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TB-2462 REV A

TESTING THE TEMPERATURE SENSOR AND LEVEL SENSOR

DEF RESERVOIR ASSEMBLIES

APPROVAL SUMMARY

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INDEX OF REVISIONS

REVISION	DESCRIPTION	APPROVED BY/ DATE
-	Initial Release	2/10/2011 CKM
A	Added Ohm Reading as a base test before VDC Reading	3/31/2011 CKM

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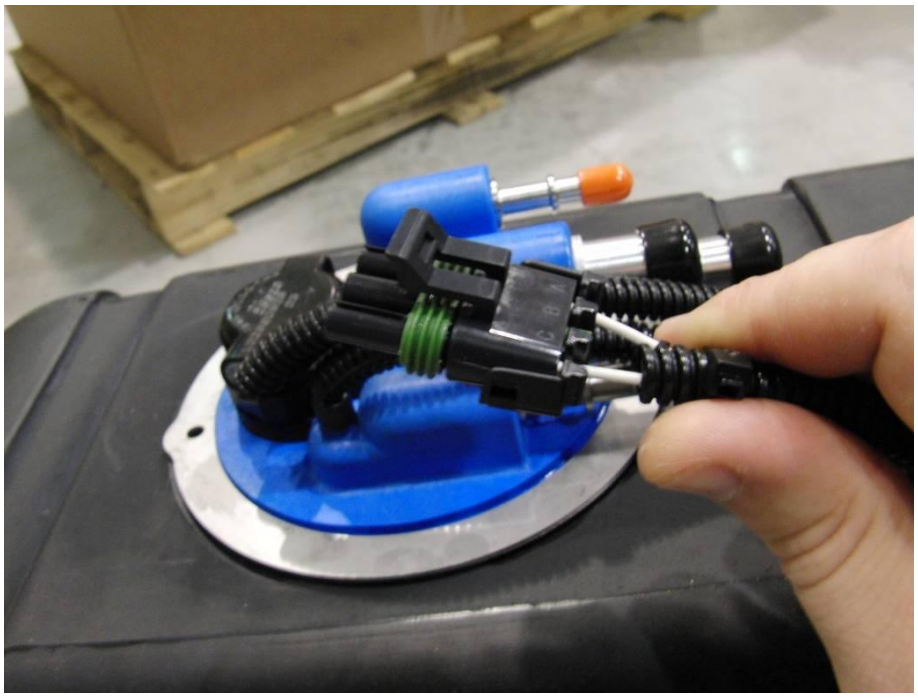
1.0 INTRODUCTION – TEMPERATURE SENSOR

The temperature sensor is a straight forward thermistor (resistor that varies with temperature). As a point of reference, one can disconnect the temperature sensor connector, a simple ohm meter can then be put across the two temperature sensor's leads (white wires, they are not polarized), and the resistance reading will correlate to the DEF's temperature. If this reading seems accurate in relation to ohms vs. DEF temperature, for thorough verification of temperature probe functionality, using a simple volt meter, one should reconnect the temperature sensor connector to the vehicle and get a voltage reading across the two wires while the vehicle is running. This reading can then be correlated and compared to the DEF's temperature. One can then use the appropriate column below to compare the readings with the temperature of the DEF.

Temp (°C)	Temp (°F)	Voltage (VDC)	Rsense (ohms)
-25	-13	3.93	4329
-20	-4	3.80	3665
-15	5	3.59	2855
-10	14	3.36	2241
-5	23	3.11	1773
0	32	2.86	1412
20	68	1.86	608
21	70	1.82	585
22	72	1.77	562
23	73	1.73	541
24	75	1.69	520
25	77	1.64	500
26	79	1.60	481
27	81	1.56	463
28	82	1.52	446
29	84	1.48	429
30	86	1.44	414
31	88	1.41	398
32	90	1.37	384
45	113	0.96	241
50	122	0.84	204

