# INSTALLATION & MAINTENANCE MANUAL
# FOR
# ENPO
# NON-CLOG DRY PIT PUMPS

Vertical Mounted

Vertical Frame

Vertical Coupled

Frame

Close Coupled

## ENPO PUMP CO
## WARRANTY

Each unit is warranted to be free from defects in material and workmanship under normal use, service and application. We will make good at our factory, or our nearest authorized service outlet without charge, any such unit or part which shall, within one year after date of installation be forwarded via prepaid transportation cheapest way and which our inspection shall disclose to our satisfaction to have been defective. This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part.

This warranty does not apply to any unit or part which shall have been repaired or altered outside our factory or authorized service agent in any way which, in our judgment, affects its quality, or which has been subject to careless handling, tampering, misuse, accident or faulty or improper installation or application. If service is required, do not use the unit or in any way disassemble. Forward the unit to the nearest authorized ENPO service outlet or direct to the factory via prepaid transportation, cheapest way.


ENPO -GINEERED -WER

**Enpo Pump Company** A DIVISION OF
**Roper Industries, Inc. (Ohio)**
420 EAST THIRD STREET, PIQUA, OHIO 45356

# LOCATION

Place the pump as near to the pumpage source as possible.

Provide a concrete foundation that will drain and keep the motor dry and clean.

It is most desirable to provide a complete housing that will protect against all weather conditions such as sun rays, rain, freezing, winds and snow. If complete housing is not possible or practical, be sure there is adequate covering or shade that will protect against sun rays to avoid adding heat to the motor, and showers which could cause dampness in the motor.

Provide ventilation which positively allows free air movement to dissipate motor heat.

For operation in rainy, high humidity weather or in cold weather conducive to condensation, forced air circulation is the best protection. For severe conditions, such as in humid underground pumping stations, the use of a dehumidifier is necessary to obtain adequate motor protection.

Provide screening over ventilation and other entrances to exclude rodents or other animals from nesting in the motor.

Provide protection as may be required from vandalism and for children or animals that may be hurt in moving parts or electrical wiring.

Follow all local, state and federal code requirements governing the installation and operation.

# SUCTION PIPING AND FITTINGS

Suction piping should be equal or larger than the pump suction size, never smaller. Use eccentric reducers with straight side up. Keep number of fittings to a minimum. Avoid using an elbow any closer to the pump than four times the diameter of the suction pipe.

The highest point in the suction line should be at the pump. Eliminate high points. Use one pipe size throughout reducing only at the pump with an eccentric reducer (straight side up).

Check the pump, suction fittings and all suction piping for bolts, rocks, wire, crating material, rodents nests and other debris. Eliminate burrs from cutting, welding or tapping pipe which will interfere with water flow.

Submergence should be at least four times the diameter of the suction pipe. If this can't be obtained, suitable baffling will be required to prevent vortexing which can cause damage.

Falling water and aeration near the suction must be avoided to prevent air from entering the pump. Use baffling if required to allow air to separate from the pumpage.

Piping should be lined up squarely and freely with the pump and supported so that strain is not transmitted to the pump.

## DISCHARGE PIPING AND FITTINGS

Use discharge fittings the size of the pump's discharge then increase with tapered concentric fittings.

Piping must be lined up and supported so that strain is not transmitted to the pump.

## STUFFING BOX PACKING

With new packing, tighten the gland nuts evenly and "finger tight" only, allowing rather free leakage. After about five minutes and when the pump is at full pressure, tighten the gland nuts until leakage is reduced to 15 to 25 drops per minute. Do not shut off all leakage. New packing may swell — loosen the gland to maintain leakage.

Occasionally, it will be necessary to further tighten the gland nuts to control leakage.

When the take up on the gland nuts is exhausted, remove the gland, add one ring of new packing. After two rings have been added and exhausted, the old packing will have lost its lubricant and become hard. If the packing is tightened too much at any time, it will also lose its lubricant. When this occurs, remove all the old packing and repack with new. Stagger the packing joints and tamp in each packing ring evenly as it is added. When repacking, examine the shaft and replace the sleeve if worn or pitted. If the sleeve is replaced, use a dial indicator to determine that the shaft has not been bent in the replacement.

