

## SECTION : 412-02 Heating and Ventilation

VEHICLE APPLICATION : 2008.0 Falcon

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## SPECIFICATIONS

### General Specifications

Description	Specification
<b>Lubricants</b>	
HVAC Lever Cam Grease/Air mix shaft Grease	Dow Corning Molykote PG 54 Silicon Grease
Engine Coolant	Do not top up the cooling system with tap water. Use only Ford Specified Coolant at a Ratio of 30 - 50 % coolant to water
A/C System O-Ring Lubrication	PAG ND-Oil 8 Ford part number AY19L000A
A/C System O-Rings	Refrigerant O-Ring, blue HNBR, Evaporator Outlet (large) Evaporator Inlet (small)

### Torque Specifications

Description	Nm
HVAC Mounting (to cowl) upper nuts (3)	9
HVAC mounting (to dash) lower LH nut (1)	7
HVAC Mounting (floor brackets) lower bolts (2)	6
Evaporator Clamp to TXV Clamping Bolt	4.4 - 6.4
HVAC Case Hi / Lo Plastic Self Tapping Screws	1.1 - 1.5
Heater Tube Clamp Retaining Screw	1.1 - 1.5
Evaporator Plastic End Plate	1.1 - 1.5
HIM to HVAC Self Tapping Screws	1.1 - 1.5
Blower Motor to HVAC Self Tapping Screws	1.1 - 1.5



## DESCRIPTION AND OPERATION



**WARNING:** To avoid accidental deployment and possible injury, the air bag system backup power supply must be depleted before repairing any HVAC (heating, Ventilation and Air Conditioning unit) components. To deplete the backup power supply, disconnect the battery positive cable and wait one minute. Failure to follow these instructions may result in personal injury.

### Differences between the 2008 Falcon and 2006 BF Falcon Heating/Ventilation Systems

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).

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. 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.

### HVAC Case and Air Distribution System

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.

The 2008 Falcon also features 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.

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: (i) 2008 Falcon Heater Only Manual HVAC, (ii) 2008 Falcon Single Zone Automatic HVAC and (iii) 2008 Falcon Dual Zone Automatic HVAC. The existing three software genders for 2006 BF Falcon (iv) Heater Only Manual HVAC, (v) Single Zone Manual HVAC and (vi) 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 be removed for service without removing the entire instrument panel (IP). Instead, the LH lower IP finish panel that incorporates the glove box can now be removed to give access to the HIM.

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

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



## DESCRIPTION AND OPERATION (Continued)

grille in the centre of the ICC (Interior Command Centre) auxiliary switches directly below the audio volume control knob. 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 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 outputs the appropriate information for the ICC display screen (Front Display Module FDM). The HIM also monitors some vehicle operating data for optimisation of Climate Control System performance.

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 (this location is the same as in 2006 BF Falcon, however the mirror housing is new). 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.

In the 2008 Falcon, the evaporator temperature thermistor is 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.

## Heating and Ventilation

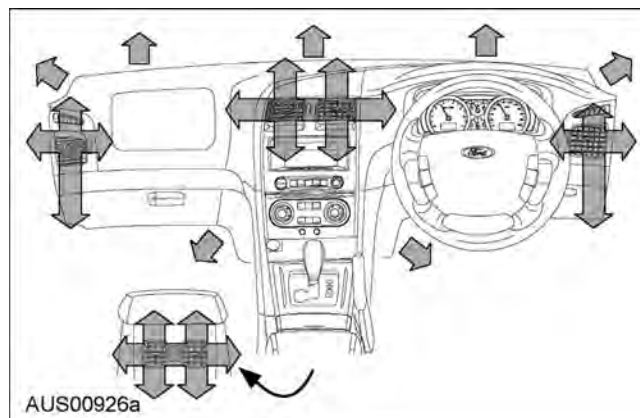
### Instrument Panel and Rear Console

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.

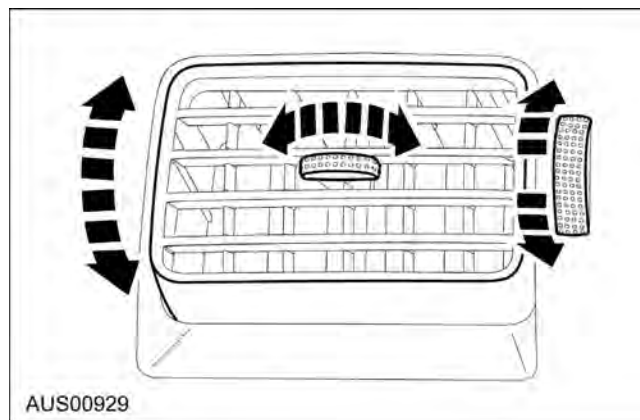
The HVAC unit features heating and cooling to the rear occupants through the console if the Face, Foot, Face/Foot split or Demist/Foot split mode is selected by the front occupants.

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



The airflow volume can be turned on or off with the rotary controls at the side of the vents. Vents may be either fully open (top detent position), fully closed (bottom detent position) or at an intermediate position to adjust the airflow.

The direction of the airflow can be adjusted horizontally and vertically within the swivelling range of the air vanes and vents.



## Distribution Modes

Distribution modes can only be selected with the ignition on.

### Face level

Air is directed to the adjustable instrument panel face vents and the centre console vents (for rear seat passengers). The vents may be adjusted for direction and flow or may be individually closed if desired.



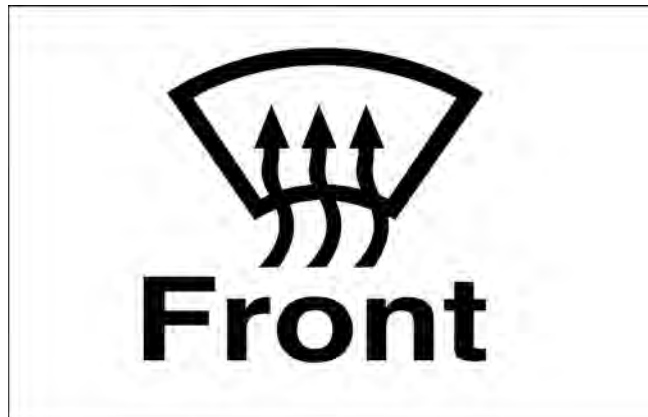
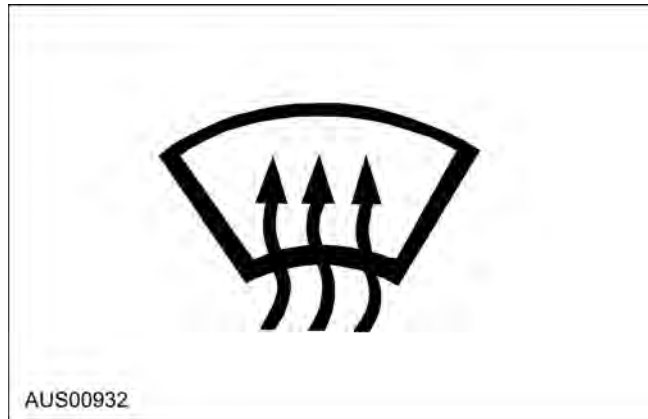
## DESCRIPTION AND OPERATION (Continued)



### Face level/footwell

Air is directed to the adjustable instrument panel face vents, centre console vents (for rear seat passengers) and front footwell vents. If heating is selected, heated air is directed to the front footwell and centre console vents and partially heated air is directed to the face level vents.

The warmer the setting, the warmer the air to face and front footwell, although air to the face vents is always somewhat cooler than to the footwell/centre console vents when heating is between minimum and maximum temperature settings. If full cooling is selected, cool air is delivered to face, footwell and centre console vents.



### Windscreen demist/footwell

Air is directed to the windscreen and side window vents to aid in glass demisting. Air is also directed to the front footwell vents and centre console vents (for rear seat passengers).



### Windscreen demist

When windscreen demist mode is selected, the A/C and fresh air modes are automatically selected for glass demisting. Also, the blower fan will automatically start if the fan was not already running.

For the Automatic Climate Control (single and dual zone), windscreen demist mode is the most efficient setting for demisting the screen, and this mode automatically controls the heat and fan settings.

**NOTE:** A/C and fresh air modes can be manually overridden but demist efficiency will be reduced.



## DESCRIPTION AND OPERATION (Continued)

### Footwell

Air is directed to the front footwell vents, centre console vents (for rear seat passengers) and a small amount is also directed to the windscreen and side window vents to reduce glass misting or fogging.



### Fresh/Recirculated air selector

Pressing this button will alternate between fresh and recirculated air modes. A graphic indicating the selected mode will appear on the ICC display.

In normal circumstances, the fresh air mode should be selected to maintain the quality of air inside the vehicle, to prevent the build-up of stale air or odours, and to reduce windscreen misting. To ensure optimum air quality, it is not advisable to select Recirc mode for extended periods of time.

To prevent the ingress of dust, odours or fumes, select the recirculated air mode. The recirculated air mode can also be used to allow the air conditioner to more effectively cool the vehicle's cabin. Do not use the recirculated air mode if vehicle occupants are smoking as tobacco odours may remain.



### Air Filtering

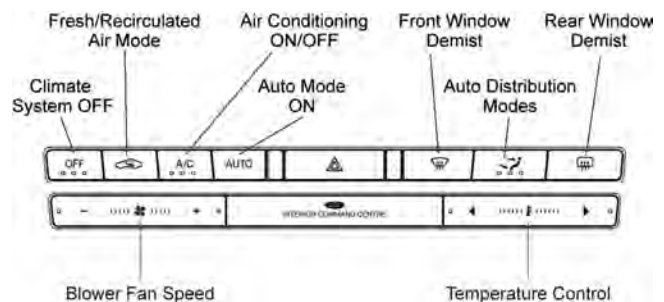
The air selector system is fitted with a fine mesh particle filter to exclude leaf debris, dust and dirt. A finer pollen filter is also available, as an accessory item, from your Ford dealer.

**NOTE:** Extended operation of the climate control system in a recirculated air mode may lead to a reduction in air quality in the cabin. The air in the cabin should be periodically refreshed by selecting fresh air settings.

To clean the standard mesh filter, blow through mesh with compressed air and wash with luke warm water.

For the optional pollen filter (where fitted), the filter cannot be washed. When serviced, the pollen filter should be replaced. If the filter is blown through with compressed air, rather than replaced, the air quality and airflow quantity may be degraded.

### Single Zone Automatic Climate Control System



The single zone automatic climate control system automatically controls heating, cooling, inlet air mode and fan speed to maintain the desired temperature level selected between 18 °C and 30 °C when operated in the 'Auto' mode. The selected cabin temperature comfort setting (eg. 22°C) is automatically maintained when 'Auto' mode is selected. Driver and front passenger have the same comfort settings. 22 °C is the recommended comfort setting for most users.

A microcomputer and sensors monitor cabin, outside air, air conditioner evaporator and engine temperatures as well as the strength of direct sunshine on the interior of the vehicle. Instrument panel face level vents should be adjusted to direct airflow to suit personal comfort.

### Automatic operation

After starting the engine, if 'Off' is displayed in the control panel display window, press the 'Auto' button to turn the system on. Adjust the comfort level to the desired temperature using the 'Temperature control' buttons. After starting the engine, if 'Auto' appears in the display window, the system will automatically adjust to the selected comfort level without any further assistance.



## DESCRIPTION AND OPERATION (Continued)



AUTO

'Auto' mode automatically controls air inlet, air distribution, fan speed, air conditioning and temperature. From time to time you may notice the air distribution mode and fan speed changing. This is the system's normal method of operation whereby it selects the mode of air distribution and fan speed most appropriate to maintain the selected comfort setting. When starting the vehicle on a cold day with a cold engine, air discharge is delayed until the engine begins to reach operating temperature. Simultaneously, the blower fan speed will increase to assist warm air circulation throughout the cabin. As the interior air warms to the preselected comfort setting, the mode will be automatically selected to best achieve the comfort level and the fan speed will then decrease.

Similarly, during high cabin temperature conditions the blower fan speed will increase and the A/C will operate at maximum performance to quickly reduce the interior temperature.



OFF

The OFF button will turn the automatic climate control system off but will allow fresh air to enter the cabin through the instrument panel vents. Fan speed and air distribution may be controlled in the off mode.

### Semi-Automatic operation

If desired, you may override the automatic control system and operate some features manually (such as fan speed and air distribution). Manually selecting such features when in 'Auto' mode will change the system to 'Semi-auto'. Full automatic control can be resumed at any time by pressing the 'Auto' button.

**NOTE:** Optimum comfort can be best achieved in AUTO mode.

### Single zone temperature control

Single zone temperature control allows the driver or passenger to set the air temperature for the entire cabin.

The rear console vent outputs correspond to all Climate Control outputs as set by the driver or front passenger.

The temperature may be set within the range of 18°C to 30°C, in 0.5°C increments. If a temperature below 18°C is selected, then 'LOW' is displayed. If a

temperature above 30°C is selected, then 'HIGH' is displayed.

When the vehicle is started, the temperature setting is retained at the previously temperature setting.

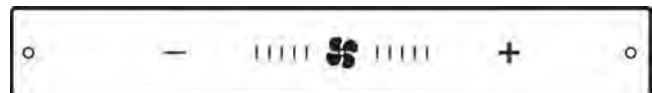
**NOTE:** The heater maintains warmth only when the engine is operating. Full heating is only available when the engine is at normal operating temperature.



### Blower fan speed selector

The blower fan speed selector is used to adjust the blower fan speed. To turn the fan off completely, press the "OFF" button.

**NOTE:** The blower fan will only operate with the ignition in the ON position.



### Outside air temperature

A sensor under the passenger-side exterior mirror monitors outside temperature. This is displayed in the message display window in the ICC. Correct operation of the sensor relies on air moving across the sensor. Therefore, at low vehicle speed, or operating the vehicle for a short period of time, the display may differ slightly from the true outside air temperature.

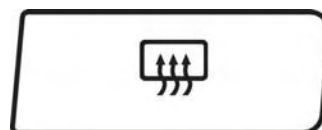
### Windscreen demist

In the event that fast demisting of glass is required, press the demist button. Air is directed to the windscreen and side window vents to demist glass. The air conditioner and blower fan will operate, the fresh air mode will be selected and heating (if available) will be used. When the glass is demisted, press the AUTO button to return to automatic climate control.



### Heated rear window demister

With the ignition on, press the switch to turn the demister on. The indicator on the ICC display will appear.



To switch off, press the switch again, otherwise the



## DESCRIPTION AND OPERATION (Continued)

demister will automatically turn itself off after approximately 15 minutes.

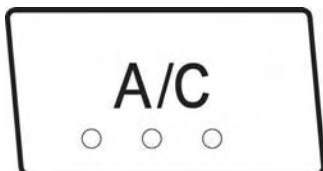
### Distribution mode selector

This button may be used to direct the air to particular groups of outlet vents. Press the button repeatedly until the desired setting is shown in the ICC display window. Note that on Orion there is only a single direction mode button, compared to the dual direction rocker button on BF ICCs. Information on distribution modes can be found earlier in this section.



### Air Conditioning

Press the 'A/C' button to toggle the air conditioner on/off.

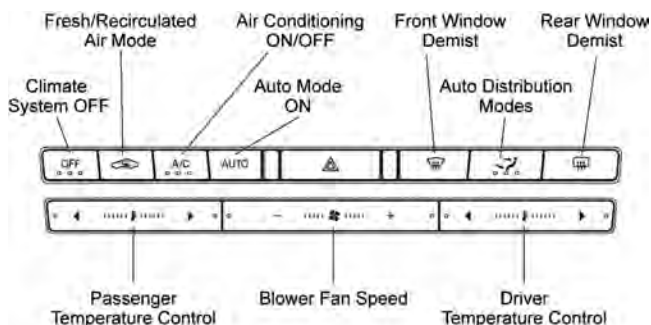


**NOTE:** The air conditioner will only operate with the engine running.

**NOTE:** If the Climate Control system is OFF and the A/C is turned ON the Climate Control system will start in 'AUTO' operation at the last selected temperature setting.

**NOTE:** At most ambient conditions, maximum cooling efficiency is automatically achieved in AUTO mode. However, maximum cooling can also be obtained by over-riding AUTO operation and selecting recirculated air, face vents and lowest set temperatures.

### Dual Zone Automatic Climate Control System



The dual zone automatic climate control system automatically controls heating, cooling, inlet air mode and fan speed to maintain the desired temperature level selected between 18 °C and 30 °C when operated in the 'Auto' mode. The selected cabin temperature comfort setting (eg. 22°C) is

automatically maintained when 'Auto' mode is selected. Driver and front passenger have independent comfort settings. 22 °C is the recommended comfort setting for most users.

The Dual zone ACC has capability of adjusting independent side to side temperature only. Air distribution mode and fan settings cannot be independently adjusted for different settings side to side. Example: If the Face vent mode on Drivers side is selected, then the Passenger side will also be in the Face vent position.

A microcomputer and sensors monitor cabin, outside air, air conditioner evaporator and engine temperatures as well as the strength of direct sunshine on the interior of the vehicle. Instrument panel face level vents should be adjusted to direct airflow to suit personal comfort.

### Automatic operation

As per the "Automatic Operation" section in the Single Zone Automatic Climate Control System section above.

