

Front Seats - Overview

Base Part Number: Base Part Number: 63100

Overview

Driver Power Seat - Without Memory

The driver seat can be equipped with either an 8-way or 10-way power seat.

The 8-way driver power seat is equipped with the following motors:

- Front height motor (serviced with seat track assembly)
- Rear height motor (serviced with seat track assembly)
- Horizontal motor (serviced separately from the seat track assembly)
- Lumbar motor (serviced with power lumbar assembly)

The 10-way driver power seat is equipped with the following motors:

- Front height motor (serviced with seat track assembly)
- Rear height motor (serviced with seat track assembly)
- Horizontal motor (serviced separately from the seat track assembly)
- Recliner motor (serviced with seat backrest assembly)
- Lumbar motor (serviced with power lumbar assembly)

Driver Power Seat - With Memory

The driver 10-way seat (with memory) is controlled by the DSM. The DSM is located on the driver seat track. The DSM hard stop/soft stops must be set/reset any time a new DSM, driver seat track or driver seat backrest is installed.

The memory system allows automatic positioning of the driver seat to 1 of 3 programmable positions. For information on programming memory positions or recalling a stored memory position, refer to the Owner's Literature.

The driver memory seat is equipped with the following motors:

- Front height motor (serviced with seat track assembly)
- Rear height motor (serviced with seat track assembly)
- Horizontal motor (serviced separately from the seat track assembly)
- Recliner motor (serviced with seat backrest assembly)
- Lumbar motor (serviced with power lumbar assembly)

The memory seat also has an easy entry/exit feature. The easy entry/exit feature is a function of the DSM that moves the driver seat back approximately 50.8 mm (2 in) (unless seat is already positioned at or near the end of travel) when the ignition is turned off. The DSM cancels this operation if a valid input command is received from the driver seat control switch, memory set switch, exterior mirror control switch or if the function has been disabled. The easy entry/exit feature can be enabled/disabled on the message center. For information on programming vehicle settings in the message center, refer to the Owner's Literature.

Passenger Power Seat

The passenger power seat can be equipped with a 10-way power seat.

The 10-way passenger power seat is equipped with the following motors:

- Front height motor (serviced with seat track assembly)
- Rear height motor (serviced with seat track assembly)
- Horizontal motor (serviced separately from the seat track assembly)
- Recliner motor (serviced with seat backrest assembly)
- Lumbar motor (serviced with power lumbar assembly)

Multi-Contour Seats

This system allows on demand independent lumbar adjustment and/or massage of each front seat.

The multi-contour front seat system consists of the following components:

- SCMG, attached to the backrest of the front driver seat
- SCMH, attached to the backrest of the front passenger seat
- Multi-contour seat buttons, located on the FDIM (touchscreen)
- Multi-contour seat control switch (part of the seat control switch)
- Front seat cushion adjuster, attached to each front seat frame (includes 4 inflatable air bladders and hoses)
- Front seat power lumbar assembly, attached to each front seat backrest (includes air pump, 3 inflatable air bladders and hoses)

Heated Seats

The driver and passenger heated seat control buttons and indicators are located on the FCIM and FDIM (if equipped with touchscreen). The heated seat system functions independently from the climate control system. Each time the heated seat button is pressed, the FCIM decreases one setting (the sequence is high, medium, low, off, high, etc.). When a heated seat is set to high, all 3 LED indicators above that heated seat's control button illuminate. When a heated seat is set to medium, only two LED indicators above that switch illuminate. When a heated seat is set to low, only one LED indicator above that switch illuminates. When off, no indicators illuminate.

The heated seat system consists of the following components:

- Seat cushion heater mat
- Seat backrest heater mat
- FCIM (includes heated seat switches)
- FDIM (includes heated seat switches)

Heated/Ventilated Seats

The driver and passenger heated/ventilated seat control buttons and indicators are located on the FCIM and FDIM. The heated/ventilated seat system functions independently from the climate control system. Each time the heated/ventilated seat buttons are pressed, the FCIM decreases one setting (the sequence is high, medium, low, off, high, etc.). When a heated/ventilated seat is set to high, all 3 LED indicators above that heated/ventilated seat's control button illuminate. When a heated/ventilated seat is set to medium, only two LED indicators above that switch illuminate. When a heated/ventilated seat is set to low, only one LED indicator above that switch illuminates. When off, no indicators illuminate.

