



Installation, Operation and Maintenance Instructions

Model SSV

Directives d'installation, d'utilisation et d'entretien

Instrucciones de Instalación, Operación y Mantenimiento



SERIES/SÉRIE/SERIES

1SV	3SV	5SV
2SV	4SV	6SV

IM018R03

Goulds Pumps



ITT Industries

Table of Contents

SUBJECT	PAGE
Safety Page.....	3
Description and Optional Pump Styles	4
Installation.....	5
Piping	5
Shaft Alignment – Motor to Pump.....	7
Wiring and Grounding	7
Priming	9
Operation	10
Maintenance	11
Disassembly/Assembly	
Mechanical Seal Replacement	11
Motor Replacement	13
Owner’s Information	13
Trouble Shooting.....	14
Engineering Data	15
Typical Plumbing and Installation.....	17
SSV Sectional Assembly	18
Goolds Pumps Limited Warranty.....	20

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 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.



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



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



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

NOTICE: Indicates special instructions which are very important and must be followed.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP. THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.



Hazardous fluids
can cause fire,
burns or death.

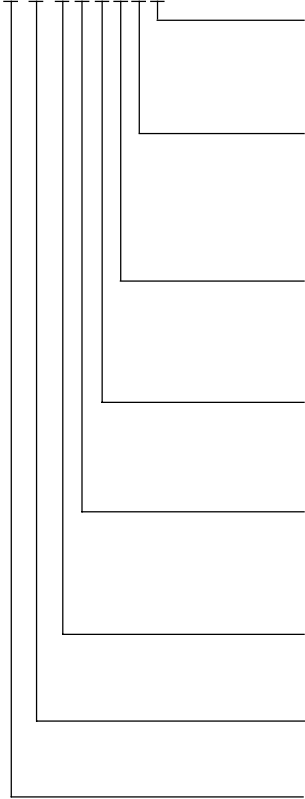
UNIT NOT DESIGNED FOR USE WITH HAZARDOUS LIQUIDS OR FLAMMABLE GASES. THESE FLUIDS MAY BE PRESENT IN CONTAINMENT AREAS.

DESCRIPTION and OPTIONAL PUMP STYLES

The Model SSV embraces a line of stainless steel industrial, commercial and residential vertical, multistage, mechanical seal equipped pumps.

MODEL NOMENCLATURE

1 SV A 1 C 1 A 0



Mechanical Seal Options:

0 = Standard Mechanical Seal. For OPTIONAL Mechanical Seals, contact dealer or factory.

Number of Stages:

A = 1 E = 5 J = 9 N = 13
 B = 2 F = 6 K = 11 P = 14
 C = 3 G = 7 L = 12 Q = 15
 D = 4 H = 8 M = 12 R = 16

Motor Phase and Enclosure:

0 = 1 PH XP 3 = 575 V ODP 6 = 575 V TEFC 9 = 3 PH TEFC
 1 = 1 PH ODP 4 = 1 PH TEFC 7 = 3 PH XP with premium
 2 = 3 PH ODP 5 = 3 PH TEFC 8 = 575 V XP efficiency

Motor HP:

C = 1/2 F = 1 1/2 J = 5 M = 15 Q = 30
 D = 3/4 G = 2 K = 7 1/2 N = 20
 E = 1 H = 3 L = 10 P = 25

Motor Hertz/RPM:

1 = 60/3450
 2 = 50/2900

Pump Material and Suction/Discharge Style:

A = 304 SS, Inline NPT Oval Flange
 B = 304 SS, Inline ANSI
 C = 304 SS, Top/Bottom ANSI
 D = 316 SS, Inline ANSI

Series: Stainless Steel Vertical

Nominal Pump Performance:

1 = 15 GPM 3 = 55 GPM 5 = 145 GPM
 2 = 28 GPM 4 = 86 GPM 6 = 290 GPM

Always specify the unit model and catalog number from pump nameplate when service or technical assistance is required.

