



## **Harrison Hydra-Gen Ltd.**

Hydraulic Driven AC Generator System

### **Installation and Maintenance Guide**

For Harrison Hydra-gen Model:

**HYDRA-DRIVE**

**HU507-GB12**

(12-28-16) - Spec. B

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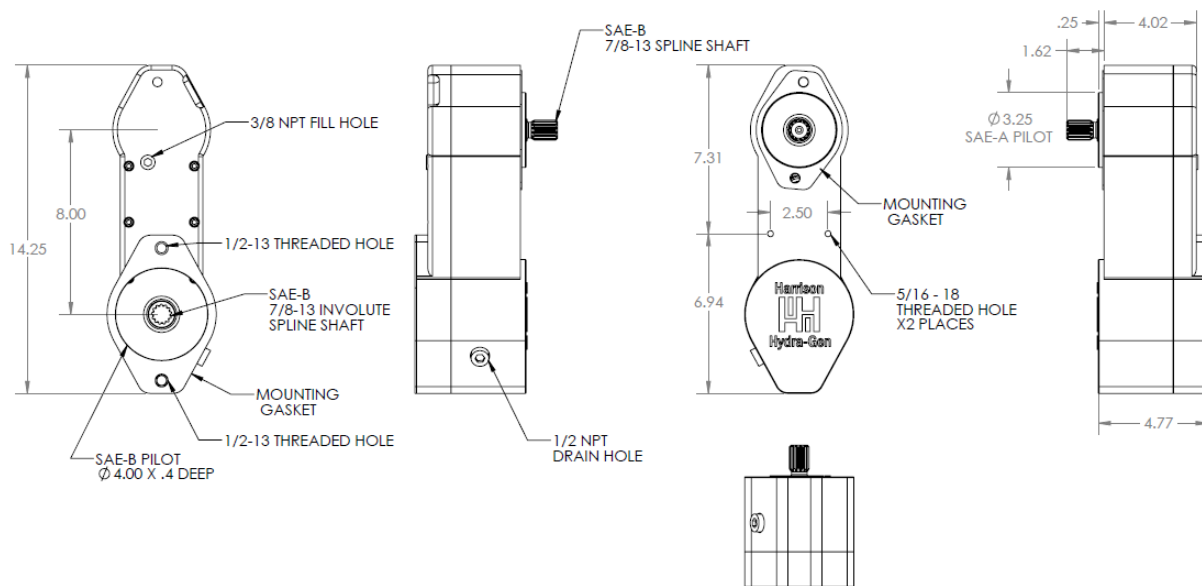
[www.harrisonhydragen.com](http://www.harrisonhydragen.com)

## GENERAL INFORMATION

The Hydra-Drive is a gearbox designed to make it possible to put a variable displacement pump on a Ford 4 x 4 truck with the TorqShift 6 transmission. The gear box attaches to a Chelsea 249 PTO output lowering it 8" and converting the output to a SAE-B 2 bolt. The Hydra-Drive is a 1:1 gearbox so the PTO ratio of 124% is not changed. The direction of rotation does change from opposite engine to engine rotation. The pump rotation needed is clockwise rotation.

**IMPORTANT:** Read this manual before proceeding in the installation of the Hydra-Drive.

## DIMENSIONS



## SPECIFICATIONS

Ratio: 1:1

Input: SAE-A pilot with a SAE-B 7/8-13 tooth shaft

Output: SAE-B pilot with a SAE-B 7/8-13 tooth spline

Output Rotation: Engine (Clockwise pump rotation needed)

PTO required: Chelsea #249 FMLX-B4XP (124% ratio)

## INSTALLATION

Before installing the PTO, Hydra-Drive and Pump, make sure the area around the transmission is clean. Do to the fact that one on the mounting bolts to mount the Hydra-Drive to the PTO is behind one of the gears, it will require assembling the Hydra-drive under the truck. Figure1 below shows the assembly.