The heated/ventilated seat system consists of the following components:

- Seat cushion heater mat (serviced by installing a new cushion foam)
- Seat backrest heater mat (serviced by installing a new backrest foam)
- Blower motor, located within each front seat cushion and backrest
- FDIM (includes climate controlled seat buttons)
- FCIM (includes climate controlled seat buttons)
- SCME, integral to the DSM
- Cushion and backrest vent bags (part of the cushion and backrest foam)
- Air duct (bellow)
- Cushion and backrest foam
- Cushion and backrest trim covers

Remote Start Climate Operation

Different climate control modes/preferences can be selected when the vehicle is started using the remote start feature. This can be accessed through the message center. For additional information on how to set the remote start preferences, refer to the Owner's Literature. When the driver seat and/or passenger seat is set to AUTO mode, the driver/passenger heated seat activates in full heat mode when the outside temperature is less than 0° C (32° F) and full cool mode (heated/ventilated seats only) when outside temperature is greater than 27° C (80° F) any time the vehicle is started using the remote start feature. No heated/ventilated seat adjustments are recognized during remote start operation. Once the ignition is cycled ON, the heated/ventilated seat turns off.

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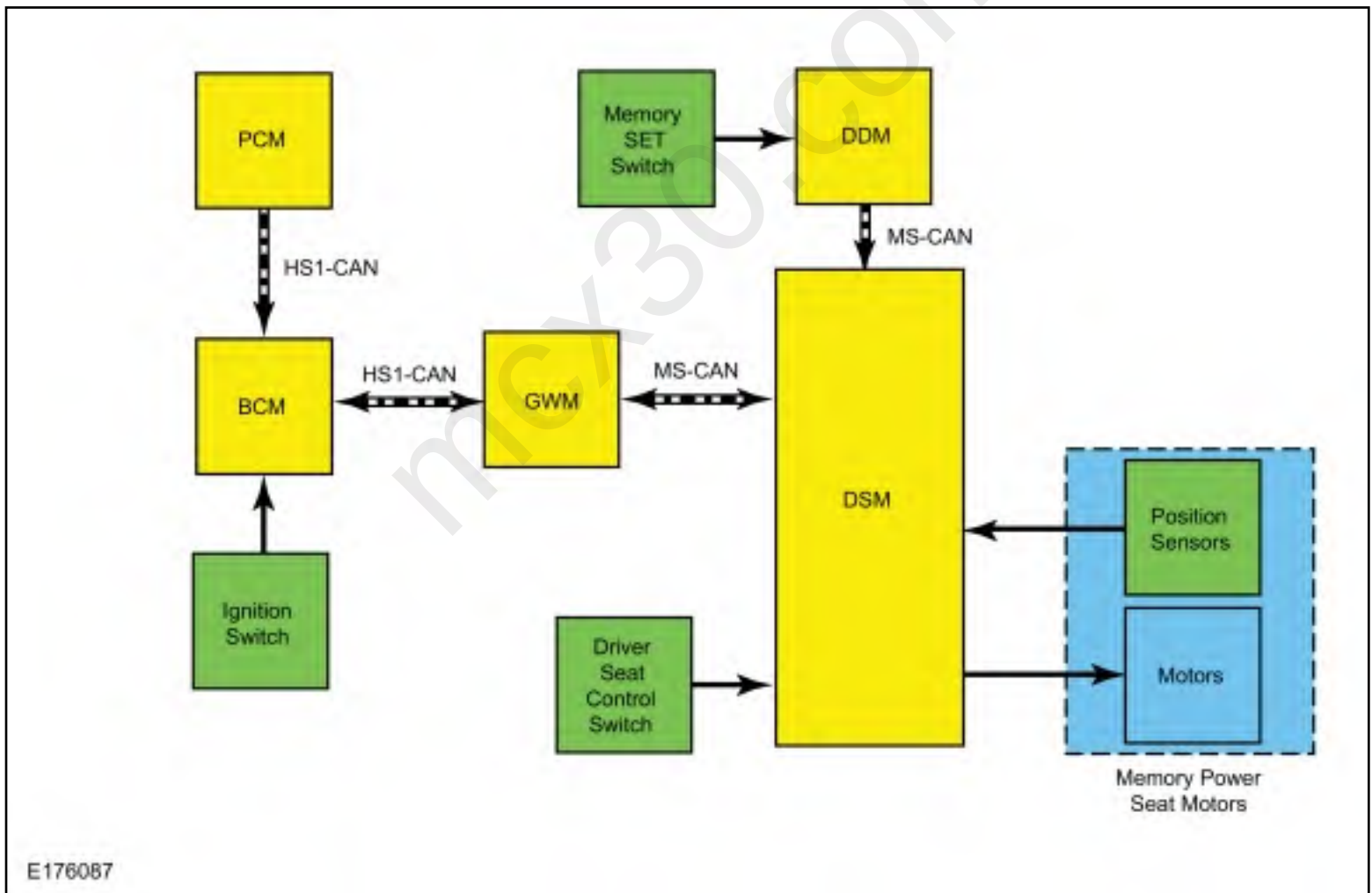
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Front Seats - System Operation and Component Description

