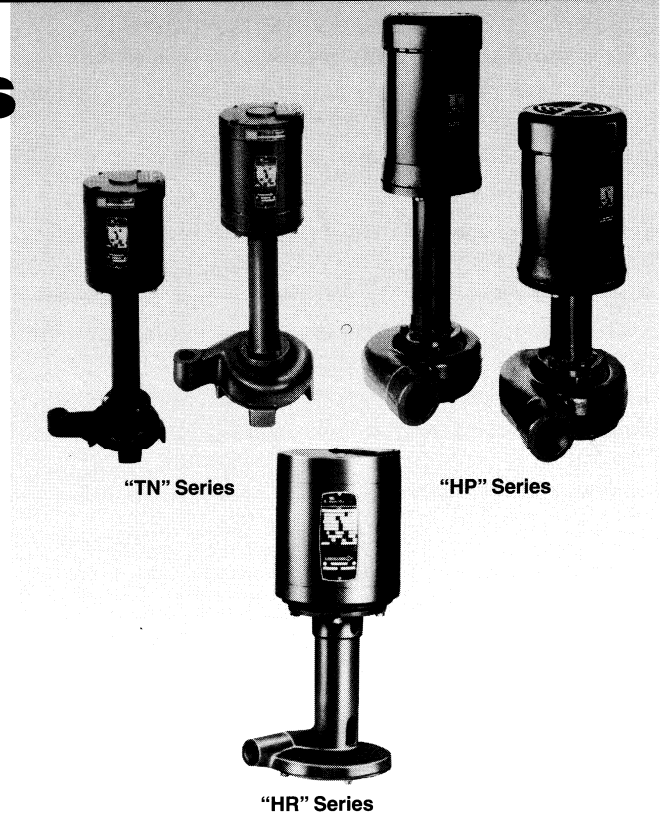


# Graymills

## Centrifugal Pumps TN, HR, HP Series

### Operations and Maintenance Instructions



### WARNINGS/CAUTIONS

Read all these **SAFETY INSTRUCTIONS** and those in the manual **BEFORE** installing or using this equipment. Keep this manual handy for reference/training.

- Pump may be heavy. If in doubt, take appropriate precautions.
- Motor must be grounded and suitable for the environment in which it is used. Only explosion-proof electrical or air operated motors can be used in solvent environment. If an explosion-proof motor is supplied on this pump it is suitable for Class 1, Group D atmosphere ONLY. If in doubt, check locally or call Graymills.
- Proper installation of electrical junction boxes is extremely important to the electrical integrity of the motor and electrical system.
- Do not allow liquids to come into contact with the motor, or any electrical components.
- Never attempt any service work while the unit is still connected to any electrical power source.
- This pump contains rotating parts. Use caution.
- When working in or around pump, be aware of what liquid is/has been pumped. If liquid is potentially harmful, take appropriate precautions.
- Air motor must have filtered and lubricated air. An air regulator is also recommended. Order Graymills part number FRL-1.
- For proper operation, maintain proper air pressure.
- Remove air supply line before doing any service on pump or motor.
- Do not hit or attempt to straighten shaft on air motor.
- Always use proper muffler.
- Never use the junction box or any other part of the wiring/electrical system to lift or move the equipment. **This could cause a failure of the electrical system, resulting in severe shock or death.**
- Do not operate this pump or allow others to operate it until the instructions and warnings have been read and are understood by all people involved.

**Never work with equipment you feel may be unsafe. Contact your Supervisor immediately.**

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## DESCRIPTION

HR Series pumps have a bottom intake and liquid is drawn in through the bottom and discharged at relatively low pressure. HP and TN Series have a double-suction liquid intake with the pump drawing liquid through intakes above and below the impeller. The top of the impeller must be covered to assure satisfactory pump-ing. Maximum liquid level is 1" below the bottom of the motor. Minimum liquid level is 1" above upper pump intake.

Centrifugal pumps will deliver a large volume of liquid at low pressures. The flow rate is influenced greatly by viscosity or restrictions such as small piping and numerous fittings. It is advisable to use pipe or hose of the same size as the pump discharge and, if restrictions must be made, do so as close to the point of application as possible. Needle and globe type valves greatly restrict the flow. Gate valves or other types with wide opening and minimum restrictions are recommended. A street "EL" also offers unusual resistance and should not be used.

Centrifugal pumps of this type will handle a relatively large amount of foreign material without damage to the pump because there are no seals or bearings in the liquid. If sediment is allowed to build up around the lower portion of the pump, the impeller housing will become clogged and binding may occur which can damage the motor or the impeller. Where substantial quantities of foreign material will be present and may settle out, make sure the pump is mounted well off the bottom and baffled to prevent this accumulation around the impeller.

Graymills Centrifugal Pumps may be throttled to provide whatever flow is required. There is no need for a bypass or relief valve. The pump uses less horsepower as flow is reduced.

Some extra long models have an outboard bearing at the bottom of the pump through which a shaft extends. When wear occurs, this bearing is easily replaced. A sleeve on the outside of the pump shaft may also be replaced.

## MAXIMUM VISCOSITY RANGE FOR SAFE OPERATION

These pumps are designed for liquids of relatively light viscosity. See catalog for maximums.

The maximum viscosities given above are recommended for standard pumps, however special Centifugals with higher horsepower may be used for higher viscosities. If the viscosity is too heavy, the motor will overload and will burn out unless overload protection has been installed. Overload protection is, therefore, recommended.

Pumps will deliver less flow as the viscosity increases. Temperature may affect viscosity. A viscosity of 100

SSU oil, for example, may increase substantially as it gets colder.

