

Coolant Level Sensors

M-261-008

(December 2007)

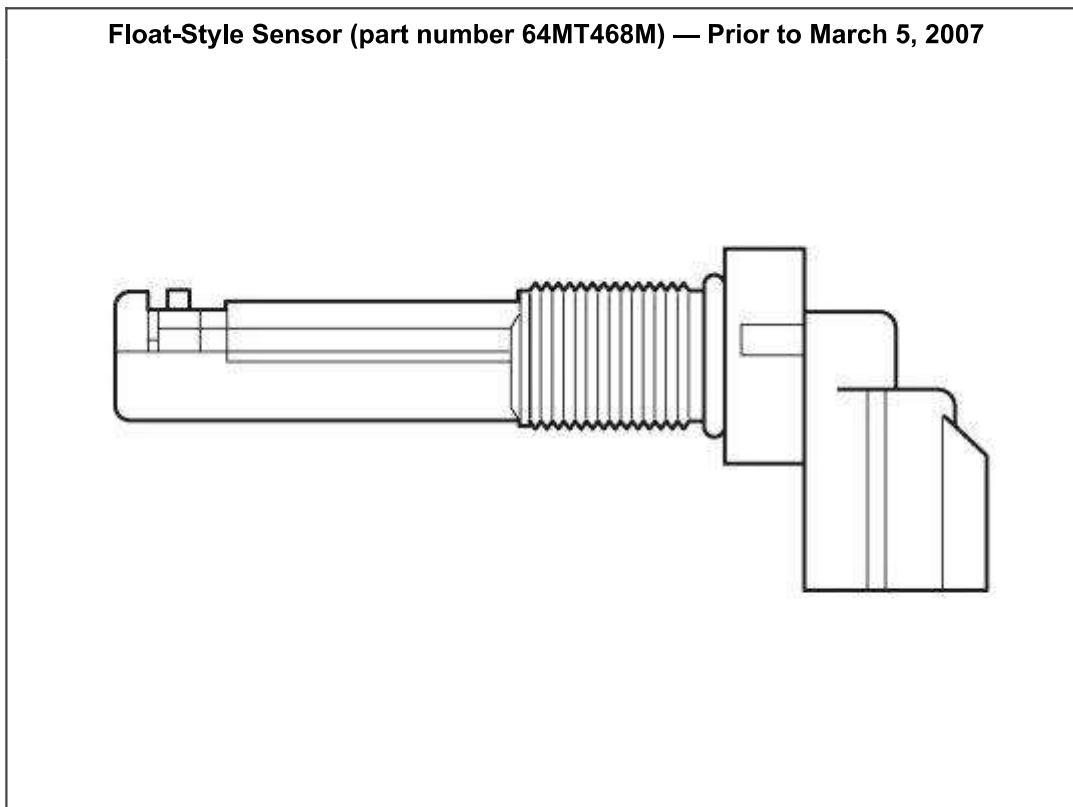
Valid for

Mack CXU,CHU,GU,MRU,LEU models

Case description

Several different coolant level sensors have been used on MACK model chassis beginning with CXP and CTP models. This service bulletin provides sensor part number, specifications and troubleshooting information for the various sensors used.

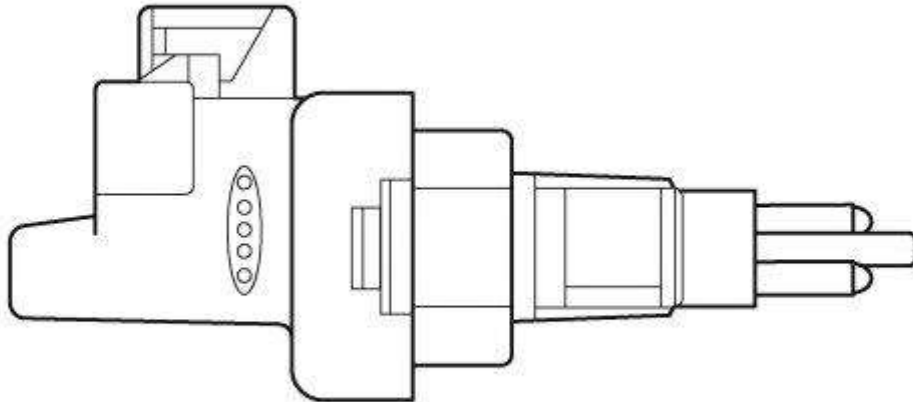
FLOAT-STYLE SENSOR (PART NO. 64MT468M) — CXP, CTP, MRU and LEU MODELS



The float-style coolant level sensor (part number 64MT468M) was utilized on CXP and CTP models from the beginning of production until March 5, 2007, at which point it was replaced in production by a probe-style sensor (part number 64MT484M). Should a defective float-style sensor be encountered, it should be replaced with the probe-style sensor. The float-style sensor was also used on MRU and LEU models until July 5, 2007, at which point it was replaced in production by a reed switch-style sensor (part number 64MT482M).