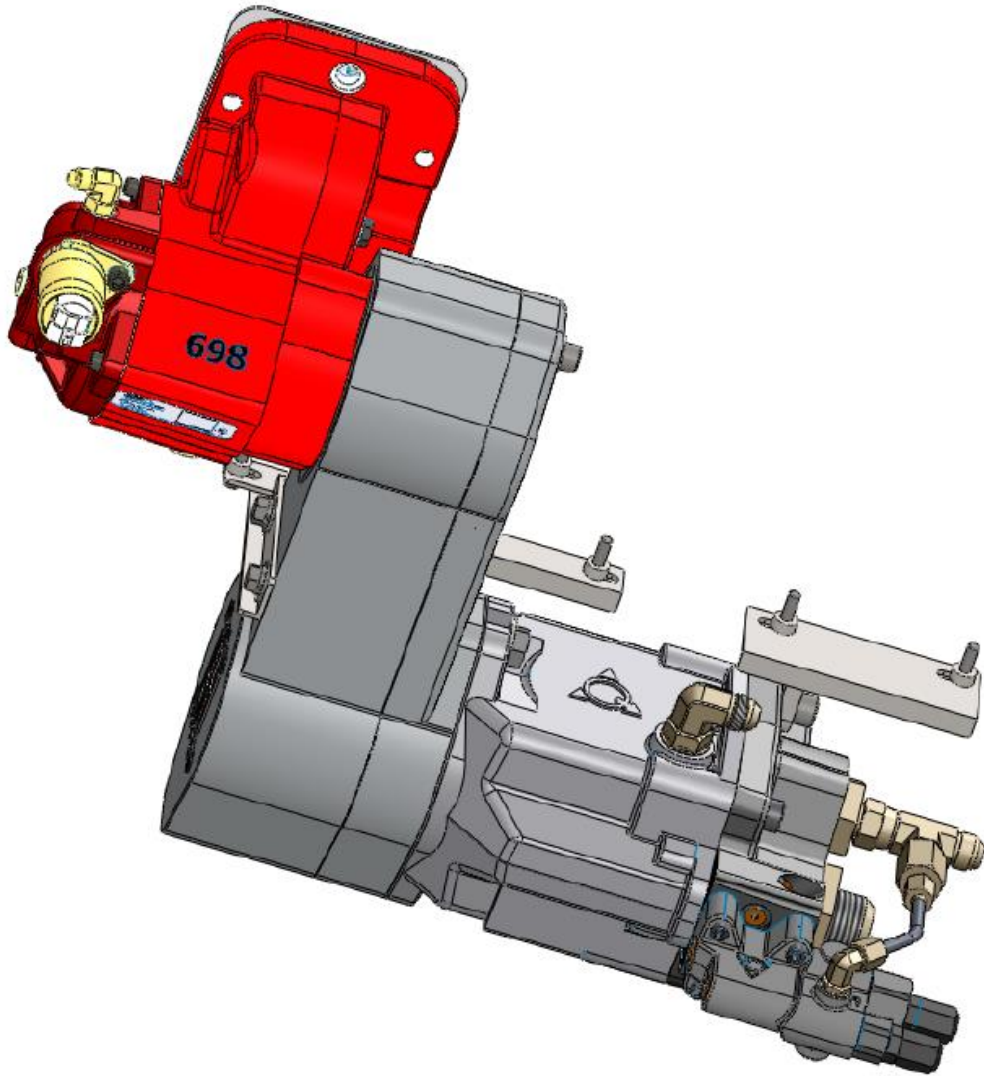


Figure 1

## STEP 1

1. Remove the 4X4 drive shaft. This will make it easier to install the PTO, Hydra-Drive and Pump.
2. Install the Chelsea PTO to the transmission. (Refer to the Chelsea Manual for instructions)
3. Test the PTO for correct operation before installing the Hydra-Drive.

The Hydra-Drive is shipped pre-assembled from the factory. Start by separating the housings and remove the top idler gear to get to the bottom SAE-A mounting hole. See figure 2 below.

