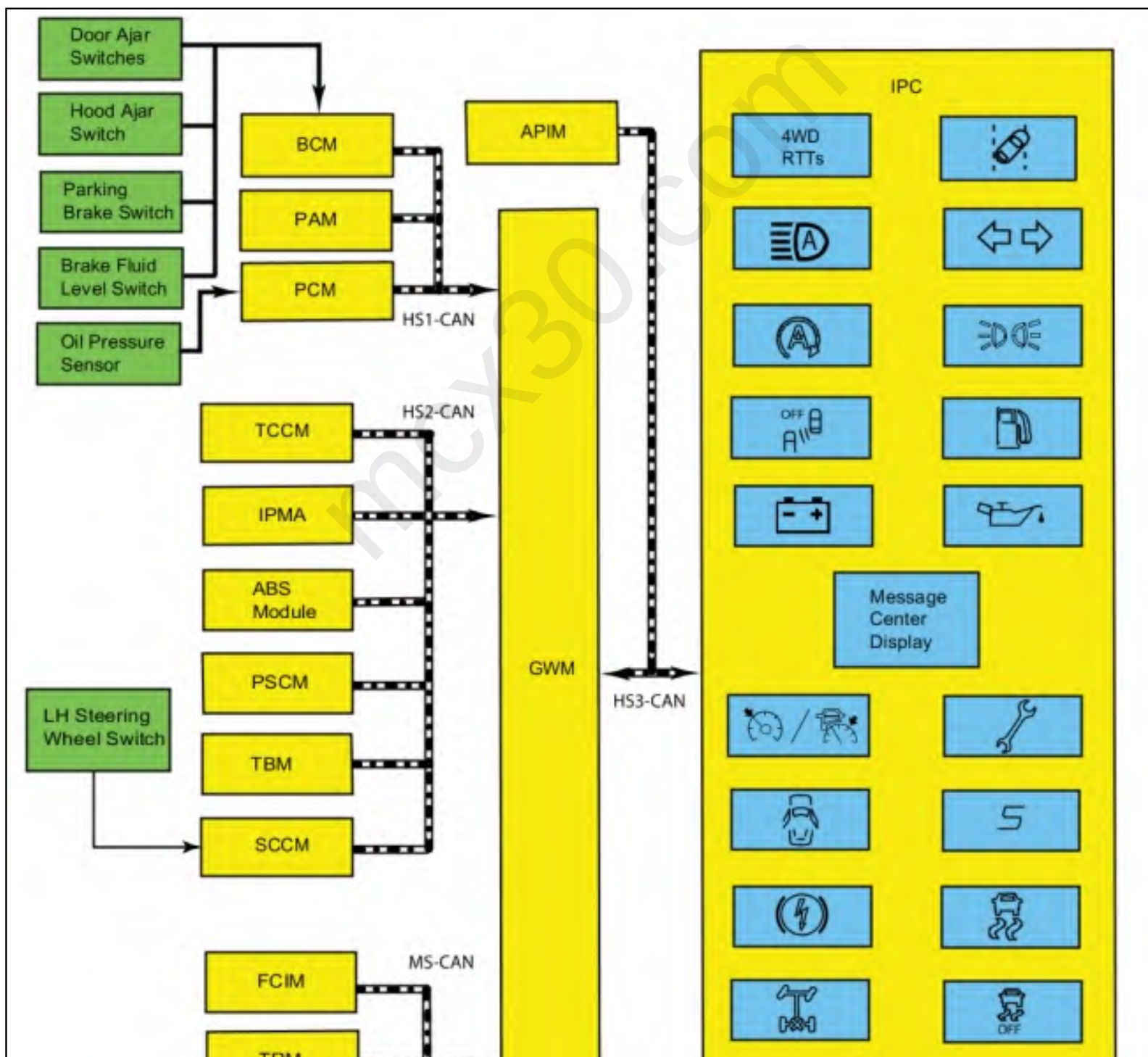
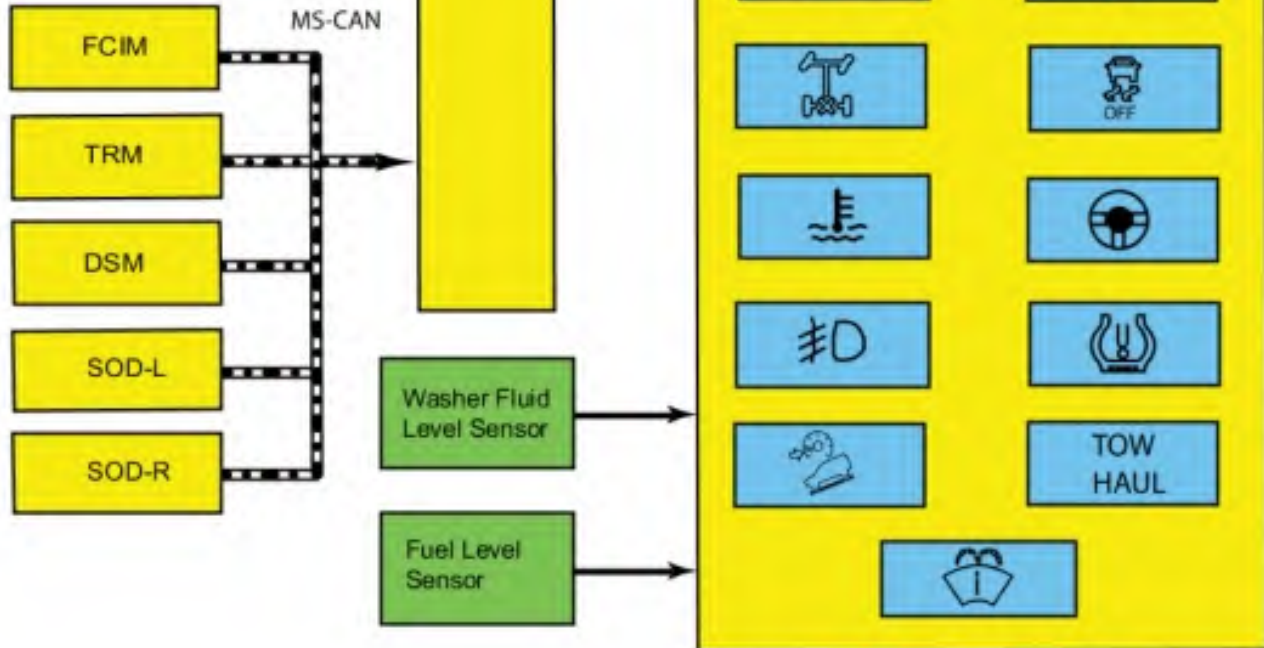


Message Center - System Operation and Component Description

System Operation

System Diagram





E263209

Network Message Chart

Module Network Input Messages - IPC

Broadcast Message	Originating Module	Message Purpose
4x2 status	TCCM	Input used to control the 2WD (2H) RTT.
4x4 auto status	TCCM	Input used to control the 4x4 auto (4A) RTT.
4x4 high status	TCCM	Input used to control the 4x4 high (4H) RTT.
4x4 low status	TCCM	Input used to control the 4x4 low (4L)RTT.
4x4 service required	TCCM	4x4 input used to control the powertrain malfunction (wrench) RTT.
4WD mode display	TCCM	Input used to control the terrain management display and warning messages.
4WD service required	TCCM	Input used for the 4WD system faults input to control the powertrain malfunction (wrench) RTT and to display 4WD fault messages.
4WD status	TCCM	Input used to control the neutral tow and off road messages. Also used to control the terrain management display and warning messages.
AWD lock	ABS module	Input used to control the power distribution display.
AWD range	TCCM	Input used to control the power distribution display.
Auto high beam status display	IPMA	Input used to control the auto high beam RTT.

