

NISSAN DIESEL AMERICA, INC.

TECHNICAL BULLETIN FS-10

DATE: JUNE 16, 2006
MODEL YEAR: 2005 AND AFTER
ENGINE MODEL: J08E-TE
CHASSIS MODEL: UD1800HD ~ UD3300
BULLETIN NUMBER: FS-10
FILE IN THE FUEL SECTION OF THE TECHNICAL BULLETIN BINDER

MALONE DUAL FUEL TANK KIT WITH TRANSFER PUMP AND CONTROL MODULE INSTALLATION INSTRUCTIONS AND TROUBLE SHOOTING GUIDE

PURPOSE

The attached Installation Instructions, Troubleshooting Guide and Owner's Card have been developed for the Malone dual fuel tank kit with transfer pump and control module for 2005 model year and after medium duty trucks.

These instructions do not apply to the dual draw / dual return or with transfer pump only systems.

INSTALLATION GUIDE

It is recommended that the installation guide be reviewed carefully by the installer prior to the kit installation to assure proper operation of the Malone dual fuel tank kit with transfer pump and control module. Retain this guide in the service shop as reference information.

TROUBLE SHOOTING GUIDE

Consult the troubleshooting guide to diagnose and test complaints of improper operation of the Malone dual fuel tank kit with transfer pump and control module. Retain this guide in the service shop as reference information.

THE INFORMATION CONTAINED IN THIS BULLETIN SHOULD NOT BE INTERPRETED AS THE BASIS FOR WARRANTY CLAIMS							
FOR THE INDICATED PERSONNEL BELOW, PLEASE READ, INITIAL, AND ROUTE TO THE FOLLOWING:							
X	SERVICE MANAGER	X	WARRANTY MANAGER	X	SERVICE TECHNICIANS INITIAL BELOW:		
X	PARTS MANAGER	X	SHOP FOREMAN				



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Accessory Installation Instructions

Description: UD Medium Duty Dual Fuel Tank with Transfer Pump & Control Module	Models: See Below	Year: 05 & later	Date: 3-15-06	Part Number: UD50T300/ UD33T300	Page: 2 of 19
			Revision: D1		

WARNING



This kit contains all the hardware, fittings, and other material necessary to properly and safely install the accessory you purchased. **DO NOT SUBSTITUTE ANY HARDWARE, FITTINGS, OR OTHER MATERIALS FOR THOSE SUPPLIED IN THIS KIT. SUBSTITUTIONS MAY CAUSE RISK OF PERSONAL INJURY; damage to the accessory kit you are installing; and damage to the vehicle or device you are installing the accessory kit on. Any substitution of the materials supplied in this kit without written authorization from Malone Specialty Inc. will void all warranties, expressed or implied.**

Applications:

UD50T300D (DEALER KIT):

All UD Trucks models with a 22" diameter tank supplied with vehicle including: 2300DH, 2600 and 3300. **This kit includes the 22" diameter, 50 gallon fuel tank.**

UD50T300:

All UD Trucks models with a 22" diameter tank supplied with vehicle including: 2300DH, 2600 and 3300. This kit **DOES NOT** include the 22" diameter, 50 gallon fuel tank which must be purchased separately.

UD33T300D (DEALER KIT)

All UD Trucks models with a 16" diameter tank supplied with vehicle including: 1800HD, 2000 and 2300LP. **This kit includes the 16" diameter, 33 gallon fuel tank.**

UD33T300

All UD Trucks models with a 16" diameter tank supplied with vehicle including: 1800HD, 2000 and 2300LP. This kit **DOES NOT** include the 16" diameter, 33 gallon fuel tank.

Note: The auxiliary tank is mounted on the passenger side frame rail. Before ordering make sure that no after market equipment is mounted on the passenger side frame that that would prevent the mounting of a fuel tank.

A separate kit for UD Trucks models 1200, 1300, 1400 and 1800CS is available, contact UD Trucks or Malone Specialty, Inc. for more details. Reference part number UDLD33T300D or UDLD33T300.

Overview:

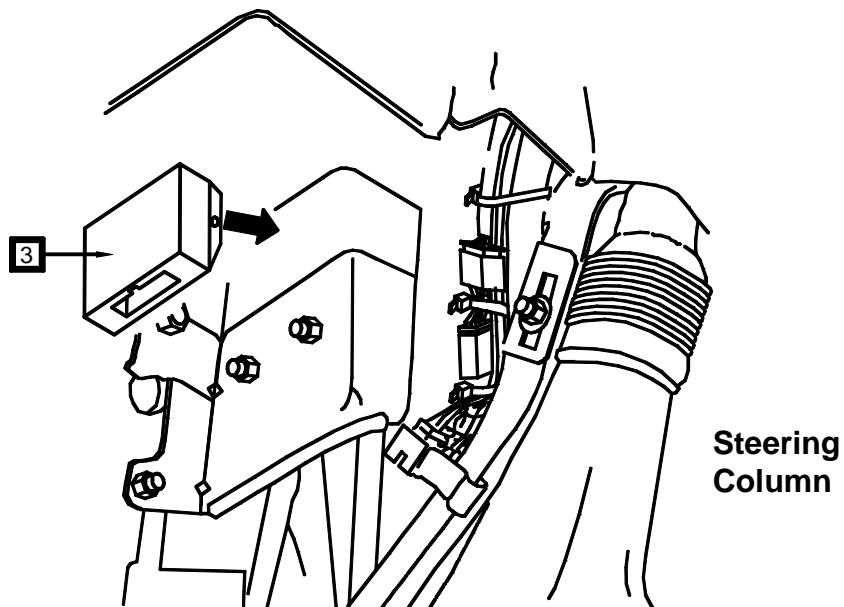
The fuel transfer pump system is designed to transfer fuel from the auxiliary fuel tank to the main fuel tank, via a transfer pump installed inside the rear left frame rail. The fuel transfer pump will only transfer fuel when the engine is running. A safety feature (enable) is incorporated into the circuitry. The enable signal (ground) is sent to the pump via an oil pressure switch installed on the right rear side of the engine. When the engine is running and oil pressure rises the oil pressure switch closes sending a ground signal to the pump.

System Operation: If primary tank falls one inch (1") below auxiliary tank, the pump activates and remains on until the primary tank is one inch (1") above the auxiliary tank. The fuel gauge level reading is a combination of the total fuel available from both tanks. The main tank fuel sender is sending a signal directly to the main fuel gauge.

Before beginning installation refer to Page 19 for general system layout. Familiarize yourself with the system components and check that you have all items required to complete the assembly.

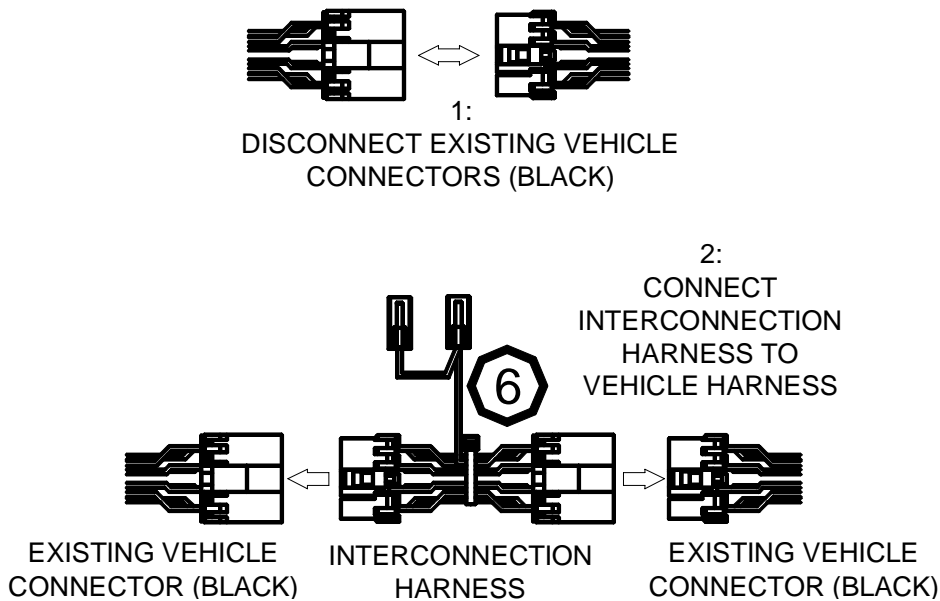
Install the Transfer Pump Module

The transfer pump module (Item 3) is mounted inside the cab, left side of the steering column. Clean the area that will be used to mount the module. Remove the tape from the back of the module, make sure the module connector is facing toward the floor and stick the module in place. Note: For manual transmission vehicles, it will be necessary to mount the module on the firewall.

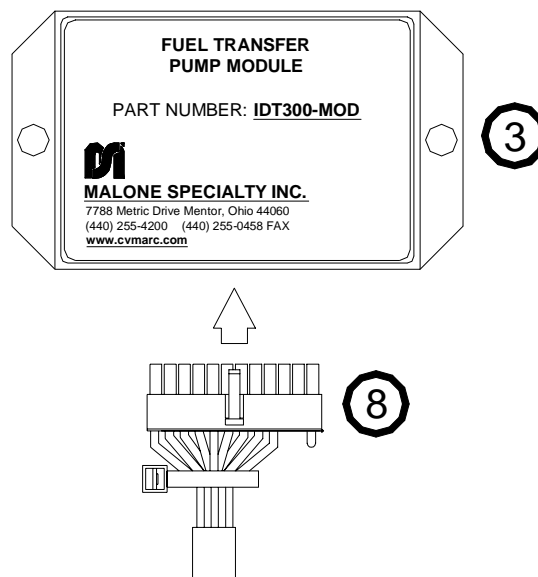


Connect vehicle power to transfer pump interconnection harness.

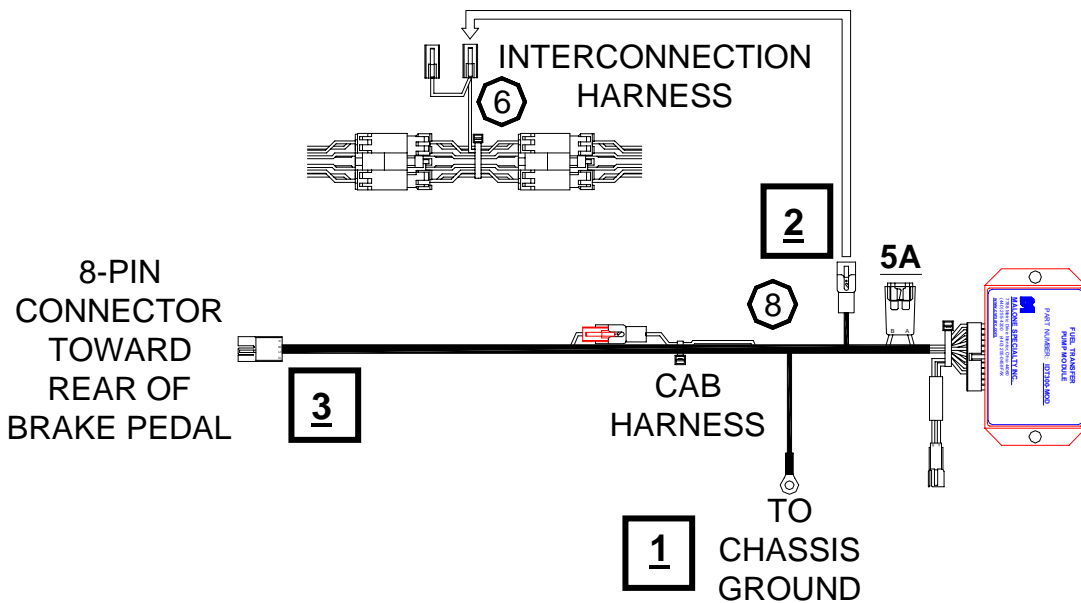
Inside the vehicle cab under the dash near the steering column locate the main harness from the ignition key switch with the black connector and carefully disconnect. Interconnect the inter-connection harness (Item 6) connectors in between the key harness and the original cab harness. See below and Page 19, Note 1.



