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1994 FORD Scorpio Wagon OEM Service and Repair Workshop Manual

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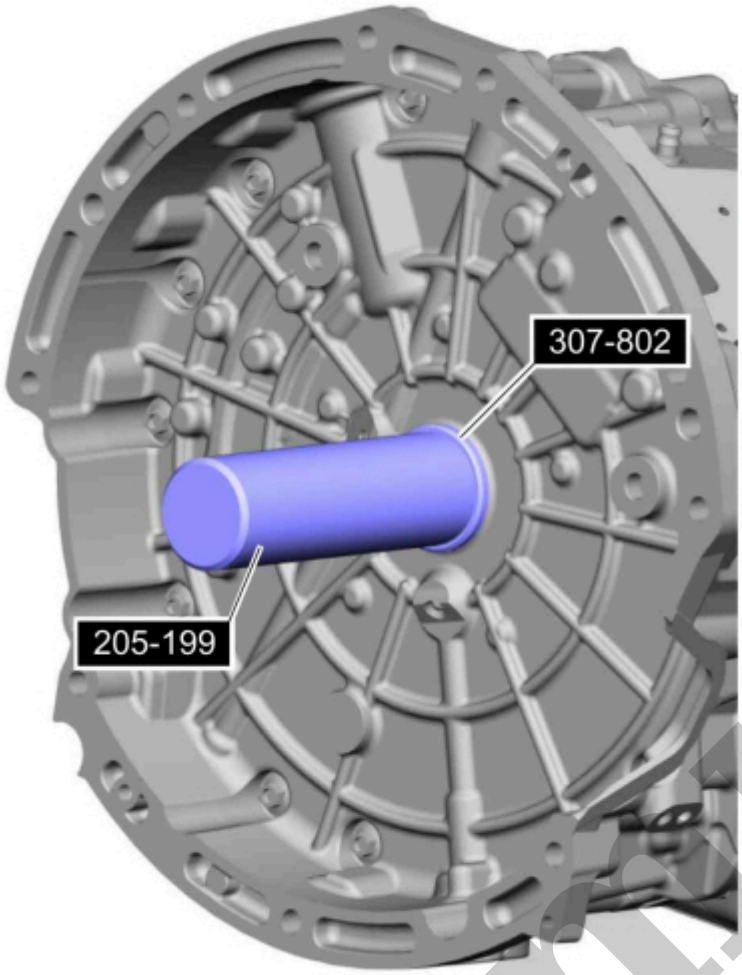

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Click here to learn about symbols, color coding, and icons used in this manual.

3. - Rotate the transmission to the horizontal position.

     Use the General Equipment: Mounting Stand

   - Using a floor crane, remove the transmission from the mounting stand.

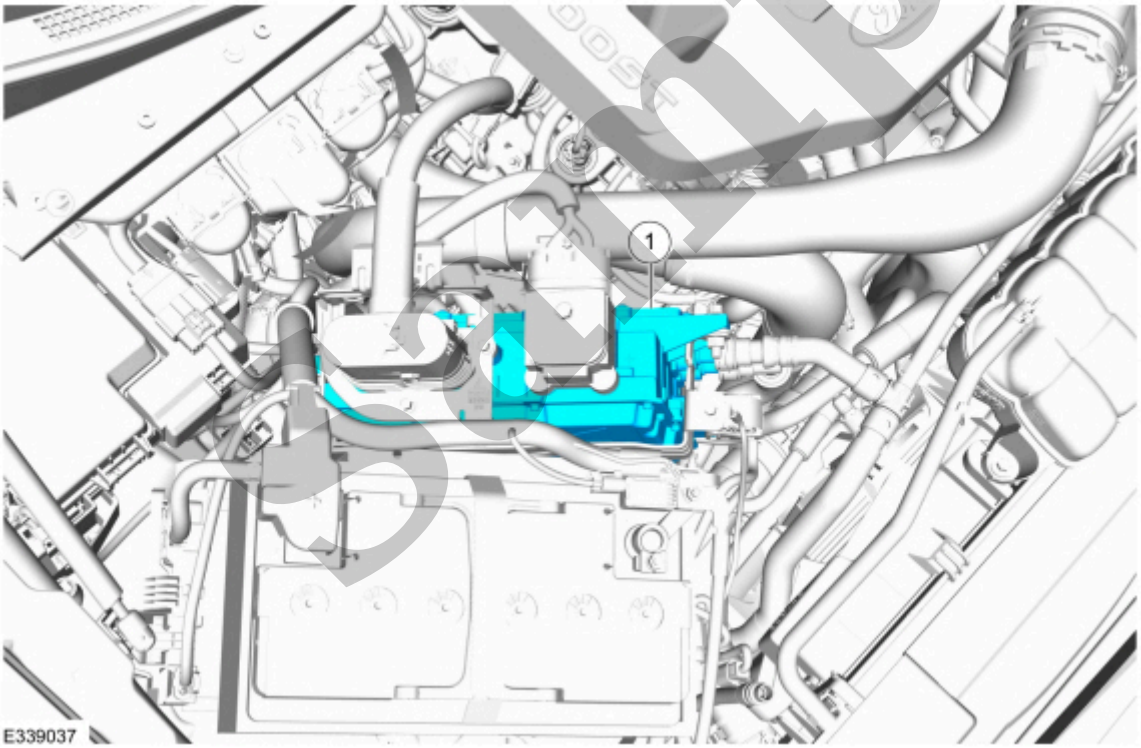
     Use the General Equipment: Floor Crane

