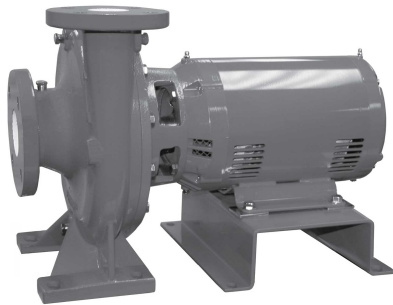
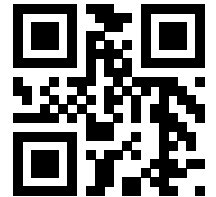


e-1531



e-1532



# Series e-1531 and e-1532



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# 1 Introduction and Safety

## 1.1 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.

## 1.2 Safety



### WARNING:

- The operator must be aware of safety precautions to prevent physical injury.
- 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.
- 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.


### 1.2.1 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 and its surroundings
- Product malfunction



#### Hazard levels

Hazard level	Indication
 <b>DANGER:</b>	A hazardous situation which, if not avoided, will result in death or serious injury

Hazard level	Indication
 <b>WARNING:</b>	A hazardous situation which, if not avoided, could result in death or serious injury
 <b>CAUTION:</b>	A hazardous situation which, if not avoided, could result in minor or moderate injury
<b>NOTICE:</b>	Notices are used when there is a risk of equipment damage or decreased performance, but not personal injury.

Special symbols

Some hazard categories have specific symbols, as shown in the following table.


Electrical hazard	Magnetic fields hazard
 <b>Electrical Hazard:</b>	 <b>CAUTION:</b>

1.2.2 Safety instruction decals



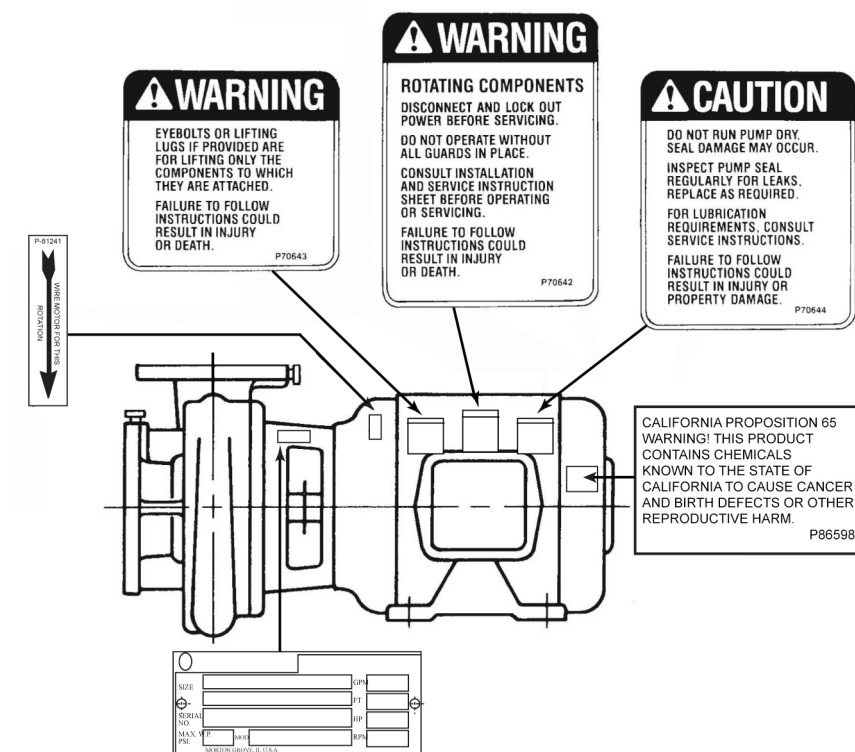
Alert symbol

**WARNING:**  
Do NOT exceed the maximum working pressure of the pump. This information is listed on the nameplate of the pump.

	This safety alert symbol is used in manuals and on the safety instruction decals on the pump to draw attention to safety-related instructions. When used, the safety alert symbol means that failure to follow the instructions may result in a safety hazard.
-------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Decals

Make sure your pump has these safety instruction decals and that they are located as this figure shows. If the decals are missing or illegible, contact your local sales and service representative for a replacement.



Make sure that all safety instruction decals are always clearly visible and readable.

### 1.2.3 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.

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

## 1.2.4 Protecting the environment

### Emissions and waste disposal

Observe the local regulations and codes regarding:

- Reporting of emissions to the appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills

### Exceptional sites



#### **CAUTION: Radiation Hazard**

Do NOT send the product to Xylem if it has been exposed to nuclear radiation, unless Xylem has been informed and appropriate actions have been agreed upon.

### Recycling guidelines

Always follow local laws and regulations regarding recycling.



# 2 Transportation and Storage

## 2.1 Examine the delivery

### 2.1.1 Examine the package

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

### 2.1.2 Examine the unit

1. Remove packing materials from the product.  
Dispose of all packing materials in accordance with local regulations.
2. To determine whether any parts have been damaged or are missing, examine the product.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.  
Use care around nails and straps.
4. If there is any issue, then contact a sales representative.

## 2.2 Safe handling requirements



### WARNING:

- Personal protective equipment should be worn when handling this equipment.
- Transportation & installation of this equipment should only be performed by qualified personnel.
- A professional rigging company should be consulted before lifting the pump assembly.
- Only use properly sized, certified lifting equipment & lifting devices, including slings, suitably rated for the weights to be lifted.
- Slings, when used, must be of identical materials to avoid differences in stretch rates.
- Do not use lifting devices that are frayed, kinked, unmarked, or worn.
- Lifting eyebolts fitted on single components of the assembly (pump or motor) must not be used to lift the complete assembly.
- Failure to observe these instructions could result in equipment or property damage, serious injury, or death.

The pump assembly can arrive in as a pump without base, or a base-mounted pump (e-1532 only). Use the following recommended ways of handling e-1531 or e-1532 pump assemblies. The pump assembly should remain horizontal during transport and lifting.

Table 1: Lifting methods

Pump type	Lifting method
A pump without base.	Use a suitable sling attached properly to solid points under the casing and motor.
A base-mounted pump. (e-1532 only)	Lifting the pump less motor or the pump, motor, & baseplate should be done by using lifting lugs provided on the baseplate, or by utilizing a forklift under the entire unit. Always take extra precaution to ensure the weight is balanced & equally distributed across both forks. When the baseplate of the assembly is structural channel construction, the pump and base plate should be set in place first. The motor should then be separately lifted & mounted to the unit.

Examples

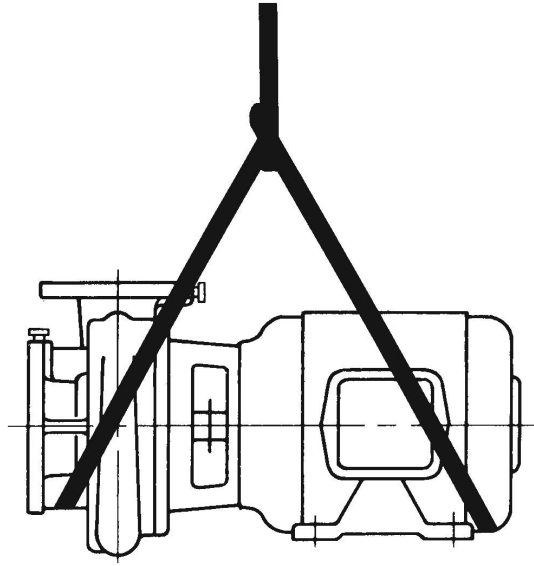


Figure 1: Example of a proper lifting method for pump without base

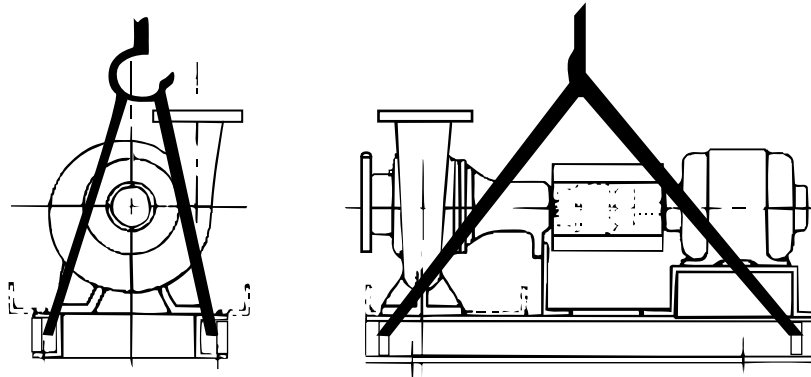


Figure 2: Example of a proper lifting method using lifting lugs for base mounted pump (e-1532 only)

