

## INSPECTION AND ADJUSTMENT OF IGNITION TIMING

3S-GTE (See pages IG-17 and 18)

5S-FE (See pages IG-21 and 22)

Ignition timing:

10° BTDC @ idle

(w/ Terminals TE1 and E1 connected)

## INSPECTION OF IDLE SPEED (3S-GTE)

### INITIAL CONDITIONS

(See Inspection and Adjustment of Idle Speed (5S-FE))

Idle speed: 800 ± 50 rpm

## INSPECTION AND ADJUSTMENT OF IDLE SPEED (5S-FE)

(See HINT on page FI-18)

### 1. INITIAL 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 connected

HINT: All vacuum hoses for EGR systems, etc. should be properly connected.

- (e) EFI system wiring connectors fully plugged
- (f) All operating accessories switched OFF
- (g) Transmission in neutral range

### 2. CHECK ISC SYSTEM (See page FI-151)

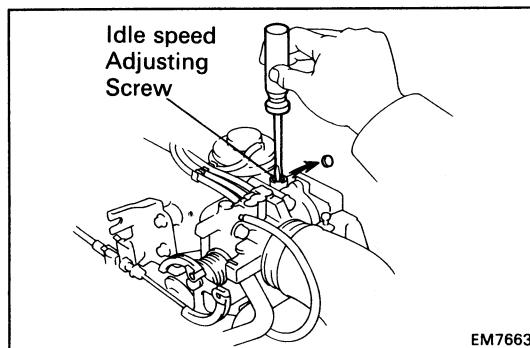
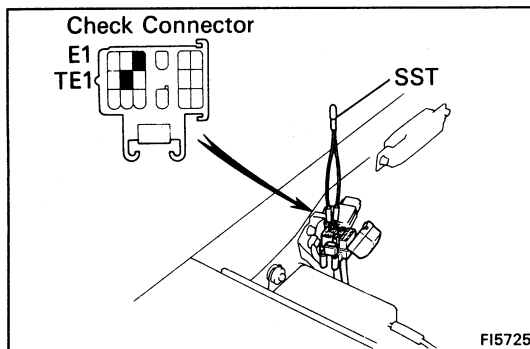
### 3. CONNECT TACHOMETER (See page IG-21)

### 4. ADJUST IDLE SPEED

- (a) Using SST, connect terminals TE1 and E1 of the check connector.

SST 09843-18020

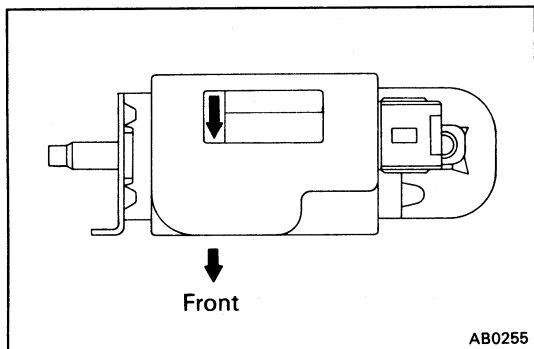
HINT: Decrease the rpm after the engine maintains a speed of the 1,000 – 1,300 rpm for 5 seconds.



- (b) Check the idle speed.

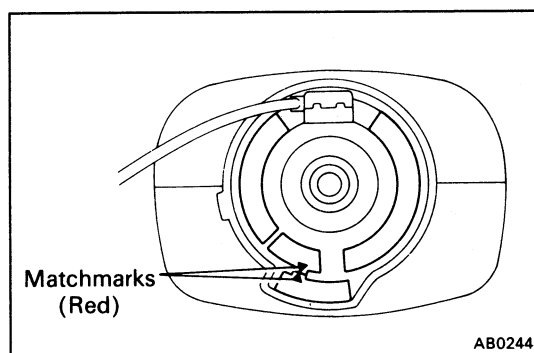
Idle speed: 650 rpm or more

- (c) If the idle speed is not as specified, adjust the idle speed by turning the IDLE SPEED ADJUSTING SCREW.



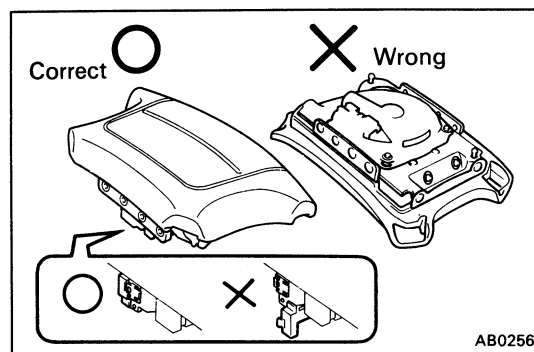
### FRONT AIRBAG SENSOR

1. Never reuse the front airbag sensors involved in a collision when the airbag has deployed. (Replace both the left and right airbag sensors.)
2. Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.
3. The front airbag sensor set bolts and nuts have been anti-rust treated. When the sensor is removed, always replace the set bolts and nuts with new ones.
4. The front 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 diagnosis system (See page AB-9).



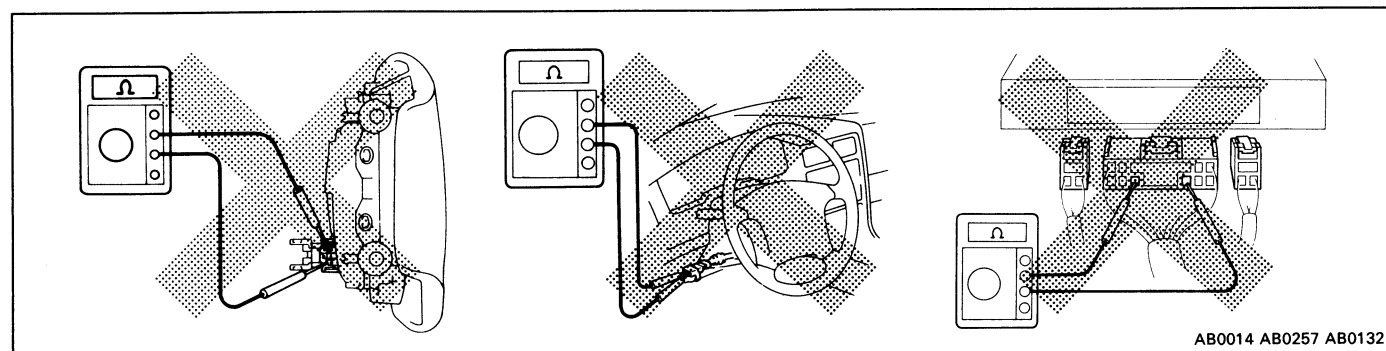
### SPIRAL CABLE (IN COMBINATION SWITCH)

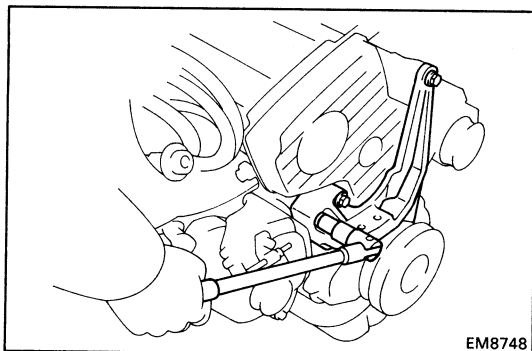
The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position; otherwise cable disconnection and other troubles may result. Refer to page AB-16 of this manual concerning correct steering wheel installation.



