

AIR CONDITIONING SYSTEM

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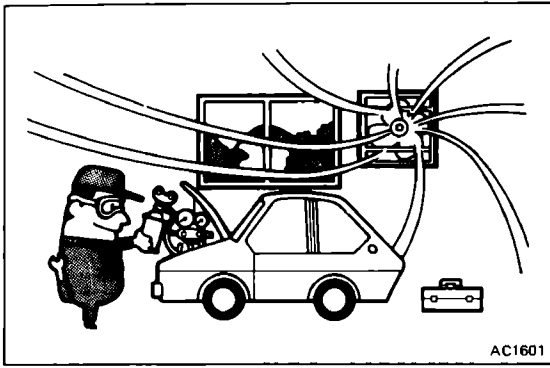
GENERAL INFORMATION

1. WHEN HANDLING REFRIGERANT (R-12), FOLLOWING PRECAUTIONS MUST BE OBSERVED

- Do not handle refrigerant in an enclosed area or near an open flame.
- Always wear eye protection.
- Be careful that liquid refrigerant does not get in your eyes or on your skin.

If liquid refrigerant gets in your eyes or on your skin;

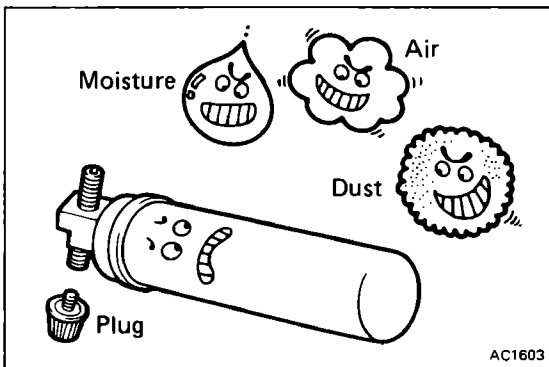
- Do not rub.
- Wash the area with a lot of cool water.
- Apply clean petroleum jelly to the skin.
- Go immediately to a physician or hospital for professional treatment.
- Do not attempt to treat yourself.



AC1601



AC1602



AC1603

2. WHEN REPLACING PARTS ON REFRIGERANT LINE;

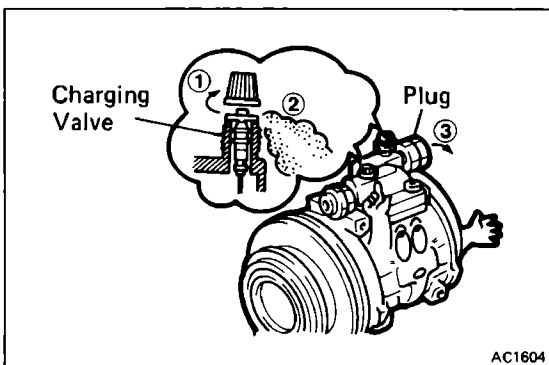
- Discharge refrigerant slowly before replacement.
- Insert a plug immediately in disconnected parts to prevent entry of moisture and dust.
- Do not leave a new condenser or receiver, etc., lying around with the plug removed.

- Discharge refrigerant from the charging valve before installing the new compressor.

If the refrigerant is not discharged first, compressor oil will spray out with the refrigerant gas when the plug is removed.

- Do not use a burner for bending or lengthening operations on tubes.

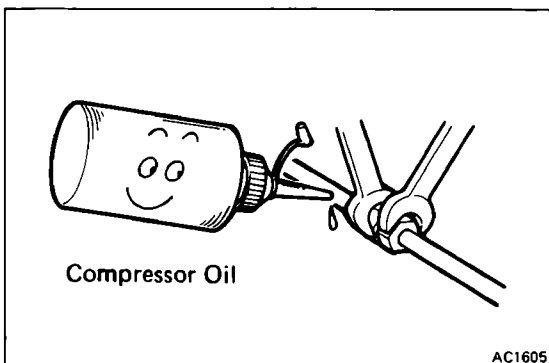
If tubes are heated with a burner, a layer of oxidation forms inside the tube, causing the same kind of trouble as an accumulation of dust.



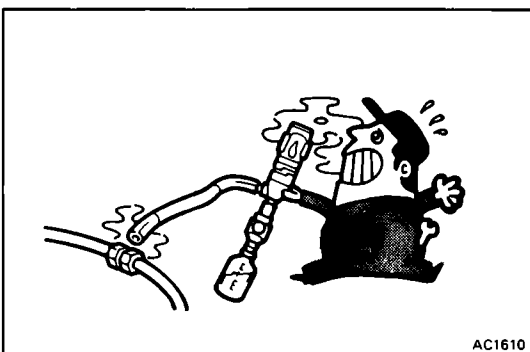
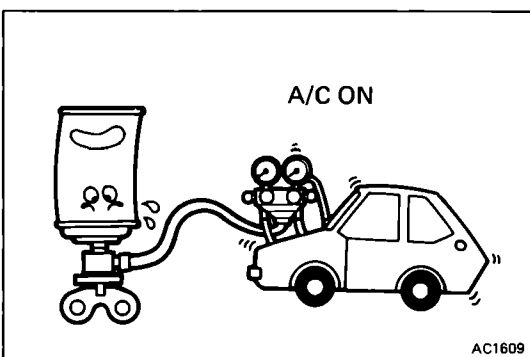
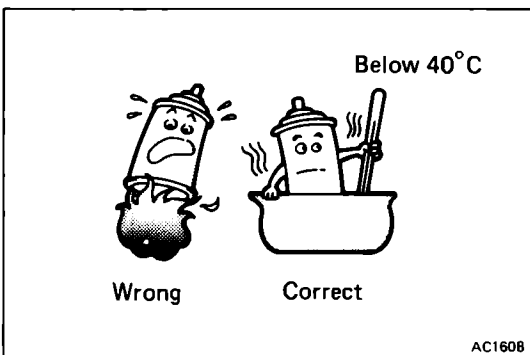
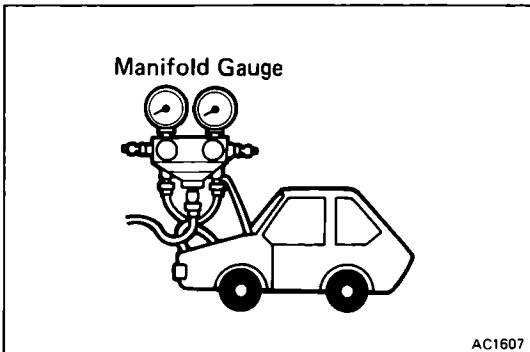
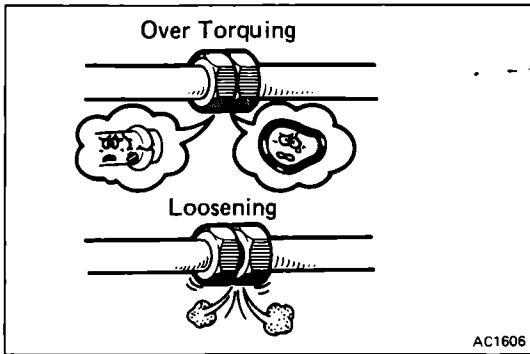
AC1604

3. WHEN TIGHTENING CONNECTING PARTS;

- Apply a few drops of compressor oil to O-ring fittings for easy tightening and to prevent leaking of refrigerant gas.
- Tighten the nut using two wrenches to avoid twisting the tube.



AC1605



(c) Tighten the O-ring fittings or the bolted type fittings to the specified torque.

4. WHEN CONNECTING MANIFOLD GAUGE;

- (a) Be sure to connect the charging hose end with a pin to the compressor charging valve.
- (b) The letter "D" engraved near the compressor service valve indicates the high pressure side, and "S" indicates the low pressure side. Pay careful attention when connecting the hose.
- (c) Tighten hose by hand.
- (d) To prevent loosening of connected hose, do not apply drops of compressor oil to the seat of connection.

NOTE: After connecting the manifold gauge and the refrigerant container (service can), discharge any air in the hoses.

5. WHEN EVACUATING;

Approx. 15 minutes after removal, check the system for leaks, then take at least another 15 minutes to make sure the air is fully removed.

6. WHEN HANDLING REFRIGERANT CONTAINER (SERVICE CAN);

- (a) Must never be heated.
- (b) Must be kept below 40°C (104°F).
- (c) If warming service can with hot water, be careful that the valve on top of the service can is never immersed in the water, as the water may permeate into the refrigerant cycle.
- (d) Empty service cans must never be re-used.

7. WHEN A/C IS ON AND REFRIGERANT GAS IS BEING REPLENISHED;

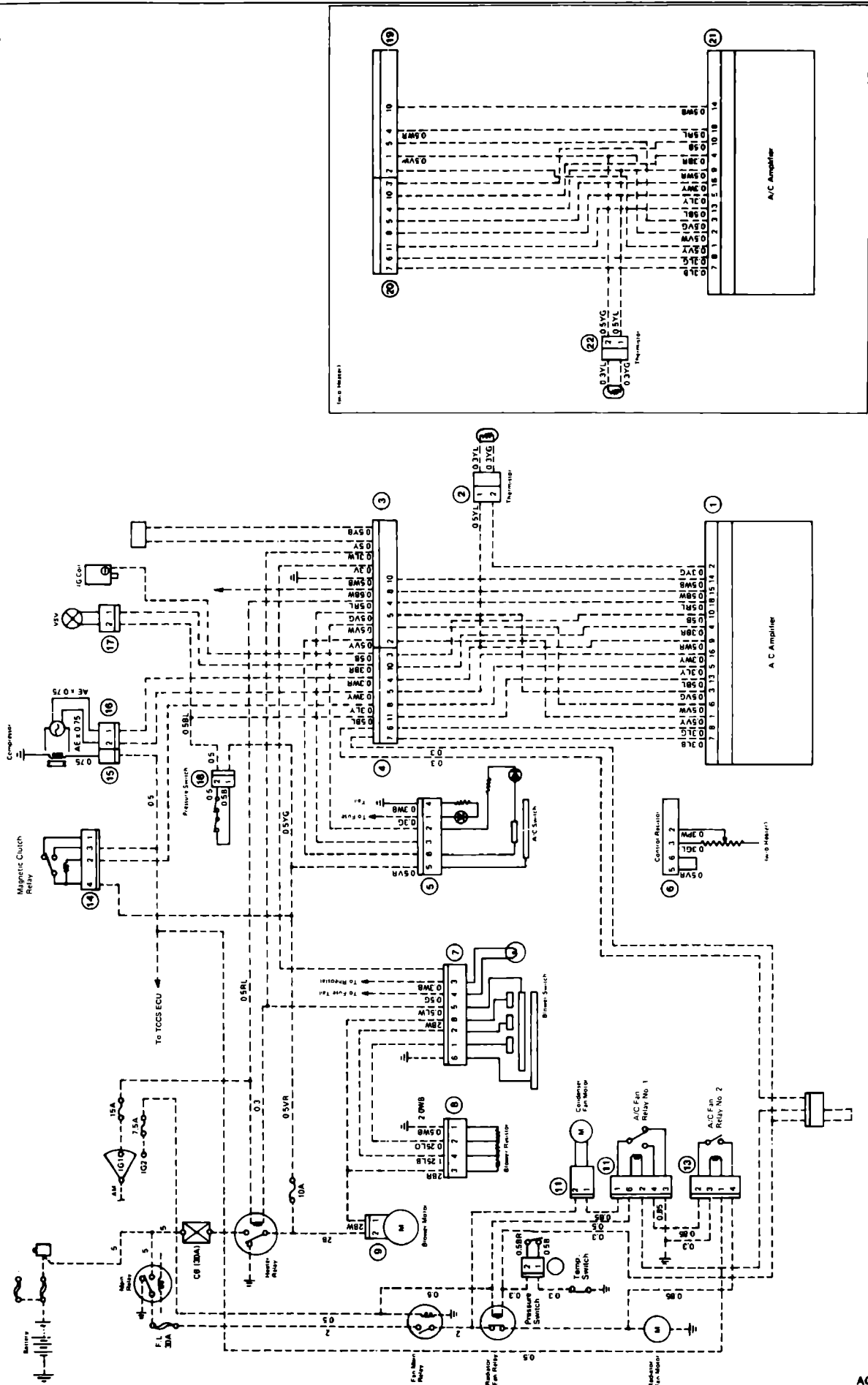
- (a) If there is not enough refrigerant gas in the refrigerant cycle, oil lubrication becomes insufficient and compressor burnout may occur, so take care to avoid this.
- (b) If the valve on the high pressure side is opened, refrigerant flows in reverse and causes the service can to rupture, so only open and close the valve on the low pressure side.
- (c) If the service can is inverted and refrigerant is inserted in a liquid state, the liquid is compressed and the compressor breaks down, so the refrigerant must be inserted in a gaseous state.
- (d) Be careful not to insert too much refrigerant gas, as this causes trouble such as inadequate cooling, poor fuel economy, engine overheat, etc.

8. WHEN USING GAS-CYLINDER TYPE LEAK DETECTION INSTRUMENT;

- (a) As a naked flame is used, first make sure that there are no flammable substances nearby before using it.
- (b) Be careful, as poisonous gas is produced when refrigerant gas comes in contact with heat parts.

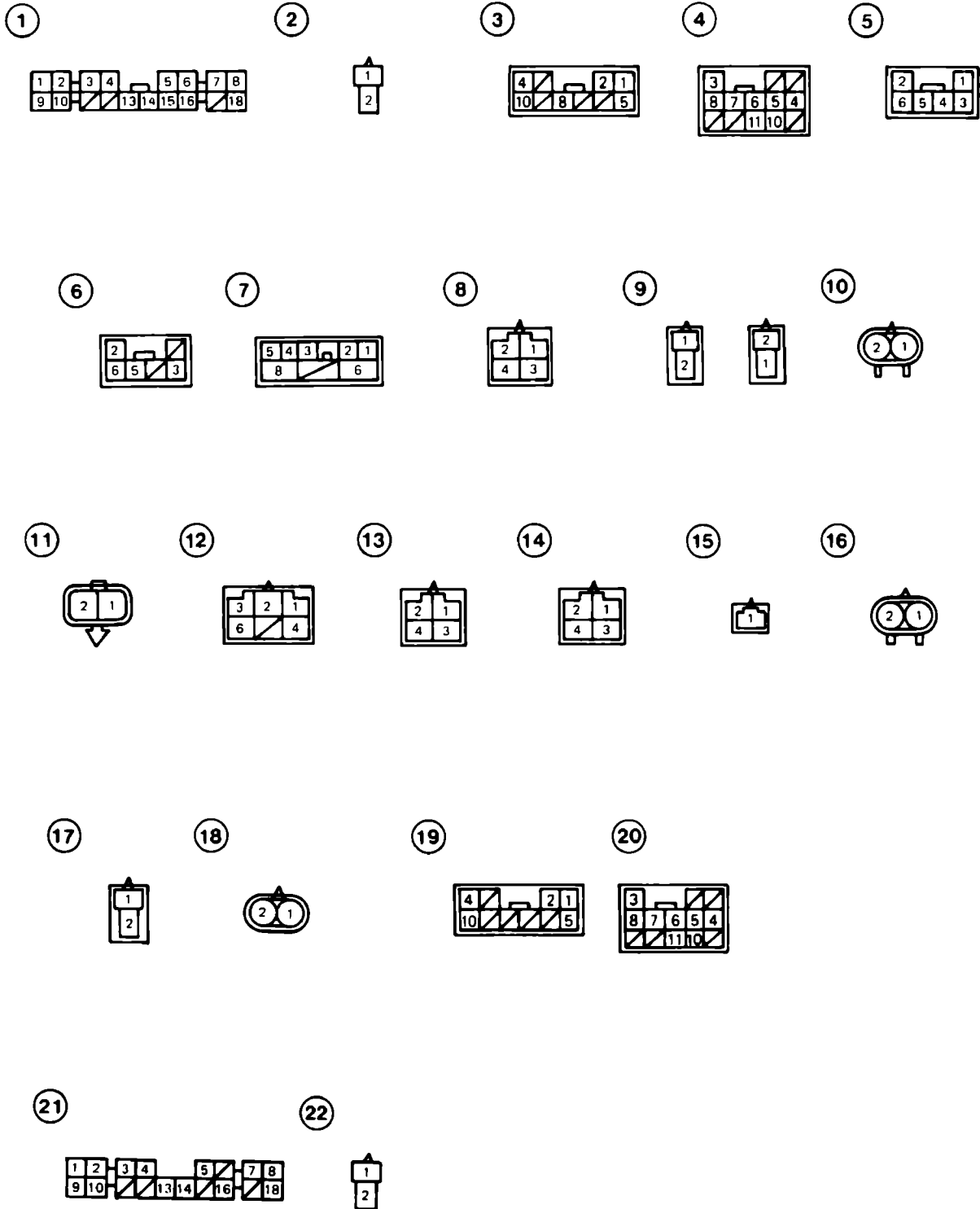
AIR CONDITIONING SYSTEM CIRCUIT

Lever Type



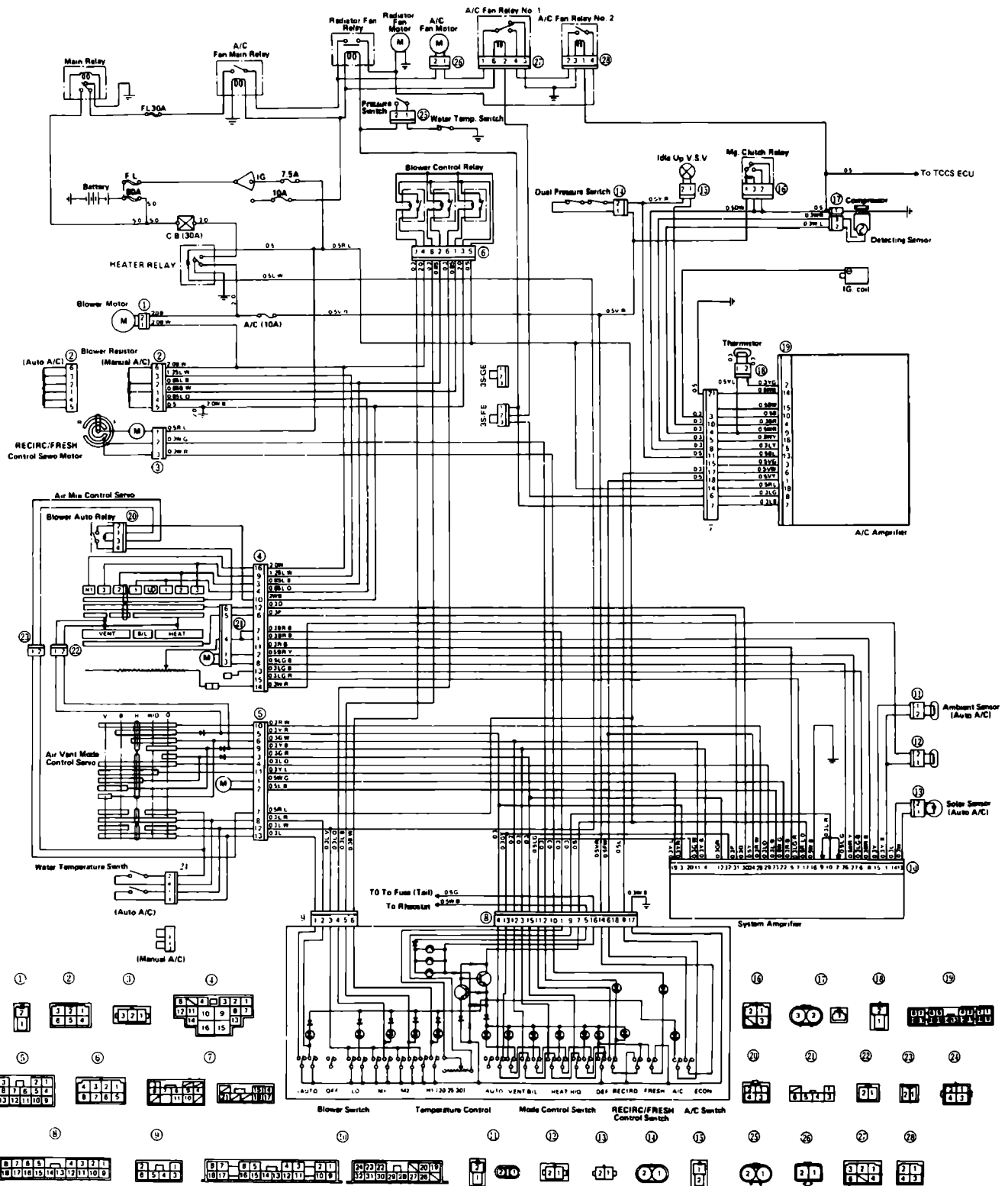
AIR CONDITIONING SYSTEM CIRCUIT (Cont'd)

Lever Type



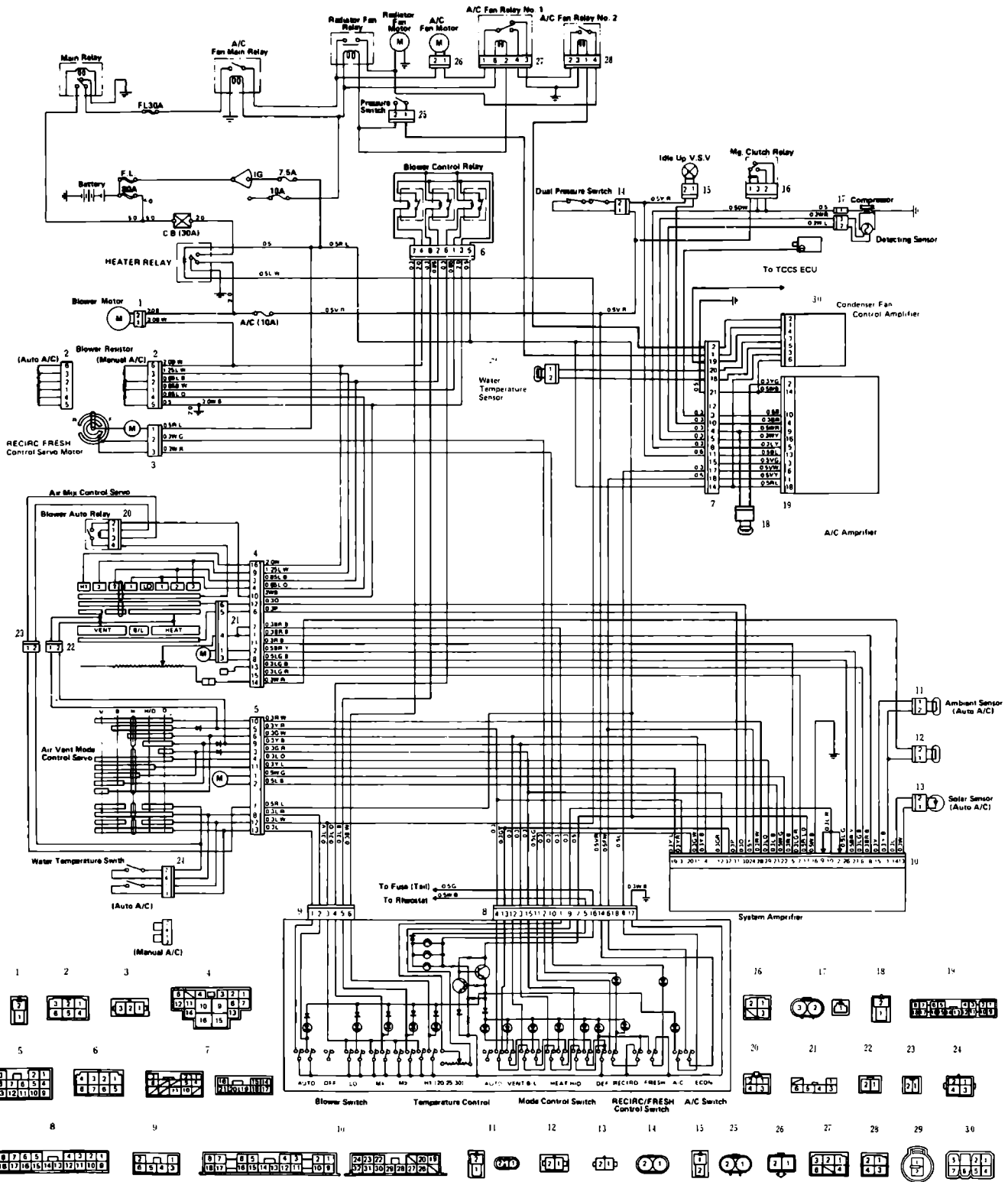
AIR CONDITIONING SYSTEM CIRCUIT (Cont'd)