PROBE-STYLE SENSOR (PART NO. 64MT484M) — CXP AND CTP MODELS

Probe-Style Sensor (part number 64MT484M) — After March 5, 2007



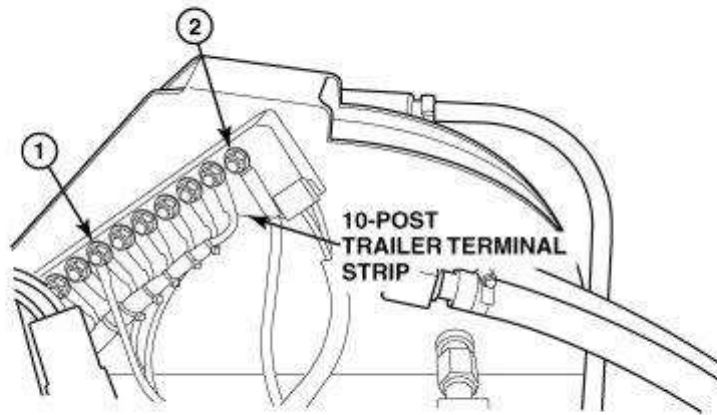
The probe-style coolant level sensor was implemented into production on CXP and CTP models equipped with US04 emission-compliant MP7 engines beginning March 5, 2007. This sensor utilizes a three-pin connector, whereas the previous float-style sensor utilized a two-pin connector.

Pin designations for the probe-style sensor are as follows:

Pin	Description
A	Input, 12 VDC (ignition power supplied from terminal No. 7 of the 10-post trailer terminal strip)
B	Signal — Less than 0.15 VDC when coolant tank is full Greater than 10.0 VDC when coolant level is low
C	Ground

Note: When replacing the previously used float-style coolant level sensor (part number 64MT468M) with the current probe-style sensor (part number 64MT484M), a power supply harness (part number 41MR31673M) is required. Power for the sensor is supplied from terminal No. 7 (ignition power) of the 10-post trailer terminal strip, which is located on the surge tank mounting bracket. The 5 amp fuse holder can either be secured to terminal No. 1 of the 10-post trailer terminal strip, or it can be secured to a neighboring harness with a tie wrap.

10-Post Trailer Terminal Strip



1. Ignition Power (Terminal No. 7)

2. Five amp fuse (fuse holder is secured to ground terminal No. 1)

Coolant Level Indication (Probe-Style Sensor 64MT484M)

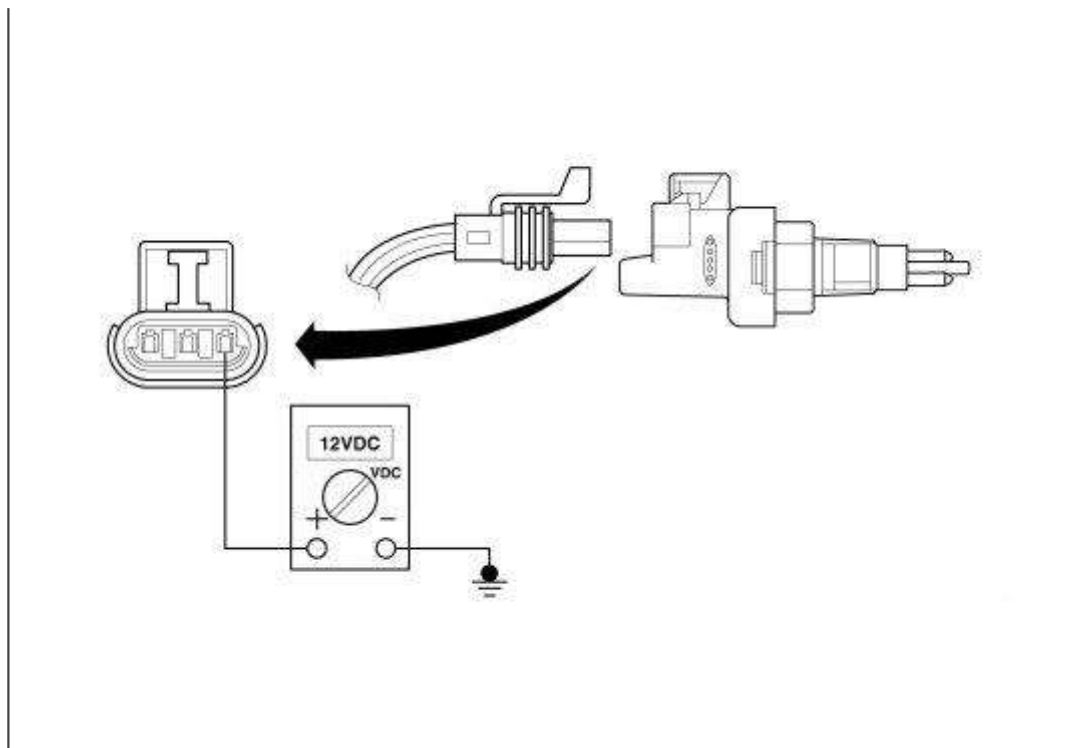
Both the Low Coolant indicator and the Shutdown indicator will illuminate 5 seconds after detecting that the coolant level in the surge tank is low. If engine shutdown is enabled, the engine will shut down.

