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2010 FORD Fusion European OEM Service and Repair Workshop Manual

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Active park assist request	IPMA (image processing module A)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . The IPMA (image processing module A) is an internal component of the Advanced Driver Assistance Systems (ADAS) module. Used to command the EPAS (electronic power assist steering) gear during parking aid maneuvers.
Ambient temperature	FCIM (front controls interface module)	The PSCM (power steering control module) module uses this information for calculations in determining the operational status of the various steering and parking systems.
ABS (anti-lock brake system) active	ABS (anti-lock brake system) module	Confirms the operational state of the ABS (anti-lock brake system) .
Battery voltage	BCM (body control module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Provides the PSCM (power steering control module) with the 12-volt battery and charging system voltage.
Brake pedal position	PCM (powertrain control module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Informs the PSCM (power steering control module) of the current brake pedal position; pressed or released. This information is used for active park assist operation.
Drive wheel torque	PCM (powertrain control module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Informs the PSCM (power steering control module) of the current torque output available at the driven wheels. This information is used for active park assist operation.
Ignition status	BCM (body control module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Confirms the ignition status of the vehicle.
Lane centering information	IPMA (image processing module A)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . The IPMA (image processing module A) is an internal component of the Advanced Driver Assistance Systems (ADAS) module. Provides the PSCM with

		control module) uses this information to verify other steering wheel angle information.
Steering angle request	IPMA (image processing module A)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . The IPMA (image processing module A) is an internal component of the Advanced Driver Assistance Systems (ADAS) module. Used to command the EPAS (electronic power assist steering) gear during active park assist maneuvers.
Steering wheel position - non-adaptive steering	ABS (anti-lock brake system) module	Used to verify the validity of the steering angle sensor.
Steering wheel position - adaptive steering	SCCM (steering column control module) module	This message is generated by the SASM (steering angle sensor module) and is sent to the SCCM (steering column control module) . The message is then sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Informs the PSCM (power steering control module) of the adaptive front steering sensor calibration and sensor status. This message is used for active park assist system function.
Trailer backup assist disable request	APIM (SYNC module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Used to disable the PSCM (power steering control module) for PTBA (Pro Trailer Backup Assist) operation for the trailer chosen by the driver.
Trailer backup assist enabled request	APIM (SYNC module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Used to enable the PSCM (power steering control module) for PTBA (Pro Trailer Backup Assist) operation for the trailer chosen by the driver.
Trailer backup assist switch request	TRM (trailer module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Used to provide the current PTBA (Pro Trailer Backup Assist) control knob position and button status; pressed, not pressed.
Trailer connection	TBM (trailer brake control module)	This message is first sent to the GWM (gateway module A) and then to the PSCM (power steering control module) . Informs the PSCM (power steering control module) a trailer is connected to the vehicle.

Vehicle longitudinal acceleration	ABS (anti-lock brake system) module	Used by the PSCM (power steering control module) for steering assist calculations.
Vehicle speed data	ABS (anti-lock brake system) module	Used to determine the level of assist supplied to the steering gear and to validate the steering wheel component angle by comparing the rotational speeds of each wheel. The difference in the speed of each wheel is used to derive a steering angle for comparison against the EPAS (electronic power assist steering) motor position sensor.
Vehicle yaw rate	ABS (anti-lock brake system) module	Used by the PSCM (power steering control module) for steering assist calculations.
Vehicle yaw rate	RCM (restraints control module)	Used by the PSCM (power steering control module) for steering assist calculations.
Wheel speed sensor information	ABS (anti-lock brake system) module	Provides the PSCM (power steering control module) with wheel speed sensor information such as number of rotations, rotation speed and direction of rotation. Used by the PSCM (power steering control module) for steering assist calculations, trailer back up assist and active park assist.

EPAS (electronic power assist steering) System

The PSCM (power steering control module) controls the functions of the EPAS (electronic power assist steering) system and communicates with other modules over the FD-CAN (Flexible Data Rate Controller Area Network) and through the GWM (gateway module A) .

To activate, the EPAS (electronic power assist steering) system requires battery voltage at the hot at all times PSCM (power steering control module) input, battery voltage at the PSCM (power steering control module) ignition-run input, the PSCM (power steering control module) must communicate with other modules over the FD-CAN (Flexible Data Rate Controller Area Network) and the PSCM (power steering control module) must receive the power pack status message from the PCM (powertrain control module) .

The main input for calculating the level of EPAS (electronic power assist steering) assist is the steering torque sensor signal (internal to the PSCM (power steering control module)). Vehicle speed is also taken into consideration in order to achieve the vehicle speed dependent steering assist characteristic.

