TECHNICAL SERVICE BULLETIN

ADAIR Auto Air Products

Subject:	QUESTIONING YOUR CUSTOMER TO ASSIST DIAGNOSIS	TSB #:	28 2-10
		Date:	17/2/10

Initial Once Read:						

To aid you in diagnosing a faulty A/C system you **MUST** question the customer to fully understand the issue. If you can ask the customer some directed questions, this will reduce the time taken to diagnose and ultimately reduce the customer cost and free up your time for other jobs.

Most customers will come into your shop on a hot day and all they will say is “MY A/C IS NOT COLD” frankly that does not tell you much at all. Where do you start your diagnosis?

We always seem to go directly to the “WET” side as being the fault as this is the part of the A/C system that produces the feeling of cold air. But is it really the problem area?
Lets look at all the possible causes for the customers complaint of “MY A/C IS NOT COLD”
The A/C system is broken into 3 defined areas – wet side (refrigerant / pressure), electrical and HVAC.

WET SIDE – Affecting system pressure / temperature.

- Refrigerant charge low, possible leakage, carry out leak detection.
- Compressor faulty internally, seized or not pumping.
- TXV jammed closed or fully open.
- Blockage in the A/C system circuit.
- Cooling system overheating.
- Customer control & system operating issues.
- Ancillary engine components such as belts, cooling system, radiator, engine fan operation or airflow direction, viscous fan clutch operation, engine coolant temperature switch.

Condenser & radiator external fin blockages, radiator seals missing, driving lamps, insect screens, bull bars or winches blocking air flow.

ELECTRICAL– Affecting compressor clutch or fan activation.

- Clutch coil open circuit, relay, fuse, wiring damage, terminal or connector corrosion,
- Pressure switch or transducer open circuit, control module fault, missing or faulty earth, short to ground or short to earth.
- Blower fan motor not operating or high current draw, blower fan resistor or amplifier fault, thermistor / amplifier / thermostat fault.
- Compressor speed sensor, compressor thermal switch, superheat swich.
- Climate control sensor faults, readings or open circuits, manual control operation

HVAC– Affecting cabin temperature.

- Air mix motor adjustment, open circuit of feed back signal, air mix door damaged seals or adjustment, linkages & cables disconnected, misadjusted or damaged.
- Vacuum leak in the mode vacuum circuit or heater tap or vacuum source line, mode doors not sealing.

Evaporator air bypass, evaporator freeze up, thermistor or thermostat probe in the incorrect location.

These are just a few areas of the complete A/C system that could lead to the customer complaint of “MY A/C IS NOT COLD”. We always tend to go for the hardest things first which is normally the wet side of the system, using our pressure gauges to “look” inside the system. We may find that all is to specification for the ambient and RH%. What’s next?

Here is a typical customer complaint on a 1998 Holden VT Berlina that would have nothing to do with either the wet or electrical side of the A/C system.

Scenario 1. “MY A/C IS NOT COLD – SOMETIMES” Advisor questions (A.Q) and Customer answers (C.A)

A.Q. At what stage do you notice that the A/C is no longer cold?
C.A. Normally it only happens when I am on a long drive towing the horse float.
A.O. Did you happen to notice if the fault coincides with driving up a hill and once the vehicle is over the hill an onto a flat road surface, did the A/C return to being cold?
C.A. Yes that is exactly what happens.

Here the advisor has a very clear direction as it points to a vacuum leak in the HVAC vacuum circuit. Holdens from 1997 will default to demist if vacuum is lost to the vacuum mode door actuators. Vacuum is stored in a plastic tank located on the HVAC and is used to keep the vacuum actuators activated when the vehicle engine is under load and no vacuum is produced. The heater tap is also kept closed with vacuum.

The rectification is to locate the vacuum leak using a hand help vacuum tester.

Scenario 2. "MY A/C IS NOT COLD – SOMETIMES" Advisor questions (A.Q) and Customer answers (C.A)

A.Q. At what stage do you notice that the A/C is no longer cold?
C.A. Normally it only happens when I am on a long drive like Melbourne to Sydney.
A.Q. Approximately how long into your journey does this occur?
C.A. About one hour.
A.Q. Did you notice that the A/C temperature became very cold before it didn't work?
Q.A. Yes.
A.O. After you stopped the vehicle did you notice a very large water puddle under the car?
C.A. Yes when I stopped at the shops and came back to the car.
A.O. When you drove off was the A/C now working and cold?
C.A. Yes.

Cause - The advisor has a very clear direction again as points the evaporator "icing up" normally due to the compressor not cycling of at the correct evaporator temperature, faulty thermistor / amplifier or thermostat, pressure cycling switch or variable stroke compressor control valve.

1. To test connect pressure gauges and lay them gently on the front windscreen.
2. Close windows and doors.
3. Select maximum A/C, lowest blower speed, face vent mode and recirculation.
4. Start car and A/C allow pressure gauges to stabilize pressure. Record the low side pressure. If below 150 kPa for 10 minutes the evaporator will "ice-up" as the refrigerant temperature will be minus 4 degrees which means the evaporator air off temperature will be approximately zero (condensate freezes at zero)
5. Bring the engine rpm up to 2000 and hold for 5 minutes. If the low side pressure stays at below 150 kPa the evaporator will "ice-up". Test and rectify the cause as described above

Notice that scenario 1 and 2 are very similar with 2 different outcomes – a vacuum issue and an evaporator ice-up issue.

OTHER STANDARD QUESTIONS THAT SHOULD BE ASKED ARE:

- Has the vehicle been in a frontal accident and repaired at a body shop lately?
- Has anyone else tried to repair the issue or worked on the vehicle before or recently. If yes have you a copy of their invoice?
- How long has this issue been present (if a leak moisture / air will effect other components)
- If an electrical problem regarding compressor activation. Did you jump start the battery lately. If incorrectly done this may effect the engine computer model (ECM)
- Do you have your radio code in case I have to disconnect the battery.

Have you just brought this vehicle? The customer would have no history of the vehicle.

Don't forget to look over the vehicle for any damage and ensure that all electrical consumers operate. Try and do this with the customer present. Note on the work order any damage, etc. This inspection will avoid any disputes after your repair is completed.