



Service Information

DTC P0D5E

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

DTC P0D5E: Charger Bus Discharge Too Long

Circuit/System Description

The hybrid/EV battery energy control module will diagnose its own systems and determine when a fault condition is present. Diagnostics and system status is communicated from the hybrid/EV battery energy control module to the hybrid/EV powertrain control module 2 through serial data. The hybrid/EV powertrain control module 2 is the host controller for diagnostic trouble code (DTC) information.

The hybrid/EV battery contains 5 high voltage contactors and 2 transistors. The high voltage contactors allow the high voltage DC batteries to be connected to the vehicle or safely contain the high voltage DC within the hybrid/EV battery assembly. The 5 high voltage contactors are a main positive high voltage contactor, main negative high voltage contactor, charge positive high voltage contactor, charge negative high voltage contactor, and multi-function high voltage contactor. The 2 transistors are the precharge transistor and heater transistor. These contactors/transistors close and open in sequence and are controlled by the hybrid/EV powertrain control module 2. The hybrid/EV powertrain control module 2 supplies voltage to the control circuit for the high voltage contactors/transistors. Ground is provided through the case ground.

Conditions for Running the DTC

P0D5E

- The charger contactors are commanded open.
- Runs once per charger contacts discharge event.
- None of the following DTCs are set: P0D4E or P0D4F.

OR

- No confirmed charger bus discharge test pass or fail received by the hybrid/EV powertrain control module 2 from the battery charger control module.
- This test runs every 10 seconds after charger discharge event if no confirmed charger bus discharge result is received by the hybrid/EV powertrain control module 2 from the battery charger control module.

Conditions for Setting the DTC

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- High voltage bus does not discharge to below 60 V within 1.5 seconds of the charger contactors being commanded open.
- OR
- With the charger contactors commanded open, current flowing to battery is greater than 2.5 A with the heater transistor enabled.

Action Taken When the DTC Sets

- DTC P0D5E is a type A DTC.
- All of the contactors will be prevented from closing.

Conditions for Clearing the DTC

- DTC P0D5E is a type A DTC.
- The [Clear Secured High Voltage DTCs](#) reset function must be performed with a scan tool before clear codes.

Diagnostic Aids

The precharge time can be affected by the following:

- A long precharge time may be caused by a stuck closed hybrid/EV battery charger negative, hybrid/EV battery charger positive or hybrid/EV battery multifunction contactor.
- A failure of the high impedance discharge circuit within the battery charger.

Reference Information

Schematic Reference

[Hybrid Energy Storage Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

Description and Operation

[Drive Motor Battery System Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

[Powertrain Diagnostic Trouble Code \(DTC\) Type Definitions](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Command the Battery Charging System Negative Contactor OPEN and CLOSED with a scan tool while listening for the contactor to open and close. The KR116A hybrid/EV battery charging system negative contactor should be heard opening and closing.
⇒ If the KR116A hybrid/EV battery charging system negative contactor is not heard opening and closing, refer to Battery Charging System Negative Contactor.
2. Command the Battery Charging System Positive Contactor OPEN and CLOSED with a scan tool while listening for the contactor to open and close. The KR116B hybrid/EV battery charging system positive contactor should be heard opening and closing.
⇒ If the KR116B hybrid/EV battery charging system positive contactor is not heard opening and closing, refer to Battery Charging System Positive Contactor.
3. Command the Hybrid/EV Battery Multifunction Contactor OPEN and CLOSED with a scan tool while listening for the contactor to open and close. The KR117 hybrid/EV battery multifunction contactor should be heard opening and closing.
⇒ If the KR117 hybrid/EV battery multifunction contactor is not heard opening and closing, refer to Hybrid/EV Battery Multifunction Contactor.
4. If all contactors are heard opening and closing, replace the T18 battery charger.

Circuit/System Testing

Danger: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
- Visually and functionally inspect the gloves before use.
- Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

Danger: The Volt Battery Pack will utilize an exchange program. Please consult the most recent revision of bulletin/PI #PIP4841, available in Service Information (SI), for a list of approved Volt Battery Pack service procedures. Components that may be removed and serviced without exchanging the complete battery pack are identified in the bulletin/PI. Please contact the GM Technical Assistance Center if you have any questions.