Push Type (FWD)

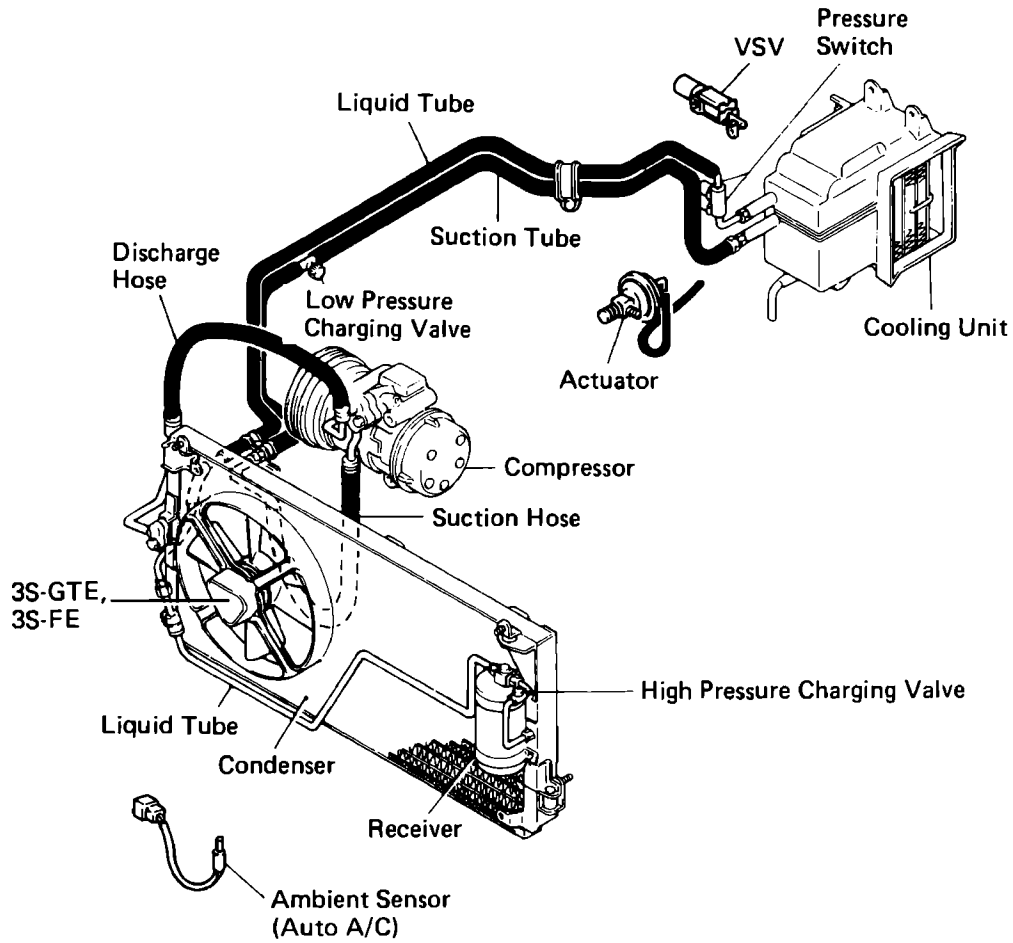


AIR CONDITIONING SYSTEM CIRCUIT

Push Type (All-Track/4WD)



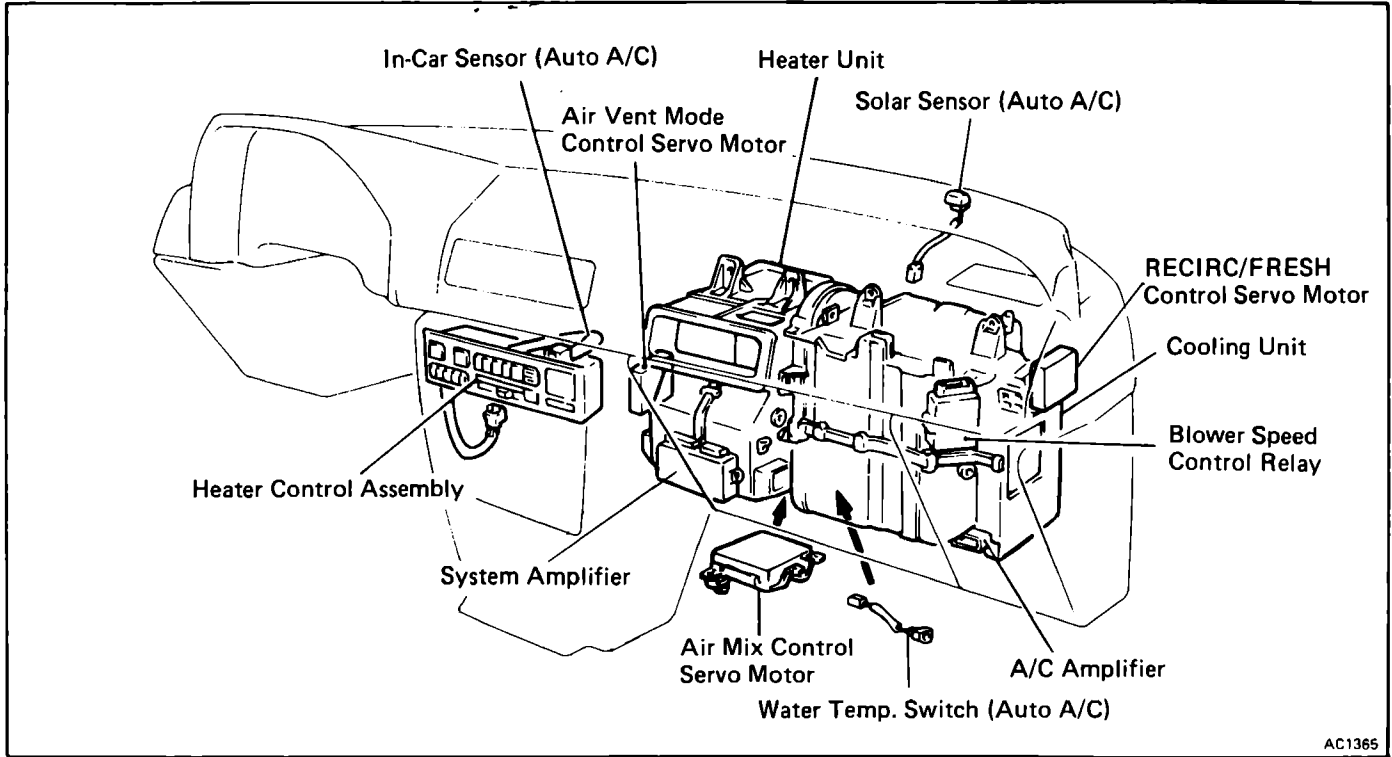
SYSTEM COMPONENTS

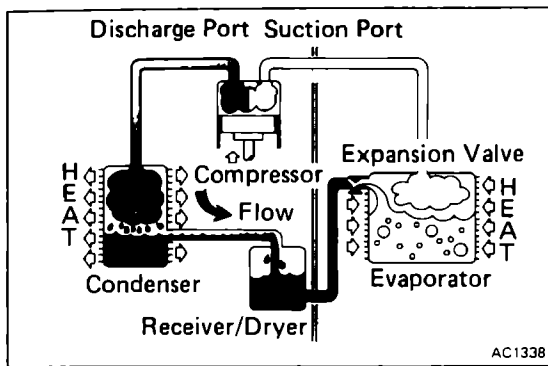


Specified torque: kg-cm (ft-lb, N·m)

0.31 in. Tube		140 (10, 14)
0.50 in. Tube		230 (17, 23)
0.62 in. Tube		330 (24, 32)
Bolted Type	(For Compressor)	250 (18, 25)
	(For Condensor)	185 (13, 18)

SYSTEM COMPONENTS (Cont'd)

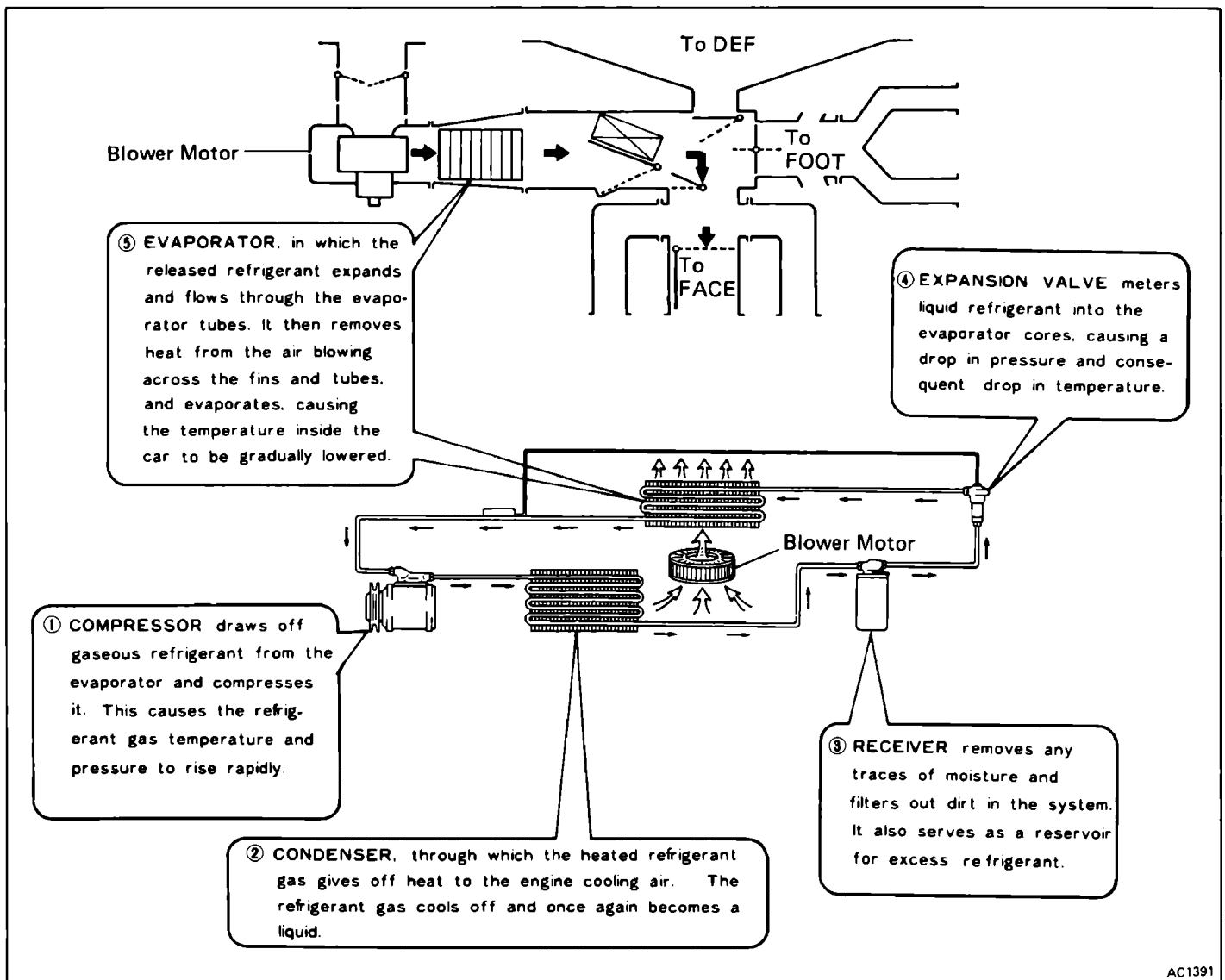




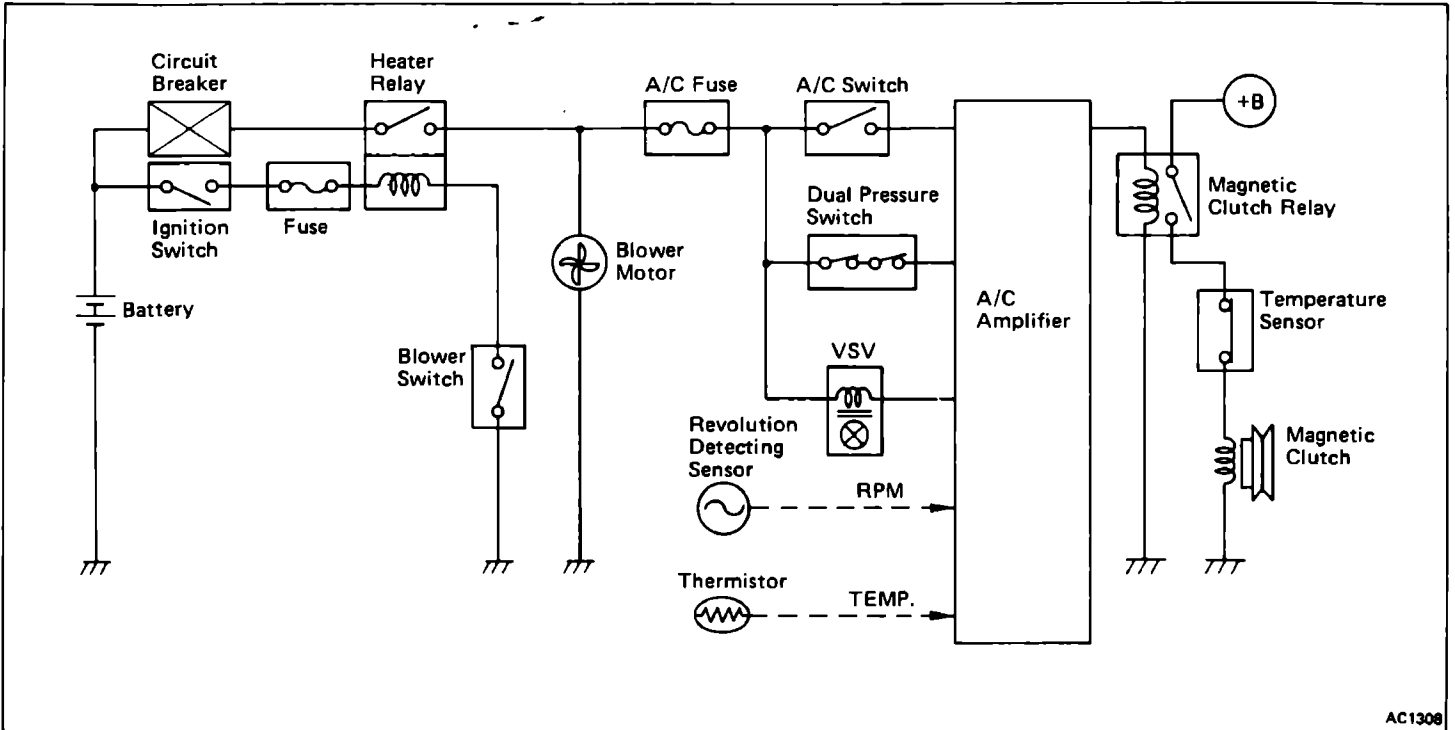
GENERAL DESCRIPTION

REFRIGERATION CYCLE

1. The compressor discharges high temperature and high pressure refrigerant containing the heat absorbed from the evaporator plus the heat created by the compressor in a discharge stroke.
2. This gaseous refrigerant flows into the condenser. In the condenser, the gaseous refrigerant condenses into liquid refrigerant.
3. This liquid refrigerant flows into the receiver which stores and filters the liquid refrigerant till the evaporator requires the refrigerant.
4. The liquid refrigerant is changed by the expansion valve into a low temperature, low pressure liquid and gaseous mixture.
5. This cold and foggy refrigerant flows to the evaporator. Vaporizing the liquid in the evaporator, the heat from the warm air stream passing through the evaporator core is transferred to the refrigerant. All the liquid is changed into the gaseous refrigerant in the evaporator and only heat-laden gaseous refrigerant is drawn into the compressor. Then the process is repeated again.



1. PRINCIPLE OF A/C ELECTRICAL CIRCUIT



AC1308

2. HOW IS MAGNETIC CLUTCH ENERGIZED ?

The general process until the magnetic clutch is energized is shown below.

- ① Ignition Switch "ON"
- ② Blower Switch "ON" → Heater Relay "ON" (Blower Motor "RUN")
- ③ A/C Switch "ON" → A/C Amplifier "ON" (A/C Amp. Main Power Supply)
- ④ Dual Pressure Switch "ON":
Refrigerant Condition (2.1 kg/cm² (30 psi, 206 kPa) less than 27 kg/cm² (384 psi, 2648 kPa))
- ⑤ Thermistor supplies temperature signal of evaporator to A/C amplifier.
- ⑥ VSV "ON" → E/G Idle Up
- ⑦ Magnetic Clutch Relay "ON"
- ⑧ Temperature Sensor "ON":
Temperature of Temperature Sensor is less than 180°C (356° F).
- ⑨ Magnetic Clutch "ON"
- ⑩ Revolution Detecting Sensor supplies RPM signal of compressor to A/C amplifier.

If compressor is not locked, magnetic clutch is continuously energized.

PRINCIPLE OF AUTOMATIC AIR CONDITIONING SYSTEM

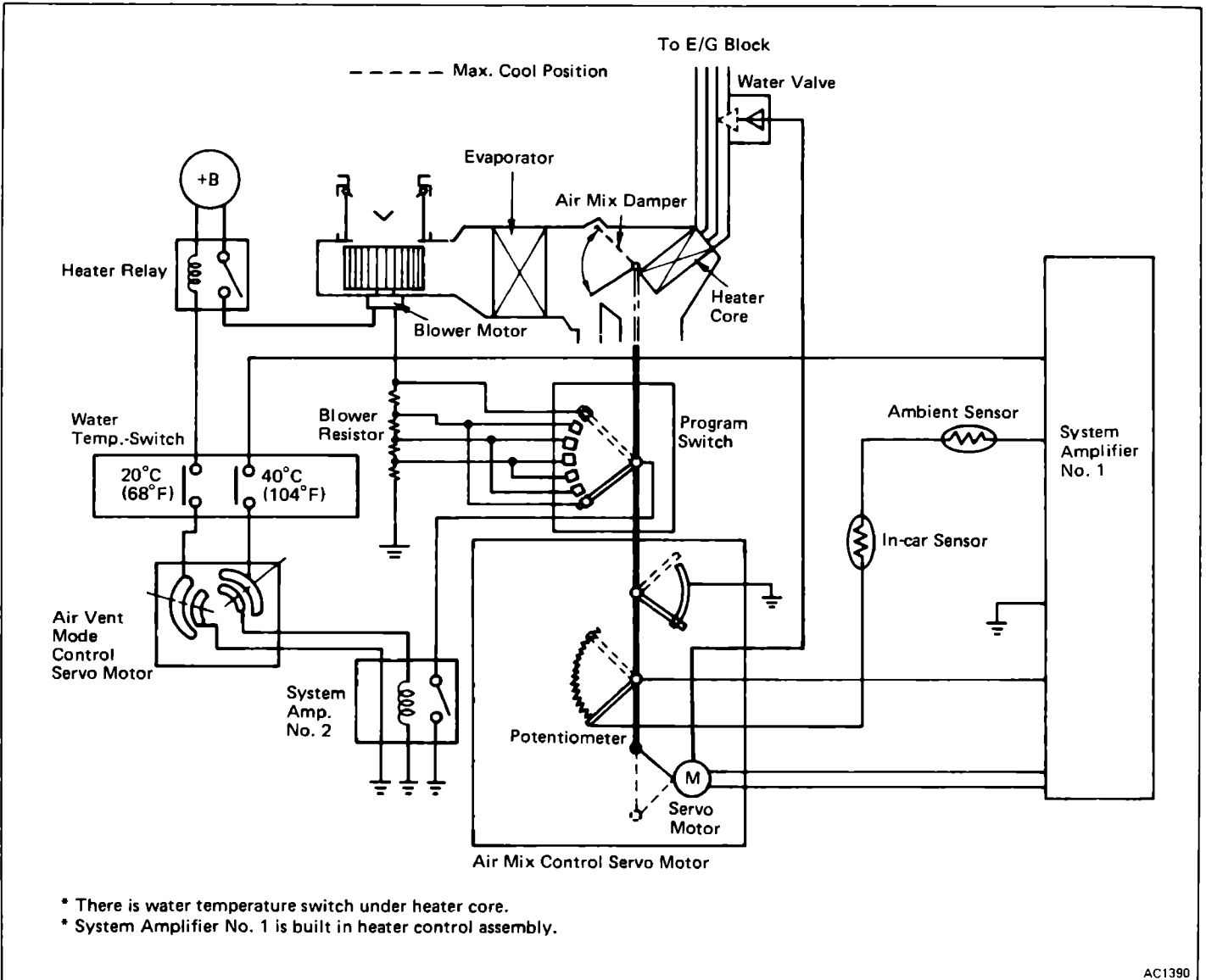
1. WHAT'S AUTOMATIC AIR CONDITIONING SYSTEM ?

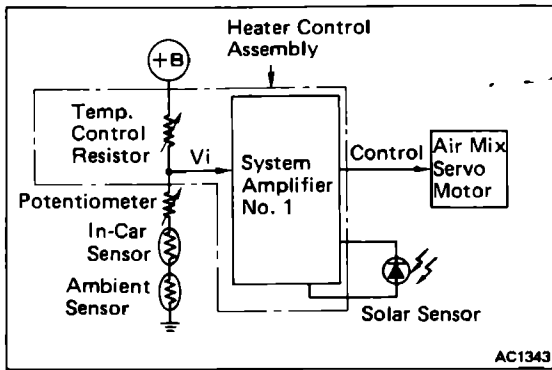
Automatic air conditioning system automatically controls the interior room temperature, the blower speed, the air vent mode, etc., according to setting temperature of hope. It keeps good air condition at all seasons.

2. HOW FUNCTIONS DOES AUTOMATIC AIR CONDITIONING SYSTEM HAVE ?

Automatic air conditioning system has four main functions as follows.

(1) Interior Room Temperature Control System & Blower Speed Control System.





Interior Room Temperature Control System & Blower Speed Control System (Cont'd)

(a) Interior Room Temperature Control System

For example, now interior room temperature is rising.

- ① Resistance value of in-car sensor decreases.
- ② Voltage of V_i decreases.
- ③ System amplifier No. 1 rotates a motor in air mix control servo motor.
- ④ Air mix control servo motor shaft moves towards max cool side.
- ⑤ Resistance value of potentiometer increases.
- ⑥ Voltage of V_i increases in original condition.
- ⑦ Air mix control servo motor shaft stops.

* When air mix control servo motor shaft moves at max cool position, water valve VSV is off. And water valve is close.

(b) Blower Speed Control System

As aforeside, according to moving of air mix control servo motor, blower speed is controlled.

Warm-up System

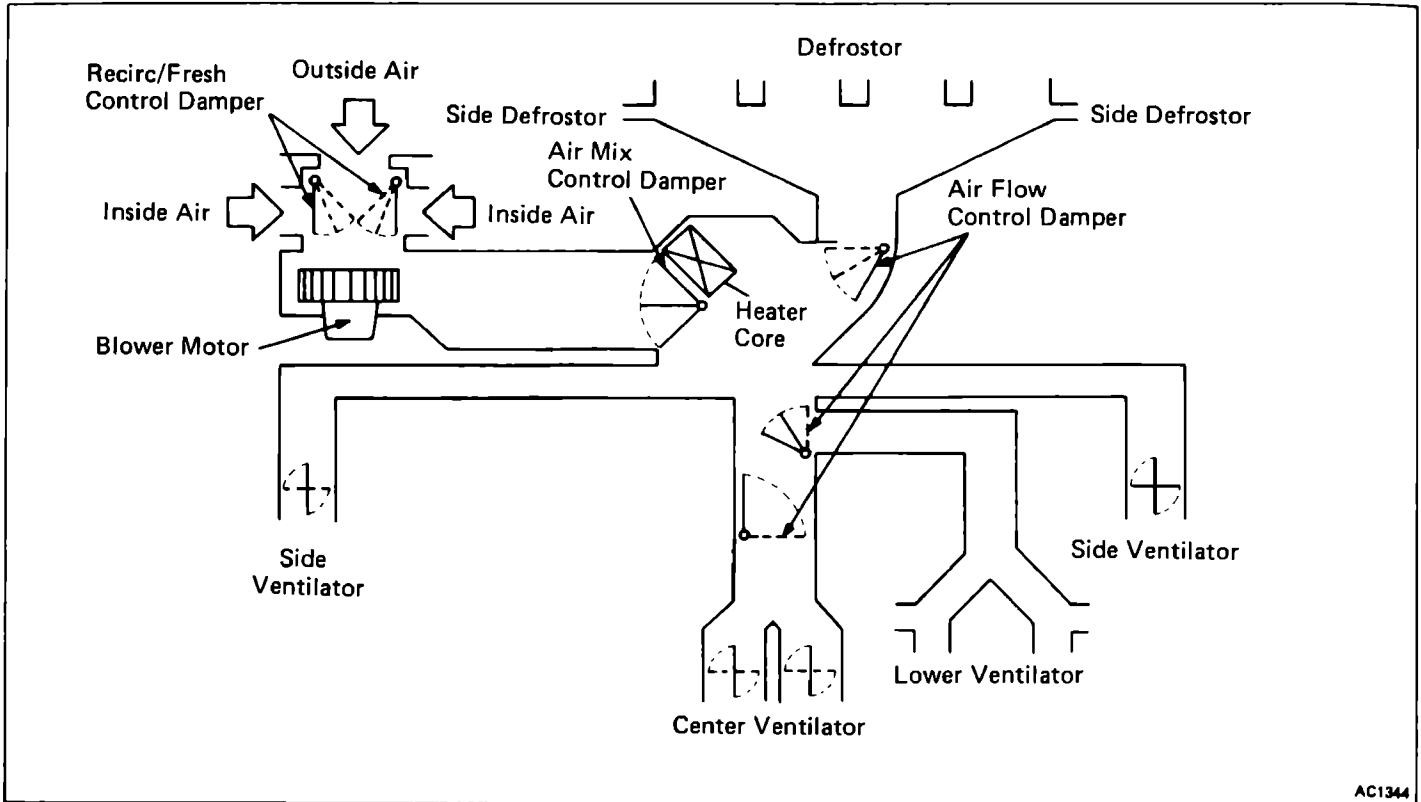
condition : Blower Switch is **AUTO** position.

