# SS 1034797 M2,108SD, 114SD Coolant Level Sensor P/N 06-93316-002

This bulletin was updated 1/28/2021 to reflect the removal of the backshell P/

**Applicable Vehicles:**

Applies to all M2, 108 / 114 SD vehicles utilizing the Low Coolant Level (LCL) sensor 06-93316-002.

**Issue**:

The Call Center has received several calls pertaining to this LCL sensor introduced to in 2018. The purpose of this solution is to bring better awareness to the sensor functions, fault codes generated, along with providing testing procedures used to validate the sensors condition.

**Background:**

The sensor mounts in the bottom of the surge tank and utilizes a dry fit installation, meaning the sensor can be removed without draining the engine coolant. The sensor sits vertically in the tank and uses a float with two magnets (mounted in the tank) to open and close switches in sensor to determine coolant level. The sensor only has two values, normal and low used to monitor coolant level. The sensor has an external O-ring used to help hold engagement of the sensor when locked in place. It is important that the sensor have this O-ring when mounting the sensor into the tank. There are other versions of the LCL sensor 06-93316 base part number, however, only the -002 (Dark Brown in color) is currently used on the M2, 108SD and 114SD vehicles.

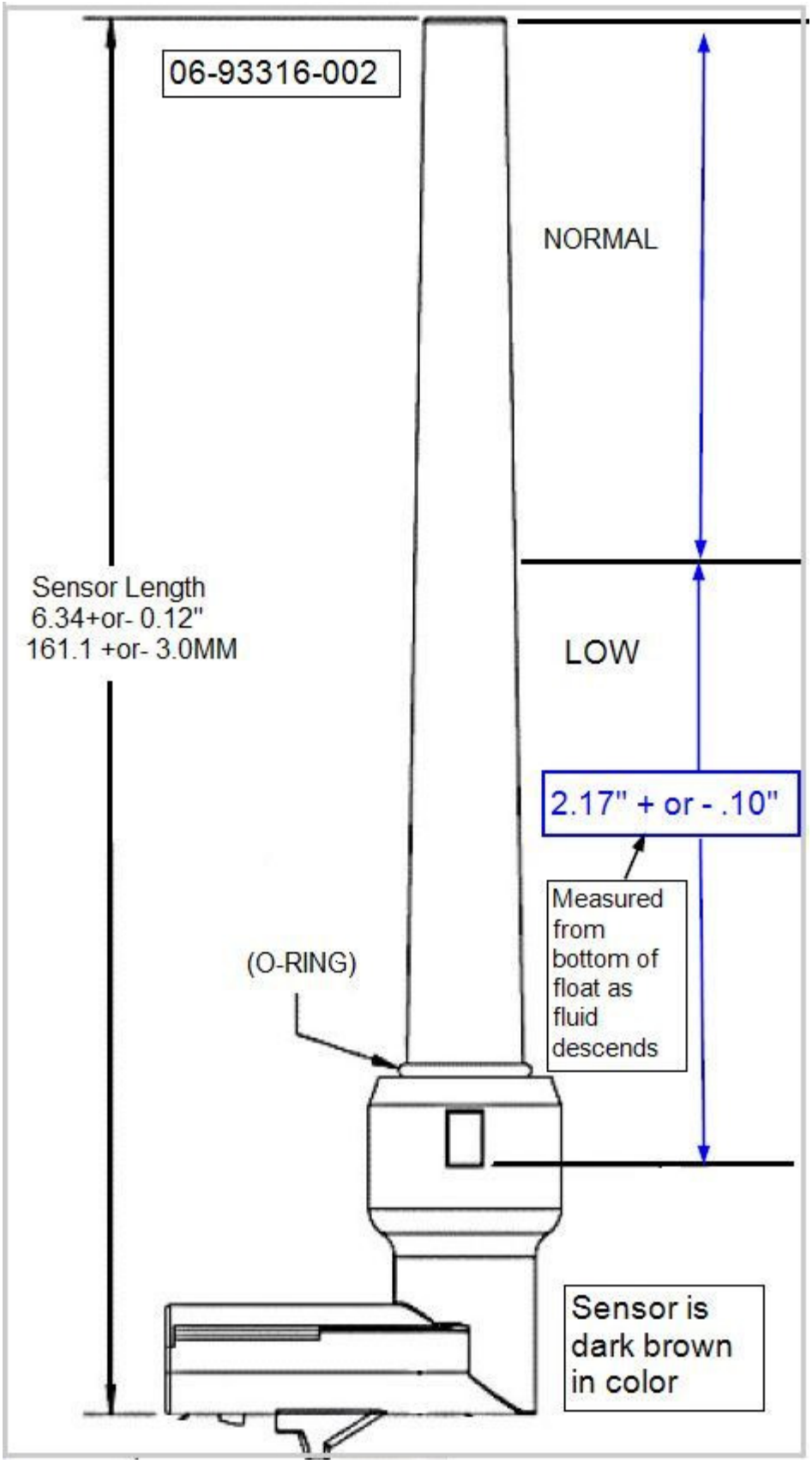
**Sensor Information:**

**06-93316-002 – Resistance Values**

| Resistance (Ohms) | Level |
|---|---|

| | |
|---|---|
| **133** + or - 3 | Normal |
| 1200 + or- 60 | Low |

### Sensor measurements

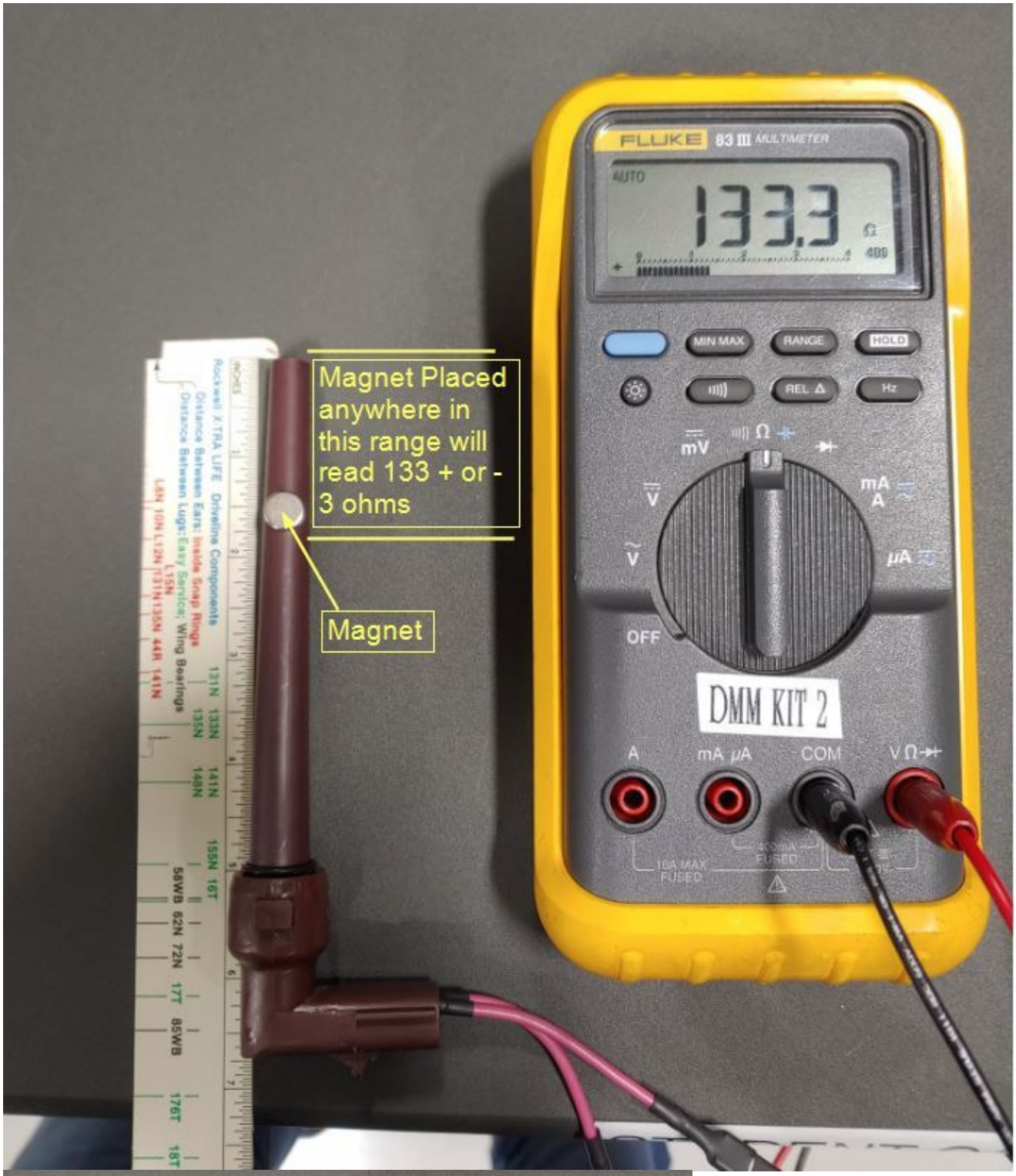

06-93316-002
NORMAL
Sensor Length
6.34+or- 0.12"
161.1 +or- 3.0MM
LOW
2.17" + or - .10"
Measured from bottom of float as fluid descends
(O-RING)
Sensor is dark brown in color