Electric Powertrain Control - Component Location

303-14F Electric Powertrain Control - 3.5L V6 PowerBoost (CN)	***2022 F-150***
Description and Operation	***Procedure revision date: 10/5/2020***

Electric Powertrain Control - Component Location

Inverter System Controller [SOBDMC]



Item	Description
1	Inverter System Controller [SOBDMC]

Electric Powertrain Control - System Operation and Component Description

303-14F Electric Powertrain Control - 3.5L V6 PowerBoost (CN)	***2022 F-150***
Description and Operation	***Procedure revision date: 11/6/2020***

Electric Powertrain Control - System Operation and Component Description

System Operation

System Diagram

6	IPC (instrument panel cluster)
7	GWM (gateway module A)
8	HVAC (heating, ventilation and air conditioning)
9	RCM (restraints control module)
10	Inverter System System Controller (ISC)/ SOBDMC (secondary on-board diagnostic control module C)
11	Transmission Speed Sensor Resolver
12	DC (direct current) Lines
13	High Voltage BJB (battery junction box)
14	High Voltage AC (alternating current) Lines
15	Electric Motor

Network Message Chart - Inverter System Controller (ISC)

Broadcast Message	Originating Module	Message Purpose
ABS (anti-lock brake system) status	ABS (anti-lock brake system)	Indicates when ABS (anti-lock brake system) is active.
Air Conditioning Compressor Status	ACCM (air conditioning control module)	Indicates status of air conditioning compressor.
Accelerator pedal position	PCM (powertrain control module)	Accelerator pedal position used for OBDII freeze frame data.
Ambient air temperature filtered	PCM (powertrain control module)	Ambient air temperature, used to adjust high voltage battery cooling fan speed.
Brake pedal applied	PCM (powertrain control module)	Brake pedal position used for OBDII freeze frame data

The center of the electric generator control system is a microprocessor called the Inverter System Controller (ISC) also known as the SOBDMC (secondary on-board diagnostic control module C) . The Inverter System Controller (ISC) receives inputs from sensors and other electronic components. Based on information received and programmed into its memory, the Inverter System Controller (ISC) generates output signals to control various relays, solenoids, and actuators.

The Inverter System Controller (ISC) can only power-up if an external signal is received from the BCM (body control module) , the BCMC (body control module C) the DCDC (direct current/direct current converter control module) , the BECM (battery energy control module) , the GWM (gateway module A) or the PCM (powertrain control module) . There are three circuits that will wake up the Inverter System Controller (ISC): ISP-R from the BCMC (body control module C) , wake-up circuit from the BCM (body control module) and the HEV Wake-up circuit from other HEV unique modules. The Inverter System Controller (ISC) will not be able to wake if the Vehicle Batter Power (VBPWR) circuit from the 12V battery is not connected to the module and the module ground wire(s) are not connected. Applying any of the 3 wake signals will cause the Inverter System Controller (ISC) to close the power relay integral to the BCMC (body control module C) VPWR circuits which supply main 12V power to the Inverter System Controller (ISC) and several other components.

Once the Inverter System Controller (ISC) is awake, it can sustain its own 12V power through a relay. The Inverter System Controller (ISC) can operate for several minutes after vehicle ignition key is turned off in order to perform various system functions.