Autopark status	PAM	Input used to control the parking aid messages displayed in the message center.
Battery low state of charge	BCM	Input used to control the charging system and load shed RTT indicator and warning messages.
BLIS trailer tow left status	SODL	Input used to control the blind spot information system RTT indicator.
BLIS trailer tow right status	SODR	Input used to control the blind spot information system RTT indicator.
Body service required request	BCM	Input used for the BCM controlled system faults input to control the powertrain malfunction (wrench) RTT.
Brake fluid level low message request	BCM	Input used to display the message center brake fluid level low message.
Brake drive mode	ABS module	Input used to control the terrain management display and warning messages.
Brake (red) warning indicator request	ABS module	Input used to display the message center brake system fault message.
Camera status display	IPMA	Input used to control the display of lane keeping system message center warning messages.
Compass direction	APIM	Input used to control the compass display.
Cross traffic alert left status	SODL	Input used to control the blind spot information system RTT indicator.
Cross traffic alert right status	SODR	Input used to control the blind spot information system RTT indicator.
Cross traffic left sensor status	SODL	Input used to control the blind spot information system RTT indicator.
Cross traffic right sensor status	SODR	Input used to control the blind spot information system RTT indicator.
Cruise control set speed	PCM	Input used to control the cruise control set speed displayed in the message center.
Cruise control status	PCM	Input used to control the cruise control RTT and message display based on the system status.
Cruise control override	PCM	Input used to control the adaptive cruise control set speed display when the cruise control is overridden by the driver.
Driver door ajar status	BCM	Input used to control the driver door ajar RTT. Input also used to display the not in park warning message.
Drive mode select status	ABS module	Input used to display the selected drive mode in the message center.

Drive mode status	SCCM	Input used to control the terrain management display and warning messages.
Electronic park brake message request	ABS module	Input used to display the electronic park brake message center informational and warning messages.
Electronic park brake (red) indicator request	ABS module	Input used to display the park brake applied message when equipped with electronic parking brake.
Electronic park brake (yellow) indicator request	ABS module	Input used to control the electronic park brake RTT.
EPAS failure	PSCM	Input used to control the service power steering message display.
Engine coolant temperature data	PCM	Input used to control the temperature gauge, the over-temperature RTT and warning message.
Engine oil life	PCM	Input used for the oil life display.
Engine overheat indication request	PCM	Input used to control the temperature gauge, the over-temperature RTT and warning message.
Engine rpm data	PCM	Input used to control the low engine oil pressure RTT, the engine idle hour display and to calculate the DTE display.
Engine service required request	PCM	Input used for the powertrain Electronic Throttle Control (ETC) component to control the powertrain malfunction (wrench) RTT.
Factory mode	BCM	Input used to indicate whether the vehicle is set in factory mode during vehicle build.
Forward collision warning message request	CCM / IPMA (with pre-collision assist)	Input used to display the forward collision fault warning messages.
Front fog lamp indicator request	BCM	Input used to control the front fog lamp RTT.
Fuel alcohol percent	PCM	Input used to calculate the running average fuel economy.
Fuel fill inlet message request	PCM	Input used to display the check fuel fill inlet message.
Fuel flow volume display	PCM	Input used to calculate the DTE.
Gear lever position	PCM	Input used to display the active park assist messages. Input is also used for the power distribution display.
Hill descent mode	ABS module	Input used to control the hill descent RTT. Input also used to control the hill descent component of the Raptor status screen.
Hill descent message request	ABS module	Input used to control the hill descent informational and fault messages. Also used to control the Raptor status screen display.

Hood ajar status	BCM	Input used to display the hood ajar warning message.
Ignition status	BCM	Ignition RUN, START and accessory states required for the IPC operating modes and fault reporting. Also used to display the not in park warning message.
Ignition type	BCM	Input used to determine the DTE based on whether the driver is using an administrator key or a MyKey® programmed key.
Immobilizer message display	BCM	Input used to display the PATS, passive entry and key programming messages.
Keycode status	BCM	Input used to display the factory keypad code.
Lane keeping indicator request	IPMA	Input used to control the lane keeping system RTT.
Lane keeping system status display	IPMA	Input used to control the lane keeping system message center warning messages.
Lane keeping system message request	IPMA	Input used to control the lane keeping alert keep hands on wheel message center warning message.
Left rear door ajar status	BCM	Input used to control the left rear door ajar RTT.
Lock system message request	BCM	Input used to display the power child lock, switch inhibit and low key FOB battery message center messages.
Memory command	DSM	Input used to display the memory seat operational messages.
Odometer count	PCM	Input used to display the vehicle odometer, the odometer reading for configured trailers in the trailer information display and to calculate the DTE.
Oil pressure warning indicator request	PCM	Input used to control the low engine oil pressure RTT .
Parklamp status	BCM	Input used to control the lights on RTT.
Parking aid fault status	PAM	Input used to display the check parking aid messages.
Parking brake warning indicator request active status	BCM	Input used to display the parking brake engaged message (manual parking brake only).
Passenger door ajar status	BCM	Input used to control the passenger door ajar RTT.
Perimeter alarm chime request	BCM	Input used to display the perimeter alarm message when the vehicle is entered before deactivating the perimeter alarm.
Power shed level request	BCM	Input used to turn off the progressive range select and SelectShift® displays when vehicle power shed function is requesting battery conservation.
Powertrain cooling message request	PCM	Input used to display the reduced power to cool the engine on the Gasoline Turbo Direct Injection (GTDI) engines.

Powertrain drive mode status	PCM	Input used to control the sport mode and tow haul Reconfigurable Telltales (RTTs). Also used to control the terrain management display and warning messages.
Reduced guard status	BCM	Input used to display the perimeter alarm reduced guard mode enabled/disabled status message.
Rear differential lock status	TCCM	Input used to control the locking differential RTT.
Rear locking differential service required	TCCM	Input used to display the service locking differential warning message.
Red brake warning indicator request	BCM	Input used to display the low brake fluid level message center message.
Remote start status	BCM	Input used to control the remote start active message display.
Reverse gear state	PCM	Input used to display the active park assist messages.
Right rear door ajar status	BCM	Input used to control the right rear door ajar RTT.
Side obstacle detect status-left	SODL	Input used to display the BLIS/ CTA system fault messages.
Side obstacle detect status-right	SODR	Input used to display the BLIS/ CTA system fault messages.
Snow plow mode	FCIM	Input used to display the snow plow active message informing the driver that electrical features are disabled for plow use.
Starting system message request	PCM	Input used to display starting system messages.
Stability-traction control chime request	ABS module	Input used to control the service AdvanceTrac® message.
Stability-traction control disabled indicator request	ABS module	Input used to control the stability-traction control disabled RTT (sliding car OFF icon), traction control on/off status messages and for the stability-traction control status component of the Raptor status screen.
Stability-traction control indicator request	ABS module	Input used to control the stability-traction control RTT.
Stability-traction control disabled indicator request	ABS module	Input used to control the stability-traction control status component of the Raptor status screen.
Stability-traction control on/off message request	ABS module	Input used to control the stability-traction control on/off status messages.
Steering effort status	ABS module	Input used to control the steering mode component of the Raptor status screen and for the terrain management display and warning messages.

