

Installation,
Operation, and
Maintenance Manual



Series 1535

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Introduction and Safety

Introduction

Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



CAUTION:

Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

NOTICE:

Save this manual for future reference, and keep it readily available at the location of the unit.

Requesting other information

Special versions can be supplied with supplementary instruction leaflets. See the sales contract for any modifications or special version characteristics. For instructions, situations, or events that are not considered in this manual or in the sales documents, please contact the nearest Xylem representative.

Always specify the exact product type and identification code when requesting technical information or spare parts.

Safety



WARNING:

- The operator must be aware of safety precautions to prevent physical injury.
 - Any pressure-containing device can explode, rupture, or discharge its contents if it is over-pressurized. Take all necessary measures to avoid over-pressurization.
 - Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment. This includes any modification to the equipment or use of parts not provided by Xylem. If there is a question regarding the intended use of the equipment, please contact a Xylem representative before proceeding.
 - This manual clearly identifies accepted methods for disassembling units. These methods must be adhered to. Trapped liquid can rapidly expand and result in a violent explosion and injury. Never apply heat to impellers, propellers, or their retaining devices to aid in their removal.
 - Do not change the service application without the approval of an authorized Xylem representative.
-



CAUTION:

You must observe the instructions contained in this manual. Failure to do so could result in physical injury, damage, or delays.




Safety terminology and symbols

About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product
- Product malfunction

Hazard levels

Hazard level	Indication
 <p>DANGER:</p>	A hazardous situation which, if not avoided, will result in death or serious injury
 <p>WARNING:</p>	A hazardous situation which, if not avoided, could result in death or serious injury
 <p>CAUTION:</p>	A hazardous situation which, if not avoided, could result in minor or moderate injury
<p>NOTICE:</p>	<ul style="list-style-type: none"> • A potential situation which, if not avoided, could result in undesirable conditions • A practice not related to personal injury

Hazard categories

Hazard categories can either fall under hazard levels or let specific symbols replace the ordinary hazard level symbols.

Electrical hazards are indicated by the following specific symbol:



Electrical Hazard:

These are examples of other categories that can occur. They fall under the ordinary hazard levels and may use complementing symbols:

- Crush hazard
- Cutting hazard
- Arc flash hazard

User safety

General safety rules

These safety rules apply:

- Always keep the work area clean.
- Pay attention to the risks presented by gas and vapors in the work area.

- Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
- Always bear in mind the risk of drowning, electrical accidents, and burn injuries.

Safety equipment

Use safety equipment according to the company regulations. Use this safety equipment within the work area:

- Hard hat
- Safety goggles, preferably with side shields
- Protective shoes
- Protective gloves
- Gas mask
- Hearing protection
- First-aid kit
- Safety devices

NOTICE:

Never operate a unit unless safety devices are installed. Also see specific information about safety devices in other chapters of this manual.

Electrical connections

Electrical connections must be made by certified electricians in compliance with all international, national, state, and local regulations. For more information about requirements, see sections dealing specifically with electrical connections.

Precautions before work

Observe these safety precautions before you work with the product or are in connection with the product:

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that all safety guards are in place and secure.
- Make sure that you have a clear path of retreat.
- Make sure that the product cannot roll or fall over and injure people or damage property.
- Make sure that the lifting equipment is in good condition.
- Use a lifting harness, a safety line, and a breathing device as required.
- Allow all system and pump components to cool before you handle them.
- Make sure that the product has been thoroughly cleaned.
- Disconnect and lock out power before you service the pump.
- Check the explosion risk before you weld or use electric hand tools.

Precautions during work

Observe these safety precautions when you work with the product or are in connection with the product:

- Never work alone.
- Always wear protective clothing and hand protection.
- Stay clear of suspended loads.
- Always lift the product by its lifting device.
- Beware of the risk of a sudden start if the product is used with an automatic level control.
- Beware of the starting jerk, which can be powerful.
- Rinse the components in water after you disassemble the pump.

Wash the skin and eyes

Follow these procedures for chemicals or hazardous fluids that have come into contact with your eyes or your skin:

Condition	Action
Chemicals or hazardous fluids in eyes	<ol style="list-style-type: none"> 1. Hold your eyelids apart forcibly with your fingers. 2. Rinse the eyes with eyewash or running water for at least 15 minutes. 3. Seek medical attention.
Chemicals or hazardous fluids on skin	<ol style="list-style-type: none"> 1. Remove contaminated clothing. 2. Wash the skin with soap and water for at least 1 minute. 3. Seek medical attention, if necessary.