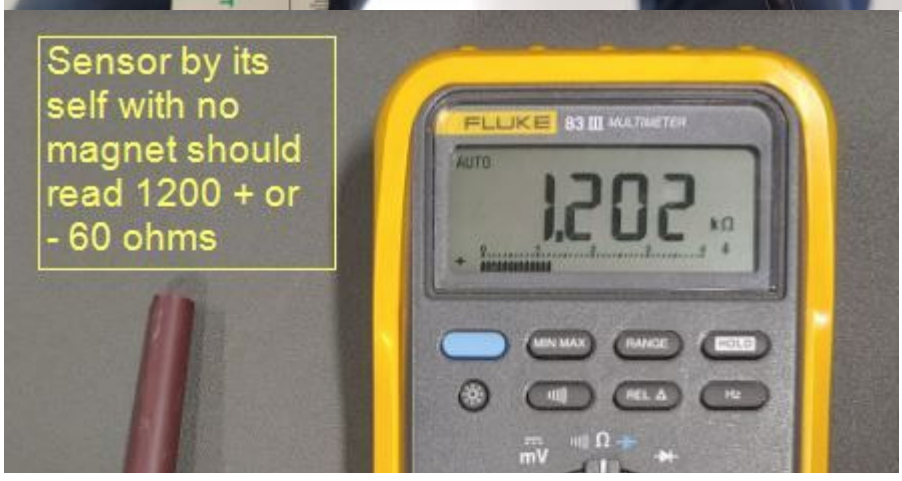
**Sensor Testing:**

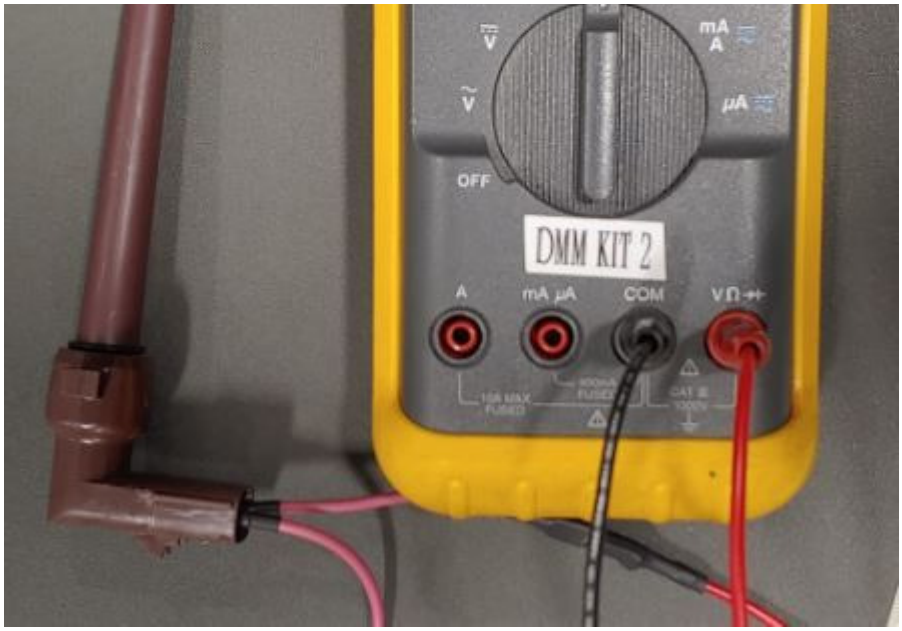
A magnet can be used to move the switches with in the sensor. If no magnet is around the sensor it will read 1200 + or - 60 ohms. If a magnet is placed on the upper portion of the sensor as pictured in the sensor measurements for "Normal" then the ohms reading should be 133 + or - 3 ohms. If the magnet is moved to the bottom of the sensor "Low" then it will read 1200 +or- 60 ohms. Reference the pictures below for examples of sensor testing.

**Example coolant level (LOW)** **Example coolant level (Normal)** **Example coolant sensor out of tank (no magnet)**


FLUKE 83 III MULTIMETER
AUTO
1.202
kΩ
MIN MAX
RANGE
HOLD
REL Δ
Hz
mV
V
mA
A
μA
OFF
DMM KIT 2
A
mA μA
COM
VΩ
Magnet
Magnet Placed anywhere in this range will read 1200 + or - 60 ohms
Rockwell X-TRA LIFE Driveline Components
Distance Between Ears: Inside Snap Rings
Distance Between Lugs: Easy Service: Wing Bearings


Magnet Placed anywhere in this range will read 133 + or - 3 ohms
Magnet
FLUKE 83 III MULTIMETER
AUTO
133.3
MIN MAX
RANGE
HOLD
REL Δ
Hz
mV
mA A
μA
OFF
DMM KIT 2
A
mA μA
COM
V Ω
10A MAX FUSED


Sensor by its self with no magnet should read 1200 + or - 60 ohms
FLUKE 83 III MULTIMETER
AUTO
1.202
kΩ
MIN MAX
RANGE
REL Δ
Hz
mV




**Codes that are generated with each engine:**

Even though the same sensor is used with both the Cummins and Detroit engines, the codes generated for *coolant level* will appear different.