### Semi-Automatic operation

As per the "Semi-Automatic Operation" section in the Single Zone Automatic Climate Control System section above.

### Dual zone temperature control

Dual zone temperature control allows the driver and front passenger to set independent air temperatures according to personal preference.

**NOTE:** This does not allow independent air distribution modes or fan speed, only temperature.

The rear console vent outputs correspond to all Climate Control outputs as set by the driver and front passenger.

The temperature may be set within the range of 18°C to 30°C, in 0.5°C increments. If a temperature below 18°C is selected, then 'LOW' is displayed. If a temperature above 30°C is selected, then 'HIGH' is displayed.

If the driver selects either 'LOW' or 'HIGH', the passenger setting is also changed to 'LOW' or 'HIGH' and the passenger is unable to choose a different setting until the driver's setting is no longer 'LOW' or 'HIGH'. When the driver changes the setting from 'LOW' or 'HIGH', both passenger and driver settings are controlled together by the driver until the passenger adjusts their temperature setting.

When the vehicle is started, the passenger and driver temperature settings are retained at the previously set driver's setting. If the driver then adjusts the temperature setting, both passenger and driver settings are controlled together by the driver until the passenger adjusts their temperature setting. If the driver and passenger settings are different, the passenger setting can be re-linked to the driver





## DESCRIPTION AND OPERATION (Continued)

setting at any time by holding down the auto button for more than 2 seconds.

**NOTE:** The heater maintains warmth only when the engine is operating. Full heating is only available when the engine is at normal operating temperature.



### Blower fan speed selector

As per the "Blower fan speed selector" section in the Single Zone Automatic Climate Control System section above.

### Outside air temperature

As per the "Outside Air Temperature" section in the Single Zone Automatic Climate Control System section above.

### Windscreen demist

As per the "Windscreen demist" section in the Single Zone Automatic Climate Control System section above.

### Heated rear window demister

As per the "Heated Rear Window Demister" section in the Single Zone Automatic Climate Control System section above.

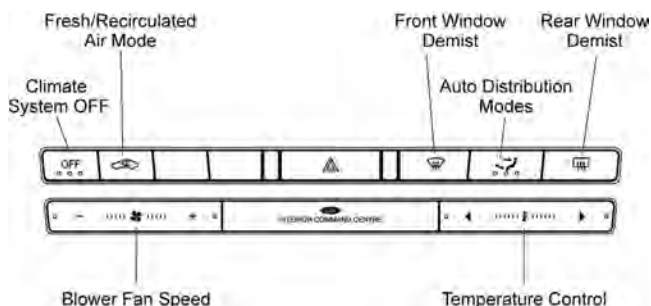
### Distribution mode selector

As per the "Distribution mode selector" section in the Single Zone Automatic Climate Control System section above.

### Air Conditioning

As per the "Air Conditioning" section in the Single Zone Automatic Climate Control System section above.

### Heater Only HVAC



The Heater Only HVAC allows manual control of the heating, inlet air mode, outlet air mode and fan speed. Because this system does not include A/C, it is not possible to reduce the temperature of the air coming out of the vents below the outside ambient temperature. For example, on a 30°C day, even with the temperature setting at L (Low), the air coming out

of the vents will not be below the ambient temperature (i.e. 30°C in this instance).

### Heater Only temperature control

The temperature of the air may be adjusted using the temperature control button. Depress the right hand side of the temperature control button to increase heating and the left hand side of the button to decrease heating. The range of settings available are L, 1, 2, 3, 4, 5, 6, 7, 8, 9, H (L=lowest amount of heating, H= highest amount of heating).

The rear console vent outputs correspond to all Climate Control outputs as set by the driver or front passenger.

**NOTE:** The heater maintains warmth only when the engine is operating. Full heating is only available when the engine is at normal operating temperature.



### Blower fan speed selector

As per the "Blower fan speed selector" section in the Single Zone Automatic Climate Control System section above.

### Outside air temperature

As per the "Outside Air Temperature" section in the Single Zone Automatic Climate Control System section above.

### Screen mode

Air is directed to the windscreen and side window vent. Some level of demisting will be achieved on the windscreen, but because there is no A/C to remove moisture from the air, demisting performance will be reduced. Fresh air mode will be selected, but can be overridden back to Recirc mode (the will increase the change for windscreen misting/fogging).

### Heated rear window demister

As per the "Heated Rear Window Demister" section in the Single Zone Automatic Climate Control System section above.

### Distribution mode selector

As per the "Distribution mode selector" section in the Single Zone Automatic Climate Control System section above.

### HVAC Ducting

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

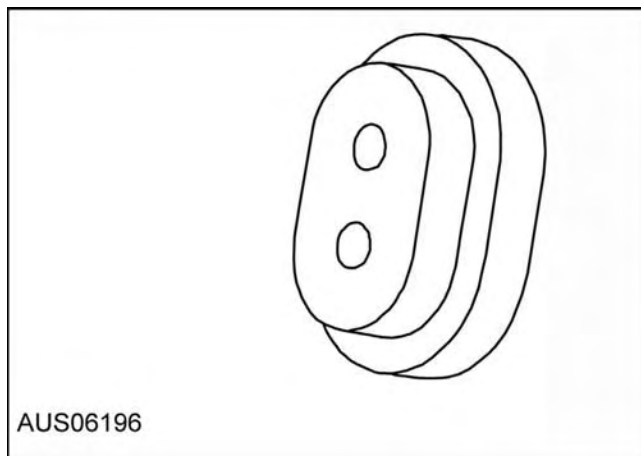


## DESCRIPTION AND OPERATION (Continued)

moulded ducts, where the 2006 BF face ducts are integral with the instrument panel central distribution/demist duct.

The fresh air intake to the HVAC unit enters the plenum chamber through the cowl grilles underneath the windscreen wipers. The recirculated air intake to the HVAC unit is inside the cabin behind the glove box and directly below the LH plenum chamber. The HVAC fresh air entry is attached to the plenum chamber with a foam seal. Outlet air from the HVAC unit can exit to the face and demist vent outlets via the instrument panel duct (central distribution/demist duct), as well as to the floor vent outlets or to the floor console duct. The HVAC unit is attached to the floor console duct with a foam seal. The instrument panel duct incorporates the demist ducts, and this duct is an integral part of the instrument panel and is not a separately serviceable item. The face ducts are blow moulded and can be removed and replaced from the instrument panel.

Between the HVAC unit and the dash panel at the locations where the heater and evaporator tubes pass through, foam pads are fitted around the tubes to seal the dash panel openings. A new pass-through seal has been adopted, using a stepped seal approach, which allows sealing on the inner dash insulator (via the larger diameter seal) as well as sealing against the dash panel (via the smaller diameter seal). This provides a more robust sealing path between the cabin and the engine bay.

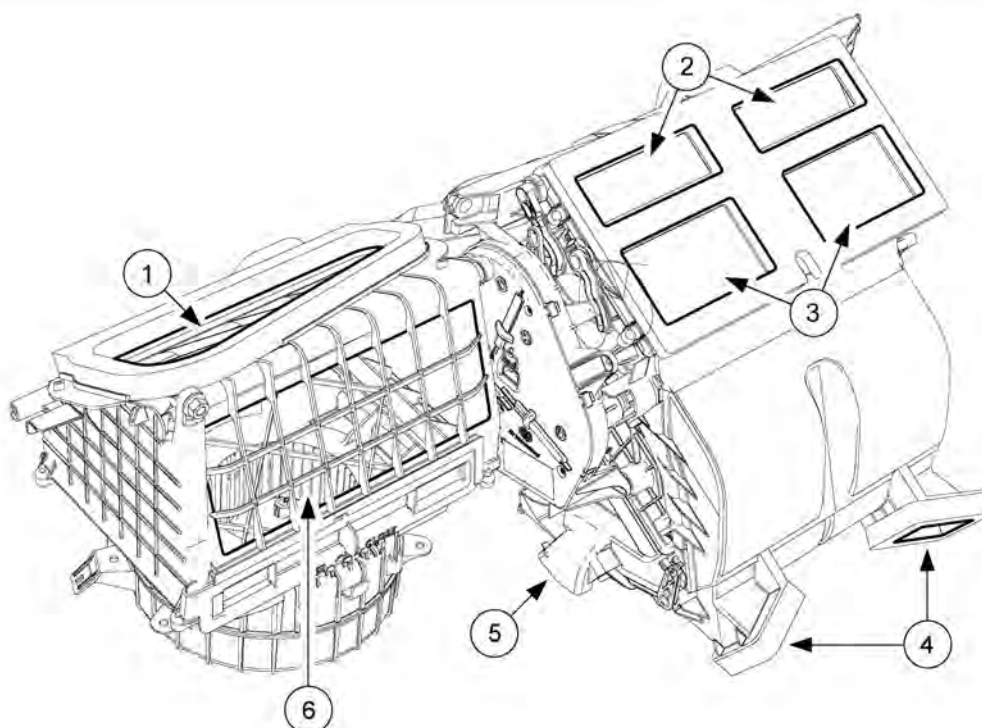


The floor console duct is removed from the vehicle as part of the floor console assembly. The duct can then be separated from the console. Refer to Removal & Installation procedure later in this section.



## DESCRIPTION AND OPERATION (Continued)

### HVAC Air Distribution Outlets and Ducts

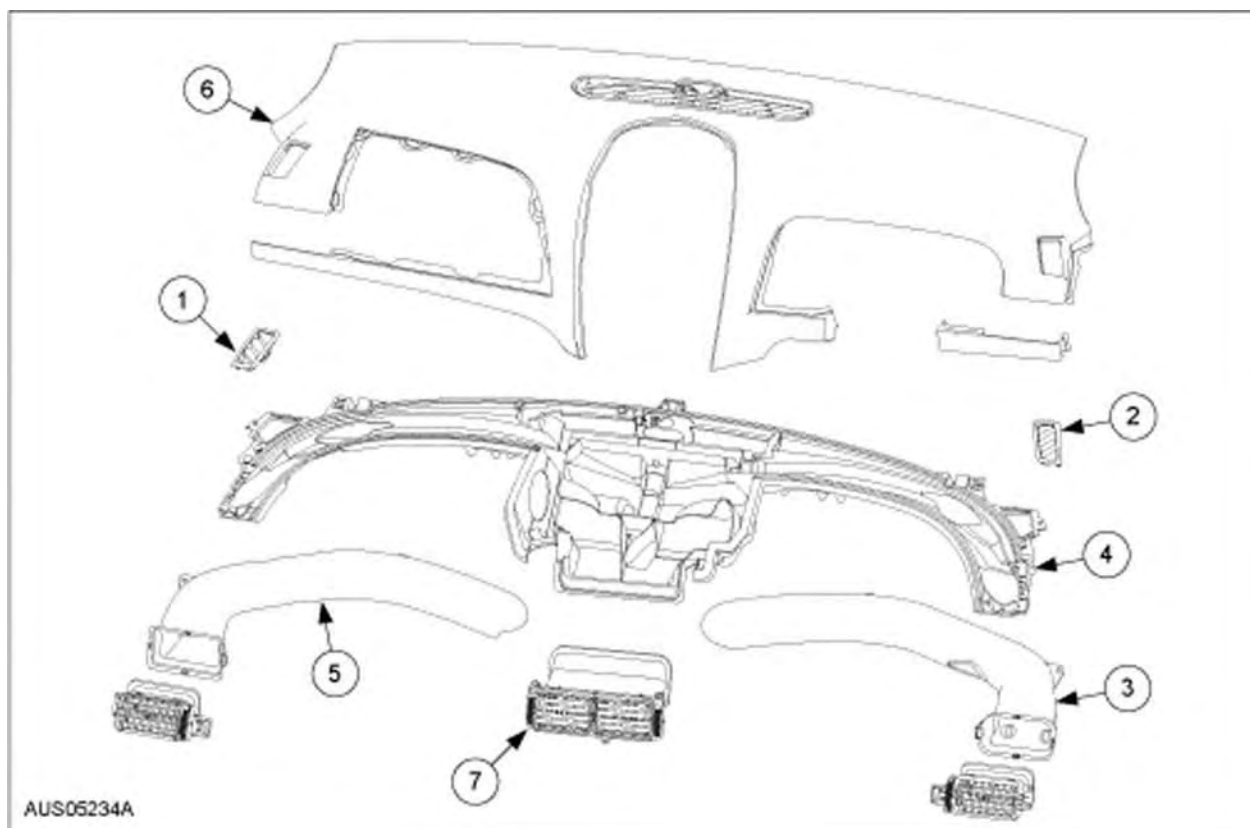


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Item	Description
1	Fresh air inlet (closed cell EPDM foam)
2	HVAC air outlet to front screen demist
3	HVAC air outlets to face vents
4	Rear Console outlets (closed cell EPDM foam)
5	Floor outlets
6	Recirculated air inlet

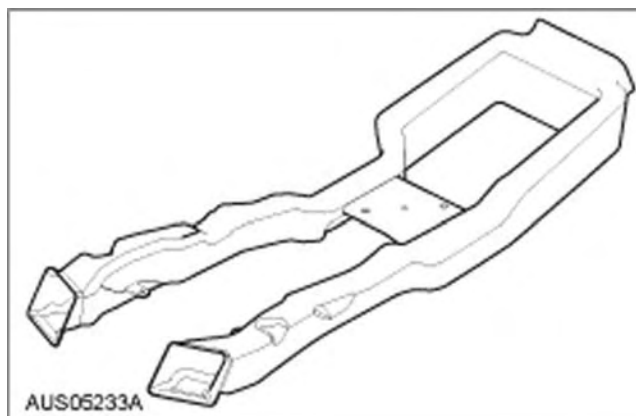
The instrument panel duct directs outlet air to the central windscreen demist outlet and to the side window demist outlets. The blow moulded face ducts direct airflow to the face centre and face side LH/RH vent outlet registers. The instrument panel duct incorporates the demist ducts, and this duct is an integral part of the instrument panel and is not a separately serviceable item. The face ducts are blow moulded and can be removed and replaced in the instrument panel.



**DESCRIPTION AND OPERATION (Continued)**

Item	Description
1	Left demist vent
2	Right demist vent
3	Right outboard face vent blowmoulded duct
4	Instrument panel duct (central distribution/demist duct) - (integral with the instrument panel and located in the centre underneath the crash pad)
5	Left outboard face vent duct blowmoulded duct
6	Instrument Panel crash pad
7	Centre face vents (part of ICC)

The floor console duct is removed from the vehicle as part of the floor console assembly. The duct can then be separated from the console. Refer to Removal & Installation procedure later in this section.



Item	Description
1	Floor console duct



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**DESCRIPTION AND OPERATION (Continued)****Acronyms and Abbreviations**

The following acronyms will be used throughout this section.

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



## DIAGNOSIS AND TESTING

### Heating and Ventilation



**WARNING:** To avoid accidental deployment and possible injury, the air bag system backup power supply must be depleted before repairing any HVAC (Heating, Ventilation and Air Conditioning unit) components. To deplete the backup power supply, disconnect the battery

positive cable and wait one minute. Failure to follow these instructions may result in personal injury.

#### Inspection and Verification

Check these items before entering Diagnostics.

Topic	Specification
Vehicle Battery Voltage	Greater than 12 Volts
Engine to be running	In all Tests
Record all DTCs present	Before Clearing
Ensure that a false DTC has not been set because of prior work on the vehicle. <b>Example:</b> If the LHF door (ACC vehicle) was removed at a body shop, Ambient temperature sensor DTC will be set.	Customer may have to be questioned on the vehicle history if a DTC is displayed and a root cause component fault cannot be found.
When referring to a Temperature / Resistance table.	Place an accurate electronic Thermometer near to the Sensor in question.
When using pressure gauges	Ensure that gauges are correctly calibrated and that the needles rest on Zero with no Refrigerant in the lines and the gauge valves open.
Vacuum pump must pull down to -100 kPa (30 in/hg)	Change the Vacuum pump oil approximately every 15 evacuations, to improve pull down time.

### Fault Symptom Chart

(Refer Fault Symptom Chart in Section 412-04)

### DTC Chart

Refer to DTC chart in Section 412-04.



**DIAGNOSIS AND TESTING (Continued)****PID Chart**

The following table lists all PIDs utilized by the WDS service tool to access specific functions within the HIM.