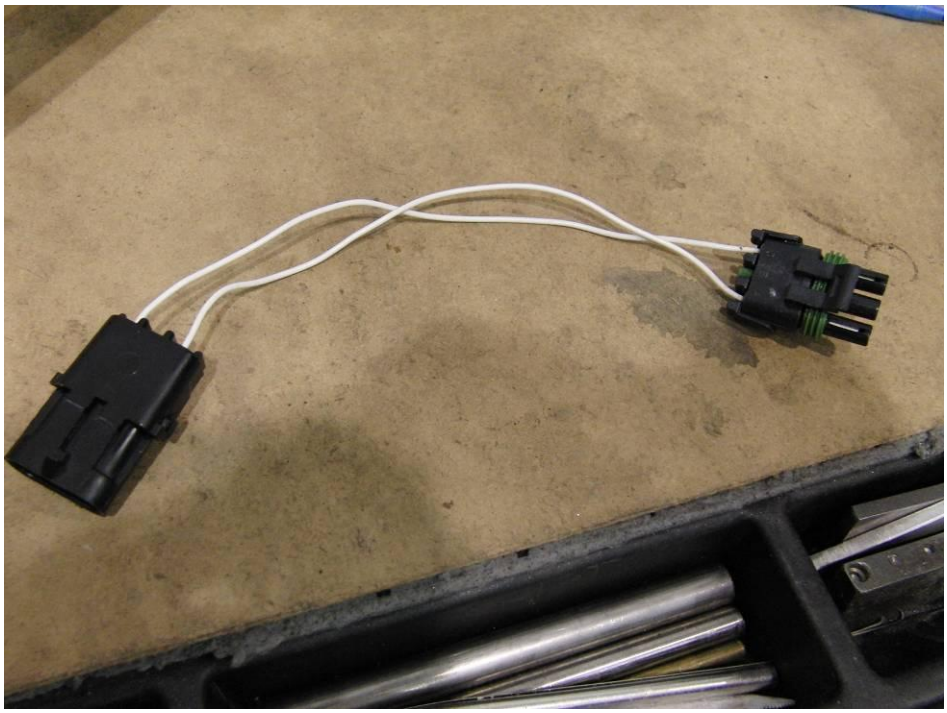
METHOD 1 (OHM READING)



(Figure 1.1)
Disconnect temperature sensor from vehicle

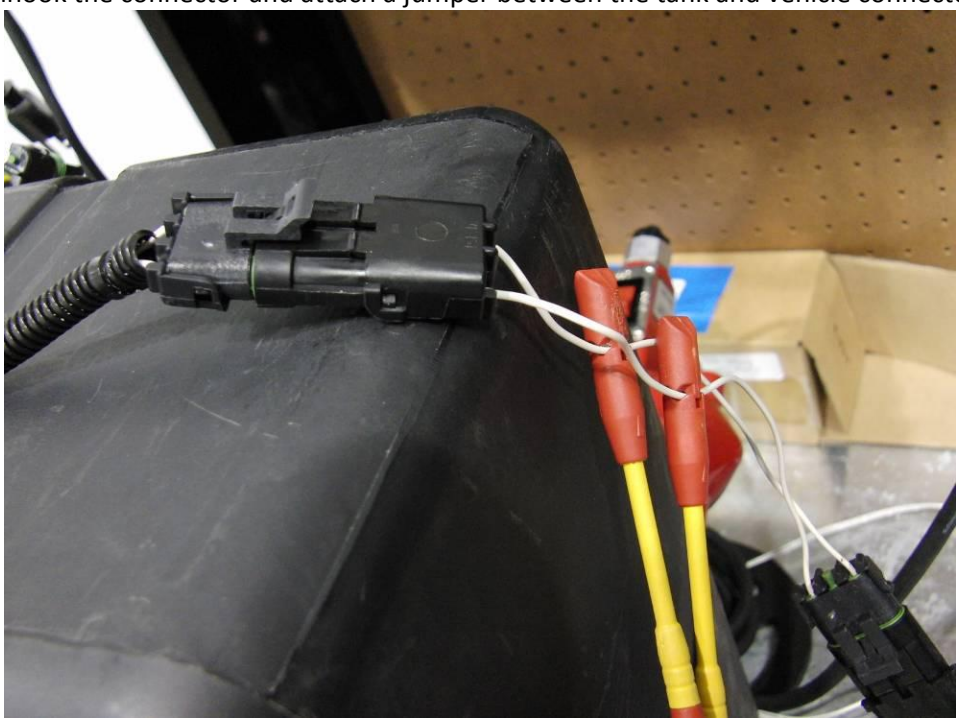
(Figure 1.2)
Use an ohm meter to get a reading from the connector leads and correlate the reading to a temperature

