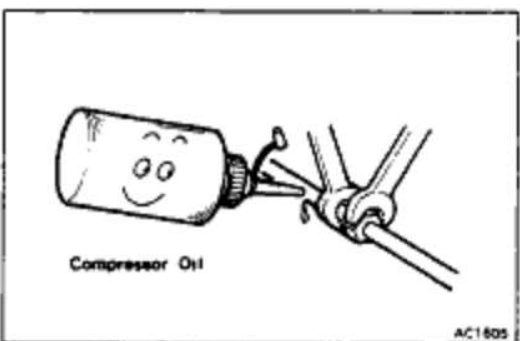
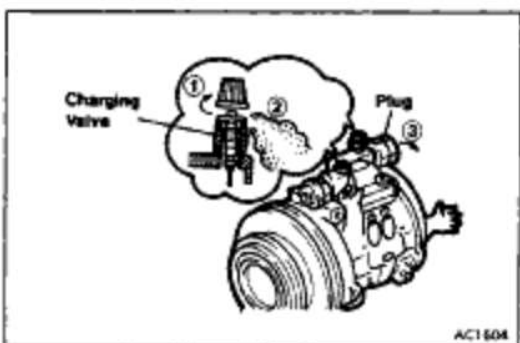
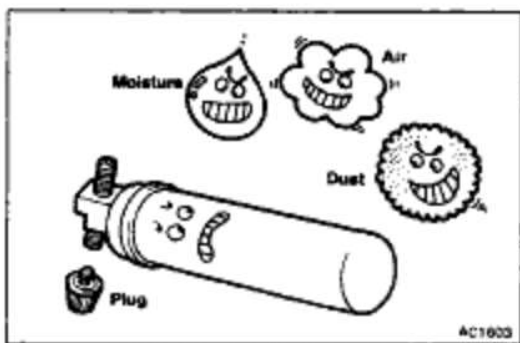
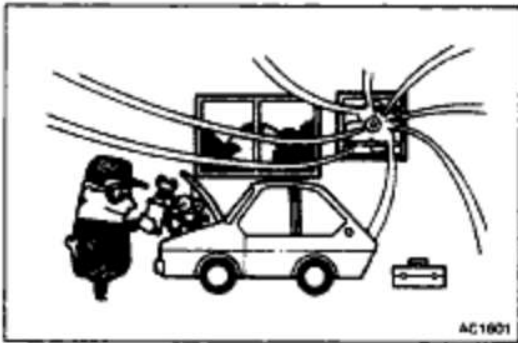


AIR CONDITIONING SYSTEM

AC-2

AIR CONDITIONING SYSTEM — General Information



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.

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.

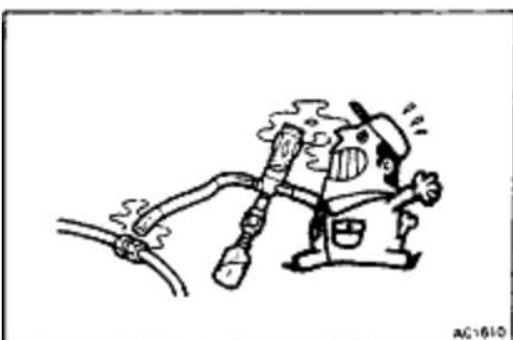
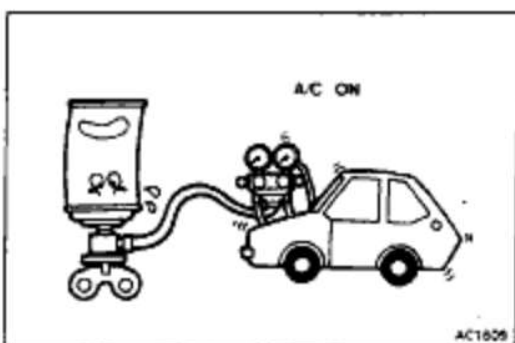
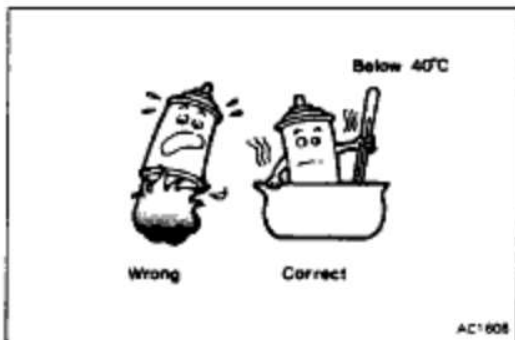
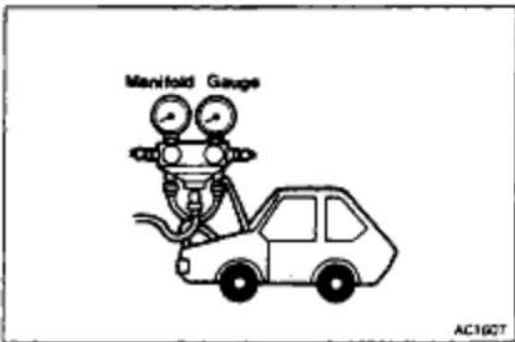
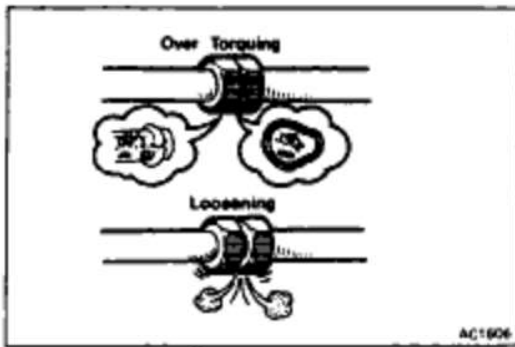
If the refrigerant is not discharged first, compressor oil will spray out with the refrigerant gas when the plug is moved.

- 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.

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.



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

4. WHEN CONNECTING MANIFOLD GAUGE;

- Be sure to connect the charging hose end with a pin to the compressor charging valve.
- 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.
- Tighten hose by hand.
- To prevent loosening of connected hose, do not apply drops of compressor oil to the seat of connection.

HINT: 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);

- Must never be heated.
- Must be kept below 40°C (104°F).
- 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.
- Empty service cans must never be re-used.

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

- 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.
- 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.
- If the service can is inverted and refrigerant is inserted in a liquid state, the liquid is compressed and the compressor brakes down, so the refrigerant must be inserted in a gaseous state.
- 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;

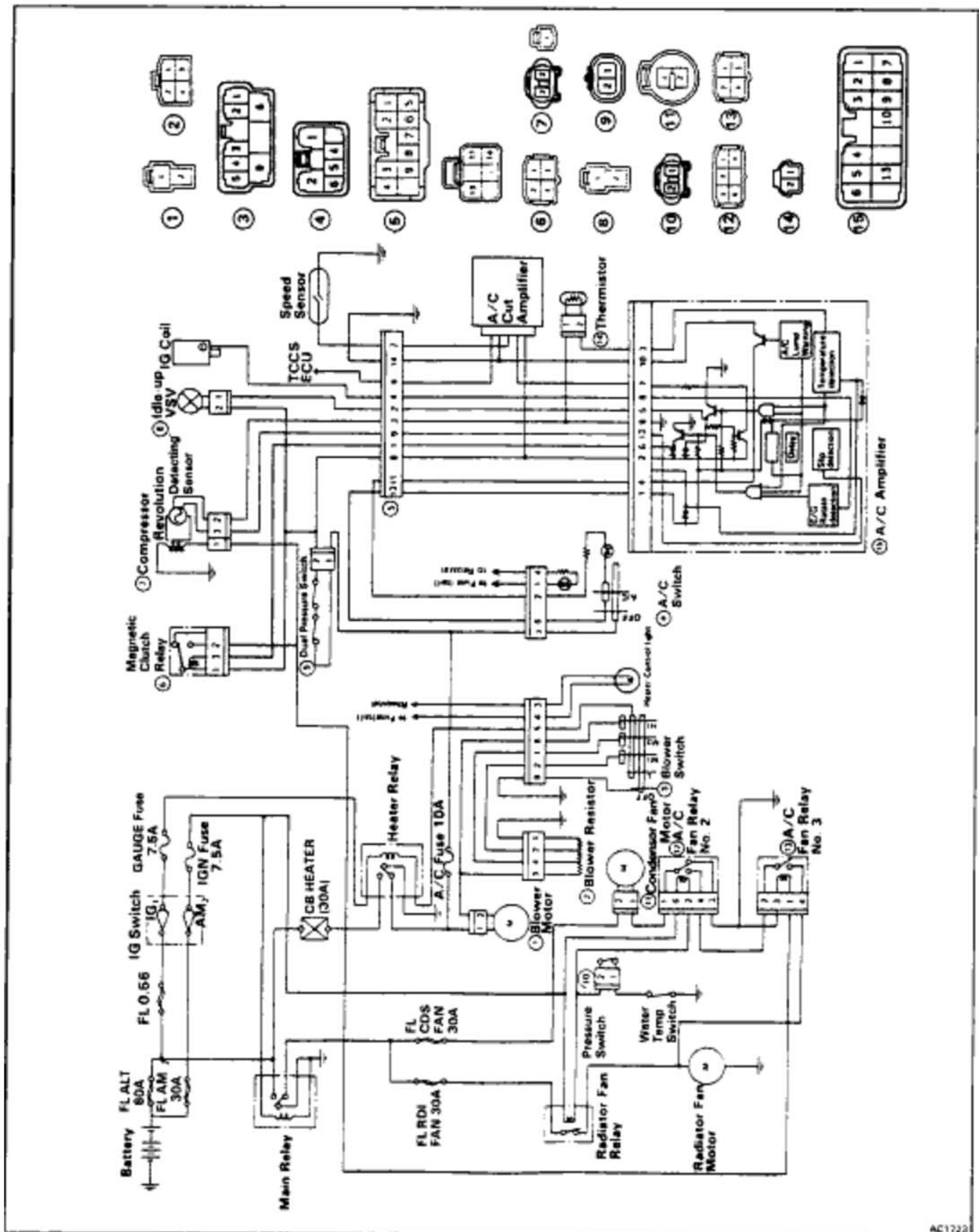
- As a naked flame is used, first make sure that there are no flammable substances nearby before using it.
- Be careful, as poisonous gas is produced when refrigerant gas comes in contact with heat parts.

AC-4

AIR CONDITIONING SYSTEM — Air Conditioning System Circuit

AIR CONDITIONING SYSTEM CIRCUIT

(Lever Type on 3S-FE Engine FWD Model)



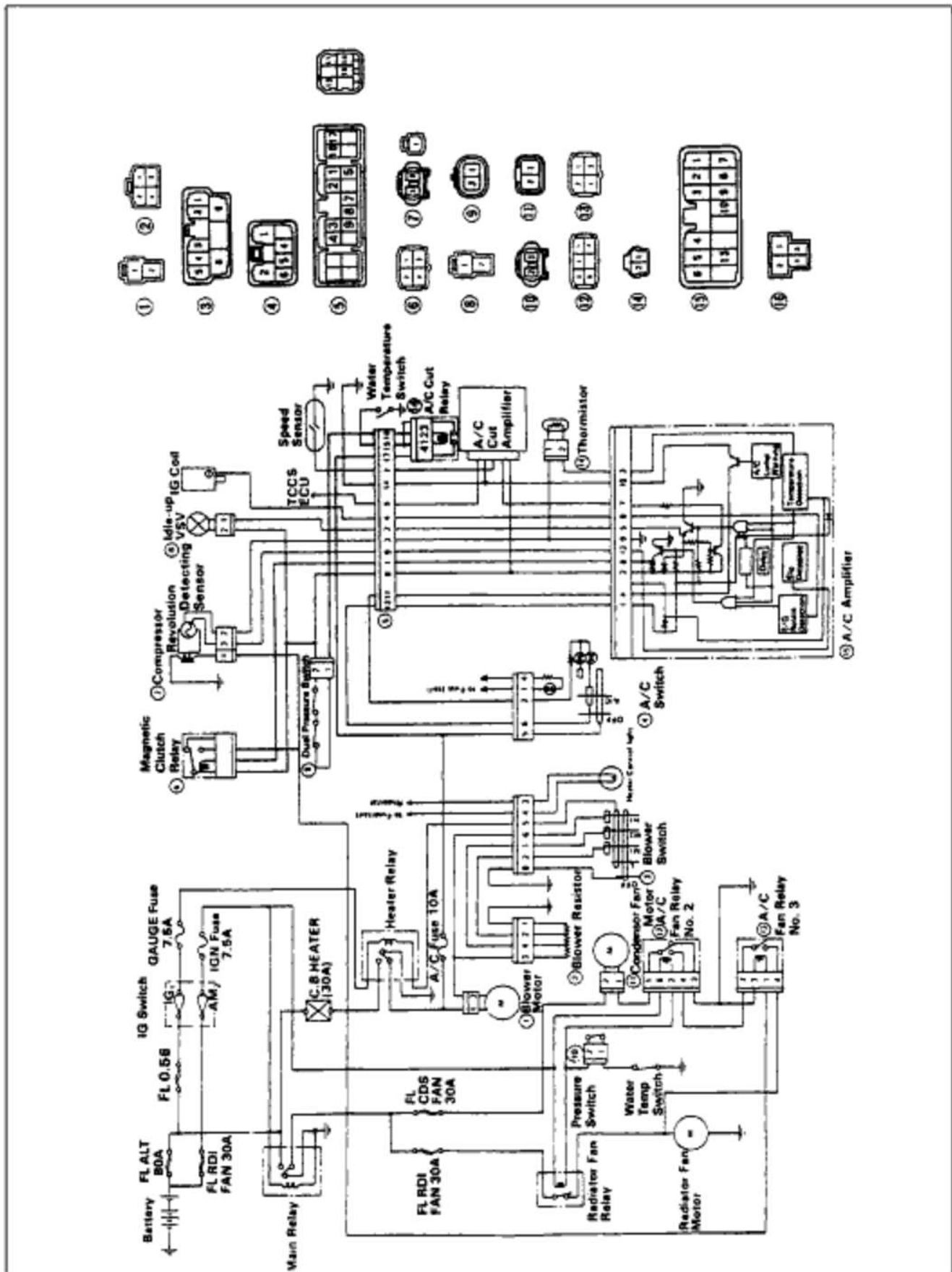
AC1723

[illegible]

AC-6

AIR CONDITIONING SYSTEM — Air Conditioning System Circuit

(Lever Type on 3S-FE Engine All-Trac/4WD Model)

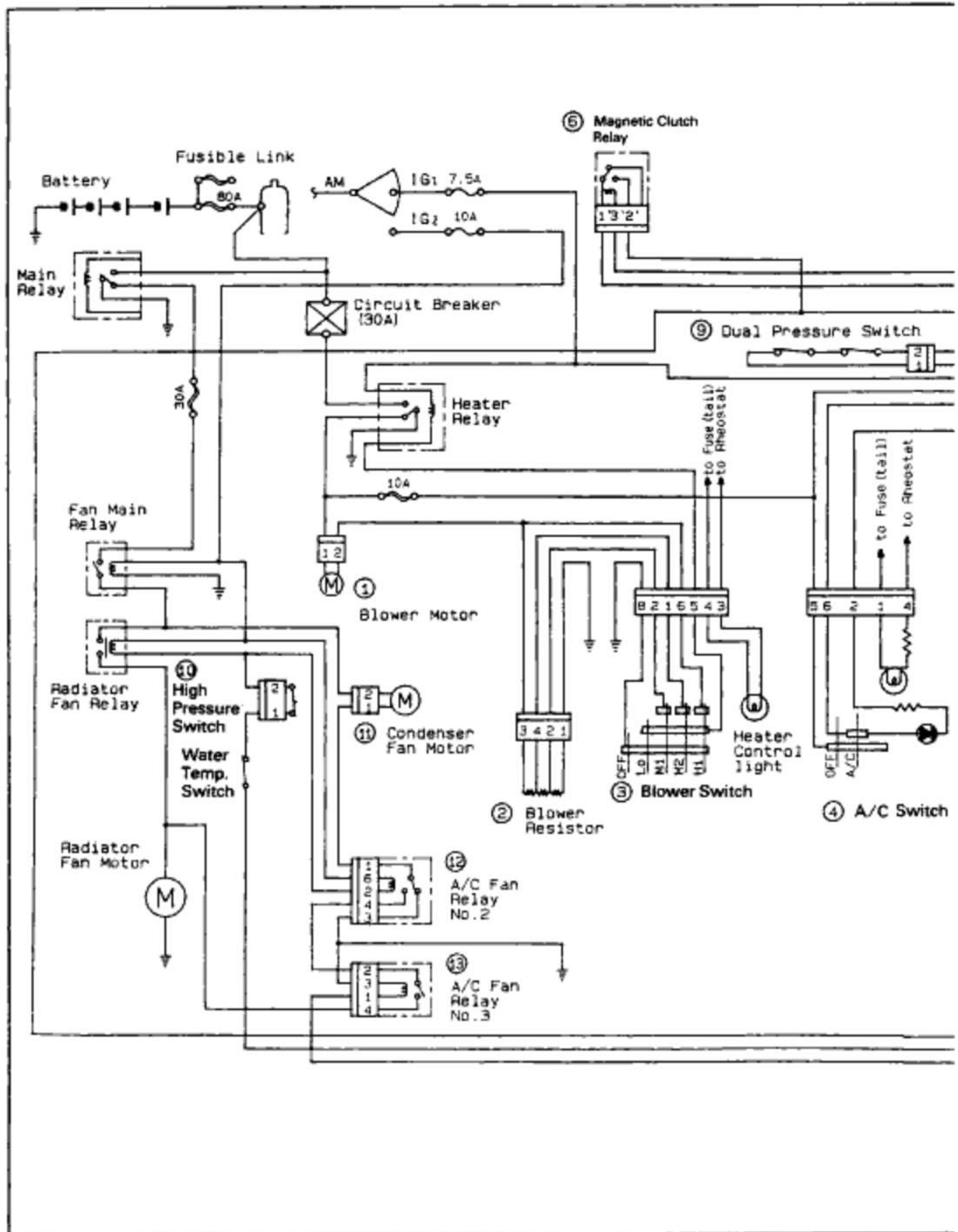


[illegible]

