ITT

Commercial Water

# Goulds Pumps

## G&L SERIES

## MODEL NPE/NPE-F

Installation, Operation and
Maintenance Instructions

GOULDS PUMPS

Goulds Pumps is a brand of ITT Corporation.

www.goulds.com

*Engineered for life*

## Table of Contents



## Owner's Information

Pump Model Number: _____

Pump Serial Number: _____

Dealer: _____

Dealer Phone No.: _____

Date of Purchase: _____

Date of Installation: _____

Current Readings at Startup:

| 1 Ø | 3 Ø | L1-2 | L2-3 | L3-1 |
|---|---|---|---|---|
| Amps: _____ | Amps: _____ | _____ | _____ | _____ |
| Volts: _____ | Volts: _____ | _____ | _____ | _____ |

## 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.**

**⚠ WARNING**

Hazardous fluids can cause fire, burns or death.

**UNIT NOT DESIGNED FOR USE WITH HAZARDOUS LIQUIDS OR FLAMMABLE GASES. THESE FLUIDS MAY BE PRESENT IN CONTAINMENT AREAS.**

### DESCRIPTION & SPECIFICATIONS:

The Models NPE (close-coupled) and NPE-F (frame-mounted) are end suction, single stage centrifugal pumps 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-trimable to intermediate diameters. Casings are fitted with a diffuser for efficiency and for negligible radial shaft loading.

Close-coupled units have NEMA 48J or 56J motors with C-face mounting and threaded shaft extension. Frame-mounted units can be coupled to motors through a spacer coupling, or belt driven.

## 1. IMPORTANT:

**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., per 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 overload. 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: | 250° F (120° C) |
| Pressure: | 125 PSI |
| 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.** General

**2.1.1.** Locate pump as near liquid source as possible (below level of liquid for automatic operation).

**2.1.2.** Protect from freezing or flooding.

**2.1.3.** Allow adequate space for servicing and ventilation.

**2.1.4.** 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.**

**2.1.5.** Avoid unnecessary fittings. Select sizes to keep friction losses to a minimum.

**2.2.** Close-Coupled Units

**2.2.1.** Units may be installed horizontally, inclined or vertically.

**⚠ CAUTION** **Do not install with motor below pump. Any leakage or condensation will affect the motor.**

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

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

**2.3.** Frame-Mounted Units

**2.3.1.** It is recommended that the bedplate be grouted to a foundation with solid footing. Refer to Figure 1.

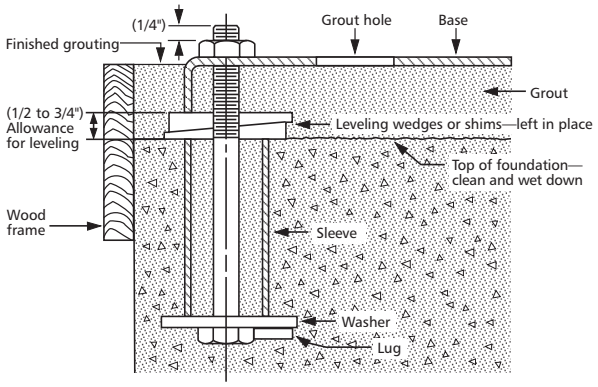



**Figure 1**

**2.3.2.** Place unit in position on wedges located at four points (two below approximate center of driver and two below approximate center of pump). Adjust wedges to level unit. Level or plumb suction and discharge flanges.

**2.3.3.** Make sure bedplate is not distorted and final coupling alignment can be made within the limits of movement of motor and by shimming, if necessary.

**2.3.4.** Tighten foundation bolts finger tight and build dam around foundation. Pour grout under bedplate making sure the areas under pump and motor feet are filled solid. Allow grout to harden 48 hours before fully tightening foundation bolts.

**2.3.5.** Tighten pump and motor hold-down bolts before connecting the piping to pump.

## 3. SUCTION PIPING:

**3.1.** Low static suction lift and short, direct, suction piping is desired. For suction lift over 10 feet and liquid temperatures over 120 F, 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 2-5.

