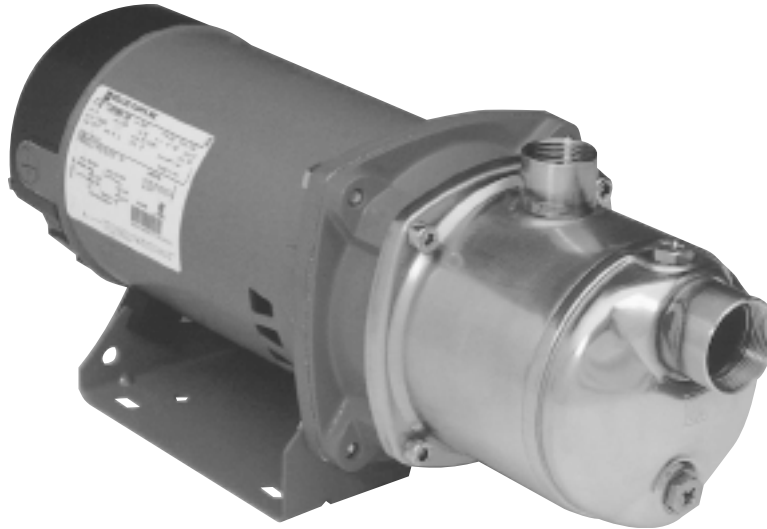


# Installation, Operation and Maintenance Instructions

# Model HMS



## Owner's Information

Please fill in data from your pump nameplate.  
Warranty information is on page 8.

Pump Model: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Dealer: \_\_\_\_\_

Dealer's Phone Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Installation Date: \_\_\_\_\_

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## Description and Specifications

The Model HMS is a close coupled, end suction, multi-stage centrifugal pump for general liquid transfer service, booster applications, etc. Liquid-end construction is all AISI Type 316 stainless steel, stamped and welded. Impellers are fully enclosed, non-trimmable to intermediate diameters. Casings are fitted with diffusers for efficiency and for negligible radial shaft loading.

All units have NEMA 48Y or 56Y motors with square flange mounting and threaded shaft extension.

## 1. Important Instructions

- 1.1 Inspect unit for damage. Report any damage to carrier/dealer immediately.
- 1.2 Electrical supply must be a separate branch circuit with fuses or circuit breakers, wire sizes, etc., in compliance with National and Local electrical codes. Install an all-leg disconnect switch near pump.

**CAUTION: ALWAYS DISCONNECT ELECTRICAL POWER WHEN HANDLING PUMP OR CONTROLS.**

- 1.3 Motors must be wired for proper voltage. Motor wiring diagram is on motor nameplate. Wire size must limit maximum voltage drop to 10% of nameplate voltage at motor terminals, or motor life and pump performance will be lowered.
- 1.4 Always use horsepower-rated switches, contactor and starters.
- 1.5 Motor protection
  - 1.5.1 Single-phase: Thermal protection for single-phase units is sometimes built in (check nameplate). If no built-in protection is provided, use a contactor with a proper load. Fusing is permissible.
  - 1.5.2 Three-phase: Provide three-leg protection with properly sized magnetic starter and thermal overloads.
- 1.6 Maximum Operating Limits:
  - Liquid Temperature: 230°F (110°C)
  - Working Pressure to: 125 PSI (8 Bar)
  - Starts per Hour: 20, evenly distributed
- 1.7 Regular inspection and maintenance will increase service life. Base schedule on operating time. Refer to Section 8.

## 2. Installation

- 2.1 Locate pump as near liquid source as possible (below level of liquid for automatic operation).
- 2.2 Protect from freezing or flooding.
- 2.3 Allow adequate space for servicing and ventilation.
- 2.4 All piping must be supported independently of the pump, and must “line-up” naturally.

**CAUTION: NEVER DRAW PIPING INTO PLACE BY FORCING THE PUMP SUCTION AND DISCHARGE CONNECTIONS.**

- 2.5 Avoid unnecessary fittings. Select sizes to keep friction losses to a minimum.
- 2.6 Units may be installed horizontally, inclined or vertically.