Acronym	Description	HIM Configuration		
		DZ	SZ	HTR
CCNT	Number of Continuous Trouble Codes Set	YES	YES	YES
NTCSDT	Number of Trouble Codes Set due to Diagnostic Test	YES	YES	YES
A_CT	Evaporator Temperature	YES	YES	N/A
ETSFD	External Temperature Sensor Filtered Data	YES	YES	N/A
EXT_TEMP	External Temperature From Sensor (unfiltered)	YES	YES	N/A
PBDAP	Passenger Blend Door Actual Position	YES	YES	YES
PBDTP	Passenger Blend Door Target Position	YES	YES	YES
BLENDDR	Driver Blend Door Position	YES	N/A	N/A
BLENTTP	Driver Blend Door Target Position	YES	N/A	N/A
BLOWVOL	HVAC Blower Voltage	YES	YES	YES
BLOWAP	Blower Motor Speed - Actual Position	YES	YES	YES
BLOWTP	Blower Motor Speed - Target Position	YES	YES	YES
LEFTOT	Passenger's Display Set Temperature	YES	N/A	N/A
RIGHTOT	Driver's Display Set Temperature	YES	N/A	N/A
MC_VREF	Vehicle Battery Voltage	YES	YES	YES
HIM_STAT	ECU Diagnostic Operating State	YES	YES	YES
CONPROV	Configuration and Programming Version	YES	YES	YES


Acronym	Description	HIM Configuration		
		DZ	SZ	HTR
CANDSV	CAN Diagnostic Specification Version	YES	YES	YES
RECIRDS	Recirculation Door Actual Position	YES	YES	YES
RECIRDTP	Recirculation Door Target Position	YES	YES	YES
CCACTM	Climate Control Actuator Modes	YES	YES	YES
MOD_ID	Module Configuration Check	YES	YES	YES
CCMODE	Climate Control Mode	YES	YES	N/A
BEM_MSG	GEM - Body Electronics Module CAN Message Receive Status	YES	YES	YES
CDU_MSG	ACM - Interior Control Center Module CAN Message Receive Status	YES	YES	YES
PCM_MSG	PCM - Powertrain Control Module CAN Message Receive Status	YES	YES	YES
ACCS	AC Compressor Cycling Request	YES	YES	N/A
CAL_VER	EEPROM Calibration Version	YES	YES	YES
CAL_VRAM	Calibration Version Currently Loaded in RAM.	YES	YES	YES



## DIAGNOSIS AND TESTING (Continued)

### Pinpoint Tests

#### PINPOINT TEST A : PLENUM CHAMBER AIR RESTRICTION (SZ / DZ/ HTR)

 **CAUTION:** Take all the standard safety procedures when dealing with A/C system refrigerant, including Eye protection and Gloves - refer to section 412-03 for the complete Safety Precautions.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>A1</b>	<b>VISUAL INSPECTION - ABOVE COWL GRILLES</b>	
	<p>Inspect the cowl panel grilles (LH and RH) below the windscreen wiper arms for evidence of airflow obstruction.</p> <p><b>Was there debris, dust or insects on the top of the cowl grille obstructing intake air to the cabin?</b></p>	<p><b>Yes</b> Remove the airflow obstruction, and blow out any debris using compressed air.</p> <p><b>No</b> Go to <b>A2</b></p>
<b>A2</b>	<b>VISUAL INSPECTION - BELOW COWL GRILLES</b>	
	<p>Remove the cowl panel grilles (LH and RH). Refer to section 501-02.</p> <p>Inspect the plenum inlet chamber below the cowl grilles for evidence of airflow obstruction.</p> <p><b>Was there debris, dust or insects in the plenum inlet chamber obstructing intake air to the cabin?</b></p>	<p><b>Yes</b> Remove the airflow obstruction, and blow out any debris using compressed air.</p> <p><b>No</b> Plenum chamber air intake was not restricted.</p>

#### PINPOINT TEST B : INSTRUMENT PANEL/ CONSOLE DUCT RESTRICTION (SZ / DZ/ HTR)

 **CAUTION:** Take all the standard safety procedures when dealing with A/C system refrigerant, including Eye protection and Gloves. Refer to Section 412-03 for the complete Safety Precautions.

**NOTE:** The instrument panel duct (incorporating demist/screen and face centre ducts) is an integral part of the instrument panel, and is not a separately serviceable item. If the duct is faulty, the complete instrument panel must be replaced (Refer to section 501-12). The face side ducts are blowmoulded ducts and can be removed from the instrument panel separately.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>B1</b>	<b>VISUAL INSPECTION - VENT OUTLETS</b>	
	<p>Inspect the demist vent outlets for evidence of airflow obstruction, including a dash mat or other item which may cover the vent outlet.</p> <p><b>Is there evidence of airflow obstruction at any demist vent outlets?</b></p>	<p><b>Yes</b> Remove the airflow obstruction.</p> <p><b>No</b> Go to <b>B2</b></p>
<b>B2</b>	<b>Airflow TEST - VENT OUTLETS</b>	
	<p>Run the engine and switch on the ACC with blower fan operating at maximum speed.</p> <p>Whilst selecting the air outlet modes using the ICC button, check for air delivery at all vent outlets (demist/screen, face front, face side LH/RH, floor LH/RH and rear console).</p> <p><b>Is airflow supplied to each vent outlet?</b></p>	<p><b>Yes</b> Instrument panel duct is not restricted.</p> <p><b>No</b> Complete Pinpoint tests E &amp; F</p>





## DIAGNOSIS AND TESTING (Continued)

### PINPOINT TEST C : HEATER CORE LEAKING CAUSING "SMELL" (SZ / DZ / HTR)



**CAUTION:** If the Heater Core is to be removed, ensure that the Heater core tubes are "capped" to avoid any Coolant spillage onto the vehicle interior.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>C1</b>	<b>COOLING SYSTEM PRESSURE</b>	
	Conduct engine cooling system pressure test. Refer to section 303-03 for test procedure.  Does the cooling system hold pressure?	<b>Yes</b> No Cooling system leakage evident.  <b>No</b> Go to <b>C2</b>
<b>C2</b>	<b>VISUAL INSPECTION</b>	
	Start Engine, select Full heat and Highest Blower Fan speed at the ICC.  Run Engine for a minimum of 10 Minutes.  From under the vehicle inspect the A/C drain tube for evidence of Engine coolant. Is there evidence at the drain tube of Coolant?	<b>Yes</b> Replace the Heater core. Refer to removal and installation instructions in this section.  <b>No</b> The Heater core is not the cause of the Coolant leakage or Smell.

### PINPOINT TEST D : ACTUATOR — RECIRCULATE DOOR (SZ / DZ/ HTR)



**CAUTION:** If carrying out a "feel" test for door movement, care should be taken to avoid injury to your Hand from moving parts such as blower motor, levers, etc.


**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>D1</b>	<b>VISUAL INSPECTION - RECIRC DOOR LEVER TO HIM CAM</b>	
	Remove the Glove Box. Refer to Section 501-12. Remove Air Intake Filter. Carry out a visual inspection to see if the Recirc door cam is connected to the HIM BLACK lever pin, Is the lever connected?	<b>Yes</b> Go to <b>D2</b>  <b>No</b> Using a flat blade screwdriver, gently move / prise the HIM lever pin into the recirc door cam.
<b>D2</b>	<b>VISUAL INSPECTION - RECIRC DOOR OPERATION</b>	
	Check for full door movement to Fresh and Recirc while pushing the ICC Button with visual inspection or by inserting your hand through the Air Intake Filter opening. Is the Fresh / Recirc Door moving fully from fresh to recirc?	<b>Yes</b> System OK Clear DTC Perform HVAC On - Demand Self Test refer to section 412-04  <b>No</b> Go to section 412-04 Pinpoint test C.



## DIAGNOSIS AND TESTING (Continued)


### PINPOINT TEST E : ACTUATOR — SCREEN/FACE DOOR (SZ / DZ/ HTR)

 **CAUTION:** If carrying out a "feel" test for door movement, care should be taken to avoid injury to your Hand from moving parts such as blower motor, levers, etc.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>E1</b>	<b>VISUAL INSPECTION - SCREEN / FACE DOOR OPERATION</b>	
	<p>Check for full door movement to Screen and Face while pushing the ICC Button. Check for air delivery from Face and Screen modes alternatively with blower operating at full speed.</p> <p><b>Are the Screen and Face modes selectable?</b></p>	<p><b>Yes</b> System OK Clear DTC Perform HVAC On-Demand Self Test. Refer to Section 412-04.</p> <p><b>No</b> Go to <b>E2</b></p>
<b>E2</b>	<b>VISUAL INSPECTION - HIM LEVER TO HVAC CAM</b>	
	<p>Remove the Glove Box. Refer to Section 501-12.</p> <p>Using a mirror and a torch view the lever area between the HIM and the HVAC to see if the HIM BLUE and GREEN lever pins are slotted into the HVAC lever cams.</p> <p><b>Were the HIM lever pins slotted into the HVAC lever cams?</b></p>	<p><b>Yes</b> Go to Section 412-04 , Pinpoint Test D.</p> <p><b>No</b> Remove the instrument panel. Refer to Section 501-12. Remove and Install the HIM ensuring that HIM levers and HVAC cams are connected. Refer to removal and installation instructions in this section.</p>

### PINPOINT TEST F : ACTUATOR — FLOOR/CONSOLE (SZ / DZ / HTR)

 **CAUTION:** If carrying out a "feel" test for door movement, care should be taken to avoid injury to your Hand from moving parts such as blower motor, levers, etc.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>F1</b>	<b>VISUAL INSPECTION - FLOOR / CONSOLE DOOR OPERATION</b>	
	<p>Check for door movement to Floor while pushing the ICC Button. Check for air delivery from floor with blower operating at full speed.</p> <p><b>NOTE:</b> It is usual for airflow from rear console while Floor / Heating is selected.</p> <p><b>Is the Floor mode selectable?</b></p>	<p><b>Yes</b> System OK Clear DTC Perform HVAC On-Demand Self Test. Refer to Section 412-04.</p> <p><b>No</b> Go to <b>F2</b></p>
<b>F2</b>	<b>VISUAL INSPECTION - HIM LEVER TO HVAC CAM</b>	
	<p>Remove the Glove Box. Refer to Section 501-12.</p> <p>Using a mirror and a torch view the lever area between the HIM and the HVAC to see if the HIM YELLOW lever pin is slotted into the HVAC cam.</p> <p><b>Was the HIM lever pin slotted into the HVAC cam?</b></p>	<p><b>Yes</b> Refer to Section 412-04, Go to PinPoint Test F.</p> <p><b>No</b> Remove the instrument panel. Refer to Section 501-12. Remove and Install the HIM ensuring that HIM levers and HVAC cams are connected. Refer to removal and installation instructions in this chapter.</p>



## DIAGNOSIS AND TESTING (Continued)

### PINPOINT TEST G : ACTUATOR — PASSENGER AIR TEMPERATURE MIX (SZ / DZ /HTR)



**CAUTION:** If carrying out a "feel" test for door movement, care should be taken to avoid injury to your Hand from moving parts such as blower motor, levers, etc.

**NOTE:** This actuator is utilised to control air temperature to both passenger and driver by the single zone (SZ) manual climate control system. It is used to control only the passenger side air temperature for dual zone (DZ) automatic climate control system. H (High) and L (Low) settings are not possible via the passenger temperature rocker switch on ACC system.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>G1</b>	<b>VISUAL INSPECTION - PASSENGER AIR MIX DOOR OPERATION</b>	
	<p>Check for full door movement to full Hot and full Cold while operating the ICC button. (For Heater Only and ACC (SZ and DZ), select H then L by drivers temperature setting button.) Feel the passenger face outlet temperature change using your hand.</p> <p><b>Does the passenger air mix door move to full Hot and full Cold positions, and passenger temperature change from Hot to Cold?</b></p>	<p><b>Yes</b> System OK Clear DTC Perform HVAC On-Demand Self Test. Refer to Section 412-04.</p> <p><b>No</b> Go to <b>G2</b></p>
<b>G2</b>	<b>VISUAL INSPECTION - HIM TO TEMP DOOR SHAFT</b>	
	<p>Remove the Glove Box. Refer to Section 501-12.</p> <p>Using a mirror and a torch view the lever area between the HIM and the HVAC to see if the HIM is connected to the temperature door shaft.</p> <p><b>Was the HIM white drive shaft connected to the temperature door shaft?</b></p>	<p><b>Yes</b> Go to Section 412-04, pinpoint test E.</p> <p><b>No</b> Engage the white HIM drive shaft with airmix door shaft by pushing the shaft in until flush with surface of HIM. The HIM drive shaft may need to be rotated using the temp controls in order to align the star drive connection. Perform HVAC On-Demand Self Test. Refer to Section 412-04.</p>

### PINPOINT TEST H : ACTUATOR — DRIVER AIR TEMPERATURE MIX (DZ)



**CAUTION:** If carrying out a "feel" test for door movement, care should be taken to avoid injury to your Hand from moving parts such as blower motor, levers, etc.

**NOTE:** This actuator is utilised to control air temperature to the driver side only for dual zone (DZ) automatic climate control system.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>H1</b>	<b>VISUAL INSPECTION - DRIVER AIR MIX DOOR OPERATION</b>	
	<p>Check for full door movement to full Cold and full Hot while operating the ICC button. (Select C then H by the Drivers temperature setting rocker switch.)</p> <p>Feel the face outlet temperature change temperature from Cold to Hot using your hand.</p> <p><b>Does the driver air mix door move to full Hot and full Cold positions? Does the driver temperature change from full Cold to full Hot?</b></p>	<p><b>Yes</b> System OK Clear DTC Perform HVAC On-Demand Self Test. Refer to Section 412-04.</p> <p><b>No</b> Go to <b>H2</b></p>



**DIAGNOSIS AND TESTING (Continued)**

Test Step		Result / Action to Take
<b>H2</b>	<b>VISUAL INSPECTION - DRIVERS SIDE ACTUATOR TO SHAFT</b>	
	<p>From under the Drivers side, view the Driver's actuator shaft, in between the airmix actuator and the HVAC, for movement while changing the temperature from Hot to Cold using the ICC button.</p> <p><b>Did the shaft turn when Hot to Cold selected?</b></p>	<p><b>Yes</b> Go to <b>H3</b></p> <p><b>No</b> Refer to Section 412-04, Go to PinPoint Test G.</p>
<b>H3</b>	<b>VISUAL INSPECTION - DRIVERS SIDE SHAFT MOVEMENT</b>	
	<p>Set the ICC to face mode.</p> <p>Remove the ICC. Refer to Section 413-08.</p> <p>Insert your hand through the ICC opening and try turning the temperature door shaft.</p> <p><b>Does the shaft turn?</b></p>	<p><b>Yes</b> Broken shaft, replace the HVAC Door Module. Refer to removal and installation instructions in this chapter.</p> <p><b>No</b> Refer to Section 412-04, Go to PinPoint Test G.</p>

**PINPOINT TEST I : INTAKE AIR FILTER RESTRICTION (SZ / DZ / HTR)**

**CAUTION:** Do not use "Hot" water to clean the standard mesh Filter, use compressed air and warm water. Do not use any water to clean the optional pollen filter (refer below for pollen filter service).

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
<b>I1</b>	<b>AIR INTAKE INSPECTION</b>	
	<p>Remove the Glove Box. Refer to Section 501-12.</p> <p>Remove the Intake Air Filter, refer to section 412-01.</p> <p><b>Was there Debris, Dust or Insects obstructing airflow through the Intake Air Filter?</b></p>	<p><b>Yes</b> Standard mesh filter - using Compressed air, "blow" any contamination from the mesh Filter. Rinse the mesh Filter under Luke warm water. Optional Pollen Filter. If heavily contaminated - Replace Filter. If mildly contaminated, use compressed air to "blow" out any contamination. <b>NOTE:</b> Cleaning rather than replacing the optional pollen filter may degrade the air quality and airflow quantity.</p> <p><b>No</b> Air Intake Filter is not the cause of the airflow restriction. Go to Pinpoint tests A &amp; B.</p>



**DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST J : HIM LEVER TO FLOOR/CONSOLE DOOR ROD INSPECTION (SZ / DZ / HTR)**

**CAUTION:** Do not alter the mode position, with your hand on the rod otherwise your hand could become jammed and cause skin damage.

**NOTE:** REFER to SECTION 412-02 SYMPTOM CHART BEFORE PROCEEDING

Test Step		Result / Action to Take
J1	<b>VEHICLE SETUP</b>	
	Remove the Glove box. Refer to Section 501-12. Start Engine. At the ICC select Face Mode. Locate and follow the Rod with your hand from the HIM all the way to the Floor door lever. <b>Is the rod connected to the Floor door lever?</b>	<b>Yes</b> Ensure that the plastic rod retainer clip is in place at the Floor door lever end. Then refer to chapter Section 412-04, Go to PinPoint Test F. <b>No</b> Reconnect rod into the Floor door lever and secure with the retaining clip.



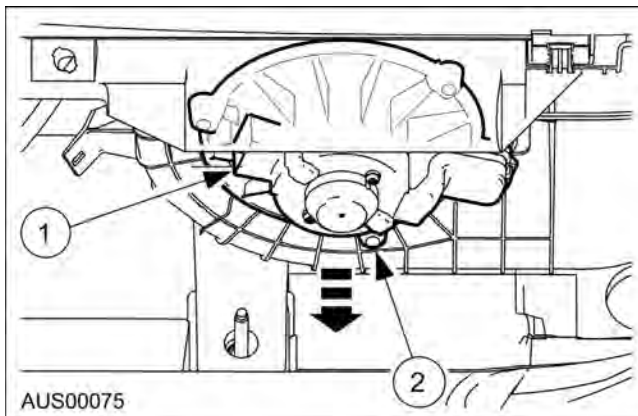
## REMOVAL AND INSTALLATION

**⚠ WARNING:** To avoid accidental deployment and possible injury, the air bag system backup power supply must be depleted before repairing any HVAC (Heating, Ventilation and Air Conditioning unit) components. To deplete the backup power supply, disconnect the battery positive cable and wait one minute. Failure to follow these instructions may result in personal injury.