Steering wheel angle	ABS module	Input used to control the steering angle component of the Raptor status screen.
Stop-start mode indicator	PCM	Input used to control the auto stop-start RTT.
Stop/start text message display	PCM	Input used to control the auto stop-start message display.
Tire pressure warning indicator	BCM	Input used to control the TPMS RTT.
Tire pressure system status	BCM	Input used to control the TPMS informational and fault messages and to display the current tire pressures.
Trailer battery charge	TRM	Input used to determine the trailer connected status for the trailer information display.
Trailer brake connect status	TBM	Input used to display the trailer brake system fault and general trailer brake electrical messages.
Trailer lamp connected	TRM	Input used to determine the trailer connected status for the trailer information display.
Trailer lamp out	TRM	Input used to display trailer lamp outages.
Trailer battery charge	TRM	Input used to display the trailer battery charging fault message.
Trailer sway event in progress	ABS module	Input used to display the trailer sway reduce speed message.
Transmission gear display	PCM	Input used to display the not in park warning message. Input also used to control the progressive and SelectShift® displays.
Transmission shift mode display	PCM	Input used to control the progressive range select and SelectShift® transmission shift mode display.
Transmission service required	PCM	Input used for the transmission component to control the powertrain malfunction (wrench) RTT.
Transport mode	BCM	Input used to indicate whether the vehicle is set in factory mode or transport mode to display the appropriate message and power down/display items such as the PRNDL at key off to conserve the battery.
Turn indication status	BCM	Input used to control the LH- RH turn signal RTT indicators.
Vehicle dynamics SOS	ABS	Input used to control the spin-out detected message.
Vehicle roll angle display	ABS module	Input used to display the vehicle pitch in the off road display.
Vehicle pitch angle display	ABS module	Input used to display the vehicle angle in the off road display.

Vehicle speed	PCM	- Input used to control the: - digital speedometer display. - DTE display - engine hour and engine idle hour displays. - not in park warning message. - power distribution display - progressive range select and SelectShift® displays. - trailer information display
Wheel torque	PCM	Input used to determine the fill level for the power distribution display.

Module Network Input Messages - PCM

Broadcast Message	Originating Module	Message Purpose
Engine oil life reset	IPC	Input used to confirm oil life reset.

Message Center Displays

Compass

On the base and mid-level IPC, the compass is displayed as a 1 or 2 character display in the message center that indicates the current direction of the vehicle (N, NE, E, SE, S, SW, W, or NW). On the high-level IPC, the compass can be displayed as a virtual compass along with the 1 or 2 character display. The IPC receives the compass direction message from the APIM over the HS-CAN3.

Digital Speedometer

NOTE: *The digital speed displayed can differ slightly from the analog speedometer due to stepper motor-pointer movement and indication tolerances.*

The IPC provides a redundant digital speedometer display in the message center. The digital speedometer display operates using the same vehicle speed inputs used to control the analog speedometer. See Speedometer. Refer to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes) .

DTE/Average Fuel Economy (AFE)

The DTE is calculated in the IPC using the Running Average Fuel Economy (RAFE), which is the fuel economy over the last 480 km (300 miles), and the fuel level input from the fuel sender(s) to determine how many miles the vehicle can be driven based on the remaining fuel in the tank. The DTE can vary in the short term by up to 50

miles, but is usually within 10 miles. Even if the fuel economy is relatively constant, the DTE can be off over a 50 mile range by -24% to +38%. The DTE display and the fuel gauge both use the fuel level input from the fuel tank to provide their respective functions. If the fuel gauge doesn't function correctly, both the fuel gauge and the DTE display are affected.

The IPC defaults to around 18 mpg when the battery is initially connected and changes based on driving habits and conditions. Generally, the driver should be getting somewhere between 13-21 mpg.

NOTE: *The actual DTE can be higher or lower than the DTE displayed in the message center due to changes in driving conditions. It is important to understand how the DTE is calculated and the factors that impact the DTE display when determining how to address any DTE concerns.*

Since the DTE is calculated and averaged over a longer period of time (480 km [300 miles]), varying driving conditions can have a significant impact on the current or short term DTE as opposed to the displayed DTE. This difference often leads to customer complaints of incorrect or invalid DTE. The following list provides some (not all) of the driving conditions that may lead to an incorrect or fluctuating DTE concern:

- Changing between towing/not towing
- Changing driving between city and highway
- Allowing the vehicle to idle for long periods of time
- Using the remote start feature frequently to allow the vehicle to warm up, particularly when parked on a grade
- Parking or driving on grades
- Inconsistent use of gasoline or E85 fuels
- Over-fueling or not filling the tank completely (partial refueling)

To better illustrate the affects of how driving conditions can affect DTE, refer to the following 2 examples. The first example below illustrates how the following observations are normal and expected since the low fuel reminder is triggered from a fuel volume and not from a fixed distance to empty.

- If while driving, the low fuel reminder (low fuel indicator and low fuel warning message) displays when the DTE equals 94.4 km (59 miles) and the driver adds 11.36 L (3 gallons) of fuel, the new DTE may become 124.8 km (78 miles). After continued driving, the low fuel reminder may now display when the DTE equals 83.2 km (52 miles).

The second example (below) illustrates what occurs when idling on an incline. In this example, the customer should be made aware of how the condition will correct after a few minutes of idling on a level surface.

- If the customer stops and parks the vehicle on an incline in a driveway, then in the morning remote starts the vehicle, allowing the engine to idle, the DTE may now equal 184 km (115 miles). As the customer drives, the low fuel reminder displays when the DTE equals 148.8 km (93 miles). Finally, after 5 more minutes of driving, the DTE is back to 80 km (50 miles).

Engine Hour And Engine Idle Hour

The IPC provides engine hour and engine idle hour displays in the message center. The IPC receives the engine

rpm data message for both displays from the GWM over the HS-CAN3. The GWM receives the engine speed message for both displays from the PCM over the HS-CAN1.

The engine idle hour displays also uses vehicle speed to identify whether the engine is simply idling or if the vehicle is being driven. The IPC receives the vehicle speed message from the GWM over the HS-CAN3. The GWM receives the vehicle speed message from the PCM over the HS-CAN1.

Factory-Transport Mode Display

During vehicle build, some modules, such as the IPC and the BCM, are set in factory mode. While in the factory mode the IPC displays FACTORY MODE CONTACT DEALER in the message center. If the vehicle is set in factory mode, the system does not automatically exit the mode and must be manually set to either the transport or normal operation mode.

When the vehicle build is complete, the vehicle is set to transport mode. While in transport mode, the IPC displays TRANSPORT MODE CONTACT DEALER in the message center. Transport mode is used to reduce the drain on the battery during longer periods where the vehicle is not used. Various systems may be altered or are disabled when in the transport mode. The vehicle automatically reverts to normal operation mode after being driven 80 km (50 mi).

The IPC receives the factory mode and transport mode mode messages from the GWM over the HS-CAN3. The GWM receives the factory mode and transport mode messages from the BCM over the HS-CAN1.

Lane Keeping System

The lane keeping system combines the lane keeping alert and lane keeping aid systems. The lane keeping alert system alerts the driver of unintentional drifting outside of the lane and the lane keeping aid system corrects the vehicle steering to keep the vehicle in the center of the lane. The IPC provides a lane keeping display as an overhead view of the vehicle in the middle of a lane with right and left lane markers to indicate the vehicle position with relation to the lane markings as well as overlay or popup messages to alert the driver when they are drifting out of their lane. The lane markers change color to indicate the condition associated with a specific condition and action or warning as controlled by the lane keeping system. The IPC also provides a lane keeping system message center off indicator to inform the driver that the lane keeping system is turned off. When the lane keeping system is turned off, the IPC turns on the lane keeping system RTT and turns off the lane keeping system display.

The IPC receives both the lane keeping system status display message and the lane keeping indicator request from the GWM over the HS-CAN3.

The GWM receives the lane keeping system status display message and the lane keeping indicator request from the IPMA over the HS-CAN2.

Off Road Display, Power Distribution and Raptor Status

The first off road display shows the vehicle pitch, vehicle roll and the front wheel turning angle.