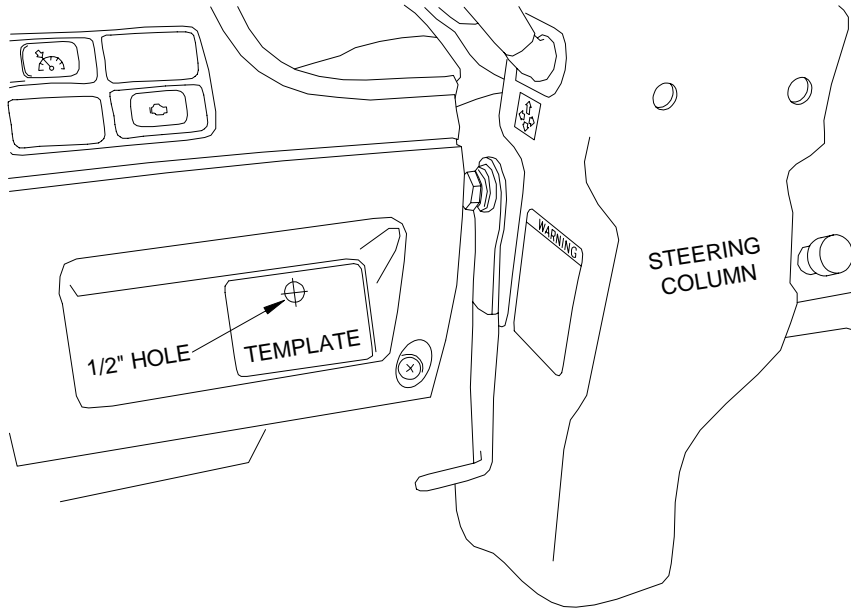
Install the 24-pin connector of the Cab Harness (Item 8) into the Transfer Pump Module (Item 3). Make sure the connection is properly and securely installed into the module connector.



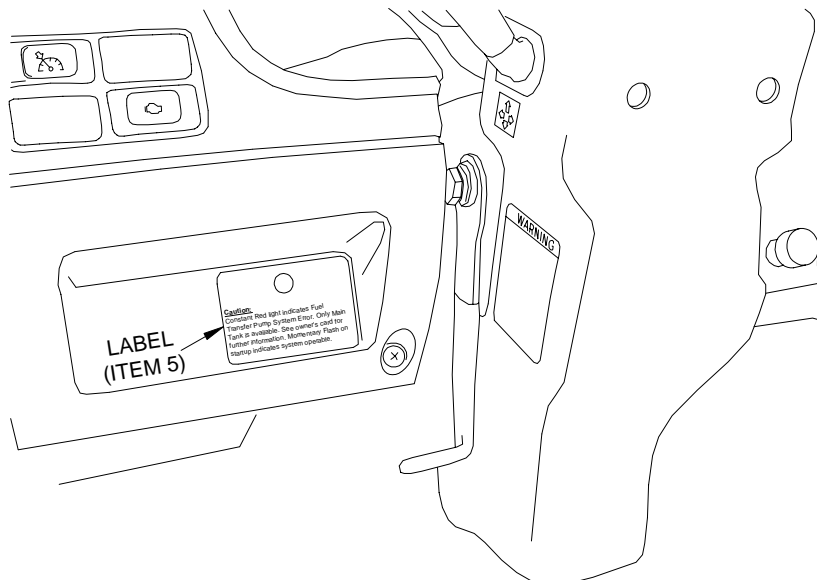
1. Route the black wire ring terminal to the left side kick panel and connect to the vehicle ground bolt. Make sure a solid ground connection is made.
2. Route the red wire connector on the cab harness (Item 8) to the interconnection harness (Item 6) previously installed and connect to one of the single red wire connectors. Make sure the connection is properly and securely installed.
3. Route the 8-pin connector of the cab harness (Item 8) towards the hole directly behind the brake pedal. Remove the cover that seals this hole.



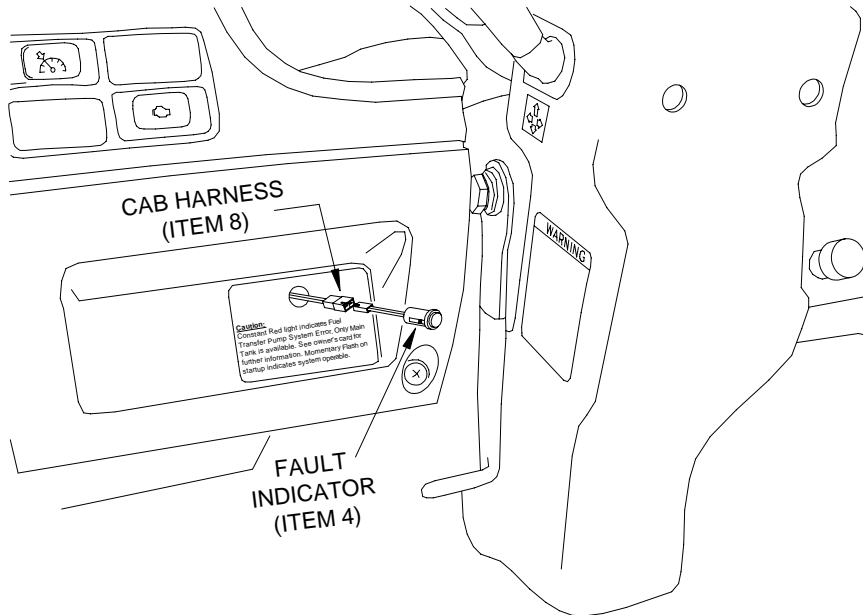
Inside the cab, install the warning label template onto the lower left side of the instrument cluster cover as shown below. Drill a 1/4" **pilot** hole through the cover using the template as a drill guide. Switch to a 1/2" drill bit and open the pilot hole up to 1/2". Remove template.



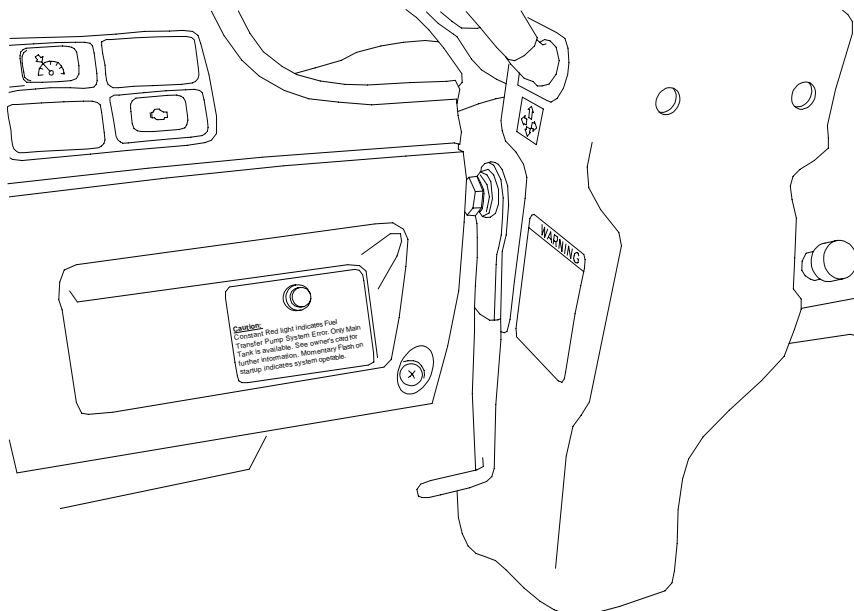
Make sure the area around the drilled hole is clean and install the warning label (Item 5) onto the instrument cluster cover making sure the hole in the label is directly over the hole previously drill in the cover. Make sure the label is straight before pressing into place.



Take the 2-pin connector (Red/White & Black/White wires) from the cab harness (Item 8) and route it from behind the instrument cluster cover through the 1/2" hole. Connect the two pin fault harness connector to two pin fault indicator connector (Item 4).



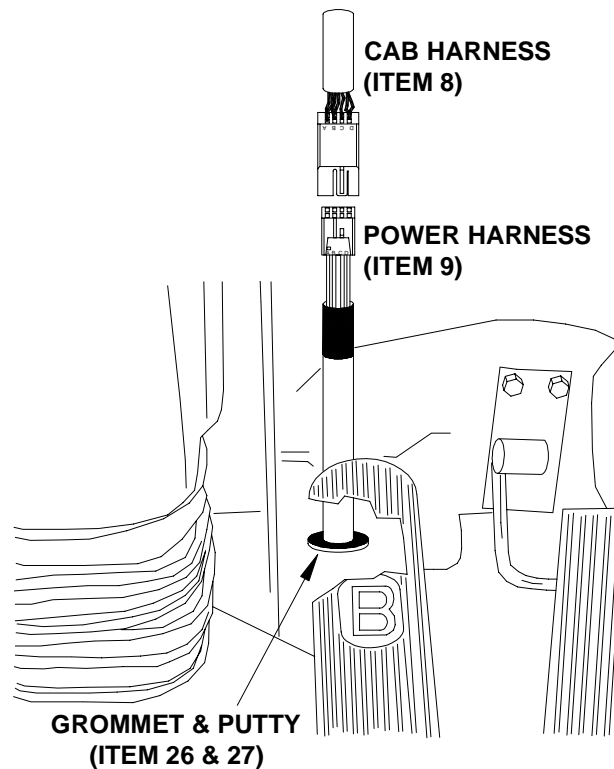
Route the wire and connectors through the hole and snap the indicator into place.



Outside the cab from under the hood panel, insert power harness (Item 9) 8-pin connector through the hole directly behind the brake pedal. Install enough of the harness to make connection to the cab harness (Item 8) inside the cab. Connect these two connectors making sure the connection is securely and properly connected.

This completes the 12Volt cab connections. Route and secure the harnesses inside the cab using tie straps (Item 29). Make sure the harnesses are not at pinch points, are away from heat producing equipment and are not hanging into the cab.

Route the excess power harness (Item 9) through the hole and install the grommet (Item 27) onto the harness and install the grommet securely onto the vehicle cab floor hole. Seal the hole with sealing putty (Item 26).