The EPAS (electronic power assist steering) gear uses a reversible motor to apply the steering assist by moving the rack inside the steering gear. The motor is connected to the rack of the steering gear by a toothed belt and pulley-bearing assembly.

EPAS (electronic power assist steering) equipped vehicles have a Pull Drift Compensation (PDC) feature to assist drivers in compensating for variation in road and driving conditions. The feature adjusts power assist offset by reducing the steering wheel effort (input torque) required to keep the vehicle traveling straight. The Pull Drift Compensation (PDC) feature is automatically enabled at vehicle speeds above 40 km/h (25 mph) with sensors indicating the vehicle is traveling straight. Pull Drift Compensation (PDC) is designed to compensate for variations in road crown, the system detects input torque to the wheel by the driver to slowly ramp in a steering assist offset to neutralize, in most situations and within limits, steering efforts for the duration of time those driving conditions exist. Full compensation requires up to 45 seconds. Changing lanes on a multilane road and the expected change in road crown would trigger a change in torque input and a compensation adjustment, and is a normal operation of the Pull Drift Compensation (PDC) feature. The feature updates automatically and continuously, however, since it is based on input torque, the feature only works with hands on the steering wheel while driving in a straight line. The system does not compensate when turning or during slight curves on highways. The system does not compensate if driver input torque, steering wheel angle or vehicle yaw rate is too large. For the system to compensate, the driver must have both hands on the steering wheel.

Active Park Assist

The active park assist system is controlled by the PAM (parking assist control module) inside the Advanced Driver Assistance Systems (ADAS) module and, when activated, can detect a parking space and steer the vehicle into the space by sending commands to the EPAS (electronic power assist steering) gear. The active park assist system is comprised of several systems and modules working together to aid in parallel parking maneuvers. The presence of certain Diagnostic Trouble Codes (DTCs) in any of those modules or systems may keep the active park assist system from being enabled or may disable the system if currently being used.

Refer to: Parking Aid - System Operation and Component Description

(413-13C Parking Aid - Vehicles With: Active Park Assist, Description and Operation).

Evasive Steer Assist (ESA)

When approaching a stationary vehicle or a slower vehicle traveling in the same direction, the Evasive Steer Assist (ESA) system is designed to help the driver steer around the vehicle. If activated, the system applies additional steering torque to help the driver steer around the vehicle. After passing the vehicle, the system applies steering torque to help the driver steer back into the lane. The system deactivates after passing the vehicle.

Evasive Steer Assist (ESA) can make the steering feel lighter if the driver steers too slow and heavier if the driver steers too aggressively.

Lane Centering Assist (LCA)

NOTE

Selectable Drive Modes

The selectable drive mode system optimizes driveability and comfort as well as maximizing traction while operating on different types of terrain. The PSCM (power steering control module) adjusts steering effort and feel based on the selected mode. For additional information on selectable drive modes,

Refer to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description

(206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

or Refer to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description

(206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

Component Description

EPAS (electronic power assist steering) Gear

The EPAS (electronic power assist steering) gear is an assembly consisting of a PSCM (power steering control module) , a motor, and a steering torque sensor, all of which are serviced as an assembly. The inner and outer tie rods and the steering gear bellows boots are available separately for service.

- The steering torque sensor is mounted near the input shaft of the EPAS (electronic power assist steering) gear and is used by the PSCM (power steering control module) to determine how much force is being used to turn the steering wheel.
- The EPAS (electronic power assist steering) gear has one inner tie rod located at each end of the gear assembly.
- The EPAS (electronic power assist steering) gear has one outer tie rod located at each end of the gear assembly.
- The EPAS (electronic power assist steering) gear has one bellows boot located at each side of the EPAS (electronic power assist steering) gear assembly. Each boot is held in place with 2 boot clamps.

PSCM (power steering control module)

The PSCM (power steering control module) is the ECU (electronic control unit) for the EPAS (electronic power assist steering) system. The module monitors all sensor inputs and FD-CAN (Flexible Data Rate Controller Area Network) messages relating to the EPAS (electronic power assist steering) system and directly controls the output of the EPAS (electronic power assist steering) motor.

