DIAGNOSTIC TROUBLE CODE CHART

The inspection procedures are shown in the table below. This table allows efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code chart. Proceed with troubleshooting in accordance with the inspection procedures listed in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The diagnostic trouble code chart for the Supplemental Restraint System is shown below as an example.

- DTC No.
  Indicates the diagnostic trouble code.
- Page or Instructions
  Indicates the page where the inspection procedures for each circuit is to be found, or gives instructions for checking and repairs.

- Trouble Area
  Indicates the suspect areas of the problem.

- Detection Item
  Indicates the system or details of the problem.

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

DTC No. (See page)	Detection Item	Trouble Area	SRS Warming Light
B0100/13 (05–119)	● Short in D squib circuit	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0101/14 (05–124)	● Open in D squib circuit	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0102/11 (05–128)	● Short in D squib circuit (to ground)	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0103/12 (05–132)	● Short in D squib circuit (to B+)	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0105/53 (05–136)	● Short in P squib circuit	● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	ON
B0106/54	● Open in P squib circuit	● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	
	b circuit (to Ground)	● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	

Injection pump (Adjustment) (Cont'd)

Injection volume (w/o HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder	Variation limit
Plus 21 – 31°	100	200	12.6 – 17.4 cc (0.77 – 1.06 cu in.)	1.4 cc (0.09 cu in.)
	500	200	9.1 – 10.3 cc (0.56 – 0.63 cu in.)	0.7 cc (0.04 cu in.)
	700	200	10.3 – 11.5 cc (0.63 – 0.70 cu in.)	
	900	200	11.7 – 12.9 cc (0.71 – 0.79 cu in.)	
	1,100	200	12.4 – 13.0 cc (0.76 – 0.79 cu in.)	
	1,700	200	10.5 – 11.7 cc (0.64 – 0.71 cu in.)	

Governor sleeve plug head thickness	3.0 mm (0.118 in.) 3.1 mm (0.122 in.) 3.2 mm (0.126 in.) 3.3 mm (0.130 in.) 3.4 mm (0.134 in.) 3.5 mm (0.138 in.) 3.6 mm (0.142 in.) 3.7 mm (0.146 in.) 3.8 mm (0.150 in.) 3.9 mm (0.154 in.) 4.0 mm (0.157 in.) 4.1 mm (0.161 in.) 4.2 mm (0.165 in.) 4.3 mm (0.169 in.) 4.5 mm (0.177 in.) 4.7 mm (0.185 in.)

Idle speed pre–setting (w/ HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder
Minus 12 – 22°	325	200	q = 3.8 – 4.2 cc (0.23 – 0.26 cu in.)

Idle speed pre–setting (w/o HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder
Minus 12 – 22°	350	200	q = 4.0 – 4.4 cc (0.24 – 0.27 cu in.)

Dash pot injection volume (w/ HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder
Minus 12 – 22°	325	200	q plus 0.14 – 0.46 cc (0.01 – 0.03 cu in.)

Dash pot injection volume (w/o HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder
Minus 12 – 22°	350	200	q plus 0.14 – 0.46 cc (0.01 – 0.03 cu in.)

Idle speed (w/ HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder	Variation limit
Minus 12 – 22°	325	200	1.1 – 2.7 cc (0.07 – 0.16 cu in.)	0.5 cc (0.03 cu in.)

Idle speed (w/o HAC)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder	Variation limit
Minus 12 – 22°	350	200	1.3 – 2.9 cc (0.08 – 0.18 cu in.)	0.5 cc (0.03 cu in.)

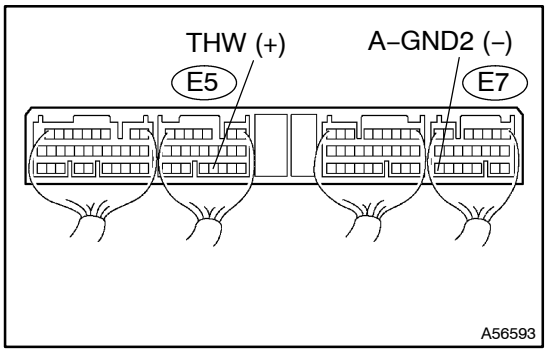
Adjusting lever moving angle	38 – 48°

INSPECTION PROCEDURE

HINT:

If DTCs 22 and 39 are output simultaneously, terminal A–GND2 (sensor ground) may be open.

1 CHECK ECM (RESISTANCE)



(a) Turn the ignition switch to LOCK.

(b) Check the resistance between the terminals of the ECM connector.

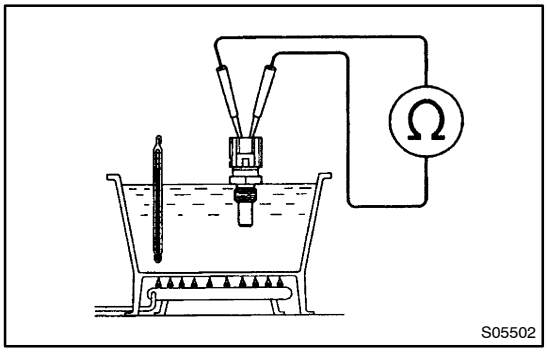
Resistance:

Engine Coolant Temp. °C (°F)	Symbols (Terminal No.)	Resistance
20 (68) (Engine is cool)	THW (E5–20) ⇔ A–GND2 (E7–22)	Approx. 2.4 kΩ
80 (176) (Engine is hot)	THW (E5–20) ⇔ A–GND2 (E7–22)	Approx. 530 Ω

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–7)**

NG

2 INSPECT ENGINE COOLANT TEMPERATURE SENSOR (CHECK RESISTANCE)



(a) Disconnect the E1 engine coolant temperature sensor connector.