METHOD 1 (VOLTAGE READING)



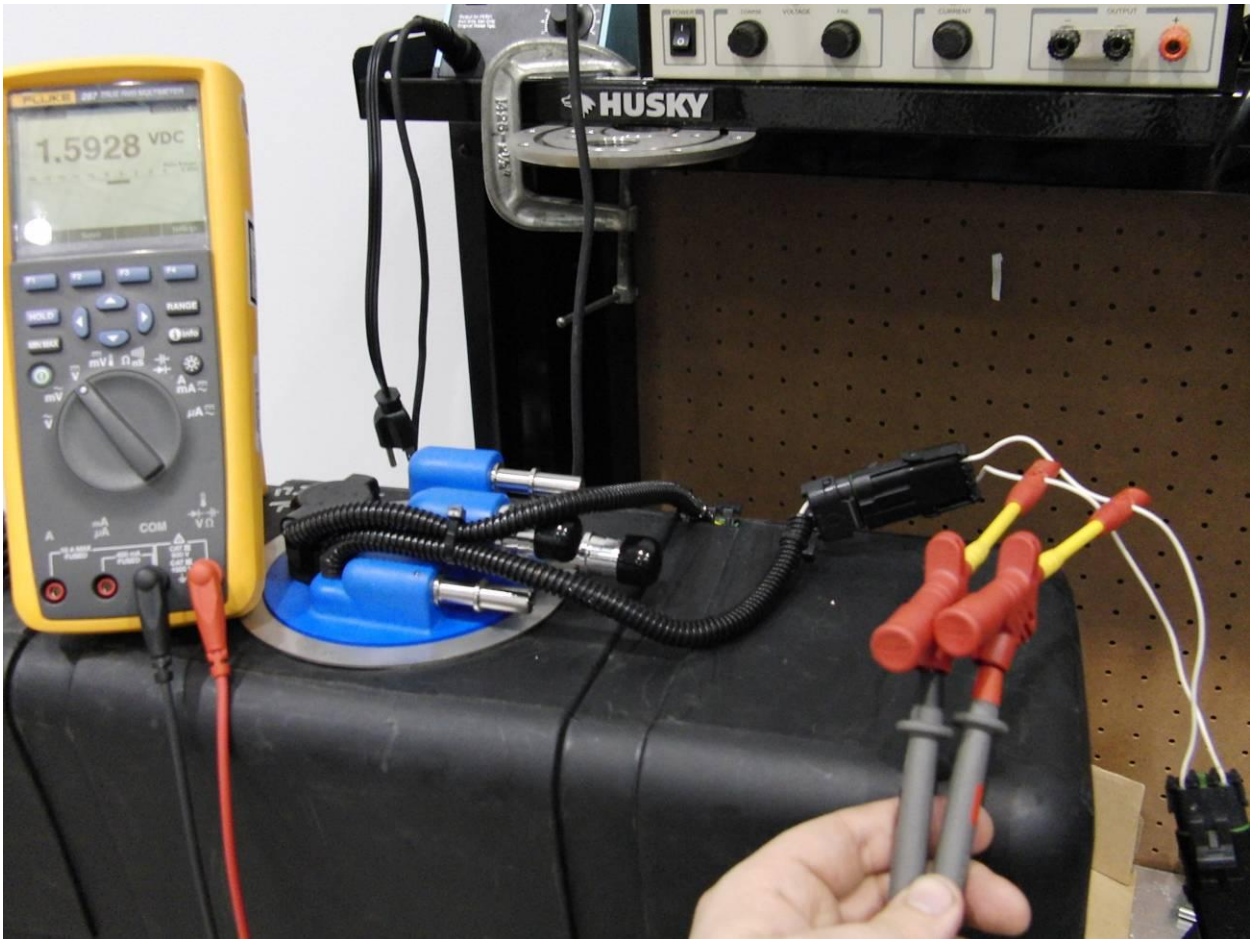
(Figure 1.1)

Unhook the connector and attach a jumper between the tank and vehicle connector.



