

Mondeo

New Model Training – Part 2



Mondeo

Powertrain

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Powertrain

Lesson 3

Electrical



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General Information

Lesson Objective

At the conclusion of this lesson the technician will be able to identify the key electric and electronic features of the Mondeo.

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Lesson Outcomes

- Describe the operation of the DC - AC power inverter.
- Identify the data communications systems used on the New Mondeo.
- Demonstrate how to change a vehicle from transport mode to normal mode

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Lesson Outcomes

- Explain the operation power heated and cooled seats
- Explain the operation of the automatic high beam function
- Explain the operation of MyFord Touch™

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Smart Regenerative Charging System

- Intelligent charging system
- Calculates battery state of charge
- Regulates generator output voltage
- BCM sends desired rate of charge to PCM
- PCM controls generator charge rate

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General Information

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Smart Regenerative Charging System

Battery Current Sensor

- Installed over the battery ground cable
- Hall effect sensor



Generator Current Sensor

- Hall effect sensor
- Attached to the generator B+ cable

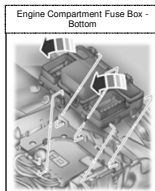
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Fuse Box Locations

- Engine compartment fuse box
- Engine compartment fuse box - Bottom
- Passenger compartment fuse box – Located under the instrument panel LH side



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Module Communication Network

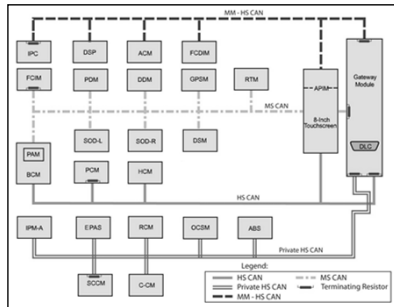
- Mondeo utilises 5 communications networks
 - High Speed CAN (HS-CAN)
 - Private High Speed CAN (Private HS-CAN)
 - Multi-Media CAN (MM HS-CAN)
 - Medium Speed CAN (MS-CAN)
 - Local Interconnect Network (LIN)

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Module Communication Network



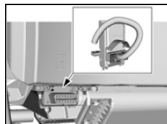
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GateWay Module

- GWM transfers the data between different networks
- Communicates between four CAN networks
- DLC is fitted to the GWM
- Located under the driver side of the dash



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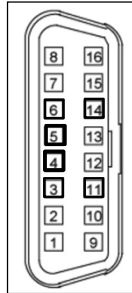
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Data Link Connector (DLC)

Networks at the DLC:

- HS1-CAN - Pin 6 & 14
- Private HS2-CAN – Pin 3 & 11
- MM HS3-CAN & MS-CAN *is not diagnosable from the DLC, Refer to Workshop Manual*
- Ground – Pin 4 & 5

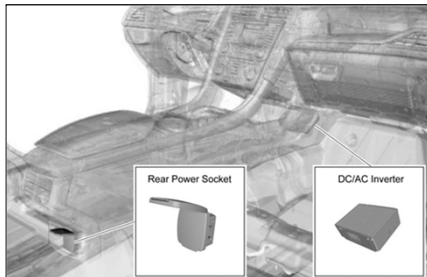


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DC/AC Inverter and AC Power Socket



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DC/AC Inverter and AC Power Socket

- Converts battery voltage to AC 240V
- Up to 150W of power
- Green status LED on the AC power socket lights when the power socket is active

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DC/AC Inverter and AC Power Socket

- AC socket incorporates two safety devices:
 - Child safety cover
 - AC power socket switch
- Power will be automatically shut off when
 - Load exceeds 150W
 - Battery voltage drops below 11V

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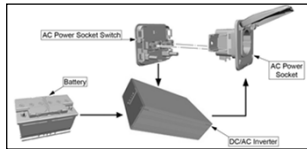
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DC/AC Inverter and AC Power Socket

AC power socket and inverter can be replaced as separate components

Do not open DC/AC inverter as charged capacitors inside it can store very high voltages



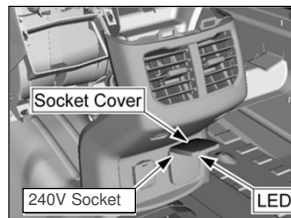
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DC/AC Inverter and AC Power Socket

- Green LED constantly flashes on fault detection



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BCM Service Mode

- Input and output signals can be checked in service mode without IDS
- The BCM requests the user to perform a set sequence of different functions;
- Warning flashers
- Light switch
- Door locking
- If the test is completed successfully, a signal tone will be output.