(b) Remove the engine coolant temperature sensor.

(c) Measure the resistance between the terminals.

Resistance:

Engine Coolant Temp. °C (°F)	Resistance
20 (68)	Approx. 2.4 kΩ
80 (176)	Approx. 530 Ω

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

3 CHECK WIRE HARNESS (ECM ⇔ ENGINE COOLANT TEMPERATURE SENSOR) (See page 01–27)

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE ECM (See page 01–27)

(6) Read the DTC by following the prompts on the tester screen.

HINT:
Refer to the hand–held tester operator's manual for further details.

3. DATA LIST

HINT:
According to the DATA LIST displayed on the hand–held tester, you can read the value of the switch, sensor, and actuator without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten the labor time.

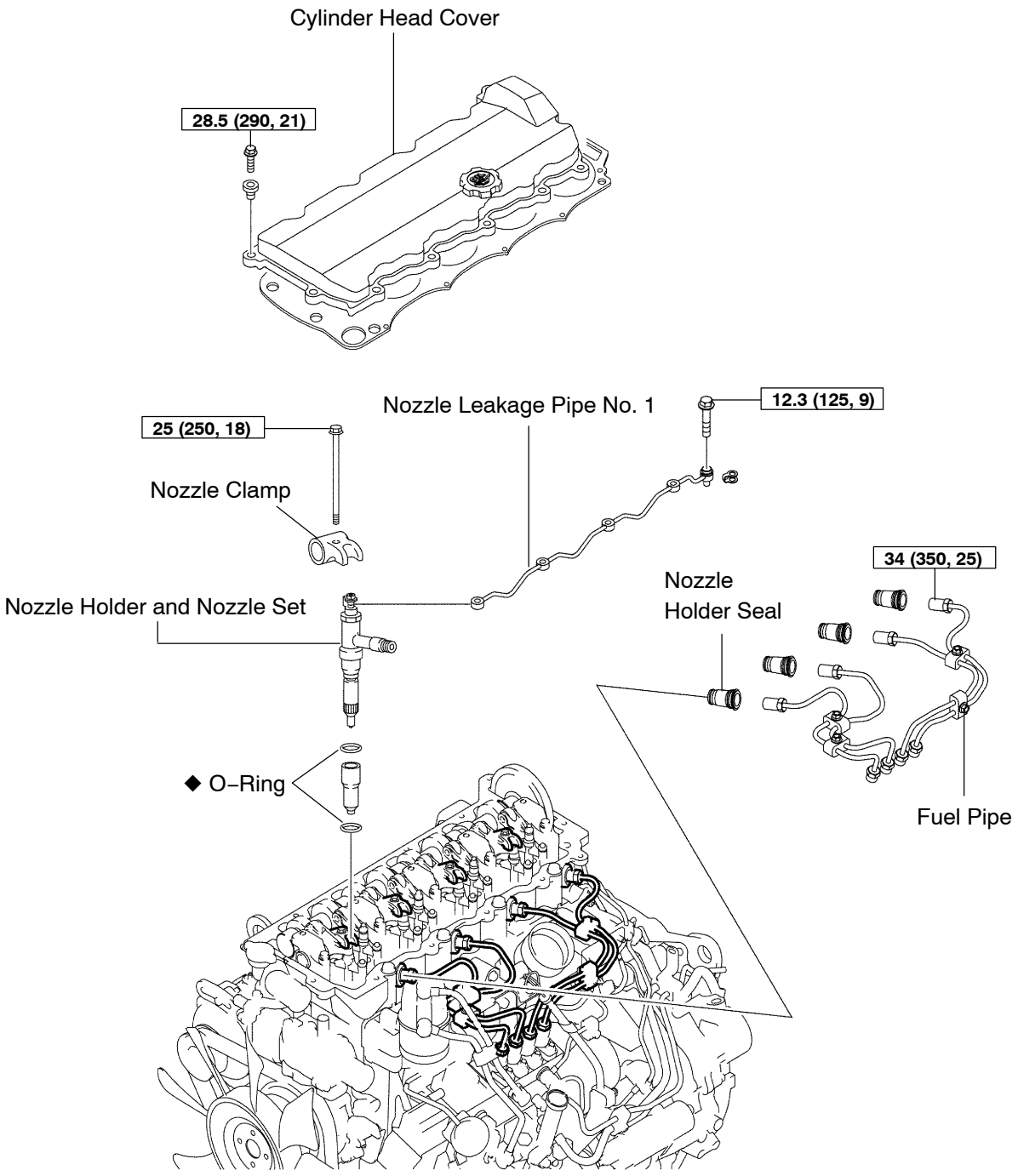
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Read the "DATA LIST", according to the display on the tester.

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ABS MOT RELAY	ABS motor relay / ON or OFF	–	–
SOL RELAY	Solenoid relay / ON or OFF	–	–
STOP LIGHT SW	Stop lamp switch / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	–
PKB SW	Parking brake switch / ON or OFF	ON : Parking brake applied OFF : Parking brake released	–
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE : No ABS operation (FR) OPERATE : During ABS operation (FR)	–
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE : No ABS operation (FL) OPERATE : During ABS operation (FL)	–
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE : No ABS operation (RR) OPERATE : During ABS operation (RR)	–
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE : No ABS operation (RL) OPERATE : During ABS operation (RL)	–
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph)max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer

NOZZLE HOLDER AND NOZZLE SET (S05C–B)

