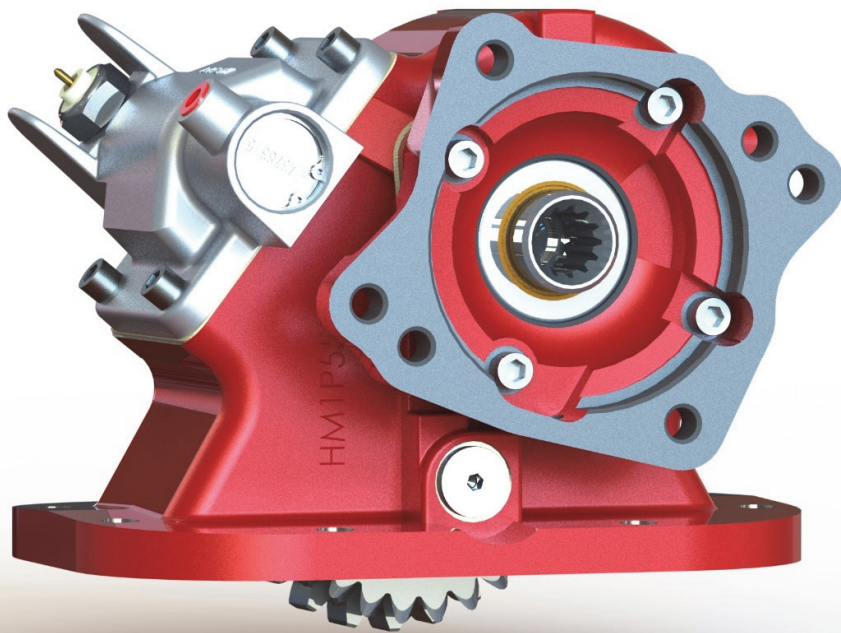
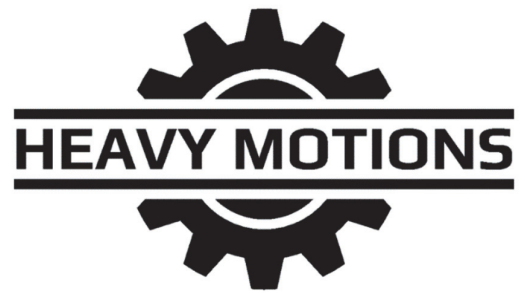




[INSTALLATION & OWNERS' MANUAL - POWER TAKE-OFFs]

HM589 Series

www.HeavyMotions.com

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SAFETY INFORMATION

Please read this manual carefully until you understand it before installing or using the Power Take Off (PTO).

- **The PTO must be properly matched with the vehicle's transmission and the driven equipment or it could cause severe damage to the equipment and/or may cause serious personal injury to the operator and others nearby.**
- **Exposed rotating driving shafts must have some form of guard to ensure safety.**
- **DO NOT go under the vehicle when the engine is running.**
- **DO NOT work on or near an exposed rotating shaft when the engine is running.**
- **DO NOT use worn-out or damaged components.**
- **DO NOT work alone while installing, repairing, or maintaining any equipment under the vehicle.**
- **Follow the proper procedure and use the proper tools and safety equipment.**
- **The operator should receive proper training regarding the PTO operation.**

PTO SAFETY LABELS

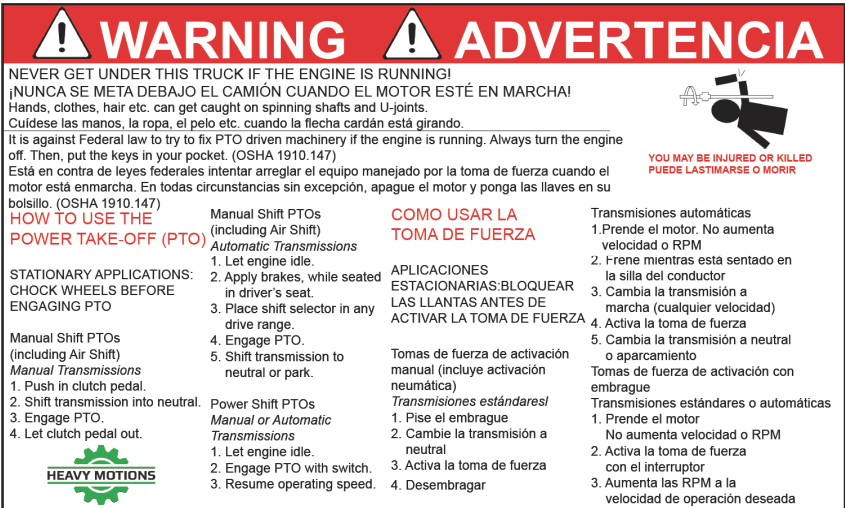
1. **Frame rail label.** Two frame rail labels are supplied. Place on the truck frame rails, one on each side, in a place where it could be easily seen by anyone going under the truck near the PTO.