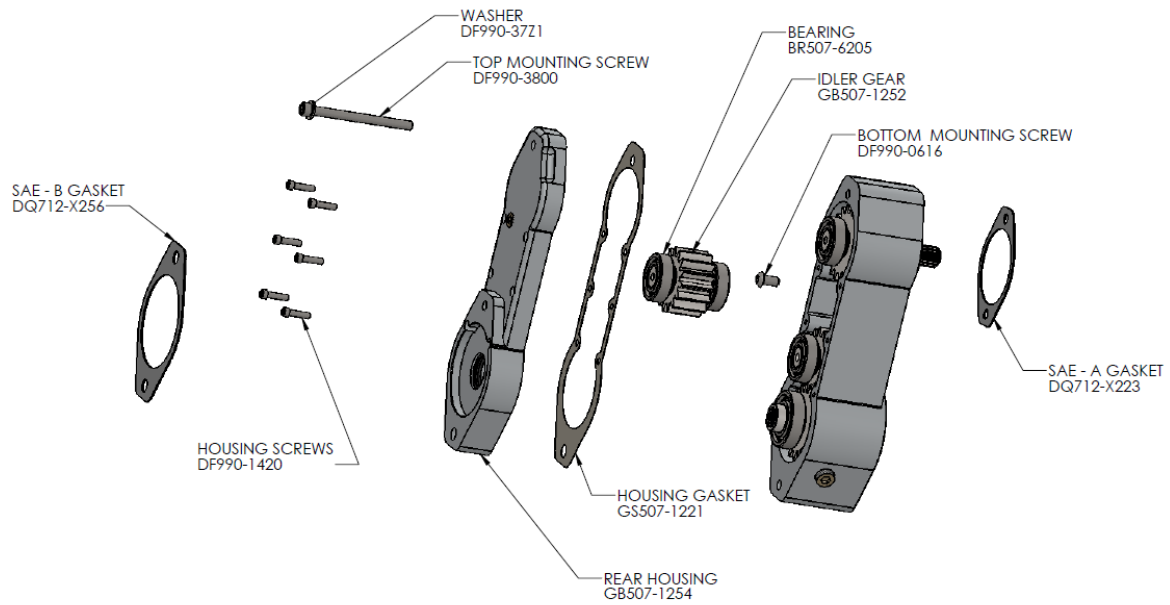


Figure 2

## **STEP 2**

- 1.** Refer to figure 2 above for step 2 instructions.
- 2.** Set the Hydra-drive on a clean surface. Remove the 6 bolts # DF990-1420 holding the 2 housings together.
- 3.** Turn the Hydra-drive on the side. Using a rubber hammer lightly tap around the side of the rear cover as you pull it out. Do not use a screwdriver to pry the housings apart. This could damage the seal surfaces and will cause it to leak. Light tapping and slightly wiggling in housings is all you should need to separate them.
- 4.** Remove the top idler gear. The bearings are pressed on to the gear. Slightly move the gear side to side while pulling up should be all it takes to remove the gear and bearings from the housing. It is not necessary to remove any of the other gears.
- 5.** With the gear removed from the housing the bottom hole to mount the assembly to the PTO is visible.
- 6.** Using half of the spline grease supplied by Chelsea (#379688) coat the female spline of the PTO shaft. Make sure to coat all the roots and valleys of the splines. The other half will be used to coat the female splines of the Hydra-Drive.
- 7.** Using the SAE-A gasket # DQ712-X223 and the button head screw # DF990-0616, install the assembly to the PTO. Installing the top screw # DF990-3800 in temporary will help the line up and make this easier to line up and mount. Install the button head screw into the bottom hole and tighten to 30 ft. lbs.
- 8.** Remove the top screw.
- 9.** Install the idle gear back into the housing. Make sure all the gears are set in position.
- 10.** Install the washer #DF990-37Z1 to the top screw # DF990-3800 and the 6 housing screws # DF990-1420 into the rear housing # GB507-1254. Install the gasket on to the rear housing. Having the screws in place should hold the gasket in place. Install this group to the main housing group. Slowly slide the housing over the bearings and with slight side to side movement with pushing them together should be all it takes to mate the parts together. Light tapping with a rubber hammer may be used if needed. Make sure the gasket stays in place. Watch as the seal goes over the shaft and does not get damaged. As the two housing get close to mating line up the gasket and start the screws. This will keep the gasket in place.
- 11.** After the housing are mated together tighten the 6 screws # DF990-1420 to 8-10 ft. lbs. and the tops screw DF990-3800 to 30 ft. lbs.

### **STEP 3**

1. Next install the front support bracket # GB507-1222 see figure 3.
2. Remove 3 of the transmission oil pan bolts that correspond to where the bracket will go.
3. Using the 3 Hex head bolt #DF990-3112SS, flat washers #DF990-SAE31 and lock washers #DF990-31Z1. Loosely attach the front bracket to the Hydra-drive.
4. Using 3 spacers #MC507-9251 and 3 flange head screws #DF990-6025MM attach to the transmission oil pan.
5. Tighten bolts. 5/16 bolts to 17 ft. lbs. and the 6mm bolts to 8 ft. lbs.