SECM (steering effort control module)	C100C:63	Steering Tracking: Circuit/Component Protection Time-Out	GO to Pinpoint Test I
SECM (steering effort control module)	C100C:67	Steering Tracking: Signal Incorrect After Event	GO to Pinpoint Test Z
SECM (steering effort control module)	C100C:68	Steering Tracking: Event Information	GO to Pinpoint Test Z
SECM (steering effort control module)	C100C:9A	Steering Tracking: Component or System Operating Conditions	GO to Pinpoint Test Z
SECM (steering effort control module)	C1039:75	Active Front Steering (AFS) Lock: Emergency Position Not Reachable	GO to Pinpoint Test J
SECM (steering effort control module)	C1039:7F	Active Front Steering (AFS) Lock: Actuator Stuck Off	GO to Pinpoint Test K
SECM (steering effort control module)	C1039:92	Active Front Steering (AFS) Lock: Performance Or Incorrect Operation	GO to Pinpoint Test K
SECM (steering effort control module)	C1039:94	Active Front Steering (AFS) Lock: Unexpected Operation	GO to Pinpoint Test K
SECM (steering effort control module)	C1B00:81	Steering Angle Sensor: Invalid Serial Data Received	GO to Pinpoint Test AA
SECM (steering effort control module)	C1B00:82	Steering Angle Sensor: Alive/Sequence Counter Incorrect/Not Updated	GO to Pinpoint Test AA

SECM (steering effort control module)	U0151:00	Lost Communication With Restraints Control Module: No Sub Type Information	GO to Pinpoint Test H
SECM (steering effort control module)	U0212:00	Lost Communication With Steering Column Control Module: No Sub Type Information	GO to Pinpoint Test O
SECM (steering effort control module)	U023A:00	Lost Communication With Image Processing Module A: No Sub Type Information	GO to Pinpoint Test P
SECM (steering effort control module)	U0401:00	Invalid Data Received from ECM/PCM A: No Sub Type Information	GO to Pinpoint Test C
SECM (steering effort control module)	U0401:81	Invalid Data Received from ECM/PCM A: Invalid Serial Data Received	GO to Pinpoint Test C
SECM (steering effort control module)	U0401:82	Invalid Data Received from ECM/PCM A: Alive/Sequence Counter Incorrect/Not Updated	GO to Pinpoint Test C
SECM (steering effort control module)	U0401:83	Invalid Data Received from ECM/PCM A: Value Of Signal Protection Calculation Incorrect	GO to Pinpoint Test C
SECM (steering effort control module)	U0415:00	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module "A": No Sub Type Information	GO to Pinpoint Test D
SECM (steering effort control module)	U0415:81	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module "A": Invalid Serial Data Received	GO to Pinpoint Test D
SECM (steering effort control module)	U0415:82	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module "A": Alive/Sequence Counter Incorrect/Not Updated	GO to Pinpoint Test D

SECM (steering effort control module)	U2016:47	Control Module Main Software: Watchdog/Safety µC Failure	GO to Pinpoint Test J
SECM (steering effort control module)	U201A:53	Control Module Main Calibration Data: Deactivated	GO to Pinpoint Test J
SECM (steering effort control module)	U2100:00	Initial Configuration Not Complete: No Sub Type Information	GO to Pinpoint Test N
SECM (steering effort control module)	U2101:00	Control Module Configuration Incompatible: No Sub Type Information	GO to Pinpoint Test N
SECM (steering effort control module)	U3000:18	Control Module: Circuit Current Below Threshold	GO to Pinpoint Test J
SECM (steering effort control module)	U3000:19	Control Module: Circuit Current Above Threshold	GO to Pinpoint Test L
SECM (steering effort control module)	U3000:45	Control Module: Program Memory Failure	GO to Pinpoint Test J
SECM (steering effort control module)	U3000:46	Control Module: Calibration/Parameter Memory Failure	GO to Pinpoint Test K
SECM (steering effort control module)	U3000:49	Control Module: Internal Electronic Failure	GO to Pinpoint Test K
SECM (steering effort control module)	U3000:54	Control Module: Missing Calibration	GO to Pinpoint Test J

(100-00 General Information, Description and Operation).

Condition	Actions
A module does not respond to the diagnostic scan tool	GO to Pinpoint Test Q
Click noise with or without steering wheel movement during vehicle startup or shutdown	GO to Pinpoint Test R
Front wheel contacting suspension control arm	GO to Pinpoint Test S
Heated steering wheel fault	GO to Pinpoint Test J
High steering effort	GO to Pinpoint Test T
The red adaptive steering system warning indicator is always on	GO to Pinpoint Test U
The yellow adaptive steering system warning indicator is always on	GO to Pinpoint Test V
The yellow adaptive steering system warning indicator flashes once per second during start up	GO to Pinpoint Test W
Message center displays Adaptive Steering Initialization	GO to Pinpoint Test W
Message center displays Adaptive Steering Off Service Required	GO to Pinpoint Test V
Message center displays Adaptive Steering Loss Do Not Drive	GO to Pinpoint Test U
Steering tie-rods adjusted unevenly	GO to Pinpoint Test X
Steering wheel is off center following adaptive steering trim service routines	GO to Pinpoint Test X
Turn signals cancel unevenly	GO to Pinpoint Test Y