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2013 FORD Edge OEM Service and Repair Workshop Manual

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The MS-CAN (medium speed-controller area network) 1 and 2 operate at a maximum data transfer speed of 125 Kbps and are designed for general information transfer. Modules on the MS-CAN (medium speed-controller area network) 1 and 2 communicate using bussed messages. The MS-CAN (medium speed-controller area network) 1 and 2 use an unshielded twisted pair cable, data bus (+) and data bus (-) circuits which allows sharing of information between all modules on the networks.

The GWM (gateway module A) transfers messages between the diagnostic scan tool and the modules on the MS-CAN (medium speed-controller area network) 1 and 2.

The GWM (gateway module A) translates the diagnostic messages from the DIAG1 to the MS-CAN (medium speed-controller area network) 1 and 2 allowing communication between the modules and the diagnostic scan tool.

Controller Area Network (CAN) Fault Tolerance

Flexible Data Rate Controller Area Network (FD-CAN) Fault Tolerance Normal Operation

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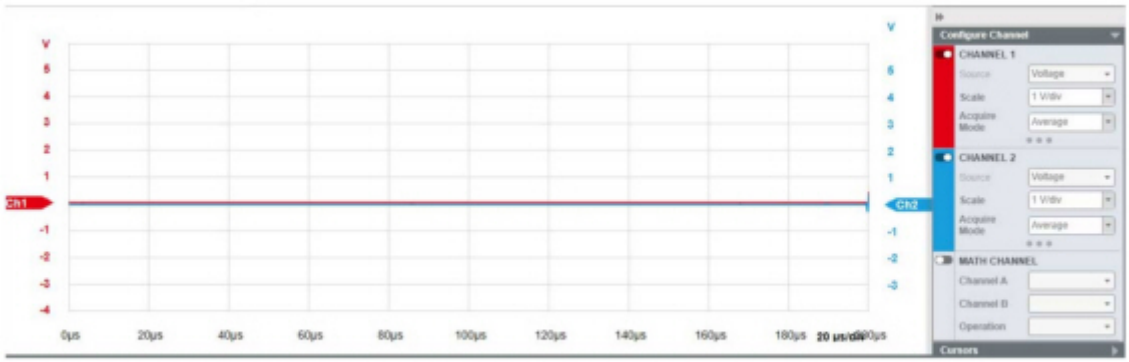
The data (+) and data (-) circuits are each regulated to approximately 2.5 volts during neutral or rested network traffic. As messages are sent on the data (+) circuit, voltage is increased by approximately 1.0 volt. Inversely, the data (-) circuit is reduced by approximately 1.0 volt when a message is sent.

Successful communication of a message can usually be identified by the slight spike at the end of a message transmission. Any signals that are significantly different than the normal CAN (controller area network) waveform may cause network Diagnostic Trouble Codes (DTCs) (U-codes) to set or may cause a complete network outage.

High Speed Controller Area Network (HS-CAN) and Medium Speed Controller Area Network (MS-CAN) Fault Tolerance Normal Operation



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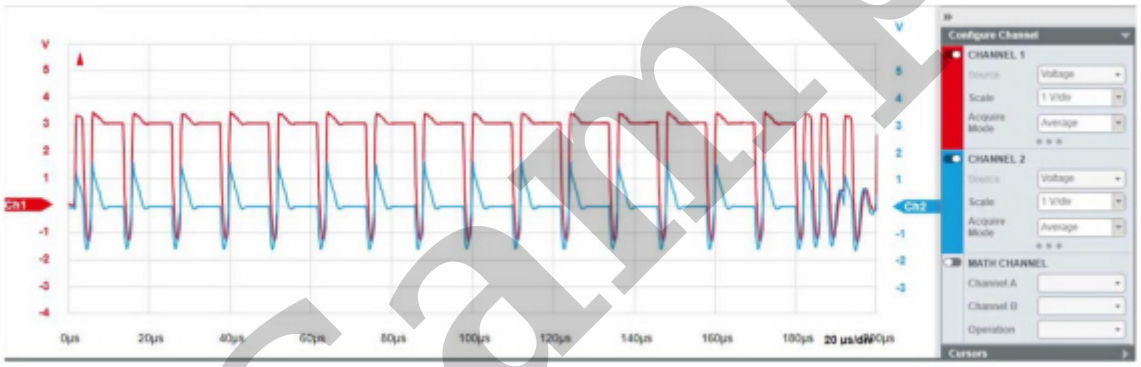
In the event the data (+) circuit becomes shorted to ground, both the data (+) and data (-) circuits are pulled low (0V) and all communication capabilities are lost.

