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Graymills

FM Series Centrifugal Pumps

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 sutable 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 with 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.

DESCRIPTION

FM Series pumps have 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 pumping. Maximum liquid is 1" below the bottom of the mounting flange.

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 matter 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 and there is no need for a bypass or relief valve. The pump uses less horsepower as flow is reduced.

MAXIMUM VISCOSITY RANGE FOR SAFE OPERATION

FM pumps are designed for liquids of relatively light viscosity. The maximum viscosity for larger pumps of 1/8 HP or more is 500 SSU. Special models may operate at higher viscosity if the horsepower is increased.

The maximum viscosities given above are recommended for standard pumps, however special Centifugals with increased horsepower may be used for higher viscosities.

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.

If the viscosity is too heavy, the motor becomes overloaded and will burn out unless overload protection has been installed. Overload protection is, therefore, recommended.

Pumps deliver less flow as viscosity increases. Temperature often affects viscosity. The viscosity of oil, for example, increases substantially as it gets colder which could cause the motor to be overloaded.

ELECTRICAL CONNECTIONS

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 using. **Keep solvents or cleaners away from motor, lower motor bearing and wiring.**

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

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 direction with the blades trailing.
3. Now 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. Never force the impeller against the casting. There should be clearance at both top and bottom.
4. Now 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.

TROUBLE SHOOTING

What to check if flow is reduced below rated output:

- 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 restricting intake.

ASSEMBLY, PUMP AND TANK UNITS

Four bolts and nuts and optional nylon pushin fasteners are furnished with FM pump and tank units for fastening pump to tank cover.

To assemble, lower pump shaft through hole in tank cover as shown and secure with furnished hardware.

Drops through 4 1/2" hole and mounts on integral flange.

NOTE: You may wish to unbolt tank cover for easier assembly.

HOW TO ORDER PARTS

Give model numbers 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.

WARRANTY

Graymills Corporation warrants that the equipment manufactured and delivered hereunder when properly installed and maintained shall be free from defects in workmanship.

This warranty does not apply to damages or defects caused by operator carelessness, misuse, abuse, improper application, or abnormal use; the use of add-on parts or equipment which damages or impairs the proper function of the unit and modifications made by Buyer.

Graymills' obligation under this warranty shall be limited to:

1. Replacing or repairing pumps, motors, tanks and structural parts within one year from the date of installation or 13 months from the date of shipment, whichever occurs first. The decision to replace rather than repair shall be made by **Graymills Corporation**;
2. Replacing or repairing components supplied by but not manufactured by **Graymills**, to the extent such components are warranted by the original manufacturer's warranty and provided that Buyer gives Graymills prompt written notice within ninety days of any defect or failure and satisfactory proof thereof.

Before **Graymills** can repair or replace a defective part under warranty, call Graymills for a Return Merchandise Authorization number (RMA number must appear on outside of package or it will be refused). Upon prepaid return to **Graymills'** factory, **Graymills'** examination must disclose such part to be defective.

This warranty does not apply to expendable parts needing replacement periodically due to normal wear. A new warranty period shall not be established for repaired or replaced materials, or products. Such items shall remain under warranty for only the remainder of the warranty period of the original materials or products. **Graymills** warrants the the equipment will function mechanically as quoted in the published specification. **Graymills** does not warrant process performance nor does **Graymills** assume any liability for equipment selection, adaptation, or installation.

The foregoing warranties are in lieu of all other warranties whether oral, written, expressed, implied, or statutory. Implied warranties of fitness for a particular purpose and merchantability shall not apply. **Graymills'** warranty obligations and Buyer's remedies thereunder (except to title) are solely and exclusively stated herein. In no case will **Graymills** be liable for consequential damages, loss of production or any other loss incurred due to interruption of service.

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