### Blower Fan Assembly

#### Removal

1. The blower fan assembly is more easily removed if the glove box assembly is removed first. Refer to section 501-12. However, removal of the glove box assembly is optional.
2. Disconnect electrical connector.
3. Undo three screws.
4. Carefully ease lower glove box support and wiring loom towards the rear of the vehicle. Lower the Blower Fan assembly and remove.

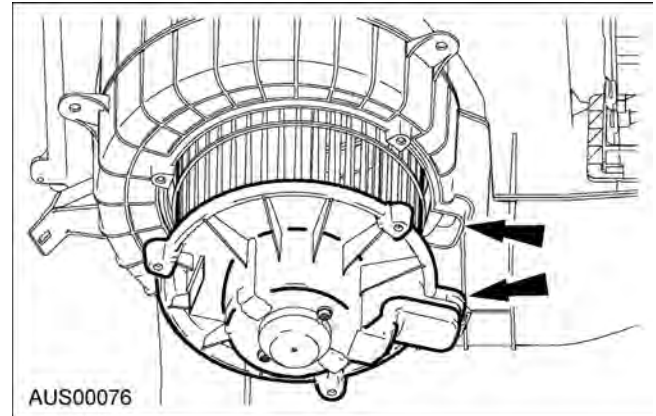


Item	Description
1	Electrical Connector
2	3 Screws

#### Installation

1. Refit components in reverse order.

**⚠ CAUTION:** Ensure correct alignment of cooling air guide.



### HVAC Assembly

The 2008 model year Falcon HVAC assembly differs from the 2002 BA Falcon in the following areas:

The condensation seal has been removed from the outer rear surface of the 2006 BA 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.

The condensate drain tube is no longer an integral part of the HVAC assembly, but is now a separate component installed in the floor of the vehicle.

The HIM has also been upgraded with internal improvements.

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

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).

#### Removal

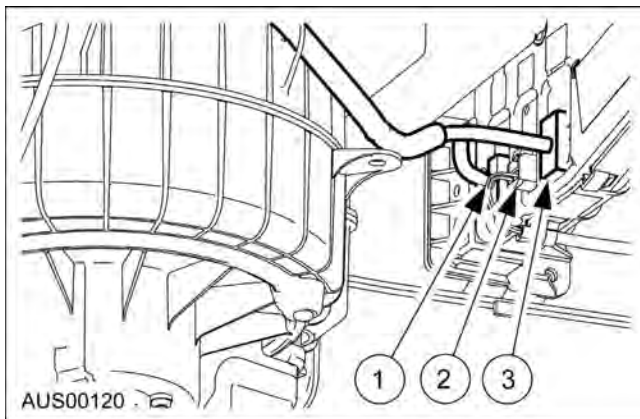
1. Recover refrigerant from the A/C system. Refer to Section 412-03.
2. Disconnect A/C tubes and TXV, Refer to Section 412-03.

**⚠ CAUTION:** Evaporator O-rings and tube ends should be capped to prevent damage and contamination.



**REMOVAL AND INSTALLATION (Continued)**

3. Remove the radiator cap to depressurise the coolant system. Disconnect heater hoses from heater core inlet/outlet tubes and immediately cap both hoses and tubes to minimise coolant loss, taking care not to allow any coolant to spill through the dash panel into the cabin. If it is necessary to drain engine coolant, refer to Section 303-03.
4. Remove Instrument Panel, Refer to Section 501-12.
5. Remove Pedal Box Assembly, refer to section 310-02.
6. Disconnect blower harness.
7. Disconnect HIM main harness (power)
8. Disconnect HIM main harness (control).

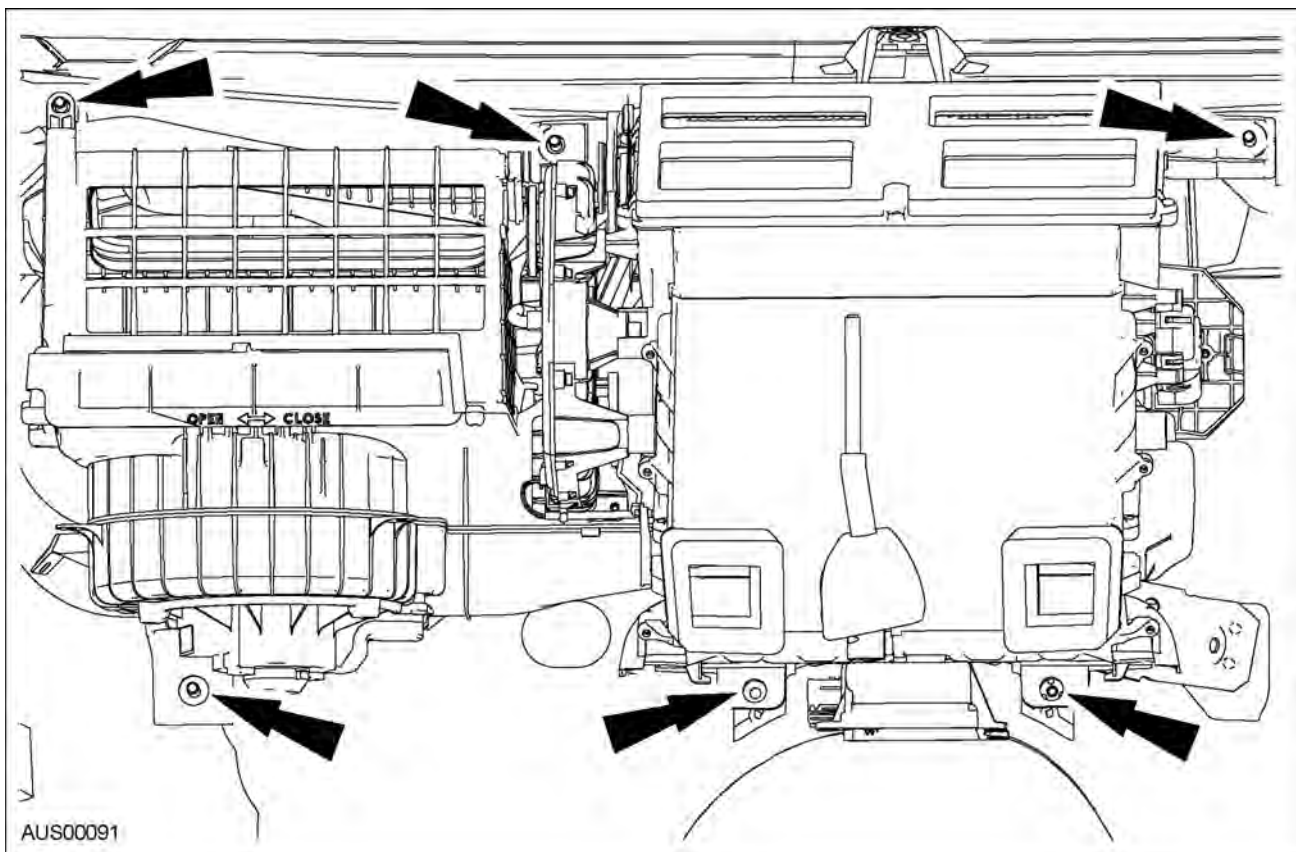


Item	Description
1	HIM Main power harness
2	Evaporator sensor elec connector
3	HIM Main control harness

9. Undo the four nuts and two bolts used to retain the HVAC Assembly mountings to the cowl, dash and floor.



## REMOVAL AND INSTALLATION (Continued)



10. Carefully work the dash panel insulation off and over each speed nut with a screwdriver. Spacer clips on upper middle and upper right mount points replace fir tree clips used on 2006 BF Falcon vehicles.

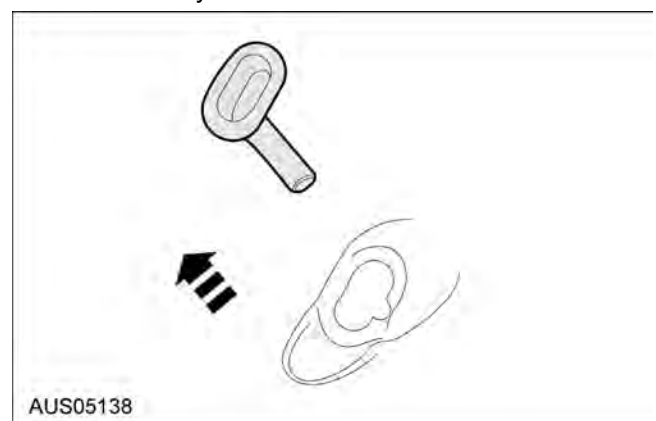
**NOTE:** A small amount of dash panel insulation around the mounting points may be damaged at removal stage, but this is not deemed to be a problem.

11. Carefully remove the HVAC assembly from the passenger side of the vehicle.

**CAUTION:** Ensure the heater tube ends are well capped to prevent coolant spillage onto the vehicle interior

**NOTE:** On removal of the HVAC, if a large section of dash panel insulation is damaged, repair before re-installing the HVAC Assembly.

12. Carefully remove drain tube from sheet metal cut out ensuring excess liquid remains on exterior of vehicle body



### Installation

1. Refit components in reverse order.

**CAUTION:** Ensure correct alignment of drain tube into notch in floor with outlet orientated towards drivers side

2. Lubricate A/C evaporator inlet/outlet tube O-ring seals with PAG compressor oil ND-Oil 8. Recharge the A/C system. For additional information, refer to A/C System Evacuation and Charging in section 412-03
3. Refill the engine coolant system as per section 303-03



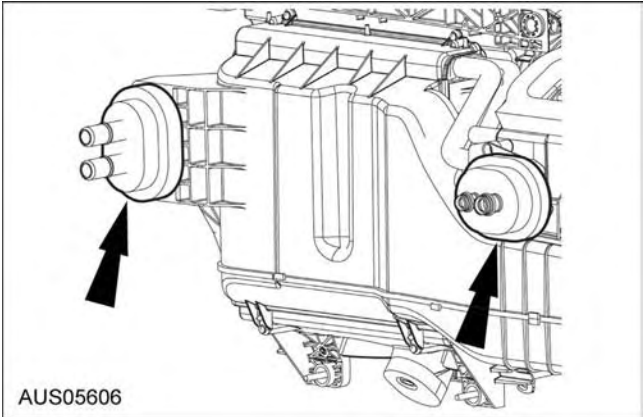


REMOVAL AND INSTALLATION (Continued)

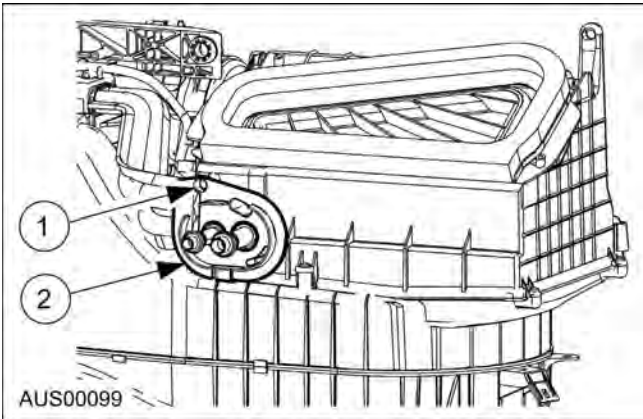
Case Assy — Recirc Door Complete

Removal

- 1. Remove HVAC Assembly, as outlined in the Removal and Installation procedure in this section.
- 2. Remove the A/C pass-through seal



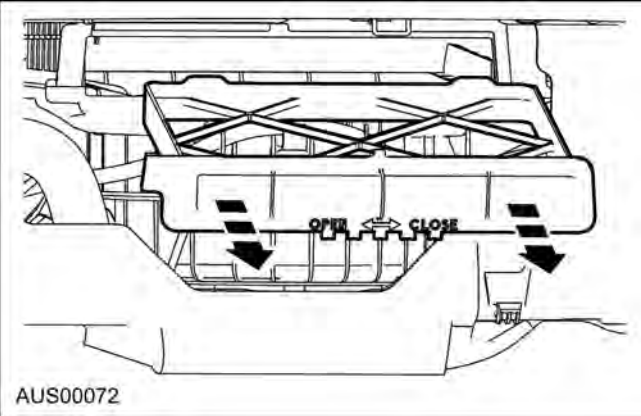
- 3. Remove one Screw from the A/C tube retaining plate.



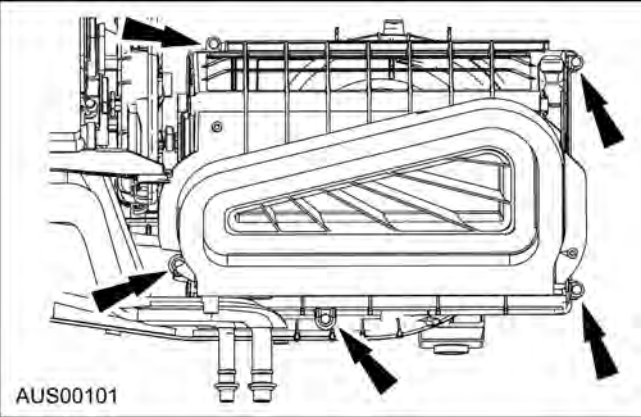
Item	Description
1	Screw
2	AC tube retaining plate

- 4. Remove the A/C tube retaining plate.

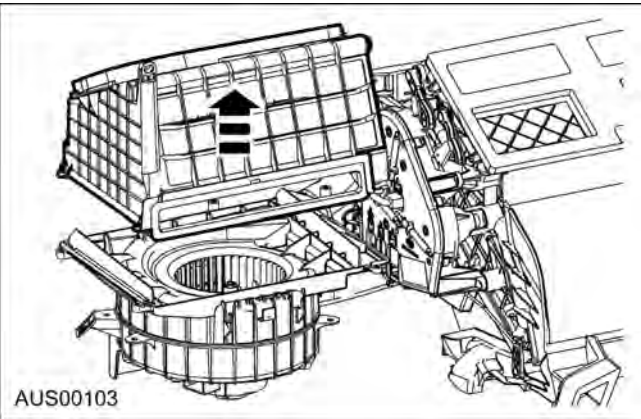
- 5. Remove Mesh Filter and Cover Assembly or Particle Filter as outlined in this section.



- 6. Undo five Screws retaining the recirc door housing to the HVAC Assembly.




- 7. Remove Recirc Case, taking care to disengage the HIM lever pin from the slot in the recirc door lever.



Installation

- 1. Refit components in reverse order, ensuring that the HIM lever pin is correctly engaged in the recirc door lever slot.

 **CAUTION:** Ensure correct alignment between tongue and groove of mating parts.

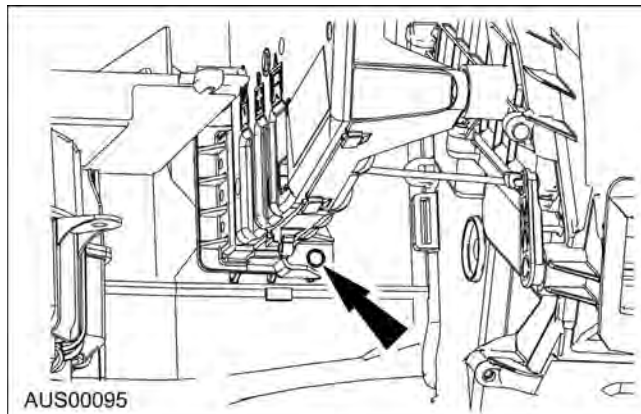


## REMOVAL AND INSTALLATION (Continued)

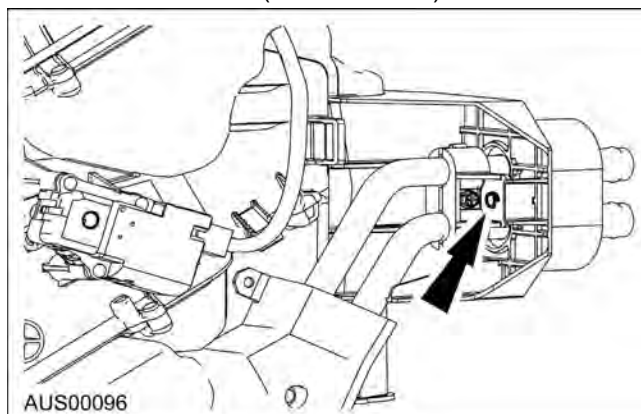
### HVAC Case Scroll

#### Removal

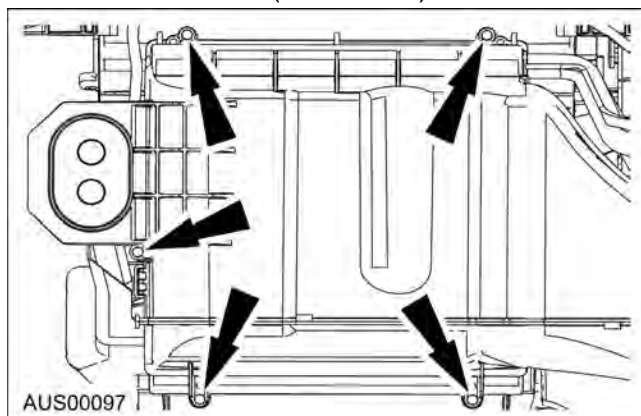
1. Remove the HVAC assembly from the vehicle (refer this section)
2. Remove the Recirc case assembly (refer this section)
3. Undo one Screw (HIM).