Battery Charging System Negative Contactor

1. Vehicle OFF, disable the high voltage at the A4 hybrid/EV battery pack. Refer to [High Voltage Disabling](#).
2. Connect the 12 V battery.
3. Disconnect the X2 harness connector at the A28 hybrid/EV battery contactor assembly.
4. Vehicle OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - ⇒ If greater than the specified range, test the ground circuit for an open/high resistance.
5. Vehicle in Service Mode, verify that a test lamp illuminates between the B+ circuit terminal 9 and ground.
 - ⇒ If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, replace the A4 hybrid/EV battery pack.
6. Reconnect the X2 harness connector.
7. Command the Battery Charging System Negative Contactor CLOSED with a scan tool.
8. Disconnect the X1 harness connector at the A28 hybrid/EV battery contactor assembly.
9. Connect a test lamp between control circuit terminal 9 and ground.

10. Command the Battery Charging System Negative Contactor OPEN and CLOSED with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - ⇒ If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K114B hybrid/EV powertrain control module 2.
 - ⇒ If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K114B hybrid/EV powertrain control module 2.
11. If all circuits test normal, replace the A28 hybrid/EV battery contactor assembly.

Battery Charging System Positive Contactor

1. Vehicle OFF, disable the high voltage at the A4 hybrid/EV battery pack. Refer to [High Voltage Disabling](#).
2. Connect the 12 V battery.
3. Disconnect the X2 harness connector at the A28 hybrid/EV battery contactor assembly.
4. Vehicle OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - ⇒ If greater than the specified range, test the ground circuit for an open/high resistance.
5. Vehicle in Service Mode, verify that a test lamp illuminates between the B+ circuit terminal 9 and ground.
 - ⇒ If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, replace the A4 hybrid/EV battery pack.
6. Reconnect the X2 harness connector.
7. Command the Battery Charging System Positive Contactor CLOSED with a scan tool.
8. Disconnect the X1 harness connector at the A28 hybrid/EV battery contactor assembly.
9. Connect a test lamp between control circuit terminal 9 and ground.
10. Command the Battery Charging System Positive Contactor OPEN and CLOSED with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - ⇒ If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K114B hybrid/EV powertrain control module 2.
 - ⇒ If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K114B hybrid/EV powertrain control module 2.
11. If all circuits test normal, replace the A28 hybrid/EV battery contactor assembly.

Battery Charging System Multifunction Contactor

1. Vehicle OFF, disable the high voltage at the A4 hybrid/EV battery pack. Refer to [High Voltage Disabling](#).
2. Connect the 12 V battery.
3. Disconnect the X2 harness connector at the A28 hybrid/EV battery contactor assembly.
4. Vehicle OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - ⇒ If greater than the specified range, test the ground circuit for an open/high resistance.
5. Vehicle in Service Mode, verify that a test lamp illuminates between the B+ circuit terminal 9 and ground.
 - ⇒ If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high

resistance. If the circuit tests normal and the B+ circuit fuse is open, replace the A4 hybrid/EV battery pack.

6. Reconnect the X2 harness connector.
7. Command the Battery Charging System Multifunction Contactor CLOSED with a scan tool.
8. Disconnect the X1 harness connector at the A28 hybrid/EV battery contactor assembly .
9. Connect a test lamp between control circuit terminal 9 and ground.
10. Command the Battery Charging System Multifunction Contactor OPEN and CLOSED with a scan tool.
The test lamp should turn ON and OFF when changing between the commanded states.
 - ⇒ If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K114B hybrid/EV powertrain control module 2.
 - ⇒ If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K114B hybrid/EV powertrain control module 2.
11. If all circuits test normal, replace the A28 hybrid/EV battery contactor assembly.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the diagnostic procedure.

- [Drive Motor Battery Wire Junction Block Relay Replacement](#)
- [Drive Motor Battery Charger Replacement](#)
- [Drive Motor Battery Replacement and Shipping Preparation](#)
- [Control Module References](#) for hybrid/EV powertrain control module 2 replacement, programming and setup