I13915

AC2H2-01

REMOVAL

1. **RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX. 10 MINUTES**
2. **STOP ENGINE**
3. **DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY**
4. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**
5. **REMOVE DRIVE BELT (See page AC–17)**
6. **DISCONNECT CRUISE CONTROL ACTUATOR CONNECTOR**
7. **REMOVE 3 CRUISE CONTROL ACTUATOR SET BOLTS**

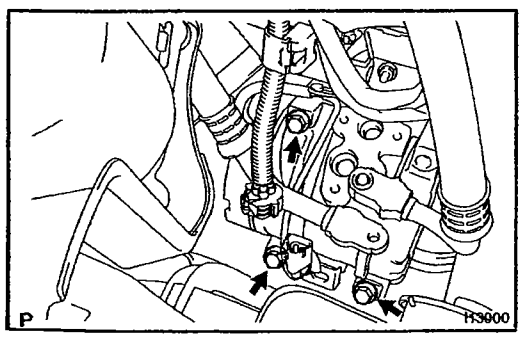


8. DISCONNECT DISCHARGE AND SUCTION HOSES

Remove the 2 bolts and disconnect the both hoses.

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.



9. REMOVE COMPRESSOR

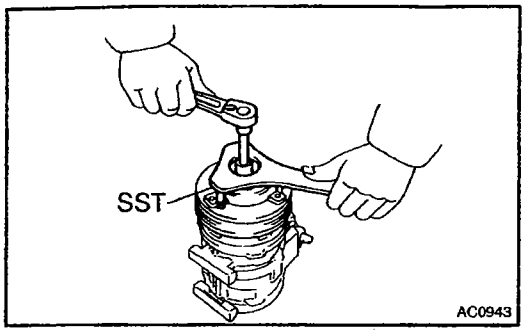
(a) Disconnect the connector.
(b) Disconnect the wire harness clamp.
(c) Remove the 3 bolts and compressor.

AC2H3-01

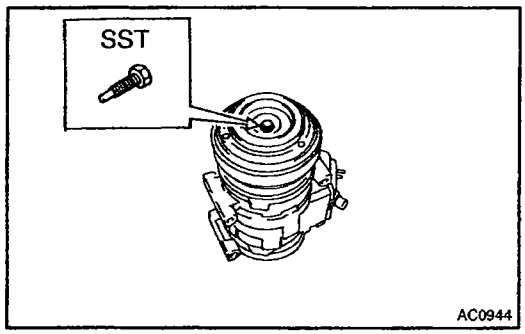
DISASSEMBLY

1. REMOVE PRESSURE PLATE

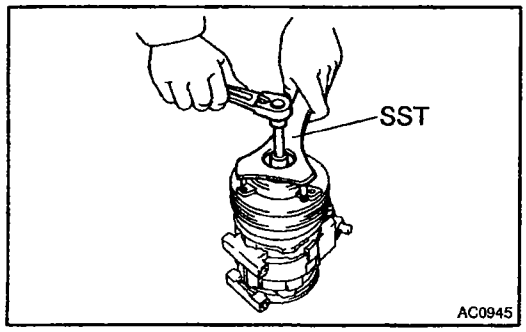
(a) Using SST and a socket wrench, remove the shaft bolt.
SST 07112–76060
Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)



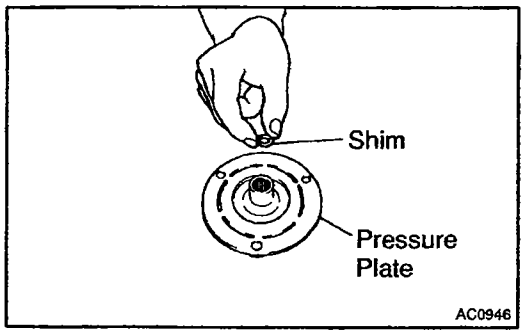
(b) Install SST on the pressure plate.
SST 07112–66040



(c) Using SST and socket wrench, remove the pressure plate.
SST 07112–66040, 07112–76060

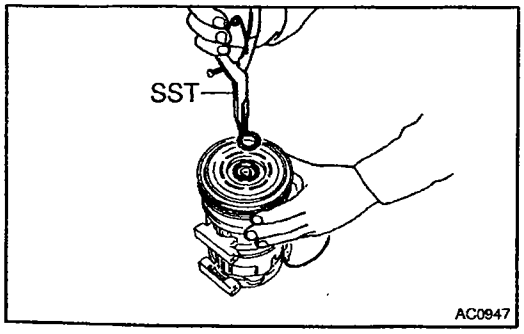


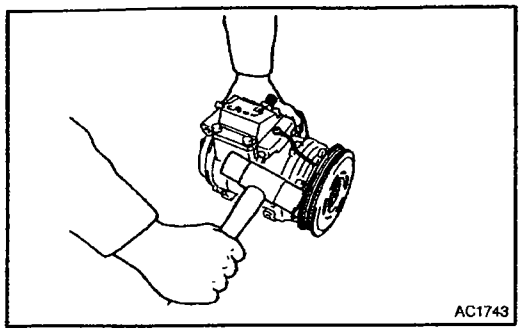
(d) Remove the shims from the pressure plate.



2. REMOVE ROTOR

(a) Using SST, remove the snap ring.
SST 07114–84020

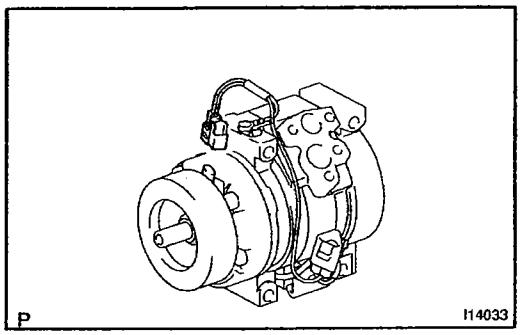




(b) Using a plastic hammer, tap the rotor off the shaft.

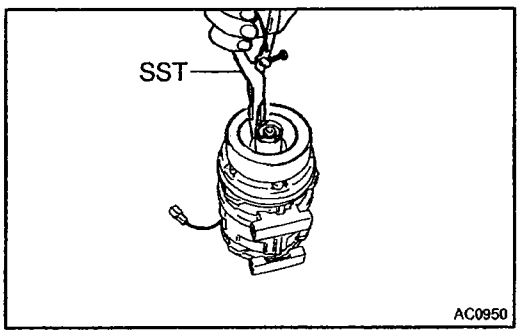
NOTICE:

Be careful not to damage the pulley when tapping on the rotor.

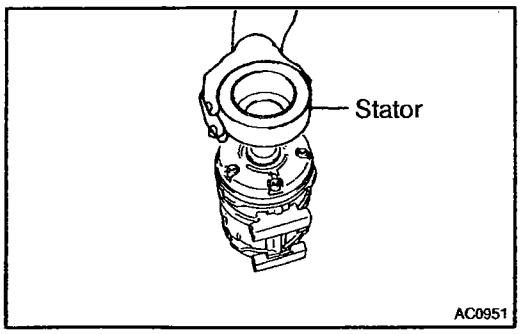


3. REMOVE STATOR

(a) Disconnect the connector from the stator.



(b) Using SST, remove the snap ring.
SST 07114–84020



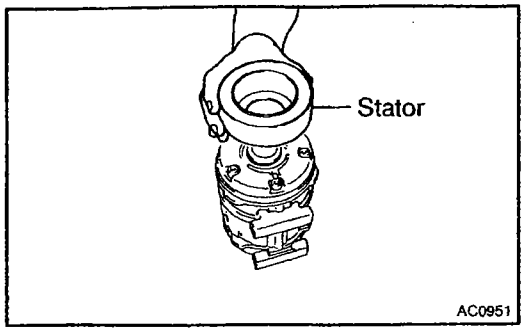
(c) Remove the stator.

AC2H4-01

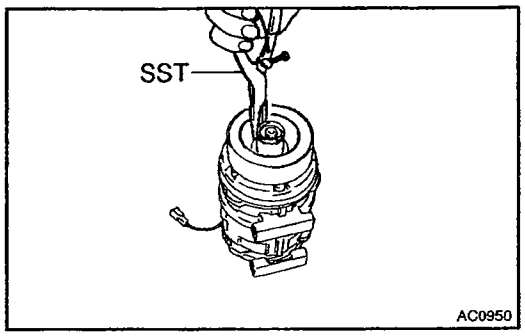
REASSEMBLY

1. INSTALL STATOR

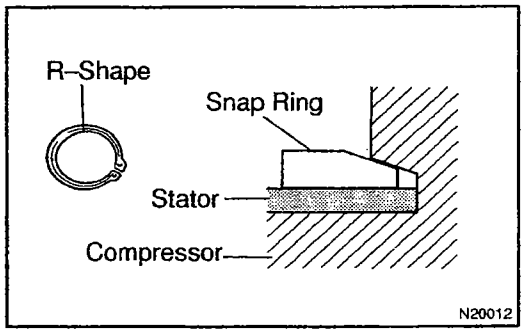
(a) Install the stator.



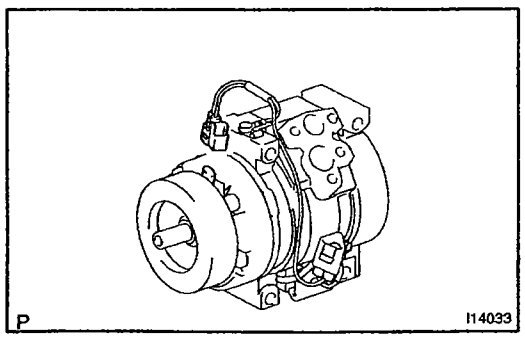
(b) Using SST, install the snap ring.
SST 07114–84020



NOTICE:
The snap ring should be installed so that its beveled side faces up.

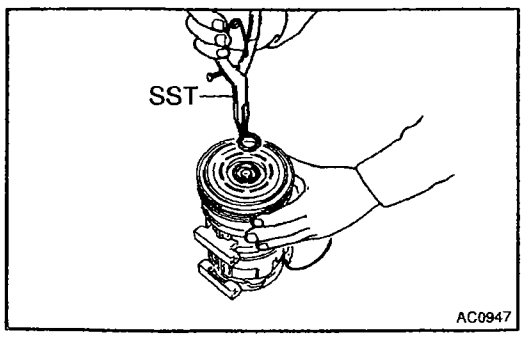


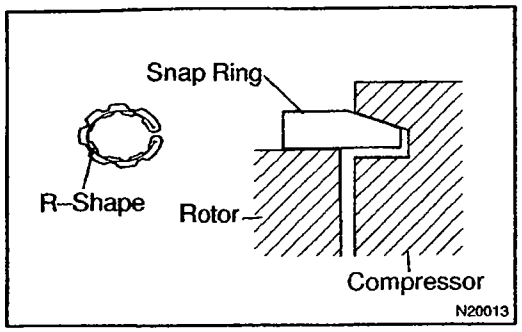
(c) Connect the connector to the stator.



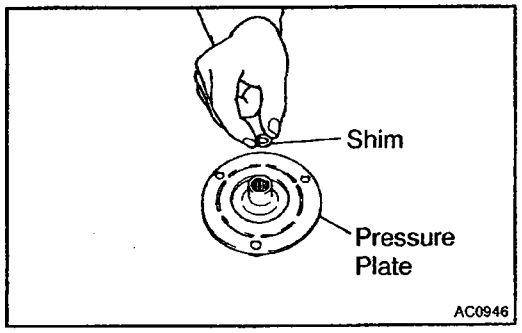
2. INSTALL ROTOR

(a) Install the rotor.
(b) Using SST, install the snap ring.
SST 07114–84020



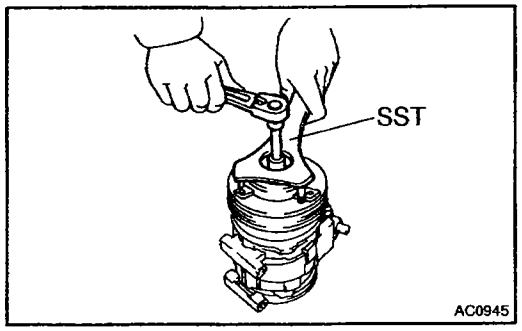


NOTICE:
The snap ring should be installed so that beveled side faces up.

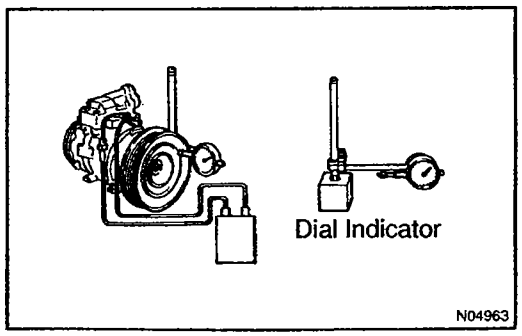


3. INSTALL PRESSURE PLATE

(a) Install the shims to the pressure plate and install the pressure plate on the rotor.



(b) Using SST and a torque wrench, install the shaft bolt.
SST 07112–66040, 07112–76060
Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)



4. INSPECT MAGNETIC CLUTCH CLEARANCE

(a) Set the dial indicator to the pressure plate of the magnetic clutch.