The second off road display shows the power distribution. The power distribution display indicates the level of

power applied to each wheel. As power is applied to the wheels, the area directly in front of each displayed wheel begins to fill in. The lowest power displayed is the closest to the wheel. As the amount of power sent to the wheels increases, the area fills in either forward (front wheels) or rearward (rear wheels) of the wheels. The IPC uses the following inputs to display and control the power distribution display:

Network Message	Function
Gear position	Used to determine the vehicle is in gear to initiate the power distribution display.
Vehicle speed	Used to indicate the vehicle is in motion and to activate the display.
Vehicle roll angle display	Used to display the vehicle roll.
Vehicle pitch angle display	Used to display the vehicle pitch.
Wheel torque	Used to identify the amount of torque applied to each wheel.

The third off road display is a sub-screen that provides an additional Raptor status screen. When selected, the Raptor status screen displays the following:

- 4x4 mode
- Differential lock status
- Hill descent mode
- Stability-traction control status
- Steering angle
- Steering mode
- Terrain mode

The IPC uses the following messages to display the Raptor status:

- Hill descent message request
- Stability-traction control disabled indicator request
- Stability-traction control indicator request
- Steering wheel angle

The IPC receives all messaged inputs from the GWM over the HS-CAN3.

For the off road and power distribution displays, the GWM receives the gear lever position, vehicle speed and wheel torque messages from the PCM over the HS-CAN1.

For the off road and power distribution displays, the GWM receives the vehicle roll angle display and vehicle pitch angle display messages from the ABS module over the HS-CAN2.

For the Raptor status screen, the GWM receives the hill descent message request, stability-traction control mode, stability-traction control disabled indicator request and steering wheel angle messages from the ABS module over the HS-CAN2.

Select Drive Mode

The IPC provides the driver interface with the Select Drive Mode system. The IPC controls the pop-up screens to select the desired drive mode. When the driver presses the drive mode button on the shift lever, the message center provides a pop-up window showing the available drive modes and the currently selected drive mode. Pressing the drive mode button on the gear shift lever changes the drive modes. The drive modes are as follows:

- Normal
- Tow Haul
- Snow/Wet
- EcoSelect
- Sport

The IPC receives the select drive mode inputs from the GWM over the HS-CAN3. The GWM receives the select drive mode inputs from the ABS module over the HS-CAN2.

Terrain Managment System (Raptor)

The IPC provides the driver interface with the terrain management system. The IPC uses a popup window to control the system with the terrain status displayed in the off road Raptor screens. When the driver presses the terrain managment up/down switch (part of the RH steering wheel switch), the message center provides a popup window showing the available terrain management mode and the currently selected mode. Pressing either up or down of the switch changes the terrain mode. The terrain modes are as follows:

- Normal
- Sport (menu item not available using a MyKey® programmed key)
- Weather
- Mud Sand
- Baja
- Rock Crawl

The IPC uses the following messaged inputs to control the terrain management system display:

- 4WD mode display
- 4WD status
- Brake drive mode
- Drive mode switch status
- Powertrain drive mode status
- Steering effort status

For additional information about the terrain management,
Refer to: Four-Wheel Drive Systems (308-07 Four-Wheel Drive Systems) .

The IPC receives all required messages from the GWM over the HS-CAN3.

The GWM receives the drive mode switch status from the SCCM over the HS-CAN2.

The GWM receives the steering effort status message from the PSCM over the HS-CAN2.

The GWM receives the powertrain drive mode message from the PCM over the HS-CAN1.

The GWM receives the brake drive mode message from the ABS module over the HS-CAN2.

The GWM receives the 4WD status and 4WD mode messages from the TCCM over the HS-CAN2.

TPMS

The IPC provides a message center display showing each tire on a vehicle image to indicate specific tire pressures.

The IPC receives the tire pressure status message from the GWM over the HS-CAN3. The GWM receives the tire pressure status message from the BCM over the HS-CAN1.

Trailer Information

The trailer information function, located in the towing tab, allows the driver to save up to ten trailers, name the trailers and track or reset their mileage. When a trailer is connected to the vehicle, the trailer information screens display the information for the most recently connected trailer. The user can change the active trailer to another named trailer or create and name a new trailer. If the user chooses not to name a trailer, a default trailer is provided. This feature also provides step-by-step instruction for connecting standard trailers.

An additional feature is a display that indicates the current status of the trailer lighting. The trailer lighting display provides trailer running, stop and turn lights. The display shows an image of a trailer from the rear with individual lamps in typical locations. The lights are either filled or highlighted depending on the lamps status along with a text status for the lighting system.

The IPC uses the following inputs to display the trailer information.

- Odometer count
- Trailer lamp connected
- Trailer lamp out
- Trailer battery charge
- Transport mode
- Vehicle speed

The IPC receives all messaged inputs from the GWM over the HS-CAN3.

The GWM receives the odometer count, transport mode and vehicle speed messages from the PCM over the HS-CAN1.

The GWM receives the trailer lamp connected, trailer lamp out and trailer battery charge messages from the TRM over the MS-CAN.

Trailer Backup Assist

As part of defining a trailer, the driver can enter measurements for any conventional trailer. When enabled, the IPC displays appropriate instructions and warnings for the trailer backup assist system through popup displays. The vehicle must be in PARK (P) to enter the trailer backup assist setup screens, but is not required to stay in those screens. For additional information about the trailer backup assist,

Refer to: [Parking Aid - System Operation and Component Description](#) (413-13D Parking Aid - Vehicles With: Trailer Back Up Assist (TBA), Description and Operation).

The IPC receives the trailer backup assist text message request from the GWM over the HS-CAN3. The GWM receives the trailer backup assist text message request from the PSCM over the HS-CAN2.

MyKey® Function Message Displays

The IPC provides message center displays for the MyKey® feature. MyKey® displays are controlled through the IPC software based on the MyKey® settings configured through the message center and the type of key in use (MyKey® or administrator key). The MyKey® function also uses other messages received by the IPC for other indications such as vehicle speed for speed limiter displays.

Odometer

The IPC receives the odometer count message from the GWM over the HS-CAN3. The GWM receives the odometer count from the PCM over the HS-CAN1. The IPC monitors the odometer count input from the GWM and commands the odometer with a digital display in the message center.

Oil Life Message Center Display

The IPC provides message center messages to inform the driver about the oil life status and when an oil change is required. The duration of the interval between oil changes is calculated in the PCM and varies due to driving conditions. The PCM assumes a base mileage of 16,090 km (10,000 mi) or 1 year for normal driving. However, this number is adjusted down for conditions such as high engine temperature, high engine rpm, use of flex fuel and possibly low oil level. The PCM calculates and provides the engine oil life percent message to the IPC. The IPC further converts the remaining oil life using the driver's configured oil life start value and displays the oil life percentage, indicating the remaining oil life. The oil change minder can be reset at any time by the driver.

The IPC receives the engine oil life message and engine oil life reset request from the GWM over the HS-CAN3.

The PCM receives the engine oil life reset request from the GWM over the HS-CAN1.

The GWM receives the engine oil life message from the PCM over the HS-CAN1.

The GWM receives the engine oil life reset message from the IPC over the HS-CAN3.

RTT Indicators

NOTE: It is important to view each of the cluster options in the Overview to identify which IPC uses a specific RTT.

Refer to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes) .

4WD (2H, 4L, 4H And 4A)

The IPC provides RTT indicators to inform the driver of the status of the 4WD system state. The IPC receives the 4x2, 4x4 high, 4x4 low and 4x4 auto status messages from the GWM over the HS-CAN3. The GWM receives the 4x2, 4x4 high, 4x4 low and 4x4 auto status messages from the PCM over the HS-CAN1.

Auto High Beam

The IPC provides the auto high beam RTT to inform the driver the auto high beam function is turned on and the high beam status may automatically change. The IPC receives the auto high beam status display message from the GWM over the HS-CAN3. The GWM receives the high beam status display message from the IPMA over the HS-CAN2.

