

Installation, Operation and Maintenance Instructions

Series NPO

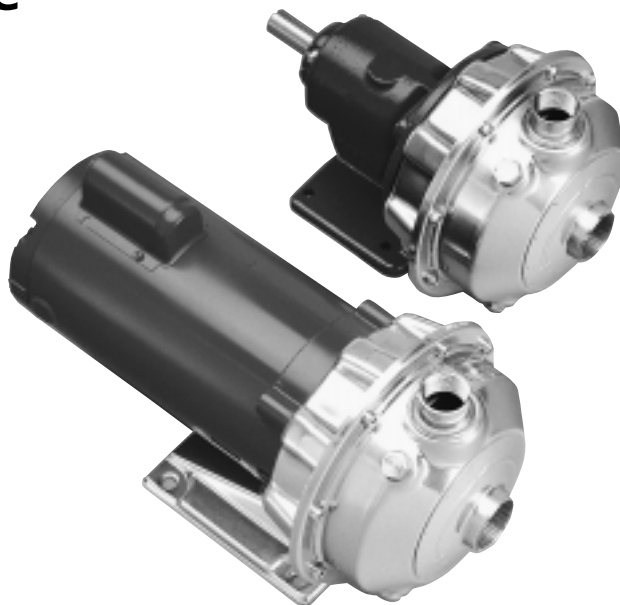


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Owner's Information

Model Number: _____

Serial Number: _____

Dealer: _____

Date of Purchase: _____ Installation: _____

SAFETY INSTRUCTIONS

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.



This is a **SAFETY ALERT SYMBOL**. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.



DANGER Warns of hazards that **WILL** cause serious personal injury, death or major property damage.



WARNING Warns of hazards that **CAN** cause serious personal injury, death or major property damage.



CAUTION Warns of hazards that **CAN** cause personal injury or property damage.

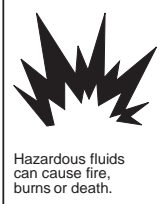
NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.



UNIT NOT DESIGNED FOR USE WITH HAZARDOUS LIQUIDS OR FLAMMABLE GASES.



NOTICE: INSPECT UNIT FOR DAMAGE AND REPORT ALL DAMAGE TO THE CARRIER OR DEALER IMMEDIATELY.

DESCRIPTION AND SPECIFICATIONS

The Series NPO embraces a line of 1", 1¼" and 1½" NPT discharge, general liquid transfer and booster pump application end suction centrifugal pumps. The liquid end construction is of AISI 316 stainless steel, stamped and welded. Open vane impellers are ideal for liquids with suspended solids to 3/8" diameter.

Engineering Data

Max Liquid Temperature:

212° F (100° C) Standard seal

250° F (120° C) Optional high temp seal

Max Pressure: 125 psi (862 kPa)

Starts per Hour: 20 – Evenly distributed

Optional Pump Styles

Optional bearing frame mounted or close-coupled, single and three phase, ODP, TEFC and three phase explosion proof motors are available. Optional mechanical seals include: Carbon/Ceramic/BUNA, Carbon/Ceramic/Viton, Carbon/Silicon Carbide/EPR, Silicon Carbide/Silicon Carbide/EPR and Silicon Carbide/Silicon Carbide/Viton. Consult with your G&L Pumps distributor for price and availability.

Piping – General

- Piping should be no smaller than the pump connection size 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.

NOTICE: DO NOT FORCE PIPING INTO PLACE AT PUMP SUCTION AND DISCHARGE CONNECTIONS.

- All pipe joints **MUST** be airtight.

PIPING – SUCTION

- Short and direct suction piping is recommended. For suction lifts over 10' (3 m) and liquid temperatures over 120° F (49° C), consult pump performance curve for net positive suction head required (NPSH_R).
- If a pipe size larger than pump suction is required, an eccentric pipe reducer, with the straight side up, **MUST** be installed at the pump suction.
- If pump is installed below the liquid source, install a full flow isolation valve in the suction for pump inspection and maintenance.

