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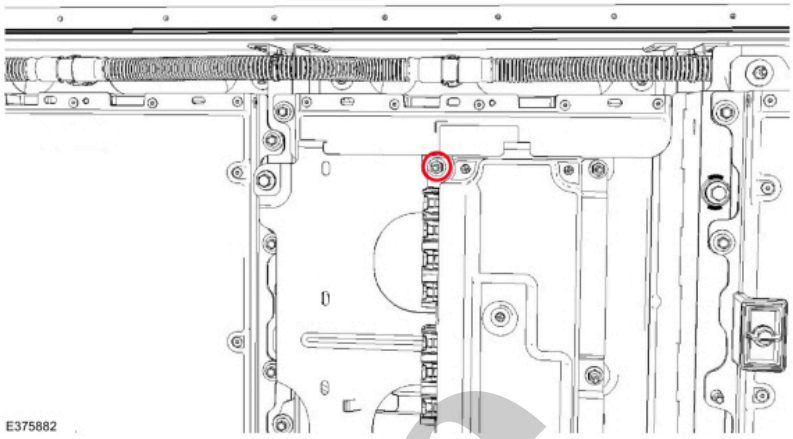
1998 FORD Mondeo Hatchback OEM Service and Repair Workshop Manual

Go to manual page

	C4816C-12	Ω	 CASE GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new high voltage battery connector assembly. REFER to: High Voltage Battery Connector Assembly - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). Re-install the high voltage battery cover and the high voltage battery. Repower the high voltage system. REFER to: High Voltage System De-energizing - Electric (414-03A High Voltage Battery, Mounting and Cables, General Procedures). Clear the BECM (battery energy control module) DTC's. Repeat the self-test.
No	INSTALL a new wiring harness. REFER to: High Voltage Battery Wiring Harness - Electric (414-03A High Voltage Battery, Mounting and Cables, Removal and Installation). Re-install the high voltage battery cover and the high voltage battery. Repower the high voltage system. REFER to: High Voltage System De-energizing - Electric (414-03A High Voltage Battery, Mounting and Cables, General Procedures). Clear the BECM (battery energy control module) DTC's. Repeat the self-test.

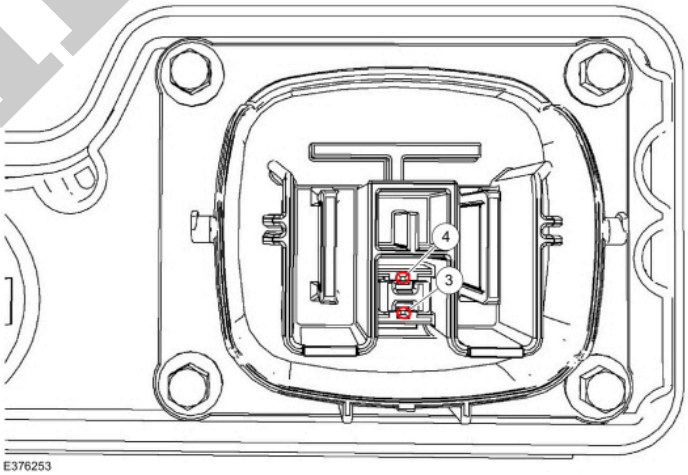
G22 CHECK THE BECM (BATTERY ENERGY CONTROL MODULE) INTERLOCK CIRCUITS INSIDE THE HIGH BATTERY PACK FOR AN OPEN

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	GO to G23

G23 CONFIRM THE LOCATION OF THE OPEN CIRCUIT

- Disconnect High Voltage battery inline C4240 .
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C4240-4 (male side)	Ω	 C292-3 (component side)

- Inspect the DC/DC converter control module C1457A
- For:
  - corrosion
  - damaged or bent pins
  - pushed-out pins
- If any concerns are present INSTALL a new high voltage cable.
  REFER to: High Voltage Battery Cables - Electric(414-03A High Voltage Battery, Mounting and Cables, Removal and Installation).
- Reconnect the DC/DC converter control module C1457A. Make sure it seats and latches correctly.
- Repower the high voltage system.
  REFER to: High Voltage System De-energizing - Electric(414-03A High Voltage Battery, Mounting and Cables, General Procedures).
- Operate the system and determine if the concern is still present.

Is the concern still present?

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 new DC/DC converter control module. REFER to: Direct Current/Direct Current (DC/DC) Converter Control Module - Electric (414-05 Voltage Converter/Inverter, Removal and Installation).

No	The system is operating correctly at this time. The concern may have been caused by module connections. Address the root cause of any connector or pin issues.

G25 CHECK FOR CORRECT SOBDM (SECONDARY ON-BOARD DIAGNOSTIC CONTROL MODULE A) OPERATION

- Ignition OFF.
- Inspect the SOBDM (secondary on-board diagnostic control module A) C1821C
- For:
  - corrosion
  - damaged or bent pins
  - pushed-out pins
- If any concerns are present INSTALL a new high voltage cable.