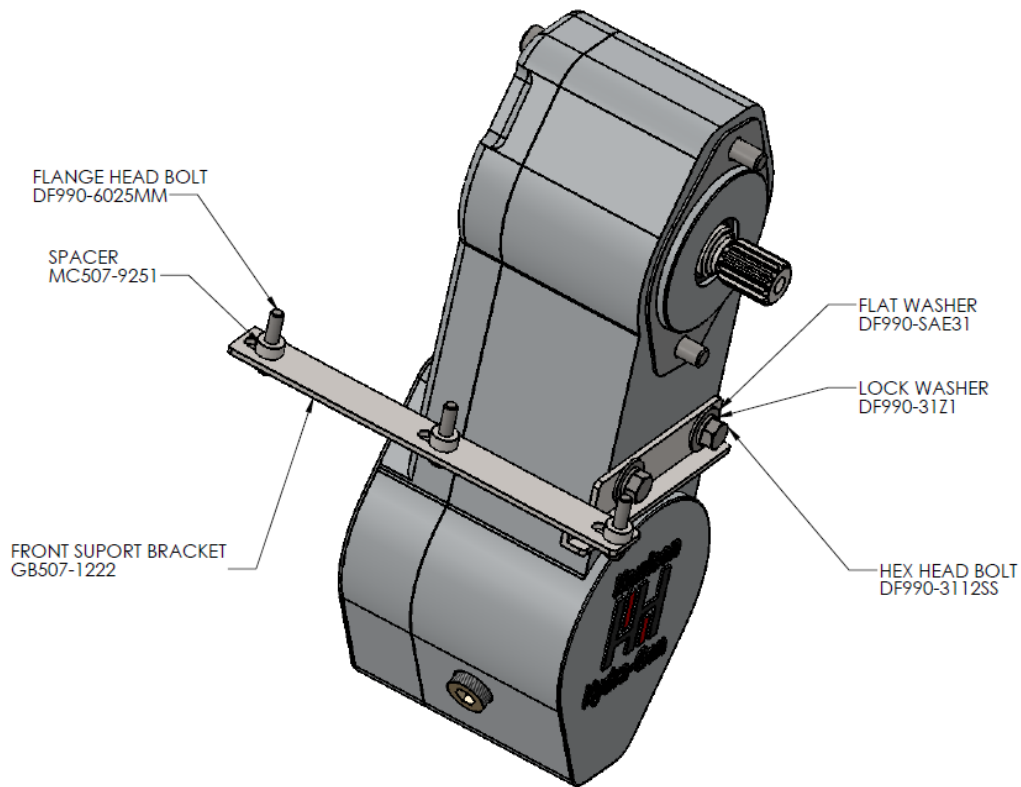


Figure 3

#### STEP 4

1. The hydra-drive is shipped with 12 ounces of gear oil. GB220-SHCG. The oil is a Mobil SCH220. **NO NOT USE ANY OTHER OIL.**
2. On the rear housing, there is a 3/8 NPT plug. See figure 4 below. Remove the plug and fill the gearbox up to the point it starts to come out of the fill hole. Using a clean oil can with a flexible nozzle is the easiest way to fill the gearbox.
3. Replace and tighten plug. Clean area of any oil.
4. Before installing the pump, run the PTO and Hydra-drive. Check for leaks.

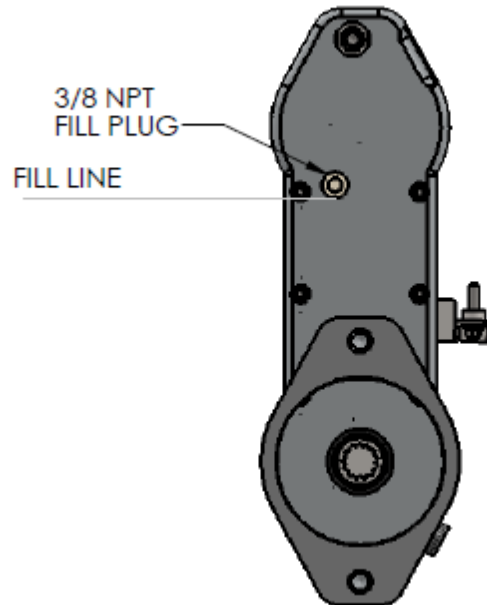


Figure 4

#### STEP 5

1. Before installing the pump to the Hydra-Drive swap the case fitting from the back to the side of the pump. See figure 5.
2. Remove the #8 SAE plug from the side of the pump and install the AQ262-0808 fitting.
3. Remove #8 long fitting from the rear of the pump and install the #8 SAE plug.

