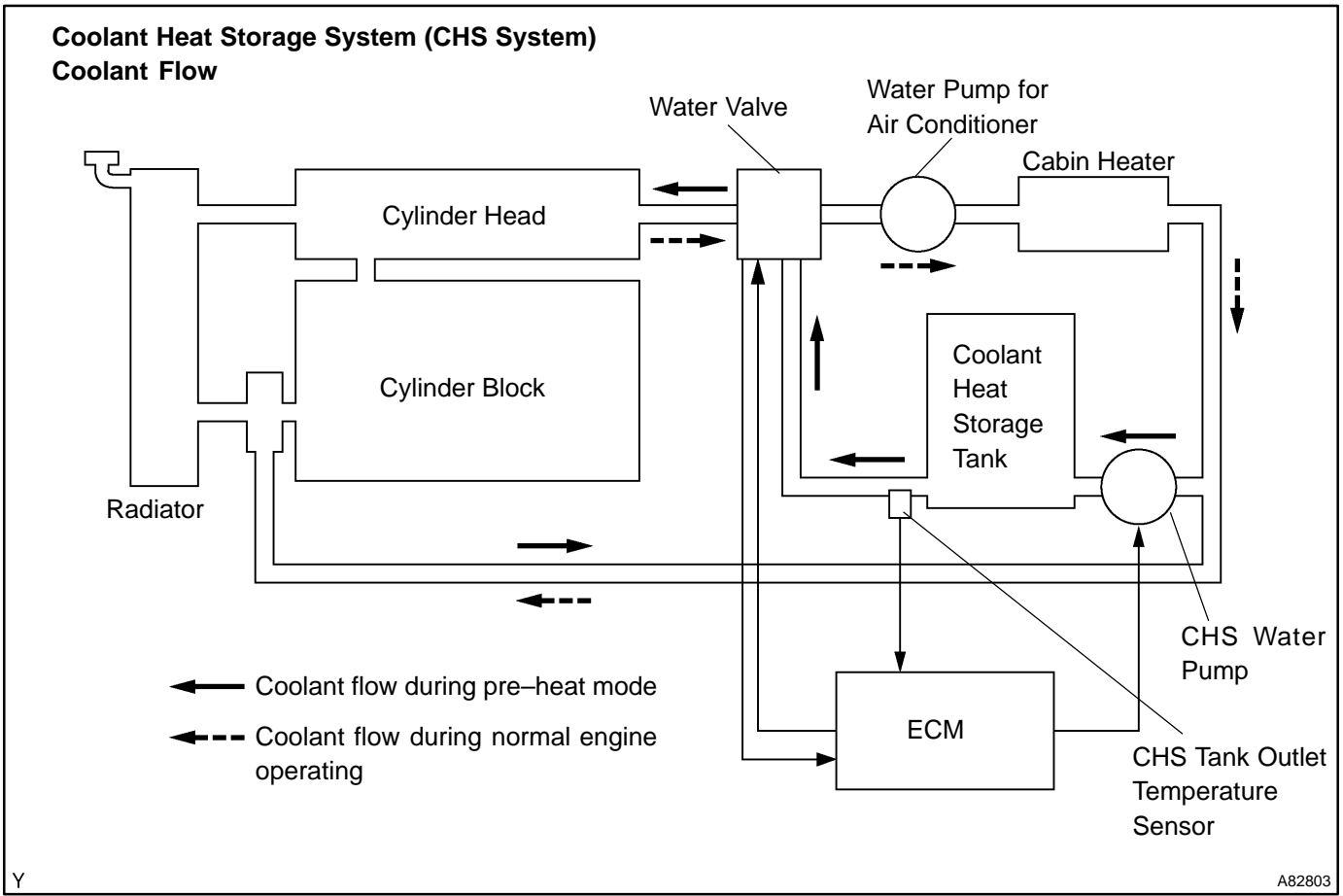


DTC	P1151	COOLANT HEAT STORAGE TANK
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CIRCUIT DESCRIPTION



This system uses an electric pump to supply hot coolant stored in the coolant heat storage (CHS) tank into the cylinder head of the engine, in order to optimize engine starting combustion and reduce the amount of unburned gas that is discharged while the engine is started. Before the engine starts, the ECM operates the electric water pump to direct the hot coolant in the CHS tank into the engine, in order to heat the cylinder head (this process is called "preheat mode"). The duration of the operation of the electric water pump is variable, depending on the temperature of the cylinder head. During normal operation of the engine, the water valve opens the passage between the cylinder head and the heater and closes the passage between the cylinder head and the tank. During the preheat mode in which the cylinder head is heated, the water valve opens the passage between the tank and the cylinder head, in order to allow the coolant to flow from the tank to the cylinder head. At this time, in order to warm up the intake port quickly before the engine is started, the coolant flows in the reverse direction.

This system consists of the CHS tank, CHS water pump, CHS tank outlet temperature sensor, water valve, and a soak timer that is built in the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
P1151	Following conditions are successively met: • CHS tank outlet temperature during preheating: below 50°C (122°F) (2 trip detection condition) • CHS tank outlet temperature during soaking: 30 °C (54 °F) or more lower than during coolant recovering	• Coolant heat storage tank

MONITOR DESCRIPTION

The ECM detects malfunction in the coolant heat storage (CHS) system with the CHS tank coolant temperature, the position of the water valve, the running condition of the engine and the operating condition of the soak timer. The soak timer built in the ECM prompts the ECM to actuate the water pump 5 hours after the HV main system has been turned OFF by using the power switch. The ECM then checks the heat retention condition of the CHS tank. In order to ensure the reliable malfunction detection, the ECM detects the CHS tank heat retention malfunction in two ways. Thus, when the following two detection conditions are consecutively met, the ECM determines that the heat retention has deteriorated and sets a DTC.

- (1) During preheating, the CHS tank outlet water temperature is below 50°C (122°F) (2 trip detection logic).
- (2) During soaking, the CHS tank outlet temperature is more than 30°C (86°F) lower than that during the got coolant recovery.

MONITOR STRATEGY

Related DTCs	P1151: Coolant heat storage tank
Required sensors/components	CHS tank outlet temperature sensor
Frequency of operation	Once per driving cycle
Duration	10 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 storage water pump operation time	3 seconds or more
Storage coolant temperature	More than 75°C (167°F)

TYPICAL MALFUNCTION THRESHOLDS

Difference storage coolant temperature and heat storage tank outlet coolant temperature	30°C (54 °F) or more
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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 and the radiator are cold.

NOTICE:

If air bleeding is not performed completely, this DTC may be detected after changing the coolant.

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 hand–held tester or the OBD II scan tool. Freeze frame data records the engine condition when malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

REPLACE COOLANT HEAT STORAGE TANK