## LANTERN RING

A lantern ring is standard on all models with packing. A sealant cup is furnished on all pumps with a lantern ring. Tighten the sealant cup cap before priming. Refill with Garlock compound No. 2 or equivalent. In repacking, position the lantern ring beneath the pipe tap opening.

## MECHANICAL SEALS

On pumps employing a double mechanical shaft seal, first open the shut off valve on the discharge of the pump, then open the vent plug on the stuffing box. Apply power and allow the pump to run until a steady flow of water is emitting from the vent plug, then close vent plug, leaving the discharge shut off valve open. Periodic cleaning of the filter will be necessitated by the degree of contamination in the pumpage. (Note: Running seals dry will destroy them.)

## ROTATION

Check when power is connected. Rotation should be in the same direction as the discharge nozzle. If rotation is wrong, on three-phase motor correct by interchanging any two lead wires; for single phase, check motor wiring diagram.

## BALL BEARING LUBRICATION

**General:** Lubrication requirements vary with speed, power load, ambient temperatures, exposure to contamination and moisture, seasonal or continuous operation and other factors. The brief recommendations which follow are general in nature and must be coupled with good judgment and consideration of the application conditions.

**Electric motors:** To lubricate electric motor bearings, remove relief grease plug. Using hand-operated grease gun only, pump grease into fittings until new grease appears at relief hole. Be sure that grease fittings are absolutely clean. Use ball bearing grease only — not machinery grease. Lubricate only when motor is not running. Start motor — bearings will become unusually hot until excess grease escapes from the relief hole. Run for twenty minutes or longer if required to remove excess grease and cool bearings to normal operating temperatures. Then replace relief grease plug.

## RECOMMENDED REGREASING PERIODS G. E. Bulletin 1816

| TYPE OF SERVICE | HORSEPOWER RANGE 1½-7½ | 10-40 | 50-150 |
|---|---|---|---|
| Easy — motors operating infrequently (1 hour per day) | 10 years | 7 years | 4 years |
| Standard — water pumps | 7 years | 4 years | 1½ years |
| Severe — 24 hours per day, 365 days per year; severe vibration | 4 years | 1½ years | 9 months |
| Very Severe — dirty, vibrating applications; high ambient | 9 months | 4 months | 4 months |

For seasonal operation, with shut down periods exceeding five months, field observations and good judgment indicate that regreasing is beneficial once a year before putting the unit into service.

**Frame Pumps:** All frames are greased at the factory before shipping.

**End of season:** Open bottom plug. Fill housing full of grease. Pump in grease until old grease is expelled. Replace plug. Store.

**Beginning of season:** Open bottom plug. Start up motor. Let motor run until surplus grease is thrown out and bearing cools down. Replace plug. No further greasing until motor is stored again.

# FRAME PUMPS, TYPE F — GREASE LUBRICATED

| TYPE OF SERVICE | FRAMES | | |
|---|---|---|---|
| | 2-3-4-9 | 6-7-8<br>60B4-62B4-VC | 12 |
| NORMAL DUTY ..... | 8 months | 6 months | 4 months |
| HEAVY DUTY ..... | 4 months | 3 months | 2 months |
| Approximate Amount of grease | 1 Tablespoon | 1½ Tablespoons | 2 Tablespoons |

To lubricate frame bearings, remove plastic cover from zerk fittings and be sure the fitting and end of grease gun are clean. Use hand operated grease gun only and pump a small amount of grease into each bearing cavity. The surplus grease will go through the bearing and into the center part of the frame. For regreasing periods, use the above chart for a guide.