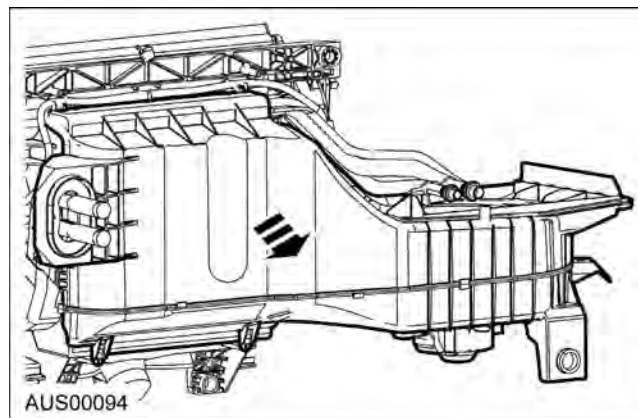
4. Undo one Screw (Heater Tubes).



5. Undo five Screws (Case-Scroll).



6. Remove Case Scroll.



#### Installation

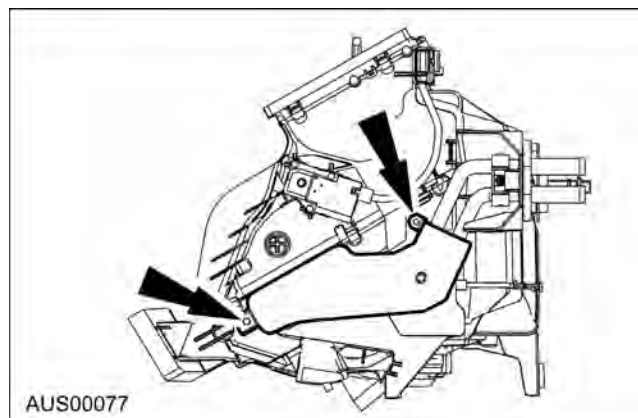
1. Refit components in reverse order.

**CAUTION:** Ensure correct alignment between tongue and groove of mating parts.

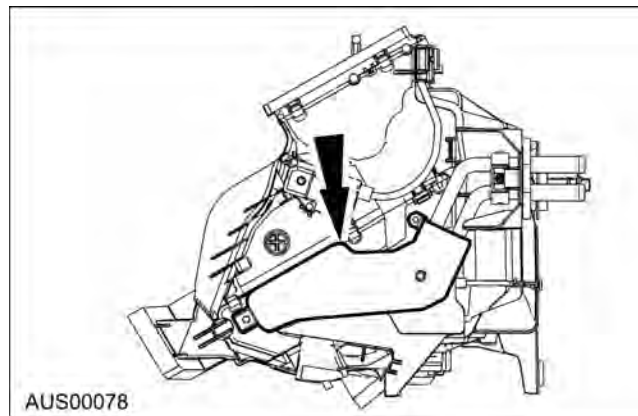
### Heater Core Assembly

#### Removal

1. Remove HVAC Assembly, as outlined in the Removal and Installation procedure in this section.
2. Remove two screws used to retain the tube shield to HVAC.



3. Remove the heater tube shield.



## REMOVAL AND INSTALLATION (Continued)

4. Slide out the Heater Core.

**CAUTION:** Care should be taken when withdrawing heater core to prevent bending of pipes (High stress may result at joint between tank and pipe if end of pipes used as "handles")

### Installation

1. Refit all previously removed components in reverse order.

**CAUTION:** When inserting heater core ensure that core "bottoms out" before fitting shield heater tube. Also ensure that foam seal is not distorted or damaged so as to affect integrity of air seal between case and core.

### HIM Assy

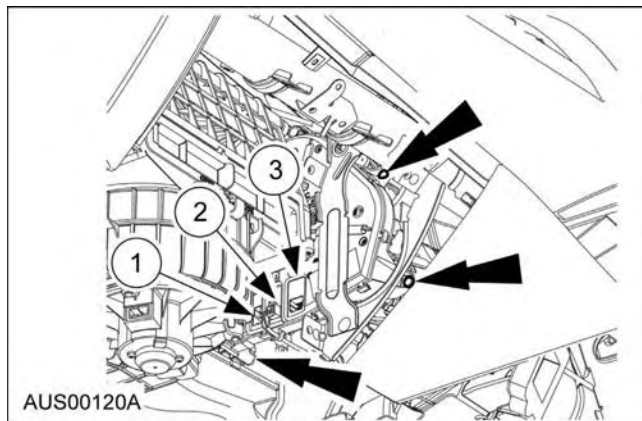
The 2008 Falcon HIM unit CAN be fitted into the 2006 BF Falcon vehicles if a HVAC or HIM replacement is necessary, provided the BF software genders are correctly selected.

The 2008 Falcon HIM can be removed for service without removing the entire instrument panel (IP). Instead, the LH lower IP finish panel that incorporates the glove box can now be removed to give access to the HIM.

### Removal

#### Without removing the Instrument Panel

- DO NOT** remove Instrument Panel.
- Remove lefthand lower finisher panel from the Instrument Panel. Refer to Section 501-12.
- Disconnect HIM electrical connectors.

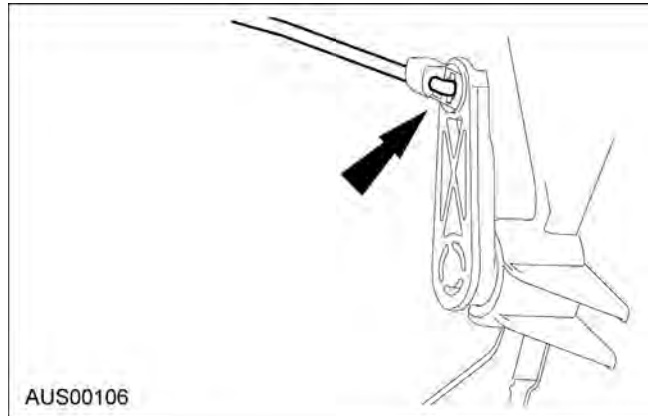


Item	Description
1	HIM Main power harness
2	Evaporator ambient / CTS sensor electrical connector
3	HIM Main control harness

4. Remove the three Screws used to retain the HIM to HVAC.

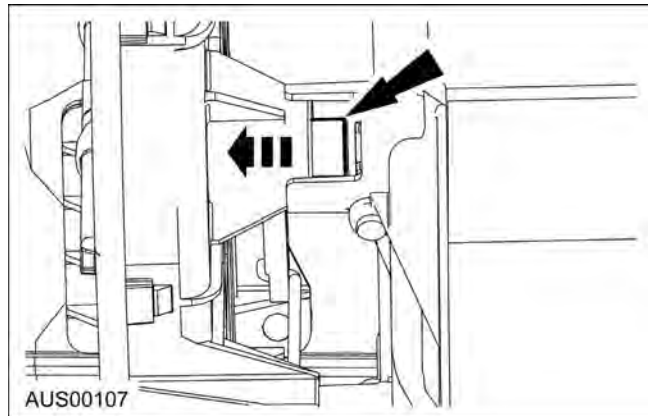
5. Disengage Rod from the Floor Door lever.

**NOTE:** Retain the rod and clip for reuse.



6. Disengage and withdraw Airmix Coupler.

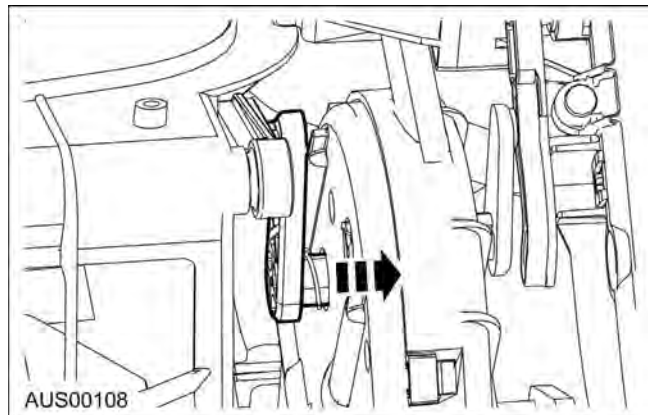
**NOTE:** Use a flat screwdriver and carefully prise airmix coupler off passenger airmix shaft.



7. Using a flat blade screwdriver between the fresh / recirc lever on the air intake and the HIM Blue lever, carefully disengage both the levers from each other.

**CAUTION:** Excessive force will damage airmix shaft flange.

**CAUTION:** If airmix shaft is accidentally withdrawn from case follow procedure in Shaft-Airmix Door DZ/SZ



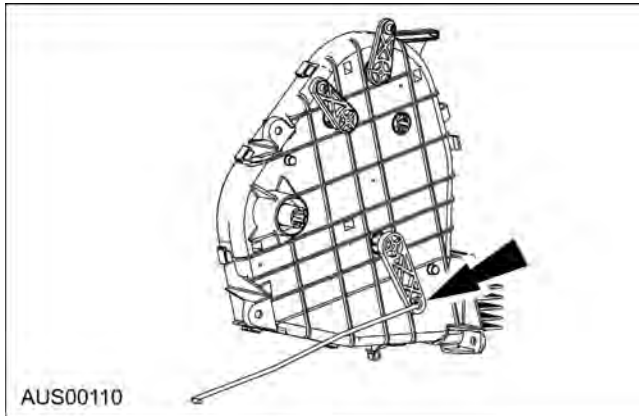
## REMOVAL AND INSTALLATION (Continued)

8. Rotate and remove HIM.

**NOTE:** Ensure alignment of airmix shaft with HIM coupling and alignment of tab with centre case.

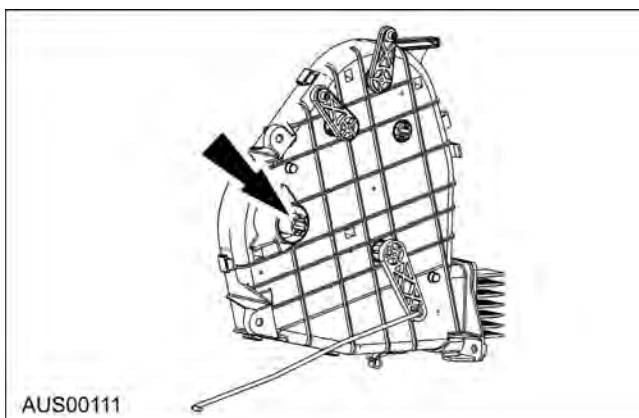
### Installation

1. Fit rod floor door to HIM in reverse order to removal procedure.

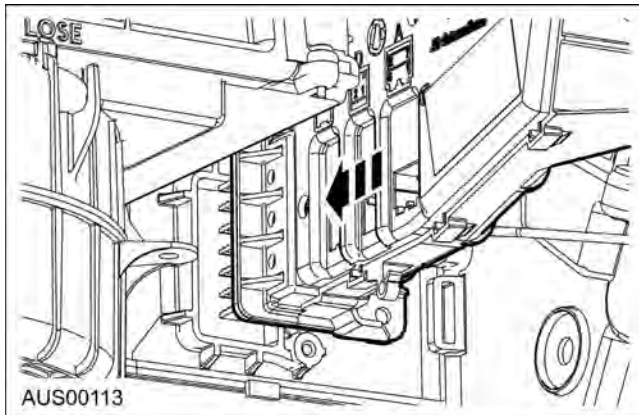


2. Depress airmix coupling into installation position.  
**NOTE:** At this stage the HVAC cam levers should be greased before installing HIM. Refer specifications in this chapter,

**NOTE:** Ensure alignment of airmix shaft with HIM coupling and alignment of tab with centre case

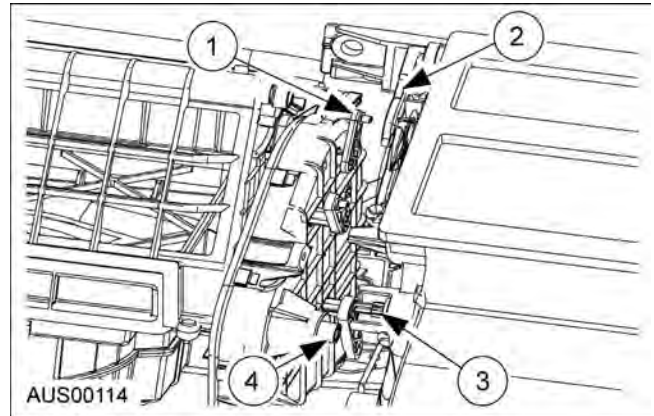


3. If scroll fitted, align heatsink into scroll opening.

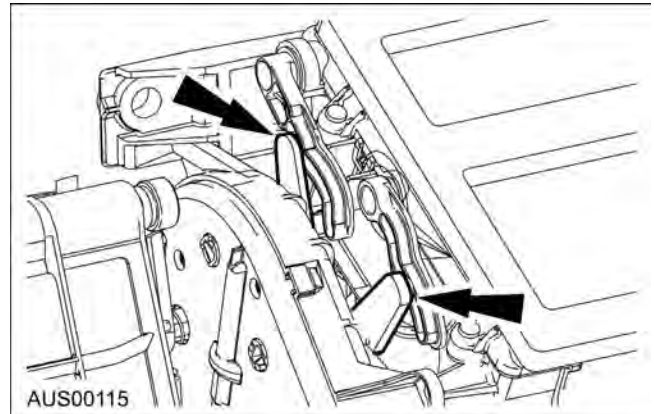


4. Align airmix coupler and levers while pushing HIM into position (1 to 2, 4 to 3).

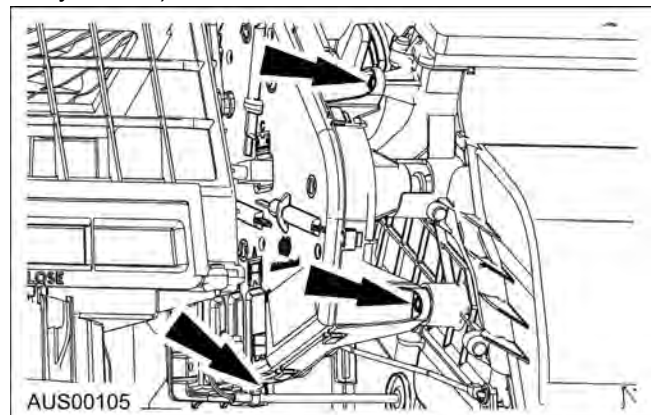
**CAUTION:** Top mounting peg must be located.



5. Align face and demist cams with HIM levers.



6. Rotate HIM and engage airmix hub into heater case (tilt HIM onto heater).  
7. Insert 3 screws (2 screws if Scroll Assembly is not yet fitted).

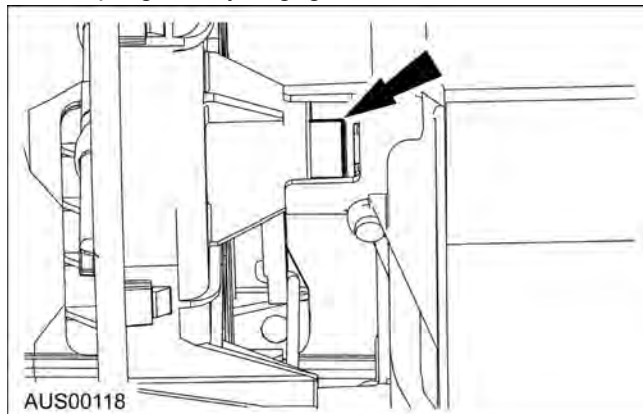


8. Check that the airmix shaft is correctly fitted into airmix door (refer installation procedure for Shaft-Airmix Door DZ/SZ in this section).

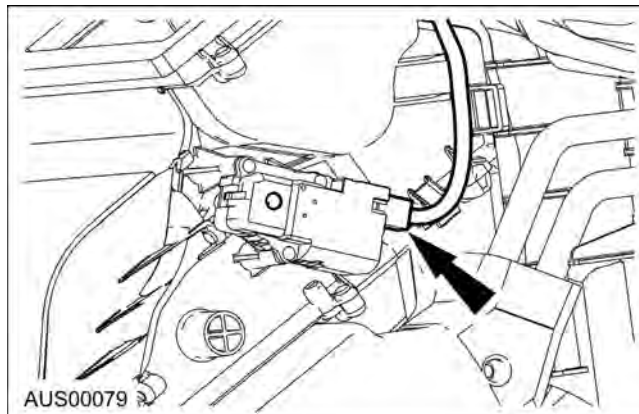


## REMOVAL AND INSTALLATION (Continued)

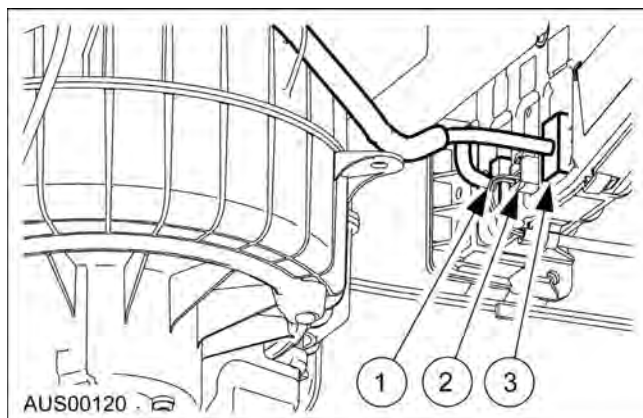
9. Rotate airmix door to align keyway with airmix coupling to fully engage airmix shaft.