Air Mode Switch is **AUTO** or **HEAT** position.

This system has a function that the blower unit blows cold air to your feet.

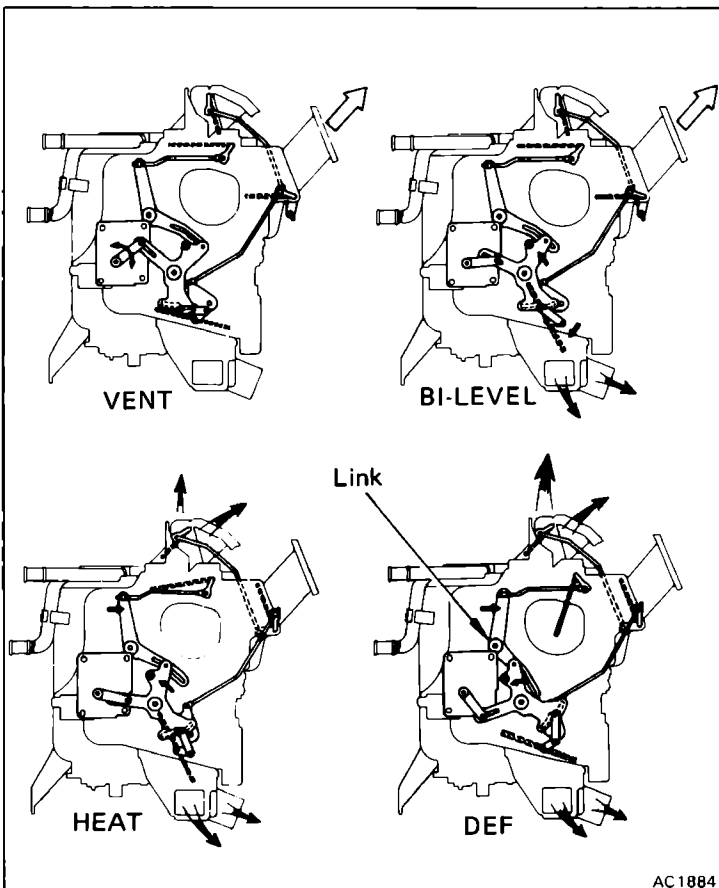
Water Temperature	Water Temperature Switch	Blower Motor
Less than 20°C (68°F)	20°C (68°F) Switch → OFF	OFF
20°C – 40°F (68°F – 104°F)	20°C (68°F) Switch → ON 40°C (104°F) Switch → OFF	Low only
More than 40°C (104°F)	40°C (104°F) Switch → ON	Automatic Control

(2) Air Vent Mode Control System & RECIRC/FRESH Control System



AC1344

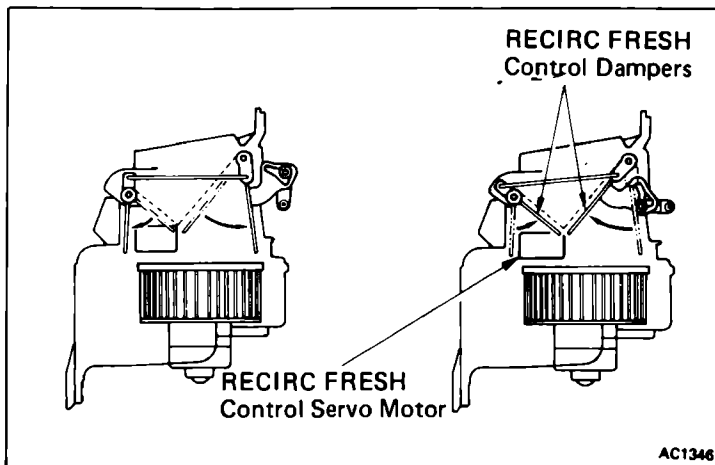
(a) Air Vent Mode Control System



AC1884

Air-flow changes as follows.

- ① Air mix control servo motor shaft moves.
- ② Program switch is changed.
(Signal is transmitted to system amp. No. 2.)
- ③ System amp. No. 2 rotates a motor in air vent mode control servo motor.
- ④ Servo motor links move.
- ⑤ Each damper moves.
- ⑥ As aforeside, the air flows as shown left illustration.



(b) RECIRC/FRESH Control System
RECIRC and FRESH Changes as follows.

- ① RECIRC/FRESH control switch is pushed.
- ② System amplifier rotates a motor in RECIRC/FRESH control servo motor.
- ③ RECIRC/FRESH control dampers move as shown left illustration.

SPECIAL TOOLS AND EQUIPMENT

Tool	SST No.	Use
Ohmmeter	–	To perform electrical diagnosis
Voltage meter	–	To perform electrical diagnosis
Ammeter	–	To perform electrical diagnosis
Air conditioner service tool set	07110-58011	To evacuate and charge system
Hexagon wrench set	07110-61050	To remove and install service valve and front housing
Seal plate remover	07112-15020	To remove felt
Magnetic clutch remover	07112-66040	To remove pressure plate
Magnetic clutch stopper	07112-76060	To remove and install pressure plate
Seal plate remover	07112-85030	To remove seal plate
Seal plate pressure	07114-15021	To install seal plate
Snap ring pliers (External type)	07114-84020	To remove and install rotor and stator

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Use etc.
DENSO OIL 6, SUNISO No. 5GS or equivalent	07117-68040 –	Compressor

TROUBLESHOOTING

You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in troubles. Check each part in order. If necessary, replace these parts.

See Page	Parts Name	Trouble	No blower operation	No cool air come out	No warm air come out	Cool air comes out inter-mittently	Limited amount of cool air at high speed	Cool air comes out only at high speed	Insufficient velocity of cool air	Insufficient cooling	No blower control
AC-4	Fuses		1	1	1						
AC-4	Circuit Breaker		1	1	1						
AC-4	Main Relay										
AC-4	Wiring		2	2	2	3					7
AC-4	Wiring Connection		2	2	2	3					7
AC-8,23	Refrigerant in System			1				4		6	
BE-43	Heater Relay		3	2	3						
—	Blower Motor		4						4		
BE-43	Blower Resistor		5								1
AC-44	Water Temp. SW 20°C (68°F)		3		3						6
AC-44	Water Temp. SW 40°C (104°F)		5		4						6
AC-44	Dual Pressure Switch			2							
AC-44	High Pressure Switch										
AC-26	Magnetic Clutch			3		1				3	
AC-43	Magnetic Clutch Relay			3							
AC-52	A/C Amplifier			4		5			5	9	5
AC-24	Compressor			4				3		4	
AC-38	Condenser			5				1		1	
AC-47	Evaporator			5		2			1		
AC-45	Expansion Valve			5						5	
AC-38	Receiver			5						7	
AC-49	Thermistor			5			1			6	
AC-22	Drive Belt			4		1		2		2	
AC-49	A/C Switch			3							

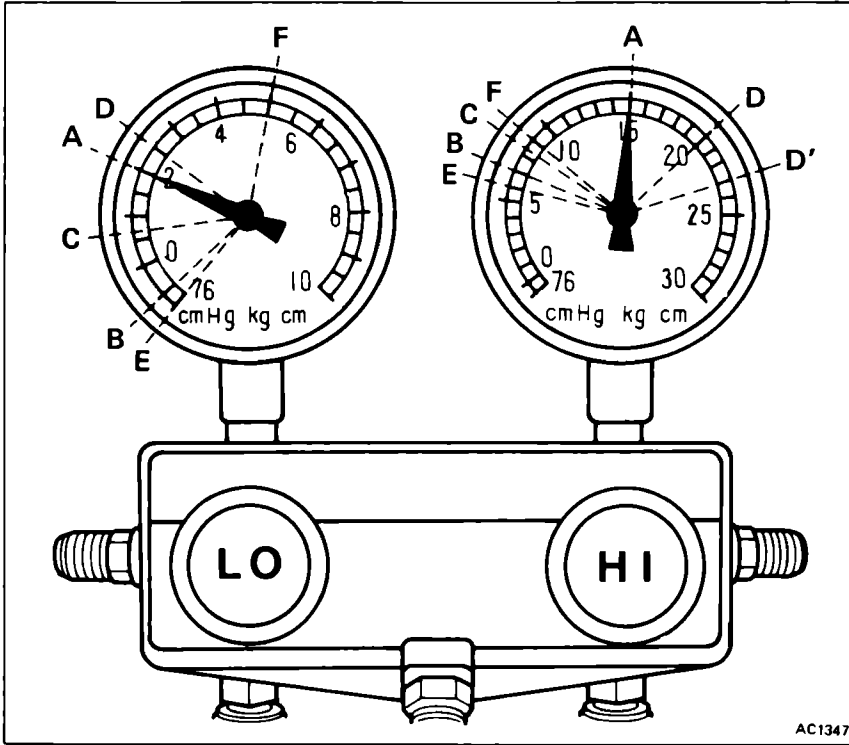
2									4	3	5	Blower Switch	BE-42
5									4	3		Temp. Control Switch	BE-44
5									4	4		Air Vent Mode Switch	BE-45
5									4	4		REC/FRE Control S/W	BE-45
3									4	4		In-Car Sensor	AC-55
3									4	4		Ambient Sensor	AC-55
3									4	4		Solar Sensor	AC-55
3									4	4		Potentiometer	—
											6	Program Switch	AC-43
4									4	4		Air Mix Control Servo	BE-47
4											5	Air Vent Mode Control Servo	BE-48
4									4	4		REC/FRE Control Servo	BE-47
4									4	4	7	System Amplifier	AC-52
								8	3			Water Valve VSV	—
								8	3			Water Valve Diaphragm	—
								8	3			Water Valve	—
										3		Leak in System	AC-48
												Excessive Moisture in System	AC-48
											5	Air in System	AC-48
								7				Air or Excessive Compressor Oil in System	AC-48
												Air Inlet Blocked	AC-48
												Air Leakage from Cooling Unit or Air Duct	AC-48
1												Servo Motor Links	AC-54

Checking of Refrigeration System with Manifold Gauge

This is a method in which the trouble is located by using a manifold gauge. Read the manifold gauge pressure when the following conditions are established:

- (a) Temperature at the air inlet is 30 – 35°C (86 – 95°F)
- (b) Engine running at 2,000 rpm
- (c) Blower fan speed switch set at high speed
- (d) Temperature control lever set at cool side

NOTE: It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.



NORMALLY FUNCTIONING REFRIGERATION SYSTEM

Gauge Reading:

Low pressure side

1.5 – 2.0 kg/cm²
(21 – 28 psi, 147 – 196 kPa)

High pressure side

14.5 – 15.0 kg/cm²
(206 – 213 psi, 1,422 – 1,471 kPa)

Each pointer of manifold gauge points to position A.

No.	Trouble	Condition	Position of Pointers
1	Moisture present in refrigeration system	Periodically cools and then fails to cool	Between A and B
2	Insufficient refrigerant	Insufficient cooling	C
3	Poor circulation of refrigerant	Insufficient cooling	C
4	Refrigerant overcharge or insufficient cooling of condenser	Does not cool sufficiently	D
5	Expansion valve improperly mounted heat sensing tube defective (opens too wide)	Insufficient cooling	D
6	Air present in refrigeration system	Does not cool sufficiently	Low is D High is D'
7	Refrigerant does not circulate	Does not cool (cools from time to time in some cases)	E
8	Insufficient compression	Does not cool	F

Checking of Refrigeration System with Manifold Gauge (Cont'd)

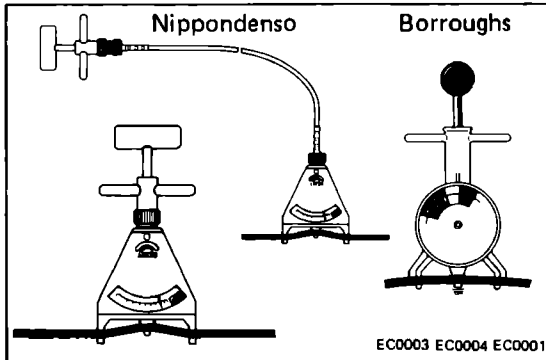
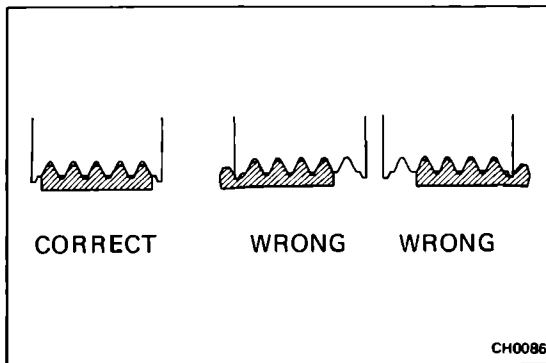
No.	Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
1	During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	Drier in oversaturated state ↓ Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace receiver and drier (2) Remove moisture in cycle through repeated vacuum purging (3) Charge refrigerant to proper amount
2	Pressure low at both low and high pressure sides Bubbles seen in sight glass Insufficient cooling performance	Gas leakage at some place in refrigeration system	Insufficient refrigerant in system ↓ Refrigerant leaking	(1) Check with leak tester and repair (2) Charge refrigerant to proper amount
3	Pressure low at both low and high pressure sides Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace receiver
4	Pressure too high at both low and high pressure sides	Unable to develop sufficient performance due to excessive refrigerant in system Condenser cooling insufficient	Excess refrigerant in cycle → refrigerant over-charged Condenser cooling insufficient → condenser fins clogged or fan motor faulty	(1) Clean condenser (2) Check fan motor operation (3) If (1) and (2) are normal, check refrigerant amount NOTE: Vent out refrigerant through gauge manifold low pressure side by gradually opening valve.
5	Pressure too high at both low and high pressure sides Frost or large amount of dew on piping at low pressure side	Trouble in expansion valve or heat sensing tube not installed correctly Refrigerant flow out	Excess refrigerant in low pressure piping ↓ Expansion valve opened too wide	(1) Check heat sensing tube installed condition (2) If (1) is normal, test expansion valve in unit Replace if defective
6	Pressure too high at both low and high pressure sides	Air entered refrigeration system	Air present in refrigeration system ↓ Insufficient vacuum purging	(1) Replace receiver and drier (2) Check compressor oil to see if dirty or insufficient (3) Vacuum purge and charge new refrigerant

Checking of Refrigeration System with Manifold Gauge (Cont'd)

No.	Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
7	<p>Vacuum indicated at low pressure side, very low pressure indicated at high pressure side</p> <p>Frost or dew seen on piping before and after receiver and drier or expansion valve</p>	<p>Refrigerant flow obstructed by moisture or dirt in refrigerant freezing or adhering to expansion valve orifice</p> <p>Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube</p>	<p>Expansion valve orifice clogged</p> <p style="text-align: center;">↓</p> <p>Refrigerant does not flow</p>	<p>Allow to stand for some time and then restart operation to determine if trouble is caused by moisture or dirt.</p> <p>If caused by moisture refer to procedures Step 2 on page AC-17.</p> <p>If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If unable to remove dirt, replace valve.</p> <p>Vacuum purge and charge new refrigerant to proper amount.</p> <p>For gas leakage from heat sensing tube, replace expansion valve.</p>
8	<p>Pressure too high at low pressure side</p> <p>Pressure too low at high pressure side</p>	<p>Internal leak in compressor</p>	<p>Compression defective</p> <p style="text-align: center;">↓</p> <p>Valve leaking or broken sliding parts (Piston, cylinder, gasket, etc.) broken</p>	<p>Repair or replace compressor</p>

***NOTE at No. 6**

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



ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

If the fins are clogged, clean them with pressurized water.

CAUTION: Be careful not to damage the fins.

2. MAKE SURE THAT DRIVE BELT IS INSTALLED CORRECTLY

After installing the drive belt, check that it fits properly in the ribbed grooves.

3. CHECK DRIVE BELT TENSION

Using a belt tension gauge, check the drive belt tension.

Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or

Borroughs No. BT-33-73F

Drive belt tension:

[3S-GTE and 3S-GE Engine]

New belt 175 ± 5 lb

Used belt 115 ± 20 lb

[3S-FE Engine]

New belt 175 ± 5 lb

Used belt 130 ± 10 lb

NOTE:

- "New belt" refers to a belt which has been used 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.

4. START ENGINE

5. TURN ON A/C SWITCH

Check that the A/C operates at each position of the blower switch.

6. CHECK MAGNETIC CLUTCH OPERATION

If magnetic clutch does not engage, check the A/C fuse.

7. CHECK THAT IDLE INCREASES

When the magnetic clutch engages, engine revolution should increase.

Standard idle-up rpm: 900 – 1,000 rpm

8. CHECK CONDENSER FAN MOTOR ROTATES

9. CHECK AMOUNT OF REFRIGERANT

If you can see bubbles in the sight glass, additional refrigerant is needed. (See page AC-23)

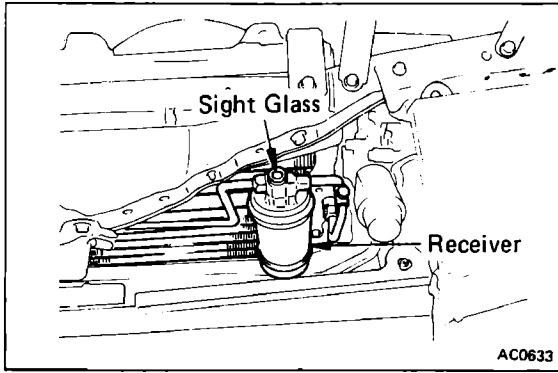
10. IF NO COOLING OR IT IS INSUFFICIENT, INSPECT FOR LEAKAGE

Using a gas leak tester, inspect each component of the refrigeration system.

REFRIGERATION SYSTEM

Checking of Refrigerant Volume

1. RUN ENGINE AT APPROX. 2000 RPM
2. OPERATE AIR CONDITIONER AT MAXIMUM COOLING FOR A FEW MINUTES
3. CHECK AMOUNT OF REFRIGERANT
Observe the sight glass on the receiver.



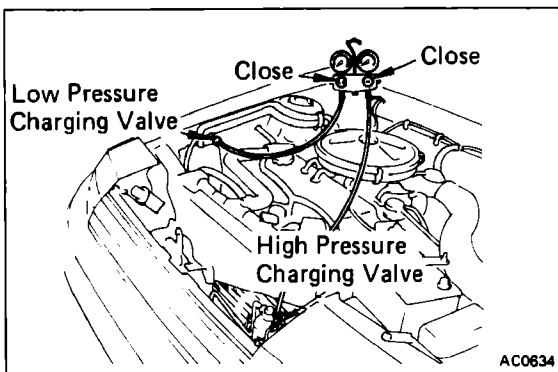
Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient	Check for leak with gas leak tester
2	No bubbles present in sight glass	Empty, proper or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	Evacuate and charge system. Then check for leak with gas leak detector
4	Temperature between compressor inlet and outlet is noticeably different	Proper or too much	Refer to items 5 and 6
5	Immediately after the air conditioner is turned off, refrigerant in sight glass stays clear	Too much	Discharge the excess refrigerant to specified amount
6	When the air conditioner is turned off, refrigerant foams and then stays clear	Proper	—

Installation of Manifold Gauge Set

1. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET
2. INSTALL CHARGING HOSES OF GAUGE SET TO CHARGING VALVES

Connect the low pressure hose to the low pressure charging valve and the high pressure hose to the high pressure charging valve. Tighten the hose nuts by hand.

NOTE: Do not apply compressor oil to the seat of the connection.

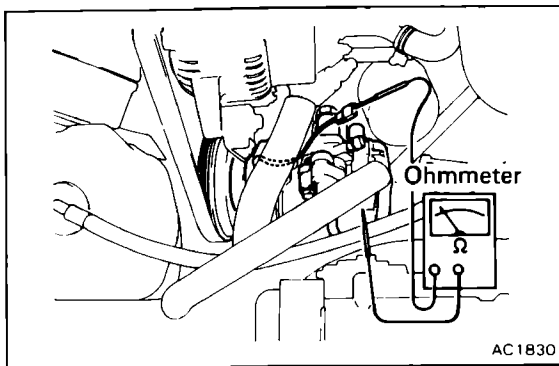


COMPRESSOR

ON-VEHICLE INSPECTION

1. **INSTALL MANIFOLD GAUGE SET**
(See page AC-23)
2. **RUN ENGINE AT FAST IDLE**
3. **CHECK COMPRESSOR FOR FOLLOWING:**
 - (a) High pressure gauge reading is not lower and low pressure gauge reading is not higher than normal.
 - (b) Metallic sound
 - (c) Leakage from shaft seal

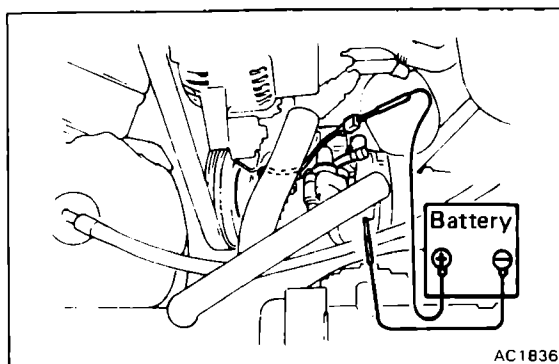
If defects are found, repair the compressor.
4. **CHECK MAGNETIC CLUTCH**
 - (a) Inspect the pressure plate and the rotor for signs of oil.
 - (b) Check the clutch bearings for noise and grease leakage.



- (c) Using an ohmmeter, measure the resistance of the stator coil between the clutch lead wire and ground.

Standard resistance: 3.4 – 3.8 Ω at 20°C (68°F)

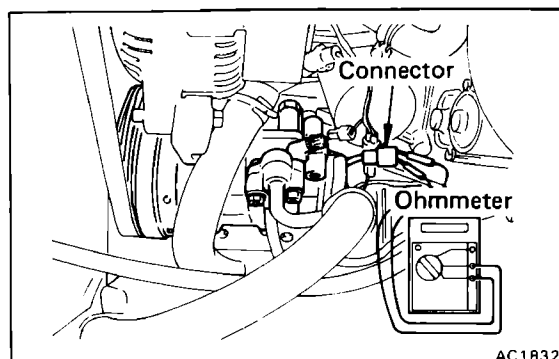
If resistance is not as specified, replace the coil.



- (d) Connect the positive (+) lead from the battery to terminal 1, check that the magnetic clutch is energized.

If magnetic clutch is not energized, replace the coil.

CAUTION: Do not short the positive (+) lead wire on the vehicle, applying battery voltage.