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Deactivating Transport Mode

- Ignition OFF
- Ignition ON
- Press brake pedal 5x and press hazard switch 2x within 10 seconds
- Start engine
- Place ignition in OFF position
- Verify RKE functionality

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Deactivating Transport Mode

- BCM automatically switches to normal mode when transport mode is deactivated

*The IPC message centre will indicate
NORMAL MODE when the procedure has
been successfully completed*

*Vehicle automatically reverts to normal mode
after driven for 80km*

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Crash Mode

Activated when RCM detects a crash;

- Doors are unlocked
- Hazard flashers activated
- Fuel pump is deactivated

Deactivating Crash Mode

- Turn key to position 0 and back to position II after at least 0.5s
- Press hazard light switch to turn off hazard warning lights

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Emergency Running Mode

If there is a fault in the BCM, the following functions are maintained:

- Windshield wiper (low speed)
- Dipped head lamps switched on with the ignition
- Stop lamps
- Park lamps
- Horn

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Field-Effect Transistor (FET) Protection Strategy

- Prevents control module damage in the event of excessive current flow
- Software monitors the current flow through the FET
- FET is shut down when excessive current is detected

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Perimeter Anti-Theft Alarm System

- Deters unauthorised entry into the vehicle
- BCM controls operation of perimeter alarm
 - Power door lock system
 - PATS
 - Ignition status
- Arms PATS by monitoring inputs from;
 - RKE system
 - Passive entry system

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Vehicle Entry Systems

Two vehicle entry systems:

- Remote Keyless Entry (RKE)
- Keyless Vehicle System (Passive)

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Remote Keyless Entry (RKE)

Vehicle locked / unlocked using:

- Remote key
- Door lock control switch (in vehicle)
- Key in the driver door lock cylinder

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Switch Inhibit Feature

- Theft protection feature prevents unlocking and opening the doors from inside the vehicle
- Only possible when all the doors are closed
- 20 seconds after locking the vehicle, BCM disables the door lock control and interior luggage compartment lid release switches.

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Fuel Filler Door Release

- Electronic fuel filler door release
- The PCM checks for excessive fuel vapour pressure and activates a pump to remove the excess pressure.

NOTE: The process to release the fuel filler door can take as long as 15 seconds.

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Smart Unlock

- Smart unlock feature prevents the doors from electronically locking when key is in the ignition lock or passive key inside vehicle
- RKE – Key in ignition lock and vehicle receives lock command from door lock control switch, BCM commands to unlock
- Keyless vehicle (Passive key)– Vehicle interior scanned by RTM and if passive key found inside vehicle, the doors will unlock

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Key Outside Car Message

- If ignition is in Pos II and no passive key is inside the vehicle 'Key outside car' message will be displayed
- To prevent the passive key being separated when the engine is running the BCM will:
 - Activate all passive start antennas to search for a passive key
 - Look to see if a door or the tailgate has been opened and closed

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Key Outside Car Message

- If a passive key is removed from a vehicle while the engine is running:
 - The ignition remains ON and the engine continues to run
 - The engine can be turned OFF using the Start/Stop button
 - The engine can also be restarted within 20 seconds of it being stopped without a passive key

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Emergency Start Function

- Allows the vehicle to start in the event a passive key has a flat battery, is faulty or a passive start antenna fails
- To enable the emergency start:
 - a) Place the passive key in the PATS transceiver slot
 - b) Press the Start/Stop button



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MyKey™

- Limits functionality of some vehicle features
- Enhances safety for in-experienced drivers
- All keys can be a MyKey™ Except one.
- Key without MyKey™ is called 'Admin Key'
- Admin Key is used to create, program and clear the MyKey™ feature
- MyKey™ remains restricted until cleared

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General Information

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MyKey™ Standard Settings

- Belt-Minder cannot be disabled
- The audio system will be muted whenever Belt-Minder is activated
- Low fuel warning is displayed in the message center and an audible chime when the distance to empty value reaches 120 km
- Parking aid cannot be disabled

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MyKey™ Optional Settings

- Vehicle speed restricted to 130 km/h
- Audible and visual speed warnings
- Audio volume restricted to 45% maximum
- AdvanceTrac™ deactivation disabled

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Rear Window Power Sunshade

- Protects vehicle interiors from ultraviolet rays
- Rises from the rear parcel shelf trim
- Operated by a one touch up/down button in center console
- Automatically lowered when vehicle is in Reverse (R)



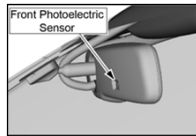
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Auto-Dimming Interior Rear View Mirror

- Automatically adjusts the reflectance level of the mirror
- Eliminates unwanted glare of vehicles at night
- Two integrated photoelectric sensors detect light intensity
- Auto-dimming mirror always returns to high reflectance when reverse gear is selected



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Auto-Dimming Interior Rear View Mirror

- Forward sensor detects light (day):
 - Mirror has high reflectance (normal)
- Forward sensor detects low light (night):
 - Rear sensor detects low light - mirror has high reflectance (normal)
 - Rear sensor detects glare - mirror has reduced reflectance

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Exterior Lighting



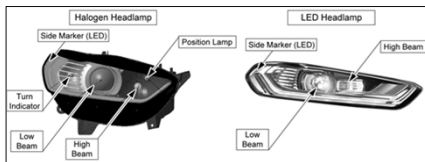
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Headlamp Assembly

Two types of headlamps:

- Quad-beam halogen headlamps
- Adaptive LED headlamps



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LED Headlamps

- Adaptive LED headlamps
- Low beam, high beam, side marker
- Daytime Running Lamps, Turn indicators and park lamps

