

A/C SYSTEM GENERAL DIAGNOSTIC PROCEDURES

Article Text

1989 Volkswagen Golf

For Volkswagen Technical Site

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Monday, August 23, 1999 11:35PM

ARTICLE BEGINNING

1983-90 AIR CONDITIONING & HEAT

General Servicing Diagnostic Procedures

All Import Makes & Models

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 damage 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.

ALTITUDE PRESSURE VARIATIONS

ALTITUDE PRESSURE VARIATIONS TABLE

Altitude (Ft. Above Sea Level)			Absolute Pressure of Atmosphere (psi)		Gauge Altitude Correction (1) (psi)	
0	.....	14.7	.....	0		
1000	.....	14.2	.....	-0.5		
2000	.....	13.7	.....	-1.0		
3000	.....	13.2	.....	-1.5		
4000	.....	12.7	.....	-2.0		
5000	.....	12.2	.....	-2.5		
6000	.....	11.7	.....	-3.0		
7000	.....	11.3	.....	-3.4		
8000	.....	10.9	.....	-3.8		
9000	.....	10.5	.....	-4.2		
10,000	.....	10.1	.....	-4.6		

(1) - Subtract correction shown from gauge readings.

ALTITUDE VACUUM VARIATIONS

ALTITUDE VACUUM VARIATIONS TABLE

Altitude (Ft. Above Sea Level)			Absolute Pressure of Atmosphere (psi)		Gauge Altitude Correction (1) (psi)	
0	29.92	0		
1000	28.92	+1.0		
2000	27.82	+2.1		
3000	26.82	+3.1		
4000	25.82	+4.1		

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5000	24.92	+5.0
6000	23.92	+6.0
7000	23.02	+6.9
8000	22.22	+7.7
9000	21.32	+8.6
10,000	20.52	+9.4

(1) - Add correction shown to gauge readings.

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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 TABLE

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PERFORM TESTS:	SHOULD BE:	IF:
----------------	------------	-----

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

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Visual Check		Visual Check Shows:
* Compressor	Quiet, 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 & warm to touch	Frosty - Check for restriction, replace desiccant.
* Sight Glass	Clear or few bubbles	Bubbly, foamy or streaks - Check gauge readings.
* High Side Lines	Dry & warm to touch	Frosty or very hot - Check for restriction or overcharge.
* Low Side Lines	Dry & cool to touch	Frosty or warm - Check for restriction, low charge or bad valve.
* Expansion Valve	Dry	Frosty - Check for