2. **PTO Control Label.** Place close to the PTO cabin control valve or device.



3. **Visor Label.** Place on the visor near the driver.



PTO INSTALLATION

1. Drain the oil from the transmission and clean the cover plate and the surrounding area.
2. Remove the cover plate from the PTO aperture on the transmission (Fig. 1).
3. Inspect the transmission PTO drive gear to make sure it is in good condition.
4. With your hand, rock the PTO drive gear in the transmission and the input gear in the PTO assembly to establish the amount of backlash in each unit.
5. In order to prevent dirt from entering the transmission, put a rag in the aperture hole.
6. Remove the gasket on the transmission opening and clean the aperture using a putty knife or wire brush (Fig. 2).

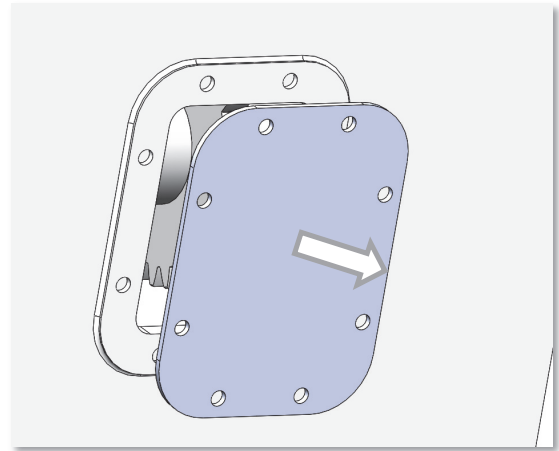


Fig. 1

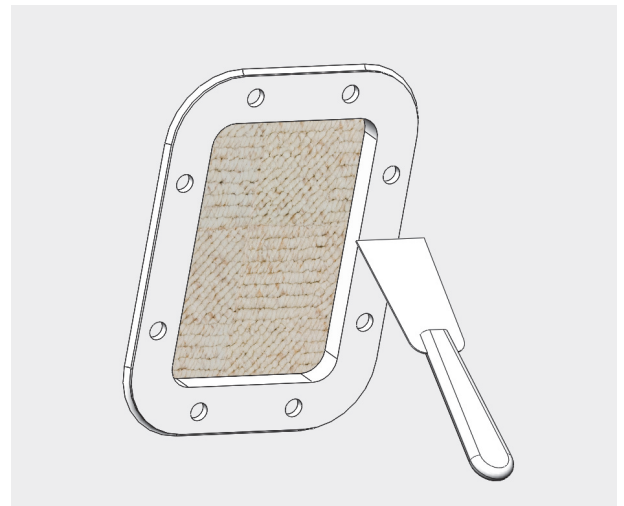


Fig. 2

7. Install the studs into the tapped holes of the transmission's PTO aperture (Fig. 3). **Make sure the studs do not interfere with the gears of the transmission.**
8. Torque the studs to 18-22 lbs.ft (24-30 N.m). **Over tightening the studs may damage the threads in the transmission housing.**

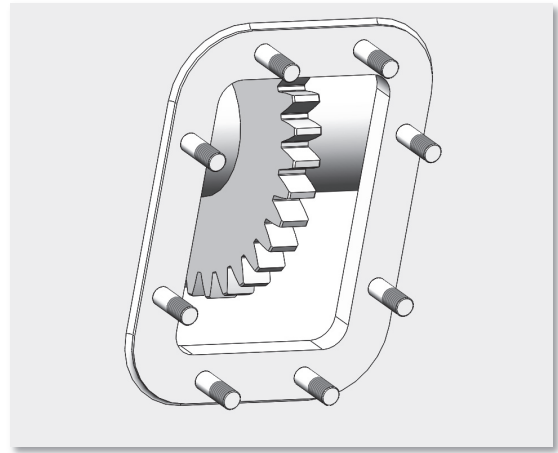


Fig. 3

9. Place the proper amount of gaskets (Use at least one gasket but do not stack more than 3 gaskets together) (Fig. 4). Usually one 0.020" gasket will be required, but more gaskets may be required when establishing proper backlash. Do not use gasket sealer because you may need to add or remove a gasket when adjusting the backlash.

