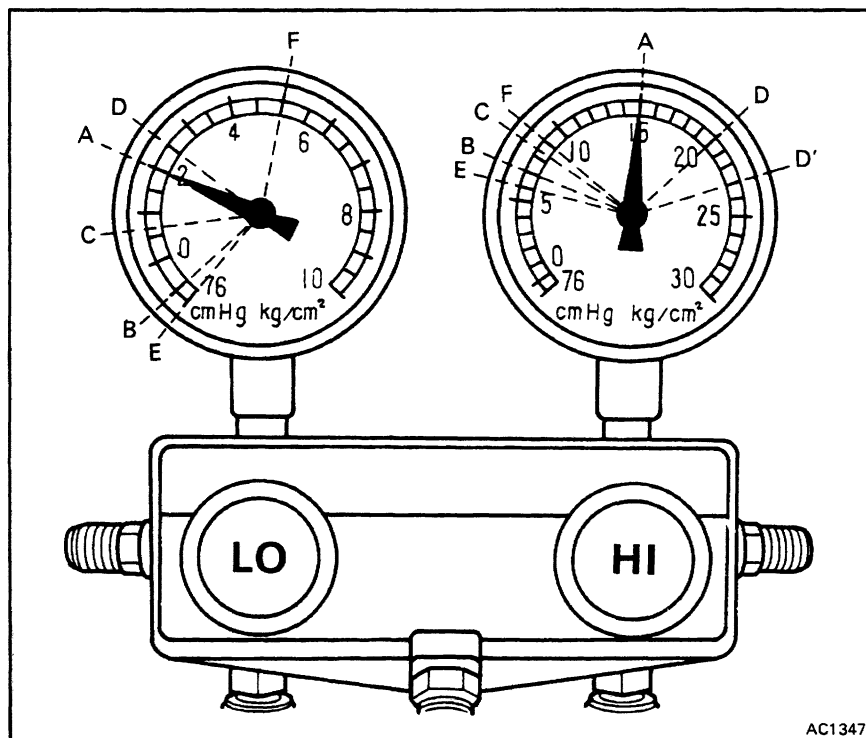


Checking of Refrigeration System with Manifold Gauge

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

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

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



NORMALLY FUNCTIONING REFRIGERATION SYSTEM:

Gauge reading

Low pressure side

1.5 – 2.0 kg / cm²

(21 – 28 psi, 147 – 196 k Pa)

High pressure side

14.5 – 15.0 kg / Cm²

(206 – 213 psi,

1,422 – 1,471 kPa)

Each pointer of manifold gauge points to position A

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

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

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

Note at No.6

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

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

No.	Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
7	Vacuum indicated at low pressure side, very low pressure indicated at high pressure side Frost or dew seen on piping before and after receiver and drier or expansion valve	Refrigerant flow obstructed by moisture or dirt in refrigerant freezing or adhering to expansion valve orifice Refrigerant flow obstructed by gas leakage from expansion valve	Expansion valve orifice clogged ↓ Refrigerant does not flow	Allow to stand for some time and then restart operation to determine if trouble is caused by moisture or dirt. If caused by moisture refer to procedures Step 2 on page AC-11. If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If unable to remove dirt, replace valve. Vacuum purge and charge new refrigerant to proper amount. For gas leakage from heat sensing tube, replace expansion valve.
8	Pressure too high at low pressure side Pressure too low at high pressure side	Internal leak in compressor	Compression defective ↓ Valve leaking or broken sliding parts (Piston, cylinder, gasket, etc.) broken	Repair or replace compressor