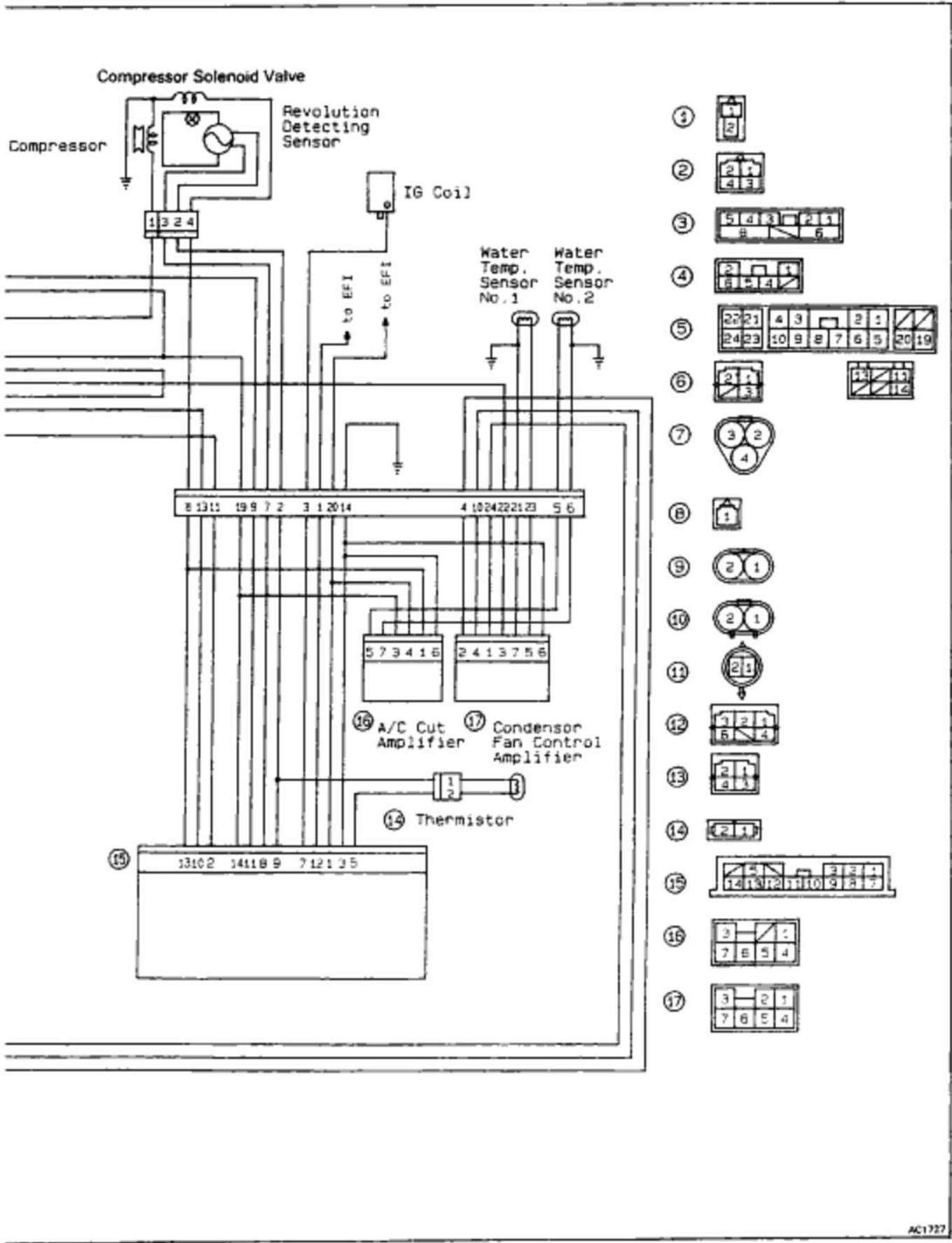
AC-8

AIR CONDITIONING SYSTEM — Air Conditioning System Circuit

(Lever Type on 2VZ-FE Engine Model)



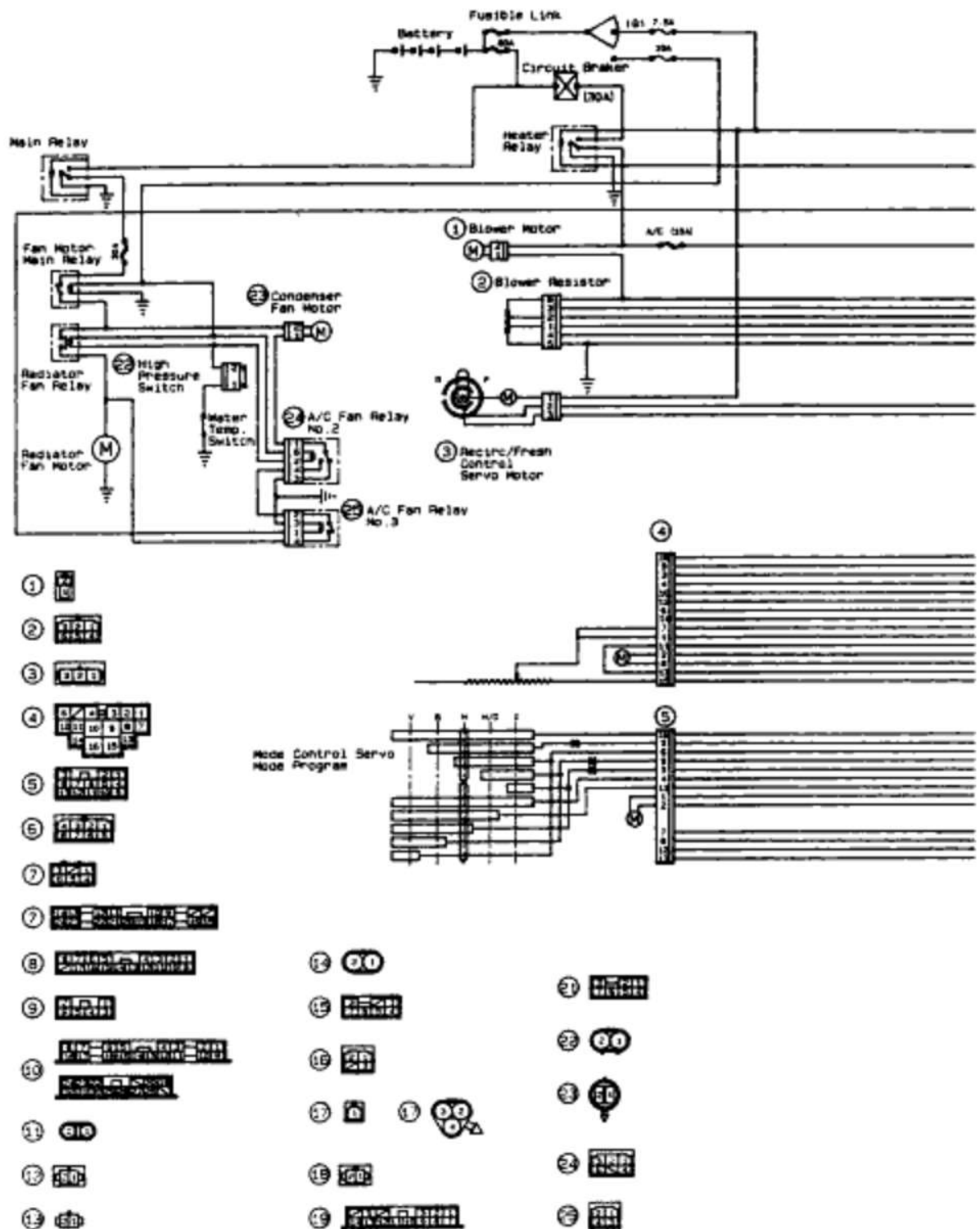
AIR CONDITIONING SYSTEM – Air Conditioning System Circuit



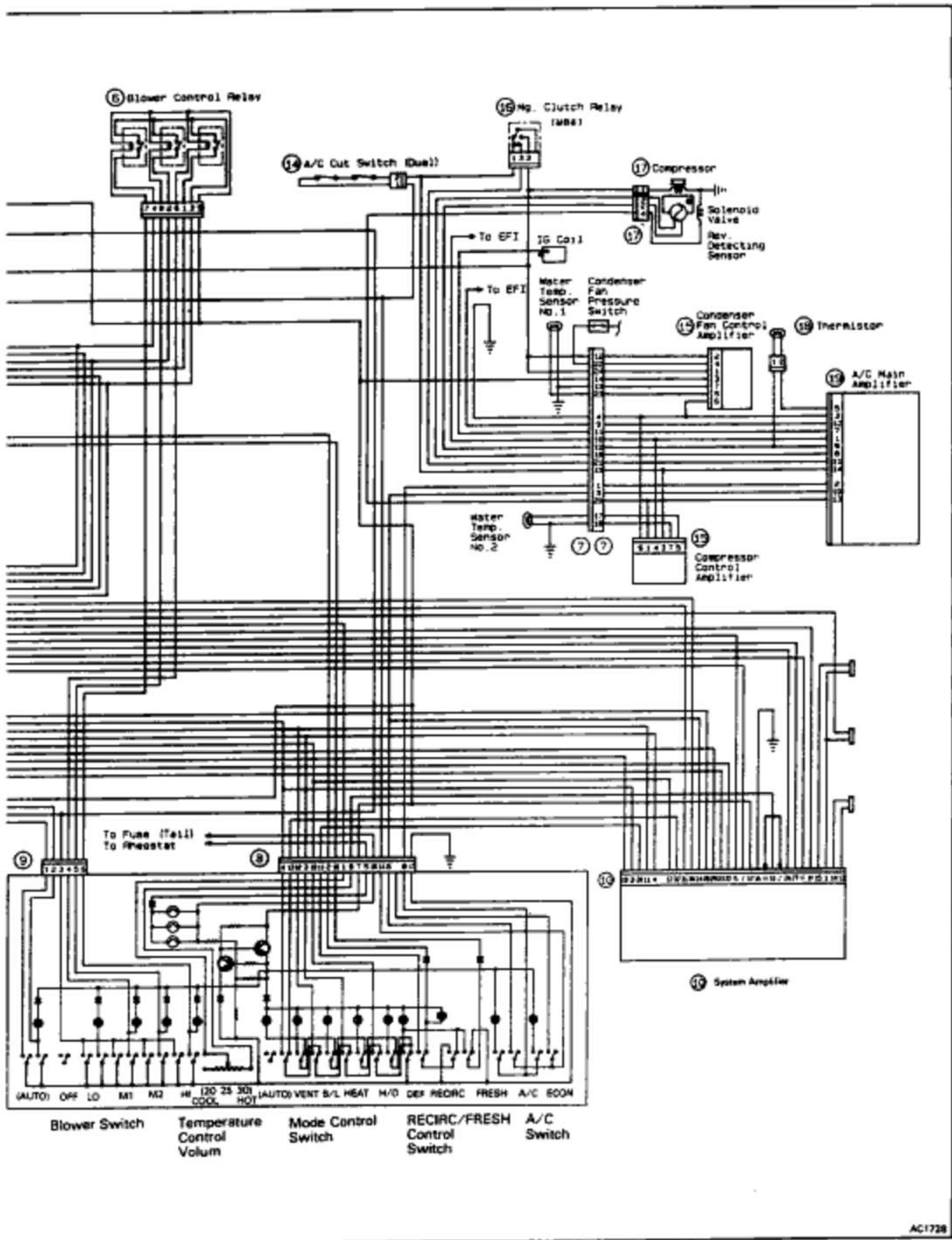
AC-10

AIR CONDITIONING SYSTEM — Air Conditioning System Circuit

(Push Type on 2VZ-FE Engine Model)



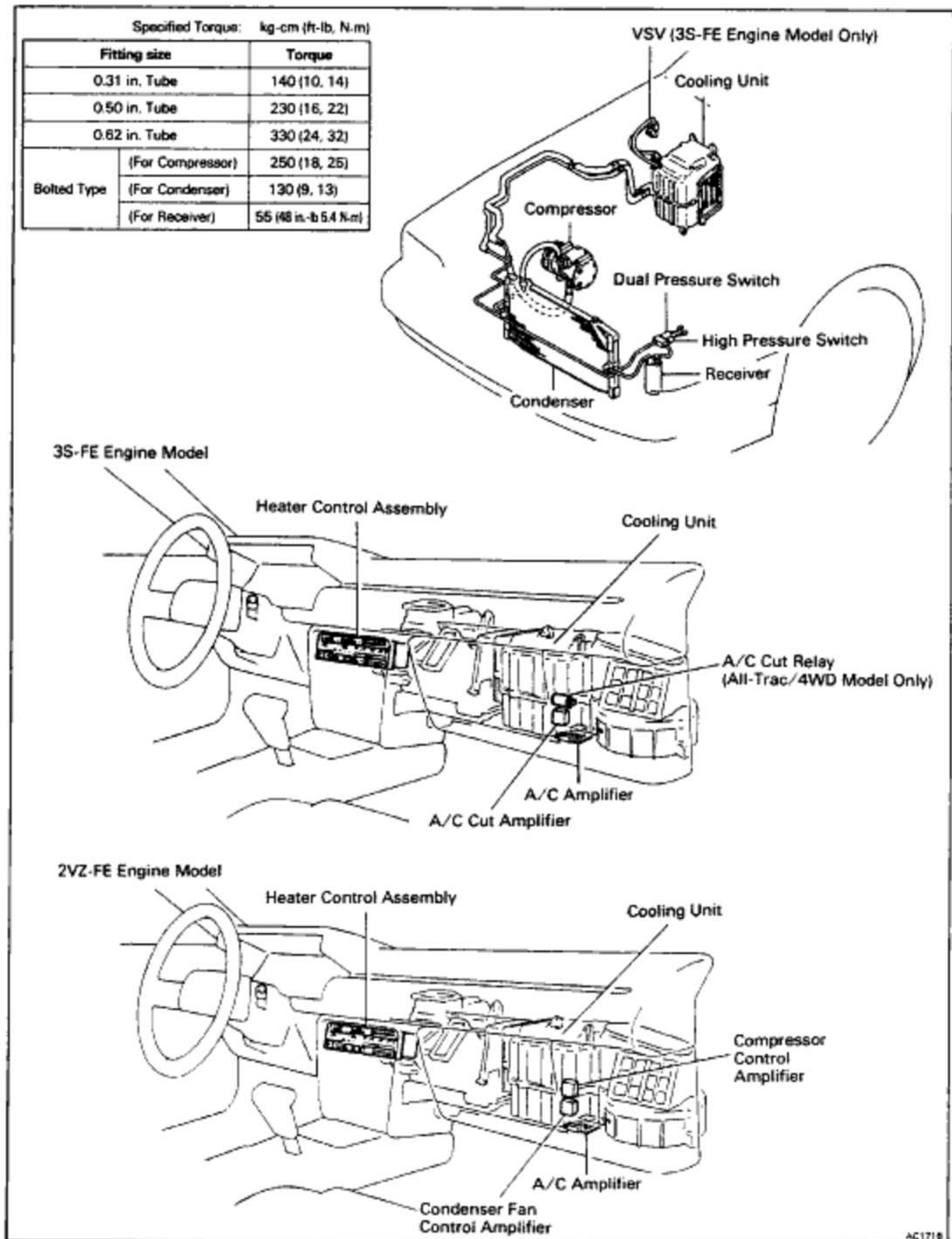
AIR CONDITIONING SYSTEM — Air Conditioning System Circuit