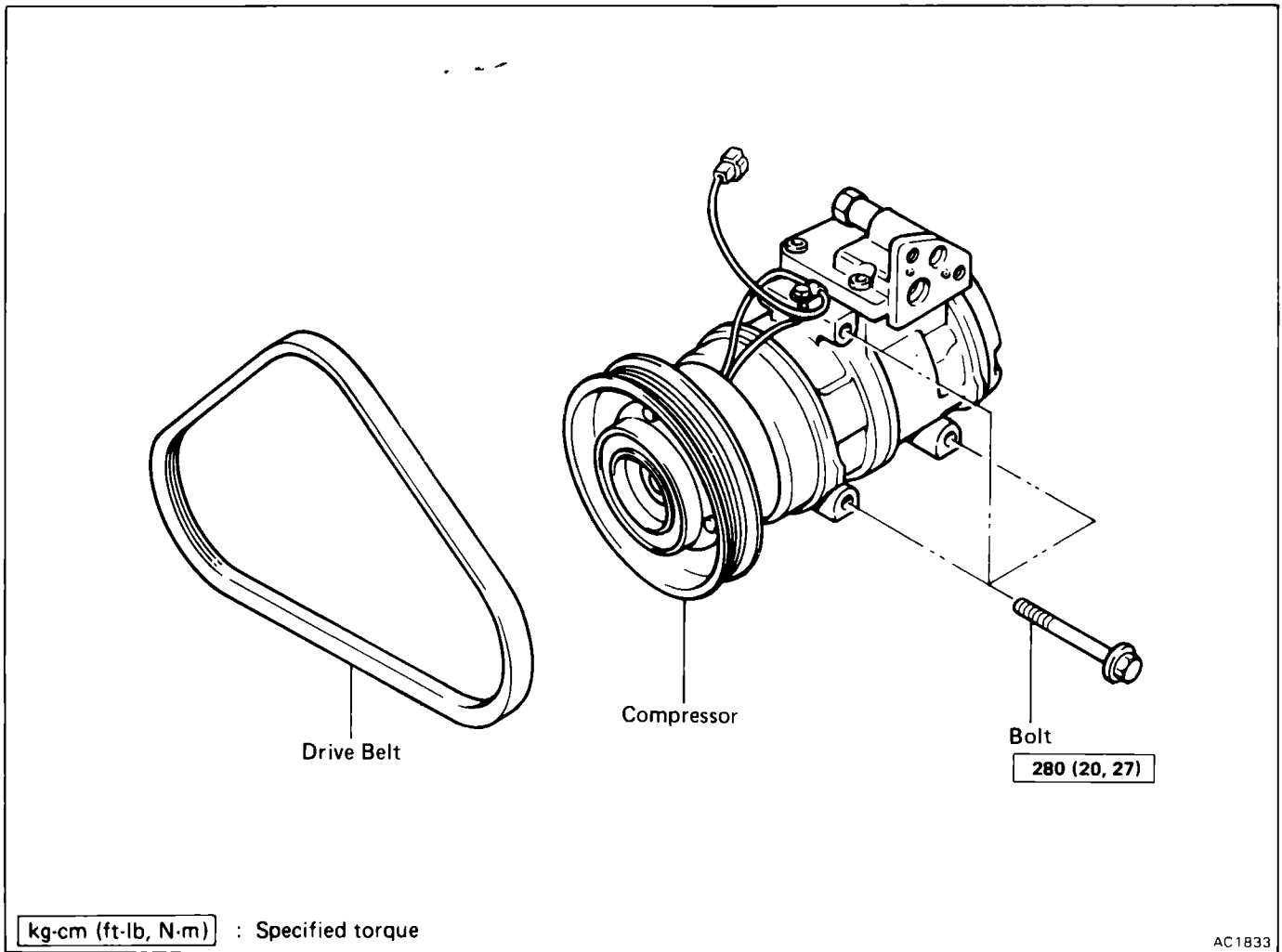


5. **REVOLUTION DETECTING SENSOR**

Using an ohmmeter, measure the resistance between two terminals of the sensor.

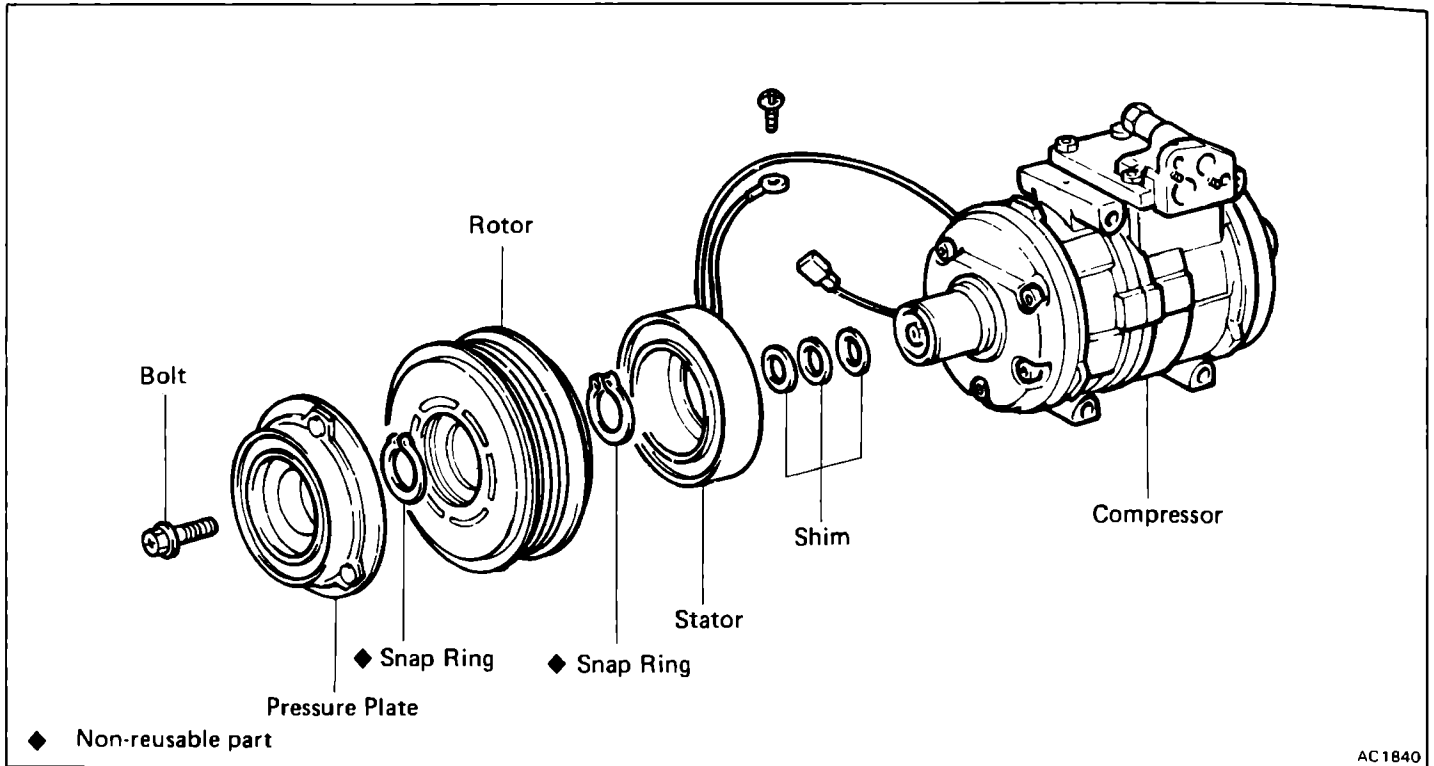
Standard resistance: 100 – 130 Ω at 20°C (68°F)

If resistance is not as specified, replace the revolution detecting sensor.



REMOVAL OF COMPRESSOR

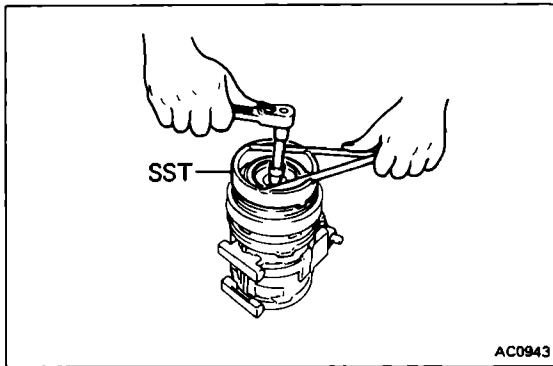
1. RUN ENGINE AT IDLE SPEED WITH AIR CONDITIONING ON FOR 10 MINUTES
2. STOP ENGINE
3. DISCONNECT NEGATIVE CABLE FROM BATTERY
4. REMOVE BATTERY
5. DISCONNECT CLUTCH LEAD WIRE FROM WIRING HARNESS
6. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
7. DISCONNECT TWO HOSES FROM COMPRESSOR SERVICE VALVES
Cap the open fitting immediately to keep moisture out of the system.
8. REMOVE COMPRESSOR
 - (a) Loosen the drive belt.
 - (b) Remove the compressor mounting bolts and the compressor.



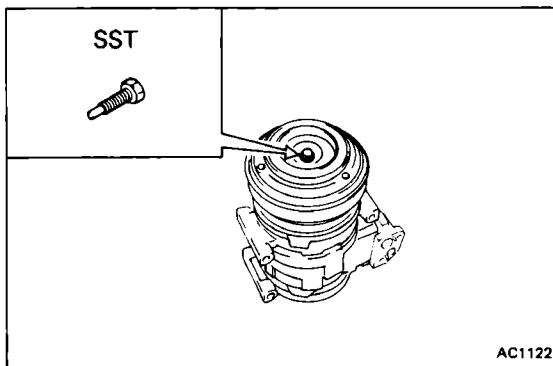
DISASSEMBLY OF MAGNETIC CLUTCH

1. REMOVE PRESSURE PLATE

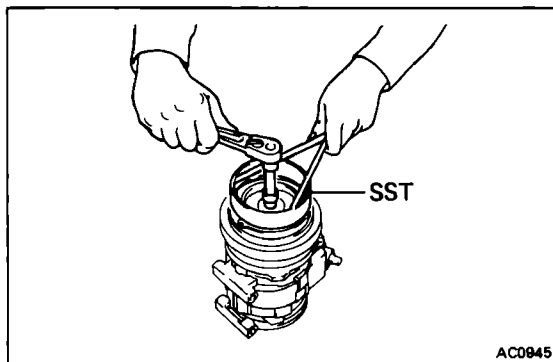
(a) Using SST and a socket, remove the shaft bolt.
SST 07112-76060

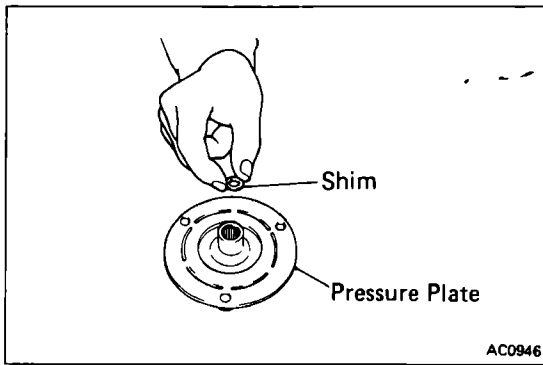


(b) Install SST to the pressure plate.
SST 07112-66040

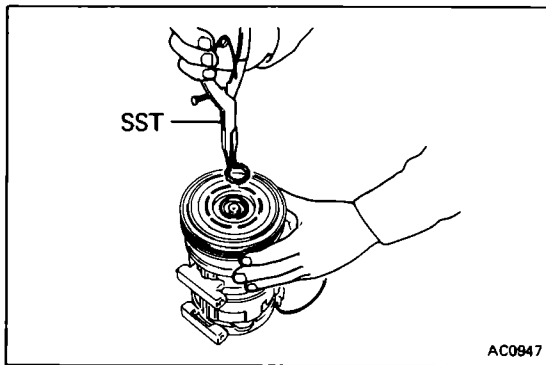


(c) Using SST and the socket, remove the pressure plate.
SST 07112-76060





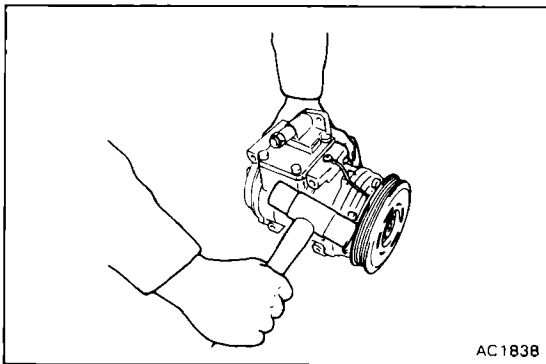
(d) Remove the shims from the pressure plate.



2. REMOVE ROTOR

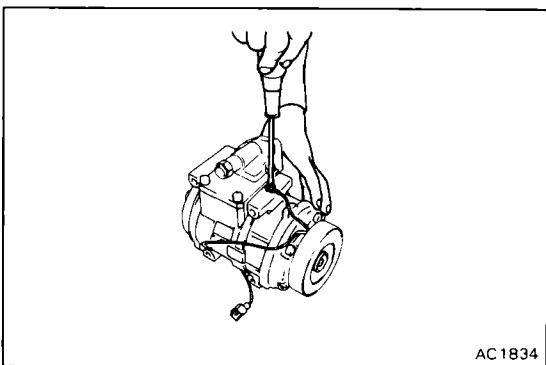
(a) Using SST, remove the snap ring.

SST 07114-84020



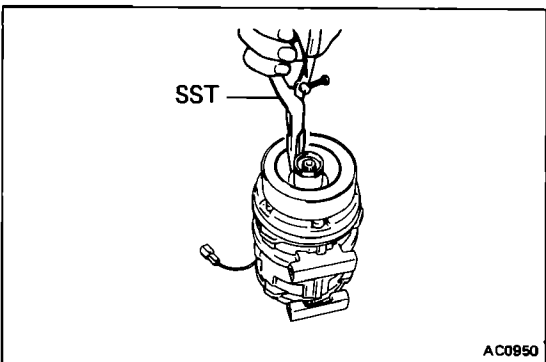
(b) Using a plastic hammer, tap the rotor off the shaft.

CAUTION: Be careful not to damage the pulley when tapping on the rotor.



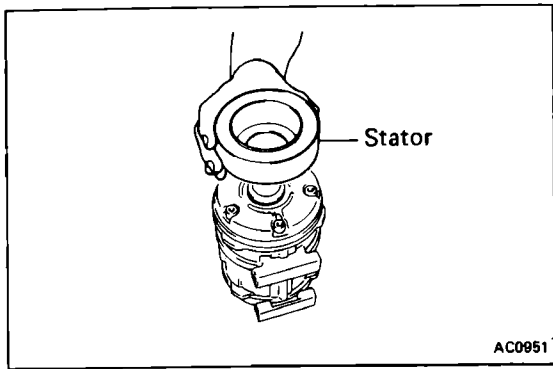
3. REMOVE STATOR

(a) Disconnect the stator lead wire from the compressor housing.

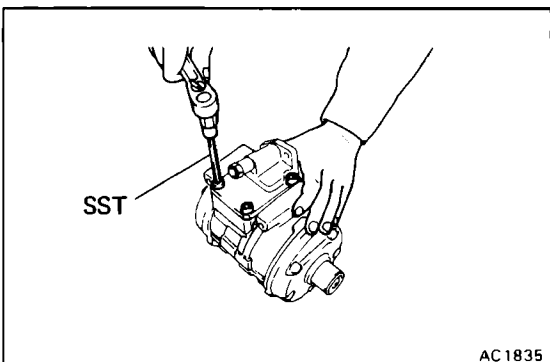
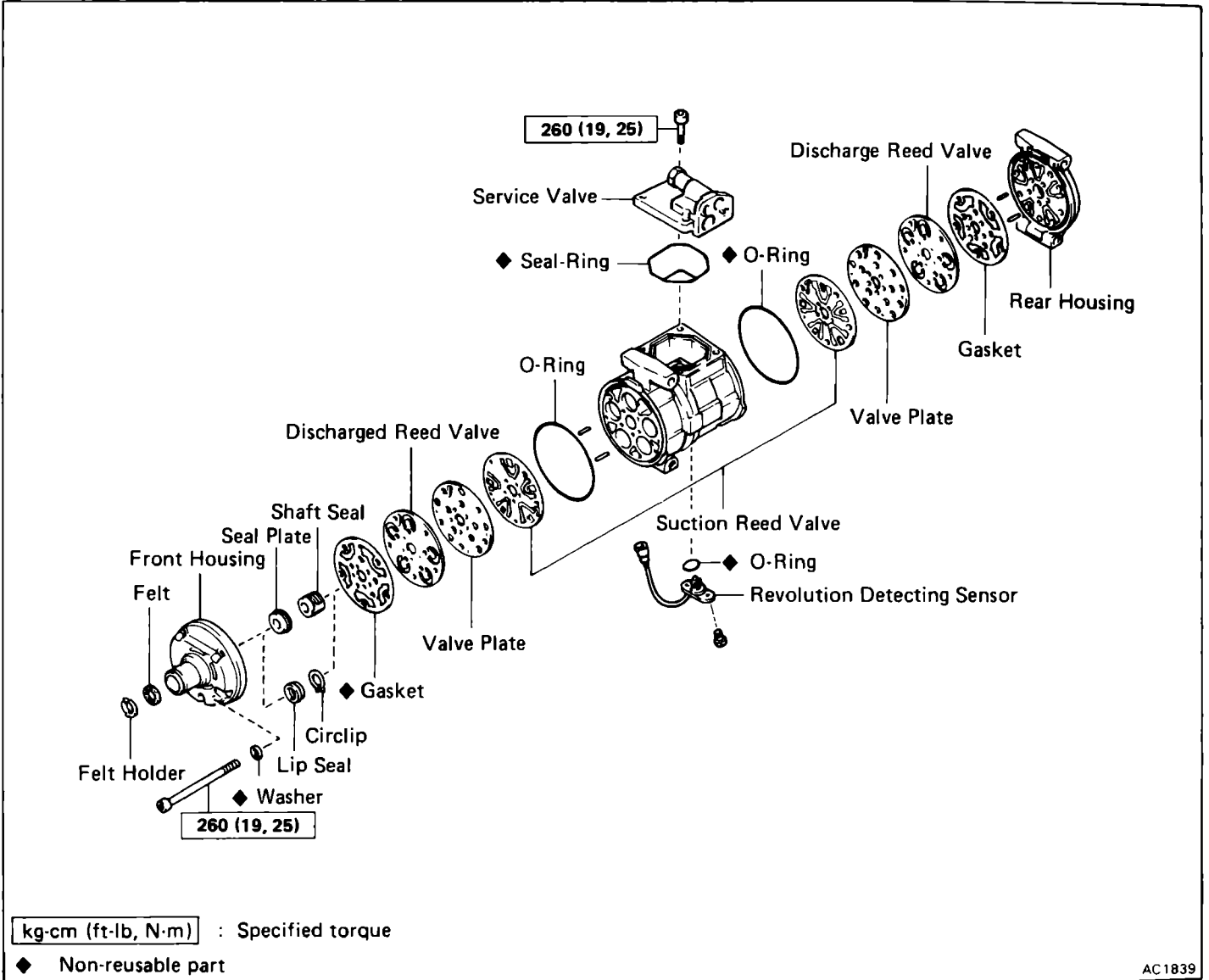


(b) Using SST, remove the snap ring.

SST 07114-84020



(c) Remove the stator.

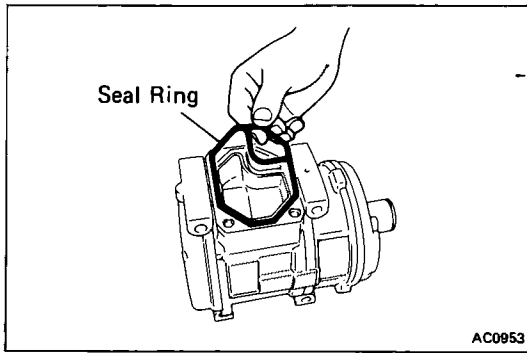


DISASSEMBLY OF COMPRESSOR

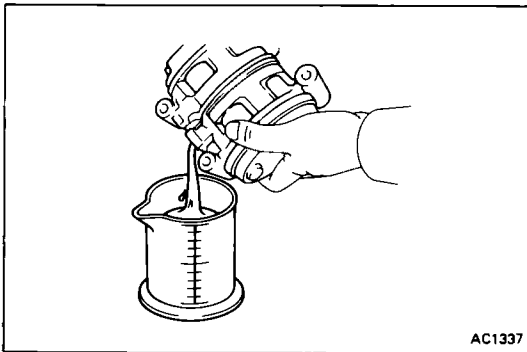
1. REMOVE SERVICE VALVE

(a) Using SST, remove four bolts holding the service valve.

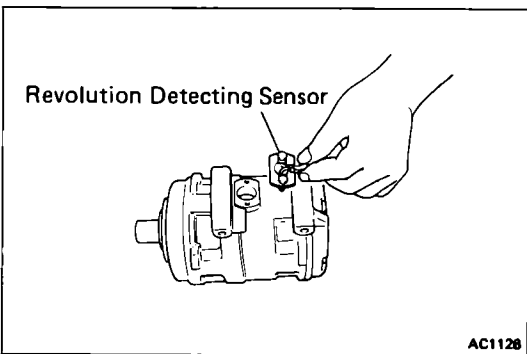
SST 07110-61050



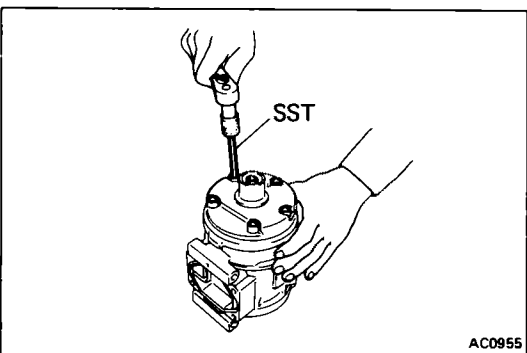
(b) Remove the seal ring from the service valves and discard them.



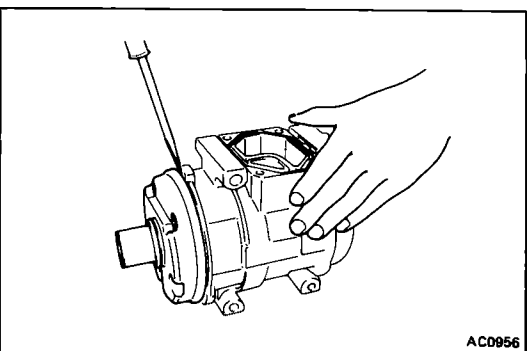
2. DRAIN COMPRESSOR OIL INTO MEASURING FLASK
 Measure the quantity of drained oil because the same amount should be replaced later.



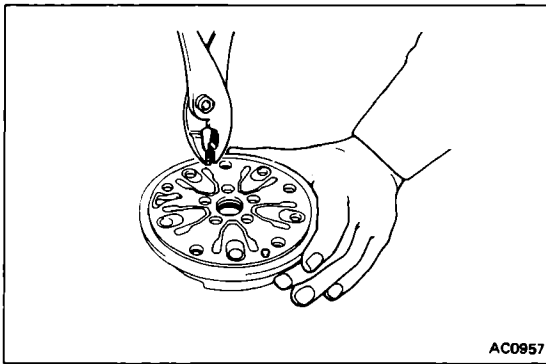
3. REMOVE REVOLUTION DETECTING SENSOR



4. REMOVE FRONT HOUSING
 (a) Using SST, remove five through bolts.
 NOTE: Do not reuse five washers.
 SST 07110-61050

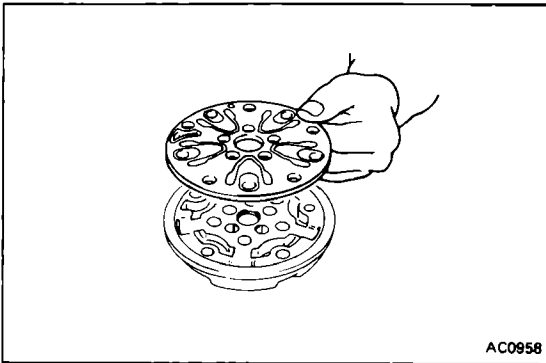


(b) Using a screwdriver, remove the front housing.
CAUTION: Be careful not to scratch the sealing surface of the front housing.

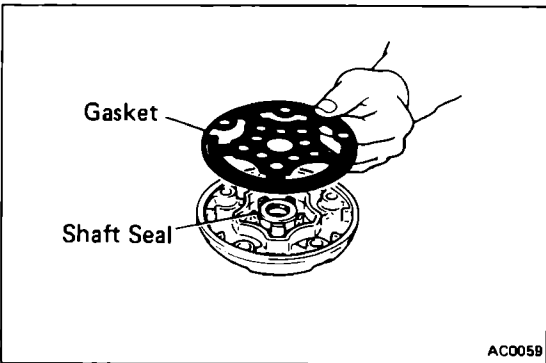


5. REMOVE FRONT VALVE PLATE

(a) Remove the two pins from the front housing. Discard the pins.