### STEERING WHEEL PAD (WITH AIRBAG)

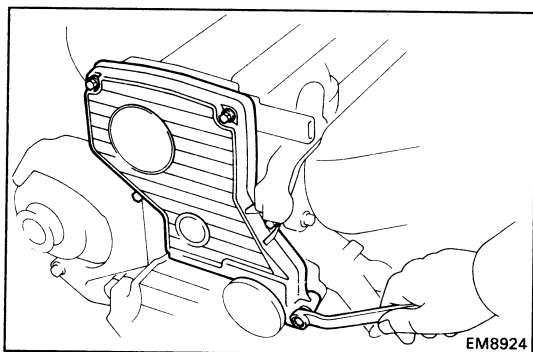
1. When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up. In this case, the twin-lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. And do not store a steering wheel pad on top of another one. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)
2. Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)



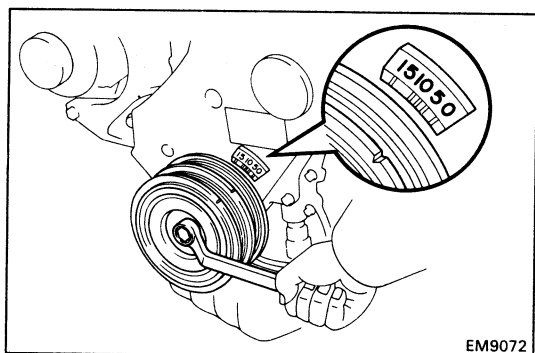
**12. REMOVE RH ENGINE MOUNTING BRACKET**

Remove the three bolts and mounting bracket.

HINT: Lower the jack and perform the operation with the engine fully up.

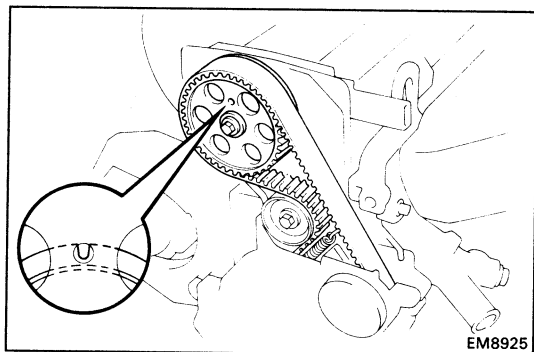
**13. REMOVE NO.2 TIMING BELT COVER**

Remove the five bolts, timing belt cover and two gaskets.

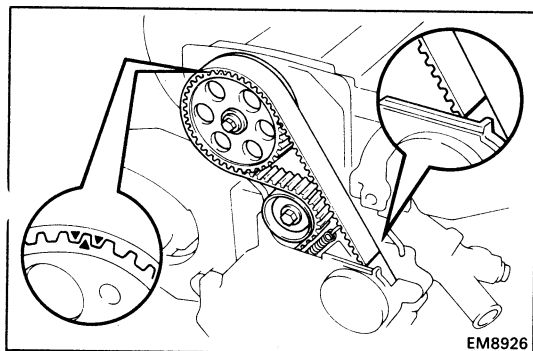
**14. REMOVE SPARK PLUGS (See page IG-11)****15. SET NO.1 CYLINDER TO TDC/COMPRESSION**

(a) Turn the crankshaft pulley and align its groove with timing mark "0" of the No.1 timing belt cover.

(b) Check that the hole of the camshaft timing pulley is aligned with the timing mark of the bearing cap.  
If not, turn the crankshaft one revolution (360°).

**16. REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEY**

HINT (When re-using timing belt): Place the matchmarks on the timing belt and camshaft timing pulley, and place matchmark on the timing belt to match the end of the No.1 timing belt cover.

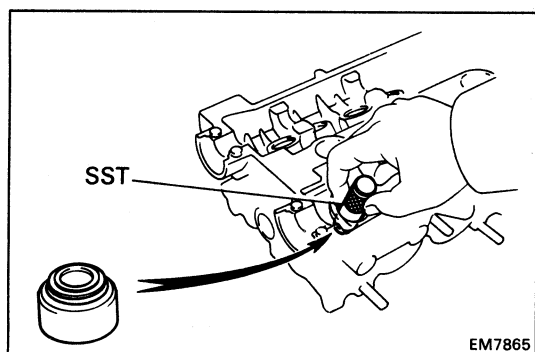


**ASSEMBLY OF CYLINDER HEAD**

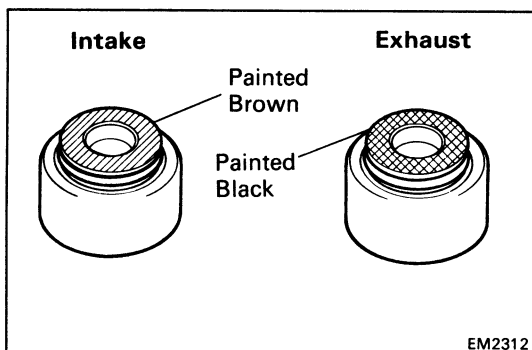
(See pages EM-61 and 62)

**HINT:**

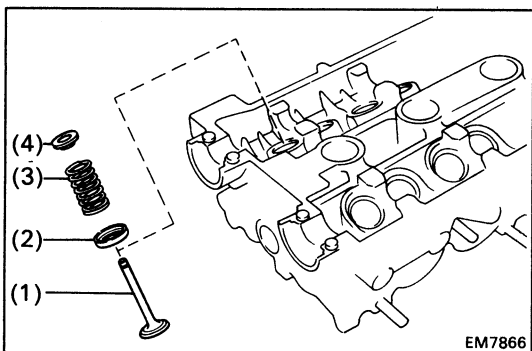
- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.

**1. INSTALL VALVES**

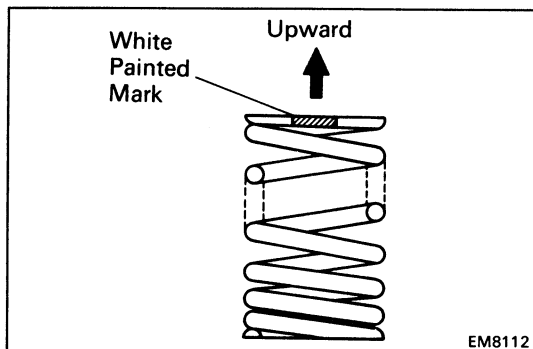
- (a) Using SST, push in a new oil seal.  
SST 09201-41020