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

Installation

- Provide adequate space and ventilation around unit for service and for motor cooling.
- Protect the pump and piping from freezing temperatures.
- The unit **MUST** be securely affixed to a level concrete or metal base foundation, adequate to absorb vibration and provide permanent, rigid support for the pump and motor assembly. See the “ENGINEERING DATA” section of this manual for specific model weights and pump base dimensions.
- Angular alignment of the suction and discharge flanges can best be accomplished using calipers at the bolt locations. See Figure 1.

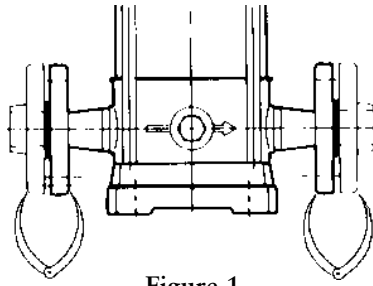


Figure 1

NOTICE: DO NOT DRAW PIPING INTO PLACE BY FORCING THE PUMP SUCTION OR DISCHARGE CONNECTIONS.

Piping

- Discharge and suction piping should be no smaller than the respective pump opening and should be kept as short as possible, avoiding unnecessary fittings to minimize friction losses.
- NOTICE: PIPING MUST BE INDEPENDENTLY SUPPORTED AND NOT PLACE ANY PIPING LOADS ON THE PUMP.**
- If suction piping larger than pump suction is required, an eccentric pipe reducer, **WITH THE STRAIGHT SIDE UP**, must be installed at the pump suction.
 - If the pump is installed below the liquid source, install a full flow isolation valve in the suction piping for pump inspection or maintenance.

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

- If pump is installed above the liquid source, the following **MUST** be provided:
 - To avoid air pockets, no part of the suction piping should be above the pump suction.
 - On any horizontal piping sections, slope piping upward from liquid source.
 - All suction pipe joints **MUST** be airtight.
 - Use a foot valve for priming, or for holding prime during intermittent duty.
- The suction strainer or suction bell **MUST** be at least 3 times the suction pipe diameter.
- Insure that the size and minimum liquid submergence, over the suction inlet, is sufficient to prevent air from entering through a suction vortex. See typical suction piping Figures 2 through 5.
- Install a discharge check valve, suitable to handle the flow and liquids, to prevent backflow.
- Install an appropriately sized gate valve, **AFTER** the discharge valve, to regulate the pump capacity, for pump inspection and for maintenance.
- When a pipe increaser is required, install between the check valve and the pump discharge.