NOTICE: DO NOT USE THE ISOLATION VALVE TO THROTTLE PUMP. THIS MAY CAUSE LOSS OF PRIME, EXCESSIVE TEMPERATURES AND DAMAGE TO PUMP, VOIDING WARRANTY.

- If the pump is installed above the liquid source, the following **MUST** be provided:
 - To avoid air pockets, no part of the piping should be above the pump suction connection.
 - Slope piping upward from liquid source.
 - Use a foot valve or check valve **ONLY** if necessary for priming or to hold prime during intermittent duty.
 - The suction strainer or suction bell **MUST** be at least 3 times the suction pipe diameter area.
 - Insure that the size and minimum submergence over suction inlet is sufficient to prevent air from entering through a suction vortex. See Figures 1 through 4.

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.
- When required, the pipe increaser should be installed between the check valve and the pump discharge.

Wiring and Grounding



- ! 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 nameplate specifications. Incorrect voltage can cause fire, damage to the motor and voids warranty.
- ! Motors equipped with automatic thermal protection open the motor's electrical circuit when a thermal overload exists. This can cause the pump to start unexpectedly and without warning.
- Use only stranded copper wire to motor and ground. The ground wire **MUST** be at a least as large as the wire to the motor. Wires should be color coded for ease of maintenance.



FAILURE TO PERMANENTLY GROUND THE PUMP, MOTOR AND CONTROLS BEFORE CONNECTING TO ELECTRICAL POWER CAN CAUSE SHOCK, BURNS OR DEATH.

NOTICE: UNIT ROTATION IS CLOCKWISE, WHEN VIEWED FROM THE MOTOR END. INCORRECT ROTATION MAY CAUSE DAMAGE TO THE PUMP AND VOIDS THE WARRANTY.

Operation

NOTICE: PUMP MUST BE FULLY PRIMED BEFORE OPERATION.



OPERATION AT OR NEAR ZERO FLOW CAN CAUSE EXTREME HEAT, PERSONAL INJURY OR PROPERTY DAMAGE.

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

Maintenance

- Motors have permanently lubricated bearings. No lubrication is possible or necessary. Follow the motor manufacturer's recommendations for maintenance.

Disassembly



FAILURE TO DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPTING ANY MAINTENANCE CAN CAUSE SHOCK, BURNS OR DEATH.



CASING MAY CONTAIN HAZARDOUS FLUIDS THAT CAN CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

- Containing pumpage as required, remove pump casing vent and drain plugs (408). Remove and discard the respective plug O-rings. Drain and flush system, as required.

- Remove the four motor bolts from the motor base or foundation.
- Remove the eight casing cap screws (370), then using the slots provided about the casing (100), pry the back pull-out assembly from the casing.
- Remove and discard the casing O-ring (513) and the internal casing O-ring (349).

NOTICE: IMPELLER COMPRESSES THE MECHANICAL SEAL SPRING – BE PREPARED FOR THE IMPELLER TO SPRING FROM SHAFT WHEN IMPELLER IS REMOVED.

- Remove the end cap from the motor, exposing a slot in the end of the motor shaft. While holding the shaft from rotation with a screwdriver, remove the impeller locknut (304) by turning it **COUNTERCLOCKWISE**.
- While continuing to hold the motor shaft from rotation, remove the impeller by turning it **COUNTERCLOCKWISE**. Inspect for wear or damage and replace as necessary.
- Using two pry bars, 180° apart, **CAREFULLY** separate the seal housing (184) from the motor adapter (108). The mechanical seal (383) rotary assembly will slide from the motor shaft with the seal housing.
- **CAREFULLY** push out the mechanical seal stationary seat from the seal housing. Inspect and wipe clean the stationary seat bore. Replace as necessary. **DISCARD** the mechanical seal assembly.
- If necessary, remove the four motor hex bolts (371) and **CAREFULLY** slide the motor adapter from the shaft.
- Replace the motor assembly and deflector (123), as required.
- Disassembly is complete.