**HINT:** The intake valve oil seal is brown and the exhaust valve oil seal is black.

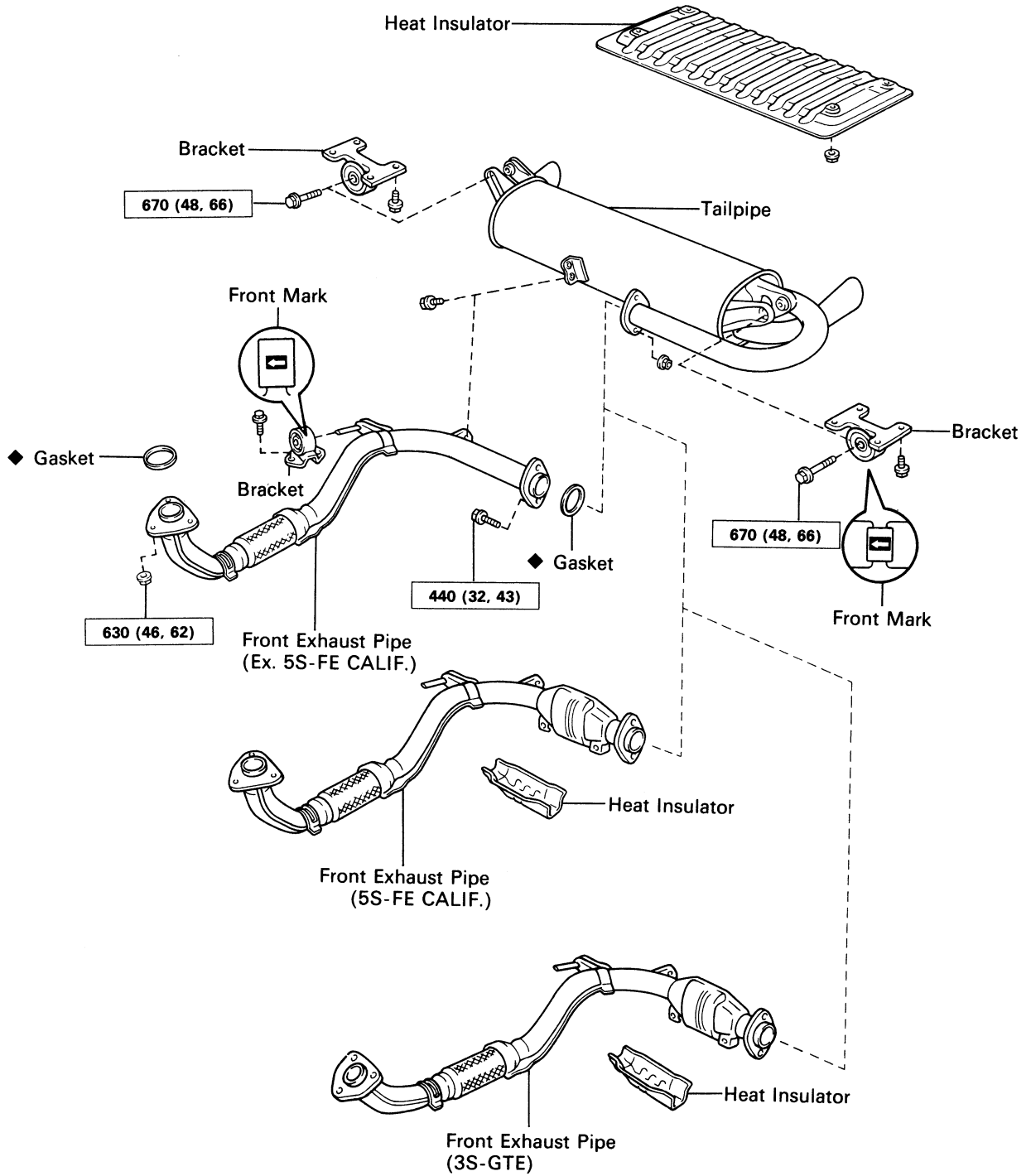


- (b) Install the following parts:
- (1) Valve
  - (2) Spring seat
  - (3) Valve spring
  - (4) Spring retainer



**HINT:** Install the valve spring, facing the white painted mark upward.

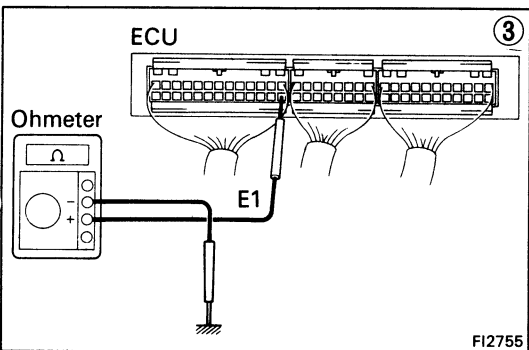
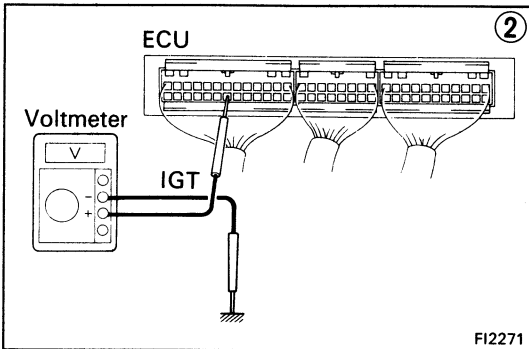
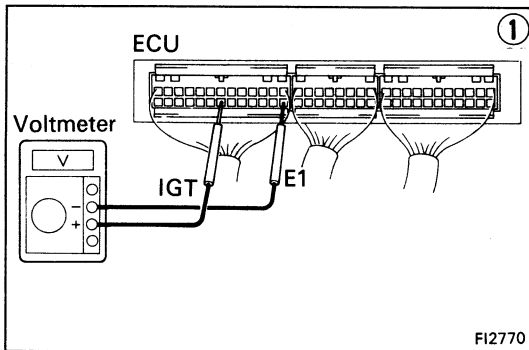
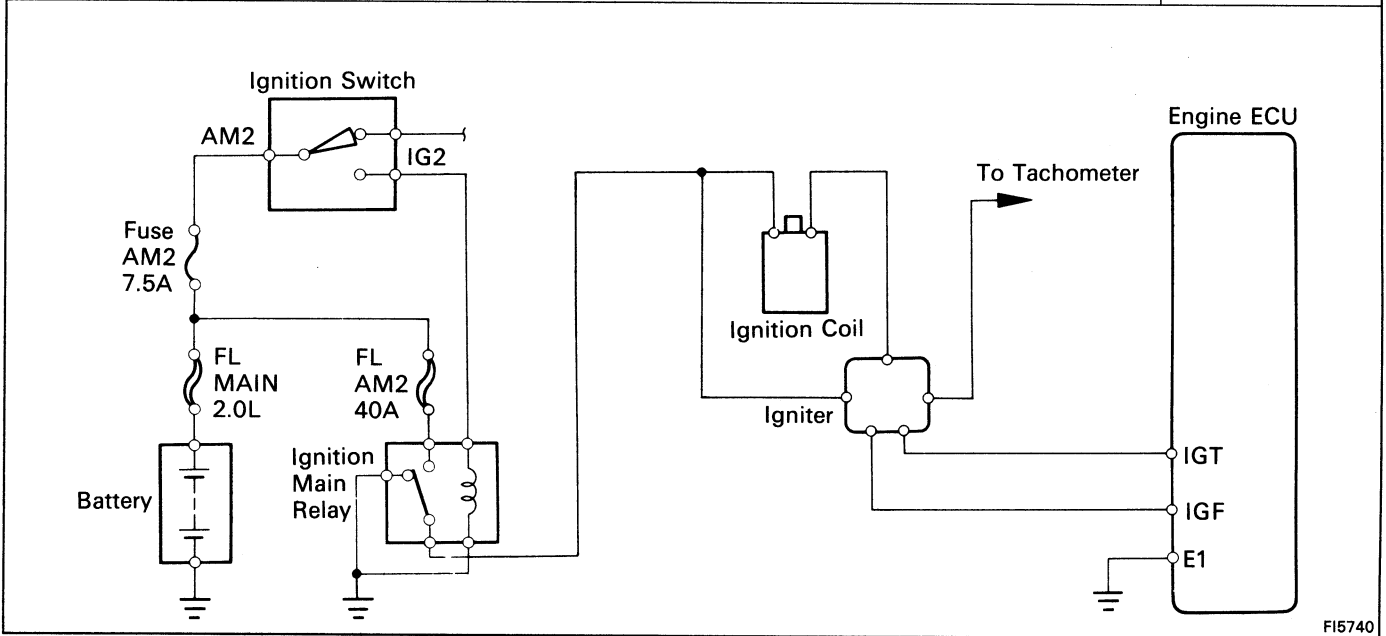
# EXHAUST PIPES AND HEAT INSULATORS COMPONENTS