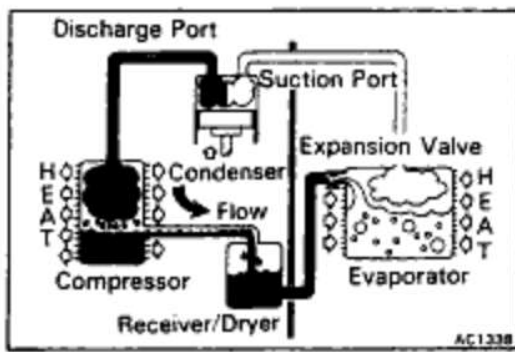


AC-12

AIR CONDITIONING SYSTEM — System Components

SYSTEM COMPONENTS

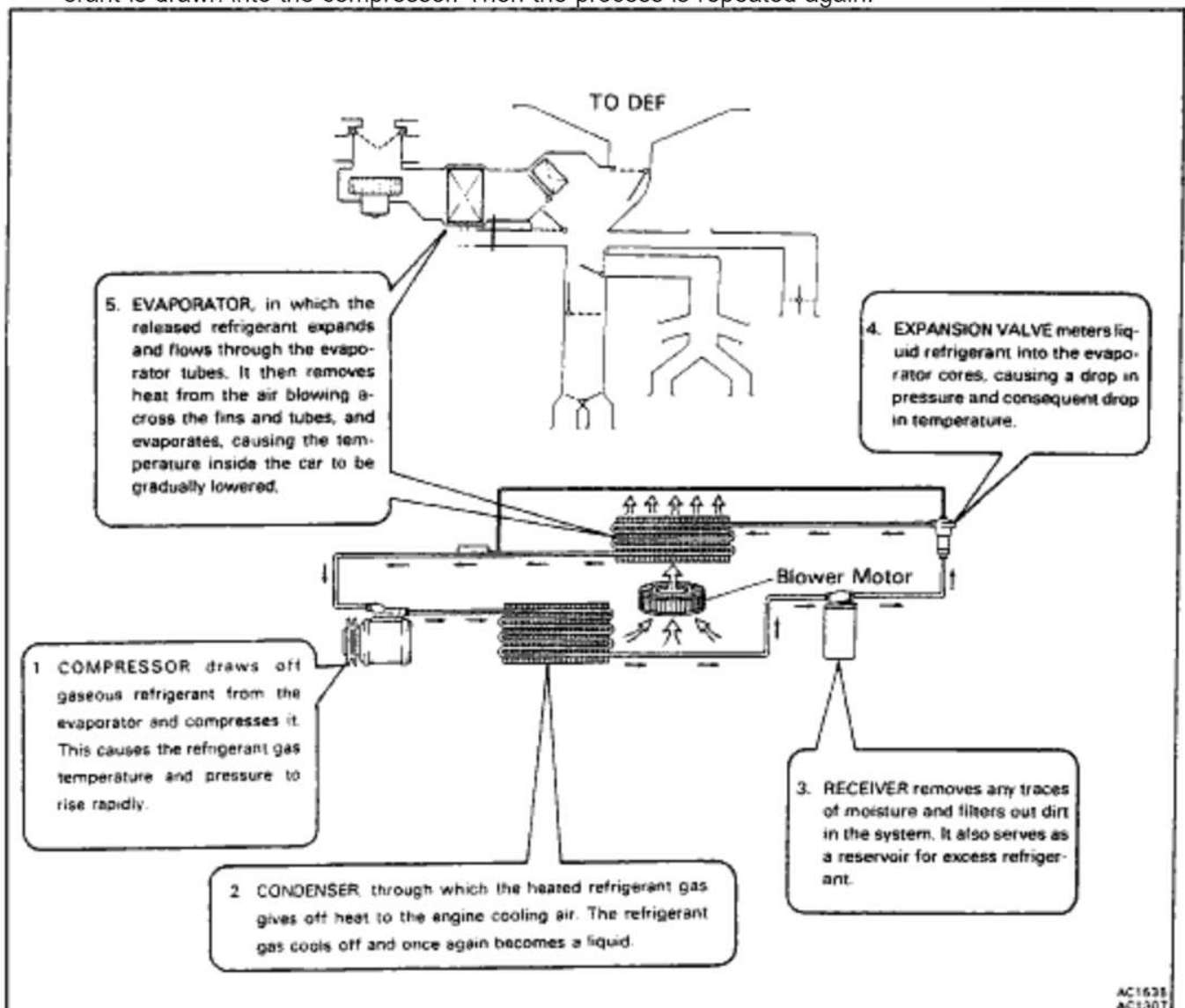




GENERAL DESCRIPTION

REFRIGERATION CYCLE

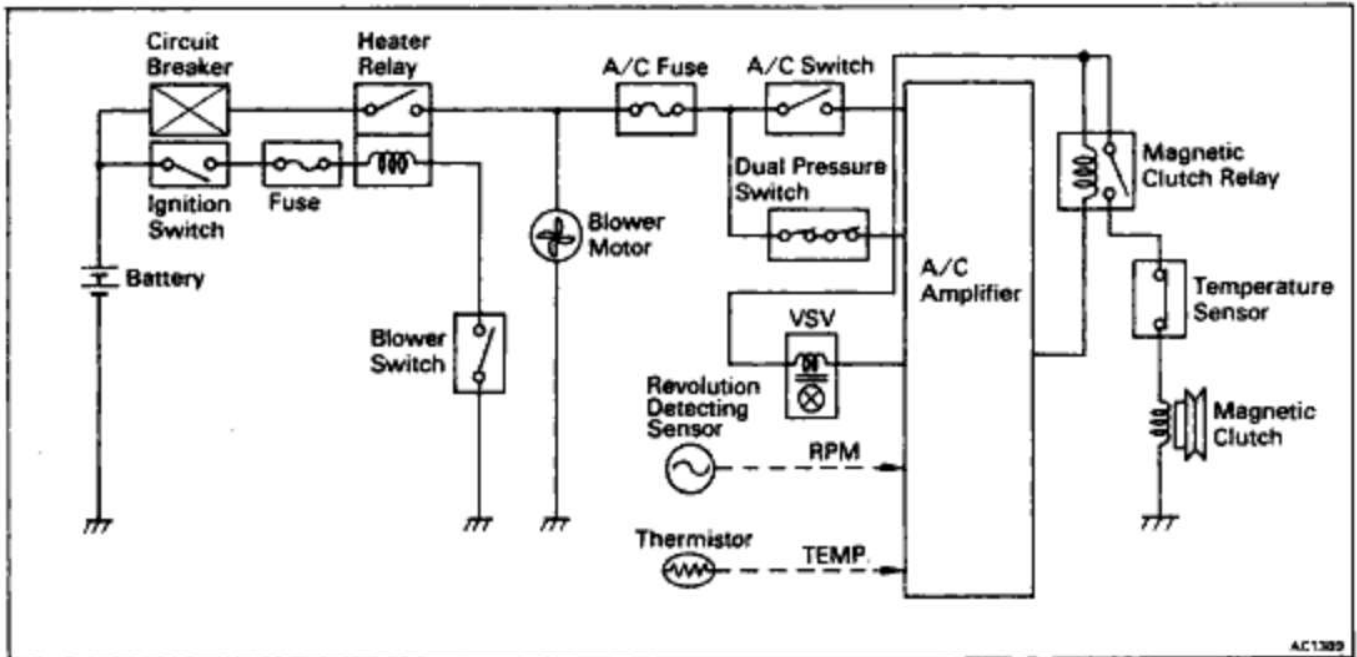
1. The compressor discharges high temperature and high pressure refrigerant containing the heat absorbed from the evaporator plus the heat created by the compressor in a discharge stroke.
2. This gaseous refrigerant flows into the condenser. In the condenser, the gaseous refrigerant condenses into liquid 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 charged 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 gaseous refrigerant in the evaporator and only heat-laden gaseous refrigerant is drawn into the compressor. Then the process is repeated again.



AC-14

AIR CONDITIONING SYSTEM – General Description

1. PRINCIPLE OF A/C ELECTRICAL CIRCUIT



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, 2,648 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.

SPECIAL TOOLS AND EQUIPMENT

Tool	SST No.	Use
Air conditioner service tool set	07110-58011	To evacuate and charge system
Ohmmeter		To perform electrical diagnosis
Voltage meter		To perform electrical diagnosis
Ammeter	07112-76060	To perform electrical diagnosis
Magnetic clutch stopper	07112-66040	To remove and install pressure plate
Magnetic clutch remover	07114-84020	To remove pressure plate
Snap ring pliers (External type)		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

AIR CONDITIONING SYSTEM – SST (Special Service Materials)

SPECIAL TOOLS AND EQUIPMENT

Tool	SST No.	Use
Air conditioner service tool set	07110-58011	To evacuate and charge system
Ohmmeter		To perform electrical diagnosis
Voltage meter		To perform electrical diagnosis
Ammeter	07112-76060	To perform electrical diagnosis
Magnetic clutch stopper	07112-66040	To remove and install pressure plate
Magnetic clutch remover	07114-84020	To remove pressure plate
Snap ring pliers (External type)		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

AC-16

AIR CONDITIONING SYSTEM – Troubleshooting

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
No cooling	Blower does not, operate (a) GAUGE fuse blown (b) FL blown (c) Circuit breaker faulty (d) HEATER relay faulty (e) HEATER fuse blown (f) Blower motor faulty (g) Blower resistor faulty (h) Blower switch faulty (i) Wiring or ground faulty Magnetic clutch does not engage (a) FL (30A CDS) blown (b) Magnetic clutch relay faulty (c) Magnetic clutch faulty (d) A/C fuse faulty (e) A/C switch faulty (f) Thermistor faulty (g) A/C amplifier faulty (h) Revolution detecting sensor faulty (i) Pressure switch faulty (j) Wiring or ground faulty (k) Refrigerant empty Compressor does not rotate properly (a) Drive belt loose or broken (b) Compressor faulty Expansion valve faulty Leak i n system	Replace fuse and check for short Replace FL and check for short Check circuit breaker Check relay . Replace fuse and check for short Check blower motor Check blower resistor Check blower switch Repair as necessary Replace FL and check for short Check relay Check magnetic clutch Replace fuse and check for short Check switch Check thermistor Check amplifier Check sensor Check switch Repair as necessary Check refrigerant pressure Ajust or replace drive belt Check compressor Check expansion valve Test system for leaks	AC-4 to 11 AC-4 to 11 AC-4 to 11 BE-73 AC-4 to 11 BE-73 BE-72, 74 AC-4 to 11 AC-4 to 11 AC-37 AC-23 AC-4 to 11 AC-44 AC-43 AC-45 to 47 AC-24 AC-36 AC-4 to 11 AC-18, 22 AC-21 AC-23 AC-39 AC-42
Cool air comes out intermittently	Magnetic clutch slipping Expansion valve faulty Excessive moisture in the system Revolution detecting sensor faulty A/C amplifier faulty Wiring connection faulty	Check magnetic clutch Check expansion valve Evacuate and charge system Check sensor Check amplifier Repair as necessary	AC-23 AC-39 AC-24 AC-45 to 47 AC-4 to 11
Cool air comes out only at high speed	Condenser clogged Drive belt slipping Compressor faulty Insufficient or too much refrigerant Air i n system	Check condenser Check or replace drive belt Check compressor Check refrigerant volume Evacuate and charge system	AC-33 AC-21 AC-23 AC-22

* FL: Fusible Link

AIR CONDITIONING SYSTEM – Troubleshooting Refrigeration System

Problem	Possible cause	Remedy	Page
Insufficient cooling	Condenser clogged	Check condenser .	AC-33
	Drive belt slipping	Check or replace drive belt	AC-21
Insufficient velocity of cool air	Magnetic clutch faulty	Check magnetic clutch	AC-23
	Compressor faulty	Check compressor	AC-23
	Expansion valve faulty	Check expansion valve	AC-39
	Thermistor faulty	Check thermistor	AC-43
	A/C amplifier faulty	Check amplifier	AC-45 to 47
	Insufficient or too much refrigerant	Check refrigerant volume	AC-22
	Air or excessive compressor oil in system	Evacuate and charge system	
	Receiver clogged		
	Water valve cable set faulty	Check receiver	AC-32
		Reset water valve cable	BE-79
Insufficient velocity of cool air	Evaporator clogged or frosted	Clean evaporator fins or filters	AC-41
	Air leakage from cooling unit or air duct	Repair as necessary	AC-39 to 42
	Air inlet blocked		
	Blower motor faulty	Repair as necessary	AC-39 to 42
A/C switch indicator flashing	A/C amplifier faulty	Replace blower motor	AC-45 to 47
		Check amplifier	
A/C switch indicator flashing	Drive belt slipping	Check or replace drive belt	AC-21
	Revolution detecting sensor faulty (w/Power steering)	Check sensor	AC-24
	A/C amplifier faulty	Check amplifier	AC-45 to 47

Discharging of Refrigeration System Evacuating and Charging of Refrigeration System

(See Air Conditioning Fundamentals and Repairs Pub. No. 36950E)

AC-18

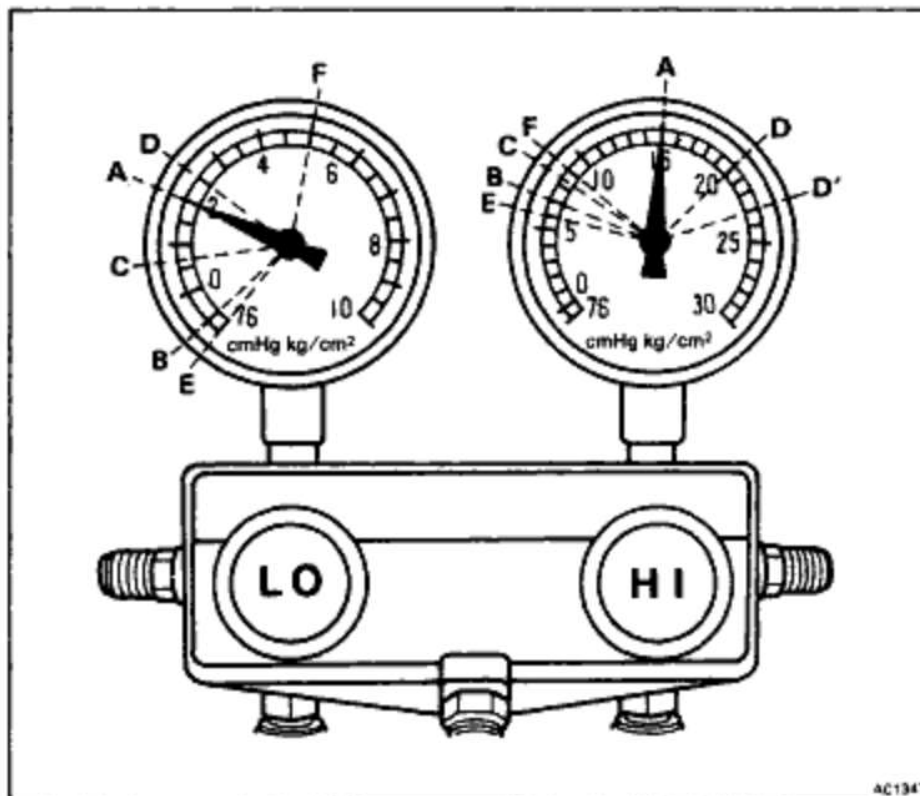
AIR CONDITIONING SYSTEM – Troubleshooting

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 1,500 rpm
- (c) Blower fan speed switch set at high speed
- (d) Temperature control lever set at cool side

HINT: 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 point 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 O
7	Refrigerant does not circulate	Does not cool! (cools from time to time in some cases)	E
8	Insufficient compression	Does not cool	F

AIR CONDITIONING SYSTEM – Troubleshooting

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 freeze 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 overcharged 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 HINT: 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 (3) 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

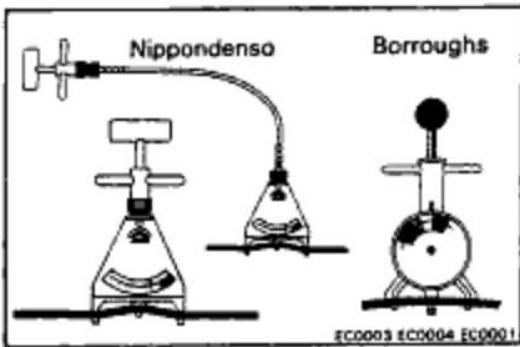
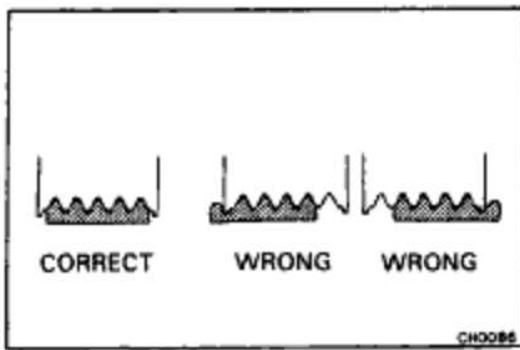
***NOTE at No.6**

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

AC-20

AIR CONDITIONING SYSTEM – Troubleshooting

No.	Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
7	Vacuum indicated at low pressure side, very low pressure indicated at high pressure side Frost or dew seen on piping before and after receiver and drier or expansion valve	Refrigerant flow obstructed by moisture or dirt in refrigerant freezing or adhering to expansion valve orifice Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube	Expansion valve orifice clogged Refrigerant does not flow	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-19. If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If unable to remove dirt, replace valve. Vacuum purge and charge new refrigerant to proper amount. For gas leakage from heat sensing tube, replace expansion valve.
8	Pressure too high at low pressure side Pressure too low at high pressure side	Internal leak in compressor	Compression defective Valve leaking or broken sliding parts (Piston, cylinder, gasket, etc. broken)	Repair or replace compressor



ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

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

NOTICE: Be careful not to damage the fins.

2. MAKE SURE THAT DRIVE BELT IS INSTALLED CORRECTLY

Check that the drive belt tits 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

Engine	New Belt	Used Belt
3S-FE	175 ± 5 lbs	130 ± 10 lbs
2ZZ-FE	175 ± 5 lbs	115 ± 20 lbs

HINT:

- "New belt" refer to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refer to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves.

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:

Engine	Standard idle-up rpm:
3S-FE	950 ± 50 rpm
2VZ-FE	800 ± 20 rpm

AC-22

AIR CONDITIONING SYSTEM – On-Vehicle Inspection

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-22](#))

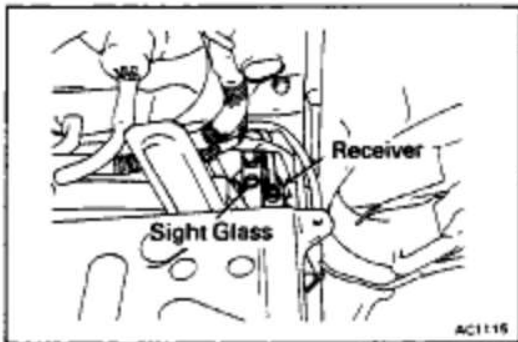
10. IF NO COOLING OR IT IS INSUFFICIENT, INSPECT FOR LEAKAGE

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

REFRIGERATION SYSTEM**Checking of Refrigerant Volume**

- 1. RUN ENGINE AT APPROX. 1,500 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	Empty, proper or too much	Refer to items 3 and 4

AC-22

AIR CONDITIONING SYSTEM – Refrigeration System

8. CHECK CONDENSER FAN MOTOR ROTATES**9. CHECK AMOUNT OF REFRIGERANT**

If you can see bubbles in the sight glass, additional refrigerant is needed.

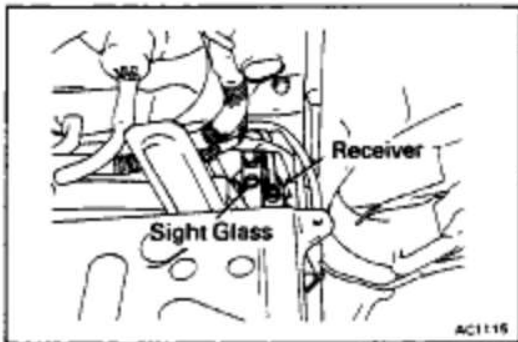
(See page [AC-22](#))

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

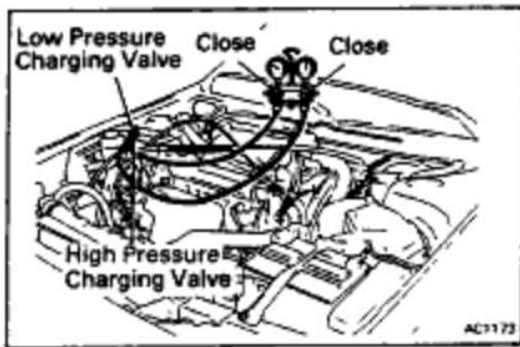
Using a gas leak tester, inspect each component of the refrigeration system.

REFRIGERATION SYSTEM**Checking of Refrigerant Volume****1. RUN ENGINE AT APPROX. 1,500 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	Empty, proper or too much	Refer to items 3 and 4



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.
HINT 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 APPROX. 1,500 RPM
3. CHECK COMPRESSOR FOR FOLLOWING:
 - (1) High pressure gauge reading is not lower and low pressure gauge reading is not higher than normal.
 - (b) Metallic sound
 - (e) Leakage from shaft seal

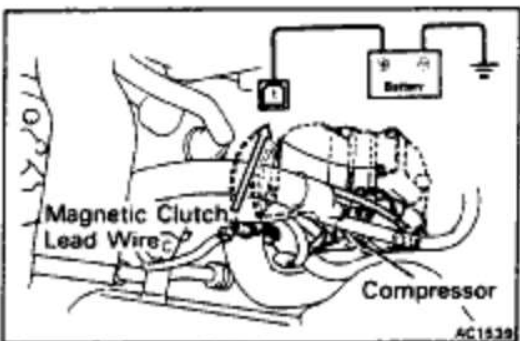
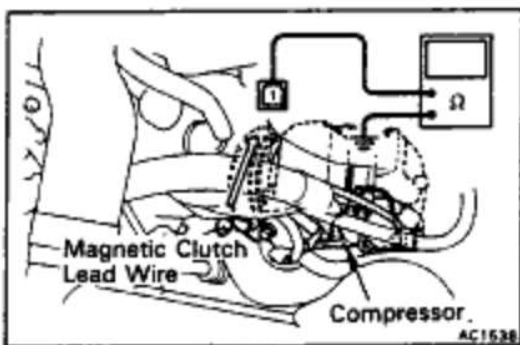
If defects are found, repair the compressor.
4. CHECK MAGNETIC CLUTCH
 - (a) Inspect the pressure plate, and the rotor for signs of oil.
 - (b) Check the clutch bearings for noise and grease leakage.
 - (e) Using an ohmmeter, measure the resistance of the stator coil between the clutch lead wire and ground.

