AIR CONDITIONING SYSTEM DIAGNOSIS

TROUBLESHOOTING

An air conditioner is a system which cools and dehumidifies the interior of a vehicle by removing heat and moisture.

NO COOLING FROM SYSTEM
1 - Blown fuse.
2 - Broken or disconnected electrical wire.
3 - Broken or disconnected ground wire.
4 - Clutch coil or solenoid burned out or disconnected.
5 - Electrical switch contacts in thermostat burned excessively or sensing element defective.
6 - Blower motor disconnected or burned out.
7 - Ignition switch ground or relay burned out.
8 - Loose or broken drive belt.
9 - Compressor partially or completely frozen.
10 - Compressor reed valves inoperative indicated by slight variation of both gauge readings at engine speed.
11 - Expansion valve stuck open - indicated by normal discharge pressure, high suction pressure and evaporator flooding.
12 - Heater valve inoperative - indicated by hot water in heater and hot discharge air from evaporator.
13 - Broken refrigerant line.
14 - Fusible plug blown (not used on all systems).
15 - Leak in system.
16 - Clogged screen or screens in receiver-dehydrator or expansion valve. Plugged hose or coil.
17 - Compressor shaft seal leaking.

INSUFFICIENT COOLING FROM SYSTEM
1 - Blower motor sluggish.
2 - Compressor clutch slipping.
3 - Obstructed blower discharge passage.
4 - Clogged air intake filter.
5 - Insufficient air circulation over condenser coil (fins clogged with dirt or bugs).
6 - Evaporator clogged.
7 - Outside air vents open.
8 - Insufficient refrigerant in system.
9 - Clogged screen in expansion valve indicated by gauge pressures being normal or showing slightly increased discharge pressure and low suction pressure with evaporator air output temperature high.
10 - Expansion valve thermal bulb has lost its charge - indicated by too high a low gauge reading and excessive sweating of evaporator and suction line.
11 - Clogged screen in receiver - indicated by higher than normal reading on high pressure gauge, lower than normal reading on low pressure gauge, and liquid lines cold to touch with possible frost.
12 - Excessive moisture in system - indicated by excessive head pressure gauge reading.
13 - Air in system - indicated by excessive head pressure and possibly bubbles in sight glass.
14 - Thermostat defective or improperly adjusted indicated by low gauge reading high or clutch cycling at too high a reading.
NOISY SYSTEM
1 - Defective winding or improper connection in compressor clutch coil or solenoid.
2 - Loose or excessively worn drive belts.
3 - Noisy clutch.
4 - Compressor noisy - loose mounting or worn inner parts.
5 - Loose panels on car.
6 - Compressor oil level low.
7 - Blower fan noisy - excessive wear in motor.
8 - Idler pulley and bearing defective.
9 - Excessive charge in system - rumbling noise or vibration in high pressure line, thumping noise in compressor, excessive head pressure and suction pressure, bubbles or cloudiness in sight glass, or low head pressure.
10 - Low charge in system - hissing in evaporator case at expansion valve, bubbles or cloudiness in sight glass or low head pressure.
11 - Excessive moisture in system - expansion valve noisy, suction pressure low.

UNUSUAL NOISE WHEN CLUTCH ENGAGED
1 - Check all compressor mounting components.
2 - Check engine components.
3 - Check for intermittent or slipping clutch.
4 - Check clutch bearing.
5 - Check shaft turning smoothness.
6 - Check oil level.

UNUSUAL NOISE WHEN CLUTCH DISENGAGED OR CHATTERING
1 - Check fuse and electrical supply.
2 - Check air gap.
TESTING SEQUENCE

TEST 1 - SYSTEM INOPERATIVE
1 - Check system fuse.
2 - Check belt tension. Tighten or replace belt.
3 - Check for current at clutch coil. If present, check defective clutch coil or clutch. Ensure good earth connection.
4 - Check system controls, relay wiring & thermostat, etc.
5 - Make visual check on all fittings and for burst or seeping hoses.
6 - Check air gap of clutch.

TEST 2 - INSUFFICIENT COOLING
High Side: Low, Low Side: Low
Bubbles in Sight Glass
Refrigerant is low. May be caused by small leak.
1 - Check for leakage & correct.
2 - Add requirement until disappear and both gauges show a normal reading.
NO Bubbles in Sight Glass
Gauge readings are excessively low. Possibly no liquid in sight glass.
1 - A serious leak may be indicated
2 - Expansion valve screen may be clogged.
3 - Expansion valve may be stuck closed.
Replace valve.

Condenser
1 - May be blocked and not having sufficient air flow. Remove screen and clean condenser.
2 - Clearance between radiator and condenser must be to system design dimensions.

Expansion Valve
Test valve using the “R-t34a” test
1 - If valve responds to test, remove bulb from tailpipe and clean contacts. Replace bulb and tighten securely.
2 - If valve does not respond to test, replace expansion valve.

High Side: Normal, Low Side: Normal
Note: LOW side gauge reading may or may not drop into vacuum while testing.
Moisture in System
1 - Purge refrigerant from system.
2 - Replace drier.
3 - Evacuate system and recharge.

High Side: High, Low Side: Normal
Note: Low side gauge reading will be constant and will not drop.
Air In System
1 - Purge refrigerant from system.
2 - Replace drier.
3 - Evacuate system and recharge.

High Side: High, Low Side: Low
Restriction
Liquid line or receiver-drier shows heavy sweating or frost immediately after point of frost.
1 - Remove component, clear restriction or renew component.

High Side: Normal, Low Side: Normal-High
Thermostatic Switch
Compressor cycles (cuts in and out too rapidly).
Thermostatic switch defective (range between points is incorrectly set)
Replace thermostst.