**Cummins LCL Codes:**

SPN/FMI 111/3-Coolant level Voltage Above Normal Shorted High

*SPN/FMI 111/18- Coolant level low*

SPN/FMI 111/4-Coolant level Open Circuit or Shorted low

**Detroit LCL Codes:**

SPN/FMI 111/3-Coolant level Voltage Above Normal Shorted High

*SPN/FMI 111/1-Coolant level Critical low*

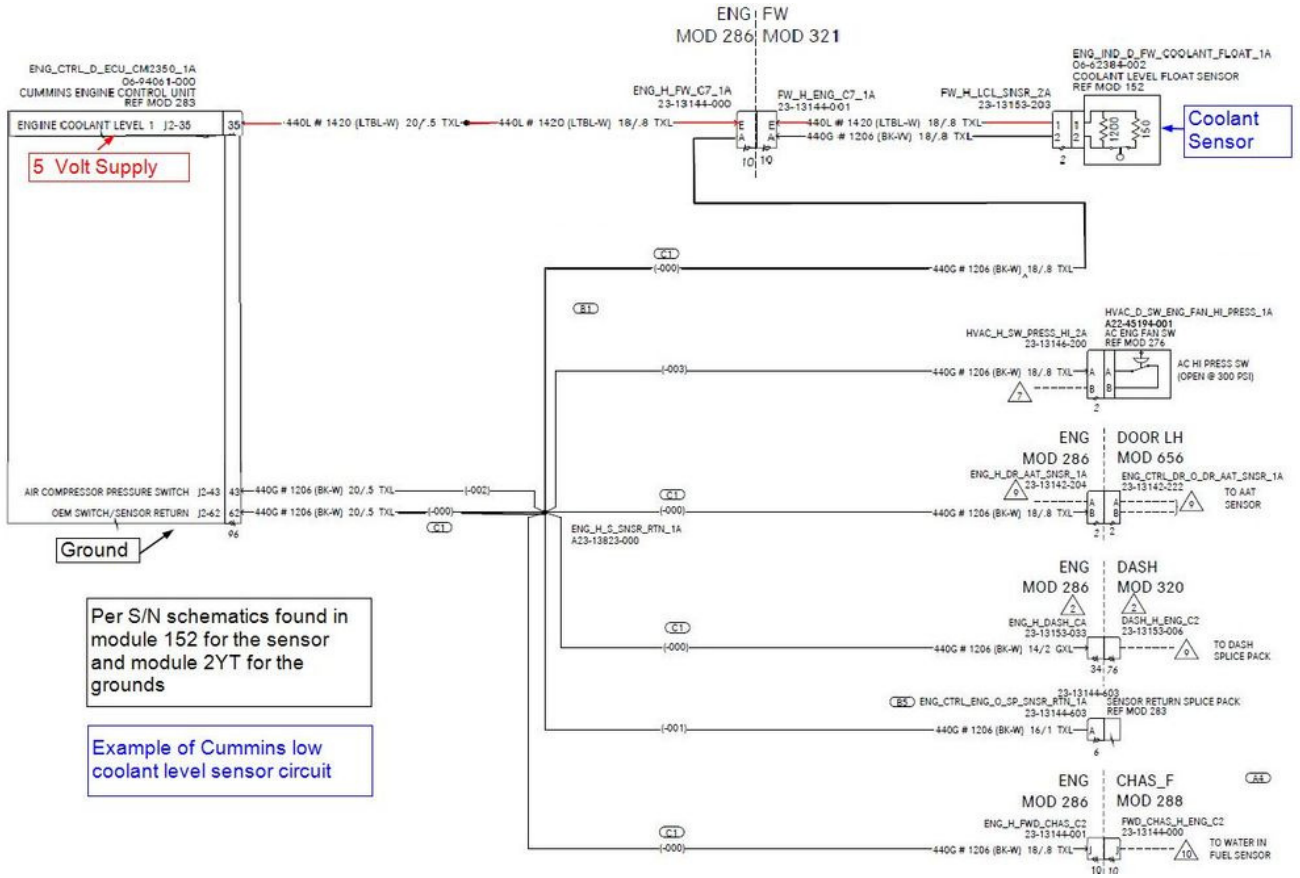
SPN/FMI 111/4-Coolant level Open Circuit or Shorted low

