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2012 FORD Fusion Hybrid OEM Service and Repair Workshop Manual

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ABS (anti-lock brake system) C0031:4A	Left Front Wheel Speed Sensor: Incorrect Component Installed	Sets when the ABS (anti-lock brake system) module detects an incorrect wheel speed sensor type.
ABS (anti-lock brake system) C0034:4A	Right Front Wheel Speed Sensor: Incorrect Component Installed	Sets when the ABS (anti-lock brake system) module detects an incorrect wheel speed sensor type.
ABS (anti-lock brake system) C0037:4A	Left Rear Wheel Speed Sensor: Incorrect Component Installed	Sets when the ABS (anti-lock brake system) module detects an incorrect wheel speed sensor type.
ABS (anti-lock brake system) C003A:4A	Right Rear Wheel Speed Sensor: Incorrect Component Installed	Sets when the ABS (anti-lock brake system) module detects an incorrect wheel speed sensor type.
ABS (anti-lock brake system) C1A95:4A	Wheel Speed Sensor: Incorrect Component Installed	Sets when the ABS (anti-lock brake system) module detects an incorrect wheel speed sensor type.

Possible Sources

- Wheel speed sensor input concern
- Wheel speed sensor
- ABS (anti-lock brake system) module

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST AM : BRAKE PRESSURE SENSOR FAULTS

Normal Operation and Fault Conditions

The ABS (anti-lock brake system) module monitors various inputs and compares the values to what should be expected. If the values received are out of range or not what should be expected, the ABS (anti-lock brake system) module sets a DTC (diagnostic trouble code) .

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).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition

Possible Sources

- Wiring, terminals or connectors
- IVD Initialization sequence not carried out
- RCM (restraints control module) concern
- ABS (anti-lock brake system) module

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST BP : ABS (ANTI-LOCK BRAKE SYSTEM) MODULE COMMUNICATION CONCERN WITH THE GWM (GATEWAY MODULE A)

Refer to Wiring Diagrams Cell 42for schematic and connector information.

Normal Operation and Fault Conditions 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).

With the ignition ON, the GWM (gateway module A) sends messages to the ABS (anti-lock brake system) module over the FD-CAN (Flexible Data Rate Controller Area Network) . If the ABS (anti-lock brake system) module does not receive these messages within a certain time frame (usually less than 1 second), the ABS (anti-lock brake system) module sets Diagnostic Trouble Codes (DTCs). This can be due to a GWM (gateway module A) failure, a circuit failure on the FD-CAN (Flexible Data Rate Controller Area Network) or an excessive load on the network. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
ABS (anti-lock brake system) U0146:00	Lost Communication With Serial Data Gateway 'A': No Sub Type Information	This DTC (diagnostic trouble code) sets in the ABS (anti-lock brake system) module if the IPC (instrument panel cluster) messages from the GWM (gateway module A) are missing for more than 5 seconds.

Possible Sources

- Network communication concern
- GWM (gateway module A)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST AP : SASM MODULE RESET CONCERN

Refer to Wiring Diagrams Cell 42for schematic and connector information.

SASM (steering angle sensor module) C1B00:85	Steering Angle Sensor: Signal Above Allowable Range	This DTC (diagnostic trouble code) sets if the SASM (steering angle sensor module) steering angle sensor information is outside regular measuring range of -1,080 degrees to +1,080 degrees.
SASM (steering angle sensor module) U1000:00	Solid State Driver Protection Active - Driver Disabled: No Sub Type Information	The SASM (steering angle sensor module) uses solid state drivers to control various outputs. When an overload occurs on any of these drivers, the SASM (steering angle sensor module) disables the output. This DTC (diagnostic trouble code) sets if one of the following conditions exists: the high power current is more than 44.75A and less than 56A for 5 seconds, or the SASM (steering angle sensor module) has detected 3 high power circuit failures within the same ignition cycle.
SASM (steering angle sensor module) U2001:98	Reduced System Function: Component Or System Over Temperature	This DTC (diagnostic trouble code) sets if the clockspring tape temperature exceeds 95°C (203°F) for 10 seconds or 105°C (221°F) for less than 500 milliseconds.
SASM (steering angle sensor module) U2002:98	Switch: Component Or System Over Temperature	This DTC (diagnostic trouble code) sets if the high power circuit FET (Field Effect Transistor) temperature exceeds 115°C (239°F) for 10 seconds or 125°C (257°F) for less than 1 second.
SASM (steering angle sensor module) U210A:02	Temperature Sensor: General Signal Failure	This DTC (diagnostic trouble code) sets due to an internal short to ground or short to voltage which causes an over-temperature condition in the clockspring tape circuits.
SASM (steering angle sensor module) U3000:1E	Control Module: Circuit Resistance Out Of Range	This DTC (diagnostic trouble code) sets if the current on the clockspring tape high power circuit is between 8A and 17A and the resistance ratio crosses the upper or lower threshold.
SASM (steering angle sensor module) U3000:42	Control Module: General Memory Failure	This DTC (diagnostic trouble code) sets due to an internal failure of the SASM (steering angle sensor module) .

