795-90148
GM11-97

Graymills

HSP High Pressure Seal Less Stainless Steel Pump

Operations and Maintenance Instructions

WARNINGS/CAUTIONS

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

SAFETY

You will find various types of safety information on the following pages and on the labels attached to Graymills equipment. The following Safety Statements explain their meaning:

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ **DANGER** The **DANGER** Symbol means that failure to follow this safety statement **will** result in serious personal injury or death.

⚠ **WARNING** The **WARNING** Symbol means that failure to follow this safety statement **might** result in serious personal injury or death.

⚠ **CAUTION** The **CAUTION** Symbol means that failure to follow this safety statement **might** result in personal injury or property damage.

⚠ **NOTE** The **NOTE** Symbol means failure to follow these instructions could cause damage to the equipment or cause it to operate improperly.

⚠ CAUTION

Never work with equipment you feel may be unsafe. Contact your Supervisor immediately if you feel a piece of equipment is in an unsafe condition.

DESCRIPTION and SPECIFICATIONS

- The HSP Series pumps are vertically immersed, end-suction designed pumps for general liquid transfer service, machine tool coolant, parts washer, filtration, waste treatment and OEM applications. Liquid-end construction is all AISI 300 series stainless steel.
- These pumps are not designed for applications requiring ANSI, FDA or NSF ratings and are not recommended for use in highly abrasive services such as grinding.
- Impellers are enclosed. HSP Series pumps are fitted with a diffuser for high efficiency and for negligible radial shaft loading.
- Units have NEMA 56J motors with C-face mounting and threaded shaft extensions.

ENGINEERING DATA

- Maximum Liquid Temperature: 250°F (120°C)
- Maximum Working Pressure: 125 psi (9 bars)
- Starts per Hour: 20 - Evenly distributed

Model	Suction	Discharge	HP
HSP 1 Series	1½" NPT	1¼" NPT	¾ - 3
HSP 2 Series	2" NPT	1½" NPT	1 - 3

INSTALLATION

NOTE:
Unit can be installed in vertical orientation only. Do not install with motor below pump.

- Unit may be mounted directly to a tank top or the optional mounting plate may be utilized.
- Minimum and maximum liquid levels must be maintained for proper pump operation. See Figure 1.
- Allow adequate space for servicing and ventilation. Protect from freezing or flooding.

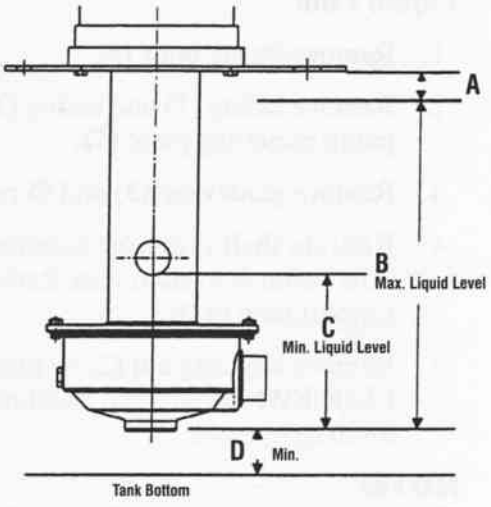


Figure 1

Model	Size	A	B		C	D
HSP	All		14	24		
		1½	13¼	23¼	6	2

PIPING

- Piping should be no smaller than the pump discharge and suction connections and kept as short as possible, avoiding unnecessary fittings to minimize friction losses.
- All piping **MUST** be independently supported and **MUST NOT** place any piping loads on the pump.

NOTE:
Do not force piping into place at pump suction and discharge connections.

- All joints **MUST** be air tight. Use 3-4 wraps of Teflon™ tape to seal threaded connections.

Piping - Suction

- Suction piping is not required for typical installation of unit.
- Suction intake should be above the minimum distance from tank bottom. Tank must be kept free of debris. See Figure 1 for minimum (D) setting.
- Use a foot valve only when necessary to hold prime during intermittent service where tank liquid level does not return to minimum depth before pump is re-started. See Figure 1.

NOTE:
In all cases, the bearing must be submerged in liquid at start-up.

- To avoid air pockets, no part of suction piping should be higher than pump suction connections.

Piping - Discharge

- Install a check valve suitable to handle the flow, liquids and to prevent backflow. After the check valve, install an appropriately sized gate valve to be used to regulate the pump capacity, pump inspection and for maintenance.

WIRING and GROUNDING

⚠ WARNING

Install, ground and wire according to local and National Electrical Code requirements.

Install an all leg disconnect switch near the pump.

Disconnect and lockout electrical power before installing or servicing pump.

Electrical supply MUST match pump's name plate specifications. Incorrect voltage can cause fire, damage to the motor and voids warranty.

Motors not protected MUST be provided with contactors and thermal overloads for single phase motors, or starters with heaters for three phase motors. See motor nameplate.

