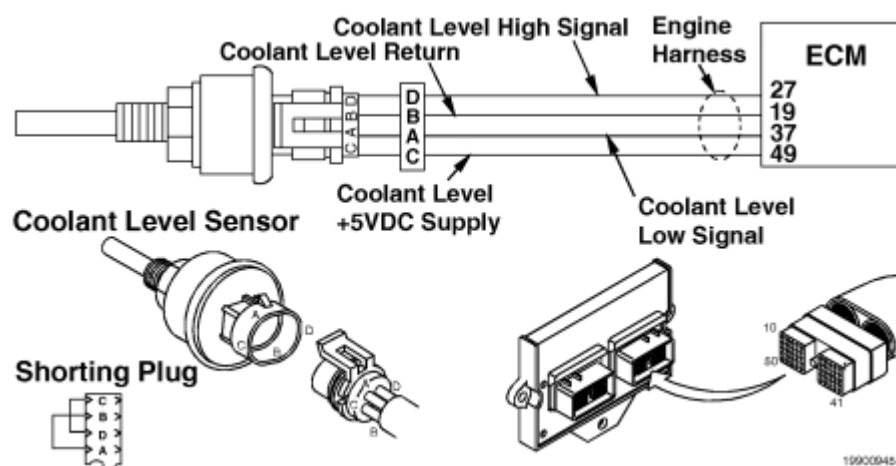


FAULT CODE 515 or 516 Coolant Level Sensor Circuit

Overview

CODE	REASON	EFFECT
Fault Code: 515 or 516 PID: P091 SPN: 091 FMI: 3 or 4 LAMP: Yellow SRT:	FC 515: High voltage detected at the auxiliary +5-VDC sensor supply voltage pin 49 of the engine harness. FC 516: Low voltage detected at the auxiliary +5-VDC sensor supply voltage pin 49 of the engine harness.	No engine protection for coolant level.

Coolant Level Sensor Circuit



Circuit Description

The coolant level sensor monitors the coolant level within the coolant system and passes information to the electronic control module (ECM) through the engine harness.

Component Location

The coolant level sensor is located in the radiator top tank or surge tank.

Shop Talk

This is an OEM-supplied component and will vary in sensor location.

- If a shorting plug is used in the coolant level circuit, verify that it is wired correctly.
- Inspect the wiring harness between the Weather-Pack four-way connector and the coolant level sensor for damage.
- Make sure the coolant level sensor is located in the middle of the tank rather than off to

one side where the coolant level can change when the vehicle makes a turn.

Cautions and Warnings

WARNING

Wait until the coolant temperature is below 50°C [120°F] before removing the coolant system pressure cap or the coolant level sensor. Failure to do so can cause personal injury from heated coolant spray.

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CAUTION

To avoid damaging a new ECM, all other active fault codes must be investigated prior to replacing the ECM.

CAUTION

To avoid pin and harness damage, use the following test leads when taking a measurement:
 Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead
 Part Number 3823995 - male Weather-Pack test lead
 Part Number 3823996 - female Weather-Pack test lead.

Troubleshooting Steps

STEPS	SPECIFICATIONS
STEP 1.	Check the coolant level sensor.
STEP 1A. Inspect the engine harness and coolant level sensor connector pins.	No damaged pins
STEP 1B. Check for active fault codes.	Fault Code 515 or 516 remains active
STEP 2.	Check the engine harness.

STEP 2A.	Inspect the harness and the ECM connector pins.	No damaged pins
STEP 2B.	Check for a short circuit to ground.	More than 100k ohms
STEP 2C.	Check for a short circuit from pin to pin.	More than 100k ohms
STEP 2D.	Check for a short circuit to a voltage source.	Less than (+) 1.0 VDC
STEP 3.	Check the ECM supply voltage.	
STEP 3A.	Measure the sensor supply voltage from the ECM.	(+) 4.5 to 5.25 VDC
STEP 4.	Clear the fault codes.	
STEP 4A.	Disable the fault code.	Fault Code 515 or 516 inactive
STEP 4B.	Clear the inactive fault codes.	All faults cleared

Guided Step 1 - Check the coolant level sensor.

Guided Step 1A - Inspect the engine harness and the coolant level sensor connector pins.



WARNING

Wait until the coolant temperature is below 50°C [120°F] before removing the coolant system pressure cap or the coolant level sensor. Failure to do so can cause personal injury from heated coolant spray.

