

Domestic® Pump Vacuum and Boiler Feed Units Series VCMD™



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. Motor must have properly sized starter with properly sized heaters to provide overload and undervoltage protection.
3. If pump, motor or piping are operating at extremely high or low temperatures, guarding or insulation is required.
4. Operating personnel should be trained in the operation of 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

**ISOLATE TANK
DURING LEAK TEST**

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

™		
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	
Bell & Gossett Morton Grove, Illinois 60053		

DN0016

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

Domestic® Series VCMD™ Combination Boiler Feed and Vacuum Units

Style CMHD-A vacuum unit mounted on horizontal steel boiler feed receiver.

Style CMHD-B vacuum unit with separate horizontal steel boiler feed receiver.

Style CMVD-A vacuum unit mounted on vertical steel boiler feed receiver.

Style CVM vacuum unit with separate cast iron boiler feed receiver.

FIG. 1 REPRESENTATIVE PIPING DIAGRAM - VCMD

Style **CMHD-A** with vacuum unit mounted on horizontal steel boiler feed receiver, and returns above receiver inlet. Refer to separate diagram for piping between boiler feed pump(s) and boiler(s).

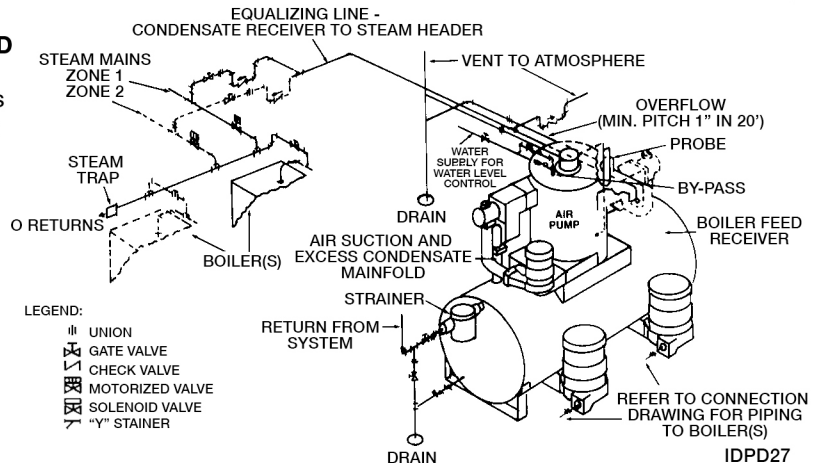


FIG. 2 REPRESENTATIVE PIPING DIAGRAM - VCMD

Style **CMHD-B** with separate vacuum unit and horizontal steel boiler feed receiver, returns above receiver inlet. Refer to separate diagram for piping between boiler feed pump(s) and boiler(s).

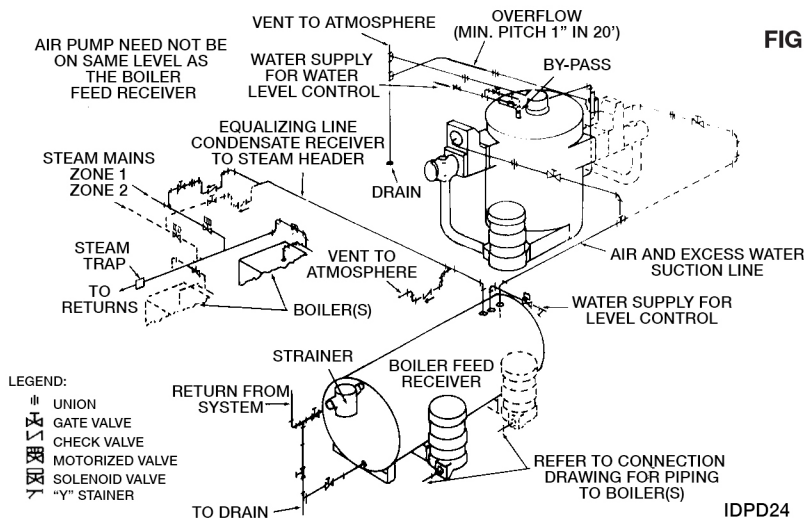
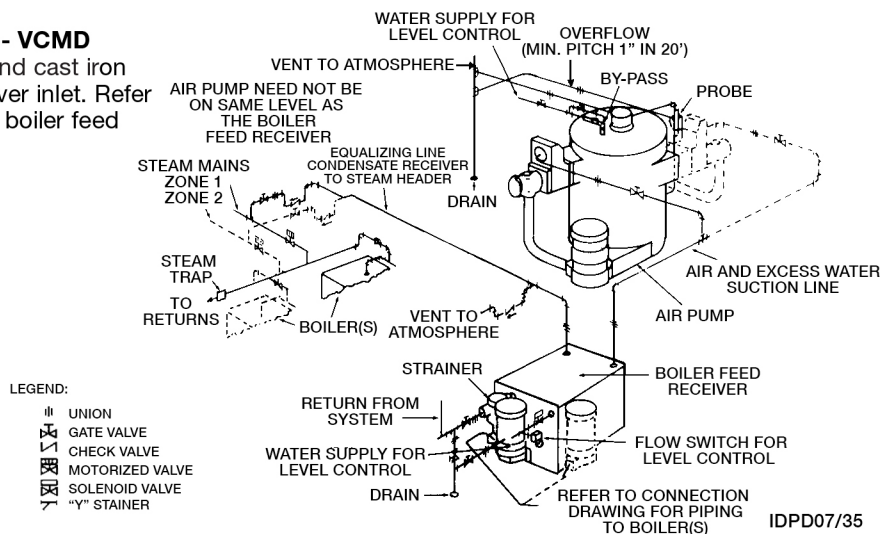