(b) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.

(c) Check the clearance between the pressure plate and rotor when connecting the negative (–) terminal to the battery.

Standard clearance:
0.45 ± 0.10 mm (0.018 ± 0.004 in.)

If the clearance is not within the standard clearance, adjust the clearance using shims to obtain the standard clearance.

Shim thickness:
0.1 mm (0.004 in.)
0.3 mm (0.012 in.)
0.5 mm (0.020 in.)

INSTALLATION

1. INSTALL COMPRESSOR

(a) Install the compressor with 3 bolts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Connect the connector.

2. CONNECT DISCHARGE AND SUCTION HOSES

(a) Lubricate 2 new O–rings with compressor oil and install them to the hoses.

(b) Connect the both hoses with 2 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:
Hose should be connected immediately after the caps have been removed.

3. INSTALL 3 CRUISE CONTROL ACTUATOR SET BOLTS

4. CONNECT CRUISE CONTROL ACTUATOR CONNECTOR

5. INSTALL AND CHECK DRIVE BELT
(See page AC–18, AC–16)

6. CONNECT NEGATIVE (–) TERMINAL CABLE TO BATTERY

7. EVACUATE AIR FROM REFRIGERATION SYSTEM CHARGE SYSTEM WITH REFRIGERANT
Specified amount: 430 ± 30 g (15.17 ± 1.06 oz.)

8. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant.
If there is leakage, check the tightening torque at the joints.

9. INSPECT A/C OPERATION

CONDENSER

AC1GJ-01

ON–VEHICLE INSPECTION

1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE

If the fins are clogged, wash them with water and dry with compressed air.

NOTICE:

Be careful not to damage the fins.

If the fins are bent, straighten them with a screwdriver or pliers.

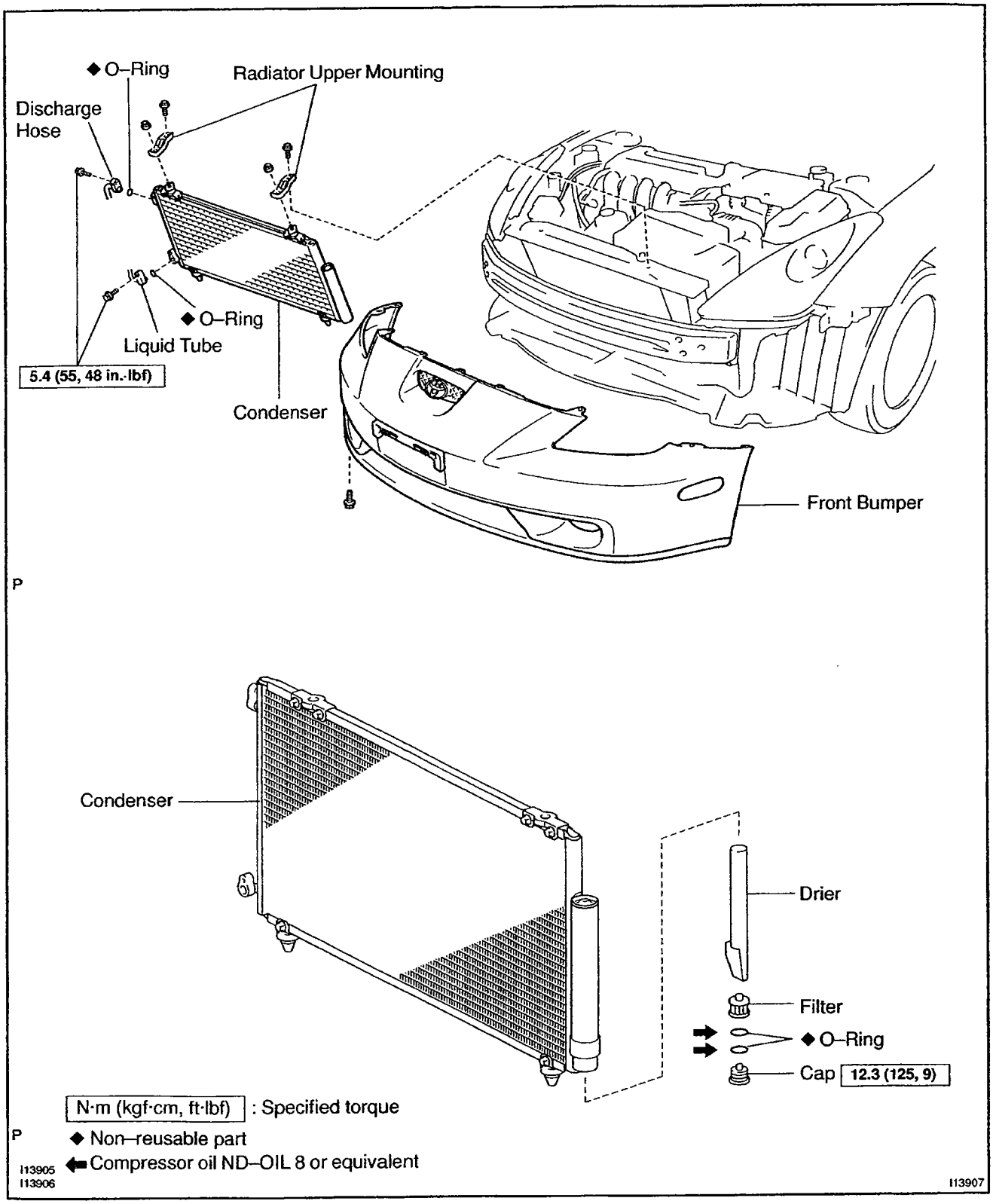
2. INSPECT CONDENSER AND FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

If there is leakage, check the tightening torque at the joints.

AC2HS–01

COMPONENTS



AC2H6-01

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

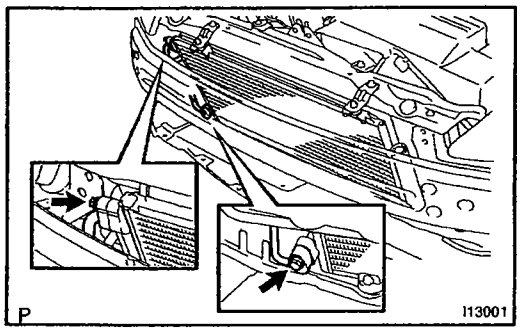
At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 430 ± 30 g (15.17 ± 1.06 oz.)

2. REMOVE FRONT BUMPER (See page BO–4)



3. REMOVE LIQUID TUBE AND DISCHARGE HOSE

Remove 2 bolts and both tubes.

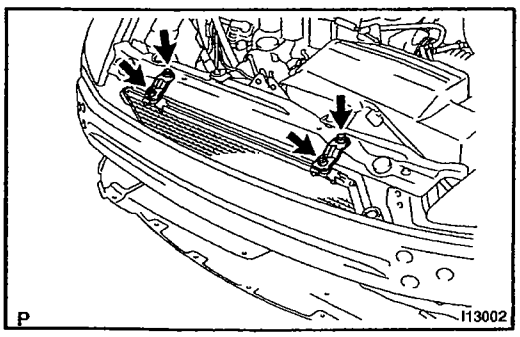
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

Cap the open fittings immediately to keep moisture out of the system.

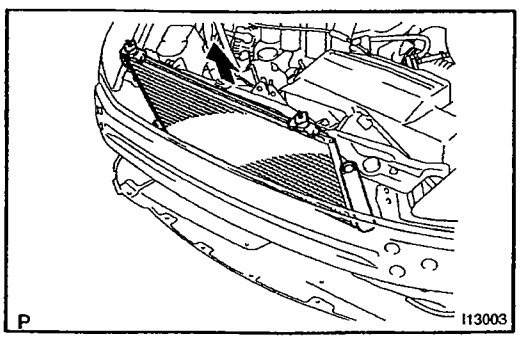
HINT:

Lubricate 2 new O–rings with compressor oil and install them to the tubes.



4. REMOVE RADIATOR UPPER MOUNTINGS

Remove the 2 bolts, 2 nuts and the 2 upper mountings.



5. REMOVE CONDENSER

Pull out the condenser.

HINT:

At the time of installation, please refer to the following item.

If condenser was replaced, add compressor oil to the compressor.

Add: 40 cc (1.4 fl. oz.)

Compressor oil: ND–OIL 8 or equivalent

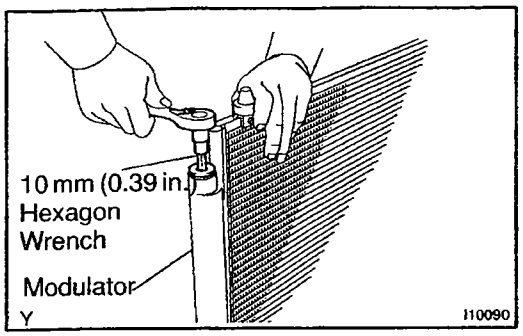
AC22C-04

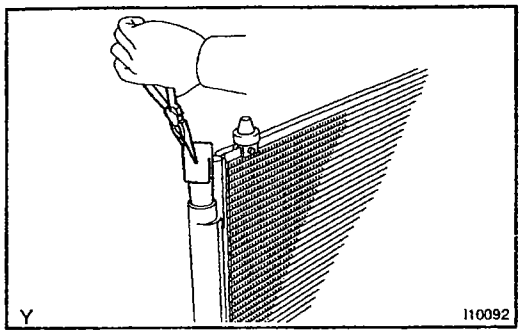
REPLACEMENT

REPLACE DRYER FROM MODULATOR

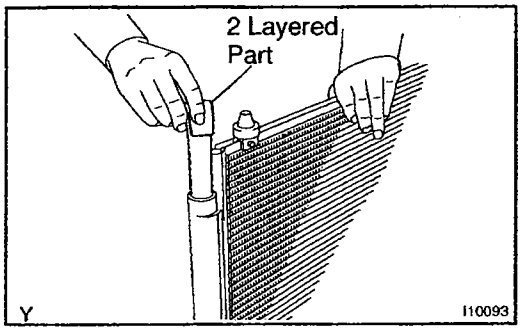
(a) Using a hexagon wrench (10 mm, 0.39 in.), remove the cap from the modulator.

(b) Remove the filter from the modulator.





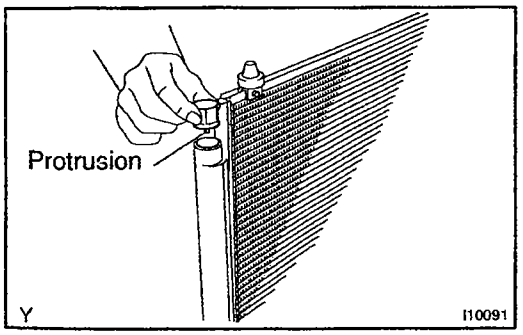
(c) Using pliers, remove the dryer.



(d) Insert a new dryer into the modulator.

NOTICE:

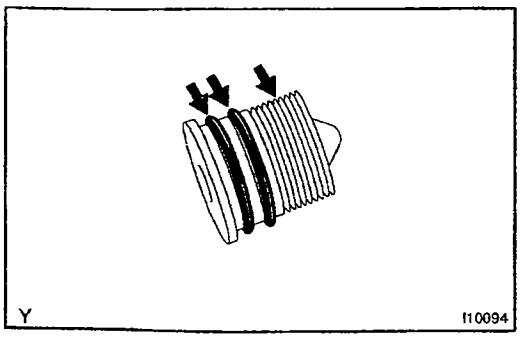
- **Do not remove the dryer from a vinyl bag until inserting it into the modulator.**
- **Install the dryer with its 2 layered part faced upward to the modulator.**



(e) Insert the filter into the modulator.

NOTICE:

Install the filter with its protrusion faced downward to the modulator.



(f) Install the cap to the modulator.

(1) Apply compressor oil to the o–rings and screw part of the cap.

Compressor oil: ND–OIL 8 or equivalent

(2) Using a hexagon wrench (10 mm, 0.39 in.), install the caps.

Torque: 12.3 N·m (125 kgf·cm, 9 ft·lbf)

INSTALLATION

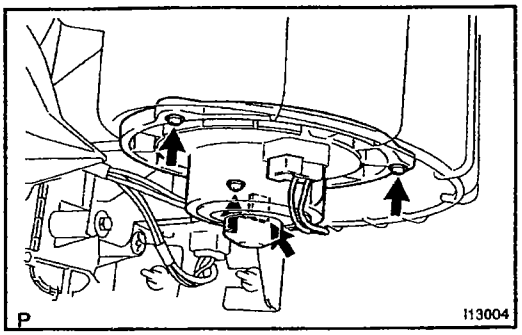
Installation is in the reverse order of removal (See page AC–45).

BLOWER MOTOR

AC1GP–02

INSPECTION

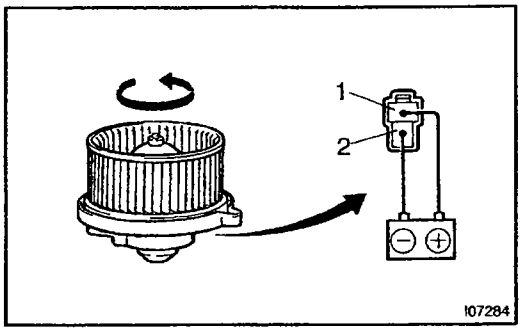
1. **REMOVE GLOVE COMPARTMENT PARTS**
   (See page BO–79)



2. **REMOVE BLOWER MOTOR**

(a) Remove the wire harness clamp and disconnect the connector.