Environmental safety

The work area

Always keep the station clean to avoid and/or discover emissions.

Waste and emissions regulations

Observe these safety regulations regarding waste and emissions:

- Appropriately dispose of all waste.
- Handle and dispose of the processed liquid in compliance with applicable environmental regulations.
- Clean up all spills in accordance with safety and environmental procedures.
- Report all environmental emissions to the appropriate authorities.



WARNING:

Do NOT send the product to the Xylem manufacturer if it has been contaminated by any nuclear radiation. Inform Xylem so that accurate actions can take place.

Electrical installation

For electrical installation recycling requirements, consult your local electric utility.

Recycling guidelines

Always follow local laws and regulations regarding recycling.

Product warranty

Coverage

Xylem undertakes to remedy defects in products from Xylem under these conditions:

- The faults are due to defects in design, materials, or workmanship.
- The faults are reported to an local sales and service representative within the warranty period.
- The product is used only under the conditions described in this manual.
- The monitoring equipment incorporated in the product is correctly connected and in use.
- All service and repair work is done by Xylem authorized personnel.
- Genuine Xylem parts are used.
- Only Ex-approved spare parts and accessories authorized by an EX-approved Xylem representative are used in Ex-approved products.

Limitations

The warranty does not cover defects caused by these situations:

- Deficient maintenance
- Improper installation
- Modifications or changes to the product and installation made without consulting an Xylem authorized representative
- Incorrectly executed repair work
- Normal wear and tear

Xylem assumes no liability for these situations:

- Bodily injuries
- Material damages
- Economic losses

Warranty claim

Xylem products are high-quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, then contact your local sales and service representative.

Transportation and Storage

Inspect the delivery

Inspect the package

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. File a claim with the shipping company if anything is out of order.
If the product has been picked up at a distributor, make a claim directly to the distributor.

Inspect the unit

1. Remove packing materials from the product.
Dispose of all packing materials in accordance with local regulations.
2. Inspect the product to determine if any parts have been damaged or are missing.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.
For your personal safety, be careful when you handle nails and straps.
4. Contact your sales representative if anything is out of order.

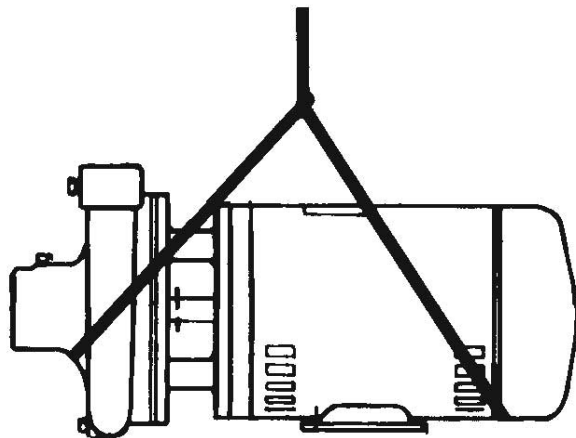
Pump lifting



WARNING:

- Assembled units and their components are heavy. Failure to properly lift and support this equipment can result in serious physical injury and/or equipment damage. Lift equipment only at the specifically identified lifting points. Lifting devices such as eyebolts, slings, and spreaders must be rated, selected, and used for the entire load being lifted.
- Crush hazard. The unit and the components can be heavy. Use proper lifting methods and wear steel-toed shoes at all times.

In order to lift the entire pump, use slings placed around the unit as shown.



Long-term storage

If the unit is stored for more than 6 months, these requirements apply:

- Store in a covered and dry location.
- Store the unit free from heat, dirt, and vibrations.
- Rotate the shaft by hand several times at least every three months.

Treat bearing and machined surfaces so that they are well preserved. Refer to the drive unit and coupling manufacturers for their long-term storage procedures.

For questions about possible long-term storage treatment services, please contact your local Xylem sales representative.

Product Description

General description

The Series 1535 is a horizontal, close-coupled pump that is designed for heavy duty operation.

