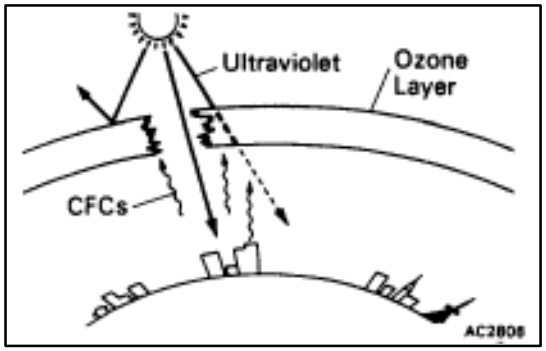
AIR CONDITIONING SYSTEM



GENERAL INFORMATION

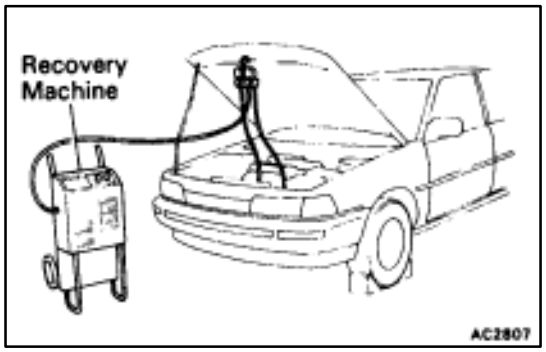
REFRIGERATION SYSTEM

AC002–01

Prevention of Refrigerant Release and Excessive Quantities

Refrigerant (CFCs) for automobile air conditioning is believed to cause harm by depleting the ozone layer which helps to protect us from the ultraviolet rays of the sun.

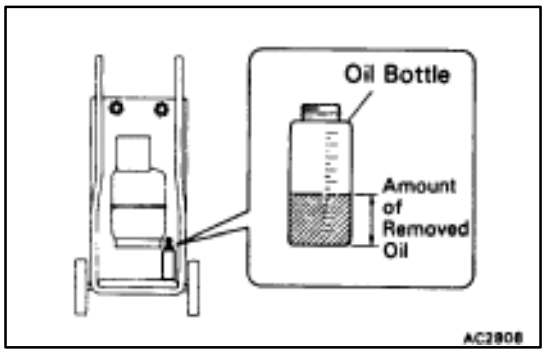
Therefore, it is necessary to prevent release of refrigerant to the atmosphere and to use the minimum amount when servicing the air conditioning.



1. USE RECOVERY MACHINE TO RECOVER REFRIGERANT

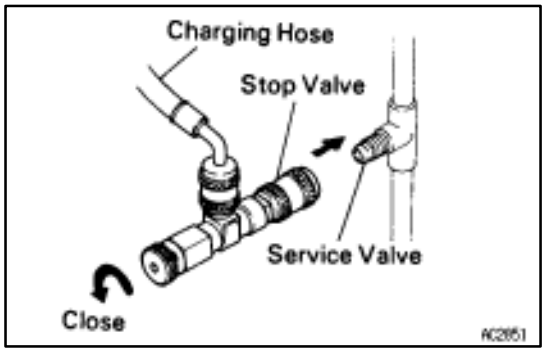
When discharging refrigerant from the system as follows, use a recovery machine to recover the refrigerant.

- Before replacing parts on the refrigerant line.
- When moisture or air gets in the refrigerant line.
- When excess refrigerant is charged.



NOTICE:

- **When handling the recovery machine, always follow the directions given in the instruction manual.**
- **After recovery, the amount of compressor oil removed must be measured and the same amount added to the system.**



2. USE CHARGING HOSES WITH STOP VALVE WHEN INSTALLING MANIFOLD GAUGE SET

To prevent release of refrigerant, using charging hoses with a stop valve when installing the manifold gauge set to the service valves on the refrigerant line.

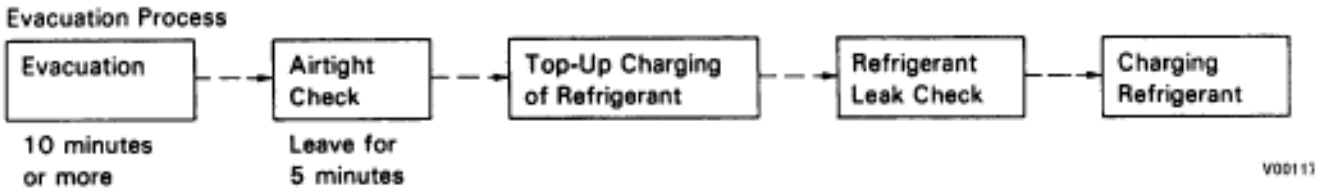
3. TIGHTEN CONNECTION PARTS SECURELY

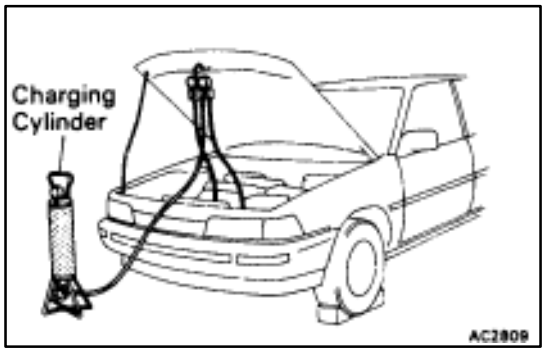
Follow the notices about tightening connecting parts in step 6 on page AC–4.

4. PROPERLY EVACUATE AIR FROM REFRIGERANT SYSTEM

To prevent release and wasteful use of refrigerant, evacuate air with care from refrigeration system as follows:

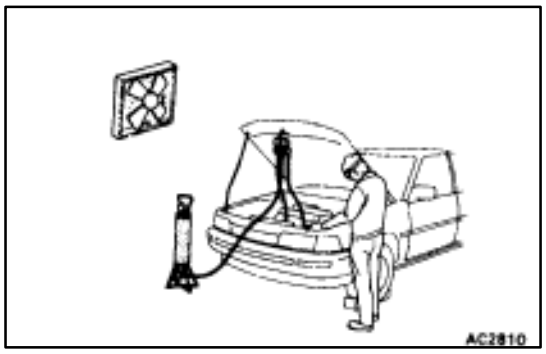
- Do not evacuate before recovering refrigerant in system.
- Do not perform repeat evacuation of system.





5. USE CHARGING CYLINDER TO CHARGE PROPER AMOUNT OF REFRIGERANT

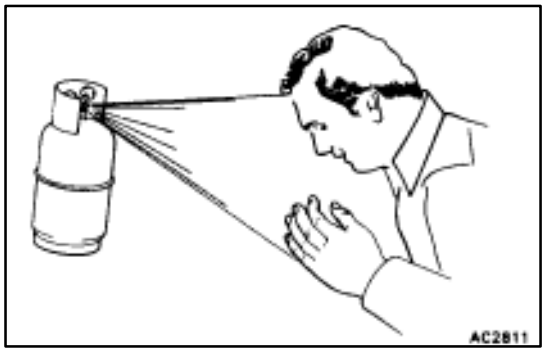
To prevent excessive use of refrigerant due to overcharging, use a charging cylinder to charge the proper amount of refrigerant.



Handling Precautions for refrigerant

1. DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OF NEAR AN OPEN FLAME

2. ALWAYS WEAR EYE PROTECTION



3. 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:

(a) Wash the area with lots of cool water.
CAUTION: Do not rub your eyes or skin.

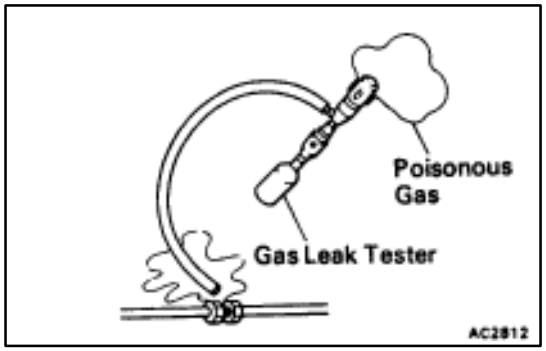
(b) Apply clean petroleum jelly to the skin.

(c) Go immediately to a physician or hospital for professional treatment.
CAUTION: Do not attempt to treat yourself.

Handling Precautions For Refrigerant Container

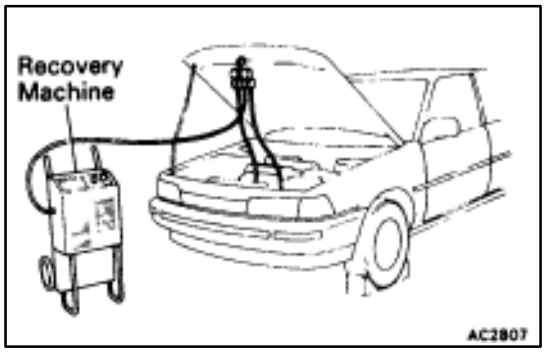
1. NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME

2. BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPLY PHYSICAL SHOCKS TO IT



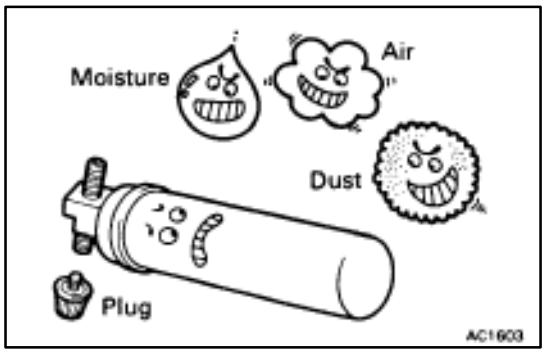
Handling Precautions for Gas–Cylinder Type Gas Leak Tester

1. **BEFORE USING TESTER MAKE SURE THAT THERE ARE NO FLAMMABLE SUBSTANCES NEARBY**
2. **BE CAREFUL NOT TO INHALE POISONOUS GAS**
   If refrigerant gas comes in contact with flame, a poisonous gas is produced. During leak tests, do not inhale any gas.



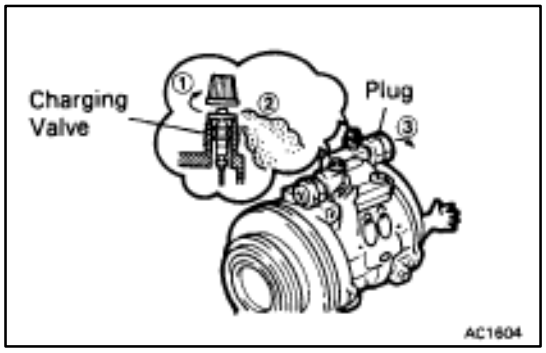
Precautions When Replacing Parts In Refrigerant Line

1. **RECOVER REFRIGERANT IN SYSTEM BEFORE REMOVING PARTS**
   Using a recovery machine, recover refrigerant in system before removing the parts.
   NOTICE: Do not release refrigerant to atmosphere.

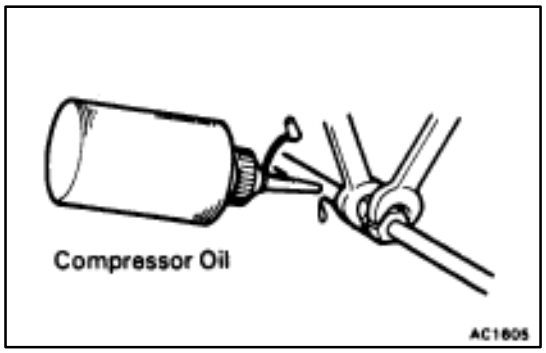


2. **INSERT PLUG IMMEDIATELY IN DISCONNECTED PARTS**
   Insert a plug immediately in the disconnected parts to prevent the entry of moisture and dust.
3. **DO NOT REMOVE PLUG FROM NEW PARTS UNTIL IMMEDIATELY BEFORE INSTALLATION**
4. **DO NOT USE BURNER FOR BENDING OR LENGTHENING OPERATIONS ON TUBE**

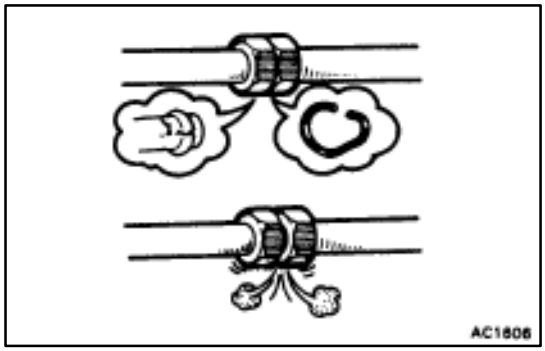
   If the tubes are heated with a burner, a layer of oxidation forms inside the tube, causing the same kind of trouble as an accumulation of dust.



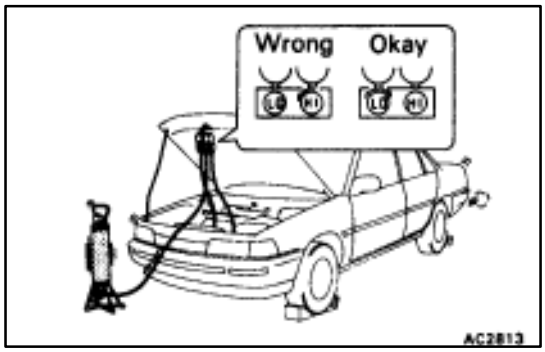
5. **DISCHARGE GAS IN NEW COMPRESSOR FROM CHARGING VALVE BEFORE INSTALLING IT**
   If the gas in new compressor is not discharged first, compressor oil will spray out with gas when the plug is removed.



6. **TIGHTEN CONNECTING PARTS SECURELY**
   Securely tighten the connecting parts to prevent leaking of refrigerant gas.
   - Apply a few drops of compressor oil to O–ring fittings for easy tightening and to prevent leaking of refrigerant gas.
   - Tighten the nuts using two wrenches to avoid twisting the tube.



- Tighten the O–ring fittings or the bolted type fittings to the specified torque.



Precautions When Charging Refrigerant

1. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT CYCLE**
   If there is not enough refrigerant in the refrigerant cycle, oil lubrication will be insufficient and compressor burnout may occur, so takecare to avoid this.
2. **DO NOT OPEN HIGH PRESSURE VALVE OF MANIFOLD WITH COMPRESSOR OPERATING**
   If the high pressure valve is opened, refrigerant flows in the reversedirection and could cause the charging cylinder to rupture, so open and close the low pressure valve only.
3. **BE CAREFUL NOT TO OVERCHARGE WITH REFRIGERANT IN SYSTEM**
   If refrigerant is overcharged, it causes trouble such as insufficient cooling, poor fuel economy, engine overheating etc.

ELECTRICAL PARTS

AC003–01

Before removing and inspecting the electrical parts, set the ignition switch to the LOCK position and disconnect the negative (–) terminal cable from battery.

CAUTION: Work must not be started until after at least 30 seconds or longer from the time the negative (–) terminal cable is disconnected.

SRS AIRBAG SYSTEM

AC004–01

Failure to carry out service operations in the correct sequence could cause the airbag system to deploy, possibly leading to a service accident. When removal or installation of the parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the AB section before performing the operation.

DESCRIPTION

FEATURES

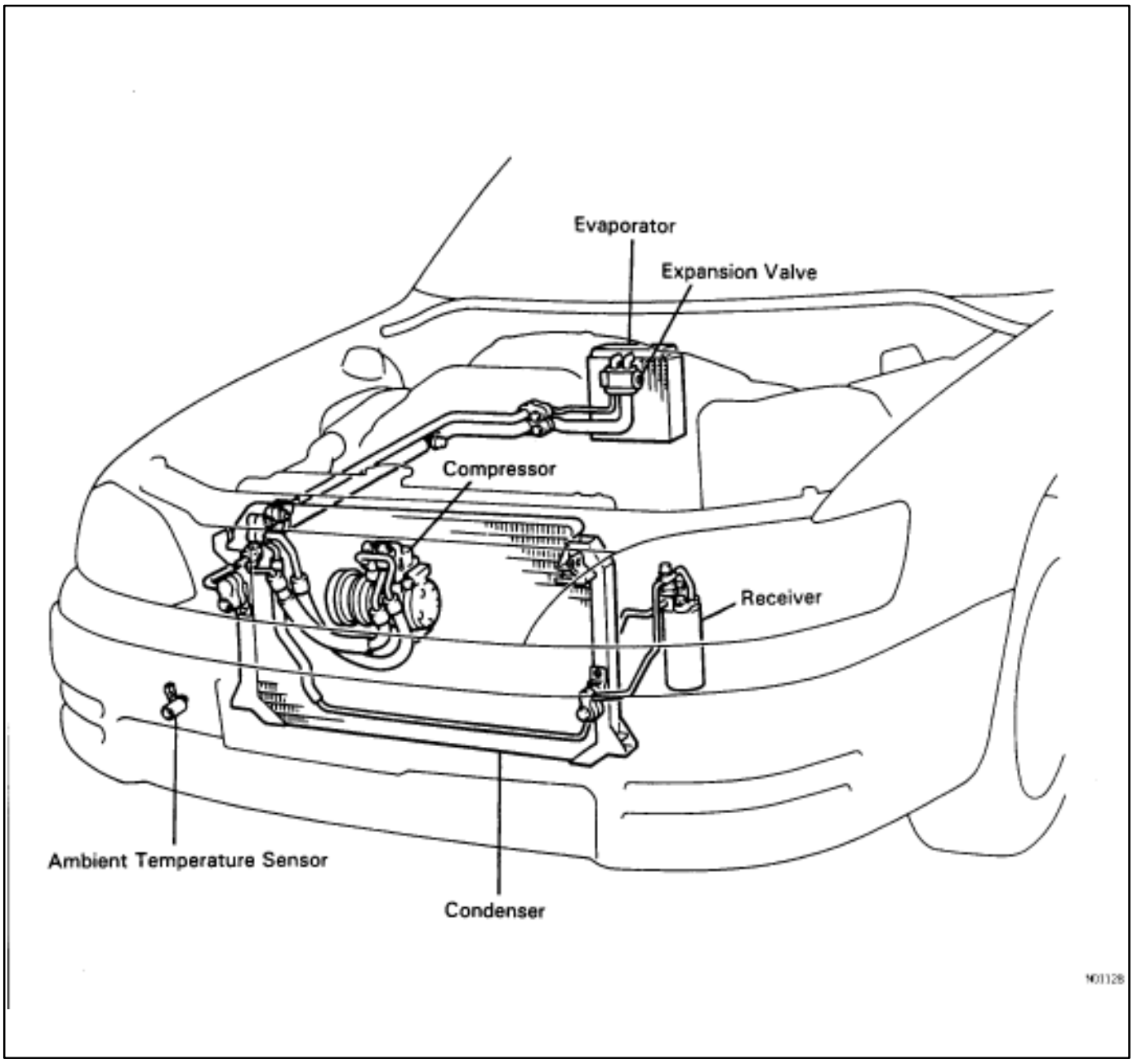
AC05K–01

The microprocessor controlled automatic air conditioning is a system which controls the cabin air conditioning automatically using a microcomputer.

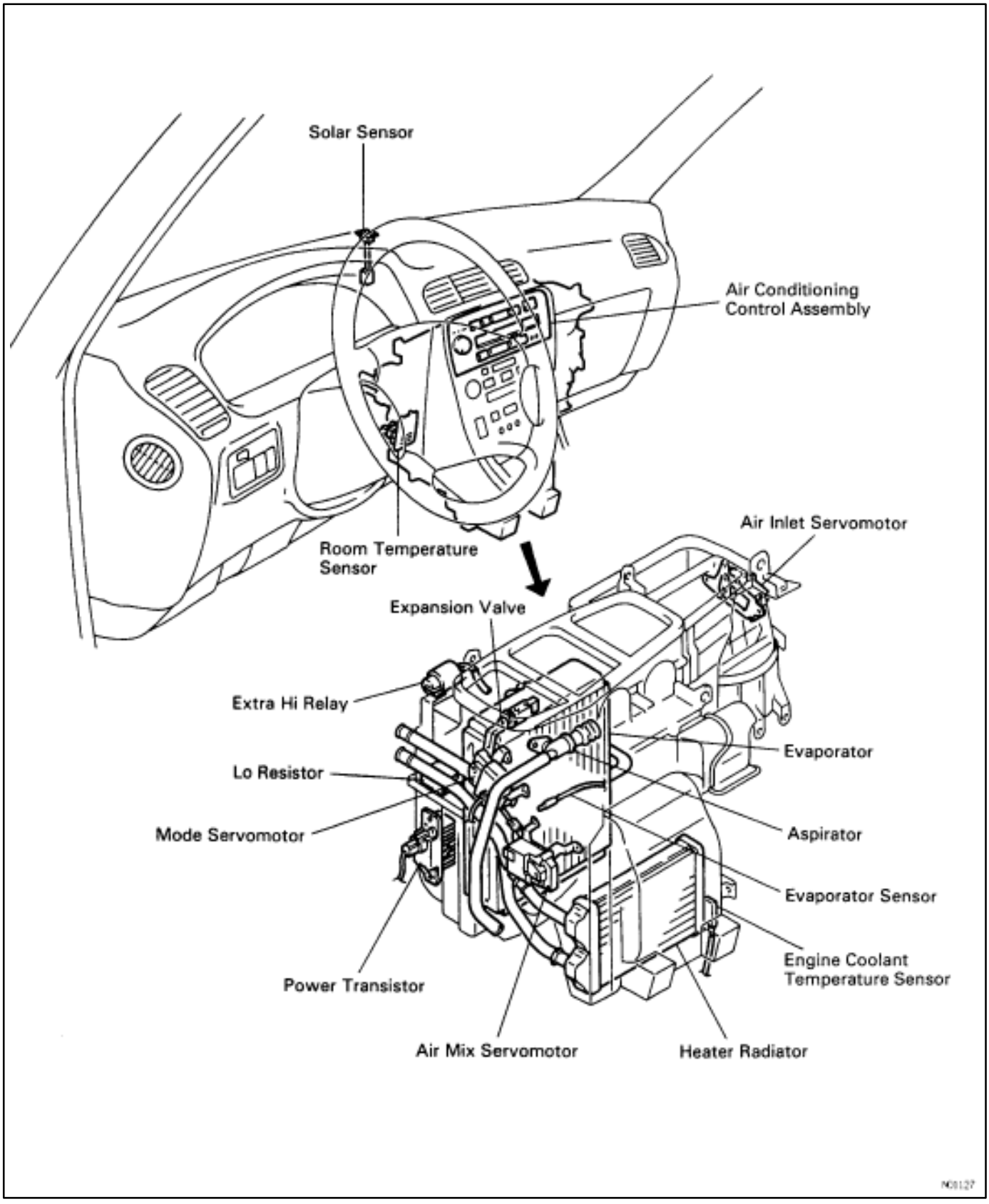
The microcomputer senses the air temperature outside and inside the cabin, the amount of sunlight, the compressor operating condition and temperature setting, etc. and maintains the optimum blower air temperature and air flow at the intakes and outlets automatically.

PARTS LOCATION

AC05L–01

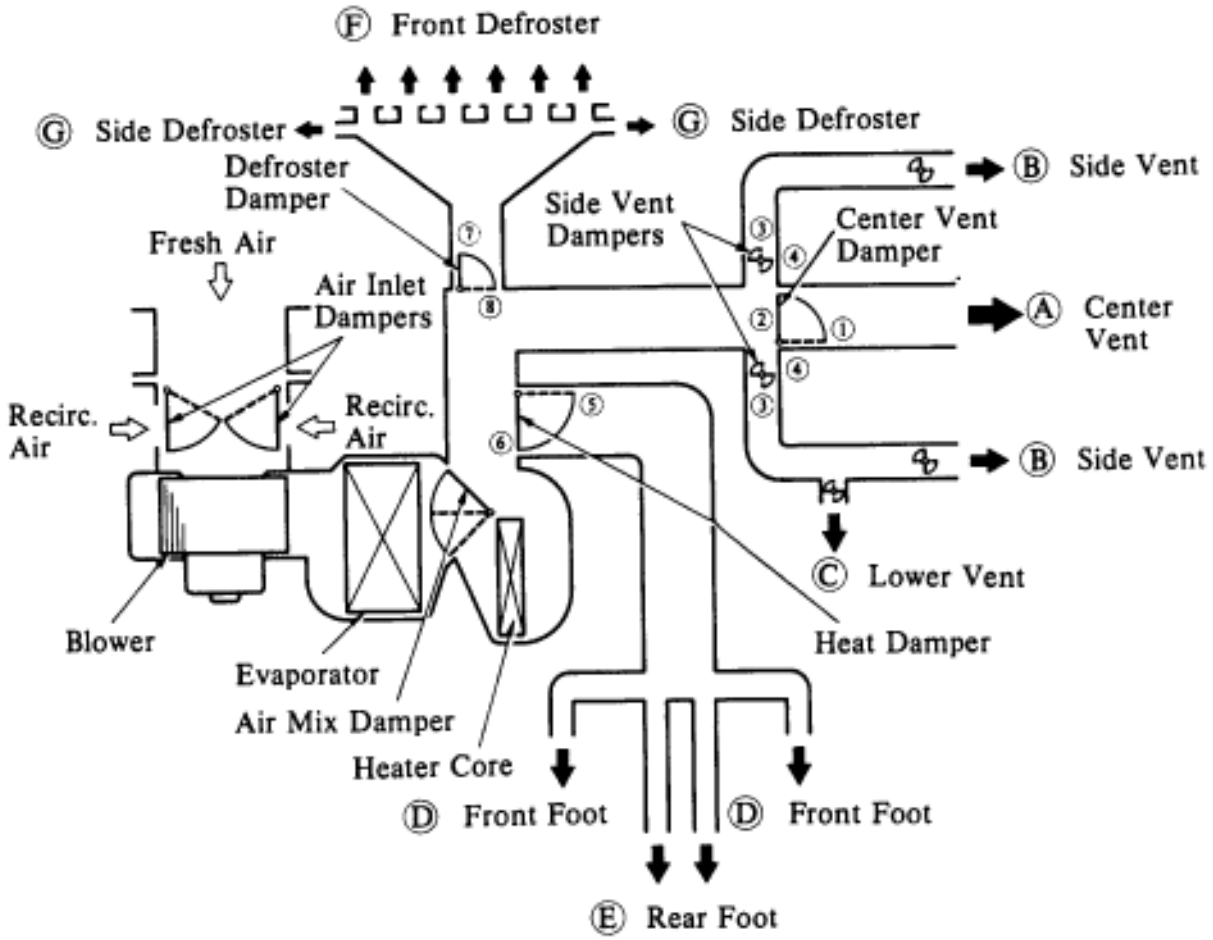


PARTS LOCATION (CONT'D)



OPERATION OF DAMPERS

AC05M–01



Air Outlet Mode		Mode Control Damper Position	Vent			Foot		Defroster	
			Ⓐ Center	Ⓑ Side	Ⓒ Lower	Ⓓ Front	Ⓔ Rear	Ⓕ Front	Ⓖ Side
Face		① ③ ⑥ ⑧	◯	◯	○				
Bi-level		① ③ ⑤ ⑧	○	○	○	○	○		
Foot		② ④ ⑤ ⑧		○	○	◯	○	○	○
Foot/ Defroster		② ④ ⑤ ⑦		○	○	○	○	○	○
Defroster		② ④ ⑥ ⑦		○	○			◯	○

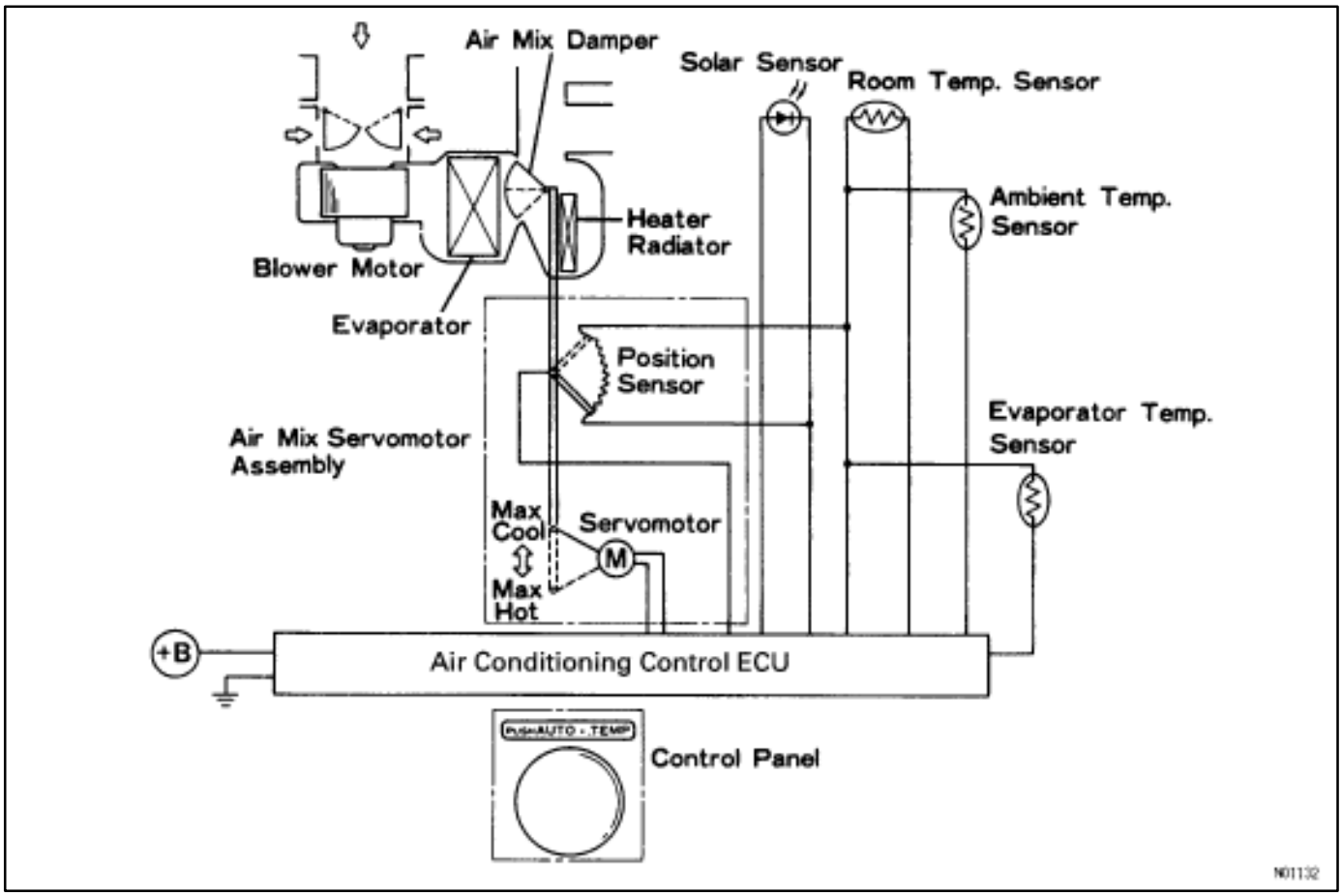
The size of the circle ○ indicates the proportion of air flow volume.

N01883

CONTROL FUNCTIONS

AC05N–01

Interior Room Temperature Control System



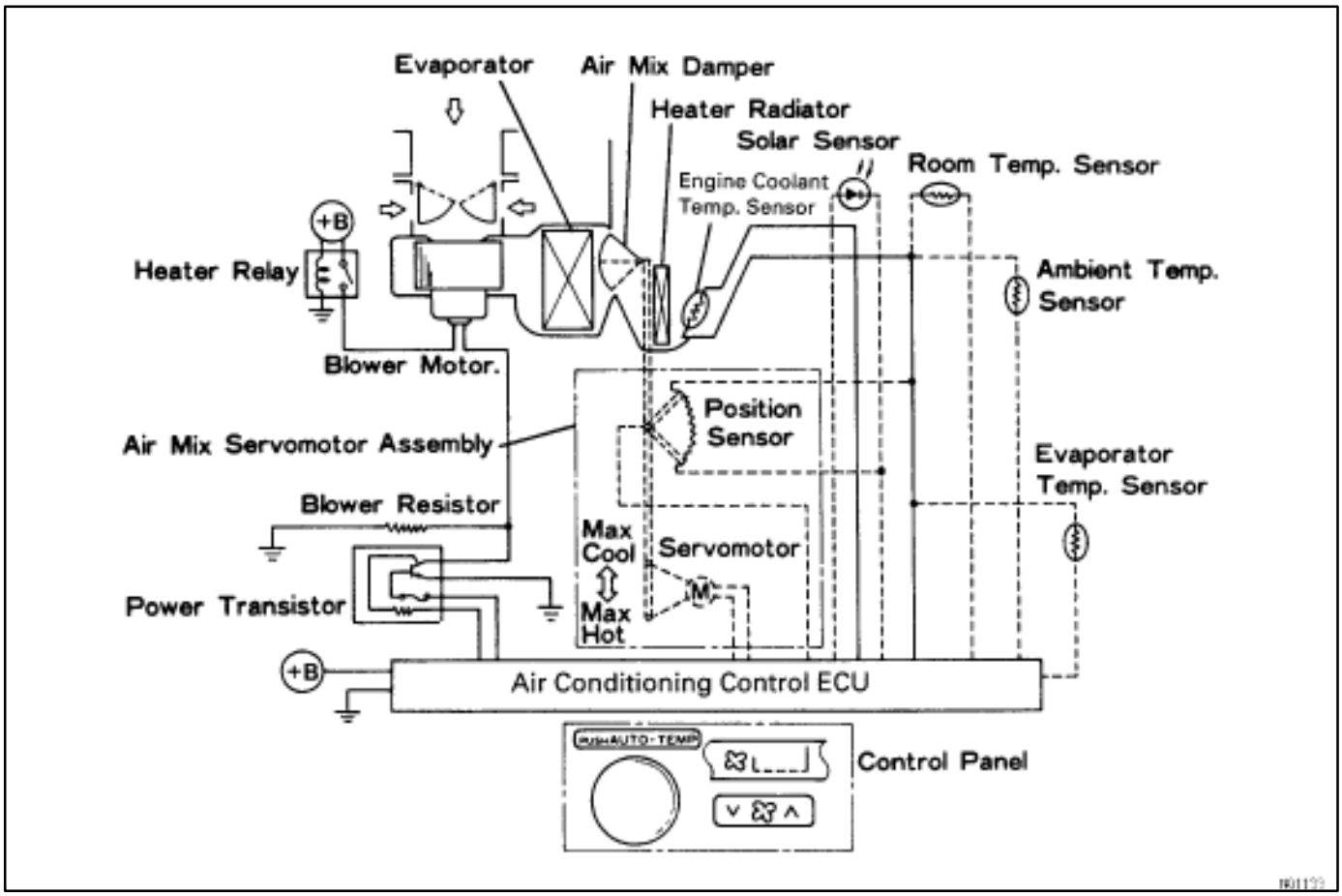
(a) The desired temperature is set using the TEMP switch.

(b) From the input signals (room temperature sensor, ambient temperature sensor, evaporator temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air flow volume and outputs signals to the air mix servomotor.

(c) When it receives signals from the ECU, the air mix servomotor opens or closes the air mix damper to change the air flow temperature. When the temperature reaches the specified temperature, it is detected by the air mix damper position sensor and the ECU stops the servomotor.

HINT: if the desired temperature setting is MAX COLD, the ECU forcedly sets the air mix damper to the Max Cool position. If it is set at MAX HOT, the ECU forcedly sets the air mix damper to the Max Hot position.

Blower Fan Speed Control System



(When AUTO Switch is ON)

(a) The desired temperature is set using the TEMP switch.

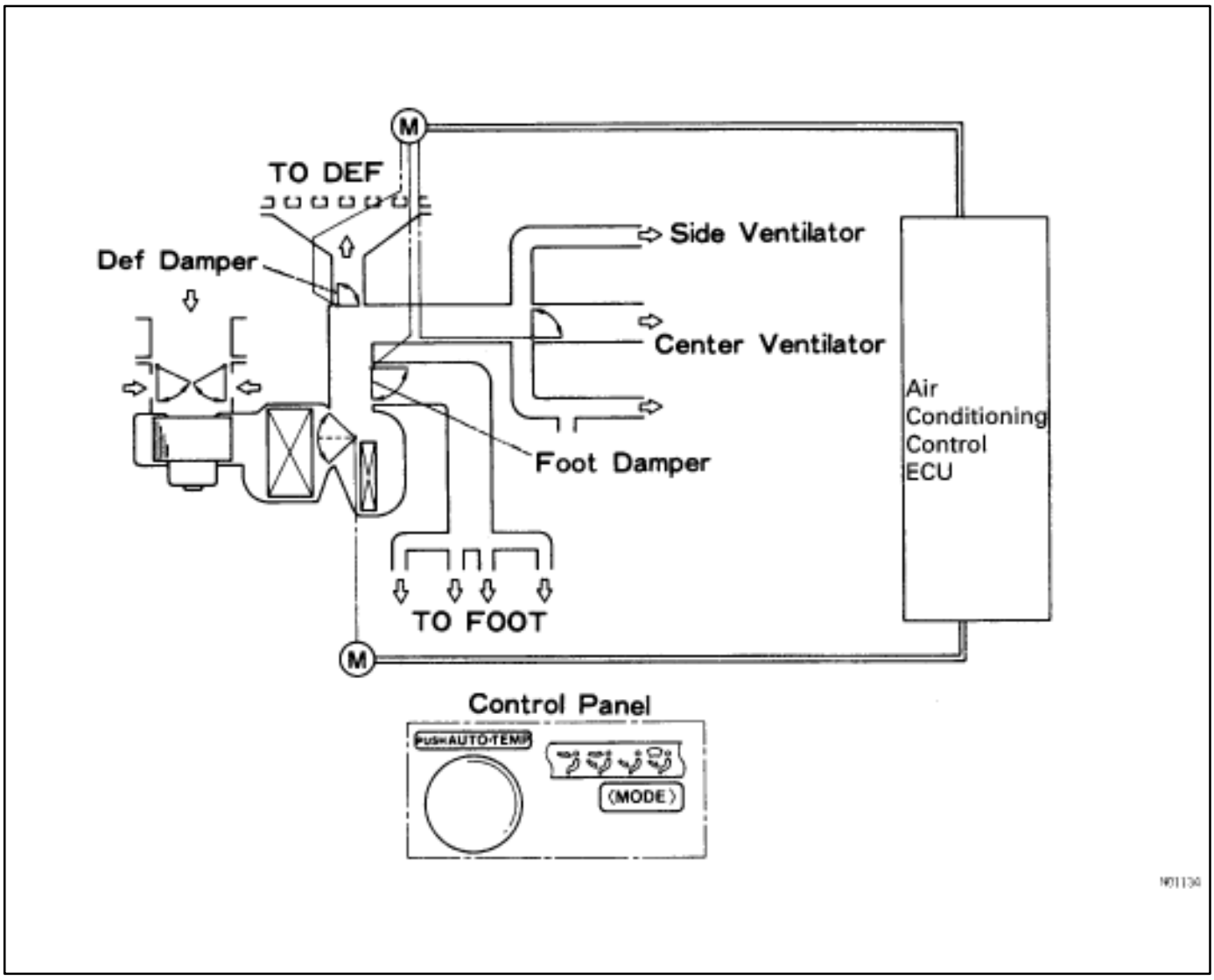
(b) From the input signals (room temperature sensor, ambient temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air flow volume and outputs signals to the power transistor.

(c) When it receives signals from the ECU, the power transistor increases or reduces the blower motor speed to control the air flow volume.

(When Manual Switch is selected)

The ECU turns the power transistor increasing or reducing the blower motor speed and fixing the air flow volume in accordance with the position of the Manual switch.

Air Flow Mode Control System



(When the AUTO Switch is ON)

(a) The desired temperature is set using the TEMP switch.

(b) From the input signals (room temperature sensor, ambient temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air flow mode and outputs signals to the mode servomotor and max cool servomotor.

(c) When it receives signals from the ECU, the servomotors open or close each of the dampers to change the air flow mode.

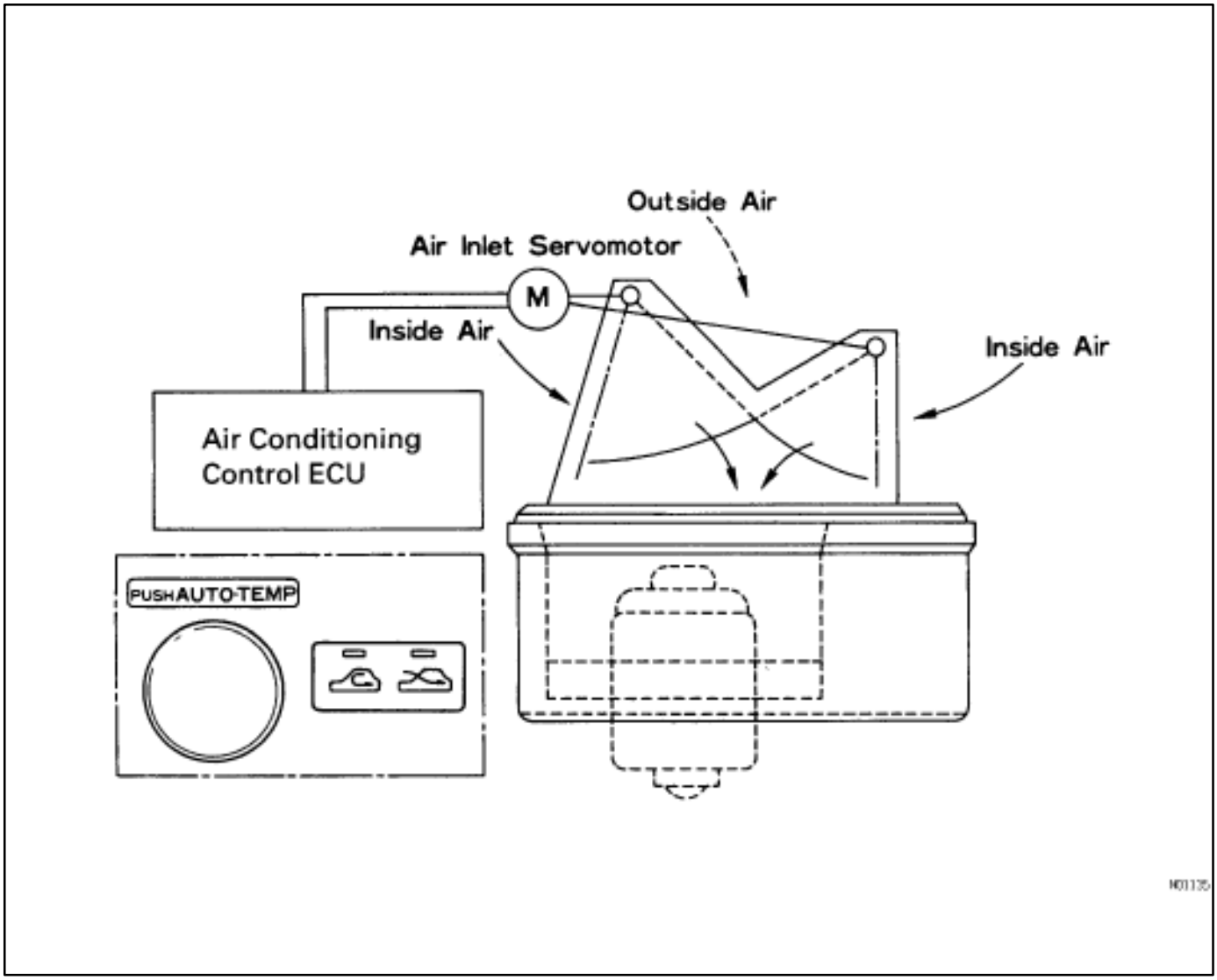
(When Manual Switch is selected)

The ECU fixes the air flow mode in accordance with the Manual switch position.

(When the Engine is Cold)

If the Mode is set on B/L or FOOT, the ECU forcedly changes the air vent to DEF if cold signals are input from the engine coolant temperature sensor.

Air Inlet Control System



(When the AUTO Switch is ON)

(a) The desired temperature is set using the TEMP switch.

(b) From the input signals (room temperature sensor, ambient temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air inlet and outputs signals to the air inlet servomotor assembly.

(c) When it receives signals from the ECU, the air inlet servomotor opens or closes the damper to change the air inlet. When the air inlet is changed to the desired setting, it is detected by the sir inlet damper position sensor and the ECU stops the servomotor.