(b) Remove the 3 screws and motor.



3. **INSPECT BLOWER MOTOR OPERATION**

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, then check that the motor operations smoothly.

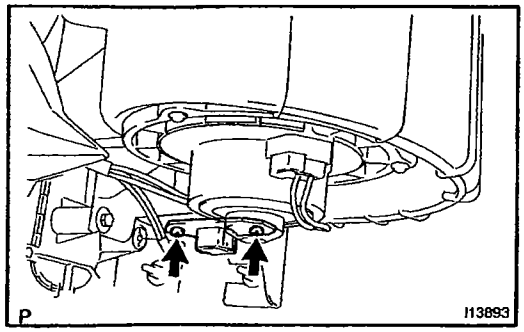
If operation is not as specified, replace the blower motor.

4. **INSTALL BLOWER MOTOR**

(a) Install the motor and 3 screws.

(b) Connect the connector and wire harness clamp.

5. **INSTALL GLOVE COMPARTMENT PARTS**
   (See page BO–85)



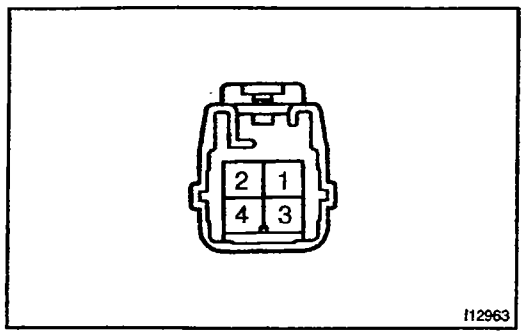
BLOWER RESISTOR

AC1GQ-02

INSPECTION

1. REMOVE BLOWER RESISTOR

(a) Disconnect the connector.
(b) Remove the 2 screws and the blower resistor.



2. INSPECT BLOWER RESISTOR CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2 – 3 – 4	Continuity

If continuity is not as specified, replace the blower resistor.

3. INSTALL BLOWER RESISTOR

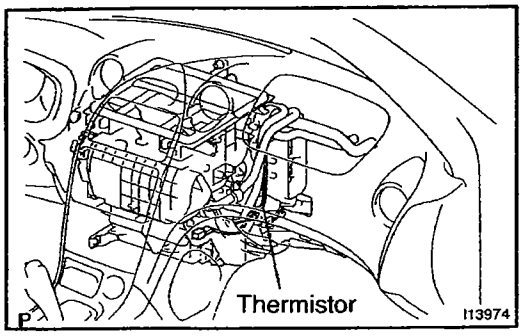
(a) Install the blower resistor and 2 screws.
(b) Connect the connector.

THERMISTOR

AC2H7-01

INSPECTION

1. **REMOVE BLOWER UNIT (See page AC–31)**



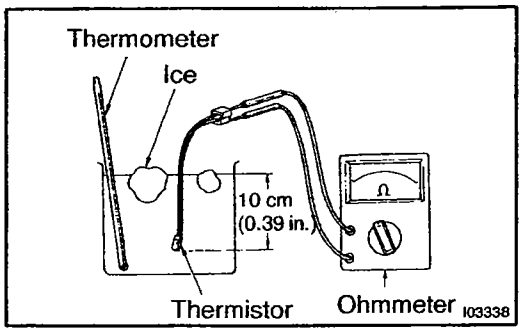
2. **REMOVE THERMISTOR**

(a) Disconnect the connector.

(b) Using a screwdriver, pull out the thermistor.

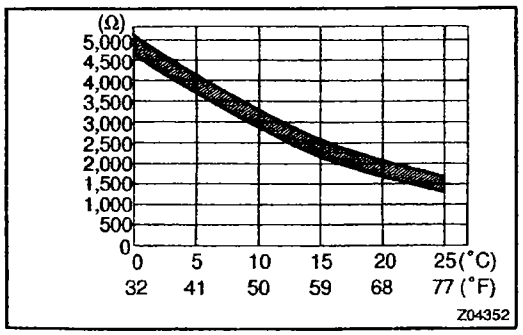
HINT:

Tape the screwdriver tip before use.



3. **INSPECT THERMISTOR**

(a) Place the thermistor in cold water, and while changing the temperature of water, measure resistance at the connector and at the same time, measure temperature of water with a thermometer.



(b) Compare the 2 readings on the chart.

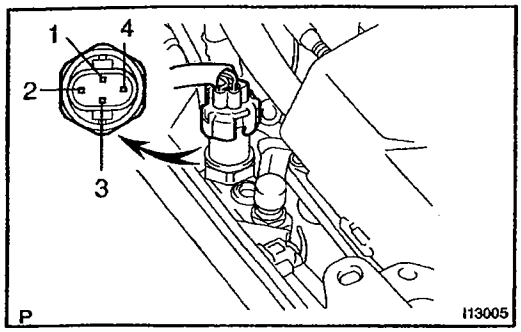
If resistance is not as specified, replace the thermistor.

4. **INSTALL THERMISTOR**

(a) Install the thermistor to A/C unit.

(b) Connect the connector.

5. **INSTALL BLOWER UNIT (See page AC–34)**

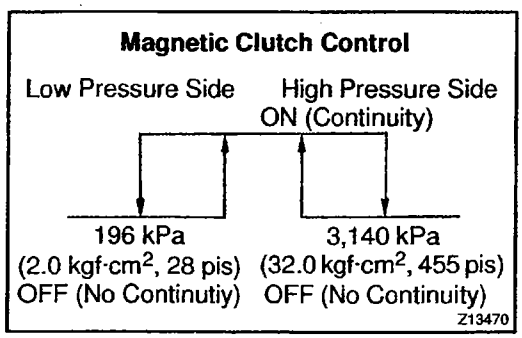


PRESSURE SWITCH

AC1GU-02

ON–VEHICLE INSPECTION

1. **SET ON MANIFOLD GAUGE SET (See page AC–19)**
2. **DISCONNECT CONNECTOR FROM PRESSURE SWITCH**
3. **RUN ENGINE AT APPROX. 1,500 RPM**

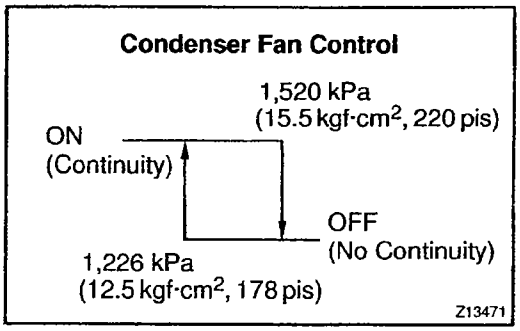


4. **Magnetic clutch control:**
   INSPECT PRESSURE SWITCH OPERATION:

(a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 1.

(b) Check continuity between terminals when refrigerant pressure is charged, as shown in the illustration.

If operation is not as specified, replace the pressure switch.



5. **Condenser fan control:**
   INSPECT PRESSURE SWITCH OPERATION

(a) Connect the positive (–) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 3.

(b) Check continuity between terminals when refrigerant pressure is changed, as shown in the illustration.

If operation is not as specified, replace the pressure switch.

6. **STOP ENGINE AND SET OFF MANIFOLD GAUGE SET**
7. **CONNECT CONNECTOR TO PRESSURE SWITCH**

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERANT SYSTEM

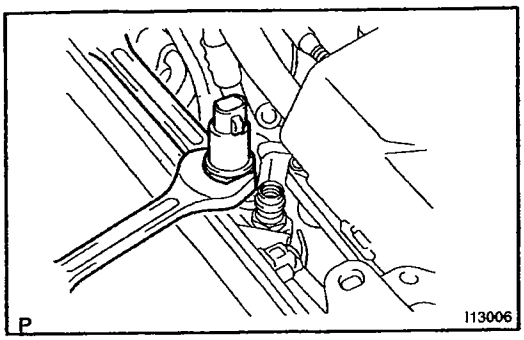
HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 430 ± 30 g (15.17 ± 1.06 oz.)



2. REMOVE PRESSURE SWITCH

(a) Disconnect the connector.

(b) Remove the pressure switch from the liquid tube.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

HINT:

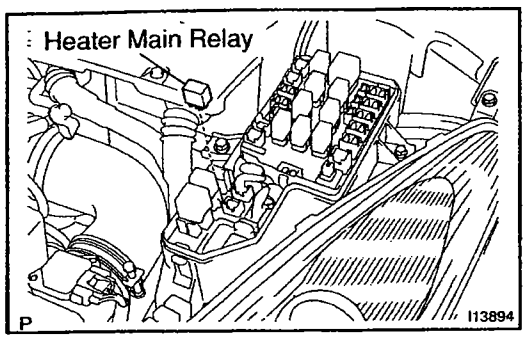
- Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and remove the switch.
- At the time of installation, please refer to the following item.

  Lubricate a new O–ring with compressor oil and install them to the switch.

AC1GW-01

INSTALLATION

Installation is in the reverse order of removal (See page AC–52).

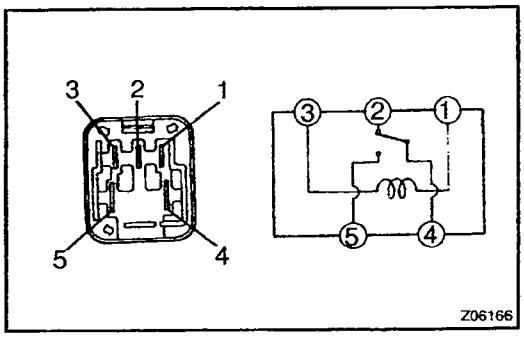


HEATER MAIN RELAY

AC1GX-02

INSPECTION

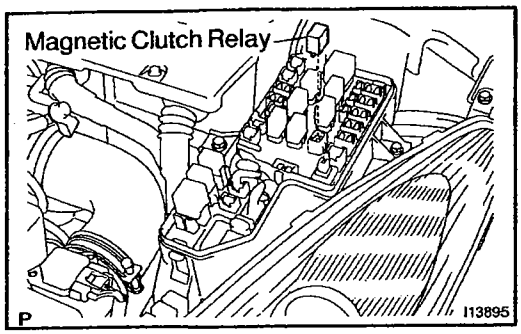
1. **REMOVE HEATER MAIN RELAY FROM ENGINE ROOM RELAY BLOCK NO. 1**



2. **INSPECT HEATER MAIN RELAY CONTINUITY**

Condition	Tester connection	Specified condition
Constant	1 – 3 2 – 4	Continuity
Apply B+ between terminals 1 and 3.	4 – 5	Continuity

If continuity is not as specified, replace the relay.

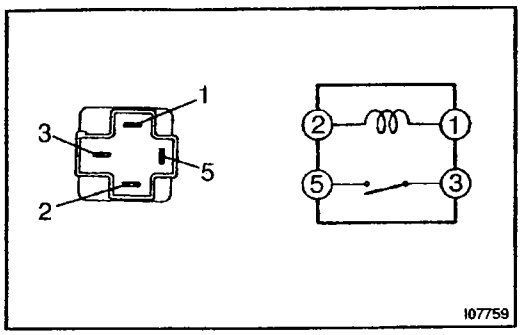


MAGNETIC CLUTCH RELAY

AC1GY-02

INSPECTION

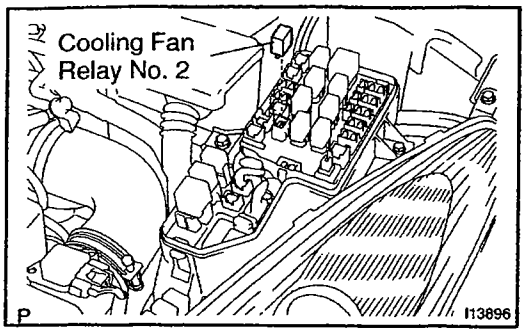
1. **REMOVE MAGNETIC CLUTCH RELAY FROM ENGINE ROOM J/B**



2. **INSPECT MAGNETIC CLUTCH RELAY CONTINUITY**

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

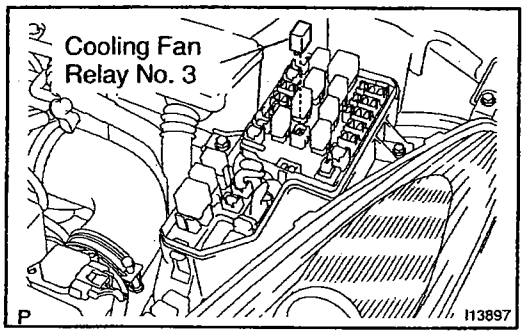


COOLING FAN RELAY

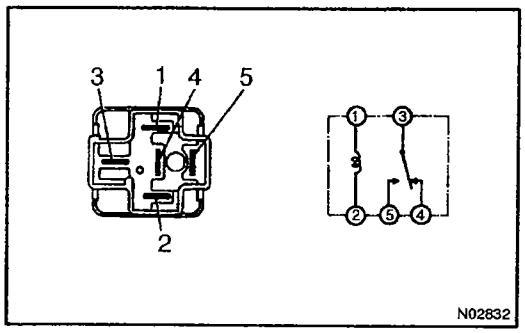
INSPECTION

AC2H8-01

1. **REMOVE COOLING FAN RELAY NO. 2 FROM ENGINE ROOM J/B**



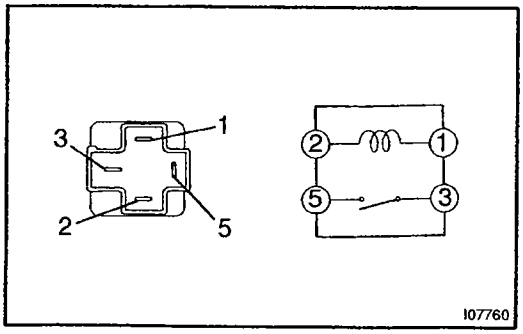
2. **REMOVE COOLING FAN RELAY NO. 3 FROM ENGINE ROOM J/B**



3. **INSPECT COOLING FAN RELAY NO.2 CONTINUITY**

Condition	Tester connection	Specified condition
Constant	1 – 2 4 – 5	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.