Base Part Number: Base Part Number: 63100

System Operation

System Diagram - Memory Seat

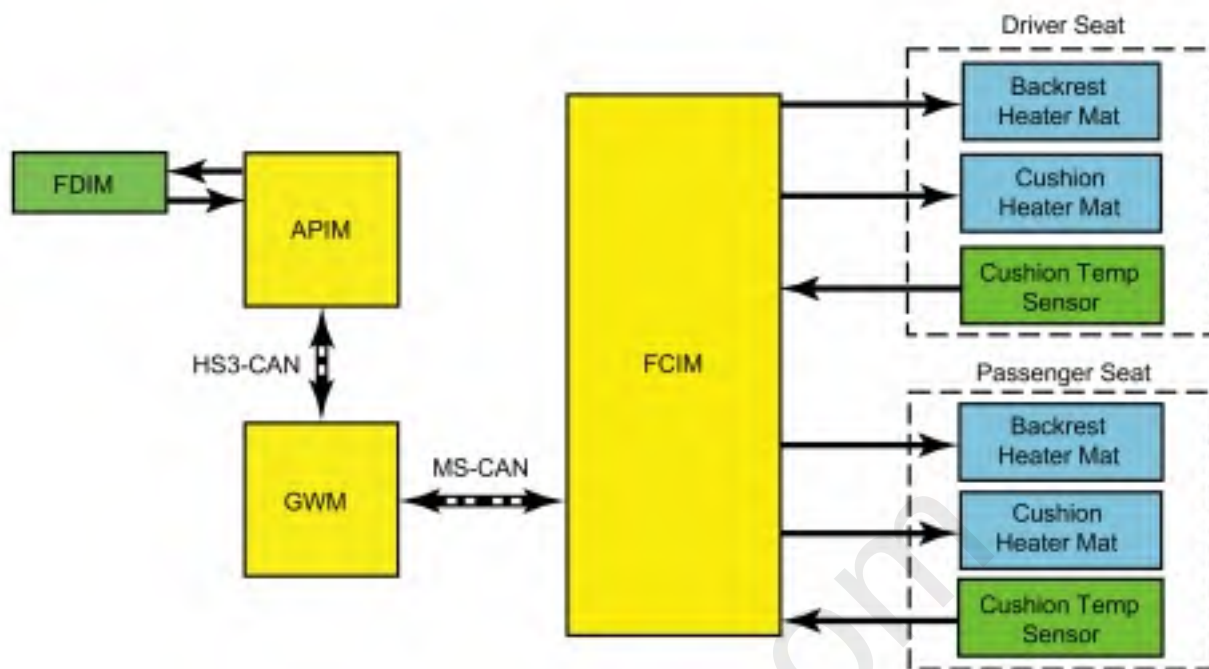


Network Message Chart - Memory Seat

DSM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Key-in-ignition status	BCM	Provides the ignition position. This input is used for the easy entry/exit feature.
Personality recall	BCM	When the personality recall command is received from the BCM, the DSM stores or recalls the associated memory seat position (1, 2 or 3). If a RKE transmitter has been programmed to a memory position, this input is used to recall the associated memory seat position.
Memory seat switch status	DDM	When the memory set switch (1, 2 or 3) is activated, the DDM sends this message to the DSM, which then stores or recalls the associated memory seat position.