kg-cm (ft-lb, N.m) : Specified torque

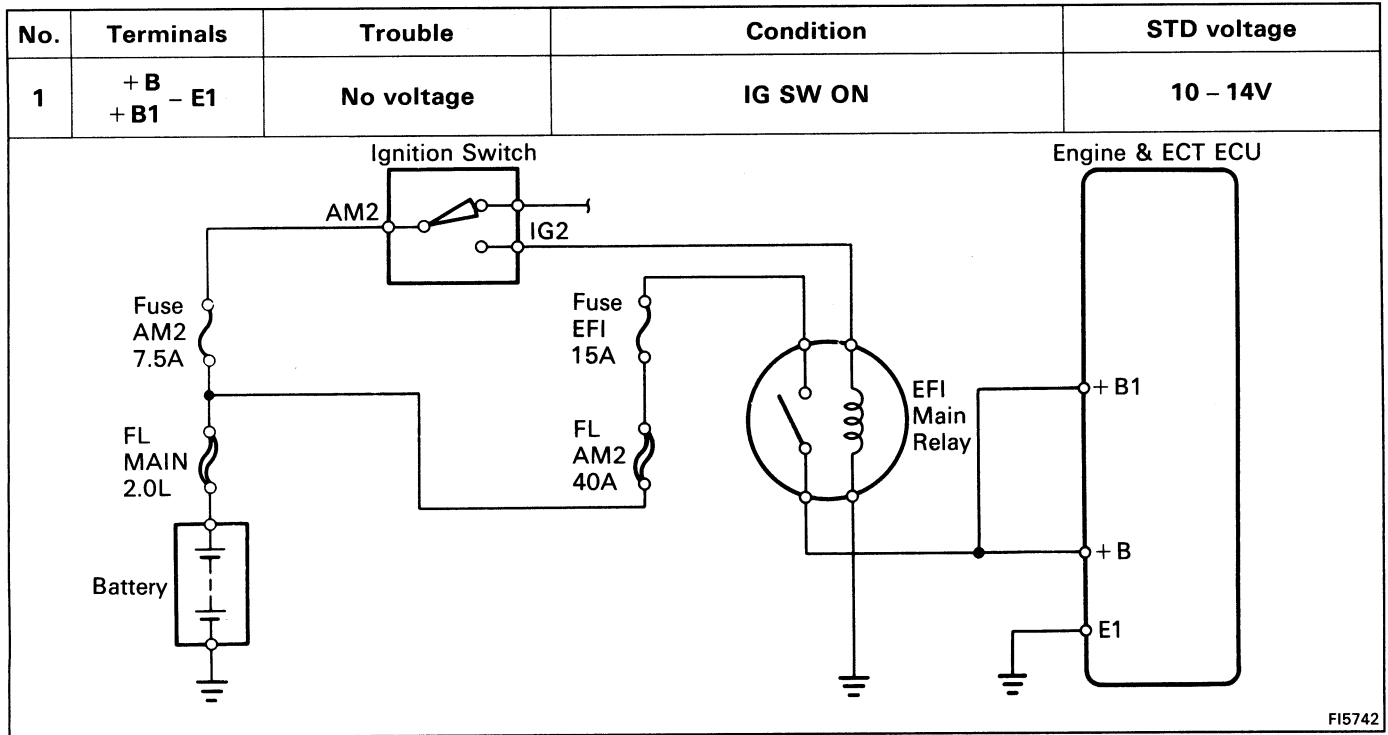
◆ Non-reusable part

No.	Terminals	Trouble	Condition	STD voltage
9	IGT – E1	No voltage	Idling	0.8 – 1.2 V

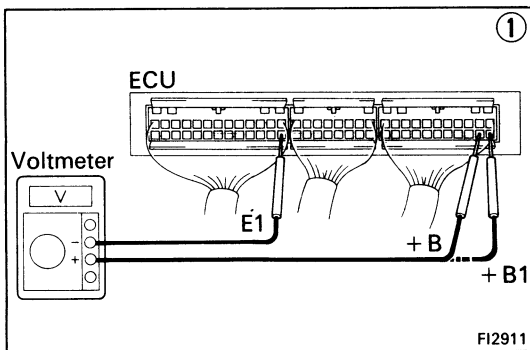


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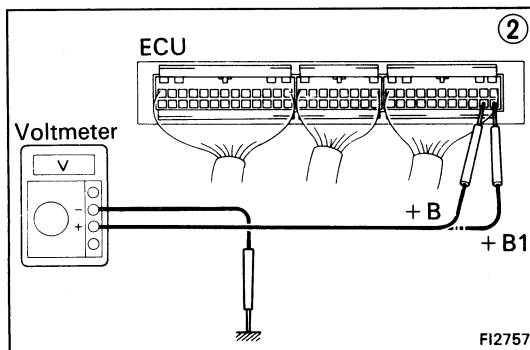
    graph TD
      Step1["① There is no voltage between ECU terminals IGT and E1. (Idling)"]
      Step2["② Check that there is voltage between ECU terminal IGT and body ground. (Idling)"]
      Step3["③ Check wiring between ECU terminal E1 and body ground."]
      Step4["Check fuse, fusible links, ignition switch and ignition main relay."]
      Step5["Check distributor. (See page IG-9)"]
      Step6["Check wiring between ECU and battery."]
      Step7["Check igniter. (See page IG-9)"]
      