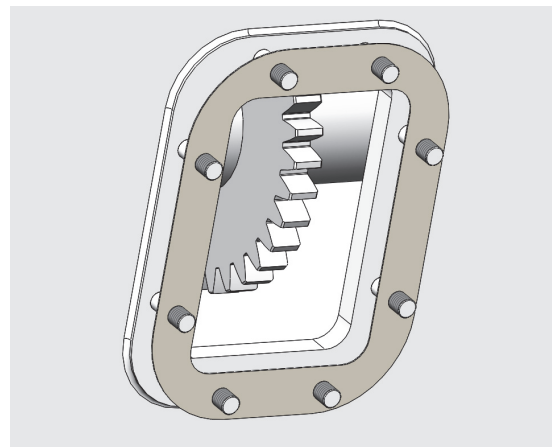


Fig. 4

10. Remove the shift cover from the PTO and mount the PTO on the transmission (Fig. 5). Make sure that the output shaft is on the desired position.

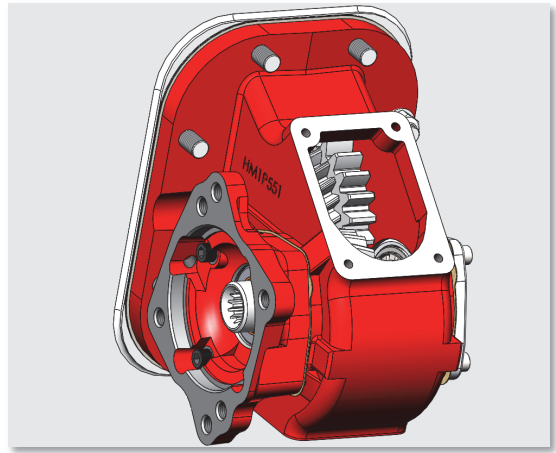


Fig. 5

11. Install the washers and nuts (Fig. 6). Torque the nuts to:
- 30-37 lbs.ft (40-50 N.m) on 6-bolt applications
 - 50-60 lbs.ft (68-80 N.m) on 8-bolt applications.

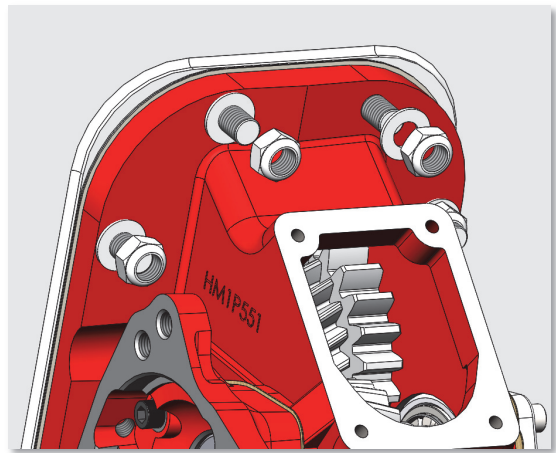


Fig. 6

CHECKING BACKLASH

1. Remove the PTO shift cover if it is still on the PTO.
2. Mount the dial indicator on the body of the PTO or the body of the transmission so it measures the movement of the PTO input gear. See Figure 7 for the proper location of the dial indicator contact point. Two common type dial indicators shown.