System Diagram - Heated Seats



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Network Message Chart - Heated Seats

FCIM Network Input Messages

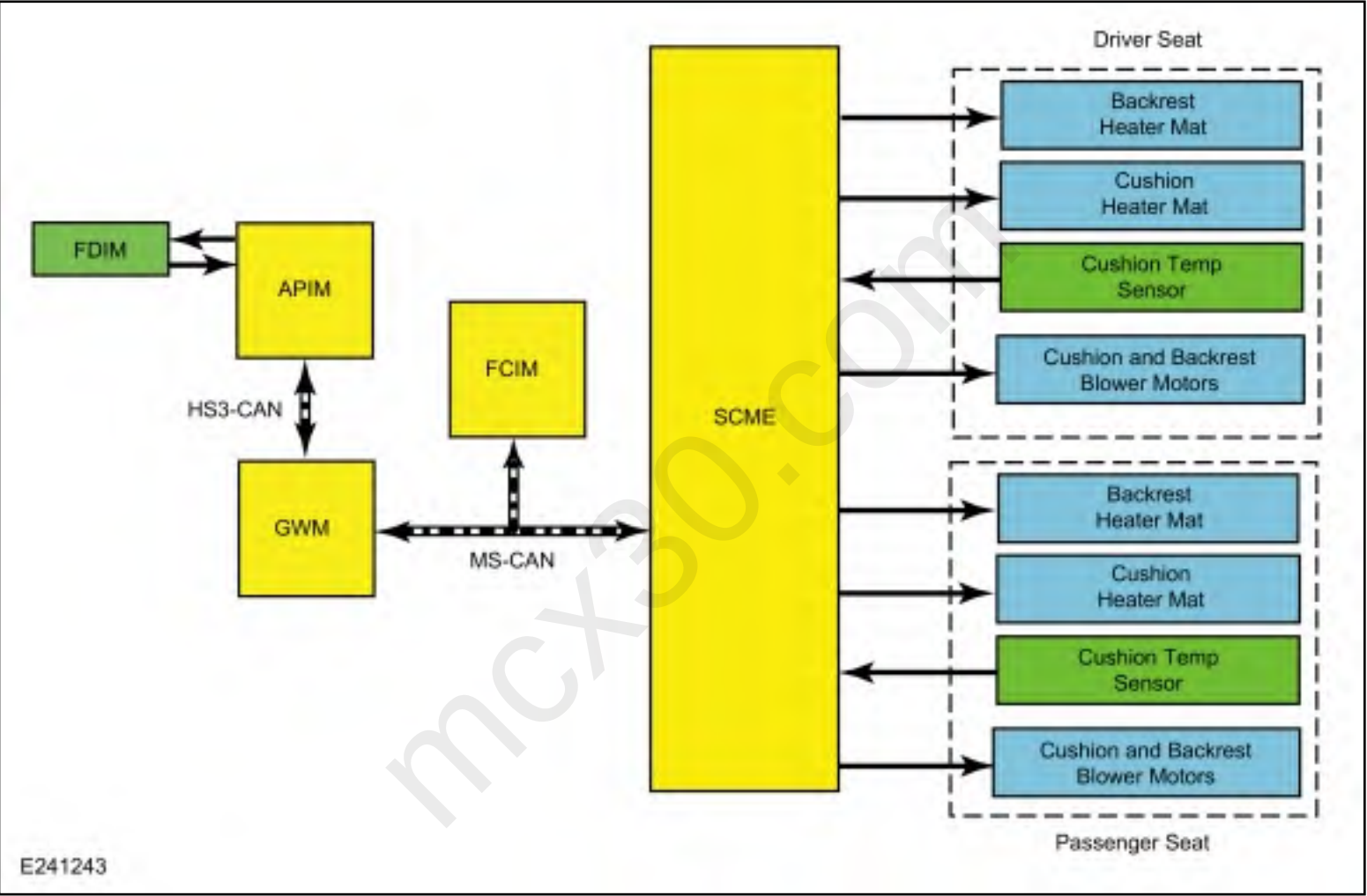
Broadcast Message	Originating Module	Message Purpose
Climate control requests	FCIM	The climate control requests message contains the heated seat request information.

FDIM Network Input Messages

Broadcast Message	Originating Module	Message Purpose

Climate control button status	FCIM	The climate control button status message provides the current status of the heated seat button(s) to the FCIM for the purpose of updating the displayed status of the heated seat buttons on the FDIM (touchscreen).
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System Diagram - Heated/Ventilated Seats



Network Message Chart - Heated/Ventilated Seats

SCME Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Climate control requests	FDIM	The climate control requests message contains the heated/ventilated seat request information.