Test Procedures

Proper function of the probe-style coolant level sensor can be verified by sensor output voltage as follows:

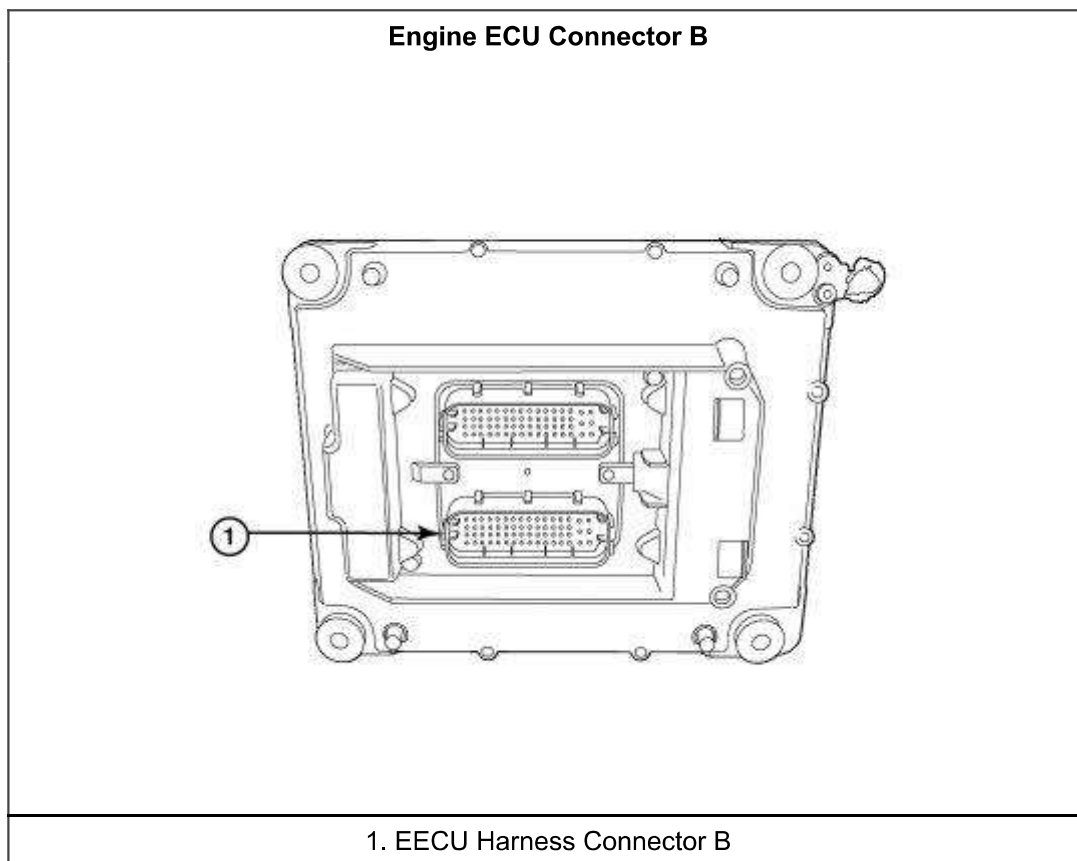
1. Verify that the coolant level inside the coolant surge tank is at the specified level.
2. Disconnect the coolant level sensor harness.
3. Turn the ignition key switch to the ON position.
4. Using a digital multimeter set to DC voltage, measure ignition voltage between pin A of the sensor connector and a good ground.

Measure Ignition Voltage at Pin A of Coolant Level Sensor Harness Connector



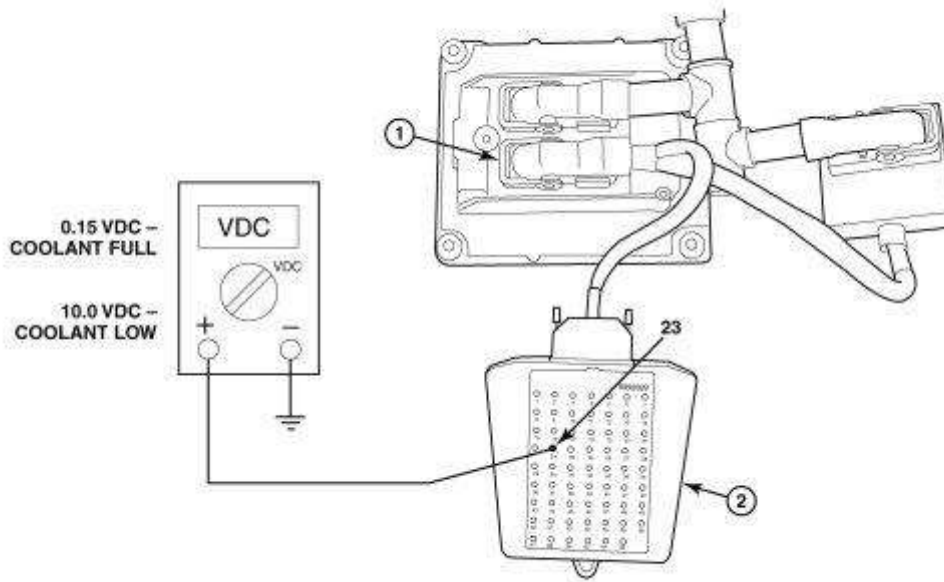
If 12 VDC is not present, check the 5 amp fuse in the external fuse holder (secured to terminal No. 1 of the 10-post trailer terminal strip). If the 5 amp fuse is OK, look for an open in the wire between terminal No. 7 of the 10-post trailer terminal strip and the coolant level sensor connector.