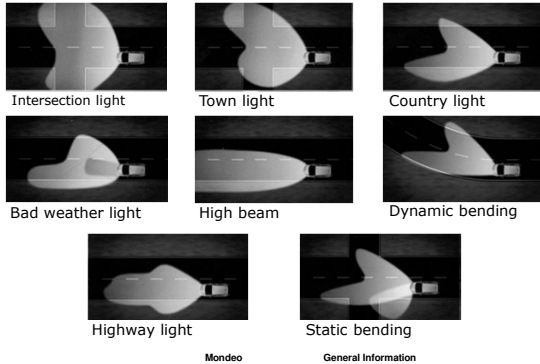


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Adaptive Headlamps



Adaptive Headlamps

- Headlamp Control Module (HCM) controls swivelling of headlamp bulbs
- Illuminates the inside of a corner while turning
- HCM aims headlamps depending on steering wheel angle and vehicle speed inputs
- Swivel motor is part of headlamp assembly



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Headlamps On With Wipers

- The exterior lamps are activated when the front wipers are on low or high speed
- Headlamp switch is in the Auto position
- The exterior lamps are deactivated when:
 - Ignition changes to OFF or ACC
 - Headlamp switch is in the OFF position
 - Front wipers turn OFF

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Automatic High Beam Trend/Titanium

- Activates the high beam automatically when:
 - Ambient light level is dark
 - Input / Pre-conditions are met
 - No traffic is present in front of vehicle
 - Light switch in autolights position
 - Vehicle speed above 40 km/h Environment lighting conditions

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Automatic High Beam Trend/Titanium

- Uses the front camera module to analyse the brightness and colour temperature of ambient light
- Emulates human high beam switching behaviour



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Automatic High Beam Trend/Titanium

- Automatically dips headlamps when an approaching vehicle or a vehicle travelling in the same direction in front is detected

The camera module will identify:

- Approaching vehicle within 800 metres
- Vehicle travelling in the same direction within 400 metres

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Automatic High Beam Trend/Titanium

- High beam will be dipped when:
 - Vehicles approaching (detects headlamps)
 - Vehicles driving in front (detects tail lamps)
 - Sufficient ambient light is detected
 - Low speeds
- Automatic high beam can be overridden by:
 - Manually dipping high beam
 - Using the headlamp flasher function

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Automatic High Beam – Sensitivity Adjustment

Can be set at one of the two settings;

- NEAR – 550m
- FAR – 800m
- Default sensitivity setting is NEAR
- The sensitivity setting is for on-coming traffic only

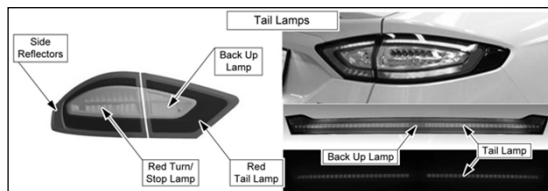
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Tail Lamp Assembly

- All LED tail lamp system except backup lamps



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Windshield Wiper Motors

- Two wiper motors actuate the wiper arms
- Located at the bottom corners of the windshield
- Wiper arms are directly mounted to the wiper motor shafts
- When a windshield wiper motor is replaced, the windshield wiper motor initialisation procedure must be performed

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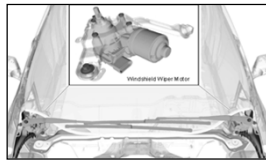
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Windshield Wiper Motors

Consists of:

- Control module
- Wiper arm position sensor
- Multi speed motor



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Windshield Wiper Motor Initialisation

Initialisation is required when a windshield wiper motor is replaced

Follow WSM for initialisation of wiper motors

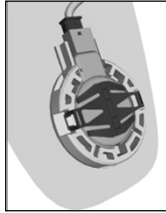
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Rain Sensor

- Uses an infrared beam to detect moisture on the windshield
- Located at the top centre of the windshield
- Moisture on the windshield:
 - Distorts the transmitted infrared beam reducing the intensity of the returning beam



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Rain Sensitive exterior lamps (rain sensing)

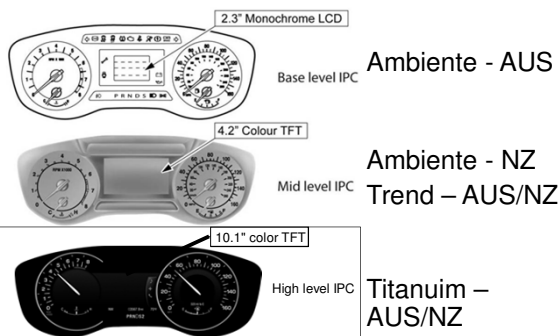
- Turns exterior lights on during heavy rain conditions
- Wiper switch and headlamps must be in auto position
- BCM activates low beam, headlamps turn off 30secs after wipers turn off

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Instrument Panel Cluster



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Message Centre

- Displays vehicle information and warnings by monitoring vehicle systems
- Allows driver to personalise vehicle settings
- Provides following features;
 - Information displays
 - Setup displays
 - System check messages
 - System warning messages

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Resetting Odometer on new vehicles

- Resetting odometer on new vehicles is possible:
 - Maximum distance of 20km not exceeded
 - Under 20km can be reset 3 times
 - Reset only possible up to 50km total
 - Reset procedure ok button on steering wheel hold for 10 seconds

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IPC Prove-Out

- The IPC carries a prove-out to verify gauges and all module controlled warning indicator lamps function when the ignition is cycled
- Gauges sweep from one stop to the other
- Timed prove-out for some indicators
- Some prove-out upon engine start
- Some have no prove-out

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Ford Eco Mode

Evaluates the driving style using two aspects:

- Anticipated, smooth driving style.
- Driving at fuel-efficient speeds

Rating is displayed in the IPC message center represented by a flower

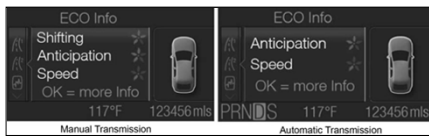
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Ford Eco Mode

- Flower is made up of five petals
- The more flower's petals shaded green, the more economical the driving



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Ford Eco Mode



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Infotainment System

- WiFi capability, web browsing and e-mail access
- Touch screen audio and navigation control
- SYNC™ and SYNC™ MyFord Touch™
- Emergency Assistance
(Not available in NZ)

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My Ford Touch™

- My Ford Touch™ has two methods of control
- The FDIM via touch screen
- The FCIM via the selection dial or buttons



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My Ford Touch™

- The functions that can be controlled by My Ford Touch™ are:
 - Phone
 - Entertainment system
 - Navigation system
 - Climate control


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My Ford Touch™

The FDIM touch screen is where all four functions are displayed and are known as My Ford Touch™ quadrants

- Touching a quadrant will open another function
- Return to the main screen home button
- To access My Ford Touch™ touch settings icon 

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My Ford Touch™

The FDIM screen is where information about all four systems can be displayed

Touching one quadrant will open another screen



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My Ford Touch™ Phone

Touching 'Phone' will bring up phone screen

This allows full function of the phone. To exit, touch home screen icon



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My Ford Touch™

Entertainment: Touch entertainment quadrant on home screen to bring up the entertainment screen



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My Ford Touch™

- Navigation To enter navigation, touch the navigation quadrant. The map will show as well as the direction
- Map data SD card is installed in the media hub



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My Ford Touch™

To enter climate control touch the climate control quadrant.

This will allow setting of the climate control for both driver and passenger.



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My Ford Touch™ system settings

Touching the settings tab will bring up the setting screen. It is possible to change various settings



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Sync™ System

The Sync™ system is a hands free communication and entertainment system.

- Connects to I Pod™ or USB devices
- Plays media by paired Bluetooth™ devices (Incl. mobile phones)
- Initiates emergency call when air bag deployed (Not available in NZ)
- Send and receive phone calls

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Voice Recognition

Voice recognition allows.

- Phone, Navigation, audio system and climate control to be activated
- When the steering wheel switch is pushed an audible prompt from the APIM will be heard

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Accessory Protocol Interface Module APIM

- Consists of two internal modules
- Vehicle Interface Processor VIP
- Consumer Interface Processor CIP
- VIP and CIP processors are not replaceable individually
- Can be flashed independently
- Requires programming procedures for correct operation - when the APIM is replaced

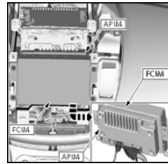
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Accessory Protocol Interface Module (APIM)

- Interprets information from:
 - The USB port
 - The auxiliary input jack
 - The cabin microphone
 - Bluetooth antenna
- Outputs sound signals to ACM
- Mounted behind control panel



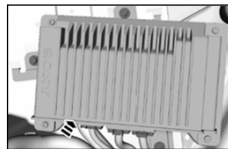
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Audio Digital Signal Processing (DSP) Module

- Enhances input audio signal from ACM
- The DSP provides enhanced audio signals to the speakers
- DSP requires Programmable Module Installation (PMI) if replaced



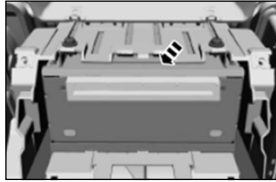
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Audio Control Module ACM

- Processes audio signals from APIM, and outputs them to the speakers
- Receives signal from AM/FM antenna and inbuilt CD player
- Mounted behind the FDIM



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Customer Interface Processor (CIP).

- (CIP) interfaces with all of the inputs to the APIM. It contains an analog-to-digital-to analog converter as well as the Bluetooth™ chipset
- Any application upgrades that are available are loaded directly to the (CIP) through the USB port

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Vehicle Interface Processor (VIP)

- The (VIP) provides an interface between the (CIP) and the vehicle
- It controls the APIM power management in translating both inbound and outbound signals
- The VIP queries the modules on the network to retrieve any (DTCs) when requested

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Front Display Interface Module(FDIM)

- Visual interface for the infotainment system
- Displays audio and navigation system info
- Mounted in centre of the instrument panel



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Front Control Interface Module (FCIM)

- *The FCIM audio buttons provide one method which the customer interacts with the infotainment system.*
- *The FCIM is separate from the ACM*



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Media Hub

- I Pod™ connection
- USB thumb drives can be connected (x2, 5V)
- Can be played through vehicle speakers
- RCA connection – Video in



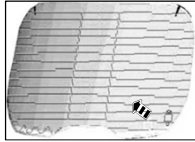
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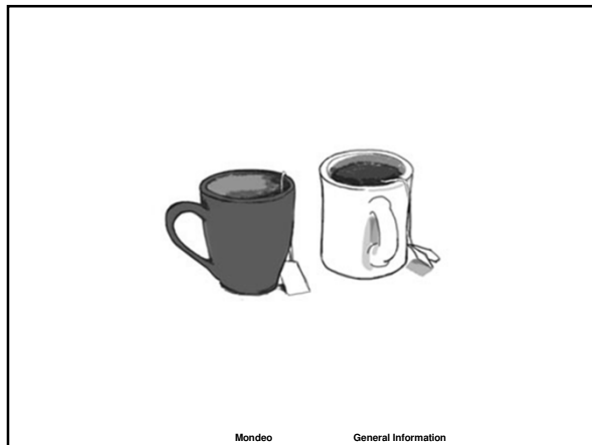
Rear Screen FM 1, AM and DAB Antenna