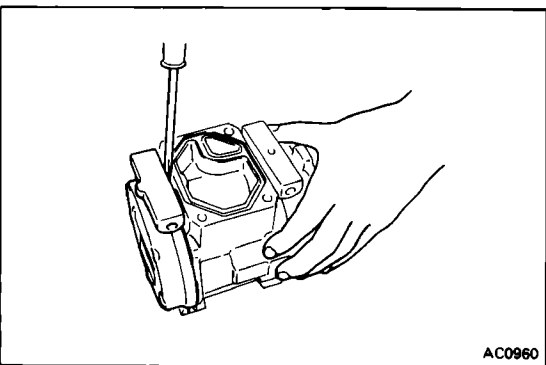


(b) Remove front valve plate with reed valves.



6. REMOVE GASKET

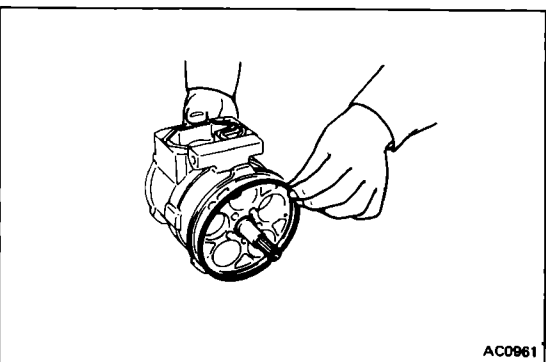
7. REMOVE SHAFT SEAL



8. REMOVE REAR HOUSING

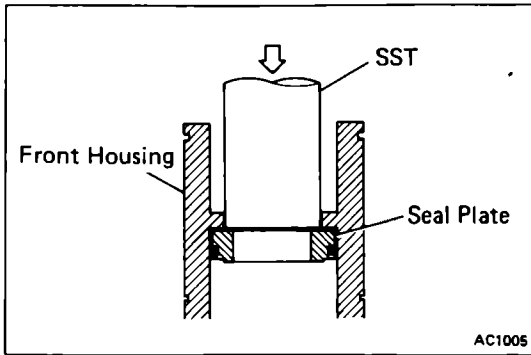
Using a screwdriver, remove the rear housing.

CAUTION: Be careful not to scratch the sealing surface of the rear housing.



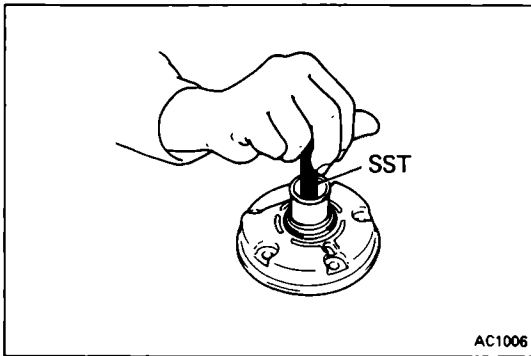
9. REMOVE FRONT AND REAR O-RINGS FROM CYLINDER BLOCK

Discard the O-rings.

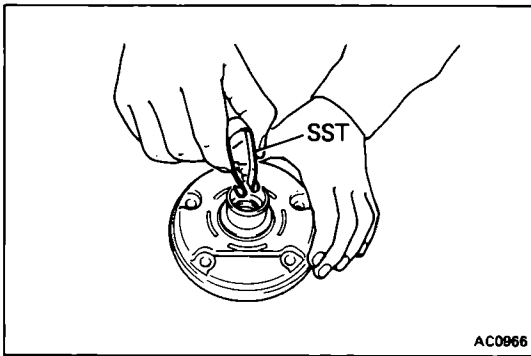


10. REMOVE SEAL PLATE

- (a) Insert SST in the seal plate.
SST 07112-85030

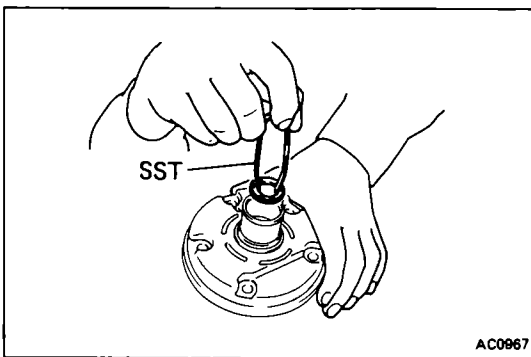


- (b) Using SST, push the seal plate out of the front housing.
SST 07112-85030

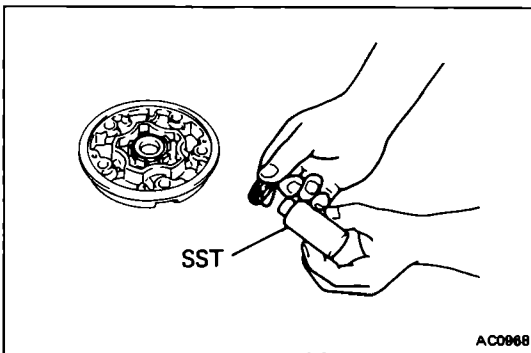


11. REMOVE FELT

- (a) Insert SST in the felt.
SST 07112-15020



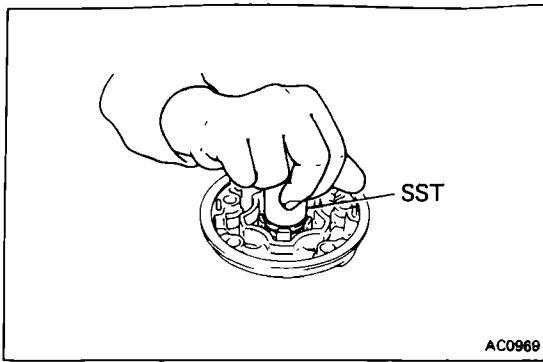
- (b) Pull the felt with felt holder out of front housing.
SST 07112-15020



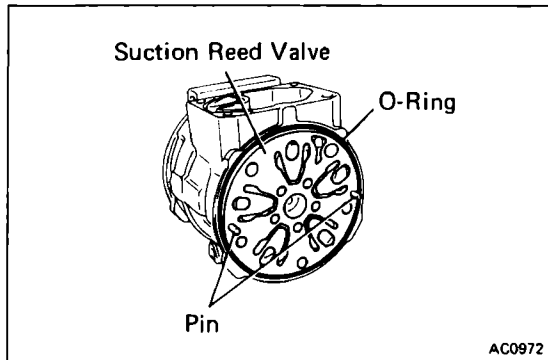
ASSEMBLY OF COMPRESSOR

1. INSTALL SEAL PLATE IF SEAL PLATE WAS REMOVED

- (a) Fit seal plate on SST.
SST 07114-15021



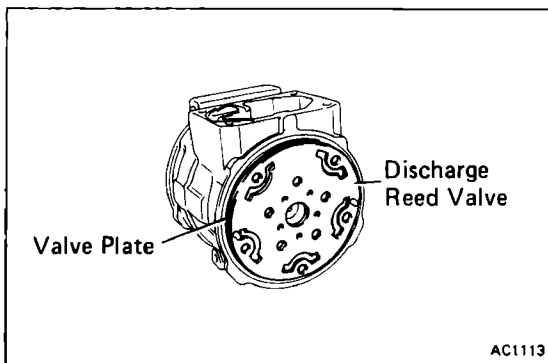
- (b) Install the seal plate.
SST 07114-15021



2. INSTALL REAR VALVE PLATE ON REAR CYLINDER

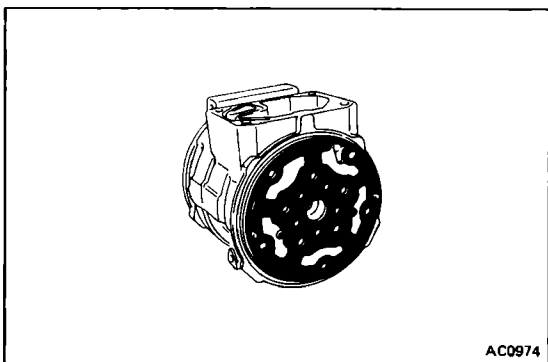
- (a) Install two pins in the rear cylinder.
(b) Lubricate a new O-ring with compressor oil. Install the O-ring in the rear cylinder.
(c) Install the rear suction valve over the pins on the rear cylinder.

NOTE: The front and rear suction valves are identical.

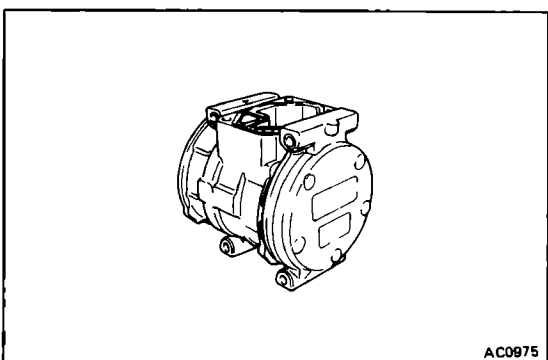


- (d) Install the rear valve plate together with the discharge valve over the pins on the rear cylinder.

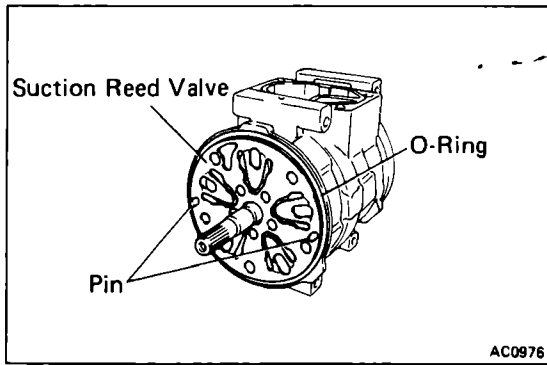
NOTE: The rear valve plate is marked with an "R".



- (e) Lubricate the new gasket with compressor oil. Install the gasket on the valve plate.

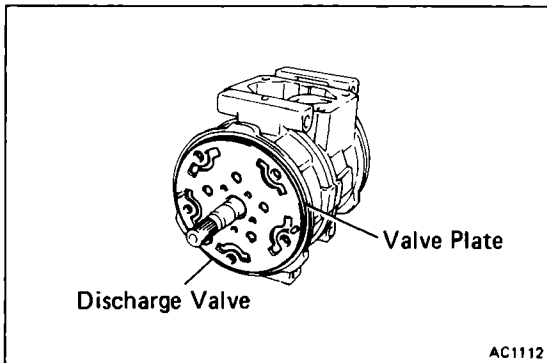


3. INSTALL REAR HOUSING ON REAR CYLINDER



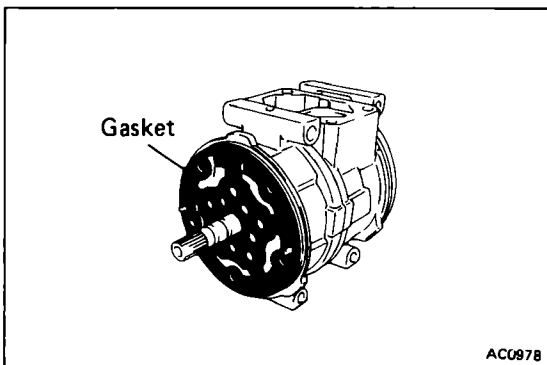
4. INSTALL FRONT VALVE PLATE ON FRONT CYLINDER

- (a) Install two pins in the front cylinder.
- (b) Lubricate a new O-ring with compressor oil. Install the O-ring in the front housing.
- (c) Install the front suction valve over the pins on the front cylinder.

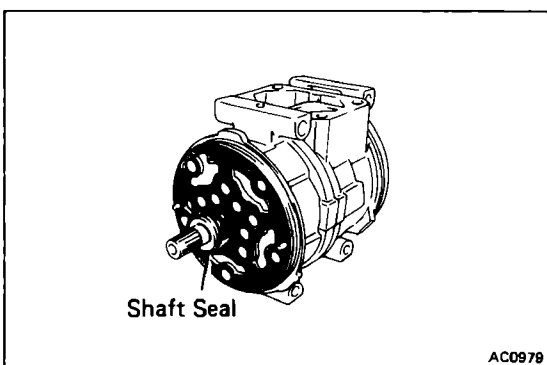


- (d) Install the front valve plate together with the discharge valve over the pins on the front cylinder.

NOTE: The front valve plate is marked with an "F".

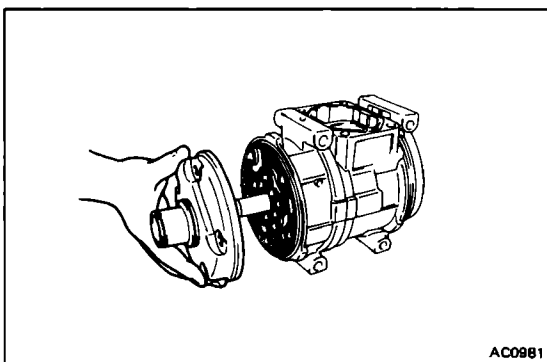


- (e) Lubricate the new gasket with compressor oil. Install the gasket on the valve plate.

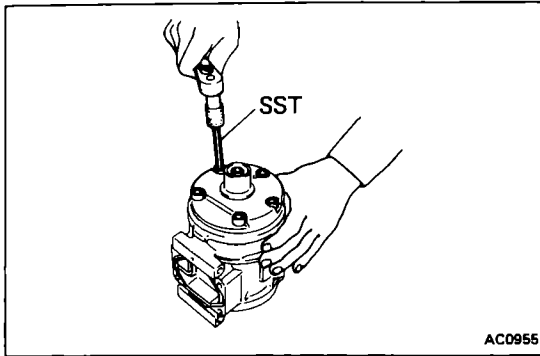


5. INSTALL SHAFT SEAL

Lubricate shaft seal with compressor oil. Fit the shaft seal on the shaft.



6. INSTALL FRONT HOUSING ON FRONT CYLINDER

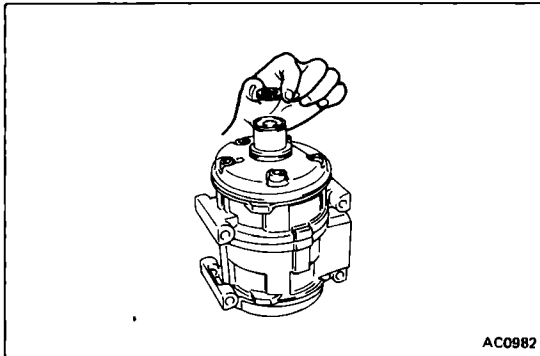


7. TIGHTEN FIVE THROUGH BOLTS

Using SST and torque wrench, gradually tighten five through bolts in two or three passes.

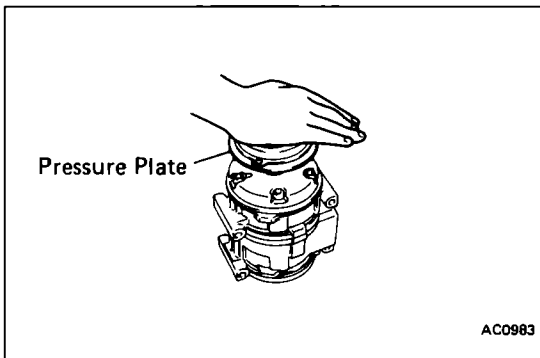
SST 07110-61050

Torque: 260 kg-cm (19 ft-lb, 25 N-m)

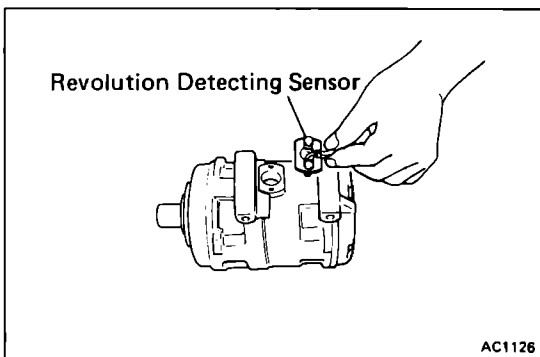


8. INSTALL FELT

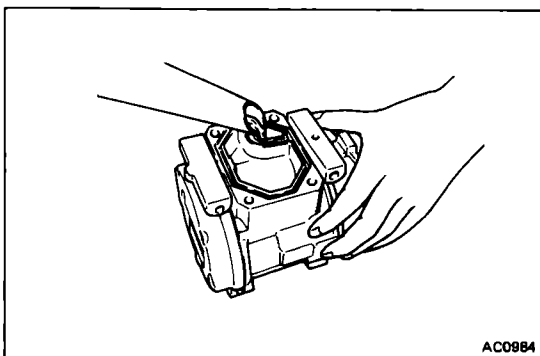
(a) Set the felt with felt holder to the front housing.



(b) Using pressure plate of magnetic clutch, install the felt.



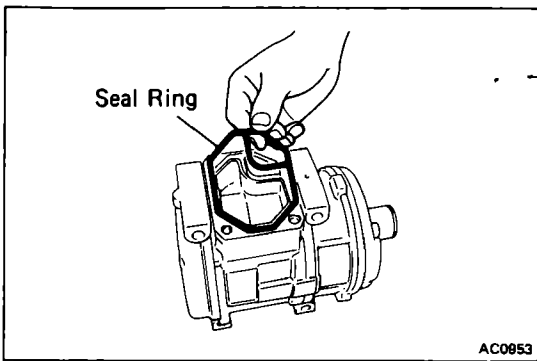
9. INSTALL REVOLUTION DETECTING SENSOR



10. POUR COMPRESSOR OIL INTO COMPRESSOR

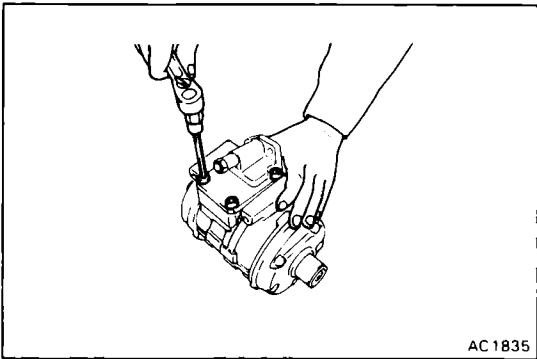
Add the same quantity of oil as was removed, plus 20 cc, into the compressor.

Compressor oil: DENSO OIL 6,
SUNISO No. 5GS or equivalent.



11. INSTALL SERVICE VALVE

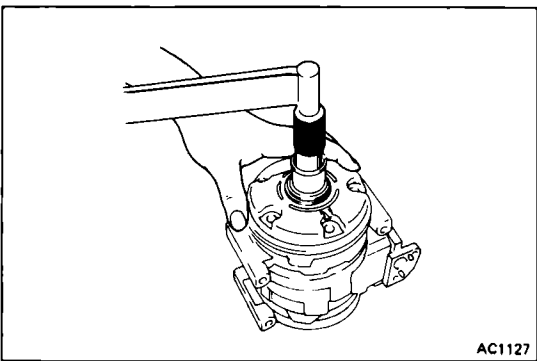
- (a) Lubricate new seal ring with compressor oil. Install the seal ring in the service valve.



- (b) Install the service valve on the compressor. Using SST and torque wrench, tighten the bolts.

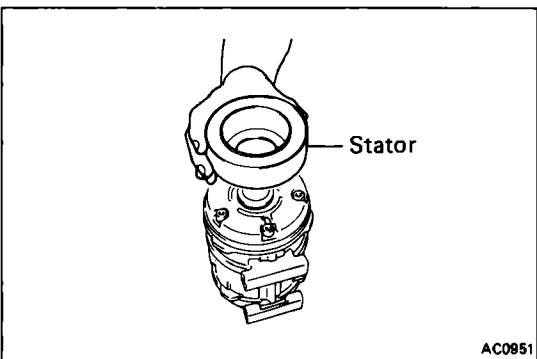
SST 07110-61050

Torque: 260 kg-cm (19 ft-lb, 25 N·m)



12. CHECK SHAFT STARTING TORQUE

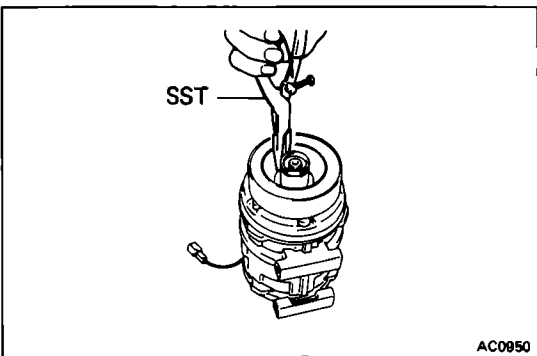
Torque: 30 kg-cm (26 in.-lb, 2.9 N·m) or less



ASSEMBLY OF MAGNETIC CLUTCH

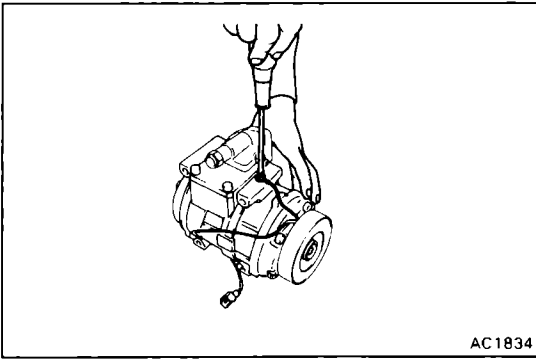
1. INSTALL STATOR

- (a) Install the stator on the compressor.

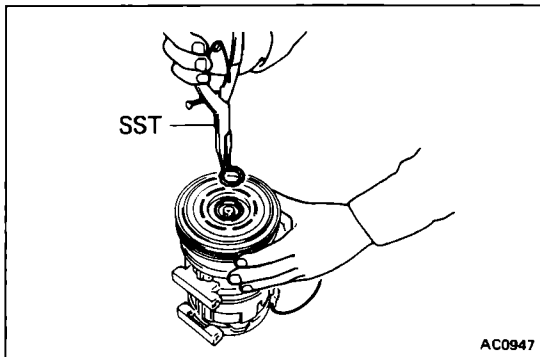


- (b) Using SST, install the new snap ring.

SST 07114-84020

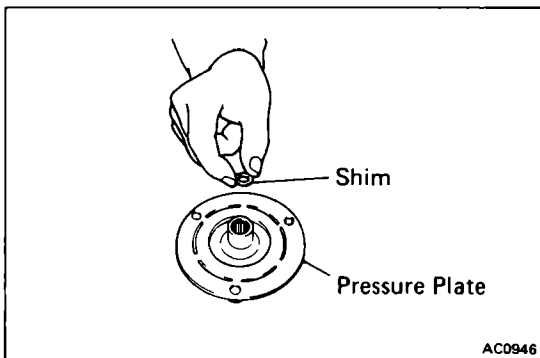


- (c) Connect the stator lead wires to the compressor housing.



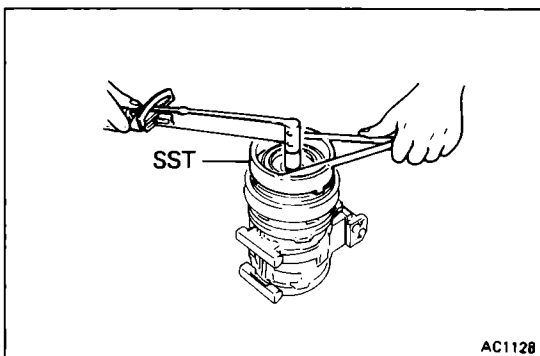
2. INSTALL ROTOR

- (a) Install the rotor on the compressor shaft.
 (b) Using SST, install the new snap ring.
 SST 07114-84020



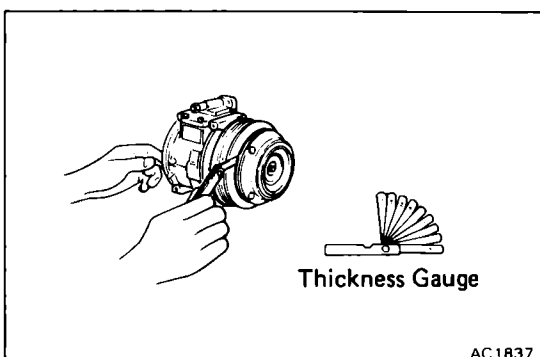
3. INSTALL PRESSURE PLATE

- (a) Install the shims to the pressure plate.



