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**Title:** Dual Fuel Tank Transfer Pump Troubleshooting on Post-2007 NGV and ProStar

**Applies To:** All Post-2007 HPV and ProStar

**DESCRIPTION**

Vehicles with two fuel tanks are equipped with an electric fuel transfer pump to balance the fuel between both tanks. The draw tank supplies fuel directly to the engine. This feature automatically transfers fuel from the storage tank to the draw tank. However, certain conditions must be met before the transfer of fuel can occur. These conditions are described below.

**NOTE:**

The fuel levels in the tanks will not be equal. This feature does not keep the fuel levels equal.

**NOTE:**

The system does not allow fuel to be transferred from the draw tank to the storage tank. If you have fuel transferring the wrong direction (from the draw to the storage), you need to [click here for more information](#).

This feature includes the following configurations:

- 0595ABE (Left Draw)
- 0595AXY (Right Draw)

The fuel level sensors are located on the top of each of the fuel tanks. The draw tank and storage tank can be located on either the right side or the left (driver) side of the vehicle depending on the vehicle configuration. The following table indicates the draw tank and storage tank locations for various truck models.

Models	Draw Tank	Storage Tank	Pump Location
4100	Right Side	Left Side	Right Rail
4200/4300/4400/8500	Right Side	Left Side	Right Rail
7000 series/8600/ProStar	Left Side	Right Side	Transmission Housing

The fuel level sensor signals are monitored by the body controller. Both sensors are connected to zero volt reference (ZVR), which is provided by the body controller.

The body controller provides near battery voltage to energize the fuel transfer pump relay coil when conditions are appropriate to transfer fuel (described below). Battery voltage is then provided through the fuel transfer pump relay switch contacts to the fuel transfer pump.

**Fuel Transfer Pump On**

The body controller will turn on the fuel transfer pump (if pump is off) when all of the conditions below are true.

- The **Fuel\_Draw\_Level** value – 6% is less than 80% Full
- AND the **Fuel\_Storage\_Level** value + 6% is greater than 10% Full
- AND the **Fuel\_Draw\_Level** value + 6% is less than the **Fuel\_Storage\_Level** value
- AND the engine is running
- AND DLB indicates that the body controller **Engine\_State** has a good status.
- AND the body controller is communicating properly with the engine control module
- AND there are no active diagnostic trouble codes on either of the fuel level sensor signal circuits.

Fuel is transferred from the fuel storage tank to the draw tank when the body controller turns on the fuel transfer pump.

**Fuel Transfer Pump Off**

The body controller will turn off the fuel transfer pump when any of the conditions below are true.

- The **Fuel\_Draw\_Level** value – 6% is greater than or equal to the **Fuel\_Storage\_Level** value
- OR the **Fuel\_Draw\_Level** value – 6% is greater than or equal to 80% Full
- OR the **Fuel\_Storage\_Level** value + 6% is less than or equal to 10% Full
- OR the engine is not running
- OR DLB indicates that the body controller **Engine\_State** has a bad status.
- OR the body controller is not communicating properly with the engine control module
- OR an active diagnostic trouble code exists on one or more of the fuel level sensor signal circuits

Fuel will no longer be transferred from the fuel storage tank to the draw tank when the body controller turns off the fuel transfer pump.

**SIGNALS TO WATCH**

Signal	Pins	Signal Type	Value	Unit	Status	Name
Ignition_Signal_Input	1600-A16	Digital Input	<input checked="" type="checkbox"/>	On/Off	0	Igni..
Accessory_Signal_Input	1600-A1	Digital Input	<input checked="" type="checkbox"/>	On/Off	0	Acce..
Engine_Running			<input type="checkbox"/>	On/Off	0	Engi..
Engine_Speed		J1939 Input		0RPM	0	Engi..
Fuel_Gauge		J1939 Output		0percent	254	Fuel..
Right_Fuel_Sensor_Signal				0percent	2	Righ..
Left_Fuel_Sensor_Signal				100percent	2	Left..
Fuel_Draw_Level				100percent	0	Fuel..
Fuel_Storage_Level				0percent	0	Fuel..
Fuel_Transfer_Pump_Req			<input type="checkbox"/>	On/Off	0	Fuel..

**NOTE:**

The Draw and Storage Level signals will read 100 and 0 percent respectively when the engine is not running.

The **Right\_Fuel\_Sensor\_Signal** or **Left\_Fuel\_Sensor\_Signal** depending on which side is the draw tank(draw tank fuel level sensor signal) and **Right\_Fuel\_Sensor\_Signal** or **Left\_Fuel\_Sensor\_Signal** depending on which side is the storage tank(storage tank fuel level sensor signal) are the actual fuel level sensor readings displayed on Diamond Logic® Builder (DLB). These readings will change quickly as fuel is added or removed from the fuel tanks.

The body controller monitors the fuel levels in both tanks and conditions the readings from **Right\_Fuel\_Sensor\_Signal** and **Left\_Fuel\_Sensor\_Signal** over time to account for sloshing fuel and to ensure that the draw tank is not overfilled and the supply tank is not emptied. The body controller will not begin to condition these values until the engine is running. The body controller does not activate the transfer pump based on the Fuel Level Sensor signals. The conditioned fuel level sensor signals, **Fuel\_Draw\_Level** and **Fuel\_Storage\_Level**, are monitored by the body controller to determine whether or not the fuel transfer pump should be activated. This eliminates the need for the body controller to react to instant changes in the sensor signal values.

The following table is an example of the signal conditions displayed on DLB during transfer pump operation. **For pump to turn on:**

Signal	Condition
Fuel_Draw_Level	(Fuel_Draw_Level - 6%) < 80%
Fuel_Storage_Level	(Fuel_Storage_Level + 6%) > 10%
Fuel_Draw_Level, Fuel_Storage_Level	(Fuel_Draw_Level + 6%) < Fuel_Storage_Level
Fuel_Transfer_Pump_Req	5 = Turn Pump ON
Engine_Running	5 = Engine Running

**POSSIBLE DIAGNOSTIC TROUBLE CODES**

DTC	MODULE	DESCRIPTION
4010-5	Body Controller	Fuel Transfer Pump Relay Under Current Or Open Circuit
4010-6	Body Controller	Fuel Transfer Pump Relay Short To Ground
520692-5	Body Controller	Fuel Transfer Pump Relay Under Current Or Open Circuit
520692-6	Body Controller	Fuel Transfer Pump Relay Short To Ground
829-0	Body Controller	Fuel Tank 1 Sensor Shorted High or Open Circuit or faulty sensor system
829-1	Body Controller	Fuel Tank 1 Sensor Short To Ground or faulty sensor system
830-0	Body Controller	Fuel Tank 2 Sensor Shorted High or Open Circuit or faulty sensor system
830-1	Body Controller	Fuel Tank 2 Sensor Short To Ground or faulty sensor system

**TROUBLESHOOTING**

1. Physically check the fuel level in each tank. Make sure that they are approximately the same as what DLB shows.
2. Make sure that the pump is correctly oriented. [Click here for more on this.](#)
3. [Check for Diagnostic Trouble Codes \(DTC's\) in the Body Controller.](#)
4. [Check for ignition and accessory voltage.](#)
5. Insure that all interlocks described in the Description section are met.

**CIRCUIT DIAGRAMS**

- [For NGV, click here S08322](#)
- [For ProStar, click here S08339](#)

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