FIG. 3 REPRESENTATIVE PIPING DIAGRAM - VCMD

Style **CVM** with separate vacuum unit and cast iron boiler feed receiver, returns above receiver inlet. Refer to separate diagram for piping between boiler feed pump(s) and boiler(s).



DESCRIPTION

The Series VCMD family of units consists of various combinations of boiler feed units combined with Domestic Series MJ vacuum producers. The vacuum producer may be mounted directly on the boiler feed unit (Style A) or the units may be independently mounted with field piping between the units (Style B). The boiler feed units can be constructed with cast iron or steel receivers in many of the standard configurations offered as Domestic boiler feed units.

The vacuum producer acts in response to selector switch settings and system vacuum also functions to remove excess water from the boiler feed tank. Various controls are supplied in accordance with system specifications and system requirements. Electrical panels are normally supplied and specific wiring diagrams are supplied with each vacuum producer electrical panel.

The boiler feed system functions like a standard vented boiler feed system. Again, various control options are available to match system specifications. Electrical panels and electrical diagrams are normally furnished.

The boiler feed units are designed to pump water into an operating boiler. The pumps are controlled by level controls on the boiler. Low water cut-off switches and alarms are often supplied (optional).

Receivers are non-code cast iron or 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.

HANDLING

Use care in installing unit.



CAUTION: UNIT LIFTING EYE

Use unit lifting eyes only to lift unit as shipped from factory. Unit must be empty and disconnected from pipes, anchors and other restraints. Use proper rigging procedures. Failure to follow these instructions could result in injury or property damage.

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 max. ambient. Insulate or ventilate as required.

BOILER FEED SYSTEM



CAUTION: NOT A CHEMICAL PUMP

Inject boiler feed compounds from chemical feed tank into boiler feed piping – never into condensate tank. Failure to follow these instructions could result in injury or property damage.

PIPING (General)

Pipe the unit per the Piping Diagram shipped with the unit or as shown herein. Locate and support piping so as to not load the pump discharge.

PIPING (Return)

Gravity return lines from the 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.

FLOAT SWITCHES

Floats are locked in place to prevent damage during shipment. Remove shipping locks. Check factory settings. Floats are adjustable for various levels of operation. The water make-up float switch should “make” at a higher level than low water cut-off switch “breaks”.

VACUUM SYSTEM

PIPING (General)

Pipe the unit per the Piping Diagram shipped with the unit or as shown herein. Locate and support piping so as to not load the pump discharge.

PIPING (Suction) (Style B)

Use a suction line at least as large as the unit inlet fitting. Vacuum storage tanks will reduce system surges or short cycling and a vertical tank can trap liquids and solids.

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 port to drain.

VACUUM SWITCH ADJUSTMENTS

Vacuum switches, when furnished, are factory adjusted and tested for the specified operating range. If settings must be readjusted, refer to manufacturer's instructions.