5. Turn the ignition key switch to the OFF position and reconnect the coolant level sensor harness connector.
6. Install the break-out box (tool No. 9998699) at the engine ECU connector B.



7. Turn the ignition key switch to the ON position, and then use a digital multimeter to measure signal voltage at pin 23 of connector B and a good ground. Signal voltage should be 0.15 VDC or less with the coolant at the specified level in the surge tank.

Measure Signal Voltage Between Pin No. 23 and Ground



1. EECU Connector B

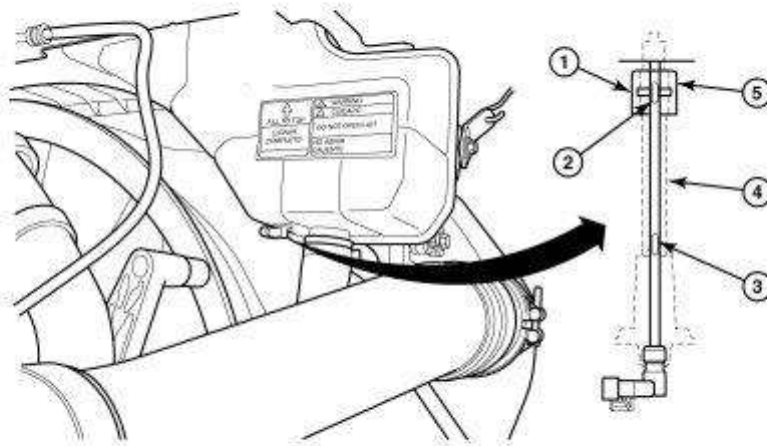
2. Break-Out Box (Tool No. 9998699)

8. Drain enough coolant from the cooling system to bring the level of coolant below the level of the coolant level sensor and note the voltage indicated on the multimeter. With the level of coolant below the sensor, signal voltage should be 10 VDC.

If signal voltage is not within specifications, replace the coolant level sensor.

REED SWITCH-STYLE COOLANT LEVEL SENSOR (PART NO. 20900982) — CXU, CHU AND GU MODELS

Reed Switch-Style Sensor (part number 20900982) — CXU, CHU and GU Models



1. Ring Magnet

2. Upper Reed Switches

3. Lower Reed Switches

4. Outer Casing (Integral part of surge tank)

5. Float (Integral part of surge tank)

CXU, CHU and GU models utilize a reed switch-style coolant level sensor. This sensor is a three-position sensor, which is comprised of a plastic tube and a float. The float, which contains a ring magnet, is an integral part of the surge tank. Inside the plastic tube is a set of reed switches; two switches at the top of the plastic tube and two switches at the bottom. As the level of coolant in the surge tank falls, a certain amount of voltage is seen at the engine ECU depending upon the position of the float relative to the reed switches. With the float at the top of the sensor (coolant level sufficient), both the top and bottom reed switches are open. As the coolant level falls, the float slides down the tube. With the float anywhere between the upper and lower reed switches (coolant level low), the top switches will close and the bottom switches will remain open. With the float at the lowest level (coolant level very low), the top switches will remain open and the bottom switches will close.

Coolant Level Indication

For vehicles manufactured prior to August 13, 2007, the amber “Low Coolant” indicator will flicker due to the coolant sloshing in the surge tank when the coolant level is low (50% of full, with the float below the top reed switches). With the coolant level very low (float at bottom reed switches), the red shutdown indicator lamp will illuminate within 4–5 seconds. If the engine shutdown option is enabled, the engine will shut down.

For vehicles manufactured after August 13, 2007, the amber “Low Coolant” indicator will illuminate 30 seconds after detecting low coolant (50% of full, with the float below the top switches). With the coolant level very low (float at bottom reed switch), the amber “Low Coolant” indicator will illuminate within 3 to 5 seconds, and the red “Shutdown” indicator will illuminate after 3 minutes. If the engine shutdown option is enabled, the engine will shut down. When coolant is replenished, the sensor must see sufficient coolant for 4–5 seconds to reset the timer.

Test Procedures

Note: The following test requires a digital multimeter and a magnet.

1. Disconnect the harness connector from the coolant level sensor, and then remove the sensor from the coolant surge tank.