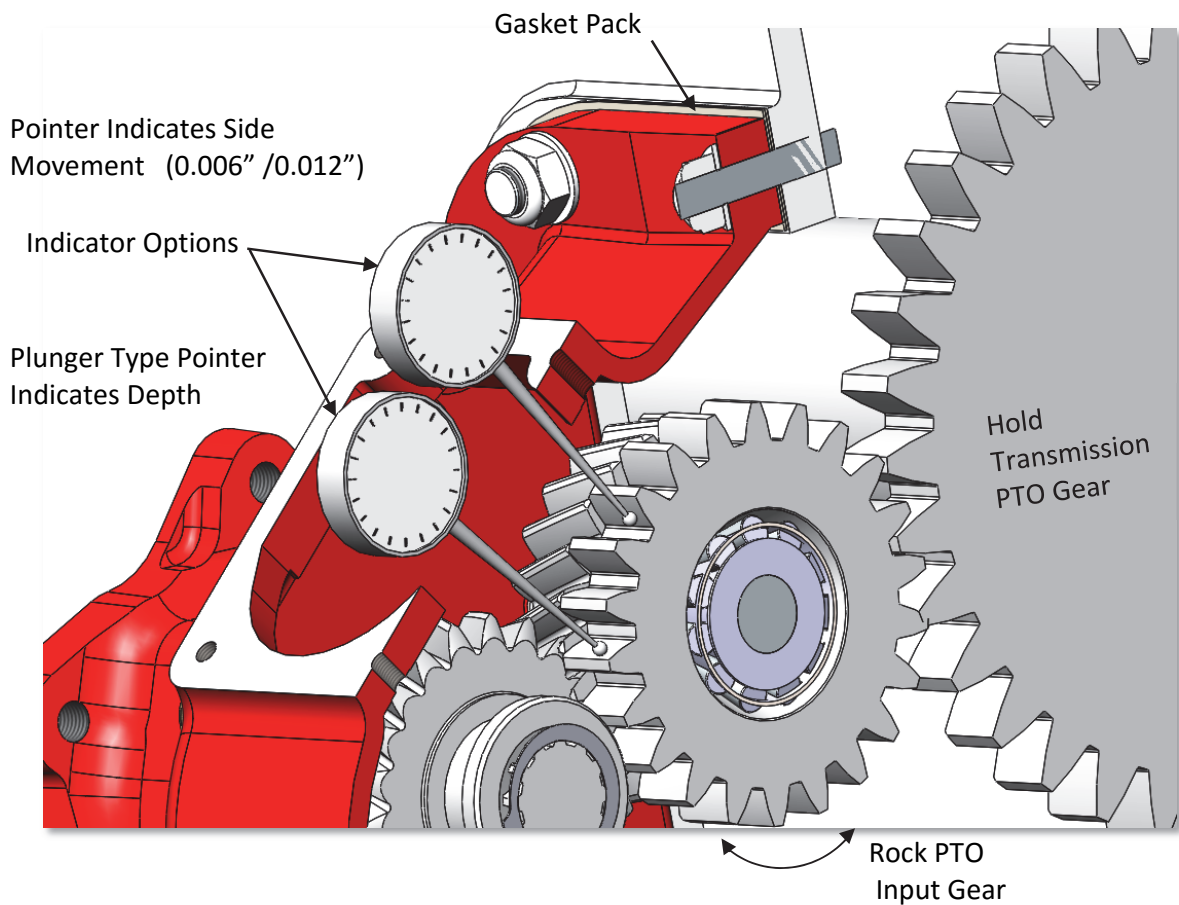


Fig. 7.

3. Make sure that the PTO drive gear in the transmission cannot move.
Hold it with a screw driver or bar.

4. Move the PTO input gear back and forth with your hand. Read in the dial indicator the measurement of the backlash.
5. The proper backlash should be 0.006" to 0.012" (0.15mm to 0.30mm). If the backlash is outside this range, adjust it by adding or removing gaskets.
 - If the backlash is too large, remove gaskets or select a thinner gasket.
 - If the backlash is too small, add gaskets or select a thicker gasket.