HURLING WATER MAKE-UP AND CONTROL

The hurling water level is automatically controlled by a solenoid valve actuated by a float switch.

Connect the water make-up assemblies to city water. Use piping at least as large as the valve piping provided. Install a manual fill valve if not included on the unit. The vacuum producer and the boiler feed unit have separate make-ups.

To operate at a high vacuum, the hurling water must be at a low temperature resulting in a low vapor pressure. Cooling water can be automatically admitted by using an optional temperature limit switch. This switch actuates the solenoid valve if the temperature rises above a preset point.

The optional condensate Temperature Limit Switch will stop normal operation of the vacuum unit when condensate exceeds the set point temperature (usually 160°F). Vacuum is not normally required when the system is up to temperature and operation of the vacuum pumps with hot condensate results in condensate loss due to evaporation.

INTERCONNECTING PIPING

On style B units, the interconnecting piping between the boiler feed unit and the vacuum producer must be the size of the vacuum producer inlet. The two vacuum inlets on duplex vacuum producers must be connected to the boiler feed tank.

ELECTRICAL WIRING & CONTROLS

Connect power wiring per NEC. 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 injury or property damage.

Three phase motors must be use starters with properly sized overload relays. Overload relays furnished are designed for manual reset.

EQUALIZING LINE

A vacuum may be formed on radiation side of system when steam stops flowing in mains. This vacuum may be higher than return line vacuum, which would prevent condensate from flowing back to pump. To correct this in an unzoned system, install equalizer line as shown in Figures 1 thru 3. To correct this in a zoned system, also install equalizer line for each zoned section or install a vacuum breaker on supply line on radiation side of each zone valve.

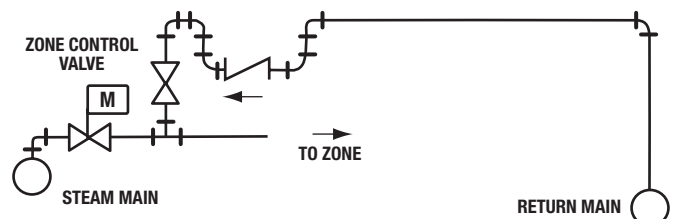


FIG. 4 EQUALIZING CONNECTIONS FOR ZONED SYSTEMS

OVERVIEW

SIMPLE AUTOMATIC OVERFLOW CONTROL

If excess condensate enters the boiler feed receiver, the water level will rise above a preselected height, and float switch will actuate the air pump. The resulting vacuum draws excess water through the air suction line into the separation chamber of the air pump from where it simply overflows to a drain. An overflow pump is not necessary or recommended unless the drain is located above the overflow of the air pump. If such a drain exists, an overflow pump can be furnished. The float switch will then start the overflow pump instead of the air pump.

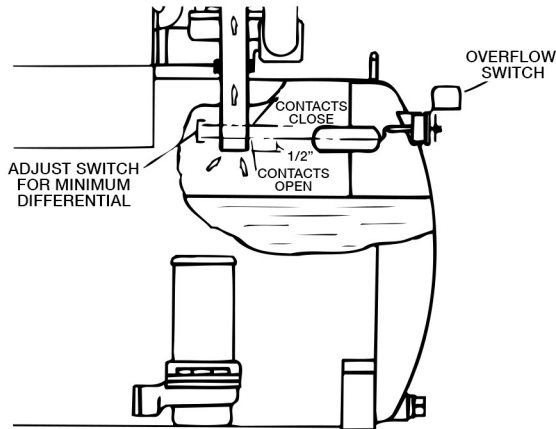
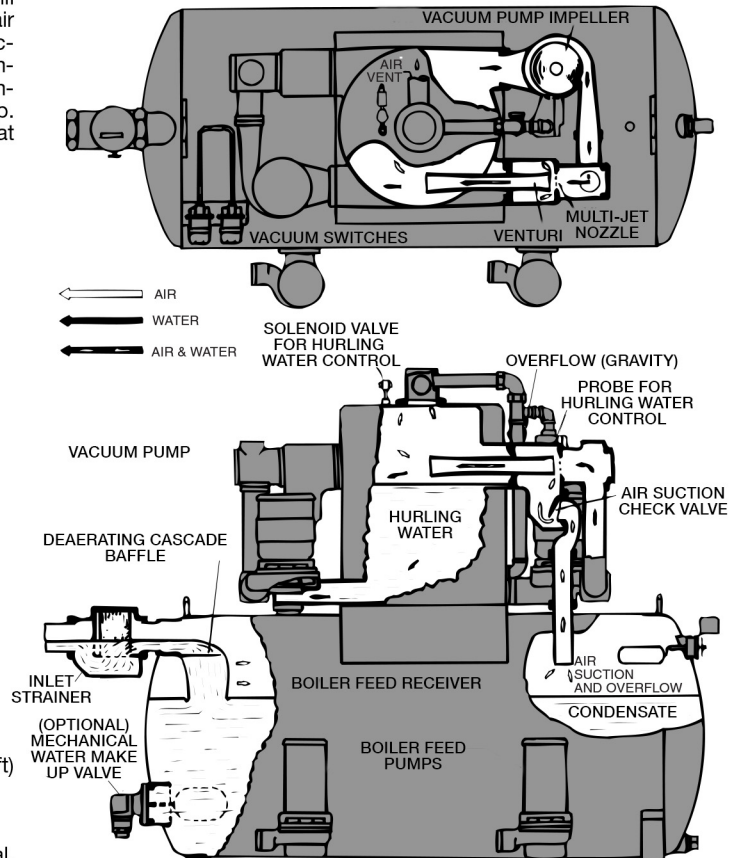


