



RIGID LIFT

PUMP INSTALLATION MANUAL

**THIS MANUAL IS TO BE USED IN CONJUNCTION WITH THE APPROPRIATE
INSTALLATION & OPERATION MANUAL AND HOIST PARTS MANUAL.**

FOR PUMP PARTS PLEASE SEE PARTS LIST SUPPLIED WITH THE PUMP

**Harsh International, Inc.
600 Oak Ave.
Eaton, CO 80615
(970)-454-2291
Fax: (970)-454-3491**

Price: \$2.50

Manual Part Number: 102684E

IMPORTANT INFORMATION

Congratulations on your recent purchase of a Harsh Hoist! This manual is only a small part of Harsh's continuing effort to serve their customers and bring the best products possible to you the customer. If you have any questions or experience any problems, contact your local Harsh Distributor or the Harsh Factory.

This manual has been prepared to provide the owner and operator with the information required to properly install and operate the pump unit. It is important that you, the owner or operator, read this manual prior to installing, operating or performing any maintenance work on the unit.

For your convenience, we have provided this space for you to record your pump model and serial numbers and date of purchase as well as your dealership name and address.

Some of the information below is needed for ordering parts. Please fill in information for faster service when ordering.

Owners Name: _____

Owners Address: _____

Pump Model Number: _____

Pump Serial Number: _____

Purchase Date: _____

Dealer Name: _____

Dealer Address: _____

Dealer Telephone Number: _____

PUMP INSTALLATION TIPS

NOTE: The installation tips listed below may or may not apply to your particular pump model.

A. Be sure the pump is located close enough to the hoist so the hydraulic hoses will reach the required distance. If the hoses will not reach other hoses may be used, providing the hoses have an equal or greater rating than the hoses provided.

B. The proper pump assembly mounting location is between the truck frame rails. Mounting the pump assembly outside the frame rails is not recommended unless the pump PTO shaft assembly is completely shielded. Normally, the pump is mounted, and the cable routed and adjusted before the box is installed on the frame.

C. Do not position the pump or tank in the area of hot exhaust or exhaust pipes.

D. Be sure that the pump and/or tank will not interfere with the moving parts of the truck.

E. Allow adequate clearance for the safety cover shielding the pump valve lever. **This shield must be in place over the valve lever!**

F. Be sure to lockwire all set screws found on the universal joint yokes.

G. Make certain the drive shaft is straight and uniform before installing.

H. Consult the truck manufacturers specifications to determine if the truck power train & electrical systems are capable of handling

the PTO or electric pump you are using. The installer is responsible to follow all guidelines and procedures recommended by the truck manufacturer when making the pump installation.

I. When routing the control cable, never bend at less than a 10 inch radius. The cable should be kept as straight as possible during this operation.

J. Check the control cable and valve for smooth operation in both directions before attempting to raise the hoist.

K. Route the electric cable carefully to avoid sharp corners and other obstructions that could lead to damage of the cable.

L. Use only copper cable that has an oil and moisture resistant cover.

M. Insure that the ends of the cable are soldered, not crimped, to the proper cable terminals.

N. **DO NOT** connect the electric cable to the battery until the pump is totally installed and connected.

IMPORTANT:
Prior to operating any pump, you must read the complete Installation and Operation Manual including all safety information and operation procedures.

PUMP INSTALLATION

PTO Driven Pumps & Remote Located Tanks

1. Measure and determine the location and desired height of the pump/tank.
2. Bolt the pump brackets to the pump/tank and clamp the brackets to the truck frame in the desired location.
3. Check the pump shaft to insure that it is parallel within 1.5 degrees to the PTO output shaft (see Figure 1), and adjust as needed. Determine the drive line angle. The ideal drive line angle is 1 to 7 degrees. If this angle is greater than 15 degrees, relocate the pump to achieve a drive line angle less than 15 degrees (see Figure 2). Install the drive line insuring that the drive line yokes are in-line.