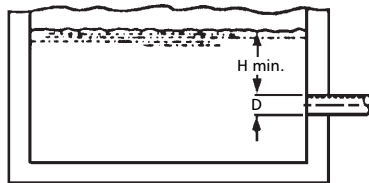


Figure 2

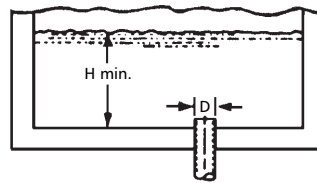


Figure 3

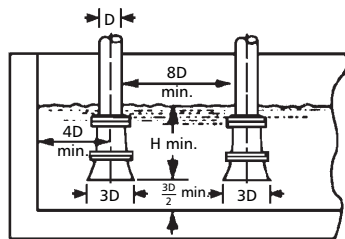


Figure 4

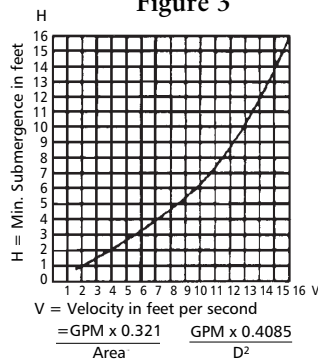


Figure 5

Shaft Alignment – Motor to Pump

- When the pump is purchased less motor, the pump will be supplied with a motor assembly shim positioned between the motor adapter and the coupling.
- To assemble the motor to the pump remove the plastic shipping straps, the 2 stainless steel coupling guard halves, and the expanded polyurethane.
- Insure that the motor assembly shim is properly positioned between the coupling and the motor adapter. If the motor assembly shim is not available, a 0.203" (5 mm) shim may be used to locate the pump shaft assembly and to set the correct height.
- For motor frame sizes 213TC and larger, attach the motor adapter flange to the motor using 4 hex cap screws. Torque to values shown in the “ENGINEERING DATA” section of this manual.
- Loosen the 4 coupling socket head screws enough to provide an adequate opening in the coupling to receive the motor shaft.
- With an adequately sized crane, carefully lower the motor assembly onto the pump motor adapter and into the coupling. Secure the 4 motor hex cap screws, torquing to the value provided in the “ENGINEERING DATA” section of this manual.
- Torque the 4 coupling socket head screws to the value provided in “ENGINEERING DATA” section of this manual.
- Remove the motor assembly shim and retain for future use.
- Install the 2 coupling guard halves.

Wiring and Grounding



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



Install an all leg disconnect switch near 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 motor and voids warranty.



Motors equipped with automatic thermal protectors open the motor's electrical circuit when an overload exists. This can cause the pump to start unexpectedly and without warning.

- Use only stranded copper wire to motor and ground. Wire size **MUST** limit the maximum voltage drop to 10% of the motor nameplate voltage, at the motor terminals. Excessive voltage drop will affect performance and void motor warranty. The ground wire must be at least as large as the wires to the motor. Wires should be color coded for ease of maintenance.
- Three phase motors require all leg protection with properly sized magnetic starters and thermal overloads.

⚠ WARNING
 Hazardous voltage
PERMANENTLY GROUND THE PUMP, MOTOR AND CONTROLS PER NEC OR LOCAL CODES BEFORE CONNECTING TO ELECTRICAL POWER. FAILURE TO DO SO CAN CAUSE SHOCK, BURNS OR DEATH.

- Connect the electrical leads to the motor, as follows:
- Single Phase Motors – Connect the BLACK wire to the BLACK motor wire. Connect the WHITE wire to the WHITE motor wire. Connect the GREEN wire to the GREEN motor wire.
- Three Phase Motors – See Figure 6.

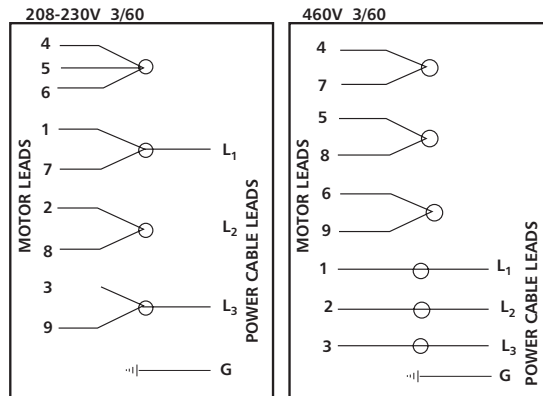


Figure 6

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

- Check pump rotation by observing the motor fan or the coupling **THROUGH** the coupling guard. **DO NOT** confuse the flow arrows, stamped on the pump body, with the rotation arrows on the coupling and motor adapter. Three phase motors only – If rotation is incorrect, have a qualified electrician interchange any two of the three power cable leads.

Priming

- To completely prime models 1SV and 2SV it is necessary to fully unscrew the pin located in the drain plug. See Figure 7.