This pump is available for suction sizes that range from 1-1/4 in. to 2 in. and is offered in motor sizes that range from 1/3 to 5 hp. When you combine these parameters, you can achieve flow rates up to 240 gpm and heads up to 114 ft.

Pump application



WARNING:

California Proposition 65 warning! This product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

You can use this pump for these types of applications:

- Hydronic heating and cooling
- Domestic hot water
- Industrial fluid transfer

This pump is for indoor use only.

Xylem recommends that you use bronze constructed pumps for pumping potable water. For other applications, contact your local sales and service representative.

Operational specifications

Operational limitations

Parameter	Value
Maximum working pressure	175 psi
Pump construction	Bronze fitted
Standard mechanical seals	BUNA-pH range limits: pH 7-9 Temperature range: -40°F to 225°F (-40°F to 107°C)

Installation

Preinstallation

Precautions



WARNING:

- When installing in a potentially explosive environment, make sure that the motor is properly certified.
- You must earth (ground) all electrical equipment. This applies to the pump equipment, the driver, and any monitoring equipment. Test the earth (ground) lead to verify that it is connected correctly.

NOTICE: Supervision by an authorized Xylem representative is recommended to ensure proper installation. Failure to do so may result in equipment damage or decreased performance.

Pump location guidelines



WARNING:

Assembled units and their components are heavy. Failure to properly lift and support this equipment can result in serious physical injury and/or equipment damage. Lift equipment only at the specifically identified lifting points. Lifting devices such as eyebolts, slings, and spreaders must be rated, selected, and used for the entire load being lifted.

Guideline	Explanation/comment
Keep the pump as close to the liquid source as practically possible.	This minimizes the friction loss and keeps the suction piping as short as possible.
Make sure that the space around the pump is sufficient.	This facilitates ventilation, inspection, maintenance, and service.
If you require lifting equipment such as a hoist or tackle, make sure that there is enough space above the pump.	This makes it easier to properly use the lifting equipment and safely remove and relocate the components to a safe location.
Protect the unit from weather and water damage due to rain, flooding, and freezing temperatures.	This is applicable if nothing else is specified.
Do not install and operate the equipment in closed systems unless the system is constructed with properly-sized safety devices and control devices.	Acceptable devices: <ul style="list-style-type: none"> • Pressure relief valves • Compression tanks • Pressure controls • Temperature controls • Flow controls If the system does not include these devices, consult the engineer or architect in charge before you operate the pump.
Take into consideration the occurrence of unwanted noise and vibration.	The best pump location for noise and vibration absorption is on a concrete floor with subsoil underneath.

Guideline	Explanation/comment
If the pump location is overhead, undertake special precautions to reduce possible noise transmission.	Consider a consultation with a noise specialist.
When possible, locate the pump below the fluid level.	This facilitates priming, ensures a steady flow of liquid, and provides a positive suction head on the pump.
Make sure that the maximum suction lift does not exceed 15.0 ft. (4.5 m). This includes friction losses.	–

Mode of discharge

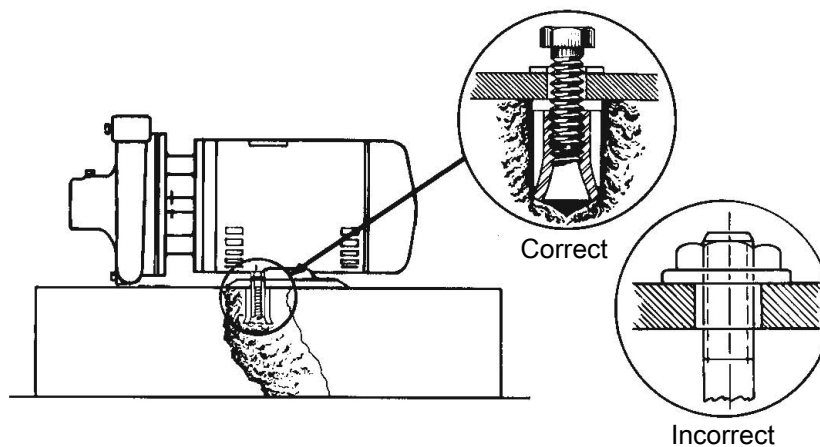
You can install this pump to discharge either vertically or horizontally. The arrow on the pump body must point in the direction of the flow.