REFER to: High Voltage System De-energizing - Electric(414-03A High Voltage Battery, Mounting and Cables, General Procedures).

- Operate the system and determine if the concern is still present.

Is the concern still present?

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	The system is operating correctly at this time. The concern may have been caused by module connections. Address the root cause of any connector or pin issues.

PINPOINT TEST H : P1A1E:66

Normal Operation and Fault Conditions

When the ignition is turned on, the BECM (battery energy control module) makes various vehicle checks. If these checks are normal, the BECM (battery energy control module) sends a signal to the contactors to close, which will supply high-voltage power to the vehicle. During the contactor close sequence the main negative contactor closes first then the pre-charge contactor to limit the amount of inrush current flow prior to closure of the positive main contactor, which supplies high-voltage power to the vehicle. The BECM (battery energy control module) utilizes a counter to prevent greater than 15 precharge events within a calibrated period of time. The counter will increment for every successful pre-charge and decrement within a calibrated parameter and period of time. The stop safely hazard (red triangle) warning indicator illuminates and the vehicle will not start for the remaining of the ignition cycle.

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
BECM (battery energy control module) P1A1E:66	Hybrid/EV Battery Contactor Control Signal: Signal Has Too Many Transitions/Events	This DTC (diagnostic trouble code) sets when the BECM (battery energy control module) detects greater than 15 successful precharge events within a calibrated time.

trouble code)		
BECM (battery energy control module) P1A42:00	Propulsion System Status Signal Performance: No Sub Type Information	DTC (diagnostic trouble code) indicates a HS-CAN (high-speed controller area network) message related to vehicle operating modes from the SOBDMC (secondary on-board diagnostic control module C) is missing for 5 seconds.

Possible Sources

- High network traffic
- SOBDMC (secondary on-board diagnostic control module C) input

I1 RETRIEVE BECM (BATTERY ENERGY CONTROL MODULE) DTCS

- Ignition ON.
- Using a diagnostic scan tool, clear the BECM (battery energy control module) Diagnostic Trouble Codes (DTCs).
- Using a diagnostic scan tool, perform BECM (battery energy control module) self-test.

Is DTC (diagnostic trouble code) P1A42:00 present?

Yes	RETRIEVE SOBDMC (secondary on-board diagnostic control module C) Diagnostic Trouble Codes (DTCs). REFER to: Rear Electric Drive Assembly (302-02 Rear Electric Drive Assembly, Diagnosis and Testing).

No	The concern is not present at this time.

PINPOINT TEST J : P1A43:00

Normal Operation and Fault Conditions

When powered on, the BECM (battery energy control module) receives and monitors input messages via the HS-CAN (high-speed controller area network) . This DTC (diagnostic trouble code) sets if the HS-CAN (high-speed controller area network) message related to high voltage battery contactor request from the SOBDMC (secondary on-board diagnostic control module C) is missing. This DTC (diagnostic trouble code) results in the MIL (malfunction indicator lamp) illuminating and will not affect vehicle operation.

DTC Fault Trigger Conditions

that consists of an high voltage battery coolant pump, high voltage battery radiator, high voltage battery coolant cooler, and a coolant diverter valve to cool the high voltage battery. For vehicles without max trailer tow, the high voltage battery coolant cooler is incorporated into the vehicle A/C (air conditioning) system. For vehicles with max trailer tow, the high voltage coolant cooler is incorporated into a seperate cooling system and ACCMB (Air Conditioining Compressor Control Module B) dedicated for cooling of the high voltage battery. The BECM (battery energy control module) monitors a total of ten thermistors are mounted inside the cell modules. If DTC (diagnostic trouble code) P0A7E:00 is present the BECM (battery energy control module) will shut the vehicle down and the stop safely hazard (red triangle) warning indicator warning illuminates. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
BECM (battery energy control module) P0A7E:00	Hybrid/EV Battery Pack 'A' Over Temperature: No Sub Type Information	A fault is indicated when the BECM (battery energy control module) measures a battery pack temperature greater than 65°C (150°F). When this fault sets, the BECM (battery energy control module) shuts down the high voltage battery after 3 seconds after the stop safely hazard (red triangle) warning indicator is illuminated in the IPC (instrument panel cluster) . If this fault is cleared or repaired while the ignition is ON, the ignition must be cycled from ON to OFF and back to ON before the BECM (battery energy control module) commands the contactors to close again.
SOBDMC (secondary on-board diagnostic control module C) P2D40:00	Hybrid/EV Battery Cooling System 'C' Performance: No Sub Type Information	A fault is indicated when the SOBDMC (secondary on-board diagnostic control module C) measures a battery pack temperature is above a desired temperature and the high voltage battery coolant cooler has been running for 5 minutes and the high voltage battery coolant temperature has not dropped by more than 3°C (6°F). The high voltage battery may overheat causing reduced power limits.