4. **INSPECT COOLING FAN RELAY NO.3 CONTINUITY**

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

CONDENSER FAN

AC1H0-02

ON–VEHICLE INSPECTION

1. INSPECT CONDENSER FAN OPERATION

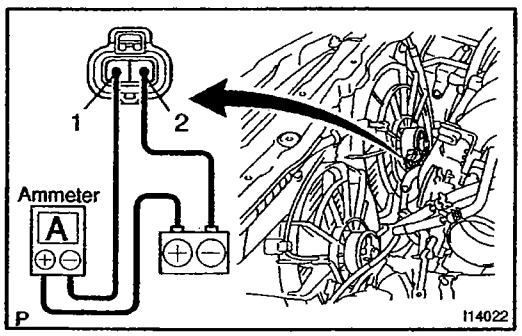
Inspect the fan operation at these condiyions, as shown in the chart.

Test conditions:

- Start engine
- Blower speed control switch position "HI"
- Temperature control dial at "COOL" position
- Set on manifold gauge set
- A/C switch ON

Condition	Fan operation (Fan speed)
Engine coolant temperature 88 °C (190 °F) or below	Rotate (Low speed)
Engine coolant temperature 98 °C (208 °F) or above	Rotate (High speed)
Refrigerant pressure is less than 1,520 kPa (15.5 kgf/cm^2, 220 psi)	Rotate (Low speed)
Refrigerant pressure is 1,520 kPa (15.5 kgf/cm^2, 220 psi) or above	Rotate (High speed)

If operation is not as specified, proceed to the next inspection.



2. INSPECT CONDENSER FAN MOTOR OPERATION

(a) Disconnect the connector.

(b) Connect battery and ammeter.

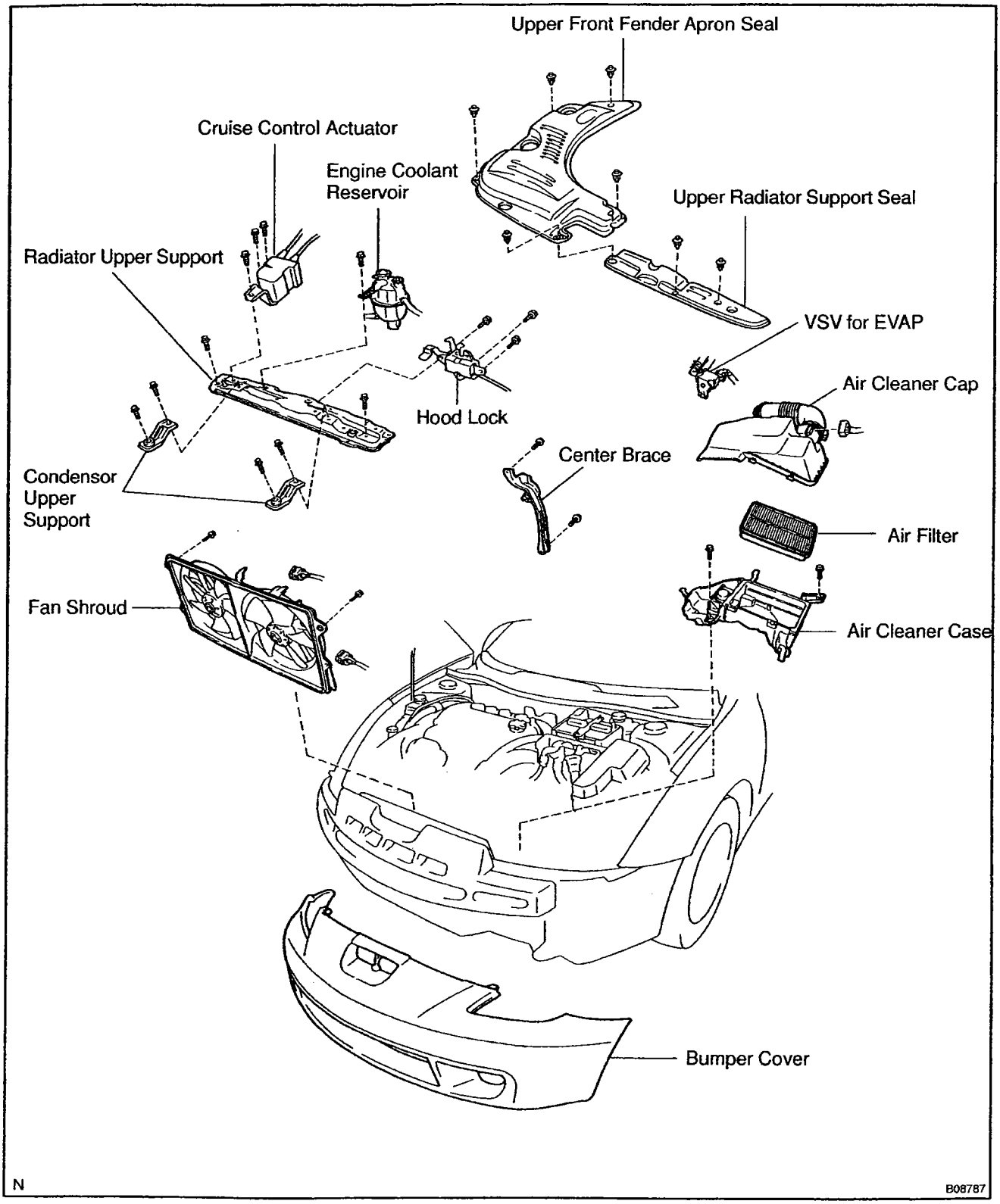
(c) Check that the fan rotates smoothly, and then check the reading on the ammeter.

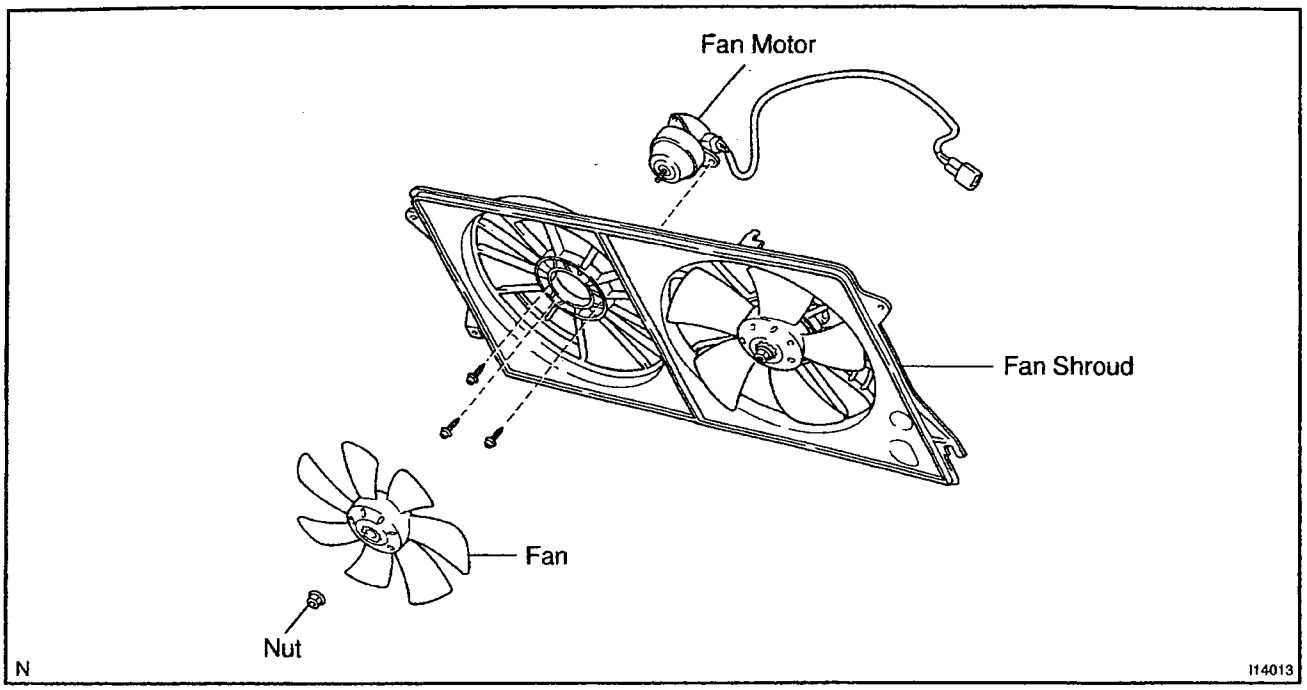
Specified amperage: 9.2 – 11.0 A at 20 °C (68 °F)

- If operation is not as specified, replace the fan motor.
- If operation is as specified, check the pressure switch, cooling fan relays and engine coolant temp. switch.

AC2HS-01

COMPONENTS




Fan Motor
Fan Shroud
Fan
Nut
N
I14013

AIR CONDITIONING AMPLIFIER

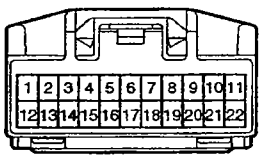
AC2H1A-01

ON–VEHICLE INSPECTION

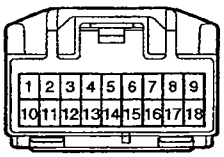
1. **REMOVE COMBINATION MATER**
   (See page BE–44)
2. **REMOVE ECM**
3. **INSPECT A/C AMPLIFIER CIRCUIT**

(a) Disconnect the connector from the combination mater and inspect the connector on the wire harness side, as shown in the chart below.
Test condition:
Turn ignition switch to ON

Wire harness side:



Connector "A"



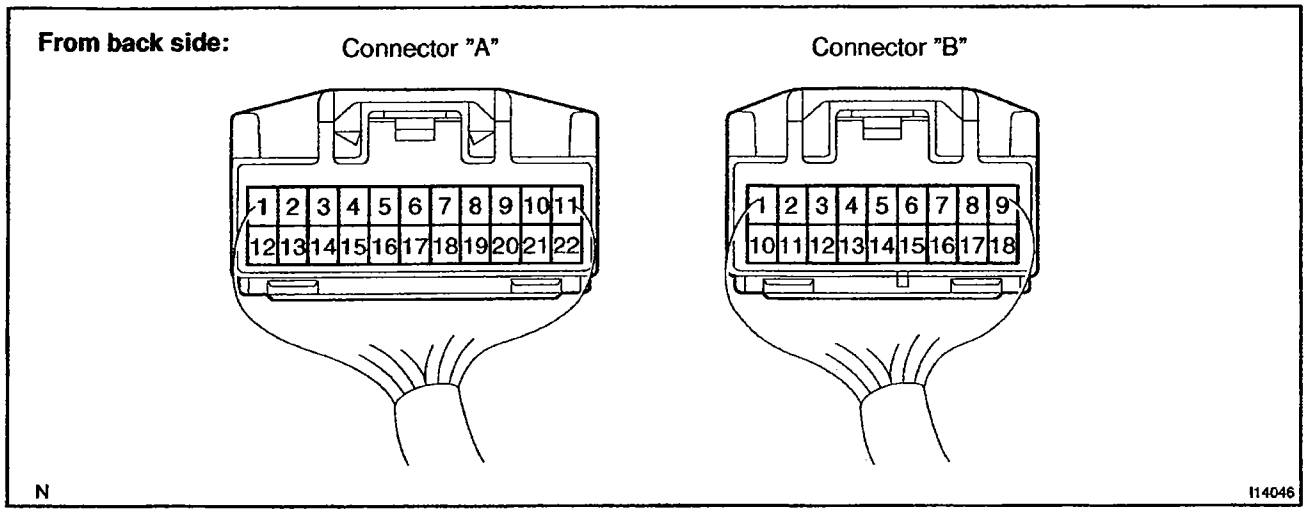
Connector "B"

I14994

Tester connection	Condition	Specified condition
A7 – Ground	Constant	Continuity
A6 – A18	Evaporator temperature at 25 °C (77 °F)	1.5 kΩ

If circuit is as specified, try replacing the amplifier with a new one. If the circuit is not as specified, inspect the circuits connected to other parts.