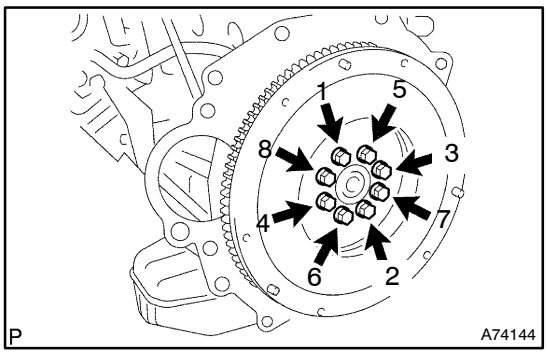
110QF–01

COMPONENTS



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

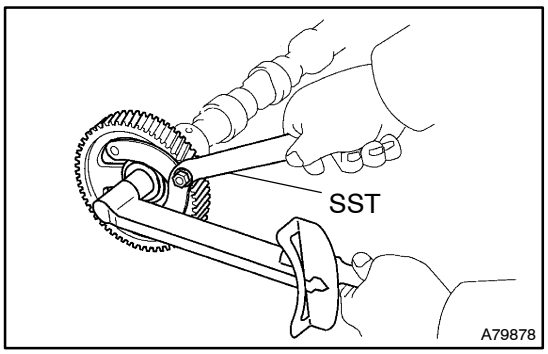
A71078



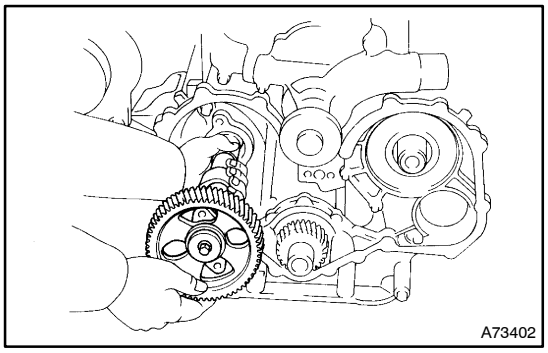
(c) Install the bolts, as shown in the illustration.
Torque: 160 N·m (1,635 kgf·cm, 121 ft·lbf)

NOTICE:
Do not start the engine within 1 hour after the installation.

39. INSTALL CLUTCH DISC ASSY (See page 42–24)
40. INSTALL CLUTCH COVER ASSY (See page 42–24)
41. INSTALL MANUAL TRANSMISSION ASSY (See page 41–3)
42. INSTALL STARTER ASSY (See page 19–3)
43. INSTALL ENGINE WIRE
44. INSTALL FRONT AXLE I–BEAM
(a) Install the front axle I–beam.
(b) Install the front spring (See page 26–5 and 26–13).
(c) Install the steering knucles (See page 30–50 and 30–55).
45. INSTALL ENGINE W/ TRANSMISSION ASSEMBLY
(a) Using an engine lifter, install the engine assembly with the transmission.
Torque:
61 N·m (622 kgf·cm, 45 ft·lbf) for mounting bracket RH, LH to frame
42 N·m (430 kgf·cm, 31 ft·lbf) for mounting bracket RH, LH to mounting insulator FR
98 N·m (1000 kgf·cm, 72 ft·lbf) for mounting bracket RR to mounting bracket RR No. 2
(b) Remove the No. 2 engine hanger.
46. INSTALL FLOOR SHIFT CABLE TRANSMISSION CONTROL SELECT
(a) Install the control cable with the clip and nut.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)
47. INSTALL FLOOR SHIFT CABLE TRANSMISSION CONTROL SHIFT
(a) Install the control cable with the clip and nut.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)
48. INSTALL EXHAUST PIPE ASSY FRONT
49. INSTALL CLUTCH RELEASE CYLINDER ASSY (See page 42–21)
50. INSTALL PROPELLER SHAFT ASSY (See pages 30–4 and 30–14)
51. INSTALL TIE ROD END SUB–ASSY LH (See pages 30–50 and 30–55)
52. INSTALL TIE ROD END SUB–ASSY RH (See pages 30–50 and 30–55)
53. INSTALL FUEL RETURN HOSE
54. INSTALL FUEL MAIN HOSE
55. INSTALL ACCEL CONTROL W/ THROTTLE CABLE ASSY
56. INSTALL AIR HOSE NO.1
57. INSTALL ENGINE WIRE
58. INSTALL RADIATOR ASSY (See page 16–11)
59. INSTALL FAN SHROUD (See page 16–11)
60. INSTALL ENGINE SERVICE HOLE SUB COVER SUB–ASSY (W/O TILT CAB CAB TYPE) (See page 14–23)
61. INSTALL FLOOR SHIFT ASSY (W/O TILT CAB CAB TYPE) (See page 14–23)
62. INSTALL SHIFT AND SELECT TRANSMISSION CONTROL CABLE ASSY (W/O TILT CAB CAB TYPE) (See page 14–23)
63. INSTALL PARKING BRAKE LEVER ASSY (W/O TILT CAB CAB TYPE) (See page 14–23)



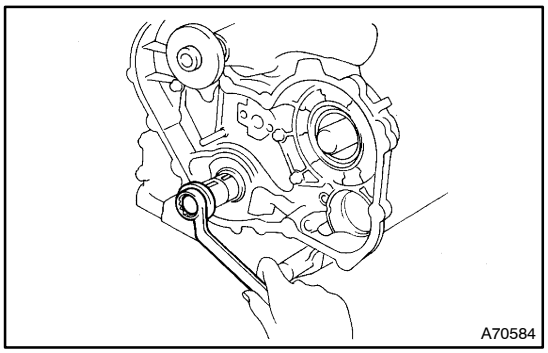
(d) Using SST, install the plate washer and bolt.
SST 09960–10010 (09962–01000, 09963–01000)
Torque 57 N·m (581 kgf·cm, 42 ft·lbf)



(e) Install the camshaft timing gear or sprocket into the cylinder block.

