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2004 FORD Focus Wagon OEM Service and Repair Workshop Manual

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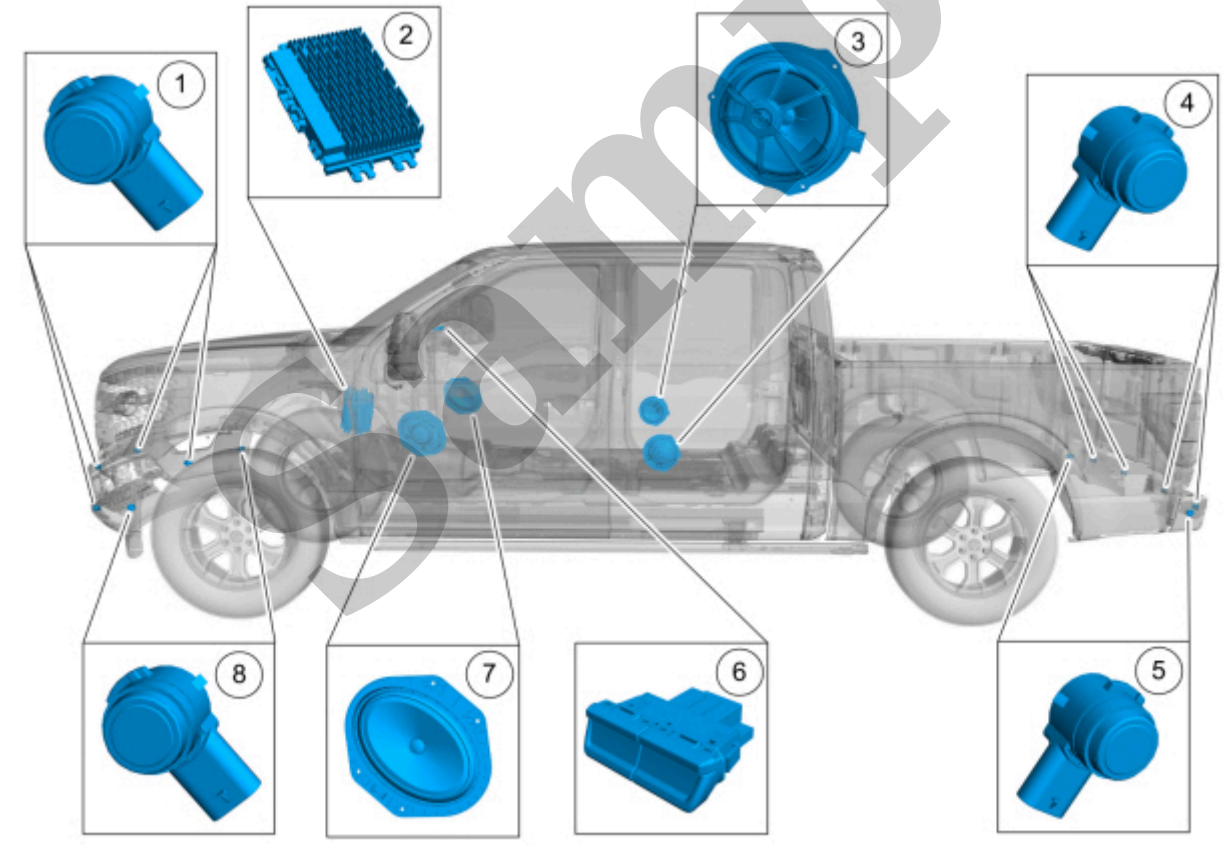
Parking Aid - Component Location

413-13A Parking Aid - Vehicles With: Rear Parking Aid	***2022 F-150***
Description and Operation	***Procedure revision date: 10/2/2020***

Parking Aid - Component Location



E338134

Item	Description

Parking Aid - Overview

413-13A Parking Aid - Vehicles With: Rear Parking Aid	*2022 F-150*
Description and Operation	***Procedure revision date: 10/2/2020***

Parking Aid - Overview

Parking Aid Overview

Parking Aid - Audible

The available parking aid features depend on the vehicle trim level and options selected. The possible audible parking aid configurations are as follows:

- Rear parking aid
- Front and rear parking aid
- Front and rear parking aid, plus active park assist and the side sensing system

The rear parking aid system sounds a warning tone through the rear speakers to alert the driver of stationary objects near the rear bumper when the vehicle is in reverse. The rear parking aid system may not detect moving objects.