      Step1 --> Step2
      Step2 -- NO --> Step4
      Step2 -- OK --> Step3
      Step3 -- BAD --> Repair1["Repair or Replace."]
      Step3 -- OK --> TryECU["Try another ECU."]
      Step4 -- BAD --> Repair2["Repair or replace."]
      Step4 -- OK --> Step5
      Step5 -- BAD --> Repair3["Repair or replace."]
      Step5 -- OK --> Step6
      Step6 -- BAD --> Repair4["Repair or replace."]
      Step6 -- OK --> Step7
      Step7 -- BAD --> Repair5["Repair or replace."]
      Step7 -- OK --> End[" "]
  
```



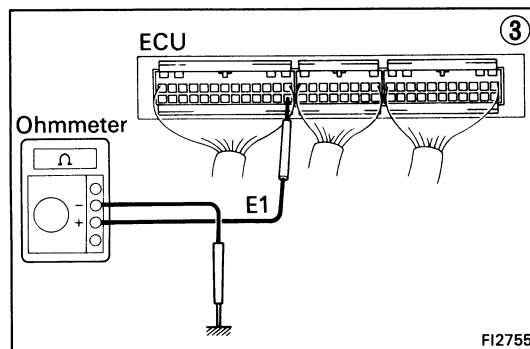
FI5742



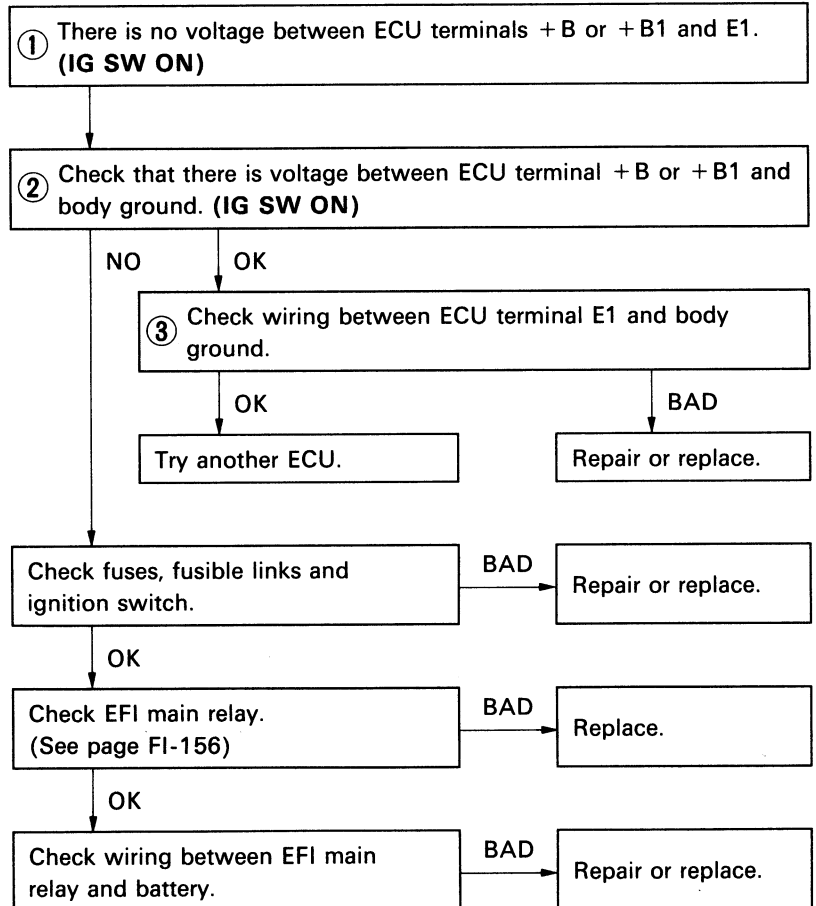
FI2911

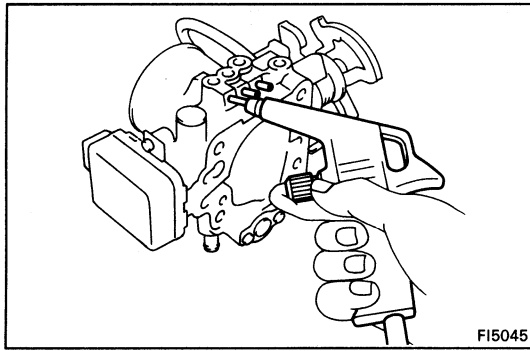


FI2757



FI2755



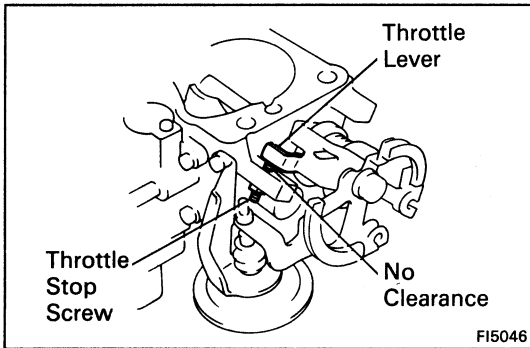


## INSPECTION OF THROTTLE BODY

### 1. CLEAN THROTTLE BODY

- (a) Using a soft brush and carburetor cleaner, clean the cast parts.
- (b) Using compressed air, clean all the passages and apertures.

**NOTICE:** To prevent deterioration, do not clean the throttle position sensor.

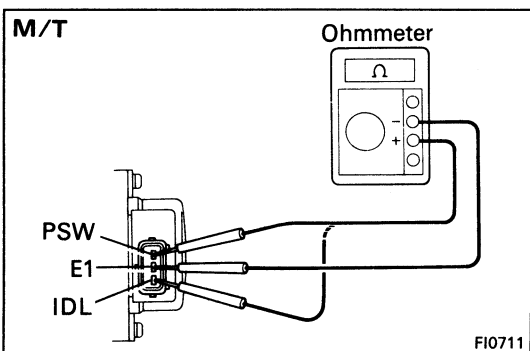
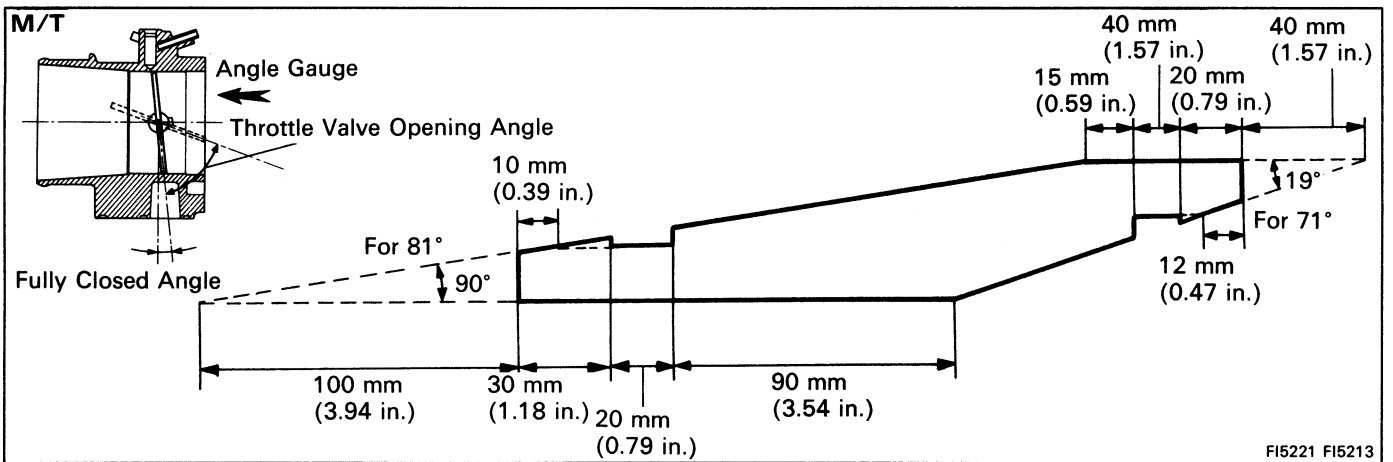


### 2. INSPECT THROTTLE VALVE

- (a) Apply vacuum hose to the throttle opener.
- (b) Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.

### 3. (M/T) INSPECT THROTTLE POSITION SENSOR

- (a) Make an angle gauge as shown in the figure.
- (b) Apply vacuum hose to the throttle opener.
- (c) Set the throttle valve opening to 71° or 81° from the vertical position (incl. throttle valve fully closed angle 6°).



- (d) Using an ohmmeter, check the continuity between each terminal.

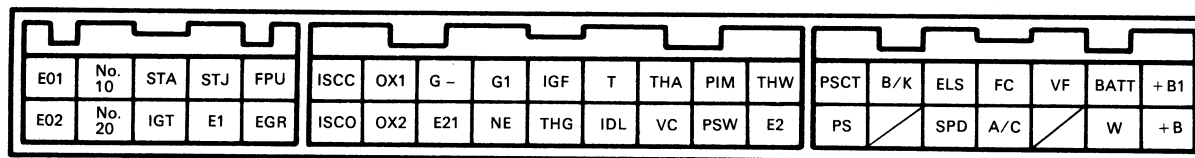
Throttle valve opening angle	Continuity	
	IDL – E1	PSW – E1
71° from vertical	No continuity	No continuity
81° from vertical	No continuity	Continuity
Less than 7.5° from vertical	Continuity	No continuity



### Resistance of ECU Wiring Connectors (5S-FE M/T)

Terminals	Condition	STD resistance (Ω)
IDL – E1	Throttle valve open	Infinity
	Throttle valve fully closed (Throttle opener must be cancelled first)	0
PSW – E1	Throttle valve fully open	0
	Throttle valve fully closed (Throttle opener must be cancelled first)	Infinity
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temp. 80°C (176°F)	200 – 400
G1 NE – G ⊖	–	170 – 210