Pumps with rotary air motors cannot be overloaded but will merely slow down or stall if viscosity is too heavy or if binding occurs.

## TEMPERATURE LIMITATIONS

Pumps with GM2GG plastic impellers can be used with temperatures up to 180°F, and with cast iron impellers temperatures higher than that will not harm the pump but the motor must be protected from overheating. Maximum ambient temperature for electric motors is 40°C (104°F).

## ELECTRICAL CONNECTIONS

All pump motors must be grounded.

Check the name plate on the pump and be sure it corresponds to the electrical current being used. For 3 phase motors, check the direction of rotation to make sure it is wired to run in **counterclockwise** direction when viewed from top of motor. Standard electrical ratings for 3 phase motors are 230/460 Volts, 60 Hz and 190/380 Volts, 50 Hz.

Standard, totally enclosed or open motors cannot be used in hazardous locations or liquids. Graymills may be able to provide explosion-proof motors for such purposes.

## MAINTENANCE

Any coolant system used with machine tools accumulates deposits of metallic chips, grinding dust, and sediment. For this reason, the containers of your coolant systems should be cleaned periodically to prevent damage to the pump and motor and to provide clean liquid for application.

**Do not restrict the vents on open motors and keep oil and chips from accumulating around the motor.**

Graymills Centrifugal Pump Motors do not require lubrication. Pumps furnished with non-standard motors requiring lubrication have instructions on the motor.

If pumps are used with liquids such as adhesives or abrasive slurries, make sure they are flushed with the proper solvent after use. **Keep solvents or cleaners away from the motor, lower motor bearing and wiring.**

## TROUBLE SHOOTING

What to check if flow is reduced below rated output:

- Check the rated delivery of this pump. If there is any question about the flow rate refer to the catalog.
- Check the intake to make sure nothing is blocking the entrance of liquid into pump.

- Check hoses to make sure there is no crimping or unusual restriction.
- Check the viscosity of liquid. The heavier the viscosity, the lower the flow rate.
- Check the voltage and cycle. (Low voltage causes reduced RPM.)
- Check rotation of motor if a 3 phase motor is used.
- Make sure the pump impeller section is immersed in the liquid.
- Check for binding within the body of the pump, caused by rags, strings, or chips.
- Make sure pump intake is not in the sludge or slurry, and is not directly on the bottom of the container, thus

#### **WHAT DETERMINES "HEAD"**

The "head" against which a pump operates is made up of the total resistance, resulting from (1) fittings, valves, and other restrictions, (2) the resistance created by friction in the pipe and resulting from internal friction caused by flow rate and the viscosity of the liquid, (3) the height to which the liquid must be raised. "Head" does not mean merely height. 10' head equals 4.3 PSI.

## **DISASSEMBLY**

1. Remove cap screws and lower volute or cover plate.
2. Remove cotter pin, impeller nut, and impeller. Some impellers are secured to the shaft by a set screw instead of an impeller nut. To remove impeller, loosen set screw and pull impeller off.
3. Remove nuts holding the pump to the motor and carefully slip the pump body away from the motor and shaft.

## **REASSEMBLY**

### **TN Series With Double Suction Impellers**

1. Assemble the pump body to the motor.
2. Place the impeller spring on the end of the shaft, then follow with the washer and impeller. Impellers have "top" and "bottom" embossed in the mold. The top of the impeller should go towards the motor. Looking at the bottom of the impeller towards the bottom of the motor, the impeller will be turning in a clockwise position with the blades trailing.
3. Screw on the impeller nut until the impeller touches the upper part of the pump casting. Then back off the nut slightly until there is clearance. The impeller should not rub on any metal surface. The fit need not be precise. Under no conditions force the impeller against the casting, nor permit the spring to push it against the

lower part of the casting. There should be clearance at both top and bottom.

4. Replace the bottom volute cover plate. Turn the impeller with your finger to make sure it is running freely, not binding and rubbing. If it runs freely, replace the cotter pins to secure the impeller nut and then bolt the lower volute to the pump body.

### **HR Series Pumps With Bottom Suction Impeller**

1. 1/25 HP motors have two bolts. When assembling the pump body to the motor, use care in drawing the bolts up snugly but not with excessive pressure which will strip the motor bolts from the motor itself. With a smaller motor, the pump shaft may require minor alignment within the pump casting so that the impeller runs true; for that reason do not tighten motor bolts all the way until you have made sure of this alignment. There is some play in the adjustment of the motor on the pump column that will permit correct alignment.
2. Reassemble the pump body to the motor, press the impeller on the shaft until the clearance between the back of the impeller and the pump casting is 1/32". Turn the pump in operating condition with the motor up to make sure impeller is not rubbing on top of volute.
3. Replace gasket and volute cover plate; then turn the impeller with your finger to make sure it is running freely without binding or rubbing. Screw the bottom volute intake cover into place securely.

### **HP Series With Double Suction Impellers**

1. Assemble volute and column assembly to the motor.
2. Replace shim washers and install shaft key. Install impeller so that blades trail when impeller is rotated clockwise.
3. Install washer, impeller and castle nut; tighten until castle nut aligns with cotter pin hole in shaft. Do not install cotter pin at this time. Rotate impeller and check to see that it is not rubbing.
4. Assemble gasket and cover plate, and again check to make sure impeller is not rubbing. If impeller rubs in step 3 or 4 add or remove shim washers to adjust impeller clearance.
5. Install cotter pin, turn pump upright and double check impeller clearance by rotating shaft.

## **HOW TO ORDER PARTS**

Give model number of pump. If model number cannot be determined, the motor serial number, horsepower, speed and type will help. Approximate date of purchase will also help. Give serial or lot number of pump.

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