

Hoffman Specialty® Vented Boiler Feed Units Series HBF and VBF



Series HBF Model 50VBF-D
Duplex, 50 gallon receiver



Series VBF, Model 50VBF-S
Simplex, 50 gallon receiver

INSTALLER: PLEASE LEAVE THIS MANUAL FOR THE OWNER'S USE.



SAFETY INSTRUCTIONS

This safety alert symbol will be used in this manual and on the unit safety instruction decals to draw attention to safety related instructions. When used, the safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.

If the decals as noted below are missing or are illegible contact your local B&G representative for a replacement.

1. Electrical connections to be made by qualified Electrician in accordance with all National, State and Local codes.
2. If pump, motor or piping are operating at extremely high or low temperatures, guarding or insulation is required.
3. Operating personnel should be trained in the operation of pumps and associated systems (condensate, boiler feed units).



EXPLOSIBLE

WARNING

DO NOT PRESSURIZE TANK.
ISOLATE TANK DURING LEAK TEST.
DO NOT RESTRICT VENT.
DO NOT PLUG OVERFLOW.
OPEN INLET VALVES SLOWLY.
DO NOT USE AS A FLASH TANK.

FAILURE TO FOLLOW INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

(2) All Units
DN0483 (Small) - DN0484 (Large)



EXPLOSIBLE

WARNING

ISOLATE TANK DURING LEAK TEST

(2) All Units
DN0485 (Small)
DN0486 (Large)

HOFFMAN SPECIALTY®

SERIES HV™		
MODEL		
SERIAL		
GPM	PSI	PUMP
CFM	IN HG.	PUMP
DWGS		
POWER V.	PH.	HZ 60
CONTROL V.	PH. 1	HZ 60
TOTAL F.L. AMP	LARGEST MOTOR F.L. AMP	

DN0016

Bell & Gossett
Morton Grove, Illinois 60053

DN0116 Units with Panel

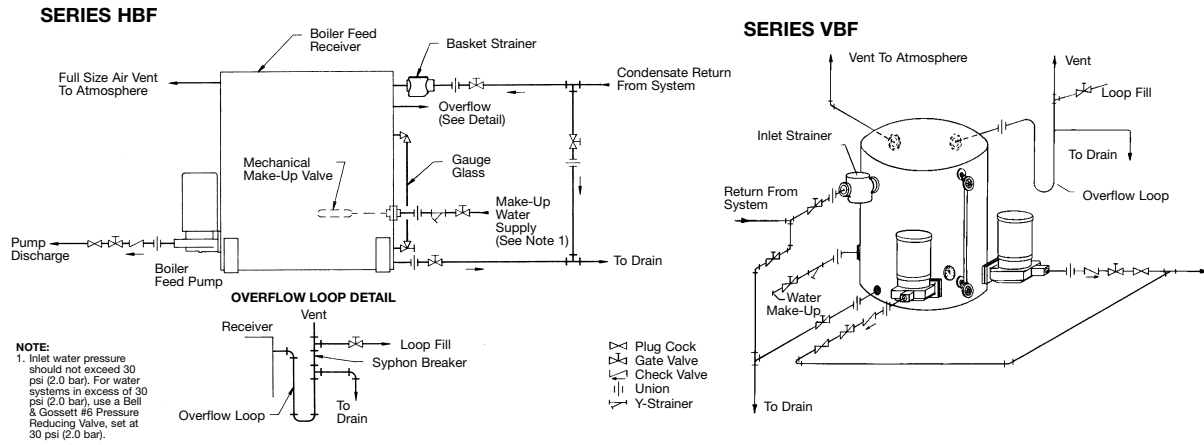
CAUTION

DO NOT RUN PUMP DRY, SEAL DAMAGE MAY OCCUR.
INSPECT PUMP SEAL REGULARLY FOR LEAKS, REPLACE AS REQUIRED.
FOR LUBRICATION REQUIREMENTS, CONSULT SERVICE INSTRUCTIONS.
FAILURE TO FOLLOW INSTRUCTIONS COULD RESULT IN INJURY OR PROPERTY DAMAGE.