(When Manual Switch is selected)

The ECU fixes the air inlet according to the position of the manual switch.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

AC02B–01

	07110–58011	Air Conditioning Service Tool Set	
	(07117–58010)	Refrigerant Dram Service Valve	
	(07117–78011)	Refrigerant Charging Gauge	
	(07117–88013)	Refrigerant Charging Hose	Green color
	(07117–88022)	Refrigerant Charging Hose	Blue color
	(07117–88040)	Refrigerant Charging Hose	Orange color
	(–––––––)	Stop Valve	
	07110–58040	Charging Hose Kit With Stio Valve	If you require a stop valve, plea se order this kit.
	07112–66040	Magnetic Clutch Remover	
	07112–76060	Magnetic Clutch Stopper	
	07114–84020	Snap Ring Pliers	
	07117–48050	Vaccum Pump Assy	Rated voltage AC220V

RECOMMENDED TOOLS

AC008–01

	09082–00015 TOYOTA Electrical Tester	

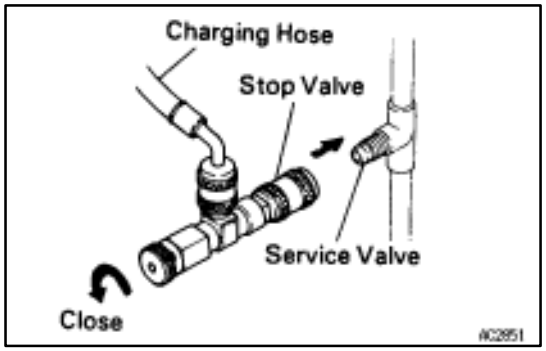
EQUIPMENT

AC009–01

Part Name	Note
Voltmeter	Measures voltage
Ammeter	Measures current
Ohmmeter	Measures resistance

LUBRICANT

Item	Capacity		Classification
	cm	fl. oz	
Compressor oil			ND OIL 6.
When replacing receiver	15	0.5	SUNISO No. 5GS or equivalent
When replacing condenser	35	1.2	
When replacing evaporator	45	1.6	
When replacing compressor	–100	–3.5	

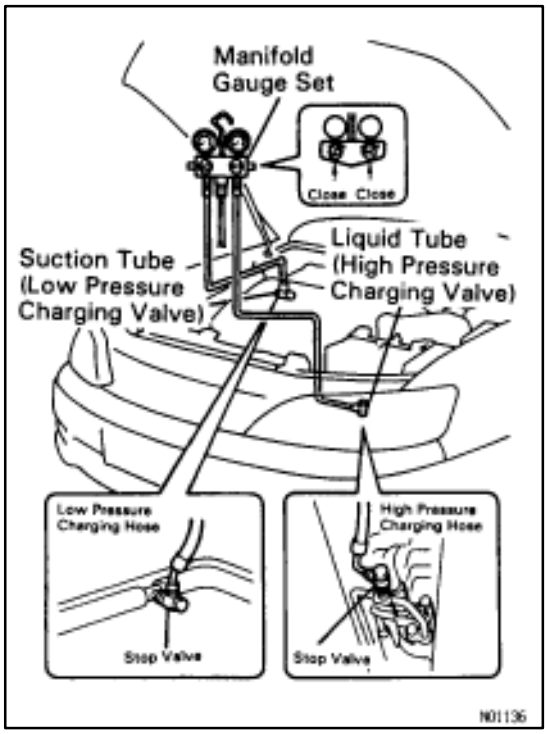


USE OF MANIFOLD GAUGE SET

MANIFOLD GAUGE SET INSTALLATION

AC00B–01

HINT: To prevent releasing refrigerant, use charging hoses with a stop valve when installing the manifold gauge set to service valves on the refrigerant line.

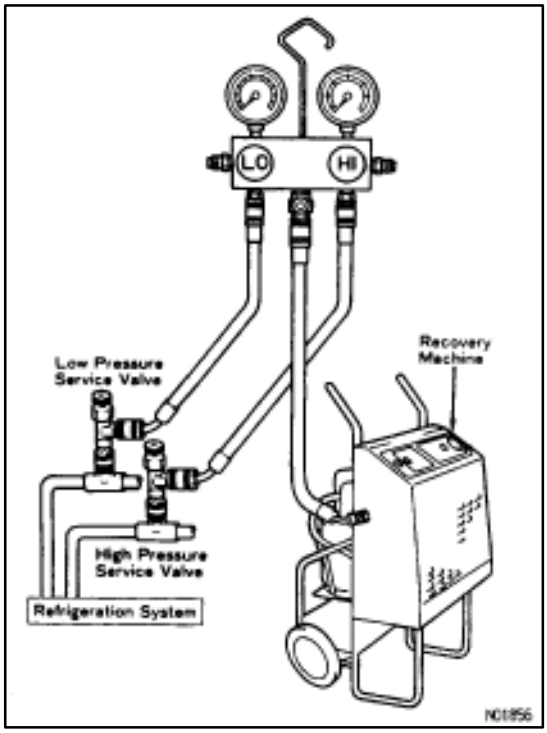


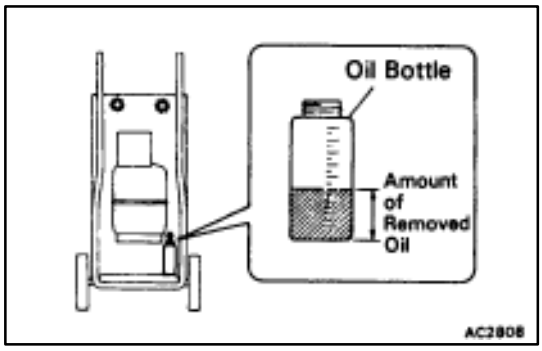
1. **CONNECT CHARGING HOSES WITH A STOP VALVE TO MANIFOLD GAUGE SET**
   Tighten the nuts by hand.
   CAUTION:
   - **Do not connect the wrong hoses to the high pressure and the low pressure side.**
   - **To prevent loosening the nuts, do not apply compressor oil to seat of the connection.**
2. **CLOSE HAND VALVES OF BOTH STOP VALVES**
3. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
4. **REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINE**
5. **CONNECT STOP VALVES TO SERVICE VALVES**
   Tighten the nuts by hand.
   CAUTION:
   - **Do not connect the wrong hoses to the high pressure and the low pressure sides.**
   - **To prevent loosening the nuts, do not apply compressor oil to seat of the connection.**
6. **OPEN HAND VALVES OF BOTH STOP VALVES**

MANIFOLD GAUGE SET REMOVAL

AC00C–01

1. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
2. **CLOSE HAND VALVES OF BOTH STEP VALVES**
3. **DISCONNECT STOP VALVES FROM SERVICE VALVES ON REFRIGERANT LINE**
4. **INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE**





USE OF REFRIGERANT RECOVERY MACHINE

RECOVERING OF REGRIGERANT IN REFRIGERANT SYSTEM

AC00D–01

When discharging refrigerant from the system as follows, use a recovery machine to recover the refrigerant.
Before replacing parts on the refrigerant line.
When moisture or air gets in the refrigerant line.
When excess refrigerant is charged.

NOTICE:

- **When handling the recovery machine, always follow the directions given in instruction manual.**
- **After recovery, the amount of compressor oil removed must bemeasured and same amount added into the system.**

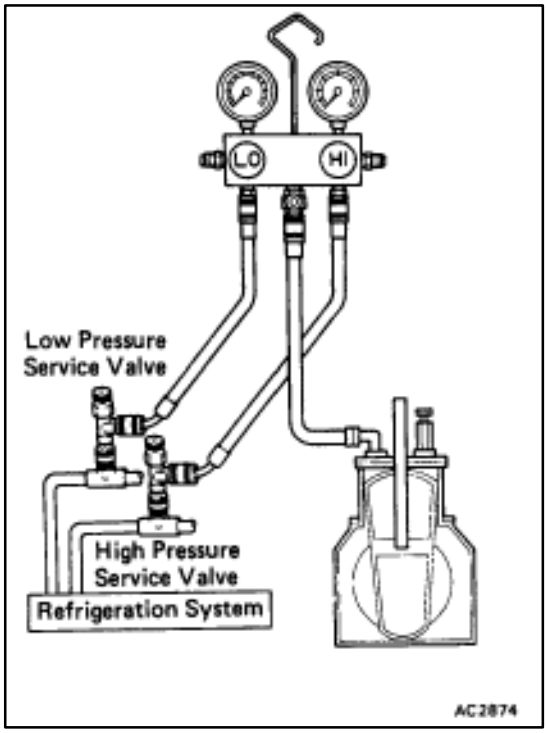
1. INSTALL MANIFOLD GAUGE SET TO SERVICE VALVES

2. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

(a) Connect the center hose to recovery machine.
(b) Operate the recovery machine.
(c) Open both high and low hand valves of manifold gauge set.

3. STOP RECOVERY MACHINE WHEN RECOVERING HAS FINISHED

4. REMOVE MANIFOLD GAUGE SET FROM SERVICE VALVES



EVACUATING AIR IN REFRIGERATION SYSTEM AND CHARGING WITH REFRIGERANT

AC05Q–01

HINT: Before charging the system with refrigerant, be sure carry out a complete evacuation of the system.

1. INSTALL MANIFOLD GAUGE SET TO SERVICE VALVES (See page AC–15)

2. EVACUATE AIR IN REFRIGERATION SYSTEM

(a) Connect the center hose of the manifold gauge set to the vacuum pump.

(b) Open both the high and low hand valves and run the vacuum pump.

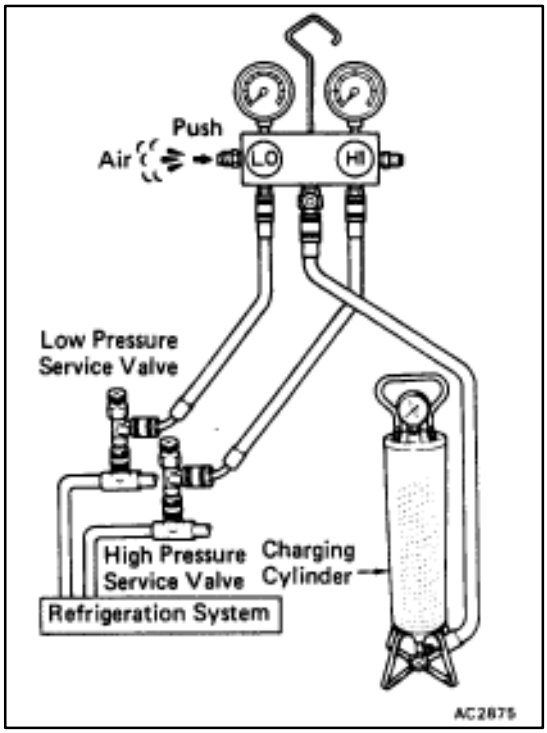
HINT: If opening the low pressure hand valve pulls the high pressure gauge into the vacuum range, there is no blokage in the system.

(c) Afer ten minutes or more, check that the low pressure gauge indicates 99.99 KPa (750 mmHg, 29.53 in. Hg) or more of vacuum.

HINT: If the reading is not 99.99 KPa (750 mmHg, 29.53 in. Hg) or more of vacuum, close both the high and low hand valves of the manifold gauge set and stop vacuum pump. Then, check the system for leaks and repair as necessary.

(d) Close both the high and low hand valves and stop the vacuum pump.

(e) Leave the system in this condition for five minutes or longer and check that there is no change in the gauge indicator.



3. INSTALL CHARGING CYLINDER

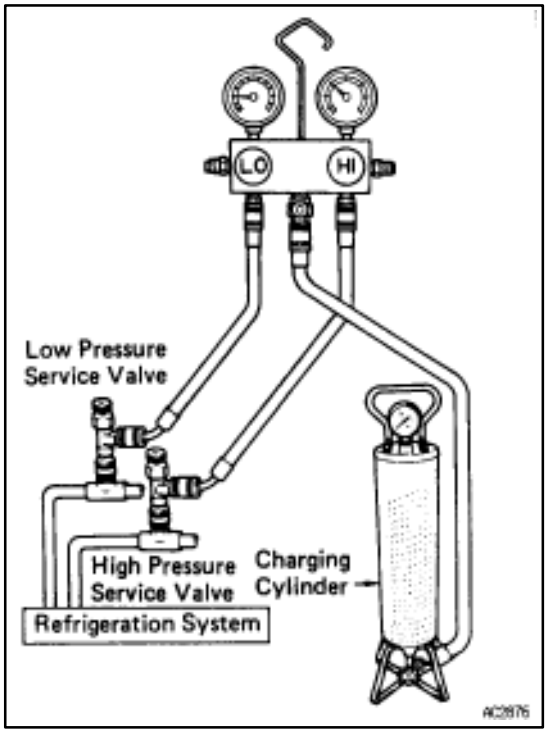
NOTICE: When handling the charging cylinder, always follow the directions given in the instruction manual.

(a) Charge the proper amount of refrigerant in charging cylinder.

(b) Connect the center hose to charging cylinder.

NOTICE: Do not open both high and low hand valves of manifold gauge set.

(c) Press on the schrader valve on the side of manifold gauge and expel the air inside of the center hose.



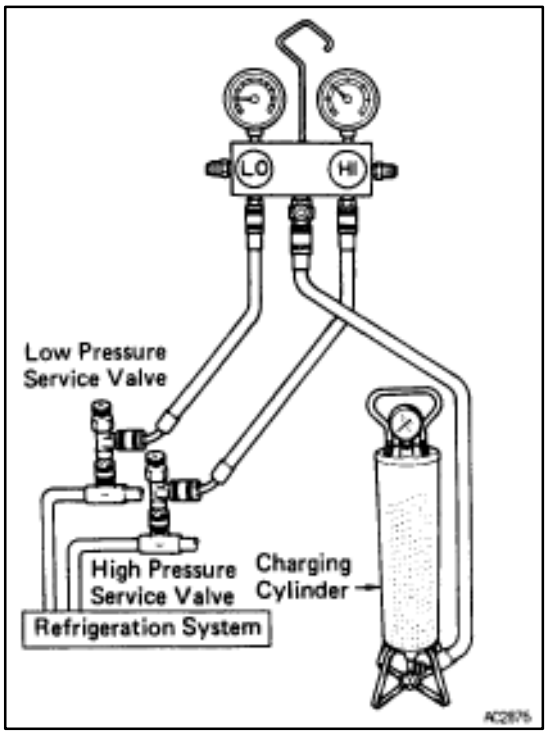
4. INSPECT REFRIGERATION SYSTEM FOR LEAKS

HINT: After evacuating the air in system, check the system for leakage.

(a) Open the high pressure hand valve to charge the system with refrigerant.

(b) When the low pressure gauge indicates 98 kPa (1 kg/ cm , 14psi), close the high pressure hand valve.

(c) Using a gas leak tester, check the system for leakage.
If leak is found, repair the faulty component or connection.



5. CHARGE EMPTY REFRIGERATION SYSTEM WITH REFRIGERANT (LIQUID)

HINT: This step is used to charge an empty system through the high pressure side with refrigerant in a liquid state.

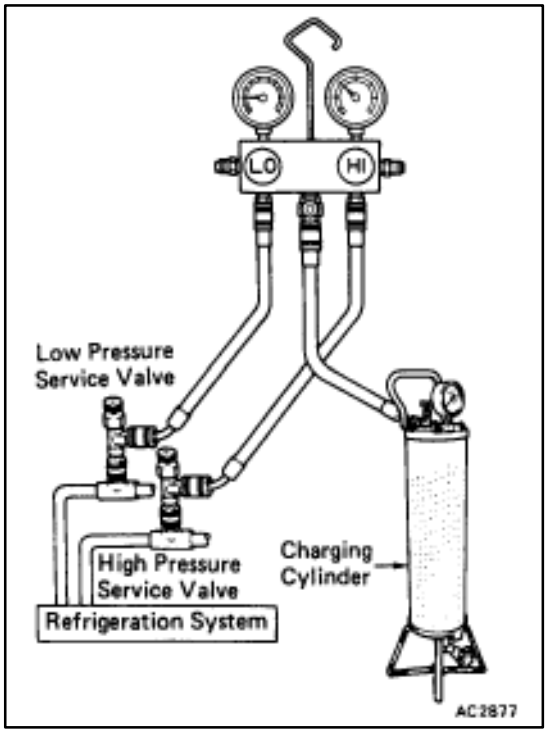
NOTICE:

- **Never run the engine when charging the system through the high pressure side with refrigerant in a liquid state.**
- **Do not open the low pressure hand valve when the system is being charged with liquid refrigerant.**

(a) Open the high pressure hand valve fully.

(b) Charge the system with specified amount of refrigerant, then close the high pressure hand valve.
HINT:

- **A fully charged system is indicated by the sight glass being free of any bubbles.**
- **If the low pressure gauge does not show a reading the system is clogged and must be repaired.**



6. CHARGE PARTIALLY REFRIGERATION SYSTEM WITH REFRIGERANT (VAPOR)

HINT: This step is used to charge the system through the low pressure side with refrigerant in a vapor state.

NOTICE: Do not open the high pressure hand valve when running the engine.

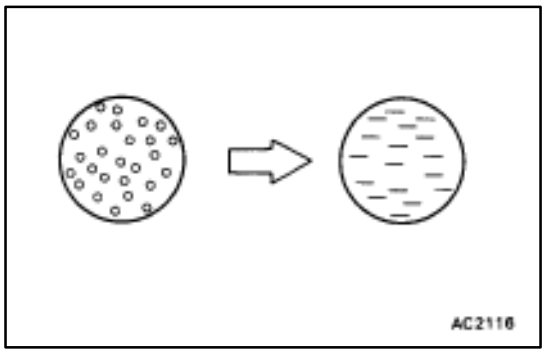
(a) Run the engine at ideling speed and operate the air conditioner.

(b) Open the low pressure hand valve.

NOTICE: Adjust the hand valve so that the low pressure gauge does not indicate over limited pressure of charging cylinder.

(c) Close the low pressure hand valve when the sight glass is free of any bubbles and stop the engine.

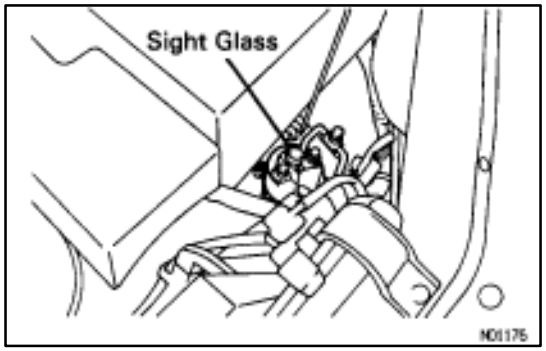
NOTICE: Be careful not to overcharge the system with refrigerant as it may cause of troubles.



7. REMOVE MANIFOLD GAUGE SET FROM SERVICE VALVES

(See page AC–15)

–MEMO–



REFRIGERANT VOLUME

REFRIGERANT VOLUME INSPECTION

AC00G–01

1. **RUN ENGINE AT IDLE SPEED**
2. **OPERATE A/C AT MAXIMUM COOLING FOR A FEW MINUTES**
3. **INSPECT AMOUNT OF REFRIGERANT**
   Observe the sight glass on the liquid tube.

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient*	(1) Check for gas lakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present in sight glass	None, sufficient or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
4	Temperature between compressor inlet and outlet is noticeably different	Proper or too much	Refer to items 5 and 6
5	Immediately after air conditioning is turned off, refrigerant in sight glass stays clear	Too much	(1) Recover refrigerant (2) Evacuate air and charge proper amount to of purified refrigerant
6	When air conditioning is turned off, refrigerant foams and then stay clear	Proper	–

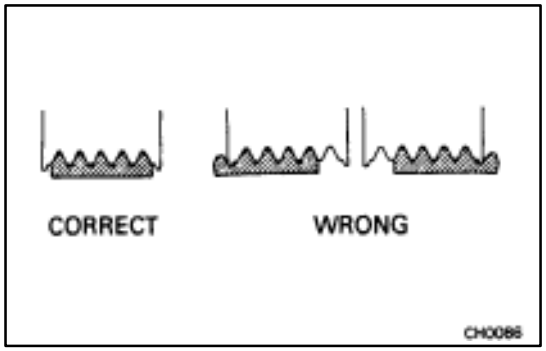
***: Bubbles in the sight glass with ambient temperatuers higher can be considered normal if cooling is sufficient.**

REFRIGERANT CHARGE VOLUME

AC00H–01

Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)



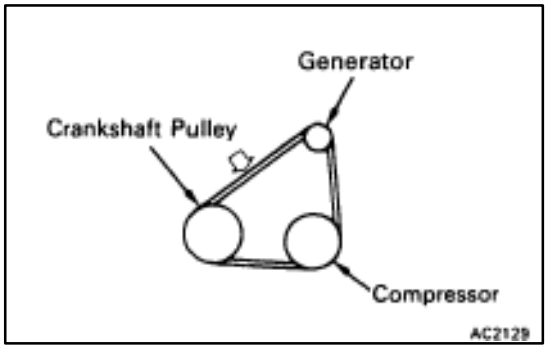
DRIVE BELT TENSION

DRIVE BELT TENSION INSPECTION

AC05R–01

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that the drive belt fits properly in the ribbed grooves.



2. INSPECT DRIVE BELT TENSION

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

Belt tension gauge:

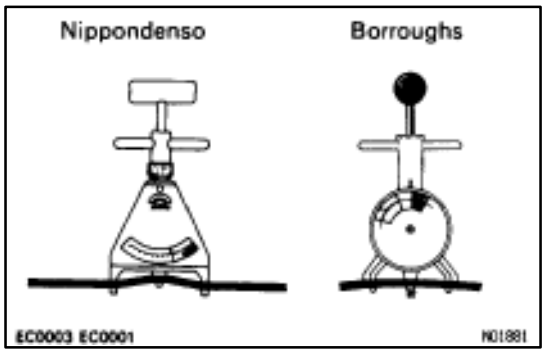
Nippondenso BTG–20 (95506–00020) or

Borroughs No. TB–33–73F

Drive belt tension:

New belt 165 ± 26 lb

Used belt 88 ± 22 lb



HINT:

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

IDLE–UP SPEED

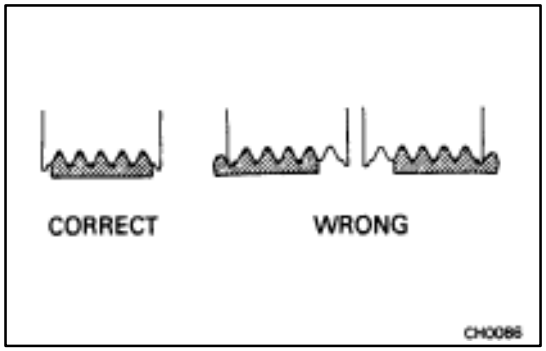
IDLE UP SPEED INSPECTION

AC05P–01

1. WARM UP ENGINE

2. INSPECT IDLE SPEED

Magnetic clutch condition	Standard idle speed (rpm)
No engaged	Approx. 700
Engaged	Approx. 700



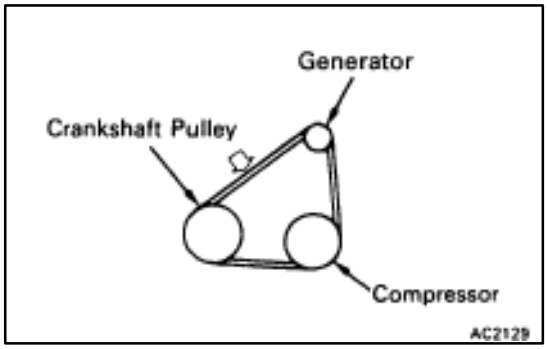
DRIVE BELT TENSION

DRIVE BELT TENSION INSPECTION

AC05R–01

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that the drive belt fits properly in the ribbed grooves.



2. INSPECT DRIVE BELT TENSION

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

Belt tension gauge:

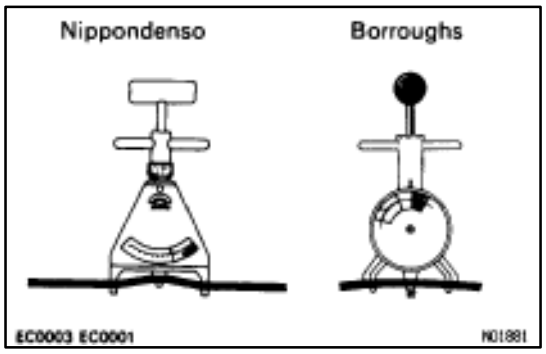
Nippondenso BTG–20 (95506–00020) or

Borroughs No. TB–33–73F

Drive belt tension:

New belt 165 ± 26 lb

Used belt 88 ± 22 lb



HINT:

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

IDLE–UP SPEED

IDLE UP SPEED INSPECTION

AC05P–01

1. WARM UP ENGINE

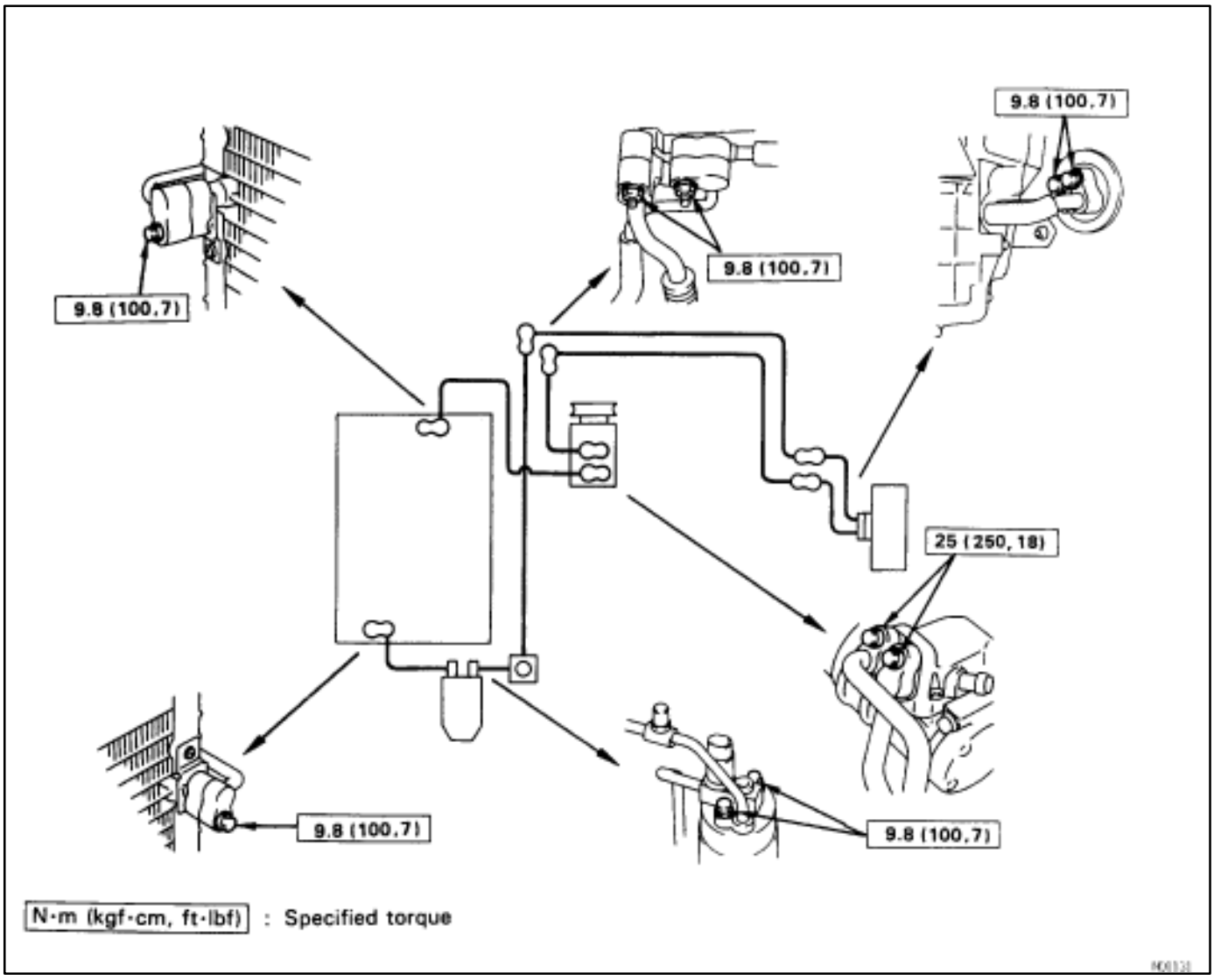
2. INSPECT IDLE SPEED

Magnetic clutch condition	Standard idle speed (rpm)
No engaged	Approx. 700
Engaged	Approx. 700

REFRIGERANT LINES

TIGHTENING TORQUE OF REFRIGERATION LINES

AC00L–01



ON–VEHICLE INSPECTION

AC00M–01

1. INSPECTION HOSE AND TUBE CONNECTIONS FOR LOOSENESS

2. INSPECT HOSES AND TUBES FOR LEAKAGE

Using a gas leak tester, check for leakage of refrigerant.

REFRIGERANT LINES REPLACEMENT

AC00N–01

1. RECOVER REFRIGERANT IN REFRIGERATION SYSTEM

2. REPLACE FAULTY TUBE OR HOSE

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

3. TORQUE CONNECTIONS TO SPECIFIED TORQUE

NOTICE: Connections should not be torque tighter than the specified torque.

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50g (33.51 ± 1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak tester, check for leakage of refrigerant.

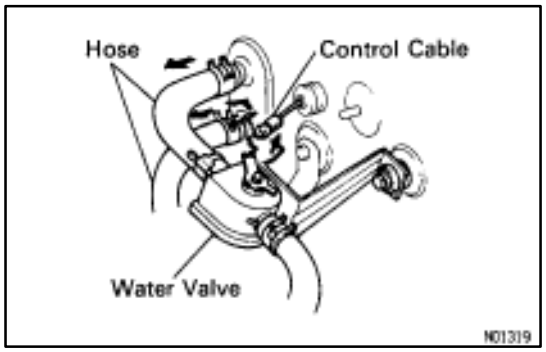
6. INSPECT AIR CONDITIONING OPERATION

AIR CONDITIONING UNIT

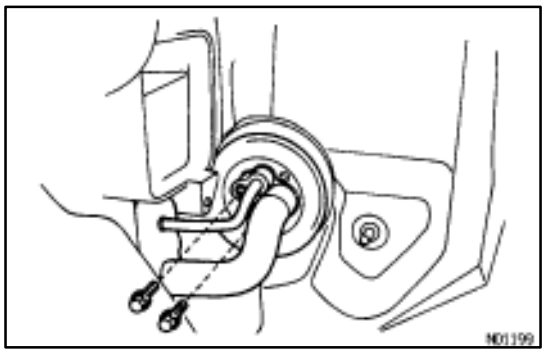
A/C UNIT REMOVAL

AC00P–01

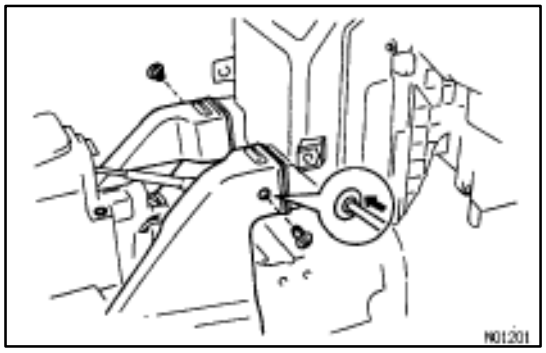
1. **RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM**
2. **DRAIN ENGINE COOLANT FROM RADIATOR**
   HINT: It is not necessary to drain out all the coolant.



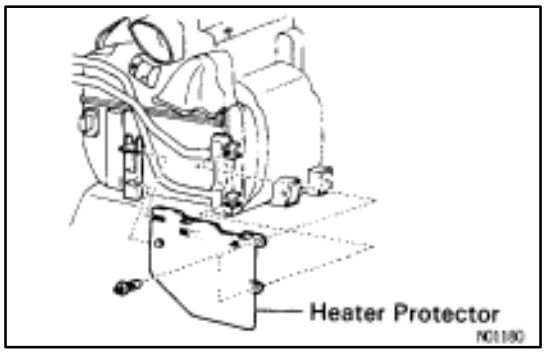
3. **DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE**
4. **DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES**
5. **REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See pages BO–109 to 115)**
6. **REMOVE BLOWER UNIT (See page AC–101)**



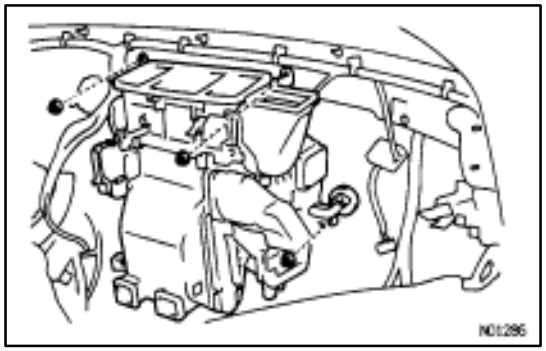
7. **DISCONNECT LIQUID AND SUCTION TUBE FROM BLOCK JOINT**
   Remove two bolts and both tubes.



8. **REMOVE REAR AIR DUCTS**
   Remove the clip and the air duct.



9. **REMOVE HEATER PROTECTOR**
   Remove the two clips and the heater protector.



10. REMOVE A/C UNIT

(a) Disconnect connectors from the unit.

(b) Remove the three nuts and the A/C unit.

A/C UNIT INSTALLATION

1. INSTALL A/C UNIT

(a) Install the A/C unit with the three nuts.

(b) Connect connectors.

2. INSTALL HEATER PROTECTOR

3. INSTALL REAR AIR DUSTS

4. CONNECT LIQUID AND SUCTION TUBE TO BLOCK JOINT

5. INSTALL BLOWER UNIT

6. INSTALL INSTRUMENT PANEL AND REINFORCEMENT

7. CONNECT WATER HOSES TO HEATER RADIATOR PIPES

8. CONNECT WATER VALVE CONTROL CABLE TO WATER VALVE

(See step 3 on page AC–116)

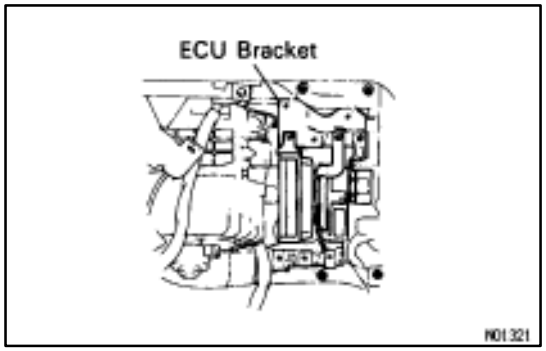
9. REFILL WITH ENGINE COOLANT

10. EVACUATE AIR FROM REFRIGERATION SYSTEM

11. CHARGE SYSTEM WITH REFRIGERANT AND INSPECT FOR LEAKAGE OF REFRIGERANT

Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)

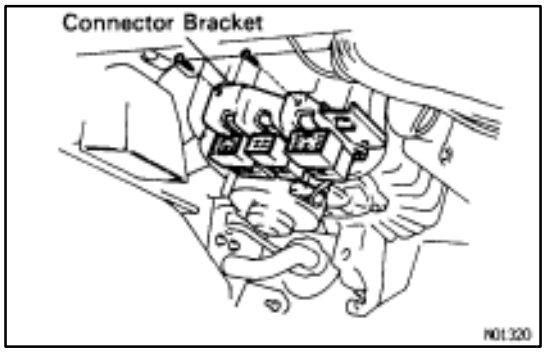


BLOWER UNIT

BLOWER UNIT REMOVAL

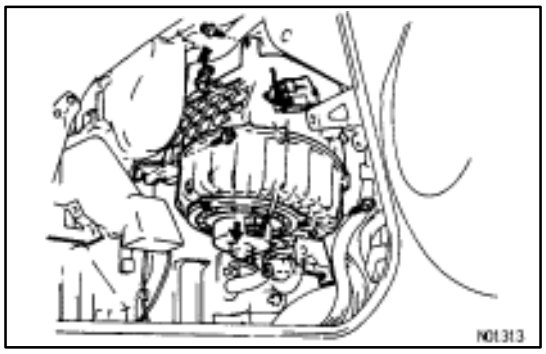
AC05S–01

1. **REMOVE GLOVE COMPARTMENT**
   (See page BO–111)
2. **REMOVE ECU AND ECU BRACKET**



3. **REMOVE CONNECTOR BRACKET**

(a) Disconnect the connector from the connector bracket.
(b) Remove the two screws and the bracket.



4. **REMOVE BLOWER UNIT**

(a) Disconnect the connectors from the blower unit.
(b) Remove the three screws, one nut and the blower unit.

BLOWER UNIT INSTALLATION

1. **INSTALL BLOWER UNIT**

(a) Install the blower unit with the three screws an one nut.
(b) Connect the connectors.

2. **INSTALL CONNECTOR BRACKET**

3. **INSTALL ECU BRACKET AND ECU**

4. **INSTALL GLOVE COMPARTMENT**
   (See page BO–111)

COMPRESSOR

ON–VEHICLE INSPECTION

AC00R–01

(Magnetic Clutch)

1. MAKE THE FOLLOWING VISUAL CHECKS

(a) Leakage of grease from the clutch bearing.

(b) Signs of oil on the pressure plate or rotor.

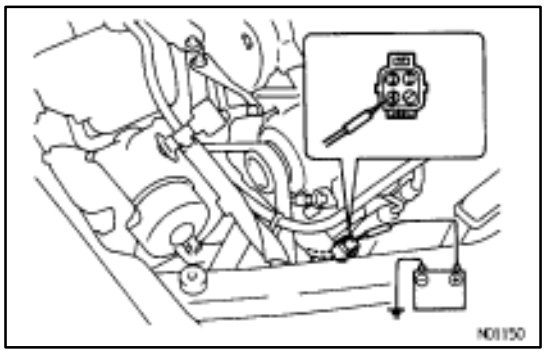
Repair or replace, as necessary.

2. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

(a) Start engine.

(b) Check for abnormal noise from near the compressor when the A/C switch is OFF.

If abnormal noise is being emitted, replace the magnetic clutch.



3. INSPECT MAGNETIC CLUTCH

(a) Disconnect the connector from the magnetic clutch.

(b) Connect the positive (+) lead from the battery to the terminal on the magnetic clutch connector and the negative (–) lead to the body ground.

(c) Check that the magnetic clutch is energized.

If operation is not as specified, replace the magnetic clutch.

(Compressor)

1. INSTALL MANIFOLD GAUGE SET

(See page AC–15)

2. START ENGINE

3. INSPECT COMPRESSOR FOR METALLIC SOUND

Check that there is a metallic sound from the compressor when the A/C switch is turn on.

If metallic sound is heard, replace the compressor assembly.

4. INSPECT PRESSURE OF REFRIGERATION SYSTEM

See “Refrigerant System Inspection with Manifold Gauge Set” on page AC–92.

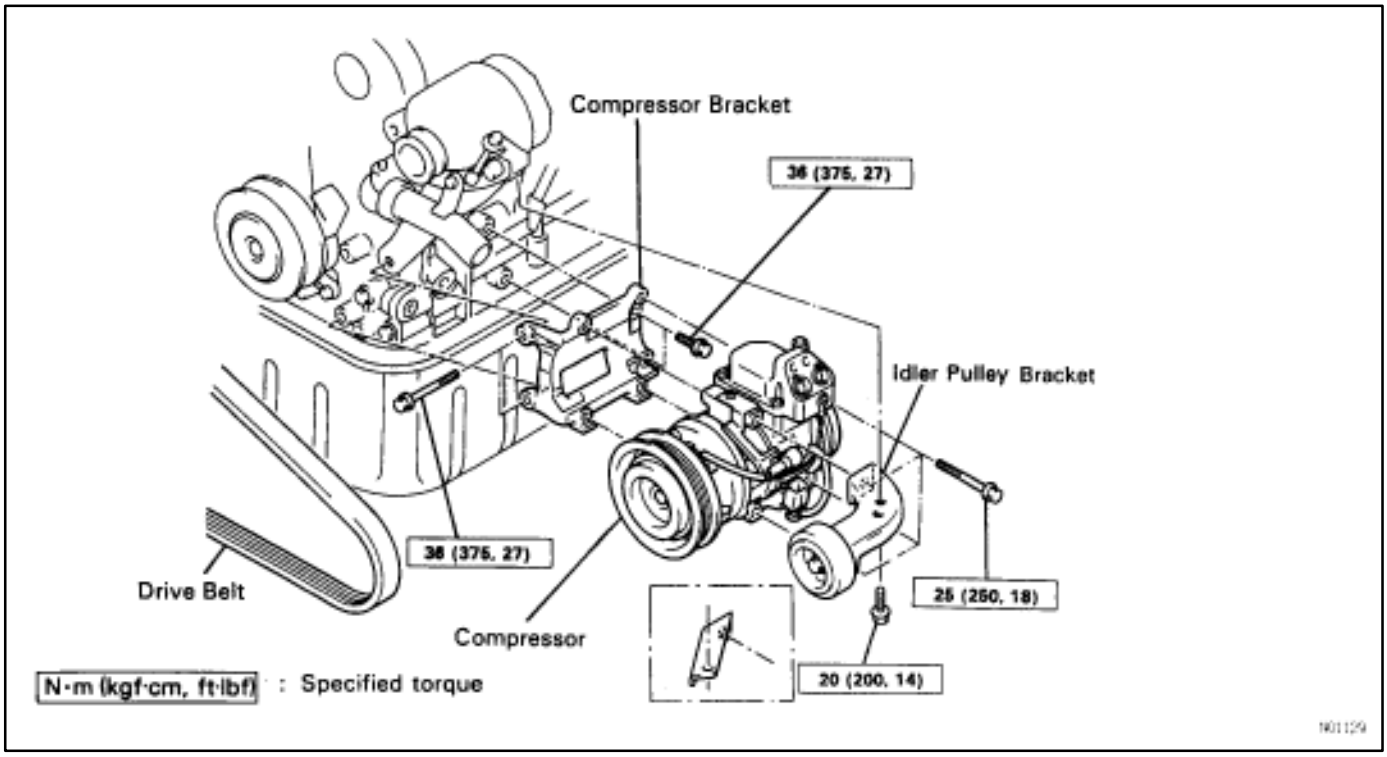
5. STOP ENGINE

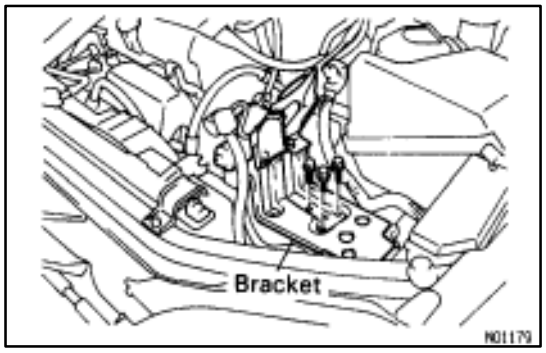
6. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT FROM SAFETY SEAL

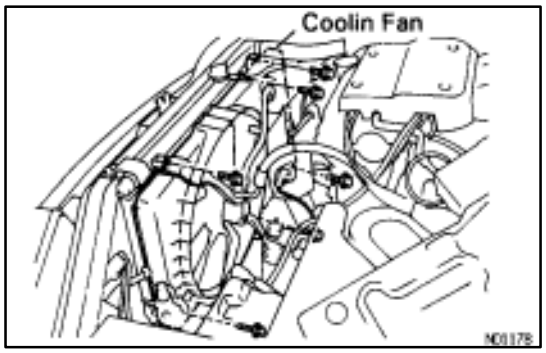
If there is any leakage, replace the compressor assembly.

COMPRESSOR REMOVAL

AC05T–01







1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX TEN MINUTES

2. STOP ENGINE

3. REMOVE BATTERY AND BRACKET

4. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

5. REMOVE COOLING FAN
(See page EG–225)

6. DISCONNECT DISCHARGE HOSE AND SUCTION HOSE FROM COMPRESSOR

7. DISCONNECT CONNECTOR FROM MAGNETIC CLUTCH

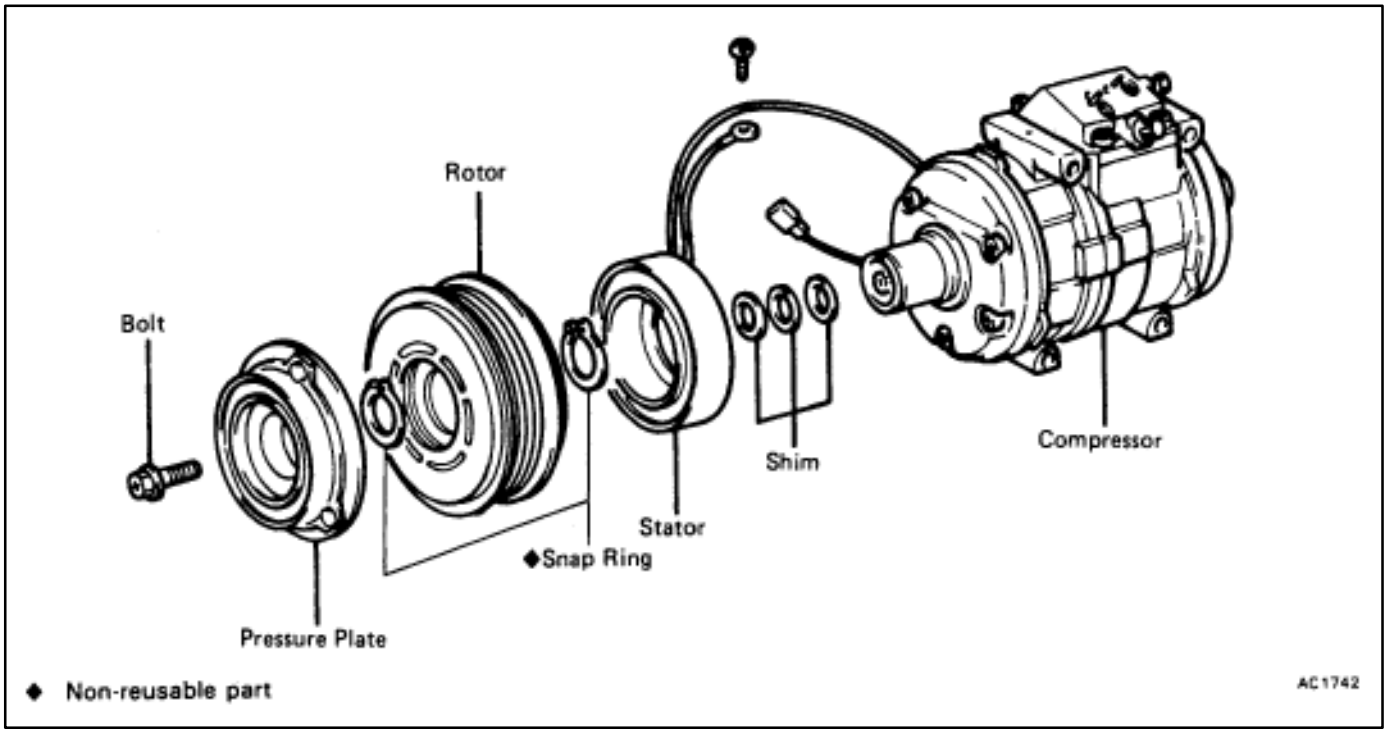
8. REMOVE COMPRESSOR

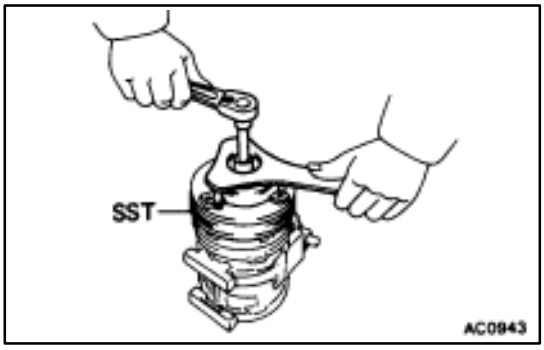
(a) Loosen the drive belt.

