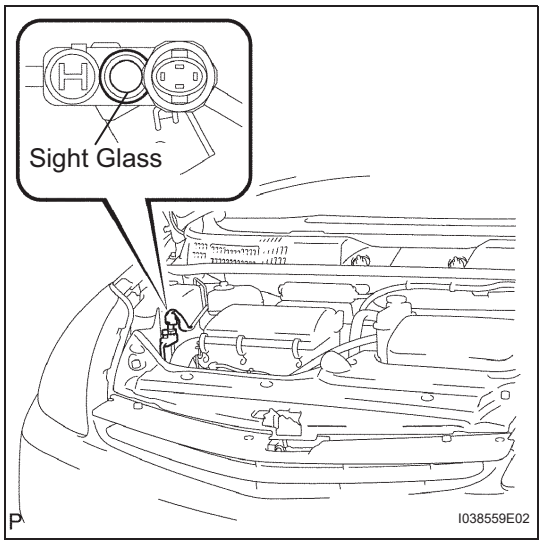


REFRIGERANT

ON-VEHICLE INSPECTION

1. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

(a) Check the sight glass of the cooler unit refrigerant liquid pipe E.

(1) Set the vehicle according to the conditions below.

Item	Condition
All doors	Fully open
Temperature setting	MAX COLD
Blower speed	HI
A/C switch	ON

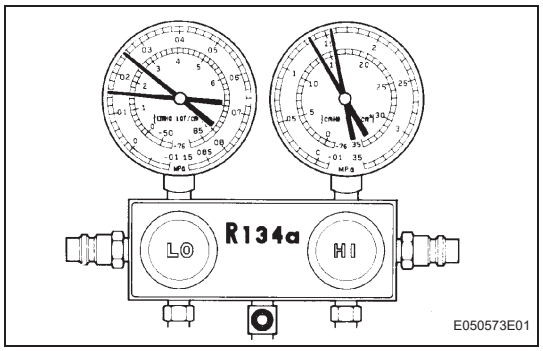
(2) Check the sight glass under these conditions.

Item	Symptom	Amount of refrigerant	Corrective Actions
1	Bubbles exist	Insufficient*	1. Check for gas leakage and repair if necessary 2. Add refrigerant until bubbles disappear
2	No bubbles exist (DTC 76 is output)	Empty, insufficient or excessive	Refer to 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	1. Check for gas leakage and repair if necessary 2. Add refrigerant until bubbles disappear
4	Considerable temperature difference between compressor inlet and outlet	Proper or excessive	Refer to 5 and 6
5	Immediately after air conditioning is turned off, refrigerant remains clear	Excessive	1. Discharge refrigerant 2. Remove air and supply proper amount of purified refrigerant
6	Immediately after air conditioning is turned off, refrigerant foams and then becomes clear	Proper	-

HINT:
Bubbles in the sight glass with the room temperature higher than usual can be considered normal if cooling is sufficient.

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

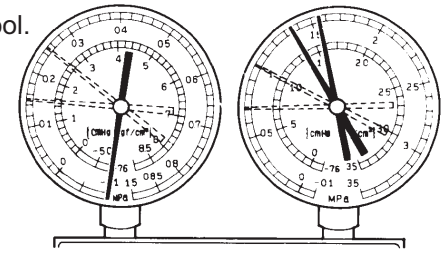
(a) This is a method in which the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when these conditions are established.
Gauge readings (Reference)
Test conditions:
- Temperature at the air inlet with the switch set at RECIRC is 30 to 35°C (86 to 95°F)
- Blower speed control switch at "HI" position
- Temperature control switch at "MAX COLD" position
- A/C switch ON
- Fully open doors



(1) The refrigeration system functions normally
Gauge reading:
Low-pressure side:
0.15 to 0.25 MPa (1.5 to 2.5 kgf/cm^2)
High-pressure side:
1.37 to 1.57 MPa (14 to 16 kgf/cm^2)

(2) Moisture present in refrigeration system

Condition:
Periodically cools and then fails to cool.