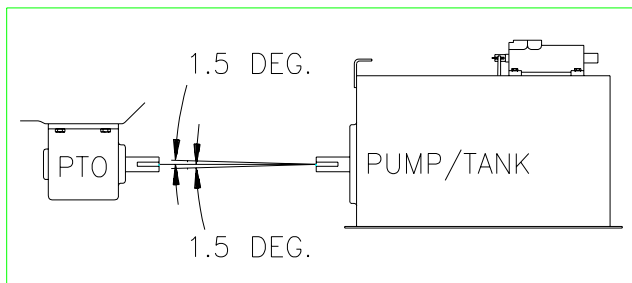


Figure 1: PTO-Pump Shaft Alignment

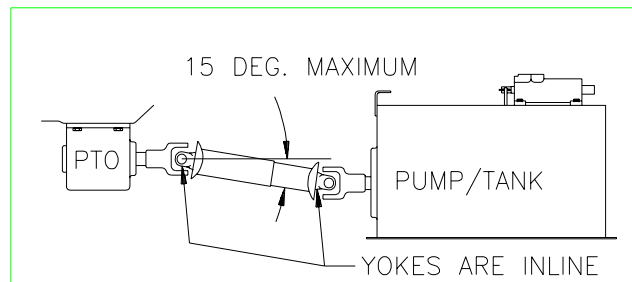


Figure 2: Drive Line Angle

NOTE: An improperly installed drive line will cause excessive noise and may result in an auxiliary power component failure. Under certain conditions, improper drive line alignment will cause jerking and galloping of the PTO/drive line system. This will cause:

- a) Excessive noise
 - b) Excessive vibration
 - c) Abnormal wear
 - d) Bearing and seal failure
 - e) Catastrophic failures
- (Example: PTO, pump, drive line)

IMPORTANT

SEE PAGE 7 FOR MORE INFORMATION ON THE ASSEMBLED DRIVE LINE

4. Drill and bolt the pump brackets to the truck frame. Add gussets or other support brackets to the pump brackets for extra strength. This keeps the pump from vibrating over rough terrain or from slight imbalances in the PTO drive shaft.

5. **PUSH-PULL STYLE** Before mounting the Cable Control Bracket, route the cable to the tank/pump to insure the cable is long enough. Install the Control Cable Bracket inside the truck cab and route the cable through the bracket and down to the control valve located on the top of the tank. Maintain a 10 inch minimum bend radius for the cable. A radius less than 10 inches will damage the cable. Cut off any excess cable housing and wire to avoid looping or excessive bends in the cable. Pull the cable control knob out until the centering lock snaps into place. Put the cable through the cable casing clamp and into the cable wire clamp.

PUMP INSTALLATION

Tighten the cable casing clamp in a new position that will allow the full movement of the valve lever when the cable knob is pulled.

With the spring-centered valve lever in neutral (centered), tighten the cable wire clamp (see Figure 3). Test the cable control both ways to insure that it works freely and return the control to neutral.

For tank and valve units, the hardware shown in Figure 3 is the same as that on tank/pump units.

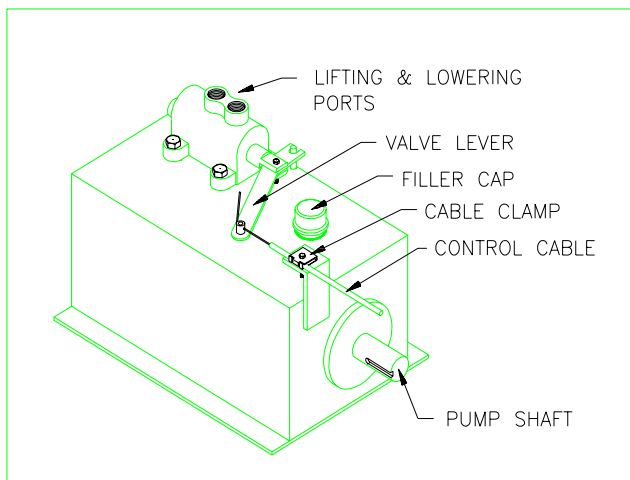


Figure 3: Pump Components

6. Cut off the excess cable wire leaving about 1 inch, from the cable wire clamp. Bend the remaining wire to prevent slippage. Attach the valve lever safety cover to the tank.

CONTROL-HANDLE STYLE Instructions are shipped with the tank.

7. When connecting the hoist plumbing, the valve lifting port (labeled 1 or B) is connected to the bottom of the cylinder to raise the hoist. The other port on the valve is the lowering port. For power up and power down hoists, this valve port is connected to the top portion of the hoist cylinder. For power up only hoists, this valve port is plugged off. Depending on the valve model, the valve may only have one port.

WARNING: Hoists which are power up and power down must not be made into power up only hoists!

Always insure that you pull the cable out to raise and push the cable in to lower.