(b) Remove four bolts and compressor.

MAGNETIC CLUTCH DISASSEMBLY

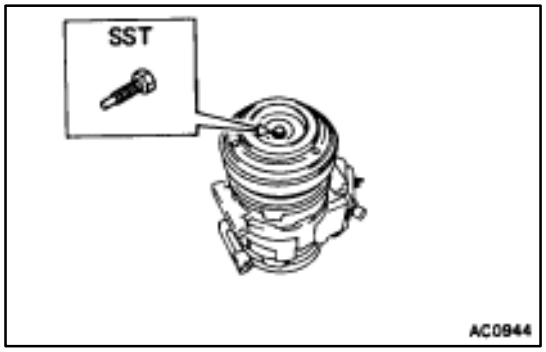
AC00T–01



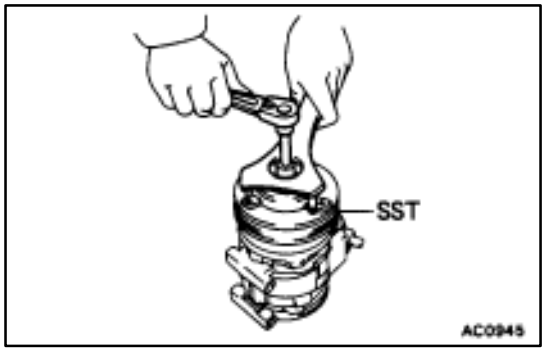


1. REMOVE PRESSURE PLATE

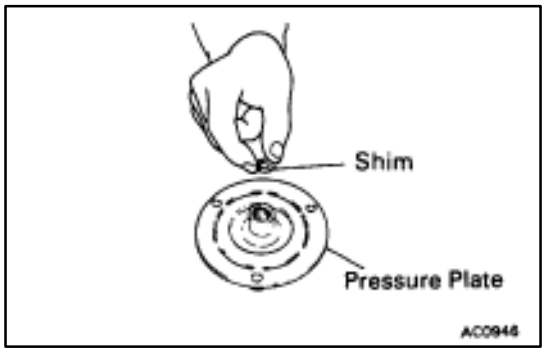
(a) Using a SST and socket wrench, remove the shaft bolt.
SST 07112–76060



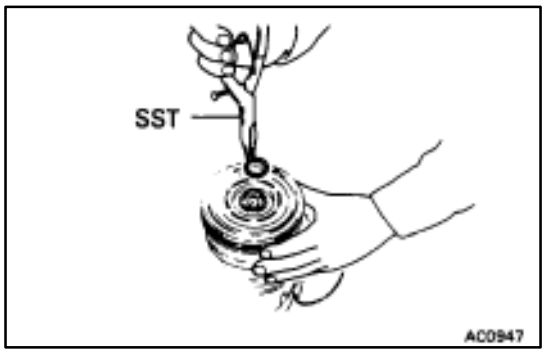
(b) Install a SST on the pressure plate.
SST 07112–66040



(c) Using a SST and socket wrench, remove the pressure plate.
SST 07112–76060

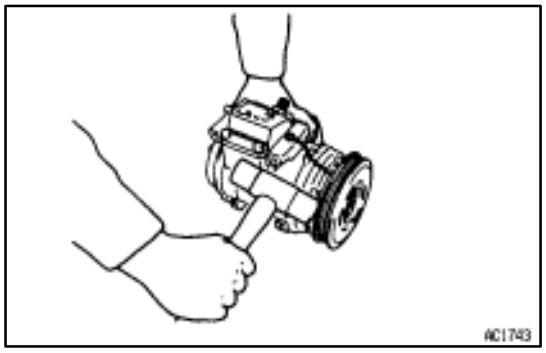


(d) Remove the shims from the pressure plate.

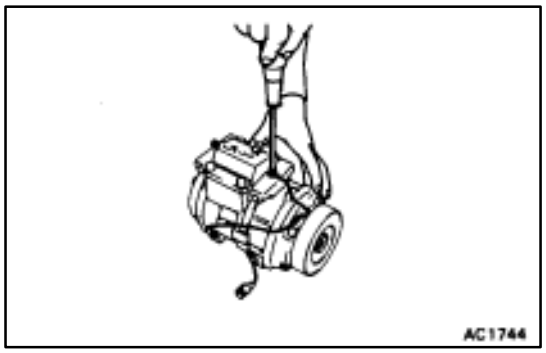


2. REMOVE ROTOR

(a) Using a SST remove the snap ring.
SST 07114–84020
CAUTION: Do not spread the point of SST widely.
Max width:
23.1 mm

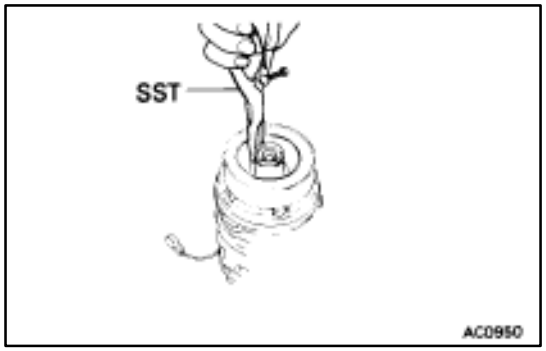


(b) Using a plastic hammer, tap the rotor off the shaft.
NOTICE: Be careful not to damage the pulley when tapping on the rotor.

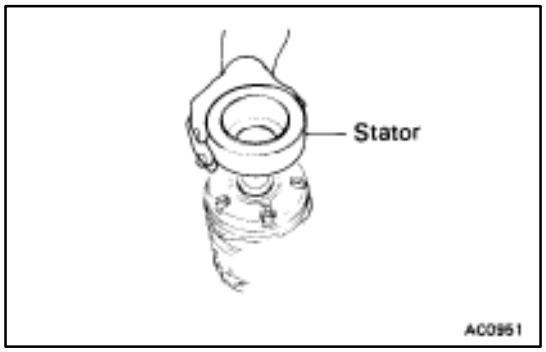


3. REMOVE STARTER

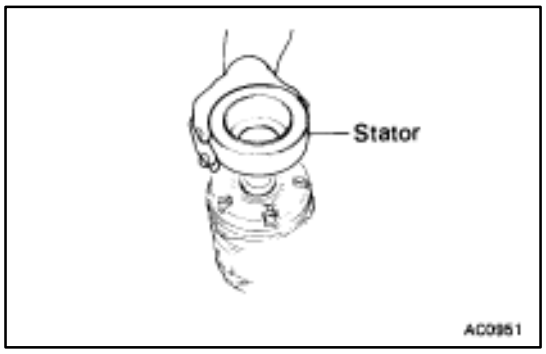
(a) Disconnect the stator lead wire from the compressor housing.



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



(c) Remove the stator.

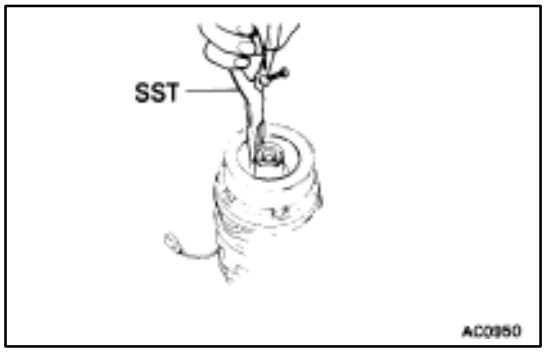


MAGNETIC CLUTCH ASSEMBLY

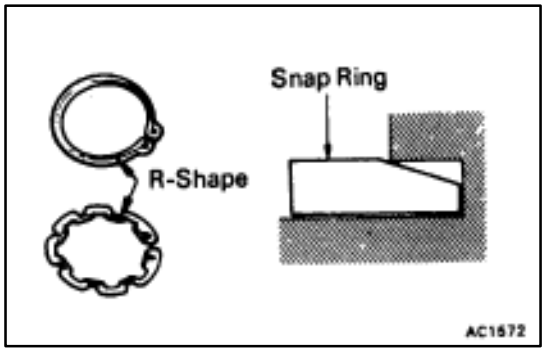
AC00U–01

1. INSTALL STATOR

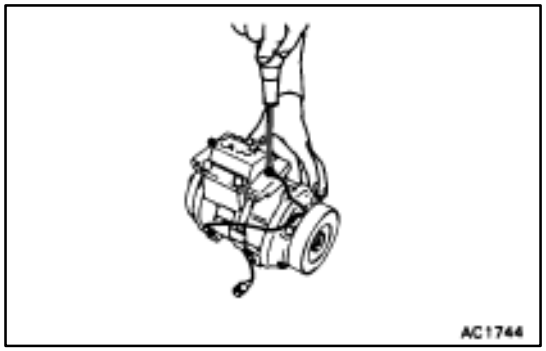
(a) Install the stator on the compressor.



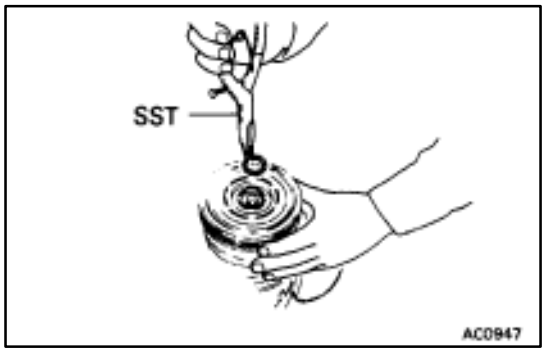
(b) Using a SST, install the new snap ring.
SST 07114–84020



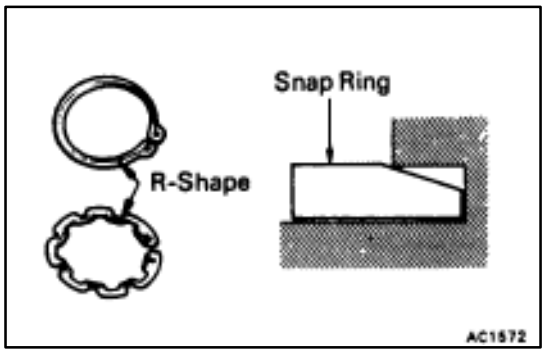
NOTICE: The snap ring should be installed so that its beveled side faces up.



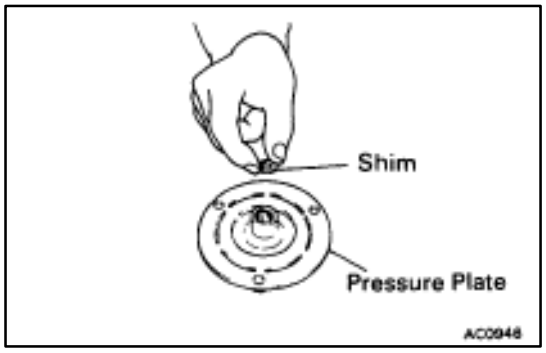
(c) Using a SST and torque wrench, fasten the magnetic clutch lead wire to the cylinder block.
Torque: 3.4 N·m (35 kgf·cm, 30 in.·lbf)
SST 07110–61050



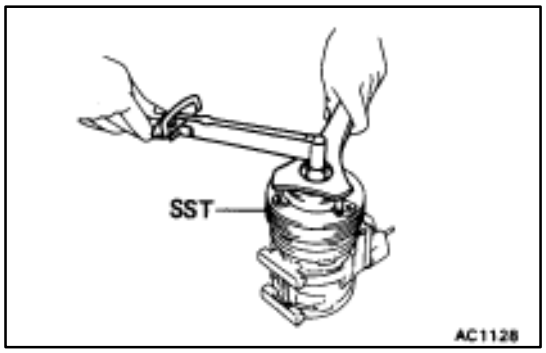
2. INSTALL ROTOR
(a) Install the rotor on the compressor shaft.
(b) Using a SST, install the new snap ring.
SST 07114–84020
CAUTION: Do not spread the point of SST widely.
Max width:
23.1 mm



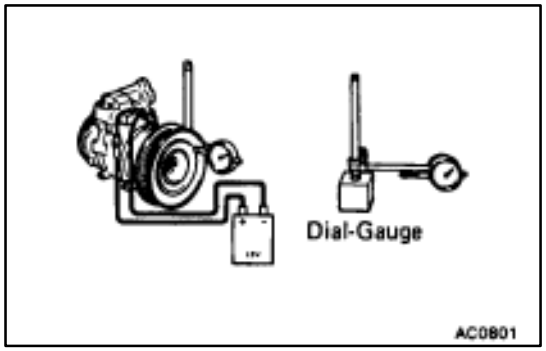
NOTICE: The snap ring should be installed so that its beveled side faces up.



3. INSTALL PRESSURE PLATE
(a) Put the shims on the pressure plate.



(b) Using a SST and torque wrench, install the shaft bolt.
SST 07112–76060
Torque: 13 N·m (135 kgf·cm, 10 ft·lbf)



4. CHECK CLEARANCE OF MAGNETIC CLUTCH

(a) Set the dial–gauge to the pressure plate of the magnetic clutch.

(b) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.

(c) Check the clearance between the pressure plate and rotor, whenconnect the negative (–) terminal of the battery.

Standard clearance:

0.5 ± 0.15 mm (0.020 ± 0.059 in.)

If the clearance is not within standard clearance, adjust the clearance using shims to obtain the standard clearance.

COMPRESSOR INSTALLATION

AC02C–01

1. INSTALL COMPRESSOR

(a) Install compressor with four bolts.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Install drive belt.

2. CONNECT CONNECTOR TO MAGNETIC CLUTCH

3. CONNECT DISCHARGE HOSE AND SUCTION HOSE TO COMPRESSOR

NOTICE: Hoses should be connected immediately after the caps have been removed.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

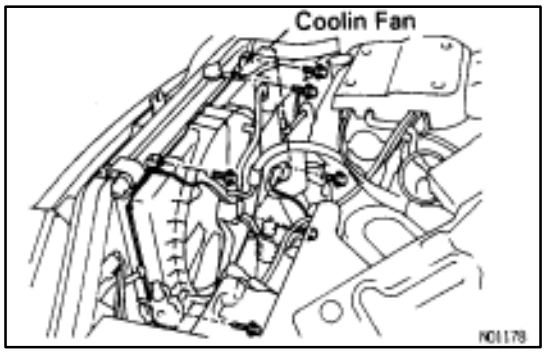
Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak tester, check for leakage of refrigerant.

If there is leakage, check the tightening torque at the joints.

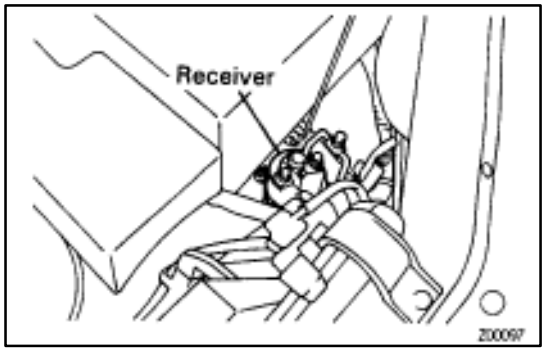


6. INSTALL COOLING FAN
(See page EG–261 and 265)

7. INSTALL BRACKET

8. INSTALL BATTERY

9. INSPECT A/C OPERATION



RECEIVER
ON–VEHICLE INSPECTION

AC00W–01

INSPECT FITTINGS FOR LEAKAGE

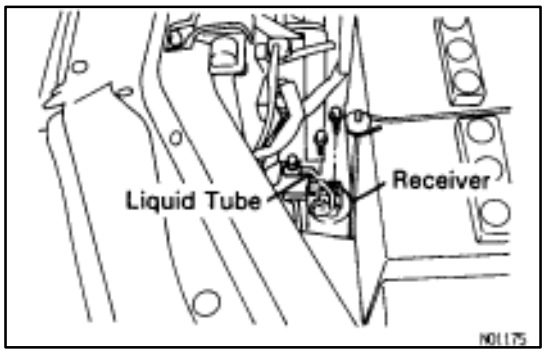
Using a gas leak tester, check for leakage.

If there is leakage, check the tightening torque at the joints.

RECEIVER REMOVAL

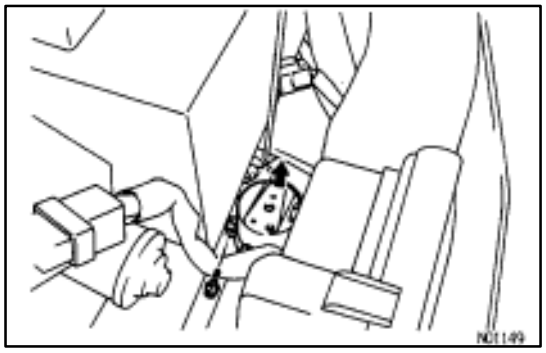
AC00X–01

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM



2. REMOVE TWO LIQUID TUBES FROM RECEIVER

Remove two bolts and both tubes from the receiver.



3. REMOVE RECEIVER FROM RECEIVER HOLDER

Remove the bolt, then remove the receiver from receiver holder.

NOTICE: Cap the open fittings immediately to keeps moisture out of the system.

RECEIVER INSTALLATION

AC00Y–01

1. INSTALL RECEIVER INTO RECEIVER HOLDER

Install the receiver into the receiver, holder with the bolt.

2. INSTALL TWO LIQUID TUBES TO RECEIVER

Install two liquid tubes to the receiver with two bolts.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE: Do not remove the caps until the tubes are connected.

3. REPLENISH COMPRESSOR OIL IF RECEIVER HAS BEEN REPLACED

Add 15 cm (0.5 fl.oz.)

Compressor oil:

ND OIL 6

SUNISO NO. 5 GS or equivalent

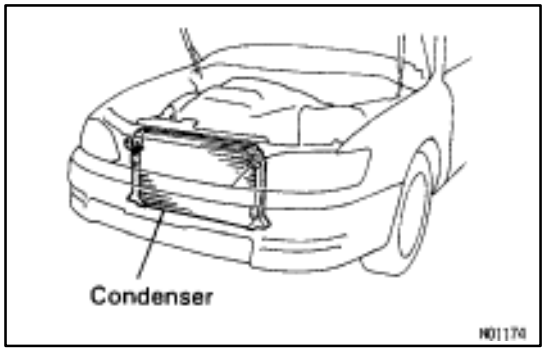
4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

6. INSPECT A/C OPERATION



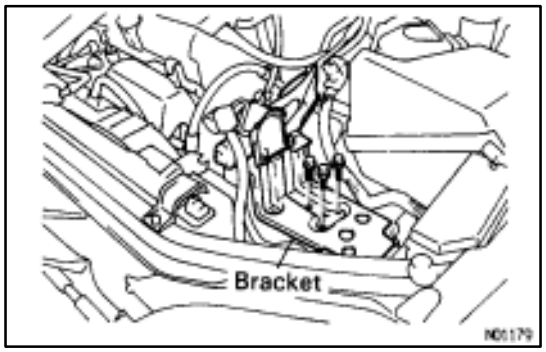
CONDENSER

ON–VEHICLE INSPECTION

AC05U–01

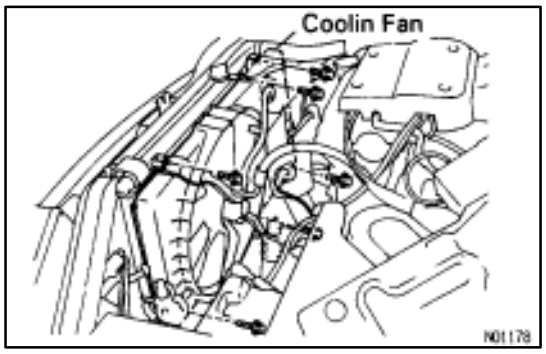
1. **INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE**
   If the fins are clogged, wash them with water and dry with compressed air.
   NOTICE: Be careful not to damage the fins.
   If the fins are bent straighten them with a screwdriver or pliers.

2. **INSPECT CONDENSER AND FITTINGS FOR LEAKAGE**
   Using a gas leak tester, check for leakage.
   If there is leakage, check the tightening torque at the joints.

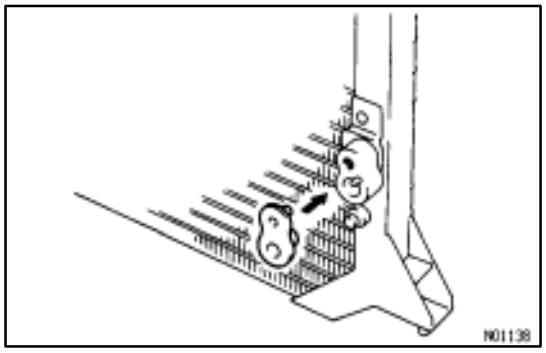


CONDENSER REMOVAL

1. **REMOVER REFRIGERANT FROM REFRIGERATION SYSTEM**

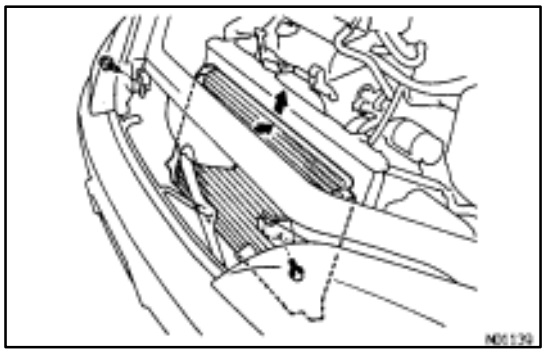


2. **REMOVE BATTERY**
3. **REMOVE UPPER COVER**
4. **REMOVE BRACKET**
5. **REMOVE COOLING FAN**
   (See page EG–255)
6. **REMOVE UPPER SUPPORT**
   Remove two bolts and two upper supports.

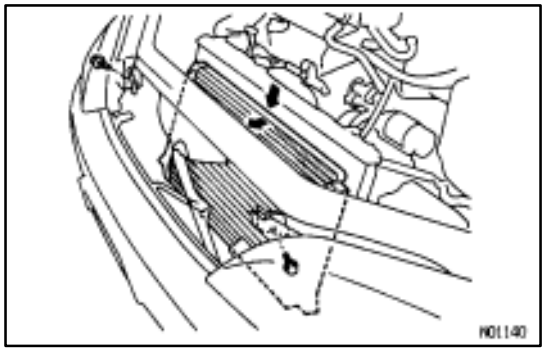


7. **REMOVE LIQUID TUBES**
   Remove two bolts and two tubes.
   NOTICE: Cap the open fittings immediately to keep moisture out of the system.

8. **REMOVE HEADLIGHTS ON THE BOTH SIDES**



9. **REMOVE CONDENSER**
   Remove two bolts and lean the radiator backward, then remove the condenser.



CONDENSER INSTALLATION

AC011–02

1. INSTALL CONDENSER

Install the condenser with two bolt.

2. INSTALL LIQUID TUBES

Install both tubes with two bolts.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE: Do not remove caps until the tube is installed.

3. INSTALL COOLING FAN

(See page EG–261 and 265)

4. REPLENISH COMPRESSOR OIL IF CONDENSER HAS BEEN REPLACED

Add 35 cm (1.2 fl.oz.)

Compressor Oil:

ND OIL 6

SUNISO NO. 5 GS or equivalent

5. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50g (33.51 ± 1.76 oz)

6. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak tester, check for leakage of refrigerant.

7. INSTALL REMOVAL PARTS

Install the removal parts in reverse order of removal procedure.

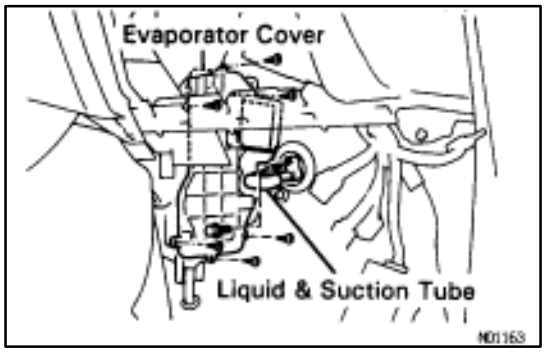
EVAPORATOR

EVAPORATOR REMOVAL

AC012–01

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

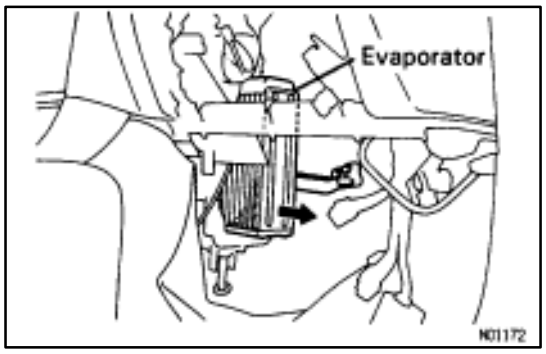
2. REMOVE BLOWER UNIT
(See page AC–101)



3. REMOVE EVAPORATOR COVER

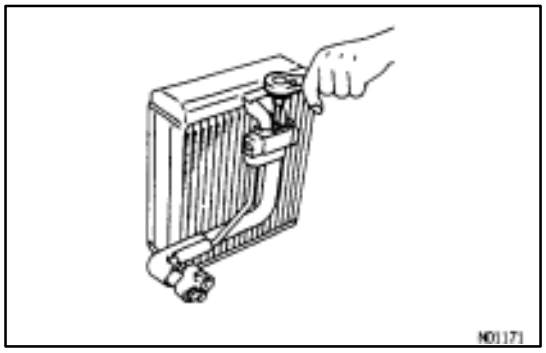
(a) Remove two bolts for the liquid and suction tube.

(b) Remove eight screws and evaporator cover.



4. REMOVE EVAPORATOR

(a) Pull and remove the evaporator.



(b) Remove two bolts using a hexagon wrench and separate the evaporator and expansion valve.

EVAPORATOR INSPECTION

AC013–01

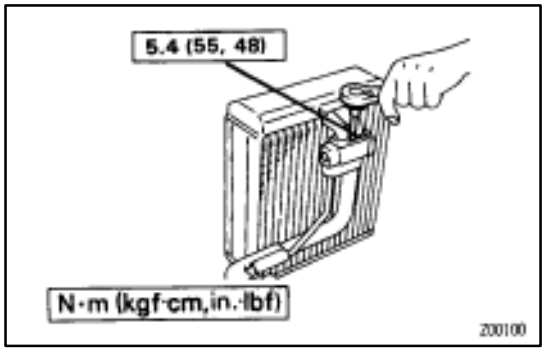
1. INSPECT FINS FOR BLOCKAGE

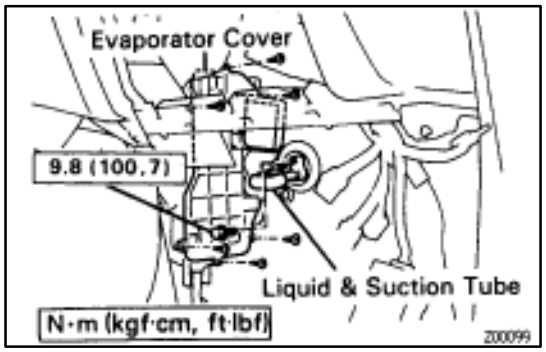
If the fins are clogged, clean them with compressed air.

NOTICE: Never use water to clean the evaporator.

2. INSPECT FITTINGS FOR CRACKS OR SCRATCHES

Repair as necessary.





EVAPORATOR INSTALLATION

AC014–01

1. INSTALL REMOVAL PARTS

Install the removal parts in reverse order of removal procedure.

HINT:

- The tightening torque for the bolt used to install the expantion valve on the evaporator is shown below.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

- The tightening torque for the bolts used to install the liquid and suction tube is shown below.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

2. REPLENISH COMPRESSOR OIL IF EVAPORATOR HAS BEEN REPLACED

Add 45 cm (1.6 fl.oz)

Compressor oil:

ND OIL 6

SUNISO No. 5 GS or equivalant

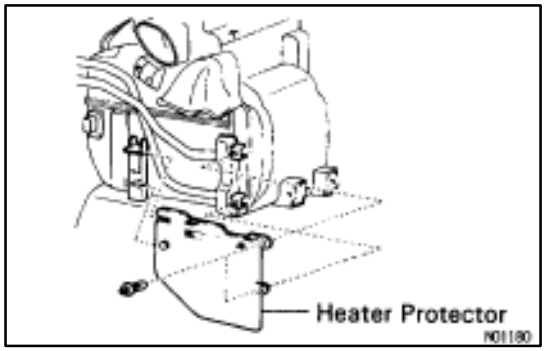
3. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50g (33.51 ± 1.76 oz)

4. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak tester, check for leakage of refrigerant.



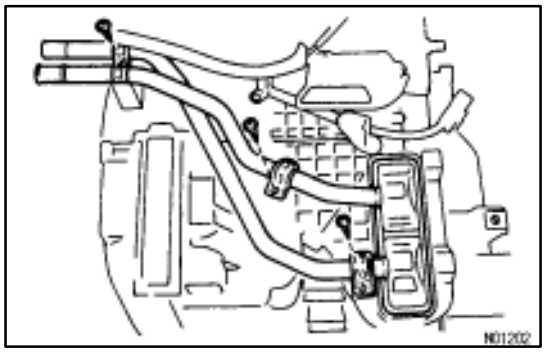
HEATER RADIATOR

HEATER RADIATOR REMOVAL

AC015–01

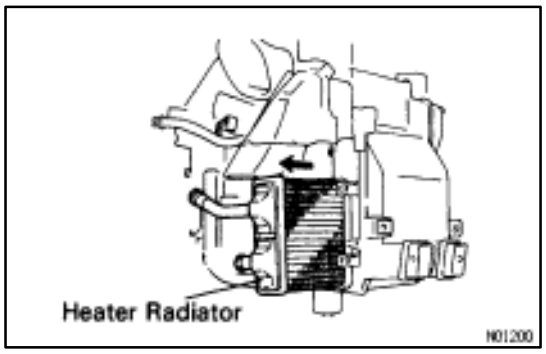
1. REMOVE HEATER PROTECTOR

Remove the two clips and the heater protector.



2. REMOVE HEATER RADIATOR

(a) Remove the three screws and the three clamps.



(b) Disconnect the heater pipes.

(c) Pull the heater radiator out.

HEATER RADIATOR INSPECTION

INSPECT FINS FOR BLOCKAGE

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

HEATER RADIATOR INSTALLATION

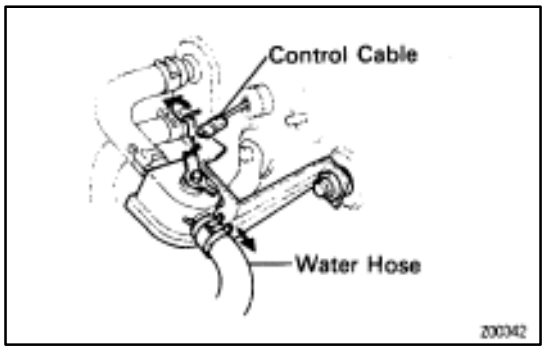
1. INSTALL HEATER RADIATOR TO A/C UNIT

(a) Put the radiator in the A/C UNIT

(b) Connect the heater pipes.

(c) Install the three clamps with three screws.

2. INSTALL HEATER PROTECTOR



WATER VALVE

WATER VALVE REMOVAL

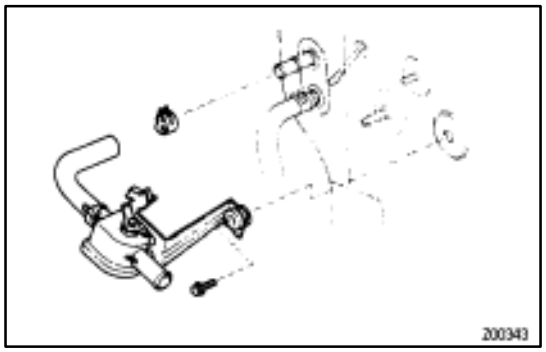
AC016–01

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT: It is not necessary to drain out all the coolant.

2. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE

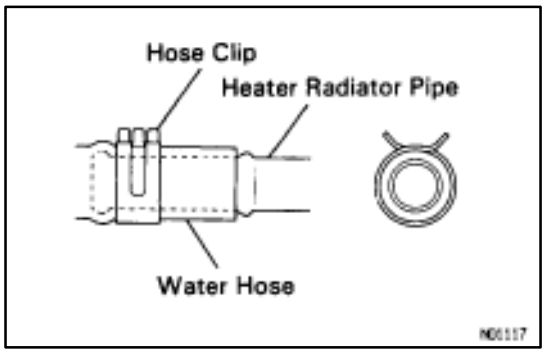
3. DISCONNECT WATER HOSE FROM WATER VALVE



4. REMOVE WATER VALVE

(a) Disconnect the water hose from the heater radiator pipe.

(b) Remove the bolt and the water valve



WATER VALVE INSTALLATION

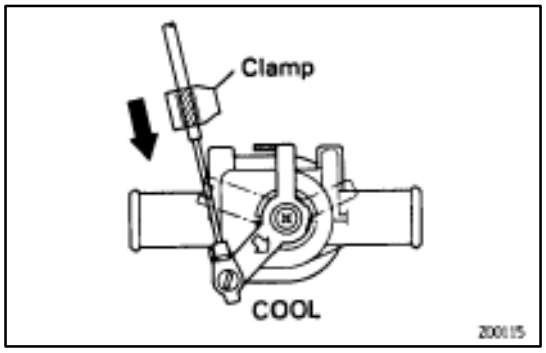
AC017–01

1. INSTALL WATER VALVE

(a) Push the water hose onto the heater radiator pipe as far as rige on the pipe and install the hose clip.

(b) Install water valve with the one bolt.

2. CONNECT HEATER HOSE TO WATER VALVE



3. CONNECT WATER VALVE CONTROL CABLE TO WATER VALVE

(a) Set the temperature control switch to “COOL”.

(b) Set the water valve lever to “COOL”, install the control cable and lock the clamp.

HINT: Lock the clamp while lightly pushing the outer cable in the direction shown by the arrow.

EXPANSION VALVE

ON–VEHICLE INSPECTION

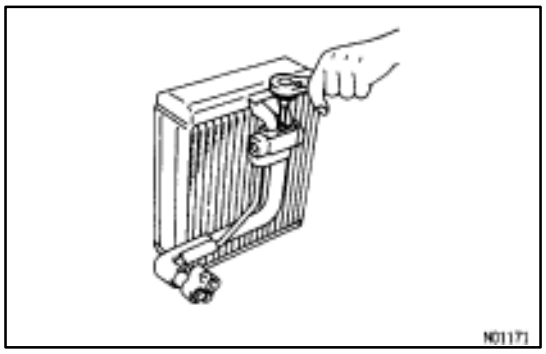
AC018–01

1. **CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE**

2. **INSTALL MANIFOLD GAUGE SET**

3. **RUN ENGINE**
   Run the engine at 2,000 rpm for at least 5 minutes. Then check that the high pressure reading is 1,275–1,471 kPa (13–15 kgf/cm , 185–213 psi).

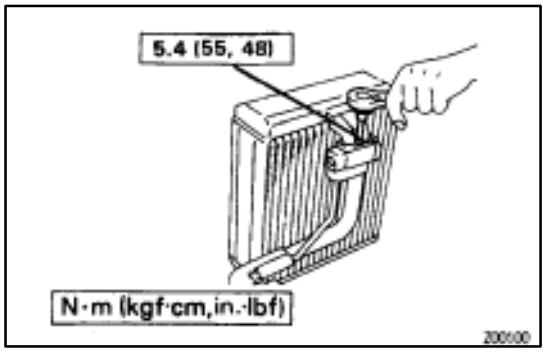
4. **CHECK EXPANSION VALVE**
   If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm , 0 psi).
   HINT: When the low pressure drops to 0 kPa (0 kgf/ cm , 0 psi), feel the receiver's IN and OUT sides for no temperature difference.



EXPANSION VALVE REMOVAL

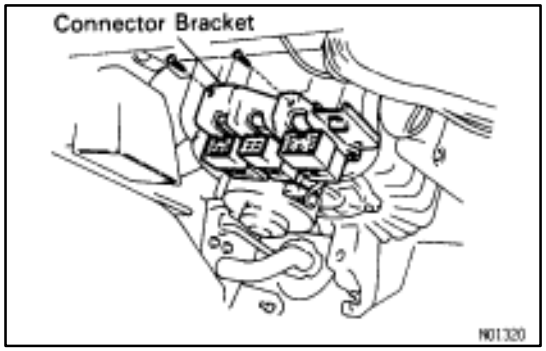
AC019–01

1. **REMOVE EVAPORATOR**
   (See page AC–113)
2. **REMOVE EXPANSION VALVE**
   (See page AC–113)



EXPANSION VALVE INSTALLATION

1. **INSTALL EXPANSION VALVE**
   (See page AC–114)
2. **INSTALL EVAPORATOR**
   (See page AC–114)

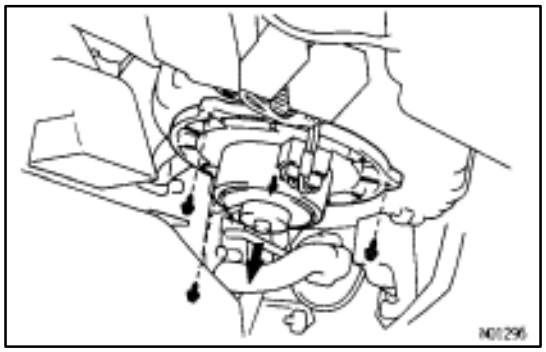


BLOWER MOTOR

BLOWER MOTOR REMOVAL

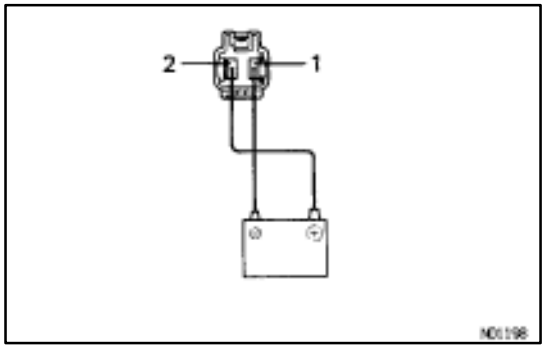
AC01C–01

1. **REMOVE INSTRUMENT LOWER PANEL AND UNDER COVER NO. 2**
   (See page BO–110)
2. **REMOVE CONNECTOR BRACKET**
   Remove the two screws and the bracket



3. **REMOVE MOTOR**

(a) Disconnect the connector.
(b) Remove the three screws and the motor.



BLOWER MOTOR INSPECTION

AC01D–01

INSPECT BLOWER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, then check that the motor operation is smooth.

BLOWER MOTOR INSTALLATION

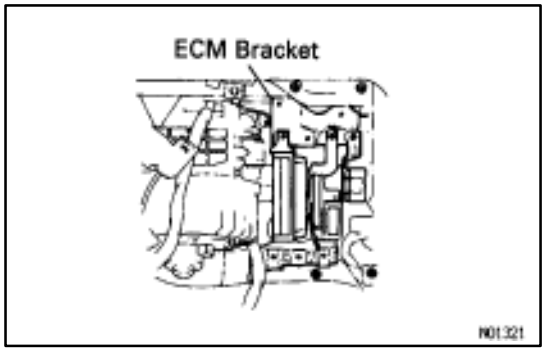
AC01E–01

1. **INSTALL MOTOR**

(a) Install the motor with three screws.
(b) Connect the connector.

2. **INSTALL CONNECTOR BRACKET**

3. **INSTALL INSTRUMENT LOWER PANEL AND UNDER COVER NO. 2**

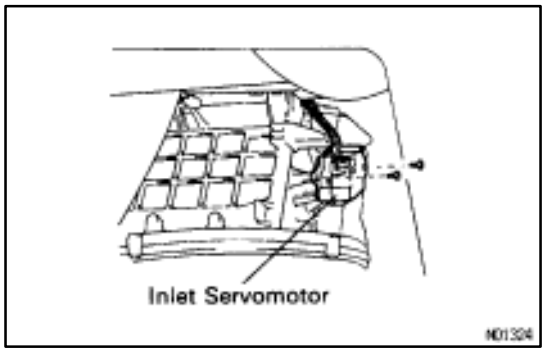


AIR INLET SERVOMOTOR

AIR INLET SERVOMOTOR REMOVAL

AC01G–01

1. **REMOVE GLOVE COMPARTMENT**
   (See page BO–111)
2. **REMOVE ECU AND ECU BRACKET**



3. **REMOVE SERVOMOTOR**

(a) Disconnect the connector.
(b) Remove the two screws and the servomotor.

AIR INLET SERVOMOTOR INSPECTION

AC05V–01

(See page AC–64)

AIR INLET SERVOMOTOR INSTALLATION

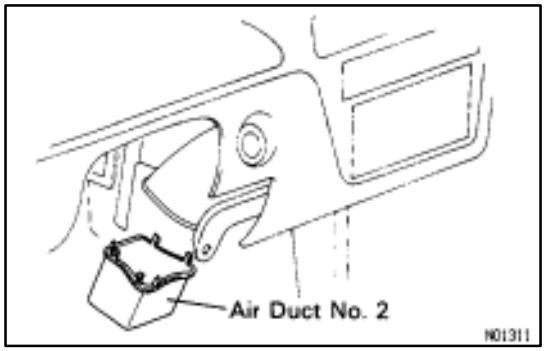
AC01J–01

1. **INSTALL SERVOMOTOR**

(a) Install the servomotor with two screws.
(b) Connect the connector.

2. **INSTALL ECU AND ECU BRACKET**

3. **INSTALL GLOVE COMPARTMENT**

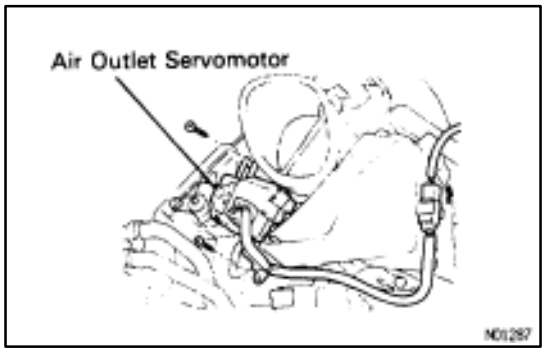


AIR OUTLET SERVOMOTOR

AIR OUTLET SERVOMOTOR REMOVAL

AC01K–01

1. **REMOVE INSTRUMENT LOWER FINISH PANEL AND AIR DUCT**
   (See pages BO–110 and 113)
2. **REMOVE AIR DUCT NO. 2**



3. **REMOVE SERVOMOTOR**

(a) Disconnect the connector.
(b) Remove the two screws and the servomotor.

AIR OUTLET SERVOMOTOR INSPECTION

AC05W–01

(See page AC–66)

AIR OUTLET SERVOMOTOR INSTALLATION

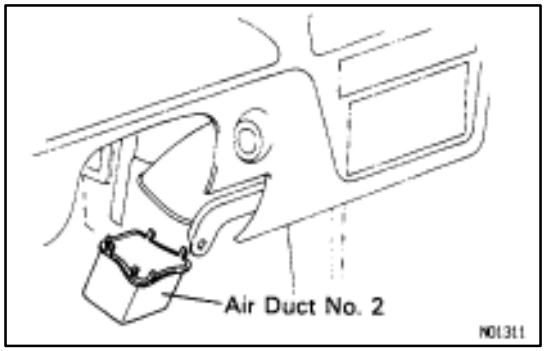
AC01M–02

1. **INSTALL SERVOMOTOR**

(a) Install the servomotor with two screws.
(b) Connect the connector.