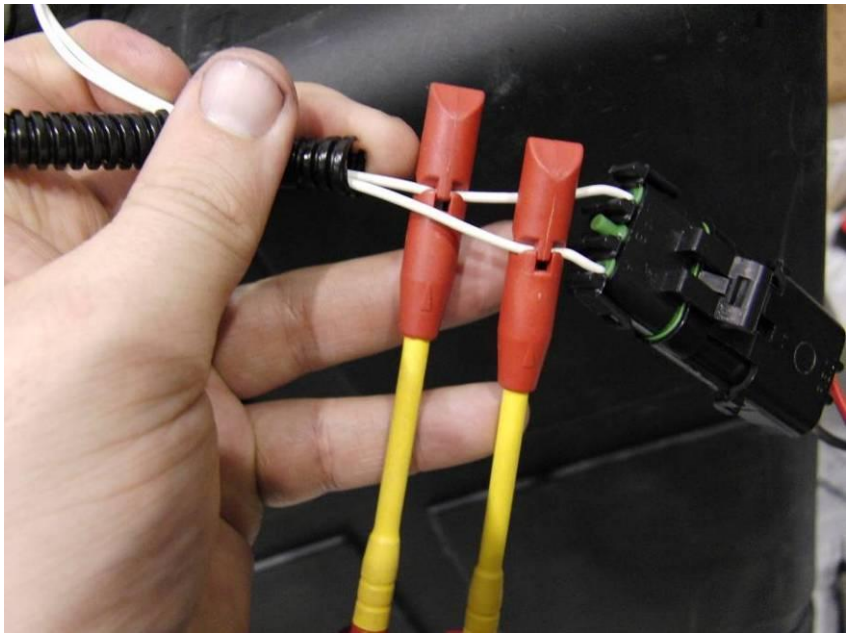
(Figure 1.2)

Attach Insulation Piercing Test Clips to the wires of the jumper while the vehicle is running



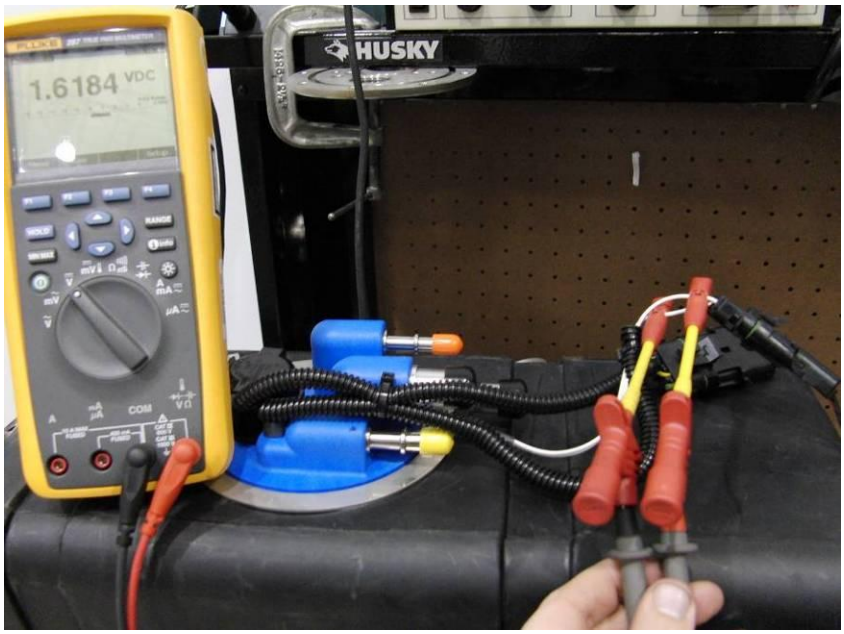
(Figure 1.3)
Use a volt meter to get a voltage reading from the clips and correlate it to a temperature value

METHOD 2



(Figure 2.1)

Leave the connector attached to the vehicle wiring, and attach Insulation Piercing Test Clips to the wires while the vehicle is running



(Figure 2.2)

Use a volt meter to get a voltage reading from the clips and correlate it to a temperature value. The small pin is designed to allow self-healing of the insulation, though one can also apply a small amount of Liquid Electrical Tape to the wire after removal of the test clips.