Climate control requests	FCIM	The climate control requests message contains the heated/ventilated seat request information.
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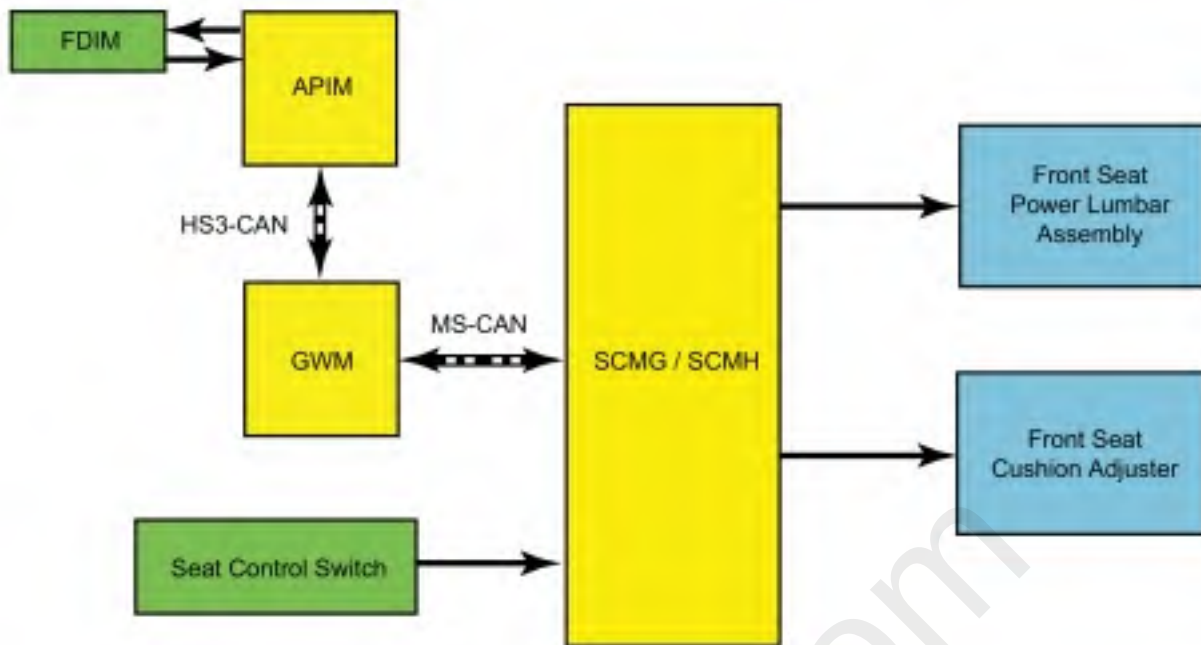
FCIM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Climate control button status	SCME	The SCME provides this message to the FCIM for the purpose of updating the displayed status of the heated/ventilated seat buttons on the FCIM.

FDIM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Climate control button status	SCME	The SCME provides this message to the FDIM for the purpose of updating the displayed status of the heated/ventilated seat buttons on the FDIM (touchscreen).

System Diagram - Multi-Contour Front Seats



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Network Message Chart - Multi-Contour Front Seats

FDIM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Multi-contour seat switch status	SCMG/ SCMH	The SCMG/ SCMH provides this message to the FDIM for the purpose of updating the displayed status of the multi-contour seat buttons on the FDIM (touchscreen).
Driver/passenger multi-contour seat position data	SCMG/ SCMH	The SCMG and SCMH provide this message to the FDIM for the purpose of updating the displayed pressure of the multi-contour seat bladders and bolster pairs on the FDIM (touchscreen).

SCMG/ SCMH Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Multi-contour seat request	FDIM	The multi-contour seat request message contains the requested multi-contour function(s) from the touchscreen.

Memory Seat Operation

The driver seat control switch provides a voltage signal to the DSM only when activated. This voltage signal causes the DSM to power the appropriate motor until the input is removed. The motor circuits are normally grounded through the DSM. The DSM internally switches the appropriate circuit from ground to voltage to operate the motors.