Route the remaining power harness (Item 9) from the main crossbar in front of the radiator towards the passenger side frame rail. Continue to route the harness inside the passenger side frame rail towards the rear of the truck.

Oil Pressure Switch & Wire Harness Installation:

Locate original oil pressure switch on the right rear side of the engine block. See sketch below.

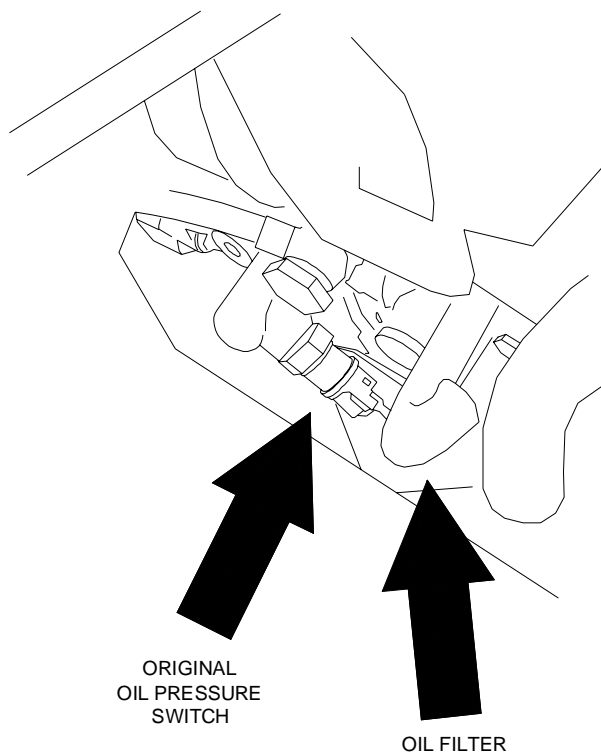
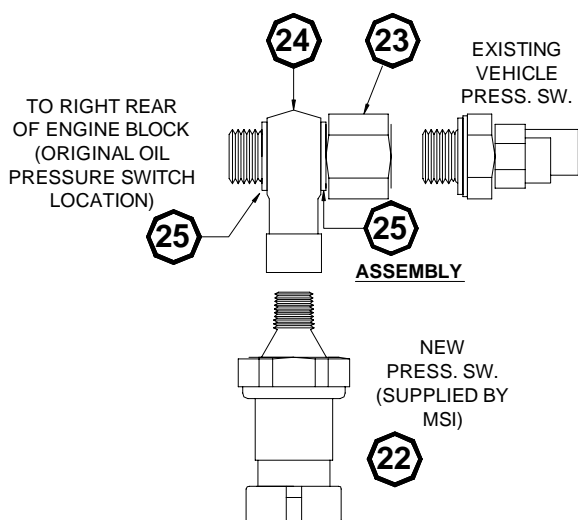
Disconnect the harness connected to the switch and remove the switch.

Install the new oil pressure switch (Item #22) into the banjo (Item #24) and tighten securely.

Install one copper seal (Item #25) onto banjo bolt (Item #23). Insert the banjo bolt through the banjo (Item #24) and install the second copper seal (Item #25) onto the end of the bolt

Install this assembly into the port vacated by removal of the original oil pressure switch. Do not tighten bolt at this time.

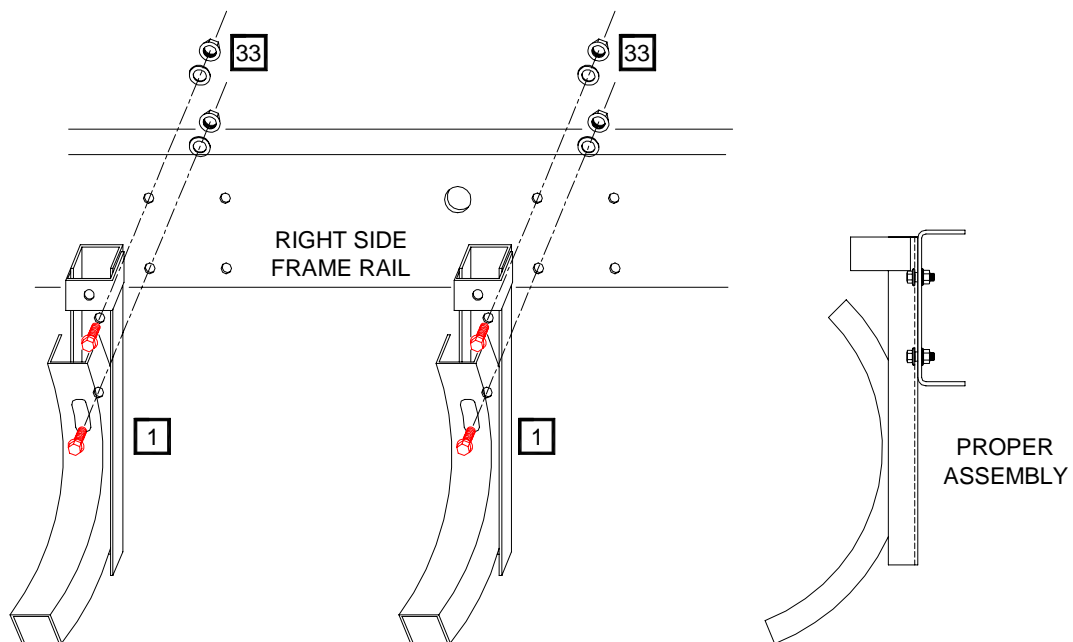
Orient the banjo and new oil pressure switch to ensure proper clearance of the oil pressure switch. When orientation is correct, tighten the banjo bolt. Install the original oil pressure switch in the bolt and tighten.



- At a location near the oil pressure switches installed earlier, connect the two green single wire connectors located on the power harness to the oil pressure harness (Item #7). See Page 19, Note 4
- Connect the two-position oil pressure harness (GREEN and BLACK wire) (Item #7) connector to the new oil pressure switch (Item #22). Make sure the connector is securely mated to the switch. Connect the original oil pressure harness to the existing oil pressure switch. Make sure the connector is securely mated to the switch. See Page 19, Note 5.
- Continue routing the power harness to the rear of the vehicle towards the auxiliary tank location.

Installation of Auxiliary Tank K-Brackets

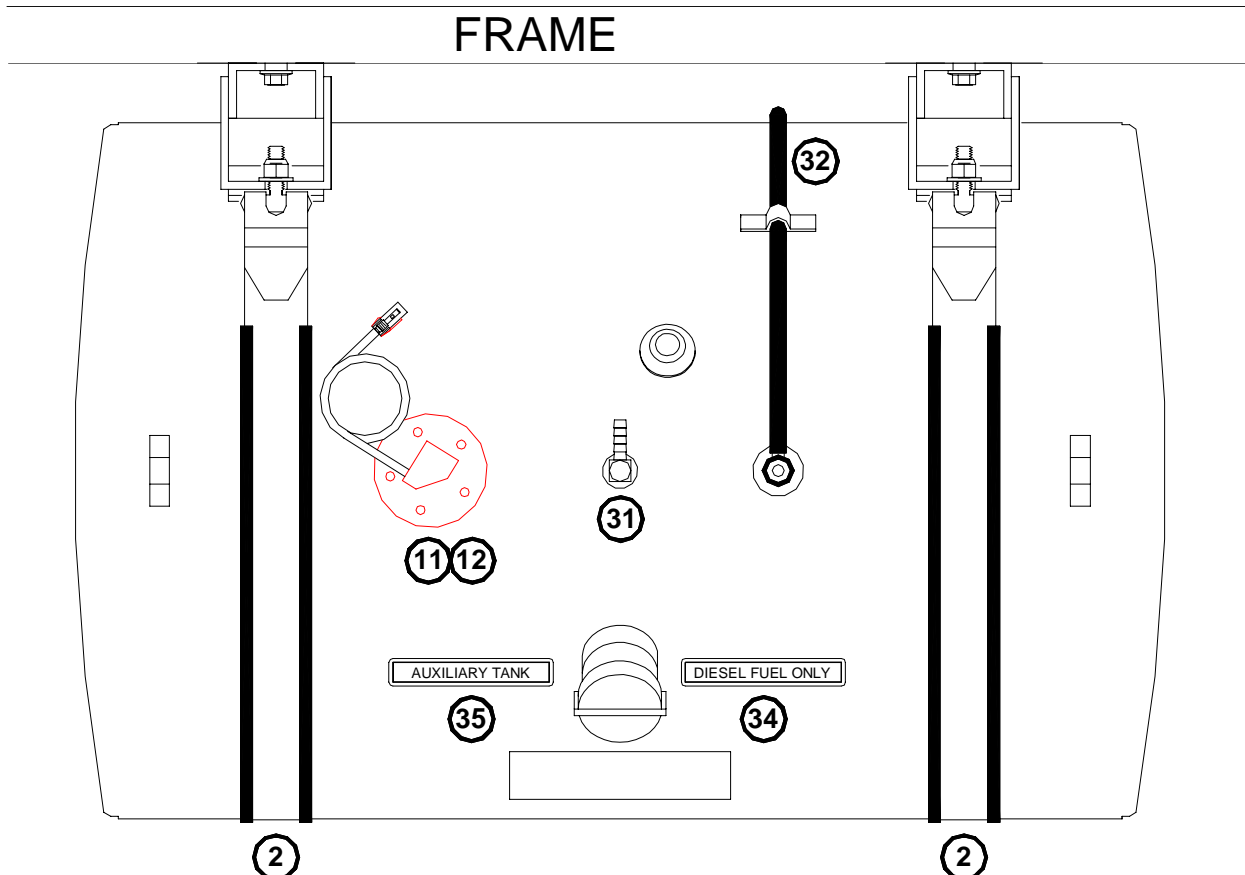
- Mount front and rear K-Brackets (Item #1) to the right frame rail using existing frame holes and bolts, nuts and washers (Item #33). Torque to 44 ft. lbs. See figure below.



Installation of Auxiliary Tank and Hardware

•Mount Tank (not supplied with this kit) to K-Brackets (Item #1) using tank strap assembly (Item #2). Position tank so fill spout is facing outward and away from frame and the top of the sender opening is horizontal to the top of the frame. Left tank strap will be to the left of sender opening and right tank strap will be to the right of supply and return ports. Center fill spout between straps. Tighten strap bolts evenly top and bottom to 27ft. Lbs. See below.

•Mount sender unit (Item #11) and sender gasket (Item #12) by removing the existing round 5 holed cover from the new auxiliary fuel tank. Discard this cover and the gasket and keep the five hex head screws. Install gasket on sender and carefully install the sender float into the tank and work the sender all the way into the tank until the sender cap is seated onto the tank sender plat. **Care must be taken to not bend or damage the sender.** Align the sender and sender gasket to the tank sender plate holes and secure using the hex head screws removed from the tank cover. For ease of installation, the notch on the gasket will face toward the 3 o'clock position and the sender harness will face toward the 10 o'clock position as shown in Sketch below.