- The rear Antenna is integrated into the rear screen
- If replacement needed, only genuine Ford screen to be fitted



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Seats

Seat features;

- Power seats
- Power seats with memory
- Easy entry/exit
- Heated and cooled seats

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Seats

Driver's seat:

- 4 way manual seats – Ambiente
- 10 way power seats – Trend
- 10 way power with memory – Titanium

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Seats

Passenger seat:

- 2 way manual seats – Ambiente
- 10 way power seats – Trend / Titanium

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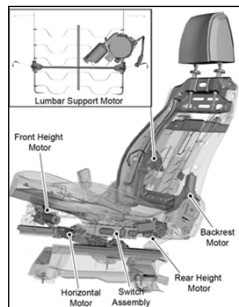
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10 Way Power Front Seat

5 seat motors:

- Front height motor
- Rear height motor
- Horizontal motor
- Backrest rake motor
- Lumbar support motor



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10 Way Power Front Seat With Memory

- Controlled by the Driver Front Seat Module (DSM) located on driver seat track
- Allows automatic position to 1 of 3 positions
- DSM monitors motor position sensors and records seat position
- Requires PMI when replaced

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DSM Hard Stop/Soft Stop

- Hard stop – If any seat track axis reaches the end of travel and cannot go further
- Soft stop – Seat stops before physically reaching end of travel
- Hard stop cannot be changed or adjusted.
- DSM sets the soft stops
- The seat motor backs up 180ms and establishes soft stop if it reaches a hard stop

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Easy Entry / Exit

- Allows easy entry/exit from the vehicle
- Moves driver seat back approx. 51mm while exiting the vehicle
- DSM records position after easy exit and returns to same position after easy entry

The seat should not already be positioned at or near the end of travel

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Seat Control Switch Assembly

- Three multifunction switches
- Located on the outer side of the seat base
- 3 momentary contact switches
- Recalls 1 of 3 positions stored in DSM



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Heated Front Seats - Titanium

- Electric heating mats – The seat base mat contains an integrated temperature sensor
- Heats the seat base and backrest
- Operated using switches on FCIM/FDIM
- Five heat settings

Functions independently of climate control system

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Heated and Cooled Seats

- Thermo-Electric Device accomplishes both heating and cooling
- TED includes heating/cooling device and a blower motor in one assembly
- One TED assembly for seat back and one for seat cushion

Do not apply power directly to the TED to test its function, it will damage the TED

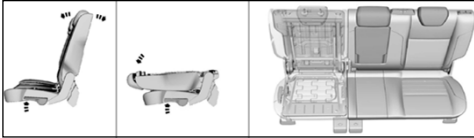
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Rear Seats

- 40/60 split rear seat with adjustable backrest recline
- Variably heated - Titanium



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Climate Control System

- Dual Automatic Temperature Control (DATC) system
- Fully automatic system, can also be manually controlled by the operator if required
- Climate control system uses sensors and electric actuators to select the air source and control airflow and temperature

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Dual Automatic Temperature Control (DATC)

There are two modes of operation available:

- Manual mode - Set the temperature and then manually select the amount and distribution of airflow and A/C operation
- Automatic mode - Set the temperature and the system will control the amount and distribution of airflow and A/C operation

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Dual Automatic Temperature Control (DATC)

Output air temperature is controlled in two ways:

- Single zone mode - Output air temperature for both the driver's side and passenger's side is linked
- Dual zone mode - Output air temperature for the driver's side and passenger's side is independent

Mondeo

General Information

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End of Lesson 3

Electrical



Mondeo

General Information

Lesson 4

Body & Chassis



Mondeo

Body & Chassis

Lesson Objective

At the conclusion of this lesson the technician will be able to identify the key body and chassis design features and functions of the Mondeo

Mondeo

Body & Chassis

1

Lesson Outcomes

- Identify the different types of driver aids that are fitted to the Mondeo and explain their function.

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Body & Chassis

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Lesson Outcomes

- Explain the function and operation of Pre Collision Assist (PCA) with Pedestrian Detection
- Identify the different types of parking aid that the Mondeo is equipped with and explain their function

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Body & Chassis

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Lesson Outcomes

- Identify the features of the Supplemental Restraint System (SRS)
- Explain the operation of the rear inflatable seat belt system.

