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2017 FORD Mustang Shelby GT350R OEM Service and Repair Workshop Manual

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		left sensor status • Side obstacle detect status-left • Side obstacle sensor status-left • BLIS (blind spot information system) trailer tow status-left		Area Network)	
		• CTA (cross traffic alert) right status • CTA (cross traffic alert) right sensor status • Side obstacle detect status-right • Side obstacle sensor status-right • BLIS (blind spot information system) trailer tow status-right			
Brake warning/low brake fluid warning/parking brake	Both	Brake (red) warning indicator request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller	IPC (instrument panel cluster)

		Passenger door ajar status Right rear door ajar status Left rear door ajar status Hood ajar status Tailgate ajar status		area network 1)	panel cluster)
Drive mode (Eco, Sport, Tow Haul, Slippery, Trail, Mud/Ruts, Deep Snow/Sand, Rock Crawl, Baja (Raptor))	RTT (reconfigurable telltale)	Selectable drive mode request Selectable drive mode status Active drive mode status	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
		Selectable AWD mode status	TCCM (transfer case control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
ELD (electronic locking differential) (eLocker)	Both	Rear differential lock indicator request	TCCM (transfer case control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Electric parking brake	RTT (reconfigurable telltale)	Parking brake (red) lamp request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate	IPC (instrument

		request			
		• 4x4 auto indicator request			
Front fog lamp	Both	Front fog lamp indicator request	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Hazard - stop safely now (HEV (hybrid electric vehicle))	RTT (reconfigurable telltale)	HEV (hybrid electric vehicle) transmission warning indicator request	SOBDMC (secondary on-board diagnostic control module C)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
		HEV (hybrid electric vehicle) battery warning indicator request	BECM (battery energy control module)	HS-CAN1 (high-speed controller area network 1)	
High beam	Both	Headlamp high beam status	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Hill descent ready	RTT (reconfigurable telltale)	Hill descent mode	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)

				FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
MIL (malfunction indicator lamp) (check engine)	Both	MIL (malfunction indicator lamp) request	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
One-pedal trail control	RTT (reconfigurable telltale)	Train one-pedal mode indicator request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Overspeed warning (Gulf Cooperative Countries [GCC])	RTT (reconfigurable telltale)	Vehicle speed	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Police engine idle activation	RTT (reconfigurable telltale)	Police idle mode status	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Powertrain malfunction (wrench) warning	RTT (reconfigurable telltale)	Engine service required	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
		Transmission service required	PCM (powertrain control module) (gas/ HEV (hybrid electric vehicle))/ TCM (transmission	FD-CAN (Flexible Data Rate Controller Area Network)	

		• Cross traffic alert left brake enable request • Cross traffic alert brake warning-right • Cross traffic alert right brake enable request • Parking aid chime request		Area Network)	
		Gear lever position	• PCM (powertrain control module) • TCM (transmission control module) (diesel)		
Seatbelt (includes rear seatbelts)	RTT (reconfigurable telltale)	• Driver rear seatbelt buckle status • Passenger rear seatbelt buckle status • Rear center seatbelt buckle status	RCM (restraints control module)	HS-CAN2 (high-speed controller area network 2)	IPC (instrument panel cluster)
Seatbelt/Belt-Minder	Both	Driver seatbelt buckle status	RCM (restraints control module)	HS-CAN2 (high-speed controller	IPC (instrument panel cluster)

| | | | adaptive steering) | | |
			• SASM (steering angle sensor module) (with adaptive front steering)		
TPMS (tire pressure monitoring system)	Both	Tire pressure warning indicator	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Trail control	RTT (reconfigurable telltale)	Trail control status	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Trail turn assist	RTT (reconfigurable telltale)	Trail assist mode indicator request	ABS (anti-lock brake system) module	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)
Turn indicator (LH (left-hand) / RH (right-hand))	Both	• Left turn lamp on request • Right turn lamp on request	BCM (body control module)	HS-CAN1 (high-speed controller area network 1)	IPC (instrument panel cluster)
Water in fuel (diesel)	RTT (reconfigurable telltale)	Water in fuel	PCM (powertrain control module)	FD-CAN (Flexible Data Rate Controller Area Network)	IPC (instrument panel cluster)

For additional information,

Refer to: [Controller Area Network (CAN) Module Communications Network - System Operation and Component Description](#)

(418-00A Controller Area Network (CAN) Module Communications Network, Description and Operation).

All messaged inputs to the IPC (instrument panel cluster) from other networks are received from the GWM (gateway module A) over the HS-CAN3 (high-speed controller area network 3) . The GWM (gateway module A) acts as a gateway to convert messages from one of the other networks to the HS-CAN3 (high-speed controller area network 3) , which is recognized by the IPC (instrument panel cluster) .

Network messages can drop out or be missing for a variety of reasons, such as high network traffic on the bus. The IPC (instrument panel cluster) incorporates a defined strategy for handling missing network messages based on time. The strategy is basically the same for all indication outputs (gauges, indicators or chimes), but differs in the length of time required for the network message to be missing. If a required network message is missing or invalid for less than the programmed length of time, the gauge, indicator or message center display that requires the network message remains at the last commanded state based upon the last network message received. If the messaged input is missing for longer than the programmed length of time, the IPC (instrument panel cluster) output (gauge, indicator etc.) reacts according to a pre-defined default action.

