



HOLDEN (DELPHI) VARIABLE STROKE COMPRESSOR DIAGNOSIS					TSB #:	53
					Date:	2/11/2011
Initial Once Read:						

Even though the Holden variable stroke compressor manufactured by Delphi has been in the Australian market place since 1994 and was first used in the Holden SB Barina. We feel that it is worthwhile re-issuing test procedures that may assist you with your diagnosis of this type of compressor.

The test procedures are broken into 6 different sections. Ensure that for each test procedure the vehicle is “set up” as described

Test 1. A/C system refrigerant charge evaluation

Test 2. Compressor operation and function

Test 3. A/C System performance—High A/C system load. Full stroke function

Test 4. A/C System performance—Low A/C system load . Control valve function

Test 5. Oil / liquid refrigerant “slugging”

Test 6. Compressor noise evaluation

Test 1. A/C System Refrigerant Charge Evaluation. The ambient temp should be above 15°C, ignition off.

STEP	ACTION	RESULT	YES	NO
A	Connect high & low pressure gauges. Read high side pressure	High pressure above 400 kPa	Go to Test 2 compressor operational test	Go to Step B
B	Carry out leak testing using an electronic leak detector or soapy water	Leak found	Rectify leak	Add fluorescent dye and recheck for leak

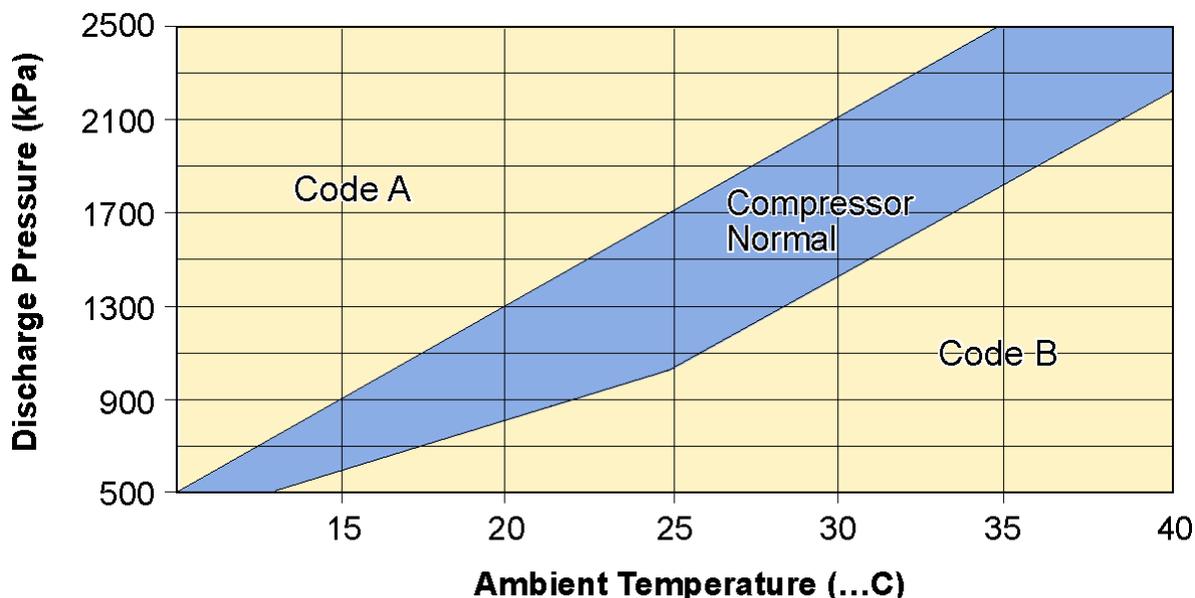
Test 2. Compressor Operational Test. Compressor forced to maximum stroke

- ◇ Highest blower fan speed
- ◇ Bonnet up, doors open
- ◇ Maximum cold A/C
- ◇ Connect high and low side pressure gauges to the A/C system
- ◇ Stabilise interior temperature to match ambient temperature
- ◇ Select face mode and insert a digital thermometer into vent
- ◇ Select air intake mode to fresh air



Test 2. Compressor Operational Test

Discharge Pressure Vs Ambient Temperature



Using your high pressure gauge reading, plot that reading against the ambient temperature on the above graph. If the intersecting values fall within the shaded area the compressor and control valve function are okay. If the result intersects in either code A or code B consult the chart.