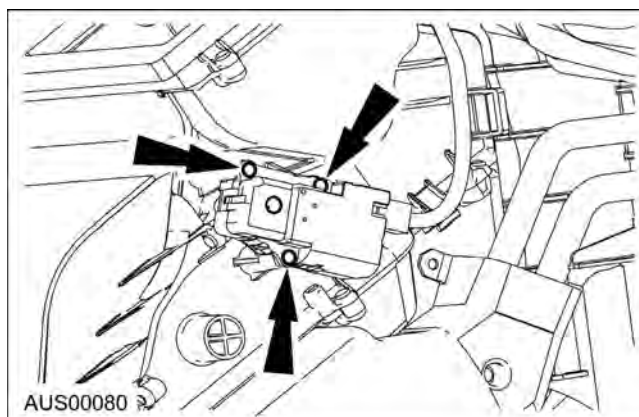
3. Disconnect Dual Zone Sub Harness at the actuator.



10. Reconnect electrical connectors.



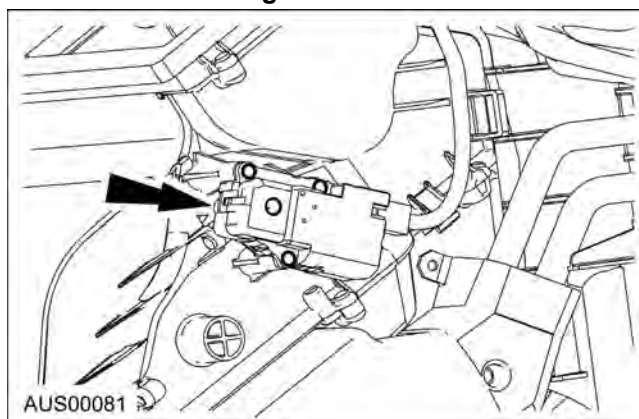
4. Undo three screws retaining the actuator to HVAC.



Item	Description
1	HIM Main power harness
2	Evaporator sensor elec connector
3	HIM Main control harness

5. Using flat screwdriver between the airmix shaft flange and actuator carefully prise off the actuator.

**CAUTION:** Excessive force will damage airmix shaft flange.



### Evaporator Core

Refer to Evaporator Core in Section 412-03.

A/C Evaporator Temperature Thermistor

Refer to A/C Evaporator Temperature Thermistor in Section 412-03.

### Actuator — Electric Airmix (ACC DZ only)

#### Removal

- Set driver side temp to full cold, face mode, if possible.
- Remove Instrument Panel, Refer to Section 501-12

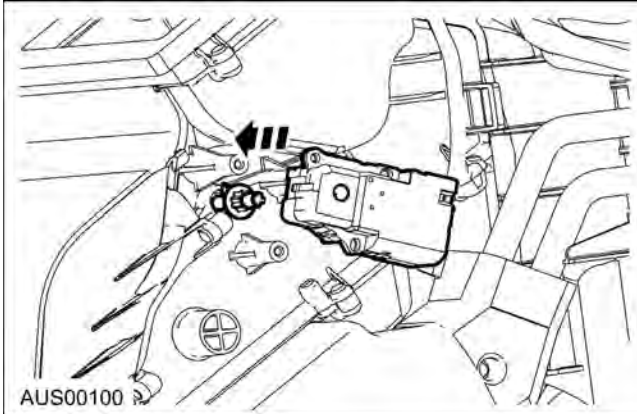
#### Installation

**CAUTION:** If airmix shaft is accidentally withdrawn from case the procedure outlined in Shaft-Airmix Door DZ/SZ needs to be followed prior to installation of actuator.



## REMOVAL AND INSTALLATION (Continued)

1. Align keyway and refit actuator in reverse order.



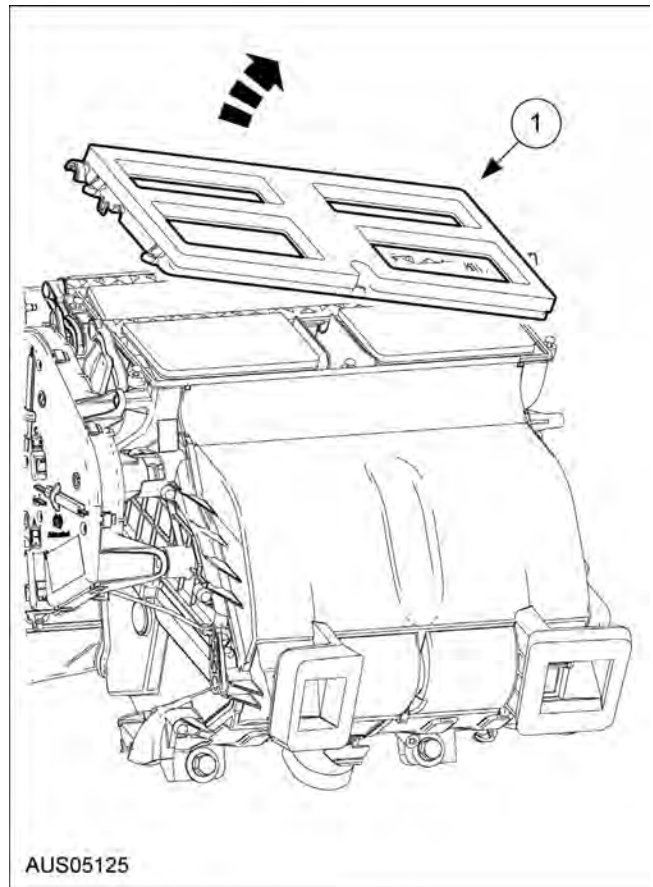
### Shaft — Airmix Door SZ

#### Removal

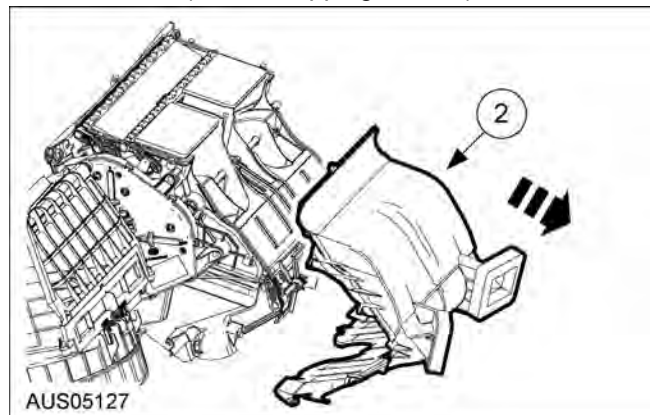
**NOTE:** The Airmix Door Shaft (SZ) is now a service replacement part, and can be replaced WITHOUT removing the HVAC assembly, discharging the A/C refrigerant or draining the engine coolant.

1. Do not remove the HVAC assembly, discharge the A/C refrigerant or drain the engine coolant, as these are not necessary to replace the air mix shaft(s). Set the ICC to Recirculation and Face modes. Remove the instrument panel (refer to section 501-12)

2. Detach the HVAC upper mode outlet panel (1) (6 x self tapping screws, 2 x clips) and lift away in direction of arrow.



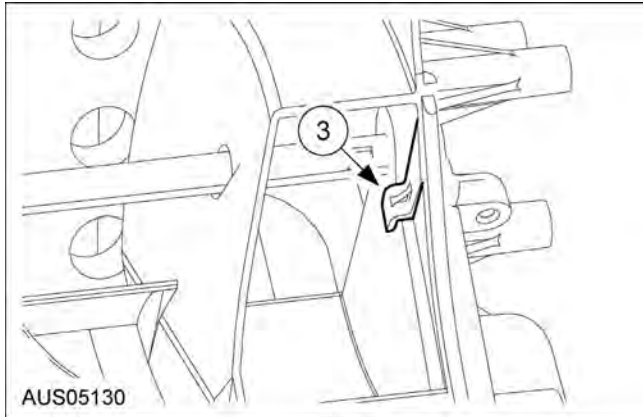
3. Disconnect the foot/rear console duct rod from the lever at the vee duct.
4. Remove the HIM assembly (3 x self tapping screws)
5. Remove the vee duct (2) from the front section of the HVAC (6 x self tapping screws)



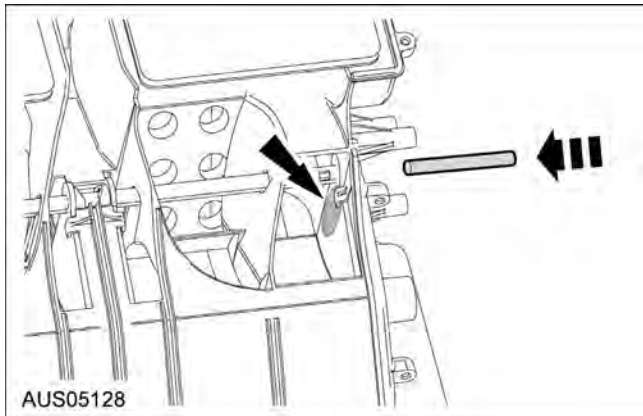


## REMOVAL AND INSTALLATION (Continued)

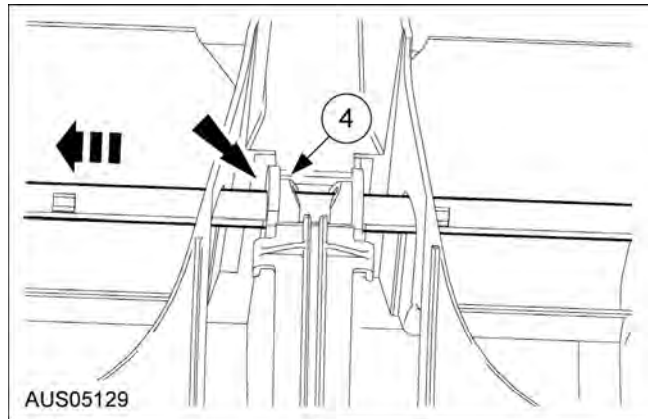
6. Move the air mix doors to the full hot position. At the full hot position the door seal edge must be in the door stop locaters (3) moulded in the case



7. From the Right side of the HVAC locate the end of the air mix shaft.  
Using a suitable 6mm pin punch and holding your thumb against the RH outer pivot, push the air mix shaft through to the LH side until approx half way (at the LH outer door pivot)  
**NOTE:** YOU MUST HOLD YOUR FINGER AS AN OPPOSING FORCE AGAINST THE DOOR PIVOTS TO AVOID THE PIVOT FROM BREAKING AWAY FROM THE DOOR WHEN PRESSURE IS APPLIED TO THE SHAFT DURING REMOVAL AND REINSTALLATION

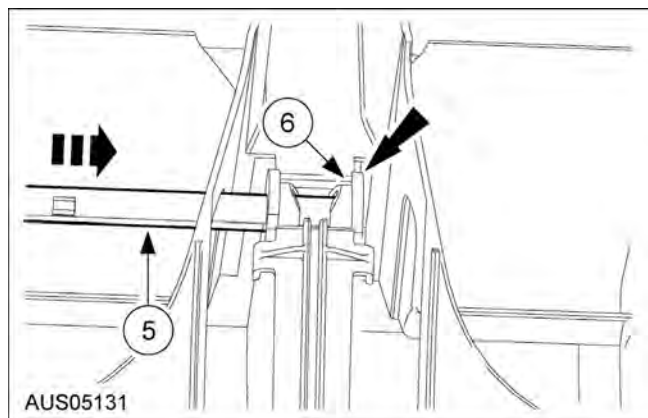


8. Using your thumb, apply pressure against the passenger side door inner pivot (4) then continue to remove the air mix shaft by pulling it through the LH side.  
**NOTE:** YOU MUST HOLD YOUR FINGER AS AN OPPOSING FORCE AGAINST THE DOOR PIVOTS TO AVOID THE PIVOT FROM BREAKING AWAY FROM THE DOOR WHEN PRESSURE IS APPLIED TO THE SHAFT DURING REMOVAL AND REINSTALLATION



### Installation

1. Inspect the new air mix shaft for any signs of plastic "flash" left over from the manufacturing process, remove this flash with a razor blade as it can affect fitment.  
Apply Molycote PG54 Silicon grease to the 4 door pivot opening with a small brush, to assist in inserting the shaft
2. Install the air mix shaft through the opening into the passenger side door outer pivot ensuring that the locaters on shaft and pivot line-up.
3. Continue pushing the air mix shaft through the passenger side door outer (5) pivot while applying pressure to the RH door inner pivot (6).  
**NOTE:** You may also have to apply pressure to the passenger side door outer pivot if the shaft is hard to insert.  
**NOTE:** YOU MUST HOLD YOUR FINGER AS AN OPPOSING FORCE AGAINST THE DOOR PIVOTS TO AVOID THE PIVOT FROM BREAKING AWAY FROM THE DOOR WHEN PRESSURE IS APPLIED TO THE SHAFT DURING REMOVAL AND REINSTALLATION

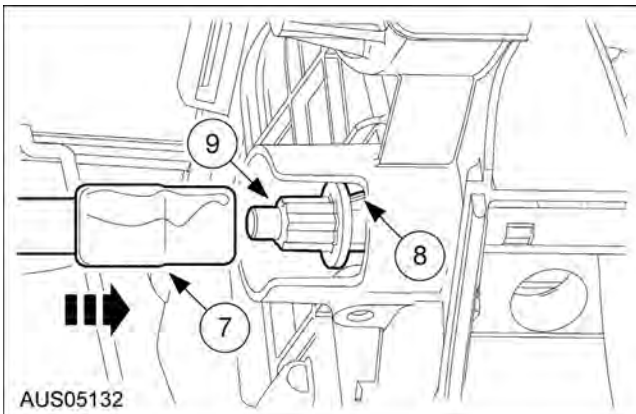


## REMOVAL AND INSTALLATION (Continued)

4. Push the air mix shaft into the RH door outer pivot.

**NOTE:** If the shaft is hard to insert into the RH door outer pivot use an 11 mm extra deep socket (7) and an extension bar then apply a slight amount of force to the end of the extension bar with the palm of your hand to drive the shaft inwards.

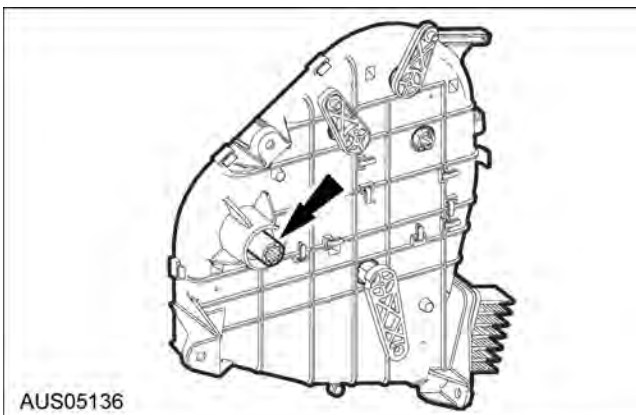
The correct shaft insertion depth of the shaft is when the plastic pointer (8) attached to the shaft drive spline (9) is 1 - 2 mm from the case recess face as illustrated.



5. Check that all the door pivot points are straight and in their correct positions. Grasp the air mix shaft and move the doors from Hot to Cold, ensure that the doors move freely in each direction, and the door end stops are reached, and that the doors seal against the case.
6. Before installing the HIM to the HVAC, remove the air mix shaft coupler then install the new coupler provided in the service pack to the HIM as illustrated.

Push the coupler all the way in until the shaft end is protruding past the face of the HIM, this will aid in air mix shaft to coupler fitment when fitting the HIM to the HVAC.

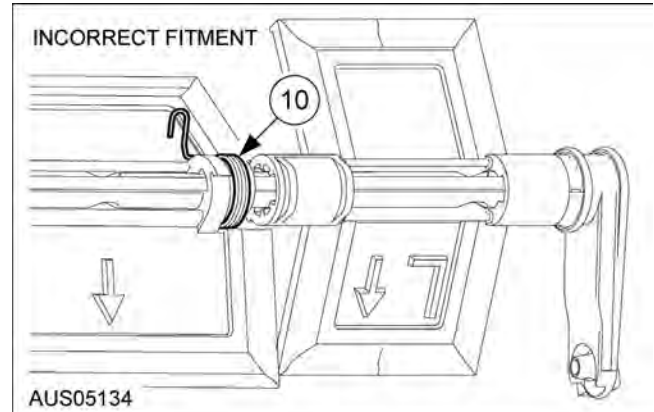
**NOTE:** The coupler can only be fitted in one direction owing to the locating recess.



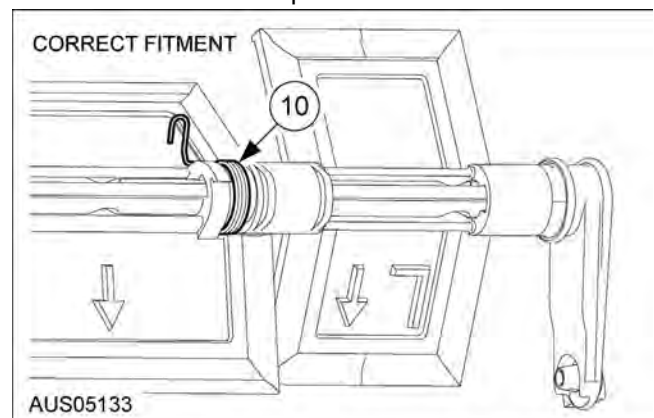
7. Refit the HIM to the HVAC. Manoeuvre the HIM into position. Insert the HIM mode levers into the HVAC door levers and the blower speed heat sink into the case.