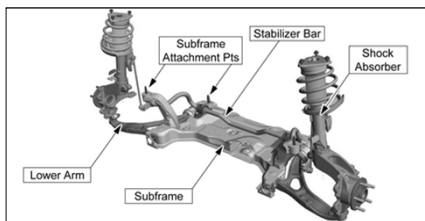
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Body & Chassis

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Front Suspension

- MacPherson struts

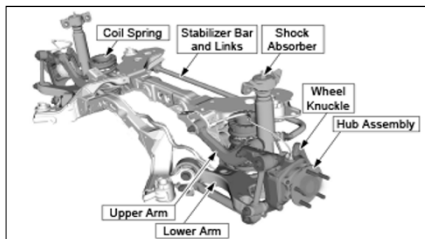


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Rear Suspension

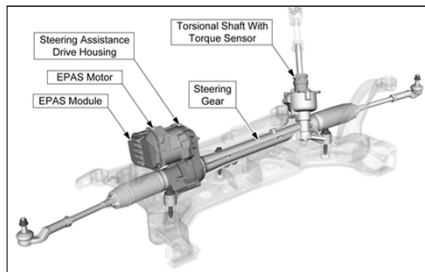


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Body & Chassis

3

Electronic Power Assisted Steering (EPAS)



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EPAS – Torque Steer Compensation

- Torque steer - Steering pulls to one side during heavy acceleration
- Counter steering force to eliminate torque steer
- Keeps vehicle on intended path
- Reduced driver effort to correct steering pull

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EPAS – Active Nibble Compensation

- Compensates for steering vibrations
- Caused by out of balance front wheel or brake shudder
- Applies counter steering force to cancel the steering wheel vibration

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EPAS – System Operation

EPAS consists of:

- Electronic Power Assisted Steering (EPAS) module
- Electric motor (with integral position sensor)
- Torque Sensor
- PSCM monitors motor position sensor, torque sensor & other modules & calculates steering assistance

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EPAS Failure Modes

When a fault is present, EPAS enters into one of the two modes of operation:

- Reduced steering assist – Default steering assistance & does not change with speed
- Manual steering mode – Mechanical steering operation without any assistance

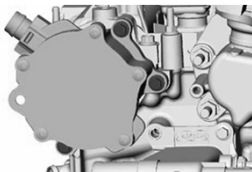
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Brake Vacuum Pump

2.0L Eco Boost engine utilises engine mounted vacuum pump together with engine manifold vacuum to supply the booster



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Electronic Parking Brake

- Replaces mechanical parking brake
- Operates independently of primary brake system
- Actuated by pulling up the switch in centre console



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Electronic Parking Brake

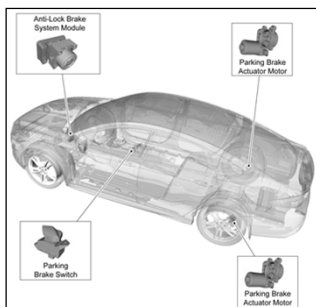
- 2 switch activated PCM controlled motors
- ABS controls and monitors parking brake system and sets DTCs if a fault exists
- IPC illuminates a brake warning indicator
- Message is displayed in message centre when a fault is present, parking brake is applied or released

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Electronic Parking Brake



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Electronic Parking Brake – Automatic Release

The parking brake automatically releases if;

- Driver door is closed
- Safety belt is fastened
- Engine is running
- Transmission is in any forward gear or reverse gear

Parking brake releases when accelerator pedal is pressed

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Electronic Parking Brake – Service Mode

Service mode is required to service the rear brake pads or removing rear brake components

Service mode is accessed by either:

- IDS
- EPB Service Mode Activation & deactivation procedure

Refer to the workshop Manual for correct procedure!

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EPB – Fault Conditions

- Insufficient clamping force
- High resistance in path of electric motor
- Red brake warning indicator
- Yellow brake warning indicator
- Restoring electronic park brake function

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Driver Aids (Safety)

- Antilock Braking system (ABS)
- Traction Control System (TCS)
- Electronic Stability Program (ESP)
- Electronic Brake Distribution (EBD)
- Emergency Brake Assist (EBA)
- Hill Launch Assist (HLA)

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Driver Aids (Safety)

- Supplemental brake assist
 - Supports adaptive cruise control
 - Supports Pre Collision Assist
 - Supports electric parking brake

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Driver Aids

- Cruise Control Systems
 - Non-Adaptive Cruise Control – Ambiente
 - Adaptive Cruise Control – Trend / Titanuim
- Adjustable Speed Limiter

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Driver Aids

- Lane Departure Warning (LDW)
- Lane Keeping Aid (LKA)
- Blind Spot Monitoring System (BLIS)
- Cross Traffic Alert (CTA) System
- Driver Alert System

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Driver Aids

- ***Pre Collision Assist (PCA)***
with Pedestrian Detection,
 - Forward Collision Warning
 - Follow Distance Indication
 - Advanced Emergency Braking

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Active City Stop (ACS)

- Applies emergency braking if a collision with a vehicle in front is imminent
- Utilizes Lidar sensor behind windscreen
- ACS is now active at speeds upto 40 km/h
- Max. possible relative speed reduction 25kph!