Grease used for these bearings should be equivalent to one of the following manufacturers' products:

G.E. Long Life Grease No. D6A2C5
Shell — Retinax A
Mobil — Mobillux No. 1
Richfield — Rocolube No. 1
Texaco — MarFak MP No. 2

**Frame Pump, Type FK — Oil Lubricated Bearings:** The ball bearings are lubricated by oil in the frame housing. Use Mobile DTE #797, Shell Turbo #27, Standard Teresso #43, or equal for oil temperatures up to 150° F. or intermittent operation. Use Mobile Extra Heavy, Shell Turbo #69, Standard Teresso #65, or equal for temperatures over 150° F. (Viscosity should be a minimum of 70 SSU at operating temperature.) Add oil through the pipe plug opening at the top of the housing and fill to the level indicated on the side of the housing. Be careful to keep out dirt. The oil level must be maintained. Check and fill when pump is not operating.

**Seals:** Grease with ball bearing grease (Mobilux No. 1 or equal) at the grease fittings placed in the bearing covers at either end of the frame. Grease after 48 hours operation. A very small amount of grease is required each time.

**Packing:** Keep the grease cup filled with No. 2 Garlock or equal grease.

# ALIGNMENT OF FLEXIBLE COUPLINGS

It is not commercially feasible to furnish bed plates which, when placed on an uneven foundation, will not spring and cause misalignment. It is therefore necessary to support them on foundations that can furnish the required rigidity.

Misalignment causes whipping of the shaft, adds thrust to bearings, leads to excessive maintenance and potential failure of equipment. If pumps are ordered with drivers, they are aligned before shipment; however, it is imperative that alignment be carefully checked prior to placing pump in operation. This is done after securing to bed plate or foundation, and making pipe connections.

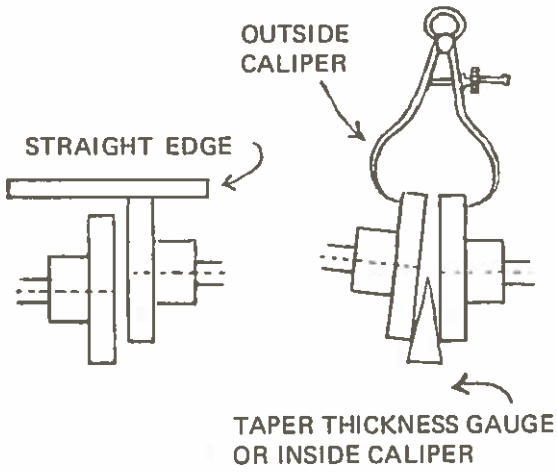
Flexible couplings must permit some lateral floating of the shafts to take care of thermal expansion and so move without excessive thrust on bearings.

Numerous types of flexible couplings are available. Some are easier to align than others, but all serve the purpose of connecting two shafts capable of transmitting torque while allowing for minor misalignment, (angular, parallel or a combination).

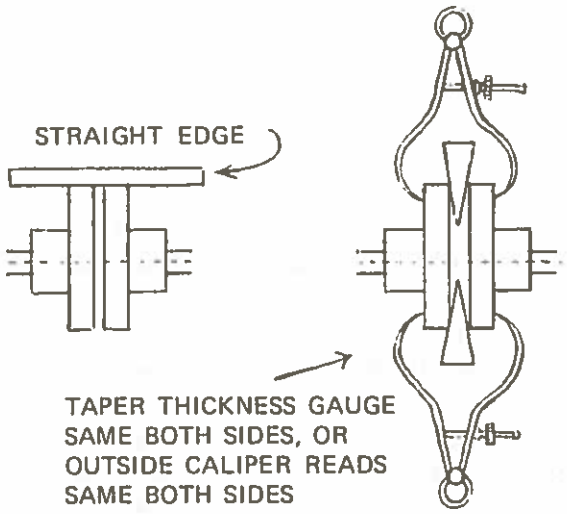
Do not assume the word flexible means the couplings are designed for misalignment. Couplings can be lined up by use of a straight edge, inside caliper, thickness gauge or outside caliper. The two ends of the coupling must be concentric and the sides parallel with no angular misalignment.