AIR SHIFT INSTALLATION

1. Place the shift cover gasket on the PTO aperture (Fig. 8).
Do not use silicone on the gasket.

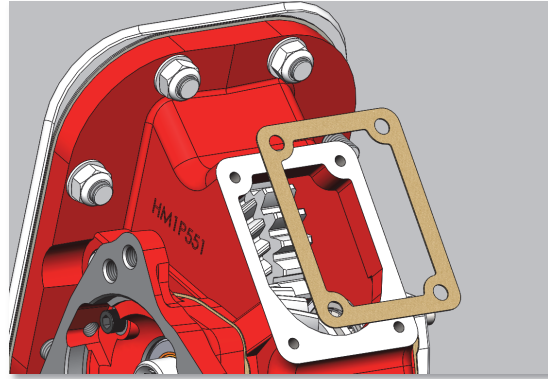


Fig. 8

2. Install the PTO shift cover so that the fork is on the same side of the output shaft.

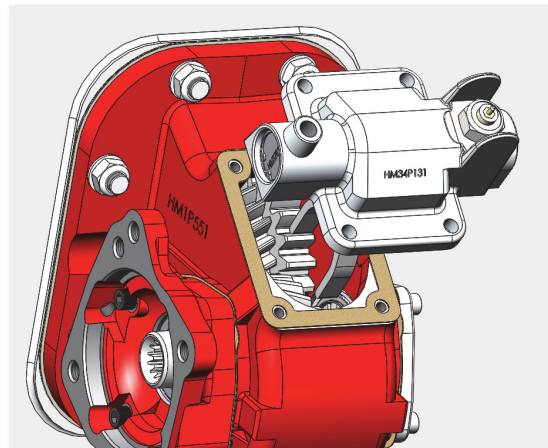


Fig. 9

3. Make sure the fork slides into the output gear groove (Fig. 10).

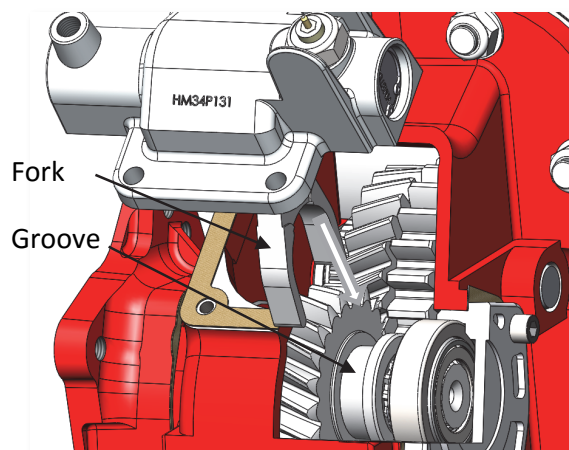


Fig. 10

4. Apply a drop of Loctite 290 on each cover bolt. Install bolts (Fig. 11).
5. Torque bolts to 16-20 lbs.ft (22-27 N.m).

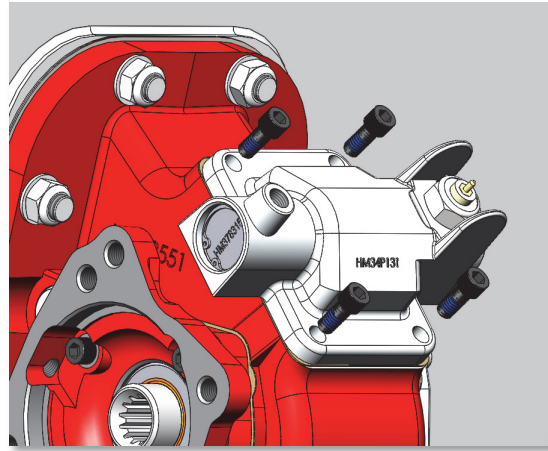


Fig. 11

6. Screw the air fitting into the shift cover (Fig. 12).
7. Install the nylon tubing that comes from the cabin control valve into the fitting (Fig. 12)

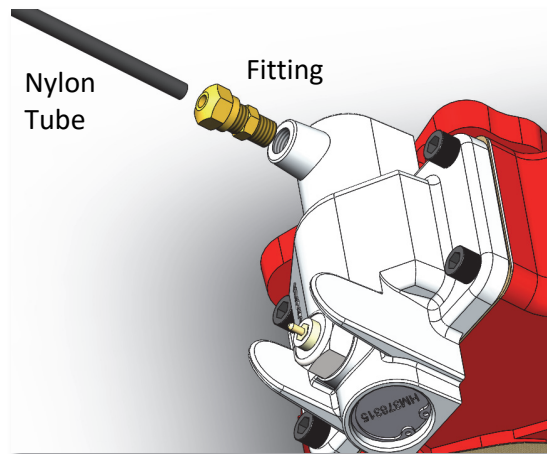


Fig. 12

Important:

- Make sure the air system has installed a pressure protection valve between the air source and the cabin control valve. It should open at 60-70 PSI.
- Connect the pressure protection valve directly to the air supply using a nipple. Do not use tubing.
- When installing the nylon tubing, avoid sharp angles, sharp edges, exhaust and manifold systems.