NOTE

Proper installation of the sender unit is critical to the proper operation of the system. Improper installation may cause the sender to hit internal fuel tank tube(s) or the side of the tank. **THE SENDER WILL ONLY FIT ONE WAY. DO NOT ATTEMPT TO MODIFY THE SENDER OR THE TANK SENDER PLATE.**

- Remove the supply plug from the top of the auxiliary tank and install the fuel supply fitting (Item #31). Orient the barb toward the frame rail.
- Install plastic overflow tube (Item #32) onto the auxiliary tank.
- Install “DIESEL FUEL ONLY” label (Item #34) to the right of the fill spout.
- Install “AUXILIARY TANK” label (Item #35) to the left of the fill spout. (See Fig. 2 page 14).

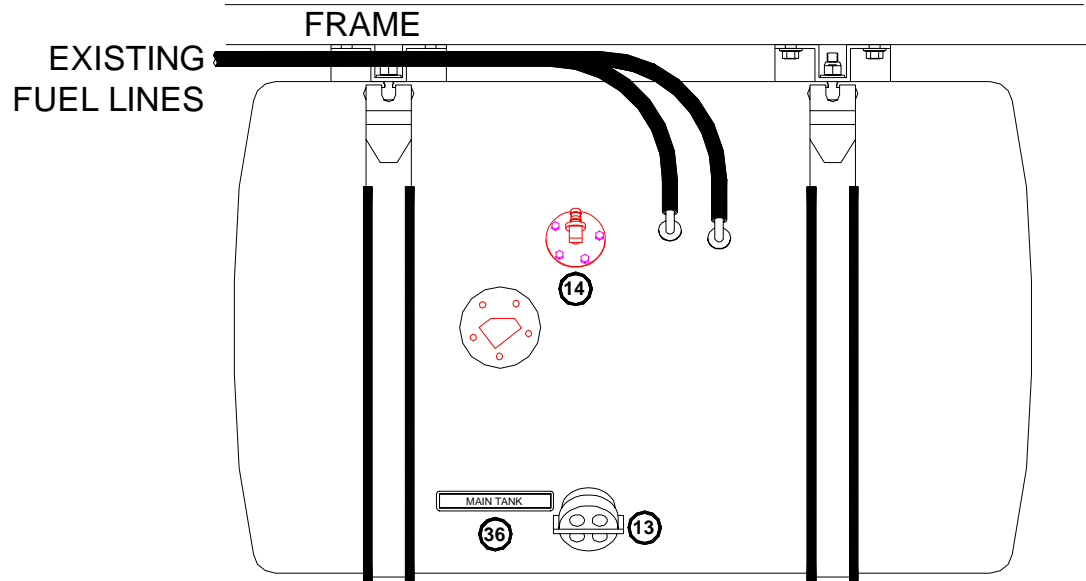
Installation of the Main Tank Hardware

- At the main tank (Left side frame rail), remove the existing round 5 holed cover and gasket from the tank. Discard this cover, gasket and five pan head screws. Install the new round 5 holed cover with fitting and gasket (Item #14) in its place. Secure the cover to the tank with the five hex head screws provided with Item #14. Orient the barb toward the frame rail.
- Remove the existing fuel cap and chain and discard. Install the new fuel cap with chain (Item #13).

IMPORTANT

The new cap (Item #13) provides the tank with pressure releasing plugs in case of an internal tank fire. Do not install or operate this kit without replacing the existing fuel cap with the one provided with this kit.

- Install “MAIN TANK” label (Item #36) to the left of the fill spout. (See Figure 1 page 13).



MAIN TANK
(Figure 1)

Installation of Transfer Pump

- On a cross-member between the two tanks, mount the transfer pump (Item #15) using any cross-member hole, fuel pump clamp (item #16) and hardware (Items #38 & 39). The pump should be mounted as close to the auxiliary tank as possible. Make sure the outlet of the pump is facing towards the main tank as shown in figure 2 below.

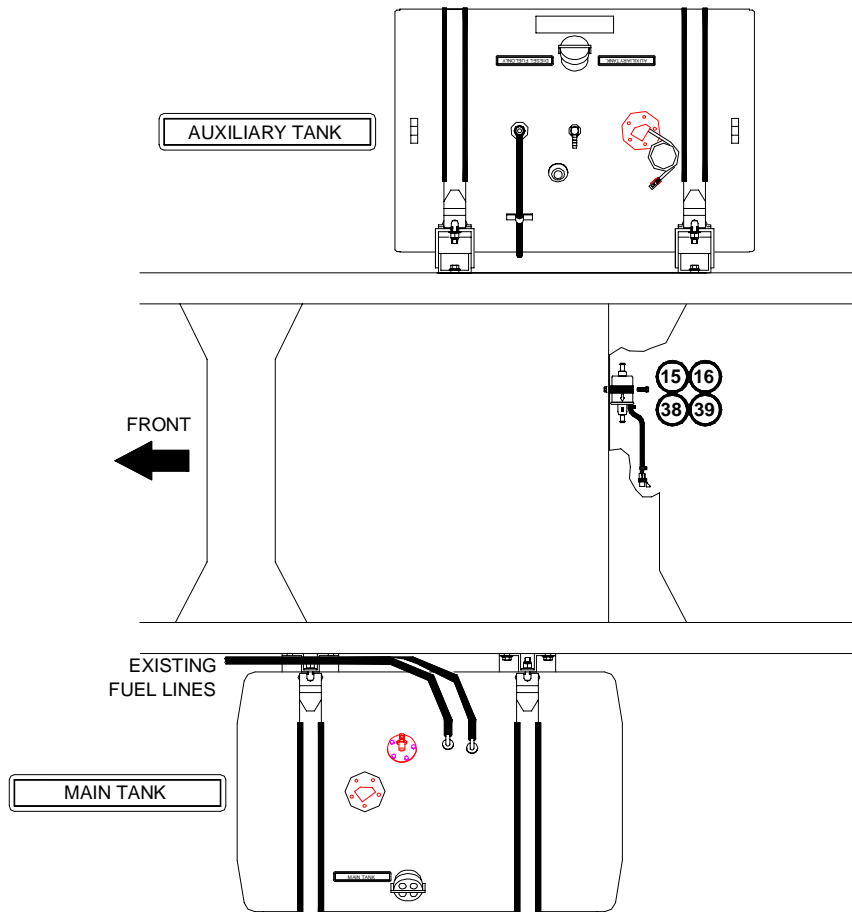


Figure 2

Final Chassis harness connection

At the auxiliary tank, route the sender harness through the frame grommet (Item28) and connect this two pin connector to the two pin connector on the chassis harness (Item 10)(YELLOW and BLACK wire). Make sure the connectors are securely mated. See Page 19, Note 7.

Continue routing the chassis harness toward the cross-member that mounts the transfer pump. At the transfer pump, connect the 2-pinned connector on the chassis harness to the transfer pump connector. Make sure the connectors are securely mated. See Page 19, Note 8.

Route the end of the chassis harness toward the main tank. At the main tank follow the sender harness through the frame to the existing vehicle harness. Disconnect the 2-pinned (YELLOW and BLACK wire) sender connector from the existing vehicle harness. See Page 19, Note 9.

Finally, connect the (2) two pinned (BLACK and YELLOW/Red) of the chassis harness (Item #10) to the main tank sender harness and the existing vehicle harness. Make sure the connectors are securely mated. See Page 19, Note 10.

This completes the electrical wire harness connections.

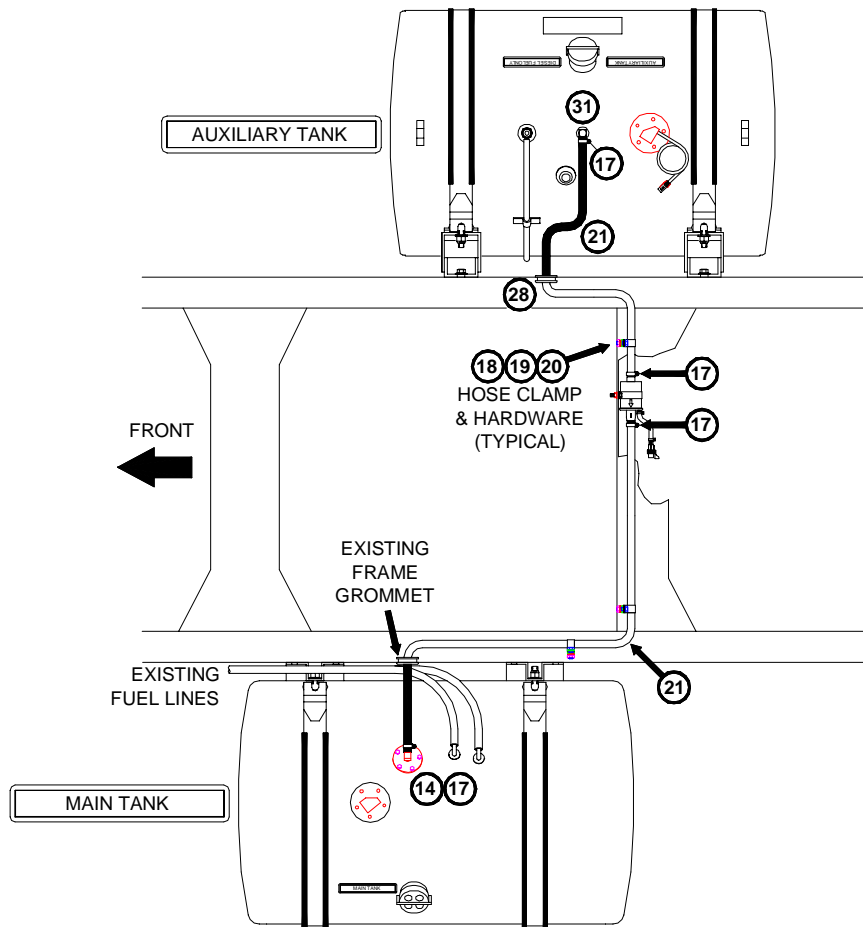
Fuel Hose Installation

Place a clamp (Item #17) on the end of a piece of hose and install hose onto the hose barb fitting (Item #31) installed on the AUXILIARY tank. Push the hose onto the fitting until it is completely seated. Secure hose to fitting with hose clamp.

Take the other end of this hose and route it through the rubber frame grommet (Item #28) and to the **INLET** side of the transfer pump (Item #15). Measure the hose length required to clamp to the pump and cut the hose. Install the hose onto the barb of the pump and secure hose to pump with clamp (Item #17).

At the **MAIN** tank, place a clamp (Item #17) on the end of a piece of hose and install hose onto the hose barb fitting (Item #31). Push the hose onto the fitting until it is completely seated. Secure hose to fitting with hose clamp.

Take the other end of this hose and route it through the existing rubber frame grommet and to the OUTLET side of the transfer pump (Item #15). Measure the hose length required to clamp to the pump and cut the hose. Install the hose onto the barb of the pump and secure hose to pump with clamp (Item #17)



Secure Harnesses and Hose

Follow the chassis harness and power harness back and secure the harnesses to the frame with tie straps (Item #29). Make sure the harnesses are not at pinch points, are away from heat producing equipment and are not hanging outside the frame rail.

Secure hose to frame rail as required with clamps and hardware (Items #18, 19 & 20). See Page 19, Note 11.

Protect all hose outside of the frame rail with plastic loom (Item #30). Cut loom to hose length and secure with tie straps (Item #29)

Peel and stick the system instruction label (Item #37) on the driver side interior door. See Page 19, Note 12.

