SECTION : 412- 00 Climate Control System - General Information

VEHICLE APPLICATION : 2008.0 Falcon

CONTENTS PAGE

DESCRIPTION AND OPERATION

DIAGNOSIS AND TESTING

DESCRIPTION AND OPERATION

Climate Control System

The 2008 Model Year Falcon is fitted with either a Single zone (SZ) or a Dual zone (DZ) Automatic Climate Control (ACC) heater/ventilation/air conditioning (HVAC) unit with manual overrides possible. Dual zone allows different comfort settings for driver and passenger.

A Manual Climate Control (MCC) HVAC unit is no longer available, however a Manual Heater Only HVAC unit (without A/C) is still available on utility vehicles.

The 2008 Falcon Air Conditioning system is a completely new system featuring an upgrade in technology. The system is now a Clutch Cycling Thermal Expansion Valve (TXV) system with a sub cooled condenser (where the BF Falcon was a Clutch Cycling Orifice Tube / suction accumulator system with a non sub-cooled condenser). The major components in the 2008 Falcon A/C system are NOT compatible with the BF Falcon.

Heating, Ventilation and Air Conditioning (HVAC) assembly

The 2008 model year Falcon **Heating, Ventilation and Air Conditioning (HVAC)** assembly differs from the 2006 BF Falcon in several areas, and CANNOT be fitted into the 2006 BF Falcon vehicles as the evaporator inlet/outlet tube ends are suited for fitment to the Thermal Expansion Valve (not the BF suction accumulator).

HVAC Case

The 2008 Falcon HVAC case features a number of internal changes. These include:

- New evaporator assembly with 38mm thick core
- New evaporator tube end fittings to suit the Thermal Expansion Valve (TXV), with new refrigerant O-rings
- New stepped evaporator seals (to interface to a new dash inner Insulator)
- New evaporator thermistor (temperature sensor) with angled plastic housing and bayonet type fitting into HVAC case
- New evaporator thermistor switching software
- Three new HVAC Integrated Module (HIM) genders

The condensation seal has been removed from the outer rear surface of the 2006 BF Falcon HVAC case (between the face vent outlets and the rear console duct outlets), and this area of the case is now etched to eliminate condensation.

An additional condensate drain tube is fitted into the floor panel, below the HVAC assembly drain outlet. This was introduced as a running change for the 2006 BF Falcon and is carried over into 2008 Falcon.

A filter mesh is standard, but a pollen filter is optional.

The Heater-Only Assembly only differs from the Heater/Air-Conditioning Assembly in that no evaporator or thermistor is fitted.

HVAC Interface	Details
Mount Points	3 nuts - HVAC to Cowl 1 nut - HVAC to Dash 2 bolts - HVAC to Floor Bracket
Sound Insulator	Integrated assembly with HVAC -Fixing posts on case, locating guide ribs around all pass throughs have been removed to allow the use of larger stepped seals. Spacer clips on upper middle and upper right mount points replace fir tree clips used on 2006 BF Falcon vehicles.
Drain	Solid drain on centreline with laminated foam seal. Interfaces to separate drain tube assembled into horizontal section of dash panel

Control Components

The HVAC unit incorporates a HIM (HVAC Integrated Module) that controls all aspects of the HVAC's operation.

The 2008 Falcon HVAC Integrated Module (HIM) has been updated with three new software genders, including:

- 2008 Falcon Heater Only Manual HVAC,
- 2008 Falcon Single Zone Automatic HVAC and
- 2008 Falcon Dual Zone Automatic HVAC. The existing three software genders for 2006 BF Falcon
- Heater Only Manual HVAC,
- Single Zone Manual HVAC and
- Dual Zone Automatic HVAC are retained within the 2008 HIM for backward compatibility into 2006 BF Falcon vehicles.

The 2008 Falcon HIM unit CAN be fitted into the 2006 BF Falcon vehicles, provided the BF software genders are correctly selected. The 2008 Falcon HIM can now be removed for service without removing the entire instrument panel (IP). Instead, the LH lower IP finish panel that incorporates the glove box can be removed to give access to the HIM.

The HIM is connected to the HS-CAN (High Speed Controller Area Network) serial data bus through which flows all sensor and command inputs required to operate the climate control system.

