

REFRIGERANT SYSTEM INSPECTION 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-14](#))

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 1,500 rpm
- (c) Blower speed control switch set at high
- (d) Temperature control set at max. cool

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

1. NORMALLY FUNCTIONING REFRIGERATION SYSTEM

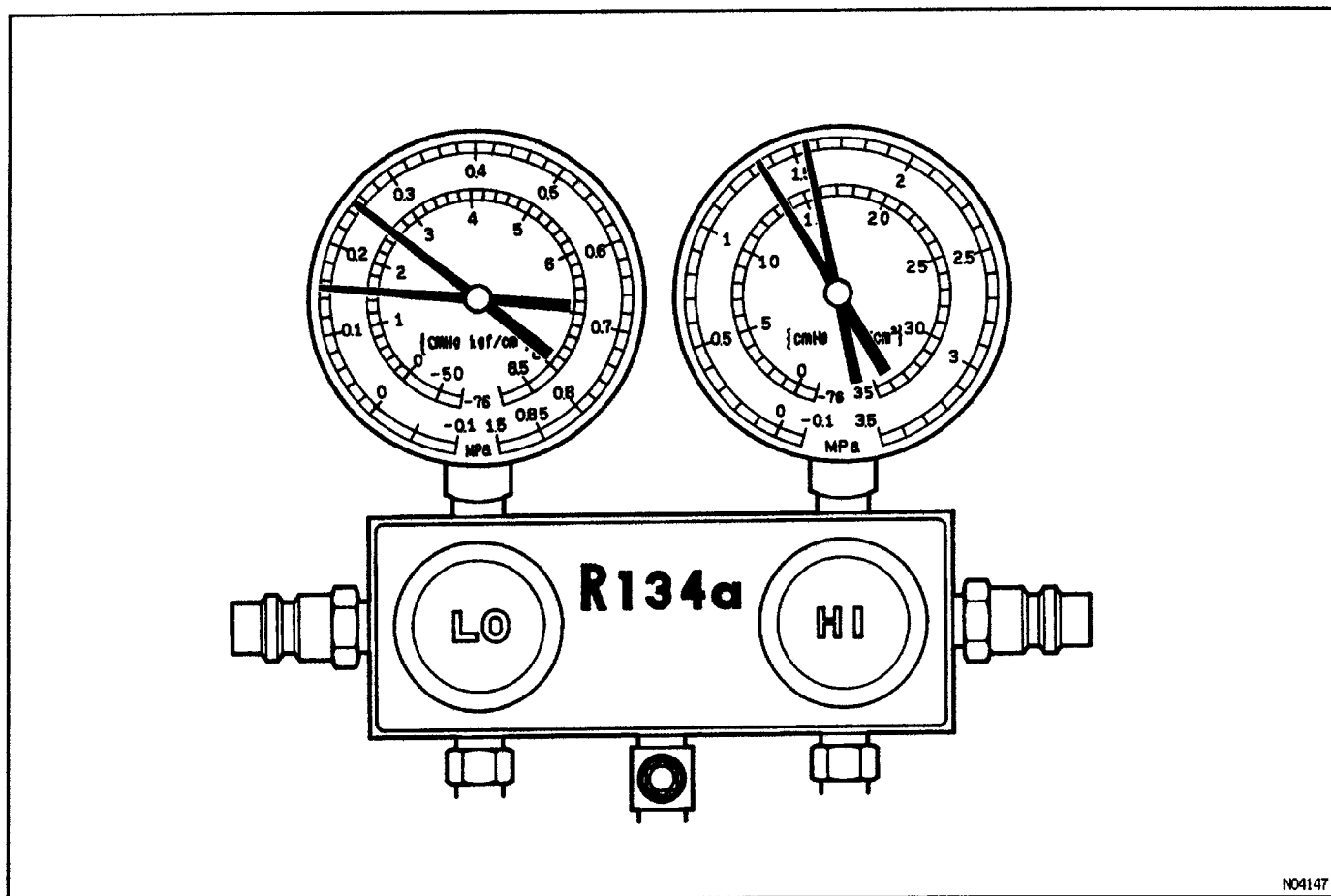
Gauge reading:

Low pressure side:

0.18 – 0.25 MPa (1.5 – 2.5 kgf/cm²)

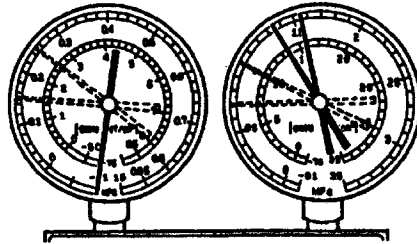
High pressure side:

1.37 – 1.57 MPa (14 – 16 kgf/cm²)



2. MOISTURE PRESENT IN REFRIGERATION SYSTEM

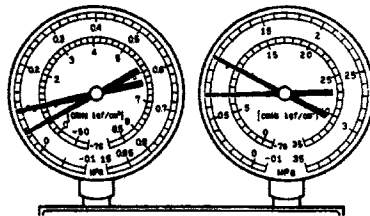
Condition: Periodically cools and then fails to cool



Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> During operation, pressure on low pressure side sometimes becomes a vacuum and sometimes normal 	<ul style="list-style-type: none"> Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts 	<ul style="list-style-type: none"> Drier In oversaturated state ↓ Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant 	<ol style="list-style-type: none"> Replace receiver/drier Remove moisture in cycle through repeatedly evacuating air Charge new refrigerant to proper amount