8. Connect the switch connector into the indicator switch (Fig. 13).

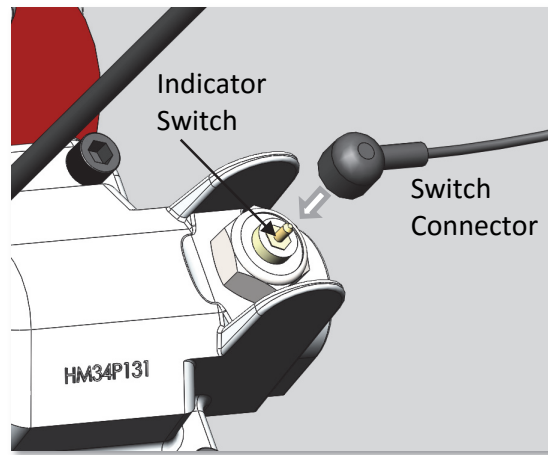


Fig. 13

9. Connect the nylon tube to the cabin single control valve or combo control valve air output (See the schematic supplied with the valve).
10. Connect the switch connector wire to the single control valve or combo valve indicator light connectors using butt connectors (See the schematic supplied with the valve).

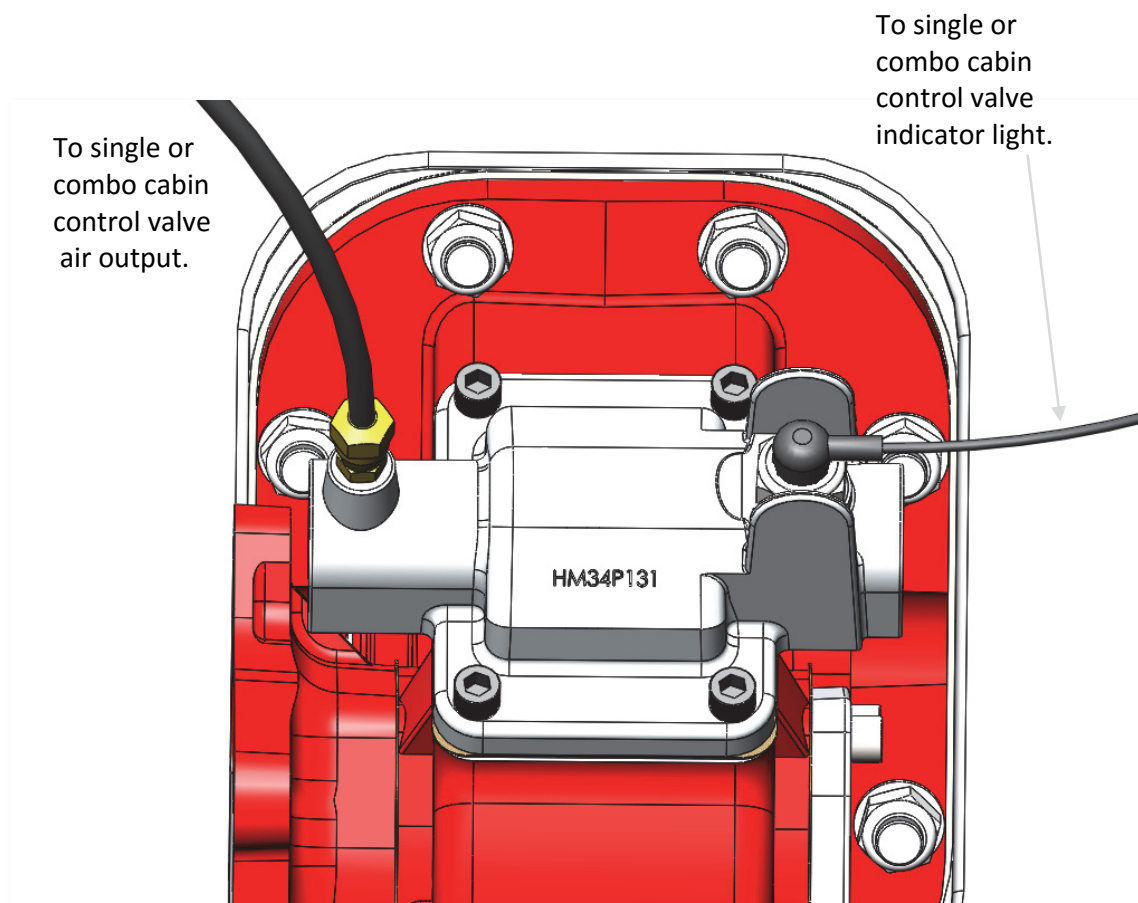


Fig. 14

**DO NOT FORGET TO REFILL THE TRANSMISSION WITH CLEAN OIL UP
TO THE PROPER LEVEL.**

PTO AND PUMP/DRIVEN UNIT ASSEMBLY

Direct Mount Pump

1. Grease the inner splines surface of the PTO output shaft with anti-fretting, high temperature, high pressure grease.
2. Install the pump into the PTO (Fig. 15). After making the pump and PTO splines match, insert the pump ensuring that the contact with the flange opening is good.