NOTICE:
Be careful not to damage the camshaft bearing.

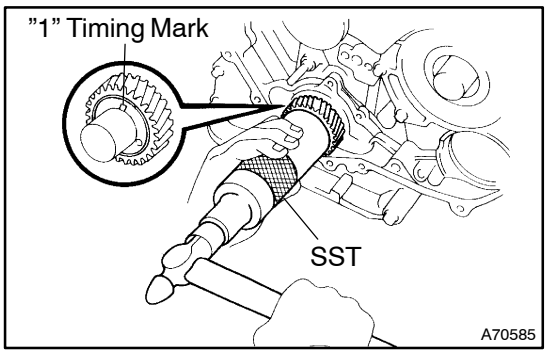
(f) Install and torque the 2 bolts.
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)



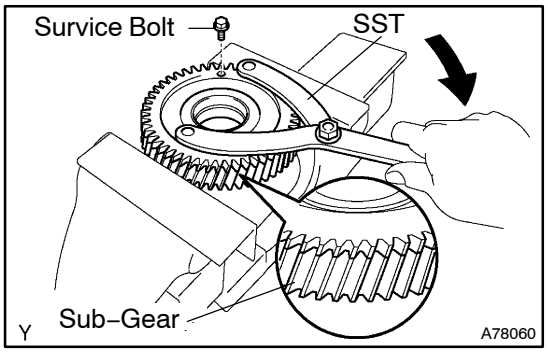
16. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET

(a) Check that the set key on crankshaft timing gear or sprocket faces upward.

If not, turn the crankshaft with a crankshaft pulley mount bolt.



(b) Put the timing gear on the crankshaft with timing mark 4 of the timing gear facing forward.
(c) Align the timing gear set key with the key groove of the crankshaft timing gear.
(d) Using SST and a hammer, tap in the crankshaft timing gear.
SST 09608–06041



17. INSTALL IDLE GEAR NO.1

(a) When the sub–gear and the idle gear have shifted, do the following work (1) and (2).
(1) Using SST, align the holes of the idle gear and sub–gear by turning the sub–gear clockwise, and install a service bolt.
SST 09960–10010 (09962–01000, 09963–00500)
(2) Align the gear teeth of the idle gear and sub–gear, and tighten the service bolt.

ENGINE COMPONENTS PARTS (S05C–TA)

140NF–02

REMOVAL AND INSTALLATION

1. PREPARATION

(a) Clean the engine.
  (1) Cover the openings with tape.
  (2) Using a steam cleaner, clean the engine.

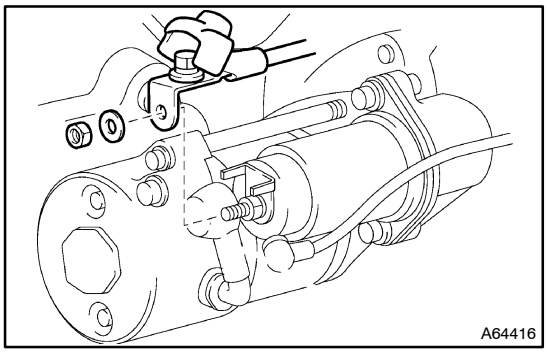
NOTICE:

Do not apply steam directly to the electrical component (generator, starter, etc.).

(b) Mount the engine on a work stand.

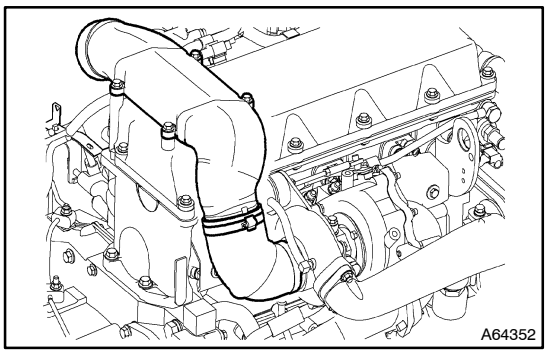
2. REMOVE ELECTRICAL WIRE ASSY

(a) Remove the clip of the wire harness.
(b) Disconnect the negative (–) terminal of the battery.
(c) Disconnect the electrical unit, switch and sensor.



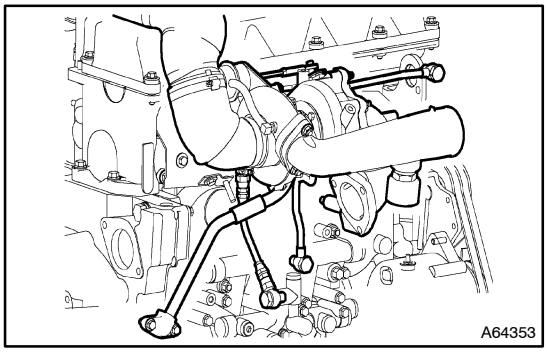
3. REMOVE STARTER ASSY

(a) Put alignment marks on the harness and the starter terminal, and then remove the harness.
(b) Remove the starter from the engine.

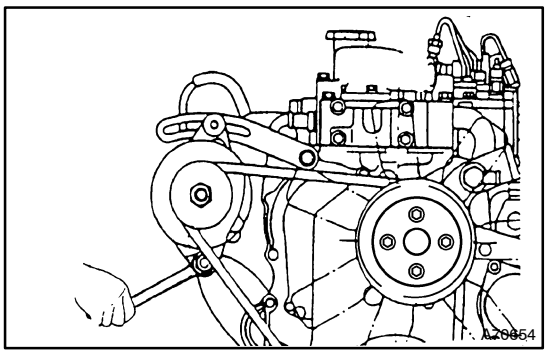


4. REMOVE TURBOCHARGER ASSY

(a) Remove the insulator.
(b) Remove the suction pipe.
(c) Remove the intake pipe.