As the seat is adjusted, the DSM monitors the motor position sensors to record the current seat position. The DSM removes voltage from the motor upon termination of the seat control switch input or if the DSM does not detect movement from the motor while monitoring the position sensor during a memory recall operation.

If the DSM loses the signal from any of the motor position sensors, the affected seat motor operates in jog mode. Jog mode allows limited operation of the affected seat motor using only the seat control switch. When the seat control switch is operated in jog mode, the seat moves in the desired direction for one second, then stops. The seat control switch must be released, then pressed again in order to move the seat for an additional second. Jog mode is an indication that there is a seat motor sensor fault. If the memory seat is operating in jog mode, a DTC sets in the DSM.

DSM Hard Stop/Soft Stop

A hard stop occurs when one of the memory seat track or backrest axes physically reach the end of travel and can go no further. A soft stop occurs when the seat stops before it physically reaches the end of travel. The hard stop is set by seat design and cannot be changed or adjusted. The soft stop is set by the DSM. The seat track axes are forward/rearward, front up/down and rear up/down. The backrest axis is recline forward/backward. To prevent unnecessary stress on the seat and motors, the DSM sets soft stop positions, 2 for each moving axis. The DSM uses a preset distance from the hard stop to determine where the soft stop occurs. When an axis reaches the hard stop and the switch is held for approximately one second, the DSM briefly reverses direction and establishes the soft stop for that axis in that direction. The DSM uses this back up strategy to check sensor integrity any time movement has stopped prematurely due to a sensor failure or obstruction.

Easy Entry/Exit

The easy entry/exit feature is a function of the DSM that moves the driver seat back approximately 50.8 mm (2 in) (unless seat is already positioned at or near the end of travel) when the ignition is turned off. The DSM receives ignition off status over the MS-CAN and operates the driver seat rearward. The DSM cancels this operation if a valid input command is received from the driver seat control switch, memory set switch, exterior mirror control switch or if the function has been disabled.

The DSM records the current seat positions before operating the seat for an easy exit operation. During easy entry operation (when the ignition is turned on), the seat is returned to the recorded seat position prior to the easy exit operation. Easy entry operation is cancelled if a valid input command is received by the DSM. A memory position recall using the memory set switch also overrides the easy exit operation.

The easy entry/exit feature can be enabled/disabled on the message center. For information on programming vehicle settings in the message center, refer to the Owner's Literature.

Power Seat Operation - Passenger and Driver (Without Memory)

The seat control switches contain normally-closed contacts which are grounded. An individual circuit is switched to voltage when a specific adjustment position is selected. The seat control switches are hard-wired directly to the applicable seat motors. The motor direction is determined by the polarity of voltage supplied from the seat control switch.

Multi-Contour Seat Operation

The multi-contour seats are independently controlled by the seat control switches (located on the outer side of the front seat cushions) or the FDIM (touchscreen). The driver and passenger front seats each contain a total of 7 inflatable bladders: 4 cushion bladders and 3 backrest lumbar bladders. The pressures for the lumbar and cushion bladders are displayed on the FDIM as a percentage of the maximum pressure.

There are 2 modes of operation: adjust or massage. Adjust mode allows pressure changes in one of the 3 lumbar bladders to be inflated or deflated to a desirable feel. Massage mode provides a sequence of inflation and deflation of the lumbar and cushion bladders to simulate a massage motion. When the massage mode is active, it will turn off (time-out) after 20 minutes of operation.

NOTE: *Refer to the Owner's Literature for information how to select the various modes using the seat control switch or touchscreen buttons.*

When in Adjust mode:

- Each tap of the up or down buttons cycles through the following bladders: Upper lumbar, middle lumbar and lower lumbar.
- When the inflate/deflate buttons are pressed (or held), the pressure increases or decreases for the currently selected bladder.
- Pressing the mode select button toggles the seat to massage mode. The ignition must be on for massage mode to function.

When in Massage mode:

- Each tap of the up or down buttons cycles between backrest and cushion massage modes.
- Each tap of the inflate/deflate buttons cycles between the intensity levels of massage (off, low and high).
- Pressing the mode select button toggles the seat to adjust mode. Middle lumbar bladder will be selected automatically.

Each multi-contour seat can be restored to the original factory settings by pressing and holding the select button greater than 30 seconds. This resets all the adjust and massage settings (including any multi-contour driver seat settings associated to memory personality 1, 2 or 3).