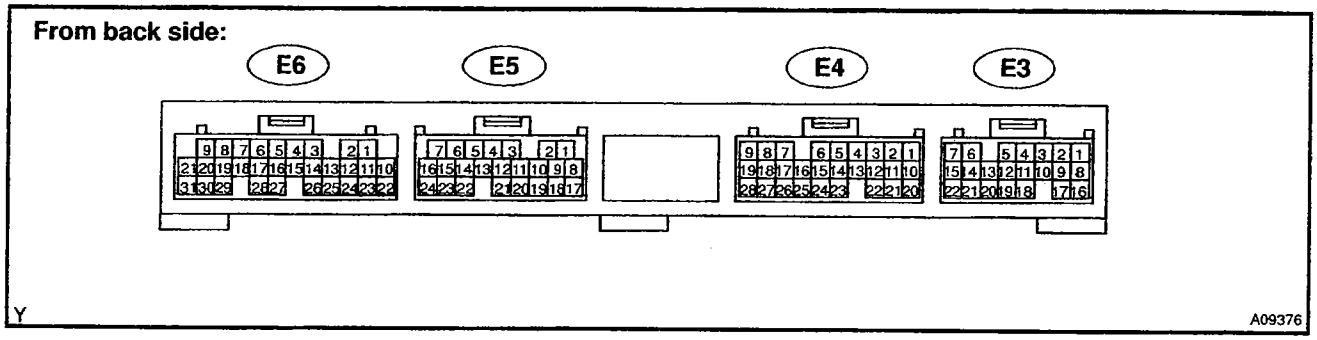
(b) Connect the connector to combination mater and inspect wire harness side from the back side, as shown in the chart below.
Test condition:
- Run engine at idle speed
- Set on manifold gauge set



Tester connection	Condition	Specified condition
B10 – Ground	A/C switch ON & Blower motor: operate	Below 1.0 V
	A/C switch OFF	Battery positive voltage
B14 – Ground	Mode selector: DEF.	Below 1.0 V
	Mode Selector: Except DEF.	Battery positive voltage
B15 – Ground	A/C switch ON	Below 1.0 V
	A/C switch OFF	Battery positive voltage
A13 – Ground	Blower motor: Operate	Below 2.0 V
	Blower motor: No operate	Battery positive voltage

If circuit is as specified, try replacing the amplifier with a new one. If the circuit is not as specified, inspect the circuits connected to other parts.

(c) Inspect the wire harness side connector of ECM from the back side, as shown in the chart below.



Tester connection	Condition	Specified condition
E3–12 ↔ Ground	Start engine. Magnetic clutch: ON	Below 1.0 V
	Start engine. Magnetic clutch: OFF	Battery positive voltage
E4–28 ↔ Ground	Start engine. A/C switch ON	Battery positive voltage
	Start engine. A/C switch OFF	No voltage
E4–18 ↔ Ground	Refrigerant pressure: 196 – 1,340 kPa	Battery positive voltage
	Refrigerant pressure: less than 196 or more than 1,340 kPa	No voltage

If circuit is as specified, try replacing the amplifier with a new one. If the circuit is not as specified, inspect the circuits connected to other parts.

AC2HB-01

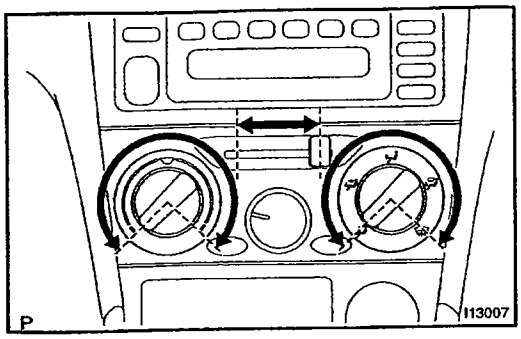
REMOVAL

1. **REMOVE COMBINATION METER (See page BE–44)**
2. **REMOVE ECM**

AC2HC-01

INSTALLATION

Installation is in the reverse order of removal (See page AC–63).



HEATER CONTROL ASSEMBLY

AC2HD-01

ON–VEHICLE INSPECTION

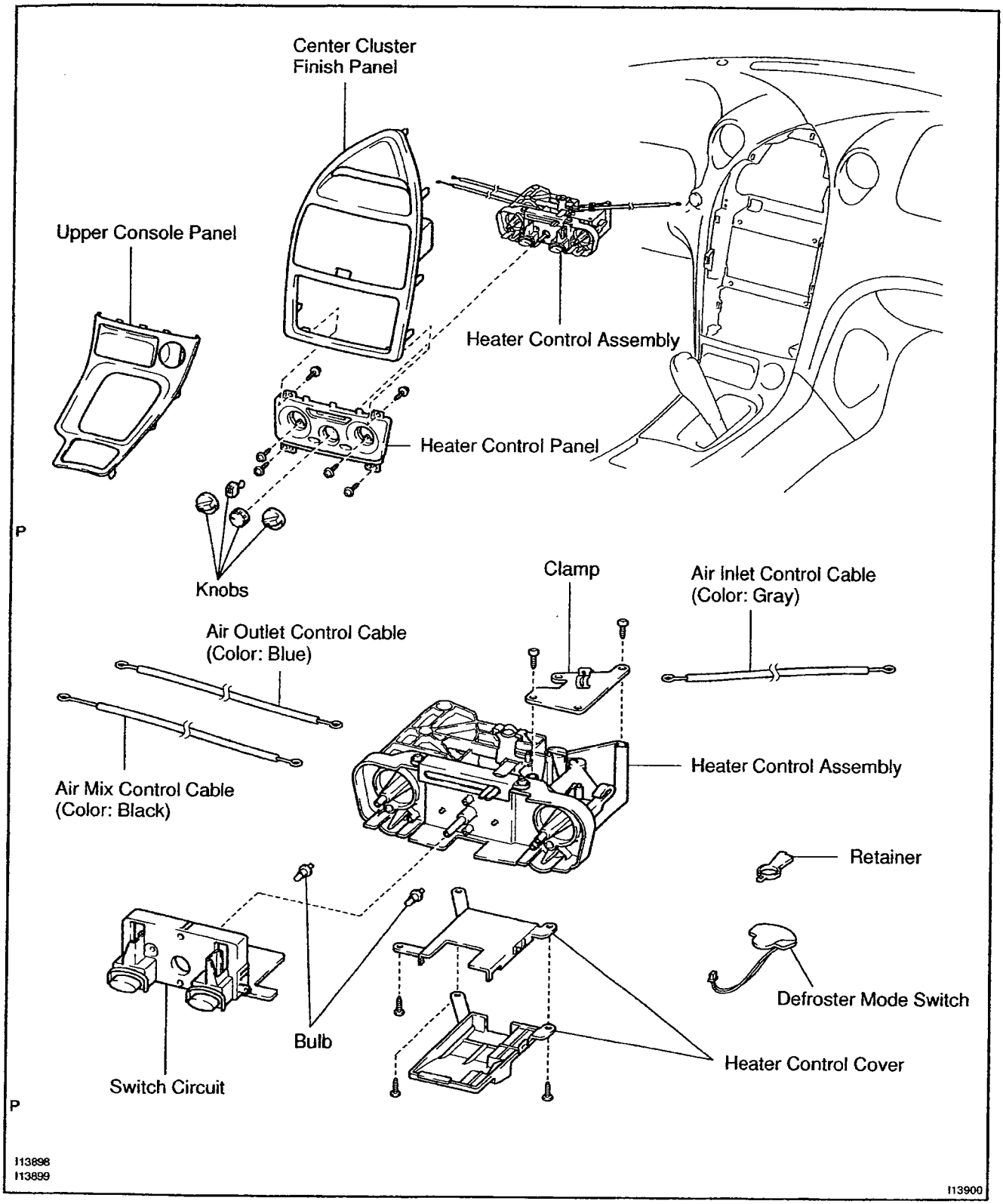
INSPECT HEATER CONTROL DIALS OPERATION

Turn the control lever and 2 control dials left and right then check that click sound can be heard and recoil is felt.

If click sound can not be heard or recoil is felt, adjust the control cable or check control cable and heater control assembly.

COMPONENTS

AC2HE-01



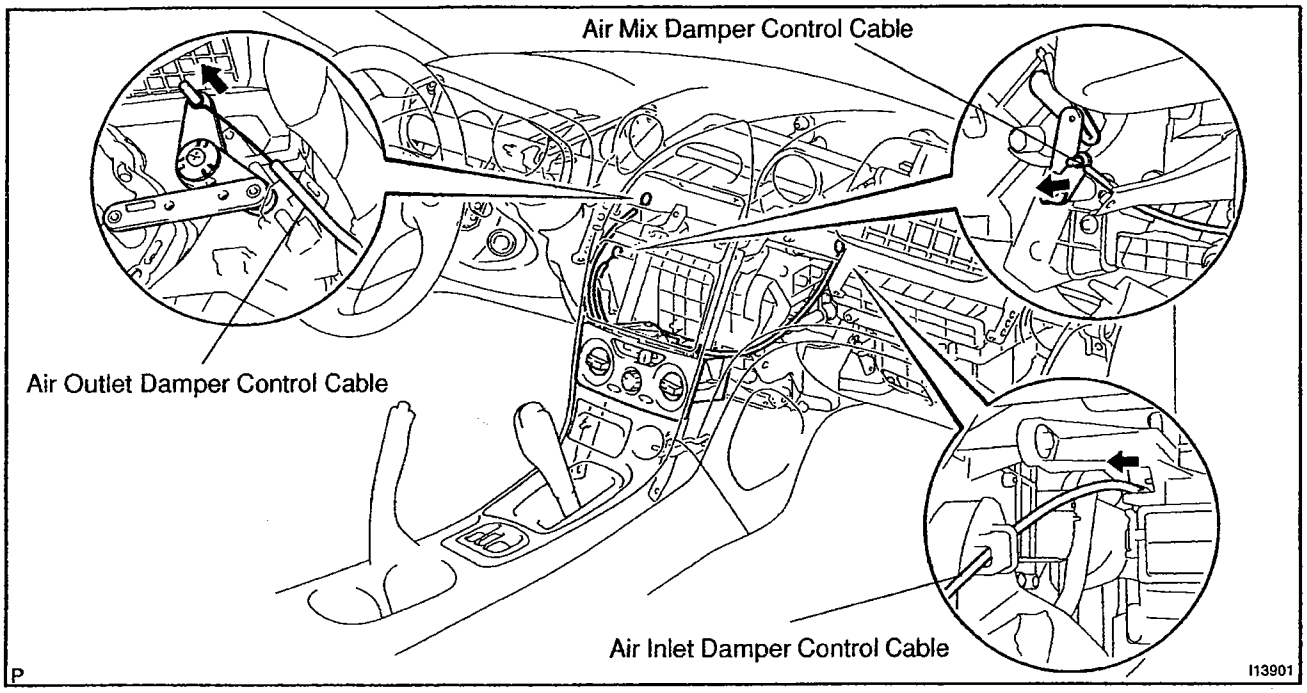
AC2HF-01

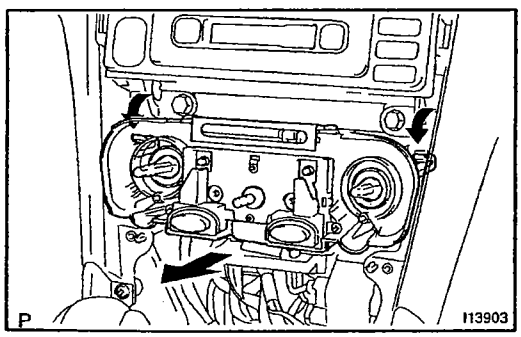
REMOVAL

1. **REMOVE CENTER CLUSTER FINISH PANEL (See page BO–79)**
2. **DISCONNECT HEATER CONTROL CABLES**

NOTICE:

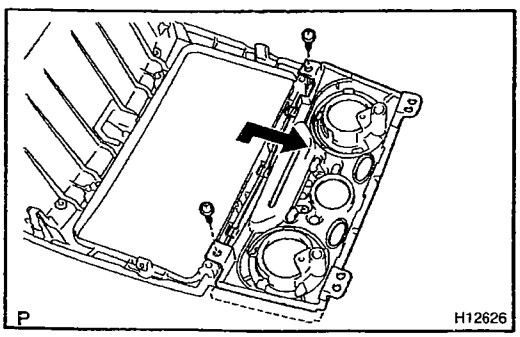
When the air mix damper control cables is disconnected, should not bend the cable.





3. **REMOVE HEATER CONTROL ASSEMBLY**

Release the 2 claws and pull out the A/C control assembly, then disconnect the connector.



4. **REMOVE HEATER CONTROL PANEL**

(a) Remove the 2 screws.

(b) Slide and remove the A/C control assembly.