ISCC + B ISCO + B1	–	19.3 – 22.3

**Engine ECU Terminals**

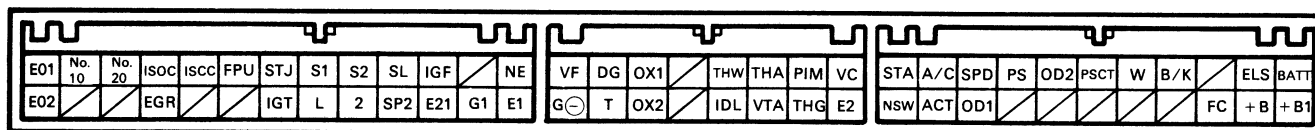


FI4065

### Resistance of ECU Wiring Connectors (5S-FE A/T)

Terminals	Condition	STD resistance (Ω)
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed (Throttle opener must be cancelled first)	2,300 or less
VTA – E2	Throttle valve fully open	2,300 – 10,000
	Throttle valve fully closed (Throttle opener must be cancelled first)	200 – 800
VC – E2	–	3,000 – 7,000
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Coolant temp. 80°C (176°F)	200 – 400
G1 NE – G ⊖	–	170 – 210
ISCC + B ISCO + B1	–	19.3 – 22.3

**Engine & ECT ECU Terminals**



FI2796

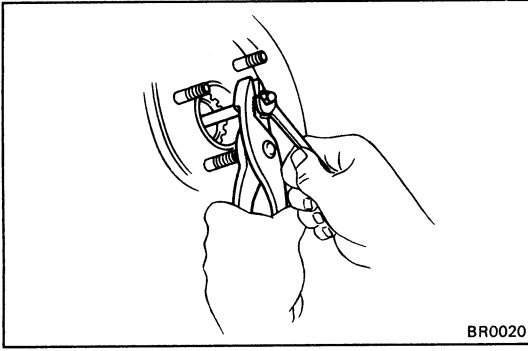
## Specifications (Cont'd)

Camshaft	Thrust clearance	STD	Intake	0.045 – 0.100 mm	0.0018 – 0.0039 in.
			Exhaust	0.030 – 0.085 mm	0.0012 – 0.0033 in.
	Journal oil clearance	Limit	Intake	0.12 mm	0.0047 in.
			Exhaust	0.10 mm	0.0039 in.
	Journal diameter	STD		0.025 – 0.062 mm	0.0010 – 0.0024 in.
		Limit		0.10 mm	0.0039 in.
	Circle runout		Limit	0.04 mm	0.0016 in.
	Cam lobe height	STD	Intake	35.310 – 35.410 mm	1.3902 – 1.3941 in.
			Exhaust	35.560 – 35.660 mm	1.4000 – 1.4039 in.
	Camshaft gear backlash	Limit	Intake	35.20 mm	1.3858 in.
			Exhaust	35.45 mm	1.3957 in.
Camshaft gear spring end free distance	STD		0.020 – 0.200 mm	0.0008 – 0.0079 in.	
	Limit		0.30 mm	0.0188 in.	
Cylinder block	Cylinder head surface warpage		Limit	0.05 mm	0.0020 in.
	Cylinder bore diameter	STD	Mark 1	87.000 – 87.010 mm	3.4252 – 3.4256 in.
			Mark 2	87.010 – 87.020 mm	3.4256 – 3.4260 in.
			Mark 3	87.020 – 87.030 mm	3.4260 – 3.4264 in.
	Limit	STD		87.23 mm	3.4342 in.
O/S 0.50			87.73 mm	3.4350 in.	
Piston and piston ring	Piston diameter	STD	Mark 1	86.911 – 86.921 mm	3.4217 – 3.4221 in.
			Mark 2	86.921 – 86.931 mm	3.4221 – 3.4225 in.
			Mark 3	86.931 – 86.941 mm	3.4225 – 3.4229 in.
	Piston oil clearance	O/S 0.50		87.411 – 87.441 mm	3.4414 – 3.4426 in.
		STD		0.079 – 0.099 mm	0.0031 – 0.0039 in.
	Piston ring groove clearance	Limit		0.119 mm	0.0047 in.
				0.030 – 0.070 mm	0.0012 – 0.0028 in.
	Piston ring end gap	STD	No.1	0.270 – 0.500 mm	0.0106 – 0.0197 in.
			No.2	0.350 – 0.600 mm	0.0138 – 0.0234 in.
	Limit	Oil		0.200 – 0.550 mm	0.0079 – 0.0217 in.