Foundation requirements

Requirements

- The foundation must be able to absorb any type of vibration and form a permanent, rigid support for the unit.
- The foundation must weigh at least 2-1/2 times the weight of the pump unit.
- Provide a flat, substantial concrete foundation in order to prevent strain and distortion when you tighten the foundation bolts.
- Sleeve-type and J-type foundation bolts are most commonly used. Both designs allow movement for the final bolt adjustment.
- Tie the concrete pad in with the finished floor.
- Use some type of expansion fitting in order to facilitate easy servicing. Insert the female portion into a suitable hole in the pad so that its top surface is flush with the pad surface. Thus, when the hold-down bolts are removed, the motor can be removed by sliding it back from the pump.

Bolt installation diagram



Piping checklist

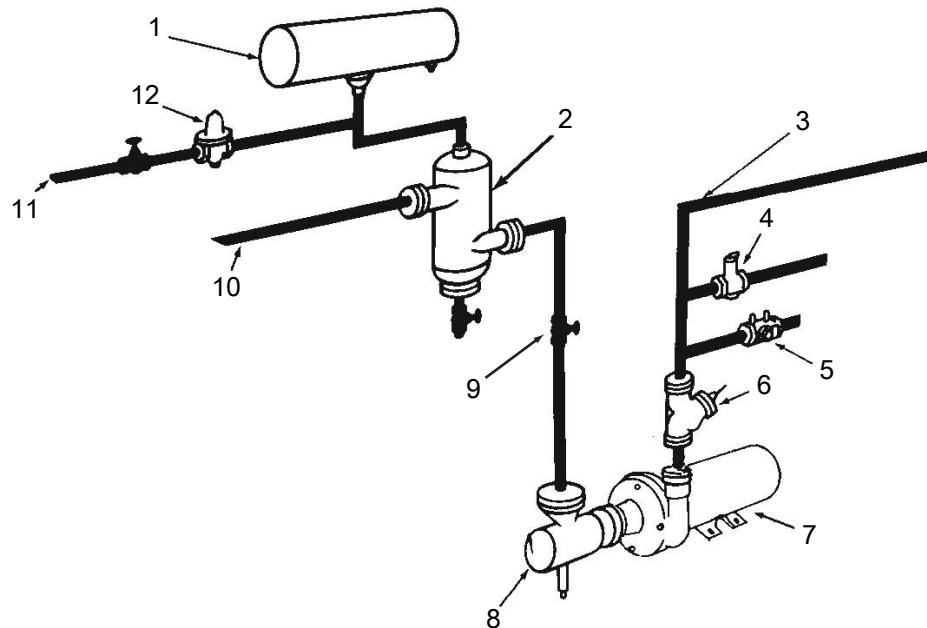


WARNING:

- The heating of water and other fluids causes volumetric expansion. The associated forces can cause the failure of system components and the release of high-temperature fluids. In order to prevent this, install properly sized and located compression tanks and pressure-relief valves. Failure to follow these instructions can result in serious personal injury or death, or property damage.
- Avoid serious personal injury and property damage. Make sure that the flange bolts are adequately torqued.
- Never force piping to make a connection with a pump.

Check	Explanation/comment	Checked
Check that a section of straight pipe, with a length that is five times its diameter, is installed between the suction side of the pump and the first elbow, or that a suction diffuser is installed.	This reduces suction turbulence by straightening the flow of liquid before it enters the pump.	
Check that the suction and discharge pipes are supported independently by use of pipe hangers near the pump .	This eliminates pipe strain on the pump .	
Check that there is a strong, rigid support for the suction and discharge lines.	As a rule, ordinary wire or band hangers are not adequate to maintain proper alignment.	
For pumps with flanges, check that the bolt holes in the pump flanges match the bolt holes in the pipe flanges.	–	
Check that the suction or discharge lines are not forced into position.	Coupling and bearing wear will result if suction or discharge lines are forced into position.	
Check that fittings for absorbing expansion are installed in the system when considerable temperature changes are expected.	This helps to avoid strain on the pump.	
Check that flexible piping is used on both the suction and discharge sides of the pump when you use an isolation base.	–	
Check that a triple duty valve is installed in the discharge line.	This valve serves as a check valve that protects the pump from water hammer, and serves as an isolation valve for servicing and for throttling.	
Check that the pipeline has isolation valves around the pump and has a drain valve in the suction pipe.	–	
Use PTFE tape sealer or a high quality thread sealant when you install the suction and discharge connections to a threaded pump housing.	–	
On an open system, check that the end of the suction pipe is at least 3 ft. below the surface of the water in the suction well. Where there is suction lift, make sure that horizontal runs of the suction pipe slope down from the pump toward the suction well and never slope up.	This prevents air from being drawn into the pump. Avoid air pockets in the suction line and make sure that each section of the suction pipe is air tight.	