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

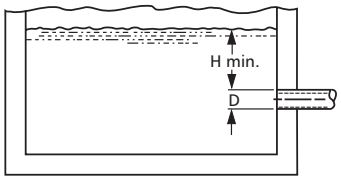



**Figure 2**

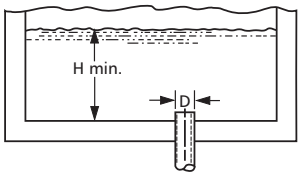



**Figure 3**

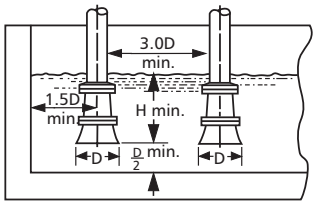



**Figure 4**

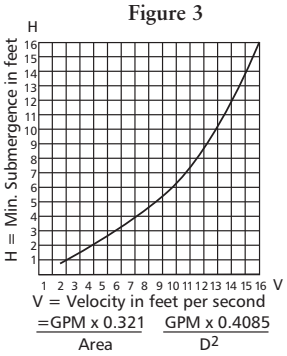



**Figure 5**

## 4. DISCHARGE PIPING:

**4.1.** 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.

**4.2.** If an increaser is required, place between check valve and pump.

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

## 5. MOTOR-TO-PUMP SHAFT ALIGNMENT:

**5.1.** Close-Coupled Units

**5.1.1.** No field alignment necessary.

**5.2.** Frame-Mounted Units

**5.2.1.** Even though the pump-motor unit may have a factory alignment, this could be disturbed in transit and must be checked prior to running. See Figure 6.

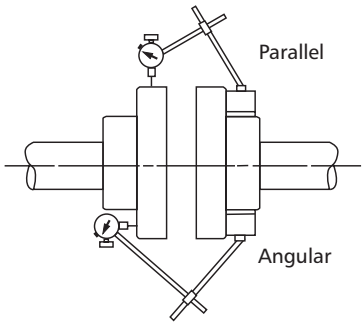



**Figure 6**

**5.2.2.** Tighten all hold-down bolts before checking the alignment.

**5.2.3.** If re-alignment is necessary, always move the motor. Shim as required.

**5.2.4.** Parallel misalignment - shafts with axis parallel but not concentric. Place dial indicator on one hub and rotate this hub 360 degrees while taking readings on the outside diameter of the other hub. Parallel alignment occurs when Total Indicator Reading is .005", or less.

**5.2.5.** Angular misalignment - shafts with axis concentric but not parallel. Place dial indicator on one hub and rotate this hub 360 degrees while taking readings on the face of the other hub. Angular alignment is achieved when Total Indicator Reading is .005", or less.

**5.2.6.** Final alignment is achieved when parallel and angular requirements are satisfied with motor hold-down bolts tight.

**⚠ CAUTION** **Always recheck both alignments after making any adjustment.**

## 6. ROTATION:

**6.1.** Correct rotation is right-hand (clockwise when viewed from the motor end). Switch power on and off quickly. Observe shaft rotation. To change rotation:

**6.1.1.** Single-phase motor: Non-reversible.

**6.1.2.** Three-phase motor: Interchange any two power supply leads.

## 7. OPERATION:

**7.1.** Before starting, pump must be primed (free of air and suction pipe full of liquid) and discharge valve partially open.

**⚠ 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.**

**7.2.** Make complete check after unit is run under operating conditions and temperature has stabilized. Check for expansion of piping. On frame-mounted units coupling alignment may have changed due to the temperature differential between pump and motor. Recheck alignment.

## 8. MAINTENANCE:

**8.1.** Close-Coupled Unit. Ball bearings are located in and are part of the motor. They are permanently lubricated. No greasing required.

**8.2.** Frame-Mounted Units

**8.2.1.** Bearing frame should be regreased every 2,000 hours or 3 month interval, whichever occurs first. Use a #2 sodium or lithium based grease. Fill until grease comes out of relief fittings, or lip seals, then wipe off excess.

**8.2.2.** Follow motor and coupling manufacturers' lubrication instructions.

**8.2.3.** Alignment must be rechecked after any maintenance work involving any disturbance of the unit.

## 9. DISASSEMBLY:

Complete disassembly of the unit will be described. Proceed only as far as required to perform the maintenance work needed.

**9.1.** Turn off power.

**9.2.** Drain system. Flush if necessary.

**9.3.** Close-Coupled Units: Remove motor hold-down bolts.

Frame-Mounted Units: Remove coupling, spacer, coupling guard and frame hold-down bolts.

**9.4.** Disassembly of Liquid End

**9.4.1.** Remove casing bolts (370).

**9.4.2.** Remove back pull-out assembly from casing (100).

**9.4.3.** Remove impeller locknut (304).

**⚠ CAUTION** **Do not insert screwdriver between impeller vanes to prevent rotation of close-coupled units. Remove cap at opposite end of motor. A screwdriver slot or a pair of flats will be exposed. Using them will prevent impeller damage.**

**9.4.4.** Remove impeller (101) by turning counter-clockwise when looking at the front of the pump. Protect hand with rag or glove.