Coupling guards are stationary enclosures surrounding a coupling with a basic function of protecting the operator. For reasons of safety, do not operate the pump unless the guard is in place.

INCORRECT ALIGNMENT




CORRECT ALIGNMENT

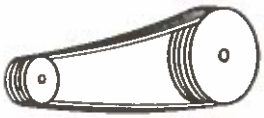


# BELT DRIVES

1 Use a matched set of V-Belts

2 Clean oil and grease from Sheaves
Remove rust and burrs

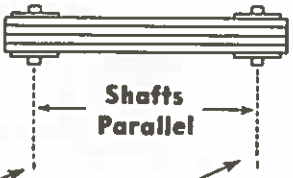
3 Slack off on take-up until belts can be placed in grooves without forcing



Not this

4 Tighten the take-up until the belts are snug.

5 Align sheave grooves like this

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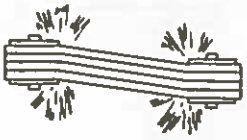
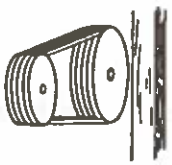


6 Align shafts like this

Not this

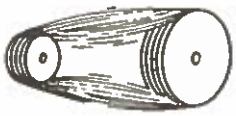
7 Give drive room to run — This



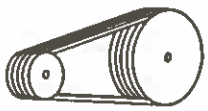
Not this

8 Run drive at full speed and adjust take-up until only slight bow appears in slack side of belts. Vertical drives, drives with extremely short centers, and drives carrying pulsating loads must be operated tighter than others.

Never use belt dressing –



If the belts slip, they are too loose



Tighten them up

9 Give belts a few days running time to become seated in sheave grooves – then readjust take-up

10 Store belts in clean, cool, dark place

11 Be safe – Use belt guards

# ELECTRIC MOTOR CARE

Under normal conditions, ball bearings will reach a temperature from 10° to 55° F. above the surrounding temperature. Unless the temperature reaches 125° F. or more above the ambient temperature, there is no cause for alarm. Check the motor nameplate for maximum ambient temperature.

It is suggested that when the motor is first placed in operation, the temperature rise be carefully observed. If the motor becomes excessively hot, an amp reading should be taken to determine the exact load the motor is carrying as well as the voltage supplied at motor terminals when the motor is in operation.

Dirt or grease should not be allowed to accumulate on the windings. Any accumulation should be removed at regular intervals, care must be taken to avoid winding insulation damage.

Be sure to check the wiring diagram furnished with the electric motor for proper connections for voltage available. Check unit for rotation and if wrong, follow motor instructions for changing. Each motor should have a separate entrance switch, located near the motor. Be sure the wire sizes leading to the motor are correct for size of motor and voltage used.

Ideal location for motor is where the air is clean, cool and dry with proper air circulation. Page 4 outlines greasing.

# TROUBLES AND THEIR CAUSES

**Failure to Pump**

1. Pump not properly primed
2. Wrong direction of rotation
3. Speed too low
4. Total head too high
5. Not enough reserve head to open check valves
6. Air leaks

**Reduced Capacity and/or Head**

1. Air pockets or leaks in the suction line
2. Obstruction in suction line or impeller
3. Insufficient submergence for the suction pipe
4. Total head more than that for which the pump is intended
5. Excessively worn impeller and wearing rings
6. Too high suction lift

**Overloading the Driving Unit**

1. Head much lower than that for which pump is intended
2. Speed too high — higher than that contemplated
3. Liquid handled of higher specific gravity or greater viscosity than that of water
4. Too large diameter of impeller
5. Low voltage

**Mechanical Troubles and Their Causes**

1. Misalignment
2. Bent shaft and/or damaged bearings
3. Suction and discharge piping not properly supported and anchored
4. Impeller screw loose or broken off
5. Material lodged in impeller
6. Excessive suction lift or vapor binding (hot water)