- Use only stranded copper wire to motor and ground. The ground wire **MUST** be at least as large as the wire to the motor. Wires should be color coded for ease of maintenance.
- Follow motor manufacturer's wiring diagram on the motor nameplate or terminal cover carefully.

⚠ WARNING

Failure to permanently ground the pump, motor and controls before connecting to electrical power can cause shock, burns or death.

ROTATION

⚠ CAUTION

Incorrect rotation may cause damage to the pump and voids the warranty.

- Correct rotation is right-hand, **CLOCKWISE** when viewed from the motor end. On tank mounted units, remove motor end plug or cover, turn power on and off quickly to observe rotation.
- To reverse three phase motor rotation, interchange any two power supply leads.

OPERATION

⚠ WARNING

Splashing or immersing open drip proof motors in fluids can cause fire, shock, burns or death.

NOTE:
Pump must be fully primed before operation. Do not run pump dry or pump bearing damage will result.

- After stabilizing the system at normal operating conditions, check the piping. If necessary, adjust the pipe supports.

MAINTENANCE

⚠ WARNING

Failure to disconnect and lockout electrical power before attempting any maintenance can cause shock, burns or death.

- Motors have permanently lubricated bearings. No lubrication is possible or necessary. Follow the motor manufacturer's recommendations for maintenance.
- If pump performance degrades due to excessive leakage, inspect pump bearing, bushing and shaft for excessive wear. Replace as necessary.

Seasonal Service:

- To **REMOVE** pump from service, drain all pumpage from pump and piping.
- To **RETURN** pump to service, replace all plugs and piping using Teflon™ tape or equivalent on male threads.
- Refer to **"OPERATION"** section of manual.

DISASSEMBLY

- Follow **ALL** warnings and instructions in the **"MAINTENANCE"** section of this manual.
- While complete disassembly of the unit will be described, it is recommended that you proceed only as far as required to perform the maintenance needed.
- Remove mounting plate bolts from tank top.
- Lift pump out of the tank with an adequately sized nylon lifting strap or chain attached to the motor.
- Remove the mounting plate, or clamp, from pump.

Liquid End:

1. Remove casing bolts (5).
2. Remove casing (1) and casing O-ring (4) from pump mounting plate (7).
3. Remove guidevane (3) and O-ring (21).
4. Restrain shaft (12) from rotation by applying a 9/16″ wrench to shaft flats through holes in the support tube (11).
5. Remove impeller nut (2) by turning **COUNTER-CLOCKWISE.** Nut may need to be heated with a torch to remove.

NOTE:
Exercise caution in handling hot impeller nut.

6. Remove impeller (16,17) by turning **COUNTER-CLOCKWISE** when looking at the front of the pump. Protect hand with a rag or glove.

NOTE:
Support tube has left hand threads.

7. Remove pump plate from support tube by turning plate **CLOCKWISE** when viewing from the front of the pump.
8. Remove snap ring (13) from pump plate and pull out restricting bushing (14).
9. Press out pump bearing (15A, 15B) with a bearing or arbor press.
10. Remove support tube from motor plate (9) by turning tube **CLOCKWISE** when viewing from the front of the pump.
11. Remove motor end plug, or cover, to expose screwdriver slot, or flats, on end of the motor shaft.
12. Restrain motor shaft with appropriate tool and remove shaft extension (12) from motor shaft. Shaft extension may need to be heated with a torch to remove. Apply heat to the shaft extension, not to motor shaft.

NOTE:
Exercise caution in handling hot shaft extension.

Inspect bushing, pump bearing and shaft extension for excessive wear. Replace as necessary.

13. Remove motor bolts (8) and remove motor plate from motor.
14. Remove U-cup seal (23) from motor plate and discard.

REASSEMBLY

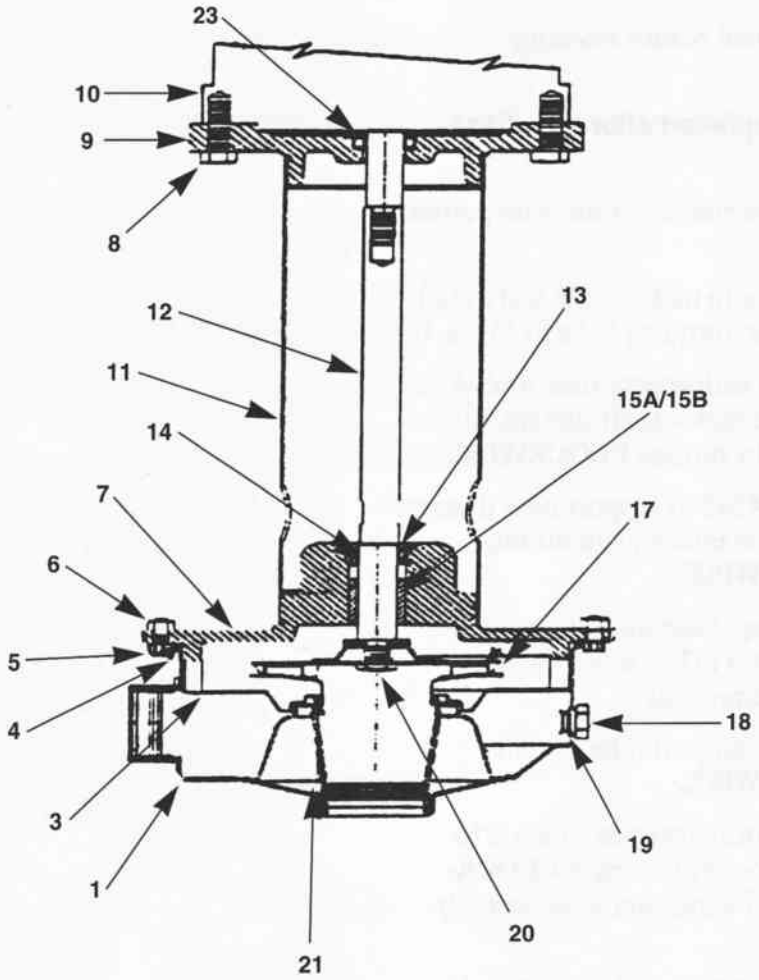
• All parts should be cleaned before assembly.

