

DTC	P1116	COOLANT TEMPERATURE SENSOR CIRCUIT STACK FOR COOLANT HEAT STORAGE SYSTEM
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CIRCUIT DESCRIPTION

Refer to DTC P1115 on page [05-270](#) .

DTC No.	Detection Condition	Trouble Area
P1116	<ul style="list-style-type: none"> • Temperature change during hot coolant recovering: 1°C (1.8 °F) or less • Difference between CHS tank outlet temperature and engine coolant temperature during hot coolant recovering: 25°C (45°F) or more 	<ul style="list-style-type: none"> • Coolant heat storage tank outlet temperature sensor • Cooling system (clogging)

MONITOR DESCRIPTION

The coolant heat storage (CHS) tank outlet temperature sensor is used for monitoring coolant temperature in the vicinity of the outlet port of the heat storage tank of the CHS system. The resistance of the sensor increases when the CHS tank outlet temperature is low, and conversely, the resistance decreases when the temperature is high. The changes in resistance are reflected in the voltage that is output by the sensor. The ECM monitors the sensor voltage and uses this value to control CHS system properly.

If the sensor output voltage deviates from the normal operating range, the ECM determines that the CHS tank outlet temperature sensor circuit has malfunctioned, and sets a DTC.

Examples:

- 1) No changes occur in the CHS tank outlet temperature sensor signal (over 1°C [1.8 °F]) after a predetermined length of time has elapsed from the start of the coolant recovering.
- 2) A significant difference (over 25°C [45 °F]) exists between the engine coolant temperature signal and the CHS tank outlet temperature sensor signal after a predetermined length of time has elapsed from the start of the coolant recovering.

MONITOR STRATEGY

Related DTCs	P1116 : Coolant temperature sensor circuit range check (stuck)
Required sensors/components	Main: Coolant heat storage tank outlet temperature sensor Related: Engine coolant temperature sensor
Frequency of operation	Once per driving cycle
Duration	45 seconds
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See page 05-20
Coolant heat storage system malfunction	Not detected
Coolant heat recovering	ON
Difference between engine coolant temperature and CHS tank outlet temperature	More than 30°C (54 °F)

TYPICAL MALFUNCTION THRESHOLDS

Temperature variation of CHS tank outlet during hot coolant recovery	1°C or less
Difference between temperatures of CHS tank outlet and engine coolant during hot coolant recovery	More than 25°C (45 °F)

WIRING DIAGRAM

Refer to DTC P1115 on page [05-270](#)

INSPECTION PROCEDURE

CAUTION:

Be careful when replacing any part in the system or changing the coolant because the coolant in the heat storage tank is hot even if the engine is cold.

HINT:

- To check the coolant heat storage (CHS) system, the ECM may cause the water pump of the CHS system to operate 5 hours after the power switch has been turned OFF.
- Read freeze frame data using the intelligent tester II. Freeze frame data records the engine condition when malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P1116)

- Connect the hand-held tester to the DLC3.
- Turn the power switch ON (IG).
- Turn the hand-held tester ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read DTCs.

Result:

Display (DTC Output)	Proceed to
P1116	A
P1116 and other DTCs	B

HINT:

If any other codes besides P1116 are output, perform troubleshooting for those DTCs first.

B

GO TO RELEVANT DTC CHART
(See page [05-55](#))

A

2 CHECK COOLING SYSTEM(CHECK FOR CLOGGING IN THE COOLANT SYSTEM)

OK: Coolant passage has no blockage.

NG

REPAIR OR REPLACE COOLING SYSTEM

OK

REPLACE TEMPERATURE SENSOR (CHS TANK OUTLET TEMPERATURE SENSOR)