

A/C SYSTEM GENERAL DIAGNOSTIC PROCEDURES

Article Text

1993 Volkswagen EuroVan
For Volkswagen Technical Site
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Saturday, March 18, 2000 10:20PM

ARTICLE BEGINNING

1993 AIR CONDITIONING & HEAT
A/C General Diagnostic Procedures

Diagnosis is an important first step in A/C system servicing. To save time and effort, systems should be carefully checked to identify the causes of poor performance. By using the following diagnostic charts, defective components or system problems can be quickly located. To identify problems that are specific to one system, refer to the repair section of this manual. The charts in this section apply to all systems.

PREPARATION FOR TESTING

- 1) Attach Low and High pressure gauges.
- 2) Start engine and allow to warm up.
- 3) Set system to COOL and blower to HIGH.
- 4) Open car doors and hood.
- 5) Run engine at fast idle for 2-3 minutes.

AIR CONDITIONING SYSTEM PERFORMANCE CHECK

AIR CONDITIONING SYSTEM PERFORMANCE CHECK TABLE

AA

PERFORM TESTS: SHOULD BE: IF:

AA

Temperature Check Temperature Check Is:

- * Switch to LOW blower.
- * Close doors.
- * Check outlet temperature. 35-45° F Too warm - Check control lever operation, heater water valve, cooling system and gauge readings.

AA

PERFORM TESTS: SHOULD BE: IF:

AA

Visual Check Visual Check Shows:

- * Compressor Quiet with no leaks Noisy - Check belts, oil level, seals, gaskets, reed valves.
- * Condenser Free of obstructions Blocked - Clean off. Plugged - Flush or replace.
- * Receiver-Drier Dry and warm to touch Frosty - Check for restriction, replace desiccant.

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- * Sight Glass Clear or few bubbles Bubbly, foamy or streaks - Check gauge readings.
- * High Side Lines Dry and warm to touch Frosty or very hot - Check for restriction or overcharge.
- * Low Side Lines Dry and cool to touch Frosty or warm - Check for restriction, low charge or bad valve.
- * Expansion Valve Dry Frosty - Check for moisture or restriction. Check sensing bulb.
- * STV Dry and cool to touch Frosty or warm - Check gauge readings for valve malfunction.
- * Evaporator Dry and cold to touch Freezing or warm - Check expansion valve, STV or thermoswitch.

~~~~~  
 PERFORM TESTS:                                              SHOULD BE:                                              IF:  
 ~~~~~  
 Gauge Readings Gauge Readings are:

- * High Side Gauge See Pressure Chart Above or below normal - See A/C Diagnosis.
- * Low Side Gauge See Pressure Chart Above or below normal

AMBIENT TEMPERATURE/PRESSURE

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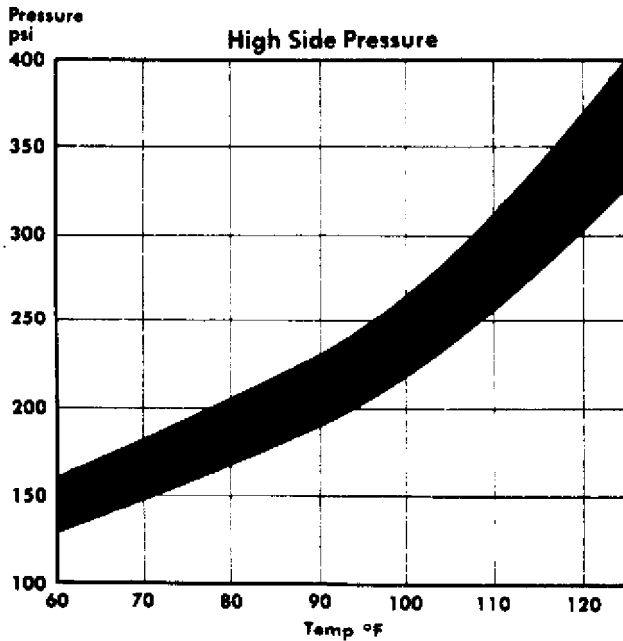


Fig. 1: Ambient Temperature/Pressure (R-12)

EVAPORATOR TEMPERATURE/PRESSURE

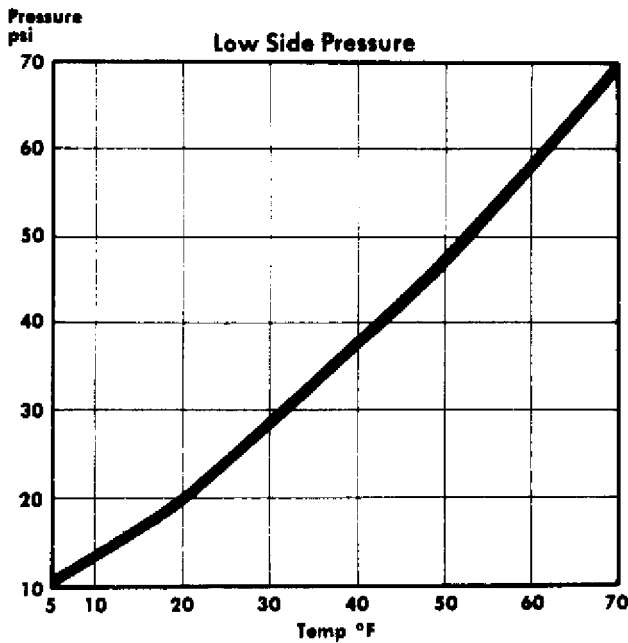


Fig. 2: Evaporator Temperature/Pressure (R-12)

