

Sanden A/C System Diagnosis (R-134a)



Test No. 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.

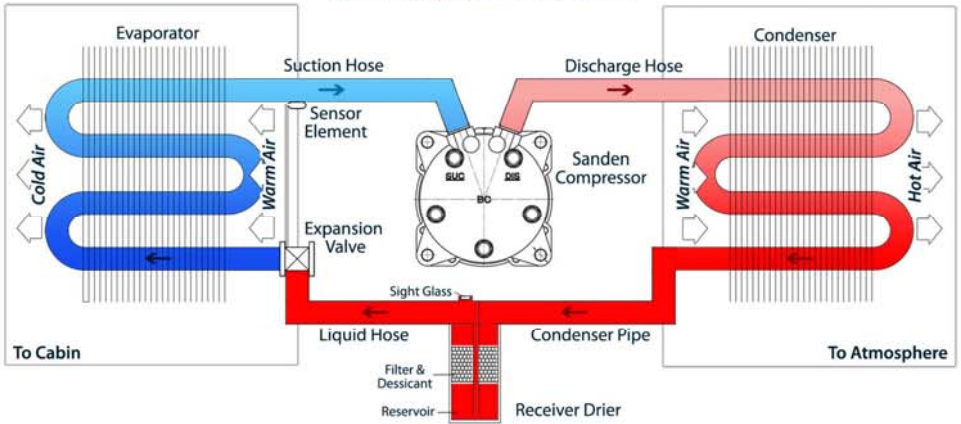
- #### Check These Five Points
1. Test gauges connected
 2. All gauge hoses are purged
 3. System is stabilized
 4. Performance Test was conducted
 5. Gauge readings are documented

Test No. 2 Insufficient Cooling

- High Side: Low
Low Side: Low
- High Side: High
Low Side: High
- High Side: Normal
Low Side: Normal
- High Side: High
Low Side: Normal
- High Side: High
Low Side: Low
- High Side: Normal
Low Side: Normal~High

- Bubbles in Sight Glass**
Refrigerant is low. May be caused by small leak.
1. Check for leakage & correct.
2. Add requirement until bubbles disappear & 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.
- Refrigerant Overcharge**
Note: Sight glass may show bubbles.
Bleed off refrigerant until heavy stream of bubbles appear, then charge with refrigerant until bubbles eliminated from sight glass.
- Engine Cooling System**
1. Check belt tension & adjust. Use tension gauge.
2. Test radiator pressure cap & system thermostat.
3. Check all hoses.
4. Ensure there is anti-freeze in coolant.
5. Check heater water valve.
- Condenser**
1. May be blocked & not having sufficient air flow. Remove bug screen & clean condenser.
2. Clearance between radiator & condenser must be to system design dimensions.
- Expansion Valve**
Test valve using the "R-134a 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.
- 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.
- 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.
- Restriction**
Liquid Line or receiver-drier shows heavy sweating or frost immediately after point of restriction.
1. Remove component clear restriction or renew component.
- Thermostatic Switch**
Compressor cycles (cuts in & out) too rapidly.
1. Thermostatic switch defective (range between points is incorrectly set).
2. Replace thermostat.

AUTOMOTIVE AIR CONDITIONING
An automotive air conditioner is a system which cools and dehumidifies the interior of a car, bus or truck by removing heat and moisture



Test No. 3 Compressor & Clutch

- Lack of Cooling
- Unusual Noise when Clutch Engaged
- Unusual Noise when Clutch Disengaged Or Chattering

- Compressor Running Rough or Intermittently or Inoperative**
1. Check belt and belt tension.
2. Check clutch air gap.
3. Check clutch voltage, amps, lead wire, earth.
4. Check clutch turning smoothness test.
5. Check for low refrigerant charge.
6. Leak test compressor.
7. Leak test and diagnose system.
- Unusual Noise when Clutch Engaged**
1. Check all compressor mounting components.
2. Check engine components.
3. Check for intermittent operation of clutch 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.



- #### 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 high 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.

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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.

- #### INTERMITTENT COOLING
1. Defective circuit breaker, blower switch or blower motor.
 2. Bad earth connection or loose electrical connection in compressor clutch coil or solenoid.
 3. Compressor clutch slipping.
 4. Expansion valve icing up - may be caused by excessive moisture in the system or incorrect super heat adjustment.
 5. Evaporator, coil icing up - thermostat probe not in coil fins, thermostat adjusted too low, defective thermostat.
 6. Clogged evaporator fins.

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