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- | | | |
|--------------|---------------------|---|
| * STV | Dry & cool to touch | moisture or restriction.
Check sensing bulb.
Frosty or warm - Check
gauge readings for valve
malfunction. |
| * Evaporator | Dry & cold to touch | Freezing or warm - Check
expansion valve, STV or
thermo switch. |

~~~~~  
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 -
See A/C Diagnosis. |

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## AMBIENT TEMPERATURE/PRESSURE

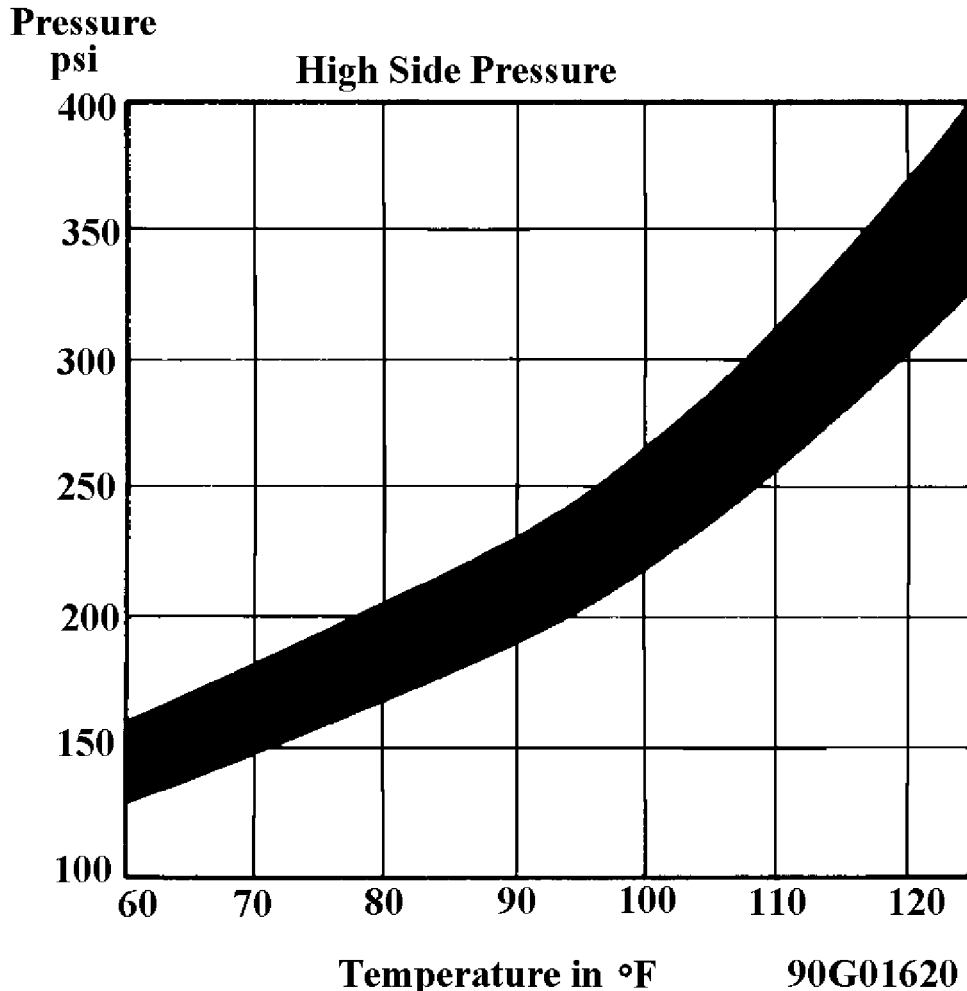


Fig. 1: Ambient Temperature/Pressure A/C Chart

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## EVAPORATOR TEMPERATURE/PRESSURE

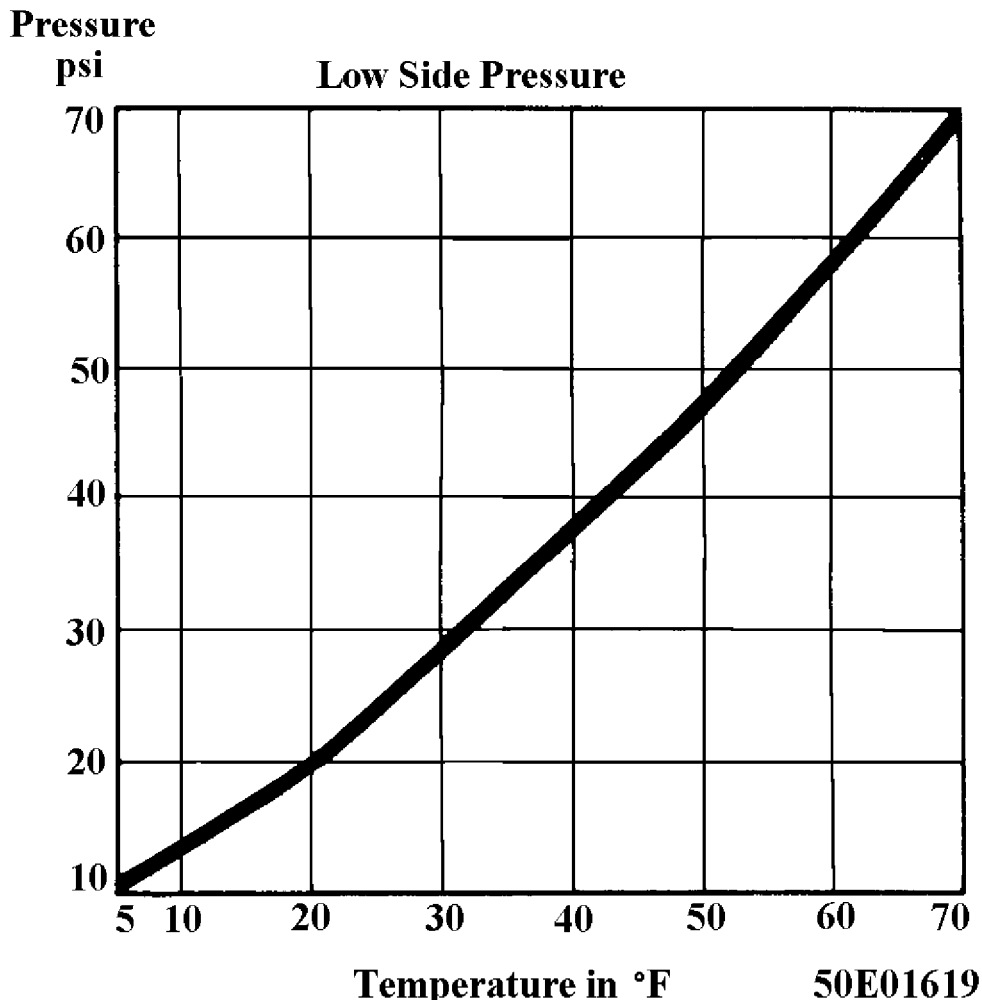


Fig. 2: Evaporator Temperature/Pressure A/C Chart

### AIR CONDITIONING DIAGNOSIS WITH GAUGES FOR SYSTEMS WITH INSUFFICIENT OR NO COOLING TABLE

| AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA |                 |                                                                                                                                         |                                 |
|----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Low Side Gauge                                                                   | High Side Gauge | Other Symptoms (1)                                                                                                                      | Diagnosis                       |
| AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA |                 |                                                                                                                                         |                                 |
| 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 and 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 switch system                                                                                                              | Defective                       |

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|                      |        |                                                                                                                                                                                                 |                                                                                                               |
|----------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| NORMAL<br>to<br>HIGH | NORMAL | only - compressor cycles off<br>and on too rapidly.<br>Cycling clutch systems only -<br>compressor doesn't turn on<br>soon enough. Discharge air<br>becomes warm as low side<br>pressure rises. | Thermostatic<br>Switch<br>Misadjusted<br>Thermostatic<br>Switch or<br>Defective<br>Pressure<br>Sensing Switch |
| LOW                  | LOW    | Bubbles in sight glass.<br>Outlet air slightly cool.                                                                                                                                            | Low R-12<br>Charge                                                                                            |