Assembly

- If removed, replace the motor shaft deflector. Install the motor adapter, with the drain opening **DOWN**, using the four hex bolts. Torque bolts to 14 lbs ft (19 N m).
- Using a quality grade of O-ring lubrication, lubricate the outer elastomer of the mechanical seal stationary seat. Fully and squarely install the stationary seat into the seal housing. With a clean, lint free cloth, **CAREFULLY** wipe the seat face clean of a lubrication or debris. **DO NOT** damage the seat face.
- Slide the seal housing assembly onto the motor shaft, seating it fully and squarely against the motor adapter.
- Using a quality grade of O-ring lubricant, lubricate the inner elastomer of the mechanical seal rotary assembly. Fully and squarely install the rotary assembly against the stationary seat.

- While holding the motor shaft from rotation with a screwdriver, install the impeller by turning it **CLOCKWISE**, insuring that the impeller seats securely against the motor shaft. Install the impeller locknut, turning it **CLOCKWISE**, torquing to 10 lbs ft (13.6 N m). Replace the motor end bell cap.
- Using a quality grade of O-ring lubricant, lubricate and install a new inner casing and casing O-ring.
- Slide the back pullout assembly into the pump casing and secure using the eight casing cap screws. Torque the cap screws to 70 lbs in (13.6 N m), using a cross pattern sequence to assure the casing is pulled down evenly.
- With new O-rings installed, install the casing vent and drain plugs, tightening securely.
- Assembly is complete.

Troubleshooting

▲WARNING

Hazardous voltage

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 through 5

LITTLE OR NO LIQUID DELIVERED

See Probable Causes 6 through 13

EXCESSIVE POWER CONSUMPTION

See Probable Causes 3, 13, 14, 15 and 18

EXCESSIVE NOISE AND VIBRATION

See Probable Causes 3, 6, 7, 8, 10, 12, 14, 16 and 17

PROBABLE CAUSES

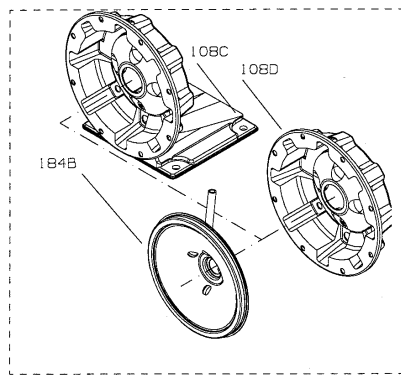
1. Motor thermal protector tripped
2. Open circuit breaker or blown fuse
3. Impeller binding
4. Motor improperly wired
5. Defective motor
6. Pump is not primed, air or gases in pumpage
7. Discharge, suction plugged or valve closed
8. Incorrect rotation (three phase only)
9. Low voltage or phase loss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