**CAUTION: DO NOT INSTALL WITH MOTOR BELOW PUMP. ANY LEAKAGE OR CONDENSATION WILL AFFECT THE MOTOR.**

2.7 Foundation must be flat and substantial to eliminate strain when tightening bolts. Use rubber mounts to minimize noise and vibration.

2.8 Tighten motor hold-down bolts before connecting piping to pump.

## 3. Suction Piping

3.1 Low static suction lift and short, direct, suction piping is desired. Consult pump performance curve for *Net Positive Suction Head Required*.

3.2 Suction pipe must be at least as large as the suction connection of the pump. Smaller size will degrade performance.

3.3 If larger pipe is required, an eccentric pipe reducer (with straight side up) must be installed at the pump.

3.4 Installation with pump below source of supply:

3.4.1 Install full flow isolation valve in piping for inspection and maintenance.

**CAUTION: DO NOT USE SUCTION ISOLATION VALVE TO THROTTLE PUMP.**

3.5 Installation with pump above source of supply:

3.5.1 Avoid air pockets. No part of piping should be higher than pump suction connection. Slope piping upward from liquid source.

3.5.2 All joints must be airtight.

3.5.3 Foot valve to be used only if necessary for priming, or to hold prime on intermittent service.

3.5.4 Suction strainer open area must be at least triple the pipe area.

3.6 Size of inlet from liquid source, and minimum submergence over inlet, must be sufficient to prevent air entering pump through vortexing. See Figures 1-4.

3.7 Use 3-4 wraps of Teflon tape to seal threaded connections.

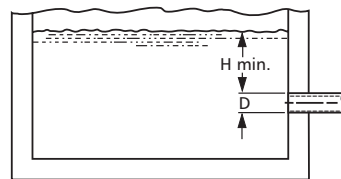


Figure 2

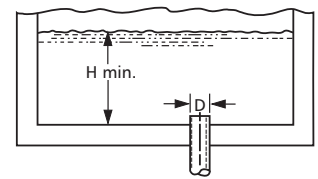


Figure 3

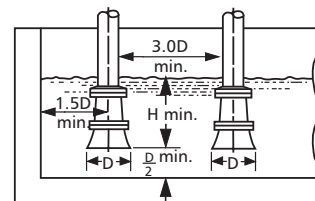


Figure 4

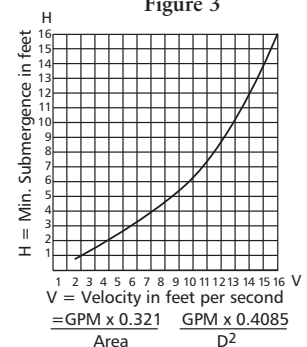


Figure 5

## 4. Discharge Piping

- 4.1 Allowance should be made for disconnecting discharge piping near casing to allow for pump disassembly.
- 4.2 Arrangement must include a check valve located between a gate valve and the pump. The gate valve is for regulation of capacity, or for inspection of the pump or check valve.
- 4.3 If an increaser is required, place between check valve and pump.
- 4.4 Use 3-4 wraps of Teflon tape to seal threaded connections.

## 5. Rotation

- 5.1 Correct rotation is right-hand (clockwise when viewed from the motor end). Switch power on and off quickly. Observe shaft rotation. to change rotation:
  - 5.1.1 Single-phase motor: Non-reversible
  - 5.1.2 Three-phase motor: Interchange any two power supply leads.

## 6. Operation

- 6.1 Before starting, pump must be primed (free of air and suction pipe full of liquid) and discharge valve partially open.
- 6.2 Make complete check after unit is run under operating conditions and temperature has stabilized. Check for expansion of piping.

## 7. Maintenance

- 7.1 Ball bearings are located in and are part of the motor. They are permanently lubricated. No greasing required.