A/C DIAGNOSIS W/GAUGES FOR SYS. W/INSUFFICIENT OR NO COOLING

A/C DIAGNOSIS W/GAUGES FOR SYS. W/INSUFFICIENT OR NO COOLING TABLE

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Low Side Gauge	High Side Gauge	Other Symptoms (1)	Diagnosis
NORMAL	NORMAL	No or few bubbles in sight glass. High side gauge may go high. Low side gauge does not fluctuate with compressor on/off cycle.	Some Air & Moisture in System
NORMAL	NORMAL	Cools okay in morning but not during hot part of day. Bubbles in sight glass. Discharge air warm when low side gauge drops into vacuum.	Excessive Moisture in System
NORMAL	NORMAL	Thermostatic sw. sys. only- compressor cycles off & on too rapidly.	Defective Thermostatic Sw.
NORMAL to HIGH	NORMAL	Cycling clutch sys only - to compressor doesn't turn on soon enough. Discharge air becomes warm as low side pressure rises.	Misadjusted Thermostatic Sw. or Defective Pressure Sensing Switch
LOW	LOW	Bubbles in sight glass. Outlet air slightly cool.	Low R-12 Charge
LOW	LOW	Sight glass clear. Outlet air very warm.	Excessively Low R-12 Charge
LOW	LOW	Outlet air slightly cool. Sweating or frost at expansion valve.	Expansion Valve Stuck Closed Screen Plugged or Sensing Bulb Malfunction
LOW	LOW	Outlet air slightly cool. High side line cool to touch. Sweating or frost on high side.	Restriction on High Side
LOW	HIGH	Evaporator outlet pipe cold. Low side goes into vacuum when blower is disconnected.	STV Stuck Open
HIGH	LOW	Evaporator outlet pipe warm. Outlet air warm.	STV Stuck Closed
HIGH	LOW	Noise from compressor.	Compressor Malfunction

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AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3 HIGH      3   HIGH      3 Outlet air warm.                3 Compressor                3
3           3           3 Liquid line very hot.           3 Malfunction                3
3           3           3 Bubbles in sight glass.           3 or                          3
3           3           3                                     3 R-12 Overcharge            3
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3 HIGH      3   HIGH      3 Outlet air slightly cool.          3 Large Amount of Air      3
3           3           3 Bubbles in sight glass.           3 of Air & Moisture        3
3           3           3                                     3 in System                  3
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3 HIGH      3   HIGH      3 Outlet air warm.                3 Expansion Valve          3
3           3           3 Evaporator outlet sweating        3 Stuck Open                 3
3           3           3 and frost.                          3                            3
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3(1) - If equipped with a low refrigerant charge protection system, 3
3 compressor operation may have stopped.                               3
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

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AIR CONDITIONING GENERAL TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE

- Compressor Not Working
- * Compressor clutch circuit open.
 - * Compressor clutch coil inoperative.
 - * Poor clutch ground connection.
 - * Fan belts loose.
 - * Thermostatic switch inoperative.
 - * Thermostatic switch not adjusted.
 - * Ambient temperature switch open.
 - * Superheat fuse blown.

- Excessive Noise or Vibration
- * Missing or loose mounting bolts.
 - * Bad idler pulley bearings.
 - * Fan belts not tightened correctly.
 - * Compressor clutch contacting body.
 - * Excessive system pressure.
 - * Compressor oil level low.
 - * Damaged clutch bearings.
 - * Damaged reed valves.
 - * Damaged compressor.

- Insufficient or No Cooling; Compressor Working
- * Expansion valve inoperative.
 - * Heater control valve stuck open.
 - * Low system pressure.
 - * Blocked condenser fins.
 - * Blocked evaporator fins.
 - * Vacuum system leak.
 - * Vacuum motors inoperative.
 - * Control cables improperly adjusted.

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- * Restricted air inlet.
- * Mode doors binding.
- * Blower motor inoperative.
- * Temperature above system capacity.

HEATING GENERAL TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE

Insufficient, Erratic, or No Heat

- * Low coolant level.
- * Incorrect thermostat.
- * Restricted coolant flow through heater core.
- * Heater hoses plugged.
- * Misadjusted control cable.
- * Sticking heater control valve.
- * Vacuum hose leaking.
- * Vacuum hose blocked.
- * Vacuum motors inoperative.
- * Blocked air inlet.
- * Inoperative heater blower motor.
- * Oil residue on heater core fins.
- * Dirt on heater core fins.

Too Much Heat

- * Improperly adjusted cables.
- * Sticking heater control valve.
- * No vacuum to heater control valve.
- * Temperature door stuck open.

Airflow Changes During Acceleration

- * Vacuum system leak.
- * Bad check valve or reservoir.

Air From Defroster At All Times

- * Vacuum system leak.
- * Improperly adjusted control cables.
- * Inoperative vacuum motor.

Blower Does Not Operate Correctly

- * Blown fuse.
- * Blower motor windings open.
- * Resistors burned out.
- * Motor ground connection loose.
- * Wiring harness connections loose.
- * Blower motor switch inoperative.
- * Blower relay inoperative.
- * Fan binding or foreign object in housing.
- * Fan blades broken or bent.

END OF ARTICLE