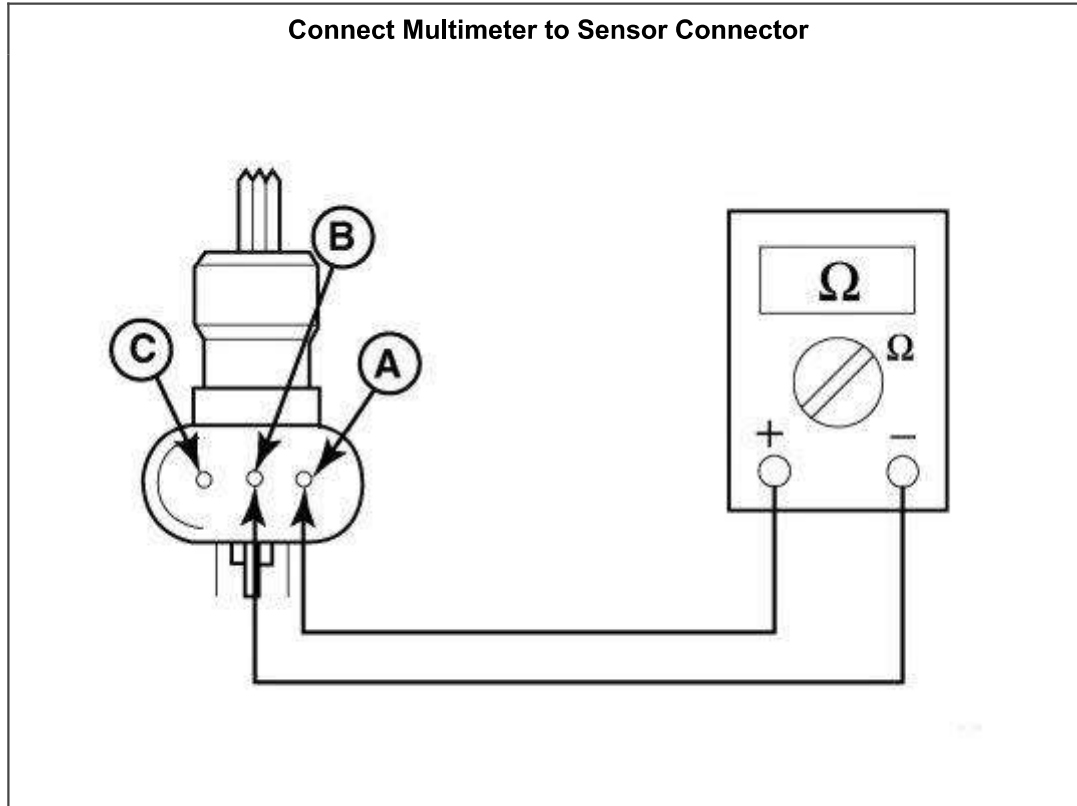
Note: The coolant level sensor is enclosed inside the surge tank. Draining the coolant is not necessary when removing the sensor.



Caution

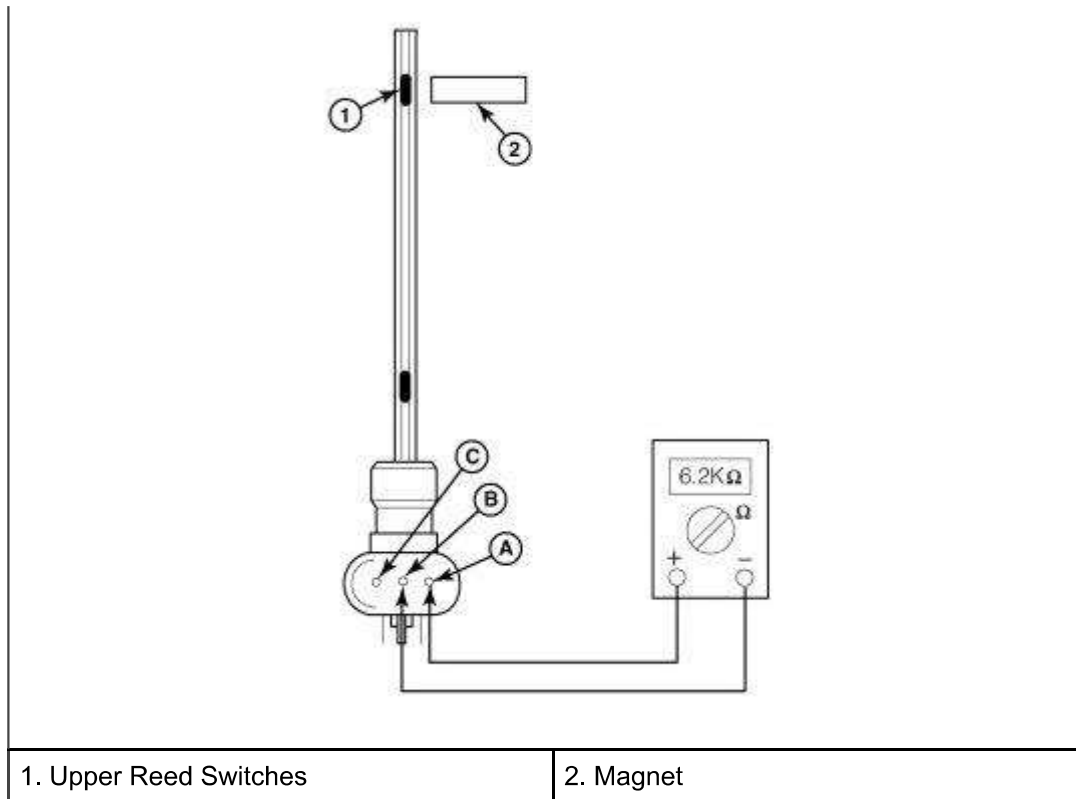
Use care when removing the sensor from the surge tank so as to not bend the plastic tube.