Typical installation



1. Compression tank (located in the suction piping)
2. Rolairtrol air separator
3. System supply
4. Flo-control valve
5. Circuit setter
6. Triple duty valve
7. Pump
8. Suction diffuser
9. Isolation valve
10. Pipe from boiler, chiller, or converter
11. Cold water supply
12. Reducing valve

Connect the wiring



WARNING:

- Disconnect and lock out electrical power before installing or servicing the pump.
- Motors without built-in protection must be provided with contactors and thermal overload protection for single-phase motors, or starters with heaters for three-phase motors. (See the nameplate on the drive unit to select properly-sized overloads.)



Electrical Hazard:

Make sure that all connections are secure and the conduit box cover is closed before you connect the electrical power.

1. Remove the screws that secure the conduit box cover.
2. Lift off the cover.
3. Attach the appropriately sized connector to the hole in the side of the conduit box.

The circulators are thermally protected by impedance or on-winding thermal protectors and do not require external overload protection.

Wiring diagrams

These wiring diagrams are typical and might not be representative for all motor types. Refer to the motor or motor nameplate for specific diagrams.

Single-phase motors

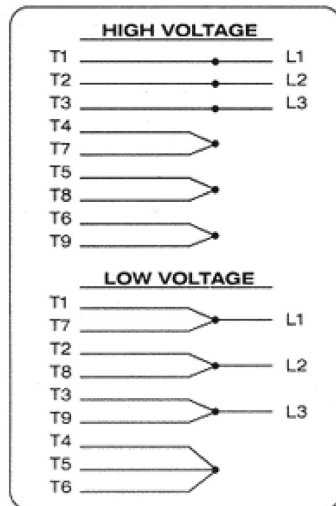
Single-phase motors are protected with inherent overheating devices and do not require external overload protection.

Single-phase motors can operate at either a low voltage (115 V) or a high voltage (230 V). Choose the voltage at which you want to operate your pump and make the wiring connections according to these diagrams:

Standard	For 1 hp, 1 phase motors only
<p>LOW VOLTAGE</p> <p>5 — BROWN</p> <p>L2 — 4 — WHITE BLACK</p> <p>L1 — 1</p> <p>6</p> <p>HIGH VOLTAGE</p> <p>5 — WHITE</p> <p>L2 — 4 — BLACK</p> <p>L1 — 1</p> <p>6 — BROWN</p>	<p>LOW VOLTAGE</p> <p>L2 — 1</p> <p>2 — RED BROWN</p> <p>L1 — 4 — BLACK WHITE</p> <p>5</p> <p>6</p> <p>HIGH VOLTAGE</p> <p>L2 — 1</p> <p>2 — RED WHITE</p> <p>L1 — 4 — BLACK</p> <p>5</p> <p>6 — BROWN</p>

Three-phase motors

Three-phase motors can operate at either a low voltage (208 to 230 V) or at a high voltage (460 V). Choose the voltage at which you want to operate your pump and make the wiring connections according to this diagram:



Commissioning, Startup, Operation, and Shutdown

Preparation for startup



WARNING:

- Failure to follow these precautions before you start the unit will lead to serious personal injury and equipment failure.
 - If the pump, motor, or piping operate at extremely high or low temperatures, then guarding or insulation is required. Failure to follow these instructions can result in serious personal injury or death, and property damage.
 - Never operate the pump without the coupling guard correctly installed.
 - Always disconnect and lock out power to the driver before you perform any installation or maintenance tasks. Failure to disconnect and lock out driver power will result in serious physical injury.
 - Operating the pump in reverse rotation can result in the contact of metal parts, heat generation, and breach of containment.
-

NOTICE:

- Verify the driver settings before you start any pump.
 - Make sure that the warm-up rate does not exceed 2.5°F (1.4°C) per minute.
-

You must follow these precautions before you start the pump:

- Flush and clean the system thoroughly to remove dirt or debris in the pipe system in order to prevent premature failure at initial startup.
- Bring variable-speed drivers to the rated speed as quickly as possible.
- If temperatures of the pumped fluid will exceed 200°F (93°C), then warm up the pump prior to operation. Circulate a small amount of fluid through the pump until the casing temperature is within 100°F (38°C) of the fluid temperature.