GENERAL SYSTEM OPERATION

The system controls an Auxiliary Fuel Tank and Fuel Pump. The Fuel Pump system automatically transfers fuel from the Auxiliary Tank to the Main Tank as necessary. If the Primary tank falls one inch (1") below auxiliary tank, the pump activates and remains on until the primary tank is one inch (1") above the auxiliary tank. The fuel gauges level reading is a combination of the total fuel available from both tanks. The main tank fuel sender sending a signal directly to the main fuel gauge.

IMPORTANT

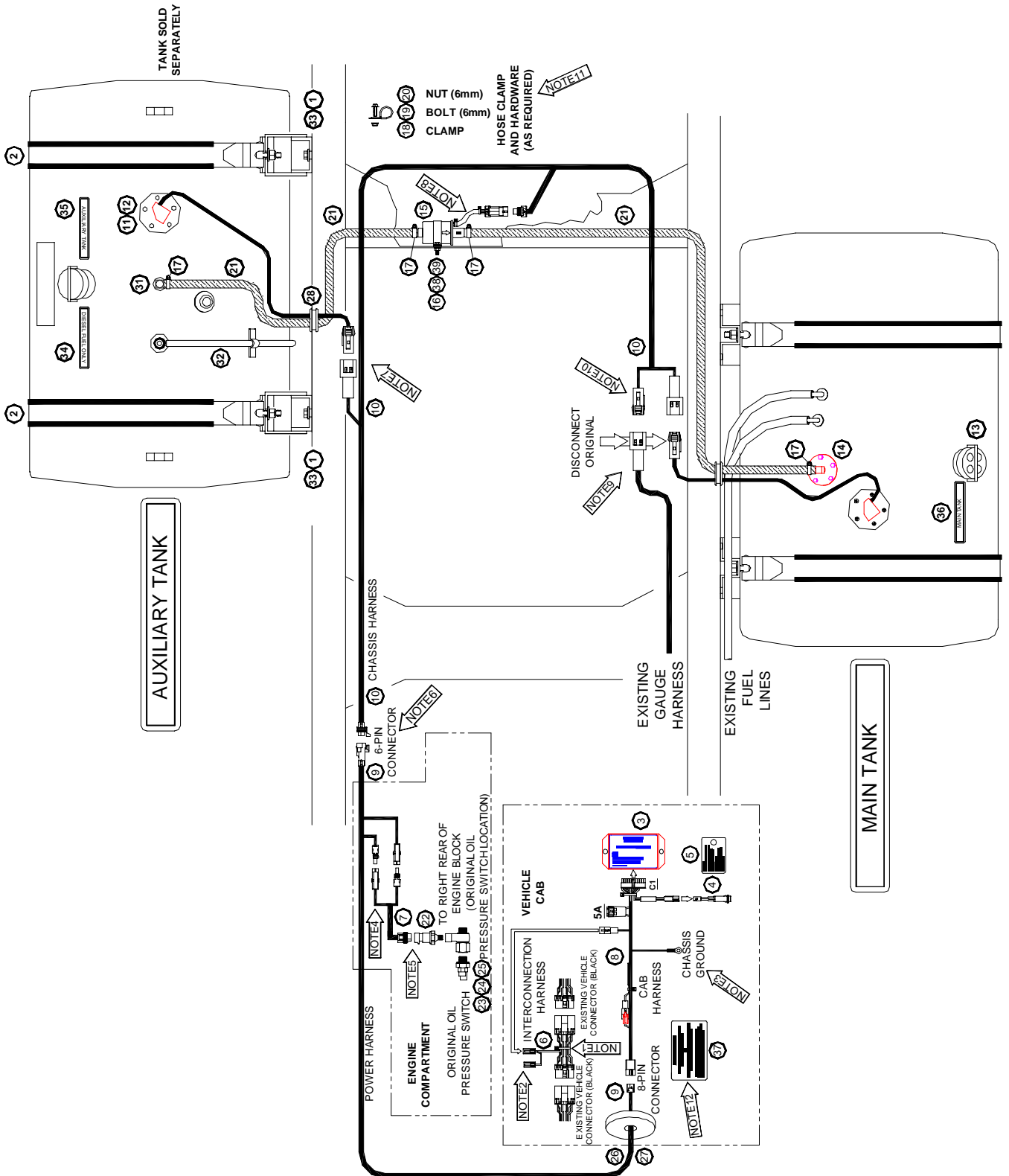
The fuel transfer pump will only transfer fuel when the engine is running. A safety feature (enable) is incorporated into the circuitry. The enable signal is sent to the pump module via an oil pressure switch installed on the right rear side of the engine. When the engine is running and oil pressure rises the oil pressure switch closes sending an enable signal to the pump module.

Also, to ensure that the main tank sender is not stuck in a low fuel position, the main tank sender must move at least 3%. This movement is accomplished when the vehicle is moved from park and moved forward or backward. The pump will not operate until it sees this main tank sender movement. When troubleshooting the system, make sure this movement is accomplished manually.

SYSTEM TEST

With the main tank fuel gauge showing less than full, disconnect the MAIN fuel connection between the chassis harness and the main tank fuel sender. Use a jumper wire and jumper the BLACK wire and the YELLOW/RED terminals on the connector.

Start the engine and verify that the transfer pump is pumping fuel into the main tank. Disconnect the jumper wire and reconnect to the main tank sender and the transfer pump should stop pumping **IF** the level in the main tank is above the level in the auxiliary tank. If the level of the main tank is below the level in the auxiliary tank, the pump will continue to transfer fuel until level in the main tank is 1" higher than the level in the auxiliary tank.



THIS VEHICLE IS EQUIPPED WITH A FUEL TRANSFER PUMP SYSTEM

General System Function:

The system controls an Auxiliary Fuel Tank and Fuel Transfer Pump. The Fuel Pump system automatically transfers fuel from the Auxiliary Tank to the Main Tank as necessary. If the Main Tank (Driver side frame rail) falls one inch (1") below Auxiliary Tank (Passenger side frame rail), the pump activates and remains on until the Main Tank is one inch (1") above the Auxiliary Tank.

IMPORTANT

The fuel transfer pump will only transfer fuel when the engine is running.

Also, to ensure that the main tank sender is not **stuck** in a low fuel position, the main tank sender must move at least 3%. This movement is accomplished when the vehicle is moved from park and moved forward or backward.

The system monitors the following conditions during normal operation:

- Main Tank Sensor Out of Range (open or short)
- Auxiliary Sensor Out of Range (open or short)
- Enable Signal False (No Oil Pressure)
- Main Sensor stuck (**system disabled after 5 minutes with no sender movement**)
- Auxiliary Sensor Stuck (**system disabled after 5 minutes with no sender movement**)

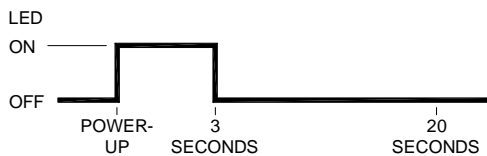
If any of the monitored conditions are found to be a problem, the Fault LED is turned on and remains on to indicate the Fuel Pump is disabled. To determine the reason the pump has been disabled, turn the Ignition switch off, then on. The Power-up Self Test LED will blink a code identifying the problem - unless it is a stuck sensor. **See chart on reverse side to determine the Fault Codes.**

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CAUTION:
Constant Red light indicates Fuel Transfer Pump System Error. **Only Main tank is available. See owner's card for further information.** Momentary Flash on startup indicates system operable.

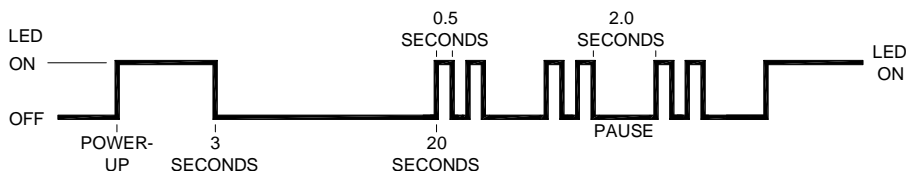


FAULT LED



SYSTEM SELF-TEST OK

FAULT CODE 2 EXAMPLE:



SYSTEM SELF-TEST FAILED
(MAIN TANK SENSOR ERROR INDICATED)

CODE	DESCRIPTION:
2	MAIN TANK SENSOR OUT OF RANGE (OPEN OR SHORT)
3	AUXILIARY TANK SENDOR OUT OF RANGE (OPEN OR SHORT)
4	ENABLE SIGNAL FALSE (NO OIL PRESSURE)
5	INVALID MODULE CABLE CONFIGURATION (MODULE JUMPER)

TROUBLE SHOOTING GUIDE

Dual Fuel Tank Kit with Transfer Pump Part # UD50T300, UD50T300D, UD33T300, UD33T300D MY 04 & LATER

TABLE OF CONTENTS

General System Function	2
Power-Up Test	2
Self Test Failed	3
Run Time Testing	3
Pump Rules	4
12VDC Power	5
Cab Harness	6
Power Harness	7
Chassis Harness	8
Oil Pressure Harness	9
Oil Pressure Switch Test	10
Pump Test	11
Tank Sender Test	11
Fuel Gauge Test	12
Warning LED Test	13
System Test	14
System Diagram	15

TROUBLE SHOOTING GUIDE

General System Function:

The system controls an Auxiliary Fuel Tank and Fuel Pump. The Fuel Pump system automatically transfers fuel from the Auxiliary Tank to the Main Tank as necessary. If the Primary tanks falls one inch (1") below auxiliary tank, the pump activates and remains on until the primary tank is one inch (1") above the auxiliary tank. The fuel gauge level reading is a combination of the total fuel available from both tanks. The main tank fuel sender is sending a signal directly to the main fuel gauge. Refer to the overall system diagram on the last page of this guide to familiarize yourself with system components and their location.

IMPORTANT:

The fuel transfer pump will only transfer fuel when the engine is running. A safety feature (enable) is incorporated into the circuitry. The enable signal is sent to the pump module via an oil pressure switch installed on the right rear side of the engine . When the engine is running and oil pressure rises the oil pressure switch closes sending an enable signal to the pump module.

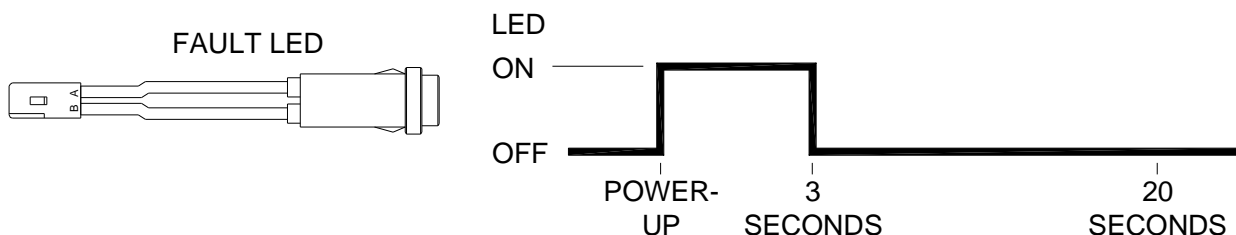
Also, to ensure that the main tank sender is not **stuck** in a low fuel position, the main tank sender must move at least 3%. This movement is accomplished when the vehicle is moved from park and moved forward or backward. The pump will not operate until it sees this main tank sender movement. When troubleshooting the system, make sure movement is accomplished.