2. Connect a digital multimeter to pins A and B of the sensor connector and set the meter to measure resistance.



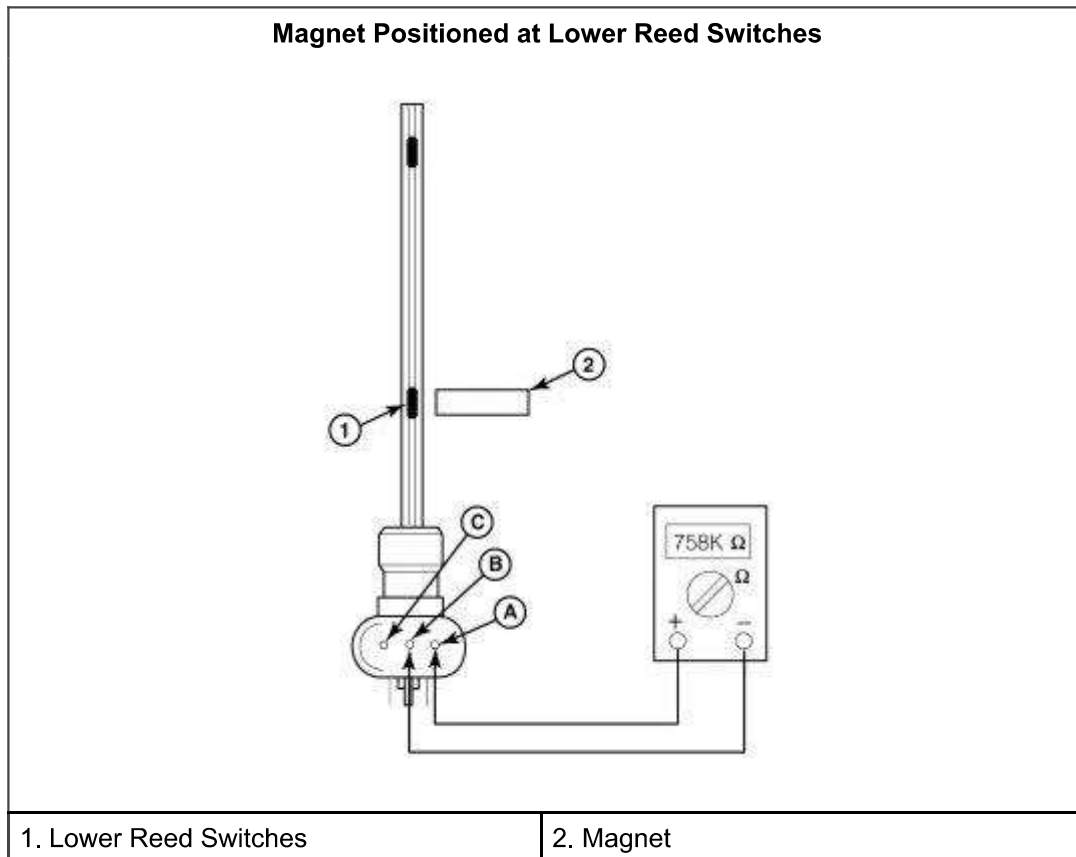
3. Position a magnet at the upper set of reed switches.

Magnet at Upper Reed Switches



With the magnet positioned at the upper reed switches, the meter should indicate 6,220 ohms.