		No.1		1.10 mm	0.0433 in.
No.2			1.20 mm	0.0472 in.	
Oil			1.15 mm	0.0453 in.	
Connecting rod	Thrust clearance	STD		0.160 – 0.312 mm	0.0063 – 0.0123 in.
		Limit		0.35 mm	0.35 in.
	Connecting rod bearing center wall thickness	STD	Mark 1	1.484 – 1.488 mm	0.0584 – 0.0586 in.
			Mark 2	1.488 – 1.492 mm	0.0586 – 0.0587 in.
			Mark 3	1.492 – 1.496 mm	0.0587 – 0.0589 in.
	Connecting rod oil clearance	STD	STD	0.024 – 0.055 mm	0.0009 – 0.0022 in.
			U/S	0.023 – 0.069 mm	0.0009 – 0.0027 in.
		Limit		0.08 mm	0.0031 in.
	Rod bending Limit per 100 mm (3.94 in.)			0.05 mm	0.0020 in.
	Rod twist Limit per 100 mm (3.94 in.)			0.15 mm	0.0059 in.
	Bushing inside diameter			22.005 – 22.017 mm	0.8663 – 0.8668 in.
	Piston pin diameter			21.997 – 22.009 mm	0.8660 – 0.8665 in.
	Piston pin oil clearance	STD		0.005 – 0.011 mm	0.0002 – 0.0004 in.
Limit			0.05 mm	0.0020 in.	
Connecting rod bolt outside diameter	STD		7.860 – 8.000 mm	0.3094 – 0.3150 in.	
	Limit		7.60 mm	0.2992 in.	

## INSTALLATION OF MASTER CYLINDER

(See page BR-9)

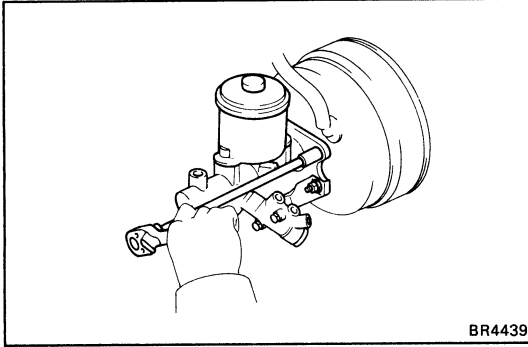
1. **ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER**  
(See page BR-16)



2. **INSTALL MASTER CYLINDER**

- (a) Install the master cylinder.
- (b) Install the P & BV with the P & BV bracket.
- (c) Install the four nuts and torque nuts.

**Torque: 130 kg-cm (9 ft-lb, 13 N·m)**

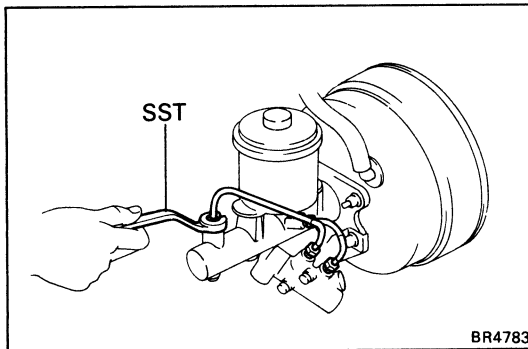


3. **CONNECT TWO BRAKE TUBES**

Using SST, connect the brake tubes to the master cylinder. Torque the union nuts.

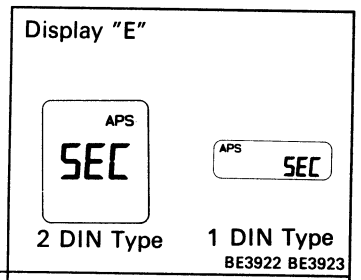
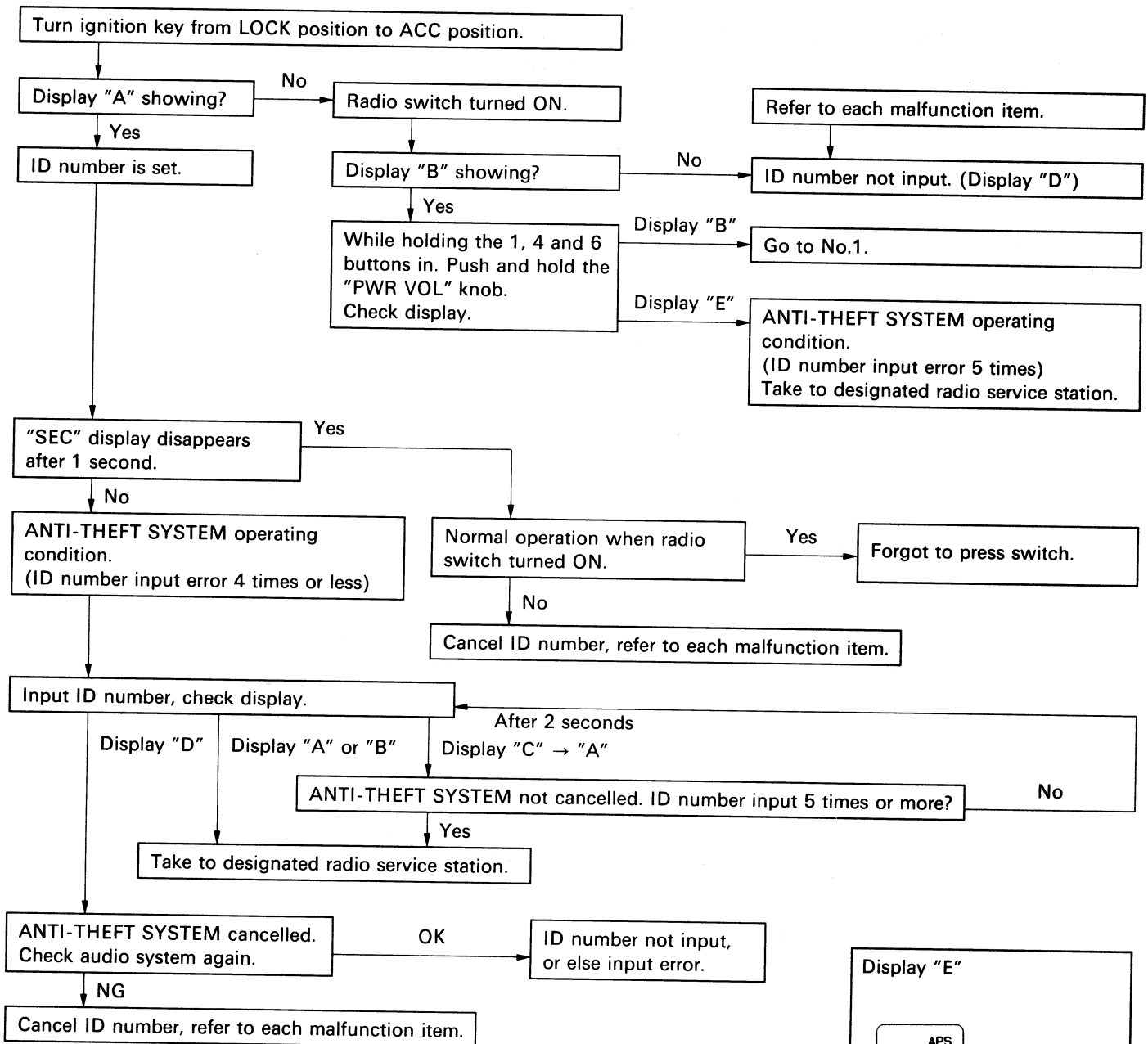
SST 09751-36011

**Torque: 155 kg-cm (11 ft-lb, 15 N·m)**



4. **CONNECT LEVEL WARNING SWITCH CONNECTOR**
5. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**  
(See page BR-6)
6. **CHECK FOR FLUID LEAKAGE**
7. **CHECK AND ADJUST BRAKE PEDAL**  
(See page BR-5)

### TROUBLESHOOTING FOR ANTI-THEFT SYSTEM



(Liquid Crystal Display (LCD) for Audio System)

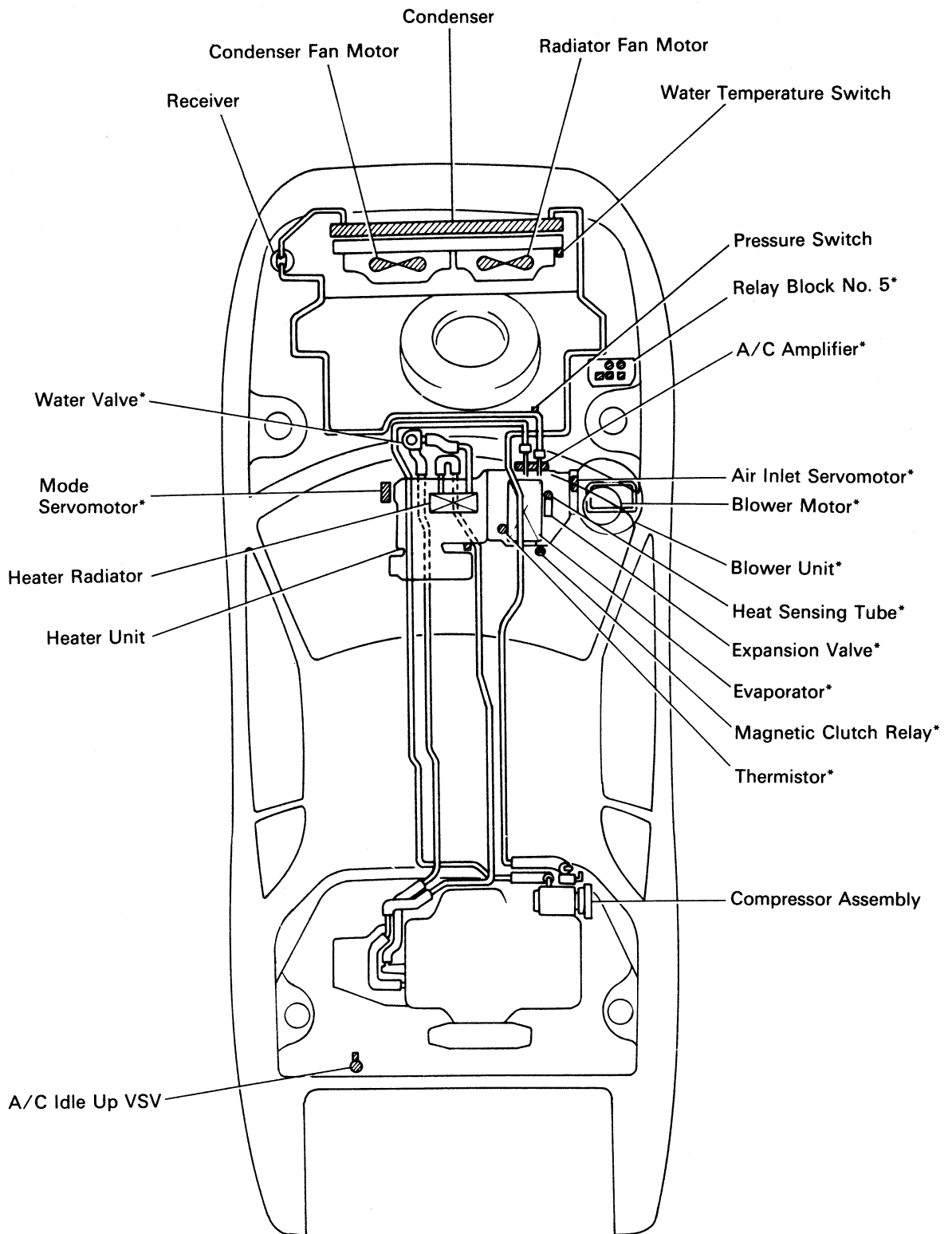
<p>Display "A"</p> <p>2 DIN Type      1 DIN Type BE2810 BE2814</p>	<p>Display "B"</p> <p>Blank, No Illumination</p> <p>2 DIN Type      1 DIN Type BE2811 BE2815</p>	<p>Display "C"</p> <p>Error Times</p> <p>2 DIN Type      1 DIN Type BE2812 BE2816</p>	<p>Display "D" Example: Radio Display</p> <p>2 DIN Type      1 DIN Type BE2813 BE2817</p>