Possible Sources

- Low coolant level
- Airlock in system
- Inoperative electric cooling fan
- Coolant flow restriction
- High voltage battery coolant pump
- High voltage battery coolant diverter valve
- High voltage battery radiator
- Restricted airflow through the A/C (air conditioning) condenser

- Ignition ON.
- Using the scan tool, clear the BECM (battery energy control module) Diagnostic Trouble Codes (DTCs).
- Using the scan tool, clear the SOBDMC (secondary on-board diagnostic control module C) Diagnostic Trouble Codes (DTCs).
- Using a diagnostic scan tool, perform BECM (battery energy control module) self-tests.
- Using a diagnostic scan tool, perform SOBDMC (secondary on-board diagnostic control module C) self-test.

Are any Diagnostic Trouble Codes (DTCs) other than P0A7E:00 and/or P2D40:00 present?

Yes	For BECM (battery energy control module) Diagnostic Trouble Codes (DTCs), REFER to the BECM (battery energy control module) DTC (diagnostic trouble code) chart and diagnose all other Diagnostic Trouble Codes (DTCs) first. For SOBDMC (secondary on-board diagnostic control module C) DTC (diagnostic trouble code) Diagnostic Trouble Codes (DTCs), REFER to: Refrigerant Cooling (302-03B Electrified Drivetrain Cooling - High Voltage Battery Refrigerant Cooling, Diagnosis and Testing). REFER to: Rear Electric Drive Assembly (302-02 Rear Electric Drive Assembly, Diagnosis and Testing).
No	GO to K2

K2 ACTIVE COMMAND THE HIGH VOLTAGE BATTERY COOLANT PUMP ON AND REPEAT BECM (BATTERY ENERGY CONTROL MODULE) SELF TEST

- Ignition ON.
- Access the BECM (battery energy control module) and control the COOL_PMP_A_CMD (Coolant Pump - A- Control Speed - Commanded) (%) PID (parameter identification)
- Using the scan tool, active command the coolant pump to 100% for 5 minutes. Confirm if the affected coolant pump is running by feeling the pump for vibration.
- Using a diagnostic scan tool, perform BECM (battery energy control module) self-test.

Is DTC (diagnostic trouble code) P0C48:00, P0C49:00, P0C4A:00, P0C4B:00, P0CFF:00, P0E1F:00, P2B29:00 and/or P2CF3:00 present or is the affected coolant pump inoperative?

Yes	Using a diagnostic scan tool, clear the BECM (battery energy control module) and SOBDMC (secondary on-board diagnostic control module C) DTC's. Perform a road test to check for for normal vehicle operation. If the concern is still present, GO to K5

No	GO to Pinpoint Test AH

K5 CHECK FOR AN AIR FLOW RESTRICTION

- Check the A/C (air conditioning) condenser for external obstruction such as leaves or cardboard and verify all air deflectors are present.

Is an air flow restriction present.

Yes	REPAIR as necessary.

No	GO to K6

K6 CHECK THE ELECTRIC COOLING FAN OPERATION

- Ignition ON.
- Connect the diagnostic tool.
- Access the PCM (powertrain control module) and control the FANELC_CMD (Electric Fan Pulse Width Modulated Control - Commanded) (% Duty Cycle) PID (parameter identification)
- Active command the electric cooling fan to 100%.

Did the electric cooling fan operate?

Yes	GO to K7

No	DIAGNOSE the electric cooling fan operation. REFER to: Electrified Drivetrain Control (302-14 Electrified Drivetrain Control, Diagnosis and Testing).

No	REPAIR or INSTALL new components as necessary. GO to K9

K9 CHECK THE A/C (AIR CONDITIONING) SYSTEM PERFORMANCE

NOTE

The A/C (air conditioning) system is utilized to cool the high voltage battery coolant.

- Check the A/C (air conditioning) system operation and outlet temperature performance.
  REFER to: Climate Control System - Electric, Vehicles With: Dual Automatic Temperature Control (DATC) (412-00 Climate Control System - General Information, Diagnosis and Testing).

Are any concerns present?

Yes	Diagnose the A/C (air conditioning) system performance concern. REFER to: Climate Control System - Electric, Vehicles With: Dual Automatic Temperature Control (DATC) (412-00 Climate Control System - General Information, Diagnosis and Testing).

No	GO to K10

K10 CHECK HIGH VOLTAGE BATTERY TEMPERATURE

- Connect a EVSE (Electric Vehicle Supply Equipment) to the vehicle charge port.
- Ignition ON.
- Turn off the HVAC (heating, ventilation and air conditioning) system.
- Access the BECM (battery energy control module) and monitor the BAT_COOL_INLETTEMP (Hybrid/EV Battery Coolant Inlet Temperature) (Deg C) PID (parameter identification)
  Access the BECM (battery energy control module) and monitor the H_BATT_TEMP (Hybrid Battery Temperature) (Deg C) PID (parameter identification)
  and verify the PID (parameter identification) value is greater than or equal to 18°C (65°F). If it is not repeat steps 2-4 until the temperature is achieved.

Are both PID (parameter identification) s greater than or equal to 18°C (65°F)?

Yes	GO to K12