**⚠ CAUTION** **Failure to remove the impeller in a counter-clockwise direction may damage threading on the impeller, shaft or both.**

**9.4.5.** With two pry bars 180 degrees apart and inserted between the seal housing (184) and the motor adapter (108), carefully separate the two parts. The mechanical seal rotary unit (383) should come off the shaft with the seal housing.

**9.4.6.** Push out the mechanical seal stationary seat from the motor side of the seal housing.

**9.5.** Disassembly of Bearing Frame

**9.5.1.** Remove bearing cover (109).

**9.5.2.** Remove shaft assembly from frame (228).

**9.5.3.** Remove lip seals (138 and 139) from bearing frame and bearing cover if worn and are being replaced.

**9.5.5.** Use bearing puller or arbor press to remove ball bearings (112 and 168).

## 10. REASSEMBLY:

**10.1.** All parts should be cleaned before assembly.

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

**10.3.** Reassembly is the reverse of disassembly.

**10.3.1.** Impeller and impeller locknut assembled onto motor shaft with 10 ft-lbs of torque.

**10.4.** Observe the following when reassembling the bearing frame.

**10.4.1.** Replace lip seals if worn or damaged.

**10.4.2.** Replace ball bearings if loose, rough or noisy when rotated.

**10.4.3.** Check shaft for runout. Maximum permissible is .002" T.I.R.

**10.5.** Observe the following when reassembling the liquid-end.

**10.5.1.** All mechanical seal components must be in good condition or leakage may result. Replacement of complete seal assembly, whenever seal has been removed, is good standard practice.

It is permissible to use a light lubricant, such as glycerin, to facilitate assembly. Do not contaminate the mechanical seal faces with lubricant.

**10.5.2.** Inspect casing O-ring (513) and replace if damaged. This O-ring may be lubricated with petroleum jelly to ease assembly.

**10.5.3.** Inspect guidevane O-ring (349) and replace if worn.

**⚠ CAUTION** **Do not lubricate guidevane O-ring (349). Insure it is not pinched by the impeller on reassembly.**

**10.6.** Check reassembled unit for binding. Correct as required.

**10.7.** Tighten casing bolts in a star pattern to prevent O-ring binding.

## 11. TROUBLE SHOOTING CHART:

MOTOR NOT RUNNING:
(See causes 1 thru 6)

LITTLE OR NO LIQUID DELIVERED:
(See causes 7 thru 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 (3-phase only)
13. Air or gasses 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
22. Pump and motor misaligned

## NPE STANDARD REPAIR PARTS LIST

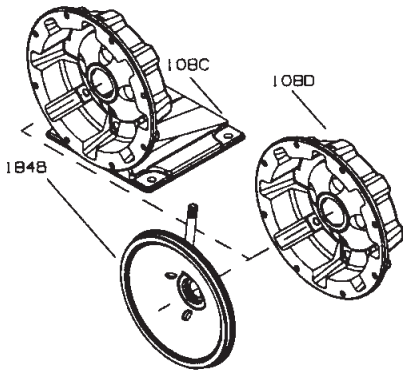
| Item No. | Description | Materials of Construction |
|---|---|---|
| 100 | Casing | AISI 316L Stainless Steel |
| 101 | Impeller | |
| 108A | Motor adapter with foot | |
| 108B | Motor adapter less foot | |
| 108C | Motor adapter with foot and flush | |
| 108D | Motor adapter less foot with flush | |
| 123 | Deflector | BUNA-N |
| 184A | Seal housing std. | AISI 316L S.S. |
| 184B | Seal housing with seal flush | |
| 240 | Motor support | 300 S.S. |
| | Rubber channel | Rubber |
| 304 | Impeller locknut | AISI 316 S.S. |
| 347 | Guidevane | AISI 316L S.S. |
| 349 | Seal-Ring, guidevane | Viton (standard) |
| | | EPR |
| | | BUNA |
| 370 | Socket head screw, casing | AISI 410 S.S. |
| 371 | Bolts, motor | Steel/plated |
| 383 | Mechanical seal | |
| 408 | Drain and vent plug, casing | AISI 316 S.S. |
| 412B | O-Ring, drain plugs | Viton (standard) |
| | | EPR |
| | | BUNA |
| 513 | O-Ring, casing | Viton (standard) |
| | | EPR |
| | | BUNA |