- (b) Using SST and torque wrench, install the shaft bolt.
 SST 07112-76060

Torque: 140 kg-cm (10 ft-lb, 14 N-m)

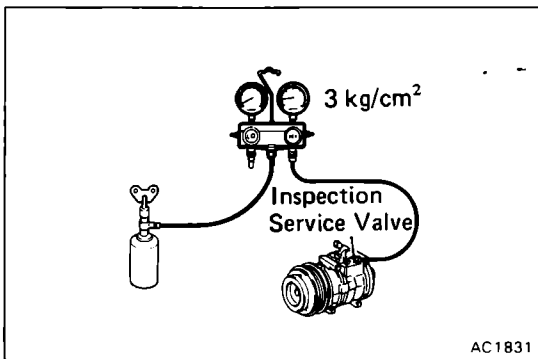


4. CHECK CLEARANCE OF MAGNETIC CLUTCH

Check the clearance between the pressure plate and rotor using thickness gauge.

Standard clearance: 0.5 ± 0.15 mm (0.0020 ± 0.0059 in.)

If the clearance is not within tolerance, change the number of shims to obtain the standard clearance.



PERFORMANCE TEST OF COMPRESSOR

1. PERFORM GAS LEAKAGE TEST

(a) Install the inspection service valve on the service valve.

NOTE: Use only a TOYOTA supplied inspection service valve to perform the gas leakage test.

Part No. Suction side 88376-17020

Discharge side 88376-22020

(b) Charge the compressor with refrigerant through the charge valve until the pressure is 3 kg/cm² (43 psi, 204 kPa).

(c) Using a gas leak detector, check the compressor for leaks.

If leaks are found, check and replace the compressor.

2. EVACUATE COMPRESSOR AND CHARGE WITH REFRIGERANT

Make sure the caps are tight and the compressor is free from moisture and contamination.

NOTE: When storing a compressor for an extended period, charge the compressor with refrigerant or dry nitrogen gas to prevent corrosion.

INSTALLATION OF COMPRESSOR

(See page AC-25)

1. INSTALL COMPRESSOR WITH THREE MOUNTING BOLTS

Torque: 280 kg-cm (20 ft-lb, 27 N·m)

2. INSTALL DRIVE BELT

(See steps 2 and 3 on page AC-22)

3. CONNECT TWO HOSES TO COMPRESSOR SERVICE VALVES

Torque:

Discharge line 250 kg-cm (18 ft-lb, 25 N·m)

Suction line 250 kg-cm (18 ft-lb, 25 N·m)

4. CONNECT CLUTCH LEAD WIRE TO WIRING HARNESS

5. PLACE BATTERY

6. CONNECT NEGATIVE CABLE TO BATTERY

7. EVACUATE AIR FROM AIR CONDITIONING SYSTEM

8. CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK FOR GAS LEAKAGE

Specified amount: 600 – 750 g (1.3 – 1.7 lb)

RECEIVER

(See page AC-8)

ON-VEHICLE INSPECTION

CHECK SIGHT GLASS, FUSIBLE PLUG AND FITTINGS FOR LEAKAGE

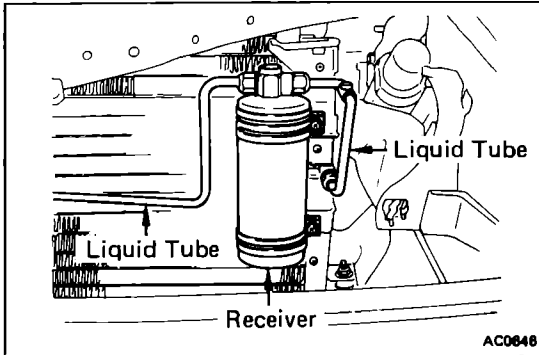
Use a gas leak tester. Repair as necessary.

REMOVAL OF RECEIVER

1. DISCHARGE REFRIGERATION SYSTEM
2. DISCONNECT TWO LIQUID TUBES FROM RECEIVER

NOTE: Cap the open fittings immediately to keep moisture out of the system.

3. REMOVE RECEIVER FROM RECEIVER HOLDER



INSTALLATION OF RECEIVER

1. INSTALL RECEIVER IN RECEIVER HOLDER

NOTE: Do not remove the blind plugs until ready for connection.

2. CONNECT TWO LIQUID TUBES TO RECEIVER

Torque: 135 kg-cm (10 ft-lb, 13 N-m)

3. IF RECEIVER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

Add 20 cc (0.7 fl.oz.)

DENSO OIL 6,
SUNISO No. 5GS or equivalent

4. EVACUATE AIR FROM AIR CONDITIONING SYSTEM

5. CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK FOR GAS LEAKAGE

Specified amount: 600 – 750 g (1.3 – 1.7 lb)

CONDENSER

(See page AC-8)

ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

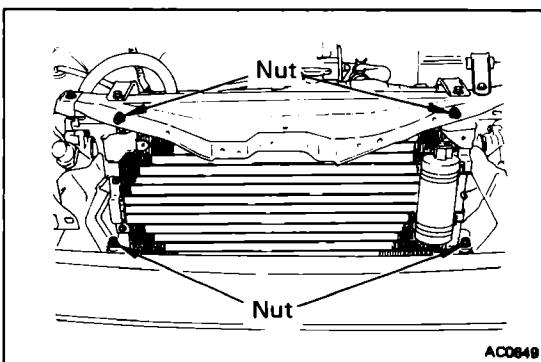
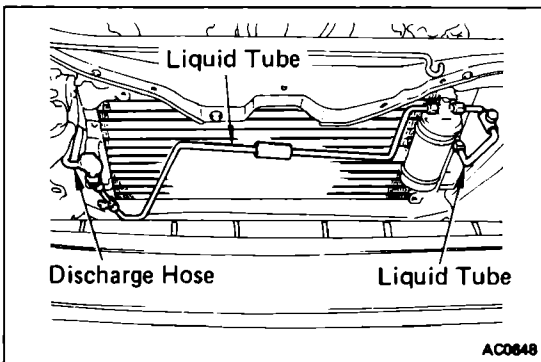
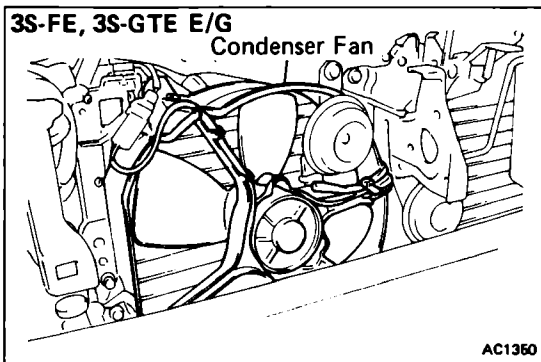
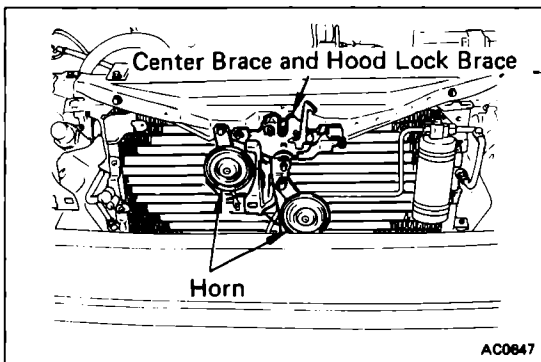
If the fins are clogged, wash them with water and dry with compressed air.

CAUTION: Be careful not to damage the fins.

If the fins are bent, straighten them with a screwdriver or pliers.

2. CHECK CONDENSER FITTINGS FOR LEAKAGE

Repair as necessary.



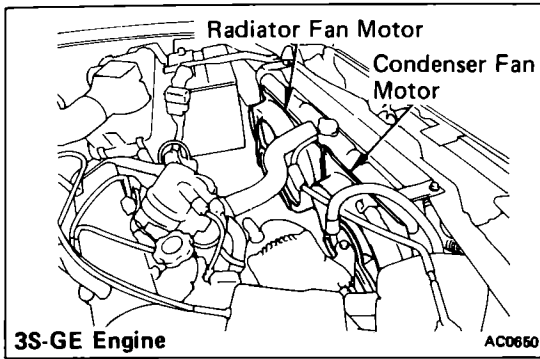
REMOVAL OF CONDENSER

1. DISCHARGE REFRIGERATION SYSTEM
2. REMOVE FRONT GRILLE AND FRONT UNDER COVER
3. REMOVE CENTER BRACE AND HORNS
4. REMOVE CONDENSER FAN (3S-FE, 3S-GTE E/G)
5. DISCONNECT DISCHARGE HOSE AND LIQUID TUBE CLAMP FROM CONDENSER INLET FITTING
6. DISCONNECT LIQUID TUBE AND LIQUID TUBE CLAMP FROM CONDENSER OUTLET FITTING
NOTE: Cap the open fittings immediately to keep moisture out of the system.
7. REMOVE CONDENSER
Remove the four nuts and condenser.

INSTALLATION OF CONDENSER

(See page AC-8)

1. INSTALL CONDENSER
Install the four condenser nuts, making sure the rubber cushions fit on the mounting flanges correctly.
2. CONNECT LIQUID TUBE, DISCHARGE HOSE TO CONDENSER
Torque:
Liquid tube 135 kg-cm (10 ft-lb, 13 N·m)
Discharge hose 250 kg-cm (18 ft-lb, 25 N·m)
3. INSTALL CONDENSER FAN (3S-FE, 3S-GTE E/G)
4. INSTALL CENTER BRACE AND HORNS
5. INSTALL FRONT GRILLE AND UNDER COVER
6. IF CONDENSER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR
Add 40 – 50 cc (1.4 – 1.7 fl.oz.)
DENSOOIL 6,
SUNISO No. 5GS or equivalent.
7. EVACUATE AIR FROM AIR CONDITIONING SYSTEM
8. CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK FOR GAS LEAKAGE
Specified amount: 600 – 750 g (1.3 – 1.7 lb)



CONDENSER FAN MOTOR

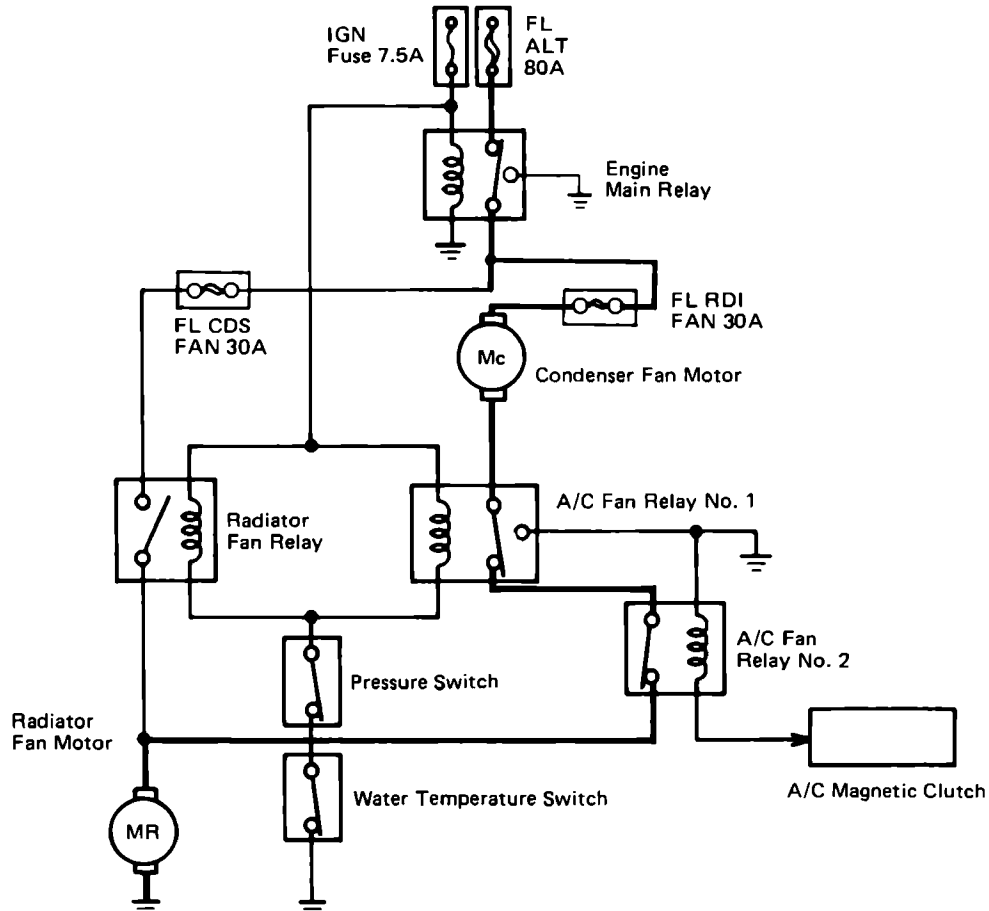
INSPECTION OF FAN MOTORS

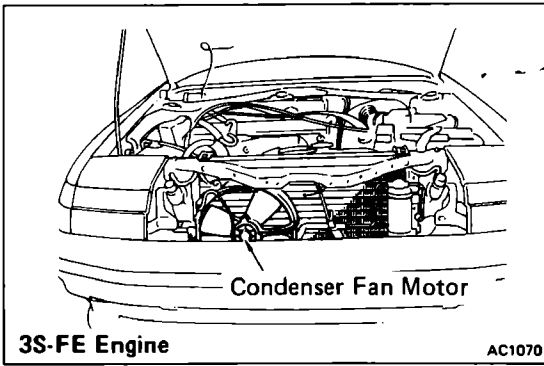
1. CHECK OPERATION OF FAN MOTOR (3S-GE Engine)

NOTE: The fan motors operate at two speeds depending on the water temperature and the A/C switch.

A/C switch	Magnetic clutch	Water temperature	Fan motor speed
OFF or ON	OFF	90°C (194°F) or below	OFF
		90°C (194°F) or above	HI
ON	ON	90°C (194°F) or below	LO
		90°C (194°F) or above or the refrigerant pressure is approx. 15.5 kg/cm ² (220 psi, 1,520 kPa) or greater.	HI

(Example) A/C Switch: ON Magnetic Clutch: ON Water Temperature: 90°C (194°F) or below
Fan Motor Speed: Low



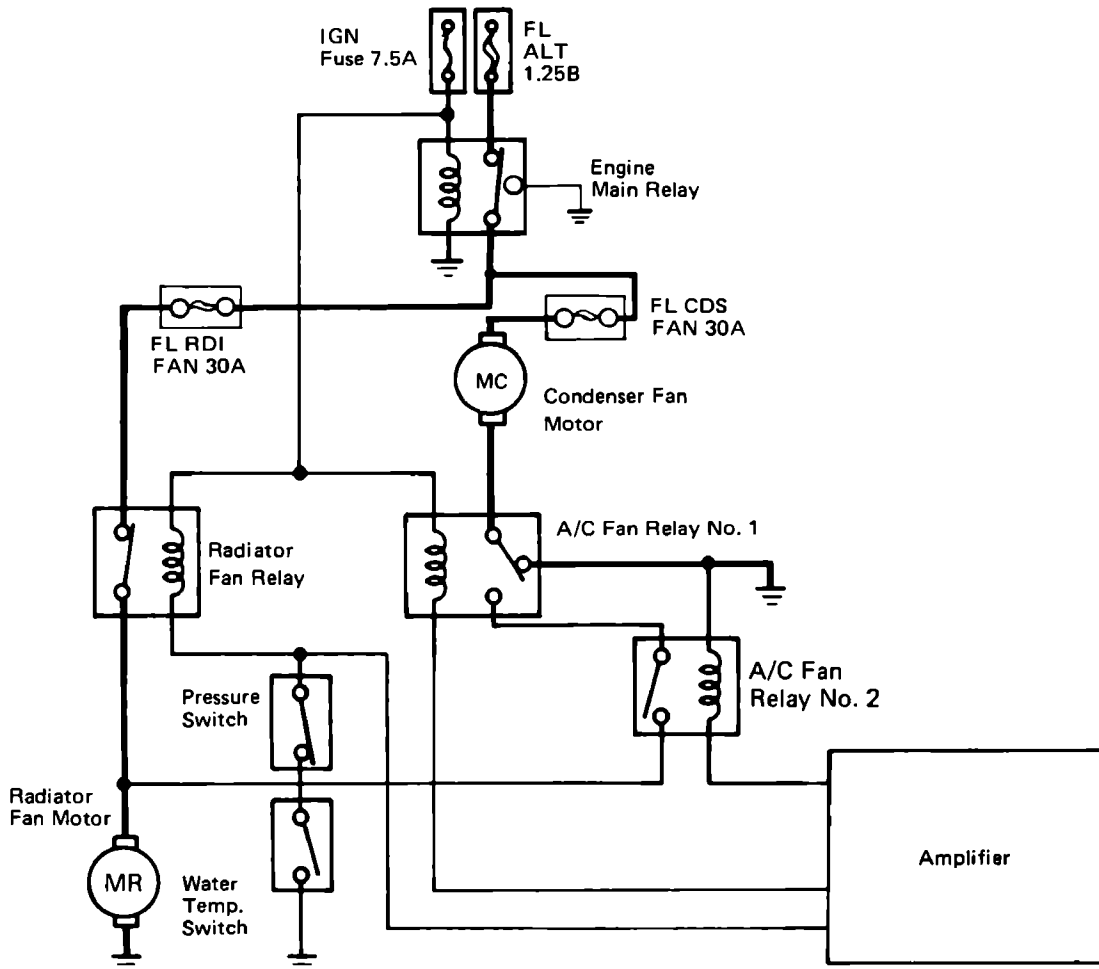


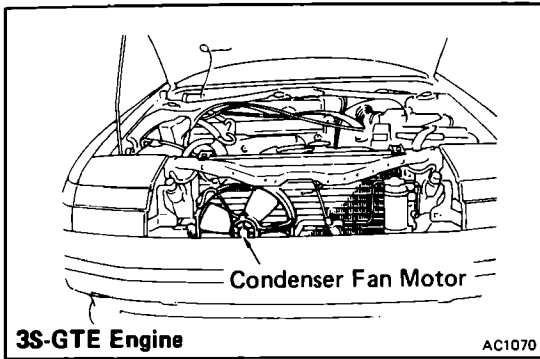
(3S-FE Engine)

NOTE: The fan motors operate at two speeds depending on the water temperature and the A/C switch.

A/C switch	Magnetic clutch	Water temperature	Condenser fan motor speed	Radiator fan motor speed
OFF	OFF	90°C (194°F) or below	OFF	OFF
		90°C (194°F) or above		HI
ON	OFF	90°C (194°F) or below	OFF	OFF
		90°C (194°F) or above		HI
	ON	90°C (194°F) or below	LO	LO
		90°C (194°F) or above or the refrigerant pressure is approx. 15.5 kg/cm ² (220 psi, 1,520 kPa) or greater.	HI	HI

(Example) A/C Switch: ON Magnetic Clutch: OFF Water Temperature: 90°C (194°F) or above
 Fan Motor Speed: High



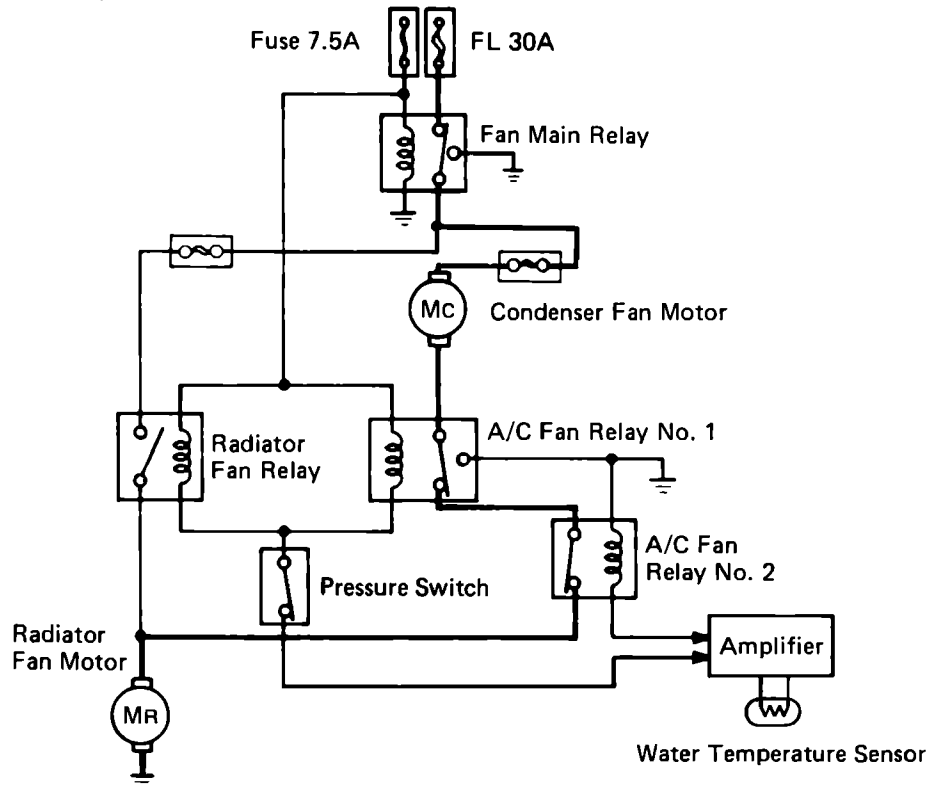


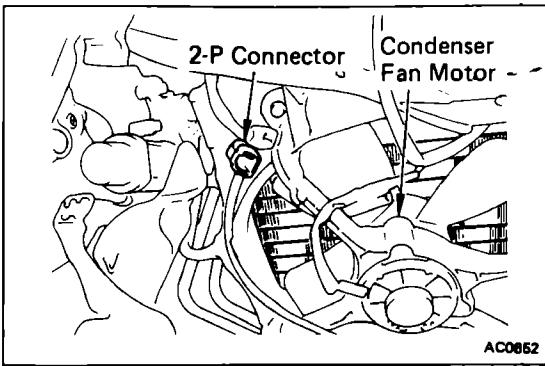
(3S-GTE Engine)

NOTE: The fan motors operate at two speed depending on the water temperature and A/C switch.

A/C switch	Magnetic clutch	Water temperature	Refrigerant pressure	Fan motor speed
OFF or ON	OFF	85°C (185°F) or below	15.5 kg/cm ² (220 psi, 1,520 kPa) or below	OFF
		85°C–90°C (185°F–194°F)		LO
		90°C (194°F) or above		HI
ON	ON	85°C (185°F) or below	15.5 kg/cm ² (220 psi, 1,520 kPa) or below	LO
		85°C–90°C (185°F–194°F)		LO
		90°C (194°F) or above		LO
		90°C (194°F) or below	15.5 kg/cm ² (220 psi, 1,520 kPa) or above	HI
		90°C (194°F) or above		

(Example) A/C Switch: ON Magnetic Clutch: ON Water Temperature: 90°C (194°F) or below
Fan Motor Speed: Low





2. INSPECT FAN MOTORS

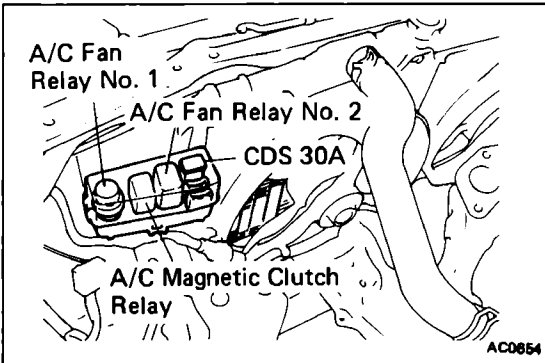
- (a) Disconnect 2-P connector of the fan motor.
- (b) Using the wire harness, apply battery voltage to the connector.
- (c) Confirm smooth rotation of the motor within the specified current flow.

Standard current: 6.7 ± 0.7 A

If current is not as specified, replace the motor.

WATER TEMPERATURE SWITCH

(See page CO-17)



RELAYS

INSPECTION OF FAN RELAY

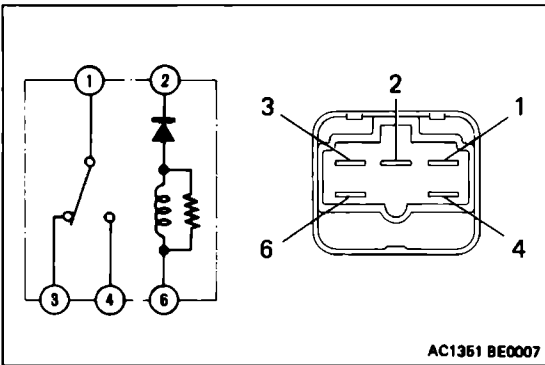
- 1. REMOVE COVER OF RELAY BOX
- 2. REMOVE RELAY

MAGNETIC CLUTCH RELAY

(See headlight control relay on page BE-17)

A/C FAN RELAY No.1

INSPECT RELAY CONTINUITY

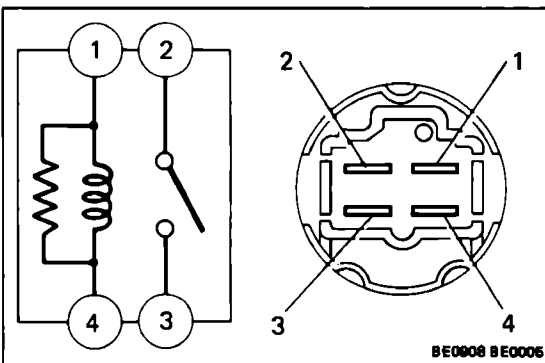


Terminal	1	2	3	4	6
Condition					
Constant	○	○	○		
Apply battery voltage to terminal 2 (-) and 6 (+)	○	○	○	○	○

If continuity is not as specified, replace the relay.