CAUTION:
Read all safety and operation information provided by the PTO manufacturer. Observe these and all safety instructions.

CAUTION!

1. **DO NOT** go under the vehicle when the engine is running.
2. **DO NOT** work on a PTO or shaft while the engine is running.
3. **DO NOT** engage or disengage the PTO or driven equipment by hand from under the vehicle when the engine is running.
4. Always shut the engine off before working on or near the PTO system.

PUMP INSTALLATION

Electric Driven/Push Button Control Pumps

1. Measure and determine the location and desired height of the pump. Clean the mating surfaces of the truck frame and the pump brackets of paint, dirt, and oil to insure a good ground. An additional ground strap back to the battery may be added to prevent pump damage due to poor grounding.

2. Measure and drill the necessary holes in the pump bracket and bolt the pump brackets to the pump. Clamp the brackets to the truck frame in the desired location.

3. Drill and bolt the pump brackets to the truck frame. Add gussets or other support brackets if needed to the pump brackets for extra strength.

THE INSTALLER MUST CONSULT WITH THE TRUCK MANUFACTURER TO DETERMINE WHAT, IF ANY, OVERLOAD PROTECTION IS NEEDED IN THE PUMP WIRING CIRCUIT.

4. Route the push button cable through the truck body and down to the pump. Connect the wires from the push button

cable to the appropriate terminals on the pump (see pump instructions). The push button control must be installed inside the cab to insure it is out of the weather. This also insures the operator operates the hoist only from inside the truck cab.

5. Route a copper cable from the battery to the pump. Attach the cable to the proper terminal on the pump. Use the following table to determine the cable size.

Length of Cable	Size of Cable
0 - 10 ft.	0
10 - 15 ft.	00
15 - 25 ft.	000

For negative ground trucks, connect the battery end of the cable to the positive terminal of the battery.

6. Since HARSH uses various pump manufacturers you must consult the plumbing and electrical drawing supplied with the pump for the proper wiring of the unit and how to plumb the hoses. **The lifting port will go to the base of the cylinder body and the down port will go to the rod end.**

IMPORTANT: KEEP THE BATTERY PROPERLY SERVICED AND CHARGED
--

PUMP INSTALLATION

ASSEMBLED DRIVE LINE INSTALLATION

WHEN INSTALLING THE PUMP AND DRIVE LINE ATTEMPT TO POSITION THE PUMP SO THE FACE OF THE PUMP SHAFT IS **46 INCHES** FROM THE FACE OF THE PTO OUTPUT SHAFT. THIS WILL ALLOW INSTALLATION OF THE ASSEMBLED DRIVE LINE WITHOUT HAVING TO ADJUST ITS LENGTH. IF IT IS NOT POSSIBLE TO MOUNT THE PUMP IN THIS LOCATION, THE INSTALLER WILL NEED TO SHORTEN THE SHAFT FOLLOWING THE PROCEDURES LISTED BELOW.

INSURE THAT THE PUMP IS MOUNTED TO PROVIDE THE NECESSARY CLEARANCE FOR THE DRIVE LINE AND SHIELD TO ROTATE WITHOUT INTERFERENCE FROM ANY OBSTRUCTIONS.

MEASURE THE ACTUAL DISTANCE FROM THE FACE OF THE PUMP SHAFT TO THE FACE OF THE PTO SHAFT. SUBTRACT THIS MEASUREMENT FROM **46 INCHES**. **THE DIFFERENCE IS THE AMOUNT THAT THE DRIVE LINE MUST BE SHORTENED.** BOTH THE INNER AND OUTER SHIELDS AS WELL AS THE HEX SHAFT MUST BE SHORTENED BY THIS AMOUNT.

A. PULL THE TWO HALVES OF THE DRIVE LINE APART.

B. CUT THE NECESSARY AMOUNT OFF THE END OF THE INNER AND OUTER PLASTIC TUBES.

C. CUT THE SAME AMOUNT OFF THE END OF THE HEX SHAFT AND CHAMFER THE END OF THE SHAFT. BE CAREFUL NOT TO DAMAGE THE PLASTIC SHIELDS DURING THE SHORTENING PROCESS AS THIS MAY INTERFERE WITH THE PROPER OPERATION OF THE SHIELD.