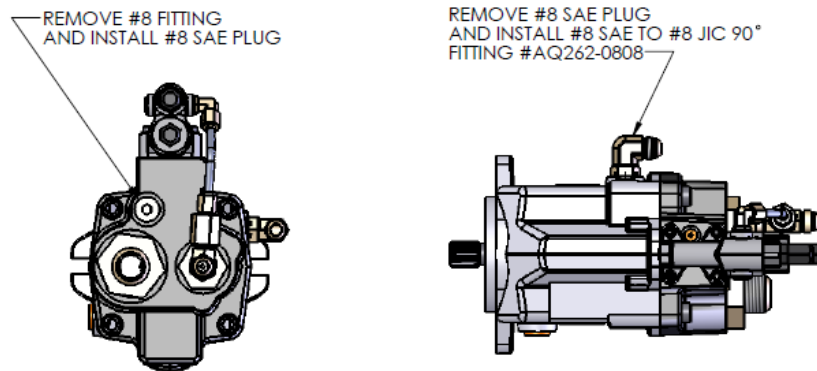


Figure 5

**STEP 6**

1. Grease female splines in Hydra-drive using the remaining Chelsea spline grease. Make sure to coat all the roots and valleys of the splines.
2. Replace the #8 run tee on the pump pressure port and replace it with a #8 branch tee supplied with the kit.
3. Remove the bolt from the port cap of the pump as shown in figure 6. This will be used to add the rear support bracket.
4. Install the SAE-B gasket # DQ712X256 to the pump pilot.
5. Install the pump to the Hydra-drive. Using the two 1/2" flat washers #DF990-0500 and the two hex head bolts #DF990-0513 (top bolt) and the #DF990-0527 (bottom bolt).
6. Torque the bolts to 55 ft. lbs.
7. Remove the 2 oil pan bolts needed to mount the rear support bracket.
8. Install the mounting bracket to the pump using the bolt DF990-4320 (7/16-14X2.0 SHCS) hand tighten.
9. Install the 2 spacers MC507-9251 using the 2 bolts DF990-6025M to the transmission oil pan.
10. Tighten the 7/16 bolt to 55 ft. lbs. and the 6mm bolts to 8 ft. lbs.
11. Install the suction and pressure hose to the pump.
12. Remove the case fitting and fill the pump case with oil.
13. Replace the case fitting and install the case drain hose.
14. Re-install drive shaft.



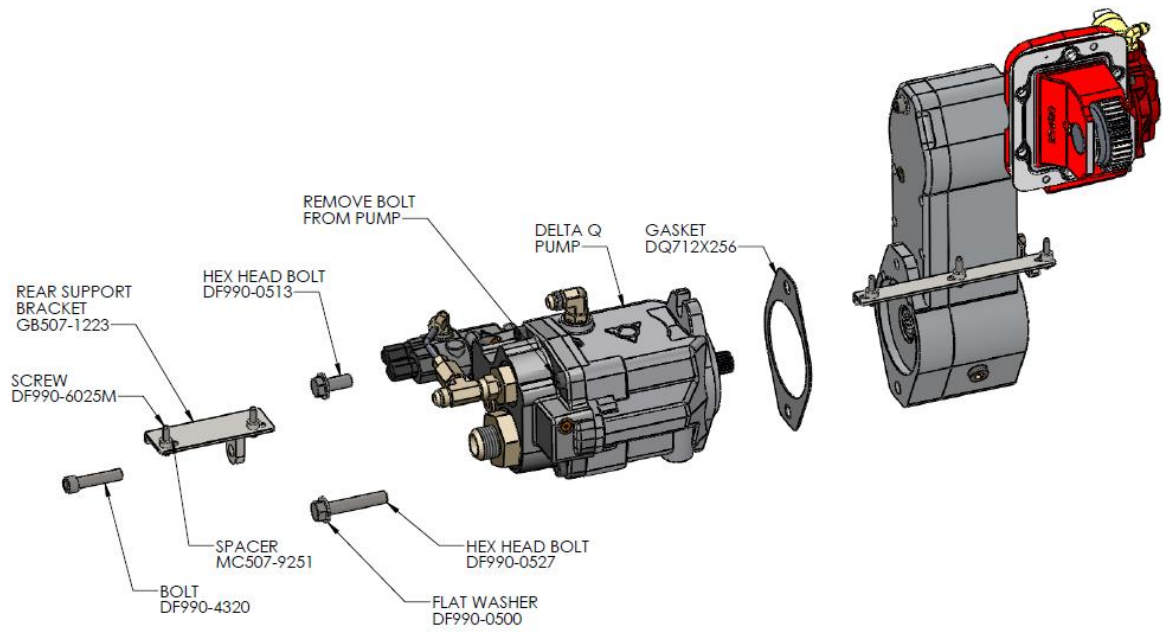


Figure 6