**Circuit checks to validate wiring integrity:**

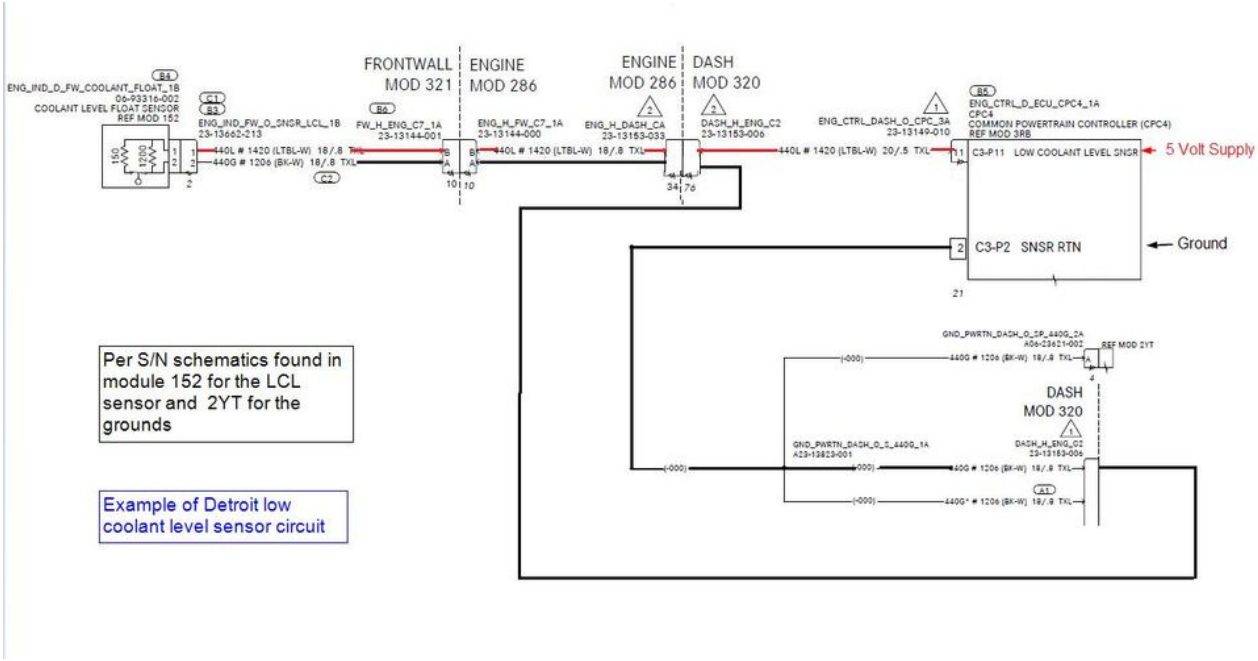
Both Cummins and Detroit use 5 volt supply for the low coolant level sensor returning to a shared ground. It is important that if the LCL sensor tests good and coolant level fault codes are showing in the service tool, that we validate that all connections between the 5 volt supply and ground are good and no added resistance is present. Also make sure to perform a visual inspection of the wiring, ensuring that there are no chafed wires. If chafed wires are found

during an inspection, make sure to repair the wires using the procedures noted in FTL Service Bulletin 54-290,making sure to add the appropriately sized twist tube to the chafed area. Make sure to inspect connector pins and terminal looking for any visual damage or corrosion.