P70644

P70644 All Units

INSTALLATION AND DESCRIPTION (TYPICAL PIPING DIAGRAM)



DESCRIPTION

Boiler feed units are designed to pump water into an operating boiler. The pumps are controlled by level controls on the boiler.

Boiler feed units are normally sized to accommodate system surges and also to provide for the addition of fresh water as required.

Series VBF and HBF units are standardized feed units intended for application to low pressure boilers. Pump discharge pressures are 20 psi (1.4 bar), 25 psi (1.7 bar) and 30 psi (2 bar) depending upon model specified. Receivers are heavy gauge, non-code steel. HBF receivers are provided with the Hoffguard™ corrosion resistant coating for longer life.

Receivers are non-code steel.



WARNING: EXPLOSIBLE

Do not pressurize receiver. Isolate receiver during leak test. Do not plug overflow. Do not restrict vent opening to atmosphere. Open valves slowly. Failure to follow these instructions could result in serious injury or death.

PRELIMINARY INSPECTION

Assure that there is no shipping damage.

Assure that nameplate ratings agree with job specifications and actual conditions.

Remove all plastic shipping plugs from receiver and pumps.

HANDLING

Use care in installing unit.

LOCATION

Place unit for easy access to all parts. Allow adequate space for servicing. Check ambient conditions.

NOTICE / TEMPERATURE LIMITS

Motors are designed to operate in 104°F (40°C) max. ambient. Insulate or ventilate as required.

PIPING (General)



CAUTION / NOT A CHEMICAL PUMP: Inject boiler feed compounds from chemical feed tank into boiler feed piping — never into boiler feed tank. Failure to follow these instructions could result in injury or property damage.

PIPING (Returns)

Gravity return lines from system must be properly pitched down to unit inlet. Returns must also be trapped to prevent steam entry into the unit. An inlet basket strainer is recommended.

PIPING (Vent)

Install a vent pipe to atmosphere. Pipe to be size of vent port on unit. Do not restrict or reduce vent opening or exceed 20 feet vertical height unless an overflow connection is provided.

PIPING (Overflow)

Pipe overflow connection to drain. When condensate temperature exceeds 200°F (93°C) an overflow loop must be used.

PIPING (PUMP DISCHARGE)

Connect the pump discharge(s) to the boiler in accordance with the above diagram. This piping must be coordinated with electrical controls in the case of multiple pumps and multiple boilers.

Boiler feed systems are supplied to meet a wide variety of system specifications. The electrical controls and piping systems must be coordinated.

WATER MAKE-UP

A mechanical valve is furnished for water make-up. A “Y” strainer is recommended ahead of this valve. See page 5 for detailed information. The inlet water pressure must not exceed 30 psi (2.0 bar).

ELECTRICAL WIRING & CONTROLS

Connect power wiring per National Electrical Code. Recheck nameplate vs. specifications and conditions. All single phase motors have internal thermal protection.




WARNING / HIGH VOLTAGE ELECTRICITY: Disconnect and lock out power before connecting or servicing unit. Failure to follow these instructions could result in serious injury or death.

All series VBF units are furnished with 115/230V 1 Phase, 60Hz motors. Factory motor wiring is for 115V. To convert motor to 230 volt, follow motor manufacturers instructions.

Pipe the unit per the above Piping Diagram. Locate and support piping so as to not load the pump discharge.

PUTTING THE UNIT INTO SERVICE

1. Assure that the unit is piped in accordance with instructions on page 2.


 **WARNING: EXPLOSIBLE** Do not pressurize receiver. Isolate receiver during leak test. Do not plug overflow. Do not restrict vent opening to atmosphere. Open valves slowly. Failure to follow these instructions could result in serious injury or death.

2. Isolate tank before performing any system leak test. Do not pressurize the tank as part of the leak test. Failure to do this can result in serious injury or death.
3. Check power leads in accordance with wiring diagram (by others).