2.0 INTRODUCTION – LEVEL SENSOR

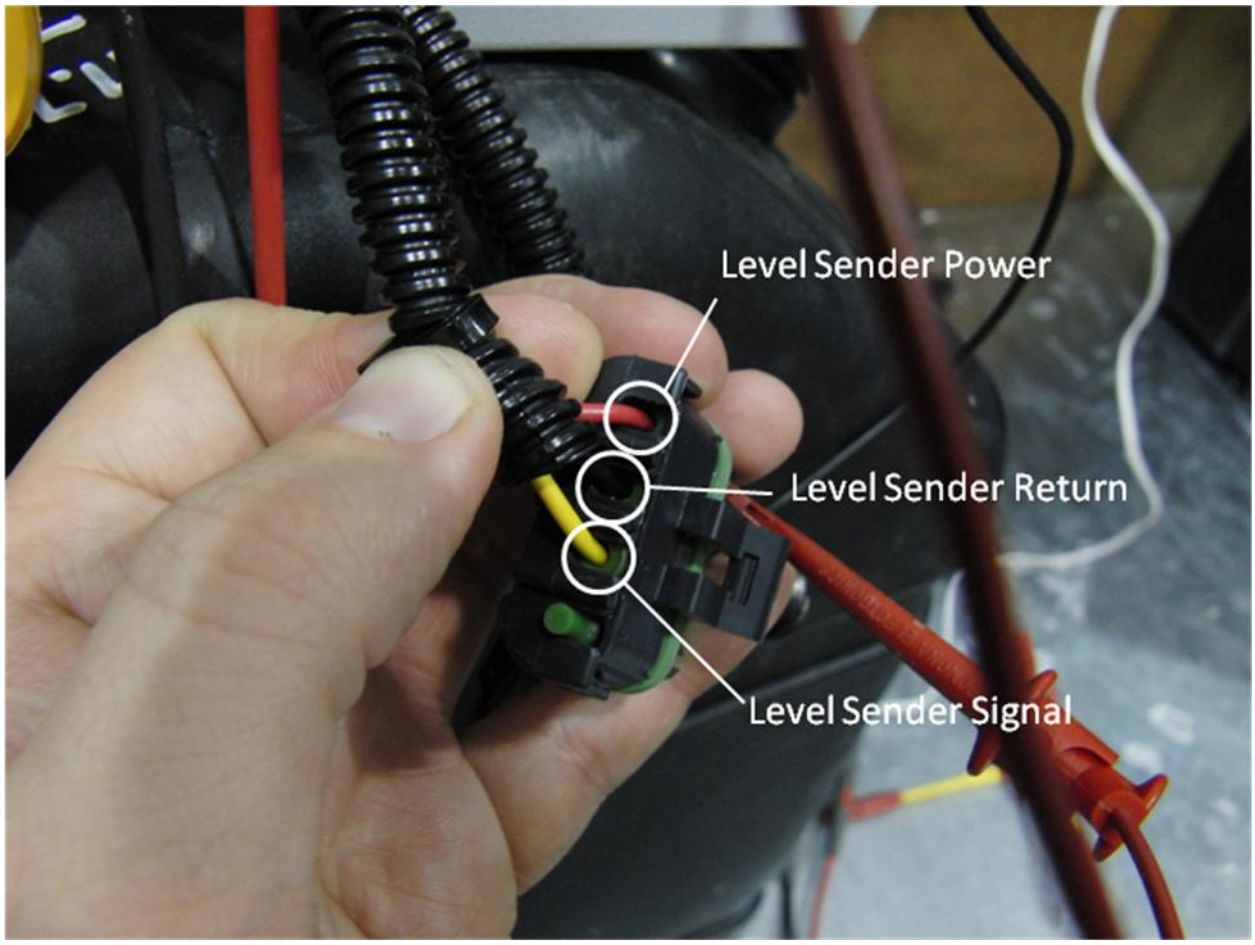
The Level Sensor must be tested while in the vehicle wiring, while the vehicle is running, because the Dosing Unit completes the output circuit of the Level Sensor. A simple volt meter across the yellow and black leads will correlate to the DEF's level, while a volt meter across the red and black leads will correlate to the voltage being supplied to the unit. At this printing, there are 4 different level senders, each for a specific engine application.