A/C FAN RELAY No.2

INSPECT RELAY CONTINUITY

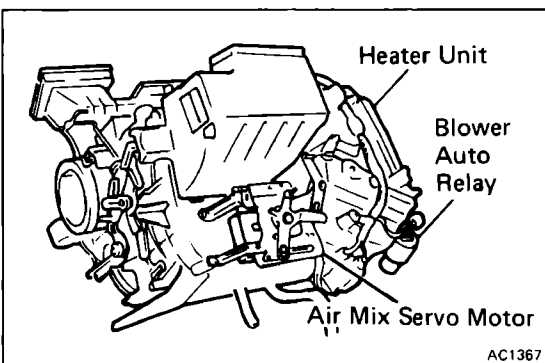


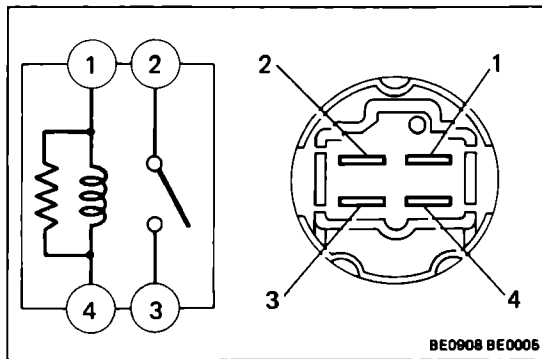
Terminal	1	2	3	4
Condition				
Constant	○	○	○	○
Apply battery voltage to terminal 1 and 4		○	○	

If continuity is not as specified, replace the relay.

BLOWER AUTO RELAY (PROGRAM SWITCH RELAY)

(See page BE-48)





INSPECT RELAY CONTINUITY

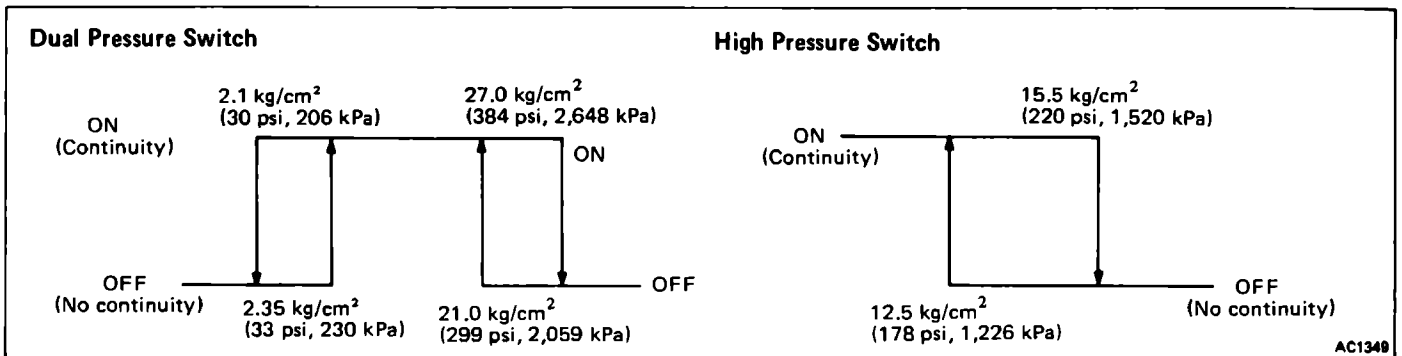
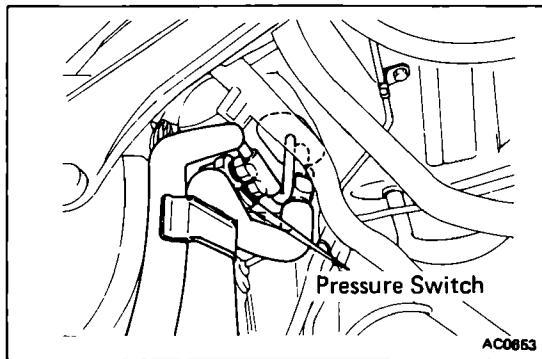
Terminal	1	2	3	4
Condition				
Constant	○	—	—	○
Apply battery voltage to terminal 1 and 4		○	○	

If continuity is not as specified replace the relay.

PRESSURE SWITCH

ON-VEHICLE INSPECTION

1. DISCONNECT CONNECTOR OF PRESSURE SWITCH
2. INSPECT PRESSURE SWITCH
 - (a) Install the manifold gauge set.
 - (b) Observe the gauge reading.
 - (c) Check the continuity between the two terminals of pressure switch shown in the below.



If defective, replace the pressure switch.

WATER TEMPERATURE SWITCH (Automatic A/C only)

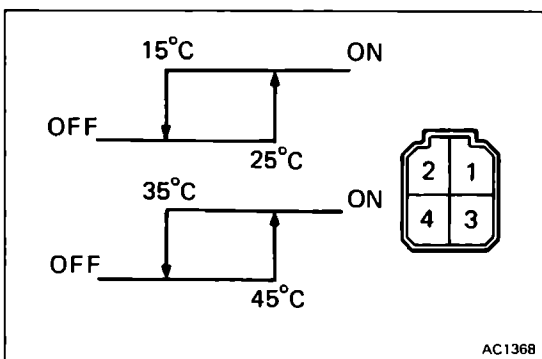
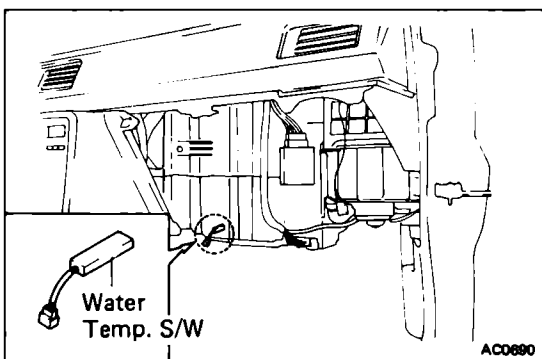
NOTE: The water temperature switch is under the heater radiator.

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between each terminal at each water temperature.

Terminal	1	2	3	4
Temperature				
15 – 25°C (53 – 77°F)	○	—	○	
35 – 45°C (95 – 113°F)		○	—	○

NOTE: When checking on the vehicle, the coolant temperature will be 20°C (68°F) higher than that of the contact point on the switch.

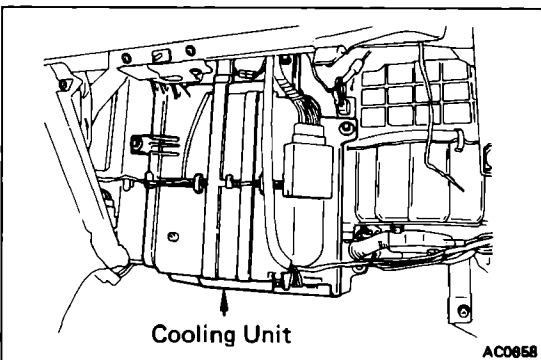
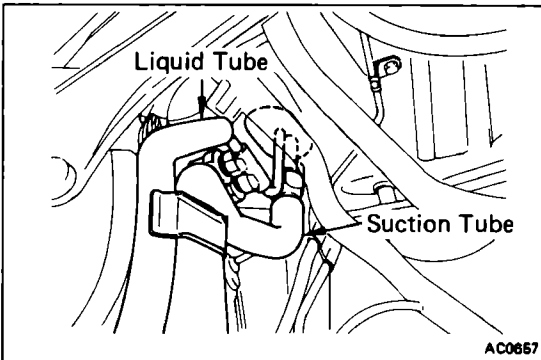
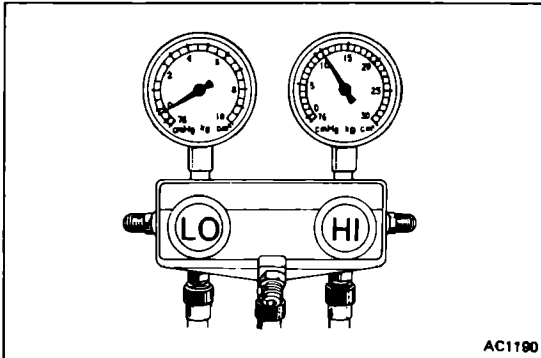


COOLING UNIT

(See pages AC-8 and 9)

ON-VEHICLE INSPECTION OF EXPANSION VALVE

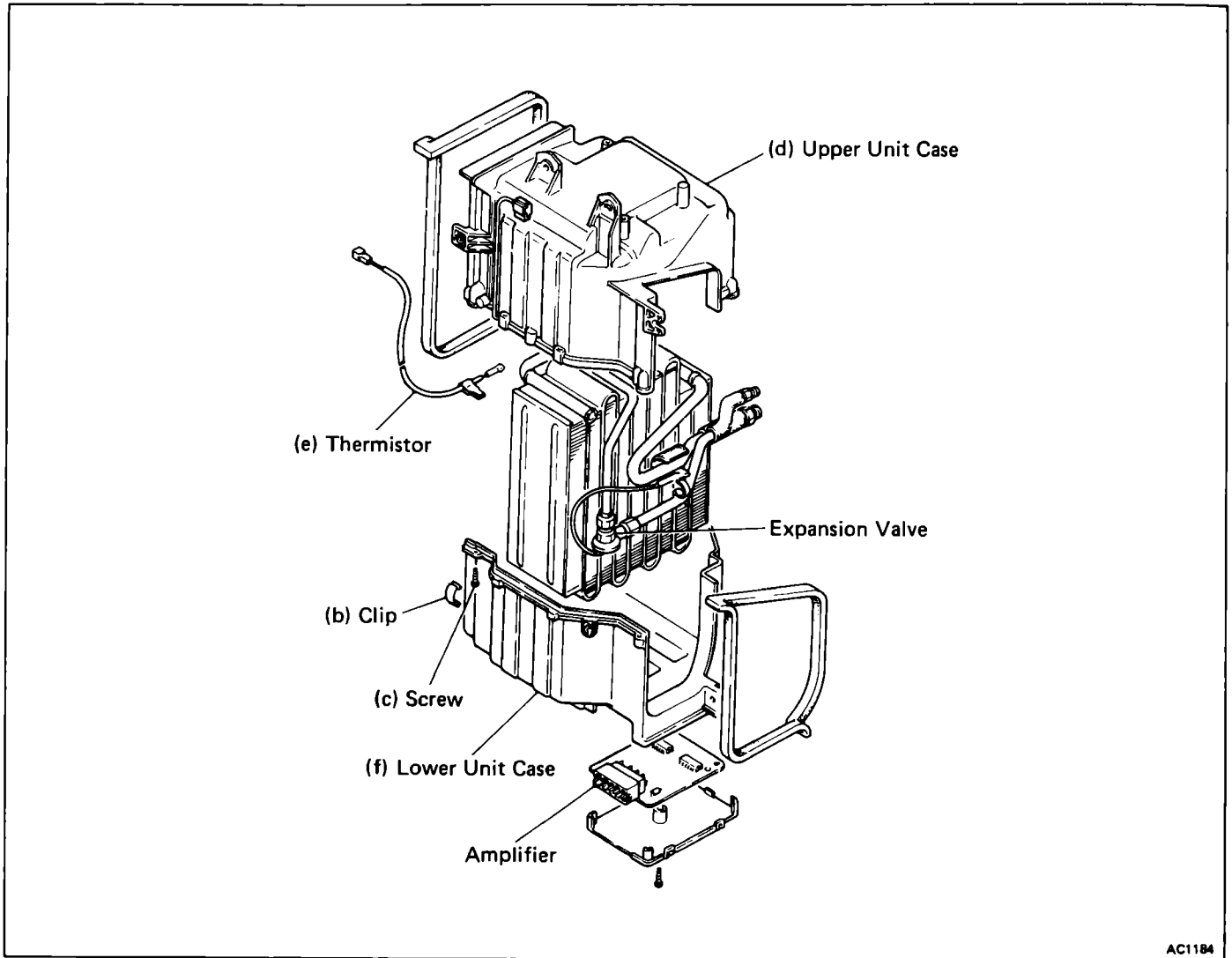
1. **CHECK QUANTITY OF REFRIGERANT GAS DURING REFRIGERATION CYCLE**
2. **INSTALL MANIFOLD GAUGE SET**
(See page AC-20)
3. **RUN ENGINE**
Run the engine at 2,000 rpm at least 5 minutes.
4. **CHECK EXPANSION VALVE**
If the expansion valve is clogged, the low pressure reading will drop to 0 kg/cm² (0 psi, 0 kPa), otherwise it is OK.



REMOVAL OF COOLING UNIT

1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
2. **DISCHARGE REFRIGERATION SYSTEM**
3. **DISCONNECT SUCTION TUBE FROM COOLING UNIT OUTLET FITTING**
4. **DISCONNECT LIQUID TUBE FROM COOLING UNIT INLET FITTING**
NOTE: Cap the open fittings immediately to keep moisture out of the system.
5. **REMOVE GROMMETS FROM INLET AND OUTLET FITTINGS**
6. **REMOVE GLOVE BOX AND REINFORCEMENT**
7. **DISCONNECT CONNECTORS**
8. **REMOVE COOLING UNIT**
Remove three nuts and four bolts.

DISASSEMBLY OF COOLING UNIT



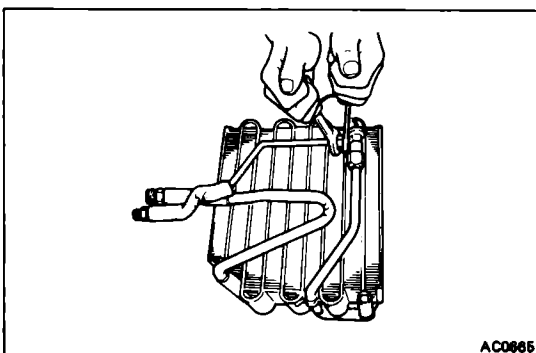
AC1184

1. REMOVE LOWER AND UPPER UNIT CASES

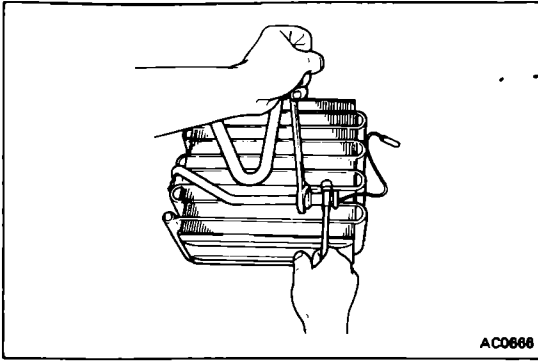
- (a) Disconnect connectors.
- (b) Remove three clips.
- (c) Remove five screws.
- (d) Remove upper unit case.
- (e) Remove thermistor with thermistor holder.
- (f) Remove lower unit case.

2. REMOVE EXPANSION VALVE

- (a) Disconnect the liquid tube from the inlet fitting of the expansion valve.
- (b) Remove the packing and heat sensing tube from suction tube of evaporator.



AC0865

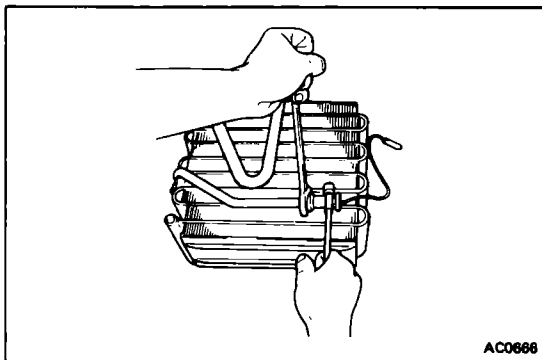


- (c) Remove expansion valve.

Evaporator

INSPECTION OF EVAPORATOR

1. **CHECK EVAPORATOR FINS FOR BLOCKAGE**
If the fins are clogged, clean them with compressed air.
CAUTION: Never use water to clean the evaporator.
2. **CHECK FITTINGS FOR CRACKS OR SCRATCHES**
Repair as necessary.



ASSEMBLY OF COOLING UNIT

INSTALL COMPONENTS ON EVAPORATOR

- (a) Connect the expansion valve to the inlet fitting of the evaporator. Torque the nut.

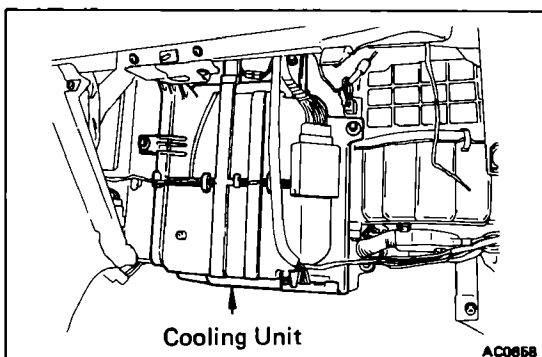
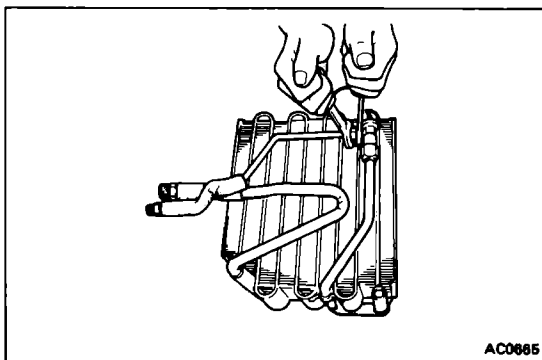
Torque: 235 kg-cm (17 ft-lb, 23 N·m)

NOTE: Be sure that the O-rings are positioned on the tube fitting.

- (b) Install the holder to the suction tube with heat sensitizing tube.
(c) Connect the liquid tube to the inlet fitting of the expansion valve. Torque the nut.

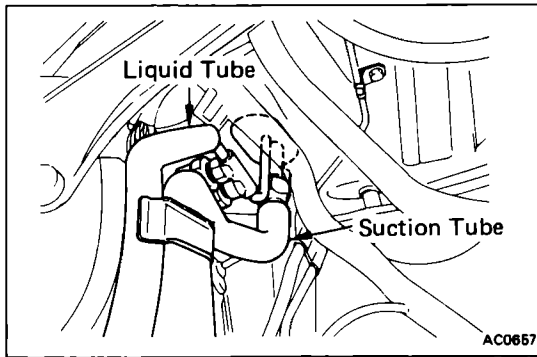
Torque: 135 kg-cm (10 ft-lb, 13 N·m)

- (d) Install lower unit case to the evaporator.
(e) Install thermistor to the evaporator.
(f) Install upper unit case.
(g) Install five screws.
(h) Install three clips.
(i) Connect connectors.



INSTALLATION OF COOLING UNIT

1. **INSTALL COOLING UNIT**
Install the cooling unit with three nuts and four bolts.
2. **CONNECT CONNECTORS**
3. **INSTALL GLOVE BOX AND REINFORCEMENT**



4. **INSTALL GROMMETS ON INLET AND OUTLET FITTINGS**
5. **CONNECT LIQUID TUBE TO COOLING UNIT INLET FITTING**
Torque the nut.
Torque: 135 kg-cm (10 ft-lb, 13 N·m)
6. **CONNECT SUCTION TUBE TO COOLING UNIT OUTLET FITTING**
Torque the nut.
Torque: 325 kg-cm (24 ft-lb, 32 N·m)
7. **IF EVAPORATOR WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**
Add 40 – 50 cc (1.4 – 1.7 fl.oz.)
DENSOIL 6,
SUNISO No. 5GS or equivalent.
8. **CONNECT NEGATIVE CABLE TO BATTERY**
9. **EVACUATE AIR FROM AIR CONDITIONING SYSTEM**
10. **CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK ON GAS LEAKAGE**
Specified amount: 600 – 750 g (1.3 – 1.7 lb)

REFRIGERANT LINES

(See page AC-8)

ON-VEHICLE INSPECTION

1. **INSPECT HOSES AND TUBES FOR LEAKAGE**
Use a gas leak tester. Replace, if necessary.
2. **CHECK THAT HOSE AND TUBE CLAMPS ARE NOT LOOSE**
Tighten or replace as necessary.

REPLACEMENT OF REFRIGERANT LINES

1. **DISCHARGE REFRIGERATION SYSTEM**
2. **REPLACE FAULTY TUBE OR HOSE**
NOTE: Cap the open fitting immediately to keep moisture out of the system.
3. **TIGHTENING TORQUE FOR O-RING FITTINGS AND BOLTED TYPE FITTINGS (See page AC-8)**
4. **EVACUATE AIR FROM AIR CONDITIONING SYSTEM**
5. **CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK ON GAS LEAKAGE**
Specified amount: 600 – 750 g (1.3 – 1.7 lb)

THERMISTOR

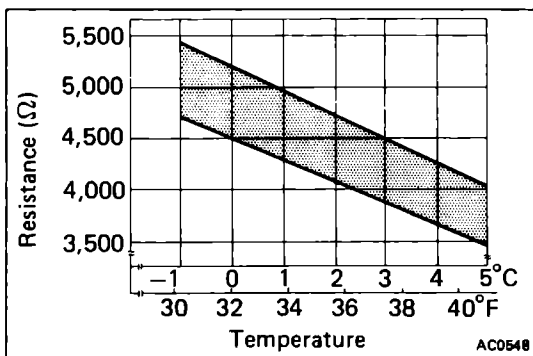
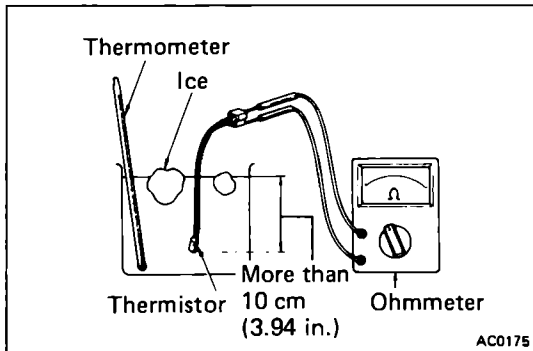
REMOVAL AND INSPECTION OF THERMISTOR

1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. REMOVE GLOVE BOX AND UNDER COVER
3. CHECK THERMISTOR INSTALLED OPERATION

Using an ohmmeter, measure the resistance at the connector.

Resistance: 1,500 Ω at 25°C (77°F)

If resistance value is not as specified, replace the thermistor.



4. REMOVE THERMISTOR

- (a) Disconnect the connector.
- (b) Remove the screw and thermistor from the cooling unit.

5. CHECK THERMISTOR OPERATION

- (a) Place the thermistor in cold water. While varying the temperature of the water, measure the resistance at the connector and, at the same time, measure the temperature of the water with a thermometer.

- (b) Compare the two readings on the chart.

If the intersection is not between the two lines, replace the thermistor.

INSTALLATION OF THERMISTOR

1. INSTALL THERMISTOR

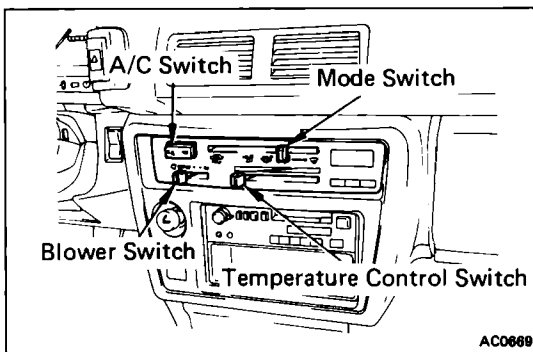
- (a) Install the thermistor with the screw.
- (b) Connect the connector.