Is the DTC (diagnostic trouble code) present and active in the SASM (steering angle sensor module) ?

Yes	INSTALL a new SASM (steering angle sensor module) -Clockspring assembly. REFER to: Clockspring - Vehicles With: Adaptive Steering (501-20B Supplemental Restraint System, Removal and Installation).

No	The SASM (steering angle sensor module) module reset has resolved the condition causing the DTC (diagnostic trouble code) . The repair is complete.

PINPOINT TEST CZ : SASM (STEERING ANGLE SENSOR MODULE) COMMUNICATION CONCERN WITH THE FCIM (FRONT CONTROLS INTERFACE MODULE)

Refer to Wiring Diagrams Cell 42for schematic and connector information.

Normal Operation and Fault Conditions 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).

With the ignition ON, the FCIM (front controls interface module) sends messages to the GWM (gateway module A) over the MS-CAN (medium speed-controller area network) , the GWM (gateway module A) relays the messages to the SASM (steering angle sensor module) over the HS-CAN2 (high-speed controller area network 2) . If the SASM (steering angle sensor module) does not receive these messages within a certain time frame, the module sets Diagnostic Trouble Codes (DTCs). This can be due to a FCIM (front controls interface module) failure, a circuit failure on the CAN (controller area network) network or an excessive load on the network. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
SASM (steering angle sensor module) U0556:82	Invalid Data Received From Front Display Interface Module: Alive/Sequence Counter Incorrect/Not Updated	Sets when the SASM (steering angle sensor module) does not receive fresh data from the FCIM (front controls interface module) within the allotted time.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- FCIM (front controls interface module)

PINPOINT TEST BL : SASM IGNITION INPUT CIRCUIT FAULT

Refer to Wiring Diagrams Cell 42for schematic and connector information.

Normal Operation and Fault Conditions 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).

The SASM (steering angle sensor module) requires an operating voltage between 8 and 17 volts. The SASM (steering angle sensor module) receives fused ignition voltage from the BCM (body control module) run-start bus. The SASM (steering angle sensor module) has a single ground circuit. The SASM (steering angle sensor module) sets this DTC (diagnostic trouble code) if there is excessive resistance or an open in the ignition circuit. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
SASM (steering angle sensor module) U3011:13	Ignition Input Off: Circuit Open	Sets if the ignition voltage supplied to the SASM (steering angle sensor module) is below 6 volts for more than 1 second.

Possible Sources

- Fuses
- Wiring, terminals or connectors
- Charging system concern
- Battery
- SASM (steering angle sensor module)

Visual Inspection and Pre-checks

- Make sure the vehicle battery terminals and cables are free of any corrosion and other contaminants.
- Make sure the vehicle battery terminals are tightened to their correct torque specifications.
- Make sure all SASM (steering angle sensor module) fuses in the BJB (battery junction box) are OK.

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST CM : ABS (ANTI-LOCK BRAKE SYSTEM) MODULE COMMUNICATION CONCERN WITH HEV (HYBRID ELECTRIC VEHICLE) PCM (POWERTRAIN CONTROL MODULE)

NOTE

The HEV (hybrid electric vehicle) PCM (powertrain control module) may also be known as the SOBDM

brake system) module by the TCCM (transfer case control module) , 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).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
ABS (anti-lock brake system) U0102:00	Lost Communication with Transfer Case Control Module: No Sub Type Information	Sets if the PCM (powertrain control module) messages are missing.
ABS (anti-lock brake system) U0403:00	Invalid Data Received From Transfer Case Control Module: No Sub Type Information	Sets if the information in one or more messages from the PCM (powertrain control module) contains invalid or out of range information.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- TCCM (transfer case control module)
- ABS (anti-lock brake system)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST AV : ABS (ANTI-LOCK BRAKE SYSTEM) MODULE COMMUNICATION CONCERN WITH GSM (GEAR SHIFT MODULE)

Refer to Wiring Diagrams Cell 14for schematic and connector information.

Normal Operation and Fault Conditions With the ignition ON, the GSM (gear shift module) sends messages to the GWM (gateway module A) over the HS-CAN2 (high-speed controller area network 2) , the GWM (gateway module A) relays these messages to the ABS (anti-lock brake system) module over the FD-CAN (Flexible Data Rate Controller Area Network) . If the ABS (anti-lock brake system) module does not receive these messages within the specified time frame, the ABS (anti-lock brake system) module sets Diagnostic Trouble Codes (DTCs). This can be due to a GSM (gear shift module) failure, a circuit failure on the CAN (controller area network) or an excessive load on the network. For information on the messages sent to the ABS (anti-lock brake system) module by the GSM (gear shift module) , 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).