FIG. 5 ADJUSTMENT OF OVERFLOW CONTROL FLOAT SWITCH

1. Close inlet valve. Set all selector switches to "Off".
2. Add water to condensate receiver until it is flooded.
3. Operate air pump to bring water level to bottom of air suction (lift) pipe; turn selector switch(es) to "Off".
4. Adjust float switch to open about 1/2" above this level.
5. Set the other quadrant as close as possible for minimum differential.



PUTTING THE UNIT INTO SERVICE

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



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 floats for free operation. Assure that shipping locks have been removed.
4. Check power leads in accordance with wiring diagram enclosed in control cabinet (when furnished).



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.

5. Install drain plugs.
6. Fill receiver (upper compartment on Series VLR) half full of water to prime pump(s) and prevent possible damage to pump seals. Avoid freezing conditions after unit receiver has been filled.
7. Check for proper rotation of all three phase motors. Rotation must be clockwise looking down on the motor as indicated by directional arrow on pump casting. If pump runs backwards, interchange two wires (3 phase only).



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.

8. Throttle plug cock in discharge line until pressure at pump (while pump is discharging) approaches pump rated pressure. Tighten plug nut to secure adjustment.
9. Connect the water make-up assemblies to city water. Use piping at least as large as the valve piping provided. Provide a manual fill valve if not included on the unit. Vacuum producer and boiler feed unit have separate make-ups.
10. Vacuum switches are factory set per job specifications and re-adjustment should not be necessary. Refer to switch manufacturer's literature for details of adjusting procedure. If resetting is required, it is helpful to disconnect wiring and set one switch at a time. The "lead" switch must make and break at a slightly deeper vacuum than the "lag" switch.

Typical vacuum switch settings are as follows:

Switch	Make	Break
LEAD	3"	8"
LAG	2 1/2"	8"

11. Assure that the controls on and related to the boiler match the control systems provided on the unit (see the wiring diagram furnished) (applicable when electrical control panel is furnished).



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.

TROUBLE SHOOTING PROCEDURES - BOILER FEED SYSTEM

All units are thoroughly tested at the factory before shipment. They should operate satisfactorily without further adjustment if properly installed and providing 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 in 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 strainer is dirty thus retarding flow. Clean periodically.
8. Boiler is full or boiler control switch is defective.
9. The low water cut-off float switch is open due to low water, incorrect adjustment or failure of makeup system.

PUMP RUNS CONTINUOUSLY

1. Pump is running backward. Rotation of three phase motor may be corrected by interchanging any two of the three wires. Rotation should be clockwise looking down on motor.
2. Steam traps are blowing through causing condensate to return at excessive temperatures. This may reduce the capacity of pump below its rating, depending on the unit and type of pump furnished. Traps should be repaired or replaced.
3. Pump discharge pressure is less than operating pressure of the boiler.
4. 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 static head.