 **WARNING / HIGH VOLTAGE:** Disconnect and lock out power before connecting or servicing unit. Failure to follow these instructions could result in serious injury or death.

4. Install drain plugs.
5. Fill receiver half full of water to prime pump(s) and prevent possible damage to pump seals. Avoid freezing conditions after unit receiver has been filled.
6. Throttle plug cock in discharge line until pressure at pump (while pump is discharging) approaches pump rated pressure. Tighten plug nut to secure adjustment.
7. Connect the water make-up assembly to city water. Use piping as least as large as the valve piping provided. A manual fill valve is also recommended. If city water pressure exceeds 30 psi (2.0 bar), install pressure reducing valve.

8. Boiler Level Controls — Assure that the controls on and related to the boiler match the control systems provided on the unit.

 **WARNING / MAINTAIN BOILER SAFETY FEATURES:** When connecting the boiler feed unit to the boiler, assure that all boiler safety controls (burner cutoff, etc.) are and remain operational. With certain control arrangements, dedicated boiler controllers are required for the boiler feed pumps. Failure to follow these instructions could result in serious injury, death or extensive property damage.

9. Check that the pump discharge pressure exceeds the maximum operating pressure of the boiler.
10. Assure that the make-up valve admits water.

 **CAUTION / DO NOT RUN DRY. SEAL DAMAGE MAY OCCUR:** Inspect pump seal regularly for leaks. Replace as required. Failure to follow these instructions could result in serious injury, death or extensive property damage.


11. If possible, observe operation thru several cycles.

OPERATION AND MAINTENANCE

Operators must be familiar with all sections of this manual to understand the operation of the unit.

Hot water, steam and electricity can be hazardous.

 **SAFETY INSTRUCTIONS:** SEE COVER OF THIS MANUAL.

 **WARNING: EXPLOSIBLE** Do not pressurize receiver. Isolate receiver during leak test. Do not plug overflow. Do not restrict vent opening to atmosphere. Open valves slowly. Failure to follow these instructions could result in serious injury or death.

 **WARNING / HIGH VOLTAGE:** Disconnect and lock out power before connecting or servicing unit. Failure to follow these instructions could result in serious injury or death.


Check motor nameplate for any lubrication requirements. Pumps require no lubrication.


NOTICE / AUTO RESTART

Single phase motors will restart automatically after thermal overload protector trips.

A properly installed unit should function unattended for long periods of time. Periodic checks to assure proper operation are highly recommended. Refer to trouble shooting section when necessary.

The inlet strainer (when furnished) is intended to protect the pump and system. Periodic cleaning should be included in the maintenance schedule. Check frequently in new systems.

 **CAUTION / SUBSEQUENT DAMAGE:** A unit showing symptoms of possible problems (overflow, noise, leaks, vibrations, continual operation, etc.) must be corrected immediately. Failure to follow this instruction may result in full liability for subsequent injury or property damage.

 **WARNING / EXPLOSIBLE:** The installed boiler feed unit becomes an integral part of the boiler system. Boiler operation and maintenance requires specific skills and training and may require licensing or certification. The boiler feed unit must be operated and maintained so as not to jeopardize the boiler operation. Failure to follow these instructions could result in serious injury, death or extensive property damage.

TROUBLE SHOOTING PROCEDURES

All units are thoroughly tested at the factory before shipment. They should operate satisfactorily without further adjustment if properly installed and provided they have not been damaged by rough handling in transit. If system or unit performance is not satisfactory, refer to the following check list.

Pump Will Not Start

1. The power supply has been interrupted, disconnect switch is open or selector switch is improperly positioned.
2. Incorrect voltage for motor. Check voltage and wiring with motor characteristics.
3. Incorrect starter coil for power supply.
4. The overload relays and the starter have tripped out and must be reset. Ambient temperature may be too high.
5. Check pump controls or other controls for proper operation.
6. Wiring to control cabinet is incorrect or connections are loose.
7. The basket strainer is dirty thus restricting flow into the receiver. Clean periodically.
8. Boiler is full or boiler control switch is defective.

Pumps Runs Continuously

1. Steam traps are blowing through causing condensate to return at excessive temperatures. This may reduce the capacity of pump below its rating. Traps should be repaired or replaced.
2. Pump discharge pressure is less than operating pressure of the boiler.
3. The total required pressure at the pump discharge is greater than the pressure for which the pump was designed. Check the total pressure which includes atmospheric pressure, the friction head and the static head.
4. A valve in the discharge line is closed or throttled too tightly.
5. Check valve is installed backwards.
6. The impeller eye is clogged.
7. Pump is too small for system.
8. Pump is running backwards.

Boiler Feed Pump is Noisy

1. The pump is working against a lower pressure than designed for. While pump is discharging, adjust plug cock in discharge line until pressure at pump approaches pump rated pressure.
2. Excessive condensate temperature. Correct system conditions.
3. Magnetic hum or bearing noise in motor. Consult motor manufacturer's authorized serviced station nearest unit location.
4. Starter chatters. Trouble is caused by low line voltage, poor connections, defective starter coil, or burned contacts.
5. Pump is running backward.

The System is Noisy

1. Banging in the steam mains is usually caused by steam passing by condensate that has collected in low lying points in the line. These problems can be eliminated by dripping low points, properly supporting the pipe, or by increasing the pitch of the lines.
2. Improper dripping of the steam mains and risers; where there is a rise in the steam main, or where it branches off into a riser, a drip trap must be installed in the drain line.
3. The piping is too small to drain properly.
4. A defective steam trap is holding condensate in steam supply line.
5. Defective check valve permits steam, to vent thru pump into the boiler feed tank.
6. A priming boiler is discharging water with the steam. Consult boiler manufacturer.

Excessive Water Overflow From Unit

1. Receiver sized too small to accommodate system surges.
2. Water make-up valve open or float set too high.
3. Water make-up valve leaks.
4. Supply water pressure exceeds 30 psi (2.0 bar). Install Pressure Reducing Valve.

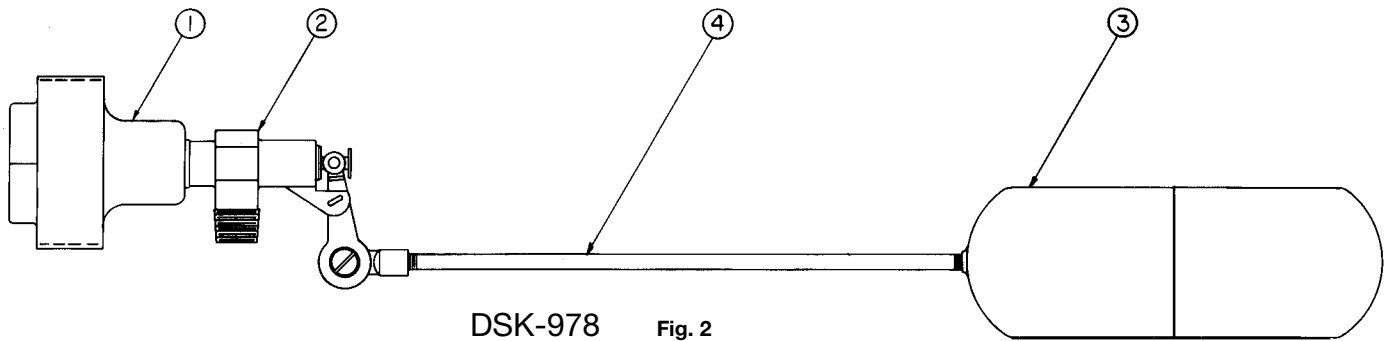
DEALER SERVICING

If trouble occurs that cannot be rectified, contact your local B&G representative. He will need the following information in order to give you assistance.

1. Complete nameplate data of pump and motor. SEE RATING NAMEPLATE.
2. Suction and discharge pipe pressure gauge readings.
3. Ampere draw of the motor.
4. A sketch of the pump hook-up and piping.
5. Provide complete information on boiler control switches and any motorized or solenoid valves in the boiler feed piping.

HOFFMAN SPECIALTY®		
SERIES		
MODEL		
SERIAL		
GPM	PSI	PUMP
CFM	IN. HG.	PUMP
DWGS		
POWER V. 115	PH.	HZ 60
CONTROL V.	PH. 1	HZ 60
TOTAL F.L. AMP.	LARGEST MOTOR F.L. AMP.	
DN0016 Bell & Gossett Morton Grove, IL, U.S.A.		

MAKE-UP WATER VALVE



DSK-978 Fig. 2

Item Number	Description	No. Req'd.	Part No.
1, 2, 3 & 4	Float Valve Assembly	1	DL1634
3	Float	1	DA0164
2 & 4	Float Valve Only (Less float and adapter)	1	DV1024
1	Adapter	1	DL1750

INSTRUCTIONS

Adjustment — The make-up water valve is factory set to maintain receiver water level at approximately $\frac{1}{2}$ full. When systems require a large percentage of make up water, the float setting should be raised to utilize full receiver capacity. When large percentages of returns from the system are available the float setting may be lowered to not less than 4" (101 mm) above the top of the pump suction opening.


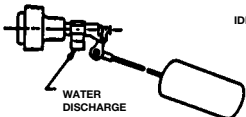
A float arm pivot allows the float setting to be raised or lowered. The valve must be removed to change float setting. This adjustment can be accomplished by loosening the screw on the float arm pivot and setting the arm position to the level desired. When the desired setting is attained interlock the toothed pivot and tighten the screw to secure the setting. Reinstall valve in the receiver.

Maintenance — The "Y" strainer should be cleaned periodically. During the first few weeks of operation the strainer screen should be checked and cleaned every week. The screen can be removed for cleaning through the strainer's branch connection. The valve should be observed for tight closing and proper level on a periodic basis.

Pressure Limitation — Inlet water pressure to the make up valve should not exceed 30 psi (2.0 bar). For water systems in excess of 30 psi (2.0 bar), installation of a Bell & Gossett #6 pressure reducing valve to reduce make up water pressure below 30 psi (2.0 bar) is recommended.

Mounting — The valve is mounted on a 2 $\frac{1}{2}$ " (64 mm) NPT pipe plug located on the side of the receiver. The entire assembly may be removed through the tapped opening. The "B" stamped on the valve mounting bushing should always be at the bottom of the installed plug to assure proper alignment.

Make-up Water Valve



IDL001

NOTE:
INSTALL "B" (BOTTOM)
IN LINE WITH
WATER DISCHARGE

This unit is equipped with an internal water make-up valve pre-set at the factory.

The valve may be readjusted to add make-up water at other water levels. Remove assembly to readjust level.

NOTICE: PRESSURE LIMITATION.

Inlet water pressure should not exceed 30 psi. For water systems in excess of 30 psi use a Bell & Gossett #6 Pressure Reducing Valve adjusted to 30 psi.

NOTICE: ALIGNMENT REQUIRED.

The "B" stamped on the valve mounting bushing should always be at the bottom of the installed valve.

MAKE-UP WATER CONNECTION



PUMP SERVICE INSTRUCTIONS FOR WATCHMAN CENTRIFUGAL PUMPS

These close coupled vertical centrifugal pumps are equipped with mechanical seals. If system has not been properly cleaned prior to installation of pump, foreign matter such as dirt, pipe scale, core sand, etc. may clog the impeller and damage the seal. A strainer is recommended in return line to pump. *Pump must not be operated dry.* Seals may be damaged if operated without water present.

1. Close inlet line gate valve and operate pump momentarily to remove as much liquid as possible from pump. Close discharge line gate valve.

CAUTION / HOT SURFACES: Surfaces are hot when system is in operation. Do not touch hot receiver, let unit cool before servicing. Failure to follow these instructions could result in injury or property damage.

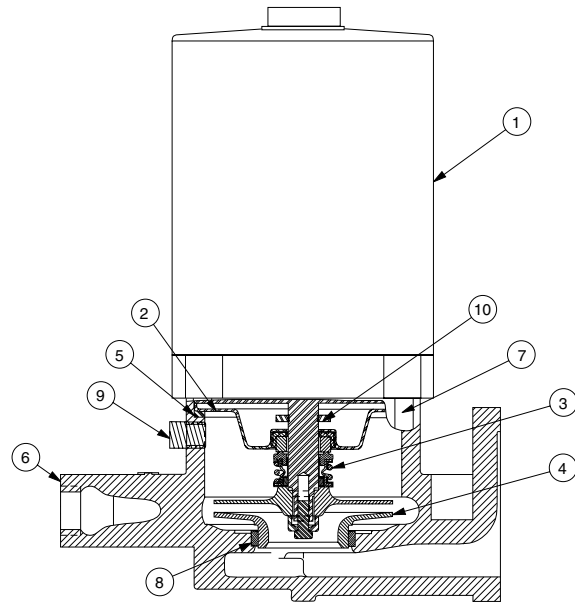
2. Shut-off and lock-out power.

WARNING / HIGH VOLTAGE: Disconnect and lock out power before connecting or servicing unit. Failure to follow these instructions could result in serious injury or death.

3. Disconnect wiring to motor.
4. Make sure unit is cool enough that pump can be handled safely. Open receiver drain to remove remaining liquid.
5. Loosen the four capscrews (4) holding pump case to motor. Assure that pressure is relieved per caution note.

CAUTION / PRESSURIZED SYSTEM: Operating system may contain very hot water under pressure. Close inlet and open drains before servicing. When servicing, *loosen* screws and move components to assure pressure is relieved before *removing* screws. Keep drains open during servicing. Failure to follow these instructions could result in injury or property damage.

6. Remove four capscrews (4) holding pump case to motor and lift motor and impeller out of pump case.
7. Remove pump/motor assembly and place on work bench.
8. Prevent the motor shaft from turning by inserting a large screwdriver into the screwdriver slot located under the plug on the rear motor endbell. Back the impeller off (counter clockwise) using a rectangular bar or other flat tool inserted between the impeller vanes.
9. Remove the rotating part of the mechanical seal from the end of the shaft.
10. Remove seal holder (13) with stationary ceramic part of mechanical seal and cup rubber from the end of the shaft.
11. Remove stationary ceramic part of mechanical seal and cup rubber from recess in seal holder.
12. To install new seal, proceed as follows: Clean recess in seal holder thoroughly. Insert new ceramic seat (grooved face first) into the rubber seat cup. Lubricate the outside of the cup and seal holder recess with soapy water. Install the ceramic/cup assembly into the seal holder, making sure the assembly bottoms evenly. When repairing "B" style pumps manufactured between 1983 through 2001, orient wire spacer eye to the left midway between motor lugs. Replace seal holder over wire spacer on the face of the motor, maintaining concentricity with motor face. Pumps manufactured in 2002 or later, are manufactured with DP1966 seal holder and do not require the wire spacer. Pumps using DP1966 should orient the seal holder tab to the left, midway between motor lugs. Using a clean,



Item Number	Description	No. Req'd.	Part No.
1	Motor 1/3 hp, 1 ph. 3500 rpm	1	180096
2	Seal Holder	1	DP1966
3	Seal*	1	—
4	Impeller	1	DP0321
5	Head Gasket*	1	DG0092
6	Pump Case with wearing ring	1	DP1665
7	Capscrew	1	DJ0083
8	Wear Ring	1	DP0482
9	Pipe Plug 1/4" (6 mm)	1	P39040
10	Water Slinger	1	DP0848
*	Seal kit including mechanical seal, head gasket, & case to receiver gasket	1	180013
	Complete pump and motor assembly	1	180001

Order Replacement Parts by Description and Part No. Specify Serial No. shown on nameplate.

lint-free cloth, wipe the mating surfaces of the seal clean of any foreign matter. Moisten the carbon section of the rotating part of the seal and lubricate the I.D. with soapy water. Place onto shaft to seat against the ceramic.

13. Hold motor shaft as described in #8 and replace the impeller on the shaft (clockwise rotation) making sure it is tight.
14. Orient motor for pump reassembly with conduit opening to the left. When mounting the pump case, discharge should be 90° to the right of the wire spacer eye or (90° to the tabs on DP1966) and conduit opening on motor. Use care to insure tight gasket fit to prevent water leakage. When replacing pump case, the wire spacer eye or the tabs on DP1966 should seat in pump case notch. If this does not occur inspect for proper alignment and reassemble.
15. Replace four capscrews (4). Tighten down capscrews evenly to avoid damage.
16. Reconnect pump bleed line (where applicable) and motor wiring.

CAUTION / DO NOT RUN DRY. SEAL DAMAGE MAY OCCUR: Inspect pump seal regularly for leaks. Replace as required. Failure to follow these instructions could result in injury or property damage.

17. Close drain and slowly open inlet valves. See warning.

WARNING: EXPLOSIBLE
Do not pressurize receiver. Isolate receiver during leak test. Do not plug overflow. Do not restrict vent opening to atmosphere. Open valves slowly. Failure to follow these instructions could result in serious injury or death.

18. Jog to check motor rotation. See caution.

CAUTION / DO NOT REVERSE: Reverse operation can cause extensive damage to pumps. Jog the motor to test for direction of rotation. Failure to follow these instructions could result in injury or property damage.

19. Observe operation thru several cycles.

PUMP SERVICE INSTRUCTIONS FOR CENTRIFUGAL PUMPS

Vertical mounting puts motor above floor dirt and water

Close coupled centrifugal pumps are designed for years of trouble free service. Units have mechanical shaft seals.

1. Close inlet line gate valve and operate pump momentarily to remove as much liquid as possible from pump. Close discharge line gate valve.

CAUTION / HOT SURFACES: Surfaces are hot when system is in operation. Do not touch hot receiver, let unit cool before servicing. Failure to follow these instructions could result in injury or property damage.

2. Shut-off and lock out power.

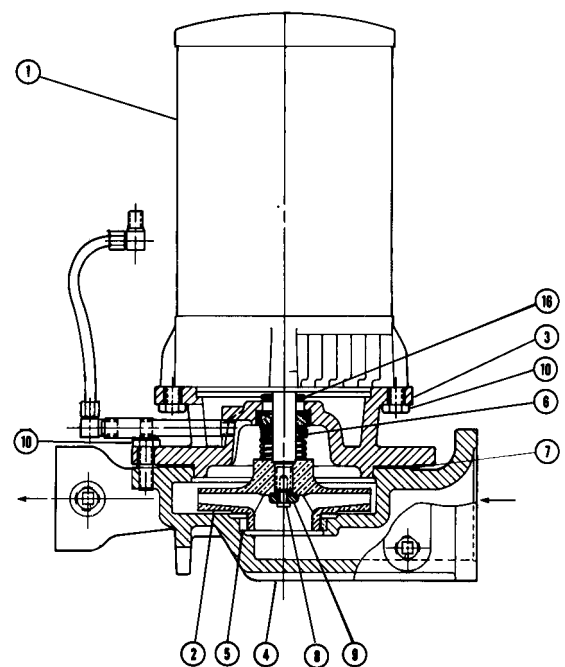
WARNING / HIGH VOLTAGE: Disconnect and lock out power before connecting or servicing unit. Failure to follow these instructions could result in serious injury or death.

3. Make sure unit is cool enough that pump can be handled safely. Open drain to remove remaining liquid.
4. Carefully remove pump drain plug and bleed line. Wait for complete drainage.
5. Loosen the motor bracket to pump volute capscrews. Assure that pressure is relieved per caution note.

CAUTION / PRESSURIZED SYSTEM: Operating system may contain very hot water under pressure. Close inlet and open drains before servicing. When servicing, *loosen* screws and move components to assure pressure is relieved before *removing* screws. Keep drains open during servicing. Failure to follow these instructions could result in injury or property damage.

6. Complete the removal of the above hardware. Remove pump/motor assembly and place on work bench.
7. Remove self locking stainless steel capscrews and stainless steel washer (or self locking brass cap nut and washer) that secure the impeller in place.
8. To remove impeller from motor shaft proceed as follows:
 - (1) Keyed Shafts. Remove impeller with gear puller or other means which will not damage impeller or bend motor shaft.
 - (2) Threaded Shafts. Hold end of motor shaft opposite pump with large screwdriver or other suitable tool and back impeller with a rectangular bar or other flat tool inserted between the vanes of the impeller.

9. Remove rotating part of seal from shaft, being careful not to break carbon face.
10. Remove capscrews holding motor bracket to motor and remove bracket.
11. Remove stationary part of seal assembly, being careful not to chip or break ceramic seal.
12. To install new seal proceed as follows:
 - (1) Clean recess in bracket thoroughly. Coat recess and "rubber" portion of seat with soap solution. Press seat into recess firmly by hand making certain both parts bottom evenly. If seal cannot be bottomed with fingers place cardboard shipping disc on ceramic and force into place with flat tool.
 - (2) Carefully place bracket in position on motor shaft with out displacing ceramic seat and secure bracket to motor with capscrews.
 - (3) Place motor vertically with pump end up. Do not attempt assembly of seal and impeller with shaft horizontal.



Item Number	Description	No. Req'd.	Part No.
1	Motor — Order by Description	1	Consult Factory
2	Impeller	1	Consult Factory
3	Pump Head	1	DP0208
4	Case with Wear Ring	1	DP1603
5	Wearing Ring	1	DP0482
8	Impeller Capscrew	1	DJ0213
9	Impeller Washer	1	DJ0267
10	Capscrews	8	DJ0066
18	Water Slinger	1	DP0848
6,7	Seal Kit Including Mech Seal, Head Gasket	1	180014
	Complete Pump and Motor Assembly	1	Consult Factory
	Case to Rec. Gasket	1	DG0060

Order Replacement Parts by Description and Part No.
Specify Serial No. shown on nameplate.

- (4) The carbon ring of the rotating seal part should not be loose in the seal head. If it is, apply a small amount of grease to the rubber bellows underneath the carbon ring to hold the ring in place. Using clean, lint free cloth, wipe mating surfaces perfectly clean. Soap shaft and push seal onto shaft so that carbon will contact ceramic seal. If spacer is required, use grease to cause spacer to adhere to bottom of seal after seal has been put on shaft. Be sure spacer is on larger diameter of shaft so that it will not catch between shoulder and impeller.

13. Replace impeller on shaft. Replace stainless steel washer and secure impeller with capscrew or cap nut.
14. Place new gasket on pump volute and reassemble motor and pump subassembly on pump volute.
15. Reconnect pump bleed line and motor wiring.

CAUTION / DO NOT RUN DRY. SEAL DAMAGE MAY OCCUR: Inspect pump seal regularly for leaks. Replace as required. Failure to follow these instructions could result in injury or property damage.

16. Close drain and slowly open inlet valves. See warning.

WARNING: EXPLOSIBLE Do not pressurize receiver. Isolate receiver during leak test. Do not plug overflow. Do not restrict vent opening to atmosphere. Open valves slowly. Failure to follow these instructions could result in serious injury or death.

17. Jog to check motor rotation. See caution.

CAUTION / DO NOT REVERSE: Reverse operation can cause extensive damage to pumps. Jog the motor to test for direction of rotation. Failure to follow these instructions could result in injury or property damage.

18. Observe operation thru several cycles.



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