Conditions

- Turn keyswitch to the OFF position.
- Disconnect the engine harness from the coolant level sensor.

Action

<p>inspect the engine harness and the coolant level sensor connector pins for:</p> <ul style="list-style-type: none"> • Bent or broken pins • Pushed back or expanded pins • Corroded pins • Moisture in or on the connector • Missing or damaged seals. 	
OK	NOT OK
<p>No damaged pins</p>	<p>Repair the damaged pins. Repair or replace the engine harness or the coolant level sensor, whichever has damaged pins.</p> <ul style="list-style-type: none"> • Repair the engine harness. Refer to Procedure 019-201 or 019-205 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271. • Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271. • Replace the coolant level sensor. Refer to Procedure 019-017 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271.
Go to 1B	Go to 4A

Guided Step 1B - Check for active fault codes.

<div> <p>Conditions</p> <ul style="list-style-type: none"> • Turn keyswitch to the ON position. </div> <div> <p>Action</p> <p>check for active fault codes.</p> <ul style="list-style-type: none"> • Using INSITE™, read the fault codes. </div>	
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OK	NOT OK
Fault Code 515 or 516 remains active	
Go to 2A	Go to 4A

Guided Step 2 - Check the engine harness.

Guided Step 2A - Inspect the engine harness and the ECM connector pins.



Wait until the coolant temperature is below 50°C [120°F] before removing the coolant system pressure cap or the coolant level sensor. Failure to do so can cause personal injury from heated coolant spray.



To avoid damaging a new ECM, all other active fault codes must be investigated prior to replacing the ECM.

Conditions <ul style="list-style-type: none"> • Turn keyswitch to the OFF position. • Disconnect the engine harness from the ECM. 	
Action <p>inspect the engine harness and the ecm connector pins for:</p> <ul style="list-style-type: none"> • Bent or broken pins • Pushed back or expanded pins • Corroded pins • Moisture in or on the connector • Missing or damaged seals. 	
OK	NOT OK

No damaged pins	<p>Repair the damaged pins. Repair or replace the engine harness or the ECM, whichever has the damaged pins.</p> <ul style="list-style-type: none">• Repair the engine harness. Refer to Procedure 019-204 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271.• Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271.• Replace the ECM. Refer to Procedure 019-031 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271.
Go to 2B	Go to 4A

Guided Step 2B - Check for a short circuit to ground.



Wait until the coolant temperature is below 50°C [120°F] before removing the coolant system pressure cap or the coolant level sensor. Failure to do so can cause personal injury from heated coolant spray.



To avoid pin and harness damage, use the following test leads when taking a measurement:

Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead

Part Number 3823995 - male Weather-Pack test lead

Part Number 3823996 - female Weather-Pack test lead.

Conditions

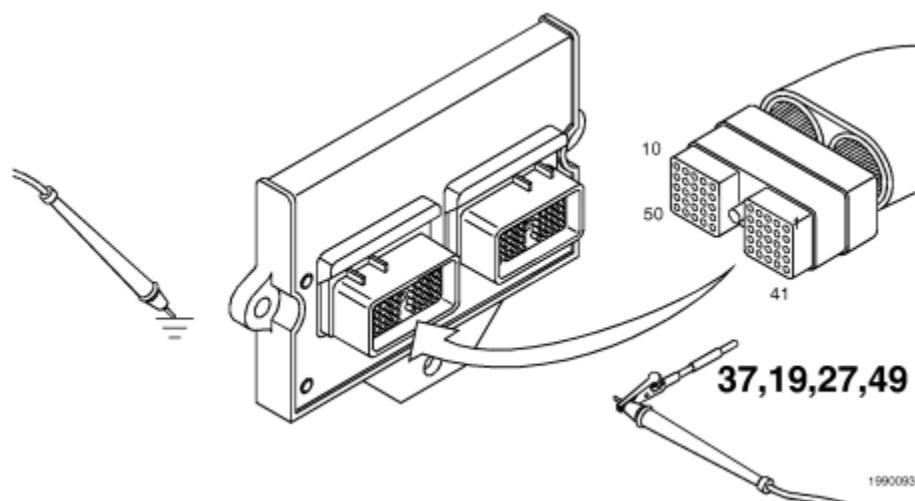
- Turn keyswitch to the OFF

- position.
- Disconnect the engine harness from the ECM.
- Disconnect the engine harness from the coolant level sensor.