2. **INSTALL HEATER DUCT**

3. **INSTALL LOWER FINISH PANEL**

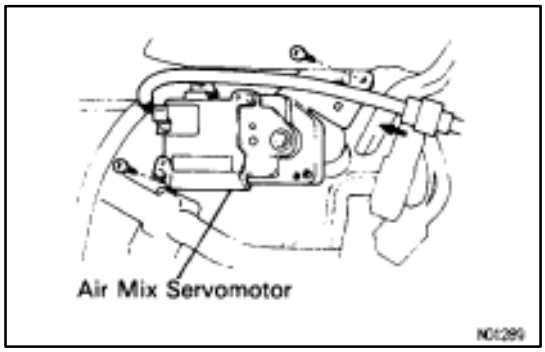


AIR MIX SERVOMOTOR

AIR MIX SERVOMOTOR REMOVAL

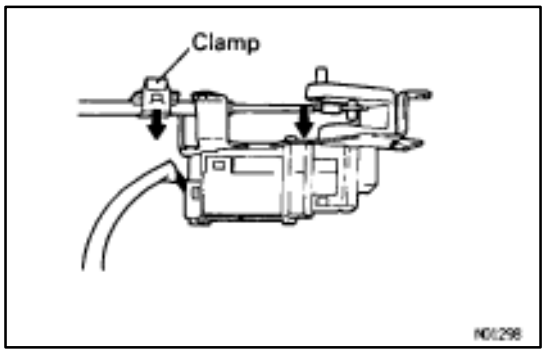
AC05X–01

1. **REMOVE INSTRUMENT LOWER FINISH PANEL, SAFETY RAD NO 2. AND AIR DUCT**
   (See pages BO–110 and 113)
2. **REMOVE AIR DUCT NO 2.**



3. **REMOVE SERVOMOTOR**

(a) Disconnect the connector.
(b) Remove the two screws and the servomotor.



(c) Disconnect the control cable.

AIR MIX SERVOMOTOR INSPECTION

AC05Y–01

(See page AC–60)

AIR MIX SERVOMOTOR INSTALLATION

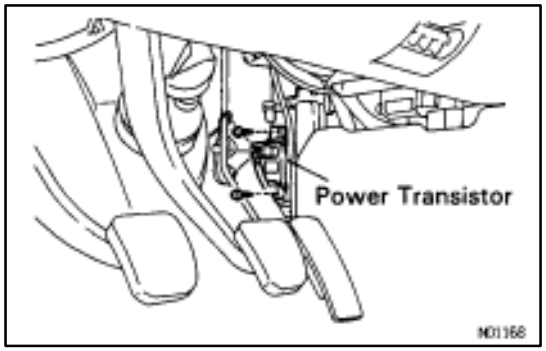
AC05Z–01

1. **INSTALL SERVOMOTOR**

(a) Connect the control cable.
(b) Install the servomotor with two screws.
(c) Connect the connector.

2. **INSTALL HEATER DUCT**

3. **INSTALL INSTRUMENT LOWER FINISH PANEL**



POWER TRANSISTOR

POWER TRANSISTOR REMOVAL

AC060–01

1. REMOVE INSTRUMENT LOWER FINISH PANEL, SAFETY PAD NO 2. AND AIR DUCT
(See pages BO–110 and 113)

2. REMOVE POWER TRANSISTOR

(a) Disconnect the connector.

(b) Remove the two screws and the power transistor.

POWER TRANSISTOR INSPECTION

AC061–01

(See page AC–76)

POWER TRANSISTOR INSTALLATION

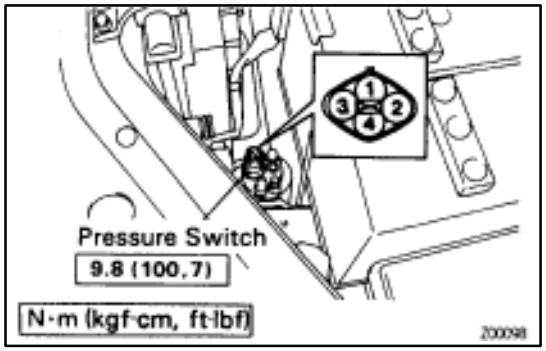
AC062–01

1. INSTALL POWER TRANSISTOR

(a) Install power transistor with tow screws.

(b) Connect the connector.

2. INSTALL AIR DUCT, INSTRUMENT LOWER FINISH PANEL AND SAFETY PAD NO 2.



PRESSURE SWITCH

PRESSURE SWITCH REMOVAL

AC01S–02

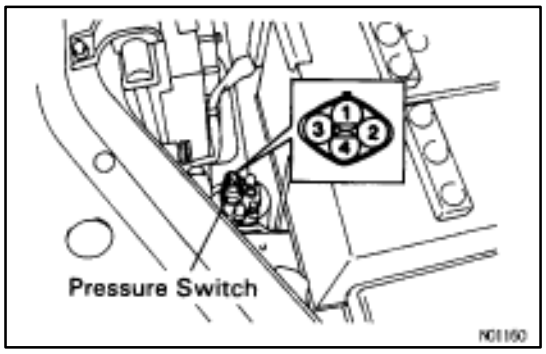
1. RECOVER REFRIGERANT IN REFRIGERATION SYSTEM

2. REMOVE PRESSURE SWITCH

(a) Disconnect the connector.

(b) Remove the pressure switch from the liquid tube.

HINT: Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and remove the switch.



PRESSURE SWITCH INSTALLATION

AC01T–01

1. INSTALL PRESSURE SWITCH

(a) Install the pressure switch to the liquid tube.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

HINT: Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and install the switch.

(b) Connect the connector.

2. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

750 ± 50 g (33.51 ± 1.76 oz)

3. INSPECT FOR LEAKAGE OF REFRIGERANT

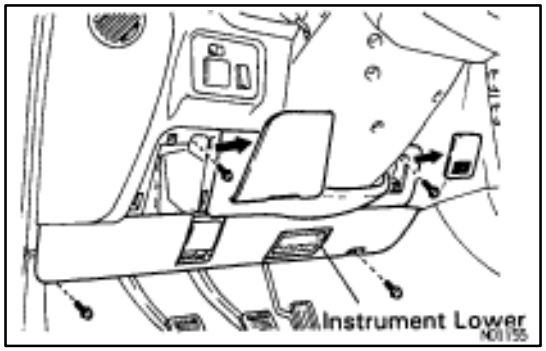
Using a gas leak tester, check for leakage of refrigerant from the pressure switch mount.

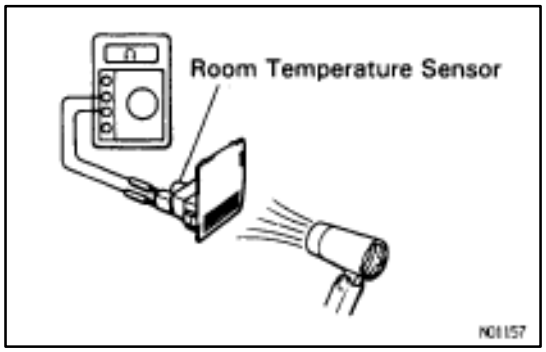
4. INSPECT A/C OPERATION

PRESSURE SWITCH INSPECTION

AC063–01

(See page AC–56)





ROOM TEMPERATURE SENSOR

ROOM TEMPERATURE SENSOR REMOVAL

AC064–01

1. **REMOVE LOWER PANEL**
   Disconnect room temperature sensor connector.
2. **REMOVE ROOM TEMPERATURE SENSOR FROM LOWER PANEL**

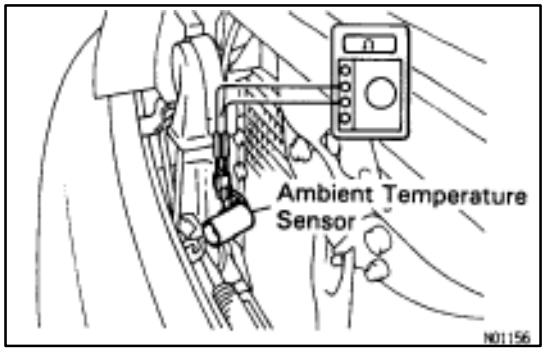
ROOM TEMPERATURE SENSOR INSPECTION

(See page AC–44)

ROOM TEMPERATURE SENSOR INSTALLATION

INSTALL ROOM TEMPERATURE SENSOR

Install room temperature sensor in reverse order of removal procedure.



AMBIENT TEMPERATURE SENSOR

AMBIENT TEMPERATURE SENSOR REMOVAL

AC065–01

REMOVE AMBIENT TEMPERATURE SENSOR

(a) Disconnect the connector.
(b) Remove the ambient temperature sensor.

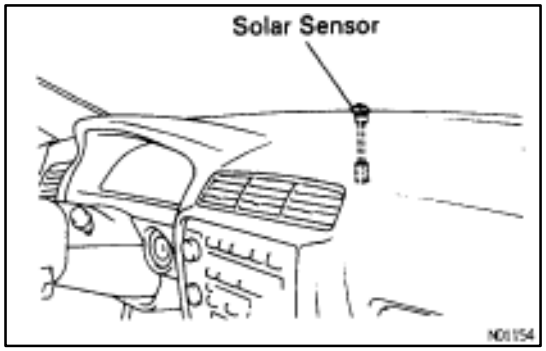
AMBIENT TEMPERATURE SENSOR INSPECTION

(See page AC–46)

AMBIENT TEMPERATURE SENSOR INSTALLATION

INSTALL AMBIENT TEMPERATURE SENSOR

Install ambient temperature sensor in reverse order of removal procedure.



SOLAR SENSOR

SOLAR SENSOR REMOVAL

AC066–01

REMOVE SOLAR SENSOR FROM DASHBOARD

(a) Remove solar sensor form dashboard.
(b) Disconnect solar sensor connector.

SOLAR SENSOR INSPECTION

(See page AC–52)

SOLAR SENSOR INSTALLATION

INSTALL SOLAR SENSOR

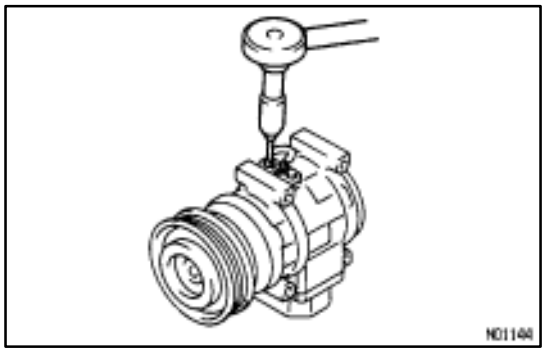
Install solar sensor in reverse order of removal procedure.

REVOLUTION DETECTING SENSOR

ON–VEHICLE INSPECTION

AC067–01

(See page AC–54)



REVOLUTION DETECTING SENSOR REMOVAL

AC01Y–01

1. **REMOVE COMPRESSOR**
   (See page AC–103)
2. **REMOVE REVOLUTION DETECTING SENSOR**

(a) Remove two bolts.

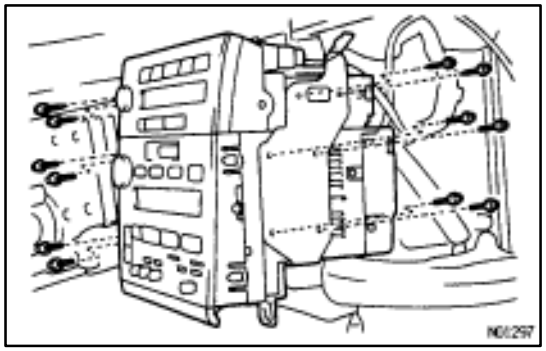
(b) Remove the revolution detecting sensor.

REVOLUTION DETECTING SENSOR INSTALLATION

AC01Z–01

1. **INSTALL REVOLUTION DETECTING SENSOR**
   Using a torque wrench, tighten the bolts.
   Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

2. **INSTALL COMPRESSOR**
   (See page AC–108)



AIR CONDITIONING CONTROL ASSEMBLY

ACO68–01

A/C CONTROL ASEMBLY REMOVAL

1. **REMOVE RADIO AND A/CCONTROL ASSEMBLY**
   (See page BO–112)

2. **REMOVE A/C CONTROL ASSEMBLY**
   Remove four screws, eight bolts and the A/C control assembly.

A/C CONTROL ASSEMBLY INSPECTION

AC069–01

Jadge whether the system is satisfactory or not based on the Troubleshooting procedure on page AC–22.

A/C CONTROL ASSEMBLY INSTALLATION

AC06A–01

1. **INSTALL A/C CONTROL ASSEMBLY TO RADIO**

2. **INSTALL RADIO AND A/C CONTROL ASSEMBLY**
   (See page BO–112)

SERVICE SPECIFICATIONS

SERVICE DATA

AC029–03

Refrigerant charge volume	950 ± 50 g 33.51 ± 1.76 oz
Drive belt tention	–
New belt	165 ± 26 lb
Used belt	88 ± 22 lb
Idle speed	–
Magnetic clutch no engaged	Approx. 700 rpm
Magnetic clutch engaged	Approx. 700 rpm
Magnetic clutch clearance	0.5 ± 0.15 mm (0.020 ± 0.006 in.)

TORQUE SPECIFICATIONS

AC02A–01

Part tightened	N·m	kgf·cm	ft·lbf
Suction hose X Compressor	25	250	18
Discharge hose X Compressor	25	250	18
Compressor X Engine	25	250	18
Liquid X Receiver	9.8	100	7
Lequid X Condensor	9.8	100	7
Expansion valve X Evaporator	5.4	55	48 in.·lbf
Suction tube X A/C unit	9.8	100	7
Liquid tube X A/C unit	9.8	100	7
Pressure switch X Liquired tube	9.8	100	7

TROUBLESHOOTING

How to Proceed with Troubleshooting

Perform troubleshooting in accordance with the procedure on the following page.

CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem. A subjective complaint such as “poor air conditioning efficiency” is also considered in the air conditioning complaints.

Therefore, in “Customer Problem Analysis” and “Problem Symptom Confirmation”, check carefully to determine whether the level of performance is the actual (normal) level or whether it is abnormal. Then perform troubleshoot accordingly.

[2] **CHECK AND CLEAR THE DIAGNOSTIC TROUBLE CODES (PRECHECK)**

First check the diagnostic trouble codes to see if there are any malfunction codes stored in memory.
If there are malfunction codes, make a note of them, then clear them and proceed to “5 Problem Symptom Confirmation”.

5 **PROBLEM SYMPTOM CONFIRMATION, ° SYMPTOM SIMULATION**

Confirm the problem symptoms. If the problem does not reappear, be sure to simulate the problem by mainly checking the circuits indicated by the diagnostic trouble code in step [2], using “Problem Simulation Method”.

• **DIAGNOSTIC TROUBLE CODE CHECK**

Check the diagnostic trouble codes. Check for problems with the sensors or the wire harness.

[6] **DIAGNOSTIC TROUBLE CHART**

If a malfunction code is confirmed in the diagnostic trouble code check, proceed to the check procedure indicated by the matrix chart for each diagnostic trouble code.

[7] **MATRIX CHART OF PROBLEM SYMPTOMS**

If the normal code is confirmed in the diagnostic trouble code check, perform inspection in accordance with the inspection order in the matrix chart of problem symptoms.

[8] **CIRCUIT INSPECTION**

Proceed with diagnosis of each circuit in accordance with the inspection order cofirmed in [6] and [7].
Determine whether the cause of the problem is in the sensor, actuators, wire harness and connectors, or the ECU.

[9] **ACTUATOR CHECK**

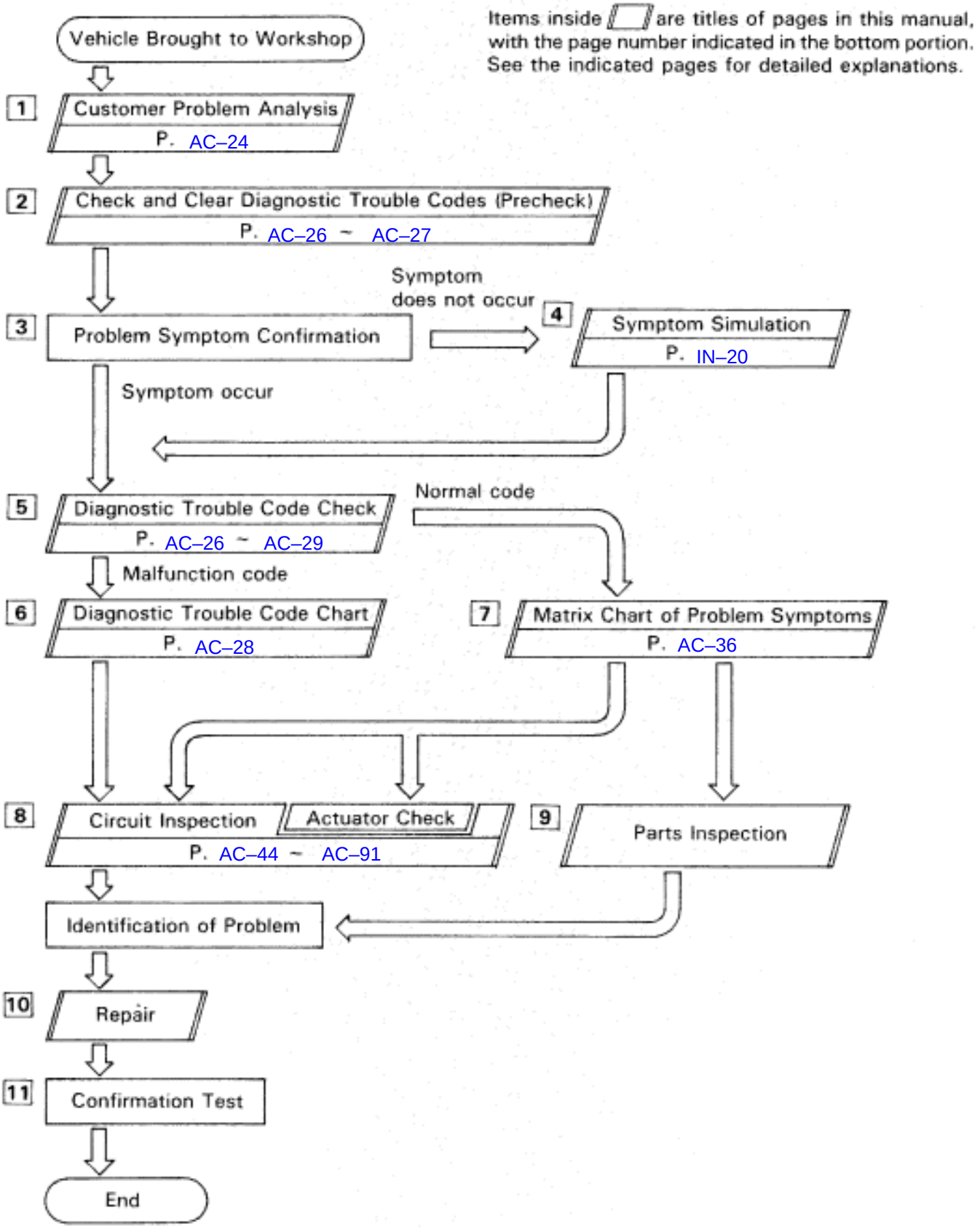
Check actuators for proper operation. Instructions for this diagnosis are given in the flow chart for each circuit.

[10] **REPAIRS**

After the cause of the problem is located, perform repairs by following the inspection and replacement procedures in this manual.

11 CONFIRMATION TEST

After completing repairs, confirm not only that the malfunction is eliminated, but also perform diagnostic trouble check and actuator check, etc. again to make sure the entire air conditioning system is operating correctly.


Items inside [ ] are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.
Vehicle Brought to Workshop
1 Customer Problem Analysis
P. AC–24
2 Check and Clear Diagnostic Trouble Codes (Precheck)
P. AC–26 ~ AC–27
3 Problem Symptom Confirmation
Symptom does not occur
4 Symptom Simulation
P. IN–20
Symptom occur
5 Diagnostic Trouble Code Check
P. AC–26 ~ AC–29
Normal code
Malfunction code
6 Diagnostic Trouble Code Chart
P. AC–28
7 Matrix Chart of Problem Symptoms
P. AC–36
8 Circuit Inspection
Actuator Check
P. AC–44 ~ AC–91
9 Parts Inspection
Identification of Problem
10 Repair
11 Confirmation Test
End

CUSTOMER PROBLEM ANALYSIS

AIR CONDITIONING SYSTEM Check Sheet

Inspector's Name :

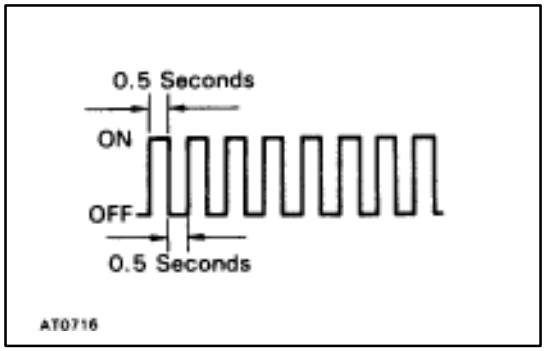
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Miles

Conditions of Problem Occurrence	Date of Problem Occurrence	/ /
	How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)
	Weather	☐ Fine ☐ Cloudy ☐ Snowy ☐ Various/Other
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F °C)

Symptoms	Air Flow Control is Faulty	☐ Blower motor does not operate ☐ Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	☐ Cabin temperature does not go down ☐ Cabin temperature does not rise ☐ Response is slow
	Air Inlet Control is Faulty	☐ Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Air Outlet Control is Faulty	☐ Air outlet mode will not change ☐ Will not enter the desired air outlet mode

Diagnostic Trouble Code Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

–MEMO–



DIAGNOSIS SYSTEM

Warning for A/C compressor lock

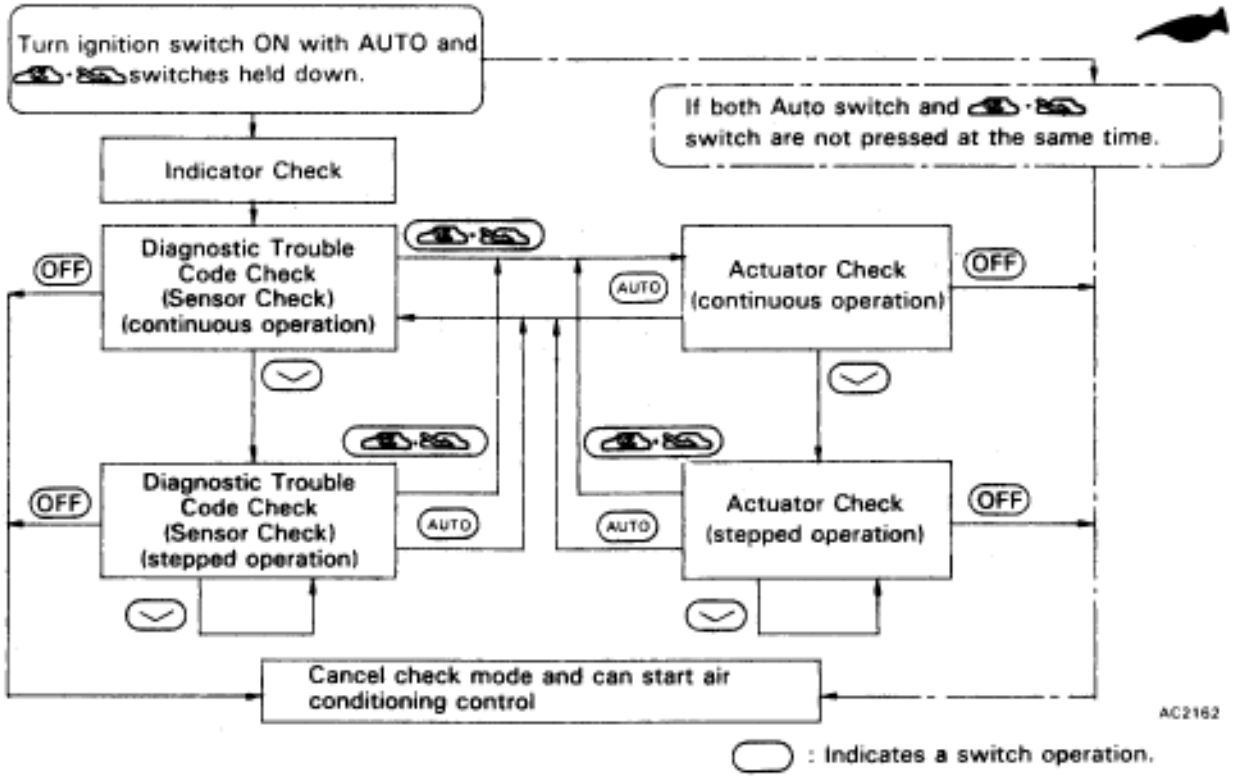
If compressor lock occurs during air conditioning operation, the A/C switch indicator on the air conditioning control assembly starts blinking to warn the driver.

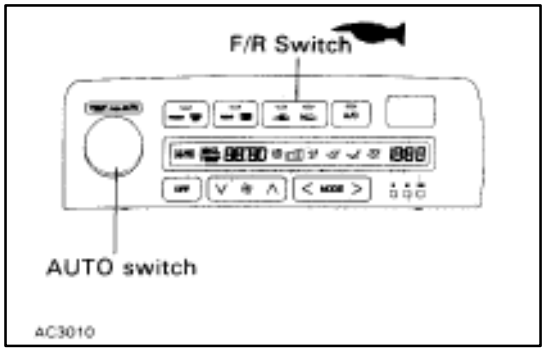
When this occurs, check for compressor lock (code 22) using diagnostic trouble code check then proceed to inspect the circuit or the component.

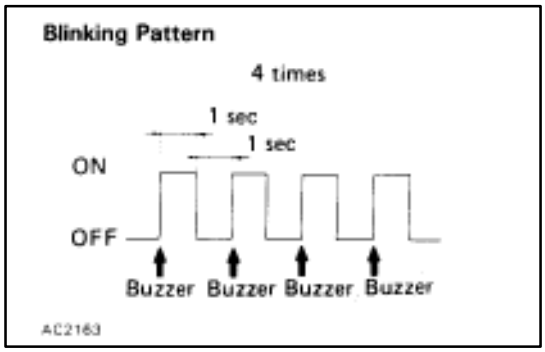
Compressor lock sensor circuit page AC–54

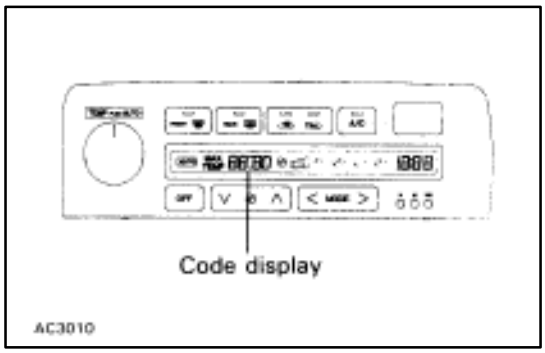
LIST OF OPERATION METHODS

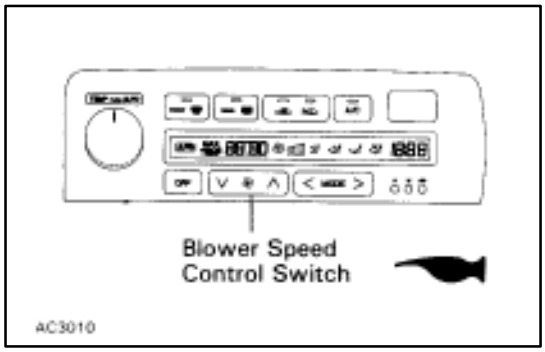
By operating each of the air conditioning control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.

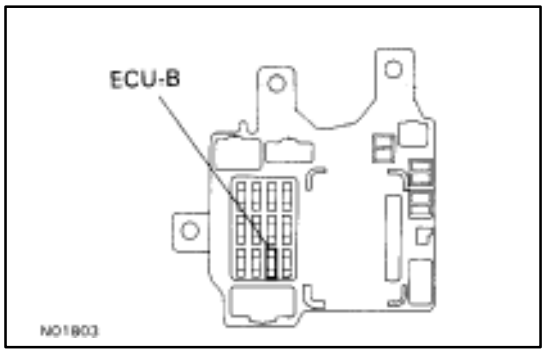












INDICATOR CHECK

1. Turn the ignition switch on while pressing the air conditioning control AUTO switch and fan simultaneously.

2. Check that all the indicators light up and go off at 1 second intervals 4 times in succession.
3. Check that the buzzer sounds when the indicators light up in 2.

HINT:

- After the indicator check is ended, the diagnostic trouble code check begins automatically.
- Press the OFF switch when desiring to cancel the check mode.

DIAGNOSTIC TROUBLE CODE CHECK (SENSOR CHECK)

1. Perform an indicator check. After the indicator check is completed, the system enters the diagnostic trouble code check mode automatically.
2. Read the code displayed on the panel. Refer to the list of codes on page AC–28 when reading the codes. (Codes are output at the temperature display.)

If the slower display is desired, press the  switch and change it to stepped operation. Each time the switch is pressed, the display changes by 1 step.

HINT:

- If the buzzer sounds when a code is being read, it means the trouble indicated by that code continues to occur.
- If the buzzer does not sound when a code is being read, it means the trouble indicated by that code occurred earlier (such as poor connector contacts, etc.).

CLEARING DIAGNOSTIC TROUBLE CODES

1. Pull out the ECU–B fuse in Junction Block No. 1 for 10 sec. or longer to clear the memory of diagnostic trouble codes.
2. After reinserting the fuse, check that the normal code is output.

DIAGNOSTIC TROUBLE CODE CHART

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

Code No.	Diag. Trouble Code Detection Condition
00	• Normal
11*	• Open or short in room temperature sensor circuit.
12	• Open or short in ambient temperature sensor circuit.
13	• Open or short in evaporator temperature sensor circuit.
14	• Open or short in engine coolant temperature sensor circuit.
21	• Open in solar sensor circuit.
	• Short in solar sensor circuit.
22	• All conditions below are detected for 3 secs. or more. (a) Engine rpm: 450 rpm or more. (b) Ratio between engine and compressor rpm diviates 20% or more in comparison to normal operation.
23	• Open in pressure sensor circuit. • Abnormal refrigerant pressure below 207 KPa, 2.1 kgf/cm° over 2660 KPa, 27 kgf/cm°
31	• Short to ground or power source circuit in Air Mix Damper position sensor circuit.
32	• Short to ground or power source circuit in Air Inlet Damper position sersor circuit.
41	• Air mix damper position sensor value does not change even if ECU operates air mix servomotor.
42	• Air inlet damper position sensor value does not change even if ECU operates air inlet servomotor.

HINT: *1 If the room temp. is approx. –20°C (–4°F) or lower code 11 may be output even though the system is normal.

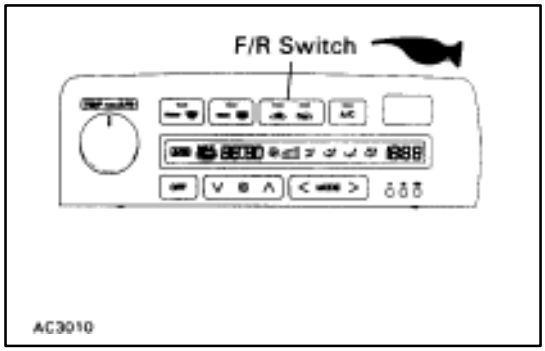
*2 If the ambient temperature is approx. –50°C (–58°F) or lower, a malfunction code may be output even though the system is normal

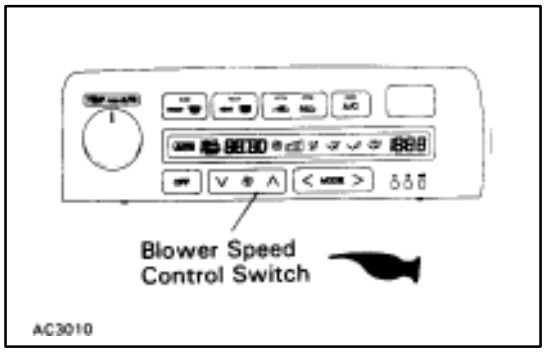
*3 If the check is being performed in a dark place, diagnostic trouble code 21 (solar sensor circuit abnormal) could be displayed.
In this case, perform diagnostic trouble code check again while shining a light, such as an inspection light, on the solar sensor.
If code 21 is still displayed, there could be trouble in the solar sensor circuit.

Trouble Area	Memory*5	See page
–	–	–
• Room temp. sensor • Harness or connector between room temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–44
• Ambient temp. sensor • Harness or connector between ambient temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–46
• Evaporator temp. sensor • Harness or connector between evaporator temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–48
• Engine coolant temp. sensor • Harness or connector between engine coolant temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–50
• Solar sensor • Harness or connector between sensor and ECU • ECU	– O (8.5 min. or more)	AC–52
• Compressor drive belt • Compressor lock sensor • Compressor • Harness and connector between ECU and compressor, compressor lock sensor • ECU	–	AC–54
• Pressure switch • Harness or connector between pressure switch and ECU • Refrigerant pipe line • ECU	–	AC–56
• Air mix damper position sensor • ECU • Harness or connector between air mix damper position sensor and ECU	O (1 min. or more)	AC–58
• Air inlet damper position sensor • ECU • Harness or connector between air inlet damper position sensor and ECU	O (1 min. or more)	AC–62
• Air mix servomotor • Air mix damper position sensor • Harness or connector between air mix damper, servomoter and ECU • ECU	O (15 sec. Or more)	AC–60
• Air inlet servomotor • A/I damper position sensor • Harness or connector between air inlet damper, servomotor and ECU • ECU	O (15 sec. Or more)	AC–64

*4 Compressor lock (DTC 22) is indicated only for a currently occuring malfunction. (see page AC–54)
To confirm diagnostic trouble code 22, perform the following steps.
(1) With the engine ON, enter the diagnostic trouble code check mode.
(2) Press the switch to enter actuator check mode, and set the operation to Step No. 3.
(3) Press the switch to return to diagnostic trouble code check mode.
(4) The diagnostic trouble code is displayed after approx. 3 secs.

*5 The ECU memorizes the DTC of the respective malfunction it has occurred for the period of the time indicated in the brackets.





ACTUATOR CHECK

1. After entering the diagnostic trouble code check mode (sensor check mode) press the
2. Since each damper, motor and relay automatically operates at 1 second intervals beginning in order from 20 in the temperature display, check the temperature and air flow visually and by hand.

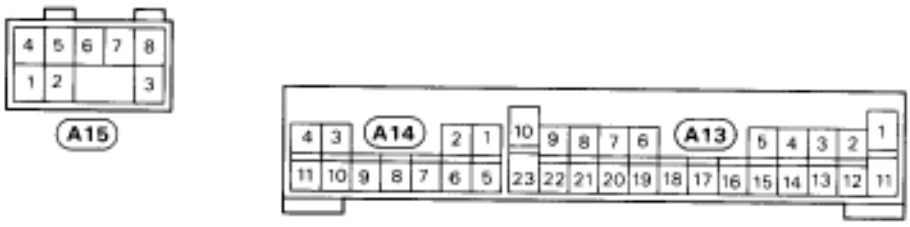
If the slower display is desired, press the switch and change it to step operation. Each time the switch is pressed, the display changes by 1 step.

HINT:

- The buzzer sounds when the display code changes.
- Codes are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the OFF switch.

Step No.	Display code	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnet clutch	Air mix damper
1	20	OFF	FACE	FRESH	OFF	Cool side (0% open)
2	21	①	↑	↑	↑	↑
3	22	③	↑	↑	ON	↑
4	23	↑	↑	F/R	↑	↑
5	24	↑	↑	RECIRC	↑	Cool/Hot (50% open)
6	25	↑	BI-LEVEL	↑	↑	↑
7	26	↑	FOOT	↑	↑	Hot side (100% open)
8	27	↑	↑	↑	↑	↑
9	28	↑	F/D	↑	↑	↑
10	29	⑤	DEF	↑	↑	↑

Terminals of ECU



AC3001

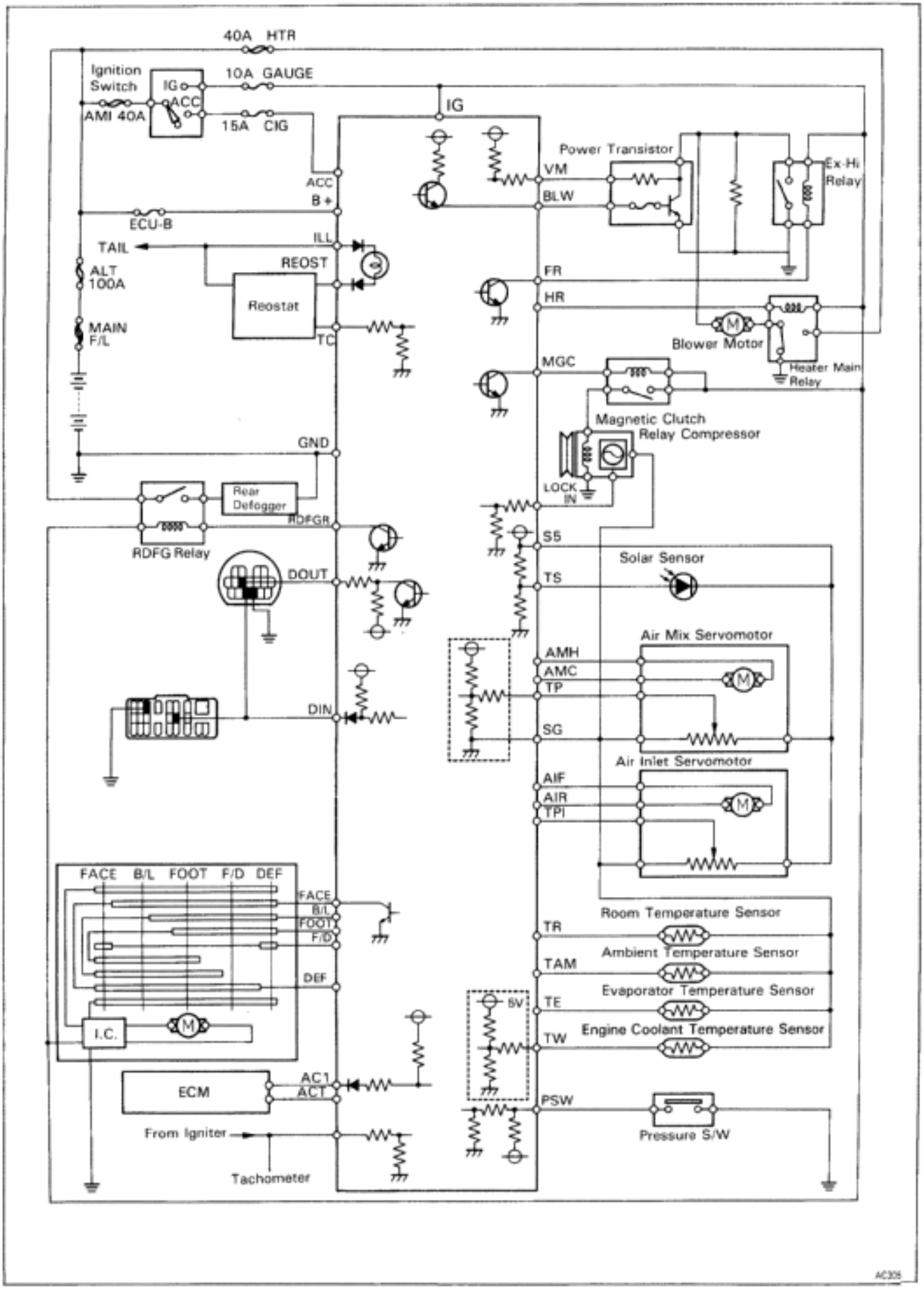
Terminal No.	Symbol	Connection/Terminal Name	Terminal No.	Symbol	Connection/Terminal Name
A13-1	AMH	Air Mix Servomotor	A13-22	DIN	DCL2, DCL1
A13-2	AMC	Air Mix Servomotor	A13-23	DOUT	DCL2
A13-3	AIF	Air Inlet Servomotor	A14-1	S5	Sensor Power Source
A13-4	AIR	Air Inlet Servomotor	A14-2	TR	Room Temperature Sensor
A13-5	RDFGR	Defogger Relay	A14-3	TAM	Ambient Temperature Sensor
A13-6	HR	Heater Relay	A14-4		
A13-7	FR	Extra-Hi Relay	A14-5	SG	Sensor Ground
A13-8	VM	Power Transister	A14-6	TE	Evaporator Temperature Sensor
A13-9	BLW	Power Transister	A14-7	TW	Engine Coolant Temp. Sensor
A13-10	MGC	Magnetic Clutch Relay	A14-8	TS	Solar Sensor
A13-11	FACE	Air Outlet Servomotor	A14-9	TP	Air Mix Damper Position Sensor
A13-12	B/L	Air Outlet Servomotor	A14-10	TPI	Air Inlet Damper Position Sensor
A13-13	FOOT	Air Outlet Servomotor	A14-11		
A13-14			A15-1	B+	Back-up Power Source
A13-15	F/D	Air Outlet Servomotor	A15-2	ACC	Power Source
A13-16	DEF	Air Outlet Servomotor	A15-3	REOST	Rheostat
A13-17	PSW	Pressure Switch	A15-4	GND	E.C.U. Ground
A13-18	AC1	ECM	A15-5	IG+	E.C.U. Power Source
A13-19	ACT	ECM	A15-6		
A13-20	LOCK IN	Lock Sensor	A15-7	ILL	Tail Relay
A13-21	IGN	No. 1 Igniter	A15-8	TC	Rheostat

Standard Value of ECU Terminal

Terminals	Symbols	Wiring Color	Condition		Standard Value
A13–1↔A13–2	AMH↔AMC	O↔P	IG OFF		13~19 Ω
A13–3↔A13–4	AIF↔AIR	RL↔R	IG OFF		13~19 Ω
A13–5↔A15–4	RDFGR↔GND	L–O↔W–B	IG ON	Rear Defogger Switch ON	Below 1 V
				Rear Defogger Switch OFF	10~14 V
A13–6↔A15–4	HR↔GND	L–W↔W–B	IG ON	Turn the Blower Motor	Below 1 V
				Do Not Turn the Blower Motor	10~14 V
A13–7↔A15–4	FR↔GND	W–G↔W–B	IG ON	Blower Level Hi or Set Temp: Max Hot or Max Cool	Below 1 V
				Blower Level OFFMedium	10~14 V
A13–8↔A15–4	VM↔GND	B–W↔W–B	IG ON	Push Blower Switch to Change the Blower Speed from 1 to 5	Speed ① 9.6 V ↓ Speed ⑤ below 1.5 V
A13–9↔A15–4	BLW↔GND	Y–W↔W–B	IG ON	Turn the Blower Motor	Below 1.5 V
A13–10↔A15–4	MGC↔GND	L–Y↔W–B	Start the Engine and Push Auto Switch	A/C Switch ON	Below 1 V
				A/C Switch OFF	10~14 V
A13–17↔A15–4	PSW↔GND	R–L↔W–B	IG ON		Below 1 V
A13–18↔A15–4	AC1↔GND	B–Y↔W–B	Start the Engine	Operate the Compressor	Below 1 V
				Do Not Operate the Compressor	1 V or More
A13–19↔A15–4	ACT↔GND	LG–R↔W–B	Start the Engine (Idling)	A/C Switch ON	10~14 V
				A/C Switch OFF	Below 1.5 V
A13–20↔A15–4	LOCK ↔GND IN	W–L↔W–B	IG OFF	at 20 °C (68 °F)	540 ~ 950 Ω
				at 100 °C (212 °F)	690 ~ 1230 Ω
A13–21↔A15–4	IGN↔GND	B↔W–B	Start the Engine		10 ~ 14 V
A13–22↔A15–4	DIN↔GND	LG–R↔W–B	IG ON	Connect Tc and E of DCL2 or DLC1	Below 1 V
				Other Than Above Condition	10~14 V
A14–1↔A14–5	S5↔SG	L↔W–R	IG ON		4~6 V
A14–1↔A14–8	S5↔TS	L–W	IG ON	Sensor Subjected to Electrical Light	Below 4 V
				Sensor Covered by a Cloth	4~4.5 V
A14–2↔A14–5	TR↔SG	G–Y↔W–R	IG ON	Cabin Temperature: 25 °C (77 °F)	1.8~2.2 V
				Cabin Temperature: 40 °C (104 °F)	1.2~1.6 V
A14–3↔A14–5	TAM↔SG	B–R↔W–R	IG ON	Ambient Temperature: 25 °C (77 °F)	1.35~1.75 V
				Ambient Temperature: 40 °C (104 °F)	0.85~1.25 V

Terminals	Symbols	Wiring Color	Condition		Standard Value
A14-5↔Body Ground	SG↔Body Grounds	W-R↔Body Ground	Always		1 Ω or less
A14-6↔A14-5	TE↔SG	L-W↔W-R	IG ON	Evaporator Temp.: 0 °C (32 °F)	2.0 – 2.4 V
				Evaporator Temp.: 15 °C (77 °F)	1.4 ~ 1.8 V
A14-7↔A14-5	TW↔SG	Y-B↔W-R	IG ON	Engine Coolant Temp.: 0 °C (32 °F)	2.8 – 3.2 V
				Engine Coolant Temp.: 40 °C (104 °F)	1.8 – 2.2 V
				Engine Coolant Temp.: 70 °C (158 °F)	0.9 ~ 1.3 V
A14-8↔A14-5	TS↔SG	W↔W-R	IG ON	Sensor Subjected to Electrical Light	1 V or more
				Sensor Covered by Cloth	Below 1 V
A14-9↔A14-5	TP↔SG	B-Y↔W-R	IG ON	Set Temp.: Max Cool	3.5 – 4.5 V
				Set Temp.: Max Hot	0.5 ~ 1.8 V
A14-10↔A14-5	TPI↔SG	L-Y↔W-R	IG ON	Push Recircu Switch	3.5 ~ 4.5 V
				Push Fresh Switch	0.5 – 1.8 V
A15-1↔A15-4	B + ↔GND	L-Y↔W-B	IG OFF		10 – 14 V
A15-2↔A15-4	ACC↔GND	L-R↔W-B	Turn Ignition Switch ACC		10 ~ 14 V
A15-4↔Body Ground	GND↔Body Ground	W-B↔Body Ground	Always		1 Ω or less
A15-5↔A15-4	IG + ↔GND	R-L↔W-B	IG ON		10 – 14 V
A15-3↔A15-4	REOST↔GND	B↔W-B	Light Control Switch :Tail Position	Rheostat Volume:Most Upward	Below 1 V
				Rheostat Volume: Most Downward	10 ~ 14 V
A15-7↔A15-4	ILL↔GND	G↔W-B	Turn the Light Control Switch to Tail Position		10 ~ 14 V
A15-8↔A15-4	TC↔GND	R-L↔W-B	Light Control Switch :Tail Position	Pheostat Volume: Most Upward	Below 1 V
				Rheostat Volume: Most Downward	10 ~ 14 V

Wiring Diagram



–MEMO–

MATRIX CHART OF PROBLEM SYMPTOMS

If a normal code is displayed during the diagnostic code check (sensor check) but the trouble still occurs (reappears), perform out troubleshooting for each problem symptom, checking the circuits for each symptom in the order given in the table below (Proceed to the page given for each circuit).