Operator commands are input into the ICC. The ICC then passes the command input through the MS-CAN (Medium Speed CAN), to the HSCAN (through a gateway in the Cluster) to the HIM. The HIM takes the information and performs the required actions and

DESCRIPTION AND OPERATION (Continued)

outputs the appropriate information for the ICC display screen (Face Display Module FDM). The HIM also monitors some vehicle operating data for optimisation of Climate Control System performance.

Feature	Details
Mode Actuation	Electric - Integrated HIM module
Air Mix Actuation Low Series	Electric - Integrated HIM module
Air Mix Actuation High Series	Electric - Integrated HIM module + DZ actuator
Control logic Low Series	Intelligent software control incorporated into HIM
Control logic High Series	Intelligent software control incorporated into HIM
Blower fan control Heater Only	10 detent fan speed control integrated in HIM
Blower fan control Low and High Series	Continuously variable fan speed control integrated into HIM, AUTO mode 10 detent fan speed control integrated in HIM, manual overide
Dual Zone	Yes
ACC compatible	Yes
A/C performance monitor	Yes - software strategy to detect A/C performance degradation.
A/C compressor protection	Yes

Both the HIM and the PCM have new software to control the ACC system and to protect the A/C compressor.

In the automatic climate control (ACC) system (not the Heater Only system), the climate control system automatically adjusts the operation mode of the HVAC to provide a set comfort under all operating conditions.

Dual zone allows different comfort settings for driver and passenger. Manual over-ride of automatic control mode is able to be selected at any time.

In the ACC system, (not the Heater Only system), each individual remote key transmitter retains the Climate Control temperature settings previously selected when that remote key was last used

The Cabin Temperature Sensor (CTS) in the 2008 Falcon has new hardware and software, and is not interchangeable with the BF Falcon CTS. The new cabin temperature sensor is located behind a small grille in the centre of the ICC (Interior Command Centre) switches directly below the audio system. The CTS reading is used by the ACC climate control system to maintain the comfort setting. The cabin temperature sensor is part of the ICC main PCB and is wired directly to the BEM. Neither the 2008 or BF Falcon cabin temperature sensors are serviceable as a separate component (if the CTS is faulty, the complete ICC must be replaced), but unlike the BF, the new CTS does not need to be recalibrated when the ICC or BEM is replaced.

The combined Twilight and Sun Load sensor is unchanged from the BF Falcon, and is still located in the top of the instrument panel between the passenger and driver screen air duct. The sensor is wired directly to the BEM. The Sun Load sensor is used by the ACC climate control system only, to adjust the ACC for different sun intensity levels. The Twilight Sensor provides information about low light conditions for automatic headlight operation.

The Ambient temperature sensor in the 2008 Falcon is located in the passenger side external mirror housing and is wired directly to the HIM. It is used by the ACC climate control system only. The Ambient Temperature sensor is not a serviceable item. If the sensor is faulty, the complete LH external mirror assembly should be replaced. Even though the ambient temperature sensor in the 2008 Falcon is unchanged from the BF Falcon, the 2008 Falcon has a new external mirror housing, so the ambient temperature sensors are NOT interchangeable.

Air Distribution

The 2008 Falcon contains a new air distribution system featuring new face, console and rear passenger ducting, new Instrument Panel registers (rear console register assembly is carry-over) and a new central screen demist vent and side window vents. The new air outlet face ducts are separate blow moulded ducts, where the 2006 BF face ducts are integral with the instrument panel central distribution/demist duct.

The HVAC unit features heating and cooling to the rear occupants through the console if the Face, Foot, Face/Foot split or Demist/Foot split mode is selected by the front occupants.

Airflow to the rear is maintained in all modes except full demist.

Air Conditioning

The 2008 Falcon Air Conditioning system is an all new system, and the major components in the 2008 Falcon A/C system are NOT compatible with the BF Falcon.

The 2008 Falcon Air Conditioning system is a Clutch Cycling Thermal Expansion Valve (TXV) system with a sub cooled condenser.

The 2008 Falcon A/C system requires significantly less refrigerant charge than the BF Falcon. Note that incorrect refrigerant charge can cause excessively high discharge pressures resulting in compressor damage, compressor cut-out, excessive operating noise or poor A/C performance.

The Thermal Expansion Valve (TXV) modulates the refrigerant flow in the circuit via a variable orifice opening and, combined with the sub cooled

DESCRIPTION AND OPERATION (Continued)

condenser, eliminates the need for a suction accumulator. This TXV replaces the fixed opening Orifice Tube used in the BF Falcon.