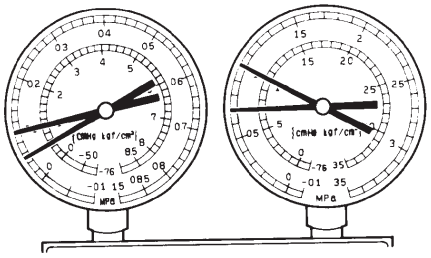


I022117E19

Symptoms	Probable Cause	Diagnosis	Corrective Actions
During operation, pressure on low-pressure side cycles between normal and vacuum	Moisture in refrigerating system freezes at expansion valve orifice, causing a temporary stop of cycle. However, when it melts, normal state is restored.	- Cooler dryer in oversaturated state Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	1. Replace cooler dryer 2. Remove moisture in cycle by repeatedly evacuating air 3. Supply proper amount of new refrigerant

(3) Insufficient cooling

Condition: Coolig system does not function effectively.

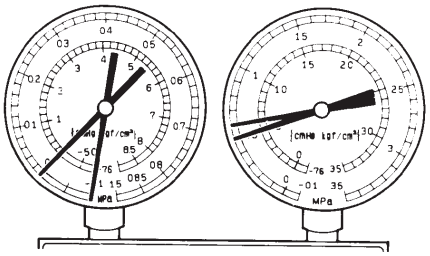


I022118E11

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure is low on both low and high-pressure sides - Bubbles are continuously seen through sight glass - Insufficient cooling performance	Gas leakage in refrigeration system	- Insufficient refrigerant - Refrigerant leaking	1. Check for gas leakage and repair if necessary 2. Supply proper amount of new refrigerant 3. If the indicated pressure value is close to 0 when connected to the gauge, create a vacuum after inspecting and repairing location of leakage

(4) Poor circulation of refrigerant

Condition: Cooling system does not function effectively.

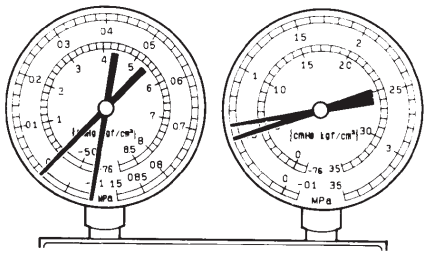


I022119E12

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure low on both low and high-pressure sides - Frost exists on pipe from cooler condenser to A/C unit	Refrigerant flow is obstructed by dirt in cooler condenser core	Cooler condenser core is clogged	Replace cooler condenser core

(5) Refrigerant does not circulate

Condition: Cooling system does not function. (Sometimes it may function)

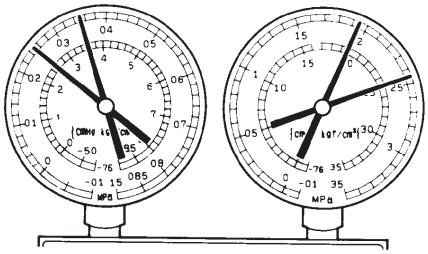


I022120E11

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Vacuum is indicated on low-pressure side and very low pressure is indicated on high-pressure side - Frost or condensation is seen on piping on both sides of cooler condenser core or expansion valve	- Refrigerant flow is obstructed by moisture or dirt in refrigeration system - Refrigerant flow obstructed by gas leaked from cooler expansion valve	Refrigerant does not circulate	1. Check expansion valve 2. Clean out dirt in cooler expansion valve by blowing air 3. Replace cooler condenser core 4. Evacuate and charge new refrigerant 5. For gas leakage from cooler expansion valve, replace cooler expansion valve

(6) Refrigerant overcharged or insufficient cooling of condenser

Condition: Cooling system does not function effectively.



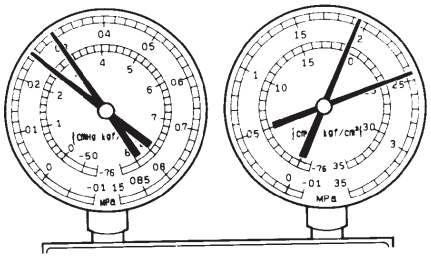
I022121E09

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure is too high on both low and high-pressure sides - No air bubbles are seen through the sight glass when compressor speed decreases	- Excessive refrigerant - Insufficient cooling of cooler condenser core	- Excessive refrigerant in cycle (excessive refrigerant is supplied) - Insufficient cooling of cooler condenser core	1. Clean cooler condenser core fins 2. Check cooling fan with condenser fan motor operation 3. If 1 and 2 normal, check the amount of refrigerant and supply proper amount of refrigerant

(7) Air present in refrigeration system

Condition: Cooling system does not function.