Symptom \ Suspect Area		Room temp. sensor circuit	Ambient temp. sensor circuit	Evaporator temp. sensor circuit	Engine Coolant temp. sensor circuit	Solar sensor circuit	Compressor lock sensor circuit	Pressure switch circuit	Air mix damper position sensor circuit	Air mix servomotor circuit	Air inlet damper position sensor circuit	Air inlet servomotor circuit
See Page		AC–44	AC–46	AC–48	AC–50	AC–52	AC–54	AC–56	AC–58	AC–60	AC–62	AC–64
Whole functions of the A/C system does not operate												
Air Flow Control	No blower operation				3							
	No blower control											
	Insufficient air flow											
Temperature Control	No cool air comes out	10	11				4	6	9	8		
	No warm air comes out	4	3	5					2	1		
	Output air is warmer or colder than the set temperature or response is slow	4	5	6	9	7			8	10		
	No temperature control (only Max. cool or Max. warm)								1	2		
No air inlet control											1	2
No air outlet control												
Engine idle up does not occur, or is continuous												
Blinking of A/C indicator							1					
Set temp. value displayed does not much up with operation of temp. control switch												
Brightness does not changes when rheostat volume or light control switch it turned.												
Unable to access the diagnosis mode.												
Diagnostic trouble code not recorded. Set mode is cleared when IG switch is turned off.												

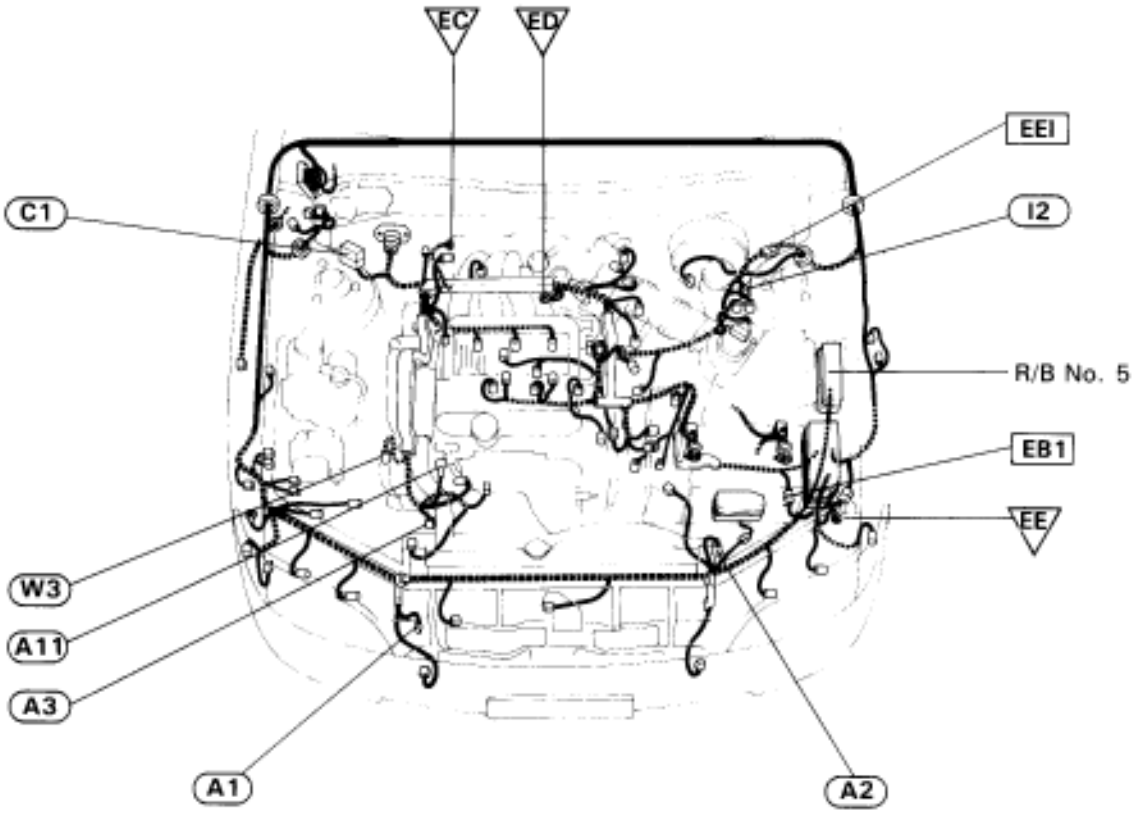
HINT:

- If the instruction “Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with te next highest number in the table to continue the check.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check or replace the air conditioning control assembly (contains the ECU).

Air outlet servomotor circuit	IG power source circuit	Acc power source circuit	Backup power source circuit	Heater main relay circuit	Power transistor circuit	Blower motor circuit	Extra-Hi relay circuit	Igniter circuit	Compressor circuit	Illumination light system	Diagnosis circuit	ECU (A/C control assy)	Inspect refrigeration system with manifold gauge set	Volume of refrigerant	Drive belt tension	Cooling fan system	Compressor	Condenser	Receiver	Evaporator	Radiator (in heater unit)	Expansion valve
AC–66	AC–68	AC–70	AC–72	AC–74	AC–76	AC–78	AC–80	AC–82	AC–84	BE–77	AC–90	IN–32	AC–92	AC–95	AC–96	EG–240	AC–102	AC–111	AC–169	AC–113	AC–115	AC–117
	1	2										3										
	4	5		1		2						6										
	4			5	2	1	3															
						1	2															
								7	5			12	3	1	2							
												6									7	
												18	3	1	2	4	11	12	13	14	15	16
												3										
												3										
1												3										
								2	1			3										
												2										
												1										
												2										
											1	2										
			1									2										

LOCATION OF CONNECTORS

Location of Connectors in Engine Compartment



A1

Ambient
Temp. Sensor

le-2-1-S

A2

Pressure Switch

le-4-1

A3

A/C Compressor
Lock Sensor

le-4-1-A

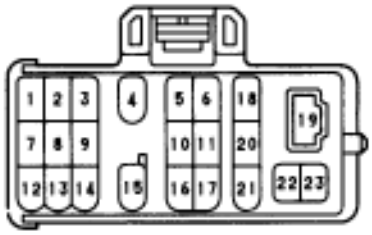
A11

Generater

X-142

C1

DCL 1



le-23-1

I2

Igniter

le-5-1

W3

Engine Coolant
Temp. Sensor

le-2-1-h

EB1

lef-8-1

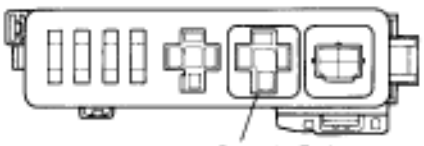
lef-8-2

EE1

lfg-4-1

lfg-4-2

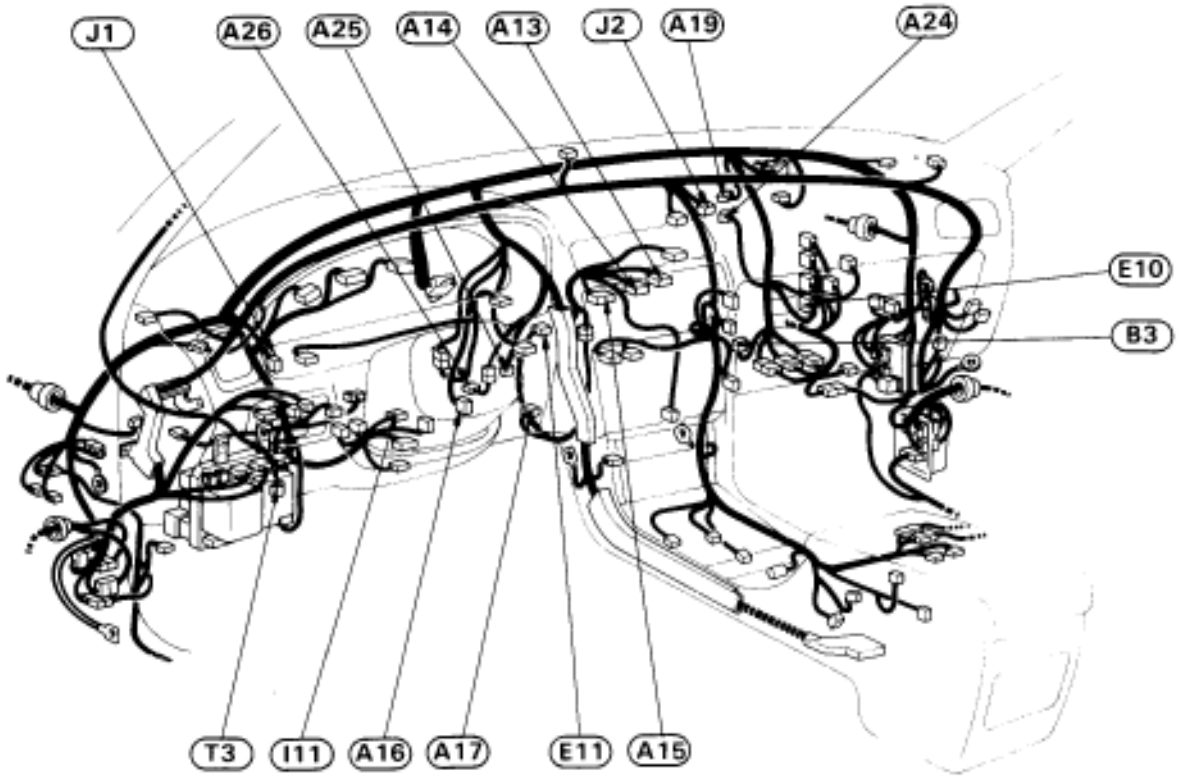
R/B No. 5



A/C Magnetic Clutch Relay

BE6669

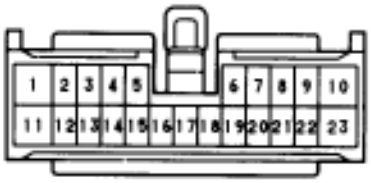
Location of Connectors in Instrument Panel



BE6661

A13

A/C
Control Assembly



eh-23-1

A14

A/C
Control Assembly

h-11-1-A

A15

A/C
Control Assembly

e-8-1

A16

Room Temp. Sensor

e-2-1

A17

Power Transister

H-4-1

A18

Solar Sensor

e-2-2-J

A19

Evaporator
Temp. Sensor

e-2-1

A25

Air Mix
Surbomotor Assembly

e-6-1

A26

Air Outlet
Servomotor

e-8-1

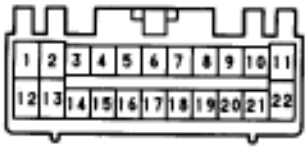
B3

Blower Motor

1-2-1

E10

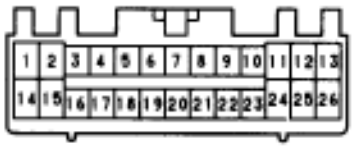
ECM



Vd-22-1

E11

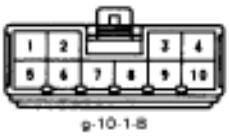
Extra-Hi Relay



Vd-26-1

I11

Ignition Switch



p-10-1-B

J1

Junction Connector

e-22-1-A

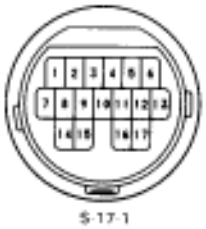
J2

Junction Connector

e-14-1-A

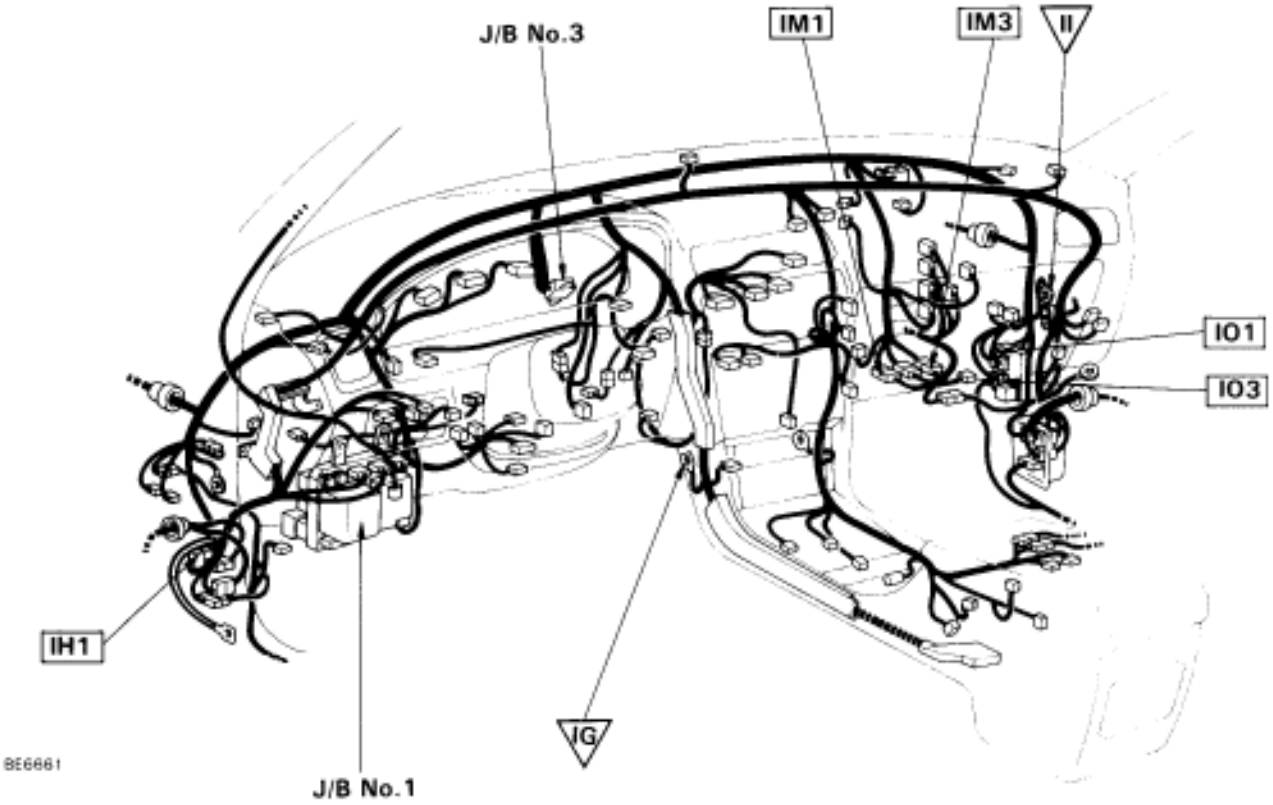
T3

DCL 2



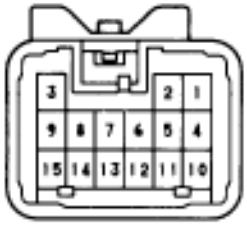
S-17-1

Location of Connectors in Instrument Panel

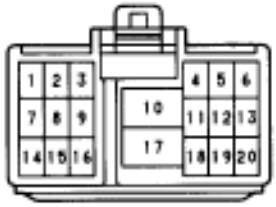


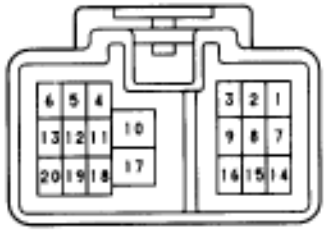
IH1


e-15-1


e-15-2

IM1


e-20-1-B

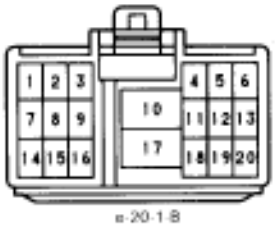

e-20-2-B

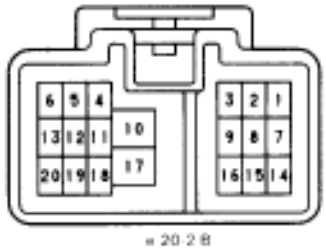
IM3

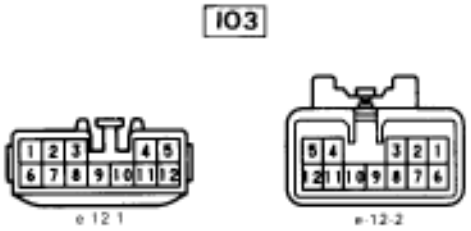

ef-19-1


ef-19-2

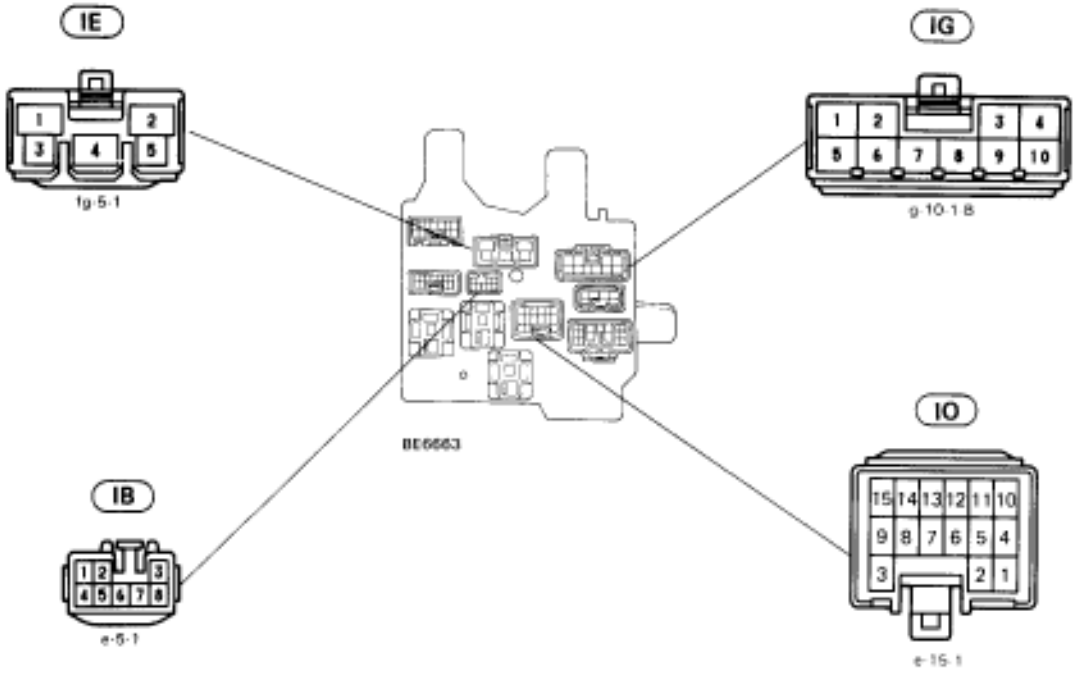
IO1


e-20-1-B

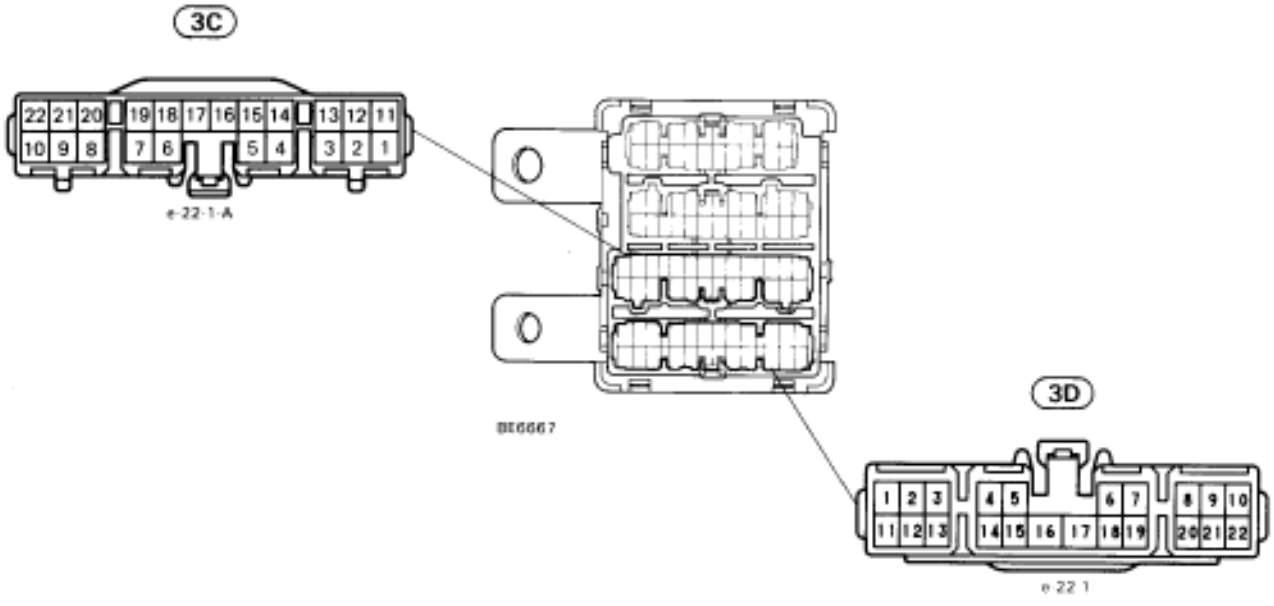

e-20-2-B


IO3
e-12-1
e-12-2

J/B No.1


IE
IG
IO
IB
fg-5-1
g-10-18
BE6663
e-5-1
e-15-1

J/B No.3


3C
3D
e-22-1-A
BE6667
e-22-1

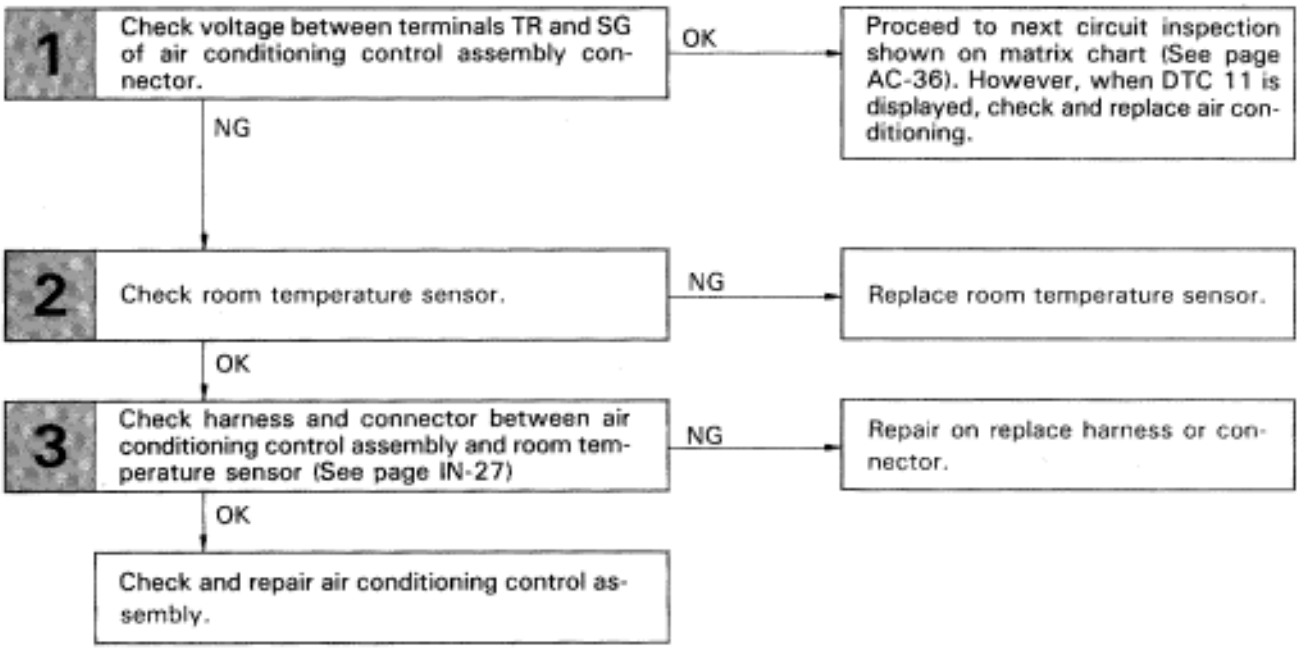
DTC 11 Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

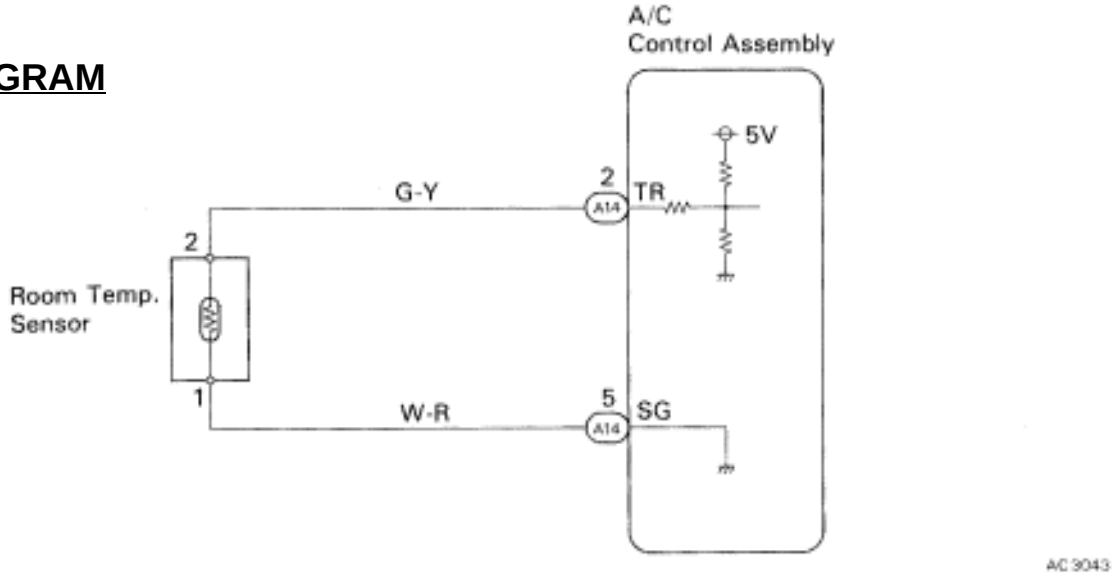
This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C ECU.

Code No.	DTC Detection Condition	Trouble Area
11	Open or short in room temperature sensor circuit.	5 Room temperature sensor. 5 Harness or connector between room temp. sensor and A/C ECU. 5 A/C ECU.

DIAGNOSTIC CHART

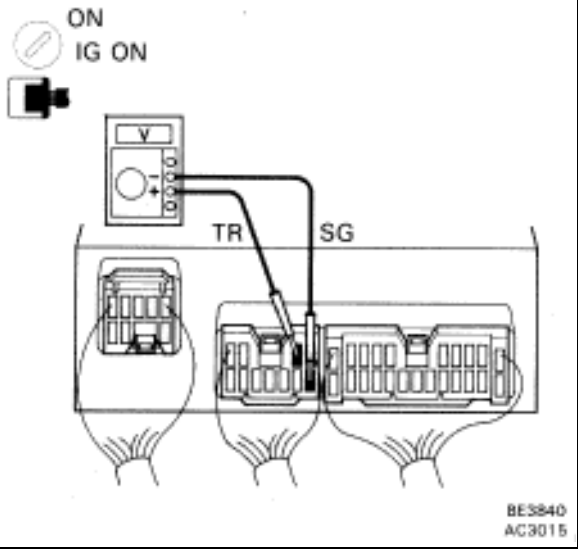


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TR and SG of air conditioning control assembly connector.**



P
3. Remove A/C control assembly with connectors still connected. (See page BO–112.)
4. Turn ignition switch ON.

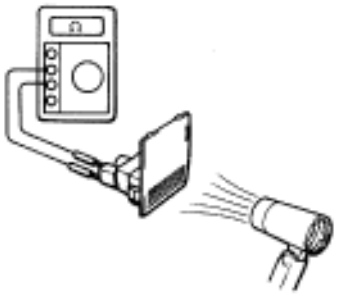
C Check voltage between terminals TR and SG of air conditioning control assembly connector at each temperature.

OK **Voltage:**
at 25°C (77°F) : 1.8 – 2.2 V
at 40°C (104°F) : 12 – 1.6 V
In addition, as the temperature increases, check and replace air conditioning control assembly.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 11 is displayed, check and replace air conditioning control assembly.**

2 **Check room temperature sensor.**



P
1. Remove room temperature sensor from safety pad No. 2.
2. Disconnect room temperature sensor connector.

C Check resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.

OK **Resistance:**
at 25°C (77°F) : 1.6 – 1.8 kΩ
at 50°C (122°F) : 0.5 – 0.7 kΩ
In addition, as the temperature increases, the resistance decreases gradually.

OK

NG **Replace room temperature sensor.**

3 **Check harness and connector between air conditioning control assembly and room temperature sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and repair air conditioning control assembly.

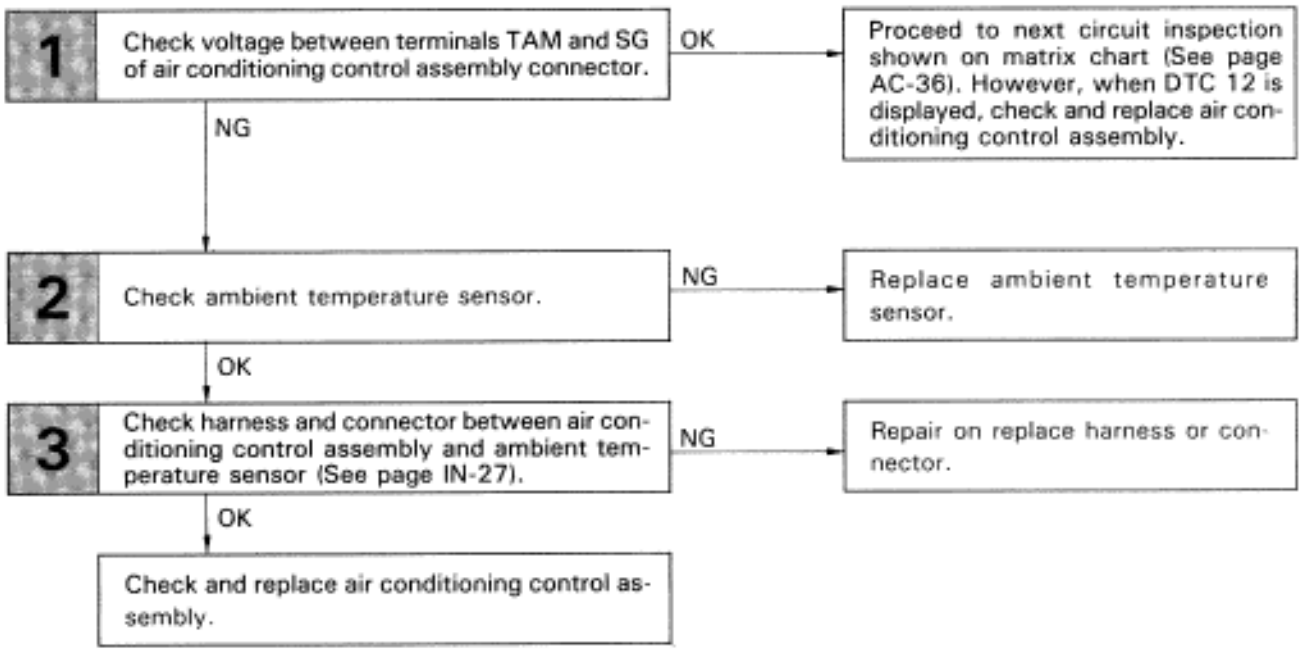
DTC 12 Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

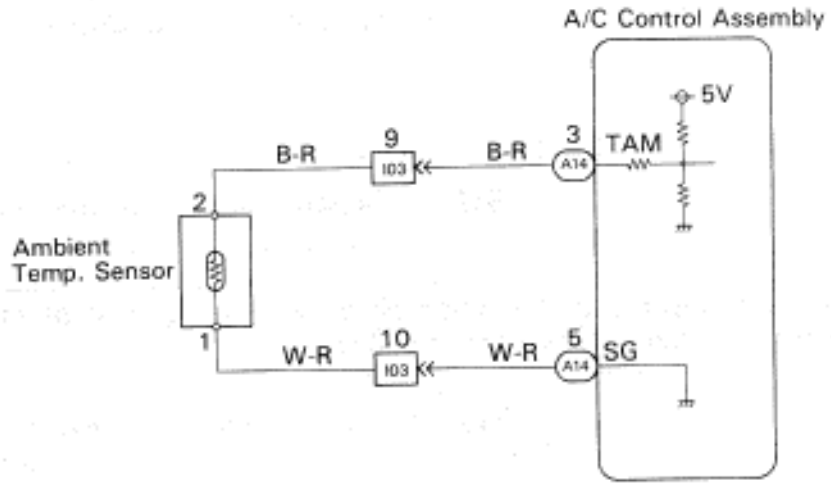
This sensor detects the ambient temperature and sends the appropriate signals to the ECU.

DTC No.	DTC Detecting Condition	Trouble Area
12	Open or short in ambient temperature sensor circuit.	5 Ambient temperature sensor. 5 Harness or connector between ambient temperature sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

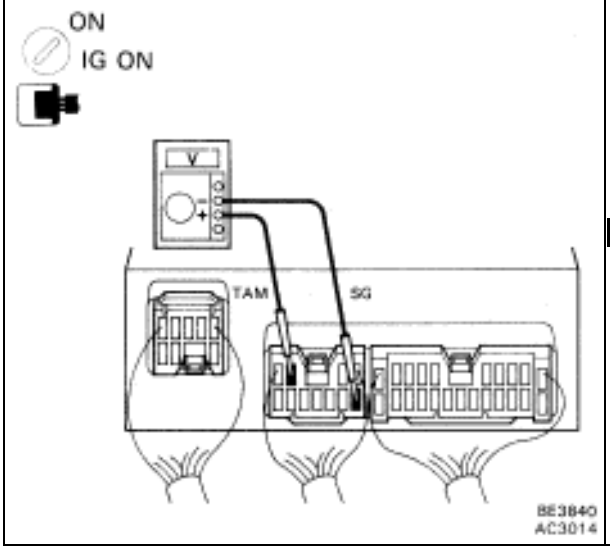


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TAM and SG of air conditioning control assembly connector.**



P
1. Remove the A/C control assembly with connectors still connected. (See page BO–112.)
2. Turn ignition switch ON.

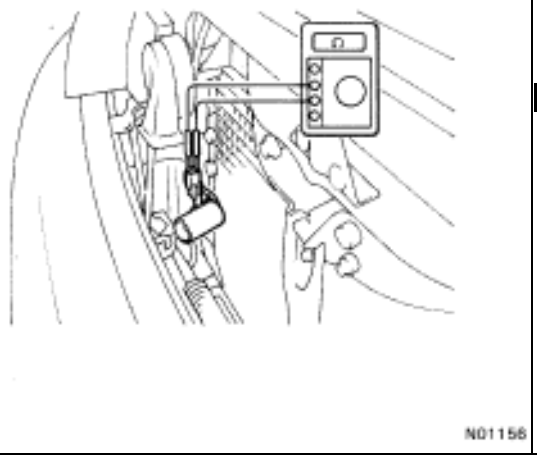
C Check voltage between terminals TAM and SG of air conditioning assembly connector at each temperature.

OK **Voltage:**
at 25°C (77°F) : 1.35 – 1.75 V
at 40°C (104F) : 0.85 – 1.25 V
In addition, as the temperature increases, the voltage decreases gradually.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 12 is displayed, check and replace air conditioning control assembly.**

2 **Check ambient temperature sensor.**



P Disconnect ambient temperature sensor connector.

C
1. Check resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.

OK **Resistance:**
at 25°C (77°F) : 1.6 – 1.8 kΩ
at 50°C (122°F) : 0.5 – 0.7 kΩ
In addition, as the temperature increases, the resistance decreases gradually.

OK

NG **Replace ambient temperature sensor.**

3 **Check harness and connector between air conditioning control assembly and ambient temperature sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioner control assembly.

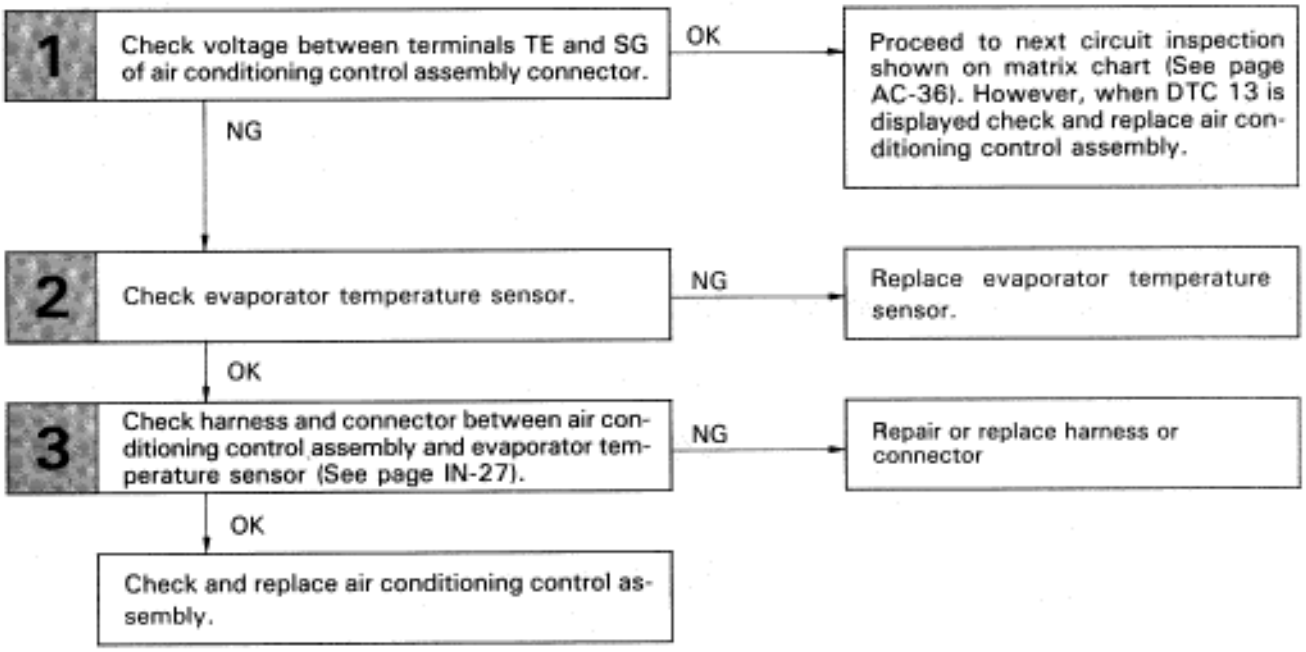
DTC 13 Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

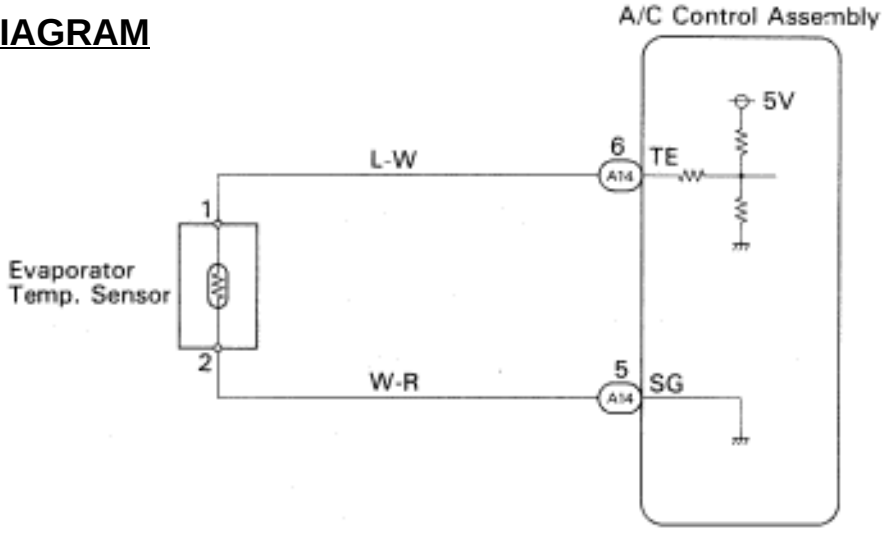
This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the air conditioning control assembly.

DTC No.	DTC Detecting Condition	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	5 Evaporator temperature sensor. 5 Harness or connector between evaporator temperature sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

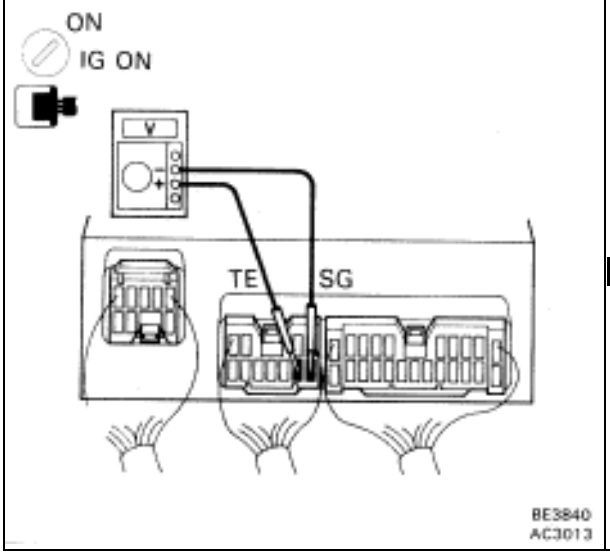


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TE and SG of air conditioning control assembly connector.**



P 1. Remove A/C control assembly with connectors still connected. (See page BO–112)

2. Turn ignition switch ON.

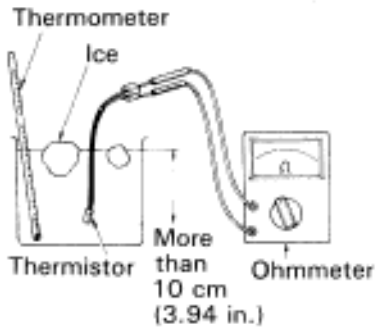
C Measure voltage between terminals TE and SG of air conditioning control assembly connector at each temperature.

OK **Voltage:**
at 0°C (32°F) : 2.0 – 2.4 V
at 15°C (59°F) : 1.4 – 1.8 V
In addition, as the temperature increases, the voltage decreases gradually.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 13 is displayed, check and replace air conditioning control assembly.**

2 **Check evaporator temperature sensor.**



P Remove evaporator temperature sensor (See page AC–37).

C Check resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.

OK **Resistance:**
at 0°C (32°F) : 4.6 – 5.1 kΩ
at 15°C (59°F) :2.1 – 2.6 kΩ
In addition, as the temperature increases, the resistance decreases gradually.