POWER -UP TEST

The first 20-seconds after the Ignition Switch is turned on, are used to perform a Self Test on the system. If a problem is found, a Fault Code is blinked on the Fault LED and the pump is disabled. Otherwise the system is enabled for pumping

"Self Test" Passed:

1. The fault LED is on during the first 3-seconds to indicate the Fault LED is working.
2. The fault LED is off for the rest of the Self Test (17 seconds).
3. The fault LED remains off during normal operation.



TROUBLE SHOOTING GUIDE

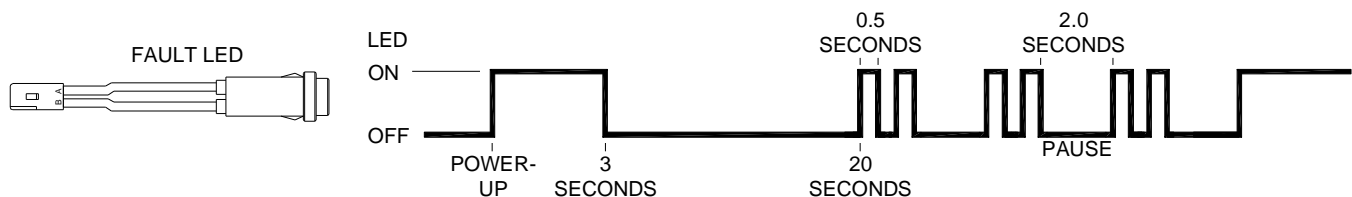
“Self Test” Failed:

1. The Fault LED is on during the first 3-seconds to indicate the Fault LED is working.
2. The Fault LED is off for the rest of the Self Test (17 seconds).
3. The Fault Code is blinked and repeated 3-times on the Fault LED.
4. The Fault LED turns on and remains on indicating that the Fuel Pump is disabled.

The highest Fault Code found is blinked 3 times on the Fault LED. The blink timing is as follows:

- Code: LED is on for 0.5 seconds and off for 0.5 seconds for each count of the code.
- Pause: LED is turned off for 2.0 seconds.
- The process is repeated 2 more times.

For example, Code 2 (Main Sensor out of Range) would be shown on power-up as follows:



Run Time Testing:

The system also monitors the following conditions during normal operation:

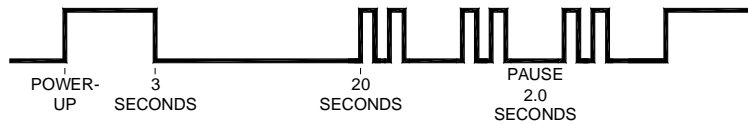
- Main Tank Sensor Out of Range (open or short)
- Auxiliary Sensor Out of Range (open or short)
- Enable Signal False (No Oil Pressure)
- Main Sensor stuck (**system disabled after 5 minutes with no sender movement**)
- Auxiliary Sensor Stuck (**system disabled after 5 minutes with no sender movement**)

If any of the monitored conditions are found to be a problem, the Fault LED is turned on and remains on to indicate the Fuel Pump is disabled. To determine the reason the pump has been disabled, turn the Ignition switch off, then on. The Power-up Self Test will indicate the problem - unless it is a stuck sensor. **See chart below to determine Fault Codes.**

TROUBLE SHOOTING GUIDE

CODE	DESCRIPTION:
2	MAIN TANK SENSOR OUT OF RANGE (OPEN OR SHORT)
3	AUXILIARY TANK SENDOR OUT OF RANGE (OPEN OR SHORT)
4	ENABLE SIGNAL FALSE (NO OIL PRESSURE)
5	INVALID MODULE CABLE CONFIGURATION (MODULE JUMPER)

CODE 2 (MAIN TANK SENSOR OUT OF RANGE)



CODE 3 (AUXILIARY TANK SENSOR OUT OF RANGE)



CODE 4 (ENABLE SIGNAL FALSE (NO OIL PRESSURE))



CODE 5 (INVALID CABLE CONFIGURATION (MODULE JUMPER))



PUMP RULES:

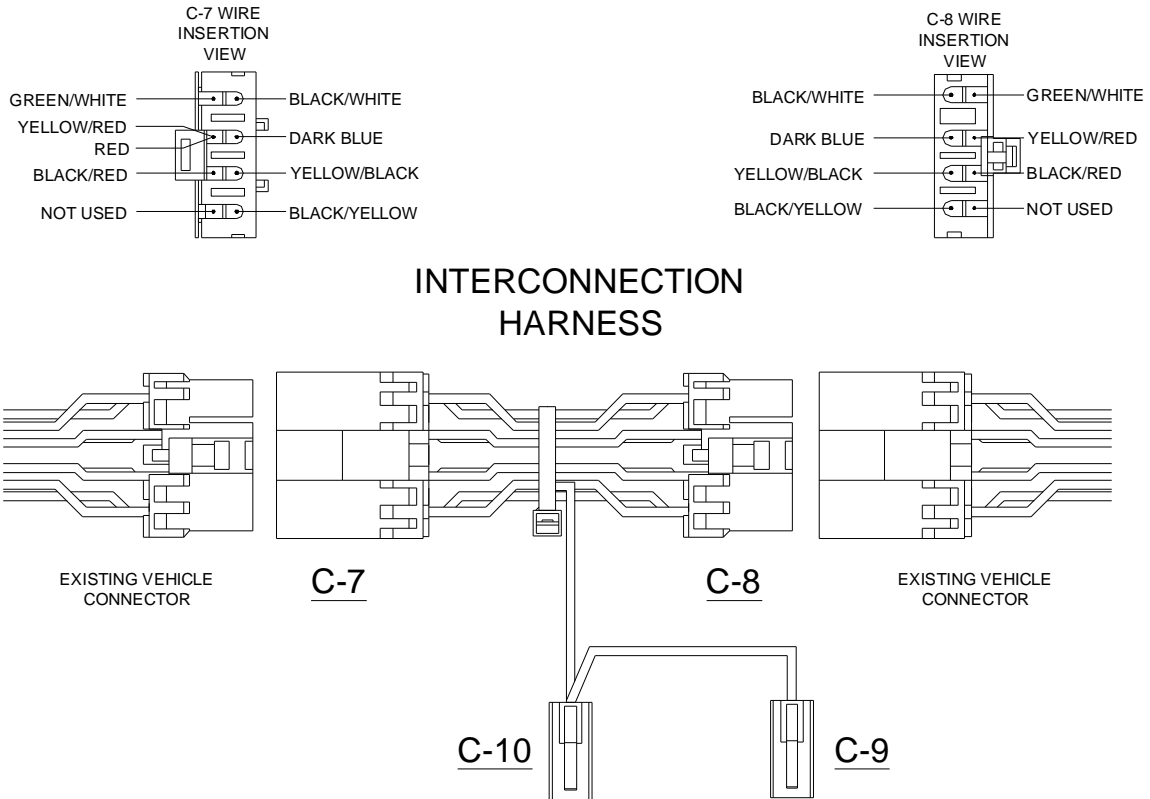
The system should start to pump when the Main Tank is approximately 4% below the level of the Auxiliary Tank and continue pumping until the Main Tank is approximately 4% above the level of the Auxiliary Tank. However pumping is only allowed when all of the following conditions are true:

- Main Sensor has moved at least 3% (once) since power up.
- Enable Signal is grounded (Oil Pressure)
- Both Fuel Senders must be "in range".
- Auxiliary tank is ABOVE 10% full.
- Main Tank is BELOW 85% full.
- Main Tank Sensor stuck - 5 minute limit.
- Auxiliary Tank Sensor stuck - 5 minute limit
- Fault LED must be off.

TROUBLE SHOOTING GUIDE

Verify system +12V power source

Transfer pump power is supplied via an interconnection harness (C-7, C-8) located on the bottom right of the steering column. One of two spare connectors (C-9 or C-10) supply power to the RED wire of the power harness (C-4).

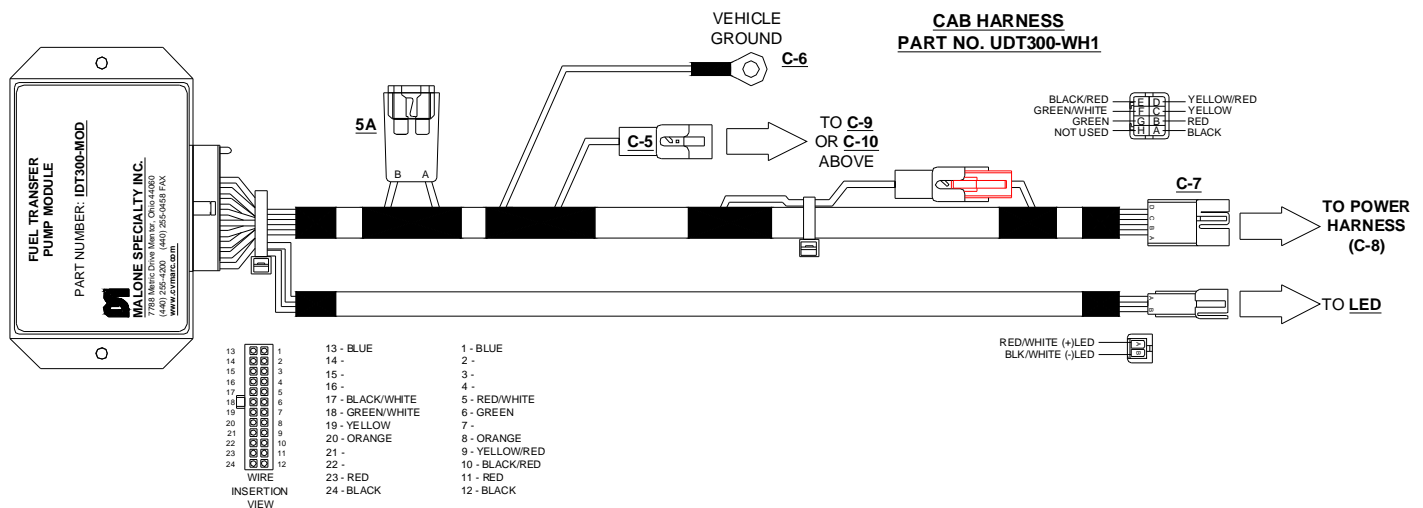


TROUBLE SHOOTING GUIDE

The **TRANSFER PUMP MODULE** is located on the Transmission Control Module bracket lower left side of the steering column. The pump and module are protected by a 5 Amp fuse via a RED wire (C-5) to the transfer pump and module. The fuse (5 Amp) is located approximately 6" from the module located inside the cab. Verify that the fuse is not blown. Replace fuse if necessary . System ground is provided by a ring terminal (C-6) connected to vehicle ground. Ensure that the ring terminal is connected to a solid vehicle ground.