**CAUTION: PUMPED LIQUID PROVIDES LUBRICATION. IF PUMP IS RUN DRY, ROTATING PARTS WILL SEIZE AND MECHANICAL SEAL WILL BE DAMAGED. DO NOT OPERATE AT OR NEAR ZERO FLOW. ENERGY IMPARTED TO THE LIQUID IS CONVERTED INTO HEAT. LIQUID MAY FLASH TO VAPOR. ROTATING PARTS REQUIRE LIQUID TO PREVENT SCORING OR SEIZING.**

## 8. Disassembly

- 8.1 Complete disassembly of the unit will be described. Proceed only as far as required to perform the maintenance work required.
  - 8.1.1 Turn off power.
  - 8.1.2 Drain system and flush if necessary.
  - 8.1.3 Disconnect discharge pipe from pump.
  - 8.1.4 Remove motor hold-down bolts.
- 8.2 Disassembly of liquid end
  - 8.2.1 Drain the pump body through the drain plug (4).
  - 8.2.2 Remove the casing screws (1) from the motor adapter (17).
  - 8.2.3 Remove the pump body (2) and the o-ring (15) located between the pump body and the seal housing (16).
  - 8.2.4 Remove motor fan cover (24) to expose wrench flats or slot on shaft end.

**CAUTION: DO NOT INSERT SCREWDRIVER BETWEEN THE FAN BLADES TO PREVENT ROTATION.**

8.2.5 Hold motor shaft at flat or slot to resist rotation and remove impeller nut and washer (5, 6).

8.2.6 The following parts can now be removed from the pump shaft in sequence: Diffuser with o-ring (7, 9), impeller spacer (8), impeller (10), impeller spacer (8), etc. until the complete "hydraulic element" is dismantled. Note: Each diffuser contains an o-ring (4).

8.2.7 Remove the shoulder washer (13) from the pump shaft (18).

**NOTE:** Further disassembly will require removal of the mechanical seal. It is recommended that a new mechanical seal be installed at reassembly.

8.2.8 Carefully pull the rotary portion of the mechanical seal (14) from the shaft coupling (19).

8.2.9 Remove the seal housing (16) from the motor adapter. The stationary portion of the mechanical seal (14) can now be removed from the seal housing.

8.2.10 Remove the motor screws (21) from the motor adapter and remove the motor adapter from the motor.

8.2.11 To remove the pump shaft (18) from the shaft coupling (19), heat must be applied to the small end of the shaft coupling. This is required to break the bond of the Loctite #271 between the pump shaft and coupling.

**CAUTION: DO NOT DAMAGE THE SMALL END OF THE SHAFT COUPLING WHERE THE MECHANICAL SEAL SITS.**

Hold the motor shaft at flats or slots to resist rotation. Repeat for removal of the shaft coupling from the motor shaft, this time heating the large end of the shaft coupling.

## 9. Reassembly

9.1 All parts should be cleaned before reassembly.

9.2 Refer to parts list to identify required replacement items. Specify pump index or catalog number when ordering parts.

9.3 Reassembly is the reverse of disassembly.

**NOTE:** The impeller spacers must be assembled with the larger diameter edge adjacent to each impeller. The last stage diffuser (12) can be identified from the standard by the holes around its circumference, it is recommended that one of these holes be lined up with the discharge port. Fix the hydraulic element by tightening the impeller screw (5) and impeller washer (6) with a torque setting of 6 lb. ft. Position the o-ring (15) on the mechanical seal housing (16), locate the pump body (2) and fit it to the motor adapter (17) with the four screws (1). Torque setting 7.5 lb. ft.

Observe the following when reassembling the pump:

9.4 Check for shaft runout. Maximum permissible is .002" TIR.

9.5 Apply Loctite 'Primer N' and Loctite #271 to motor shaft, thread coupling shaft in place and torque to 30 lb.ft. of torque.

9.6 Lubricate shaft coupling and seal housing stationary seat holder with a 50/50 glycerin and water solution prior to installation of mechanical seal components.

9.7 Apply Loctite 'Primer N' to pump shaft and Loctite #271 to pump shaft. Thread pump shaft in place and torque to 30 lb. ft. of torque.