CAN (-) Circuit Shorted to Ground



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In the event the data (-) circuit becomes shorted to ground, the data (-) circuit is pulled low (0V) and the data (+) circuit reaches near-normal peak voltage (3.0V) during communication but falls to 0V instead of normal base voltage (2.5V). Communication may continue but at a degraded level.

CAN (+) Circuit Shorted to Battery Voltage

through the gateway module as the feature/function in question. The information listed in the communication message chart below provides the key reference information to make this possible.

Example:

The ability of the power running boards to extend when the driver door is opened confirms the ability of the gateway module to successfully translate messages from the HS-CAN1 (high-speed controller area network 1) to the MS-CAN (medium speed-controller area network) . If this function is not operating correctly, perform a comparative check for another function that is completed using the same translation path but with different originating and receiving modules. Refer to the comparative example below:

Network Message	Originating Module	Network Type	Receiving Module(s)
Driver door ajar status	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	• PCM (powertrain control module) • PAM (parking assist control module) • GWM (gateway module A)
Driver door ajar status	GWM (gateway module A)	MS-CAN (medium speed-controller area network)	• PRB (power running board)

In this example, the path for relaying gear lever position information from the PCM (powertrain control module) to the DDM (driver door module) is being used for a comparative functional check. The diagnostic scan tool display of the gear lever position information in the DDM (driver door module) was used to verify the functionality of the HS-CAN1 (high-speed controller area network 1) to MS-CAN (medium speed-controller area network) path.

Network Message	Originating Module	Network Type	Receiving Module(s)
Gear lever position	PCM (powertrain control module)	HS-CAN1 (high-speed controller area network 1)	• BCM (body control module) • PAM (parking assist control module) • GWM (gateway module A)
Gear lever position	GWM (gateway module A)	MS-CAN (medium speed-controller area network)	• DDM (driver door module)

		area network 2)	
A/C (air conditioning) clutch status (battery management)	GWM (gateway module A)	MS-CAN (medium speed-controller area network) 1	• DDM (driver door module) • HVAC (heating, ventilation and air conditioning) module • PDM (passenger door module)
A/C (air conditioning) clutch status (engine data)	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	• GWM (gateway module A)
A/C (air conditioning) clutch status (engine data)	GWM (gateway module A)	HS-CAN3 (high-speed controller area network 3)	• ACM (audio front control module) • APIM (SYNC module) • IPC (instrument panel cluster) • TRM (trailer module) / TBM (trailer brake control module)
ABS (anti-lock brake system) active	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	• IPMA (image processing module A) • PCM (powertrain control module) • PSCM (power steering control module) • SOBDMC (secondary on-board diagnostic control module C) • VDM (vehicle dynamics control module) • GWM (gateway module A)

		area network 3)	• TRM (trailer module) / TBM (trailer brake control module)
Accelerator pedal position	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	• ABS (anti-lock brake system) module • CMR (Camera Module - Rear) • HCM (headlamp control module) • IPMA (image processing module A) • PSCM (power steering control module) • SOBDMC (secondary on-board diagnostic control module C) • VDM (vehicle dynamics control module) • GWM (gateway module A)
Accelerator pedal position	GWM (gateway module A)	HS-CAN1 (high-speed controller area network 1)	• BCM (body control module) • BECM (battery energy control module) • SOBDMB (Secondary On-Board Diagnostic Control Module B (SOBDMB)) (All Wheel Drive Control [AWDC])
Accelerator pedal position	GWM (gateway module A)	HS-CAN2 (high-speed controller area network 2)	• GSM (gear shift module) • OCS (occupant classification system) module • RCM (restraints control module)