The compressor contains a new oil quantity, hence a different part number and is NOT compatible with the BF A/C system.

The 2008 Falcon I6 A/C compressor bracket is different to the BF in that it has added bosses at the top to locate an engine lifting eye.

The 2008 A/C condenser assembly is different in construction, size, mounting points, inlet/outlet fittings and operating characteristics to the BA/BF condenser assembly, and uses new mounting bolts. The new sub-cooled condenser features an integral receiver/modulator with a serviceable filter/drier assembly. The condenser receiver/modulator replaces the suction accumulator used in the BF Falcon.

In the 2008 Falcon, some of the tube pad fitting joints are different to the BF Falcon, in that the tube extends right through the pad fitting and is no longer brazed to the fitting, thus reducing the potential for leakage. These new tube fittings require new mounting bolts.

The Condenser Inlet (Discharge) hose has a revised routing, new pad fittings requiring different joint bolts and a support on the radiator side tank using a saddle clamp.

A new Compressor Inlet (Suction) hose now mounts to the suction sub-tube on the liquid line manifold with a quick joint and clamp. The hose routing is different to BF and the compressor end of the hose assembly has a new pad fitting requiring a different joint bolt. The quick joint assembly is unchanged from BF Falcon.

The 2008 Falcon features a new Condenser to Evaporator tube (A/C liquid line). The tube is now 8.0mm in outer diameter and without any hose section, and requires two new smaller diameter refrigerant O-rings. The liquid line now includes a manifold that interfaces to the TXV. It includes two service charge points, a high pressure discharge port on the body apron adjacent to the fender/mudguard (same as the BF location) and a low pressure suction port located on the suction sub-tube outlet on the manifold. The Liquid line is also now clipped to the body in two locations using plastic clips, and has a new pad fitting requiring a different joint bolt at the condenser end of the tube.

If the 2008 Falcon A/C liquid line is to be replaced, there is a new service replacement liquid line with two extra joints compared with the original equipment (OE) liquid line. The new service liquid line is required because the OE liquid line must be cut to remove the line, and the added joints allow for liquid line assembly without removal of major adjacent components.

The TXV mounts between a new evaporator E-Clamp and the liquid line manifold, with bolts that pass through the liquid line manifold and TXV to thread into the E-clamp.

The 2008 Falcon evaporator assembly is different to the BF, with an all new 38mm thick core that has a revised refrigerant flow path, a new dash panel pass-through seal and revised tube end fittings on the inlet/outlet tubes to suit the TXV. The evaporator inlet/outlet tubes have a different pitch to BF and use different refrigerant O-rings. The evaporator temperature thermistor is also new, using a different type of sensor in a new location and a revised mounting in the HVAC case, along with new software in the HIM that controls the thermistor switching points.

The 2008 Falcon features the BF Falcon single engine cooling fan with new 16mm radiator on all I6 vehicles, except for the Turbo variants and 1 tonne ute and on all V8 vehicles. The BF twin cooling fans and new 27mm radiator are placed on all I6 Turbo and one tonne Utes, and on all V8 vehicles.

All new radiators have been fitted with foam seals on the front face, along the top rail and down the two side tanks. The lower air deflector also has a foam seal that sits on its upper surface directly underneath the condenser core. These seals have been fitted to prevent hot air recirculating from the engine bay around to the front of the radiator and condenser.

DIAGNOSIS AND TESTING

Climate Control System - General Information

Acronyms and Abbreviations

NOTE: The following acronyms will be used throughout this section.

A/C	Air Conditioning
ACC	Automatic Climate Control
ACPT	Air Conditioning Pressure Transducer
BEM	Body Electronics Module
CAN	Controller Area Network
CTS	Cabin Temperature Sensor
DTC	Diagnostic Trouble Code
DZ	Dual Zone
ECU	Electronic Control Unit
EEC	Electronic Engine Control (part of PCM)
EVT	Evaporator Vent Temperature
FDM	Face Display Module
HIM	HVAC Integrated Module
HTR	Heater
HVAC	Heating, Ventilation & Air Conditioning Assembly
ICC	Interior Command Centre
MAX	Maximum
MCC	Manual Climate Control
MIN	Minimum
MSG	Message
N/A	Not Applicable
PCM	Powertrain Control Module
PID	Parameter Identifier
RPM	Revolutions Per Minute
SZ	Single Zone
TXV	Thermal Expansion Valve