General 960-0111/0121-XX Readout	
Out (Vdc)	**Fluid Height**
4.00	0%
3.91	5%
3.79	10%
3.64	15%
3.43	20%
3.13	25%
3.00	30%
2.86	35%
2.69	40%
2.49	45%
2.25	50%
2.11	55%
1.96	60%
1.79	65%
1.59	70%
1.37	75%
1.23	80%
1.07	85%
0.90	90%
0.71	95%
0.50	100%

Quick Reference				
LEVEL %	**960-0111-XX 960-0121-XX**	**960-0119-XX 960-0124-XX**	**960-0113-XX 960-0122-XX**	**960-0114-XX 960-0123-XX**
0	**4.0 VDC**	**4.5 VDC**	**0.30 VDC**	**0.50 VDC**
50	**2.25 VDC**	**2.5 VDC**	**1.45 VDC**	**2.50 VDC**
100	**0.50 VDC**	**0.50 VDC**	**2.6 VDC**	**4.50 VDC**

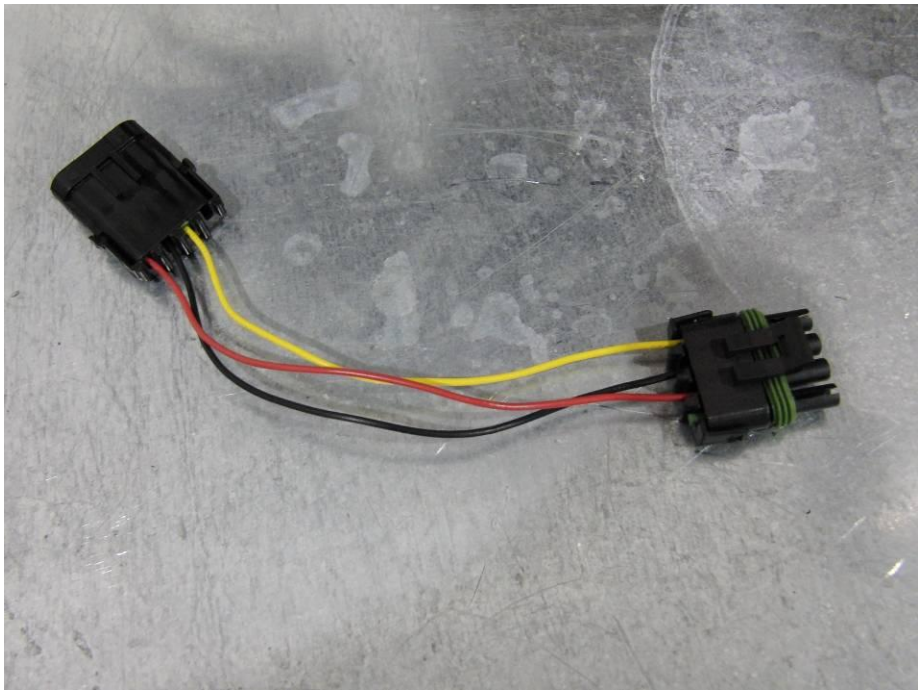
Sensor's Part Number	Voltage between Yellow and Black Leads		Voltage required between Red and black
	Empty	Full	
960-0114-xx	0.50 VDC	4.5 VDC	9-18 VDC
960-0111-xx	4.0 VDC	0.5 VDC	9-18 VDC
960-0113-xx	0.3 VDC	3.0 VDC	9-18 VDC
960-0119-xx	4.5 VDC	0.5 VDC	9-18 VDC
960-0123-xx	0.50 VDC	4.5 VDC	18-32 VDC
960-0121-xx	4.0 VDC	0.5 VDC	18-32 VDC
960-0122-xx	0.3 VDC	3.0 VDC	18-32 VDC
960-0124-xx	4.5 VDC	0.5 VDC	18-32 VDC