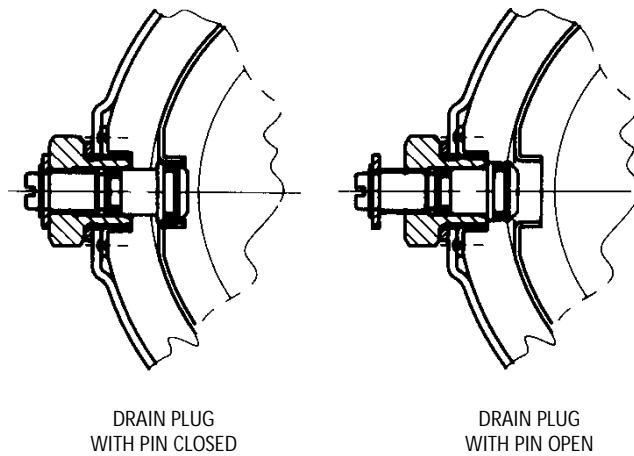


Figure 7

- For installations with the liquid level above the pump:
 - Close the discharge valve.
 - Remove the vent plug and fully unscrew the drain plug pin, 1SV and 2SV only.
 - Open the suction valve until liquid flows out of the vent plug opening.
 - Install and torque the vent plug to the values provided in the “ENGINEERING DATA” section of this manual. Close the drain plug pin, 1SV and 2SV only, and open the discharge valve.
- For installations with the liquid level below the pump:
 - Install foot valve at suction end.
 - Remove the vent plug and fully unscrew the drain plug pin, 1SV and 2SV only. With the provided vented funnel, completely fill the casing with liquid.
 - Install and torque the vent plug, close the drain plug pin, 1SV and 2SV only, and open the suction valve.

Operation



DO NOT OPERATE UNIT WITHOUT SAFETY GUARD IN PLACE. TO DO SO CAN CAUSE SEVERE PERSONAL INJURY.

NOTICE: PUMP MUST BE COMPLETELY PRIMED BEFORE OPERATION.



DO NOT OPERATE PUMP AT OR NEAR ZERO FLOW. TO DO SO CAN CAUSE EXTREME HEAT, DAMAGE TO THE PUMP, INJURY OR PROPERTY DAMAGE.

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



HAZARDOUS MACHINERY. MOTOR THERMAL PROTECTORS CAN RESTART MOTOR UNEXPECTEDLY AND WITHOUT WARNING, CAUSING SEVERE PERSONAL INJURY.

- See the “ENGINEERING DATA” section in this manual for the recommended maximum pump starts per hour.

Maintenance

▲WARNING

Hazardous
voltage

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

- Unit motor requires regular lubrication maintenance.

MOTOR LUBRICATION Recommended Motor Bearing Lubrication Intervals

Interval	Service Environment
1 – 2 Years	Light Duty in Clean Atmosphere
1 Year	8 – 16 hours/day – Clean, Dry Atmosphere
6 Months	12 – 24 hours/day – Moisture Present
3 Months	12 – 24 hours/day – Dirty, High Moisture

- When lubricants are operated at elevated temperatures, the lubrication frequency should be increased.
- **DO NOT** intermix grease bases (lithium, sodium, etc.). Completely purge old grease if changing grease base.
- Over greasing can cause excessive bearing temperatures, lubricant and bearing failure.

Mechanical Seal Replacement

1. Close all necessary suction and discharge valves.
2. Drain the liquid from the pump by removing the lower drain plug and the upper vent plug.
3. Remove the coupling guards, the 4 coupling hex cap screws, the coupling and coupling drive pin.
4. Remove the 4 motor hex cap screws. On units with motor frames 213TC and larger, remove the 4 motor adapter flange hex cap screws. With an adequately sized crane, carefully remove the motor. **DO NOT** rest the motor on the motor shaft.
5. Remove the 4 tie rod nuts and lock washers.
6. Carefully remove the motor adapter by sliding it up the pump shaft. Larger units may require an adequately sized crane to lift the motor adapter. **DO NOT** damage the shaft.

NOTICE: EDGES OF THE STAINLESS STEEL PARTS ARE SHARP. WEAR APPROPRIATE PROTECTIVE CLOTHING.