At initial startup, do not adjust the variable-speed drivers or check for speed governor or over-speed trip settings while the variable-speed driver is coupled to the pump. If the settings have not been verified, then uncouple the unit and refer to instructions supplied by the driver manufacturer.

Pump rotation

The rotation of the pump is clockwise when viewed from the back of the motor. An arrow shows the direction of rotation.

Prime the pump



CAUTION:

Do not run the pump dry.

NOTICE:

Do not prime the pump while it is running by letting water into it through the discharge pipe. This method can damage the pump or motor or blow out a fuse.

Make sure that the pump body is full of liquid before startup. If the system does not automatically fill the pump body with liquid, then you must manually prime the pump.

When you prime the pump from an independent source, you can connect a 1/4 in. pipe line that is controlled by a valve to one of the side plugs on the volute shell. You can also replace plugs in the top and bottom of the volute casing with 1/8 in. valves in order to facilitate priming and draining.

1. Loosen the vent plugs on the pump body.
2. While venting the air from the pump body, rotate the pump shaft a few times by hand.
3. After all air has been purged from the pump, close the vent plugs.

Start the pump



WARNING:

Pressurize the pump body slowly while you check for leaks at all joints with gaskets. Failure to follow these instructions can result in serious personal injury and/or property damage.



CAUTION:

- Immediately observe the pressure gauges. If discharge pressure is not quickly attained, stop the driver, reprime, and attempt to restart the pump.
 - Observe the pump for vibration levels, bearing temperature, and excessive noise. If normal levels are exceeded, shut down the pump and resolve the issue.
-

- Open the suction valve.
 - Open any recirculation or cooling lines.
1. Fully close or partially open the discharge valve, depending on system conditions.
 2. Start the driver.
 3. Slowly open the discharge valve until the pump reaches the desired flow.
 4. Immediately check the pressure gauge to ensure that the pump quickly reaches the correct discharge pressure.
 5. If the pump fails to reach the correct pressure, perform these steps:
 - a) Stop the driver.
 - b) Restart the driver.
 6. Monitor the pump while it is operating:
 - a) Check the pump for bearing temperature, excessive vibration, and noise.
 - b) If the pump exceeds normal levels, then shut down the pump immediately and correct the problem.
 7. Repeat steps 5 and 6 until the pump runs properly.

Pump operation precautions

General considerations

**CAUTION:**

- Vary the capacity with the regulating valve in the discharge line. Never throttle the flow from the suction side since this can result in decreased performance, unexpected heat generation, and equipment damage.
 - Do not overload the driver. Driver overload can result in unexpected heat generation and equipment damage. The driver can overload in these circumstances:
 - The specific gravity of the pumped fluid is greater than expected.
 - The pumped fluid exceeds the rated flow rate.
 - Make sure to operate the pump at or near the rated conditions. Failure to do so can result in pump damage from cavitation or recirculation.
-

Operation at reduced capacity

**WARNING:**

Never operate any pumping system with a blocked suction and discharge. Operation, even for a brief period under these conditions, can cause confined pumped fluid to overheat, which results in a violent explosion. You must take all necessary measures to avoid this condition.

**CAUTION:**

- Avoid excessive vibration levels. Excessive vibration levels can damage the bearings, stuffing box or seal chamber, and the mechanical seal, which can result in decreased performance.
 - Avoid increased radial load. Failure to do so can cause stress on the shaft and bearings.
 - Avoid heat build-up. Failure to do so can cause rotating parts to score or seize.
 - Avoid cavitation. Failure to do so can cause damage to the internal surfaces of the pump.
-

Operation under freezing conditions

NOTICE:

Do not expose an idle pump to freezing conditions. Drain all liquid that is inside the pump. Failure to do so can cause liquid to freeze and damage the pump.

