ISX CM871

Coolant Temperature High

1 Coolant temperature sensor stuck in-range

Solution: S00001303

Verification

Conditions

- Turn keyswitch OFF.
- Connect the recommended Cummins® electronic service tool or equivalent.

Action

- Visually inspect the coolant level.
- Monitor the engine coolant temperature sensor.
- Use the recommended Cummins® electronic service tool or equivalent.
- Compare the engine coolant temperature sensor reading to an infrared thermometer or a known value.

Specification

- The engine coolant temperature **must** be within the following specification of the infrared thermometer or known value: 5 C [9.8 F]

Linked Solutions

- None

Repair

- Replace the engine coolant temperature sensor. Refer to Procedure 019-019

Validation

- None

2 Cooling fan component inspection

Solution: S00001291

Verification

Conditions

- Turn keyswitch OFF.

Action

- Visually inspect the cooling fan and cooling fan blades.

Refer to OEM Service Manual

- Visually inspect the cooling fan hub assembly.

Refer to OEM Service Manual

- Visually inspect the cooling fan shroud. Refer to Procedure 008-038

Refer to OEM Service Manual

- Visually inspect the recirculation baffles.

Refer to OEM Service Manual

- Visually inspect the cooling fan belt. Refer to Procedure 008-002
- Visually inspect the automatic cooling fan belt tensioner. Refer to Procedure 008-080

Specification

- If any of the checks are **not** within specification, then proceed to the Repair section.

Linked Solutions

- None

Repair

- Adjust, repair, or replace the component preventing correct cooling fan operation.

Refer to OEM Service Manual

Validation

- None

3 Combustion gases entering the cooling system

Solution: S00001212

Verification

Conditions

- Engine running at idle.

Action

- Run engine at high idle.
- Check for air or combustion gases in the cooling system.
- Perform the combustion gas leak test. Refer to Procedure 008-019

Specification

- If the color of the test fluid remains blue, then combustion gases are **not** entering the cooling system. Proceed to the next solution.
- If the color of the test fluid changes from blue to green or yellow, then combustion gases are entering the cooling system. Proceed to the Linked Solution section.

Linked Solutions

- EGR cooler is internally leaking (3.1 [S00001269])
- Fuel injector o-rings or fuel injector sleeves are damaged (3.2 [S00001271])
- Cylinder head gasket or cylinder head is malfunctioning (3.3 [S00001270])

Repair

- No additional action is required for this solution.

Validation

- None

3.1 EGR cooler is internally leaking

Solution: S00001269

Verification

Conditions

- Turn keyswitch OFF.

Action

- Perform the coolant strip test. Refer to Procedure 011-019

Specification

- Review the Coolant Test Strip Results Guidelines.
- If coolant is **not** in the EGR cooler exhaust outlet, the EGR cooler is **not** malfunctioning. Proceed to the next solution.
- If coolant is in both the EGR cooler exhaust outlet and the inlet, then perform the EGR Cooler Pressure Test. Refer to Procedure 011-019
- If coolant is in the EGR cooler exhaust outlet, but **not** in the inlet, then a malfunctioning EGR cooler has been detected.

Linked Solutions

- None

Repair

- Replace the EGR cooler. Refer to Procedure 011-019

Validation

- None

3.2 Fuel injector o-rings or fuel injector sleeves are damaged

Solution: S00001271

Verification

Conditions

- Turn keyswitch OFF.

Action

- Remove the fuel injectors. Refer to Procedure 006-026
- Visually inspect the fuel injector o-rings for damage. Refer to Procedure 006-026
- Visually inspect the fuel injector sleeves for damage. Refer to Procedure 002-004

Specification

- If any damage is found, then proceed to the Repair section.

Linked Solutions

- None

Repair

Repair or replace **only** the components that were found to be out of specification.

- Replace the damaged fuel injector o-rings. Refer to Procedure 006-026
- Replace the damaged fuel injector sleeves or cylinder head. Refer to Procedure 002-004

Validation

- None

3.3 Cylinder head gasket or cylinder head is malfunctioning

Solution: S00001270

Verification

Conditions

- Turn keyswitch OFF.

Action

- Inspect the cylinder head for damage. Refer to Procedure 002-004
- Inspect for a damaged cylinder head gasket. Refer to Procedure 002-004

Specification

- If any damage is found, then proceed to the Repair section.

Linked Solutions

- None

Repair

Repair or replace **only** the components that were found to be out of specification.

- Replace the cylinder head gasket. Refer to Procedure 002-004
- Replace the cylinder head. Refer to Procedure 002-004

Validation

- None

4 Fan clutch operates incorrectly

Solution: S00000328

Verification

Conditions

- Engine running.
- Air conditioning turned OFF.

Action

- Operate engine at rated rpm.
- Verify the fan is engaging at the correct engine temperature.

Specification

- If the cooling fan clutch does **not** engage at the correct engine temperature, then proceed to the Linked Solutions section.

Linked Solutions

- Incorrect adjustable parameter setting (4.1 [S00001285])
- Fan control solenoid or circuit is malfunctioning (4.2 [S00001281])

Repair

- No additional action is required for this solution.

Validation

- None

4.1 Incorrect adjustable parameter setting

Solution: S00001285

Verification

Conditions

- Turn keyswitch ON.
- Connect the recommended Cummins® electronic service tool or equivalent.