If equipped, the side sensing system uses the front and rear side sensors to detect and map obstacles that are near the sides of the vehicle. The side sensing system provides a warning tone if an obstacle is detected on the right or left side of the vehicle while the vehicle moves slowly in forward or reverse.

The side sensing system is unavailable when the traction control system is deactivated. The side sensing system may not be available until the vehicle is driven approximately one vehicle length allowing the system to reinitialize after the following conditions:

- Ignition switched on, off, and back on.
- Vehicle is stationary for two minutes or more.

Parking Aid - System Operation and Component Description

413-13A Parking Aid - Vehicles With: Rear Parking Aid	***2022 F-150***
Description and Operation	***Procedure revision date: 10/3/2022***

Parking Aid - System Operation and Component Description

System Operation

Parking Aid - Audible

System Diagram

6	RH (right-hand) front inner sensor
7	RH (right-hand) rear outer sensor
8	RH (right-hand) front outer sensor
9	Left rear side sensor
10	Right rear side sensor
11	Left front active sensor
12	Right front active sensor
13	Parking aid switch
14	IPMA (image processing module A)
15	PCM (powertrain control module)
16	TCM (transmission control module)
17	PSCM (power steering control module)
18	ABS (anti-lock brake system) module
19	GWM (gateway module A)
20	TCU (telematic control unit module)
21	BCM (body control module)
22	SCCM (steering column control module)
23	APIM (SYNC module)
24	Audio system display
25	TRM (trailer module) (If equipped)
26	IPC (instrument panel cluster)

data		
Vehicle speed	PCM (powertrain control module)	Disables the parking aid if the vehicle speed exceeds a preset threshold.
Wheel speed data	ABS (anti-lock brake system) module	Confirms vehicle movement and calculates distance traveled during active park assist maneuvers.
Wheel rotation data	ABS (anti-lock brake system) module	Confirms wheel rotation during active park assist maneuvers.
Wheel rotation direction	ABS (anti-lock brake system) module	Confirms wheel rotation direction during active park assist maneuvers.

IPC (instrument panel cluster) Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Audio chime status	ACM (audio front control module)	Provides audio chime status feedback to the IPC (instrument panel cluster) .
Parking aid chime request	IPMA (image processing module A)	Commands parking aid warning tones through the IPC (instrument panel cluster) chime arbitrator.
Parking aid fault status	IPMA (image processing module A)	Indicates a parking aid fault.
Parking aid front status	IPMA (image processing module A)	Indicates the status of the front parking aid.
Parking aid rear status	IPMA (image processing module A)	Indicates the status of the rear parking aid.
Parking aid sensor data	IPMA (image processing module A)	Provides data on the parking aid sensors.
Parking aid text message	IPMA (image processing module A)	Provides parking aid information for the message center.

The rear parking aid system calculates the distance to an object around the rear of the vehicle using 4 ultrasonic sensors. The rear parking aid sensors detect objects approximately 180 cm (70 in) from the rear of the vehicle, 50 cm (20 in) from the rear side of the vehicle, and 30 cm (12 in) above the ground. To detect objects behind the vehicle, the IPMA (image processing module A) supplies voltage and ground to the rear ultrasonic sensors while monitoring a signal return circuit from each sensor. The 4 rear sensors share common voltage and ground circuits.

The front parking aid system calculates the distance to an object around the front of the vehicle using 4 ultrasonic sensors. The front parking aid sensors detect objects approximately 70 cm (27 in) from the front of the vehicle, 50 cm (20 in) from the front side of the vehicle, 30 cm (12 in) above the ground. To detect objects in front of the vehicle, the IPMA (image processing module A) supplies voltage and ground to the front ultrasonic sensors while monitoring a signal return circuit from each sensor. The 4 front sensors share common voltage and ground circuits. Vehicles equipped with active park assist must be equipped with the front parking aid system.

Only objects that reflect a sufficient amount of sound waves are detected by the parking aid sensors. The surface properties, size and composition of an object can affect the ability of the parking aid system to detect the object.

Parking aid operation may be affected by:

- Improper sensor installation or alignment
- Dirt or ice covered sensors
- Heavy rain or snow

The parking aid system detects objects when the vehicle is in any of the following conditions:

- Reverse (rear parking aid).
- Motion in any gear except neutral (front parking aid and side sensing system, if equipped).
- Moving toward the object.
- Stationary and the object is moving toward the vehicle.
- The vehicle and object are both moving toward one another.