Some failure modes require a complete power-down and restart of the Inverter System Controller (ISC) to recover. To ensure a complete module power-down, you must wait several minutes after key-off, or monitor the Inverter System Controller (ISC) communication to determine if the module has completely shut down.

Vehicle Starting

Driver Demand

- The driver has changed one of the controls in the vehicle.
- The driver expects a reaction out of the vehicle. Example: Driver pressed down on accelerate pedal, air conditioning is requested on or off, and so forth.

Non-Driver Demand

- State of charge of HV battery is too low or too high.
- Air conditioning power levels to maintain core temperature.

Modes of Operation

Electric

The system operates in this mode when the vehicle is propelled by the electrical power stored in the high voltage battery. The torque is supplied to the output shafts by the electric motor. This is the preferred mode

- high voltage traction battery
- regenerative brake system

Component Description

Inverter System Controller (ISC)

The Inverter System Controller (ISC) is a stand alone module. The Inverter System Controller (ISC) receives a variety of CAN (controller area network) messages and hardwired signals from modules connected to the CAN (controller area network) . Based on information received, the Inverter System Controller (ISC) makes a decision on how to control the operation of the electric motor. In case of a concern, the Inverter System Controller (ISC) is able to detect and store the appropriate DTC (diagnostic trouble code) . The Diagnostic Trouble Codes can be retrieved from the Inverter System Controller (ISC) by carrying out an on demand or continuous memory self test. The Inverter System Controller (ISC) can be reprogrammed.

DCDC (direct current/direct current converter control module)	U0293:00	Lost Communication with Hybrid/EV Powertrain Control Module: No Sub Type Information	GO to Pinpoint Test CE
IPC (instrument panel cluster)	U0293:00	Lost Communication with Hybrid/EV Powertrain Control Module: No Sub Type Information	GO to Pinpoint Test CE
PAM (parking assist control module)	U0293:00	Lost Communication with Hybrid/EV Powertrain Control Module: No Sub Type Information	GO to Pinpoint Test CE
PCM (powertrain control module)	U0293:00	Lost Communication with Hybrid/EV Powertrain Control Module: No Sub Type Information	GO to Pinpoint Test CE
SOBDMC (secondary on-board diagnostic control module C)	C0030:00	Left Front Tone Wheel: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0033:00	Right Front Tone Wheel: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0036:00	Left Rear Tone Wheel: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0039:00	Right Rear Tone Wheel: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0047:00	Brake Booster Pressure Sensor: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0048:00	Brake Booster Travel Sensor: No Sub Type Information	GO to Pinpoint Test BS

SOBDMC (secondary on-board diagnostic control module C)	C0064:00	Roll Rate Sensor: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C006C:00	Stability System: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0072:00	Brake Temperature Too High: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0500:00	Left Front Wheel Speed Sensor "A" Circuit/Open: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0501:00	Left Front Wheel Speed Sensor "A" Range/Performance: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0504:00	Left Front Wheel Speed Sensor "A" Intermittent/Erratic: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0506:00	Right Front Wheel Speed Sensor "A" Circuit/Open: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0507:00	Right Front Wheel Speed Sensor "A" Range/Performance: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C050A:00	Right Front Wheel Speed Sensor "A" Intermittent/Erratic: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C050C:00	Left Rear Wheel Speed Sensor "A" Circuit/Open: No Sub Type Information	GO to Pinpoint Test BS

SOBDMC (secondary on-board diagnostic control module C)	C052D:00	ABS Pump Motor Control Circuit High: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C052E:00	ABS Pump Motor Control Circuit Low: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C053D:00	Brake Pressure Sensor "A" Range/Performance: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0555:00	Left Front Wheel Speed Sensor "A" Incorrect Component Installed: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0556:00	Right Front Wheel Speed Sensor "A" Incorrect Component Installed: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0557:00	Left Rear Wheel Speed Sensor "A" Incorrect Component Installed: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0558:00	Right Rear Wheel Speed Sensor "A" Incorrect Component Installed: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C055C:00	ABS Pump Motor Supply Voltage Circuit "A" Range/Performance: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C055E:00	Brake Hydraulic Circuit "A" Leak: No Sub Type Information	GO to Pinpoint Test BS
SOBDMC (secondary on-board diagnostic control module C)	C0560:00	Brake Pressure Sensor "A" Missing Calibration: No Sub Type Information	GO to Pinpoint Test BS