			• DCDC (direct current/direct current converter control module) • PACM (pedestrian alert control module) • SOBDM (secondary on-board diagnostic control module A) (Battery Charging Control Module [BCCM]) • SOBDMB (Secondary On-Board Diagnostic Control Module B (SOBDMB)) (All Wheel Drive Control [AWDC]) • GWM (gateway module A)
Accessory delay	GWM (gateway module A)	FD-CAN (Flexible Data Rate Controller Area Network)	• ABS (anti-lock brake system) module • CMR (Camera Module - Rear) • HCM (headlamp control module) • IPMA (image processing module A) • PCM (powertrain control module) • PSCM (power steering control module) • SOBDMC (secondary on-board diagnostic control module C) • VDM (vehicle dynamics control module)
Accessory delay	GWM (gateway module A)	HS-CAN2 (high-speed controller	• GSM (gear shift module) • OCS (occupant classification system)

		area network) 2	
ACM (audio front control module) configuration	ACM (audio front control module)	HS-CAN3 (high-speed controller area network 3)	• APIM (SYNC module)
ACM (audio front control module) track information	ACM (audio front control module)	HS-CAN3 (high-speed controller area network 3)	• APIM (SYNC module) • IPC (instrument panel cluster)
Active noise audio status	ACM (audio front control module)	HS-CAN3 (high-speed controller area network 3)	• DSP (audio digital signal processing module)
Active park assist chime request	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	• ABS (anti-lock brake system) module • PCM (powertrain control module) • PSCM (power steering control module) • GWM (gateway module A)
Active park assist chime request	GWM (gateway module A)	HS-CAN1 (high-speed controller area network 1)	• BCM (body control module)
Active park assist chime request	GWM (gateway module A)	HS-CAN3 (high-speed controller area network 3)	• ACM (audio front control module) • APIM (SYNC module)

		area network 3)	
Adaptive headlamp fault	HCM (headlamp control module)	FD-CAN (Flexible Data Rate Controller Area Network)	• GWM (gateway module A)
Adaptive headlamp fault	GWM (gateway module A)	HS-CAN2 (high-speed controller area network 2)	• SCCM (steering column control module)
Adaptive headlamp fault	GWM (gateway module A)	FD-CAN (Flexible Data Rate Controller Area Network)	• IPMA (image processing module A)
Adjustable speed limiter chime request	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	• ABS (anti-lock brake system) module • IPMA (image processing module A) • SOBDMC (secondary on-board diagnostic control module C) • GWM (gateway module A)
Adjustable speed limiter chime request	GWM (gateway module A)	HS-CAN1 (high-speed controller area network 1)	• ACCM (air conditioning control module) • ACCMB (Air Conditioining Compressor Control Module B) • BCM (body control module)

		Area Network)	• IPMA (image processing module A) • PCM (powertrain control module) • PSCM (power steering control module)
Adjustable speed limiter commands	GWM (gateway module A)	HS-CAN1 (high-speed controller area network 1)	• BCM (body control module)
Adjustable speed limiter commands	GWM (gateway module A)	MS-CAN (medium speed-controller area network) 1	• DDM (driver door module) • PDM (passenger door module)
Airbag deployment status	RCM (restraints control module)	HS-CAN2 (high-speed controller area network 2)	• GWM (gateway module A)
Airbag deployment status	GWM (gateway module A)	HS-CAN3 (high-speed controller area network 3)	• ACM (audio front control module) • APIM (SYNC module)
Airbag deployment status	GWM (gateway module A)	HS-CAN4 (high-speed controller area network 4)	• TCU (telematic control unit module)
Airbag indicator status	IPC (instrument panel cluster)	HS-CAN3 (high-speed controller	• GWM (gateway module A)