D. SLIDE THE ASSEMBLY BACK TOGETHER AND INSTALL THE DRIVE LINE ON THE UNIT.

E. GREASE THE DRIVE LINE COMPONENTS.

PUMP INSTALLATION

HARSH DIRECT MOUNT PUMP INSTALLATION

THE DIRECT MOUNT PUMP HARSH SUPPLIES IS A BIROTATIONAL PUMP WITH A 13 TOOTH SPLINED SHAFT AND A 2 BOLT SAE”B” FLANGE. THE PUMP MOUNTS DIRECTLY TO THE PTO AND SHOULD BE POSITIONED SO YOU CAN USE THE SIDE AND/OR END PORTS. IT IS RECOMMENDED THAT YOU USE THE HARSH SUPPLIED TANK AND VALVE OPTION WITH THIS PUMP. IF YOU ARE NOT USING THE HARSH TANK AND VALVE THEN YOU MUST INSURE THE SYSTEM YOU USE MEETS ALL THE REQUIREMENTS OF THE HARSH HOIST YOU ARE INSTALLING.

THE PUMP IS BI-ROTATIONAL* AND WILL ROTATE EITHER DIRECTION. YOU MUST INSURE YOU HAVE THE INLET HOSE (FROM THE FRONT OF THE TANK TO THE PUMP) IN THE PUMP PORT THAT WILL ALLOW THE OIL TO ENTER THE PUMP AND FLOW AROUND THE GEAR TEETH. THE OIL DOES NOT FLOW BETWEEN THE TEETH. THE INLET LINE SHOULD BE AS CLOSE TO THE SIZE OF THE INLET FITTING AS POSSIBLE AND SHOULD BE A SUCTION HOSE WITH CRIMP FITTINGS.

THE PUMP HOSES ARE NORMALLY SUPPLIED BY THE INSTALLER, HOWEVER IN SOME CASES THE HOSES MAY BE SUPPLIED BY HARSH. IN BOTH CASES, THE HOSES SHOULD BE PLUMBED AS FOLLOWS: THE PRESSURE HOSE GOES FROM THE (OUTLET PORT OF THE PUMP TO THE SIDE PORT IN THE VALVE). THE CONTROL VALVE IS MOUNTED ON THE TOP OF THE TANK AND HAS A 3/8 INCH NPT PORT. YOU SHOULD USE AT LEAST A 1/2 INCH HOSE FROM THE PUMP TO THE VALVE. THIS HOSE MUST HAVE A WORKING PRESSURE RATING EQUAL TO OR EXCEEDING THE HOIST MAXIMUM PRESSURE SETTING. THE SUCTION HOSE SHOULD BE THE SAME SIZE AS THE PUMP PORT.

NOTE:

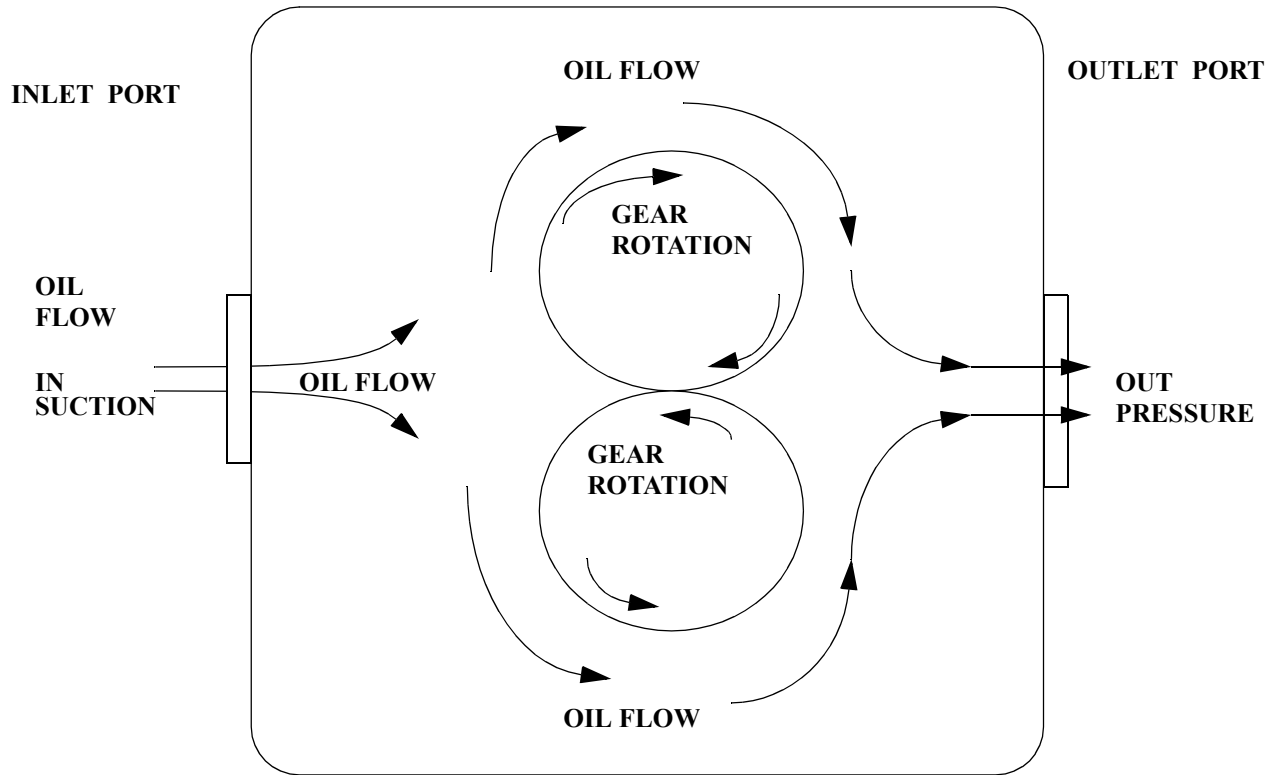
ALWAYS DOUBLE CHECK THE PTO ROTATION AND PUMP ROTATION TO INSURE YOU HAVE THE INLET AND OUTLET PROPERLY PLUMBED.