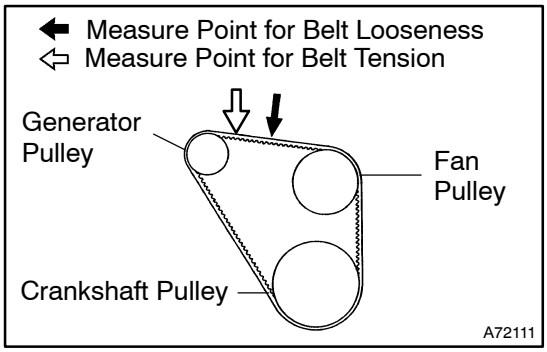


(d) Remove the oil pipe.
(e) Remove the water pipe.
(f) Remove the exhaust pipe.
(g) Remove the 4 bolts.



19. INSTALL GENERATOR AND V BELT

(a) Attach the generator provisionally, and install the V belt.



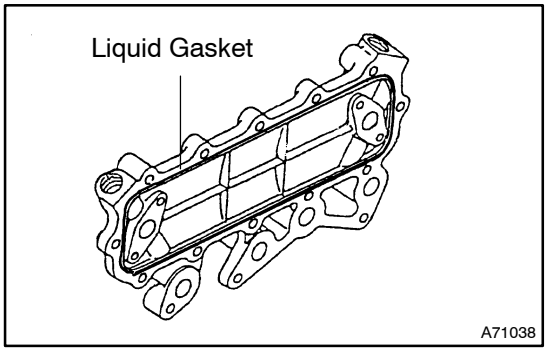
(b) Press the center point of the V belt with a load of approx. 98 N (10 kgf, 22 lbf) and adjust the V belt deflection so that it should be within the standard value.
V belt deflection: 10 – 15 mm (0.394 – 0.591 in.)

HINT:

- "New belt" refers to a belt which has been used for less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a new belt, run the engine for approx. 5 minutes and recheck the belt tension.

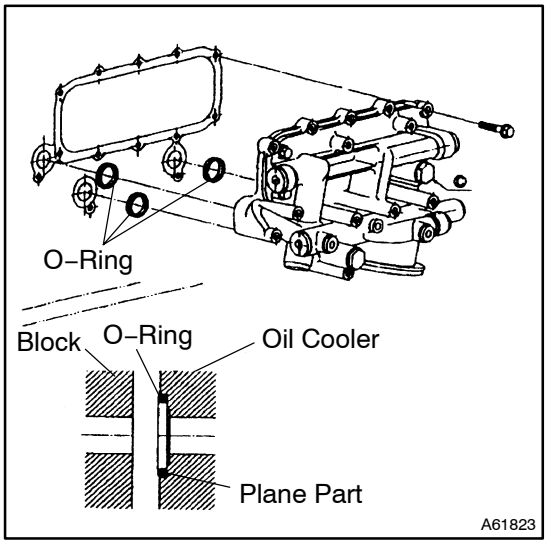
(c) Tighten the V belt adjusting bolt.

(d) Tighten the through bolt.
Torque: 46.6 N·m (475 kgf·cm, 34 ft·lbf)



20. INSTALL OIL COOLER ASSY

(a) Clean the cylinder block mounting surface of the oil cooler.



(b) Insert new O–rings into the O–ring groove of the oil cooler.

HINT:

Face the flat area of the O–ring toward the oil cooler for installation.

(c) Apply seal packing to the oil cooler housing and install it onto the cylinder block within 20 minutes.
Seal packing: Part No. 08826–00100 or equivalent
Coating width: 1.5 – 2.5 mm (0.059 – 0.098 in.)

HINT:

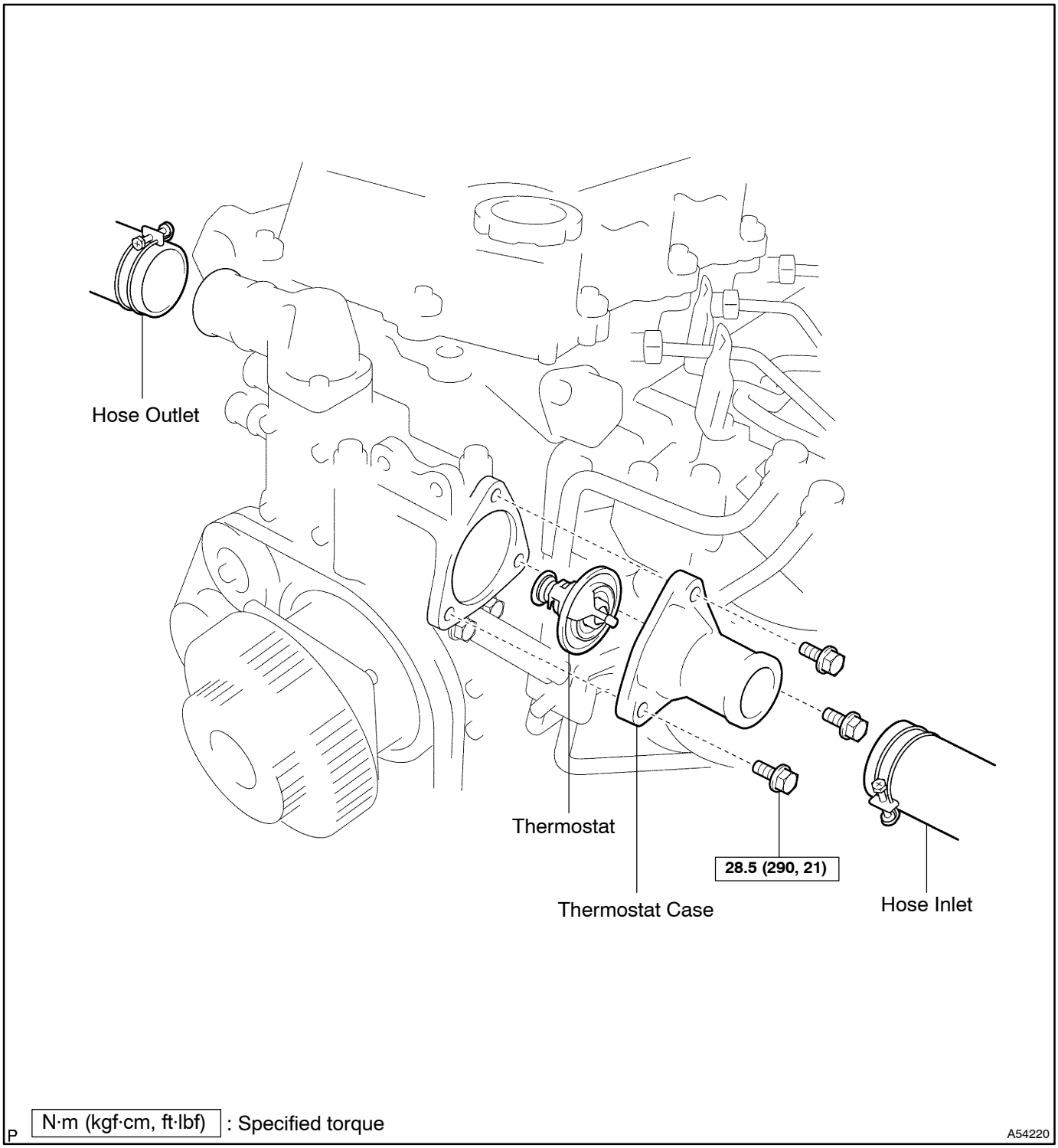
If more than 20 minutes have passed since the seal packing is applied, do not assemble the parts. After removing the seal packing completely, reapply it to assemble them.

(d) Install the oil line.

THERMOSTAT (S05C–TA)

COMPONENTS

160BT–04



OIL FILTER SUB–ASSY (15B–FTE)

170E8–01

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.**

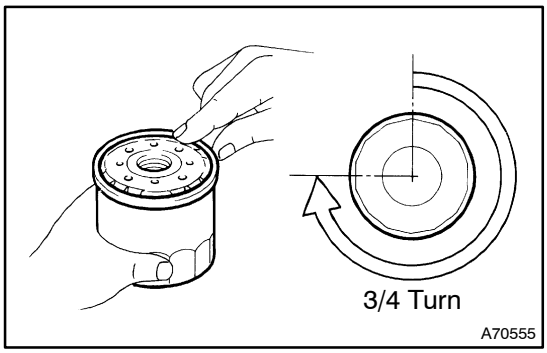
1. DRAIN ENGINE OIL

(a) Remove the oil filler cap.

(b) Remove the oil drain plug, and drain the oil into a container.

2. REMOVE OIL FILTER SUB–ASSY

SST 09228–10002



3. INSTALL OIL FILTER SUB–ASSY

(a) Using SST, remove the oil filter.
SST 09228–10002

(b) Check and clean the oil filter installation surface.

(c) Apply clean engine oil to the rubber gasket of a new oil filter.

(d) Lightly screw the oil filter into place, and tighten it by hand until the rubber gasket contacts the installation surface.

(e) Using SST, tighten the oil filter by an additional 3/4 turn to seat the filter.

4. ADD ENGINE OIL

(a) Clean the drain plug, and install a new gasket and the drain plug.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(b) Add fresh engine oil.
Oil capacity:

Drain and refill	w/ oil filter change	9.3 liters (9.8 US qts, 8.2 Imp. qts)
	w/o oil filter change	8.4 liters (8.9 US qts, 7.4 imp. qts)
Dry fill		9.9 liters (10.5 US qts, 8.7 Imp. qts)

(c) Reinstall the oil filler cap.