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Pre Collision Assist (PCA) with Pedestrian Detection

- *Forward Collision Warning*
- *Follow Distance Indication*
- *Advanced Emergency Braking*

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Pre Collision Assist (PCA) with Pedestrian Detection

- System overview
- Windshield mounted camera
- Bumper mounted radar monitors the area in front of the vehicle



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Pre Collision Assist (PCA)

Forward Collision Warning (FCW)

- Heads-Up Display (HUD)
- Warns driver of possible collision
- Illuminates red warning bar on windshield
- Operational range >5kph ...max. vehicle speed



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Pre Collision Assist (PCA)

Follow Distance Indication (FDI)

- Distance screen is shown on driver demand
- Adopts FCW sensitivity settings
- Operational range: 30kph...max. vehicle speed



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Pre Collision Assist (PCA)

Advanced Emergency Braking (AEB)

- Pre-fills the brake system and increases sensitivity
- Enhances driver demanded braking to the appropriate deceleration level to avoid collision
- Autonomous deceleration if no input from the driver in the event of a pending collision with pedestrians or vehicles

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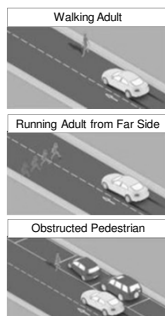
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Pre Collision Assist (PCA)

Pedestrian recognition

- Detection of stationary and moving pedestrians possible.
- Step by Step operation
 - Forward Collision Warning
 - Brake pre-charge
 - Partial braking
 - Full auto braking



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Parking Systems

Three types of parking systems:

- Parking Aid (eight sensors) – All variants
- Active Park Assist (ten sensors) – Titanium
- Rear View Camera System – Trend/Titanium

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Parking Aid

- Audible warning when objects are near to the front or rear of vehicle
- Automatically activated front sensors when ignition on & in any gear – except park & neutral
- Not effective at greater than 5km/h



The system can be enabled & disabled in IPC

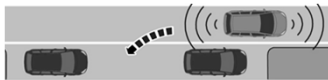
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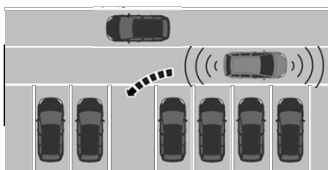
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Active Park Assist

- Parallel Parking



- Perpendicular Parking



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Parking System Sensors

The Parking Aid Module (PAM) controls the APA system and utilises following info:

- Steering angle inputs - (SASM)
- Vehicle wheel roll count & direction - ABS
- APA and park aid ultrasonic sensor inputs
- Vehicle speed - ABS module
- Transmission selection - PCM
- Torsion bar torque - PSCM

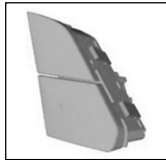
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System Function Switches

- The APA switch and front park assist disable switch are used to turn the park assist system on and off



- Located under the climate control face plate

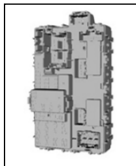
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Parking Aid Module (PAM)

- Controls reverse parking aid, parking aid & APA systems
- Located behind the right rear quarter trim panel



- Carries out a self-test when parking aid system is activated

The PAM module is programmable / flash capable

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Rear View Camera (RVC) System

- Visually aids the driver when in reverse
- Camera is located in the tailgate and image is displayed in MFD



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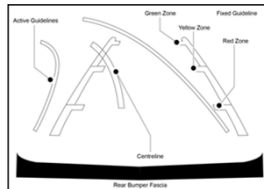
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Rear View Camera (RVC) System

5 video features:

- Fixed guidelines
- Active guidelines
- Visual park aid alert
- Manual zoom
- Video camera delay



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Supplemental Restraint System (SRS)

SRS system consists of:

- Driver and passenger airbags
- Driver and passenger side airbags
- Side curtain airbags
- Driver knee airbag
- **Rear inflatable seatbelts**
- Driver & passenger seatbelt pretensioner

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Supplemental Restraint System (SRS)

- Restraint Control Module (RCM)
- Front impact sensors (X2)
- Side impact sensors (X4)
- Seat occupant and seat position sensors
- Collapsible steering column and clockspring

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Supplemental Restraint System (SRS)

After disconnecting battery, wait for a minimum of 3 minutes before disconnecting SRS components

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Seat Belt Warning

- Audible warning to warn the driver of occupants that have not fastened their seat belts
- Seat belt buckle switch and seat occupancy sensor determine presence of passenger
- This function can be deactivated, refer to WSM



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Post Crash Alert

- Safety feature which alerts others that the vehicle was involved in collision
- Makes it easier to locate the vehicle
- RCM determines severity of crash and activates the post crash alert

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Post Crash Alert

BCM carries out following steps:

- Activates the hazard flashers
- Sounds the horn
- Turns on the interior lights
- Unlocks the doors
- Turns the wipers off (if on)

Operates until the battery power is depleted or it is deactivated

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Rear Inflatable Seat Belts

- Combines safety features of airbag and seat belt
- Vehicle crash sensors determine crash severity and deploy inflatable seat belts
- Increased width of seat belt holds the occupants more effectively

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Rear Inflatable Seat Belts – Components

- Inflatable belt bag and fill tube
- Buckle assembly and tongue
- Compressed gas cylinder
- Diffuser and manifold
- Shoulder strap
- Lap strap

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Rear Inflatable Seat Belts – Components



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Rear Inflatable Seat Belts – Inflatable Belt Bag and Fill Tube

- Tubular airbag folded inside safety belt
- Fills with cold compressed air and breaks through belt

Inflatable seat belts fill at a lower pressure and a slower rate because they do not need to close the gap between the belt and the occupant

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Rear Inflatable Seat Belts – Components



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Rear Inflatable Seat Belts

- Cold compressed gas used to inflate seat belts through special buckle
- No heat generating chemical reaction like traditional airbags
- Inflated belts do not feel warm to drivers body