Fit the HIM onto the HVAC (3 x self tapping screws) Reconnect the floor / console rod. the coupler end through the HIM and onto the air mix shaft spline, you may need to operate the air mix door by hand to engage the splines. When the HIM coupler is pushed onto the air mix shaft you can view the door pivots to ensure that they have not been pushed out of position when the coupler was engaged onto the shaft

8. During the dismantling of the Vee cover from the HVAC and the subsequent removal of the floor/console mode door assembly, it could happen that the outer doors become disconnected from the return spring mechanism (10) This spring mechanism must be inspected before refitting the Vee cover back onto the HVAC or the floor/console mode operation will be faulty. The illustration shows that the door has moved on the shaft and the spring mechanism is caught half way between shaft and door. If this was refitted to the HVAC, a problem will exist in foot mode requiring the I.P to be removed again.



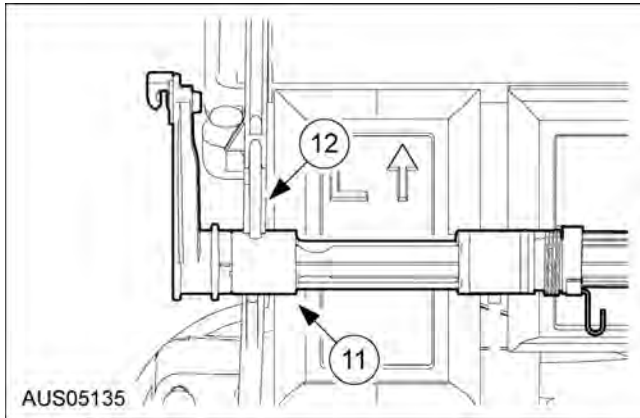
9. If the outer doors become disconnected from the return spring mechanism, use a flat blade screwdriver relocate the coil section of the spring back onto the door pivot boss.





## REMOVAL AND INSTALLATION (Continued)

10. When refitting the Vee panel back onto the HVAC, ensure that the LH foot/console mode door locator is correctly fitted into the panel recess (12), as illustrated.
2. Detach the HVAC upper mode outlet panel (1) (6 x self tapping screws, 2 x clips)



11. Install the Vee duct and the upper mode panel
12. Refit the instrument panel and check the operation of the climate control system

### Shaft — Airmix Door DZ

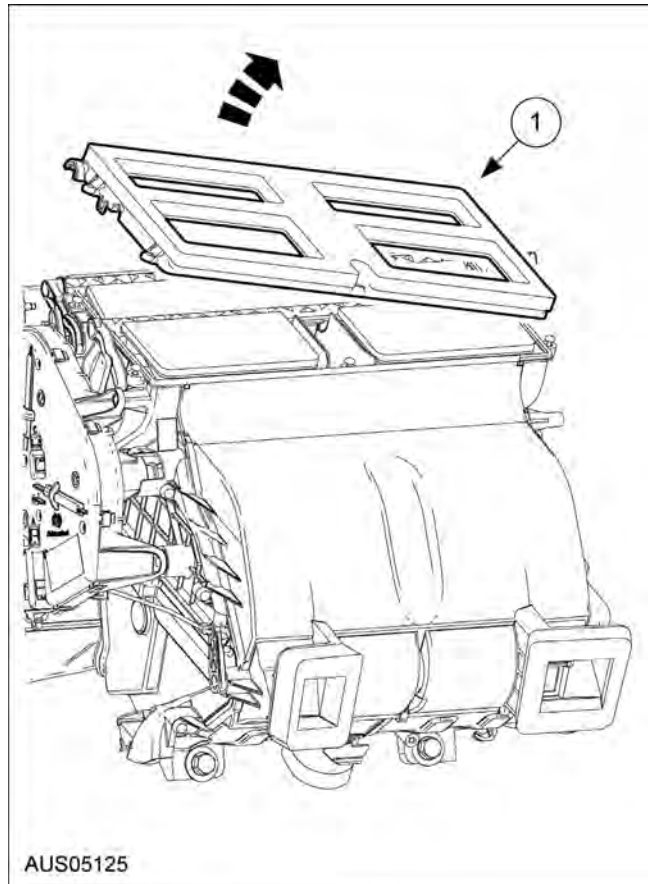
**NOTE:** The Airmix Door Shafts (DZ) are now service replacement parts, and can be replaced WITHOUT removing the HVAC assembly, discharging the A/C refrigerant or draining the engine coolant.

The dual zone air mix shaft removal and assembly is essentially the same as for the single zone, with the main difference being that the dual zone HVAC has two individual temperature doors, one each for both driver and passenger.

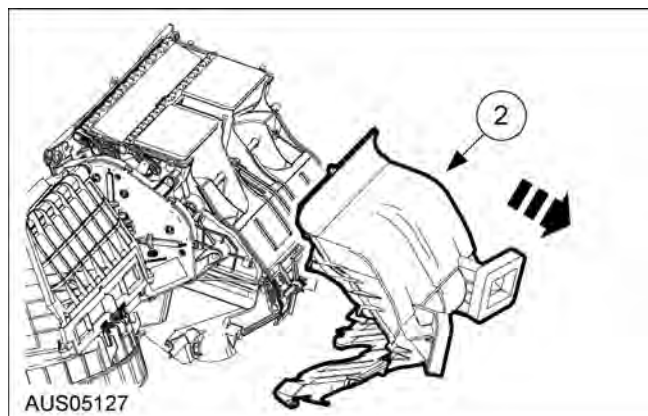
The driver side shaft is driven via the HIM whereas the passenger side is driven by a separate electric motor

#### Removal

1. Do not remove the HVAC asy, discharge the A/C refrigerant or drain the engine coolant, as these are not necessary to replace the air mix shaft(s). Set the ICC to Recirculation and Face modes. Remove the instrument panel (refer to section 501-12)

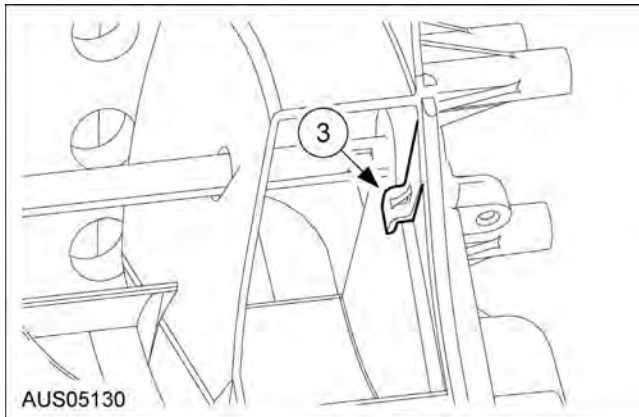


3. Disconnect the foot / rear console duct rod from the lever at the Vee duct.
4. Remove the HIM assembly (3 x self tapping screws)
5. Remove the Vee duct (2) from the front section of the HVAC (6 x self tapping screws)



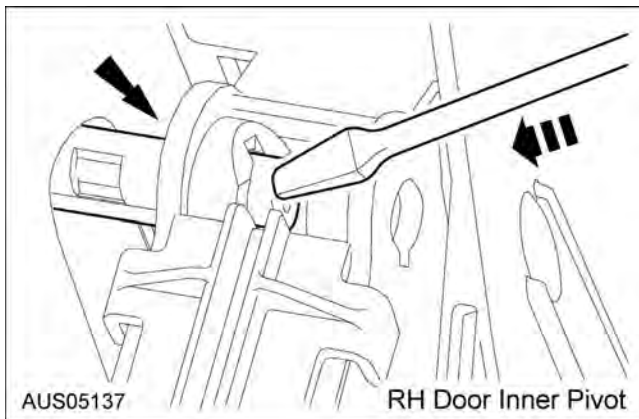
## REMOVAL AND INSTALLATION (Continued)

6. Move the air mix doors to the full hot position. At the full hot position the door seal edge must be in the door stop locaters (3) moulded in the case



7. Passenger side air mix shaft.

1. Apply pressure with your finger behind the RH door inner pivot, then using a flat blade, medium screwdriver push the shaft through the door pivot.



**NOTE:** YOU MUST HOLD YOUR FINGER AS AN OPPOSING FORCE AGAINST THE DOOR PIVOTS TO AVOID THE PIVOT FROM BREAKING AWAY FROM THE DOOR WHEN PRESSURE IS APPLIED TO THE SHAFT DURING REMOVAL AND REINSTALLATION

2. Remove the shaft to the Left by hand.
8. Driver side air mix shaft.

1. To remove this shaft the electric actuator motor will have to be removed (3 x self tapping screws).

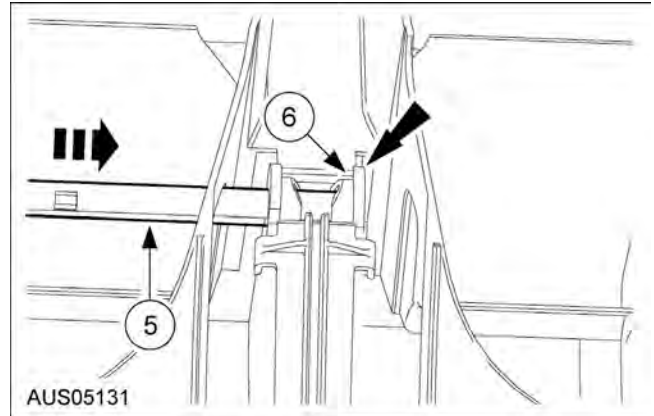
**NOTE:** YOU MUST HOLD YOUR FINGER AS AN OPPOSING FORCE AGAINST THE DOOR PIVOTS TO AVOID THE PIVOT FROM BREAKING AWAY FROM THE DOOR WHEN PRESSURE IS APPLIED TO THE SHAFT DURING REMOVAL AND REINSTALLATION

2. Apply pressure with your thumb behind the RH door inner pivot, then using a flat blade,

medium screwdriver push the shaft through the door pivot. Remove the shaft to the Right by hand.

### Installation

1. Inspect the new air mix shaft for any signs of plastic "flash" left over from the manufacturing process, remove this flash with a razor blade as it would effect fitment.  
Apply Molycote PG54 Silicon grease to the 4 door pivot opening with a small brush, to assist in inserting the shaft
2. Passenger side air mix shaft.
  1. Install the new passenger side air mix shaft into the HVAC case in the reverse order of removal, steps 7P and 8P, ensuring that the locaters on shaft and pivot line-up. Continue pushing the air mix shaft through the passenger side door outer pivot while applying pressure to the LH door outer pivot.



**NOTE:** YOU MUST HOLD YOUR FINGER AS AN OPPOSING FORCE AGAINST THE DOOR PIVOTS TO AVOID THE PIVOT FROM BREAKING AWAY FROM THE DOOR WHEN PRESSURE IS APPLIED TO THE SHAFT DURING REMOVAL AND REINSTALLATION

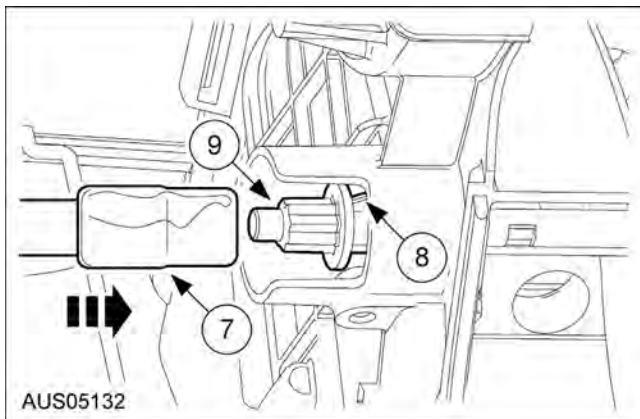
2. Push the air mix shaft into the LH door inner pivot.

**NOTE:** If the shaft is hard to insert into the LH door inner pivot use an 11 mm extra deep socket and an extension bar then apply a slight amount of force to the end of the extension bar with the palm of your hand to drive the shaft inwards.

The correct shaft insertion depth is when the plastic pointer attached to the shaft drive spline is 1 - 2 mm from the case recess face.



## REMOVAL AND INSTALLATION (Continued)



### 3. Drivers side air mix shaft.

1. Install the new driver side air mix shaft into the HVAC case in the reverse order of removal, steps 7D and 8D, ensuring that the locaters on shaft and pivot line-up. Continue pushing the air mix shaft through the driver side door outer pivot while applying pressure to the RH door outer pivot.
2. Push the air mix shaft into the RH door inner pivot.

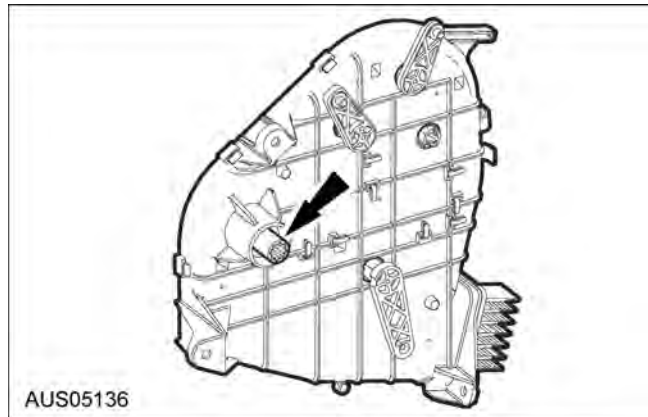
**NOTE:** If the shaft is hard to insert into the RH door inner pivot use an 11 mm extra deep socket and an extension bar then apply a slight amount of force to the end of the extension bar with the palm of your hand to drive the shaft inwards.

The correct shaft insertion depth is when the driver side shaft end is 1mm from the passenger side shaft end at the inner door pivots.

After replacing the shaft, reassemble the electric actuator motor (3 x self tapping screws).

4. Check that all the door pivot points are straight and in their correct positions. Grasp the air mix shaft and move the doors from Hot to Cold, ensure that the doors move freely in each direction, and the door end stops are reached, and that the doors seal against the case.
5. Before installing the HIM to the HVAC, remove the air mix shaft coupler then install the new coupler provided in the service pack to the HIM as shown in the picture (opposite). Push the coupler all the way in until the shaft end is protruding past the face of the HIM, this will aid in air mix shaft to coupler fitment when fitting the HIM to the HVAC.

**NOTE:** The coupler can only be fitted in One (1) direction owing to the locating recess.



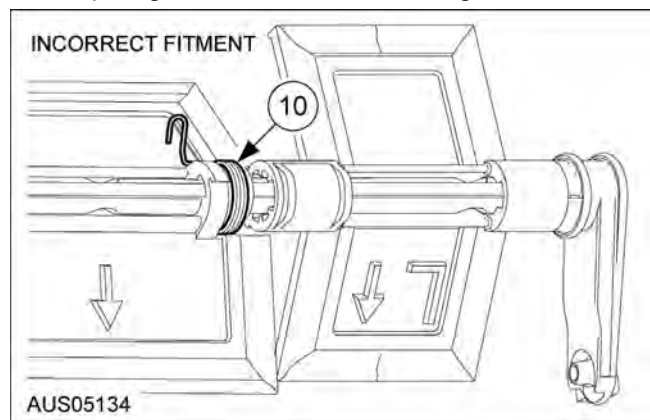
### 6. Refit the HIM to the HVAC.

Manoeuvrer the HIM into position.

Insert the HIM mode levers into the HVAC door levers and the blower speed heat sink into the case.

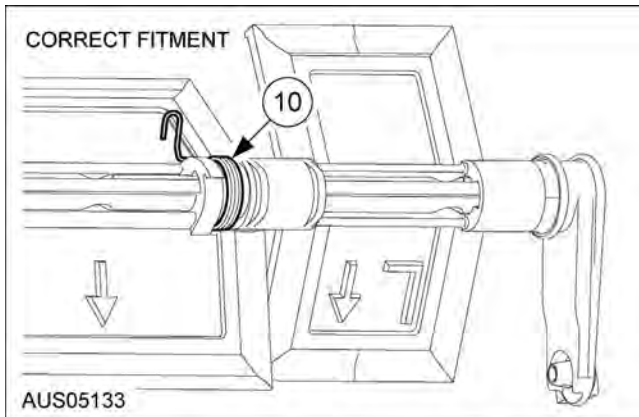
Fit the HIM onto the HVAC (3 x self tapping screws) Reconnect the floor / console rod. the coupler end through the HIM and onto the air mix shaft spline, you may need to operate the air mix door by hand to engage the splines. . When the HIM coupler is pushed onto the air mix shaft you can view the door pivots to ensure that they have not been pushed out of position when the coupler was engaged onto the shaft.

7. During the dismantling of the Vee cover from the HVAC and the subsequent removal of the floor/console mode door assembly, it could happen that the outer doors become disconnected from the return spring mechanism. This spring mechanism must be inspected before refitting the Vee cover back onto the HVAC or the floor/console mode operation will be faulty. The illustration shows that the door has moved on the shaft and the spring mechanism is caught half way between shaft and door. If this was refitted to the HVAC, a problem will exist in foot mode requiring the I.P. to be removed again.