7. To gain access to the mechanical seal, it is necessary to remove the stainless steel upper plate which is held in place by an O-ring located under the plate rim. Place a small block of wood against the underside of the rim and, while moving around the rim, tap with a mallet against the block until the upper plate loosens. Remove the upper plate and O-ring from the pump casing. Discard the O-ring.
8. Remove the stationary element from the upper plate. With a clean cloth, wipe the upper plate bore clean and inspect for damage. Replace the upper plate, as required.
9. Remove the top (vented) stainless steel inner casing. Grasp the pump shaft, below the mechanical seal, and move it sharply back and forth to free the first stage from the lower pump body. Remove the entire stack assembly from the pump external sleeve.
10. Slide the mechanical seal rotary element, spring and washer from the pump shaft. Discard the entire mechanical seal assembly.
11. Lubricate the inside of the new mechanical seal assembly with a quality grade of O-ring lubricant.
12. To install a new mechanical seal rotary assembly, slide the assembly onto the pump shaft, spring end first. Be sure the top spring tip is in the hole of the rotary portion of the seal. **DO NOT** scratch or otherwise damage the seal face. With a clean, lint free cloth, wipe the seal face clean of all lubricant or debris.
13. Lubricate the outside of the new mechanical seal stationary element with a quality grade of O-ring lubricant.
14. Insert the stationary seat into the seal housing with the seal face out. **DO NOT** scratch or otherwise damage the seal face. Insure that the stationary seat is fully seated into the seal housing. With a clean, lint free cloth, wipe the seal face clean of all lubricant or debris.
15. With a new O-ring, install the seal housing onto the pump shaft, seating the plate fully and squarely onto the pump outer shell.
16. Place the motor adapter over the 4 tie rod bolts, using an adequately sized crane when required, and install the 4 lock washers and tie rod nuts. Torque the nuts, in sequence, to the value provided in the “ENGINEERING DATA” section of this manual.
17. With an adequately sized crane, carefully lower the motor onto the motor adapter, lining up the electrical conduit connection and the 4 motor adapter bolt holes, as required.

18. Install the 4 motor hex cap screws, torquing to the value provided in the “ENGINEERING DATA” section of this manual.
19. Place the coupling drive pin into the pump shaft and install the coupling halves onto the motor and pump shafts. Install the 4 coupling socket head screws, lock washers and nuts, **DO NOT** tighten.
20. Position the motor assembly shim between the coupling and the motor adapter. If the motor assembly shim is not available, a 0.203" (5 mm) shim may be used to locate the pump shaft assembly and to set the correct height.
21. Tighten the 4 coupling socket head screws, torquing screws to values provided in the “ENGINEERING DATA” section of this manual. Tighten evenly so that the gap between the halves is equal side to side and top to bottom.
22. Install the 2 coupling guard halves.

Motor Replacement

- To remove the motor follow steps 1 through 4, as provided in the “MECHANICAL SEAL REPLACEMENT” section of this manual.
- For motor frames 213TC and larger, remove the 4 motor hex cap screws and the motor adapter.
- Install the motor adapter flange onto the new motor, torquing the 4 hex cap screws to the values provided in the “ENGINEERING DATA” section of this manual.
- Complete the reassembly following steps 17 through 22 in the “MECHANICAL SEAL REPLACEMENT” section of this manual.
- All additional unit service or maintenance, not addressed in this manual, should be performed at a qualified service location. Contact your local dealer or G&L Pumps distributor for assistance.

Owner Information

Model Number: _____

Serial Number: _____

Dealer: _____

Date of Purchase: _____ Date of Delivery: _____

Trouble Shooting Guide

⚠ WARNING
Hazardous
voltage

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

SYMPTOM

MOTOR NOT RUNNING

See Probable Cause – 1 through 5

LITTLE OR NO LIQUID DELIVERED BY PUMP

See Probable Cause – 6 through 12

POWER CONSUMPTION TOO HIGH

See Probable Cause – 3, 12, 13, 15

EXCESSIVE NOISE AND VIBRATION

See Probable Cause – 3, 6 - 8, 10, 12, 13, 16

PROBABLE CAUSE

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

Engineering Data

Maximum Working Pressure = 230 psi (16 bar) with the oval suction and discharge flanges
(1SV, 2SV, 3SV, 4SV)
360 psi (25 bar) with ANSI suction and discharge flanges