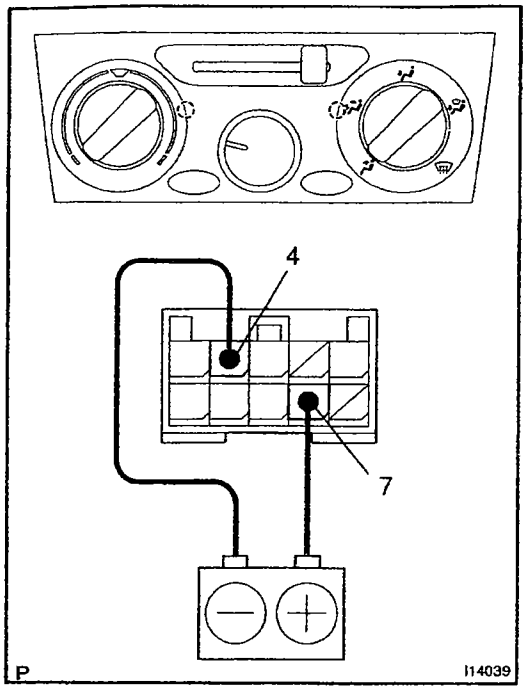
AC2HS-01

INSPECTION

1. INSPECT ILLUMINATION OPERATION

Connect the positive (+) lead from the battery to terminal 7 and negative (–) lead to terminal 4 then check that the illuminations lights up.

If operation is not as specified, check the faulty bulb.

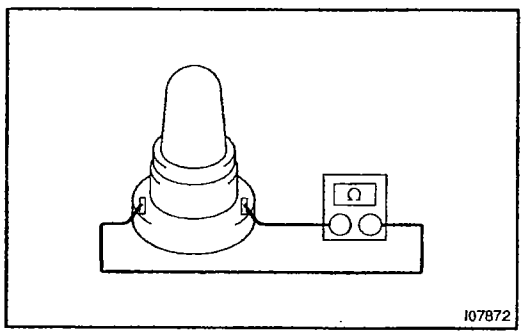


2. INSPECT BULB

Apply the tester as shown in the illustration to the test for continuity.

If continuity exists, replace the heater control.

If no continuity exists, replace the bulb.

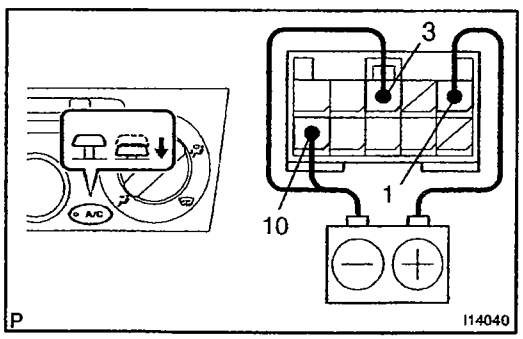


3. INSPECT A/C INDICATOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3 and 10.

(b) Push the A/C button in and then check that the indicator lights up.

If operation is not as specified, replace the switch.

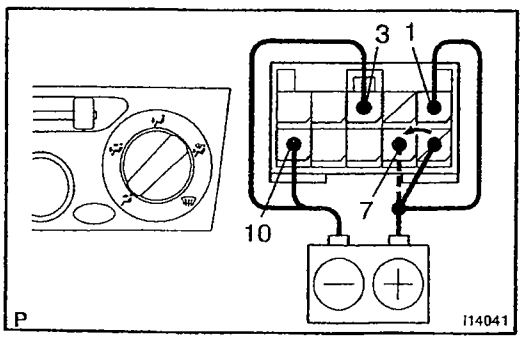


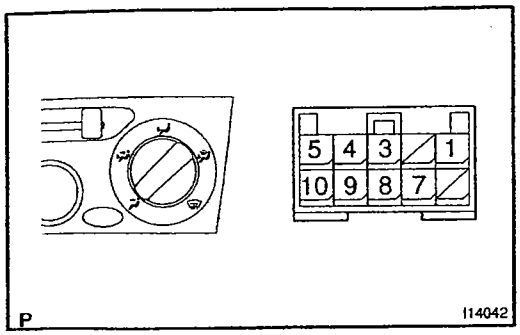
4. INSPECT DIMMING OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3 and 10 while press the switch.

(b) Connect the positive (+) lead from battery to terminal 7 and then check that the indicator dims.

If operation is not as specified, replace the switch.

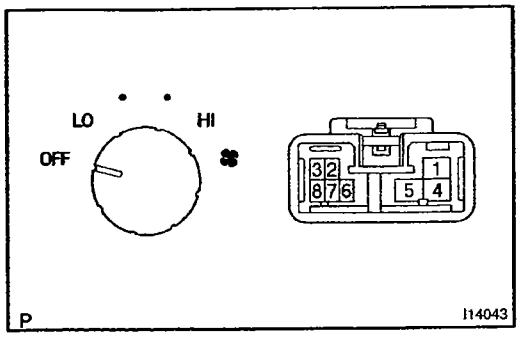




5. INSPECT A/C SWITCH CONTINUITY

Condition/ Circuit	Tester connection	Specified condition
OFF	–	No continuity
ON	9 – 3	Continuity

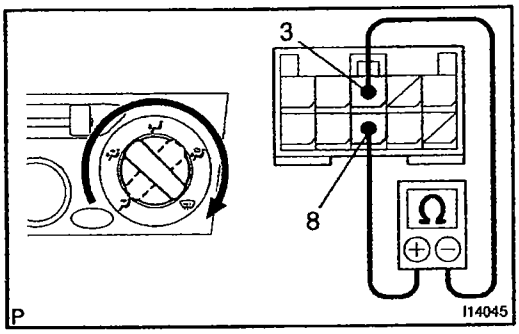
Switch continuity:
If continuity is not as specified, replace the switch.
Illumination circuit:
If continuity is not as specified, replace the bulb.



6. INSPECT BLOWER SPEED CONTROL SWITCH CONTINUITY

Position/ Circuit	Tester connection	Specified condition
OFF	–	No continuity
LO	1 – 8	Continuity
M1	1 – 6 – 8	Continuity
M2	1 – 5 – 8	Continuity
HI	1 – 4 – 8	Continuity

If continuity is not as specified, replace the switch.



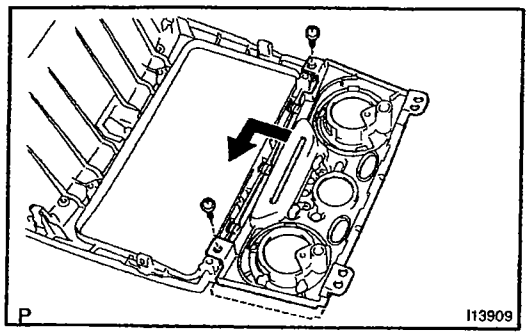
7. INSPECT DEFROSTER MODE SWITCH OPERATION

Position/ Circuit	Tester connection	Specified condition
OFF	–	No continuity
ON	3 – 8	Continuity

If no continuity exists, replace the switch.

8. INSPECT REAR DEFOGGER SWITCH OPERATION

(See page BE–55)



AC2HG-01

INSTALLATION

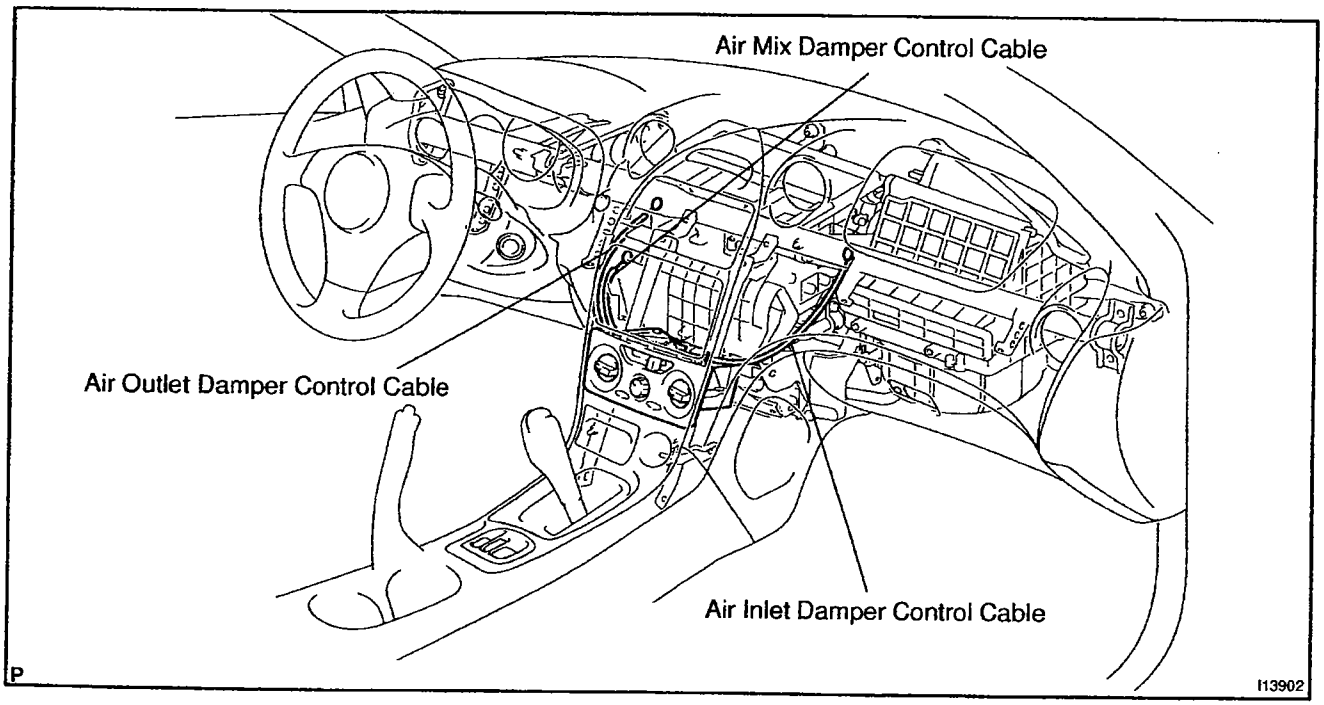
1. INSTALL A/C CONTROL PANEL

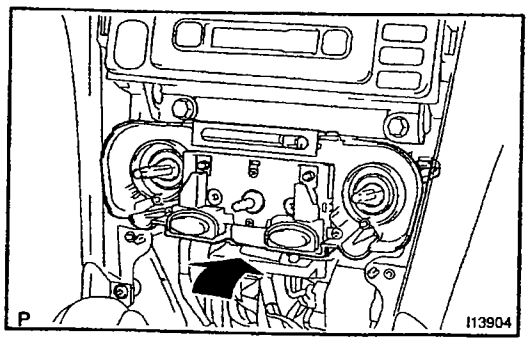
Install the A/C control panel and 2 screws.

2. INSTALL A/C CONTROL ASSEMBLY

(a) Install the A/C control assembly temporarily.

(b) Pass through the A/C control cables as shown in the illustration.

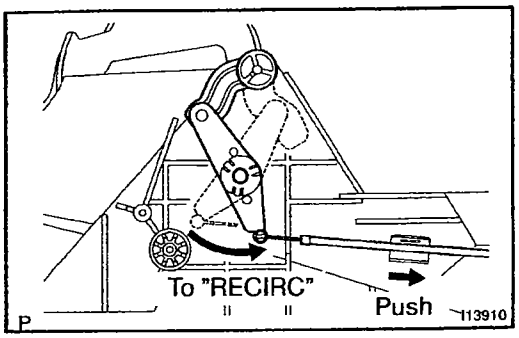




(c) Fit the 2 claws of heater control assembly in the instrument panel hole.

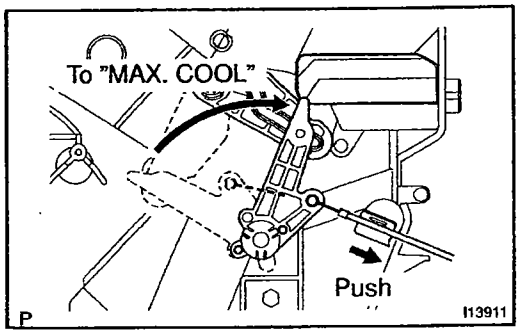
3. CONNECT A/C CONTROL CABLES

(a) Set air inlet control lever to "RECIRC" position.
(b) Set temperature control dial to "MAX. COOL" position.
(c) Set mode control dial to "DEF" position.



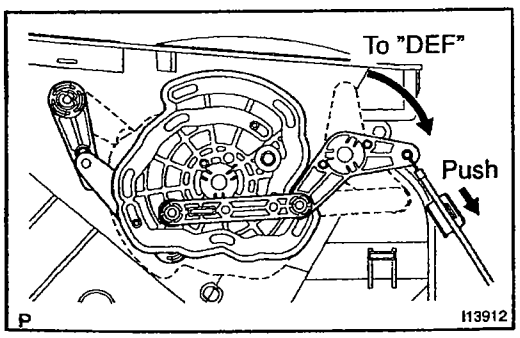
(d) Adjust air inlet damper control cable.
Set air inlet damper control lever to "RECIRC" position and connect the inner cable to lever pin and clamp the outer cable.

HINT:
Lock the clamp while lightly pushing the outer cable to the direction shown by arrow in the illustration.



