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2018 FORD Mondeo Hatchback OEM Service and Repair Workshop Manual

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Possible Sources

- Refer to pinpoint test.

AM1 RETRIEVE SOBDM (SECONDARY ON-BOARD DIAGNOSTIC CONTROL MODULE A) DTCS

- Ignition ON.
- Using a diagnostic scan tool, perform SOBDM (secondary on-board diagnostic control module A) self-test.

Are any DTC (diagnostic trouble code) present?

Yes	DIAGNOSE the SOBDM (secondary on-board diagnostic control module A) Diagnostic Trouble Codes (DTCs). REFER to: High Voltage Battery Charging System - Electric (414-03B High Voltage Battery Charging System, Diagnosis and Testing).
No	The concern is not present at this time. Connect a known good EVSE (Electric Vehicle Supply Equipment) to attempt to duplicate a high voltage battery charging system fault. If a fault occurs repeat the SOBDM (secondary on-board diagnostic control module A) self test.

PINPOINT TEST AN : P262B:00

Refer to Wiring Diagrams Cell 13for schematic and connector information.

Normal Operation and Fault Conditions When the ignition is turned off the BECM (battery energy control module) has in internal timer that monitors key off time. When the ignition is turned on the BECM (battery energy control module) monitors various inputs to determine if a key off timer malfunction exists. This DTC (diagnostic trouble code) will illuminate the MIL (malfunction indicator lamp) . **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
BECM (battery energy control module) P262B:00	Control Module Power Off Timer Performance: No Sub Type Information	This DTC (diagnostic trouble code) sets when the BECM (battery energy control module) detects a key off timer malfunction.

Possible Sources

Yes	Consult with customer that the aftermarket accessories may be causing the concern.

No	GO to AN3

AN3 CHECK THE 12V BATTERY CABLE CONNECTIONS

- Inspect the 12-volt battery cable connections.

Are the connections clean and tight?

Yes	CHECK OASIS (Online Automotive Service Information System) 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 BECM (battery energy control module) . REFER to: Battery Energy Control Module (BECM) - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).

No	Repair the connections.

PINPOINT TEST AO : P29FF:00

Refer to Wiring Diagrams Cell 13for schematic and connector information.

Normal Operation and Fault Conditions When the ignition is turned on and the BECM (battery energy control module) is operational it continiously monitors cell voltages. If the BECM (battery energy control module) detects consecutive low of cell voltages in the same row of a battery module this may indicate the high voltage battery is in a thermal runaway event. The BECM (battery energy control module) sets DTC (diagnostic trouble code) P29FF:00 and the vehicle is shut down and disabled. The stop safefy MIL (malfunction indicator lamp) illuminates and a notification to exit the vehicle appears. The DTC (diagnostic trouble code) and vehicle shutdown is carried over between ignition cycles and must be manually cleared using a scan tool. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition

- IGNITION OFF for a minimum of 5 minutes.
- Using a diagnostic scan tool, perform BECM (battery energy control module) self-test.

Are any other DTC's present other than P29FF:00?

Yes	ADDRESSS all other BECM (battery energy control module) DTCs first. REFER to the DTC (diagnostic trouble code) chart in this section. If during the repair if obvious visual heat related damage is observed to the high voltage battery cover or internal high voltage battery components stop the repair and INSTALL a new high voltage battery. REFER to: High Voltage Battery - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).

No	GO to AO2

AO2 MONITOR AND RECORD THE HIGH VOLTAGE BATTERY CELL VOLTAGE VALUES

- Ignition ON.
- Using the scan tool, select Toolbox; All; BECM battery health tool.
- - Subtract the "Calculated Median Cell Battery Voltage" from the "Maximum Cell Voltage" and record the result.
  - Subtract "Minimum Cell Voltage" from "Calculated Median Cell Battery Voltage" and record the result.

Is the larger of the two calculations greater than or equal to 0.100 Volts?

Yes	IDENTIFY and RECORD the battery module number and location that contains the faulted cell. GO to AO3

No	CLEAR the BECM (battery energy control module) DTCs. The DTC (diagnostic trouble code) may be related to an intermittent fault condition.