Auto Stop-Start

The IPC provides the auto stop-start RTT along with multiple messages displayed at various times throughout the auto stop-start system operation to inform the driver of the system status and to provide direction for the driver intervention required. The IPC receives the stop-start mode indicator message request from the GWM over the HS-CAN3. The GWM receives the stop-start mode indicator message request from the PCM over the HS-CAN1.

The auto stop-start indicator informs the driver of the following states:

Indicator Status	System Status
Solid green	The auto stop-start feature has temporarily turned off the engine.
Solid amber	A stop-start system concern exists.
Flash in either green or amber	A system state as determined by the PCM.
Grayed out (mid-level and high-level IPC)	Indicates the auto stop-start feature is not available.

The IPC receives the stop/start indicator request from the GWM over the HS-CAN3. The GWM receives the auto stop/start indicator request from the PCM over the HS-CAN1.

BLIS Off

The IPC provides a RTT to inform the driver the BLIS is turned off.

The IPC receives all network messages required to operate the BLIS RTT from the GWM over the HS-CAN3.

The GWM receives the cross traffic alert left status, side obstacle detect status-left and the BLIS trailer tow left status messages from the SODL over the MS-CAN.

The GWM receives the cross traffic alert right status, side obstacle status-right and the BLIS trailer tow right status messages from the SODR over the MS-CAN.

Charging System Message Center Displays

The IPC provides a charging system RTT along with message displays indicating the status of the charging system. When a fault is present in the charging system, the BCM sends the battery low state of charge message to display message center warning messages and the charging system RTT.

The IPC receives the battery low state of charge message from the GWM over the HS-CAN3. The GWM receives the battery low state of charge message from the BCM over the HS-CAN1.

Cruise Control

The cruise control RTT informs the driver of the cruise control status (off, active or standby). When off, the cruise control RTT is not displayed. When the cruise control system is active, the cruise control RTT turns green and turns gray when in standby.

The IPC uses cruise control status, cruise control set speed and cruise control override messaged inputs to control the cruise control RTT.

The IPC receives the cruise control status, cruise control set speed and cruise control override messages from the GWM over the HS-CAN3.

The GWM receives the cruise control status, cruise control set speed and cruise control override messages from the PCM over the HS-CAN1.

Door Ajar

The IPC provides a door ajar RTT along with message displays to indicate the status of the doors. The BCM monitors each of the ajar inputs (driver, passenger, left rear and right rear) and sends a door ajar status (driver door ajar status, passenger door ajar status, left rear door ajar status or right rear door ajar status) message to the GWM over the HS-CAN1. The IPC receives the driver door ajar status, passenger door ajar status, left rear door ajar status or right rear door ajar status messages from the GWM over the HS-CAN3 to display the specific ajar RTT and corresponding warning message.

Electronic Park Brake

The electronic park brake indicator indicates a fault in the electronic park brake system. The IPC receives the electronic park brake (yellow) indicator request from the GWM over the HS-CAN3. The GWM receives the electronic park brake (yellow) indicator request from the ABS module over the HS-CAN2.

ELD

The IPC receives the rear differential lock status message from the GWM over the HS-CAN3. The GWM receives the rear differential lock status message from the TCCM over the HS-CAN1.

If the vehicle is shifted into ELD mode, the TCCM sends the IPC the rear differential lock status message to illuminate the ELD indicator. If the vehicle is shifted out of ELD mode, the TCCM sends the IPC the rear differential lock status message to turn off the ELD indicator, informing the driver the vehicle has shifted out of ELD mode.

Engine Over-Temperature

The IPC provides the engine over-temperature RTT to alert the driver the engine is over temperature. The IPC receives the engine overheat indication request and the engine coolant temperature data from the GWM over the HS-CAN3. The GWM receives the engine overheat indication request and the engine over-temperature message from the PCM over the HS-CAN1.

Front Fog Lamp

The front fog lamp indicator informs the driver that the front fog lamps are turned on. The IPC receives the front fog lamp indicator request from the GWM over the HS-CAN3. The GWM receives the front fog lamp indicator request from the BCM module over the HS-CAN1.

Hill Descent

The IPC provides the hill descent RTT to indicate to the driver that the hill descent control is on. The IPC receives the hill descent mode message from the GWM over the HS-CAN3. The GWM receives the hill descent mode message from ABS module over the HS-CAN2.

Lane Keeping System Off

The IPC provides the lane keeping system off RTT to indicate the lane keeping system has been turned off or is disabled due to a fault condition. The IPC receives the lane keeping indicator request from the GWM over the HS-CAN3. The GWM receives the lane keeping indicator request from the IPMA over the HS-CAN2.

LH - RH Turn Signal/Hazard

When the multifunction switch is in the LH or RH turn position or if the hazard switch is on, the BCM sends the right turn lamp on request, the left turn lamp on request or both messages to the GWM over the HS-CAN1. The GWM sends the right turn lamp on request, the left turn lamp on request or both messages to the IPC over the HS-CAN3. Upon receipt of the applicable turn signal on/off data, the IPC flashes the turn signal RTT on and off.

Lights On

When the parking lamps are turned on, the BCM sends the parklamp status message to the GWM over the HS-

CAN1. The IPC receives the parklamp status message from the GWM over the HS-CAN3 to illuminate the lights on RTT.

Low Fuel

The IPC provides the low fuel RTT indicator to indicate the fuel level is low at several preset stages before the driver runs out of fuel. The low fuel RTT indicator is displayed in 2 colors, amber and red depending on the remaining fuel range. The IPC uses the calculated DTE to control the low fuel RTT. When the fuel level reaches approximately 120 km (75 miles) (MyKey® users only) and 80 km (50 miles), 40 km (25 miles), 20 km (10 miles) and 0 km (0 miles) for MyKey® and administrator key users, the IPC turns on the low fuel RTT indicator.

Low Engine Oil Pressure

The IPC uses the engine oil pressure warning indicator request and engine rpm data to control the low engine oil pressure indicator. The engine oil pressure sensor is hardwired to the PCM. The PCM provides the oil pressure warning indicator request and the engine rpm data to the GWM over the HS-CAN1. The GWM provides the oil pressure warning indicator request and engine rpm data to the IPC over the HS-CAN3. The IPC requires engine rpm above 400 rpm before the message center displays the low engine oil pressure RTT.

Low Washer Fluid Level

The low washer fluid level switch is hardwired to the IPC through a single signal circuit and is grounded through a separate ground circuit. The IPC provides a reference voltage to the washer fluid level switch. When the washer fluid is low, the washer fluid level switch closes to ground, pulling the reference voltage low. When the IPC detects the washer fluid input is pulled low, the low washer fluid level RTT warning indicator illuminates.

Neutral Tow

On base vehicles, the neutral tow feature is selected on or off external to the IPC. On the Raptor, the neutral tow feature is selected on or off through the message center. For additional information about the neutral tow feature operation, refer to the Owner's Literature or Refer to: Four-Wheel Drive Systems (308-07 Four-Wheel Drive Systems) .

Powertrain Malfunction (Wrench)

The IPC provides a powertrain malfunction (wrench) message center RTT to indicate transmission, Electronic Throttle Control (ETC), 4WD, and BCM concerns.

The IPC receives all the required messages from the GWM over the HS-CAN3.

The GWM receives the transmission service required and engine service required messages from the PCM over the HS-CAN1.

The GWM receives the 4WD service required message from the TCCM over the HS-CAN2.

The GWM receives the body service required message from the BCM over the HS-CAN1.

PRNDL/Progressive Range Select And SelectShift®

The progressive range select display provides a numerical display of the lower transmission ranges and indicates to the driver which gear is currently selected when the driver has manually shifted to a lower range (1-6 [6R80 transmission] or 1-10 [10R80 transmission]). The SelectShift® display indicates to the driver which gear is currently selected when the transmission is in the SelectShift® mode. When the transmission is in SelectShift® mode, the gear number is displayed in the SelectShift® display area.