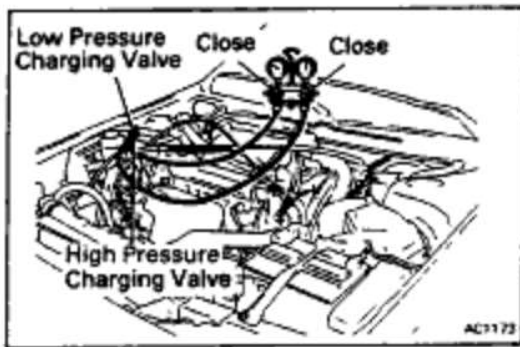
Standard resistance: 3.4 – 3.8 Ω at 20°C (68°F)

If resistance value 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.

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





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.
HINT Do not apply compressor oil to the seat of the connection.

COMPRESSOR

ON-VEHICLE INSPECTION

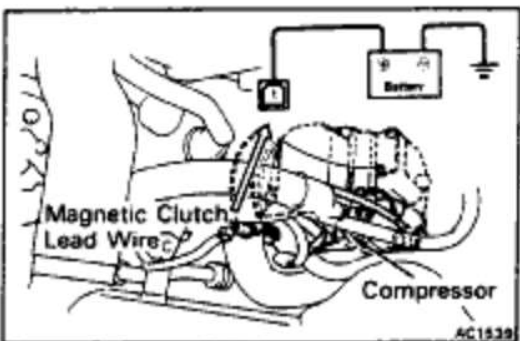
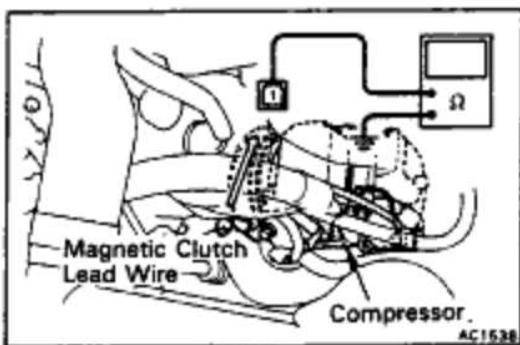
1. INSTALL MANIFOLD GAUGE SET
(See page AC-23)
2. RUN ENGINE AT APPROX. 1,500 RPM
3. CHECK COMPRESSOR FOR FOLLOWING:
 - (1) High pressure gauge reading is not lower and low pressure gauge reading is not higher than normal.
 - (b) Metallic sound
 - (e) Leakage from shaft seal
 If defects are found, repair 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.
 - (e) 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 value is not as specified, replace the coil.

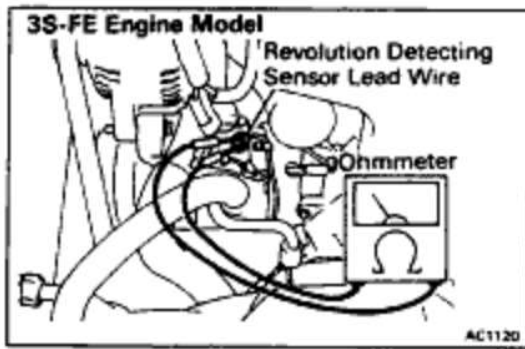
- (d) Connect the positive (+) lead from the battery to terminal 1, check that the magnetic clutch is energized. If magnetic clutch is not energized, replace the coil.

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



AC-24

AIR CONDITIONING SYSTEM – Compressor

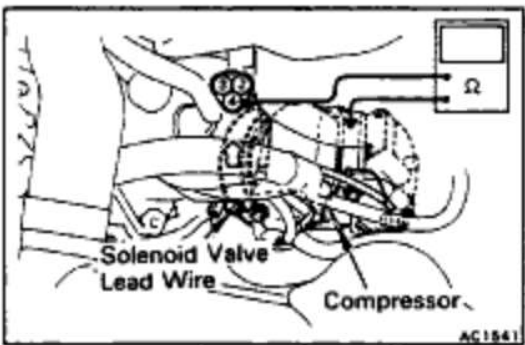
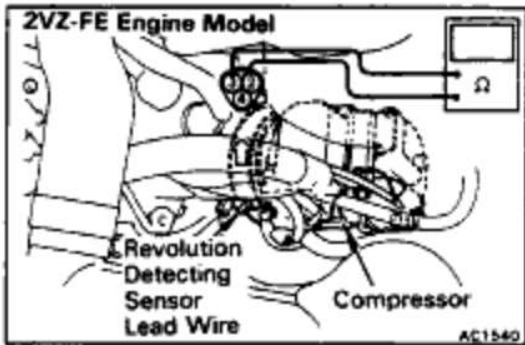


5. CHECK REVOLUTION DETECTING SENSOR

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

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

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



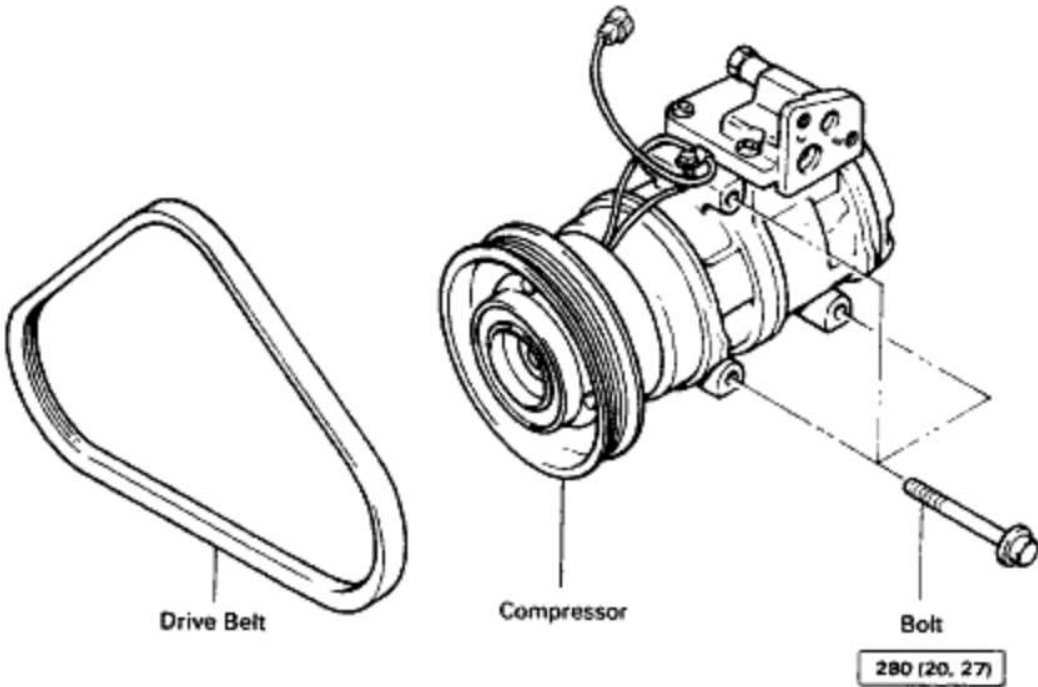
6. CHECK SOLENOID VALVE

Using an ohmmeter, check the continuity.

If continuity is not as specified, replace the valve.

REMOVAL OF COMPRESSOR

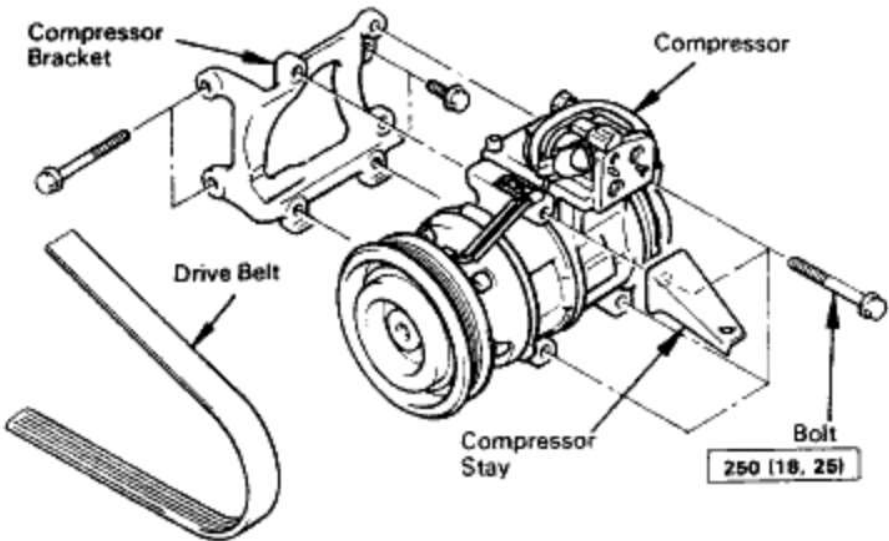
3S-FE Engine Model



kg-cm (ft-lb, N·m) : Specified torque

AC1826

2VZ-FE Engine Model

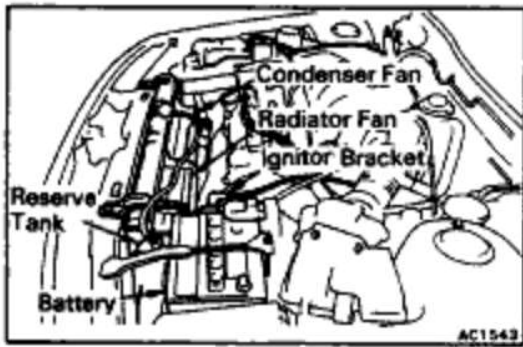


kg-cm (ft-lb, N·m) : Specified torque

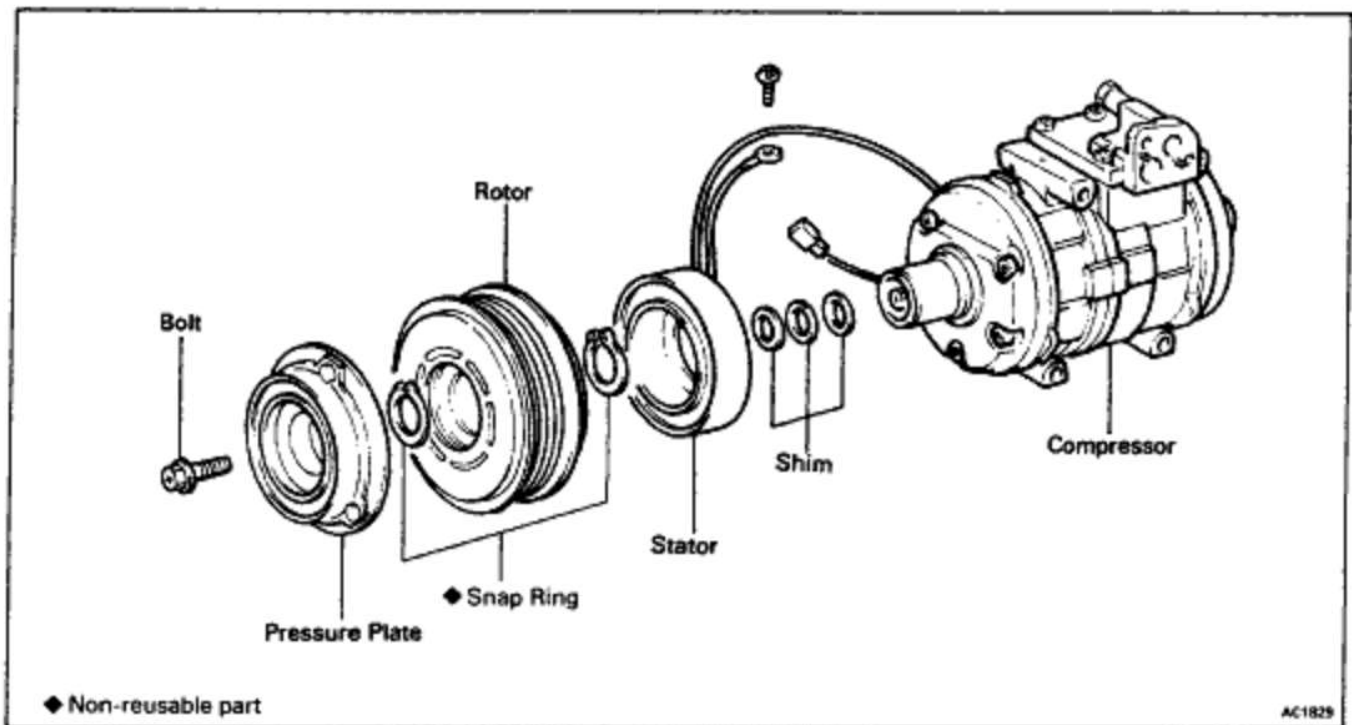
AC1825

AC-26

AIR CONDITIONING SYSTEM – Compressor



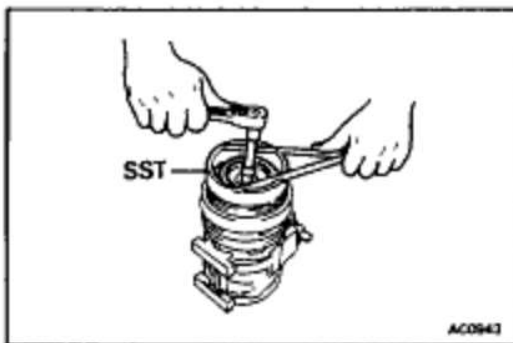
1. **RUN– ENGINE AT IDLE SPEED WITH AIR CONDITIONING ON FOR 10 MINUTES**
2. **STOP ENGINE**
3. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
4. **REMOVE BATTERY**
5. **(2VZ–FE ENGINE)**
REMOVE IGNITOR BRACKET, RADIATOR FAN AND CONDENSER FAN
6. **DISCONNECT CONNECTOR FOR MAGNETIC CLUTCH, TEMPERATURE SWITCH AND REVOLUTION DETECTING SENSOR**
7. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**
8. **DISCONNECT TWO HOSES FROM COMPRESSOR SERVICE VALVES**
Cap the open fitting immediately to keep moisture out of the system.
9. **REMOVE COMPRESSOR**
 - (a) Loosen the drive belt.
 - (b) Remove the compressor mounting bolts and the compressor.



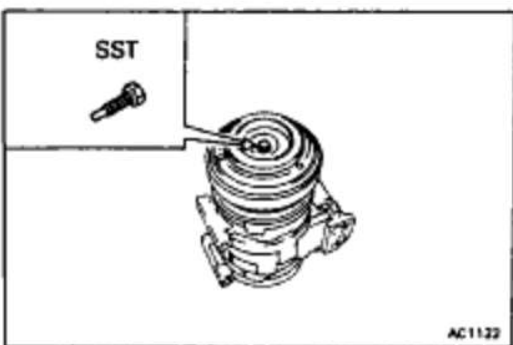
DISASSEMBLY OF MAGNETIC CLUTCH

1. REMOVE PRESSURE PLATE

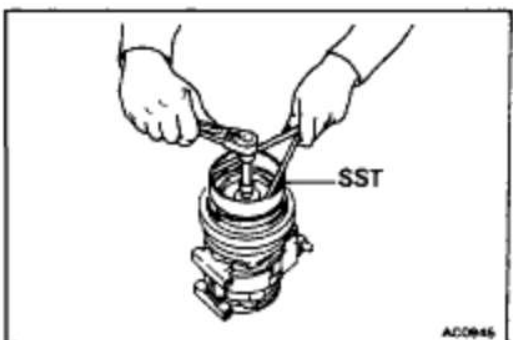
- (a) Using SST and a socket, remove the shaft bolt.
SST 07112-76060



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

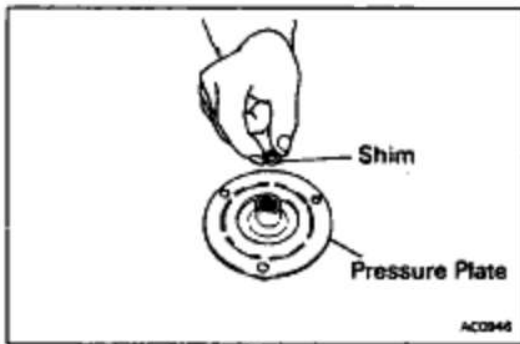


- (c) Using SST and the socket, remove the pressure plate.
SST 07112-76060

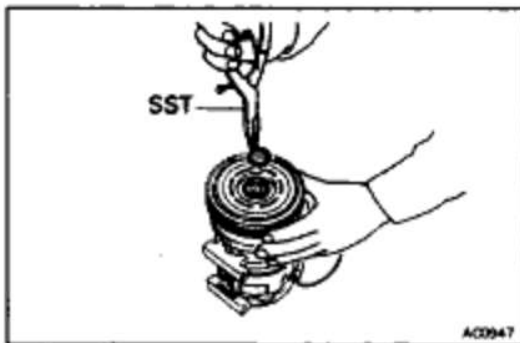


AC-28

AIR CONDITIONING SYSTEM – Compressor

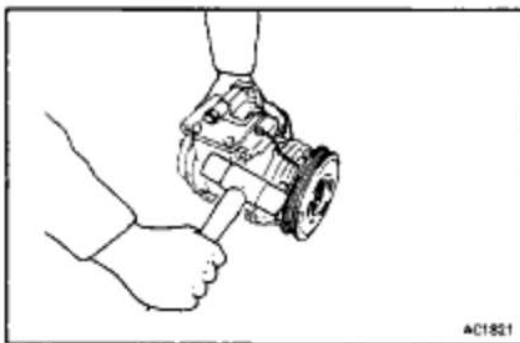


(d) Remove the shims from the pressure plate.



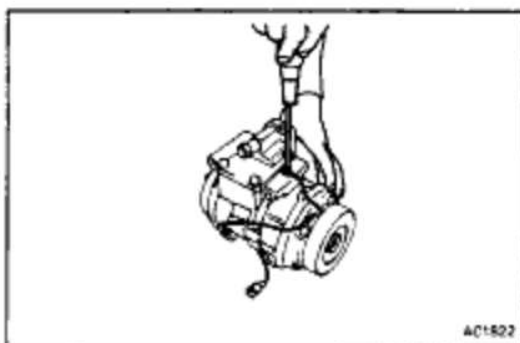
2. REMOVE ROTOR

(a) Using SST, remove the snap ring.
SST 07114-84020



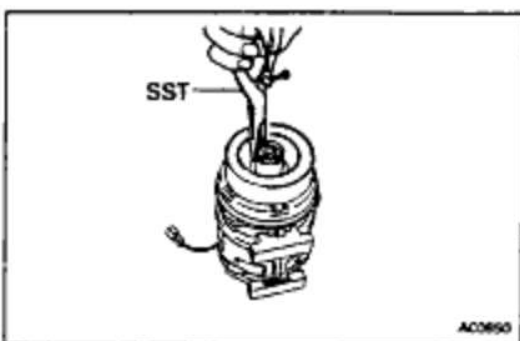
(b) Using a plastic hammer, tap the rotor off the shaft.