## MECHANICAL SEAL APPLICATION CHART

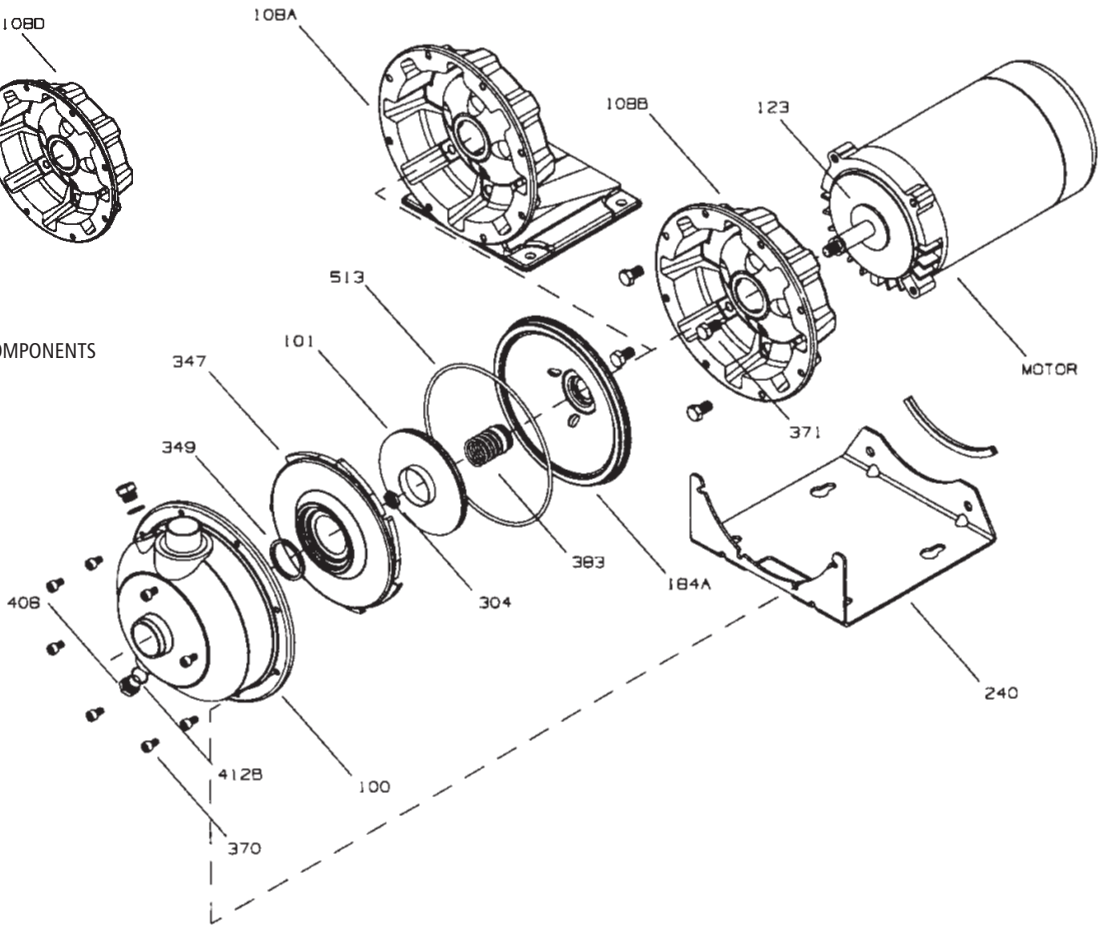
| Item 383 Mechanical Seal (⅝" seal) | | | | |
|---|---|---|---|---|
| **Rotary** | **Stationary** | **Elastomers** | **Metal Parts** | **Part No.** |
| Carbon | Sil-Carbide | EPR | 316SS | 10K18 |
| | | Viton | | 10K55 |
| Sil-Carbide | | EPR | | 10K81 |
| | | Viton | | 10K62 |

**NOTE:** Close coupled units supplied with ½ HP 1750 RPM, ½ - 3 HP Explosion Proof or 5 HP motors, utilize motor adapter less foot and a footed motor.

**NOTE:** Frame mounted units (NPE-F) utilize the XS Power frame and motor adapter less foot. For repair parts for the power frame refer to the XS-Power frame repair parts page in the parts section of your catalog. To order the power frame complete order item 14L61.




**NOTE:** OPTIONAL SEAL FLUSH COMPONENTS



ITT

Commercial Water

## 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.**

GOULDS PUMPS

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

**April, 2008**



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