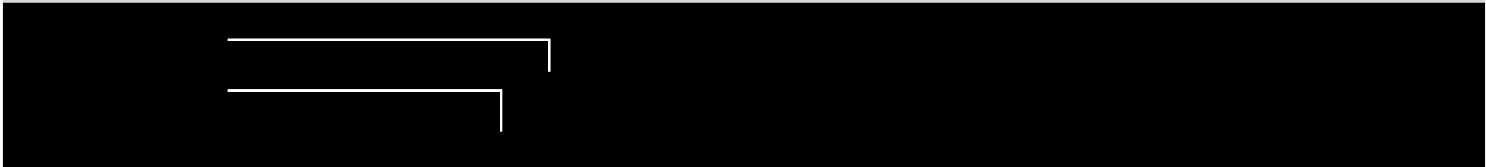


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2005 FORD Freestar OEM Service and Repair Workshop Manual

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Steering Column - System Operation and Component Description

<i>211-04 Steering Column</i>	<i>2022 F-150</i>
<i>Description and Operation</i>	<i>Procedure revision date: 10/1/2020</i>

Steering Column - System Operation and Component Description

System Diagram

Sample

2	SCCM (steering column control module)
3	GWM (gateway module A)
4	BCM (body control module)
5	DSM (driver front seat module)
6	DDM (driver door module)
7	Memory Set Switch
8	Tilt Motor
9	Telescopic Motor
10	Hall Effect Sensor
11	Hall Effect Sensor

System Operation

Network Message Chart - Power Adjustable Steering Column

Module Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Ignition status	BCM (body control module)	This message is used to communicate ignition status, which is used for initiating the easy entry/easy exit feature.
Personality recall	BCM (body control module)	When the personality recall command is received from the BCM (body control module), the DSM (driver front seat module) stores or recalls the steering wheel position. If a RKE (remote keyless entry) transmitter has been programmed to a memory position, this input is used to recall the steering column position.
Steering column position switch status	SCCM (steering column control module)	Message to control the adjustable steering column when the steering column control switch is pressed. The message is transmitted from the

The memory SET switch is monitored by the DDM (driver door module) . When a memory position is recalled through the memory SET switch, the DDM (driver door module) sends a MS-CAN (medium speed-controller area network) message to the DSM (driver front seat module) . The DSM (driver front seat module) activates the tilt/telescopic motor(s) and monitors the Hall-effect sensors to adjust the steering column to the position that is stored in the DSM (driver front seat module) memory. Once the steering column reaches the desired position, the DSM (driver front seat module) deactivates the steering column motor(s). If the DSM (driver front seat module) receives a steering column switch input during a memory position recall function, the module stops the memory recall and responds to the new steering column switch position input.

When the RKE (remote keyless entry) transmitter is activated, the BCM (body control module) sends a High Speed Controller Area Network 1 (HS1-CAN) message to the GWM (gateway module A) . The GWM (gateway module A) then sends a MS-CAN (medium speed-controller area network) message to the DSM (driver front seat module) , which moves the steering column to the position that is stored in the DSM (driver front seat module) memory.

Easy Entry/Easy Exit

The easy entry/easy exit function moves the steering column to the full upward position when the vehicle is in the PARK position and the ignition is OFF.

The DSM (driver front seat module) monitors the steering column position using Hall-effect sensors that are integral to the tilt and telescopic motors. The DSM (driver front seat module) commands the steering column to the full upward position when the ignition status message indicates the ignition is OFF. The DSM (driver front seat module) cancels this operation if a valid input is received from the steering column control switch or memory position switch.

The DSM (driver front seat module) records the current steering column position before powering the steering column for an easy exit operation. This recorded position returns the steering column to this position on the next easy entry operation. During easy entry operation, the steering column is either returned to the position previous to the easy exit operation or to the saved memory preset if a RKE (remote keyless entry) transmitter is used.

The easy entry/easy exit feature can be enabled or disabled using the message center. Refer to Driver Controls in the Owner's Literature for instructions for using the message center.

Component Description

Steering Column Control Switch

The steering column control switch is a momentary contact switch that is connected directly to the LH (left-hand) side of the SCCM (steering column control module) and controls the forward, rearward, upward and downward movement of the steering column. The steering column control switch is serviced separately.

Steering Column Tilt Motor

The DSM (driver front seat module) provides power and ground to the tilt motor, which controls the upward and downward position of the power adjustable steering column. The tilt motor is equipped with a Hall-effect

Steering Column

211-04 Steering Column	2022 F-150
Diagnosis and Testing	Procedure revision date: 11/2/2020

Steering Column

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#)

(100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC (diagnostic trouble code)	Description	Action
DSM (driver front seat module)	B1299:24	Steering Column Adjust Down Switch: Signal Stuck High	GO to Pinpoint Test E
DSM (driver front seat module)	B12A1:24	Steering Column Adjust In Switch: Signal Stuck High	GO to Pinpoint Test E
DSM (driver front seat module)	B12A2:24	Steering Column Adjust Out Switch: Signal Stuck High	GO to Pinpoint Test E
DSM (driver front seat module)	B12A7:11	Steering Column Tilt Sensor A: Circuit Short To Ground	GO to Pinpoint Test C
DSM (driver front seat module)	B12A7:15	Steering Column Tilt Sensor A: Circuit Short To Battery or Open	GO to Pinpoint Test C

Symptom Chart

Symptom Chart: Power Adjustable Steering Column

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#)

(100-00 General Information, Description and Operation).