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

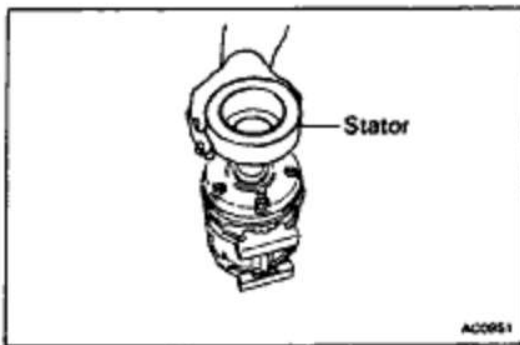


3. REMOVE STATOR

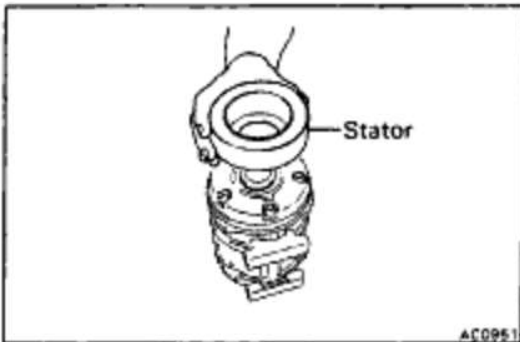
(a) Disconnect the stator lead wire from the compressor housing.



(b) Using SST, remove the snap ring.
SST 07114-84020



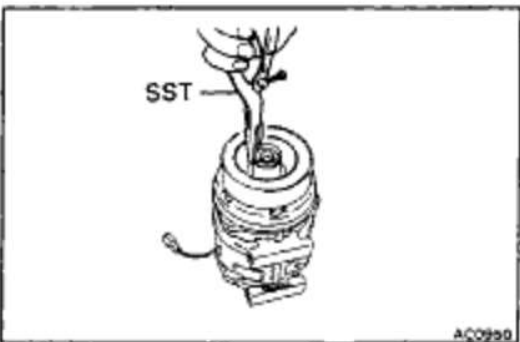
(c) Remove the stator.



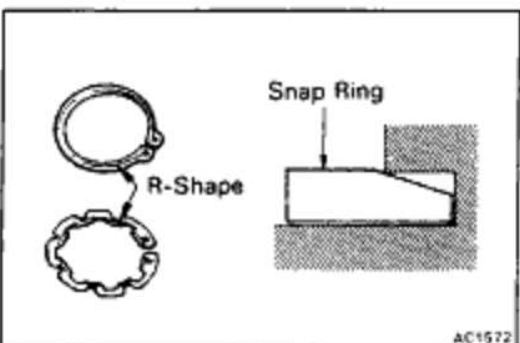
ASSEMBLY OF MAGNETIC CLUTCH

1. INSTALL STATOR

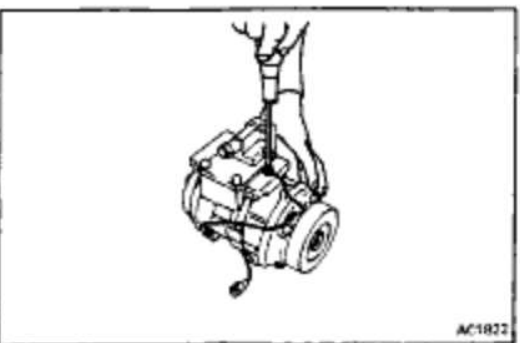
(a) Install the stator on the compressor.



(b) Using SST, install the new snap ring.
SST 07114-84020



NOTICE: The snap ring should be installed so that its R-shape looks up.



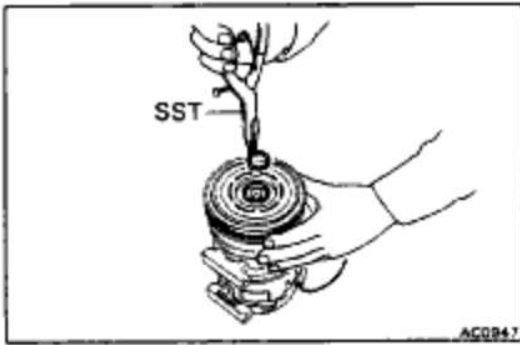
(c) Using SST and torque wrench, fasten the magnetic clutch lead wire to the cylinder block.

Torque: 35 kg-cm (30 in.-lb, 3.4 N-m)

SST 07110-61050

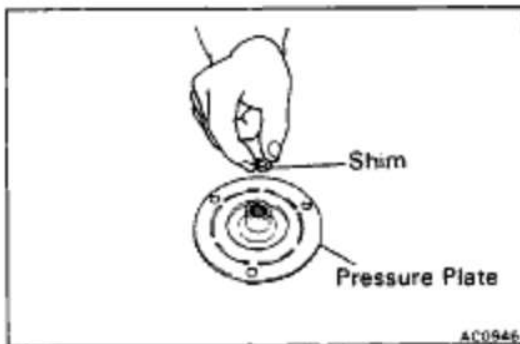
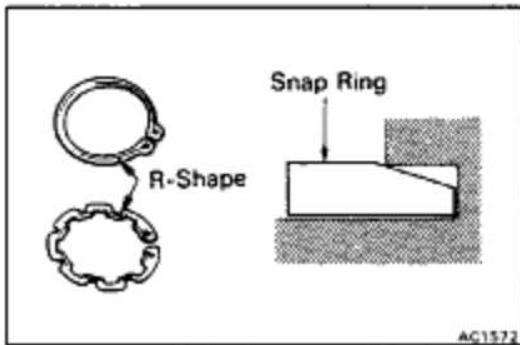
AC-30

AIR CONDITIONING SYSTEM – Compressor

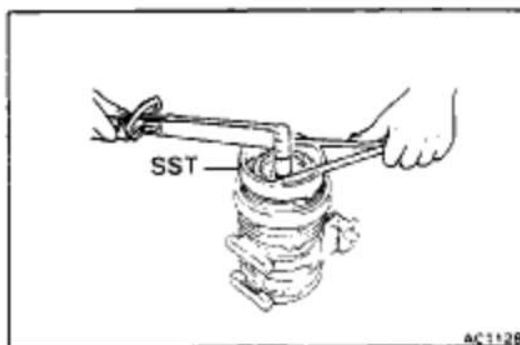
**2. INSTALL ROTOR**

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

NOTICE: The snap ring should be installed so that its R-shape looks up.

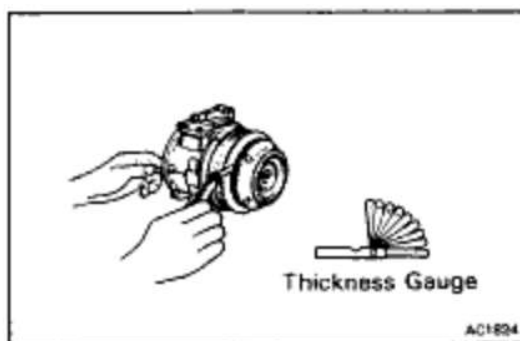
**3. INSTALL PRESSURE PLATE**

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



- (b) Using SST and torque wrench, install the shaft bolt.
- SST 07112-76064

Torque: 135 kg-cm (9.7 ft-lb, 13 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
(0.020 ± 0.0059 in.)**

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

INSTALLATION OF COMPRESSOR

(See page [AC-25](#))

1. INSTALL COMPRESSOR WITH FOUR MOUNTING BOLTS

Torque:

3S-FE engine 280 kg-cm (20 ft-lb, 27 N-m)

2VZ-FE engine 250 kg-cm (18 ft-lb, 25 N-m)

2. INSTALL DRIVE BELT(See steps 2 and 3 on page [AC-21](#))

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. (2VZ-FE ENGINE MODEL)

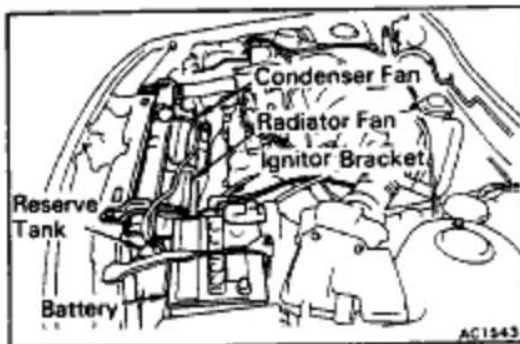
PLACE CONDENSER FAN, RADIATOR FAN AND IGNITOR BRACKET

6. INSTALL BATTERY AND 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-12](#))

ON-VEHICLE INSPECTION

CHECK SIGHT GLASS, FUSIBLE PLUG AND FITTINGS FOR LEAKAGE

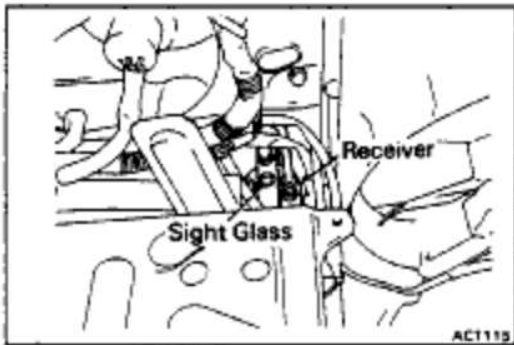
Use a gas leak tester. Repair as necessary.

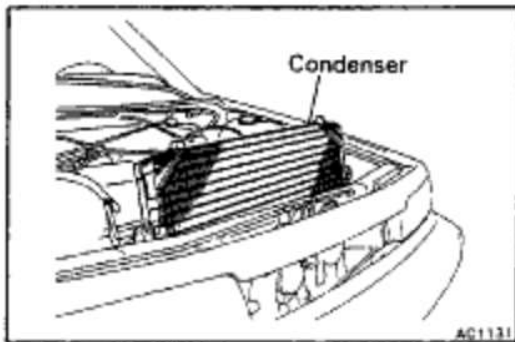
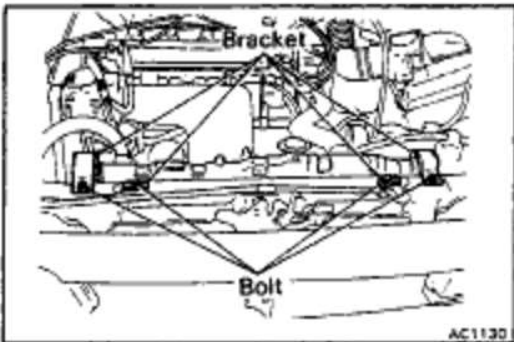
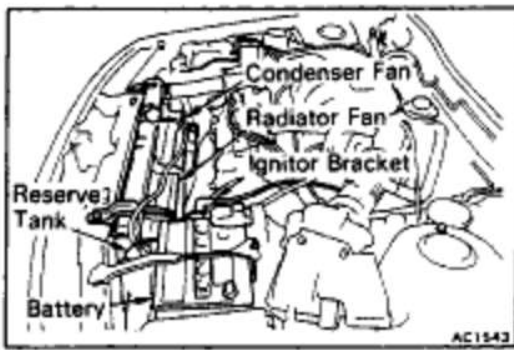
REMOVAL OF RECEIVER

1. **DISCHARGE REFRIGERATION SYSTEM**
2. **REMOVE BATTERY, RESERVE TANK AND IGNITOR BRACKET**
3. **DISCONNECT TWO LIQUID TUBES FROM RECEIVER**
HINT: Cap the open fittings immediately to keep moisture out of the system.
4. **REMOVE RECEIVER FROM RECEIVER HOLDER**

INSTALLATION OF RECEIVER

1. **INSTALL RECEIVER IN RECEIVER HOLDER**
HINT: Do not remove the blind plugs until ready for connection.
2. **CONNECT TWO LIQUID TUBES TO RECEIVER**
Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)
3. **REINSTALL IGNITOR BRACKET, RESERVE TANK AND BATTERY**
4. **IF RECEIVER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**
Add 20 cc (0.7 fl.oz.)
Compressor oil: **DENSO OIL 6,**
SUNISO NO. 5GS or equivalent
5. **EVACUATE AIR FROM AIR CONDITIONING SYSTEM**
6. **CHARGE AND CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK FOR GAS LEAKAGE**
Specified amount: 600 – 750 g (1.3 – 1.7 lb)





CONDENSER

(See page AC-12)

ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINES FOR BLOCKAGE OR DAMAGE

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

NOTICE: Be careful not to damage the fins.

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

2. CHECK CONDENSER FITTINGS FOR LEAKAGE

Repair as necessary.

REMOVAL OF CONDENSER

1. DISCHARGE REFRIGERATION SYSTEM

2. REMOVE BATTERY, IGNITOR BRACKET RADIATOR FAN, CONDENSER FAN

3. DISCONNECT LIQUID TUBE AND DISCHARGE HOSE FROM CONDENSER FITTINGS

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

4. REMOVE CONDENSER

Remove four brackets and four bolts.

INSTALLATION OF CONDENSER

(See page AC-12)

1. INSTALL CONDENSER

Install the brackets and bolts, making sure the rubber cushions fit on the mounting flanges correctly.

2. CONNECT LIQUID TUBE, DISCHARGE HOSE TO CONDENSER

Torque:

Liquid tube 130 kg-cm (9 ft-lb, 13 N-m)

Discharge hose 130 kg-cm (9 ft-lb, 13 N-m)

3. REINSTALL CONDENSER FAN, RADIATOR FAN IGNITOR BRACKET AND BATTERY

4. IF CONDENSER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

Add 40 – 50 cc (1.4 – 1.7 fl.oz.)

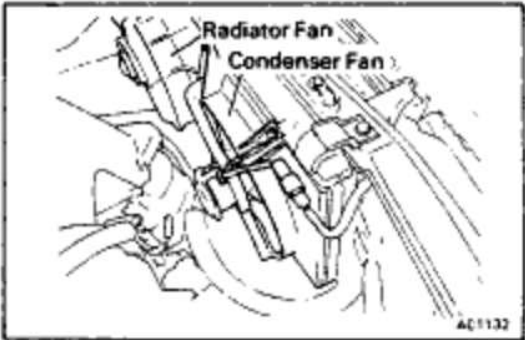
Compressor oil: DENSOIL 6,

SUNISO NO. 5GS or equivalent

5. EVACUATE AIR FROM AIR CONDITIONING SYSTEM

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

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



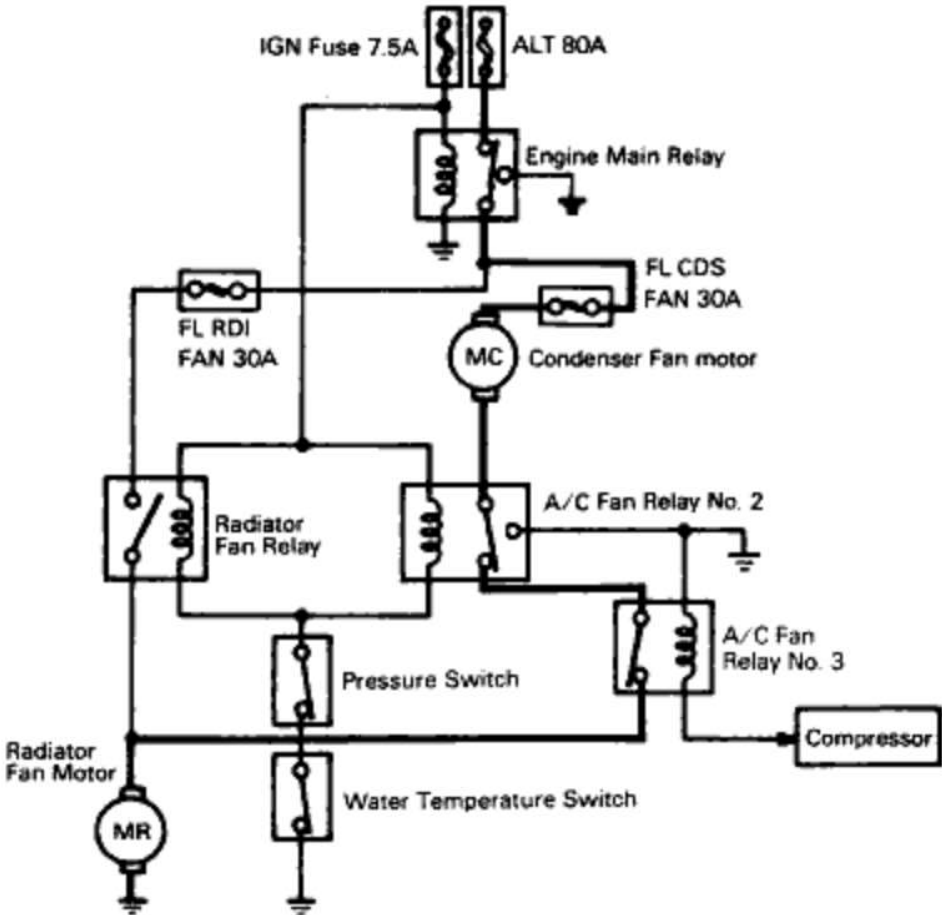
CONDENSER FAN MOTOR INSPECTION ON FAN MOTORS

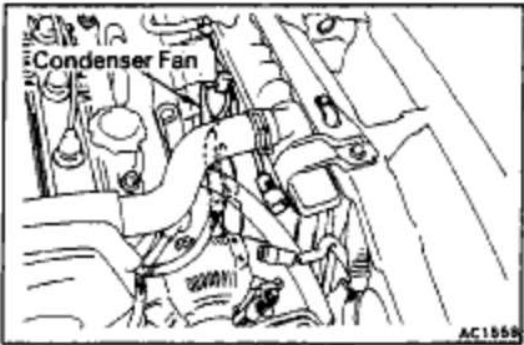
1. CHECK OPERATION OF FAN MOTOR

HINT: The fan motor operates at two speeds depending on the water temperature and the A/C switch.
3S-FE Engine Model

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	High
		90°C (194°F) or below	Low
ON	ON	90°C (194°F) or above or the refrigerant pressure is approx. 15.5 kg/cm ² (220 psi, 1,520 kPa) or greater	High