NOTE:
All o-rings should be replaced after any disassembly of unit.

1. Check motor shaft for run out. Maximum permissible is .002″ TIR.
2. Install new U-cup seal in motor plate and install motor plate on motor, torquing bolts to 15 lbs. ft.
3. Restrain motor shaft with appropriate tool. Apply LOCTITE® #242 to motor shaft threads and install shaft extension by turning **CLOCKWISE.**
4. Apply LOCTITE® #242 to support tube threads. Attach support tube to motor plate turning **COUNTER-CLOCKWISE.**
5. Replace pump bearing, bushing and snap ring in pump plate. Use LOCTITE® #242 when installing bushing in pump plate.
6. Install pump plate to support tube turning **COUNTER-CLOCKWISE.**
7. While holding shaft from rotation with a 9/16″ wrench, install impeller by turning it **CLOCKWISE,** insuring that the impeller seats securely against the shaft.
8. Apply LOCTITE® #242 to end of shaft and install impeller nut, turning **CLOCKWISE.**
9. Install guidevane and guidevane O-ring on SL models only.

NOTE:
Do not lubricate guidevane o-ring. Ensure it is not pinched by the impeller on reassembly.

10. Install new casing O-ring and casing, torquing casing bolts to 50 lbs. in.
11. Check reassembled unit for binding. If binding occurs, realign casing over impeller eye.
12. Assembly is complete.



Repair Parts

Item #	Qty	Description	Material	Item #	Qty	Description	Material
1	1	Casing (Model SL)	AISI 316L	13	1	Internal Snap Ring	Stainless Steel
3	1	Guidevane	Stainless Steel	14	1	Bushing	Nitronic 60 S.S.
4	1	O-ring - Casing	Viton/EPR	15A	1	Bearing	Viton
5	8	Socket Head Cap Screw	AISI 304	15B	1	Bearing	Carbon
6	8	Hex Nut	Stainless Steel	17	1	Impeller	AISI 304 S.S.
7	1	Pump Mounting Plate	AISI 303 S.S.	18	1	Plug, Drain and Vent	AISI 304 S.S.
8	4	Hex Head Bolt	Plated Steel	19	2	O-ring (Drain and Vent Plug)	Viton/EPR
9	1	Motor Plate	Cast Iron	20	1	Impeller Nut	AISI 300 S.S.
10	1	Motor	Electrical	21	1	O-ring (Impeller)	Viton/EPR
11	1	Support Tube	AISI 304 S.S.	22	1	O-ring - Casing	Viton/EPR
12	1	Shaft Extension	AISI 304 S.S.	23	1	U-cup Seal	Teflon™

TROUBLE SHOOTING

⚠ WARNING

Failure to disconnect and lockout electrical power before attempting any maintenance can cause shock, burns or death.

SYMPTOM:

Motor Not Running
See Probable Causes 1 thru 5

Little or No Liquid Delivered
See Probable Causes 6 thru 12

Excessive Power Consumption
See Probable Causes 3, 12, 13, 14

Excessive Noise & Vibration
See Probable Causes 3, 6, 7, 10, 13, 15 & 16

PROBABLE CAUSES:

1. Motor thermal protector tripped
2. Open circuit breaker or blown fuse
3. Impeller binding
4. Motor improperly wired
5. Defective motor
6. Pump is not primed, air or gases in pumpage
7. Discharge, suction plugged or valve closed
8. Incorrect rotation (3 phase only)
9. Low voltage or phase loss
10. Impeller worn or plugged with debris
11. System head too high
12. Incorrect impeller diameter
13. Discharge head too low - excessive flow rate
14. Fluid viscosity and/or specific gravity too high
15. Worn bearing
16. Pump, motor or piping loose

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 and returned). 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 that 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.

Graymills
3705 N. Lincoln Ave. Chicago, IL 60613 773-248-6825 Fax 773-477-8673