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Rear Inflatable Seat Belts – Shoulder Strap and Lap Strap

- Shoulder strap
 - Comfortable padded feel and smooth rolled edges
- Lap strap
 - Does not inflate
 - Standard belt with its own retracting system

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Rear Inflatable Seat Belts –

- Distributes crash force over five times more of the occupant's torso
- Additional support to head and neck



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Fuel Shut-Off

- Stops fuel flow to the engine in the event of an accident
- Not every impact causes fuel shut-off

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Fuel Shut-Off

- Vehicle restart after fuel shut-off event;
 - Turn ignition off
 - Turn the ignition to crank
 - Turn the ignition off
 - Turn the ignition on again to re-enable the fuel pump

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Fuel Shut-Off

Vehicles equipped with push button start:

- Press START/STOP button to turn ignition off
- Press the brake pedal and press the START/STOP button (crank attempt)
- Remove your foot from the brake pedal and press the START/STOP button (ignition off)
- Press the START/STOP button again to re-enable the fuel system

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Emergency Assistance (Not available in New Zealand)

- Initiates an emergency call automatically to ensure rapid assistance after an accident

To use the emergency assist function, a cell phone with a Bluetooth™ connection must be present in the vehicle

- Uses GPSM to send information regarding the vehicle location to control centre

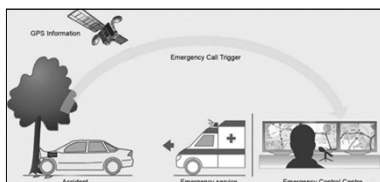
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Emergency Assistance (Not available in New Zealand)

- RCM initiates the emergency call
- Occupant can cancel the call within 10 sec
- Emergency number is region dependent




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End of Lesson 4

Body & Chassis




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Lesson 5

Service Requirements



Mondeo

Service Requirements

Lesson Objective

At the conclusion of this lesson the technician will be able to identify the major service requirements of the Mondeo.

Mondeo

Service Requirements

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Lesson Outcomes

- Demonstrate the Location of the jacking and lifting points
- Identify the location of the service points
- Identify the location of the fuse boxes

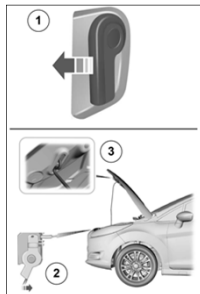
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Service Requirements

1

Opening the Bonnet

1. Pull the bonnet release handle
2. Move the catch to the right
3. Open the bonnet and support it with the prop rod



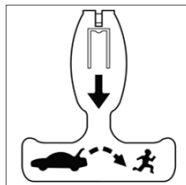
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Service Requirements

21

Interior Luggage Compartment Release

- Escape route if locked inside the luggage compartment
- Located inside the luggage compartment lid
- Pull the illuminated "T" shaped handle to open luggage compartment lid
- Glow in the dark material for handle



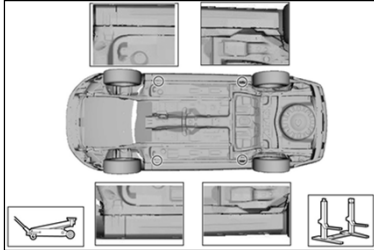
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Service Requirements

21

Jacking and Lifting

Only the specified jacking points may be used for jacking up and supporting the vehicle



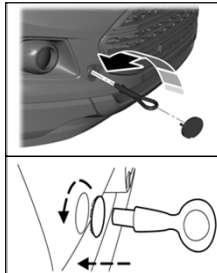
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Service Requirements

2

Towing Points

- A towing eye is located in the spare wheel well
- The towing eye can be screwed into the front and rear bumper support beam



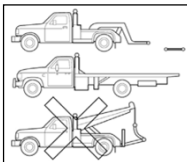
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Service Requirements

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Towing the Vehicle on Four Wheels (all vehicles)

- Strongly recommend vehicles are recovered on a flat-bed trailer
- Can be towed on 4 wheels when:
 - The ignition is switched on
 - Facing forward
 - Transmission in N
 - Max speed 56km/h, no further than 80 km



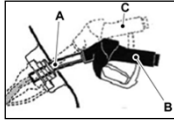
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Service Requirements

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Capless Fuel System

- Fuel filler has no filler cap
- Self sealing to protect foreign material from entering the fuel tank
- An emergency plastic funnel is provided for refueling with a portable fuel container



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Service Requirements

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Fuel Quality

Recommended minimum 95 octane unleaded gasoline or equivalent national specification

Vehicle is suitable for ethanol blends up to 10% (E5 and E10)

- Do not use ethanol blended fuel if vehicle is to be stored for more than 2 months

Mondeo

Service Requirements

5

Emergency Running Mode

- Activated by a fault in BCM and ignition is on
- The following functions are maintained:
 - Windshield wiper (low speed)
 - Dipped head lamps (are switched on every time the ignition is switched on)
 - Stop lamps
 - Park lamp
 - Horn

Mondeo

Service Requirements

6

Spare Wheel / Emergency Spare Wheel

Spare wheel variants:

- 16" Full size – NZ hatch and wagon, AUS hatch only
- 16" Mini spare – AUS wagon only
- Located under cargo area with the mechanical jack and wrench



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Service Requirements

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End of Lesson 5

Service Requirements



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Service Requirements