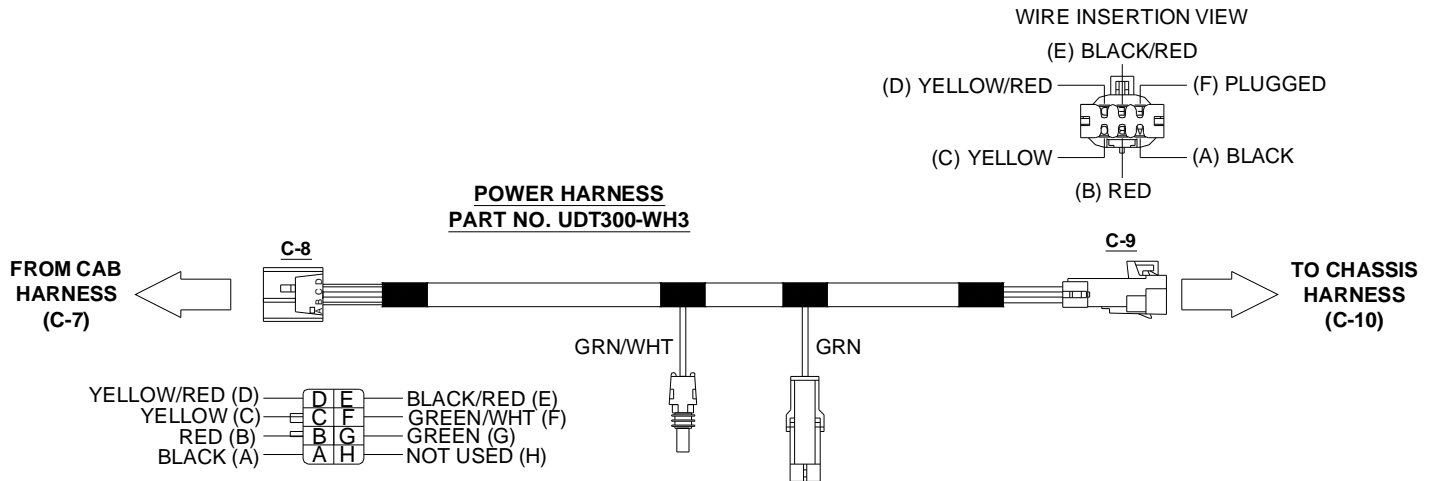
Make sure the 22-pin **CAB HARNESS** connector is securely mated to the transfer pump module. Check harness for loose connections and or broken or damaged wires.

Connector **(C-7)** mates to the **POWER HARNESS** and is located inside the cab near the driver side kick panel and floor board. Make sure this **(C-7 to C-8)** connection is completely and properly connected. Check for loose or broken wires. See connector wire color layout below.



TROUBLE SHOOTING GUIDE

The **POWER HARNESS** connector (**C-9**) is mated to the **CHASSIS HARNESS** connector (**C-10**) below. The (**C-9 to C-10**) connection is located inside the left frame rail adjacent to the transmission. Find these connectors and ensure that the connection is completely and properly mated. Check for loose or broken wires. See connector wire color layout below.



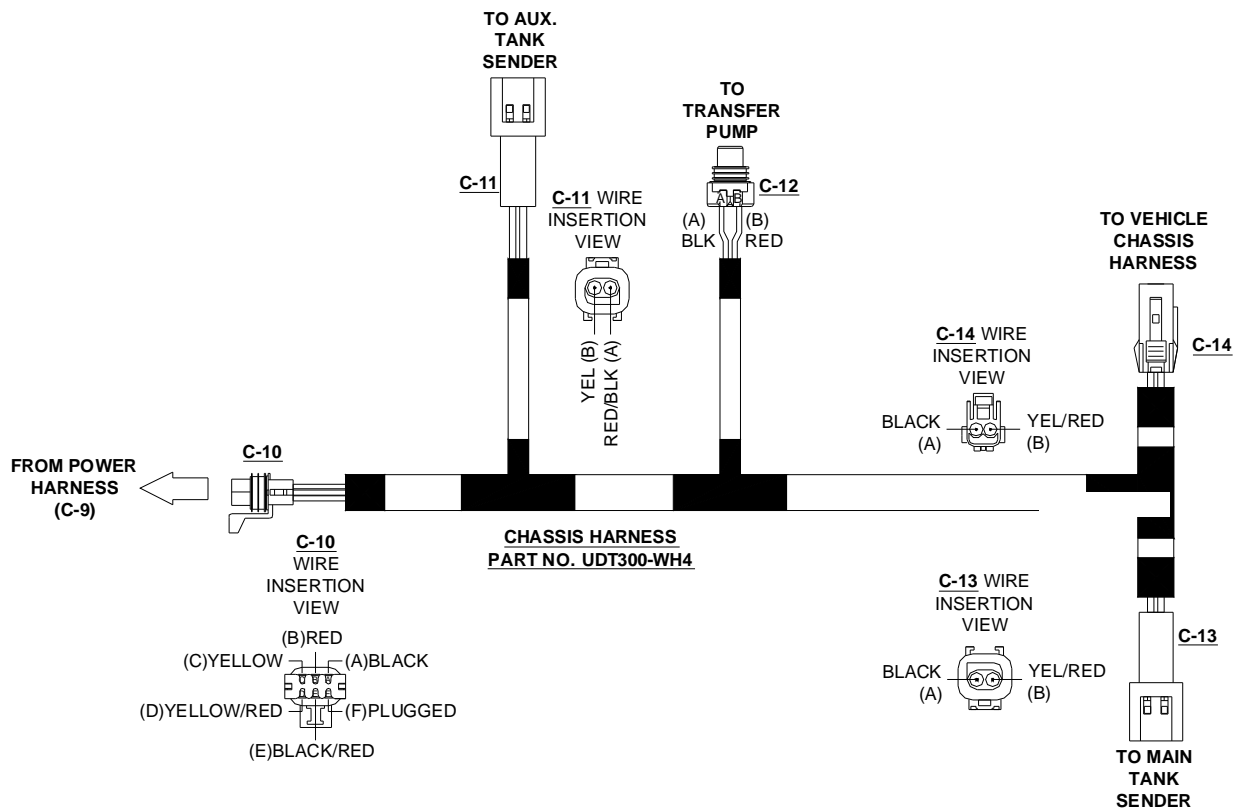
TROUBLE SHOOTING GUIDE

The **Chassis harness** connects the Auxiliary Tank sender, the Transfer Pump and the Main Tank sender to the system. At each connection, make sure the connection is completely and properly connected. Check for loose or broken wires. See connector wire color layout below.

Locate **(C-11 to Auxiliary tank sender)** near the Auxiliary Tank inside the frame rail.

Locate **(C-12 to Transfer Pump)** near the Transfer pump located on cross-member.

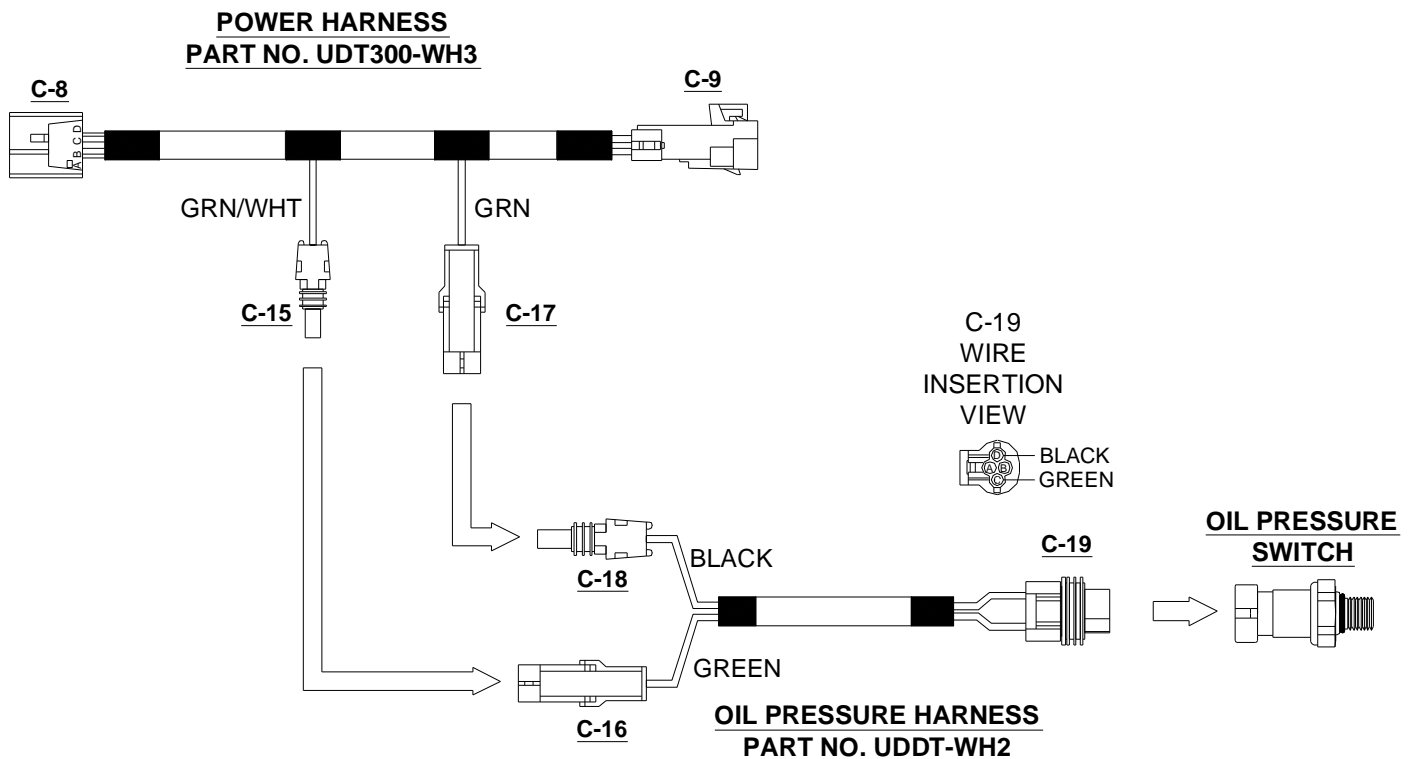
Locate **(C-13 to Main tank sender and C-14 to Vehicle Chassis harness)** near the Main **SIDE** tank located on the left side frame rail.



TROUBLE SHOOTING GUIDE

Oil Pressure Switch and Harness

Locate the **(C-15 to C-16 and the C-17 to C-18)** connection located inside the left frame rail adjacent to the transmission. Find these connectors and ensure that the connection is completely and properly mated. Check for loose or broken wires. See connector wire color layout below. Locate the C-19 connector at the end of the Oil pressure harness located on the right rear side of the engine block. Ensure that the connection C-19 is completely and properly mated to the oil pressure switch. Verify wire color layout as shown below.