9.8 Inspect casing o-ring (15) and impeller o-rings (9) for damage or wear and replace if necessary.

9.9 O-rings may be lubricated with glycerin and water solution or petroleum jelly to ease assembly.

9.10 Tighten casing screws to 10 lb.ft. of torque using a star pattern to prevent o-ring binding.

## 10. Troubleshooting Guide

### MOTOR NOT RUNNING

(See causes 1 through 6)

### LITTLE OR NO LIQUID DELIVERED

(See causes 7 through 17)

### POWER CONSUMPTION TOO HIGH

(See causes 4, 17, 18, 19, 22)

### EXCESSIVE NOISE AND VIBRATION

(See causes 4, 6, 9, 13, 15, 16,18,20, 21, 22)

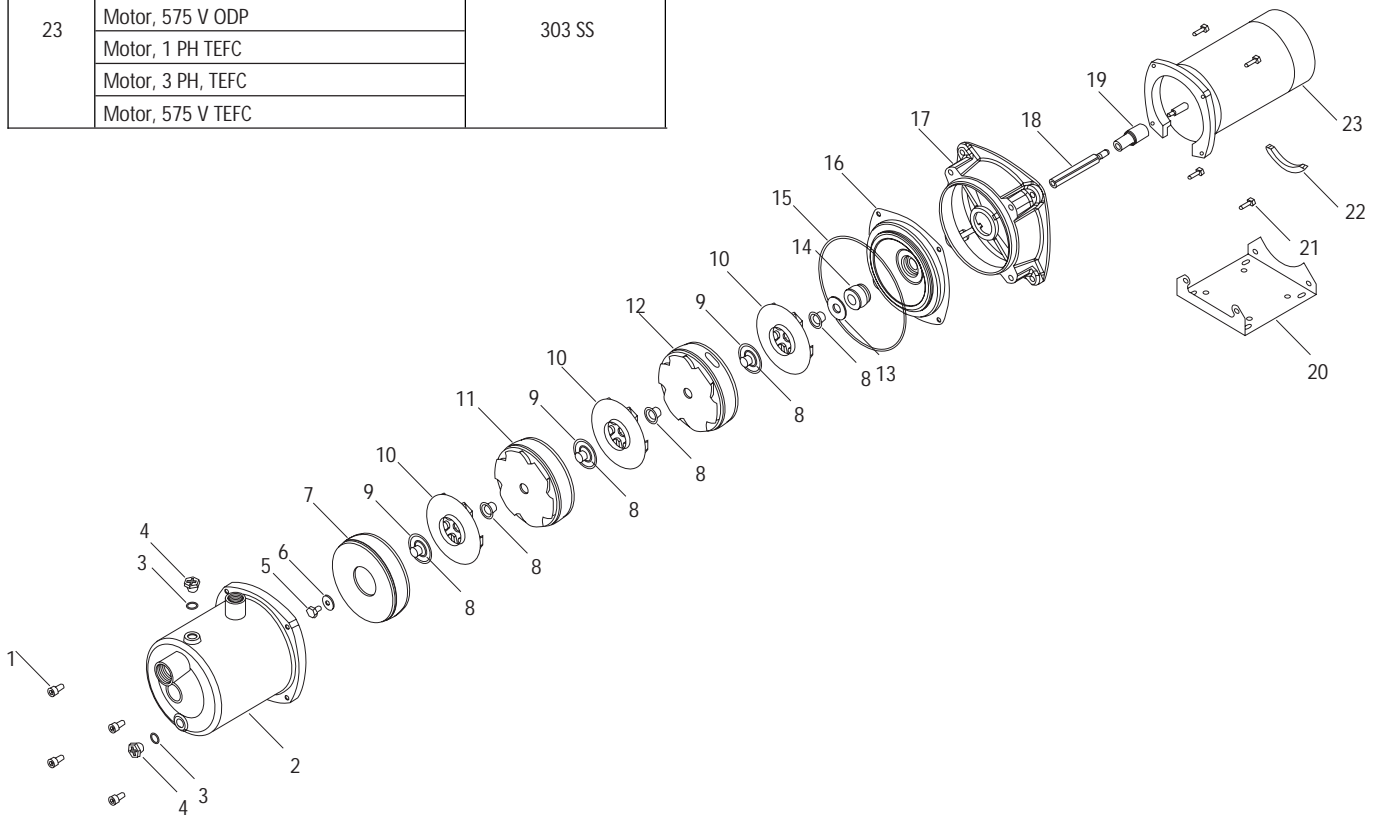
### PROBABLE CAUSE

1. Tripped thermal protector
2. Open circuit breaker
3. Blown fuse
4. Rotating parts binding
5. Motor wired improperly
6. Defective motor
7. Not primed
8. Discharge plugged or valve closed
9. Incorrect rotation
10. Foot valve too small, suction not submerged, inlet screen plugged.
11. Low voltage
12. Phase loss (three phase only)
13. Air or gases in liquid
14. System head too high
15. NPSHA too low:  
Suction lift too high or suction losses excessive  
Check with vacuum gauge
16. Impeller worn or plugged
17. Incorrect impeller diameter
18. Head too low, causing excessive flow rate
19. Viscosity or specific gravity too high
20. Worn bearings
21. Pump or piping loose