Repair Parts

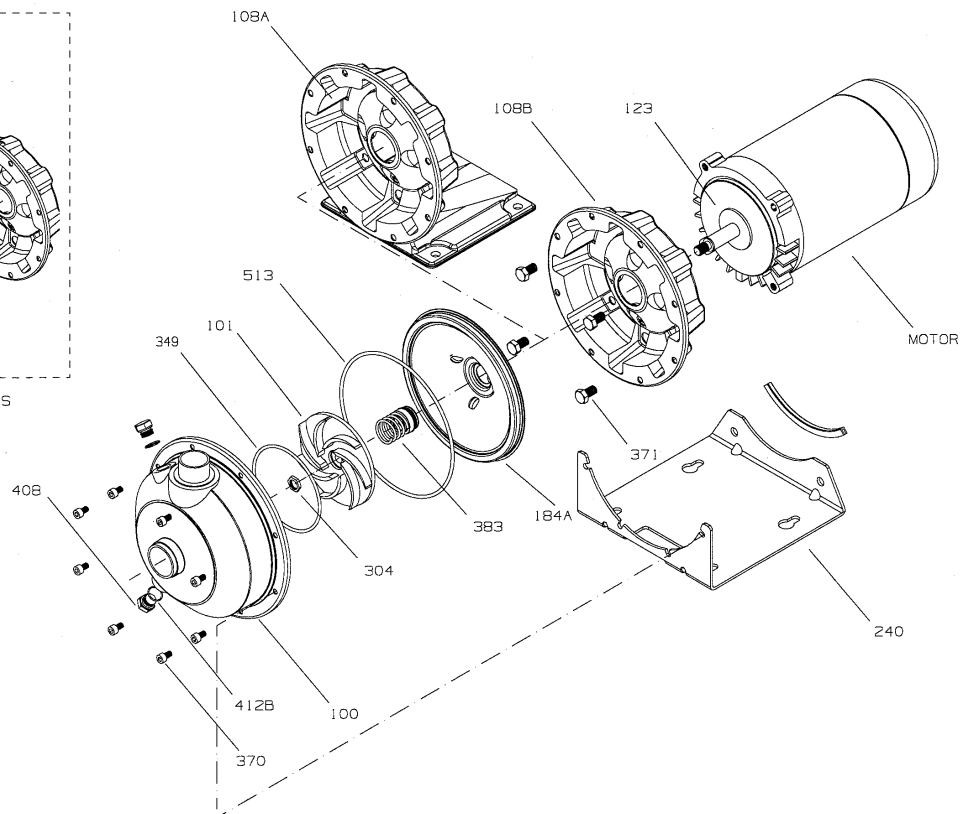
Item No.	Description	Materials of Construction	Qty.
100	Casing	AISI 316L SS	1
101	Impeller		
108A	Motor adapter with foot	AISI 316L SS	1
108B	without foot		
108C	with foot and flush		
108D	without foot and flush		
123	Deflector	BUNA-N	1
184A	Seal housing – standard	AISI 316L SS	1
184B	Seal housing with seal flush		
240	Motor support	300 SS	1
	Rubber channel	Rubber	1
304	Impeller locknut	AISI 316 SS	1
349	O-ring, internal	Viton standard	1
		EPR	
		BUNA	
370	Socket head screw, casing	AISI 430 SS	8
371	Bolts, motor	Steel/plated	4
383	Mechanical seal	See Mechanical Seal Chart	1
408	Drain and vent plug, casing	AISI 316 SS	2
412B	O-ring, drain plugs	Viton standard	2
		EPR	
		BUNA	
513	O-ring, casing	Viton standard	1
		EPR	
		BUNA	

Impeller Code	Pump Size		
	1SN 1 x 1¼ – 6	2SN 1¼ x 1½ – 6	3SN 1½ x 2 – 6
	Diameter	Diameter	Diameter
A	4 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆
B	4	5 ⁵ / ₁₆	5 ⁵ / ₁₆
C	3 ³ / ₄	4 ⁷ / ₈	4 ¹⁵ / ₁₆
D	3 ¹ / ₂	4 ⁷ / ₁₆	4 ⁷ / ₈
E	3 ³ / ₄	4 ⁷ / ₁₆	4 ⁷ / ₁₆
F	3	3 ³ / ₄	4 ³ / ₁₆
G	5 ⁵ / ₈	3 ⁷ / ₁₆	3 ³ / ₄
H	5	–	–

John Crane Type 21 Mechanical Seal (⅝" Seal)					
Seal Code	Rotary	Stationary	Elastomer	Metal Parts	Casing O-ring
1	Carbon	Ceramic	BUNA	316SS	BUNA
2		Sil-Carb.	EPR		EPR
3		Ceramic	Viton		Viton
4			Viton		
5	Sil-Carb.	Sil. Carb.	EPR		EPR
6			Viton		Viton



OPTIONAL SEAL FLUSH COMPONENTS



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 Goulds Pumps 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.