Shut down the pump

1. Slowly close the discharge valve.
2. Shut down and lock the driver to prevent accidental rotation.

Maintenance

Bearing maintenance

Bearing lubrication schedule

Type of bearing	First lubrication	Lubrication intervals
Motor bearings	No initial lubrication. The motor was lubricated at the factory.	Refer to the motor manufacturer's recommendations for lubrication intervals.

Disassembly

Disassembly precautions



WARNING:

- This manual clearly identifies accepted methods for disassembling units. These methods must be adhered to. Trapped liquid can rapidly expand and result in a violent explosion and injury. Never apply heat to impellers, propellers, or their retaining devices to aid in their removal.
- Make sure that the pump is isolated from the system and that pressure is relieved before you disassemble the pump, remove plugs, open vent or drain valves, or disconnect the piping.
- Always disconnect and lock out power to the driver before you perform any installation or maintenance tasks. Failure to disconnect and lock out driver power will result in serious physical injury.
- Crush hazard. The unit and the components can be heavy. Use proper lifting methods and wear steel-toed shoes at all times.

NOTICE:

Make sure that all replacement parts are available before you disassemble the pump for overhaul.

Drain the pump



CAUTION:

- Allow all system and pump components to cool before you handle them to prevent physical injury.

1. Disconnect the electrical supply and lock it out of service.
2. Loosen the conduit box cover screws and remove the cover.
3. Disconnect the conduit and wiring.
4. Close the isolation valves on the suction and discharge sides of the pump.
You must drain the system if no valves are installed.
5. Open the drain valve.
Do not proceed until liquid stops coming out of the drain valve. If liquid continues to flow from the drain valve, the isolation valves are not sealing properly and you must repair them before you proceed.
6. Leave the drain valve open and remove the drain plug located on the bottom of the pump housing.

- Do not reinstall the plug or close the drain valve until the reassembly is complete.
7. Drain the liquid from the piping and flush the pump if it is necessary.
 8. Disconnect all auxiliary piping and tubing.
 9. Loosen the volute capscrews but do not remove them.
 10. Shift the pump position slightly in order to allow the pressurized water to escape.

**WARNING:**

Make certain that the internal pressure is relieved before you continue. Failure to follow these instructions can result in serious personal injury and/or property damage.

11. Remove the volute capscrews and remove the pump assembly from the volute.

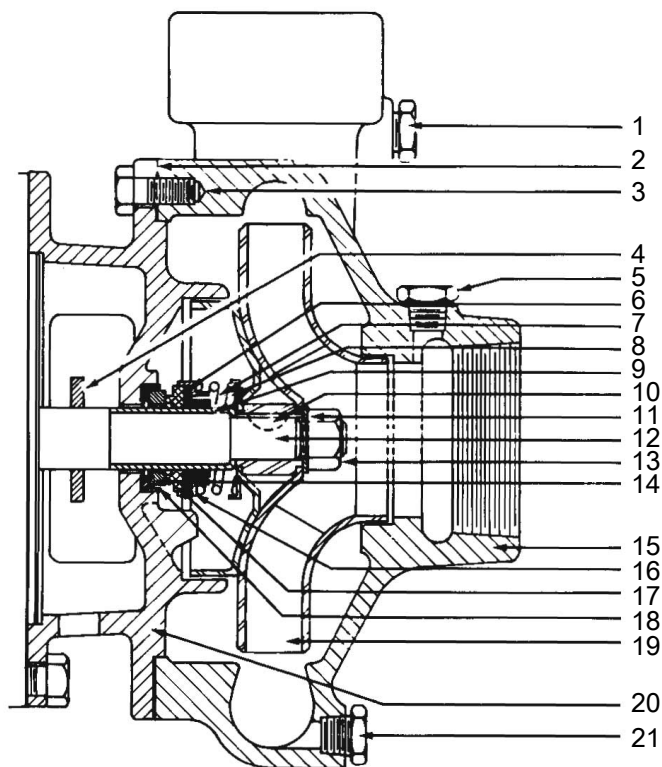
Remove the seal assembly

1. Remove the motor assembly from the system.
2. Use either a strap wrench or a rag in order to prevent the impeller from turning with one hand while you loosen the impeller nut with the other hand.
3. Lift the spring retainer and the seal spring from the shaft.
4. Remove the compression ring from the seal collar by inserting a small screwdriver underneath the ring and carefully applying an upward force.