The following may trigger false detections when driving at slow/creeping speeds (could be decelerating or accelerating) less than 12 km/h (8 mph), but not at a stop:

- Near another vehicle equipped with parking aid sensors. The other vehicle could be several meters away (it does not have to be within the detection zone of the host vehicle).
- Near a truck or school bus with air brakes (while the bus/truck is applying their brake).

IPMA (image processing module A)

The IPMA (image processing module A) calculates and reports (via audio system tones) the distance between the front or rear bumper of the vehicle and an object. The IPMA (image processing module A) requires PMI (programmable module installation) when replaced.

The IPMA (image processing module A) uses the ethernet communiction network for OTA (Over-The-Air Programming) . For more information on OTA (Over-The-Air Programming) ,

Refer to: Module Configuration - System Operation and Component Description

(418-01B Module Configuration - Vehicles With: Over-the-Air (OTA) Programming, Description and Operation).

Parking Aid Switch

The parking aid system is enabled or disabled using the parking aid switch. The parking aid system is only disabled for one key cycle. The parking aid system is enabled by default and cannot be disabled when a MyKey® restricted key is in use. The parking aid switch is integral to the instrument panel console switch assembly. It is hardwired to the IPMA (image processing module A) .

IPMA (image processing module A)	B1B38:96	Right Front Inner Sensor: Component Internal Failure	GO to Pinpoint Test O
IPMA (image processing module A)	B1B38:98	Right Front Inner Sensor: Component Or System Over Temperature	GO to Pinpoint Test P
IPMA (image processing module A)	B1B40:08	Left Front Outer Sensor: Bus Signal/Message Failure	GO to Pinpoint Test L
IPMA (image processing module A)	B1B40:96	Left Front Outer Sensor: Component Internal Failure	GO to Pinpoint Test O
IPMA (image processing module A)	B1B40:98	Left Front Outer Sensor: Component Or System Over Temperature	GO to Pinpoint Test P
IPMA (image processing module A)	B1B42:08	Left Front Inner Sensor: Bus Signal/Message Failure	GO to Pinpoint Test M
IPMA (image processing module A)	B1B42:96	Left Front Inner Sensor: Component Internal Failure	GO to Pinpoint Test O
IPMA (image processing module A)	B1B42:98	Left Front Inner Sensor: Component Or System Over Temperature	GO to Pinpoint Test P
IPMA (image processing module A)	B1B44:08	Right Rear Outer Sensor: Bus Signal/Message Failure	GO to Pinpoint Test F
IPMA (image processing module A)	B1B44:96	Right Rear Outer Sensor: Component Internal Failure	GO to Pinpoint Test N
IPMA (image processing module A)	B1B44:98	Right Rear Outer Sensor: Component Or System Over Temperature	GO to Pinpoint Test Q
IPMA (image processing module A)	B1B46:08	Right Rear Inner Sensor: Bus Signal/Message Failure	GO to Pinpoint Test G
IPMA (image processing module A)	B1B46:96	Right Rear Inner Sensor: Component Internal Failure	GO to Pinpoint Test N
IPMA (image processing module A)	B1B46:98	Right Rear Inner Sensor: Component Or System Over Temperature	GO to Pinpoint Test Q

	• IPMA (image processing module A)	
The audible parking aid is inoperative	• Refer to the Pinpoint Test	GO to Pinpoint Test A
Continuous or intermittent tone when no obstacles or fault codes are present	• Refer to the Pinpoint Test	GO to Pinpoint Test R
The parking aid audio tones are inoperative	• Refer to the Pinpoint Test	GO to Pinpoint Test A
The parking aid switch is inoperative or does not operate correctly	• Refer to the Pinpoint Test	GO to Pinpoint Test D
The parking aid disable switch LED (light emitting diode) is inoperative or always on	• Refer to the Pinpoint Test	GO to Pinpoint Test E
The reverse brake assist is inoperative or does not operate correctly	• Refer to the Pinpoint Test	REFER to: Blind Spot Information System(419-04A Side and Rear Vision, Diagnosis and Testing).
Sensor blockage	• Refer to the Pinpoint Test	GO to Pinpoint Test R
The parking aid menu is not available in the message center and cannot be deactivated	• A MyKey® restricted key is in use	Normal operation.

Pinpoint Test(s)

PINPOINT TEST A : THE AUDIBLE PARKING AID IS INOPERATIVE

NOTE