THE PUMP IS SUPPLIED WITH A SET OF PLUGS TO PLUG THE UNUSED PORTS.

* BI-ROTATIONAL MEANS THAT YOU DO NOT NEED TO TAKE THE PUMP APART TO REVERSE THE ROTATION. YOU SIMPLY NEED TO INSURE THAT THE HOSE FROM YOUR OIL SUPPLY TANK ATTACHES TO THE PORT THAT ALLOWS THE OIL TO FLOW AROUND THE TWO GEARS WHEN THE PTO IS OPERATING.

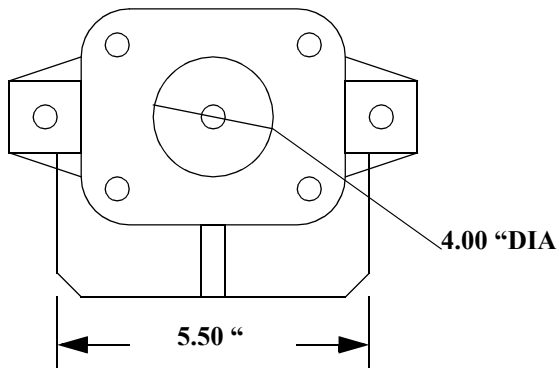
PUMP INSTALLATION

DIRECT MOUNT PUMP

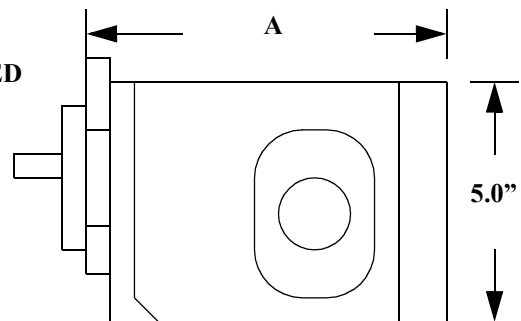


CHECK THE PTO AND PUMP ROTATION. THE GEARS MUST PULL THE OIL IN THROUGH THE INLET PORT, AROUND THE OUTSIDE OF THE GEARS, AND PUSH IT OUT THE PRESSURE PORT. IF YOUR ROTATION IS OPPOSITE THE ABOVE VIEW THEN THE GEARS WILL TURN THE OTHER DIRECTION AND THE INLET AND OUTLET PORTS WILL BE REVERSED KEEPING IN MIND THAT THE OIL AGAIN MUST FLOW AROUND THE GEARS AND NOT BETWEEN THEM.

SAE "B" 2 BOLT FLANGE



**7/8 " SPLINED
13 TOOTH
SHAFT**



A= 102997 8GPM - 6.44 "
A= 102998 13GPM - 6.94 "

NOTES