**Example of Cummins LCL wiring Circuit:**



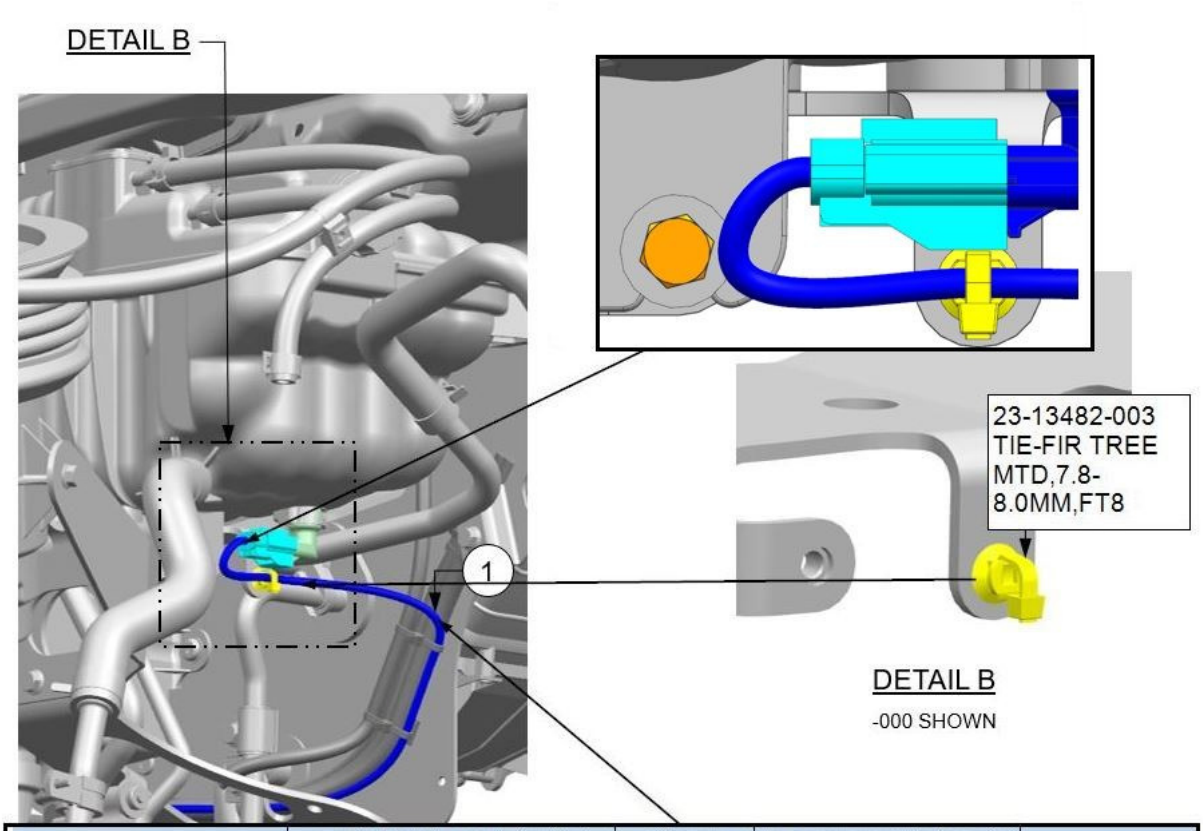

**Example of Detroit LCL wiring Circuit:**




**Extra harness support and protection can be obtained by adding, 8MM twist tube to the LCL sensor, if damage is found in that area. See below illustrations for routing and of the harness at the LCL sensor.**