2.1 LEVEL SENSOR – GENERAL INFO



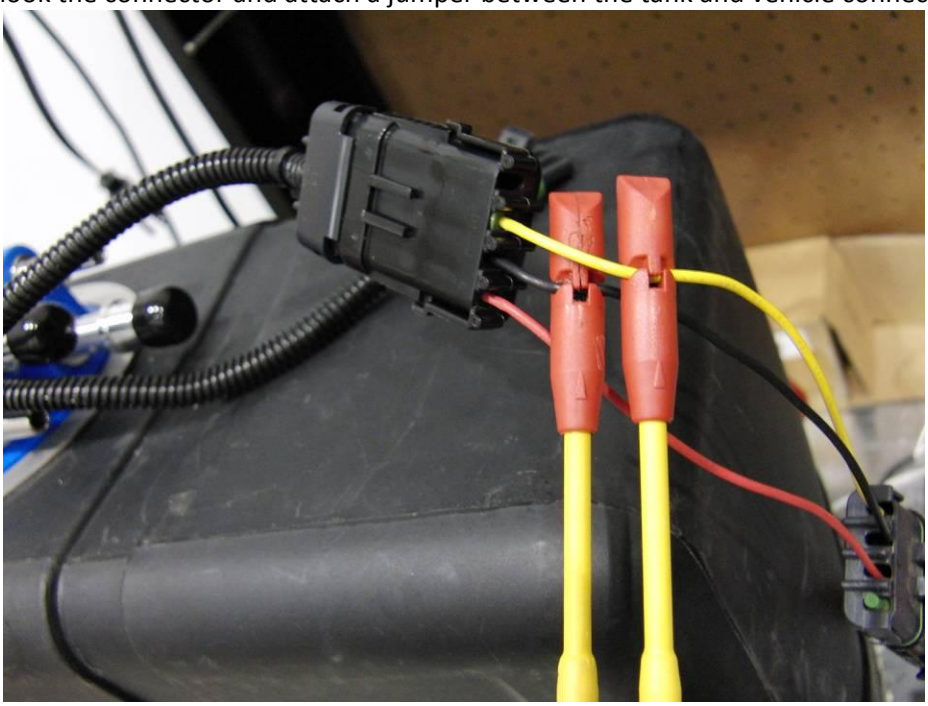
(Figure 4.1)
Level sensor wire reference and nomenclature

METHOD 1 (RECOMMENDED)



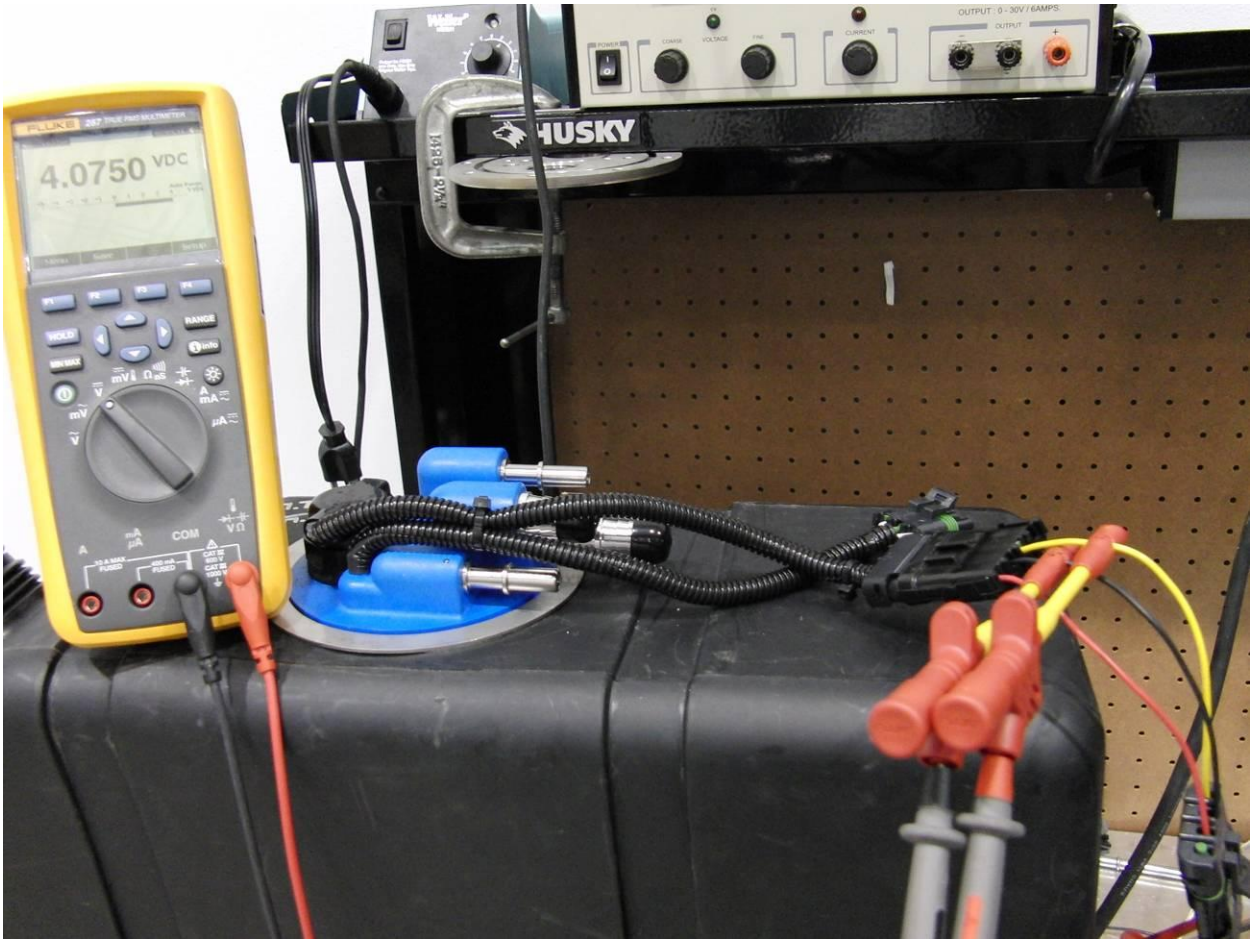
(Figure 5.1)