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HINT:

- Refer to Owner's Manual for operation details of ANTI-THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

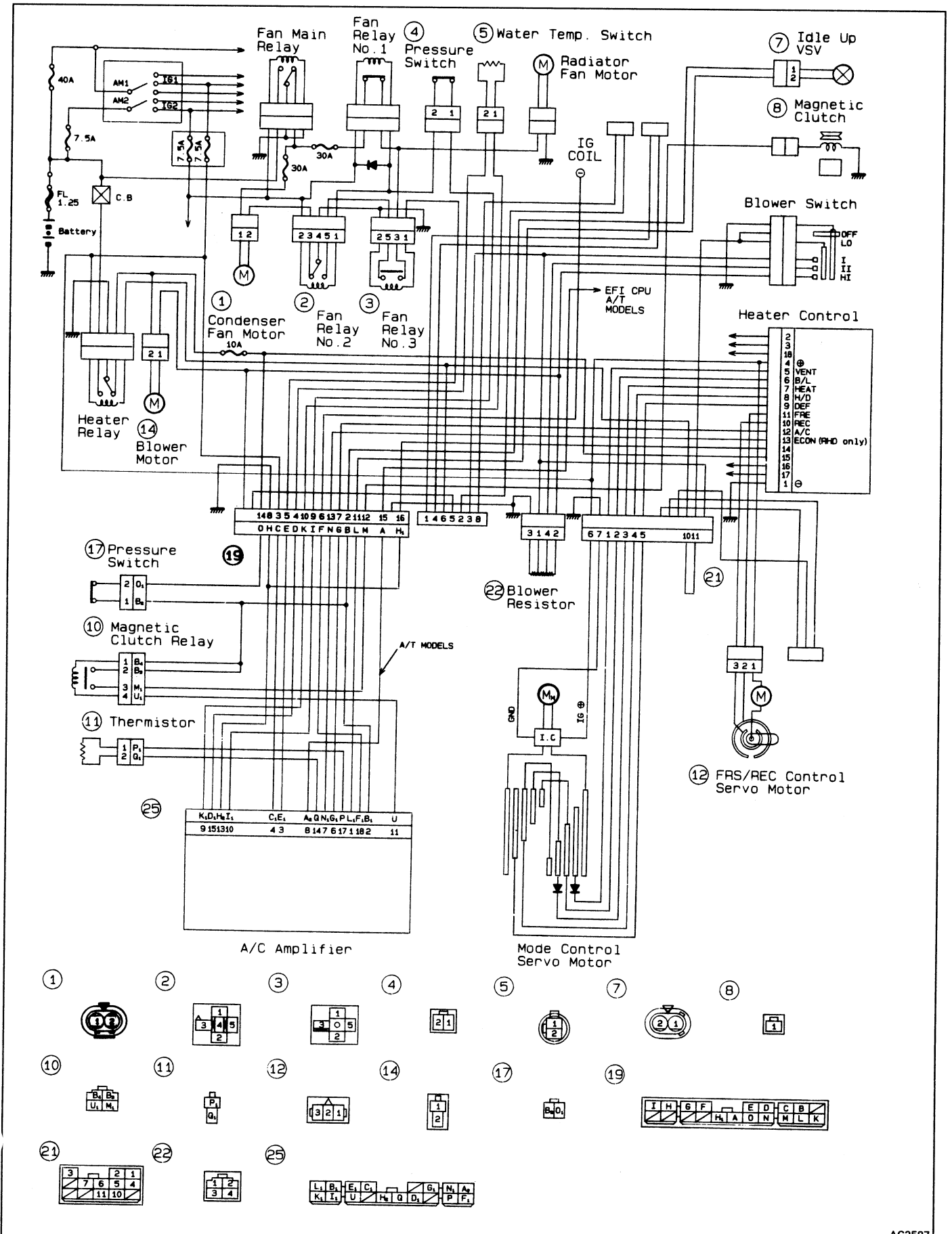
## DESCRIPTION

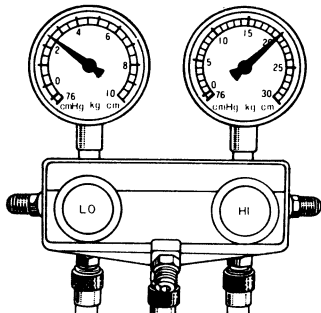
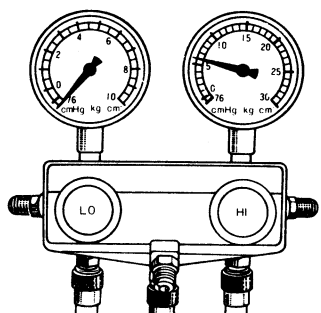
### LOCATIONS OF A/C SYSTEM



RHD vehicles, for parts marked (\*), are in always symmetrically opposite to LHD vehicles.

**ELECTRICAL WIRING DIAGRAMS**



No.	Gauge reading kg/cm <sup>2</sup> (psi, kPa)	Condition	Probable cause	Remedy
4	<p>Pressure too high at both low and high pressure side</p> 	<p>Insufficient cooling</p>	<p>Insufficient cooling of condenser</p>	<p>(1) Clean condenser (2) Check fan motor operation</p>
5			<p>Refrigerant over charged</p>	<p>Check amount of refrigerant HINT: Vent out refrigerant through gauge manifold low pressure side by gradually opening valve</p>
6			<p>Air present in system</p>	<p>(1) Replace receiver (2) Check compressor oil to see if dirty or insufficient (3) Evacuate air and charge with new refrigerant</p>
7			<ul style="list-style-type: none"> <li>● Insufficient cooling</li> <li>● Frost or large amount of dew on piping at low pressure side</li> </ul>	<p>Expansion valve improperly mounted, heat sensing tube defective (Opens too wide)</p>
8	<p>Vacuum indicated at low pressure side, very low pressure indicated at high pressure</p> 	<ul style="list-style-type: none"> <li>● Does not cool (Cools from time to time in some cases)</li> <li>● Frost or dew seen on piping before and after receiver or expansion valve</li> </ul>	<p>Refrigerant does not circulate</p>	<p>Allow to stand for some time and then restart operation to determine if trouble is caused by moisture or dirt If caused by moisture refer to procedures step 2 on page AC-10 If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If not able to remove dirt, replace valve Evacuate air and charge with new refrigerant to proper amount For gas leakage from heat sensing tube, replace expansion valve</p>

HINT at No. 6

These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without evacuating air.