The progressive range select and SelectShift® display behavior changes based on each IPC design. The base IPC shows the range select in the menu on-demand screen and in popup windows with the transmission gears listed in the center of the display and the selected gear in the the upper left corner (the first digit is the selected gear and the second digit is the number of gears).

For all Instrument Panel Clusters (IPCs), the display changes depending on the driver selections (range select or SelectShift®) and for the mid-level and high-level Instrument Panel Clusters (IPCs), whether indicators are displayed in the lower portions of the display area. To view where the display area is located on the mid-level and high-level Instrument Panel Clusters (IPCs),

Refer to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes) .

For additional information related to the progressive range select or SelectShift® features, refer to the Owner's Literature.

The IPC uses the following messages to control the PRNDL/progressive range select and SelectShift® indication.

- Transport mode
- Transmission gear display
- Transmission shift mode display
- Power shed level request
- Vehicle speed

The IPC receives the transmission gear position, transmission shift mode display and vehicle speed messages from the GWM over the HS-CAN3. The GWM receives the transmission gear position, transmission shift mode display and vehicle speed messages from the PCM over the HS-CAN1.

The IPC receives the transport mode and power shed level request messages from the GWM over the HS-CAN3. The GWM receives the transport mode and power shed level request messages from the BCM over the HS-CAN1.

The IPC also uses a park detect switch (part of the selector lever) input to signal the IPC the shift lever is fully seated in the PARK (P) position. The IPC compares the park detect switch input with the park status in the transmission gear position message sent from the PCM. The IPC provides a battery reference voltage to the park detect switch. When the selector lever is in PARK (P), the park detect switch routes the reference voltage to ground, pulling the circuit low to the IPC. When the selector lever is moved out of PARK (P), the park detect switch opens to ground, sending the reference voltage high.

Stability-Traction Control Disabled RTT (Sliding Car OFF Icon)

When the driver enables or disables the stability-traction control system, the ABS module sends the stability-traction control disabled indicator request message to the GWM over the HS-CAN2. The GWM sends the stability-traction control disabled indicator request message to the IPC over the HS-CAN3 to illuminate or turn off the stability-traction control disabled RTT (sliding car OFF icon) based upon the system state.

Refer to ABS/Brake/Stability-Traction Control System Indication description for information on the conditions when the stability-traction control disabled indicator (sliding car OFF icon) is turned on.

When a MyKey® administrator has set the AdvanceTrac® feature to always on and a MyKey® programmed key is in use, the stability-traction control system cannot be disabled. The menu selection in the message center used to disable the stability-traction control system does not display when a MyKey® is in use, but remains active for the MyKey® administrator to select the AdvanceTrac® always on feature off. The stability-traction control indicator still functions normally to indicate a stability-traction control system fault and a stability-traction control active event.

Refer to ABS/Brake/Stability-Traction Control System Indication description for information on the conditions when the stability-traction control RTT (sliding car Off icon) is turned on.

Refer to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes) .

Stability-Traction Control RTT (Sliding Car Icon)

The IPC receives the stability-traction control indicator request message from the GWM over the HS-CAN3. The GWM receives the stability-traction control indicator request message from the ABS over the HS-CAN2.

Refer to ABS/Brake/Stability-Traction Control System Indication description for information on the conditions when the stability-traction control RTT (sliding car Off icon) is turned on.

Refer to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes) .

Steering Mode RTT

The IPC provides the steering mode RTT to indicate the driver steering mode selected (sport, comfort or normal). The IPC receives the steering effort status message from the GWM over the HS-CAN3. The GWM receives the steering effort status message from the PSCM over the HS-CAN2.

TPMS

The IPC receives the tire pressure warning indicator message from the GWM over the HS-CAN3. The GWM receives the tire pressure warning indicator message from the BCM over the HS-CAN1.

If the BCM determines the tire pressure has exceeded the low tire pressure limits, the tire pressure warning indicator request message is sent to the IPC to illuminate the TPMS RTT.

If a TPMS monitor or sensor fault condition exists, the BCM sends the tire pressure warning indicator request message to the IPC to flash the TPMS RTT. The IPC flashes the TPMS warning indicator for 75 seconds then turns the indicator on solid.

Warning Messages

4WD

The message center provides messages to check the 4x4 system and provide a system status when a fault condition exists. The IPC receives the 4WD service required message from the GWM over the HS-CAN3. The GWM receives the 4WD service required message from the TCCM over the HS-CAN2.

Adaptive Cruise Control

The message center provides messages explaining the need for driver intervention and system status. The adaptive cruise control messages are supplemental to the cruise control RTT and the adaptive cruise control warning chime. The IPC receives the adaptive cruise control message display from the GWM over the HS-CAN3. The GWM receives the adaptive cruise control message display from the CCM over the HS-CAN2 on vehicles without pre-collision assist. The GWM receives the adaptive cruise control message display from the IPMA over the HS-CAN2 on vehicles with pre-collision assist.

Auto Engine Idle Shut Down

The message center provides messages explaining the status of an impending engine idle shut down. The IPC receives the engine idle shut down message request from the GWM over the HS-CAN3. The GWM receives the engine idle shut down message request from the PCM over the HS-CAN1.

Auto Stop-Start

The message center provides messages explaining the need for driver intervention and system status. The IPC receives the stop/start text message display request from the GWM over the HS-CAN3. The GWM receives the stop/start text message display from the PCM over the HS-CAN1.

Blind Spot Monitoring System (BLIS®)/Cross Traffic Alert (CTA)

The message center provides messages indicating the reason for the Blind Spot Monitoring System (BLIS®)/Cross Traffic Alert (CTA) fault. The IPC receives the side obstacle sensor status-left and side obstacle sensor status-right messages from the GWM over the HS-CAN3. The GWM receives the side obstacle sensor status-left and side obstacle sensor status-right messages from the SODL and SODR, respectively, over the MS-CAN.

Brake System

The message center provides brake system warning messages for the following concerns and status:

- Low brake fluid level
- Parking brake status and faults
- ABS faults

The IPC receives all network messages required to operate the brake warning indicator from the GWM over the HS-CAN3.

When a base brake system fault exists, the ABS module sends the brake (red) warning indicator request to the GWM over the HS-CAN2 to display the check brake system message center warning.

When the parking brake is applied on a manual parking brake vehicle, the BCM sends the parking brake warning indicator request active status to the GWM over the HS-CAN1 to display the parking brake engaged message center warning.

When the parking brake is applied on an electronic parking brake vehicle, the BCM sends the electronic park brake (red) indicator request to the GWM over the HS-CAN1 to display the parking brake engaged message center warning.

When a low brake fluid level condition exists, the BCM sends the red brake warning indicator request to the GWM over the HS-CAN1 to display the brake fluid level low message center warning.

Charging System

The message center provides a warning message indicating the status of the charging system. When a fault is present in the charging system, the BCM sends the battery low state of charge message to the GWM over the HS-CAN1. The IPC receives the battery low state of charge message from the GWM over the HS-CAN3.

Check Fuel Fill Inlet

The message center provides a check fuel fill inlet message to warn the driver there is a problem with the fuel fill inlet pipe resulting in a significant evaporative emission leak following vehicle refueling. The IPC receives the fuel fill inlet message request from the GWM over the HS-CAN3. The GWM receives the fuel fill inlet message request from the PCM over the HS-CAN1.

Door-Hood Ajar

The IPC provides a door and hood ajar warnings to indicate the status of the doors and hood. The IPC receives the driver door ajar, passenger door ajar, left rear door ajar, the right rear door ajar status and hood ajar status messages from the GWM over the HS-CAN3. The GWM receives the driver door ajar, passenger door ajar, left rear door ajar, the right rear door ajar status and hood ajar status messages from the BCM over the HS-CAN1. The BCM monitors each of the ajar inputs and sends the specific door ajar status message to the IPC to display the ajar warning indicator and corresponding warning message.

