

Installation, Operation and Maintenance Instructions

Series 3888D3/ 3888D4



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Owner's Information

Model Number: _____
 Serial Number: _____
 Dealer: _____
 Dealer Phone No. _____
 Date of Purchase: _____ Installation: _____
 Current Readings at Startup:
 Single Phase: _____
 Three Phase – 1st Phase: _____
 2nd Phase: _____ 3rd Phase: _____

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.

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

DESCRIPTION AND SPECIFICATIONS

The Series 3888D3 and 3888D4 embrace a line of residential, commercial and industrial 3" and 4" 125# ANSI flanged discharge, 3" (76 mm) solids handling, dual seal, submersible sewage pumps.

The range covers both single phase and three phase models. Horsepowers 1½ through 7½ at 1750 RPM. Pump nameplate contains all specific model information.

Model	HP	RPM	Volts	Phase	Amps	Wt.(lbs.)
WS1512D3	1½	1725	230	1	11.0	182
WS1532D3	1½	1725	208-230	3	10.0	180
WS1534D3	1½	1725	460	3	5.0	180
WS1512D3M	1½	1725	230	1	11.0	182
WS1532D3M	1½	1725	208-230	3	10.0	180
WS1534D3M	1½	1725	460	3	5.0	180
WS2012D3	2	1725	230	1	15.0	186
WS2032D3	2	1725	208-230	3	10.0	184
WS2034D3	2	1725	460	3	5.0	184
WS3012D3	3	1725	230	1	20.0	205
WS3032D3	3	1725	208-230	3	12.0	190
WS3034D3	3	1725	460	3	6.0	190
WS5012D3	5	1725	230	1	26.5	210
WS5032D3	5	1725	208-230	3	16.4	205
WS5034D3	5	1725	460	3	8.2	195
WS1512D4	1½	1725	230	1	13.2	182
WS1532D4	1½	1725	208-230	3	10.0	180
WS1534D4	1½	1725	460	3	5.0	180
WS1512D4M	1½	1725	230	1	13.2	182
WS1532D4M	1½	1725	208-230	3	10.0	180
WS1534D4M	1½	1725	460	3	5.0	180
WS2012D4	2	1725	230	1	16.3	186
WS2032D4	2	1725	208-230	3	11.6	184
WS2034D4	2	1725	460	3	5.8	190
WS3012D4	3	1725	230	1	21.5	205
WS3032D4	3	1725	208-230	3	14.4	195
WS3034D4	3	1725	460	3	7.2	190
WS5012D4	5	1725	230	1	26.5	210
WS5032D4	5	1725	208-230	3	16.6	210
WS5034D4	5	1725	460	3	8.3	200

Optional Pump Styles

For optional lower mechanical seal add the pump model number character suffix:

“K” = Tung Carb/Tung Carb, Buna – Lower seal only
Sil Carb/Sil Carb, Buna – Lower seal only (standard)

For optional length power and motor overheat sensor cable add the pump model number character suffix:

“S” = 30’ “U” = 50’ “J” = 100’

For optional bronze impeller, add a “Y” suffix to the pump model number.

Lifting of Pump

⚠ WARNING



Hazardous voltage can shock, burn or cause death.

DO NOT LIFT, CARRY OR HANG PUMP BY THE ELECTRICAL CABLES. DAMAGE TO THE ELECTRICAL CABLES CAN CAUSE SHOCK, BURNS OR DEATH.

- Lift the pump with an adequately sized chain or cable attached to the lifting eye bolt (458). **DO NOT** damage electrical and sensor cables while raising and lowering unit.

Sliderail System

- The **OPTIONAL** Goulds Model A10-30 (3888D3) and A10-40 (3888D4) sliderail system is recommended for proper installation.

NOTICE: FOLLOW THE INSTALLATION AND OPERATION INSTRUCTIONS PROVIDED WITH THE SLIDERAIL SYSTEM.

- Installation of the sliderail system should locate the pump opposite the influent opening, preventing stagnate areas where solids can settle.
- The pit floor **MUST** be flat under the sliderail base and have sufficient loading capacity to support the entire weight of the assembly, including the sliderail base, sliderail guide, pump and all assorted piping.

Piping

- Discharge piping should be no smaller than 3" or 4" (76 or 102 mm) diameter and kept as short as possible, avoiding unnecessary fittings to minimize friction losses.
- Install an adequately sized check valve, suitable for handling 3" (76 mm) solids, in the discharge pipe to prevent backflow. Follow the check valve manufacturer's installation instructions.
- Install an adequately sized gate valve **ABOVE** the check valve for pump, plumbing and check valve maintenance.
- To deter air locking, drill a $\frac{3}{16}$ " (4.8 mm) hole, 2" (50.8 mm) beyond the pump discharge connection.
- All piping must be adequately supported, so as not to impart any piping strain or loads on the pump.

Access Doors

- Access doors can be single or double leaf design. Doors should include a lifting handle and a lock provision for tamper resistant operation. Standard and heavy duty steel or aluminum doors are available.
- The pit access door must be of sufficient size to allow for inspection, maintenance and crane or hoist service.

Liquid Level Controls

- The recommended float operation sequence requires a three or four float system. In the three float system, the floats are designated SW-1 for the bottom float, SW-2 for the middle float and SW-3 for the top float. In a four float system the fourth float is designated SW-4.
- **Simplex Control** – The rising liquid level raises float SW-2, turning on the pump. When the liquid level falls sufficiently, SW-1 will turn the pump off. If the influent is excessive, or if the pump fails to operate correctly, SW-3 will activate an alarm, which will remain on until manually reset.
- **Duplex Control** – The duplex control will alternate the two pumps, causing the lead pump to change at each system cycle. When equipped with three floats, the system will cycle the same as the simplex control, described above, except that the SW-1 will cause the lead pump to alternate.
- If the influent is excessive, or if the lead pump fails to operate correctly, the rising level will activate SW-3, turning on the lag pump and the alarm. As before the alarm must be manually reset.

- **Four Float Control** – The four float system operates the same as the duplex control system, except that float SW-3 will not turn on the alarm. In this system SW-4 turns on the alarm, which again must be manually reset.
- The **OPTIONAL** Goulds A2-3 mercury float switch has been designed to close on a 8" (20.3 cm) rise in liquid level from the bottom of the float bulb. A weight on the float's electrical cable keeps the float suspended and allows the float to rise correctly. Floats may be suspended from their cables. See Figure 1.

NOTICE: POSITION THE FLOATS SO THAT THEY DO NOT SNAG OR TANGLE ON THE PUMP, DISCHARGE PIPING, OR OTHER EQUIPMENT.

- The lower most float turns the unit off and should be set as shown in the "TYPICAL PLUMBING and INSTALLATION" drawing provided in this manual.
- Increasing the distance between the SW-1 and SW-2 floats lengthens the running time. Six (6) minutes is the minimum recommended pump cycle time.

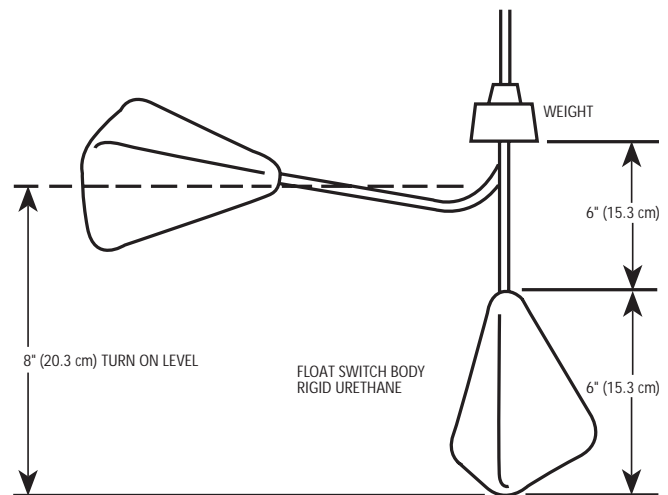


Figure 1

NOTICE: DURING PUMP OPERATION, INSURE THAT THE LIQUID LEVEL DOES NOT DROP BELOW THE PUMP MOTOR FOR EXTENDED PERIODS. THIS CAN CAUSE THE PUMP MOTOR TO OVERHEAT, CAUSING MOTOR DAMAGE AND VOIDING THE WARRANTY.

Sensor

- **Motor Overheat Sensor** – Single phase $1\frac{1}{2}$ and 2 HP motors are equipped with a thermal protector, which when an over temperature, or over current exists, shuts down the pump motor. A temperature sensing device is supplied as standard on the 3 and 5 HP single phase motors, which when an over temperature exists, sends a signal to the pump control panel to shut down the pump motor and turn ON the indicator light. See the "PUMP MOTOR CONTROL PANELS" section for the recommended circuit configuration.

Pump Motor Control Panels

- Control panels shall be in accordance with local and National Electrical Code requirements.
- Single phase panels shall be equipped with a Goulds' "SES" or "A" Series panel, or **AS A MINIMUM**, a control panel with a properly sized magnetic contactor and a disconnect switch.
- The 3 and 5 HP single phase motor control panels shall be equipped with a Goulds' "SES" or "A" Series panel, or **AS A MINIMUM**, a control panel with a properly sized magnetic contactor, an ambient compensated Quick Trip Class 10 overload relay and two 50 mf run capacitors.
- Three phase panels shall be equipped with a Goulds' "SES" or "A" Series panel, or **AS A MINIMUM**, with a 3 pole circuit breaker, an across the line magnetic starter NEMA rated for the appropriate horsepower, ambient compensated Quick Trip Class 10 overload relays.
- On units equipped with a motor overheat sensor, the panel **MUST** be equipped with a motor overheat sensor circuit. It is recommended that this control circuit be configured with an auto reset motor overheat shut down circuit, an oil tight indicator light, and a motor overheat sensor test circuit.

Wiring and Grounding

- Use only stranded copper wire to motor and ground. The ground wire must be at least as large as the wires to the motor. Wires should be color coded for ease of maintenance.



- ! 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 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.

- Where cables must be spliced or connected to the motor leads, splices **MUST** be water tight. Commercially available potting or heat shrink kits may be used, if allowed by local or federal regulations.

NOTICE: FOLLOW THE SPLICE KIT MANUFACTURER'S INSTRUCTIONS.

- Where wire splices are used, follow one of these procedures:

- Butt join the wires using properly sized and correctly crimped Sta-Kon™, or equivalent, connectors. Insulate and water proof each joint using heat shrink tubing equipped with a self contained sealer. Apply heat evenly from a torch until adequately sealed.

OR

- Use plastic insulators and a neoprene gasket sleeve set with properly sized and correctly crimped Sta-Kon™ connectors. Place a cap and gasket on each wire end, center insulator body over splice, insert the sleeve into the body as far as possible, hand tighten caps.
- In the case of multiple conductors, stagger the joints.



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

Operation

- The 3888D3 and 3888D4 mechanical seal chambers and motors are filled with a special insulating oil. No further lubrication is necessary or possible.
- If the unit has been stored for an extended period, check the oil level in the motor and seal chamber, to insure that they are full, using the following procedures:
 - Seal Chamber – With the pump secured on its side and the seal housing plug (358E) up, remove the plug. The oil level should be no more than 1/2" (13 mm) below the inside of the housing. With the proper oil (218), fill as required. **DO NOT** over fill.
 - Motor Cover – With the pump in the upright position, remove the oil fill plug (358), being careful that nothing enters the motor. The oil level should be above the top of the motor. With the correct oil fill as required. **DO NOT** over fill.
 - Cable Gland Assemblies – Re-torque both the power and sensor cable glands to values given in step 12 of "POWER and SENSOR CABLE REPLACEMENT".
- Before lowering the pump(s) into the containment area, three phase units should be jogged to insure correct rotation. See the motor rotation arrow on the motor cover (341). Check both pumps in a duplex operation.

NOTICE: MOTOR STARTUP TORQUE, "KICKBACK", WILL CAUSE THE MOTOR TO TWIST IN THE DIRECTION OPPOSITE ROTATION. INSURE THAT THE PUMP ASSEMBLY IS ADEQUATELY RESTRAINED.



DO NOT PLACE HANDS IN PUMP SUCTION WHILE CHECKING MOTOR ROTATION. TO DO SO WILL CAUSE SEVERE PERSONAL INJURY.

NOTICE: DO NOT SWITCH PRIMARY POWER LEADS COMING INTO A THREE PHASE DUPLEX CONTROL PANEL, THIS WILL REVERSE ROTATION OF BOTH PUMPS.

- If the three phase motor(s) rotation is backwards, reverse any two pump power cable leads at the pump control panel.
- Check the motor overheat sensor circuit by depressing the sensor test button, when provided on the pump control panel. If the pilot light comes ON the circuit is operational, if the light does not come ON, repair as necessary.



MOTOR OVERHEAT/OVER CURRENT SENSING DEVICES AUTOMATICALLY RESTART THE MOTOR UNEXPECTEDLY AND WITHOUT WARNING. THIS CAN CAUSE SEVERE PERSONAL INJURY.

- After installing the pump into the containment area, with adequate submergence, open the discharge valve fully. Start the unit using manual controls. If flow is appreciably less than rated performance, pump may be air bound. To expel trapped air, jog the unit several times, using the manual controls.
- Have a qualified electrician take current measurements on the single or all three phases. Record these readings in the space provided in the “OWNER’S INFORMATION” section of this manual for future reference.
- The unit is now ready for normal operation. Place the controls in the automatic position.

Maintenance



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



UNIT MUST BE FLUSHED AND DISINFECTED, INSIDE AND OUT, PRIOR TO SERVICING.



Biohazard can cause serious personal injury.

Periodic Maintenance

NOTICE: ROUTINE PERIODIC INSPECTIONS ARE REQUIRED AND SHOULD FOLLOW THE FREQUENCY AND MAINTENANCE SCHEDULE PROVIDED.

FREQUENCY	REQUIRED MAINTENANCE
MONTHLY	<ul style="list-style-type: none"> • Duplex Units – Check for even operating times. Uneven times indicate a defective unit, float switch or control. • Unimpeded float operation. • Check motor resistance to ground. See “ENGINEERING DATA” section for resistance readings and procedures.
EVERY TWO YEARS	<ul style="list-style-type: none"> • Remove and replace motor and seal insulating oil. Inspect oil for contamination as follows: <ul style="list-style-type: none"> • Clear oil, no burnt odor – Oil, motor and seals are in satisfactory condition. • Dark oil, burnt odor – Pump motor has overheated. Check the motor winding resistance to ground. Ohm readings of 1 megohm or higher is required. If lower readings are present, return the unit to an authorized service facility for service. • Milky, emulsified oil – Seals have failed. Unit must be returned to an authorized service facility for service. • Dispose of the motor insulating oil properly. • Inspect power and sensor cables for damage or wear. Replace immediately if damage or wear is detected. • Inspect impeller for damage or wear. Replace as required following the procedures provided in the “LOWER MECHANICAL SEAL” section of manual.
EVERY FIVE YEARS	<ul style="list-style-type: none"> • Unit should undergo a complete overhaul, including: <ol style="list-style-type: none"> a) Full disassembly, cleaning and inspection. b) Replacement of damaged or worn mechanical seal or impeller. c) Replacement of motor. d) Complete insulation tests to the resistance values provided in the “ENGINEERING DATA” section of this manual.

Disassembly

▲WARNING

Hazardous
voltage

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

NOTICE: FOLLOW ALL SAFETY AND LIFTING INSTRUCTIONS PROVIDED IN THIS MANUAL.

- Following the slide rail instructions, remove the pumping unit from the sewage containment area.

▲WARNING



Biohazard can
cause serious
personal injury.

UNIT MUST BE FLUSHED AND DISINFECTED, INSIDE AND OUT, PRIOR TO SERVICING.

LOWER MECHANICAL SEAL REPLACEMENT

1. Follow ALL instructions provided in the “DISASSEMBLY” section of this manual.
2. To gain access to the pump impeller and lower mechanical seal, remove the 4 casing hex cap screws (372D). Remove casing (100).
3. Removal of the lower mechanical seal assembly (387) requires draining the special insulating oil from the seal housing (184). This is accomplished by removing the seal housing drain plug (358) and draining the oil into an adequately sized clean receptacle. See “ENGINEERING DATA” section for required volume.

NOTICE: THE MOTOR INSULATING OIL MUST BE INSPECTED FOLLOWING THE PROCEDURES PROVIDED IN THE “TWO YEAR – PERIODIC MAINTENANCE” SECTION.

4. To remove the impeller (101), secure the impeller from rotation then remove the impeller screw (198) by turning the screw **COUNTERCLOCKWISE**. Remove the impeller washer (199), and impeller key (178), then remove the impeller from the motor shaft.

NOTICE: DISCARD THE IMPELLER SCREW, IT CANNOT BE REUSED.

5. Remove and discard the lower mechanical seal and stationary seat. **DO NOT** damage the motor shaft or stationary seat bore.
6. Inspect and wipe clean the stationary seat bore.
7. To install the new stationary seat into the seal housing, lubricate the stationary seat bore and motor shaft with clean motor insulating oil. Using Goulds mechanical seal installation driver tool (A02A017), slide the stationary seat fully and squarely into the seal housing.
8. With a clean, lint free cloth, wipe the stationary face clean of all lubricating oil or debris. **DO NOT** scratch or otherwise damage the seal face.

9. Lubricate the inside of the rotary elastomer with clean motor insulating oil. Using both Goulds installation tools, slide the seal rotary onto the motor shaft and seat fully against the stationary seat. Remove the seal installation tools.

NOTICE: DISCARD THE SEAL SPRING RETAINER, IF PROVIDED.

10. Install the impeller key into the shaft keyway.
11. Apply 2 to 3 drops of Loctite™ #271 to the shaft threads.
12. Slide impeller onto shaft, securing with the impeller washer and new impeller screw. With the impeller secured from rotation, tighten the impeller screw turning **CLOCKWISE** to 35 lbs ft (47 N m) torque.
13. Fill the seal chamber with special insulating oil to within 1/2" (13 mm) of the seal chamber housing. Tape drain plug with Teflon™ tape and install plug securely.
14. Install the four casing hex cap screws with lock washers and torque in sequence to 35 lbs ft (47 N m).

NOTICE: FOLLOW THE INSTRUCTIONS PROVIDED IN THE “WIRING and GROUNDING” AND “OPERATION” SECTIONS OF THE MANUAL AFTER UNIT DISASSEMBLY, REASSEMBLY.

UPPER MECHANICAL SEAL REPLACEMENT

1. To gain access to the upper mechanical seal follow steps 1 through 6 in the “LOWER MECHANICAL SEAL REPLACEMENT” section of this manual.
2. Removal of the upper mechanical seal requires removal of the seal housing and draining the special insulating oil from the motor cover (341).

▲CAUTION

Hazardous
Pressure

FAILURE TO REMOVE DRAIN PLUG CAREFULLY CAN CAUSE HOT OIL TO ERUPT FROM OIL RESERVOIR CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

3. Remove the motor cover oil drain plug and drain the insulating oil into an adequately sized clean receptacle. See the “ENGINEERING DATA” section of this manual for volume. **DO NOT** allow the pump assembly to drag or rest on the motor shaft.

NOTICE: CAREFULLY FOLLOW THE INSTRUCTIONS PROVIDED IN THE “TWO YEAR – PERIODIC MAINTENANCE” SECTION OF THIS MANUAL, FOR THE OIL INSPECTION AND REQUIRED ACTIONS.

4. Remove the four hex head screws (352). Remove the seal housing. Remove and discard the seal housing O-ring (412P).
5. With a properly sized snap ring pliers, remove and discard the seal retaining ring (361), **DO NOT** damage the motor shaft. Slide the upper mechanical seal rotary assembly (383) from the shaft and discard. Remove and discard the upper stationary seat, being careful not to damage the stationary seat bore in the seal housing.
6. Inspect and wipe the stationary seat bore clean.

7. To install a new upper stationary seat, lubricate the stationary seat bore and motor shaft with clean motor insulating oil. Using the Goulds mechanical seal installation driver tool (A02A017) slide a new stationary seat fully and squarely into the seal housing bore.
8. With a clean, lint free cloth, wipe the stationary seat face clean of all lubricant or debris. **DO NOT** scratch or otherwise damage the seat face. Lightly lubricate the seat face with clean insulating oil.
9. Lubricate the inside of the rotary elastomer with clean motor insulating oil. Using both Goulds installation tools, slide the seal rotary assembly over motor shaft, and seat fully against the stationary seat. Install the seal spring retainer over the motor shaft and seat on the rotary half of the mechanical seal.
10. With properly sized retaining ring pliers, install a new retaining ring, compressing the seal spring and locking the upper mechanical seal in place. Wipe off excessive oil. **DO NOT** damage the motor shaft.

NOTICE: INSURE THAT THE UPPER MECHANICAL SEAL RETAINING RING IS SEATED FULLY INTO THE RETAINING RING GROOVE.

11. Lubricate with a quality grade of O-ring lubricant and install a new seal housing O-ring on the seal housing and then slide the seal housing over the motor shaft, seating it fully into the bearing housing (340). Secure the seal housing with the four hex head screws, torquing each to 35 lbs ft (47 N.m).
12. To complete the pump assembly follow steps 7 through 13 in the “**LOWER MECHANICAL SEAL REPLACEMENT**” section of this manual.
13. Fill the motor cover, with special motor insulating oil, to a level above the top of the motor. **DO NOT** over fill.
14. Tape the motor cover oil drain plug with Teflon™ tape and install securely.

NOTICE: FOLLOW THE INSTRUCTIONS PROVIDED IN THE “**WIRING and GROUNDING**” AND “**OPERATION**” SECTIONS OF THE MANUAL AFTER UNIT DISASSEMBLY, REASSEMBLY.

POWER AND SENSOR CABLE REPLACEMENT

1. Follow **ALL** instructions provided in the “**DISASSEMBLY**” section of this manual.



FAILURE TO REMOVE DRAIN PLUG CAREFULLY CAN CAUSE HOT OIL TO ERUPT FROM OIL RESERVOIR CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

2. Replacement requires draining the special motor insulating oil from the motor cover. This is accomplished by removing the motor cover oil drain plug and draining the oil into an adequately sized clean receptacle. See the “**ENGINEERING DATA**” section of this manual for volume.

NOTICE: CAREFULLY FOLLOW THE INSTRUCTIONS PROVIDED IN THE “**TWO YEAR PERIODIC MAINTENANCE**” SECTION OF THIS MANUAL, FOR THE OIL INSPECTION AND REQUIRED ACTIONS.

3. Remove the power cable strain relief (484B) and, when installed, the sensor cable strain relief (484) assemblies from the motor cover and slide up the cables.
4. Remove the four motor cover hex head cap screws (372D) and carefully slide the motor cover from the pump assembly. Remove and discard the bearing housing O-ring (412P). **DO NOT** damage the power and sensor cables.



FAILURE TO DRAIN CAPACITOR OF STORED ELECTRICAL CHARGE BEFORE SERVICING CAN CAUSE SEVERE SHOCK.

5. Disconnect the power cable wires from the motor leads and ground. On 3 and 5 Hp single phase motors, disconnect the motor overheat sensor cable wires from the sensor.
6. Remove cables from motor cover, inspect and replace as required.

NOTICE: DISCARD BOTH STRAIN RELIEF ASSEMBLIES. THEY CAN NOT BE REUSED.

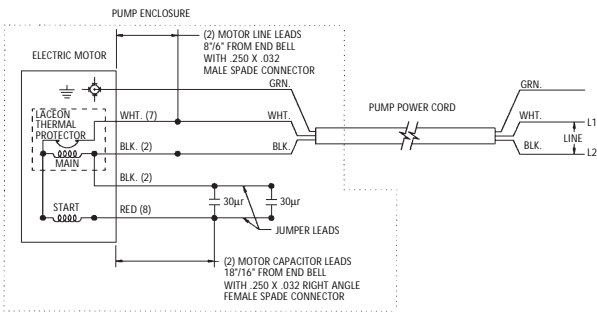
7. Lubricate with a quality grade of O-ring lubricant and install a new motor cover O-ring into the groove provided in the bearing housing.
8. Install new motor and sensor cable strain relief assemblies onto cables, sliding the hex glands on first, then the washers and finally the packing. Insert the cables into their respective motor cover holes. Pull an appropriate amount of cable through the motor cover to allow for connecting the cable leads. **DO NOT** tighten the strain relief glands.
9. Connect the power cable leads to the motor assembly as follows:
 - 1½ and 2 HP Single Phase Motors – Connect the **BLACK** and **WHITE** wires to the **BLACK (2)** and **WHITE (7)** motor leads respectively. See Figure 2.
 - 3 and 5 HP Single Phase Motors – Connect the **BLACK** wire to the **BLACK (2)** motor lead, connect the **WHITE** wire to **WHITE (7)** motor lead, connect the **RED** wire to the **RED (8)** motor lead and connect the **GREEN** wire to the motor ground. See Figure 3.
 - Three Phase Motors – See Figure 4.

10. On 3 and 5 HP single phase motors, attach the motor overheat sensor cable leads as shown in Figure 5.



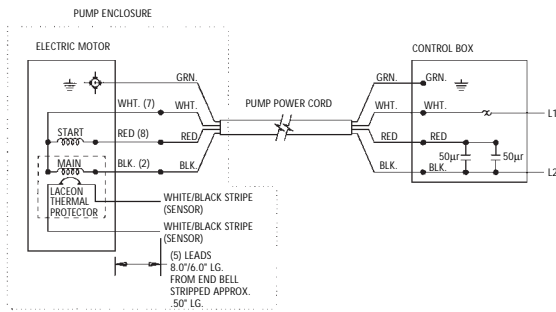
FAILURE TO CONNECT POWER AND SENSOR WIRES TO DESIGNATED WIRES CAN CAUSE A SHOCK, BURNS OR DEATH.

11. Wire tie the power and sensor cables to the motor assembly.
12. Slide the motor cover onto the motor assembly, while carefully pulling the power and sensor cables out through their respective motor cover holes. **DO NOT** damage cables. Install the four motor cover hex cap screws, torquing to 35 lbs ft (47 N m).
13. Install the sensor cable strain relief assembly, torquing to 75 lbs in (8.5 N m) and then the power cable strain relief assembly torquing the steel bushing to 100 lbs in (11.3 N m).



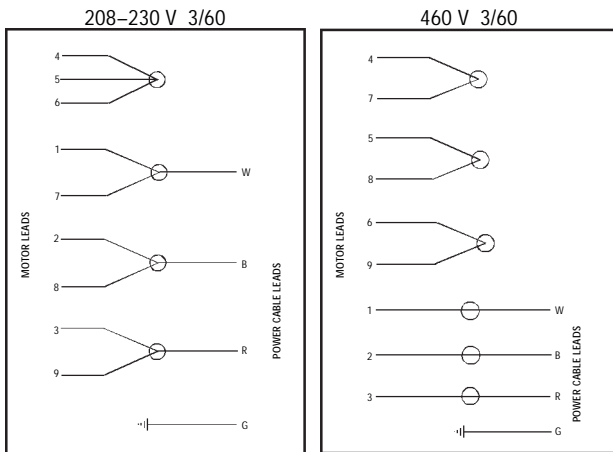
WIRING DIAGRAM FOR 1½ AND 2 HP SINGLE PHASE

Figure 2



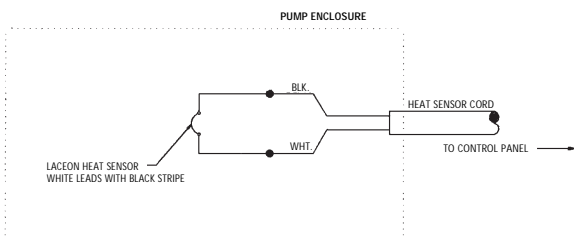
WIRING DIAGRAM FOR 3 AND 5 HP SINGLE PHASE

Figure 3



THREE PHASE MOTOR WIRING DIAGRAM

Figure 4



WIRING DIAGRAM FOR HEAT SENSOR

Figure 5

- Fill the motor cover, with special motor insulating oil, to a level above the top of the motor. **DO NOT** over fill.
- Tape the motor cover oil drain plug with Teflon™ tape and install securely.
- If the motor cover was replaced, it is necessary to transfer the Goulds Pumps nameplate. Using two stainless steel No. 2 round head metallic drive screws, install the Goulds Pumps nameplate.

NOTICE: FOLLOW THE INSTRUCTIONS PROVIDED IN THE “WIRING and GROUNDING” AND “OPERATION” SECTIONS OF THE MANUAL AFTER UNIT DISASSEMBLY, REASSEMBLY.

RUN CAPACITOR REPLACEMENT

- Follow ALL instructions provided in the “DISASSEMBLY” section of this manual.
- Single phase 1½ and 2 HP models require two motor run capacitors, which are located within the motor cover. A Goulds Pumps replacement kit part number 9K233 is available.

CAUTION
Hazardous Pressure

FAILURE TO REMOVE DRAIN PLUG CAREFULLY CAN CAUSE HOT OIL TO ERUPT FROM OIL RESERVOIR CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

- To gain access to the motor run capacitors follow steps 2 through 8 in the “POWER and SENSOR CABLE REPLACEMENT” section of this manual.
- Disconnect the motor leads from the capacitor then remove and discard the two run capacitors.
- Install two new 30 mf run capacitors to the motor, then connect the two capacitors together using the **BLACK** jumper wires provided. Connect the **RED (8)** and the **BLACK (2)** motor leads to a capacitor. See Figure 6.
- Reconnect the **BLACK (2)** and **WHITE (7)** motor leads to the respective **BLACK** and **WHITE** power cable leads.

WARNING
Hazardous voltage

FAILURE TO CONNECT POWER TO DESIGNATED WIRES CAN CAUSE SHOCK, BURNS OR DEATH.

- To complete assembly follow steps 11 through 16 in the “POWER and SENSOR CABLE REPLACEMENT” section of this manual.

NOTICE: FOLLOW THE INSTRUCTIONS PROVIDED IN THE “WIRING and GROUNDING” AND “OPERATION” SECTIONS OF THE MANUAL AFTER UNIT DISASSEMBLY, REASSEMBLY.

MOTOR REPLACEMENT

- Prior to motor cover removal, follow steps 1 through 6 in the “UPPER MECHANICAL SEAL REPLACEMENT” section of this manual.
- To gain access to the motor assembly follow steps 2 through 5 in the “POWER and SENSOR CABLE REPLACEMENT” section of this manual.

NOTICE: DISCARD BOTH STRAIN RELIEF ASSEMBLIES. THEY CAN NOT BE REUSED.

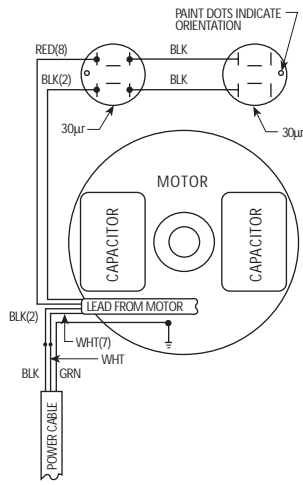
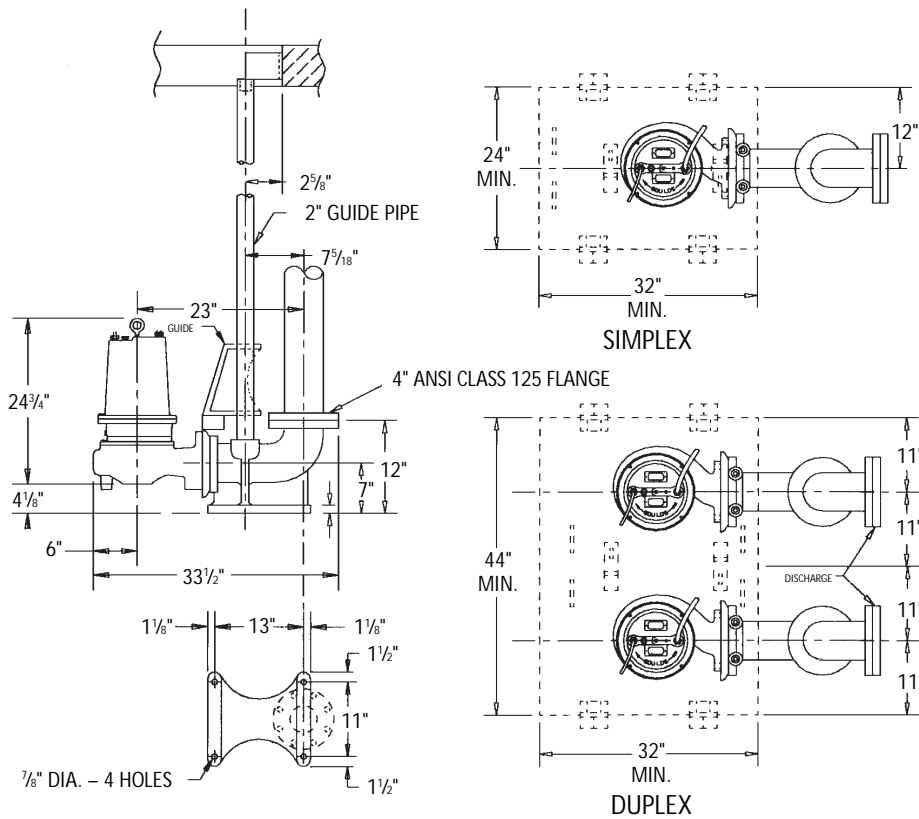


Figure 6

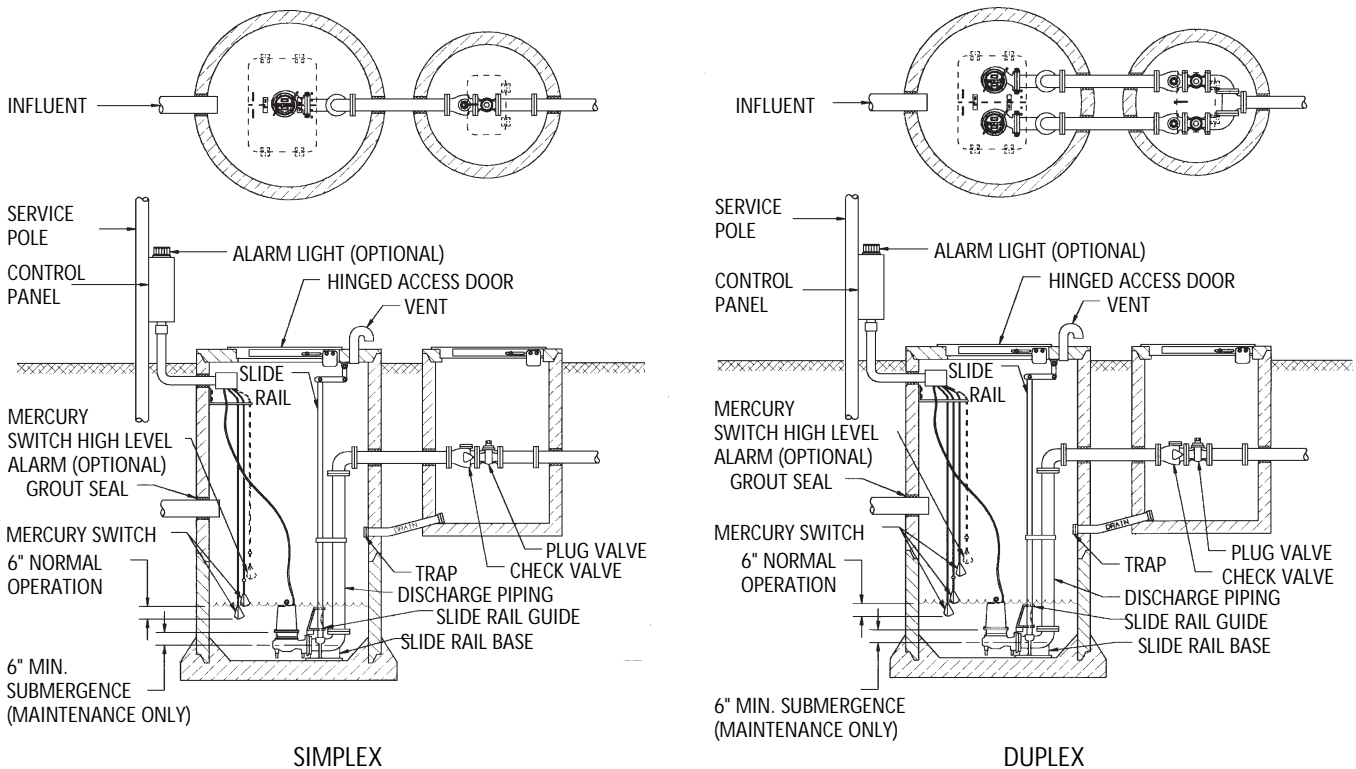
3. Remove the four motor thru bolts and carefully pull motor assembly from bearing housing. Further motor service **MUST** be provided by a qualified motor repair facility.
4. On 5 HP, three phase motors remove the two self threading anti-rotation screws, located where the motor shell attaches to the bearing housing.
5. Insert the motor assembly into the bearing housing, visually aligning the motor thru bolts through the lower motor vent openings.
6. Install the four motor thru bolts, torquing to 35 lbs in (4 N.m).
7. On the 5 HP, three phase motors re-install the two self threading anti-rotation screws.
8. Follow steps 7 through 14 in the **“UPPER MECHANICAL SEAL REPLACEMENT”** section of this manual.
9. To complete the assembly follow steps 6 through 16 in the **“POWER and SENSOR CABLE REPLACEMENT”** section of this manual.

NOTICE: FOLLOW THE INSTRUCTIONS PROVIDED IN THE “WIRING and GROUNDING” AND “OPERATION” SECTIONS OF THE MANUAL AFTER UNIT DISASSEMBLY, REASSEMBLY.

Typical 3 x 4 and 4 x 4 Slide Rail Installation



Typical Plumbing and Installation



Engineering Data

Maximum Diameter Solids	3 in	76 mm	Maximum Operating Temperature		
			Continuous Operation	40° C	104° F
			Intermittent Operation	60° C	140° F
Minimum Casing Thickness	5/16 in	8 mm	Seal Chamber Oil Capacity	1.5 qts.	1.4 L
Casing Corrosion Allowance	1/8 in	3 mm	Motor Cover Oil Capacity		
Maximum Working Pressure	30 psi	207 kPa	1 Phase and 3 Phase 1½ – 5 HP	7.0 qts	6.8 L
Minimum Pump Submergence – Below Top of Motor Dome	6 in	152 mm	3 Phase 7½ HP	6.5 qts	6.3 L
Maximum Pump Submergence	50'	15.2 m			
Maximum Number of Evenly Distributed Starts per Hour	6				

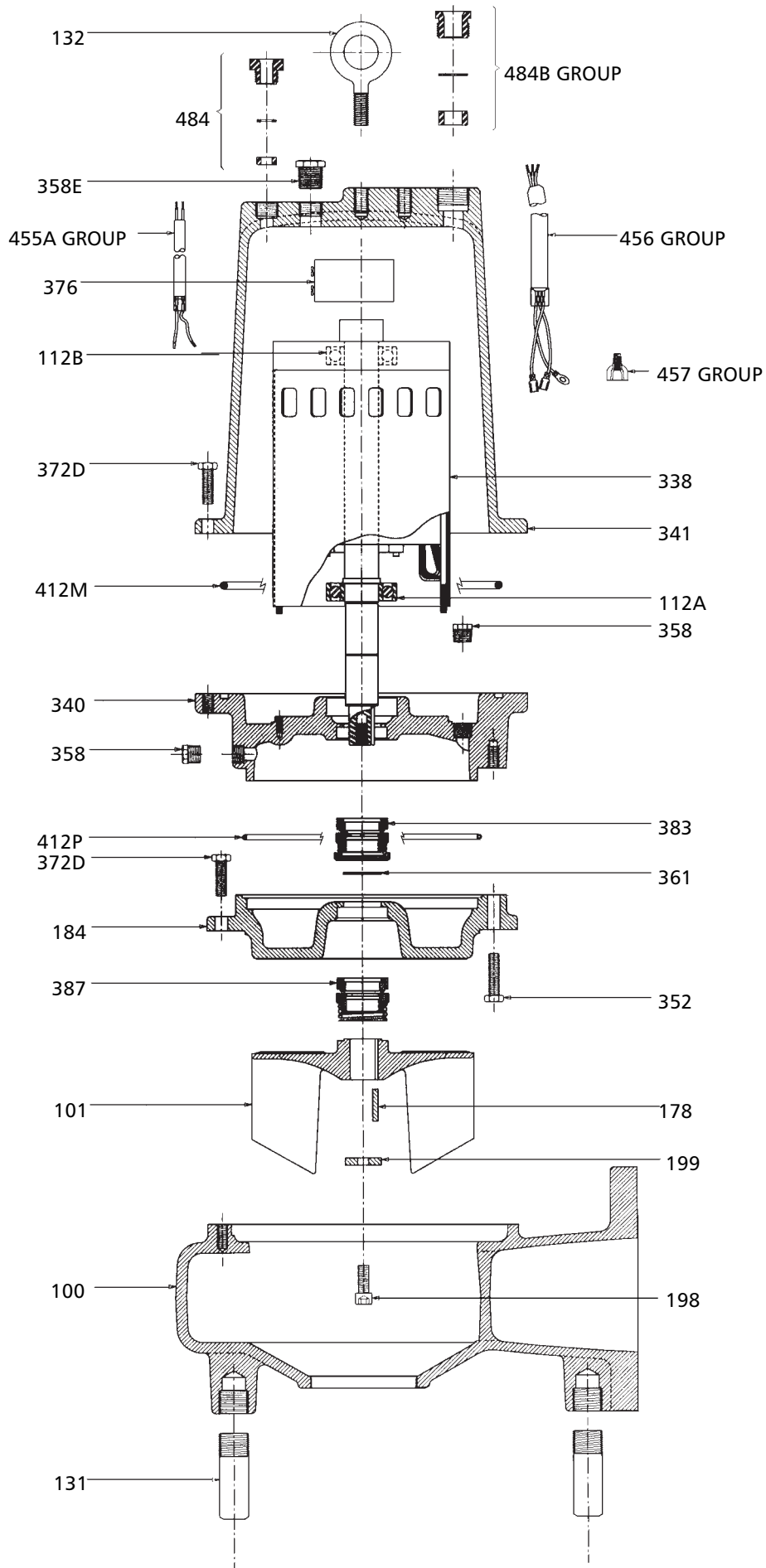
ELECTRICAL

HP	RPM	Voltage	Phase /Hz	Amps		KVA Code	Winding Resistance Line to Line (Ohms)	Power Cable AWG	Fuse/Circuit Breaker Amps	
				3888D3	3888D4				3888D3	3888D4
1½	1725	230	1/60	11	13.2	F	1.39	14/3	15	20
11/2		200								
2	1725	230	1/60	15.0	16.3	D	1.3	14/3	20	25
2		200								
3	1725	230	1/60	20.0	21.5	C	1.3	10/4	30	30
3		200	1/60							
5	1725	230	1/60	26.5	26.5	B	0.77	10/4	35	35
1½	1725	208–230/460	3/60	10/5.0	10/5.0	K	2.3/9.3	14/4	15/10	15/10
1½		200	3/60							
2	1725	208–230/460	3/60	10/5.0	11.6/5.8	F	2.3/9.3	14/4	15/10	15/10
3	1725	208–230/460	3/60	12/6.0	14.4/7.2	H	1.9/7.5	14/4	20/10	20/10
3		200	3/60							
5	1725	208–230/460	3/60	16.4/8.2	16.6/8.3	E	1.2/4.8	10/4*	25/15	25/15
5		200	3/60							
7½	1725	230/460	3/60							

*14/4 5 HP 460 V.

Repair Motors

HP	Phase	Voltage	RPM	Order Number	Wt. (lbs.)
1½	1	230	1725	114-925R	36.0
2	1	230	1725	114-926R	39.0
3	1	230	1725	114-927R	42.0
3	1	200	1725		
5	1	230	1725	114-928R	44.0
1½	3	230/460	1725	114-9217R	26.0
2	3	230/460	1725	114-9217R	26.0
2	3	200	1725		
3	3	230/460	1725	114-9218R	30.0
5	3	230/460	1725	114-9219R	38.0
5	3	200	1725		
7½	3	230/460	1725	119-961R	47.0



Series 3888D3/3888D4: Repair Parts Table

Item No.	Part Name	Material	Qty.	Repair Parts Order Number – 1725 RPM						Max. Wt. (Lbs.)	
				1½ HP M	1½ HP	2 HP	3 HP	5 HP	7½ HP		
100	Casing – 3888D3	Cast Iron	1	1K190						42.0	
	Casing – 3888D4			1K219						52.0	
101	Impeller – 3888D3 standard diameter	Cast Iron	1	2K154 5¼"	2K24 6½"	2K25 7.0"	2K26 7¼"	2K27 8.0"	N/A	7.0	
	Impeller – 3888D3 optional diameter	Bronze		2K515 5¼"	2K284 6½"	2K285 7.0"	2K286 7¼"	2K287 8.0"	N/A	8.0	
	Impeller – 3888D4 standard diameter	Cast Iron		2K512 5½"	2K294 6¼"	2K295 6½"	2K296 7.0"	2K297A 7¼"	2K532 7¼"	7.5	
	Impeller – 3888D4 optional diameter	Bronze		2K513 5½"	2K329 6¼"	2K328 6½"	2K327 7.0"	2K326 7¼"	2K533 7¼"	8.5	
112A	Lower Ball Bearing	Steel	1	4K135						4K402	–
112B	Upper Ball Bearing	Steel	1	4K132						4K403	–
131	Foot	Galvanized Steel	3	4K42						–	
132	Eye Bolt	Galvanized Steel	1	13K193						–	
178	Impeller Key	AISI 300 Series SS	1	4K11						–	
184	Seal Housing – 3888D3	Cast Iron	1	1K189						N/A	19.0
	Seal Housing – 3888D4	Cast Iron	1	1K218						–	18.0
198	Impeller Bolt	AISI 300 Series SS	1	13K48						–	
199	Impeller Washer	Hardened Steel	1	13K133						–	
218	Insulating Oil Gallons required 1 and 3 PH	Turbine Oil	1	4K432 (5 gals.)						38 lbs./gal.	
		Convis 150		2.2	2.2	2.2	2.2	2.2	2.2		
246	Seal Sensor: obsolete 1/93	Nylon/Brass	1	9K191						–	
338	Motor		1	See Repair Motors chart						–	
340	Bearing Housing	Cast Iron	1	1K176						1K303	28.0
341	Motor Cover – 1 and 3 PH	Cast Iron	1	1K177						–	39.0
352	3888D3 – Screw-seal hsg. to bearing hsg.	AISI 300 Series SS	4	13K189						–	
	3888D4 – Screw-seal hsg. to bearing hsg.	AISI 300 series SS	4	13K81						–	
358	Plug – seal housing ¼" NPT	Steel	2	6K2						–	
358E	Plug – motor cover ⅜" NPT	Steel	1	6K68						–	
361	Retaining Ring	AISI 300 series SS	1	4K305						–	
372D	Hex Screw – bearing housing to motor cover and seal housing to casing	AISI 300 series SS	8	13K186						–	
376	Capacitor – 1 PH only: 1.5/2HP – Internal Kit, 3/5 HP – External		2	9K233**	9K233**	9K233**	9K262	9K262	N/A	–	
383	Mechanical Seal – upper	Carbon/Ceramic	1	10K21 (John Crane Type 21)						–	
387	Mechanical Seal – lower (standard before 1/99)	Carbon/Ceramic	1	10K21 (John Crane Type 21)						–	
	Mechanical Seal – lower (optional)	Tungsten Carbide	1	10K22 (John Crane Type 21)						–	
	Mechanical Seal – lower (standard 1/99)	Silicon Carbide	1	10K28 (John Crane Type 21)						–	
412M	O-Ring – motor cover	BUNA-N, AS 568A-374	1	4K242						–	
412P	O-Ring – seal housing	BUNA-N, AS 568A-374	1	5K74						–	
455A	Heat Sensor Cable – obsolete*		1	See chart below						–	
456	Power Cable		1	See chart below						–	
457	Wire Nut 1 PH 3 PH, 200–230 V (power cable) 3 PH, 460 V	Nylon Housing	3	9K145	9K145	9K145	9K252	9K252	N/A	–	
			4	9K145	9K145	9K145	9K145	9K252	9K252	–	
			6	9K145						9K252	–
	Wire Nut Heat Sensor Cable, 3/5 HP, 1 PH only	Nylon Housing	2	9K223						–	
484	Strain Relief Assembly – Sensor Cables Obsolete*		1	5K113						–	
484B	Strain Relief Assembly 1 PH, 230 V 3 PH, 200–230 V (power cable) 3 PH, 460 V		1	5K234	5K234	5K234	5K227	5K227	N/A	–	
				5K226	5K226	5K226	5K226	5K227	5K227	–	
				5K226						5K227	–
	Seal Installation Tool – guide	Delrin	1	A01A008						–	
	Seal Installation Tool – driver	Delrin	1	A02A017						–	
	Loctite #271		1	AL271121						–	

3888D3/3888D4 Power and Sensor Cables Description	Type and AWG Size	Standard length	Optional Lengths*				Wt. (lbs./5 ft.)
		20'	30'	50'	100'		
Power Cables							
1 PH: 1½ and 2 HP, 230 V with bare leads	STOW – 14/3	9K163	9K216	9K161	9K217	0.9	
1PH: 3 – 5 HP, 230 V with bare leads	STOW – 10/4	9K251	9K247	9K248	9K250	1.6	
3 PH: 1½ – 5 HP, 460 V; 1½ – 3 HP, 208–230 V	STOW – 14/4	9K153	9K218	9K154	9K219	1.1	
3 PH: 5 HP, 200/230 V – Units date coded prior to 1/93 require new 1K177 motor & 7½ HP, 200/230/460 V cover, and 5K227 strain relief when changing cord.	STOW – 10/4	9K251	9K247	9K248	9K250	1.6	
Sensor Cables							
Heat Sensor: 3/5 HP, 1 PH only Obsolete*	SJTOW – 16/2	9K253	9K258	9K259	9K260	0.5	
Mechanical seal sensor: Obsolete*	SJTOW – 16/2	9K189	9K220	9K221	9K222	0.5	

* Sensor cables – Seal sensor cable used on D/DX prior to 1/93.

Heat sensor cable used on 3 and 5 HP, 1 PH prior to 6/99 and 9/99 respectively.

NOTE: 1K299 motor cover required with seal and heat sensor cable.

** 9K144 is a 20MFD Capacitor used prior to March 1991 – 2 required. 9K233 is a 30MFD Capacitor used on units date coded April 91 and later – 2 required. Do not use on motors dated March 1991 or earlier.

Trouble Shooting

⚠WARNING
Hazardous
voltage

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

SYMPTOM	PROBABLE CAUSE	RECOMMENDED ACTION
MOTOR NOT RUNNING NOTE: If circuit breaker “OPENS” repeatedly, DO NOT reset. Call qualified electrician.	Motor thermal protector tripped.	Allow motor to cool. Insure minimum pump submergence. Clear debris from casing and impeller.
	Open circuit breaker or blown fuse. Pump impeller binding or jammed. a) Manual operation Power cable is damaged. qualified electrician.	Determine cause, call a qualified electrician. Check motor amp draw. If two or more times higher than listed in the “ DESCRIPTION AND SPECIFICATIONS ” section, impeller is locked, motor bearings or shaft is damaged. Clear debris from casing and impeller, consult with dealer. Resistance between power leads must read zero. Resistance between power leads and ground should read infinity. If any reading is incorrect, call a
b) Automatic operation NOTE: Check the pump in manual mode first to confirm operation. If pump operates, the automatic controls are at fault. If pump does not operate, see above.	Inadequate electrical connection in control panel. Defective liquid level switch.	Inspect control panel wiring. Call a qualified electrician. With switch disconnected, check continuity while activating liquid level switch. Replace switch, as required.
	Insufficient liquid level to activate controls. Liquid level cords tangled.	Allow liquid level to rise 3" to 4" (76 mm - 101 mm) above turn-on level. Untangle cords and insure free operation.
PUMP WILL NOT TURN OFF	Liquid level cords tangled.	Untangle cords and insure free operation.
	Pump is air locked.	Shut off pump for approximately one minute, then restart. Repeat until air lock clears. If air locking persists in a system with a check valve pipe, a 0.188" (5 mm) hole may be drilled in the discharge pipe approximately 2" (51 mm) beyond the discharge connection.
	Influent flow is matching pump's discharge capacity.	Larger pump may be required.
LITTLE OR NO LIQUID DELIVERED BY PUMP	Check valve installed backwards, plugged or stuck closed.	Check flow arrow on valve and check valve operation.
	Excessive system head.	Consult with dealer.
	Pump inlet plugged.	Inspect and clear as required.
	Improper voltage or wired incorrectly.	Check pump rotation, voltage and wiring. Consult with qualified electrician.
	Pump is air locked.	See recommended action, above.
	Impeller is worn or damaged.	Inspect impeller, replace as required.
PUMP CYCLES CONSTANTLY	Liquid level controls defective or improperly positioned.	Inspect, readjust or replace as required.
	Discharge check valve inoperative.	Inspect, repair or replace as required.
	Sewage containment area too small.	Consult with dealer.
	Influent excessive for this size pump.	Consult with dealer.

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.