DTC Fault Trigger Conditions

		lever position message or the power pack status message.
SASM (steering angle sensor module) U0401:81	Invalid Data Received from ECM/PCM A: Invalid Serial Data Received	Sets if the SASM (steering angle sensor module) receives invalid data in the vehicle speed quality factor check message.
SASM (steering angle sensor module) U0401:82	Invalid Data Received from ECM/PCM A: Alive/Sequence Counter Incorrect/Not Updated	Sets if the SASM (steering angle sensor module) receives invalid data in the vehicle speed counter check message.
SASM (steering angle sensor module) U0401:83	Invalid Data Received from ECM/PCM A: Value Of Signal Protection Calculation Incorrect	Sets if the SASM (steering angle sensor module) receives invalid data in the vehicle speed checksum check message.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- PCM (powertrain control module)
- SASM (steering angle sensor module)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST AX : SASM (STEERING ANGLE SENSOR MODULE) COMMUNICATION CONCERN WITH THE ABS (ANTI-LOCK BRAKE SYSTEM) MODULE

Refer to Wiring Diagrams Cell 42for schematic and connector information.
Normal Operation and Fault Conditions 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).
With the ignition ON, the ABS (anti-lock brake system) module sends messages to the GWM (gateway module A) over the FD-CAN (Flexible Data Rate Controller Area Network) , the GWM (gateway module A) relays the messages to the SASM (steering angle sensor module) over the HS-CAN2 (high-speed controller area network 2) . If the SASM (steering angle sensor module) does not receive these messages within a certain time frame, the module sets Diagnostic Trouble Codes (DTCs). This can be due to a ABS (anti-lock brake system) failure, a circuit failure on the CAN (controller area network) network or an excessive load on the network. **DTC Fault Trigger Conditions**

DTC (diagnostic	Description	Fault Trigger Condition

SASM (steering angle sensor module) U0122:00	Lost Communication With Vehicle Dynamics Control Module: No Sub Type Information	Sets if the SASM (steering angle sensor module) detects any of the VDM (vehicle dynamics control module) messages are missing.
SASM (steering angle sensor module) U0416:00	Invalid Data Received From Vehicle Dynamics Control Module: No Sub Type Information	Sets if the suspension messages from the VDM (vehicle dynamics control module) contain invalid information.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- VDM (vehicle dynamics control module)
- SASM (steering angle sensor module)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST AZ : SASM (STEERING ANGLE SENSOR MODULE) COMMUNICATION CONCERN WITH THE SECM (STEERING EFFORT CONTROL MODULE)

Refer to Wiring Diagrams Cell 42for schematic and connector information.
Normal Operation and Fault Conditions 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).
With the ignition ON, the SECM (steering effort control module) sends messages to the SASM (steering angle sensor module) over a private CAN (controller area network) . If the SASM (steering angle sensor module) does not receive these messages within a certain time frame, the module sets Diagnostic Trouble Codes (DTCs). This can be due to a SECM (steering effort control module) failure, a circuit failure on the CAN (controller area network) network or an excessive load on the network. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
SASM (steering angle sensor module) U0130:00	Lost Communication With Steering Effort Control Module: No Sub Type Information	Sets if the SASM (steering angle sensor module) detects any of the SECM (steering effort control module) messages are missing.
SASM (steering angle sensor	Invalid Data Received From Steering Effort Control Module:	Sets when the SASM (steering angle sensor module) receives invalid adaptive front steering

PINPOINT TEST BB : SASM (STEERING ANGLE SENSOR MODULE) COMMUNICATION CONCERN WITH IPC (INSTRUMENT PANEL CLUSTER)

Refer to Wiring Diagrams Cell 42for schematic and connector information.

Normal Operation and Fault Conditions 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).

With the ignition ON, the IPC (instrument panel cluster) sends messages to the SASM (steering angle sensor module) module through the GWM (gateway module A) over the HS-CAN3 (high-speed controller area network 3) . If the SASM (steering angle sensor module) does not receive these messages within a certain time frame or if the messages contain invalid information, the module sets Diagnostic Trouble Codes (DTCs). This can be due to a IPC (instrument panel cluster) failure, a circuit failure on the CAN (controller area network) or an excessive load on the network. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
SASM (steering angle sensor module) U0155:00	Lost Communication With Instrument Panel Cluster (IPC) Control Module: No Sub Type Information	Sets when the SASM (steering angle sensor module) does not receive messages from the IPC (instrument panel cluster) .
SASM (steering angle sensor module) U0423:00	Invalid Data Received from Instrument Panel Cluster Control Module: No Sub Type Information	Sets if the SASM (steering angle sensor module) receives invalid data in the messages from the IPC (instrument panel cluster) .
SASM (steering angle sensor module) U0423:82	Invalid Data Received from Instrument Panel Cluster Control Module: Alive/Sequence Counter Incorrect/Not Updated	Sets if the SASM (steering angle sensor module) receives invalid data in the messages from the IPC (instrument panel cluster) .

Possible Sources

- Network communication concern
- Over or under voltage concerns
- IPC (instrument panel cluster)
- GWM (gateway module A)

Pinpoint Test Steps available in the on-line Workshop Manual.