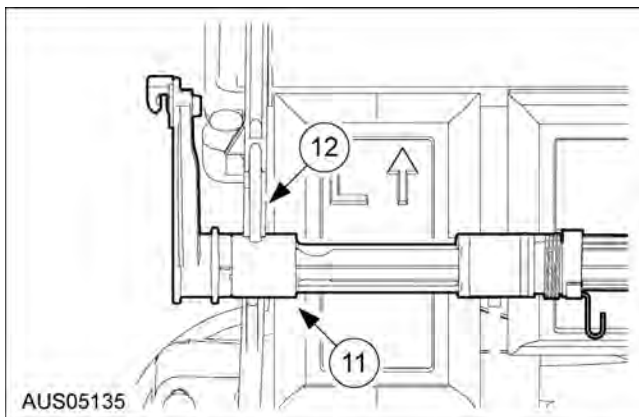


## REMOVAL AND INSTALLATION (Continued)

8. If the outer doors become disconnected from the return spring mechanism, use a flat blade screwdriver relocate the coil section of the spring back onto the door pivot boss.



9. When refitting the Vee panel back onto the HVAC, ensure that the LH foot/console mode door locator is correctly fitted into the panel recess, see arrow in picture.



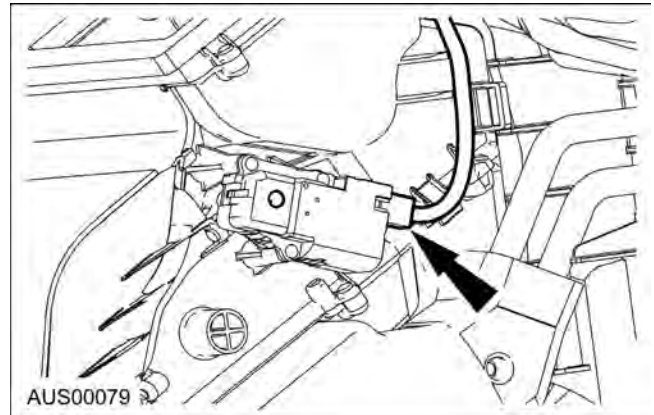
10. Install the Vee duct and the upper mode panel.  
11. Refit the instrument panel and check the operation of the climate control system.

### Dual Zone Sub Harness

#### Removal

1. Remove HVAC Assembly, as outlined in the Removal and Installation procedure in this section.

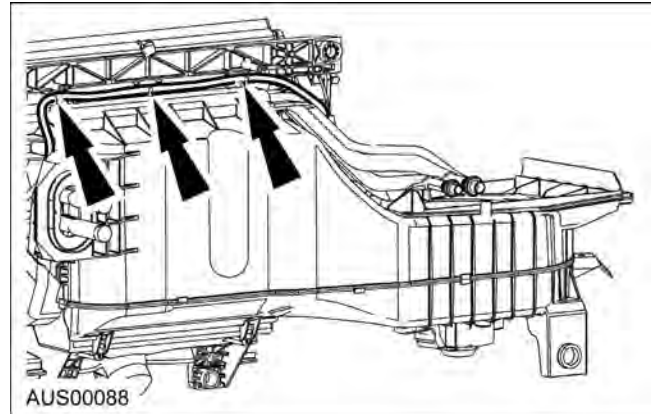
2. Disconnect harness connector from Actuator-Electric Airmix.



3. Disconnect harness connector from HIM.



4. Unclip Harness and remove.



#### Installation

1. Refit components in reverse order.

### Filter and Cover Assembly — Mesh (Standard Fitment)

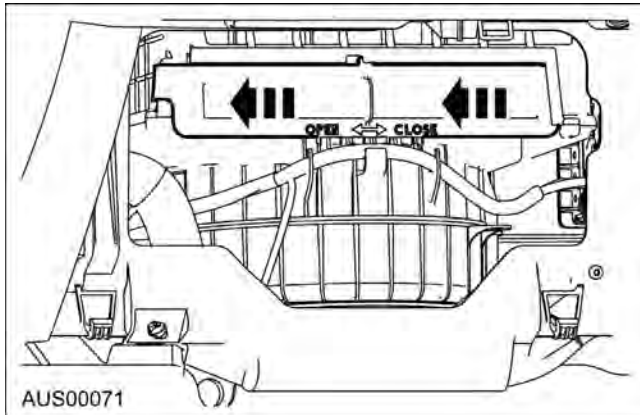
#### Removal

1. Refer to Section 501-12, and remove glove box assembly to gain access to Filter.

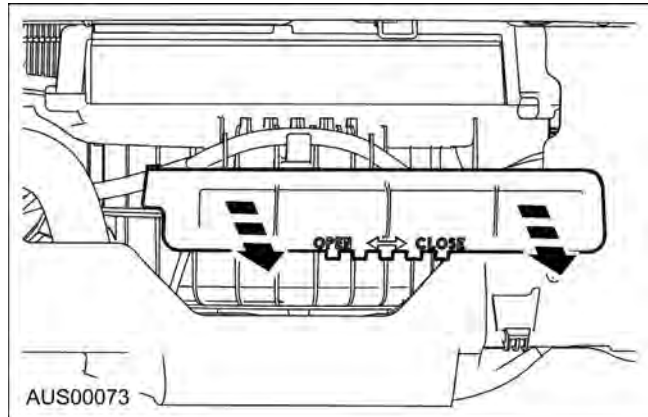


## REMOVAL AND INSTALLATION (Continued)

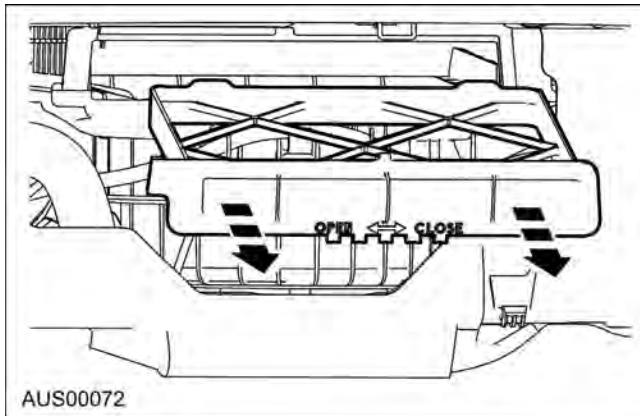
- Slide Mesh Filter and Cover assembly to open position (LH side).



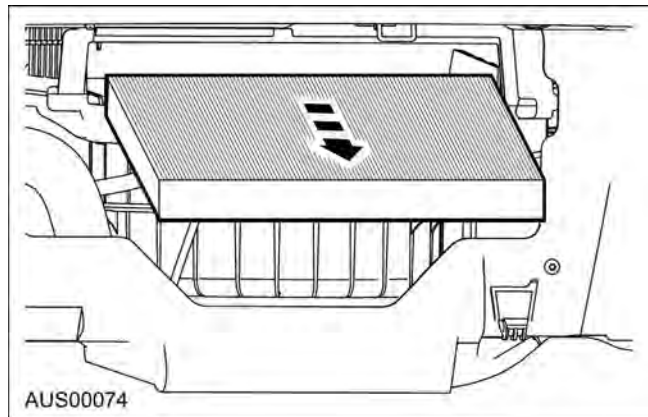
- Remove Cover & Seal Assembly.



- Ensure that no debris is allowed to fall into the blower housing.
- Pull out Filter-assembly.



- Pull out Particle Filter.



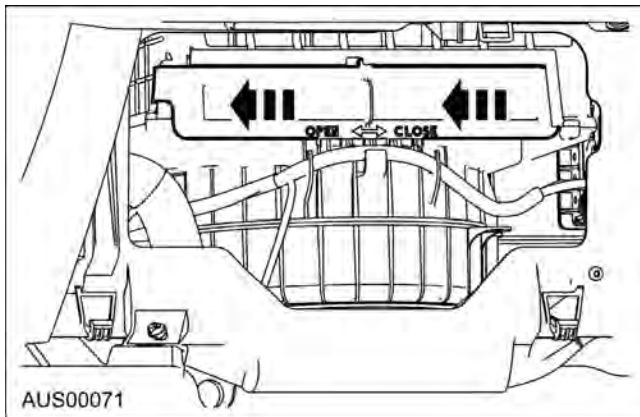
### Installation

- Refit components in reverse order.

### Filter — Particle (Optional Fitment)

#### Removal

- Refer to Section 501-12, and remove glove box assembly to gain access to Filter.
- Slide Cover and Seal Assembly to open (LH side).



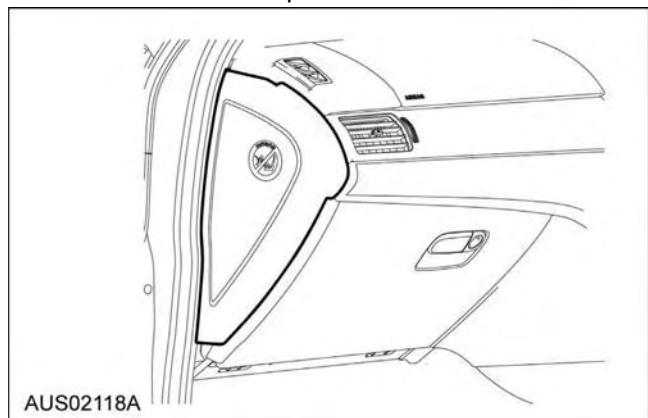
### Installation

- Refit components in reverse order.

### Vent Outlet Register — Outboard

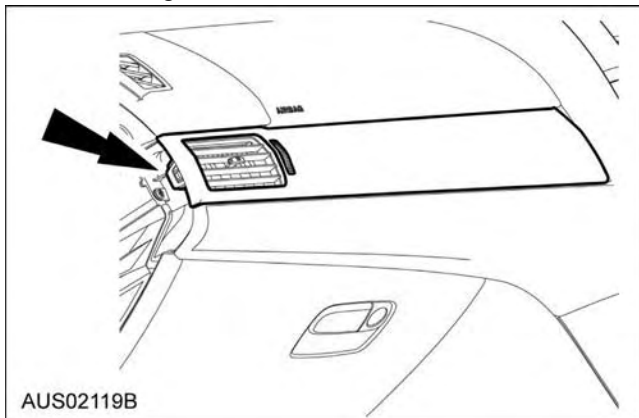
#### Removal and Installation

- Peel off door seal around area covering end cap of instrument panel, refer to Section 501-12.
- Remove LH end cap.

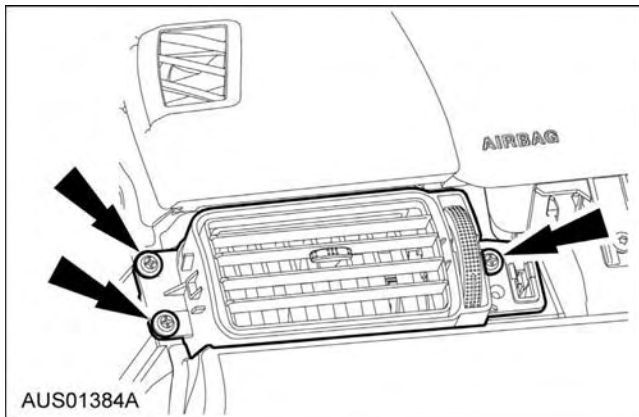


## REMOVAL AND INSTALLATION (Continued)

3. To remove the spear, please refer to the Instrument Panel Section 501-12 as the process has changed from Barra.



4. Remove three screws/self tappers from registers. Ease register on inboard top edge to dislodge clip and remove register.



5. Assemble in reverse order.

### Vent Outlet Register — Centre Register

#### Removal and Installation

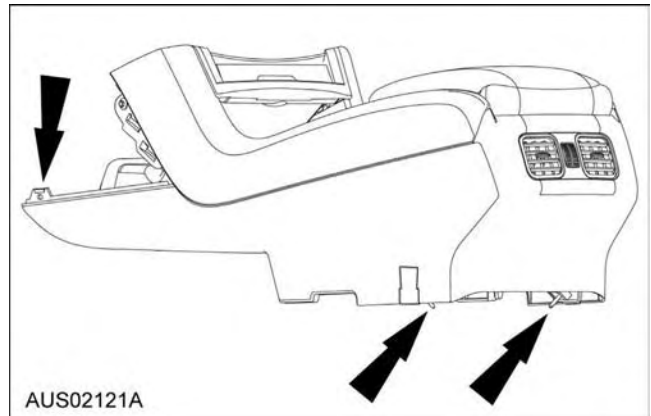
The centre vent outlet register is no longer a separately serviceable item. The entire Interior Command Centre must be replaced if the centre vent outlet register needs servicing. Refer to section 412-08 for removal of the Interior Command Centre.

### Vent Outlet Register — Floor Console Register

#### Removal and Installation

1. Close flaps on register.

2. Remove the console screws at the front and back.



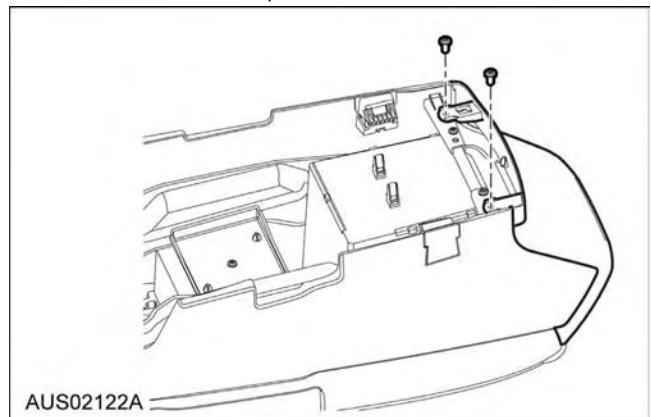
3. Lift the console and remove the screws from the rear finish panel at the bottom of the console. Remove the rear finish panel.
4. Remove register from the rear finish panel by unclipping the register off the rear of the fascia at four clipping points.
5. On assembly of register rear finish panel, enter lower clips first and roll register finish panel into place.

### Floor Console Duct

#### Removal and Installation

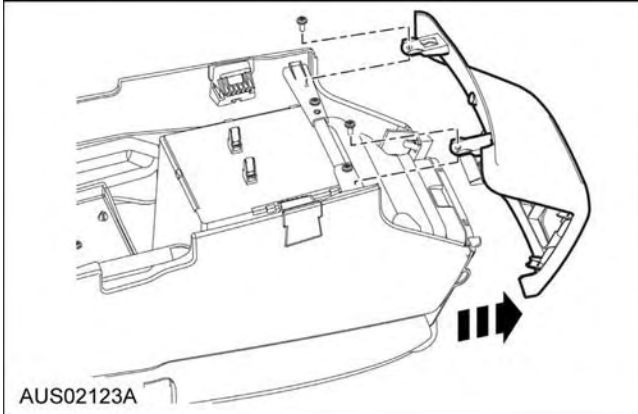
The floor console duct is removed from the vehicle as part of the floor console assembly. The duct can then be separated from the console.

1. Remove floor console and duct assembly (Refer to Section 501-12).

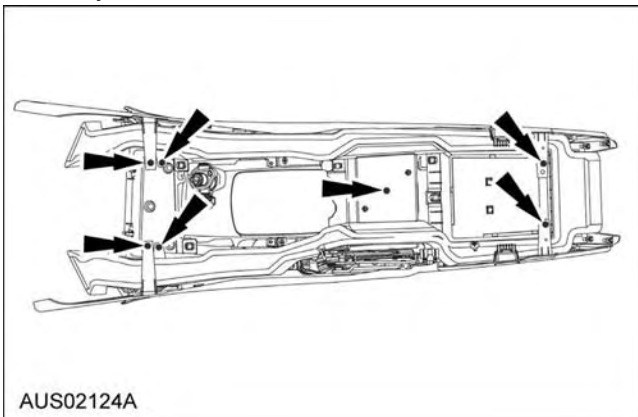


**REMOVAL AND INSTALLATION (Continued)**

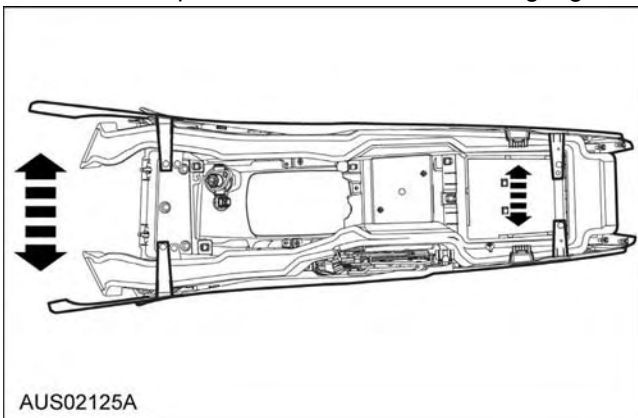
2. Invert console taking care that the console lid does not swing open, and loosen two screws holding console rear finish panel to console body. Ease console lid and rear finish panel assembly away from the console body.



3. Remove four screws locating duct to console body, and four screws locating console sides to body.



4. Carefully spread console sides at rear to lift duct upwards and past the console side retaining lugs. Carefully spread console sides at front to pull duct rearwards past the console side retaining lugs.



5. To install, reverse the steps 1-4.