5. CHECK ENGINE OIL LEVEL

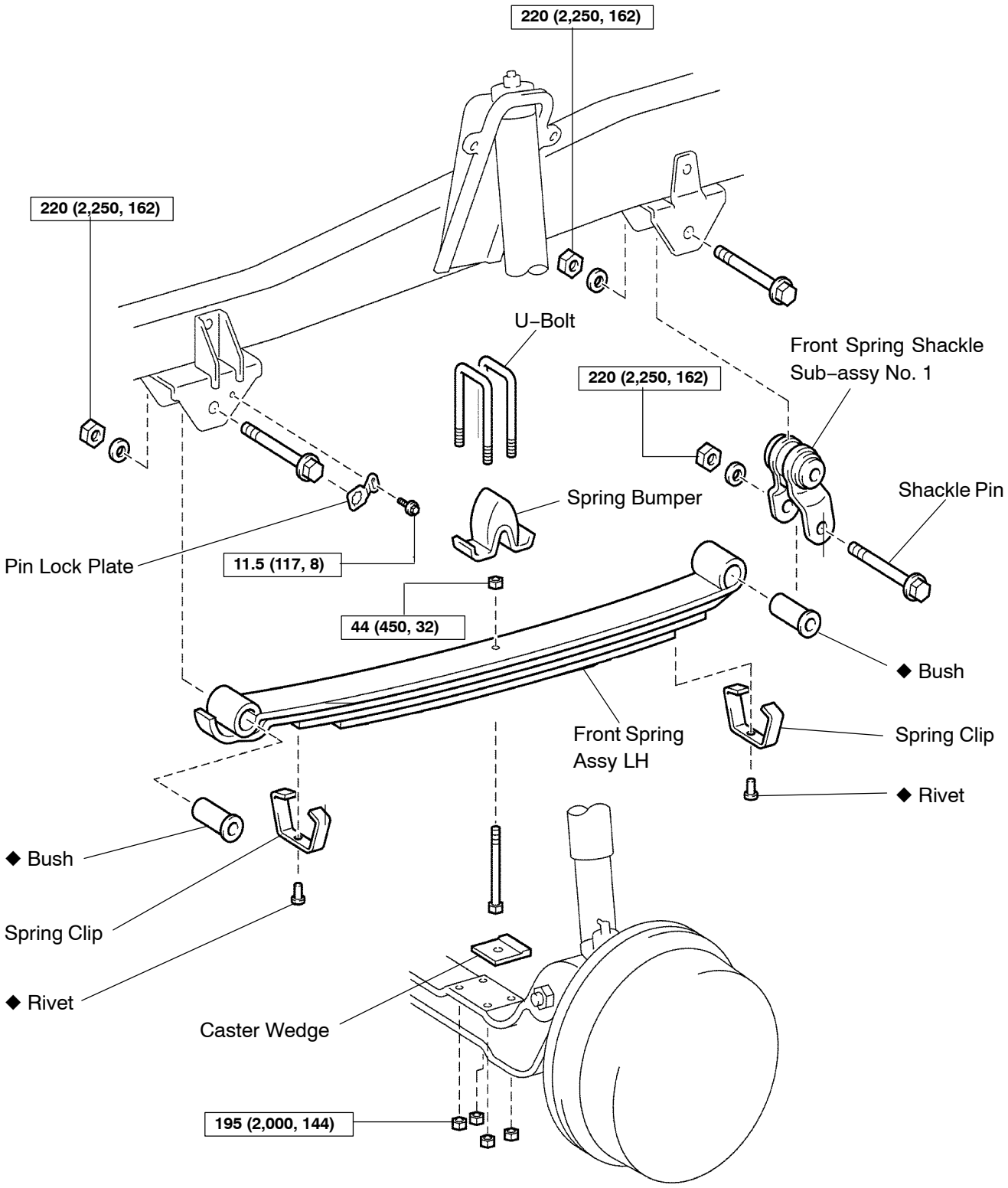
6. CHECK FOR ENGINE OIL LEAKS

FRONT SPRING ASSY LH (RUBBER BUSH TYPE)

260D4-01

COMPONENTS

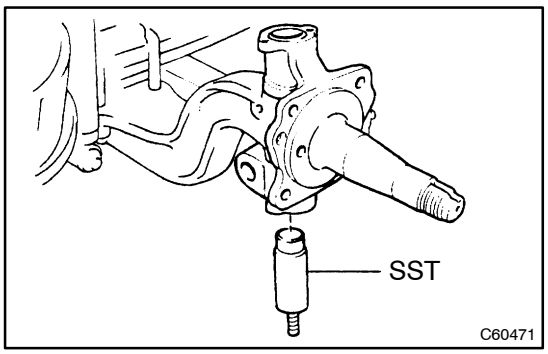
Regular Cab Models (w/o Stabilizer)



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

◆ Non–reusable part

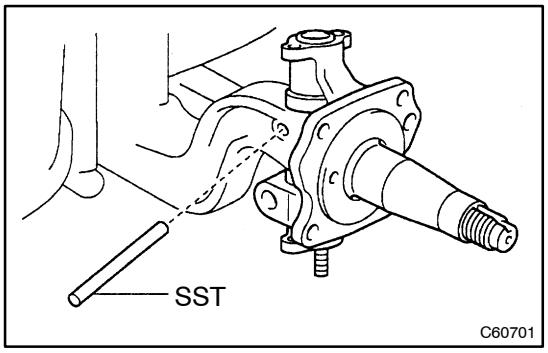
C95180



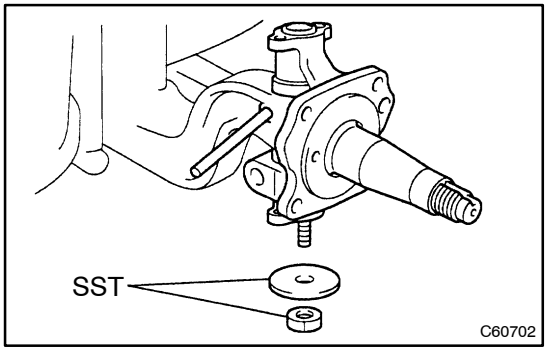
10. INSTALL STEERING KNUCKLE LH

(a) Using SST and a plastic hammer, tap in the king pin.
SST 09657–1131

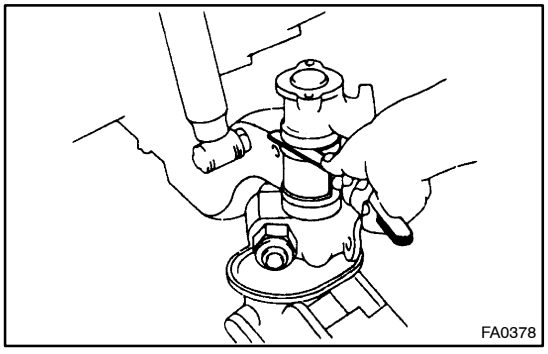
HINT:
Apply MP grease to the bushing, I–beam and bearing inside.



