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2006 FORD Mustang Convertible OEM Service and Repair Workshop Manual

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Yes	GO to B2

No	Secure the loose battery cable(s) connections to the battery.

B2 VERIFY THE BATTERY CONDITION

- Verify the battery condition.

Does the battery pass the condition test?

Yes	RETURN the battery to service. CLEAR the DTC and RETEST the system.

No	If the analyzer reads REPLACE BATTERY or REPLACE-BAD CELL or does not pass the battery condition test, INSTALL a new battery. REFER to: Battery - Electric (414-01 Battery, Mounting and Cables, Removal and Installation).

PINPOINT TEST C : B1616:04

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
BCM (body control module) B1616:04	Electrical System High Key Off Load: System Internal Failures	BCM (body control module) sets this DTC (diagnostic trouble code) when the BMS (battery monitoring sensor) senses a high load draw when the ignition is off.

Possible Sources

- Aftermarket electrical component
- Vehicle module(s)
- Wiring, terminals or connectors

No	The system is operating correctly at this time. The DTC (diagnostic trouble code) may have been set due to high network traffic or an intermittent fault condition.

C4 CHECK FOR CORRECT OPERATION LONG SOAK

- Using a diagnostic scan tool, clear the BCM (body control module) DTCs.
- Ignition OFF.
- Wait 12 hours.
- Ignition ON.
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the BCM (body control module) self-test.

Is DTC (diagnostic trouble code) B1616:04 still present?

Yes	GO to C5

No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

C5 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all the BCM (body control module) connectors.
- Repair:
  - corrosion (install new connectors or terminals - clean module pins)
  - damaged or bent pins - install new terminals pins
  - pushed-out pins - install new pins as necessary
- Reconnect the BCM (body control module) connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable service articles: TSB (Technical Service Bulletin) , GSB (General Service Bulletin) , SSM (special service message) or FSA (Field Service Action) . If a service article exists for this concern, DISCONTINUE this test and FOLLOW the service article instructions. If no service articles address this concern, INSTALL a new BCM (body control module) . REFER to: Body Control Module (BCM)

Battery

414-01 Battery, Mounting and Cables	***2022 F-150***
Diagnosis and Testing	***Procedure revision date: 09/9/2022***

Battery

General Equipment

Diagnostic Battery Charger

1. Use Ford approved battery test equipment listed in the Ford Warranty and Policy Manual.

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
BCM (body control module)	B11D9:09	Vehicle Battery: Component Failures	GO to Pinpoint Test C
BCM (body control module)	B15DA:09	Vehicle Battery "C": Component Failures	GO to Pinpoint Test D

Global Customer Symptom Code (GCSC) Chart

- Inspect high current BJB (battery junction box) connections.

A1 TEST THE MAIN ENGINE COMPARTMENT BATTERY CONDITION

NOTICE

If equipped, vehicles with an auxiliary battery(s) must be disconnected in addition to the main 12 volt battery to remove the 12 voltage from the vehicle or vehicle damage may occur.

NOTE

Failure to fully charge the battery before retesting may cause false readings.

- Using the Diagnostic Battery Charger and the battery cables removed from the battery, verify the battery condition.
  REFER to: Battery Disconnect and Connect(414-01 Battery, Mounting and Cables, General Procedures).

Is the battery OK?

Yes	RETURN the battery to service.

No	If the analyzer reads REPLACE BATTERY or REPLACE-BAD CELL, INSTALL a new battery. REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

PINPOINT TEST B : AUXILIARY BATTERY(S) CONDITION TEST

Normal Operation and Fault Conditions

Battery condition is determined by measuring battery terminal voltage after a specific discharge current is applied for a specified time period.

Possible Sources

- Auxiliary Battery(s)
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect wiring, terminals and connectors.
- Inspect the auxiliary battery(s).
- Inspect the auxiliary battery(s) mounting.
- Inspect high current BJB (battery junction box) connections.