OK

NG **Replace evaporator temperature sensor.**

3 **Check harness and connector between air conditioner control assembly and evaporator temperature sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

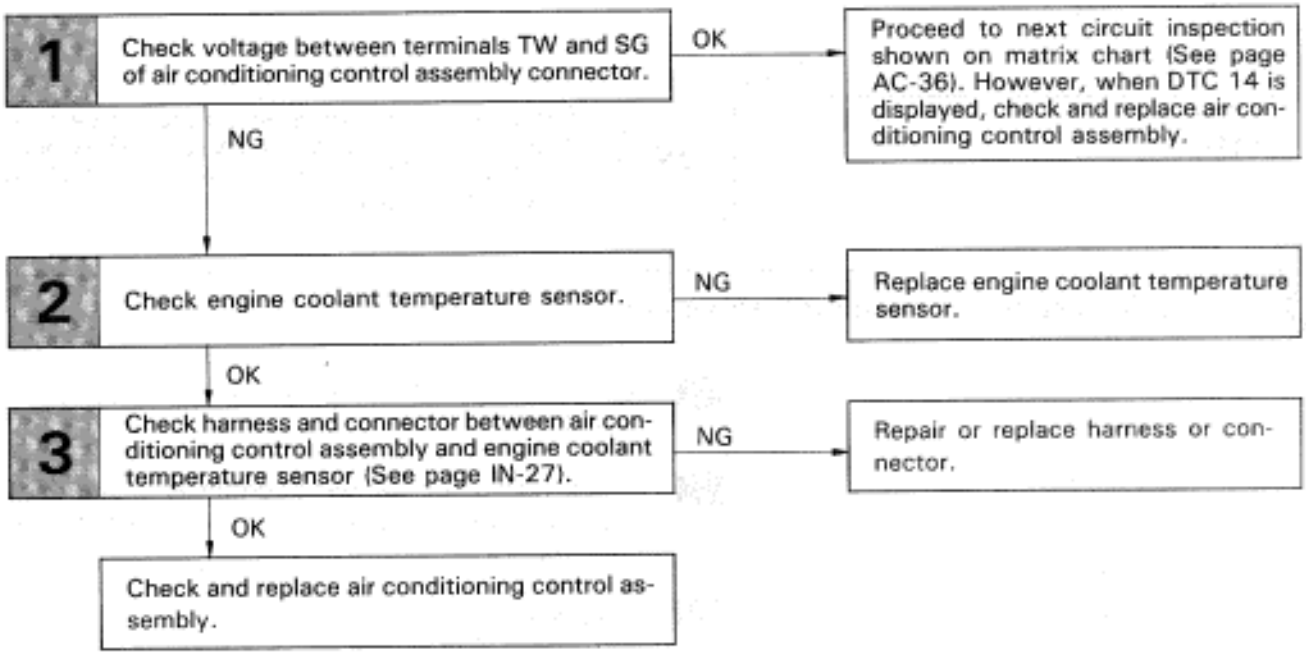
DTC 14 Engine Coolant Temperature Sensor Circuit

CIRCUIT DESCRIPTION

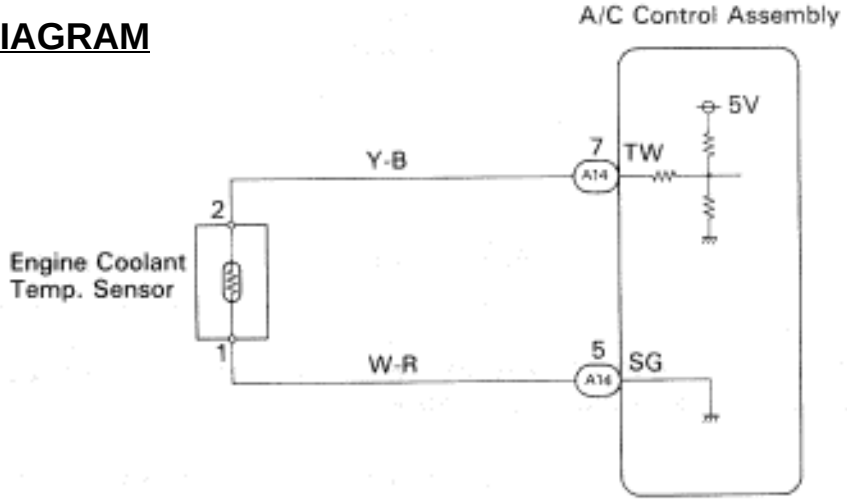
This sensor detects the engine coolant temperature and sends the appropriate signals to the air conditioning control assembly. These signals are used for warm up control when the engine is cold.

DTC No.	DTC Detecting Condition	Trouble Area
14	Open or short in engine coolant temperaturesensor circuit.	5 Engine coolant temperature sensor. 5 Harness or connector between engine coolant temperature sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART



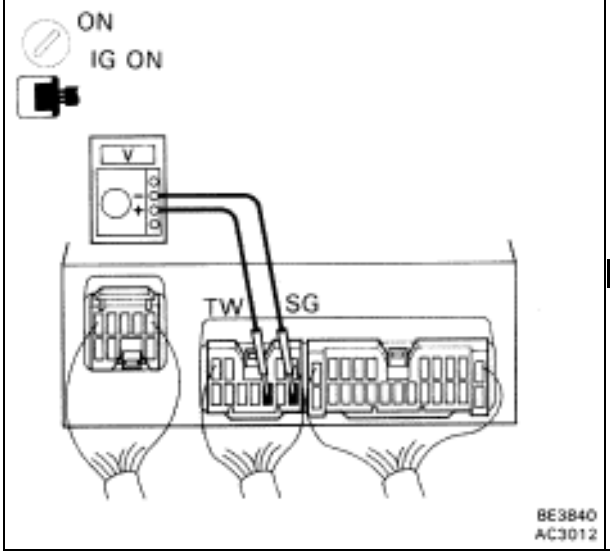
WIRING DIAGRAM



AC3039

INSPECTION PROCEDURE

1 **Check voltage between terminals TW and SG of air conditioning control assembly connector.**



P
1. Remove A/C control assembly with connectors still connected. (See page BO–112)
2. Turn ignition switch ON.

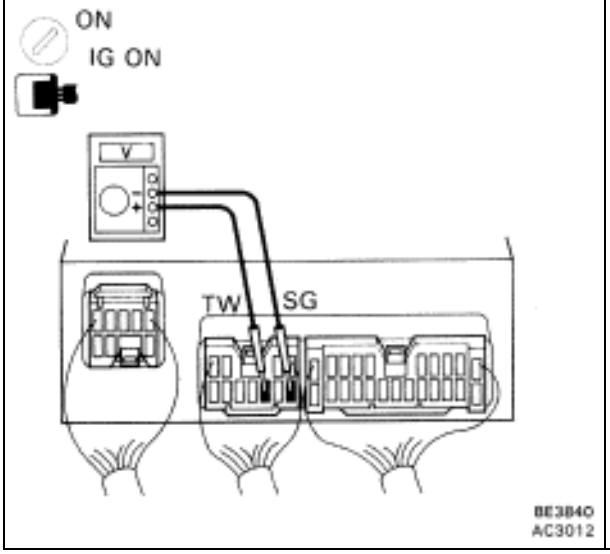
C Measure voltage between terminals TW and SG of air conditioning control assembly connector at each temperature.

OK **Voltage:**
at 0°C (32°F) : 2.8 – 3.2 V
at 40°C (104°F) : 1.8 – 2.2 V
at 70°C (158°F) : 0.9 – 1.3 V
In addition, as the temperature increases, the voltage decreases gradually.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 14 is displayed, check and repair air conditioning control assembly.**

2 **Check engine coolant temperature sensor.**



P
1. Remove heater unit.
2. Remove engine coolant temperature sensor.

C Measure resistance between terminals 1 and 2 of engine coolant temperature sensor connector at each temperature.

OK **Resistance:**
at 0°C (32°F) : 48.5 – 51.5 kΩ
at 40°C (104°F) : 2.5 – 2.7 kΩ
at 100°C (212°F) : 1.9 – 2.1 kΩ
In addition, as the temperature increases, the voltage decreases gradually.

OK

NG **Replace engine coolant temperature sensor.**

3 **Check harness and connector between air conditioning control assembly and engine coolant temperature sensor (See page IN–27).**

OK

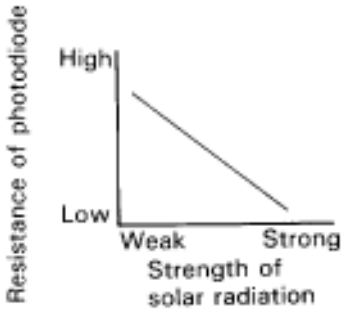
NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

DTC 21 Solar Sensor Circuit

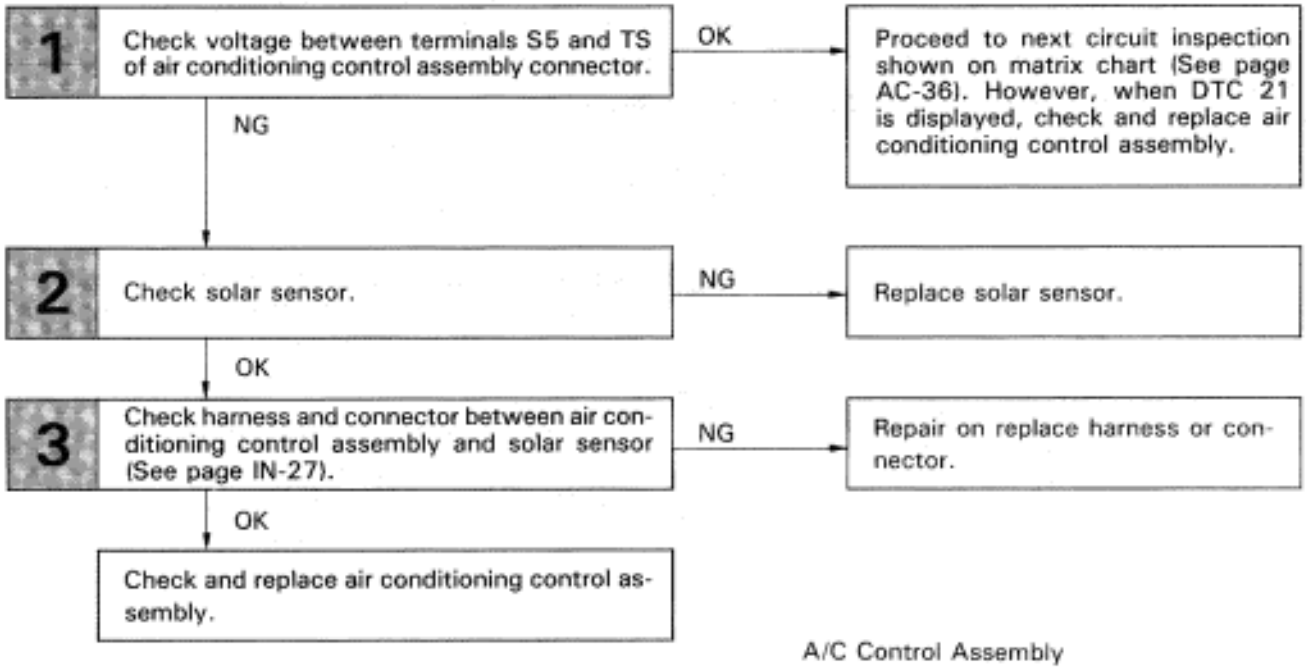
CIRCUIT DESCRIPTION

A photo diode in the solar sensor detects solar radiation and sends signals to the air conditioning control assembly.

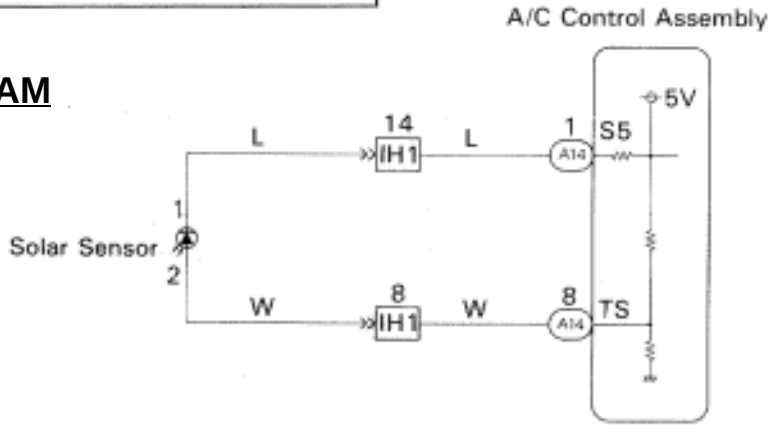


DTC No.	DTC Detecting Condition	Trouble Area
21	Open or short in solar sensor circuit. (Please note that display of diagnostic troublecode 21 is not abnormal when the sensor isnot receiving solar radiation.)	5 Solar sensor. 5 Harness or connector between solar sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

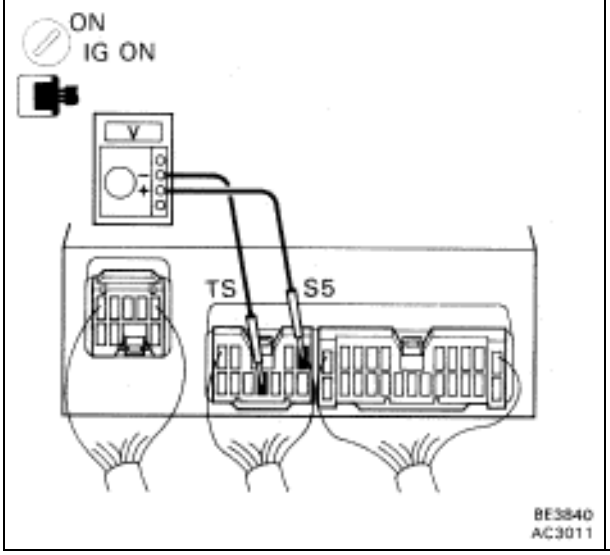


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals S5 and TS of air conditioning control assembly connector.**



P 1. Remove A/C control assembly with connectors still connected. Turn ignition switch ON.

C Measure voltage between terminals S5 and TS of air conditioning control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

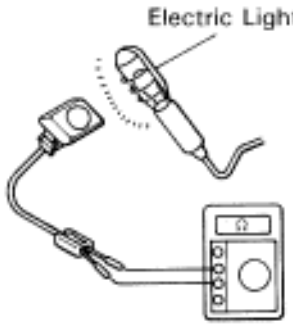
OK

Condition	Voltage
Sensor subjected to electric light	Below 4 V
Sensor covered by a cloth	4–4.5 V

In addition, when the inspection light is gradually moved away from the sensor, the voltage increases.

OK → **OK** → **Proceed to next circuit inspection shown on matrix chart (See page AC–78). However, when DTC 21 is displayed, check and replace air conditioning control assembly.**

2 **Check solar sensor.**



P 1. Remove solar sensor from dashboard.
2. Disconnect solar sensor connector.

C 1. Cover the sensor by a cloth.
2. Measure resistance between terminals 1 and 2 of solar sensor connector.

Hint Connect positive ⊕ lead of ohmmeter to terminal 2 and negative ⊖ lead to terminal 1 of the solar sensor.

OK **Resistance: ∞Ω (no continuity)**

P 1. Remove the cloth from the solar sensor and subject the sensor to electric light.
2. Measure resistance.

OK **Resistance: Below 10 kΩ (continuity).**
In addition, as the electric light is moved gradually away from the sensor the resistance increases.

OK → **NG** → **Replace solar sensor.**

3 **Check harness and connector between air conditioning control assembly and solar sensor (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

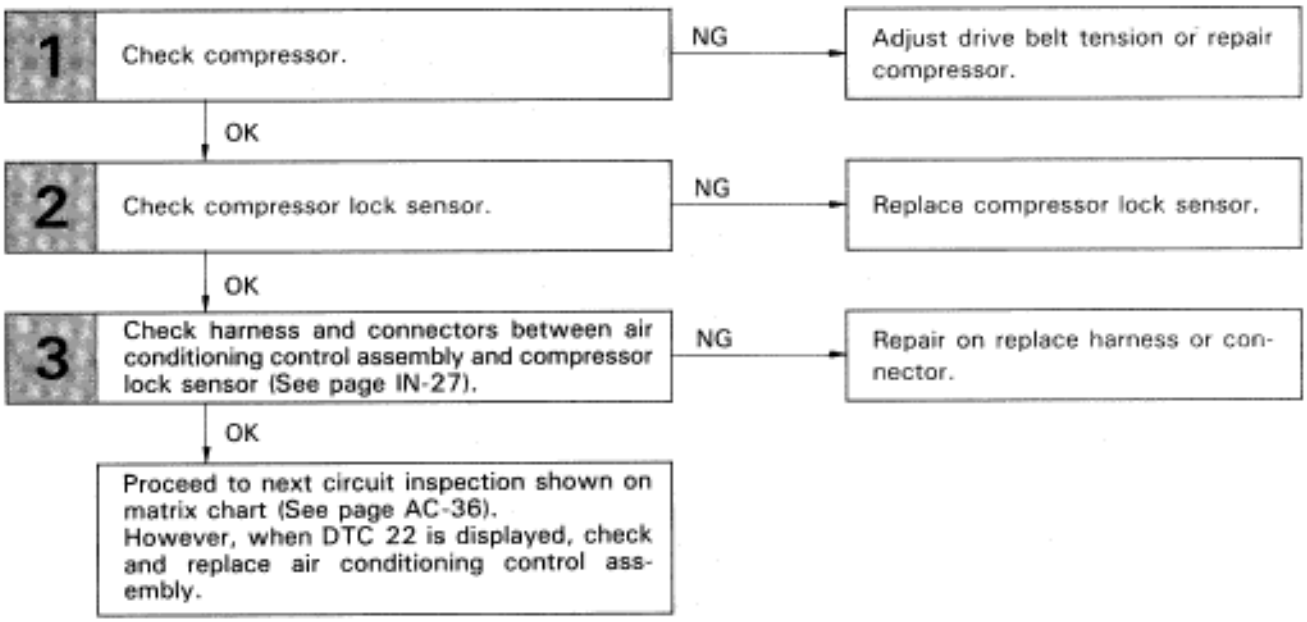
DTC 22 Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

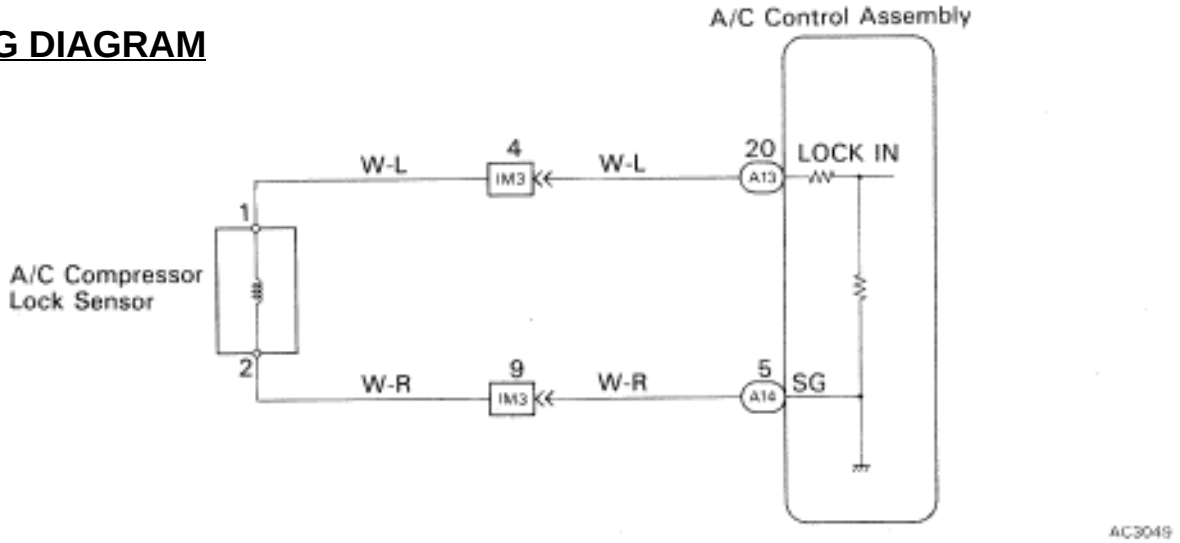
This sensor sends 4 pulses per engine revolution to the air conditioning control assembly. If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the air conditioning control assembly turns the compressor off. And, the indicator flashes at about 1 second intervals.

DTC No.	DTC Detecting Condition	Trouble Area
22	All conditions below are detected for 3 secs.or more. (a) Engine rpm; 450 rpm or more (b) Ratio between engine and compressorrpm deviates 20 % or more in compari–son to normal operation.	5 Compressor 5 Compressor drive belt. 5 Compressor lock sensor. 5 Harness and connector between compressor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

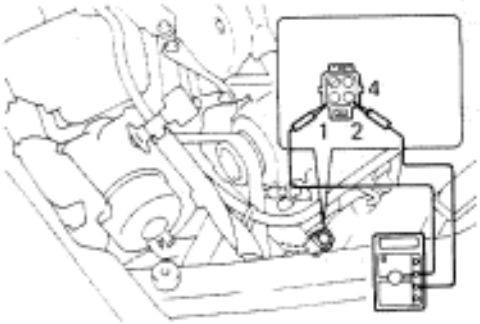
1 **Check compressor.**

P
1. Check compressor drive belt tension (See page AC–96).
2. Check if the compressor does not lock during operation with engine started and blower switch and A/C switch ON.

OK → **2**

NG → **Adjust drive belt tension or repair compressor.**

2 **Check compressor lock sensor.**

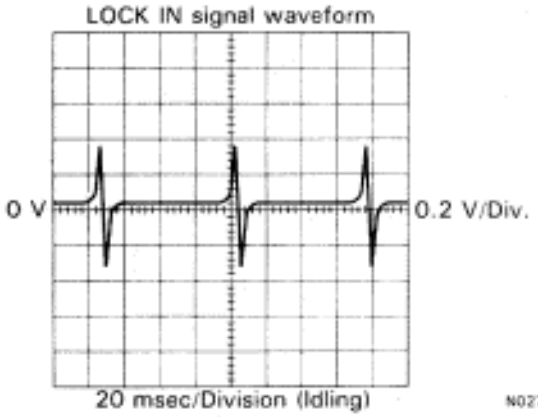


P Disconnect compressor lock sensor connector.

C Measure resistance between terminals 1 and 2 of compressor lock sensor connector.

OK **Resistance: at 20°C (68°F): 65 – 125Ω**

Reference **INSPECTION USING OSCILLOSCOPE**



- During cranking or idling, measure voltage between terminals LOCK IN and SG of A/C control assembly.

HINT: The correct wavefoam appears as shown in the illustration on the left.

OK → **3**

NG → **Replace compressor lock sensor.**

3 **Check harness and connector between air conditioning control assembly and compressor lock sensor (See page IN–27).**

OK → **Proceed to next circuit inspection shown on matrix chart (See page AC–78). However, when DTC 22 is displayed, chech and replace air conditioning control assembly.**

NG → **Repair or replace harness or connector.**

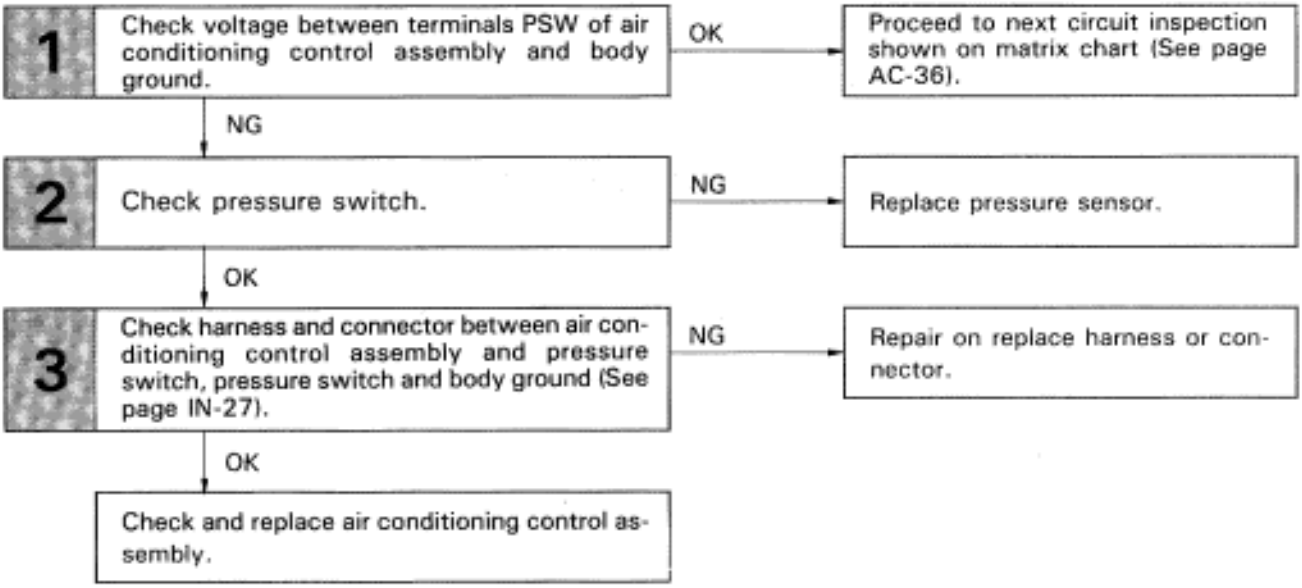
DTC 23 Pressure Switch Circuit

CIRCUIT DESCRIPTION

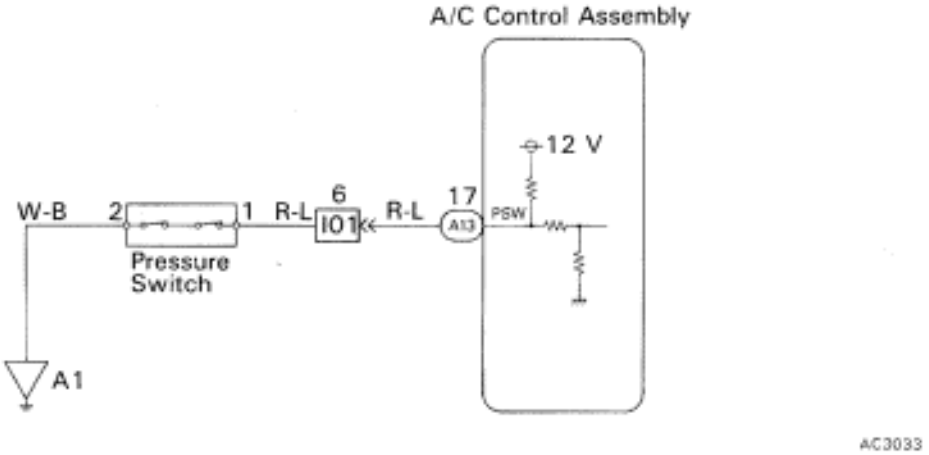
This pressure switch sends the appropriate signals to the air conditioning control assembly when the air conditioning refrigerant pressure drops too low or rises too high. When the air conditioning control assembly receives these signals, it outputs signals via the ECM to switch off the compressor relay and turns the magnet clutch off.

DTC No.	DTC Detecting Condition	Trouble Area
23	◦ Open in pressure sensor circuit. ◦ Abnormal refrigerant pressure. below 207 kPa. 2.1 kgf/cm5, over 2660 kPa, 27 kgf/cm5	◦ Pressure switch ◦ Harness or connector between pressure switch and ECU. ◦ Refrigerant pipe line. ◦ ECU.

DIAGNOSTIC CHART

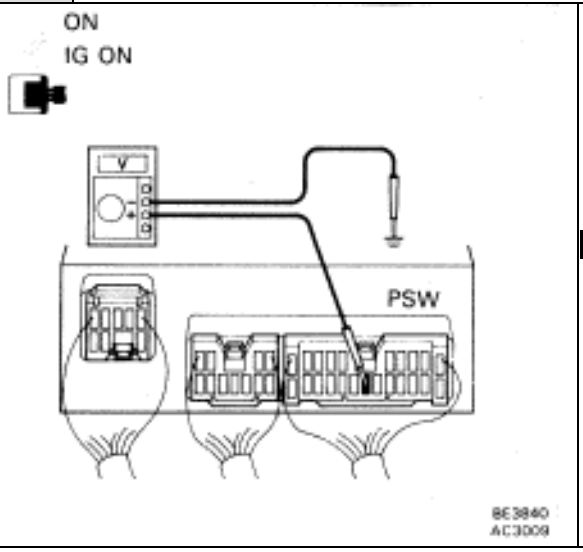


WIRING DIAGRAM



INSPECTION PROCEDURE

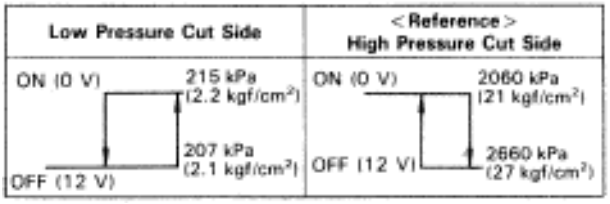
1 **Check voltage between terminals PSW of air conditioning control assembly and body ground.**



P 1. Install the manifold gauge set. (See page AC–15)
2. Turn ignition switch ON.

C Check voltage between terminals PSW of air conditioning control assembly connector and body ground when air conditioning gas pressure is changed.

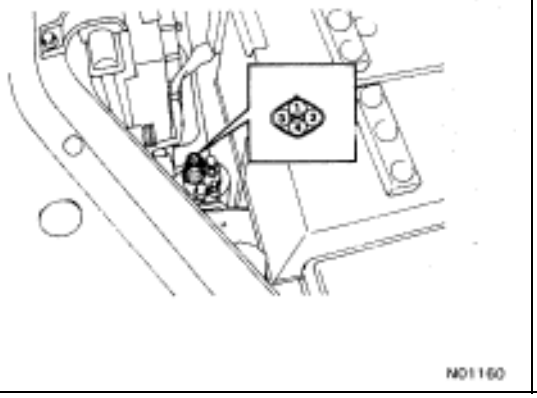
OK **The voltage changes with gas pressure, as shown in the diagram below.**



NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

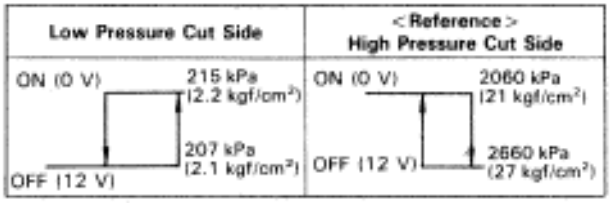
2 **Check pressure switch.**



P Disconnect pressure switch connector.

C Check continuity between terminals 1 and 4 of pressure switch when air conditioning gas pressure is changed.

OK **The continuity changes with gas pressure as shown below.**



OK

NG **Replace pressure switch.**

3 **Check harness and connector between air conditioning control assembly and pressure switch, pressure switch and body ground (See page IN–27).**

OK

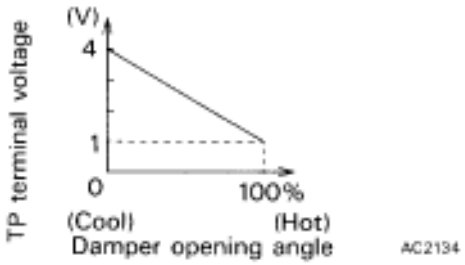
NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

DTC 31, 41 Air Mix Damper Position Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the position of the air mix damper and sends the appropriate signals to the air conditioning control assembly.
The position sensor is built into the air mix servomotor assembly.



Code No.	DTC Detection Condition	Trouble Area
31	Short to ground or power source circuit in airmix damper position sensor circuit.	5 Air mix damper position sensor. 5 Harness of connector between air mix servomotor assembly and A/C control assembly. 5 A/C control assembly.
41	Air mix damper position sensor value does not change even if ECM operates air mix servomotor.	

DIAGNOSTIC CHART

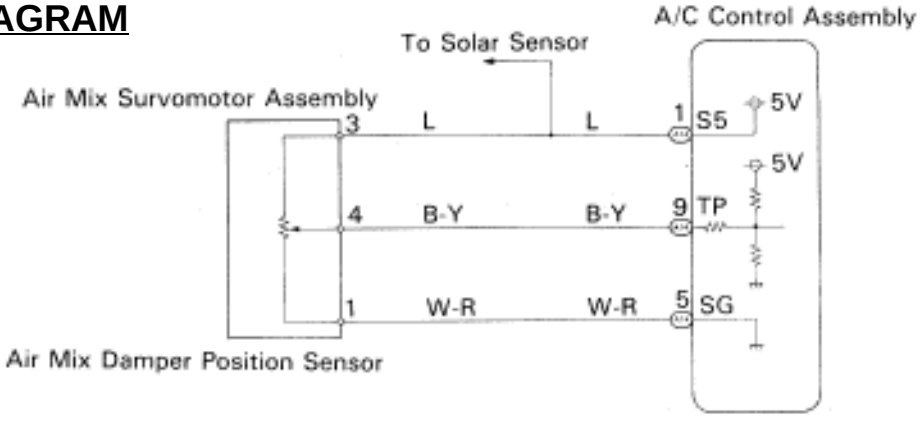
1 Check voltage between terminals TP and SG of air conditioning control assembly connector.
- OK → Proceed to next circuit inspection shown on matrix chart (See page AC-36). However, when DTC 31 or 41 is displayed, check and replace air conditioning control assembly.
- NG

2 Check air mix damper position sensor.
- NG → Replace air mix servomotor assembly.
- OK

3 Check harness and connector between air conditioning control assembly and air mix servomotor assembly (See page IN-27).
- NG → Repair or replace harness or connector.
- OK

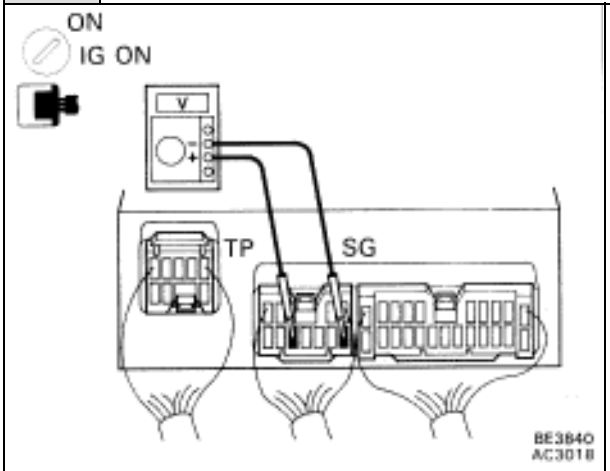
Check and replace air conditioning control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TP and SG of air conditioning control assembly connector.**



P
1. Remove A/C control assembly with connectors still connected.
2. Turn ignition switch ON.

C Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SG of air conditioning control asesembly connector each time when the set temperature is changed.

OK

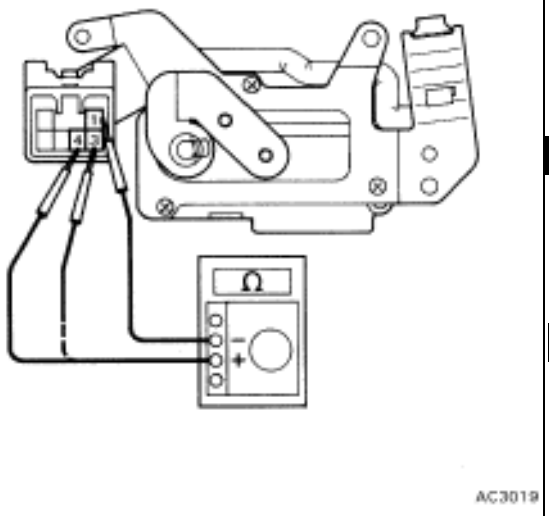
Set Temperature	Voltage
Max. cool	3.5 – 4.5 V
Max. hot	0.5 – 1.8 V

In addition, as the set temperature increases the voltage decreases gradually without interruption.

NG

OK **Proceed to next circuit in spection shown on matrix chart (See page AC–36). However, when DTC 31 or 41 is displayed, check and replace air conditioning control assembly.**

2 **Check air mix damper position sensor.**



P
1. Remove A/C unit. (See page AC–99)
2. Disconnect air mix servomotor assembly connector.

C Measure resistance between terminals 3 and 1 of air mix servomotor assebly connector.

OK **Resistance: 4.7 – 7.2 kΩ**

C While operating air mix servomotor as in the procedure on page AC–61, measure resistance between terminals 4 and 1 of air mix servomotor assembly connector.

OK

Position	Resistance
Max. cool	3.8 – 5.8 kΩ
Max. warm	0.95 – 1.45 kΩ

As the air mix servomotor moves from cool side to warm side, the resistance decreases gradually without interruption.

OK

NG **Replace air mix servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air mix servomotor assembly (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

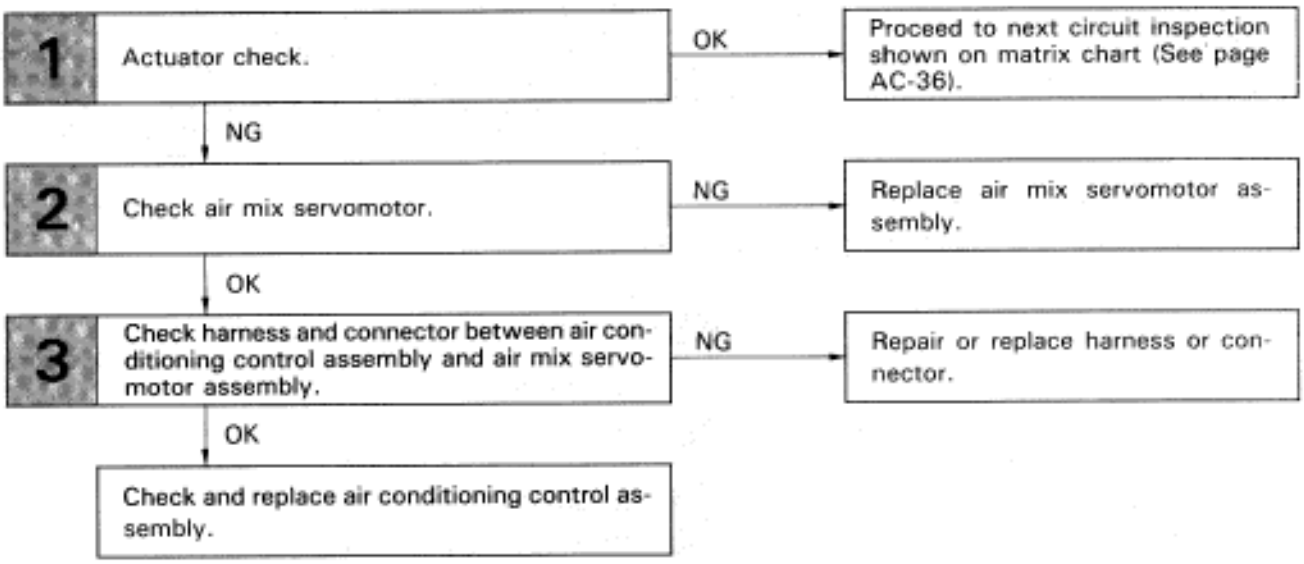
DTC 41 Air Mix Servomotor Circuit

CIRCUIT DESCRIPTION

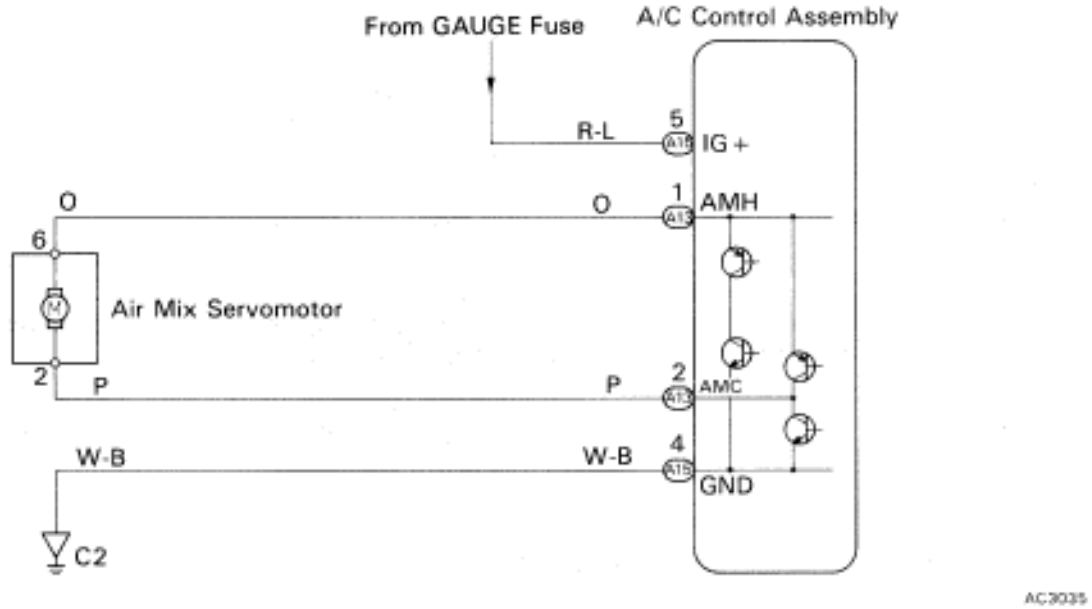
The air mix servomotor is controlled by the ECU and moves the air mix damper to the desired position.

Code No.	DTC Detection Condition	Trouble Area
41	Air mix damper position sensor value does not change even if ECU operates air mix servomotor.	5 Air mix servomotor. 5 Air mix damper position sensor 5 Harness or connector between ECU and A/M servomotor, A/M damper position sensor 5 ECU

DIAGNOSTIC CHART

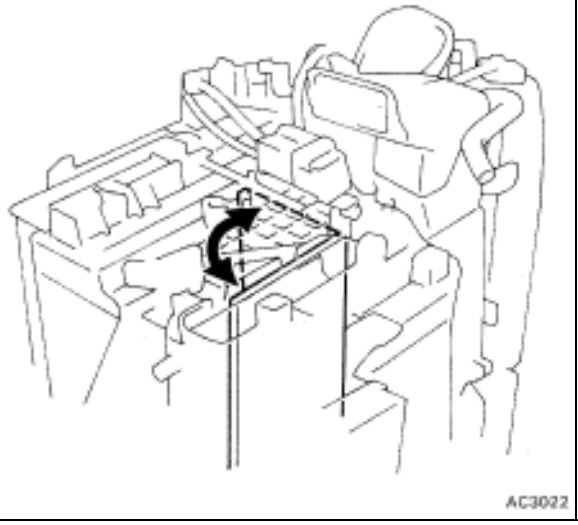


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Actuator check.**



P
1. Warm up the engine.
2. Set to the actuator check mode (See page AC–30).
3. Press the mode switch and change it to step operation.

C Press the mode switch and check the operatiion of the air mix damper and the condition of the blower.

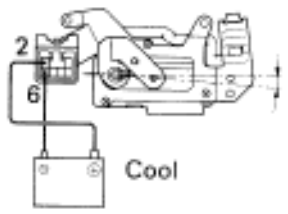
OK

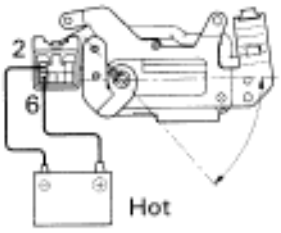
Display Code	Air Mix Damper	Condition
20 – 23	0% (Fully closed)	Cool air comes out
24 – 25	50%	
26 – 29	100% (Fully opened)	Warm air comes out

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check air mix servomotor.**





AC3020
AC3021

P Remove heater unit.

C Connect positive ∞ lead to terminal 2 and negative ⊕ lead to terminal 6.

OK **The lever turns smoothly to cool side.**

C Connect negative ⊕ lead to terminal 2 and positive ∞ lead to terminal 6.

OK **The lever turns smoothly to Hot side.**

OK

NG **Replace air mix servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air mix servomotor assembly (See page IN–27).**

OK

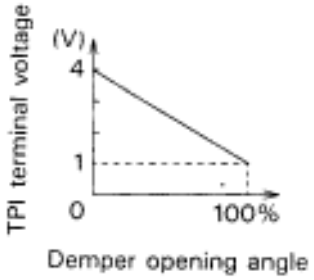
NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

DTC 32,42 Air Inlet Damper Position Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the position of the air inlet damper and sends the appropriate signals to the air conditioning control assembly.
The position sensor is built into the air mix servomotor assembly.



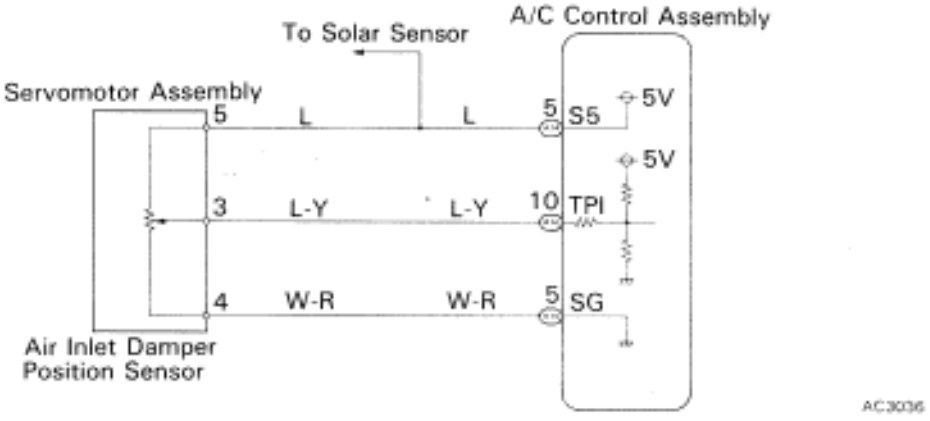
Code No.	DTC Detection Condition	Trouble Area
32	Short to ground or power source circuit in airinlet damper position sensor circuit.	5 Air inlet damper position sensor. 5 Harness or connector between air inlet servomotor assembly and A/C control assembly. 5 A/C control assembly.
42	Air inlet damper position sensor value does not change even if ECU operates air inlet ser– .	