**Extra harness support for ISB, L9, DDE5, DD8, ISLE5 and MBE900 engines.**

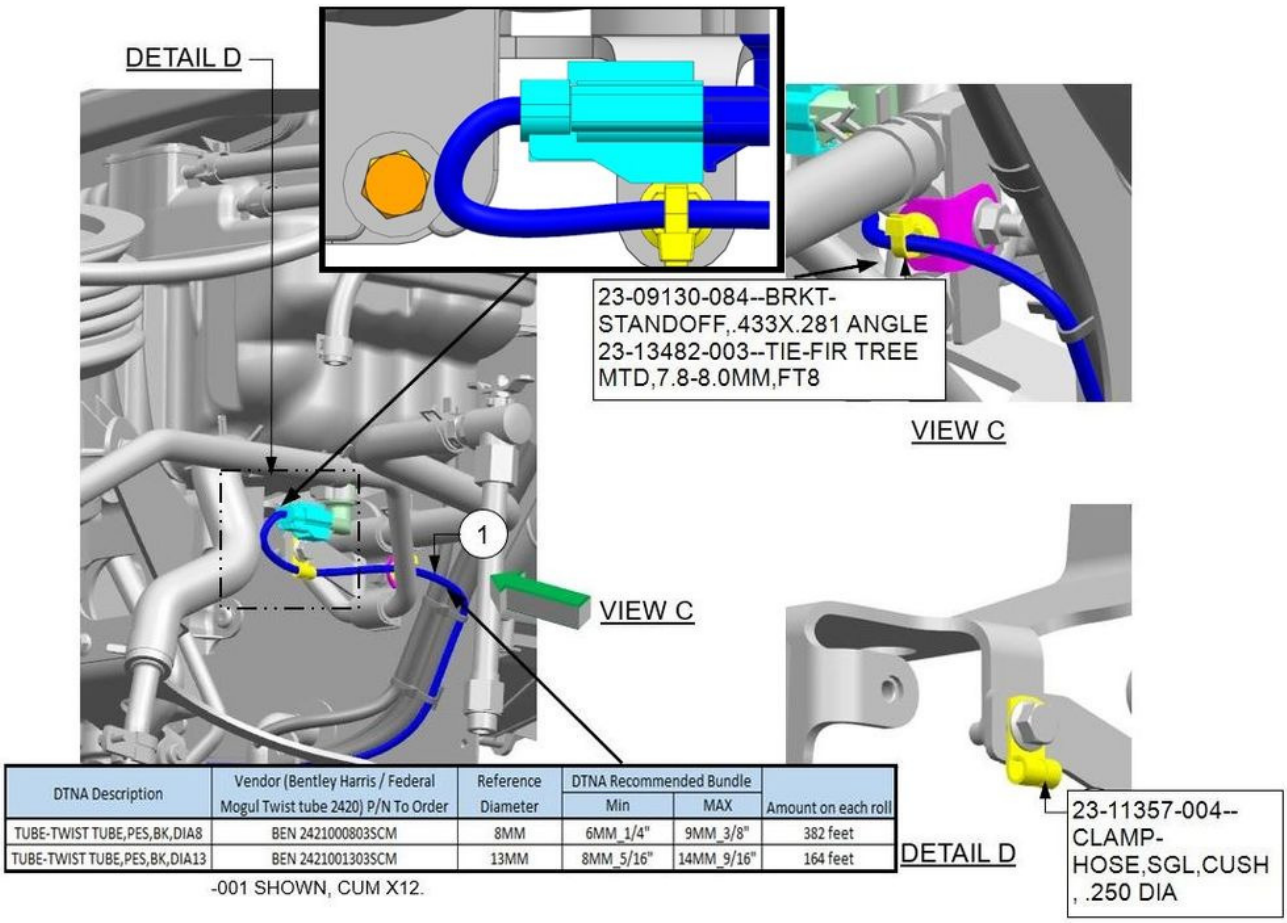
The following content was updated removing the backshell as the added length that the backshell would add could cause interference with the lower radiator mounting bolt.




| DTNA Description | Vendor (Bentley Harris / Federal Mogul Twist tube 2420) P/N To Order | Reference Diameter | DTNA Recommended Bundle | | Amount on each roll |
|---|---|---|---|---|---|
| | | | Min | MAX | |
| TUBE-TWIST TUBE,PES,BK,DIA8 | BEN 2421000803SCM | 8MM | 6MM_1/4" | 9MM_3/8" | 382 feet |

-000 SHOWN, B6.7, L9, DD5, DD8, ISLE5, MBE900

Extra harness support for X12 engines




| DTNA Description | Vendor (Bentley Harris / Federal Mogul Twist tube 2420) P/N To Order | Reference Diameter | DTNA Recommended Bundle Min | DTNA Recommended Bundle MAX | Amount on each roll |
|---|---|---|---|---|---|
| TUBE-TWIST TUBE,PES,BK,DIA8 | BEN 2421000803SCM | 8MM | 6MM_1/4" | 9MM_3/8" | 382 feet |
| TUBE-TWIST TUBE,PES,BK,DIA13 | BEN 2421001303SCM | 13MM | 8MM_5/16" | 14MM_9/16" | 164 feet |

-001 SHOWN, CUM X12.

**Additional Information:**

As noted above, in the coolant level sensor resistance value checks, if the float (white in color) for the sensor is moved away from the sensor, it will read roughly 1200 ohms, similar to a low coolant condition. In some rare cases, with a full or over full coolant level, and with the system at full operating temperature (tank pressurized), the float, located in the surge tank and not serviceable in the field, may get hung up or shifted past the retaining fins, resulting in a low coolant code. If this condition occurs, the only way to resolve the issue is to replace the tank. In the future, a longer float (black in color) will be used to eliminate this condition. See picture of a cut away surge tank where the float is hung up just past the retaining fins.

Labels :

108SD 114SD M2

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