(e) Adjust air mix damper control cable.
Set air mix damper control lever to "MAX. COOL" position and connect the inner cable to lever pin and clamp the outer cable.

HINT:
Lock the clamp while lightly pushing the outer cable to the direction shown by arrow in the illustration.



(f) Adjust air outlet damper control cable.
Pull the air outlet damper control link to "DEF" position, connect the control cable and lock the clamp.

HINT:
Lock the clamp while lightly pushing the outer cable to the direction shown by arrow in the illustration.

ENGINE COOLANT TEMPERATURE (ECT) SWITCH

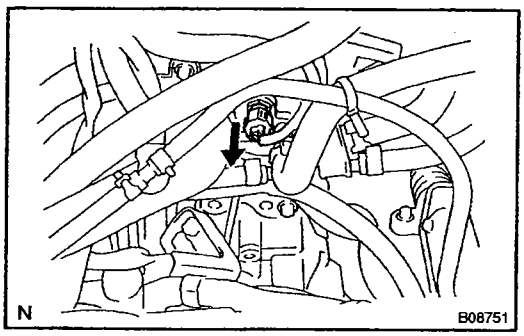
AC1HE-02

INSPECTION

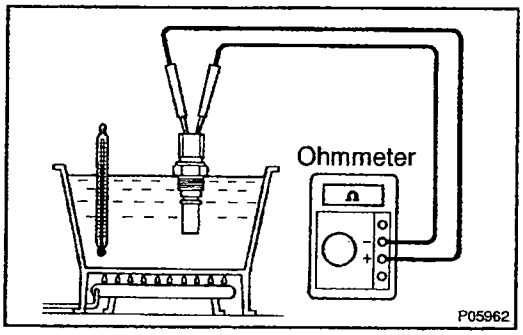
1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all the coolant.



2. REMOVE ECT SWITCH



3. INSPECT SWITCH CONTINUITY

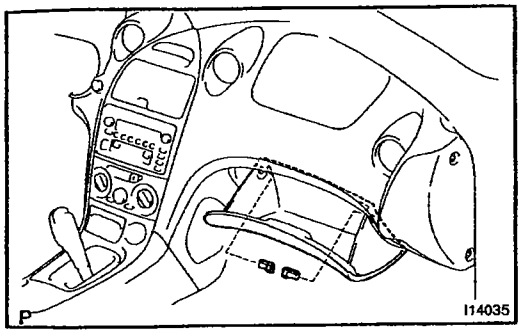
(a) Using an ohmmeter, check that no continuity exists between the terminals when the coolant temperature is above 90 °C (194 °F).

(b) Using an ohmmeter, check that continuity exists between the terminals when the coolant temperature is below 83 °C (181 °F).

If no continuity exists, replace the switch.

4. INSTALL ECT SWITCH

5. REFILL ENGINE COOLANT



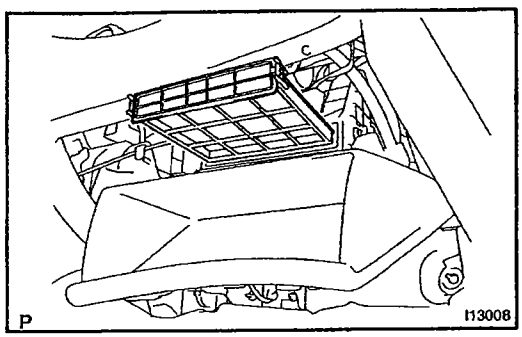
AIR REFINER FILTER

REPLACEMENT

AC2HH-01

1. REMOVE AIR REFINER FILTER

(a) Remove the 2 pins in the glove box and open the glove box widely by pulling it down.



(b) Pull out the filter case.

(c) Remove the air refiner filter from the filter case.

2. INSTALL AIR REFINER FILTER

(a) Install the air refiner filter to filter case.

(b) Install the filter case.

(c) Close the glove box and install the 2 pins to it.

– MEMO –

ALPHABETICAL INDEX

A

	Page Vol.
ABBREVIATIONS USED IN THIS MANUAL (TERMS)	IN–35 (1)
ABS ACTUATOR	BR–48 (2)
AIR CONDITIONING (PREPARATION)	PP–85 (1)
AIR CONDITIONING (SERVICE SPECIFICATIONS)	SS–57 (1)
AIR CONDITIONING AMPLIFIER	AC–60 (2)
AIR CONDITIONING SYSTEM	AC–1 (2)
AIR CONDITIONING UNIT	AC–24 (2)
AIR REFINER FILTER	AC–73 (2)
AIRBAG SENSOR ASSEMBLY	RS–52 (2)
ANTENNA	BE–119 (2)
ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD) (DIAGNOSTICS)	DI–274 (1)
ATF TEMPERATURE SENSOR (U240E)	AX–6 (2)
ATF TEMPERATURE SENSOR (U341E)	AX–5 (2)
AUDIO SYSTEM	BE–88 (2)
AUTOMATIC TRANSAXLE (U240E) (DIAGNOSTICS)	DI–155 (1)
AUTOMATIC TRANSAXLE (U240E) (PREPARATION)	PP–46 (1)
AUTOMATIC TRANSAXLE (U240E) (SERVICE SPECIFICATIONS)	SS–41 (1)
AUTOMATIC TRANSAXLE (U341E) (DIAGNOSTICS)	DI–218 (1)
AUTOMATIC TRANSAXLE (U341E) (PREPARATION)	PP–51 (1)
AUTOMATIC TRANSAXLE (U341E) (SERVICE SPECIFICATIONS)	SS–43 (1)
AUTOMATIC TRANSAXLE SYSTEM (U240E)	AX–1 (2)
AUTOMATIC TRANSAXLE SYSTEM (U341E)	AX–1 (2)
AUTOMATIC TRANSAXLE UNIT (U240E)	AX–30 (2)
AUTOMATIC TRANSAXLE UNIT (U341E)	AX–30 (2)

B

BACK DOOR	BO–22 (2)
BACK DOOR GLASS	BO–64 (2)
BACK DOOR STAY	BO–27 (2)
BACK–UP LIGHT SYSTEM	BE–30 (2)
BLOWER MOTOR	AC–48 (2)
BLOWER RESISTOR	AC–49 (2)
BLOWER UNIT	AC–30 (2)
BODY (PREPARATION)	PP–80 (1)
BODY (SERVICE SPECIFICATIONS)	SS–55 (1)
BODY CONTROL SYSTEM (DIAGNOSTICS)	DI–535 (1)
BODY ELECTRICAL (PREPARATION)	PP–77 (1)
BODY ELECTRICAL (SERVICE SPECIFICATIONS)	SS–54 (1)
BODY ELECTRICAL SYSTEM	BE–1 (2)
BRAKE	MA–6 (1)
BRAKE (PREPARATION)	PP–62 (1)
BRAKE (SERVICE SPECIFICATIONS)	SS–49 (1)
BRAKE BOOSTER ASSEMBLY	BR–13 (2)
BRAKE FLUID	BR–4 (2)
BRAKE MASTER CYLINDER	BR–9 (2)
BRAKE PEDAL	BR–6 (2)
BRAKE SYSTEM	BR–1 (2)

C

CAMSHAFT POSITION SENSOR	IG–8 (2)
CAMSHAFT TIMING OIL CONTROL VALVE	SF–46 (2)
CHARGING (PREPARATION)	PP–24 (1)
CHARGING (SERVICE SPECIFICATIONS)	SS–27 (1)
CHARGING SYSTEM	CH–1 (2)
CHASSIS	MA–7 (1)
CIRCUIT INSPECTION (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–285 (1)
CIRCUIT INSPECTION (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–175 (1)
CIRCUIT INSPECTION (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–238 (1)
CIRCUIT INSPECTION (BODY CONTROL SYSTEM) (DIAGNOSTICS)	DI–544 (1)
CIRCUIT INSPECTION (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–496 (1)
CIRCUIT INSPECTION (ENGINE) (DIAGNOSTICS)	DI–23 (1)
CIRCUIT INSPECTION (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–339 (1)
CIRCUIT OPENING RELAY	SF–53 (2)
CLIP	BO–1 (2)
CLOCK	BE–122 (2)
CLUTCH (PREPARATION)	PP–27 (1)
CLUTCH (SERVICE SPECIFICATIONS)	SS–29 (1)
CLUTCH MASTER CYLINDER	CL–4 (2)
CLUTCH PEDAL	CL–2 (2)
CLUTCH RELEASE CYLINDER	CL–9 (2)
CLUTCH UNIT	CL–14 (2)
CO/HC	EM–1 (2)
COMBINATION METER	BE–39 (2)
COMPRESSION	EM–3 (2)
COMPRESSOR AND MAGNETIC CLUTCH	AC–35 (2)
CONDENSER	AC–43 (2)
CONDENSER FAN	AC–57 (2)
COOLANT	CO–1 (2)
COOLING (PREPARATION)	PP–11 (1)
COOLING (SERVICE SPECIFICATIONS)	SS–19 (1)
COOLING FAN RELAY	AC–56 (2)
COOLING FAN RELAY	CO–31 (2)
CRANKSHAFT POSITION SENSOR	IG–11 (2)
CRUISE CONTROL SYSTEM (DIAGNOSTICS)	DI–483 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–275 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–156 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–219 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (BODY CONTROL SYSTEM) (DIAGNOSTICS)	DI–536 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–484 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (ENGINE) (DIAGNOSTICS)	DI–2 (1)
CUSTOMER PROBLEM ANALYSIS CHECK (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–325 (1)
CYLINDER BLOCK	EM–85 (2)
CYLINDER HEAD	EM–36 (2)

D

	Page Vol.
DEFOGGER SYSTEM	BE–54 (2)
DIAGNOSTIC TROUBLE CODE CHART (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–280 (1)
DIAGNOSTIC TROUBLE CODE CHART (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–168 (1)
DIAGNOSTIC TROUBLE CODE CHART (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–231 (1)
DIAGNOSTIC TROUBLE CODE CHART (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–490 (1)
DIAGNOSTIC TROUBLE CODE CHART (ENGINE) (DIAGNOSTICS)	DI–14 (1)
DIAGNOSTIC TROUBLE CODE CHART (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–332 (1)
DIFFERENTIAL CASE (C56)	MX–45 (2)
DIFFERENTIAL CASE (C60)	MX–48 (2)
DIFFERENTIAL OIL SEAL (U240E)	AX–14 (2)
DIFFERENTIAL OIL SEAL (U341E)	AX–13 (2)
DIRECT CLUTCH SPEED SENSOR (U341E)	AX–4 (2)
DOOR SIDE AIRBAG SENSOR	RS–67 (2)
DRIVE BELT	AC–16 (2)
DRIVE BELT	SR–3 (2)

E

EFI MAIN RELAY	SF–52 (2)
ELECTRIC COOLING FAN	CO–24 (2)
ELECTRIC TENSION REDUCER SYSTEM	BE–52 (2)
EMISSION CONTROL (PREPARATION)	PP–7 (1)
EMISSION CONTROL (SERVICE SPECIFICATIONS)	SS–16 (1)
EMISSION CONTROL SYSTEM	EC–1 (2)
ENGINE	MA–5 (1)
ENGINE (DIAGNOSTICS)	DI–1 (1)
ENGINE CONTROL MODULE (ECM)	SF–71 (2)
ENGINE COOLANT TEMPERATURE (ECT) SENSOR	SF–62 (2)
ENGINE COOLANT TEMPERATURE (ECT) SWITCH	AC–72 (2)
ENGINE MECHANICAL (PREPARATION)	PP–2 (1)
ENGINE MECHANICAL (SERVICE SPECIFICATIONS)	SS–6 (1)
ENGINE UNIT	EM–70 (2)
EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM	EC–5 (2)
EXHAUST SYSTEM	EM–115 (2)

F

FLOOR SHIFT ASSEMBLY (U240E)	AX–17 (2)
FLOOR SHIFT ASSEMBLY (U341E)	AX–16 (2)
FOG LIGHT SYSTEM	BE–22 (2)
FOR ALL OF VEHICLES	IN–10 (1)
FRONT AIRBAG SENSOR	RS–57 (2)
FRONT AXLE HUB	SA–11 (2)
FRONT BRAKE CALIPER	BR–20 (2)
FRONT BRAKE PAD	BR–17 (2)
FRONT BUMPER	BO–4 (2)
FRONT DOOR	BO–10 (2)
FRONT DRIVE SHAFT	SA–18 (2)
FRONT LOWER BALL JOINT	SA–46 (2)
FRONT LOWER SUSPENSION ARM	SA–41 (2)
FRONT PASSENGER AIRBAG ASSEMBLY	RS–26 (2)
FRONT SEAT	BO–92 (2)
FRONT SHOCK ABSORBER	SA–33 (2)
FRONT SPEED SENSOR	BR–55 (2)
FRONT STABILIZER BAR	SA–50 (2)
FRONT WHEEL ALIGNMENT	SA–4 (2)
FRONT WHEEL HUB BOLT	SA–17 (2)
FRONT WIPER AND WASHER	BO–28 (2)
FUEL CUT RPM	SF–73 (2)
FUEL PRESSURE REGULATOR	SF–15 (2)
FUEL PUMP	SF–6 (2)
FUEL TANK AND LINE	SF–26 (2)