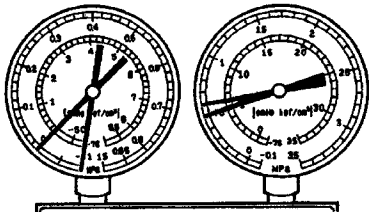
3. INSUFFICIENT REFRIGERANT

Condition: Insufficient cooling

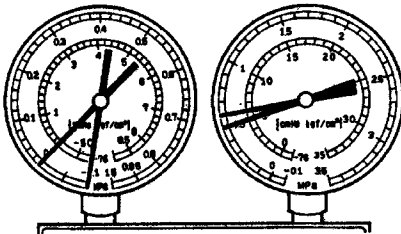


Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure low on both low and high pressure sides Bubbles seen in sight glass continuously Insufficient cooling performance 	<ul style="list-style-type: none"> Gas leakage at some place in refrigeration system 	<ul style="list-style-type: none"> Insufficient refrigerant in system ↓ Refrigerant leaking 	<ol style="list-style-type: none"> Check for gas leakage with leak detector and repair if necessary Charge refrigerant to proper amount If pressure indicated value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

4. POOR CIRCULATION OF REFRIGERANT

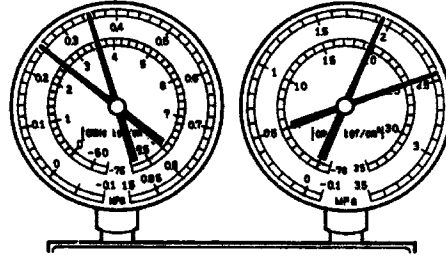
Condition: Insufficient cooling			
			
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure low on both low and high pressure sides Frost on tubes from receiver to unit 	<ul style="list-style-type: none"> Refrigerant flow obstructed by dirt in receiver 	<ul style="list-style-type: none"> Receiver clogged 	<ul style="list-style-type: none"> Replace receiver

5. REFRIGERANT DOES NOT CIRCULATE

Condition: Does not cool (Cools from time to time in some cases)			
			
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Vacuum indicated on low pressure side, very low pressure indicated on high pressure side Frost or dew seen on piping before and after receiver/drier or expansion valve 	<ul style="list-style-type: none"> Refrigerant flow obstructed by moisture or dirt in refrigeration system Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube 	<ul style="list-style-type: none"> Refrigerant does not circulate 	<ol style="list-style-type: none"> Check heat sensing tube, expansion valve and EPR Clean out dirt in expansion valve by blowing with air. If not able to remove dirt, replace expansion valve Replace receiver Evacuate air and charge new refrigerant to proper amount. For gas leakage from heat sensing tube, replace expansion valve.

6. REFRIGERANT OVERCHARGE OR INSUFFICIENT COOLING OF CONDENSER

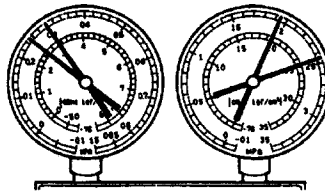
Condition: Insufficient Cooling



Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure too high on both low and high pressure sides No air bubbles seen through the sight glass even when the engine rpm is lowered. 	<ul style="list-style-type: none"> Unable to develop sufficient performance due to excessive refrigerant in system Insufficient cooling of condenser 	<ul style="list-style-type: none"> Excessive refrigerant in cycle → refrigerant overcharged Condenser cooling insufficient → condenser fins clogged or fan motor faulty 	<ol style="list-style-type: none"> Clean condenser Check fan motor operation If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant

7. AIR PRESENT IN REFRIGERATION SYSTEM

Condition: Insufficient Cooling

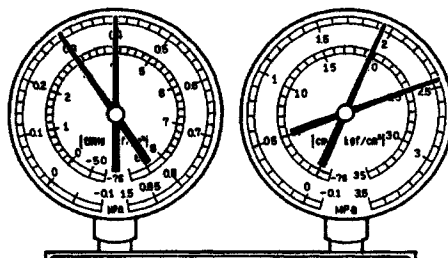


NOTE: These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure too high on both low and high pressure sides The low pressure piping is hot to the touch Bubbles seen in sight glass 	<ul style="list-style-type: none"> Air-entered in refrigeration system 	<ul style="list-style-type: none"> Air present in refrigeration system Insufficient vacuum purging 	<ol style="list-style-type: none"> Check compressor oil to see if dirty or insufficient Evacuate air and charge new refrigerant

8. EXPANSION VALVE IMPROPERLY MOUNTED/HEAT SENSING TUBE DEFECTIVE (OPENS TOO WIDE)

Condition: Insufficient cooling

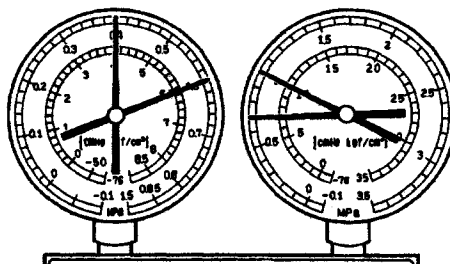


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Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure too high on both low and high pressure sides Frost or large amount of dew on piping on low pressure side 	<ul style="list-style-type: none"> Trouble in expansion valve or heat sensing tube not installed correctly 	<ul style="list-style-type: none"> Excessive refrigerant in low pressure piping Expansion valve opened too wide 	<ul style="list-style-type: none"> (1) Check heat sensing tube installed condition (2) If (1) is normal, check expansion valve Replace if defective

9. DEFECTIVE COMPRESSION COMPRESSOR

Condition: Does not cool



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Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure too high on low pressure side Pressure too low on high pressure side 	<ul style="list-style-type: none"> Internal leak in compressor 	<ul style="list-style-type: none"> Compression defective Valve leaking or broken, sliding parts 	<ul style="list-style-type: none"> Repair or replace compressor