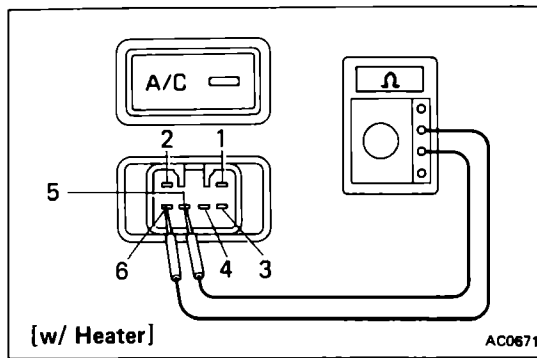
2. INSTALL GLOVE BOX AND UNDER COVER
3. CONNECT NEGATIVE CABLE TO BATTERY

A/C SWITCH (Lever Type)

ON-VEHICLE INSPECTION

1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. REMOVE CENTER CLUSTER
3. DISCONNECT A/C SWITCH CONNECTOR



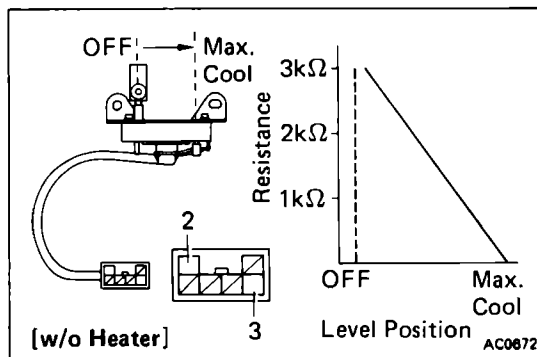


4. CHECK A/C SWITCH FOR CONTINUITY (w/ Heater)

Using an ohmmeter, check continuity between the terminals for each switch position as shown in the table.

Terminal \ Switch position	5	6	2	*1	*4
OFF				○	○
A/C	○	○	○	○	○

* For illumination light.



If there is no continuity as specified, replace the A/C switch.

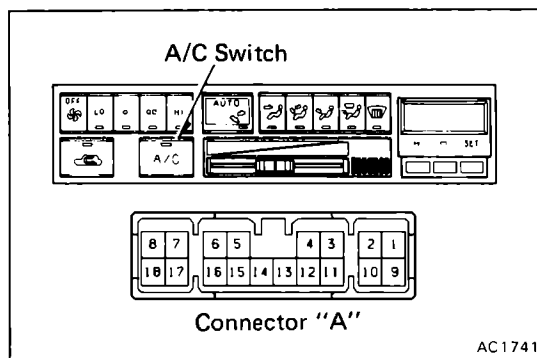
(w/o Heater)

Using an ohmmeter, check resistance between the terminals 2 and 3 for each lever position as shown in the table.

5. CONNECT A/C SWITCH CONNECTOR

6. INSTALL CENTER CLUSTER

7. CONNECT NEGATIVE CABLE TO BATTERY



A/C CONTROL PANEL ASSEMBLY (Push Type)

INSPECTION OF HEATER CONTROL ASSEMBLY

(See page BE-47)

INSPECT A/C INDICATOR LIGHT OPERATION

- Connect the positive (+) battery lead to terminal A2 and the negative (–) battery lead to terminal A7.
- With the A/C button pushed in, check that the indicator light is lit.

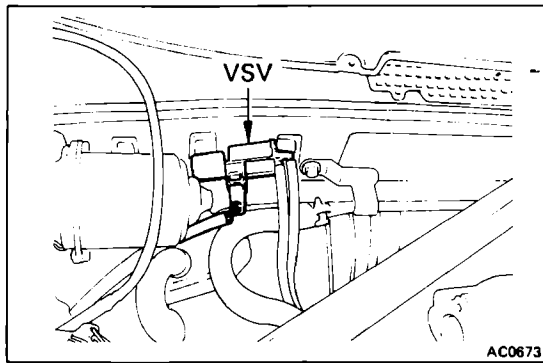
If operation is not as specified, replace the heater control.

INSPECT A/C SWITCH CONTINUITY

Inspect the A/C switch continuity between terminals.

Terminal \ Switch position	A2	A7	A8	A18
OFF				
ON	○	○	○	○

If continuity is not as specified, replace the heater control.

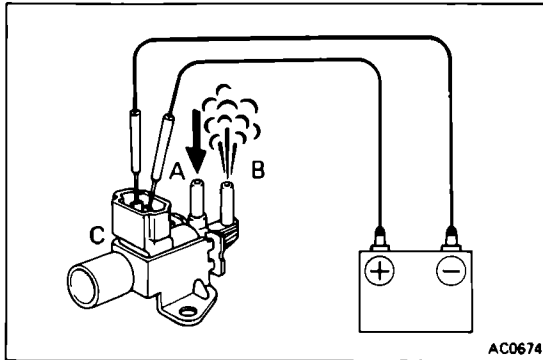


VACUUM SWITCHING VALVE (VSV)

(See page AC-8)

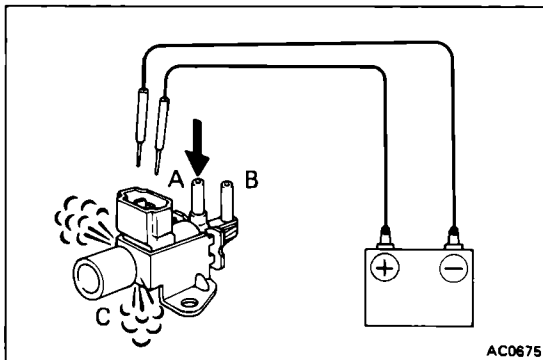
INSPECTION OF VSV

1. REMOVE VSV



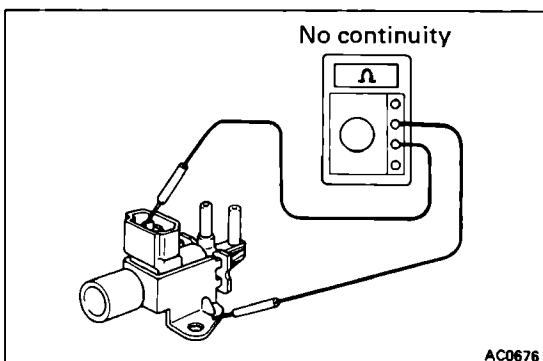
2. CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR INTO PIPE

- (a) Connect the VSV terminals to the battery terminals as shown.
- (b) Blow into pipe "A", and check that air comes out of pipe "B" but does not come out of filter "C".



- (c) Disconnect the battery.
- (d) Blow into pipe "A" and check that air comes out of filter "C" but does not come out of pipe "B".

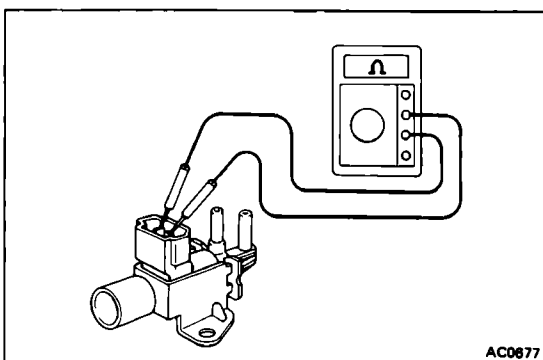
If a problem is found, replace the VSV.



3. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between each terminal and the VSV body.

If a short circuit is found, repair or replace the VSV.

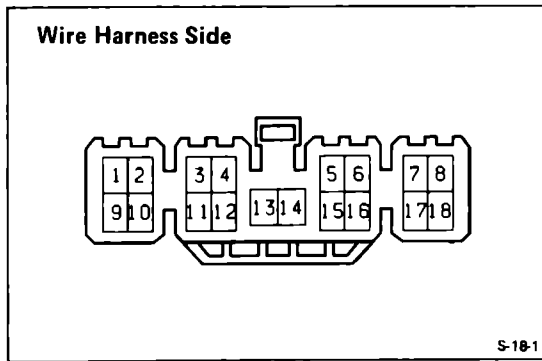


4. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the two terminals of the VSV.

Specified resistance: 38 – 43 Ω at 20°C (68° F)

If resistance value is not as specified, replace the VSV.



AMPLIFIERS

Air Conditioner Amplifiers

INSPECTION OF AMPLIFIER

INSPECT AMPLIFIER CIRCUIT

Disconnect the amplifier and inspect the connector on the wire harness side as shown in the chart below.

Test conditions:

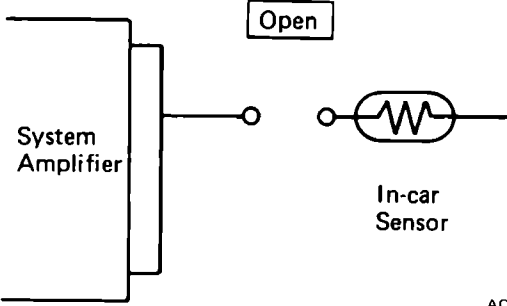
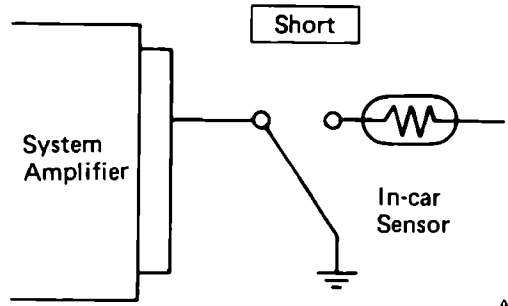
- (1) Ignition switch: ON
- (2) Temperature control lever: MAX COOL
- (3) Blower switch : HI

Check for	Tester connection	Condition	Specified value
Continuity	14 – Ground	Constant	Continuity
Voltage	1 – 14	Turn A/C switch on.	Battery voltage
		Turn A/C switch off.	No voltage
	6 – 14	Turn A/C switch on.	Battery voltage
		Turn A/C switch off.	No voltage
	4 – 14	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	5 – 14	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	7 – 14	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	8 – 14	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	10 – 14	Start the engine.	Approx. 10 to 14 V
		Stop the engine.	No voltage
	13 – 14	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	18 – 14	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
Resistance	2 – 9	Constant	Approx. 1.5 k Ω at 25°C (77°F)
	16 – 9	Constant	Approx. 115 Ω

If circuit is correct, replace the amplifier.

INSPECTION OF SYSTEM AMPLIFIER

1. False Signal Input to System Amplifier

False Signal	A	B
Condition	Interior room temperature is very low.  AC1370	Interior room temperature is very high.  AC1371
Your Work	Remove in-car sensor connector.	Remove in-car sensor, and ground the number 1 pin of in-car sensor female connector.

2. System Operation when Input False Signal

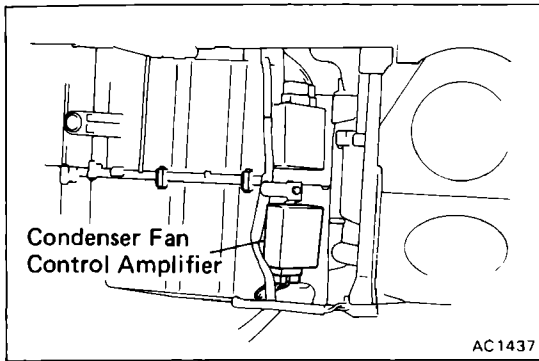
Condition: Setting Temperature is at 25°C (77°F)

System Main Parts	False Signal	Motion			
Air Mix Control Servo Motor	A	Air mix control servo motor shaft moves towards max-hot side.			
	B	Air mix control servo motor shaft moves towards max-cool side.			
Air Vent Mode Control Servo Motor	Air Vent Mode Damper				
		VENT	BI-LEVEL	HEAT	DEF
	A	Close	Close	Open	Close
	B	Open	Close	Close	Close

System Operation when Input False Signal (Cont'd)

System Main Parts	False Signal	Motor
Blower Motor	A	Blower motor rotates at high speed.
	B	
Water Valve	A	OPEN
	B	CLOSE
FRE/REC Control Servo Motor	FRE Switch ON	Fresh air is ventilated.
	REC Switch ON	Recirculation air is ventilated.

If necessary, replace the system amplifier.

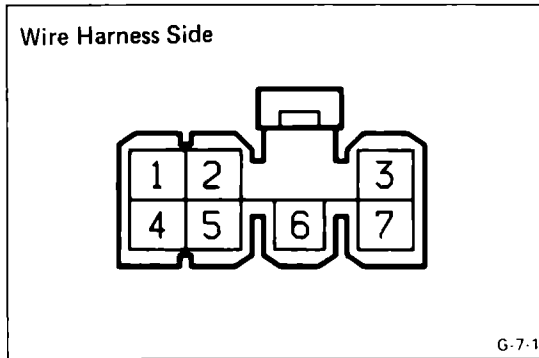


Condenser Fan Control Amplifier (3S-GTE Engine)

INSPECTION OF AMPLIFIER

INSPECT AMPLIFIER CIRCUIT

Disconnect the amplifier and inspect the connector on the wire harness side as shown in the chart below.



Test conditions:

- (1) Ignition switch: ON
- (2) Temperature control lever: MAX COOL
- (3) Blower switch : HI

Check for	Tester connection	Condition	Specified value
Continuity	2 – 6	Constant	Continuity
	6 – Ground	Constant	Continuity
Voltage	3 – 6	Turn ignition switch on	Battery voltage
		Turn ignition switch off	No voltage
	4 – 6	Turn ignition switch on	Battery voltage
		Turn ignition switch off	No voltage
Resistance	7 – 5	Constant	Approx. 570 Ω at 25°C (77°F)

MOTORS

Air Mix Control Servo Motor

(See page BE-50)

RECIRC/FRESH Control Servo Motor

(See page BE-50)

Air Vent Mode Control Servo Motor

(See page BE-51)

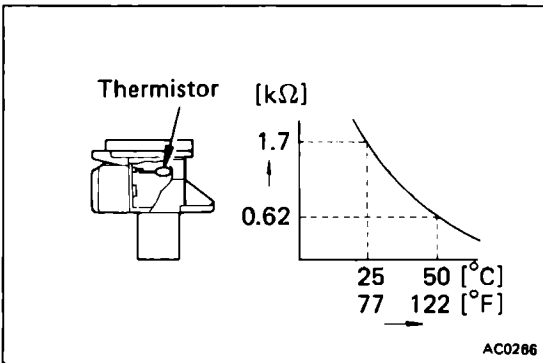
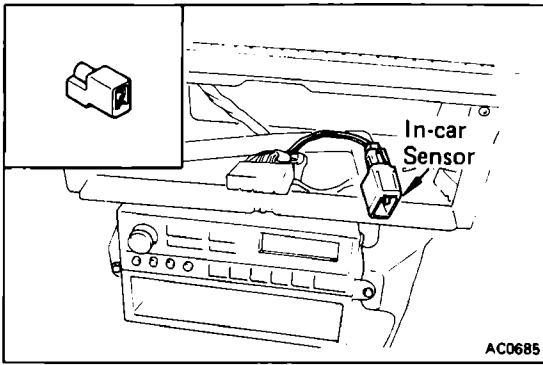
SENSORS

1. IN-CAR SENSOR

Check the sensor resistance.

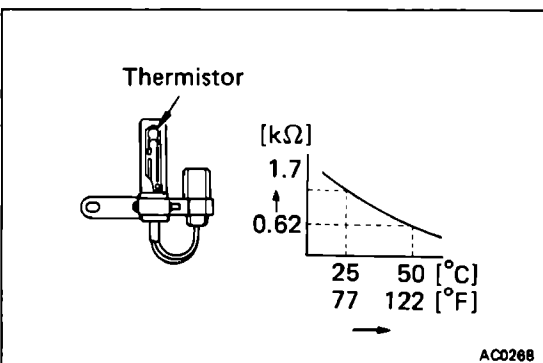
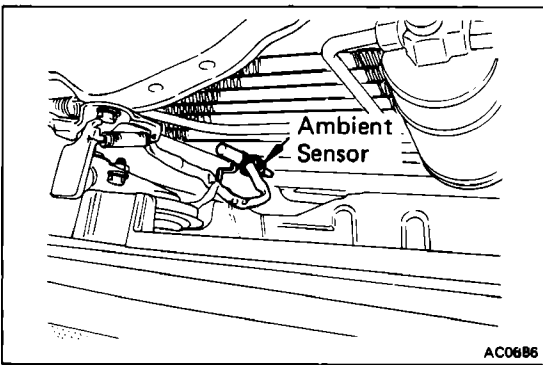
NOTE: If there is an open circuit in the sensor, the system will operate at maximum heating.

Conversely, if there is a short in the system, it will operate at maximum cooling.



2. AMBIENT SENSOR

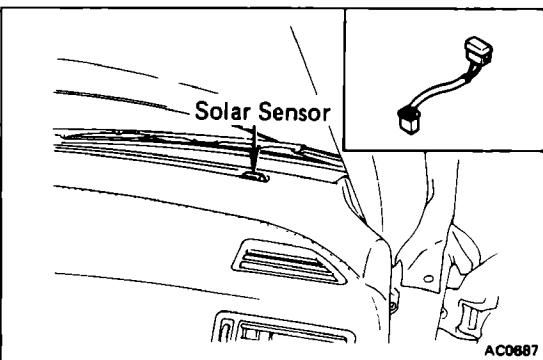
Check the sensor resistance.

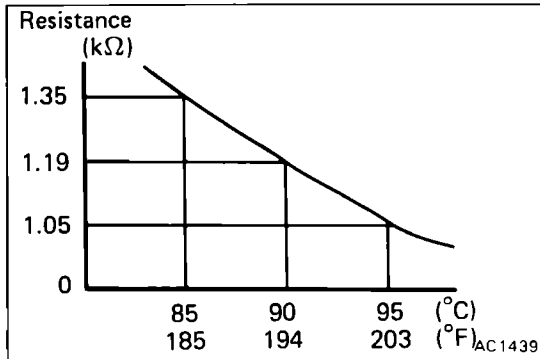
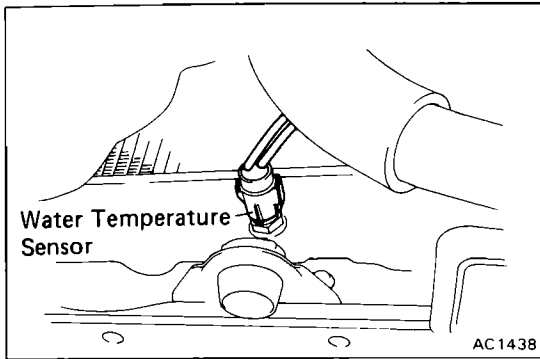


3. SOLAR SENSOR

Using an ohmmeter, check the continuity.

NOTE: There is the solar sensor on the safety pad of the assistant side.





4. WATER TEMPERATURE SENSOR (3S-GTE Engine)

Check the sensor operation.

FUNCTIONAL TEST AND ADJUSTMENT

Automatic Temperature Control System (Automatic A/C only)

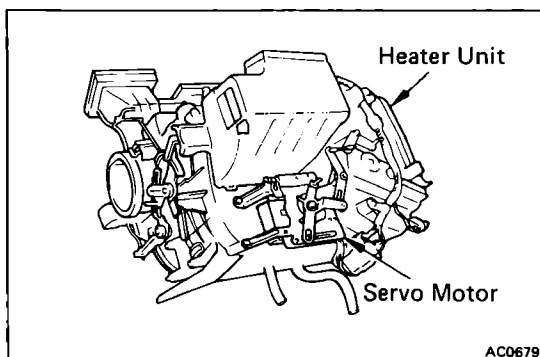
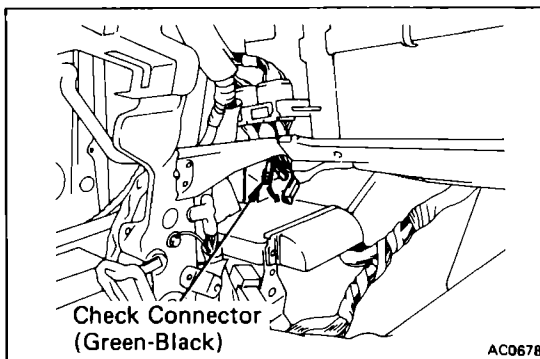
ON-VEHICLE INSPECTION

1. REMOVE COMPONENTS FROM VEHICLE

- (a) Glove box
- (b) Reinforcement

2. REPLACE A/C WIRE HARNESS CONNECTION FOR TEST

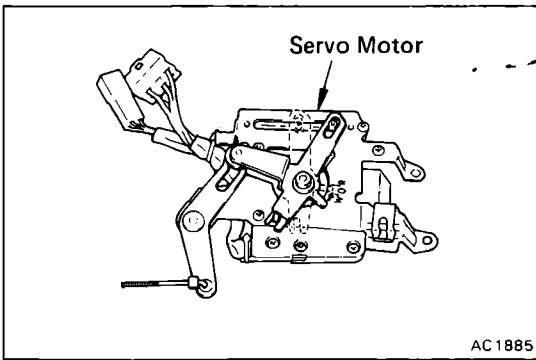
- (a) Disconnect the white single terminal connectors at the heater assembly.
- (b) Connect the check connector (Green-Black) to the above mentioned male single terminal connector (White-Red).



3. PLACE TEMPERATURE CONTROL LEVER AT 25°C (77° F) POSITION

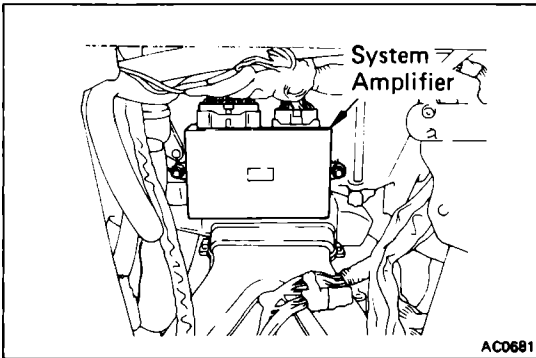
4. RUN ENGINE AT IDLING

5. TURN ON BLOWER SWITCH TO AUTO POSITION



6. CHECK AUTOMATIC TEMPERATURE CONTROL SYSTEM

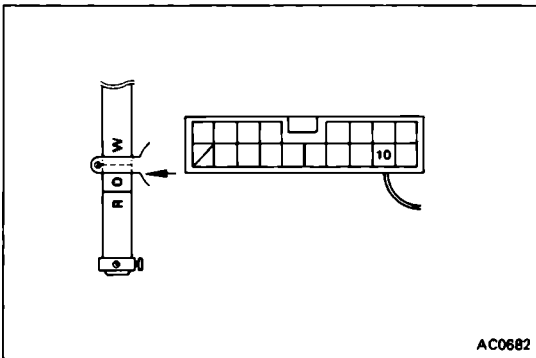
- (a) Verify that the guide plate on the servo motor is positioned at the mark "O". (between the "R" and "W")
- (b) If the guide plate position is not at the mark "O", adjust as follows.



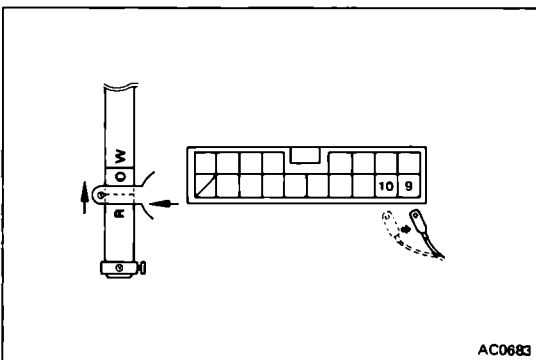
7. ADJUST AUTOMATIC TEMPERATURE CONTROL SYSTEM

- (a) Disconnect the A/C wire harness from the System amplifier.
- (b) Adjust automatic temperature control system by changing the terminal position in the above mentioned A/C wire harness.

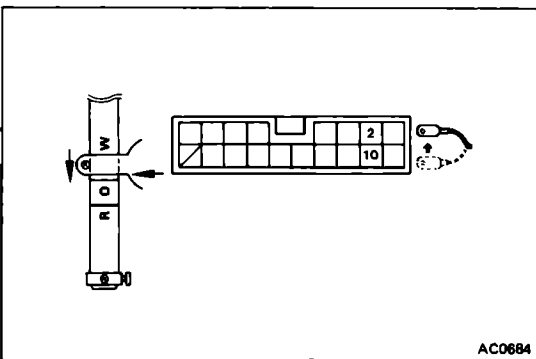
NOTE: Normally the adjusting terminal is in the 10 terminal position.



- (c) If the guide plate position is over the "R" area, install the adjusting terminal into the 9 position.



- (d) If the guide plate position is over the "W" area, install the adjusting terminal into the 2 position.



8. REASSEMBLE

- (a) Reconnect the A/C wire harness to the System amplifier.
- (b) Disconnect the check connector from the A/C wire harness.
- (c) Reconnect the White-Red connectors.
- (d) Install the glove box and reinforcement.