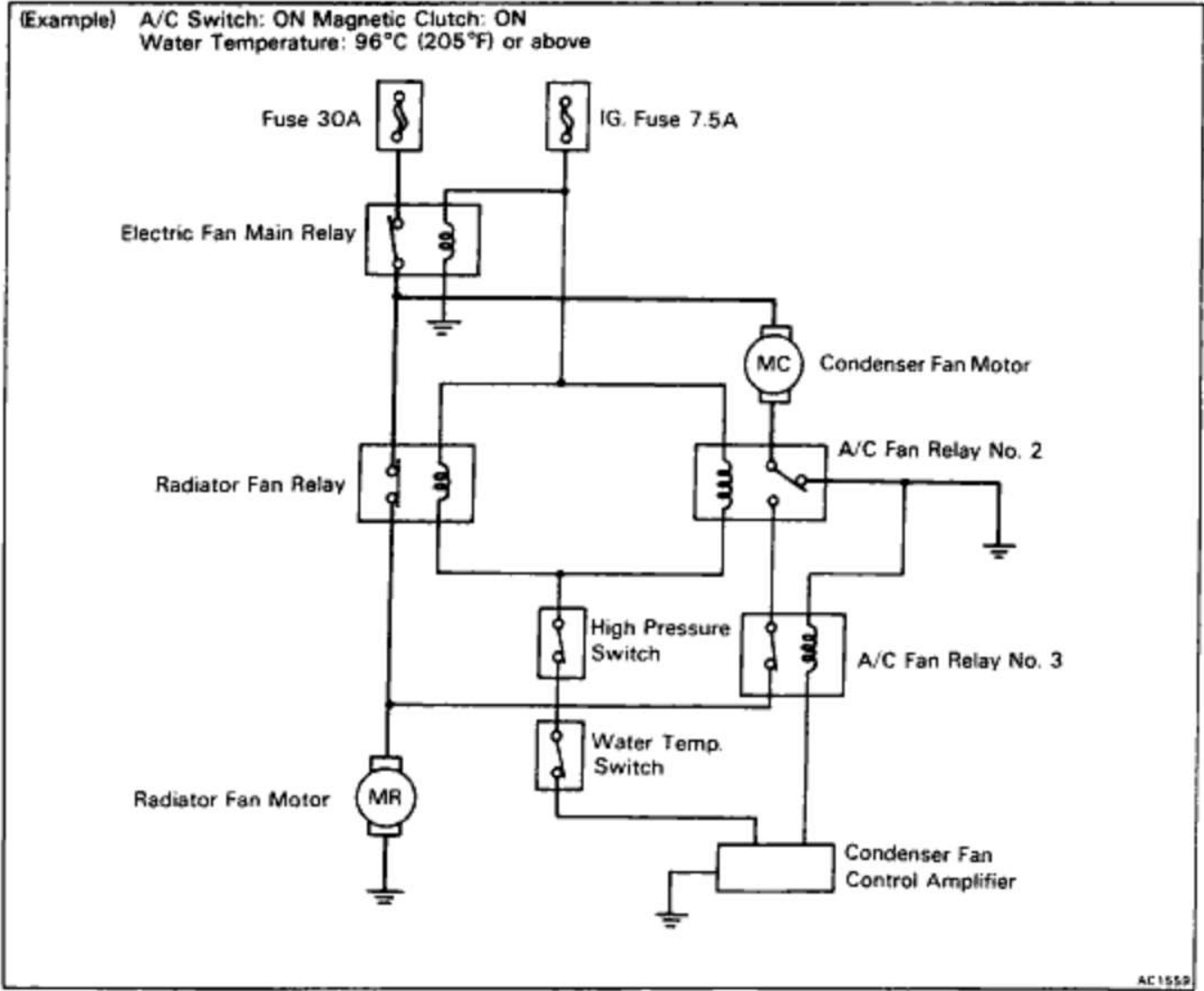
Example A/C Switch: ON Magnetic Clutch: ON Water Temperature: 90°C (194°F) or below
Fan Motor Speed: LOW





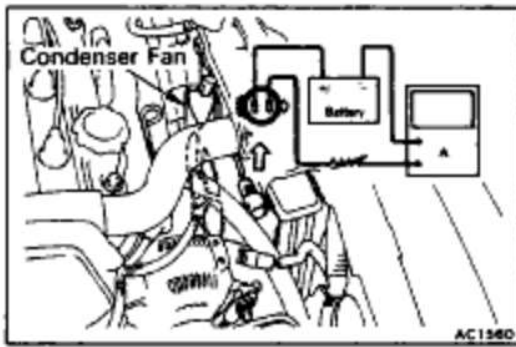
(2VZ-FE Engine Model)

A/C Switch	Magnetic Clutch	Water Temperature	Fan Motor Speed
OFF or ON	OFF	91 °C (196°F) or below	Off
		91 °C (196°F) – 96°C (205°F)	Low
		96°C (205°F) or above	High
ON	ON	91 °C (196°F) or below	Low
		96°C (205°F) or above or the refrigerant pressure is approx. 15.5 kg/cm2 (220psi, 1,520 kPa) or greater	High



AC-36

AIR CONDITIONING SYSTEM — Condenser Fan Motor



2. INSPECT FAN MOTOR

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

Standard current: 6.6 ± 0.8 A

If defective, replace the motor.

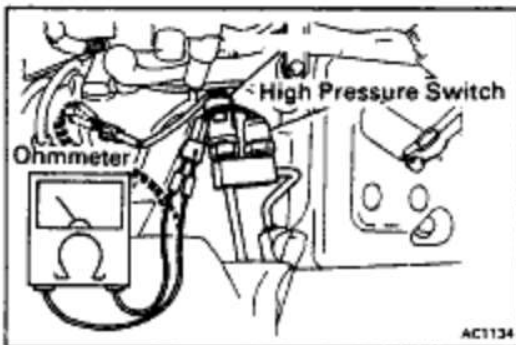
3. CHECK HIGH PRESSURE SWITCH

- Install manifold gauge set.
(See page AC-23)
- Check continuity between the two terminals of the pressure switch when refrigerant pressure is less than approx. 12.5 kg/cm² (178 psi, 1,226 kPa).
- Check that there is no continuity between two terminals of the pressure switch when refrigerant pressure is more than approx. 15.5 kg/cm² (220 psi, 1,520 kPa).

If continuity is not as specified, replace the switch.

4. CHECK WATER TEMPERATURE SWITCH

(See page AC-49)



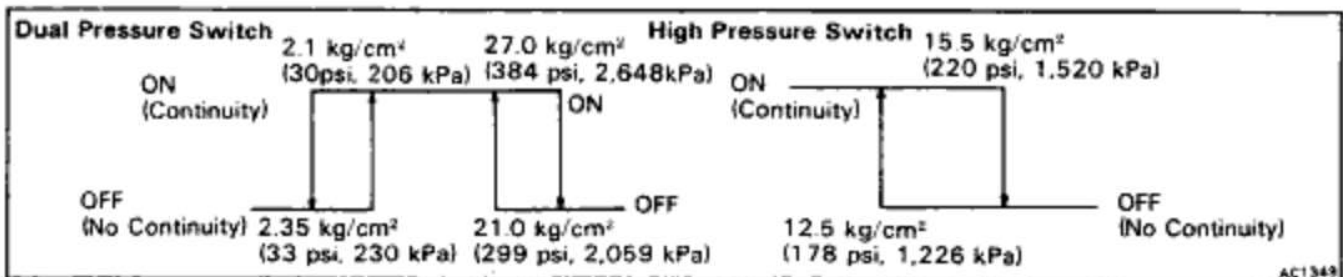
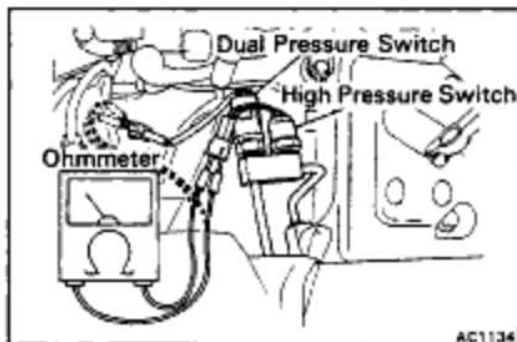
PRESSURE SWITCH

(See page AC-12)

ON-VEHICLE INSPECTION

- DISCONNECT CONNECTOR OF PRESSURE SWITCH
- INSPECT PRESSURE SWITCH

- Install the manifold gauge set.
- Observe the gauge reading.
- Check continuity between the two terminals of the pressure switch shown in the below.

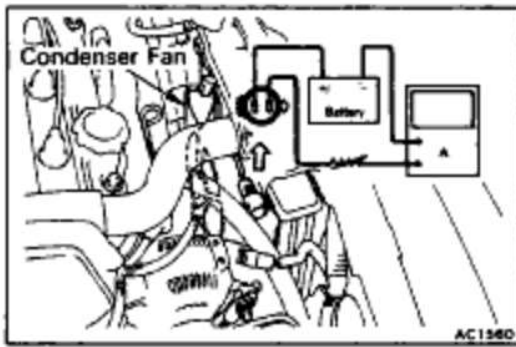


If defective, replace the pressure switch.

- CONNECT CONNECTOR OF PRESSURE SWITCH

AC-36

AIR CONDITIONING SYSTEM — Pressure Switch



2. INSPECT FAN MOTOR

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

Standard current: 6.6 ± 0.8 A

If defective, replace the motor.

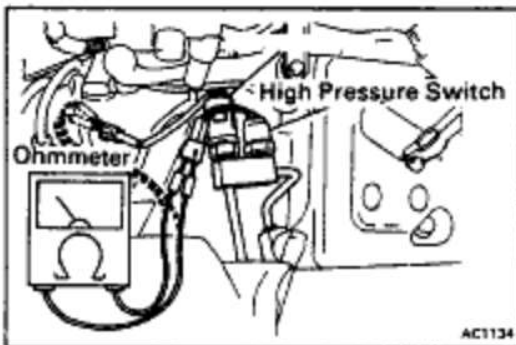
3. CHECK HIGH PRESSURE SWITCH

- Install manifold gauge set.
(See page AC-23)
- Check continuity between the two terminals of the pressure switch when refrigerant pressure is less than approx. 12.5 kg/cm² (178 psi, 1,226 kPa).
- Check that there is no continuity between two terminals of the pressure switch when refrigerant pressure is more than approx. 15.5 kg/cm² (220 psi, 1,520 kPa).

If continuity is not as specified, replace the switch.

4. CHECK WATER TEMPERATURE SWITCH

(See page AC-49)



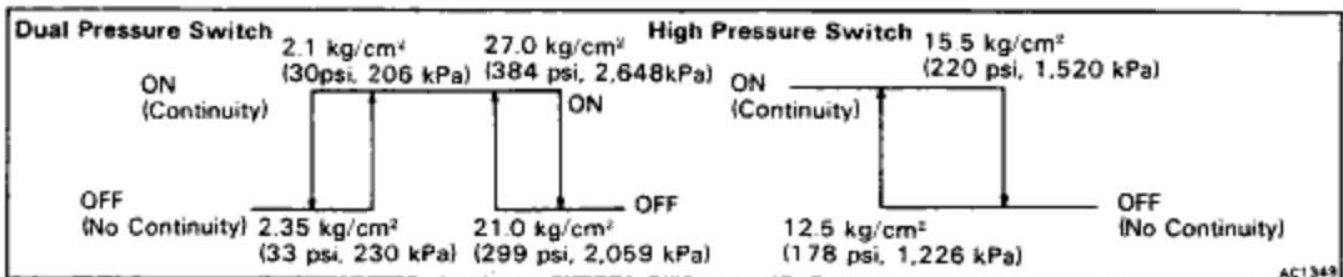
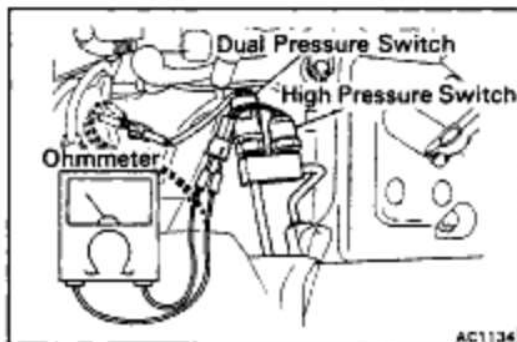
PRESSURE SWITCH

(See page AC-12)

ON-VEHICLE INSPECTION

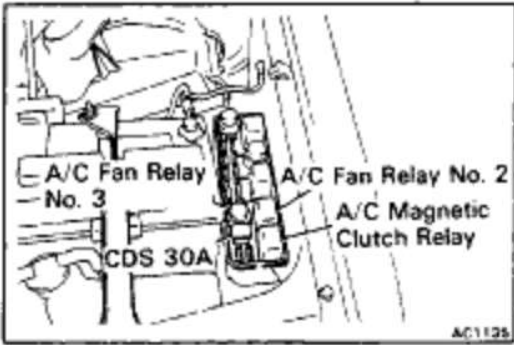
- DISCONNECT CONNECTOR OF PRESSURE SWITCH
- INSPECT PRESSURE SWITCH

- Install the manifold gauge set.
- Observe the gauge reading.
- Check continuity between the two terminals of the pressure switch shown in the below.



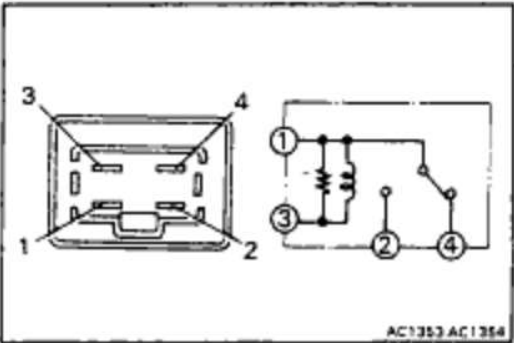
If defective, replace the pressure switch.

3. CONNECT CONNECTOR OF PRESSURE SWITCH



RELAYS
INSPECTION OF A/C RELAY

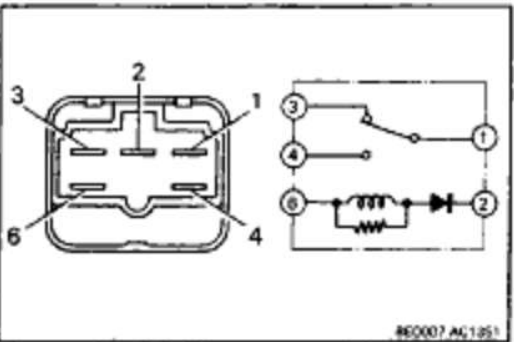
- 1. REMOVE COVER OF RELAY BOX
- 2. REMOVE RELAY
- 3. INSPECT RELAY CONTINUITY (Magnetic Clutch Relay)



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

If continuity is not as specified, replace the relay.

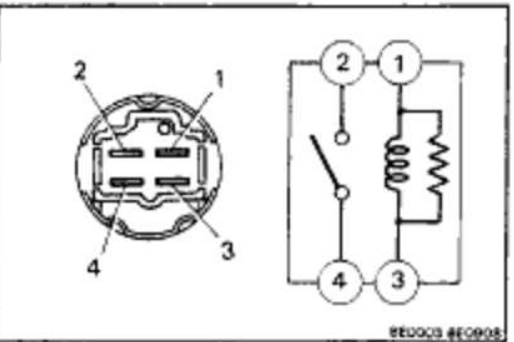
(A/C Fan Relay No. 2)



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

If continuity is not as specified, replace the relay.

(A/C Fan Relay No. 3)

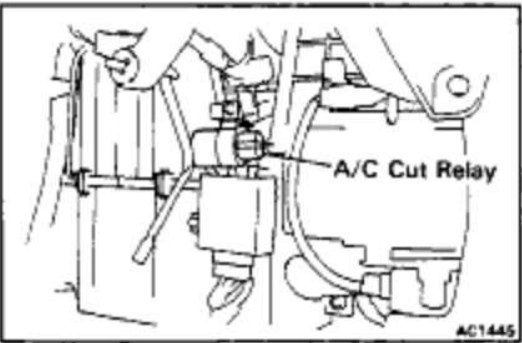


Terminal Condition	1	2	3	4
Constant				
Apply battery -voltage to terminal 1 and 3				

If continuity is not as specified, replace the relay.

AC-38

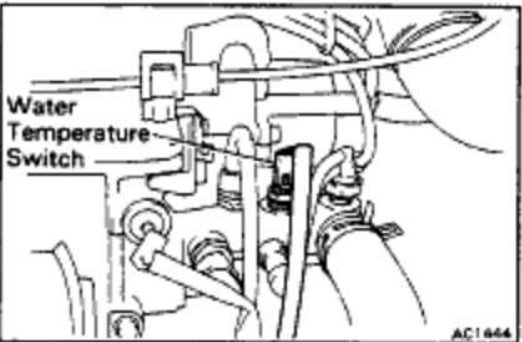
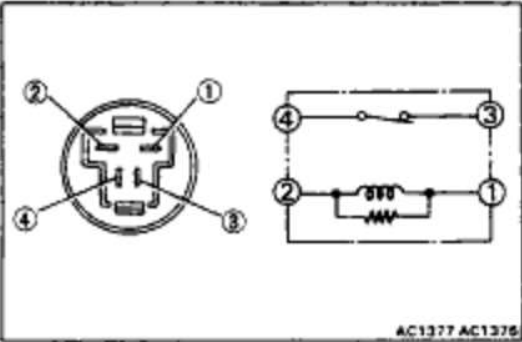
AIR CONDITIONING SYSTEM - Relays



All-Trac/4WD Model
(A/C Cut Relay)

Terminals	1	2	3	4
Condition				
Constant				
Apply battery voltage to terminal 1 and 2			No continuity	

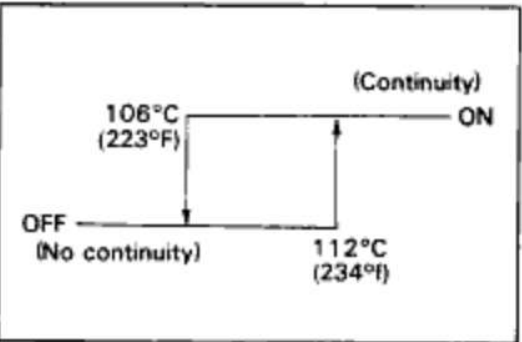
If continuity is not as specified, replace the relay.



WATER TEMPERATURE SWITCH

All-Trac/4WD Model
INSPECT SWITCH CONTINUITY

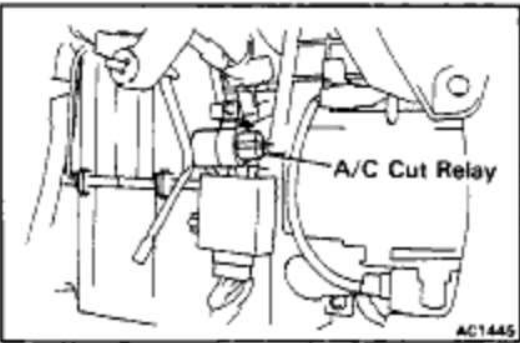
Inspect the switch continuity.



If defective, replace the water temperature switch.