5. A valve in the discharge line is closed or throttled too tightly. Check valve is installed backwards.
6. The impeller eye is clogged.
7. Pump is too small for system.

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. However, this applies to certain units only; others are designed to handle boiling water.
3. The piping is too small to drain properly.
4. A defective trap is holding condensate in steam supply line.
5. Pump is running backward.

THE SYSTEM IS NOISY

1. Banging in the steam mains is usually caused by steam "imploding" in condensate lying in low points in lines. These problems can be eliminated by dripping low points, properly supporting the pipe, or by increasing the pitch of the line.
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 trap is holding condensate in steam supply line.
5. Defective check valve permits steam to vent thru pump into the boiler feed tank.
6. Steam blowing thru a defective trap.
7. A priming boiler is discharging water with the steam. Consult boiler manufacturer.

TROUBLE SHOOTING PROCEDURES - VACUUM PRODUCER

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 in 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. System has vacuum and vacuum switches are open.
8. Temperature limit switch open due to high condensate temperature.
9. Temperature limit switch improperly wired.

PUMP RUNS CONTINUOUSLY

1. Pump is running backward. Rotation of three phase motor may be corrected by interchanging any two of the three wires. Rotation should be clockwise looking down on motor.
2. System flow or leaks prevent the unit from developing design vacuum. Vacuum system must be tight.
3. System is drawing vacuum greater than the vapor pressure of liquid – the liquid is being boiled and then condensed in the vacuum unit.
4. Holes in the nozzle plate are plugged or worn and the system will not develop vacuum. Inspect and clean nozzle plates.

SYSTEM OVERFLOWS

1. System may be normal. Cooling water is required to lower vapor pressure of hurling water to be able to draw deep vacuum.
2. Temperature limit switch is set lower than required and adds unnecessary water.
3. The design vacuum is greater than the vapor pressure of a liquid within the system. The liquid is being boiled from the system and condensed in the hurling chamber.
4. Temperature limit switch is wired incorrectly.
5. Float switch is improperly adjusted. Remove float switch cover plate and readjust the cam activating the electrical switch.
6. Boiler feed receiver sized too small to accommodate system surges.
7. water make-up valve open or float switch set too high.
8. Water make-up valve leaks.

SYSTEM STARTS AND STOPS RAPIDLY

1. Pumping against a small closed system. Add vacuum storage tank or reset vacuum switches.

BOTH PUMPS RUN

1. Improper vacuum switch adjustment. Readjust lead vacuum switch to make and break at deeper vacuums than the lag switch. Refer to manufacturers' literature.
2. Low vacuum in system causing lag system switch to be closed.

PUMP SERVICE INSTRUCTIONS FOR SERIES C35, MODEL 609PF 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.



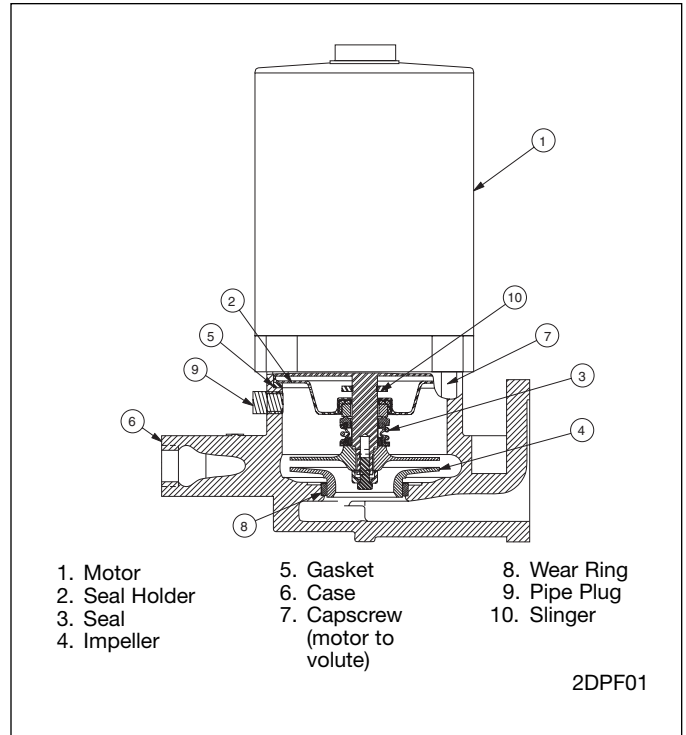
WARNING / HIGH VOLTAGE: Disconnect and lock out power before connecting or servicing unit. Failure to follow these instructions could result in serious injury or death.