Electronic Park Brake

The message center provides messages to indicate the status of the electronic parking brake system. The messages displayed are a combination of informational messages, warning and system fault messages. The IPC uses the following messages to display the applicable message center message.

- Electronic park brake message request
- Electronic park brake (red) indicator request
- Brake (red) warning indicator request

- Brake fluid level low message request

The IPC receives all messages required to display the electronic park brake messages from the GWM over the HS-CAN3.

The GWM receives the electronic park brake message request and the electronic park brake (red) indicator request and the brake (red) warning indicator request from the ABS module over the HS-CAN2.

The GWM receives the brake fluid level low message request from the BCM module over the HS-CAN1.

ELD

The message center provides informational and fault messages to inform the driver of the ELD status. The IPC receives the rear locking differential service required message and the rear differential lock message request from the GWM over the HS-CAN3. The GWM receives the rear locking differential service required message and the rear differential lock message request from the TCCM over the HS-CAN2.

EPAS

The IPC provides a message center message to indicate there is an EPAS system concern. When a fault exists in the EPAS, the PSCM sends a request to the IPC through the GWM.

The IPC receives the EPAS failure message from the GWM over the HS-CAN3.

The GWM receives the EPAS failure message from the PSCM over the HS-CAN2.

Engine On

The message center provides the engine on warning message to inform the driver they are exiting the vehicle when the engine is running. The IPC uses multiple inputs to determine the vehicle is stopped and the driver is preparing to exit the vehicle. The messages required to control the engine on warning message are as follows:

- Driver door ajar status
- Engine status
- Transmission gear display mode
- Vehicle speed

The IPC receives the driver door ajar status from the GWM over the HS-CAN3. The GWM receives the driver door ajar status from the BCM over the HS-CAN1.

The IPC receives the engine status, transmission gear display mode and the vehicle speed messages from the GWM over the HS-CAN3. The GWM receives the engine status, transmission gear display mode and the vehicle speed messages from the PCM over the HS-CAN1.

Engine Over-Temperature

The message center provides the engine coolant over-temperature message to supplement the engine over-temperature RTT and alert the driver the engine is over temperature. The IPC receives the engine overheat indication request and the engine coolant temperature data from the GWM over the HS-CAN3. The GWM receives the engine overheat indication request and the engine over-temperature message from the PCM over the HS-CAN1.

Factory-Transport Mode

During vehicle build, some modules, such as the IPC and the BCM, are set in factory mode. While in the factory mode the IPC displays FACTORY MODE CONTACT DEALER in the message center. If the vehicle is set in factory mode, the system does not automatically exit the mode and must be manually set to either the transport or normal operation mode.

When the vehicle build is complete, the vehicle is set to transport mode. While in transport mode, the IPC displays TRANSPORT MODE CONTACT DEALER in the message center. Transport mode is used to reduce the drain on the battery during longer periods where the vehicle is not used. Various systems may be altered or are disabled when in the transport mode. The vehicle automatically reverts to normal operation mode after being driven 201 km (125 mi).

The IPC receives the factory mode message and the transport mode messages from the GWM over the HS-CAN3. The GWM receives the factory mode message and the transport mode message from the BCM over the HS-CAN1.

Forward Collision

The message center provides the forward collision warning messages to inform the driver of the forward collision status. The IPC receives the forward collision warning message request from the GWM over the HS-CAN3. The GWM receives the forward collision warning message request from the CCM over the HS-CAN2 on vehicles without pre-collision assist. The GWM receives the forward collision warning message request from the IPMA over the HS-CAN2 on vehicles with pre-collision assist.

Hill Descent Control

The message center provides informational and fault hill descent control messages to inform the driver of the hill descent control system status. The IPC receives the hill descent message request from the GWM over the HS-CAN3. The GWM receives the Hill descent message request from the ABS module over the HS-CAN2.

Keypad Factory Code

The message center can display the original keypad factory code when requested. The IPC receives the keypad factory code data from the GWM over the HS-CAN3. The GWM receives the keypad factory code data from the BCM over the HS-CAN1. For information on how to retrieve the factory code, Refer to: [Handles, Locks, Latches and Entry Systems - System Operation and Component Description](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).

Lane Keeping System

The message center provides a warning message for the lane keeping alert and system fault messages for the over

all lane keeping system. The IPC receives all required messages from the GWM over the HS-CAN3. The GWM receives the lane keeping system message request, the lane keeping system status display and the camera status display message from the IPMA over the HS-CAN2.

Load Shed

The message center provides load shed messages to inform the driver to use less options to conserve battery voltage. The IPC receives the power shed level request from the GWM over the HS-CAN3. The GWM receives the power shed level request from the BCM over the HS-CAN1.

Low Washer Fluid Level

The low washer fluid level switch is hardwired to the IPC through a single signal circuit and is grounded through a separate ground circuit. The IPC provides a reference voltage to the washer fluid level switch. When the washer fluid is low, the washer fluid level switch closes to ground, pulling the reference voltage low. When the IPC detects the washer fluid input is pulled low, the low washer fluid level RTT warning indicator illuminates.

Memory Seat Status

The message center provides memory seat status messages to provide the driver confirmation that memory position storing was successful and that recalling a memory position can not be recalled while driving the vehicle. The IPC receives the memory command message from the GWM over the HS-CAN3. The GWM receives the memory command message from the DSM over the MS-CAN.

Neutral Tow

The message center provides towing system messages to indicate the status of the neutral tow feature when the neutral tow system is enabled and the vehicle is capable of free-rolling. The IPC receives a 4WD status message from the GWM over the HS-CAN3. The GWM receives the 4WD status message from the TCCM over the HS-CAN2.

Off Road Mode

The message center provides off road informational messages to indicate the status of the off road system status. The IPC receives a 4WD status message from the GWM over the HS-CAN3. The GWM receives the 4WD status message from the TCCM over the HS-CAN2.

Oil Life

The instrument cluster provides messages to inform the driver about the oil life status, oil life reset status and when an oil change is required. The duration of the interval between oil changes is calculated in the PCM and varies due to driving conditions. The PCM assumes a base mileage of 16,090 km (10,000 mi) or 1 year for normal driving. However, this number is adjusted down for conditions such as high engine temperature, high engine rpm, use of flex fuel and possibly low oil level. The PCM calculates and provides the engine oil life percent message to the IPC. The IPC further converts the remaining oil life using the driver's configured oil life start value and displays the oil life percentage, indicating the remaining oil life. The oil change minder can be reset at any time by the

driver.

The IPC receives the engine oil life message from the GWM over the HS-CAN3. The GWM receives the engine oil life message from the PCM over the HS-CAN1.

The PCM receives the engine oil life data reset message from the GWM over the HS-CAN1. The GWM receives the engine oil life data reset message from the IPC over the HS-CAN3.

Parking Aid System

The IPC provides messages to indicate the status of the parking aid system. The IPC receives the parking aid fault status message from the GWM over the HS-CAN3. The GWM receives the parking aid fault status message from the PAM over the HS-CAN1.

PATS And Passive Key And Immobilizer System

The message center provides the starting system fault message to indicate there is a concern with the PATS. The message center provides passive key and immobilizer system messages to indicate the key is in the luggage compartment, the key is left in the vehicle, no key is detected, accessory power is active, to press the brake to start the vehicle or to place the key in the backup slot. The IPC uses the immobilizer message display message input from the BCM to display the applicable message center message.

The IPC receives the immobilizer message display data from the GWM over the HS-CAN3.

The GWM receives the immobilizer message display data from the BCM over the HS-CAN1.