AC-38

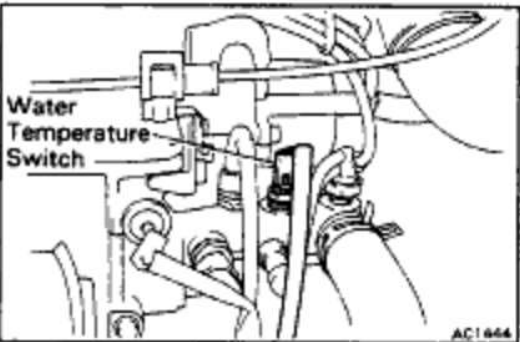
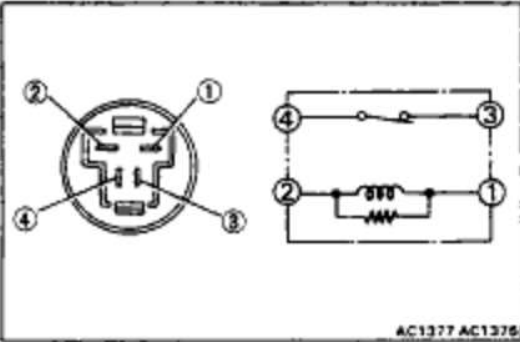
AIR CONDITIONING SYSTEM – Water Temperature Switch



All-Trac/4WD Model
(A/C Cut Relay)

Terminals	1	2	3	4
Condition				
Constant				
Apply battery voltage to terminal 1 and 2			No continuity	

If continuity is not as specified, replace the relay.

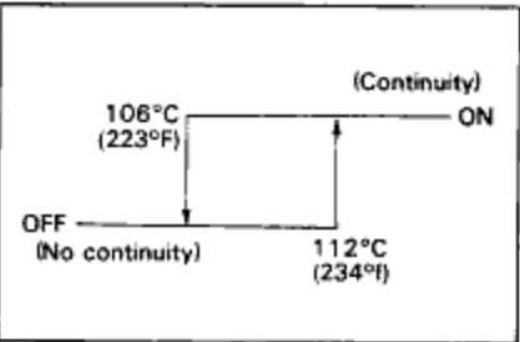


WATER TEMPERATURE SWITCH

All-Trac/4WD Model
INSPECT SWITCH CONTINUITY

Inspect the switch continuity.

If defective, replace the water temperature switch.

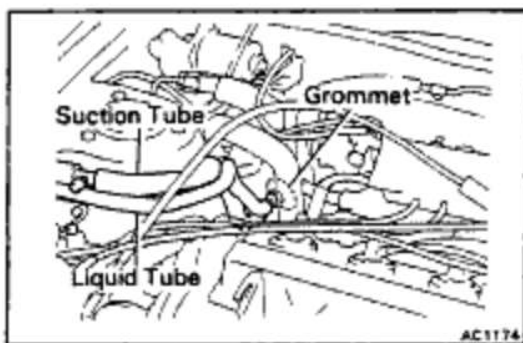
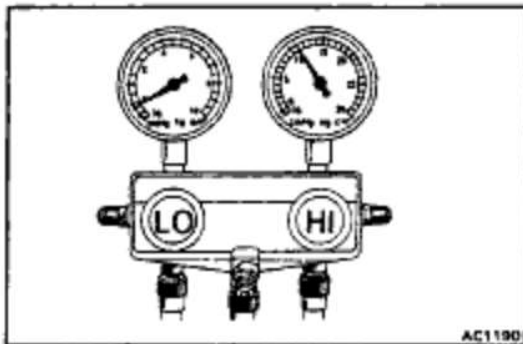


COOLING UNIT

(See page AC-12)

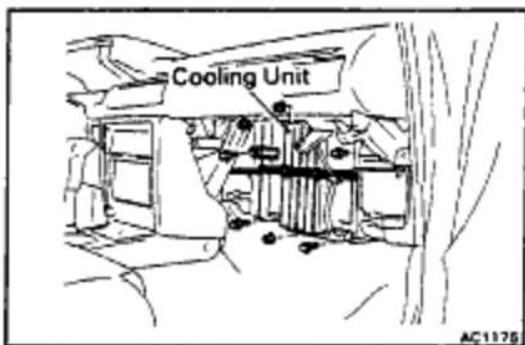
ON-VEHICLE INSPECTION OF EXPANSION VALVE

1. CHECK QUANTITY OF REFRIGERANT GAS DURING REFRIGERATION CYCLE
2. INSTALL MANIFOLD GAUGE SET
(See page AC-23)
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

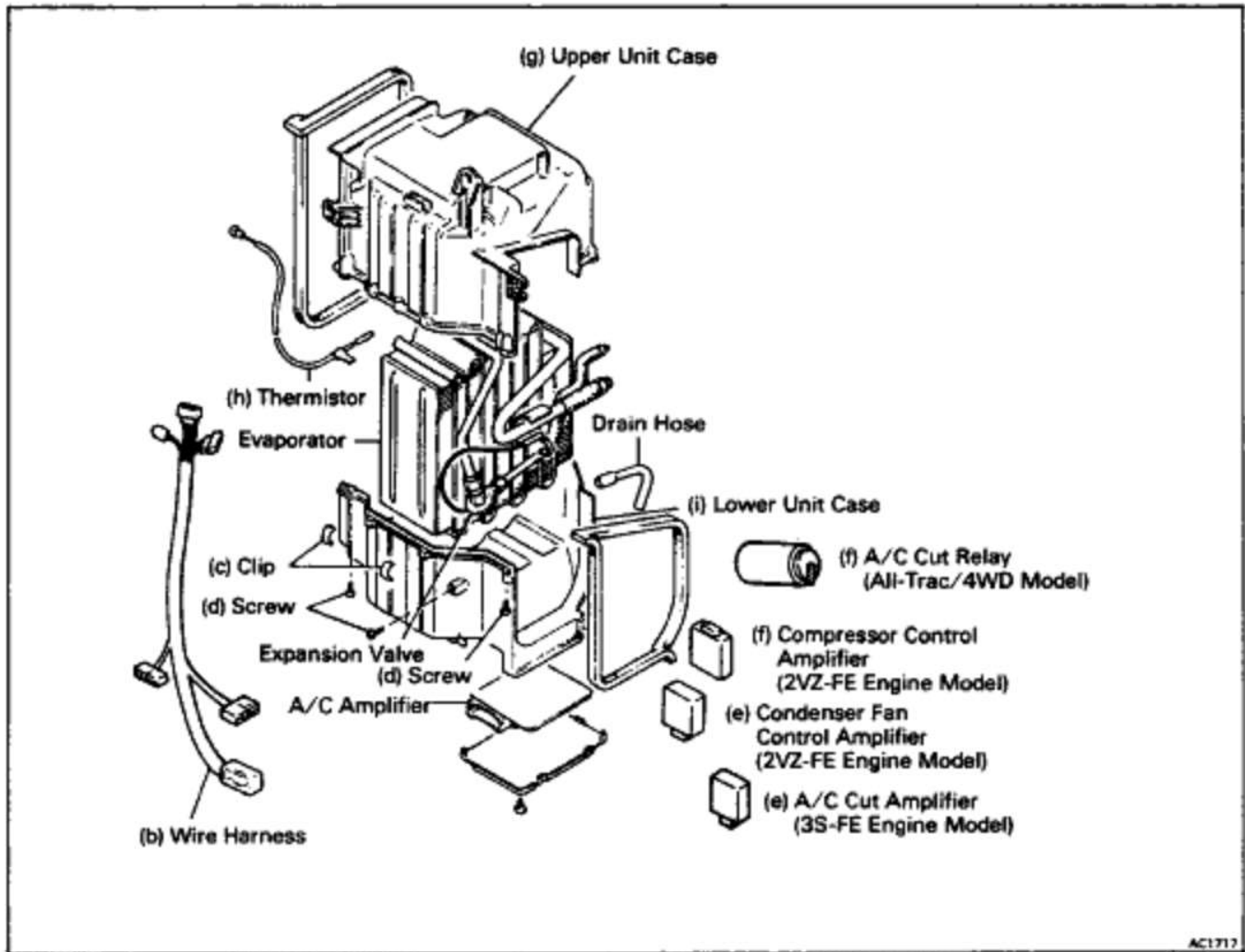
1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. DISCHARGE REFRIGERATION SYSTEM
3. DISCONNECT SUCTION TUBE FROM COOLING UNIT OUTLET FITTING
4. DISCONNECT LIQUID TUBE FROM COOLING UNIT INLET FITTING
HINT: Cap the open fittings immediately to keep moisture out of the system.
5. REMOVE GROMMETS FROM INLET AND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



AC-40

AIR CONDITIONING SYSTEM – Cooling Unit

DISASSEMBLY OF COOLING UNIT

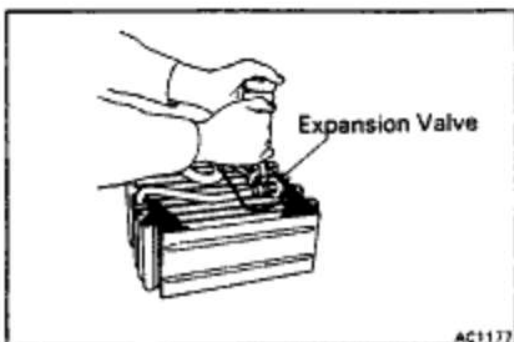


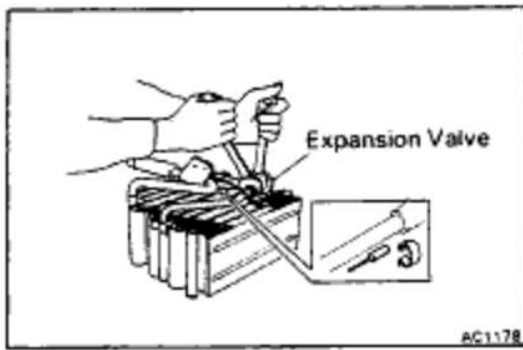
1. REMOVAL LOWER AND UPPER UNIT CASES

- Disconnect connectors.
- Remove wire harness.
- Remove four clips.
- Remove five screws.
- Remove condenser fan control amplifier (2VZ-FE E/G) or A/C cut amplifier (3S-FE E/G).
- Remove compressor control amplifier (2VZ-FE E/G) or A/C cut relay (All-Trac/4WD model).
- Remove upper unit case.
- Remove thermistor with thermistor holder.
- Remove lower unit case.

2. REMOVE EXPANSION VALVE

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





(c) Remove the expansion valve.

Evaporator

INSPECTION OF EVAPORATOR

1. CHECK EVAPORATOR FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

NOTICE: 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: 230 kg-cm (16 ft-lb, 22 N-m)

HINT: Be sure that the O-ring are positioned on the tube fitting.

(b) Install the holder to the suction tube with heat sensitzing tube.

(c) Connect the liquid tube to the inlet fitting of the expansion valve. Torque the nut.

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

(d) Install lower unit case to the evaporator.

(e) Install thermistor to the evaporator.

(f) Install upper unit case.

(g) Install four screws.

(h) Install four clips.

(i) Install wire harness.

(j) Install condenser fan control amplifier.

(k) Install compressor control amplifier.

(l) Connect connectors.

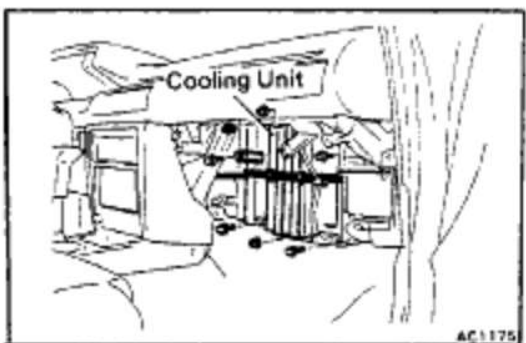
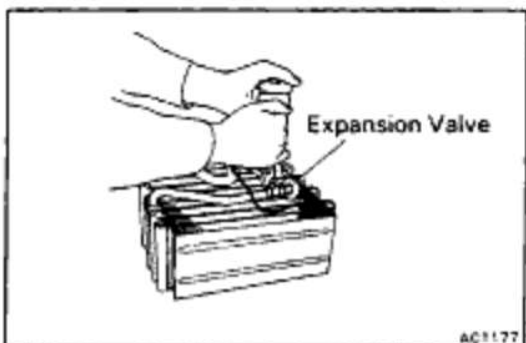
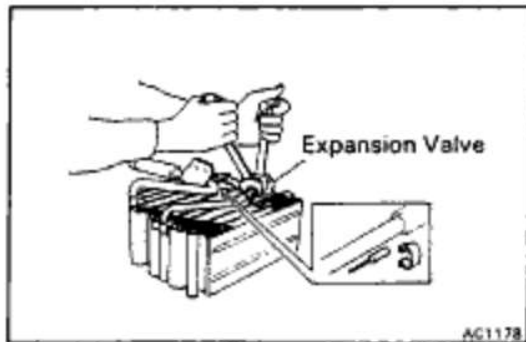
INSTALLATION OF COOLING UNIT

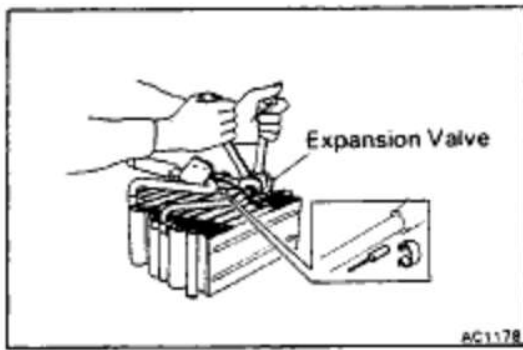
1. INSTALL COOLING UNIT

Install the cooling unit with three nuts and four bolts.

2. CONNECT CONNECTORS

3. INSTALL GLOVE BOX REINFORCEMENT





(c) Remove the expansion valve.

Evaporator

INSPECTION OF EVAPORATOR

1. CHECK EVAPORATOR FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

NOTICE: 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: 230 kg-cm (16 ft-lb, 22 N-m)

HINT: Be sure that the O-ring are positioned on the tube fitting.

(b) Install the holder to the suction tube with heat sensitzing tube.

(c) Connect the liquid tube to the inlet fitting of the expansion valve. Torque the nut.

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

(d) Install lower unit case to the evaporator.

(e) Install thermistor to the evaporator.

(f) Install upper unit case.

(g) Install four screws.

(h) Install four clips.

(i) Install wire harness.

(j) Install condenser fan control amplifier.

(k) Install compressor control amplifier.

(l) Connect connectors.

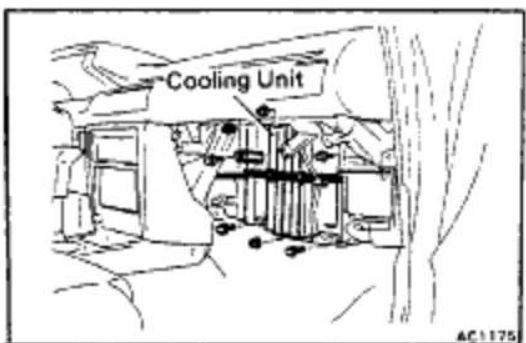
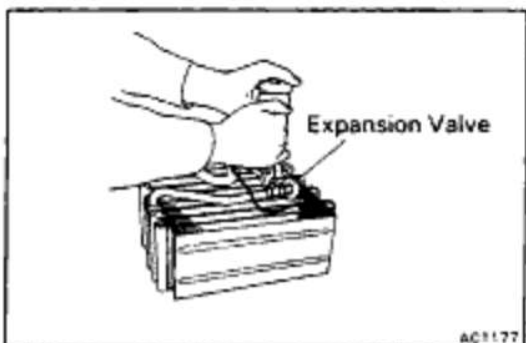
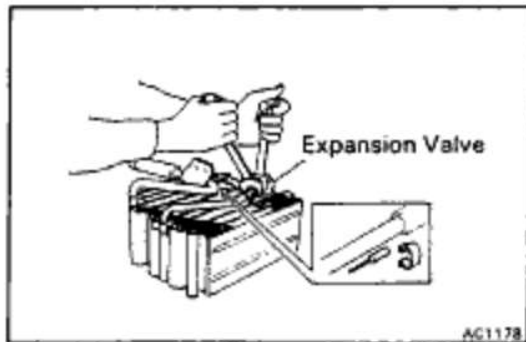
INSTALLATION OF COOLING UNIT

1. INSTALL COOLING UNIT

Install the cooling unit with three nuts and four bolts.

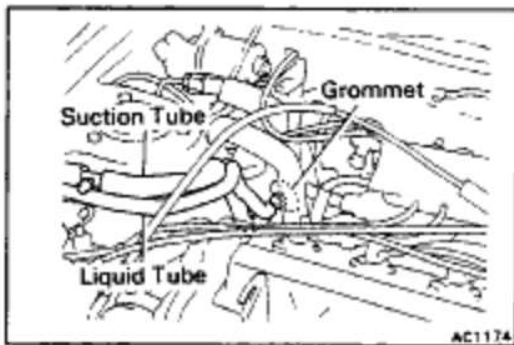
2. CONNECT CONNECTORS

3. INSTALL GLOVE BOX REINFORCEMENT



AC-42

AIR CONDITIONING SYSTEM – Cooling Unit



4. **INSTALL GROMMETS ON INLET AND OUTLET FITTINGS**
5. **CONNECT LIQUID TUBE TO COOLING UNIT INLET FITTING**
Torque the nut.
Torque: 140 kg-cm (10 ft-lb, 14 N-m)
6. **CONNECT SUCTION TUBE TO COOLING UNIT OUTLET FITTING**
Torque the nut.
Torque: 330 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.)
Compressor oil: 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 FOR GAS LEAKAGE**
Specified amount: 600 – 700 g (1.3 – 1.7 lb)

REFRIGERANT LINES

(See page [AC-12](#))

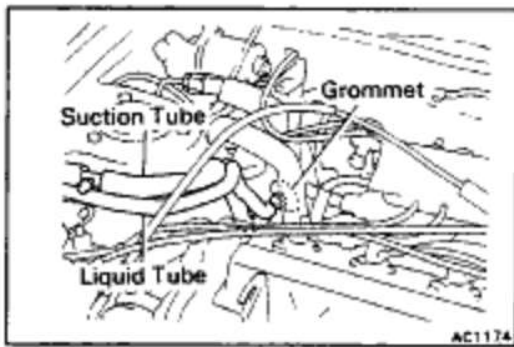
1. **INSPECT HOSES AND TUBES FOR LEAKAGE**
Use a gas leak detector. Replace, if necessary.
2. **CHECK THAT HOSE AND TUBE CLAMPS ARE NOT LOOSE**
Tighten or replace as necessary.