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 motor to pump volute fasteners. 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 (7) 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 (2) 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. Orient motor so that conduit opening on motor is to the left midway between motor lugs. Replace seal holder on the face of the motor maintaining concentricity with motor face. Place new ceramic part of seal in the cup rubber over motor shaft and press firmly into recess of seal holder by hand, making certain both parts bottom evenly. If assembly cannot be bottomed with fingers place a wooden or cardboard tube over shaft onto ceramic and push into place. Using a clean, 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 place onto shaft to seat against the ceramic. Place seal spring onto shaft.
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 conduit opening on motor. Use care to insure tight gasket fit to prevent water leakage. When replacing pump case, the wire spacer eye should seat in pump case notch for fit up. If this does not occur inspect for proper alignment and reassemble.



15. Replace four capscrews (7). 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.



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

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 (EXCEPT 'B' OR 609)

Vertical mounting puts motor above floor direct and water

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

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



CAUTION: HOT SURFACE

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 serious injury or death.

2. Shut-off and lock out power.



WARNING: HIGH VOLTAGE

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

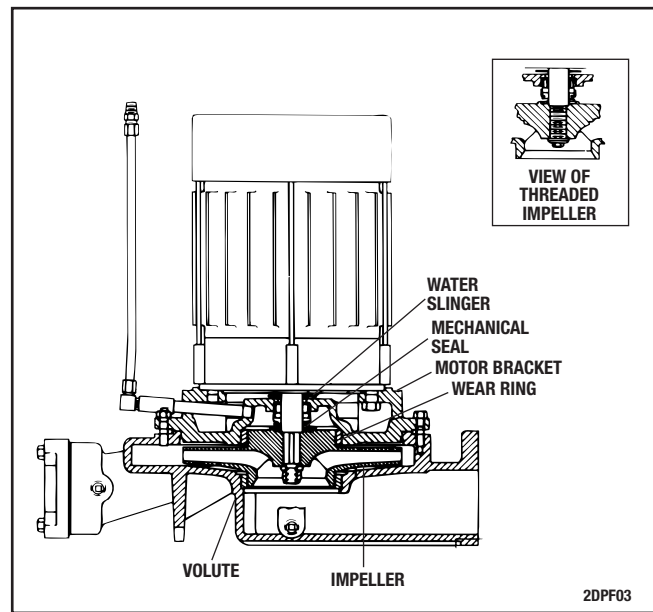
3. Make sure unit is cool enough that pump can be handled safely. Open drain to remove remaining liquid.
4. Carefully remove pump drain plug and bleed line. Wait for complete drainage.
5. Loosen the motor bracket to pump volute capscrews. Assure that the pressure is relieved per caution note.



CAUTION: PRESSURIZED SYSTEM

Operating system may contain very hot water. 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 death.

6. Complete the removal of the 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 off 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 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 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 tool.



2DPF03

- (2) Carefully place bracket in position on motor shaft without 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.

- (4) The "carbon" of rotating part of seal should not be loose. If it is, hold in place with grease. 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 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 serious injury or death.

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 serious injury or death.

18. Observe operation thru several cycles.

1. Close pump isolation valve or system return line valve. Operate pump momentarily to discharge as much water as possible. Close pump discharge valve.

**CAUTION: HOT SURFACE**

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 serious injury or death.