DIAGNOSTIC CHART

1. Check voltage between terminals TPI and SG of air conditioning control assembly connector.
   - OK → Proceed to next circuit inspection shown on matrix chart (See page AC-36). However, when DTC 32 or 42 is displayed, check and replace air conditioning control assembly.
   - NG ↓
2. Check air inlet damper position sensor.
   - NG → Replace air inlet servomotor assembly.
   - OK ↓
3. Check harness and connectors between air conditioning control assembly and air inlet servomotor assembly (See page IN-27).
   - NG → Repair or replace harness or connector.
   - OK ↓

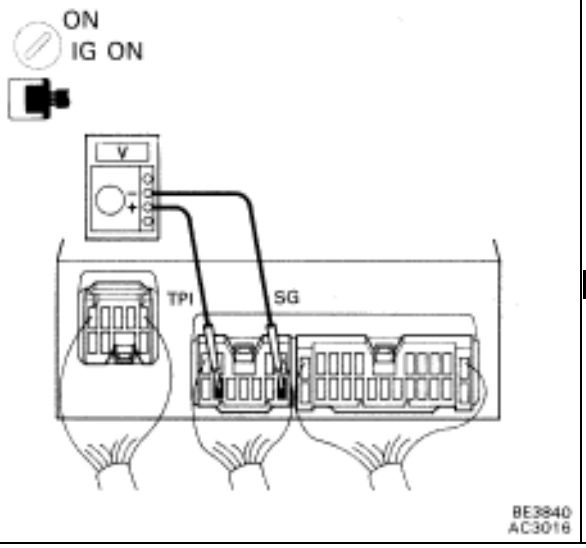
Check and replace air conditioning control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TPI and SG of air conditioning control assembly connector.**



P
1. Remove A/C control assembly with connectors still connected.
2. Turn ignition switch ON.

C Press REC/FRS switch to change air inlet between fresh and recirculation air, and measure voltage between terminals TPI and SG of air conditioning control assembly when the air inlet servomotor operates.

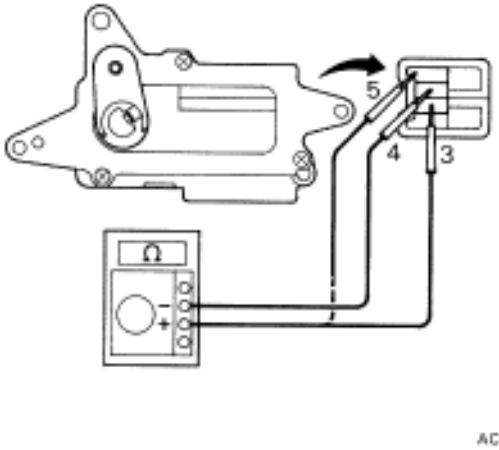
OK

FRS-REC Switch	Voltage
REC	3.5 ~ 4.5 V
FRS	0.5 ~ 1.8 V

In addition, as the air inlet servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

OK → **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 32 or 42 is displayed, check and replace air conditioning control assembly.**

2 **Check air inlet damper position sensor.**



P
1. Remove A/C unit. (See page AC–99)
2. Disconnect air inlet servomotor assembly connector.

C Measure resistance between terminals 4 and 5 of air inlet servomotor assembly connector.

OK **Resistance: 4.7 ~ 7.2 kΩ**

C While operating air inlet servomotor as in the procedure on page AC–65, measure resistance between terminals 3 and 5 of air inlet servomotor assembly connector.

OK **Resistance:**

Damper Position	Resistance
REC side	3.8 ~ 5.8 kΩ
FRS side	0.95 ~ 1.45 kΩ

As the air inlet servomotor moves from REC side to FRS side, the resistance decreases gradually without interruption.

OK → **NG** → **Replace air inlet servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air inlet servomotor assembly (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

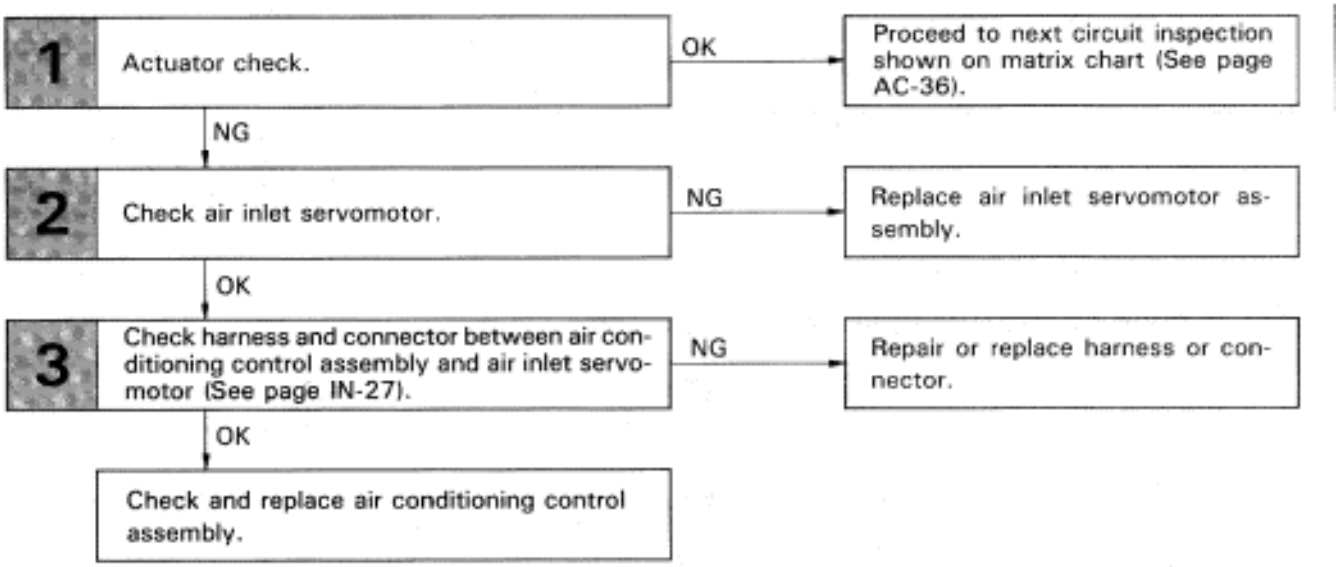
DTC 42 Air Inlet Servomotor Circuit

CIRCUIT DESCRIPTION

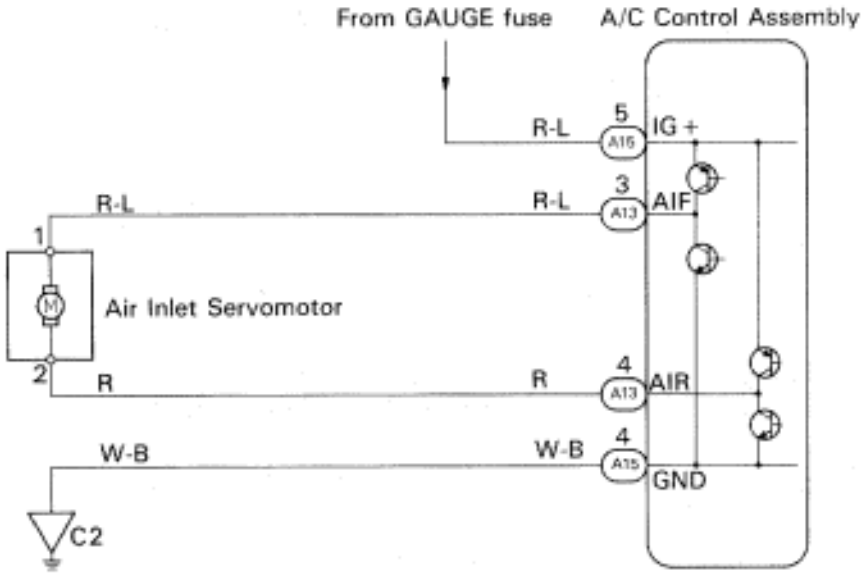
The air inlet servomotor is controlled by the air conditioning control assembly and moves the air inlet damper to the desired position.

Code No.	DTC Detection Condition	Trouble Area
42	Air inlet damper position sensor value does not change even if ECU operates air inlet servomotor.	5 Air inlet damper position sensor. 5 Harness or connector between air inlet servomotor assembly and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

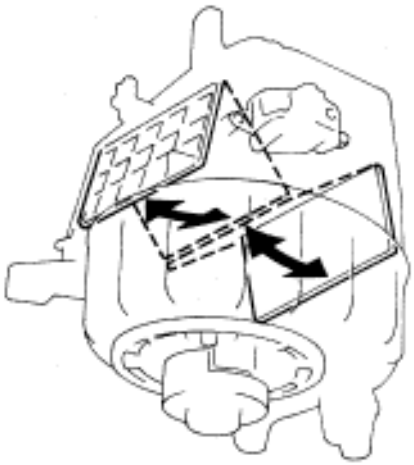


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Actuator check.**



P 1. Remove glove box to see and check the air inlet damper operation.
2. Set to the actuator check mode (See page AC–30).
3. Press the switch and change it to step operation.

C Press the switch and check the operation air inlet damper.

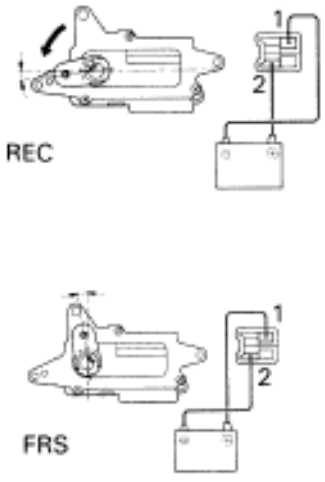
OK

Display Code	Air Inlet Damper
20 ~ 22	FRS
23	F/R
24 ~ 29	REC

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check air inlet servomotor.**



P Remove cooling unit.

C Connect positive ∞ lead to terminal 2 and negative ⊕ lead to terminal 1.

OK **The lever moves smoothly to REC position.**

C Connect negatives ⊕ lead to terminal 2 and positive ∞ lead to terminal 1.

OK **The lever moves smoothly to FRS position.**

OK

NG **Replace air inlet servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air inlet servomotor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

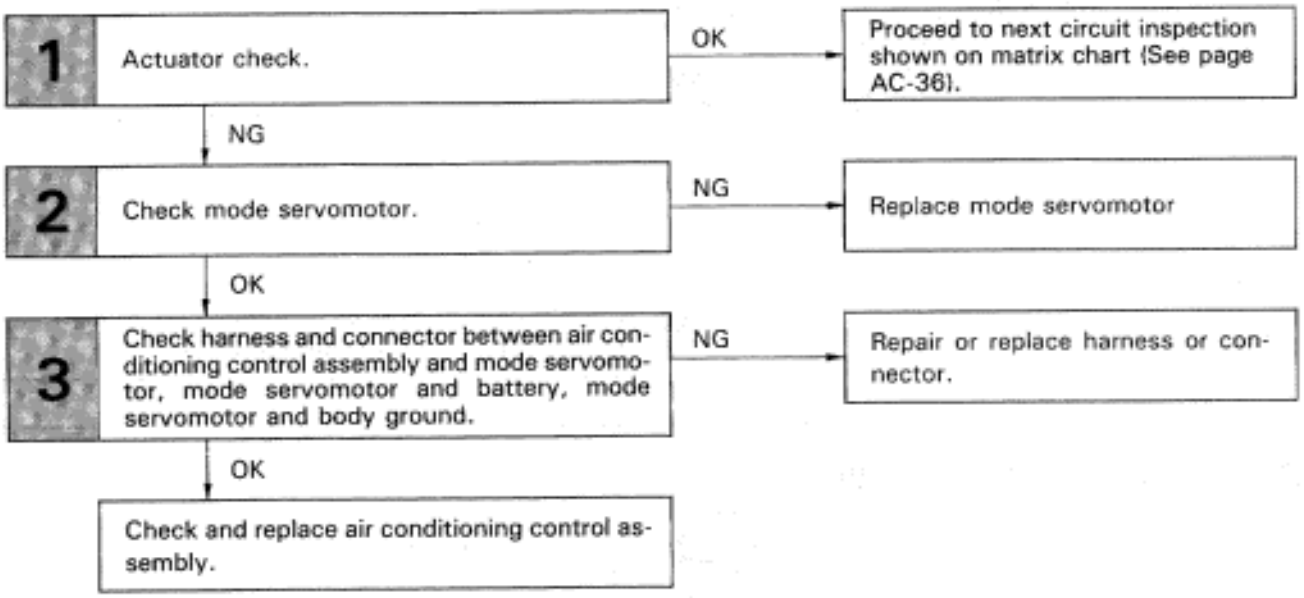
Check and replace air conditioning control assembly.

Air Outlet Servomotor Circuit

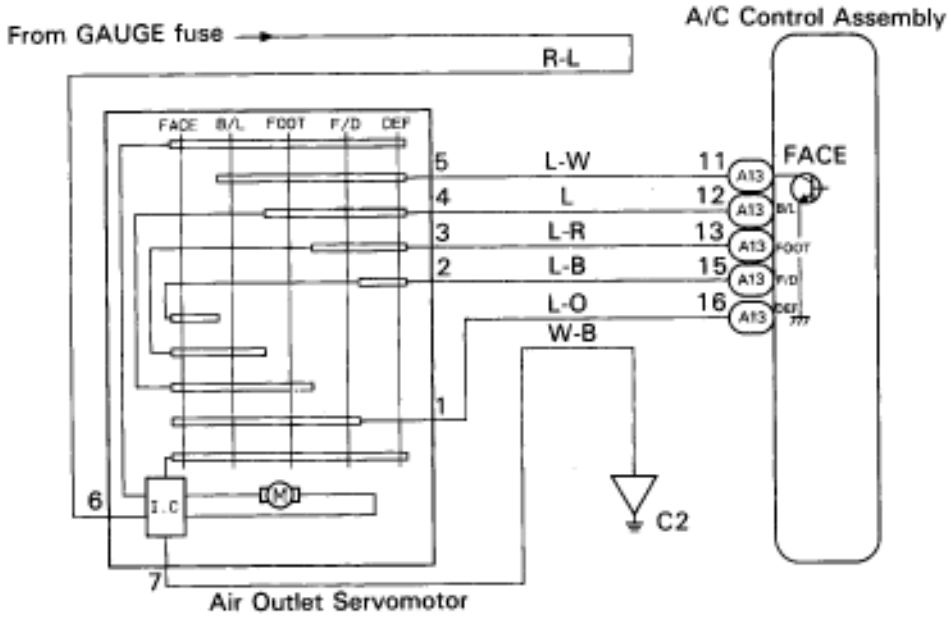
CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by signals from the ECU. When the AUTO switch is on, the ECU changes the mode automatically between (FACE), (BI–LEVEL) and (FOOT) according to the temperature setting.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Actuator check.**

Display Code	Air Flow Mode
20 ~ 24	FACE
25	BI-LEVEL
26 ~ 27	FOOT
28	FOOT DEF
29	DEF

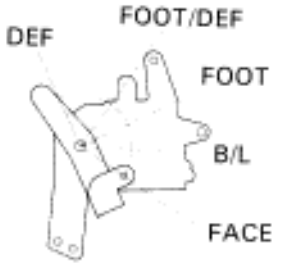
P 1. Set to the actuator check mode (See page AC–30).
2. Press the mode (<) switch and change to step operation.

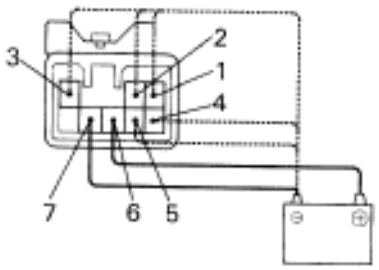
C Press the mode (<) switch in order and check the condition of air flow mode.

OK **The mode changes with the change in the temperature display as shown in the table.**

OK → **NG** → **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check mode servomotor.**





N01283
N01285

P Remove heater unit (See page AC–99).

C 1. Connect positive ∞ lead to terminal 6 and negative ⊕ lead to terminal 7.
2. Check the lever operation when the negative ⊕ lead is connected to the terminals shown below.

OK **The lever moves smoothly to the position for each mode.**

Ground Terminals	Mode
5	FACE
4	BI-LEVEL
3	FOOT
2	FOOT DEF
1	DEF

OK → **NG** → **Replace mode servomotor.**

3 **Check harness and connector between air conditioning control assembly and mode servomotor mode servomotor and battery, mode servomotor and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

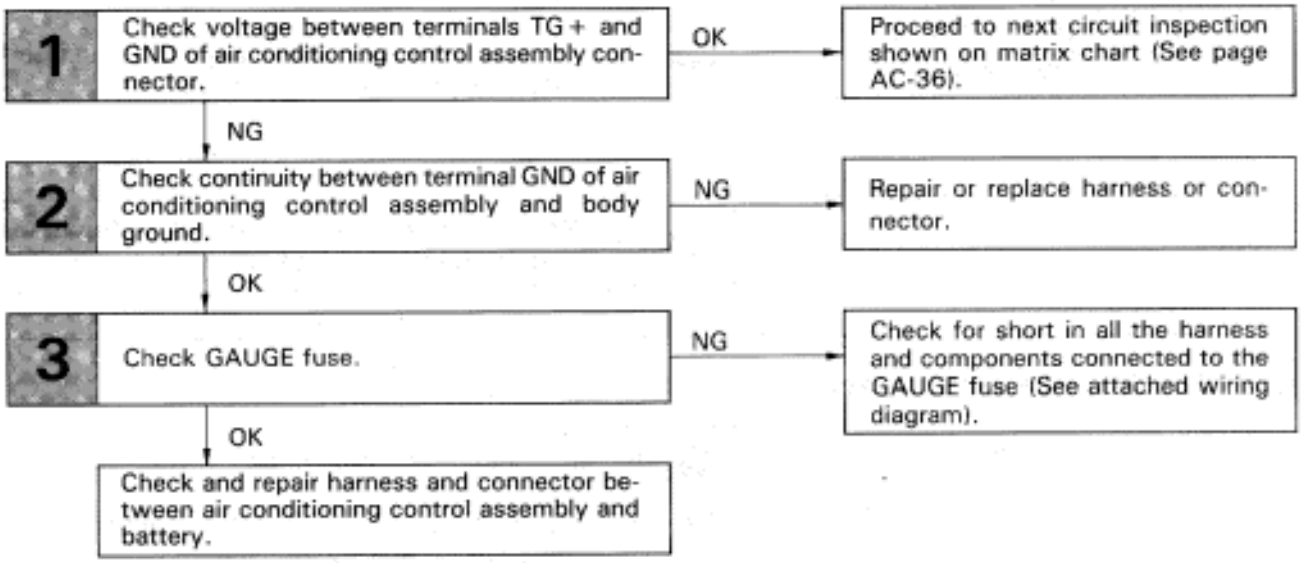
Repair or replace air conditioning control assembly.

IG Power Source Circuit

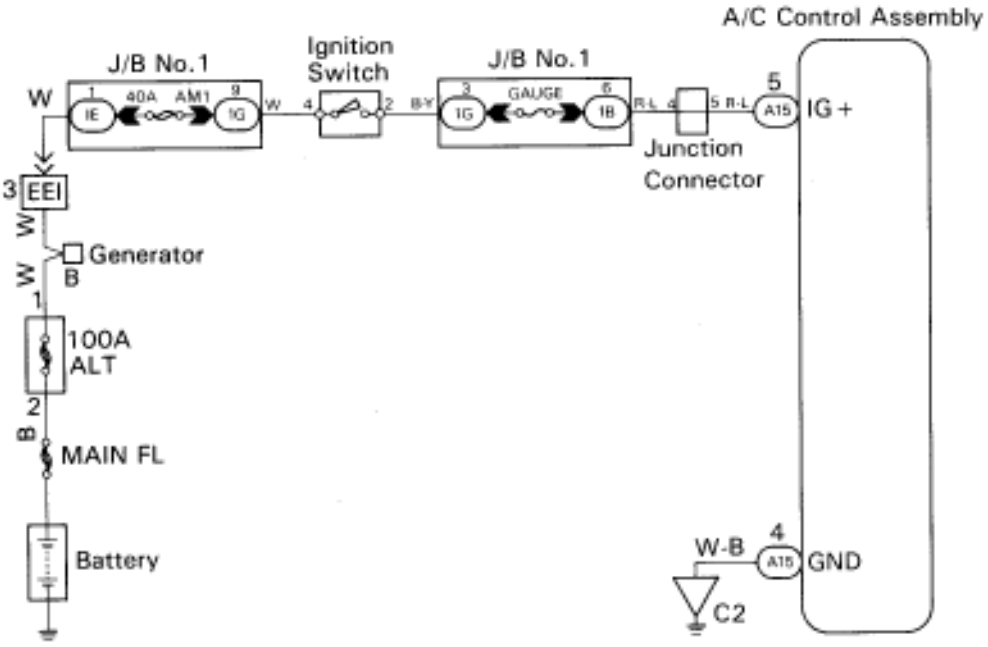
CIRCUIT DESCRIPTION

This is the power source for the air conditioning control assembly (contains the ECU) and servomotors, etc.

DIAGNOSTIC CHART

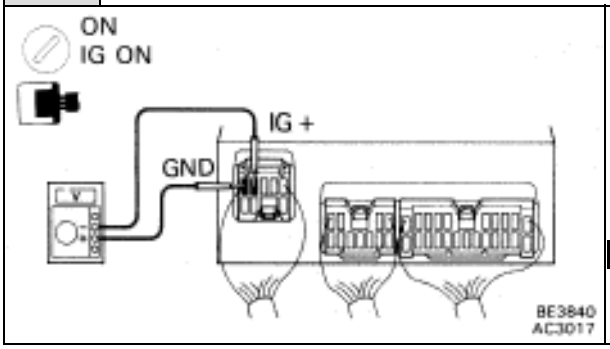


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals IG+ and E of air conditioning control assembly connector.**



P 1. Remove console upper panel. (See page BO–112)
2. Remove A/C ECU with connectors still connected.
3. Turn ignition switch ON.

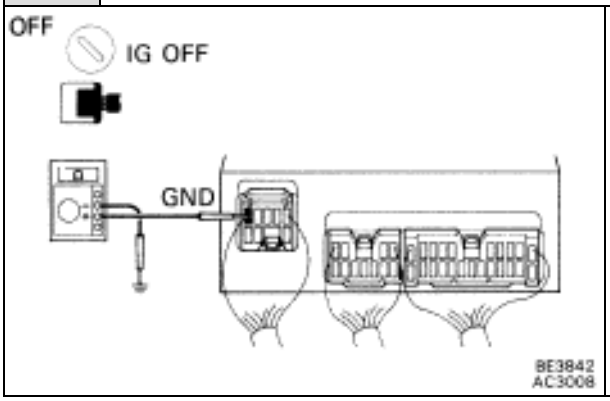
C Measure voltage between terminals IG+ and GND of air conditioning control assembly.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check continuity between terminal E of air conditioning control assembly and body ground.**



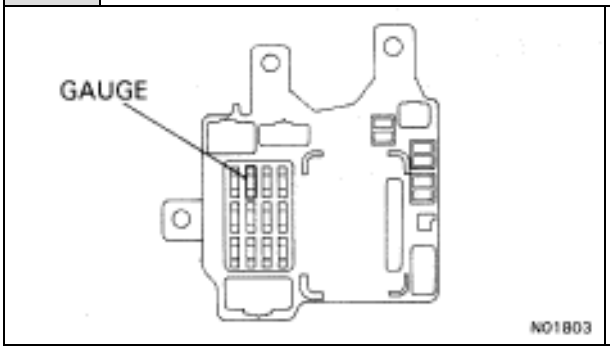
P Measure resistance between terminal GND of air conditioning control assembly and body ground

OK **Resistance: Below 1 Ω**

OK

NG **Repair or replace harness or connector.**

3 **Check HEATER fuse.**



P Remove GAUGE fuse J/B No.1.

C Check continuity of gauge fuse.

OK **Continuity.**

OK

NG **Check for short in all the harness and components connected to the GAUGE fuse (See attached wiring diagram).**

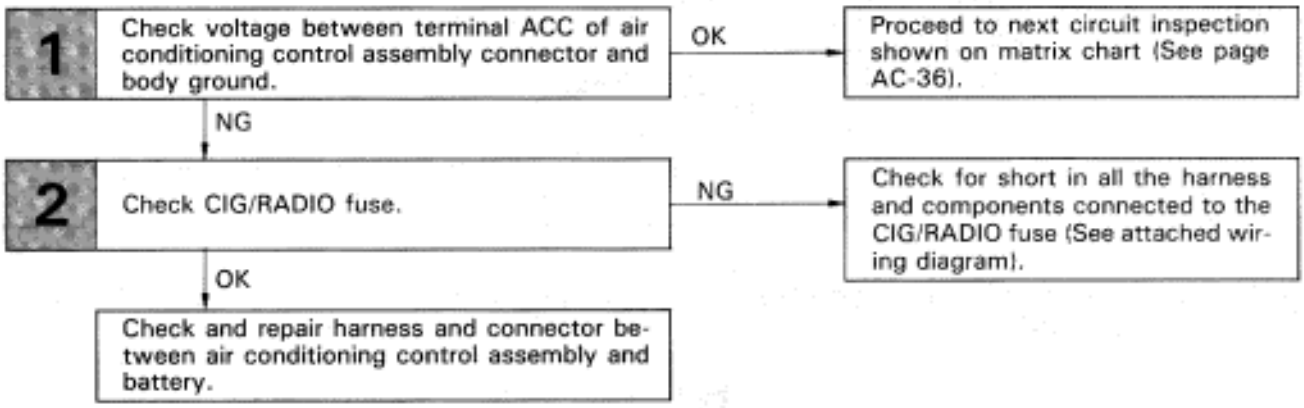
Check and repair harness and connector between air conditioning control assembly and battery.

ACC Power Source Circuit

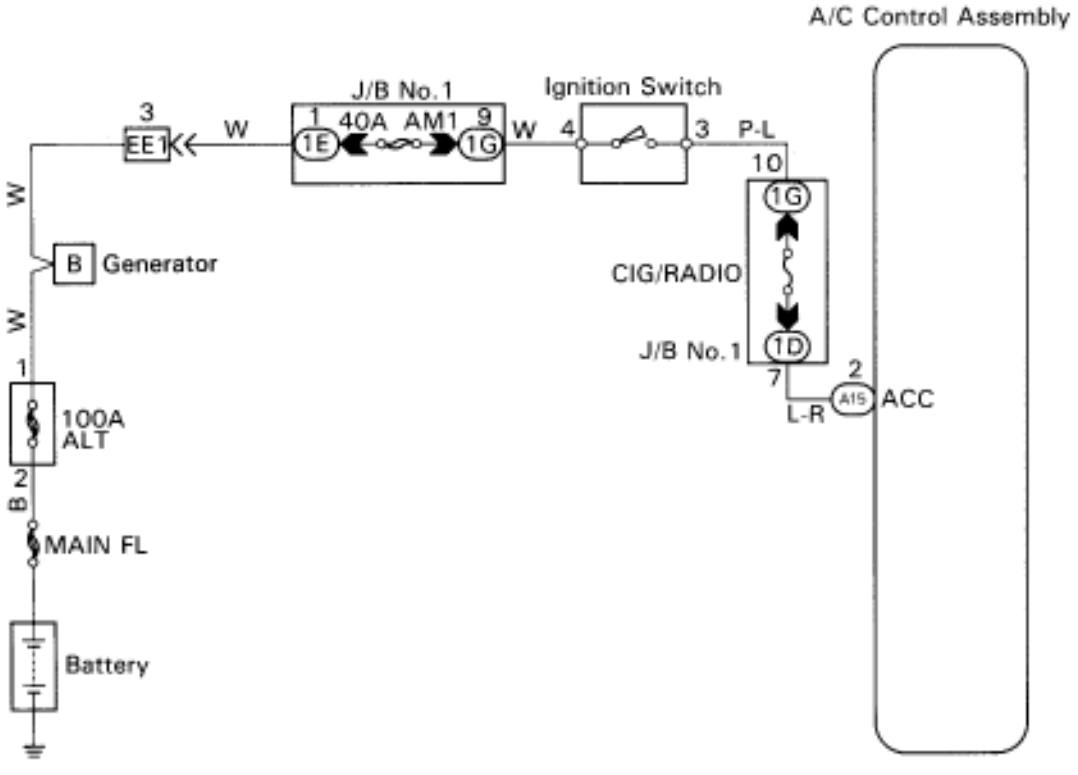
CIRCUIT DESCRIPTION

This circuit supplies power to the air conditioning control assembly (contains the ECU).

DIAGNOSTIC CHART

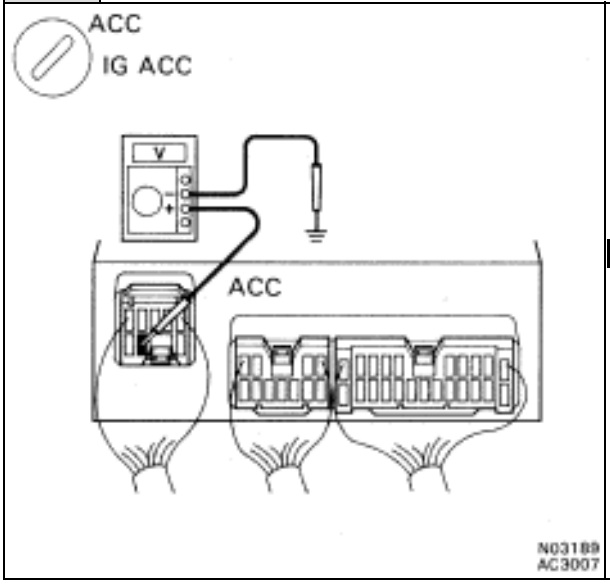


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal ACC of air conditioning control assembly connector and body ground.**



P 1. Remove console upper panel. (See page BO–112)
2. Remove A/C ECU with connectors still connected.
3. Turn ignition switch ON.

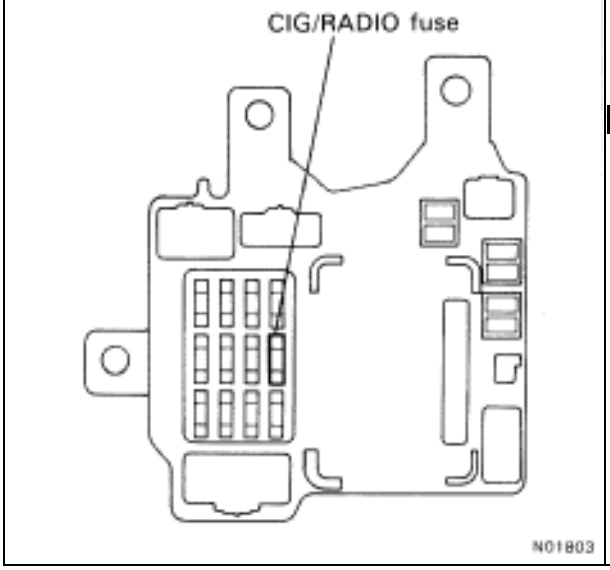
C Measure voltage between terminal ACC of air conditioning control assembly connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check RADIO No.2 fuse.**



P Remove CIG/RADIO fuse from J/B No.1.

C Check continuity of CIG/RADIO fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the CIG/RADIO fuse (See attached wiring diagram).**

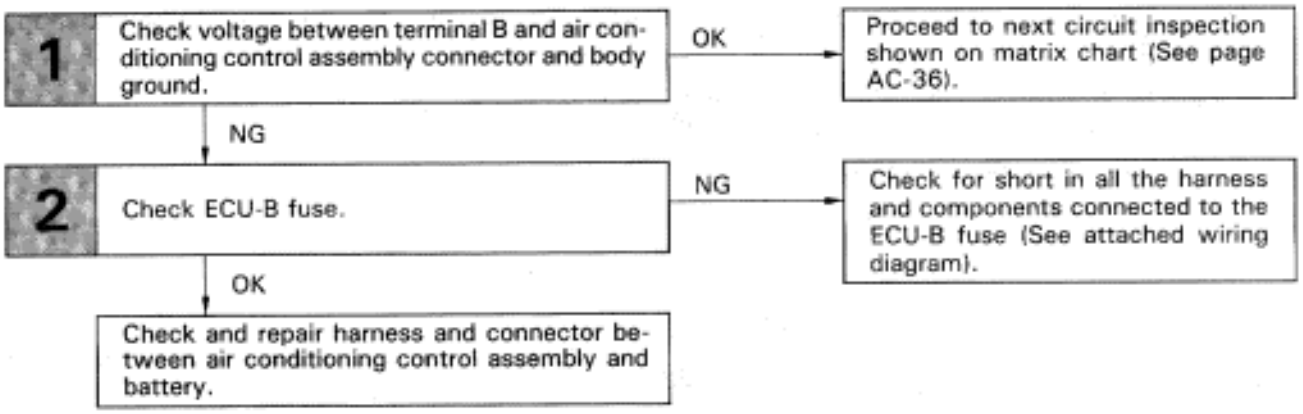
Check and repair harness and connector between air conditioning control assembly and battery.

Back–up Power Source Circuit

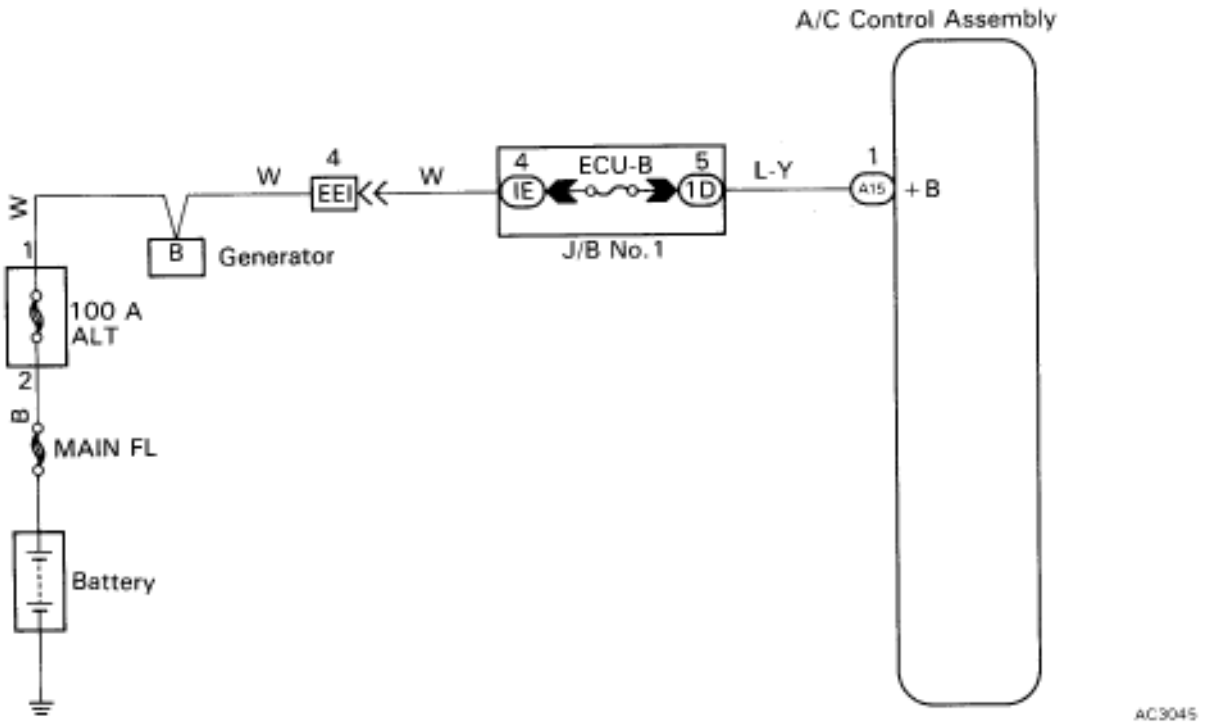
CIRCUIT DESCRIPTION

This is the backup power source for the air conditioning control assembly. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

DIAGNOSTIC CHART

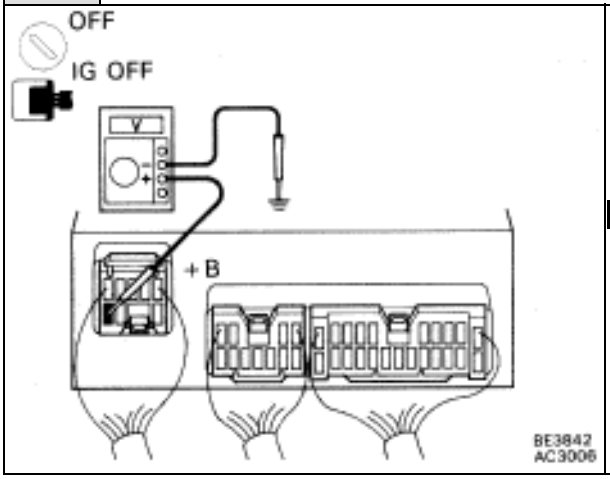


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal B+ of air conditioning control assembly connector and body ground.**



P 1. Remove console upper panel. (See page BO–112.)
2. Remove A/C ECU with connectors still connected.

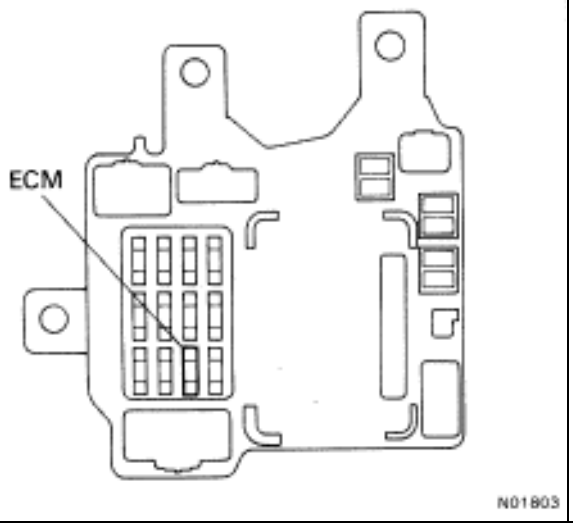
C Measure voltage between terminal B+ of air conditioning control assembly connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check DOME fuse.**



P Remove ECU–B fuse from J/B No.1.

C Check continuity of ECU–B fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the DOME fuse (See attached wiring diagram).**

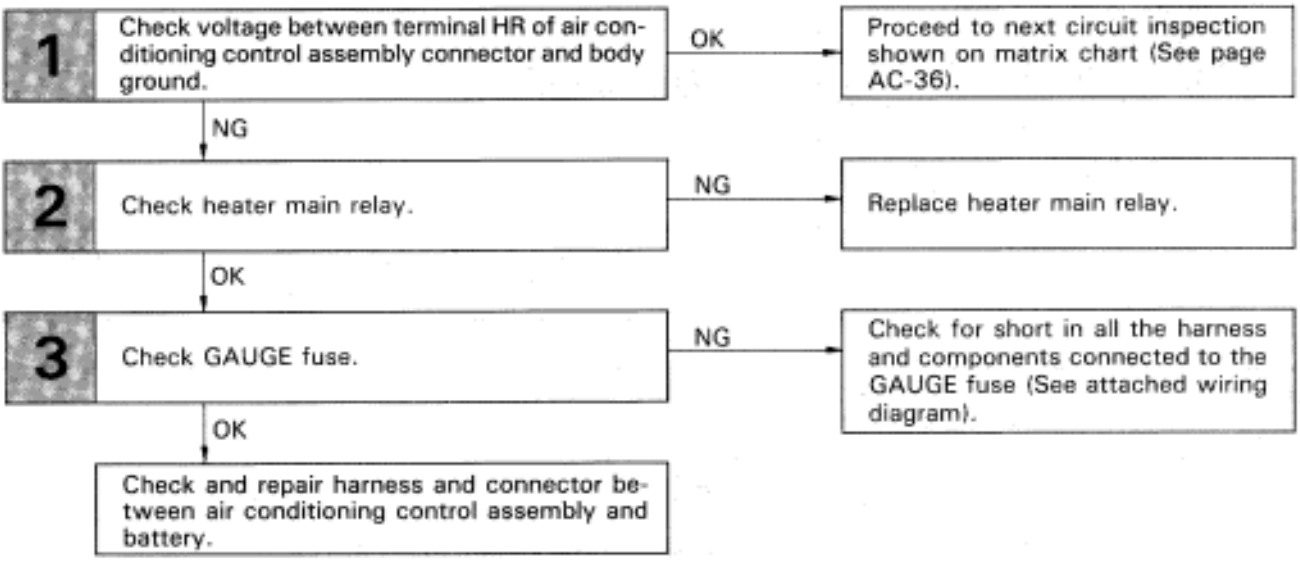
Check and repair harness and connector between air conditioning control assembly and battery.

Heater Main Relay Circuit

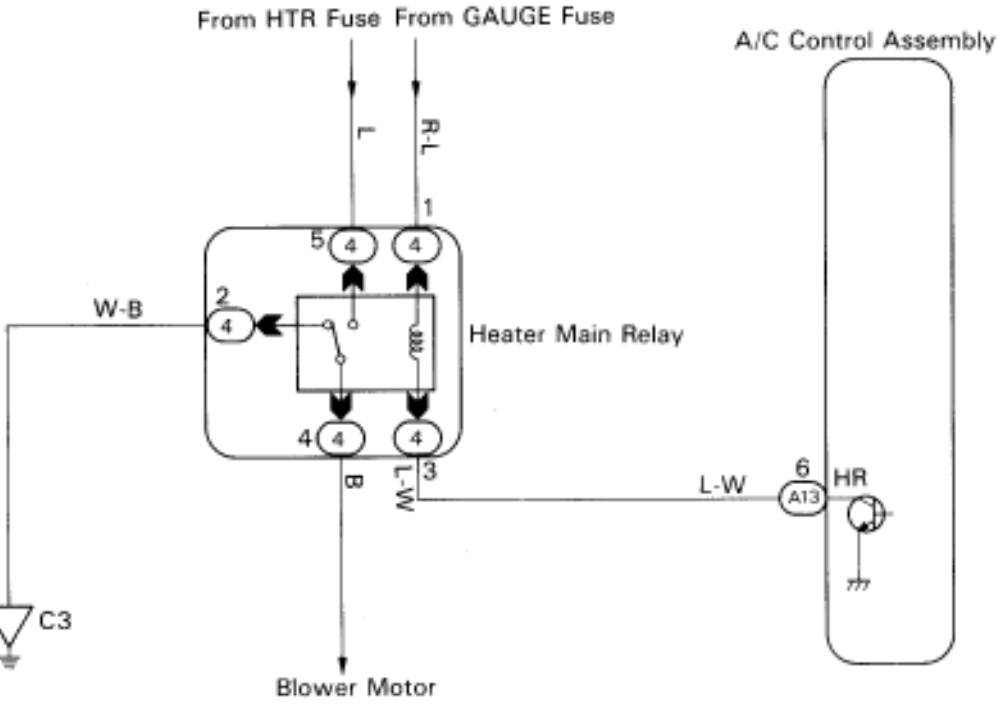
CIRCUIT DESCRIPTION

The heater main relay is switched on by signals from the air conditioning control assembly.
It supplies power to the blower motor.

DIAGNOSTIC CHART

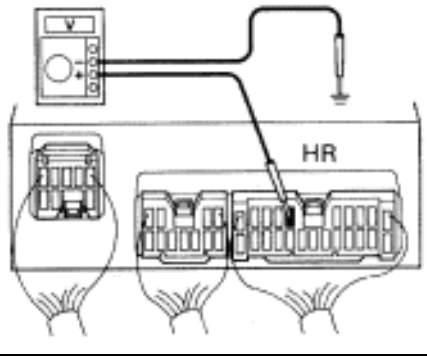


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal HR of air conditioning control assembly connector and body ground.**



P Remove A/C control assembly with connectors still connected.

C 1. Measure voltage between terminal HR of air conditioning control assembly and body ground when ignition switch is on and off.

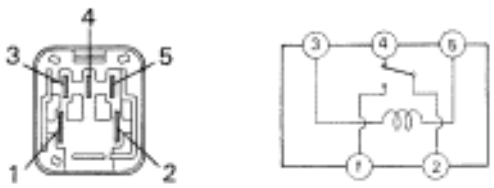
OK

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check heater main relay.**



C Check continuity between each pair of terminals of heater main relay shown below.

OK

Terminals 1 and 4	Open
Terminals 2 and 4	Continuity
Terminals 3 and 5	Continuity (62.5 ~ 90.9 Ω)

P 1. Apply battery positive voltage between terminals 3 and 5.

2. Check continuity between each pair of terminal shown below.

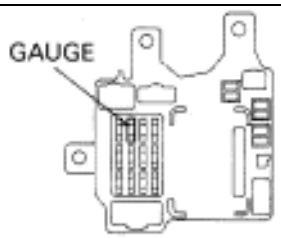
OK

Terminals 1 and 2	Continuity
Terminals 2 and 4	Open

OK

NG **Replace heater main relay.**

3 **Check GAUGE fuse.**



P Remove GAUGE fuse.

C Check continuity of GAUGE fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the GAUGE fuse (See attached wiring diagram).**

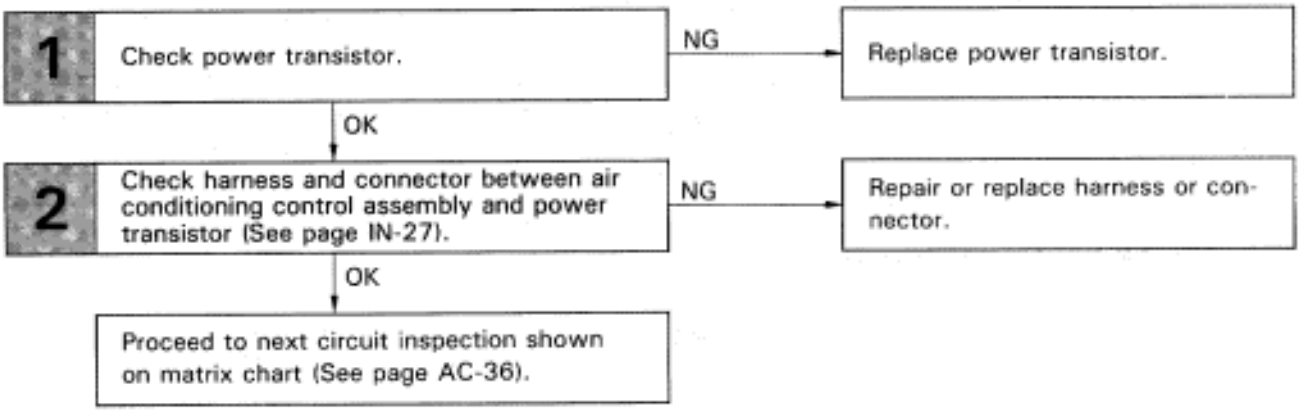
Check and repair harness and connector between air conditioning control assembly and battery.