REPLACEMENT OF REFRIGERANT LINES

1. **DISCHARGE REFRIGERATION SYSTEM**
2. **REPLACE FAULTY TUBE OR HOSE**
HINT: Cap the open fitting immediately to keep moisture out of the system.
3. **TIGHTENING TORQUE FOR O-RING AND BOLTED TYPE FITTINGS**
(See page [AC-12](#))
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)

AC-42

AIR CONDITIONING SYSTEM – Refrigerant Lines



4. **INSTALL GROMMETS ON INLET AND OUTLET FITTINGS**
5. **CONNECT LIQUID TUBE TO COOLING UNIT INLET FITTING**
Torque the nut.
Torque: 140 kg-cm (10 ft-lb, 14 N-m)
6. **CONNECT SUCTION TUBE TO COOLING UNIT OUTLET FITTING**
Torque the nut.
Torque: 330 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.)
Compressor oil: 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 FOR GAS LEAKAGE**
Specified amount: 600 – 700 g (1.3 – 1.7 lb)

REFRIGERANT LINES

(See page [AC-12](#))

1. **INSPECT HOSES AND TUBES FOR LEAKAGE**
Use a gas leak detector. 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**
HINT: Cap the open fitting immediately to keep moisture out of the system.
3. **TIGHTENING TORQUE FOR O-RING AND BOLTED TYPE FITTINGS**
(See page [AC-12](#))
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)

THERMISTOR

(See page AC-40)

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

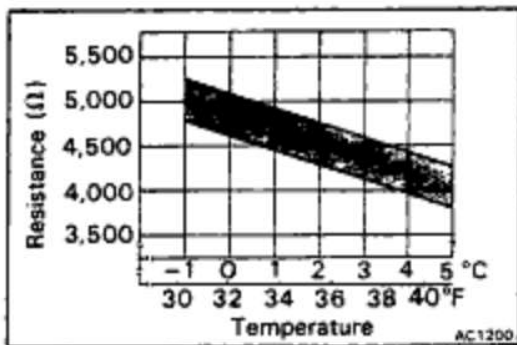
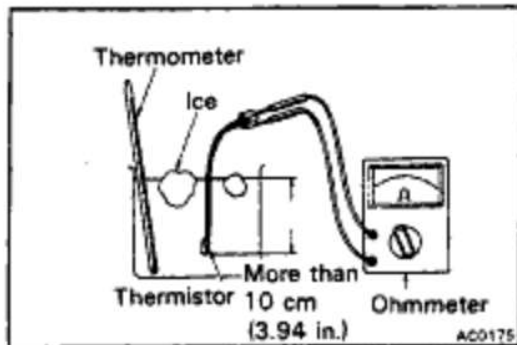
- (a) Disconnect the connector.
- (b) Remove the screw and thermistor from the cooling unit.

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.



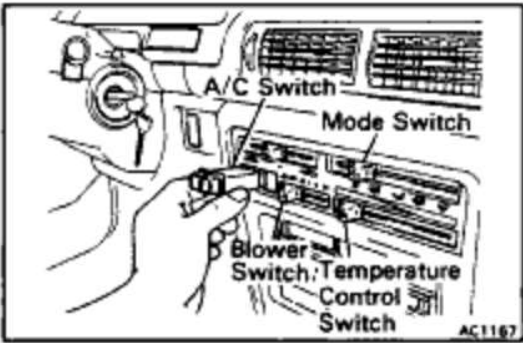
INSTALLATION OF THERMISTOR

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



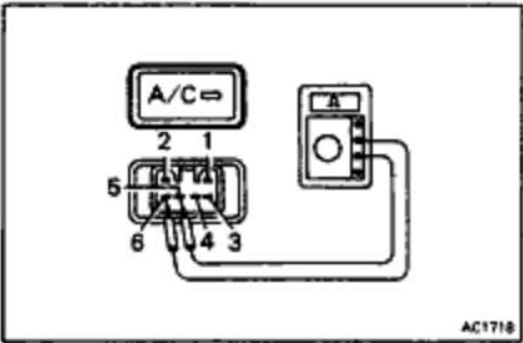
AC SWITCH (Lever Type)

(See page AC-12)

ON-VEHICLE INSPECTION

- 1. DISCONNECT NEGATIVE CABLE FROM BATTERY
- 2. REMOVE A/C SWITCH
- 3. CHECK A/C SWITCH FOR CONTINUITY

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



Terminal	2	3	5	6	Illumination	
Switch position					1	4
OFF						
A/C						

HINT: When checking for continuity in circuits which contain an LED, please observe the following instructions.

- (a) Use a tester with a power source of 3V or greater to overcome the circuit resistance.
- (b) If a suitable tester is not available, apply battery voltage and check that the LED lights up.

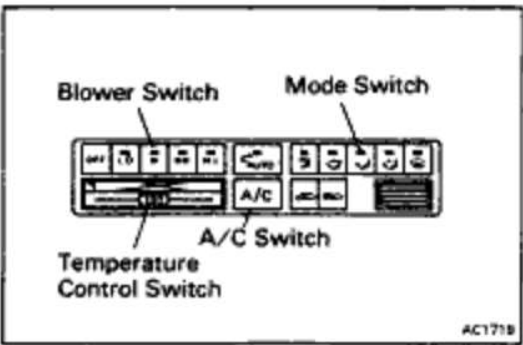
If there is no continuity as specified, replace the A/C switch.

- 4. INSTALL A/C SWITCH
- 5. CONNECT NEGATIVE CABLE TO BATTERY

A/C SWITCH (Push Type)

- 1. DISCONNECT NEGATIVE CABLE FROM BATTERY
- 2. REMOVE HEATER CONTROL ASSEMBLY
- 3. DISCONNECT HEATER CONTROL CONNECTOR
- 4. CHECK A/C SWITCH CONTINUITY

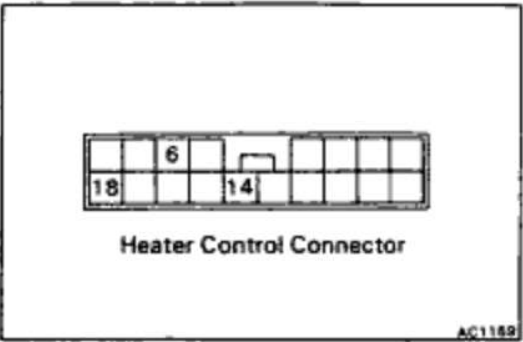
Using an ohmmeter, check continuity between the terminals for each switch position as shown in the table.

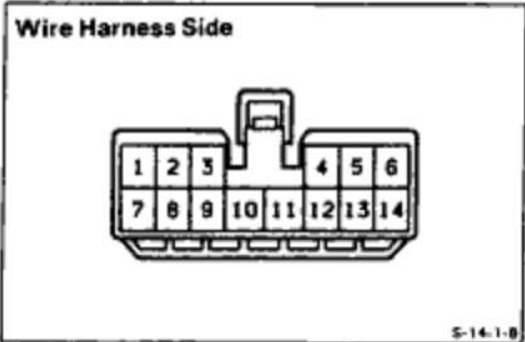


Terminal	6	14
Switch position		
OFF		
A/C		

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

- 5. CONNECT HEATER CONTROL CONNECTOR
- 6. INSTALL HEATER CONTROL ASSEMBLY
- 7. CONNECT NEGATIVE CABLE TO BATTERY





AMPLIFIERS

Inspection of Amplifier

(See page AC-12)

Air Conditioner 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: ON
- (2) Temperature control lever: MAX. COOL
- (3) Blower switch: HI

3S-FE Engine Model

Check for	Tester connection	Condition	Specified value
Continuity	10 — Ground	Constant	Continuity
Voltage	4 — 10	Turn A/C switch on.	Battery voltage
		Turn A/C switch off.	No voltage
	1 — 10	Turn A/C switch on.	Battery voltage
		Turn A/C switch off.	No voltage
Voltage	2 — 10	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	6 — 10	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	8 — 10	Start engine.	4approx. 10 to 14 V
		Stop engine.	No voltage
	5 — 10	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
Resistance	3 — 9	Constant	ApProx. 1.7 kΩ at 25°C (77°F)
	9 — 13	Constant	ApproX. 250 Ω

If circuit is as specified, replace the amplifier.

AC-46

AIR CONDITIONING SYSTEM – Amplifiers

2VZ-FE Engine Model

Check for	Tester connection	Condition	Specified value
Continuity	3 — Ground	Constant	Continuity
Voltage	14 — Ground	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	11 — Ground	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
	2 — Ground	Turn A/C switch on.	Battery voltage
		Turn A/C switch off.	No voltage
	10 — Ground	Turn A/C switch on.	Battery voltage
		Turn A/C switch off.	No voltage
Resistance	7 — Ground	Start engine.	Approx. 10 to 14 V
		Stop engine.	No voltage
	5 — 9	Constant	Approx. 1.5 k Ω at 27°C (77°F)
	8 — 9	Constant	Approx. 250 Ω

If the circuit is as specified, replace the amplifier.

Wire Harness Side



Condenser Fan Control Amplifier

INSPECT AMPLIFIER CIRCUIT

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

Check for	Tester connection	Condition	Specified value
Continuity	1 — Ground	Constant	Continuity
	2 — Ground	Constant	Continuity
	5 — Ground	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

If circuit is as specified, replace the amplifier.

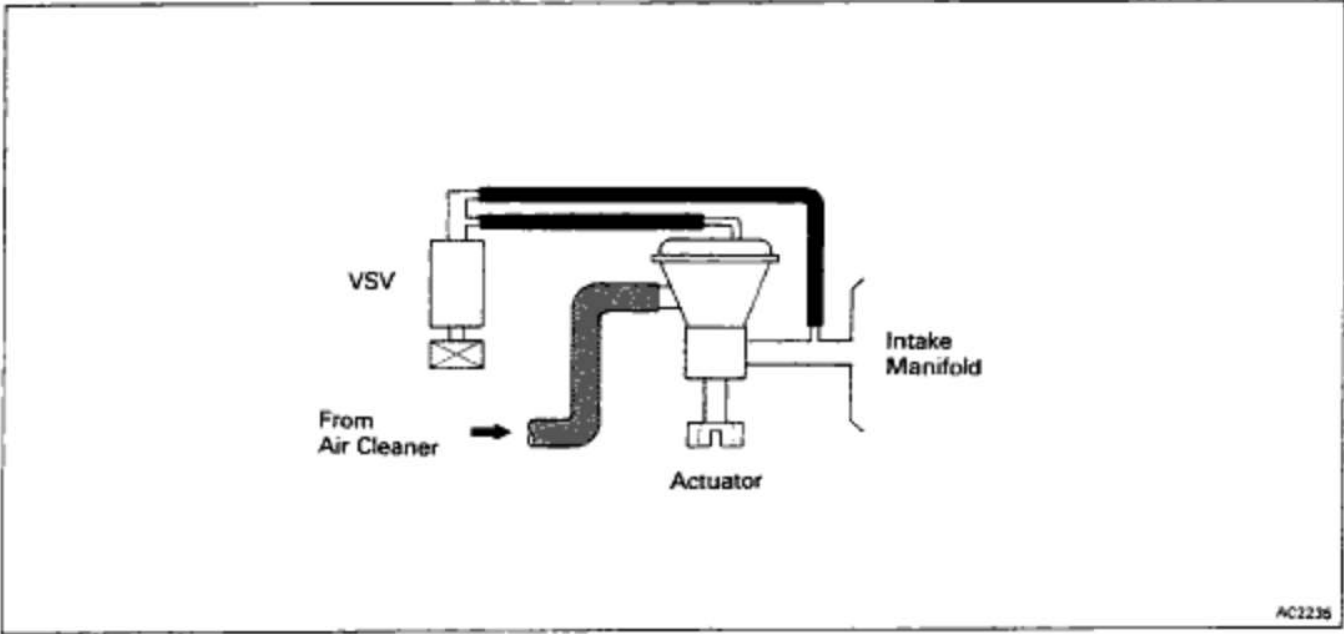


Compressor Control Amplifier
INSPECT AMPLIFIER CIRCUIT

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

Check for	Tester connection	Condition	Specified value
Continuity	6 – Ground	Constant	Continuity
Voltage	3 – Ground	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
Resistance	5–7	Constant	Approx. 4.4 kΩ 25°C(77°F)

VACUUM HOSE CIRCUIT (3S-FE Engine)



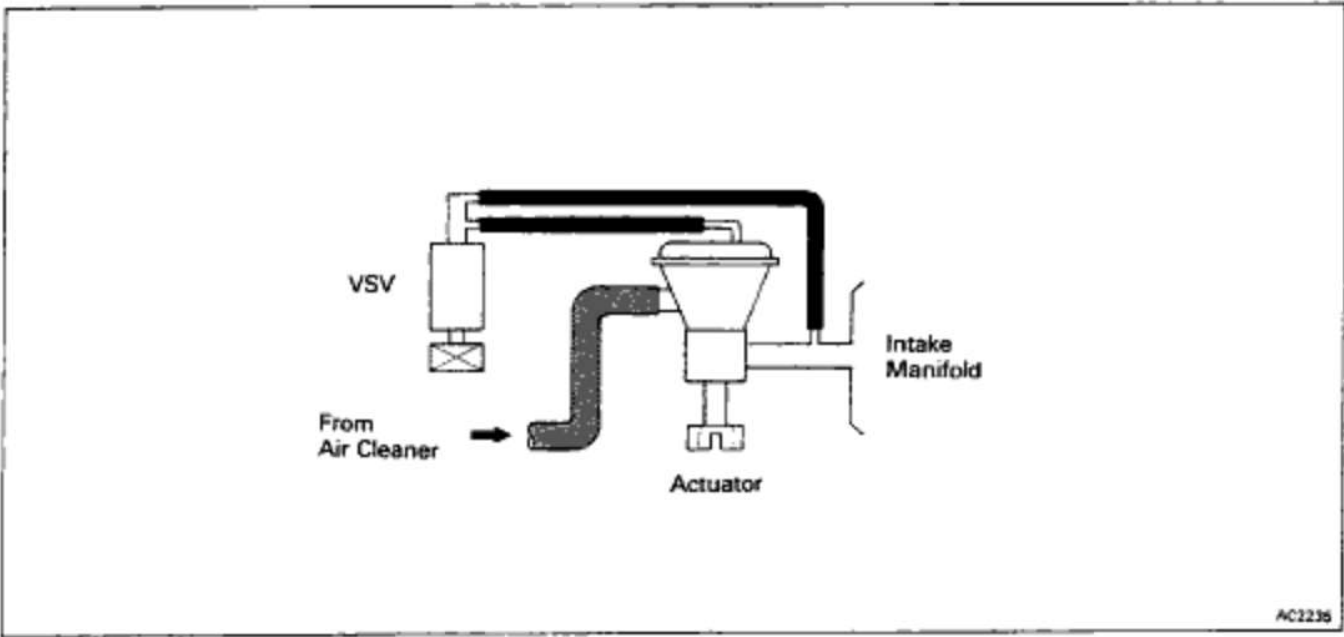


Compressor Control Amplifier
INSPECT AMPLIFIER CIRCUIT

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

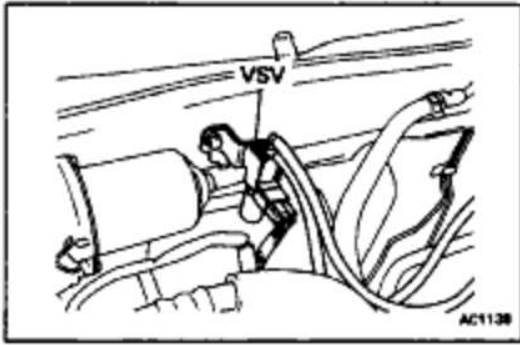
Check for	Tester connection	Condition	Specified value
Continuity	6 – Ground	Constant	Continuity
Voltage	3 – Ground	Turn ignition switch on.	Battery voltage
		Turn ignition switch off.	No voltage
Resistance	5–7	Constant	Approx. 4.4 kΩ 25°C (77°F)

VACUUM HOSE CIRCUIT (3S-FE Engine)



AC-48

AIR CONDITIONING SYSTEM – Vacuum Switching Valve (VSV)

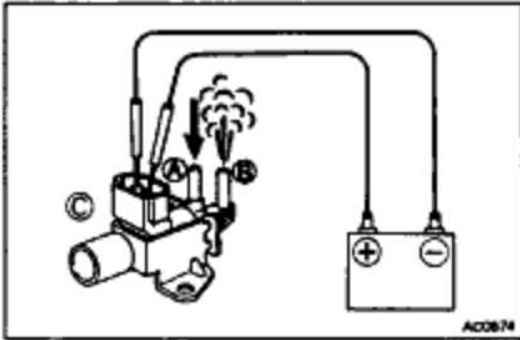


VACUUM SWITCHING VALVE (VSV)

(See pages AC-4 to AC-7)

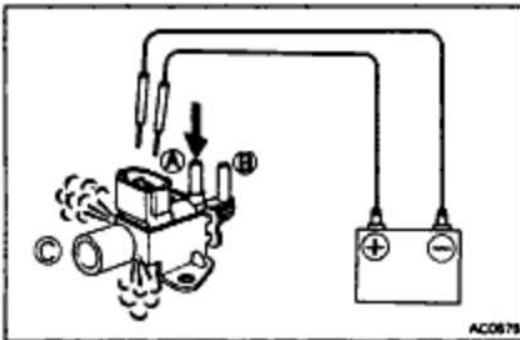
INSPECTION OF VSV

1. REMOVE VSV



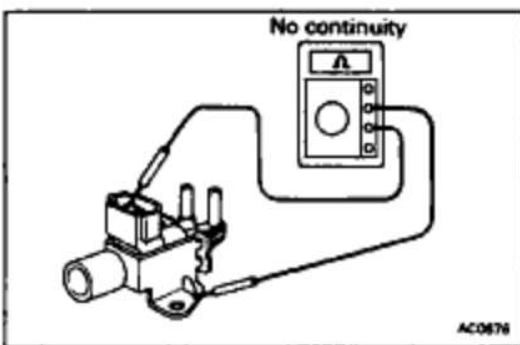
2. CHECK VACUUM CIRCUIT CONTINUITY IN VSV 8* BLOWING AIR INTO PIPE

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



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

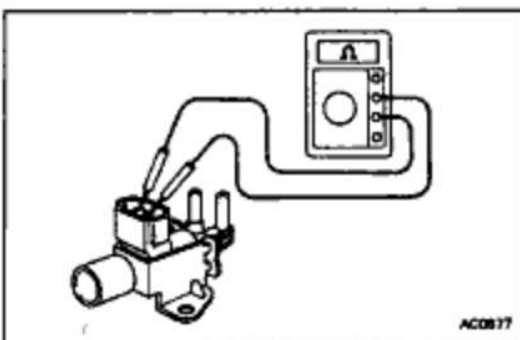
If a problem is found, replace the VSV.



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: 37 – 44 at 20°C (68°F)

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