2. Shut-off and lock out power.

**WARNING: HIGH VOLTAGE**

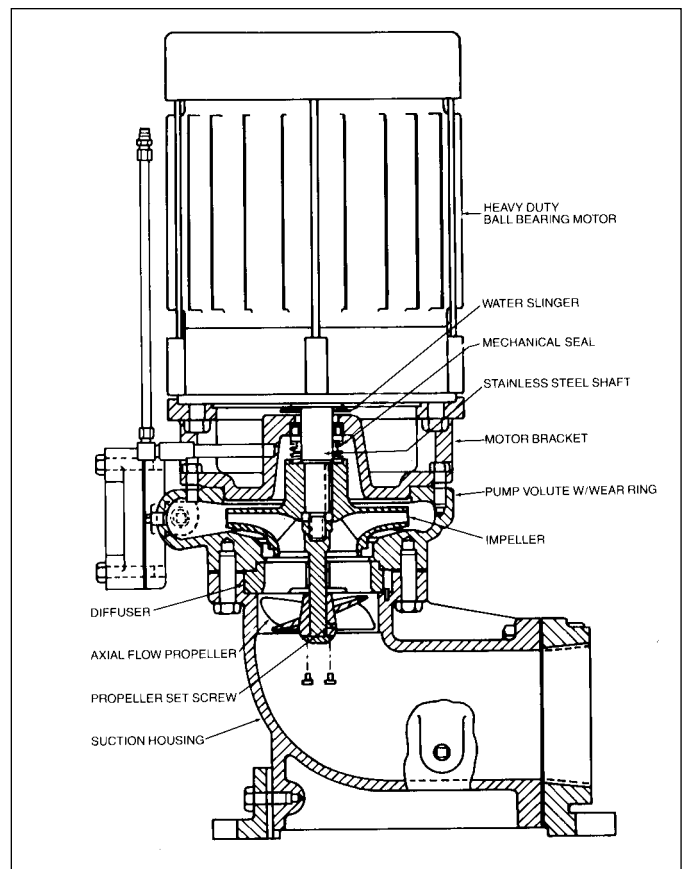
Disconnect and lock out power before connecting servicing unit. Failure to follow these instructions could result in serious injury or death.

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 both the discharge connection and the suction housing to pump volute fasteners. Assure that the pressure is relieved per caution note.

**CAUTION: PRESSURIZED SYSTEM**

Operating system may contain very hot water. 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 death.

6. Complete the removal of the hardware. Remove pump/motor assembly and place on work bench.
- 7a. Remove the suction housing capscrews and separate the pump/motor assembly from the suction housing. Note, the diffuser should separate from the suction housing to allow the pump/motor assembly to be removed.
 - (1) Threaded Motor Shafts (3Hp and less). Remove propeller lock nut. Remove propeller with propeller stem as an assembly with the diffuser. To install a new propeller, remove the propeller set screws and separate from the stem.
 - (2) Keyed Motor Shafts (5Hp and larger). Remove propeller set screws. Remove propeller, remove diffuser, and unscrew the propeller stem.
- 7b. Remove propeller, propeller stem and diffuser from the assembly as follows:
8. Remove capscrews holding motor bracket and pump volute together. Remove motor and bracket assembly from the volute by lifting straight away from volute.
9. 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 off with a rectangular bar or other flat tool inserted between the vanes of the impeller.
10. Remove rotating part of seal from shaft, being careful not break carbon face.
11. Remove capscrews holding motor bracket to motor and remove bracket.
12. Remove stationary part of seal assembly, being careful not to chip or break ceramic seal.



13. To install 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 without 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.
 - (4) The "carbon" of rotating part of seal should not be loose. If it is, hold in place with grease. 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 will not catch between shoulder and impeller.
14. Place impeller on shaft. Make sure impeller is seated.
 15. Reassemble volute to bracket.
 16. Install stem over drive pin in impeller eye. Tighten lock nut.
 17. Set stem to .004 TIR.

18. Install diffuser.
19. Install propeller and tighten set screws.
20. Using new gasket and noting alignment pin, install assembly on suction housing.
21. Install suction housing and discharge fasteners and tighten.
22. 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 serious injury or death.



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.

24. 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 serious injury or death.

25. Observe operation thru several cycles.

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

DEALER SERVICE

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. Vacuum readings.
4. Ampere draw of the motors.
5. A sketch of the pump hook-up and piping.
6. Complete information on boiler control switches and any motorized or solenoid valves in the boiler feed piping.

TM		
SERIES		HV TM
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	
Bell & Gossett Morton Grove, Illinois 60053		

DN0016

xylem
Let's Solve Water

Xylem Inc.
8200 N. Austin Avenue
Morton Grove, Illinois 60053
Phone: (847) 966-3700
Fax: (847) 965-8379
www.bellgossett.com

Bell & Gossett is a trademark of Xylem Inc. or one of its subsidiaries.
© 2018 Xylem Inc. DN0137F March 2018