3. Rotate the pump so that the holes for the bolts on the pump flange and on the PTO flange are aligned (Fig. 16).

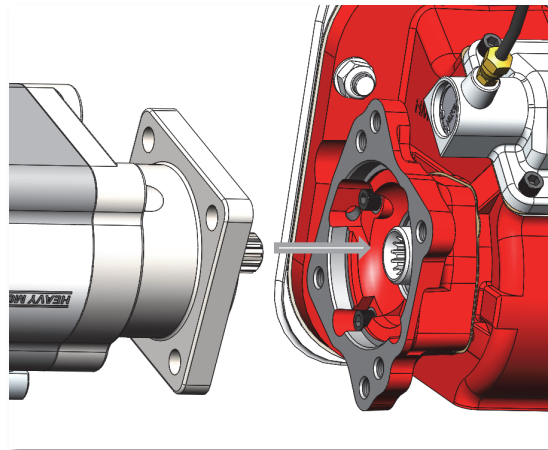


Fig. 15

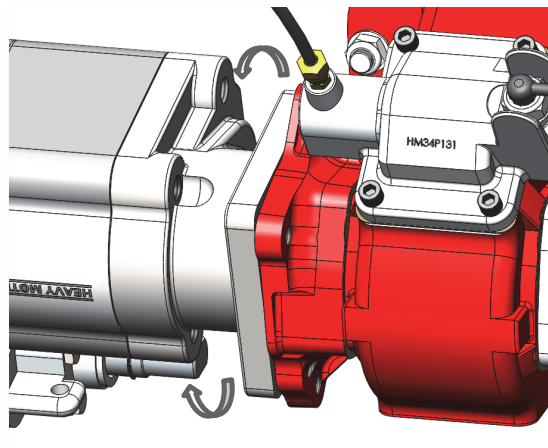


Fig. 16

4. Apply a drop of Loctite 290 on each bolt, install washers and bolts (Fig. 17).
5. **Tighten the bolts in opposite angles, not in sequence.** Torque bolts to 60-70 lbs.ft (82-94 N.m).

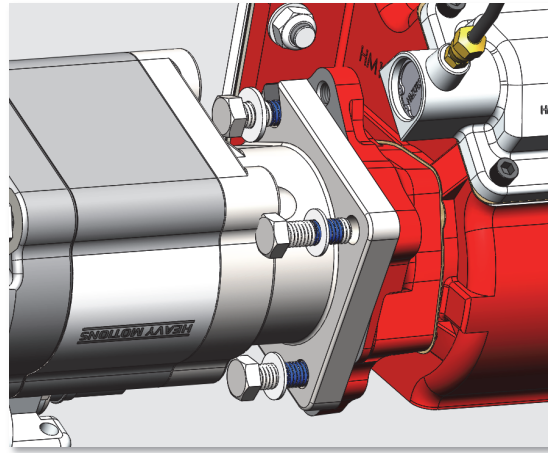


Fig. 17

Important: Use a pump bracket on the rear of the pump to help support the weight of the pump if:

- The combined weight of the pump, its fittings, and hoses exceeds 40 pounds (18 Kg).
6. The distance between the centerline of the PTO to the end of the pump is 18 inches (45 cm) or longer (Distance “D” Fig.18).