NOTICE:

These seal assemblies consist of a stationary seal insert assembly and a rotating seal assembly. Each of these components must be replaced when you replace the mechanical seal. Never replace individual components separately.

5. Remove the ring collar and remaining seal components from the shaft.
6. Use a clean, lint free rag in order to remove any debris that has accumulated in the seal recess.



1. Gauge tapping plug	12. Shaft
2. Volute gasket	13. Impeller locknut
3. Volute cover capscrews	14. Ceramic seat
4. Slinger	15. Volute
5. Gauge tapping plug	16. Seal housing
6. Bellows	17. Rotating ring
7. Seal assembly	18. Seat gasket
8. Spring	19. Impeller, enclosed
9. Shaft sleeve	20. Bracket
10. Impeller key	21. Volute drain plug
11. Impeller lockwasher	–

Pre-assembly inspections

Guidelines

Before you assemble the pump parts, make sure you follow these guidelines:

- Inspect the pump parts according to the information in these pre-assembly topics before you reassemble your pump. Replace any part that does not meet the required criteria.
- Make sure that the parts are clean. Clean the pump parts in solvent in order to remove oil, grease, and dirt.

NOTICE: Protect machined surfaces while you clean the parts. Failure to do so may result in equipment damage.

Areas to inspect

Inspect the pump regularly for leaking seals, worn gaskets, and loose or damaged components. Replace or repair these parts as required.

Reassembly

Reassemble the seal assembly



WARNING:

After you disassemble a gasket joint, always use a new gasket upon reassembly. Never reuse old gaskets. Failure to follow these instructions can result in serious personal injury, death, and/or property damage.





1. Place a new retainer in the bracket seal recess.
2. Seat a thin rubber gasket in the recess and set the ceramic insert on top of the gasket. The ceramic has a top side and bottom side. The bottom is identifiable by its slightly recessed grooves. These grooves should face downward toward the rubber gasket.
3. Lubricate the rubber seal collar with soapy water.

The rotating seal assembly includes these parts:

- Seal ring
 - Rubber collar
 - Brass collar
 - Compression ring
4. Push the entire rotating seal assembly onto the shaft as one unit.
Do not attempt to assemble the seal by placing the components on the shaft individually. Align the notches in the collar with the recesses found on each side of the carbon ring.
 5. Press the seal housing tightly against the upper end of the rubber collar.
Use a screwdriver and press at several points along the periphery in order to provide a tight and even fit. Do not tap on the seal because you can break the ceramic or carbon insert.
 6. Place the seal spring on the shaft and then the spring retainer.
 7. Place the impeller and lockwasher on the shaft.
 8. Thread the impeller nut onto the shaft and tighten according to these values:
 - 3/8 in. nut to 8 - 12 ft. lbs. (11 - 16 Nm)
 - 7/16 in. nut to 17 - 22 ft. lbs (23 - 30 Nm)
 Do not overtighten.
 9. Clean the pump body of excess debris.
 10. Place a new gasket in the recess of the pump body.
 11. Replace the motor assembly by inserting the impeller in the pump body and evenly tighten the eight capscrews.
Tighten the 3/8 in. capscrews to 10 - 14 ft. lbs (14 - 19 Nm).

Capscrew torque values

Capscrew torque in ft-lbs (Nm)

Capscrew type	Head marking	1/4 in.	5/16 in.	3/8 in.	7/16 in.	1/2 in.	5/8 in.	3/4 in.	7/8 in.	1 in.
SAE grade 2		6 (8)	13 (18)	25 (34)	38 (52)	60 (81)	120 (163)	190 (258)	210 (285)	300 (407)
Brass or stainless steel	 or 	4 (5)	10 (14)	17 (23)	27 (37)	42 (57)	83 (113)	130 (176)	200 (271)	300 (407)
SAE grade 5		10 (14)	20 (27)	35 (47)	60 (81)	90 (122)	180 (244)	325 (441)	525 (712)	800 (1085)

Dealer servicing

If trouble occurs that cannot be rectified, contact your local sales and service representative and be prepared to provide this information:

1. Complete nameplate data of pump and motor
2. Suction and discharge pipe pressure gauge readings
3. Ampere draw of the motor
4. A sketch of the pump hook-up and piping

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- 1) The tissue in plants that brings water upward from the roots
- 2) A leading global water technology company

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