Heated Seat Operation

The driver and passenger heated seat control buttons and indicators are located on the FCIM and FDIM (touchscreen, if equipped). The heated seat system functions independently of the vehicle's climate control system. Each time the heated seat button is pressed, the system decreases one setting (the sequence is high, med, low, off, high, etc.).

When activated, the FCIM supplies voltage to the selected seat heater circuit. Each seat cushion heater mat and backrest heater mat is connected in a series circuit to the FCIM and powered by the output circuit for that seat. The FCIM monitors inputs from a temperature sensor located in each seat cushion heater mat, and maintains seat temperature by cycling the heater circuits on/off. The heated seat remains ON until the heated seat switch button is pressed to cycle the FCIM OFF or the ignition is set to OFF.

If a fault is detected by the FCIM, the module stops supplying voltage to that individual left or right seat that the fault was detected on until the ignition is turned OFF and then ON.

Heated/Ventilated Seat Operation

The driver and passenger heated/ventilated seat buttons are selected from the FCIM and FDIM (touchscreen). The heated/ventilated seat system functions independently from the vehicle's climate control system.

Heat Operation

- The system control settings are indicated next to each heated/ventilated seat switch button on the touchscreen. The first setting is HIGH (3 indicators), the second setting is MED (2 indicators) and the third is LOW (1 indicator) then OFF (no indicators).
- When activated, the SCME supplies voltage to the selected seat heater circuit. Each seat cushion heater mat and backrest heater mat is connected in a series circuit to the SCME and powered by the output circuit for that seat. The SCME monitors inputs from a temperature sensor located in each seat cushion heater mat, and maintains seat temperature by cycling the heater circuits on/off. The heated seat remains ON until the heated seat switch button is pressed to cycle the SCME OFF or the ignition is set to OFF.

Ventilation Operation

- The seat cushion and backrest are each equipped with a blower motor assembly. Each blower motor draws air through the surface of the cushion and backrest through the foam. Once the system is activated, the SCME controls the blower speed dependant on the heated/ventilated seat settings.
- The system control settings are based on the 3 indicators next to each heated/ventilated seat switch button on the touchscreen. The first setting is HIGH (3 indicators), the second setting is MED (2 indicators) and the third is LOW (1 indicator) then OFF (no indicators).

Remote Start Climate Operation

Different climate control modes/preferences can be selected when the vehicle is started using the remote start feature. This can be accessed through the message center. For additional information on how to set the remote start preferences, refer to the Owner's Literature. When the driver seat and/or passenger seat is set to AUTO mode, the driver/passenger heated seat activates in full heat mode when the outside temperature is less than 0° C (32° F) and full cool mode (heated/ventilated seats only) when outside temperature is greater than 27° C (80° F) any time the vehicle is started using the remote start feature. No heated/ventilated seat adjustments are recognized during remote start operation. Once the ignition is cycled ON, the heated/ventilated seat turns off.

Component Description

Seat Control Switch - Without Memory

The seat control switch contains normally closed contacts (which are grounded). When a specific adjustment position is selected, an individual circuit is switched to voltage.

Seat Control Switch - With Memory

The seat control switch is hard-wired to the DSM, which controls seat operation. When a specific seat

adjustment position is selected, an individual circuit is switched to voltage.

Seat Control Switch - With Multi-Contour Seats

The driver seat control switch is hard-wired to the DSM, which controls seat operation. When a specific seat adjustment position is selected, an individual circuit is switched to voltage.

The driver and passenger seat control switches each contain a 5 position momentary contact switch which provides an analog signal (stepped resistance) to the SCMG or SCMH. The resistance range for each multi-contour button is as follows:

Multi-Contour Switch	Resistance
Select	26 to 54 ohms
Down	113 to 125 ohms
Up	196 to 221 ohms
Deflate	317 to 351 ohms
Inflate	483 to 533 ohms
No switch active	573 to 634 ohms

DSM

The driver seat control switch and power memory seat motors are hard-wired to the DSM. The DSM controls the operation of the power memory seat. The DSM communicates on the MS-CAN. The SCME is integral to the DSM. PMI is required on both the DSM and the SCME when a new DSM is installed. The DSM hard stop/soft stops must be set/reset any time a new DSM, driver seat track or driver seat backrest is installed.