CODE - A	CODE - B
<p><u>Over charge of lubricating oil or refrigerant.</u> Symptom: Low pressure to specification or slightly higher. High side high</p> <p><u>Oil overcharge</u> Recover refrigerant. Remove and drain compressor of oil. If the measured amount of oil is greater than 150cc flush complete A/C system. Fill compressor with 220cc of PAG oil (p/n. 12345923)</p> <p><u>Refrigerant overcharge</u> Evacuate and recharge A/C system to 800+-25 grams</p> <p><u>TX Valve jammed open.</u> Symptom: Low pressure to specification or slightly higher. High side high System appears normal, but may go warm temporarily on extended journeys and return to correct operation after the vehicle has been shut down</p> <p><u>Engine cooling fans.</u> Symptom: Low pressure to specification or slightly higher. High pressure high—Faulty radiator or condenser fan, relay or a condenser internal or external restriction</p>	<p><u>Compressor not pumping.</u> Symptom: Low side pressure high. High side pressure lower than specification. Confirm by completing test—3b</p> <p><u>Refrigerant undercharge.</u> Symptom: Low pressure to specification. High pressure low Check A/C system for leaks. Repair leak. Evacuate and recharge the A/C system to 800+- 25 grams</p> <p><u>TX Valve or Filter drier restricted.</u> Symptom: Low side pressure to specification High side pressure low</p> <p><u>Filter drier.</u> Feel the inlet and outlet tubes of the filter drier, both tube temperatures should be the same. If temperatures are different, check the filter drier co-ordination or replace the filter drier</p> <p><u>TX Valve.</u> Operate the engine to 2000 rpm, check pressure gauge readings before and after increasing engine rpm the difference should be no more than 140 kPa</p>



Test 3. Compressor Performance: HIGH A/C System Load Simulation Test.

- ◇ Highest blower fan speed
- ◇ Doors and bonnet open
- ◇ Maximum cold A/C
- ◇ Connect high and low side pressure gauges to the A/C system
- ◇ Select face vent and insert a digital thermometer
- ◇ Select air intake to fresh air
- ◇ Engine at fast idle approximately 3000 rpm
- ◇ Test duration 5 minutes

STEP	ACTION	RESULT	YES	NO
A.	Check high and low pressures. <i>Subtract</i> the low side reading from the high side reading and compare the difference to the RESULT column in chart Figure 4	Difference less than 210 kPa	Go to Step C	Go to Test 4
B.	Ignition OFF Rotate compressor clutch front plate (not pulley)	Front plate turns "FREELY" by hand.	Go to Test 4	Go to Step C
C.	Replace compressor	Is problem rectified. Confirm by repeating step A.	END	Check for TXV fault

Test 4. Compressor Performance: LOW A/C System Load Simulation Test. Control valve set point