Unhook the connector and attach a jumper between the tank and vehicle connector.



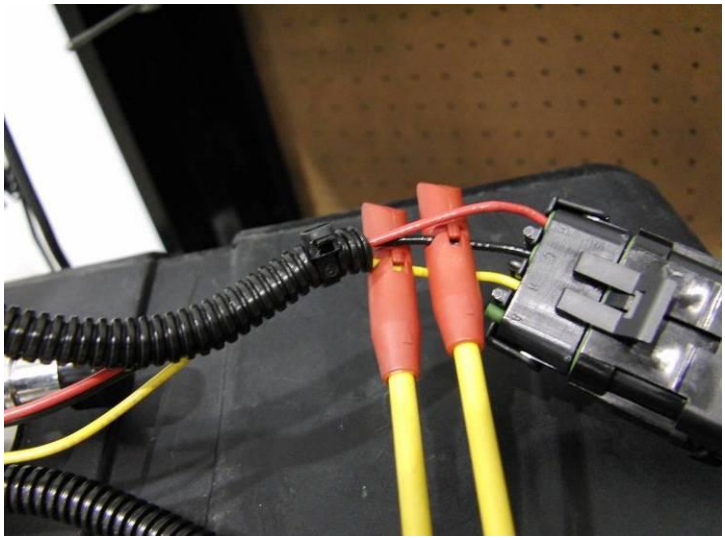
(Figure 5.2)

While the vehicle is running, attach Insulation Piercing Test Clips to the Signal (Yellow) and Return (Black) wires of the jumper.



(Figure 5.3)
Use a volt meter to get a voltage reading from the connector leads (black wire to black lead and yellow wire to red lead) and correlate the reading to a fluid level.

METHOD 2



(Figure 6.1)
Leave the connector attached to vehicle wiring, while the vehicle is running, and attach Insulation Piercing Test Clips to the Signal (Yellow) and Return (Black) wires.

(Figure 6.2)
Use a volt meter to get a voltage reading from the connector leads (black wire to black lead and yellow wire to red lead) and correlate the reading to a fluid level. The small pin is designed to allow self-healing of the insulation, though one can also apply a small amount of Liquid Electrical Tape to the wire after removal of the test clips.

NOTE: Clips can also be used on the red and black wires to get a voltage reading from the vehicle.