AO3 INSPECT THE HIGH VOLTAGE BATTERY COMPONENTS

- Ignition OFF.
- Depower the high voltage system.
  REFER to: High Voltage System De-energizing - Electric(414-03A High Voltage Battery, Mounting and Cables, General Procedures).

(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Fourth Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Fourth Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Fourth Row Upper High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Fourth Row Upper High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Fifth Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Fifth Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
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REFER to: Sixth Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Sixth Row Upper High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
REFER to: Sixth Row Upper High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
INSTALL a new BECM (battery energy control module) .
REFER to: Battery Energy Control Module (BECM) - Electric
(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).

	REFER to: Sixth Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row Upper High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row Upper High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). INSTALL a new BECM (battery energy control module) . REFER to: Battery Energy Control Module (BECM) - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).

PINPOINT TEST AP : HIGH VOLTAGE BATTERY PACK CELL BALANCING FAULTS

Normal Operation and Fault Conditions

The high voltage battery pack is consisted of multiple series-connected cells. To preserve battery life and insure the battery pack good performance, it is essential to minimize the deviations between individual cell State-Of-Charge (SOC). Cell balancing circuit, located inside BECM (battery energy control module) , is used to achieve the objective by closing the electric circuit to discharge the cells with high State-Of-Charge (SOC). Cell balancing occurs when the high voltage battery State-Of-Charge (SOC) is equal or greater than 15% and the ignition has been turned off for greater than 48 hours. When cell balancing circuit is stuck open or closed, the corresponding cells SOCs are higher or lower than the other cell SOCs, and the powertrain malfunction (wrench) indicator illuminates. The stop safely hazard (red triangle) warning indicator and MIL (malfunction indicator lamp) illuminates. For DTC's P0B24:00 electric motor propulsion will be limited reducing vehicle power. For the cell module location, REFER to: High Voltage Battery, Mounting and Cables - Electric - Component Location(414-03A High Voltage Battery, Mounting and Cables, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition

BECM (battery energy control module) P0DBA:00	Hybrid/EV Battery Cell Balancing Circuit 'D' Stuck Off: No Sub Type Information	Sets if cell balance circuit D is stuck open.
BECM (battery energy control module) P0DBD:00	Hybrid/EV Battery Cell Balancing Circuit 'E' Stuck On: No Sub Type Information	Sets if cell balance circuit E is stuck closed.
BECM (battery energy control module) P0DBE:00	Hybrid/EV Battery Cell Balancing Circuit 'E' Stuck Off: No Sub Type Information	Sets if cell balance circuit E is stuck open.
BECM (battery energy control module) P0DC1:00	Hybrid/EV Battery Cell Balancing Circuit 'F' Stuck On: No Sub Type Information	Sets if cell balance circuit F is stuck closed.
BECM (battery energy control module) P0DC2:00	Hybrid/EV Battery Cell Balancing Circuit 'F' Stuck Off: No Sub Type Information	Sets if cell balance circuit F is stuck open.
BECM (battery energy control module) P0DC5:00	Hybrid/EV Battery Cell Balancing Circuit 'G' Stuck On: No Sub Type Information	Sets if cell balance circuit G is stuck closed.
BECM (battery energy control module) P0DC6:00	Hybrid/EV Battery Cell Balancing Circuit 'G' Stuck Off: No Sub Type Information	Sets if cell balance circuit G is stuck open.
BECM (battery energy control module) P0DC9:00	Hybrid/EV Battery Cell Balancing Circuit 'H' Stuck On: No Sub Type Information	Sets if cell balance circuit H is stuck closed.

Is DTC (diagnostic trouble code) P1A0F:68, P0C30:00, P0AFB:00, P0A7D:00, P0A7E:00, P0AFD:00, P0AD9:00, P0ADD:00, P0AA4:00, P0AA5:00, P0AA2:00, P0C78:00, P2C89:00, P0B3B:00, P0B40:00, P0B45:00, P0B4A:00, P0B4F:00, P0B54:00, P0B59:00, P0B5E:00 or U0300:00 present?