G

GENERAL INFORMATION (HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS)	IN–19 (1)
GENERAL INFORMATION (HOW TO USE THIS MANUAL)	IN–1 (1)
GENERAL INFORMATION (REPAIR INSTRUCTIONS)	IN–4 (1)
GENERATOR	CH–5 (2)
GLOSSARY OF SAE AND TOYOTA TERMS (TERMS)	IN–40 (1)

H

HEADLIGHT	BO–6 (2)
HEADLIGHT AND TAILLIGHT SYSTEM	BE–15 (2)
HEATED OXYGEN SENSOR	SF–69 (2)
HEATER CONTROL ASSEMBLY	AC–65 (2)
HEATER MAIN RELAY	AC–54 (2)
HOOD	BO–9 (2)
HORN SYSTEM	BE–125 (2)
HOW TO PROCEED WITH TROUBLESHOOTING (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–274 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–155 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–218 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (BODY CONTROL SYSTEM) (DIAGNOSTICS)	DI–535 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–483 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (ENGINE) (DIAGNOSTICS)	DI–1 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS)	IN–20 (1)
HOW TO PROCEED WITH TROUBLESHOOTING (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–324 (1)
HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS	IN–19 (1)
HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE (HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS)	IN–30 (1)
HOW TO USE THIS MANUAL	IN–1 (1)

I

	Page Vol.
IDENTIFICATION INFORMATION	IN–3 (1)
IDLE AIR CONTROL (IAC) VALVE	SF–40 (2)
IDLE SPEED	EM–14 (2)
IGNITION (PREPARATION)	PP–19 (1)
IGNITION (SERVICE SPECIFICATIONS)	SS–23 (1)
IGNITION COIL	IG–5 (2)
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH	BE–13 (2)
IGNITION SYSTEM	IG–1 (2)
IGNITION TIMING	EM–13 (2)
INJECTOR	SF–18 (2)
INPUT SHAFT (C56)	MX–26 (2)
INPUT SHAFT (C60)	MX–29 (2)
INSIDE VEHICLE	MA–2 (1)
INSTRUMENT PANEL	BO–76 (2)
INTERIOR LIGHT SYSTEM	BE–27 (2)

K

KNOCK SENSOR	SF–66 (2)

L

LUBRICATION (PREPARATION)	PP–15 (1)
LUBRICATION (SERVICE SPECIFICATIONS)	SS–21 (1)

M

MAGNETIC CLUTCH RELAY	AC–55 (2)
MAINTENANCE (PREPARATION)	PP–1 (1)
MAINTENANCE (SERVICE SPECIFICATIONS)	SS–4 (1)
MANIFOLD GAUGE SET	AC–19 (2)
MANUAL TRANSAXLE (C56) (PREPARATION)	PP–31 (1)
MANUAL TRANSAXLE (C56) (SERVICE SPECIFICATIONS)	SS–31 (1)
MANUAL TRANSAXLE (C60) (PREPARATION)	PP–38 (1)
MANUAL TRANSAXLE (C60) (SERVICE SPECIFICATIONS)	SS–36 (1)
MANUAL TRANSAXLE ASSEMBLY (C56)	MX–9 (2)
MANUAL TRANSAXLE ASSEMBLY (C60)	MX–9 (2)
MANUAL TRANSAXLE UNIT (C56)	MX–2 (2)
MANUAL TRANSAXLE UNIT (C60)	MX–2 (2)
MASS AIR FLOW (MAF) METER	SF–29 (2)

O

OIL AND FILTER	LU–1 (2)
OIL NOZZLE (2ZZ–GE)	LU–14 (2)
OIL PUMP	LU–5 (2)
OUTPUT SHAFT (C56)	MX–34 (2)
OUTPUT SHAFT (C60)	MX–37 (2)
OUTSIDE VEHICLE	MA–1 (1)

P

PARK/NEUTRAL POSITION (PNP) SWITCH (U240E)	AX–8 (2)
PARK/NEUTRAL POSITION (PNP) SWITCH (U341E)	AX–7 (2)
PARKING BRAKE	BR–42 (2)
PARKING BRAKE LEVER	BR–8 (2)
PARTS LAYOUT AND SCHEMATIC DRAWING	EC–2 (2)
PARTS LOCATION (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–281 (1)
PARTS LOCATION (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–169 (1)
PARTS LOCATION (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–232 (1)
PARTS LOCATION (BODY CONTROL SYSTEM) (DIAGNOSTICS)	DI–537 (1)
PARTS LOCATION (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–491 (1)
PARTS LOCATION (ENGINE) (DIAGNOSTICS)	DI–19 (1)
PARTS LOCATION (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–335 (1)
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	EC–4 (2)
POWER DOOR LOCK CONTROL SYSTEM	BE–62 (2)
POWER MIRROR CONTROL SYSTEM	BE–85 (2)
POWER SOURCE	BE–10 (2)
POWER STEERING FLUID	SR–4 (2)
POWER STEERING GEAR	SR–33 (2)
POWER STEERING VANE PUMP	SR–22 (2)
POWER WINDOW CONTROL SYSTEM	BE–58 (2)
PRE–CHECK (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–276 (1)
PRE–CHECK (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–157 (1)
PRE–CHECK (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–220 (1)
PRE–CHECK (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–485 (1)
PRE–CHECK (ENGINE) (DIAGNOSTICS)	DI–3 (1)
PRE–CHECK (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–326 (1)
PRECAUTION (FOR ALL OF VEHICLES)	IN–10 (1)
PRESSURE SWITCH	AC–51 (2)
PROBLEM SYMPTOMS TABLE (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–284 (1)
PROBLEM SYMPTOMS TABLE (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–172 (1)
PROBLEM SYMPTOMS TABLE (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–234 (1)
PROBLEM SYMPTOMS TABLE (BODY CONTROL SYSTEM) (DIAGNOSTICS)	DI–542 (1)
PROBLEM SYMPTOMS TABLE (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–494 (1)
PROBLEM SYMPTOMS TABLE (ENGINE) (DIAGNOSTICS)	DI–22 (1)
PROBLEM SYMPTOMS TABLE (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–338 (1)
PROPORTIONING VALVE (P VALVE)	BR–47 (2)

Q

	Page Vol.
QUARTER WINDOW GLASS	BO–55 (2)

R

RADIATOR	CO–12 (2)
REAR AXLE CARRIER	SA–54 (2)
REAR BRAKE CALIPER	BR–36 (2)
REAR BRAKE PAD	BR–33 (2)
REAR BUMPER	BO–5 (2)
REAR DRUM BRAKE	BR–28 (2)
REAR LOWER SUSPENSION ARM	SA–71 (2)
REAR SEAT	BO–101 (2)
REAR SHOCK ABSORBER	SA–61 (2)
REAR SPEED SENSOR	BR–58 (2)
REAR STABILIZER BAR	SA–75 (2)
REAR UPPER SUSPENSION ARM	SA–68 (2)
REAR WHEEL ALIGNMENT	SA–8 (2)
REAR WHEEL HUB BOLT	SA–60 (2)
REAR WIPER AND WASHER	BO–33 (2)
REFRIGERANT LINE	AC–21 (2)
REPAIR INSTRUCTIONS	IN–4 (1)
REVERSE SHIFT WARNING BUZZER SYSTEM (C60)	MX–55 (2)
ROOF DRIP SIDE MOULDING	BO–38 (2)
ROOF HEADLINING	BO–86 (2)
ROOF SIDE MOULDING	BO–42 (2)

S

SEAT BELT	BO–106 (2)
SEAT BELT PRETENSIONER	BO–109 (2)
SFI (PREPARATION)	PP–8 (1)
SFI (SERVICE SPECIFICATIONS)	SS–17 (1)
SFI SYSTEM	SF–1 (2)
SHIFT AND SELECT LEVER SHAFT (C56)	MX–44 (2)
SHIFT AND SELECT LEVER SHAFT (C60)	MX–47 (2)
SHIFT LEVER AND CONTROL CABLE (C56)	MX–52 (2)
SHIFT LEVER AND CONTROL CABLE (C60)	MX–57 (2)
SHIFT LOCK SYSTEM (U240E)	AX–15 (2)
SHIFT LOCK SYSTEM (U341E)	AX–14 (2)
SIDE AIRBAG ASSEMBLY	RS–39 (2)
SIDE AIRBAG SENSOR ASSEMBLY	RS–62 (2)
SIDE MUD GUARD	BO–46 (2)
SLIDING ROOF	BO–69 (2)
SLIDING ROOF SYSTEM	BE–82 (2)
SPEED SENSOR (U240E)	AX–4 (2)
SRS AIRBAG	BO–3 (2)
SRS AIRBAG	RS–1 (2)
STANDARD BOLT (SERVICE SPECIFICATIONS)	SS–1 (1)
STARTER	ST–2 (2)
STARTER RELAY	ST–17 (2)
STARTING (PREPARATION)	PP–21 (1)
STARTING (SERVICE SPECIFICATIONS)	SS–25 (1)
STARTING SYSTEM	ST–1 (2)
STEERING (PREPARATION)	PP–67 (1)
STEERING (SERVICE SPECIFICATIONS)	SS–51 (1)
STEERING SYSTEM	SR–1 (2)
STEERING WHEEL	SR–8 (2)
STEERING WHEEL PAD AND SPIRAL CABLE	RS–12 (2)
STOP LIGHT SYSTEM	BE–32 (2)
SUPPLEMENTAL RESTRAINT SYSTEM (DIAGNOSTICS)	DI–324 (1)
SUPPLEMENTAL RESTRAINT SYSTEM (PREPARATION)	PP–74 (1)
SUPPLEMENTAL RESTRAINT SYSTEM (SERVICE SPECIFICATIONS)	SS–53 (1)
SUSPENSION AND AXLE (PREPARATION)	PP–56 (1)
SUSPENSION AND AXLE (SERVICE SPECIFICATIONS)	SS–45 (1)

T

TERMINALS OF ECM (AUTOMATIC TRANSAXLE (U240E)) (DIAGNOSTICS)	DI–170 (1)
TERMINALS OF ECM (AUTOMATIC TRANSAXLE (U341E)) (DIAGNOSTICS)	DI–233 (1)
TERMINALS OF ECM (ENGINE) (DIAGNOSTICS)	DI–20 (1)
TERMINALS OF ECU (ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)) (DIAGNOSTICS)	DI–282 (1)
TERMINALS OF ECU (BODY CONTROL SYSTEM) (DIAGNOSTICS)	DI–539 (1)
TERMINALS OF ECU (CRUISE CONTROL SYSTEM) (DIAGNOSTICS)	DI–492 (1)
TERMINALS OF ECU (SUPPLEMENTAL RESTRAINT SYSTEM) (DIAGNOSTICS)	DI–336 (1)
TERMS	IN–35 (1)
THERMISTOR	AC–50 (2)
THERMOSTAT	CO–8 (2)
THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM	EC–11 (2)
THROTTLE BODY	SF–33 (2)
TILT STEERING COLUMN	SR–9 (2)
TIMING CHAIN	EM–15 (2)
TIRE AND WHEEL	SA–2 (2)
TORQUE CONVERTER CLUTCH AND DRIVE PLATE (U240E)	AX–36 (2)
TORQUE CONVERTER CLUTCH AND DRIVE PLATE (U341E)	AX–36 (2)
TROUBLESHOOTING	AC–14 (2)
TROUBLESHOOTING	BE–2 (2)
TROUBLESHOOTING	BR–2 (2)
TROUBLESHOOTING	CL–1 (2)
TROUBLESHOOTING	SA–1 (2)
TROUBLESHOOTING	SR–2 (2)
TROUBLESHOOTING (C56)	MX–1 (2)
TROUBLESHOOTING (C60)	MX–1 (2)
TURN SIGNAL AND HAZARD WARNING SYSTEM	BE–25 (2)

U

UNDER HOOD	MA–4 (1)

V

VALVE BODY ASSEMBLY (U240E)	AX–10 (2)
VALVE BODY ASSEMBLY (U341E)	AX–9 (2)
VALVE CLEARANCE	EM–4 (2)
VAPOR PRESSURE SENSOR	SF–64 (2)
VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER (IDENTIFICATION INFORMATION)	IN–3 (1)
VEHICLE LIFT AND SUPPORT LOCATIONS (REPAIR INSTRUCTIONS)	IN–8 (1)
VEHICLE SPEED SENSOR (U240E)	AX–3 (2)
VEHICLE SPEED SENSOR (U341E)	AX–3 (2)
VSV FOR CANISTER CLOSED VALVE (CCV)	SF–58 (2)
VSV FOR EVAPORATIVE EMISSION (EVAP)	SF–56 (2)
VSV FOR INTAKE AIR CONTROL VALVE	SF–54 (2)
VSV FOR PRESSURE SWITCHING VALVE	SF–60 (2)

W

	Page Vol.
WATER PUMP	CO–4 (2)
WINDSHIELD	BO–47 (2)
WIPER AND WASHER SYSTEM	BE–34 (2)
WIRE HARNESS AND CONNECTOR	RS–72 (2)
WIRELESS DOOR LOCK CONTROL SYSTEM	BE–67 (2)

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