| LOW                  | LOW    | Sight glass clear. Outlet<br>air very warm.                                                                                                                                                     | Excessively<br>Low R-12<br>Charge                                                                             |
| LOW                  | LOW    | Outlet air slightly cool.<br>Sweating or frost at<br>expansion valve.                                                                                                                           | Expansion<br>Valve Stuck<br>Closed Screen<br>Plugged or<br>Sensing Bulb<br>Malfunction                        |
| LOW                  | LOW    | Outlet air slightly cool.<br>High side line cool to touch.<br>Sweating or frost on high<br>side.                                                                                                | Restriction<br>on High Side                                                                                   |
| LOW                  | HIGH   | Evaporator outlet pipe cold.<br>Low side goes into vacuum<br>when blower is disconnected.                                                                                                       | STV Stuck<br>Open                                                                                             |
| HIGH                 | LOW    | Evaporator outlet pipe warm.<br>Outlet air warm.                                                                                                                                                | STV Stuck<br>Closed                                                                                           |
| HIGH                 | LOW    | Noise from compressor.                                                                                                                                                                          | Compressor<br>Malfunction                                                                                     |
| HIGH                 | HIGH   | Outlet air warm. Liquid<br>line very hot. Bubbles in<br>sight glass.                                                                                                                            | Compressor<br>Malfunction<br>or R-12<br>Overcharge                                                            |
| HIGH                 | HIGH   | Outlet air slightly cool.<br>Bubbles in sight glass.                                                                                                                                            | Large Amount<br>of Air and<br>Moisture in<br>System                                                           |
| HIGH                 | HIGH   | Outlet air warm. Evaporator<br>outlet sweating and frost.                                                                                                                                       | Expansion<br>Valve<br>Stuck Open                                                                              |

(1) - If equipped with a low refrigerant charge protection system,  
compressor operation may have stopped.

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END OF ARTICLE