(b) Insert SST to the hole of the lock pin and fix the guide in the I–beam.
SST 09712–1080



(c) Insert SSTs to the thread of the guide, and turn the nut until the nut begins to fix.
SST 09654–1080, 9201–12100



(d) Using a jack, raise the steering knuckle.
(e) Measure the clearance between the I–beam and knuckle.
Thrust clearance: 0.10 mm (0.039 in.) or less
(f) Select the shim.
Standard thickness:

1.9 mm (0.075 in.)	2.3 mm (0.091 in.)
2.0 mm (0.079 in.)	2.4 mm (0.094 in.)
2.1 mm (0.083 in.)	2.5 mm (0.098 in.)
2.2 mm (0.087 in.)	2.6 mm (0.102 in.)

(g) Remove the jack.
(h) Using a brass bar and hammer, remove the king pin, shim and bearing.
(i) Place the selected shim and bearing.
(j) Position the hole downward and the notched position of the king pin forward to the hole side.

320TO–01

PROBLEM SYMPTOMS TABLE

Use the table below to help you find a cause of the problem. The numbers indicate the priority of a likely cause of the problem. Check each part in order. If necessary, replace these parts.

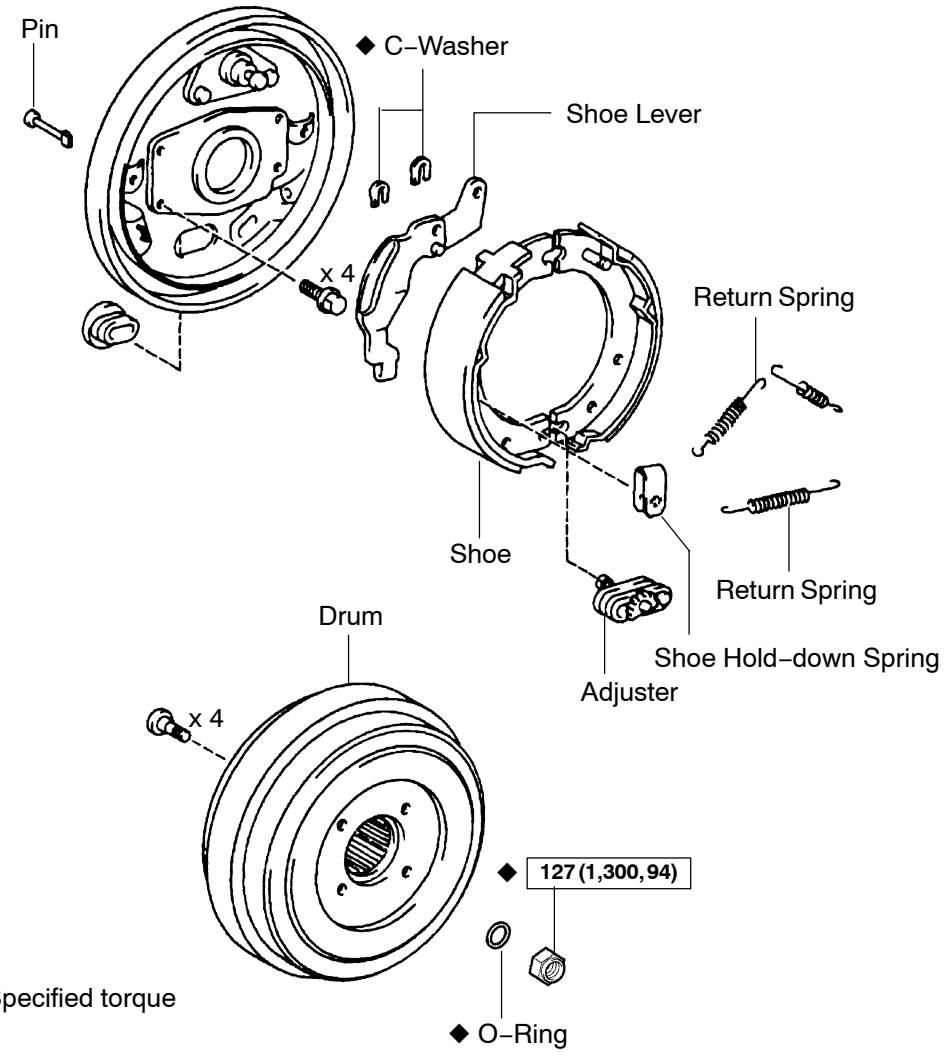
Symptom	Suspected Area	See Page
Low pedal or spongy pedal	3. Fluid leaks in brake system	–
	4. Air in brake system	32–4
	5. Piston seals (Worn or damaged)	32–37
	6. Rear brake shoe clearance(Out of adjustment)	32–53
	7. Master cylinder (Faulty)	32–10
	8. Booster push rod (Out of adjustment)	32–10
Brake drag	1. Brake pedal free play (Minimmum)	32–7
	2. Parking brake lever travel (Out of adjustment)	33–2
	3. Parking brake wire (Sticking)	33–3
	4. Rear brake shoe clearance (Out of adjustment)	32–53
	5. Pad or lining (Cracked or distorted)	32–37
		32–42
		32–52
	6. Piston (Stuck)	32–37
		32–42
		32–53
	7. Piston (Frozen)	32–37
		32–42
	8. Tension or return spring (Faulty)	32–53
		32–42
		32–53
	9. Booster push rod (Out of adjustment)	32–19
	10.Vacuum leaks in booster system	32–17
	11.Master cylinder (Faulty)	32–10
Brake pull	1. Piston (Stuck)	32–37
		32–42
		32–53
	2. Pad or lining (Oily)	32–37
		32–42
		32–53
	3. Piston (Frozen)	32–37
		32–42
		32–53
	4. Disc (Scored)	32–37
	5. Pad or lining (Cracked or distorted)	32–37
		32–42
		32–53

PARKING BRAKE ASSY

330BJ-01

COMPONENTS

Regular Cab 2.0 t (6.3 in. Type)



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

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