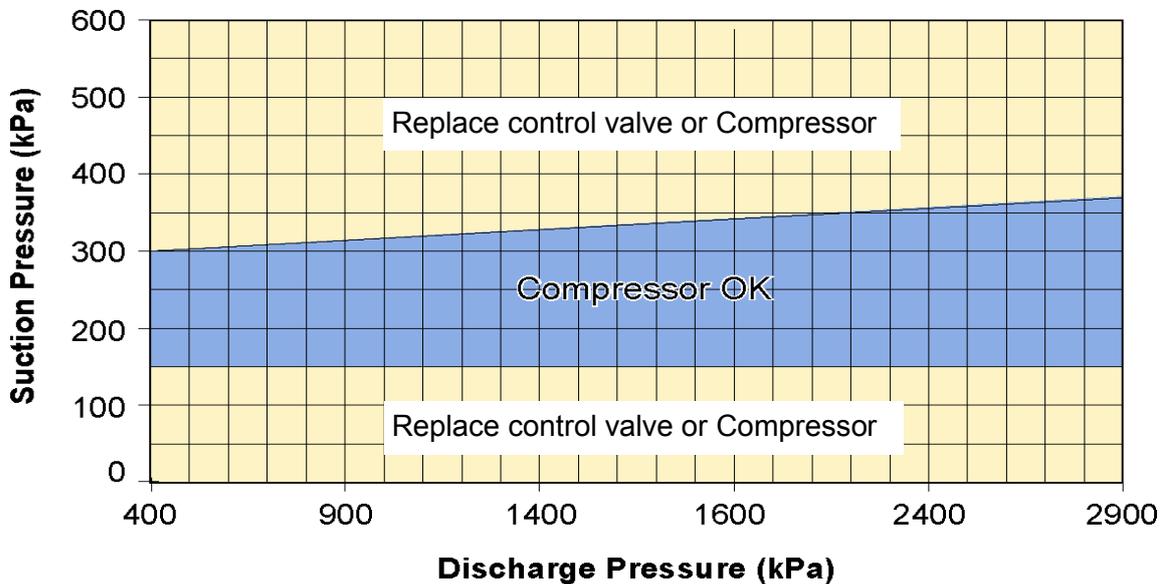
- ◇ Lowest blower fan speed
- ◇ Doors and windows closed
- ◇ Maximum cold A/C
- ◇ Connect high and low side pressure gauges to the A/C system
- ◇ Select face mode and insert a digital thermometer into vent
- ◇ Select air intake to recirculation mode
- ◇ Engine at fast idle approximately 1500 rpm
- ◇ Test duration 5 minutes



Test 4. Compressor Performance—LOW A/C System Load Simulation Test. Control valve set point (continued)

STEP	ACTION	RESULT	YES	NO
A.	Check high and low pressures	Do high and low pressure readings intersect in the shaded area in Figure 3	OKAY	Go to step B
B.	Replace control valve or compressor	Is the problem rectified? Confirm by repeating step A	END	

Control Valve Setpoint Check



Test 5. Oil / liquid refrigerant slugging test

- ◇ Highest blower fan speed
- ◇ Select A/C full cold
- ◇ Bonnet closed
- ◇ Engine at fast idle approximately 1500 rpm for three (3) minutes
- ◇ Turn engine off for three (3) minutes

Test Criteria

- A. Restart the engine with A/C off
- B. Select lowest blower fan speed and engage A/C
- C. Listen for short duration quick knocking noise

Causes

- TXV jammed open
- Excessive A/C system lubricant. Remove compressor and drain. Flush A/C system of all oil
- Excessive refrigerant charge or R134a refrigerant not used



Test 6. Compressor noise evaluation test

- ◇ Lowest blower fan speed
- ◇ Select A/C full cold
- ◇ Engine speed at idle
- ◇ Bonnet open
- ◇ Select face mode
- ◇ Test duration five (5) minutes

Test Criteria

Build up high side pressure to 2000 kPa by deactivating the engine cooling fans by removing the electrical connectors or relays.

Note: *Do not* allow the high side pressure to exceed 2000 kPa as compressor overload noises will be heard, this is normal.

Listen for compressor A/C system noises. Compare the noise heard to the “known noises” chart below.

TEST / SYMPTOM	NOISE	REPLACE COMPRESSOR
Build A/C system pressure up to 2000 kPa while listening for noises	Rattle – similar to engine bearing knock	YES
High side pressure at or above 2000 kPa	Clunk – 2 to 4 second duration	NO Normal for load increase
Compressor engagement Normally heard at first start in the morning	Slugging or quick knocking	NO Oil / liquid slugging (refer test 4) or jammed open TXV
All pressure ranges. Normally at idle	Ticking, squeal or growling	NO Idler, clutch bearing or A/C belt
Higher than specification High side pressure, normally above 2000 Rpm	Rumble, growl, groan or A/C system pulsation through hoses	NO. Refrigerant overcharge, condenser air flow, internal or external condenser restriction
All pressure ranges. Normally heard at idle or Slightly above	Continuous metallic knock or groan	NO Compressor bolts or mounting loose
From inside vehicle noise is heard that becomes louder with increased engine RPM or evaporator load	Bearing type or “whirring”	NO Refrigerant tubes touching body. Accelerator or cruise control cable touching suction tube. Block valve touching firewall opening