Action

check for a short circuit to ground.

- Measure the resistance from pin 37 of the engine harness connector to engine block ground.
- Measure the resistance from pin 19 of the engine harness connector to engine block ground.
- Measure the resistance from pin 27 of the engine harness connector to engine block ground.
- Measure the resistance from pin 49 of the engine harness connector to engine block ground.



OK	NOT OK
More than 100k ohms	Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271 .
Go to 2C	Go to 4A

Guided Step 2C - Check for a short circuit from pin to pin.



WARNING

Wait until the coolant temperature is below 50°C [120°F] before removing the coolant system pressure cap or the coolant level sensor. Failure to do so can cause personal injury from heated coolant spray.



CAUTION

To avoid pin and harness damage, use the following test leads when taking a measurement:

Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead

Part Number 3823995 - male Weather-Pack test lead

Part Number 3823996 - female Weather-Pack test lead.

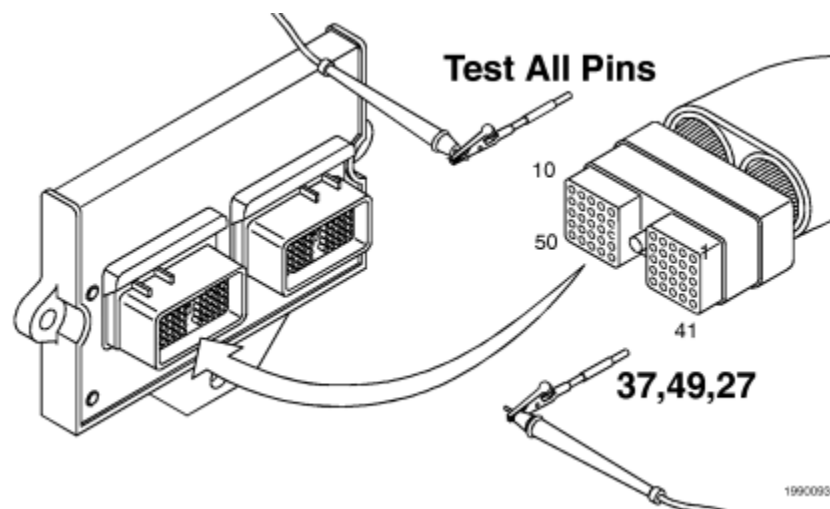
Conditions

- Turn keyswitch to the OFF position.
- Disconnect the engine harness from the ECM.
- Disconnect the engine harness from the coolant level sensor.

Action

check for a short circuit from pin to pin.

- Measure the resistance from pin 37 of the engine harness connector to all other pins in the connector.
- Measure the resistance from pin 49 of the engine harness connector to all other pins in the connector.
- Measure the resistance from pin 27 of the engine harness connector to all other pins in the connector.



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OK	NOT OK
More than 100k ohms	Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271 .
Go to 2D	Go to 4A

Guided Step 2D - Check for a short circuit to a voltage source.



To avoid pin and harness damage, use the following test leads when

taking a measurement:

Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead

Part Number 3823995 - male Weather-Pack test lead

Part Number 3823996 - female Weather-Pack test lead.

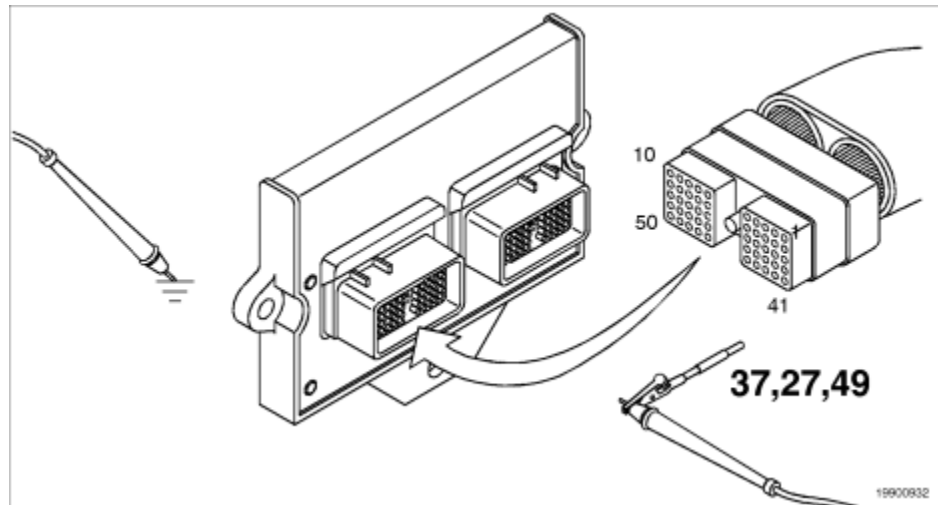
Conditions

- Turn keyswitch to the OFF position.
- Disconnect the engine harness from the ECM.
- Disconnect the engine harness from the coolant level sensor.