Power Transistor Circuit

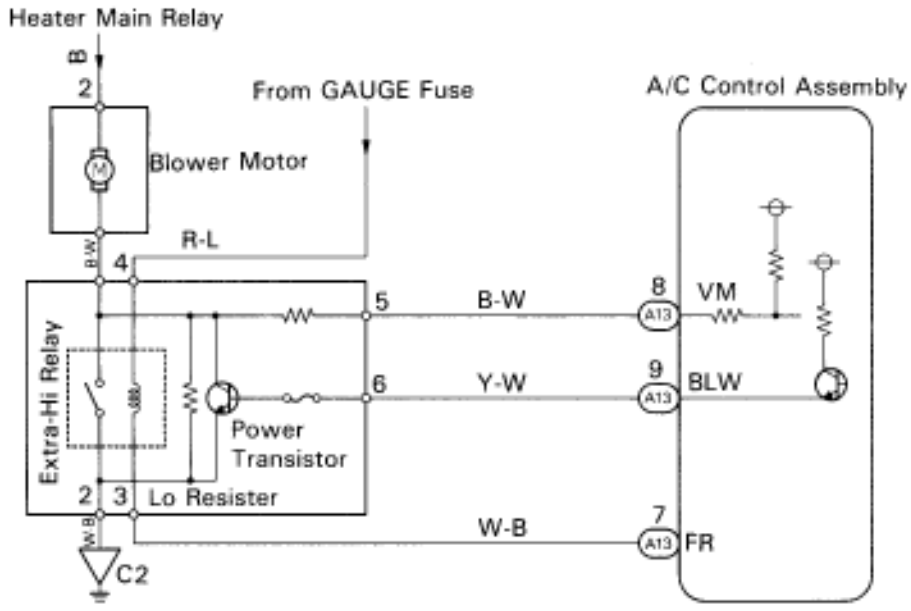
CIRCUIT DESCRIPTION

The air conditioning control assembly controls the blower speed by varying the voltage at terminal BLW which applies the base current to the power transistor.
The air conditioning control assembly also monitors the power transistor collector voltage at terminal, VM to control blower air volume precisely.

DIAGNOSTIC CHART

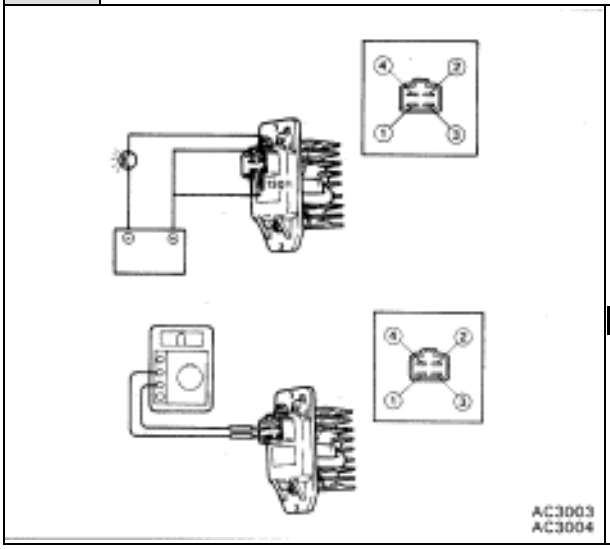


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check power transistor.**



P
1. Remove A/C unit (See page AC–99).
2. Disconnect power transistor connector. (See page AC–7)

C
1. Check test bulb lights up when battery and resistor are connected to power transistor connects as left illustration shows.
2. Measure resistance between terminal 1 and 4.

OK
1. **The bulb lights up.**
2. **2.0 – 2.4 kΩ**

OK → **NG** → **Replace power transistor.**

2 **Check Lo–resister.**

P
1. Remove Lo–resister (See page AC–7).
2. Disconnect Lo–resister connector.

C
1. Measure resistance between terminal 1 and 2.

OK
1. **Resistance: 1.8 – 2.2 Ω**

OK → **NG** → **Replace Lo–resister.**

3 **Check harness and connector between air conditioning control assembly and power transistor (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

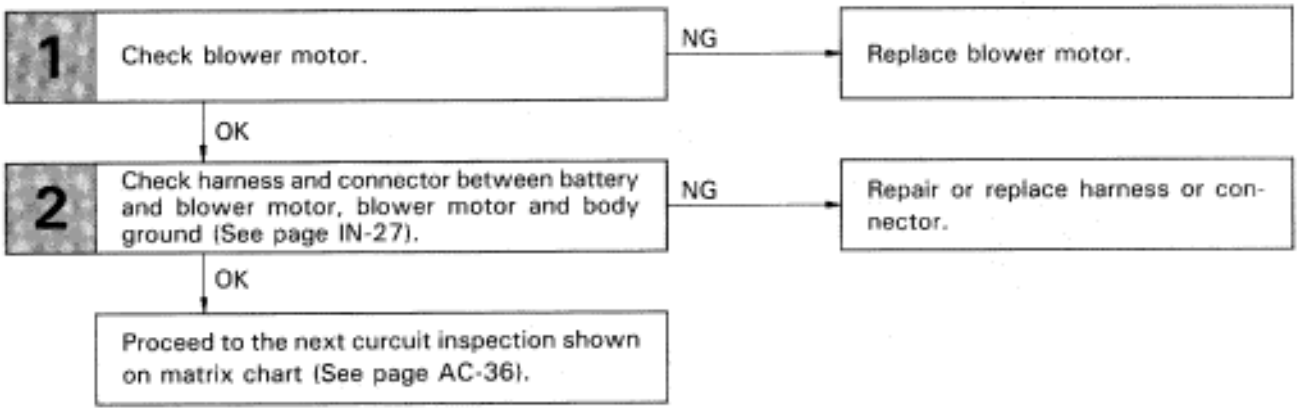
Proceed to next circuit inspection shown on matrix chart (See page AC–36).

Blower Motor Circuit

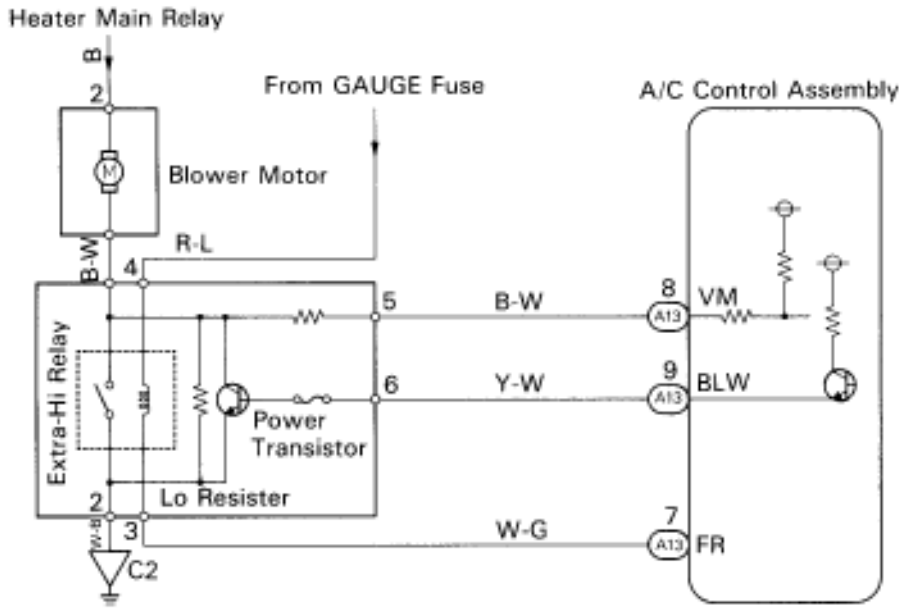
CIRCUIT DESCRIPTION

This is the power source for the blower motor.

DIAGNOSTIC CHART

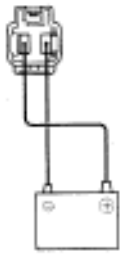


WIRING DIAGRAM



AC3037

1	Check blower motor.



P Remove blower motor (See page AC–118).

C Connect positive ∞ lead connected to terminal 2 of blower motor connector, negative ⊕ lead to terminal 1.

OK **Blower motor operates smoothly.**

OK → **2** Check harness and connector between battery and blower motor, blower motor and body ground (See page IN–27).

NG → **Replace blower motor.**

OK → **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

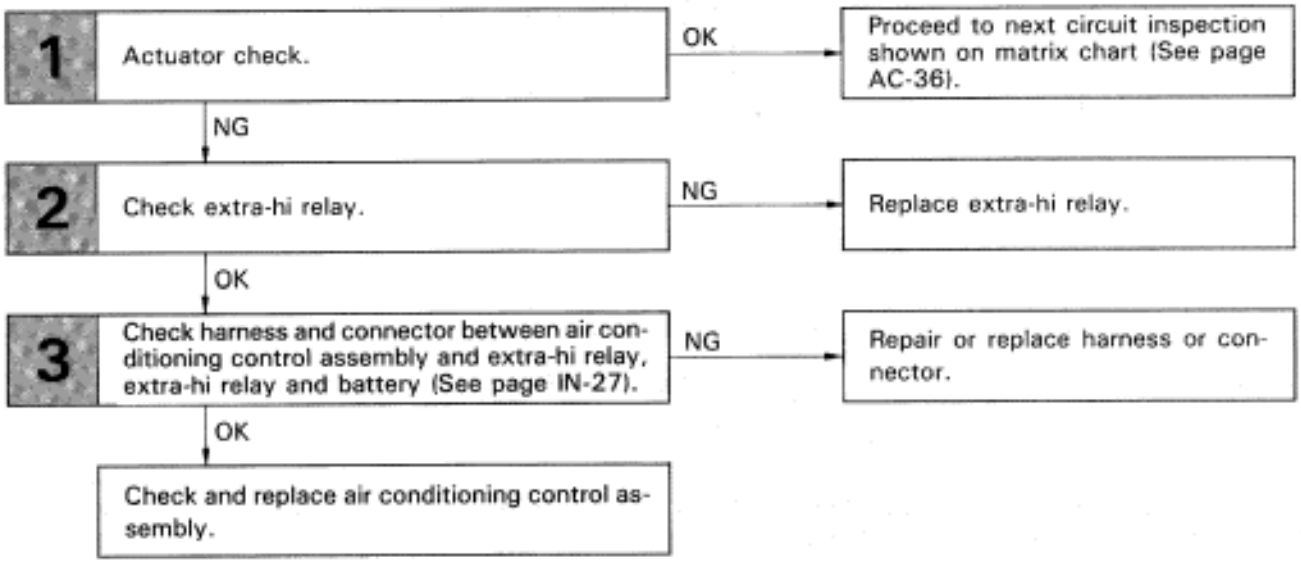
NG → **Repair or replace harness or connector.**

Extra–Hi Relay Circuit

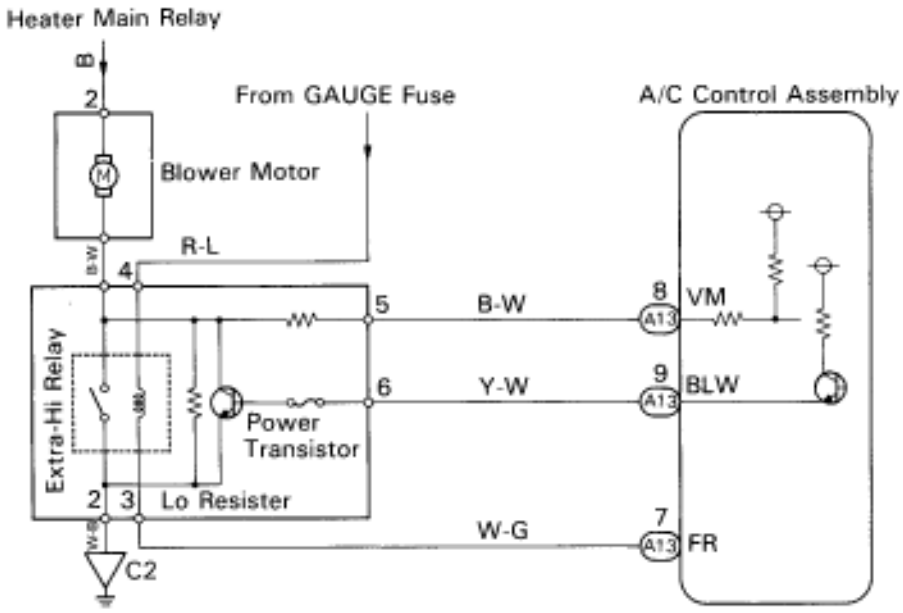
CIRCUIT DESCRIPTION

The extra–Hi relay is switched on by signals from the air conditioning control assembly.

DIAGNOSTIC CHART



WIRING DIAGRAM



AC3037

INSPECTION PROCEDURE

1 **Actuator check.**

Display Code	Blower
21	Low
22 ~ 28	Med
29	Hi

P 1. Set to the actuator check mode (See page AC–30).
2. Press the mode (<) switch and change it to step operation.

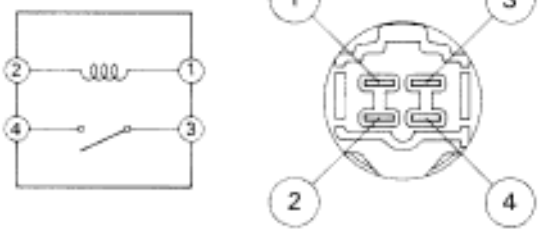
C Press the mode (<) switch in order and check the condition of the blower.

OK **Blower speed changes from Low to Hi as shown in the table when the display code is changed from 21 to 29.**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check extra–hi relay.**



P Remove extra–hi relay.

C Check continuity between each pair of terminal shown below of extra–hi relay.

OK

Terminals 1 and 2	Continuity (55.8 ~ 88.9 Ω)
Terminals 3 and 4	Open

P 1. Apply battery positive voltage between terminals 1 and 2.
2. Check continuity between terminals 3 and 4.

OK

Terminals 3 and 4	Continuity

OK

NG **Replace extra–hi relay.**

3 **Check harness and connector between air conditioning control assembly and extra–hi relay, extra–hi relay and battery (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

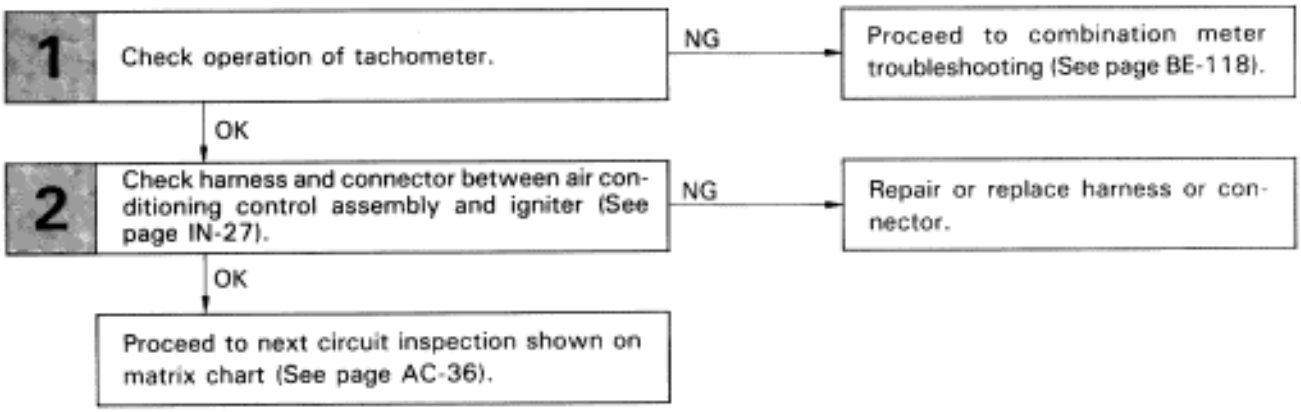
Check and replace air conditioning control assembly.

Igniter Circuit

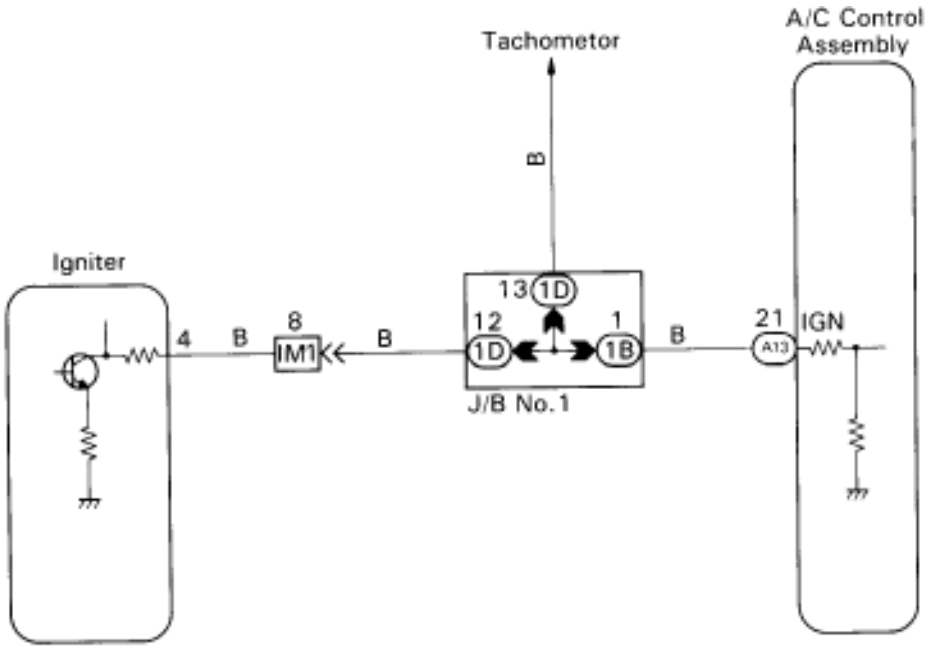
CIRCUIT DESCRIPTION

This air conditioning control assembly monitors the engine speed through signals sent from the igniter. The air conditioning control assembly uses these signals and compressor speed signals to detect the compressor lock condition.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of tachometer.**
P	Check that the tachometer operates normally.

OK

NG **Proceed to combination meter troubleshooting (See page BE–118).**

2	**Check harness and connector between air conditioning control assembly and igniter (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page AC–36).

Compressor Circuit

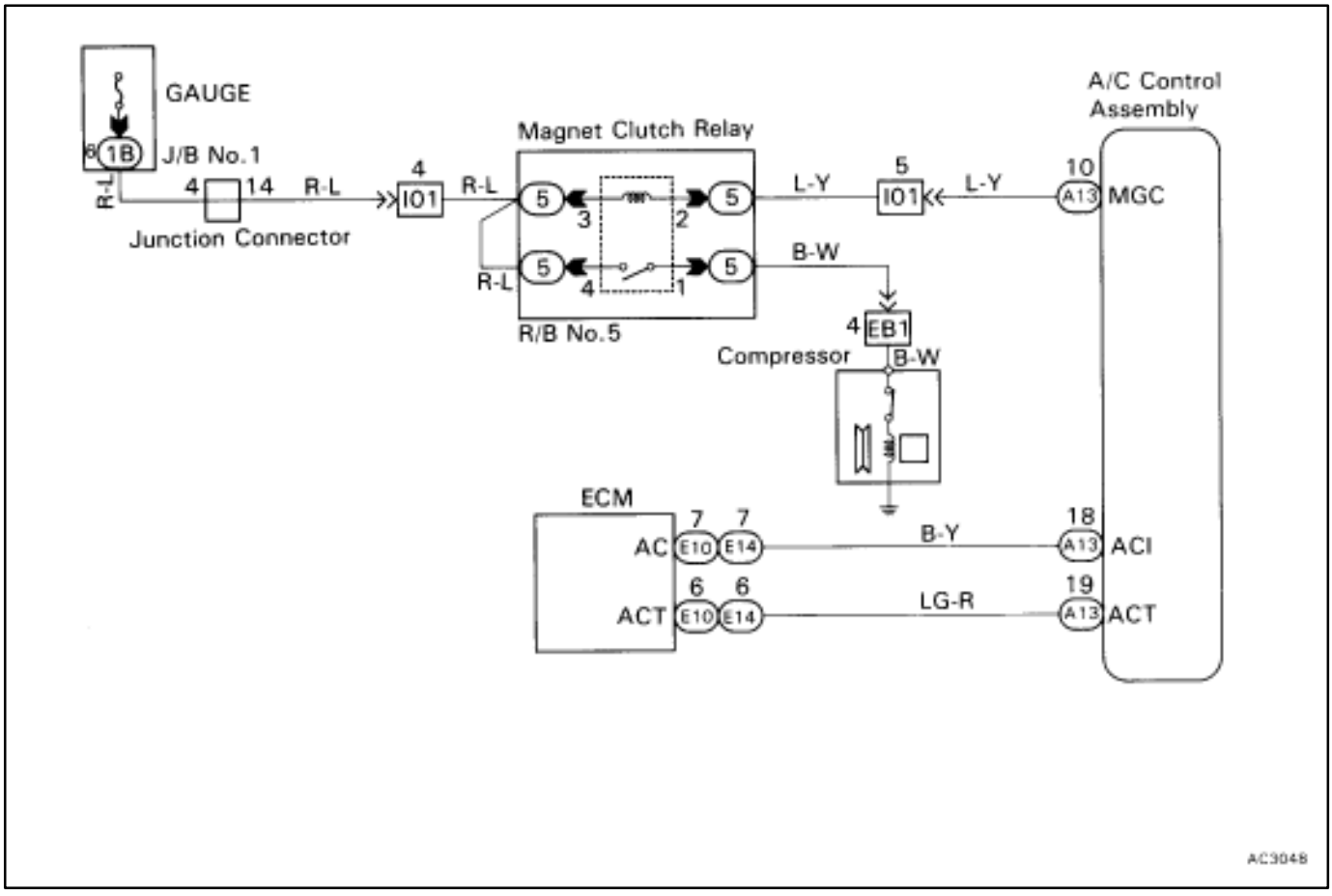
CIRCUIT DESCRIPTION

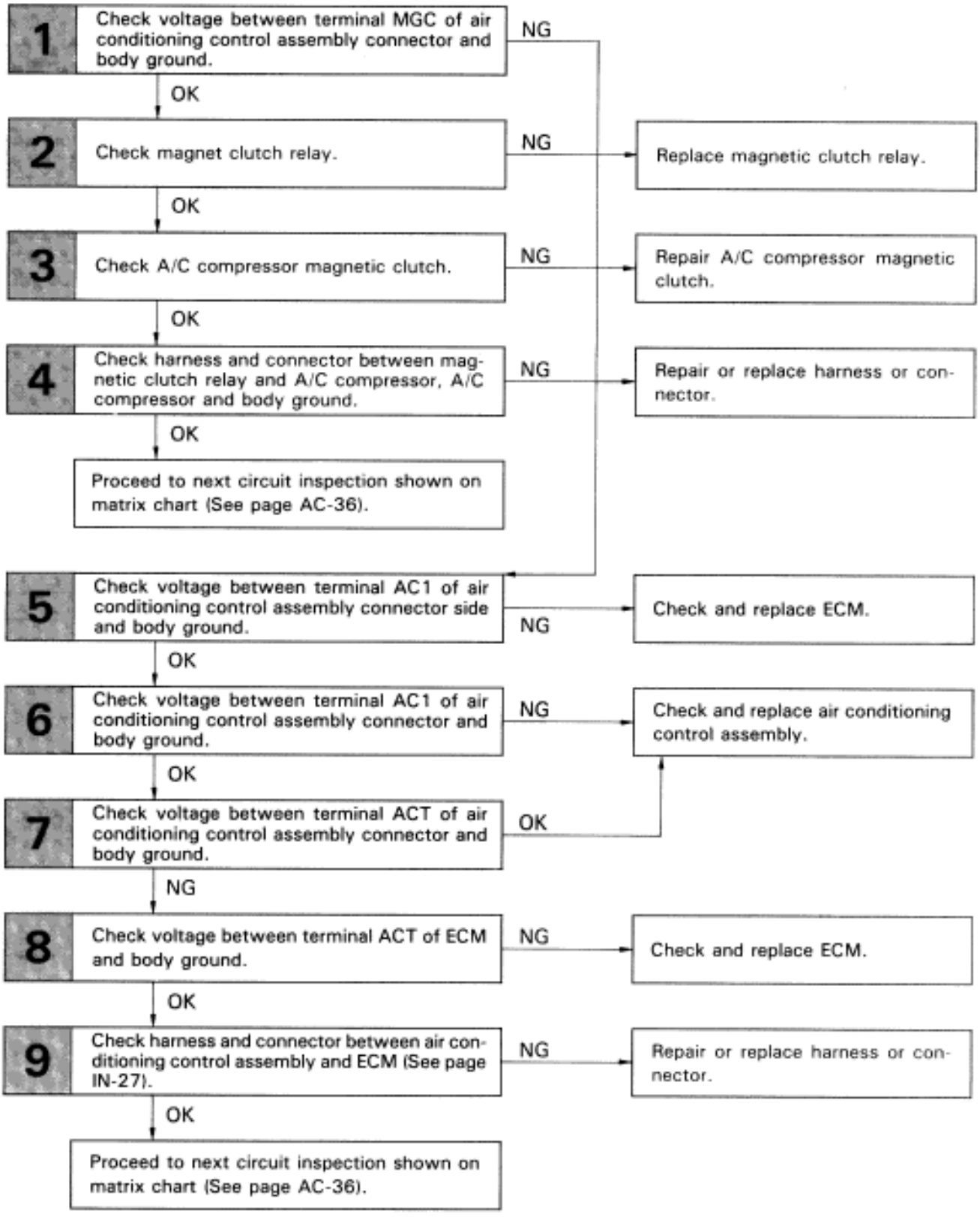
The air conditioning control assembly outputs the magnetic clutch ON signal from terminal AC1 to the ECM. When the ECM & TCM receives this signal, it sends a signal from terminal ACT and switches the air conditioning magnetic clutch relay on, thus turning on the air conditioning compressor magnetic clutch.

DIAGNOSTIC CHART

See next page for the Diagnostic Chart.

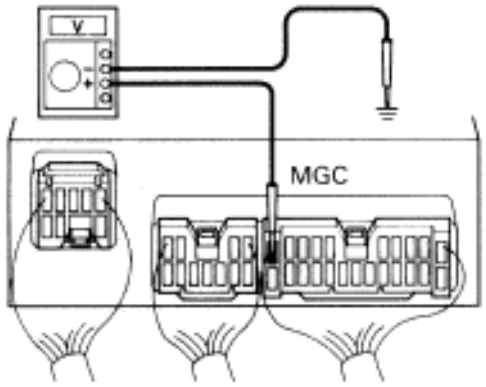
WIRING DIAGRAM




1
Check voltage between terminal MGC of air conditioning control assembly connector and body ground.
NG
OK
2
Check magnet clutch relay.
NG
Replace magnetic clutch relay.
OK
3
Check A/C compressor magnetic clutch.
NG
Repair A/C compressor magnetic clutch.
OK
4
Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground.
NG
Repair or replace harness or connector.
OK
Proceed to next circuit inspection shown on matrix chart (See page AC-36).
5
Check voltage between terminal AC1 of air conditioning control assembly connector side and body ground.
NG
Check and replace ECM.
OK
6
Check voltage between terminal AC1 of air conditioning control assembly connector and body ground.
NG
Check and replace air conditioning control assembly.
OK
7
Check voltage between terminal ACT of air conditioning control assembly connector and body ground.
OK
NG
8
Check voltage between terminal ACT of ECM and body ground.
NG
Check and replace ECM.
OK
9
Check harness and connector between air conditioning control assembly and ECM (See page IN-27).
NG
Repair or replace harness or connector.
OK
Proceed to next circuit inspection shown on matrix chart (See page AC-36).

INSPECTION PROCEDURE

1 **Check voltage between terminal MGC of air conditioning control assembly connector and body ground.**



P
1. Remove A/C control assembly with connectors still connected. (See page BO–112).
2. Start the engine and push AUTO switch.

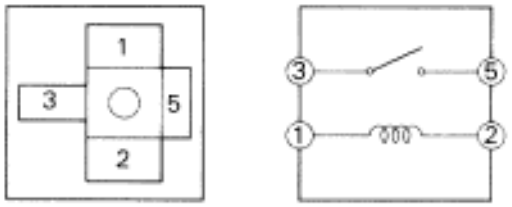
C Check voltage between terminal MGC of air conditioning control assembly connector and body ground when magnetic clutch is on and off by A/C switch.

OK

A/C switch	Voltage
ON	Below 1 V
OFF	10 – 14 V

OK → **NG** → **Go to step 5.**

2 **Check magnetic clutch relay.**



P Remove magnetic clutch relay from R/B No. 5.

C Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK

Terminals 1 and 2	Continuity (62.5 ~ 90.9 Ω)
Terminals 3 and 5	Open

P
1. Apply battery positive voltage between terminals 1 and 2.
2. Check continuity between terminals 3 and 5.

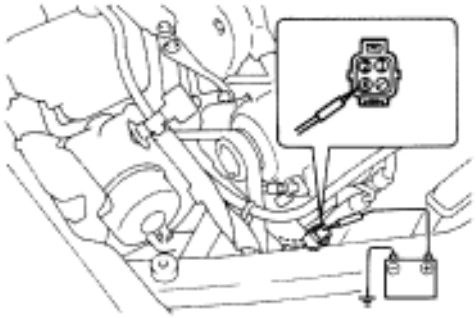
OK

Terminals 3 and 5	Continuity

OK → **NG** → **Replace magnetic clutch relay.**

Go to step 3 .

3	Check air compressor magnetic clutch.



P Disconnect clutch connector.

C Connect positive ∞ lead connected to battery to magnetic clutch connector terminal 4.

OK **Magnetic clutch is energized.**

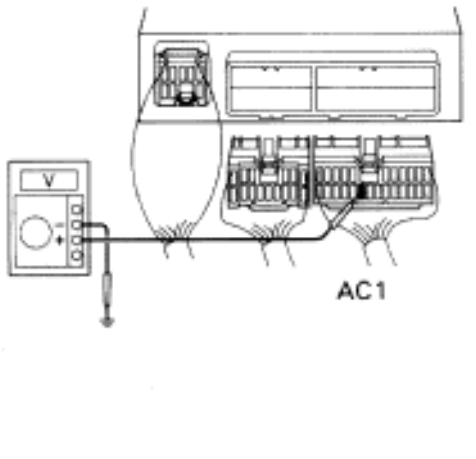
OK → **NG** → **Repair A/C compressor magnetic clutch.**

4	Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground.

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on a matrix chart (See page AC–36).

5	Check voltage between terminal AC1 of air conditioning control assembly connector side and body ground.



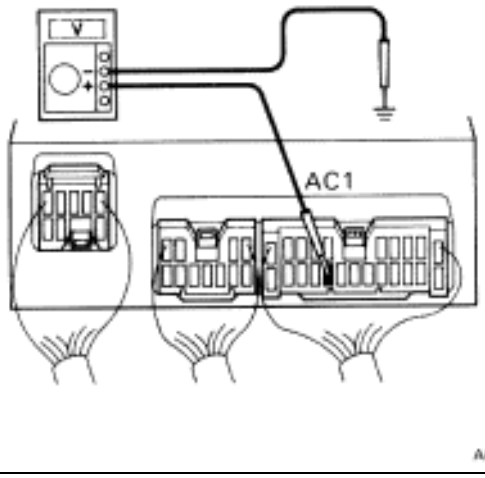
P
1. Disconnect air conditioner control connector.
2. IG S/W ON.

C Check voltage between terminal AC1 of air conditioning control assembly harness side connector and body ground.

OK **10 – 14 V**

OK → **NG** → **Check and replace ECM.**

6 **Check voltage between terminal AC1 of air conditioning control assembly connecter and body ground.**



P
1. Remove A/C control assembly with connectors still connected. (See page BO–112)
2. Start the engine and push AUTO switch.

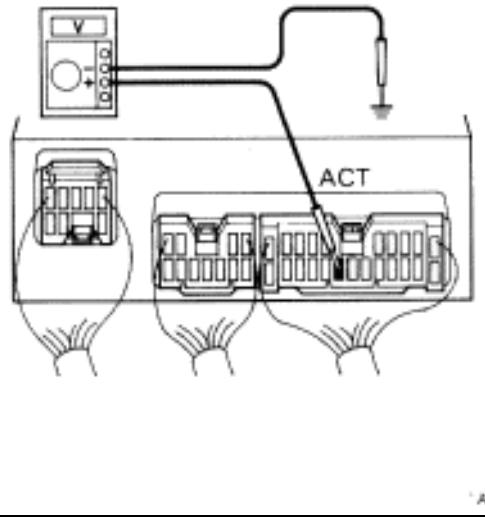
C Check the voltage between terminal AC1 of air conditioning control assembly connector4 and body ground when magnetic clutch is on and off by A/C switch.

OK

Magnetic clutch	Voltage
ON	Below 1 V
OFF	10 – 14V

OK → **NG** → **Check and replace air condition control assembly.**

7 **Check voltage between terminal ACT of air conditioning control assembly and body ground.**



P
1. Remove A/C control assembly with connectors still connected.
2. Start the engine and push AUTO switch.

C Check the voltage between terminal ACT of air conditioning control assembly and body ground.

OK

A/C switch	Voltage
ON	10 – 14 V
OFF	Below 1.5 V

NG → **OK** → **Check and replace A/C control assembly.**

8 **Check voltage between terminal ACT of ECM connector and body ground (See page EG–450).**

OK → **NG** → **Check and replace ECM.**

9	Check harness and connector between air conditioning control assembly and ECM.

OK

NG → Repair or replace harness or connector.

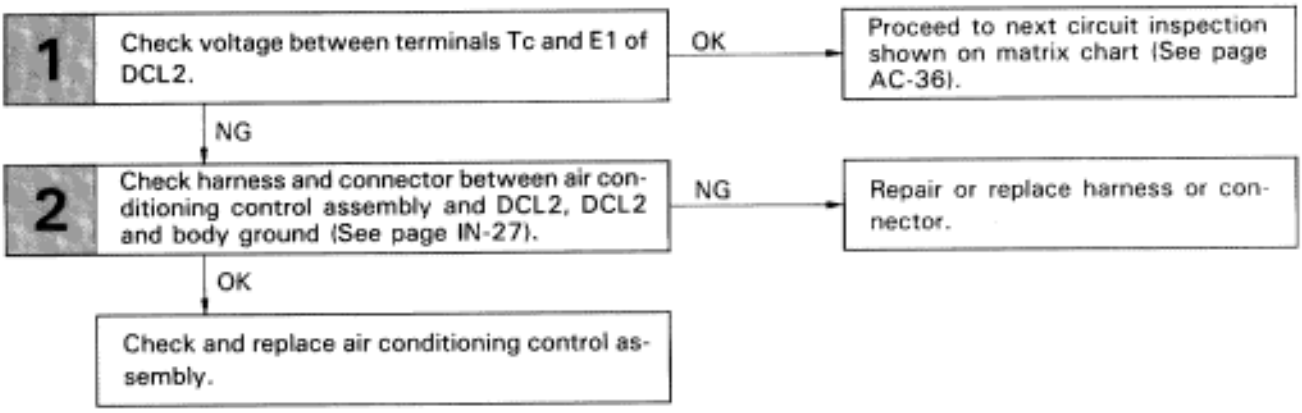
Proceed to next circuit inspection shown on a matrix chart (See page–36).

Diagnostic Circuit

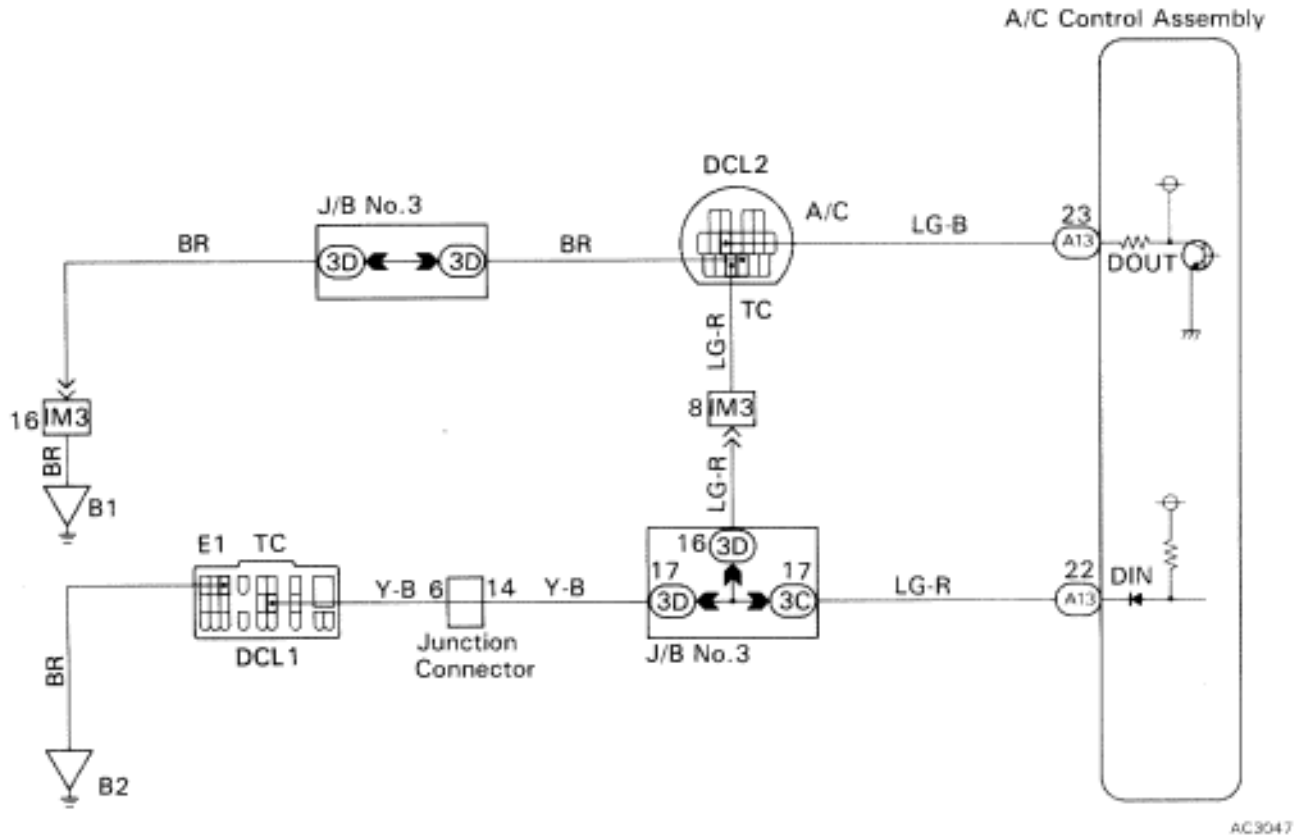
CIRCUIT DESCRIPTION

This circuit sends signals to the ECU requesting output of diagnostic trouble codes.

DIAGNOSTIC CHART

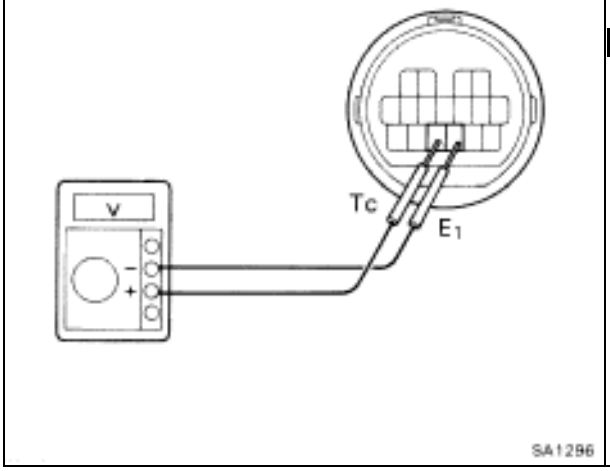


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals Tc and E1 of DCL2.**



P
1. Turn ignition switch on.
2. Check voltage between terminals Tc and E1 of DCL2.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check harness and connector between air conditioning control assembly and DCL2, DCL2 and body ground (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

Inspection of Refrigeration System with Manifold Gauge Set

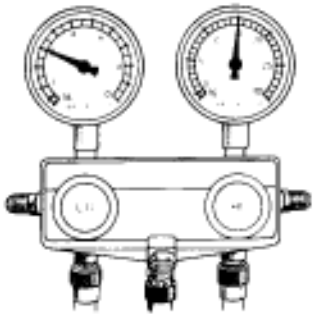
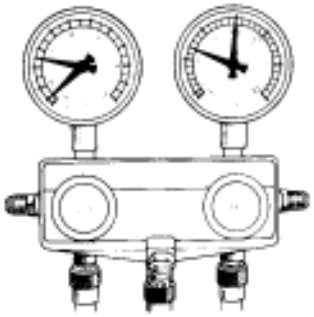
This is a method in which the trouble is located by using a manifold gauge set. (See “Use of Manifold Gauge Set” on page AC–15) Read the manifold gauge pressure when the following conditions are established.

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

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

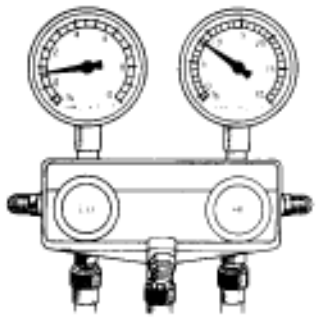
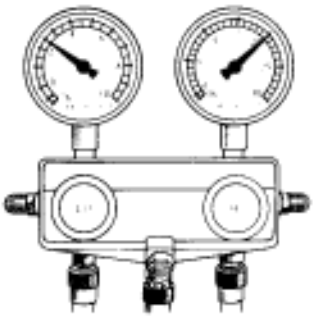
NOTICE:

- **Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.**
- **Evacuate air and charge proper amount of purified refrigerant after installing the parts the parts in the refrigerant line.**

No.	Gauge reading kPa (kgf/cm², psi)	Condition	Probable cause	Remedy
1	LO: 147 – 196 (1.5 – 2.0, 21 – 28) HI: 1,422 – 1,471 (14.5 – 15.0, 206 – 213)  AC0067	Normal cooling	Normally functioning system	
2	During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal  AC0068	Periodically cools and then fails to cool	Moisture present in refrigeration system	(1) Replace receiver (2) Remove moisture is system through repeatedly evacuating air

NOTICE:

- **Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.**
- **Evacuate air and charge proper amount of purified refrigerant after installing the parts in the refrigerant line.**

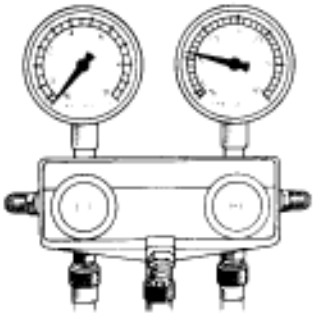
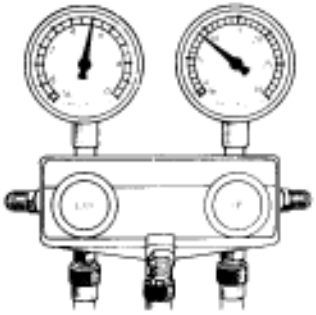
No.	Gauge reading kPa (kgf/cm², psi)	Condition	Probable cause	Remedy
3	Pressure low at both low and high pressure sides  AC0069	• Insufficient cooling • Bubbles seen in sight glass	Insufficient refrigerant	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
		• Insufficient cooling • Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Replace receiver
4	Pressure too high at both low and high pressure sides  AC0070	Insufficient cooling	Insufficient cooling of condenser	(1) Clean condenser (2) Check fan motor operation
5			Refrigerant overcharged	(1) Check amount of refrigerant If refrigerant is overcharged (2) Recover refrigerant (3) Evacuate air and charge proper amount of purified refrigerant
6			Air present in system	(1) Replace receiver (2) Check compressor oil to see if dirty (3) Remove air in system through repeatedly evacuating air
7		• Insufficient cooling • Frost or Large amount of dew on piping at low pressure side	Expansion valve improperly mounted, heat sensing tube defective (Opens too wide)	(1) Check heat sensing tube installation condition If (1) is normal (2) Check expansion valve and replace if defective

HINT at 6:

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

NOTICE:

- **Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.**
- **Evacuate air and charge proper amount of purified refrigerant after installing the parts in the refrigerant line.**

No.	Gauge reading kPa (kgf/cm², psi)	Condition	Probable cause	Remedy
8	Vacuum indicated at low pressure side, very low pressure indicated at high pressure  AC0156	• Does not cool (Cools from time to time in some cases) • Frost or dew seen on piping before and after receiver or expansion valve	Refrigerant does not circulate	(1) Check heat sensing tube for gas leakage and replace expansion valve if defective If (1) is normal (2) Clean out dirt in expansion valve by blowing with air if not able to remove dirt, replace expansion valve (3) Replace receiver
9	Pressure too high at low pressure side, pressure too low at high pressure side  AC0157	Does not cool	Insufficient compression	Repair or replace compressor