NOTE: These gauge indications occur when the refrigeration system opens and the refrigerant is charged without vacuum purging.

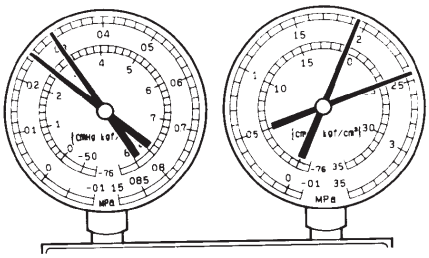


I022122E08

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure is too high on both low and high-pressure sides - Low-pressure piping is too hot to touch Bubbles are seen through sight glass	Air in system	- Air present in refrigeration system - Insufficient vacuum purging	1. Check compressor oil to see if it is dirty or insufficient 2. Evacuate and charge new refrigerant

(8) Expansion valve malfunction

Condition: Insufficient Cooling

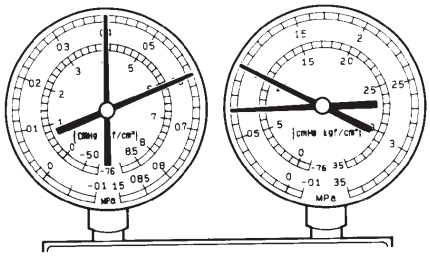


I022123E13

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure is too high on both low and high-pressure sides - Frost or large amount of condensation on piping on low-pressure side	Trouble in cooler expansion valve	- Excessive refrigerant in low pressure piping - Cooler expansion valve is opened too wide	Replace cooler expansion valve

(9) Defective compression in compressor

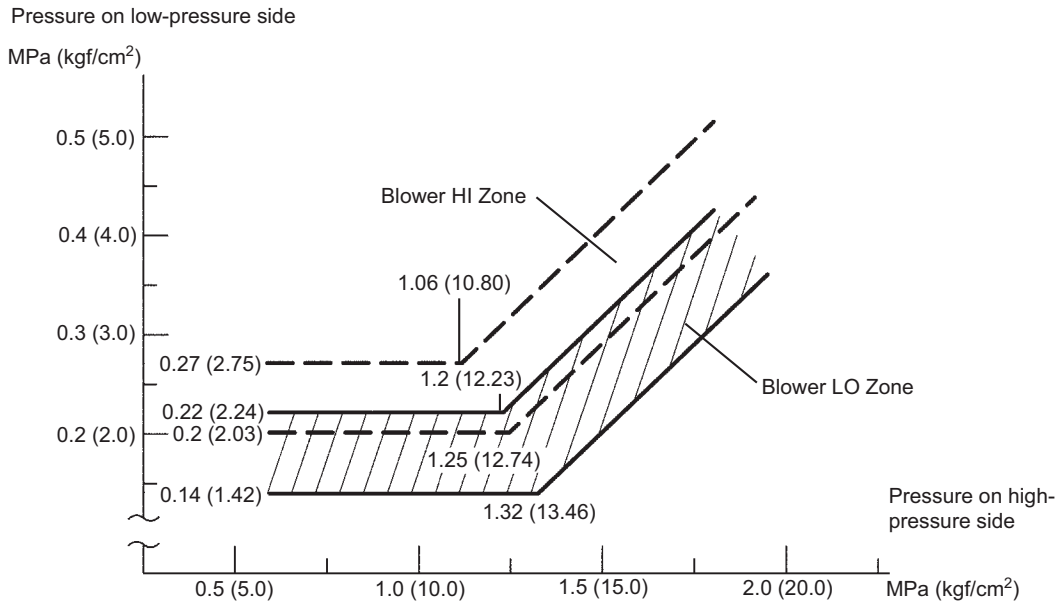
Condition: Insufficient Cooling



I022124E09

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure is too high on both low and high-pressure sides - Pressure is too low on high-pressure side	Internal leak in cooler compressor	- Compression failure - Leakage from damaged valve or broken sliding parts	Repair or replace compressor

Gauge readings (Reference)



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