

DTC P023A

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 P023A

Charge Air Cooler (CAC) Coolant Pump Relay Control Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay Coil Voltage Supply	P023A	P023A	—	—
Relay Switch Voltage Supply	P023A	1	—	—
Relay Control	P023A	P023A	P023A	—
Relay Controlled Output	P023A	1	2	—
Charge Air Cooler Coolant Pump Ground	—	1	—	—
1. Charge Air Cooler Coolant Pump inoperative without a DTC. 2. Charge Air Cooler Coolant Pump always ON without a DTC.				

Circuit Description

The supercharger intercooler relay is a normally open relay. The relay armature is held in the open position by spring tension. The ignition 1 voltage is supplied directly to the relay coil and to the armature contact when the ignition is ON, or the engine is running. The engine control module (ECM) supplies the ground path to the relay coil control circuit via an internal integrated circuit called an output driver module. When the engine is running, the ECM commands the relay ON, and the relay coil creates an electromagnetic field. This electromagnetic field overcomes the spring tension and pulls the armature contact into the stationary contact of the relay load circuit. The closing of the relay contacts allow current to flow from the battery to the supercharger intercooler pump. When the ignition switch is turned to the OFF position, power is interrupted to the output driver module in the ECM and the relay electromagnetic field collapses. This allows the spring tension to separate the

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relay armature contact from the relay load circuit contact, which interrupts current flow to the supercharger charge air cooler coolant pump.

If the ECM detects an improper voltage on the pump relay control circuit this DTC sets.

Conditions for Running the DTC

- The battery voltage is between 11–18 V.
- The engine is running.
- The DTC runs continuously when the above conditions are met.

Conditions for Setting the DTC

The ECM detects that commanded and actual states of output driver do not match.

Action Taken When the DTC Sets

DTC P023A is a Type B DTC.

Conditions for Clearing the MIL/DTC

DTC P023A is a Type B DTC.

Diagnostic Aids

- A resistance of 1–4 Ω on the charge air cooler coolant pump or relay circuits may cause this DTC to set.
- When disconnecting electrical connectors or removing fuses and relays from a fuse block, inspect the component electrical terminals for corrosion and the mating electrical terminals for correct tension.
- For a charge air cooler coolant pump that is inoperative or always ON, without a DTC, refer to [Supercharger Intercooler Relay Diagnosis](#).

Reference Information

Schematic Reference

[Engine Controls Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

Description and Operation

- [Supercharger Description and Operation](#)
- [Boost Control System Description](#)

Electrical Information Reference

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

DTC Type Reference

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

Scan Tool Reference

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

Circuit/System Verification

1. Ignition ON, command the CAC Clnt. Pump Relay ON and OFF several times with a scan tool. You should hear and feel the relay click and the charge air cooler coolant pump should turn ON and OFF.
2. Ignition ON, command the CAC Clnt. Pump Relay ON and OFF with a scan tool while observing the following control circuit status parameters:
 - CAC Clnt. Pump Relay Ckt. Short Gnd Test Status
 - CAC Clnt. Pump Relay Ckt. Open Test Status
 - CAC Clnt. Pump Relay Ckt. Short Volts Test StatusEach parameter should toggle between OK and Not run.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

Circuit/System Testing

1. Ignition OFF, disconnect the charge air cooler coolant pump relay.
2. Verify that a test lamp illuminates between the B+ circuit terminal 30 and ground.
 - ⇒ If the test lamp does not illuminate, test the B+ circuit for an open/high resistance. If the circuit tests normal and the ignition circuit fuse is open, test the control circuit terminal 87 for a short to ground. If the circuit tests normal, test or replace the relay.
3. Verify that a test lamp illuminates between the B+ circuit terminal 85 and ground.
 - ⇒ If the test lamp does not illuminate, test the B+ circuit for an open/high resistance.
4. Connect a test lamp between the relay coil B+ circuit terminal 85 and the relay control circuit terminal 86.
5. Command the CAC Clnt. Pump Relay ON and OFF with a scan tool. The test lamp should turn ON and OFF.
 - ⇒ If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the ECM.
 - ⇒ If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the ECM.
6. If all circuits test normal, test or replace the charge air cooler coolant pump relay.

Component Testing

Coolant Pump Relay

1. Ignition OFF, disconnect the charge air cooler coolant pump relay.
2. Test for 70–95 Ω between terminals 85 and 86.
 - ⇒ If the resistance is not within the specified range, replace the relay.
3. Test for infinite resistance between the following terminals:

- 30 and 86
- 30 and 87
- 30 and 85
- 85 and 87

⇒ If not the specified value, replace the relay.

4. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 Ω between terminals 30 and 87.

⇒ If greater than the specified range, replace the relay.

Repair Instructions

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

- [Relay Replacement](#)
- [Control Module References](#) for ECM replacement, setup, and programming