Maximum Working Pressure = 5SVB 2 and 3 stage 175 psi (12 bar)
(5SV, 6SV) 5SVD 2 and 3 stage 275 psi (19 bar)
5SV 4 stage and above 360 psi (25 bar)
6SVB 175 psi (12 bar)
6SVD 275 psi (19 bar)

Maximum Liquid Temperature = 230° F (110° C)

ELECTRICAL DATA

HP	Motor Frame	RPM	Voltage	Phase/Hz	Starts/Hour
¾	56C	3600	230	1/60	30
			208 – 230/460	3/60	30
1	56C	3600	230	1/60	30
			208 – 230/460	3/60	30
1½	56C	3600	230	1/60	30
			208 – 230/460	3/60	30
2	56C	3600	230	1/60	30
			208 – 230/460	3/60	30
3	56C	3600	230	1/60	30
			208 – 230/460	3/60	30
5	184TCH	3600	230	1/60	20
			208 – 230/460	3/60	20
7½	184TCH	3600	230	1/60	20
			208 – 230/460	3/60	20
10	213TC 225TC	3600	230	1/60	20
			208 – 230/460	3/60	20
15	215TC 254TC	3600	230	1/60	15
			208 – 230/460	3/60	15
20	254TC 256TC	3600	208 – 230/460	3/60	15
25	256TC 284TC	3600	208 – 230/460	3/60	12
30	284TC 286TC	3600	208 – 230/460	3/60	12