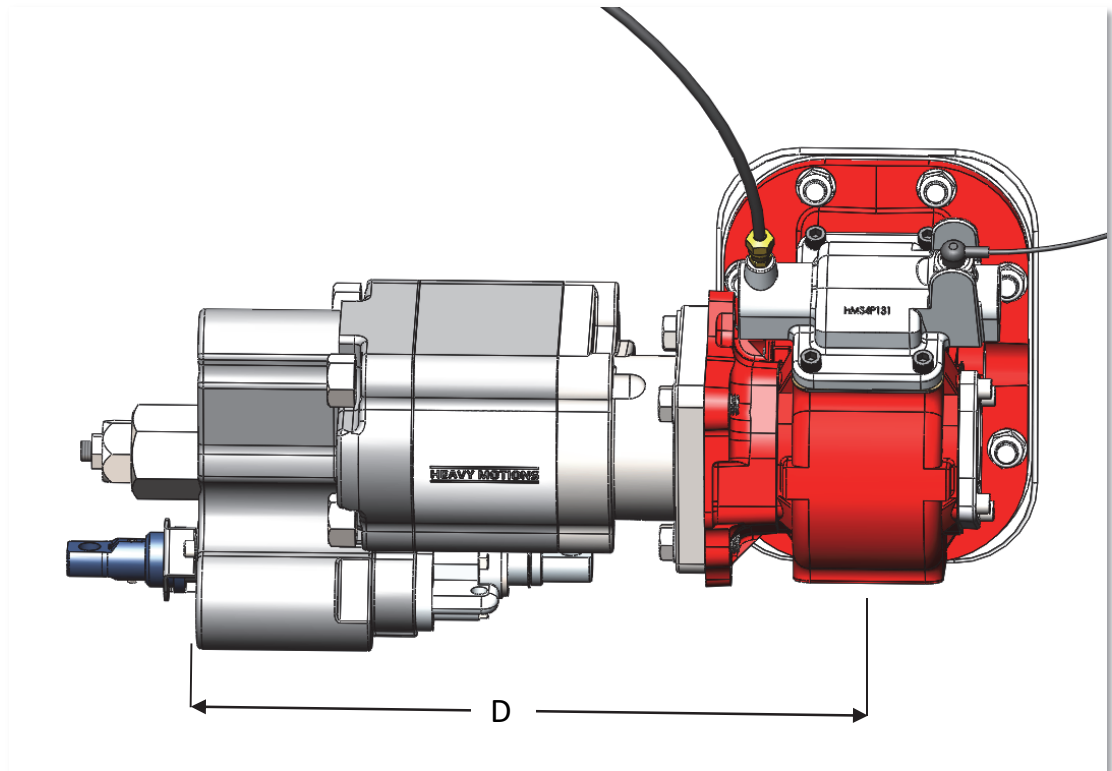


Fig. 18

The bracket must be attached to at least 2 transmission bolt locations and at least 2 pump locations. Make sure that the bracket does not preload the pump/PTO mounting.

PTO MAINTENANCE

To ensure a safe and trouble free operation, the owner and/or operator must perform the following periodic maintenance:

Daily:

- Look for air leaks, hydraulic leaks, and make sure the mechanisms are working properly. Perform repairs as required.

Monthly:

- Tighten all air, hydraulic and hardware to the proper torque.
- Direct Mount: Ensure that the PTO and Pump shaft splines are properly greased. Use anti-fretting, high temperature, high pressure grease only.
- Remote Mount: Check the PTO driveline components for an out of phase condition, excessive vibration, excessive u-joint angles or worn parts. Perform repairs as required.

PTO OPERATION

Important: Failure to follow the proper PTO operation will result in premature PTO failure.

Stationary Applications: Chock the wheels before engaging the PTO.

Manual Transmissions:

1. Push in the clutch pedal to disengage transmission and wait a few seconds so the transmission stops turning.
2. Shift the transmission into neutral.
3. Engage the PTO using the dash mounted valve.
4. Let clutch pedal out.

Automatic Transmissions:

1. Let engine idle.
2. Apply brakes.
3. Place shift selector in any drive range.
4. Engage the PTO using the dash mounted valve.
5. Shift transmission to neutral or park.

NOTE: Expect a slight increase in PTO noise level as oil thins out at operating temperature.



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