Memory Set Switch

The memory set switch contains 3 momentary contact switches. It is hard-wired to the DDM and is used to recall 1 of 3 memory positions stored in the DSM.

Driver Seat Track - Without Memory

There are 3 front seat track bi-directional motors present on power seat tracks. The horizontal (fore/aft)

front seat track motor is the only seat track motor which can be serviced separately from the seat track assembly. All other seat track motors (front height, rear height) are serviced as part of the seat track assembly. The seat track motors move the power seat forward/backward and up/down depending on the polarity of voltage supplied from the seat control switch.

Driver Seat Track - With Memory

There are 3 front seat track bi-directional motors present on power seat tracks. The horizontal (fore/aft) front seat track motor is the only seat track motor which can be serviced separately from the seat track assembly. All other seat track motors (front height, rear height) are serviced as part of the seat track assembly. Each seat track motor contains a Hall-effect sensor which provides seat track position information to the DSM for setting/obtaining desired preset seat memory positions. The seat track motors move the power seat forward/backward and up/down depending on the polarity of voltage supplied from the DSM.

Passenger Seat Track

The passenger power seat is equipped with 3 front seat track bi-directional motors. The horizontal (fore/aft) front seat track motor is the only seat track motor which can be serviced separately from the seat track assembly. All other seat track motors (front height, rear height) are serviced as part of the seat track assembly. The seat track motors move the power seat forward/backward and up/down depending on the polarity of voltage supplied from the seat control switch.

Driver Seat Backrest

The 10-way driver seat backrest contains a bi-directional motor which is integral to the seat backrest frame assembly. If equipped with memory, the seat backrest motor contains a Hall-effect sensor which provides seat backrest position information to the DSM for setting/obtaining desired preset seat memory positions. The seat backrest motor moves the seat backrest forward/backward depending on the polarity of voltage supplied from the DSM (if equipped with memory) or from the seat control switch.

Passenger Seat Backrest

The 10-way passenger seat backrest contains a bi-directional motor which is integral to the seat backrest frame assembly. The seat backrest motor moves the seat backrest forward/backward depending on the polarity of voltage supplied from the seat control switch.

Front Seat Power Lumbar Assembly

The front seat power lumbar assembly is mounted to the backrest (serviced as an assembly).

FDIM

If equipped, the FDIM (touchscreen) contains the heated and heated/ventilated seat buttons.

FCIM

The FCIM contains the heated seat or heated/ventilated seat control buttons. If equipped with heated seats, the FCIM monitors the seat cushion temperature sensor and supplies heater current to the seat cushion and backrest heater mats until the desired setpoint temperature is reached. Once the setpoint temperature is reached, the FCIM cycles the heater circuits on/off as required to maintain the setpoint temperature.

Heater Mat

The cushion heater mats are each equipped with a temperature sensor (thermistor) which provides feedback to the FCIM (heated seats only) or SCME (heated/ventilated seats). The heater mats are serviced by installing a new backrest/cushion foam. The cushion and backrest heater mats are connected in series.

Blower Motor

If equipped with heated/ventilated seats, the seat cushion and backrest are each equipped with a blower motor assembly. The blower motor assembly is controlled by the SCME.

Front Seat Power Lumbar Assembly - Multi-Contour Seats

The front seat power lumbar assembly includes an air pump, air hoses and bladders (serviced as an assembly).

Front Seat Cushion Adjuster - Multi-Contour Seats

The front seat cushion adjuster includes air hoses and bladders (serviced as an assembly).

SCME

If equipped with heated/ventilated seats, the SCME controls the operation of the heated/ventilated seat system. The SCME is integral to the DSM. PMI is required for both the DSM and the SCME when a new DSM is installed.

SCMG

The SCMG controls the operation of the driver multi-contour seat. PMI is required when a new SCMG

is installed. The SCMG communicates on the MS-CAN. The SCMG controls the air pump (part of the front seat power lumbar assembly) which supplies air pressure necessary to be diverted to the applicable air bladders/bolsters as required for the desired mode(s) of operation.

SCMH

The SCMH controls the operation of the passenger multi-contour seat. PMI is required when a new SCMH is installed. The SCMH communicates on the MS-CAN. The SCMH controls the air pump (part of the front seat power lumbar assembly) which supplies air pressure necessary to be diverted to the applicable air bladders/bolsters as required for the desired mode(s) of operation.

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