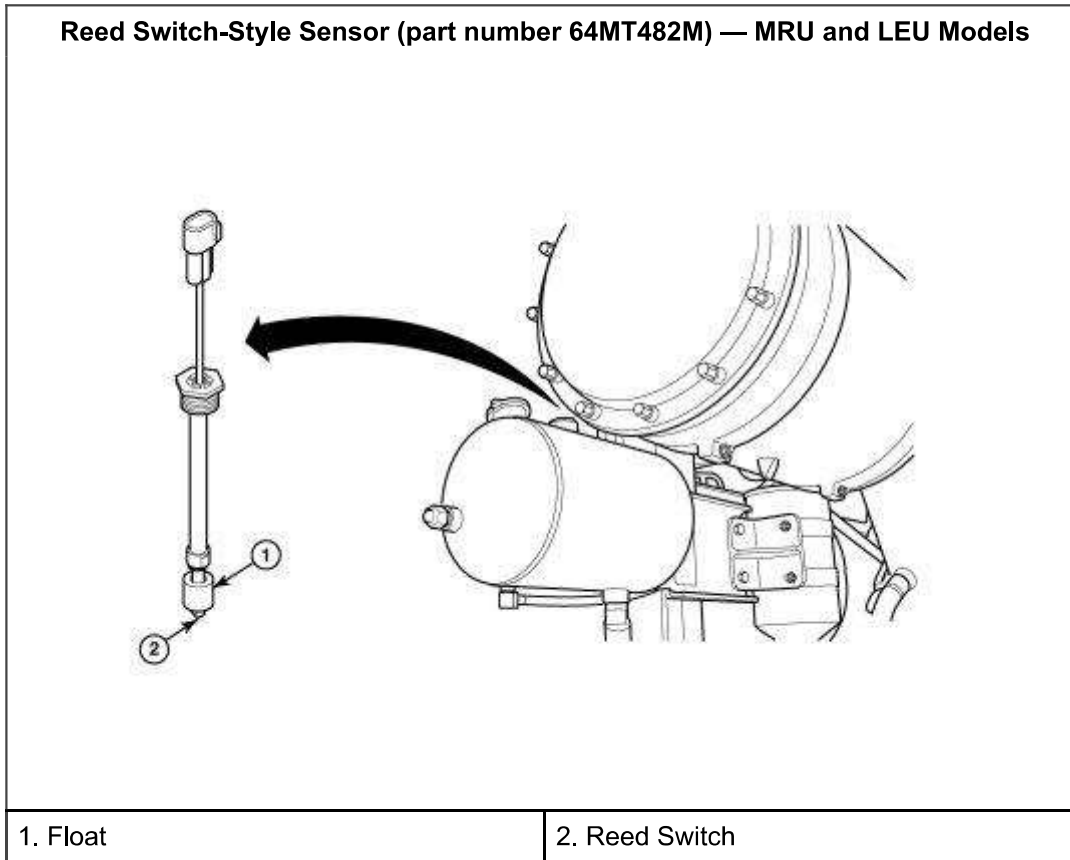
4. Remove the magnet from the upper reed switches and then note the resistance reading on the meter. The meter should indicate 2,000 ohms.
5. Position the magnet at the lower reed switches.



With the magnet positioned at the bottom reed switches, the meter should indicate 758 ohms.

If the resistance readings obtained in the above tests are not within specifications, replace the sensor.

REED SWITCH-STYLE COOLANT LEVEL SENSOR (PART NO. 64MT482M) — MRU AND LEU MODELS



Beginning July 5, 2007, the reed switch-style coolant level sensor was implemented into production on MRU and LEU models, replacing the previous float-style sensor (part number 64MT468M). This reed switch-style sensor is different from the sensor used on CXU, CHU and GU models in that this sensor is basically an on/off sensor. The sensor is comprised of a reed switch inside a plastic tube, with a float that contains a ring magnet, which slides up and down the tube. When the coolant level drops too low, the float moves away from the reed switch, causing the switch to close. The engine ECU then sees a certain voltage based on the internal resistance of the sensor.

Note: On MRU and LEU models equipped with the float-style sensor (part number 64MT468M), replacement of the coolant surge tank will be required if the sensor is being changed to the reed switch style sensor. Part numbers for the surge tank are as follows:

76MF446M — MRU or LEU with MP7 engine

76MF448M — MRU with MP8 engine

Updating a chassis to the float-style sensor and revised surge tank requires adding sub-dataset 21095856 and reprogramming the engine ECU. Refer to the VCADS user's guide for information on reprogramming the engine ECU.

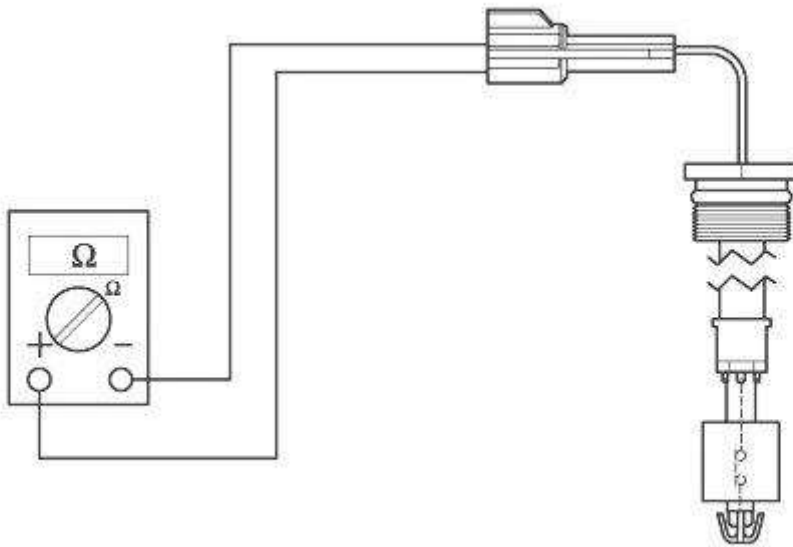
Coolant Level Indication

The amber "Low Coolant" indicator will illuminate after 5 seconds when low coolant is detected. After an additional 5 seconds, the red "Shutdown" indicator will illuminate. If the engine shutdown option is enabled, the engine will shut down.