Yes	REFER to the BECM (battery energy control module) DTC (diagnostic trouble code) chart in this section and diagnose all other Diagnostic Trouble Codes (DTCs) first.

No	GO to AP2

AP2 CHECK THE HIGH VOLTAGE BATTERY STATE OF CHARGE.

- Ignition ON.
- Using a diagnostic scan tool, view BECM (battery energy control module) PIDs.
- Access the BECM (battery energy control module) and monitor the BATT_CHAR_[SOC] (Battery Pack State of Charge (SOC)) (%) PID (parameter identification)

Is the PID (parameter identification) value 30% or greater?

Yes	GO to AP3

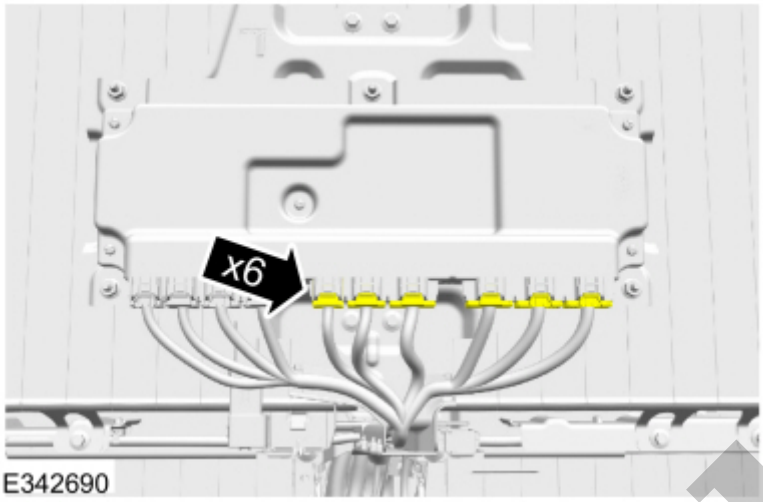
No	CONNECT a known good level 2 (240V) EVSE into the vehicle charge port and wait until SOC (State Of Charge) increases 30% or more. GO to AP3

AP3 REPEAT THE BECM (BATTERY ENERGY CONTROL MODULE) SELF-TEST.

- Ignition ON.
- Using the scan tool, clear the BECM (battery energy control module) Diagnostic Trouble Codes (DTCs).
- Ignition OFF for a minimum of 1 minute.
- Ignition ON.
- Using the scan tool, perform BECM (battery energy control module) self-test.

Is DTC (diagnostic trouble code) P0DAD:00, P0DAE:00, P0DB1:00, P0DB2:00, P0DB5:00, P0DB6:00, P0DB9:00, P0DBA:00, P0DBD:00, P0DBE:00, P0DC1:00, P0DC2:00, P0DC5:00, P0DC6:00, P0DC9:00 and/or P0DCA:00?

Yes	INSTALL a new BECM (battery energy control module) . REFER to: Battery Energy Control Module (BECM) - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).

- Inspect the BECM (battery energy control module) harness connectors and the BECM (battery energy control module) for:
- 

- For:
  - corrosion
  - damaged or bent pins
  - pushed-out pins

Are any concerns present?

Yes	If wiring harness connector or pin concerns are present install new high voltage battery wiring harness and/or BECM (battery energy control module) . REFER to: High Voltage Battery Wiring Harness - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Battery Energy Control Module (BECM) - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
No	GO to AP6

AP6 INSPECT ALL HIGH VOLTAGE BATTERY MODULES

- Inspect each cell module of signs of venting such as electrolyte leakage and/or residue.

Are any concerns present?

	(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row Upper High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Sixth Row Upper High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). GO to AP7
No	INSTALL the module that contains the RECORDED faulted cell from test step AP4. REFER to: First Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: First Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Second Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Second Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Third Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Third Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Fourth Row High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Fourth Row High Voltage Battery Module - Electric, Vehicles With: Extended Range Battery (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). REFER to: Fourth Row Upper High Voltage Battery Module - Electric, Vehicles With: Standard Range Battery