Perimeter Alarm And Reduced Guard (Intrusion/Motion)

The message center provides the perimeter alarm message to indicate the perimeter alarm has been activated and to start the vehicle to stop the alarm. The IPC receives the perimeter alarm chime request message from the GWM over the HS-CAN3. The GWM receives the perimeter alarm chime request from the BCM over the HS-CAN1.

The message center also provides a menu to set up the reduced guard (intrusion/motion) feature of the alarm system. The message center displays a message to inform the driver whether the alarm is set up to disable the intrusion and motion sensor inputs. The IPC receives the reduced guard status message from the GWM over the HS-CAN3. The GWM receives the reduced guard status message from the BCM over the HS-CAN1.

Power Child Lock-Switch Inhibit And Low Key Fob

The IPC provides a power child lock warning to inform the driver the child lock feature did not function properly. The power child lock feature is activated through the rear window lockout switch on the driver side master window control switch.

The IPC provides a switch inhibit warning to notify the driver that some switches have been purposely inhibited and are inoperative. For security purposes, interior switches are inhibited by the BCM 20 seconds after the vehicle is electronically locked and prevents someone from using a stick (or other object) through an open window and

activating the switch.

The IPC provides a low key fob battery warning to alert the driver the key fob battery needs to be replaced. The low key fob battery warning is not displayed in RUN or START modes if the power child lock warning is active to prevent the BCM from cycling between the two warnings, causing the chime associated with the power child lock warning from repeatedly sounding every 4 seconds.

The IPC receives the lock system message request from the GWM over the HS-CAN3. The GWM receives the lock system message request from the BCM over the HS-CAN1.

Powertrain Cooling

On vehicles equipped with a Gasoline Turbo Direct Injection (GTDI) engine, the IPC provides a message to inform the driver that vehicle performance is reduced to allow the engine to cool. This feature is part of the smart cooling function in the PCM and provides powertrain cooling protection under high ambient temperature conditions.

The IPC receives the powertrain cooling message request from the GWM over the HS-CAN3. The GWM receives the powertrain cooling message request from the PCM over the HS-CAN1.

PRNDL Not In Park (Shift To Park)

The message center provides a shift to park message to inform the driver the vehicle is not in PARK (P) under 2 sets of conditions. First, the IPC displays the shift to park message if the selector lever is not in PARK (P), the ignition is OFF and the driver door is open or ajar. Second, the message center displays the shift to park message if the selector lever is not in PARK (P), the ignition is ON or in ACC, the driver door is open or ajar and the brake pedal is not applied with vehicle speed less than 5 km/h (3 mph). The IPC uses multiple messages to control the shift to park message.

The IPC receives all required messages from the GWM over the HS-CAN3.

The GWM receives the transmission gear display mode and vehicle speed messages from the PCM over the HS-CAN1.

The GWM receives the driver door ajar status, transport mode and ignition status message from the BCM over the HS-CAN1.

The IPC also uses the park position detect input to determine whether the vehicle is in PARK (P) along with the transmission gear display mode message.

See Park Position Detect Switch component description.

Refer to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes) .

Remote Start

The IPC provides remote start messages to inform the driver the vehicle is in the remote start active state and how to change the state to a drivable state. The remote start message display is active as soon as the vehicle is remote

started (that is, the engine is running, but the ignition status is off).

The IPC receives the remote start status message from the GWM over the HS-CAN3. The GWM receives the remote start status message from the BCM over the HS-CAN1.

Snow Plow Mode

The message center provides the snow plow mode active warning to inform the customer the functionality of some electrical features like heated seats and heated steering wheel are restricted due to activation of the snow plow. This feature enables the snow plow to function at full power. The IPC receives the snow plow mode message from the GWM over the HS-CAN3. The GWM receives the snow plow mode message from the FCIM over the MS-CAN.

Spinout Detection System

The spinout detection feature activates the hazard indicator to alert other vehicles approaching the vehicle following a spin-out, potentially reducing the risk of collision, especially in low visibility weather conditions. A spinout is defined as a slip angle greater than 40 degrees followed by 5 seconds of vehicle at rest.

When a spinout is detected, the system activates the hazard indicator and the IPC displays a message to inform the driver that the hazards have been turned on. The IPC receives the vehicle dynamics SOS message from the GWM over the HS-CAN3. The GWM receives the vehicle dynamics SOS message from the ABS module over the HS-CAN2.

Stability - Traction Control

The message center provides stability-traction control system messages to indicate the stability-traction control system status or if the stability-traction control system has a fault and requires service.

When the stability-traction control system has been selected off or on, the ABS module sends the stability-traction control on/off message request to the GWM over the HS-CAN2. The GWM sends the stability-traction control on/off message request to the IPC over the HS-CAN3.

When a fault condition exists in the stability-traction control system, the ABS module sets a DTC and sends the stability-traction control chime request to the GWM over the HS-CAN2. The GWM sends the stability-traction control chime request to the IPC over the HS-CAN3.

Starting System

The message center provides a starting system message to inform the driver of further actions required to start the engine or to explain the reason for the inability to start the engine. The IPC receives the starting system message request from the GWM over the HS-CAN3. The GWM receives the starting system message request from the PCM over the HS-CAN1.

Steering Wheel Lock (If Equipped)

The message center provides messages to indicate the status of the steering wheel lock system. The IPC receives

the steering wheel lock message request from the GWM over the HS-CAN3. The GWM receives the steering wheel lock message request from the BCM over the HS-CAN1.

TPMS

The IPC provides message center displays to indicate the TPMS sensor training status or a malfunction in the TPMS. The IPC receives the tire pressure system status message from the GWM over the HS-CAN3. The GWM receives the tire pressure system status message from the BCM over the HS-CAN1.

Trailer

The message center provides messages describing the status of the trailer electrical system. The IPC uses the following inputs to display the trailer message center messages.

- Trailer battery charge
- Trailer brake connect status
- Trailer lamp connected
- Trailer lamp out
- Trailer sway event in progress

The IPC receives all messaged inputs from the GWM over the HS-CAN3.

The GWM receives the trailer brake connect status messages from the TBM over the HS-CAN2.

The GWM receives the trailer sway event in progress message from the ABS module over the HS-CAN2.

The GWM receives the trailer lamp connected, trailer lamp out and trailer battery charge messages from the TRM over the MS-CAN.

Component Description

Brake Fluid Level Switch

The brake fluid level switch is mounted in the master cylinder reservoir and is hardwired to the BCM through a signal circuit and grounded through a separate body ground circuit. The BCM 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 BCM.

The brake fluid level switch uses an internal resistor in parallel. This enables the BCM to differentiate between a disconnected brake fluid level switch connector and a full level condition.

Engine Oil Pressure Sensor

The engine oil pressure sensor is hardwired to the PCM through voltage reference (VREF), signal and return circuits. The PCM provides the sensor voltage supply on the VREF circuit and monitors the change in voltage

through the signal and return circuits as the engine oil pressure changes.

Low Washer Fluid Level Switch

The low washer fluid switch is hardwired to the IPC through a single signal wire and is grounded to a body ground through a separate circuit. The IPC provides a reference voltage to the low washer fluid level sensor. When the washer fluid level is low, the float drops closing the switch and pulling the reference voltage low. When the washer fluid level is high, the float lifts off the switch and opens the circuit to the IPC sending the reference voltage high.

Steering Wheel Switch - Message Center

The message center switch is part of the LH steering wheel switch and is comprised of 5 buttons (up, down, left, right and OK). The message center switch uses different resistance values associated with each specific button. The SCCM sends out a reference voltage to the upper LH steering wheel switch on the input circuit and monitors the voltage drops. The voltage drop varies depending upon the resistance of the specific button pressed, providing indication to the SCCM which button is pressed.

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