Condition	Actions
The adjustable steering column is inoperative in one or more directions using the steering column control switch	GO to Pinpoint Test A
The adjustable steering column is inoperative in one or more directions using the memory position switch	GO to Pinpoint Test B
The adjustable steering column is inoperative in one or more directions using the RKE (remote keyless entry) transmitter	GO to Pinpoint Test B
The adjustable steering column is inoperative in one or more directions using the easy entry/easy exit feature	GO to Pinpoint Test B
The adjustable steering column operates in one second intervals when using the steering column control switch (jog mode)	GO to Pinpoint Test C

Pinpoint Tests

PINPOINT TEST A : THE ADJUSTABLE STEERING COLUMN IS INOPERATIVE IN ONE OR MORE DIRECTIONS USING THE STEERING COLUMN CONTROL SWITCH

Refer to Wiring Diagrams Cell 128 for schematic and connector information.

Normal Operation and Fault Conditions REFER to: [Steering Column - System Operation and Component Description](#)

(211-04 Steering Column, Description and Operation).

Possible Sources

- Wiring, terminals or connectors
- Adjustable steering column tilt motor
- Adjustable steering column telescopic motor

Yes	DIAGNOSE the SCCM (steering column control module) Diagnostic Trouble Codes (DTCs). REFER to: Steering Wheel and Column Electrical Components (211-05 Steering Wheel and Column Electrical Components, Diagnosis and Testing).
------------	--

No	GO to A4
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A4 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCs) IN THE DSM (DRIVER FRONT SEAT MODULE)

- Using a diagnostic scan tool, carry out the DSM (driver front seat module) self-test.

Are any Diagnostic Trouble Codes (DTCs) present in the DSM (driver front seat module) ?

Yes	For DSM (driver front seat module) DTC (diagnostic trouble code) B1375:11, B1375:12, B1375:13, B137E:11, B137E:12 or, B137E:13, GO to Pinpoint Test D For all other DSM (driver front seat module) Diagnostic Trouble Codes (DTCs), REFER to: Front Seats (501-10A Front Seats, Diagnosis and Testing).
------------	--

No	GO to A5
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A5 CHECK THE SCCM (STEERING COLUMN CONTROL MODULE) STEERING COLUMN ADJUST SWITCH (STRCOL_ADJ) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, view the SCCM (steering column control module) Parameter Identification (PIDs).
- Access the SCCM (steering column control module) and monitor the STRCOL_ADJ (Steering Column Adjust Switch) PID (parameter identification) while activating the steering column control switch in all 4 directions.

Does the PID (parameter identification) display match each steering column control switch position?

Yes	GO to A6
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No	If the PID (parameter identification) displays "No Movement" or "Invalid", or if the PID (parameter identification) display does not match one or more switch positions, INSTALL a new steering
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Are the resistances less than 3 ohms?

Yes	GO to A7
------------	--------------------------

No	REPAIR the circuit. TEST the system for normal operation.
-----------	---

A7 CHECK THE ADJUSTABLE STEERING COLUMN MOTOR CIRCUITS FOR A SHORT TO GROUND

- Measure:

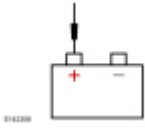

Positive Lead	Measurement / Action	Negative Lead
C2600-1	Ω	Ground
C2600-2	Ω	Ground

- Measure:


Positive Lead	Measurement / Action	Negative Lead
C2601-1	Ω	Ground
C2601-2	Ω	Ground

Are the resistances greater than 10,000 ohms?

Yes	GO to A8
------------	--------------------------

Positive Lead	Measurement / Action	Negative Lead
 Positive battery terminal		C341A-6

- Momentarily connect a fused jumper wire:

Positive Lead	Measurement / Action	Negative Lead
C341A-2		Ground

Does the telescopic motor move the steering column when the fused jumper wire is connected to ground?

Yes	GO to A10
------------	---------------------------

No	INSTALL a new telescopic motor. REFER to: Steering Column Telescopic Motor (211-04 Steering Column, Removal and Installation).
-----------	--

A10 CHECK FOR CORRECT DSM (DRIVER FRONT SEAT MODULE) OPERATION

- Inspect DSM (driver front seat module) connectors.
- Repair:
 - corrosion (install new connector or terminal - clean module pins)
 - damaged or bent pins - install new terminals or pins
 - pushed-out pins - install new pins as necessary
- Connect DSM (driver front seat module) C341A and C341B.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	If the adjustable steering column is inoperative using the easy entry/exit feature, GO to B2 If the adjustable steering column is inoperative using the memory position switch, GO to B3 If the adjustable steering column is inoperative using an RKE (remote keyless entry) transmitter, GO to B4
------------	---

No	If the steering column does not move at all in one or more directions using the steering column switch, GO to Pinpoint Test A If the steering column only moves in one second intervals (jog mode) in one or more directions using the steering column switch, GO to Pinpoint Test C
-----------	--

B2 VERIFY THE EASY ENTRY/EXIT FEATURE IS ENABLED

- Using the message center, enable the easy entry/exit feature. Refer to the Owner's Literature for additional instructions for using the message center.
- Activate the easy entry/easy exit feature by turning the ignition on and then off.

Does the adjustable steering column operate using the easy entry/easy exit feature?

Yes	The repair is complete. INFORM the customer that the easy entry/easy exit feature was disabled and RETURN the vehicle to the customer.
------------	--

No	GO to B5
-----------	--------------------------

B3 CHECK THE OPERATION OF THE MEMORY SEATS AND MEMORY MIRRORS USING THE MEMORY POSITION SWITCH

- Check the operation of the seats and memory mirrors using the memory position switch. If necessary, refer to the Owner's Literature for additional instructions for programming a memory position.

Do the seats and mirrors operate correctly using the memory position switch?

Yes	GO to B5
------------	--------------------------