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
BCM (body control module) B11D9:09	Vehicle Battery: Component Failures	Sets in the BCM (body control module) when the BMS (battery monitoring sensor) senses a failed battery due to one of the following conditions. • Failure of the 12 volt main engine compartment battery • Disconnected 12 volt main engine compartment battery • Failure of the auxiliary battery(s) set after 10 engine cranks • Open auxiliary battery(s) fuse (in the high current BJB (battery junction box)) • Open auxiliary battery(s) fuse (attached to the auxiliary battery(s) post) • Disconnected auxiliary battery(s), set after 10 engine cranks

Possible Sources

- Auxiliary battery(s)
- Auxiliary battery(s) fuses
- Main engine compartment battery
- Main engine compartment battery and auxiliary battery(s) connections

Visual Inspection and Pre-checks

- Verify the auxiliary battery(s) fuses

C1 INSPECT ALL BATTERY CONNECTIONS

- Ignition OFF.
- Inspect the 12 volt main engine compartment battery connections.
- **NOTE**

  Vehicles equipped with two auxiliary batteries, the batteries are two 12 volt batteries connected in series creating a 24 volt battery supply.

  Inspect the auxiliary battery(s) connections.

Are all battery cable connections securely fasten to the main and auxiliary battery(s)?

Yes	GO to C2

Normal Operation and Fault Conditions The BCM (body control module) monitors auxiliary battery(s) through a battery current sensor which uses a PWM (pulse width modulation) circuit which is wired to the BCM (body control module) . For Non-hybrid vehicles with auxiliary batteries and a 110 - 120 volt 2kw pickup bed power outlet there are two 12 volt batteries in series creating a 24 volt source. The battery current sensor is non serviceable and is part of the assembly for the Direct Current/Alternation Current (DC/AC) inverter. For Hybrid vehicles there is a single 12 volt auxiliary battery. The battery current sensor is located on the auxiliary negative battery cable and is a serviceable part. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
BCM (body control module) B15DA:09	Vehicle Battery 'C': Component Failures	Sets in the BCM (body control module) when the senses a failed auxiliary battery due to one of the following conditions. • Disconnected auxiliary battery(s) • Open auxiliary battery(s) fuse (attached to the auxiliary battery(s) post) • Open auxiliary battery(s) fuse (in the high current BJB (battery junction box)) (hybrid vehicles only) • Failure of the auxiliary battery(s) • The BCM (body control module) does not detect current from the battery current sensor.

Possible Sources

- Auxiliary battery(s)
- Auxiliary battery(s) fuses
- Battery current sensor
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Verify the auxiliary battery(s) fuses
- Inspect the battery current sensor (Located on the Direct Current/Alternation Current (DC/AC) inverter, for 2Kw pickup bed power outlet. For Hybrid located on the auxiliary negative battery cable)
- Inspect the battery current sensor connector

D1 INSPECT THE AUXILIARY BATTERY(S) CONNECTIONS

NOTE

- disconnected electrical connector
- battery ground cable routed through the battery current sensor
- debris between the battery current sensor and the battery ground cable

Are any of these conditions found during inspection?

Yes	For hybrid vehicles, REPAIR as necessary or INSTALL a new battery current sensor. REFER to: Battery Current Sensor (414-01 Battery, Mounting and Cables, Removal and Installation). For 2Kw pickup bed power outlet, INSTALL a new Direct Current/Alternation Current (DC/AC) inverter, REFER to: Direct Current/Alternating Current (DC/AC) Inverter - Vehicles With: 110-120V 2kW Pickup Bed Power Outlet (414-05 Voltage Converter/Inverter, Removal and Installation).

No	GO to D4

D4 CHECK THE BATTERY CURRENT SENSOR REFERENCE VOLTAGE CIRCUIT

- Ignition OFF.
- Disconnect Battery current sensor C3888 .
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1	V	Ground

Is the voltage between 4.8 and 5.2 volts?

Yes	GO to D8

No	If the voltage is less than 4.8 volts, GO to D6 If the voltage is greater than 5.2 volts, GO to D5

No	REPAIR the circuit.

D7 CHECK THE BATTERY CURRENT SENSOR REFERENCE VOLTAGE CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1	Ω	C2280F-3

Is the resistance less than 3 ohms?

Yes	GO to D15

No	REPAIR the circuit.

D8 CHECK THE BATTERY CURRENT SENSOR SIGNAL RETURN CIRCUIT

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1	V⎓	C3888-2

Is the voltage between 4.8 and 5.2 volts?

Yes	GO to D11

No	GO to D9

- Ignition OFF.
- Disconnect BCM (body control module) C2280F .
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-3	V	Ground

Is any voltage present?

Yes	REPAIR the circuit.

No	GO to D12

D12 CHECK THE BATTERY CURRENT SENSOR FEEDBACK CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect BCM (body control module) C2280F .
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-3	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to D13

No	REPAIR the circuit.