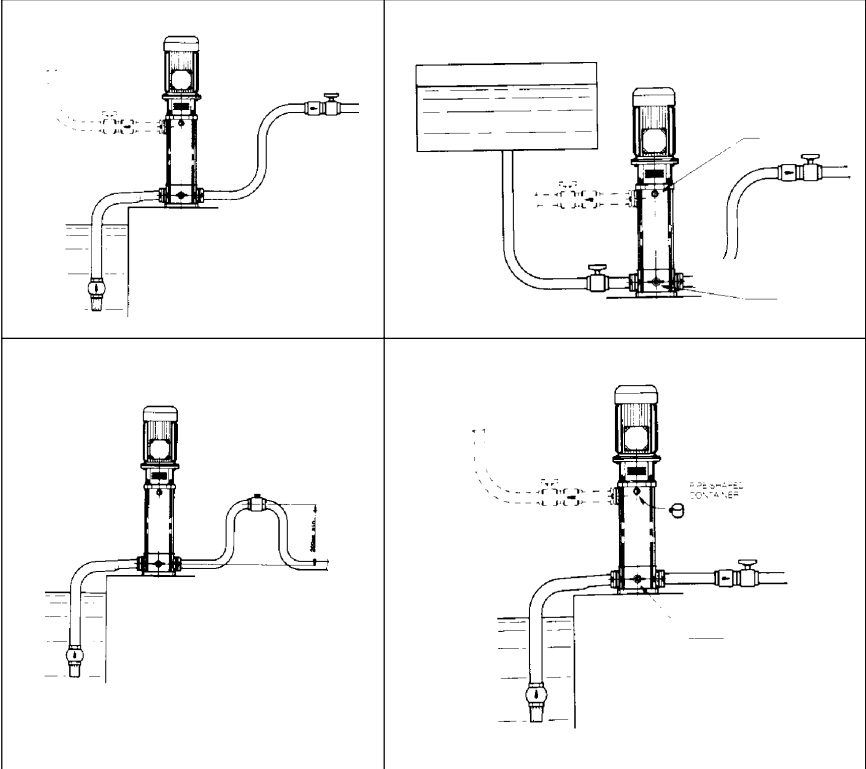
TORQUE VALUES

HP	Motor Frame	Motor Bolt	Adapter Flange	Coupling
¾	56C	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
1	56C	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
1½	56C	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
2	56C	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
3	56C	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
5	184TCH	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
7½	184TCH	20 lbs ft (27 N .m)	–	15 lbs ft (20 N .m)
10	213TC 215TC	45 lbs ft (61 N .m)	30 lbs ft (40 N .m)	30 lbs ft (40 N .m)
15	215TC 254 TC	45 lbs ft (61 N .m)	30 lbs ft (40 N .m) 48 lbs ft (65 N .m)	30 lbs ft (40 N .m) 48 lbs ft (65 N .m)
20	254TC 256TC	45 lbs ft (61 N .m)	48 lbs ft (65 N .m)	48 lbs ft (65 N .m)
25	256TC 284TC	45 lbs ft (61 N .m)	48 lbs ft (65 N .m)	48 lbs ft (65 N .m)
30	284TC 286TC	45 lbs ft (61 N .m)	48 lbs ft (65 N .m)	48 lbs ft (65 N .m)

TORQUE VALUES

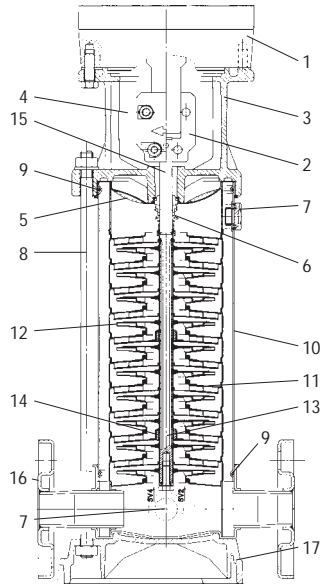
Pump Size	Tie Rod Nuts	Vent and Drain
1SV	22 lbs ft (30 N .m)	15 lbs ft (20 N .m)
2SV	22 lbs ft (30 N .m)	15 lbs ft (20 N .m)
3SV	37 lbs ft (50 N .m)	15 lbs ft (20 N .m)
4SV	37 lbs ft (50 N .m)	15 lbs ft (20 N .m)
5SV	52 lbs ft (70 N .m)	30 lbs ft (40 N .m)
6SV	52 lbs ft (70 N .m)	30 lbs ft (40 N .m)

Typical Plumbing and Installation



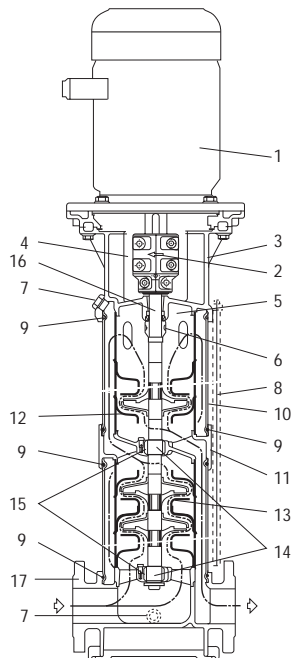
NOTE: Discharge loop must be high enough to keep liquid in the bottom stages during shut-down.

1SV, 2SV, 3SV, and 4SV Major Components



- 1 Standard NEMA vertical motor
- 2 Rigid coupling
- 3 Motor adapter
- 4 Coupling guard
- 5 Stainless steel seal housing
- 6 Mechanical seal
- 7 Stainless steel fill and drain plugs
- 8 Tie-rods
- 9 O-ring
- 10 Stainless steel pump casing
- 11 Stainless steel diffuser
- 12 Stainless steel impeller
- 13 Tungsten carbide shaft sleeve
- 14 Ceramic bushing
- 15 Stainless steel shaft
- 16 Stainless steel pump body
- 17 Pump base

5SV and 6SV Major Components



- 1 Standard NEMA vertical motor
- 2 Rigid coupling
- 3 Motor adapter
- 4 Coupling guard
- 5 Seal housing
- 6 Mechanical seal
- 7 Stainless steel fill and drain plugs
- 8 Tie-rods
- 9 O-ring
- 10 Stainless steel pump casing
- 11 Intermediate crossover stage
- 12 Stainless steel diffuser
- 13 Stainless steel impeller
- 14 Tungsten carbide shaft sleeve
- 15 Ceramic bushing
- 16 Stainless steel shaft
- 17 Pump body



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.