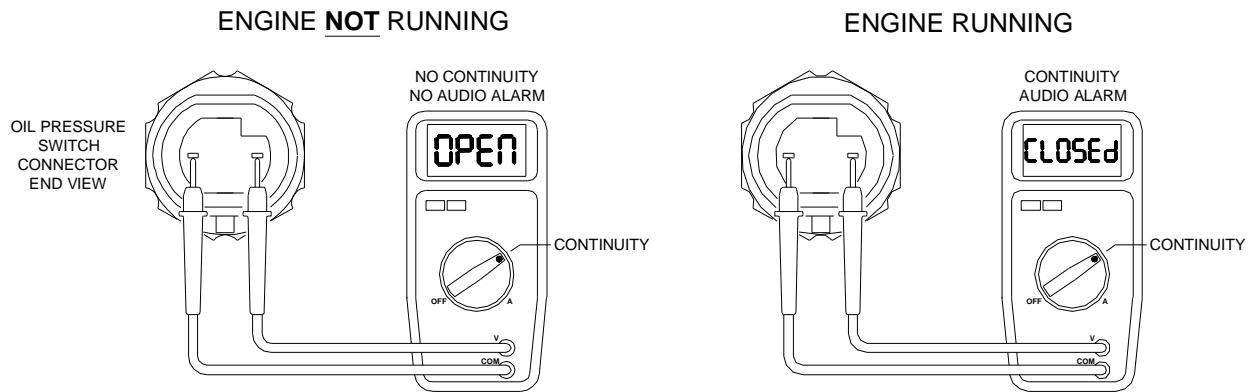


TROUBLE SHOOTING GUIDE

Check Oil Pressure Switch

The oil pressure switch is a normally closed switch. The switch closes (and completes the circuit) when engine is running and oil pressure is detected. Failure of the switch to close when engine is running will not permit the transfer pump system to function. Check the oil pressure switch for proper operation as follows:

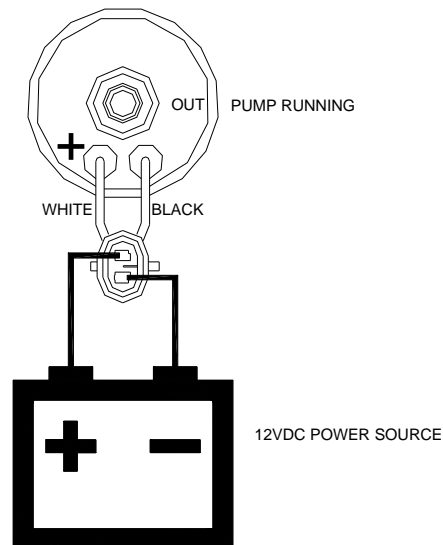
With an ohm-meter set to check continuity (Use the audio continuity setting), measure across the two pins on the oil pressure switch with the engine **NOT** running. No audio alarm should be detected (infinite Ohms, Open circuit). Start the engine and allow oil pressure to build. Measure across the same two pins and an audio alarm should be detected (zero ohms, Closed circuit.) Any test readings other than as described above indicate that the pressure switch is defective and must be replaced.



TROUBLE SHOOTING GUIDE

HOW TO CHECK THE PUMP

Use a 12VDC power source and apply this voltage across the pins of the pump connector exactly as shown below. The pump should run with 12VDC applied. Failure of the pump to run with 12VDC applied indicates a defective pump and it must be replaced. **DO NOT RUN THE PUMP FOR MORE THAN 15 SECONDS DRY OR DAMAGE TO THE PUMP MAY OCCUR.**



HOW TO CHECK THE FUEL TANK SENDERS

For the Auxiliary tank sender:

Disconnect connector (C-11) from the Auxiliary Tank sender. Using an ohm-meter, Position the sender to the full position (float up) and note the resistance. Position the sender to the empty position (float down) and note the resistance. Position the sender to approximately the 1/2 full position (float middle) and note the resistance. Check these readings against the chart below. If the resistance is different than the table, replace the defective Auxiliary Tank sender.

For the Main Tank sender:

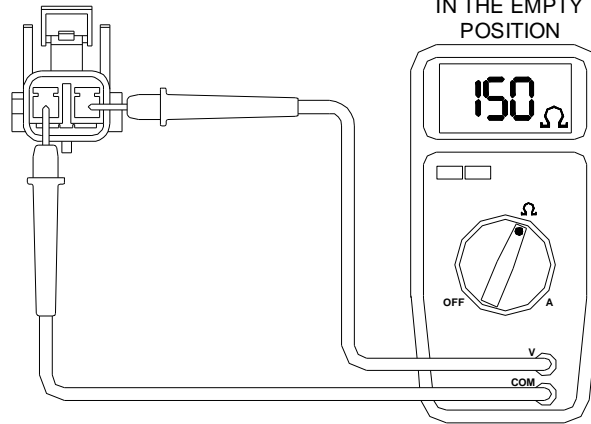
Disconnect connector (C-13) from the Main Tank sender. Using an ohm-meter, Position the sender to the full position (float up) and note the resistance. Position the sender to the empty position (float down) and note the resistance. Position the sender to approximately the 1/2 full position (float middle) and note the resistance. Check these readings against the chart below. If the resistance is different than the table, replace the defective Main Tank sender. NOTE: If it is not possible to change the position of the Main Tank sender, note the cab fuel gauge setting and determine approximate resistance reading.

TROUBLE SHOOTING GUIDE

AUX. TANK SENDER
&
MAIN TANK
SENDER
CONNECTOR
(TERMINAL VIEW)

FLOAT POSITION	RESISTANCE VALUE (Ω)
FULL	0.0 \pm 2.5
1/2	50.0 \pm 2.5
EMPTY	150 \pm 5.0

READING SHOWN
IS FOR SENDERS
IN THE EMPTY
POSITION



FUEL GAUGE NOT WORKING

NOTE: The fuel transfer pump system only interconnects between the main sender and the vehicle harness.

Make sure the connectors (C-13 & C-14) are connected properly to the main sender harness and the vehicle harness properly. Turn the ignition to the ON position and check fuel gauge for proper operation. If not, go to next step.

Turn OFF the ignition switch and disconnect (C-13 & C-14) and reconnect the main tank sender to the vehicle harness (This removes the Auxiliary tank sender from the system). Turn the ignition to the ON position and check if fuel gauge is function properly. If not, refer to the UD Trucks Service Manual under the fuel gauge section. If so, go to next step.

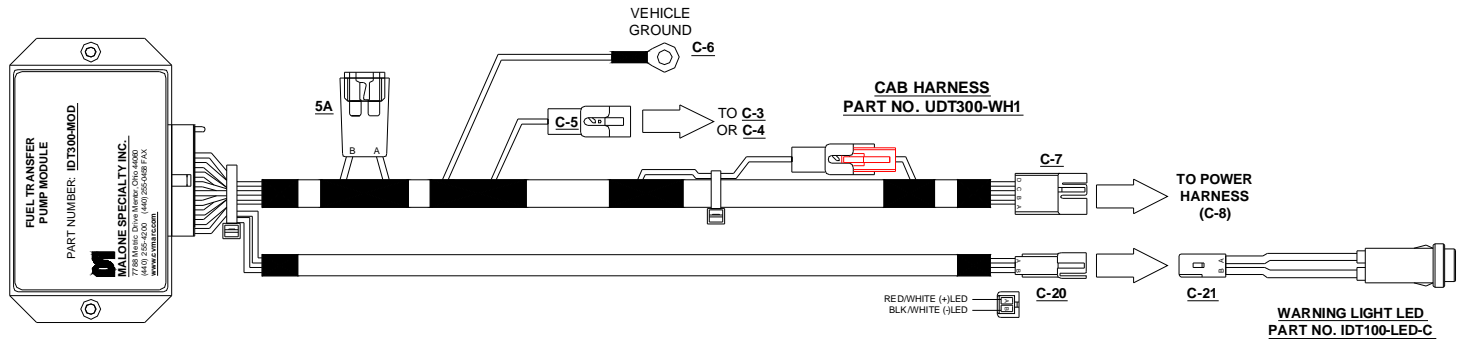
Check for broken wires or loose connections between connector (C-13 & C-14). Repair as required or replace chassis harness. Reconnect connectors (C-13 & C-14) between the main harness sender and the vehicle harness. Ensure the connections are properly installed and secure. Turn the ignition switch to the ON position and the fuel gauge should function properly.

TROUBLE SHOOTING GUIDE

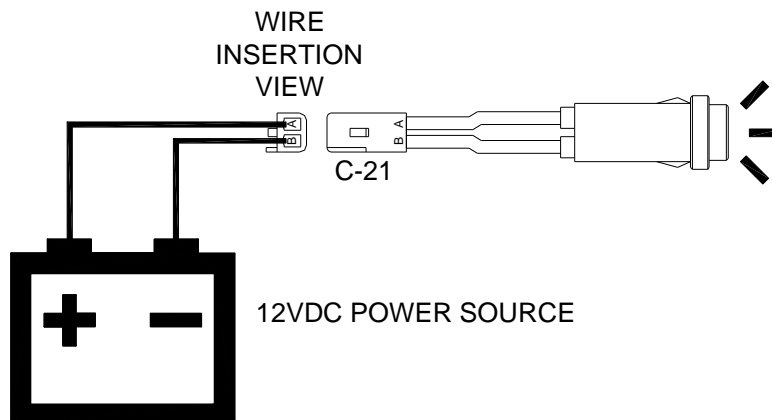
CHECK WARNING LIGHT LED

The warning light LED should turn on during each engine restart while performing a system self test. If the LED does not illuminate during each engine restart perform the following test to determine if the LED has burned out.

Disconnect the LED harness connector (C-21) from the Cab harness connector (C-20).
Remove the LED harness from the dash.



Use a 12VDC power source and apply this voltage across the pins of the LED connector exactly as shown below. The LED should light with 12VDC applied. Failure of the LED to illuminate indicates a defective LED and it must be replaced.



TROUBLE SHOOTING GUIDE

How to Verify Fuel Transfer Pump System Operation



IMPORTANT

If all the prior tests have been completed satisfactorily and the fuel gauge shows less than a full tank then this test can be preformed. This test cannot be done with the main tank showing full.

With the main tank fuel gauge showing less than full, disconnect the MAIN fuel connection between the chassis harness (C-13) and the main fuel sender. Use a jumper wire and connect the BLACK wire and the YELLOW/RED wire from connector.

Start the engine, then verify if the transfer pump is pumping fuel into the main tank. If pumping, the transfer pump is working. If not pumping then change defective pump module. If the transfer pump is pumping, disconnect the jumper wire and reconnect to the main tank sender and the transfer pump should not pump fuel, if the level in the main tank is above the level in the auxiliary tank. If the level of the main tank is below the level in the auxiliary tank, the pump will continue to transfer fuel until level in the main tank is higher than the level in the auxiliary tank.

NOTE:

To ensure that the Main Tank Sender is not stuck in a low fuel position, the Main Tank sender must show movement of at least 3% (1/2") to the Transfer pump module. This movement is normally accomplished when the vehicle is moved from park and moved forward or backward. The pump will not operate until it sees this Main Tank Sender movement. When troubleshooting the system, make sure this movement is accomplished by manually moving the sender float.

If all above steps have been verified as working and the pump does not operate properly, then the Transfer Pump Module must be replaced. This module is not field repairable.

TROUBLE SHOOTING GUIDE