Test Procedures

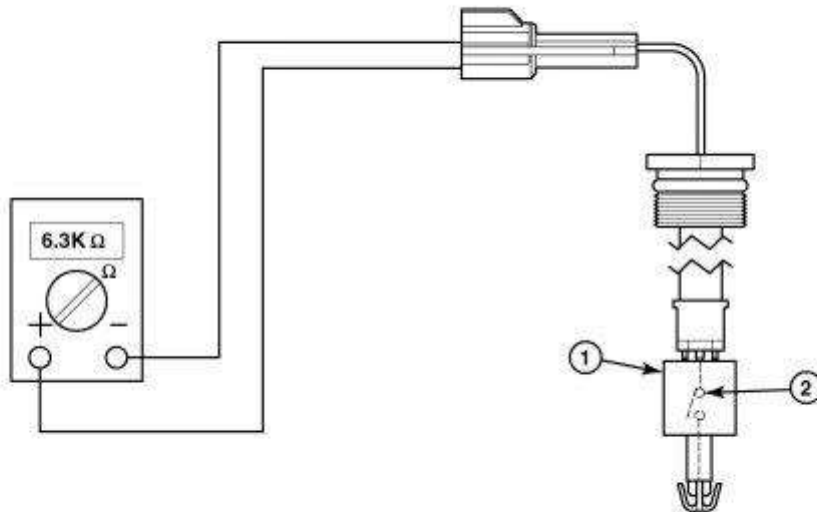
1. Disconnect the sensor harness connector and then remove the sensor from the surge tank.
2. Connect a digital multimeter to the sensor connector pins and set the meter to measure resistance.

Connect Multimeter to Sensor Connector



3. Hold the sensor float at the top position and note the reading indicated on the meter. Resistance should be 6,300 ohms.

Measure Sensor Resistance with Float at Top

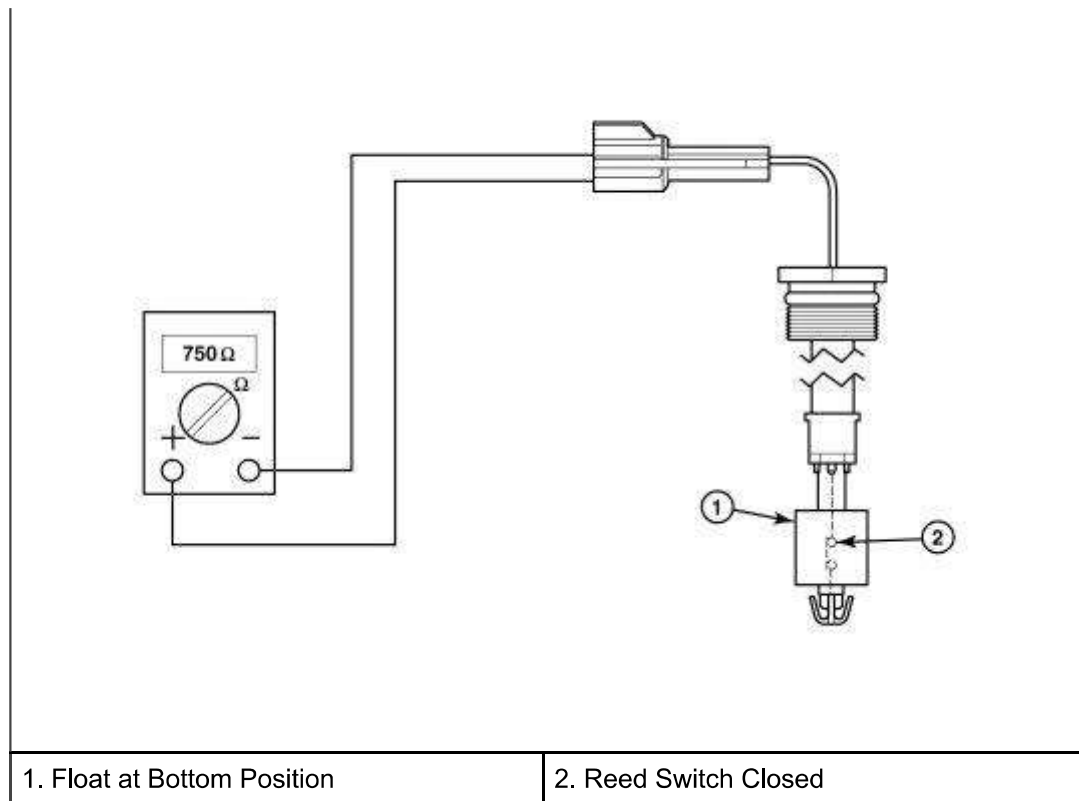


1. Float at Top Position

2. Reed Switch Opened

4. Move the float to the bottom of the sensor. At the bottom position, the reed switch should close, and the meter should indicate 750 ohms.

Measure Sensor Resistance with Float at Bottom



If sensor resistance is not within specifications, replace the sensor.

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