## Parts List

| Item No. | Part Description                         | Material       |
|----------|--|----------------|
| 1        | Screw, casing                            | 400 SS         |
| 2        | Pump, casing with plug and Viton o-rings | 316L SS        |
| 3        | O-ring, fill and drain plug              | Viton          |
| 4        | Fill and drain plug                      | 315 SS         |
| 5        | Impeller bolt                            | 316 SS         |
| 6        | Impeller lock washer                     | 316 SS         |
| 7        | Diffuser cover, first stage              | 316L SS        |
| 8        | Impeller spacer                          | 316L SS        |
| 9        | O-ring, impeller                         | EPR            |
|          |  | Optional Viton |
| 10       | Impeller                                 | 316L SS        |
| 11       | Diffuser, intermediate                   | 316L SS        |
| 12       | Diffuser, last stage                     | 316L SS        |
| 13       | Washer, mechanical seal                  | 316 SS         |
| 14       | Mechanical seal                          | Varies         |
| 15       | O-ring, casing                           | EPR            |
|          |  | Optional Viton |
| 16       | Seal housing                             | 316L SS        |
| 17       | Motor adapter                            | Aluminum       |
| 18       | Shaft, pump                              | 316 SS         |
| 19       | Shaft coupling                           | 316 SS         |
| 20       | Foot, pump                               | Steel          |
| 21       | Screw, motor to motor adapter            | Steel          |
| 22       | Spacer                                   | Rubber         |
| 23       | Motor, 1 PH ODP                          | 303 SS         |
|          | Motor, 3 PH ODP                          |                |
|          | Motor, 575 V ODP                         |                |
|          | Motor, 1 PH TEFC                         |                |
|          | Motor, 3 PH, TEFC                        |                |
|          | Motor, 575 V TEFC                        |                |

| Rotary | Stationary      | Elastomer | Metal Parts | Part No. |
|--------|-----------------|-----------|-------------|----------|
| Carbon | Ceramic         | EPR       | 316SS       | 10L29    |
|        |                 | Viton     |             | 10L30    |
|        | Silicon Carbide | EPR       |             | 10L31    |
|        |                 | Viton     |             | 10L32    |







### GOULDS PUMPS LIMITED WARRANTY

This warranty applies to all water systems pumps manufactured by Goulds Pumps.

Any part or parts found to be defective within the warranty period shall be replaced at no charge to the dealer during the warranty period. The warranty period shall exist for a period of twelve (12) months from date of installation or eighteen (18) months from date of manufacture, whichever period is shorter.

A dealer who believes that a warranty claim exists must contact the authorized GouldsPumps distributor from whom the pump was purchased and furnish complete details regarding the claim. The distributor is authorized to adjust any warranty claims utilizing the Goulds Pumps Customer Service Department.

**The warranty excludes:**

- (a) Labor, transportation and related costs incurred by the dealer;
- (b) Reinstallation costs of repaired equipment;
- (c) Reinstallation costs of replacement equipment;
- (d) Consequential damages of any kind; and,
- (e) Reimbursement for loss caused by interruption of service.

**For purposes of this warranty, the following terms have these definitions:**

- (1) "Distributor" means any individual, partnership, corporation, association, or other legal relationship that stands between Goulds Pumps and the dealer in purchases, consignments or contracts for sale of the subject pumps.
- (2) "Dealer" means any individual, partnership, corporation, association, or other legal relationship which engages in the business of selling or leasing pumps to customers.
- (3) "Customer" means any entity who buys or leases the subject pumps from a dealer. The "customer" may mean an individual, partnership, corporation, limited liability company, association or other legal entity which may engage in any type of business.

**THIS WARRANTY EXTENDS TO THE DEALER ONLY.**