Refer to the diagnostic overview descriptions located before each pinpoint test for further descriptions of the default action specific to each indicator or gauge. If the missing messaged input to the IPC (instrument panel cluster) returns at any time, the normal function of the gauge, indicator or message center display resumes.

Over-The-Air (OTA) Updates

The IPC (instrument panel cluster) is capable of receiving software updates through a cellular or WiFi connection to the vehicle. The software updates are sent to the TCU (telematic control unit module) and then to the enhanced central gateway (ECG), or GWM (gateway module A) . The GWM (gateway module A) sends the software update data to the IPC (instrument panel cluster) over the HS-CAN3 (high-speed controller area network 3) or through a pair of ethernet cable circuits connected to the IPC (instrument panel cluster) , depending upon the type of software update or IPC (instrument panel cluster) level. The ethernet cable connections are used for higher speed downloads and enhanced data security. The ethernet cables are color coded specifically for each module.

The ethernet connection is used for module software updates only, and not for receiving messaged data related to IPC (instrument panel cluster) function or driver information. If a module communication concern is detected, it will only affect the CAN (controller area network) connections to the IPC (instrument panel cluster) .

For certain types of software updates, certain vehicle functions will be unavailable while the updates are occurring, such as vehicle start, driving the vehicle, charging the vehicle (HEV (hybrid electric vehicle)) or using the key fob to lock or unlock the vehicle. The vehicle owner can schedule the software updates for

with a chime.

- At approximately 1/8 tank of remaining fuel, the IPC (instrument panel cluster) illuminates the low fuel message center indicator and the message center displays FUEL LEVEL LOW along with a chime.

- Traction control, Emergency Assist feature and the Do Not Disturb feature can be set to always on or user selectable in the MyKey® menu.

- If the traction control always on feature is turned on and the MyKey® driver attempts to disable the traction control, the message center displays ADVANCETRAC ON MYKEY SETTING.

The following features are provided in the message center display when a MyKey® key is being used:

- MyKey® miles driven by the MyKey® user can be found in the information display.

- The number of MyKey® programmed and administrator keys can be found in the MyKey® menu.

- The parking aid, Blind Spot Monitoring System/Cross Traffic Alert (BLIS®/CTA), lane departure alert and collision avoidance warning menus are disabled in the message center to force these features always on.

When an administrator key is in use, the following information is provided in the centerstack display:

- a menu in the message center guiding the user to create a MyKey®. When the maximum MyKey® limit is reached, the MyKey® creation menu is no longer available.

- a menu with options for setting 6 MyKey® features:

  - MyKey® speed limiter.

  - MyKey® pre-selected speed warning.

  - MyKey® radio volume limiter.

  - traction control always on or user selectable.

  - emergency assist feature always on or user selectable.

  - do not disturb feature always on or user selectable.

- a menu with the option to clear all MyKey® programmed keys at once.

For information on the MyKey® features, refer to the Owner's Literature.

Dealer Test Mode (Engineering Test Mode)

To enter the IPC (instrument panel cluster) engineering test mode or dealer test mode, begin with the ignition off. Press and hold the RH (right-hand) steering wheel switch OK button. For push-button start vehicles, place the ignition on and continue to hold the button for 5-8 seconds until the display indicates Test or Gauge Sweep. For key ignition vehicles, place the ignition in the key on position, and wait 5-8 seconds until the display indicates Test or Gauge Sweep. Press the up or down arrow buttons to navigate through each of the

In addition to the main fuel gauge, the message center provides virtual fuel gauges for each individual tank on all Instrument Panel Clusters (IPCs).

After a fuel fill up, the time for the fuel gauge to move from empty (E) to full (F) ranges from 2 seconds to 55 minutes depending on which operating mode the fuel gauge is in.

The IPC (instrument panel cluster) uses 4 different operating modes to calculate the fuel level:

- Anti-slosh (default mode)

- Key OFF fueling

- Key ON fueling

- Recovery

Anti-Slosh Mode

The default fuel gauge mode is called the anti-slosh mode. To prevent fuel gauge changes from fuel slosh (gauge instability due to changes in fuel sensor readings caused by fuel moving around in the tank), the fuel gauge takes approximately 40 minutes to go from empty (E) to full (F).

Key OFF Fueling Mode

The key OFF fueling mode (2 seconds to read empty [E] to full [F]) requires 3 conditions to be met:

- The ignition must be in the OFF mode when refueling the vehicle.

- At least 10% of the vehicle's fuel capacity must be added to the fuel tank.

- The IPC (instrument panel cluster) must receive a valid ignition ON fuel sensor reading within one second of the ignition being put into the RUN mode. The key ON sample readings are considered valid if the fuel sensor reading is between 10 ohms ± 2 ohms and 180 ohms ± 4 ohms.

If these conditions are not met, the fuel gauge stays in the anti-slosh mode, which results in a slow to read full (F) event.

Key ON Fueling Mode

In key ON fueling mode, a 30-second timer activates after the transmission is put into the PARK (P) or NEUTRAL (N) position. When the 30-second time has elapsed and at least 9% of the vehicle's fuel capacity has been added, the fuel gauge response time is 60 seconds to read from empty (E) to full (F). When the transmission is shifted out of PARK (P) or NEUTRAL (N), the fuel gauge strategy reverts to the anti-slosh mode. The key ON fueling mode prevents slow to read full events from happening if the customer refuels the vehicle with the ignition in the RUN mode.

The key ON fueling mode (approximately 60 seconds to read empty [E] to full [F]) requires the following conditions be met: