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2018 FORD Mustang OEM Service and Repair Workshop Manual

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Tailgate Step

The message center provides a message to alert the driver the tailgate step is open when attempting to close the power tailgate. The tailgate cannot close with the step in the open position.

TPMS (tire pressure monitoring system) (Fault and Tire Training Status)

The IPC (instrument panel cluster) provides message center displays to indicate the TPMS (tire pressure monitoring system) sensor training status or a malfunction in the TPMS (tire pressure monitoring system) .

Trailer Brake and Lighting

The message center provides warning messages to indicate the status of the trailer brake and trailer lamp connections and trailer lamps.

Trailer Sway

The message center provides the trailer sway warning message to inform that a trailer sway has been detected and to reduce speed to help regain control of the trailer.

Vehicle Start Inhibit (Over the Air [OTA] Update)

The message center provides a warning message that vehicle start is inhibited due to an over-the-air software update in progress.

Work Surface (Stow Before Driving)

The message center provides a message to remind the driver to stow the mobile work surface before driving the vehicle. The mobile work surface uses a work surface status switch hardwired to the BCM (body control module) . When the work surface is open, the switch closes to ground. The BCM (body control module) monitors the signal, and sends a status message to the IPC (instrument panel cluster) to display the message in the message center.

Component Description

Brake Fluid Level Switch

The brake fluid level switch is mounted in the master cylinder reservoir, and is hardwired to the ABS (anti-lock brake system) module through a signal circuit and a separate return circuit. The ABS (anti-lock brake system) module provides a reference voltage to the brake fluid level switch. When the brake fluid level is low, the float drops, allowing the switch to close, pulling the reference voltage low. When the brake fluid level is high, the float lifts, opening the switch contacts, sending the reference voltage high on the signal circuit to the ABS (anti-lock brake system) module.

Steering Wheel Switch - Message Center

The message center switch is part of the RH (right-hand) steering wheel switch and comprised of 5 buttons (up, down, OK, back and menu). The message center switch uses different resistance values associated with each button. The SCCM (steering column control module) sends out a reference voltage to the RH (right-hand) steering wheel switch on the input circuit and monitors the voltage drops. The voltage drop varies depending

Message Center - System Operation and Component Description

413-01 Instrumentation, Message Center and Warning Chimes	***2022 F-150***
Description and Operation	***Procedure revision date: 09/29/2021***

Message Center - System Operation and Component Description

System Operation

System Diagram

Message Center

2	Parking brake switch
3	Brake fluid level switch
4	Door/tailgate ajar switches
5	Hood ajar switch
6	RH (right-hand) steering wheel switch
7	PCM (powertrain control module)
8	TCM (transmission control module) (diesel)
9	ABS (anti-lock brake system) module
10	TCCM (transfer case control module)
11	IPMA (image processing module A)
12	PSCM (power steering control module)
13	VDM (vehicle dynamics control module)
14	BCM (body control module)
15	PACM (pedestrian alert control module)
16	HCM (headlamp control module)
17	RCM (restraints control module)
18	Without adaptive steering
19	SCCM (steering column control module)
20	With adaptive steering
21	SASM (steering angle sensor module)
22	SECM (steering effort control module)

Digital speedometer	Vehicle speed	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
DTE (distance to empty) /Average fuel economy	• Fuel flow volume display • Fuel level display • Fuel alcohol percent • Odometer count	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
	Transport mode	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
	Fuel level data	IPC (instrument panel cluster)	HS-CAN3 (high-speed controller area network 3)	PCM (powertrain control module)
Forward collision alert	Forward collision warning indicator request	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Lane keeping system	• Hands off display • Lane keeping system status display	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Lane centering system	• Traffic jam assist status • Traffic jam assist message request	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)

Network Message Chart - Information-On-Demand Displays

The information-on-demand displays are selected using the menu screens in the message center. The data in each display is shown when the IPC (instrument panel cluster) receives messaged inputs from other modules on the CAN (controller area network) , unless the display data is controlled exclusively by the IPC (instrument panel cluster) . The IPC (instrument panel cluster) communcates on the HS-CAN3 (high-speed controller area network 3) . If the originating module communicates on a network other than the HS-CAN3 (high-speed controller area network 3) , the messaged signals are sent to the GWM (gateway module A) first, then to the IPC (instrument panel cluster) .

Information Display	Network Message	Originating Module	Originating CAN (controller area network)	Receiving Module
Brake coach (HEV (hybrid electric vehicle))	• Brake event data • Regenerative braking event level data	PCM (powertrain control module) / SOBDMC (secondary on-board diagnostic control module C)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Diesel exhaust fluid level	Diesel exhaust fluid level indicator	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Electric Vehicle (EV) coach (HEV (hybrid electric vehicle))	• Power level fill display • Power level threshold display • Power regeneration threshold display	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Engine hour/Engine idle hour	• Engine rpm data • Vehicle speed	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)

Trailer lighting	Parklamp status	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
	• Trailer lamp connected • Trailer lamp out • Trailer turn indicator status • Trailer battery charge status	TRM (trailer module)	HS-CAN3 (high-speed controller area network 3)	IPC (instrument panel cluster)
Trailer information	• Trailer setup • Trailer reverse status • Trailer reverse message request	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
	• BLIS (blind spot information system) trailer tow left status • BLIS (blind spot information system) trailer tow right status	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
	Vehicle speed	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
	Gear lever position	PCM (powertrain control module) (gas/ HEV (hybrid electric vehicle))/ TCM (transmission control module) (diesel)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)

Auto hold	Auto hold message request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Auto stop start	Stop start message request	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Automatic engine shutdown	Engine idle shutdown status	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Brake system/Parking brake engaged/Brake fluid low	• Brake (red) warning indicator request • Parking brake (red) indicator request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
	Brake warning indicator request	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Brake applied - power reduced	Brake pedal applied message request	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Change 4WD lubrication	4WD high/low status	TCCM (transfer case control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Check fuel door (HEV (hybrid electric vehicle)	Refuel system status	PCM (powertrain control module)	FD-CAN (Flexible Data	IPC (instrument

Electric parking brake	• Brake lamp request • Parking brake message request • Park brake (yellow) warning indicator request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Electronic locking differential (eLocker)	• Rear locking differential service required • Rear differential lock message request	TCCM (transfer case control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Engine oil level	Engine oil level warning request	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Engine oil change minder	Engine oil life	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Factory/transport mode	• Factory mode • Transport mode	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Front camera	Camera status display	IPMA (image processing module A)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Hill descent control	Hill descent message request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data	IPC (instrument

			Rate Controller Area Network)	panel cluster)
Passive key and immobilizer system	Immobilizer message display	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
	Power pack status	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	
Pedestrian alert (HEV (hybrid electric vehicle))	Pedestrian alert fault	PACM (pedestrian alert control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Perimeter alarm	Perimeter alarm chime request	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Power child door locks	Lock system message request	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Power running boards	Power step message request	DSM (driver front seat module)	MS-CAN (medium speed-controller area network)	IPC (instrument panel cluster)
Power steering	EPAS (electronic power assist steering) failure	PSCM (power steering control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Powertrain cooling	Powertrain cooling message request	PCM (powertrain control module)	FD-CAN (Flexible Data	IPC (instrument