Action

check for a short circuit to a voltage source.

- Measure the voltage from pin 37 of the engine harness connector to engine block ground.
- Measure the voltage from pin 27 of the engine harness connector to engine block ground.
- Measure the voltage from pin 49 of the engine harness



connector to engine block ground.	
OK	NOT OK
Less than (+) 1.0 VDC	Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271 .
Go to 3A	Go to 4A

Guided Step 3 - Check for the ECM voltage.

Guided Step 3A - Measure the sensor supply voltage from the ECM.

WARNING

Wait until the coolant temperature is below 50°C [120°F] before removing the coolant system pressure cap or the coolant level sensor. Failure to do so can cause personal injury from heated coolant spray.

CAUTION

To avoid pin and harness damage, use the following test leads when taking a measurement:

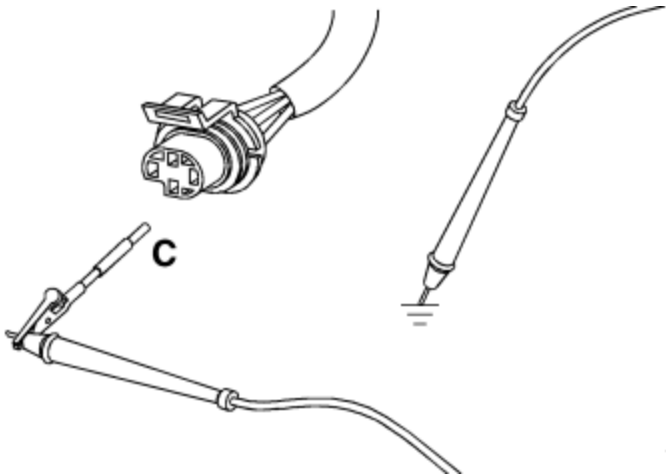
Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead

Part Number 3823995 - male Weather-Pack test lead

Part Number 3823996 - female Weather-Pack test lead.

Conditions

- Connect the engine harness to the ECM.
- Disconnect the engine harness from the coolant

<p>level sensor.</p> <ul style="list-style-type: none"> • Turn keyswitch to the ON position. <p>Action</p> <p>measure the sensor supply voltage from the ecm.</p> <ul style="list-style-type: none"> • Measure the voltage from pin C of the coolant level sensor, harness side, to engine block ground. 	 <p>19900693</p>
OK	NOT OK
(+) 4.5 to 5.25 VDC	Replace the ECM. Refer to Procedure 019-031 in the Troubleshooting and Repair Manual, ISC Fuel Systems ISC Series Engines, Bulletin 3666271 .
Go to 4A	Go to 4A

Guided Step 4 - Clear the fault codes.

Guided Step 4A - Disable the fault code.

<p>Conditions</p> <ul style="list-style-type: none"> • Connect all components. • Turn keyswitch to the ON position. <p>Action</p> <p>disable the fault code.</p> <ul style="list-style-type: none"> • Start the engine, and let idle for 1 	
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<div><div><div>minute.</div><div><ul style="list-style-type: none">Using INSITE™, verify that Fault Code 515 or 516 is inactive.</div></div></div>	
OK	NOT OK
Fault Code 515 or 516 inactive	Return to troubleshooting steps, or contact your local Cummins Authorized Repair Location if all steps have been completed and checked again.
Go to 4B	Go to 1A

Guided Step 4B - Clear the inactive fault codes.

<div><div><div>Conditions</div><div><ul style="list-style-type: none">Connect all components.Turn keyswitch to the ON position.</div></div><div><div>Action</div><div>clear the inactive fault codes.</div><div><ul style="list-style-type: none">Erase the inactive fault codes using INSITE™.</div></div></div>	
OK	NOT OK
All faults cleared	Troubleshoot any remaining active fault codes.
Repair complete	Appropriate troubleshooting chart