Action

- Use the recommended Cummins® electronic service tool or equivalent.

Ensure the following adjustable parameters are set correctly for the application:

- Fan Control Logic.
- Fan Control Switch.
- Air Conditioner Pressure Switch Input.

Specification

- If the Fan Control parameters do **not** match the application, then incorrect Fan Control settings have been detected.

Linked Solutions

- None

Repair

- Adjust the features and parameters to the correct settings. Refer to Procedure 019-078

Validation

- Connect all components
- Connect the recommended Cummins® electronic service tool or equivalent.
- Disable the fault code.
- Operate the engine within the "Conditions for Clearing the Fault Code" found in the Overview section of the troubleshooting procedure.
- Verify that the fault code is no longer active.
- Check ECM Calibration Revision History
- Use the recommended Cummins® electronic service tool or equivalent to find the current ECM code and revision number in the ECM.
- Compare the ECM code and revision number in the ECM to the calibration revisions listed in the ECM Calibration Revision History Database for applicable changes related to this fault code.
- Refer to ECM Calibration Revision History Database.

4.2 Fan control solenoid or circuit is malfunctioning

Solution: S00001281

Verification

Conditions

- Turn keyswitch OFF.
- Disconnect the fan control solenoid from the OEM wiring harness.

Action

- Inspect the pins and connectors for damage. Refer to Procedure 019-361
- Measure the resistance between the fan control solenoid SIGNAL pin and fan control solenoid RETURN pin of the fan control solenoid connector.
- Refer to the circuit diagram or wiring diagram for connector pin identification.

Specification

- If the fan control solenoid resistance does **not** meet specification, then a malfunctioning fan control solenoid has been detected.

Refer to OEM Service Manual

Linked Solutions

- None

Repair

- Replace the fan control solenoid.

Refer to OEM Service Manual

Validation

- None

5 Radiator is externally obstructed

Solution: S00001292

Verification

Conditions

- Turn keyswitch OFF.

Action

- Visually inspect the radiator for damage.
- Visually inspect the radiator for any type of external obstruction.
- Check for closed cold weather radiator cover or winterfront.

Refer to OEM Service Manual

Specification

- If an obstruction is found, then proceed to the Repair section.

Linked Solutions

- None

Repair

Repair or replace **only** the components that were found to be out of specification.

- Repair or replace the restricted radiator.

Refer to OEM Service Manual

- Remove the obstruction.

Refer to OEM Service Manual

Validation

- None

6 Thermostat is malfunctioning

Solution: S00001299

Verification

Conditions

- Turn keyswitch OFF.

Action

- Check the coolant thermostat for proper operation. Refer to Procedure 008-013
- Check for a damaged or leaking thermostat seal. Refer to Procedure 008-013
- Check the thermostat opening temperature with an infrared temperature gun.
- If a temperature gun is **not** available or if the temperature gun reading is above the correct thermostat opening temperature, then proceed to Linked Solutions section.

Specification

- If any damage is noted or if the thermostat does **not** open at the correct temperature, then a malfunctioning coolant thermostat has been detected.
- If any damage or if the thermostat seal is found leaking, then a malfunctioning thermostat seal has been detected.

Linked Solutions

- Out-of-chassis opening temperature test (6.1 [S00001359])

Repair

- Replace the engine coolant thermostat. Refer to Procedure 008-013

Validation

- None

6.1 Out-of-chassis opening temperature test

Solution: S00001359

Verification

Conditions

- Turn keyswitch OFF.

Action

- Perform the out-of-chassis opening temperature test. Refer to Procedure 008-013

Specification

- If any damage is noted or if the thermostat does **not** open at the correct temperature, then a malfunctioning coolant thermostat has been detected.
- If any damage or if the thermostat seal is found leaking, then a malfunctioning thermostat seal has been detected.

Linked Solutions

- None

Repair

- Replace the engine coolant thermostat. Refer to Procedure 008-013

A new thermostat seal should be used when replacing the engine coolant thermostat.
If the thermostat seal is damaged, the engine coolant thermostat will still need to be replaced since the thermostat seal is **not** a separately serviceable item.

Validation

- Connect all components
- Connect the recommended Cummins® electronic service tool or equivalent.
- Disable the fault code.
- Operate the engine within the "Conditions for Clearing the Fault Code" found in the Overview section of the troubleshooting procedure.
- Verify that the fault code is no longer active.
- Check ECM Calibration Revision History
- Use the recommended Cummins® electronic service tool or equivalent to find the current ECM code and revision number in the ECM.
- Compare the ECM code and revision number in the ECM to the calibration revisions listed in the ECM Calibration Revision History Database for applicable changes related to this fault code.
- Refer to ECM Calibration Revision History Database.

7 Radiator shutters malfunctioning (if equipped)

Solution: S00001300

Verification

Conditions

- Turn keyswitch OFF.

Action

- Manually operate the radiator shutters.

Refer to OEM Service Manual

- Check the shutterstat setting.

Refer to OEM Service Manual

Specification

- None

Linked Solutions

- None

Repair

- Repair or replace the malfunctioning radiator shutters or shutterstat.

Refer to OEM Service Manual

Validation

- None

If all steps have been completed and no root cause has been identified, then follow the technical escalation process.