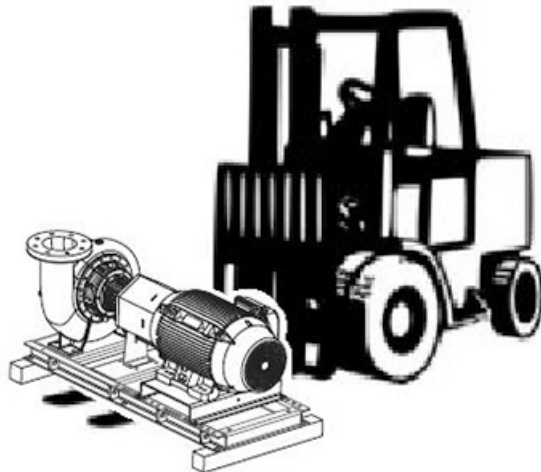


Figure 3: Lift using a forklift

## 2.3 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 manufacturer for their long-term storage procedures.

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

# 3 Product Description

## 3.1 General description

### Description

The pump is a centrifugal, close-coupled pump. The following pump features make it easy to install, operate, and service:

- High efficiency
- Rugged stainless steel-fitted construction
- Footless (e-1531) or Foot-mounted (e-1532) volute

### Intended applications



#### WARNING:

This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

The pump is intended for use with these pumped fluids:

- Unheated domestic and fresh water
- Boiler feed water
- Condensate
- Hydronic cooling or heating
- Benign liquids
- Pressure boosting
- General liquid transfer

### Rotation

Pump rotation is clockwise when viewed from the back of the motor. An arrow is also located on the pump to show the direction of rotation.

## 3.2 Operational specifications

### Mechanical seal specifications

Seal type/ Parameter	Standard seal, BUNA/Carbon/ Ceramic	Optional seal, EPR/Carbon / Tungsten Carbide	Optional seal, FKM/Carbon / Ceramic	Optional seal, EPR/Silicon Carbide/Silicon Carbide	Optional seal, EPR/Carbon / Tungsten Carbide with external flush <sup>1,3,4</sup>	Packing <sup>2</sup>
Operating temperature range, °F (°C)	-20 to 225 (-29 to 107)	-20 to 250 (-29 to 121)	-10 to 225 (-23 to 107)	-20 to 250 (-29 to 121)	-20 to 250 (-29 to 121)	0 to 200 (-18 to 93)
pH range limits	7.0 to 9.0	7.0 to 11.0	7.0 to 9.0	7.0 to 12.5	7.0 to 9.0	7.0 to 9.0
Resistance to dissolved solids	Low	Low-Medium	Low	Medium-High	Low-Medium	Medium
Maximum glycol/water concentration	50/50%	50/50%	50/50%	60/40%	50/50%	Not recommended

#### Table notes

1. An external flush is required on low pressure systems that contain a high concentration of abrasives.
2. Use packing on open or closed systems which require a large amount of makeup water, as well as systems that are subjected to a wide variety of chemical conditions and solids buildup.
3. For operating temperatures above 250°F, a cooled flush is required and is recommended for temperatures above 225°F for optimum seal life. On closed systems, cooling is accomplished by inserting a small heat exchanger in the flush line to cool the seal flushing fluid.
4. Flush-line filters and sediment separators are available on request.

# 4 Installation

## 4.1 Preinstallation

### Precautions




---

**WARNING:**

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

---

Evaluate the installation in order to determine that the Net Positive Suction Head Available (NPSH<sub>A</sub>) meets or exceeds the Net Positive Suction Head Required (NPSH<sub>R</sub>), as stated by the pump performance curve.

### 4.1.1 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"> <li>• Pressure relief valves</li> <li>• Compression tanks</li> <li>• Pressure controls</li> <li>• Temperature controls</li> <li>• Flow controls</li> </ul> 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.
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.

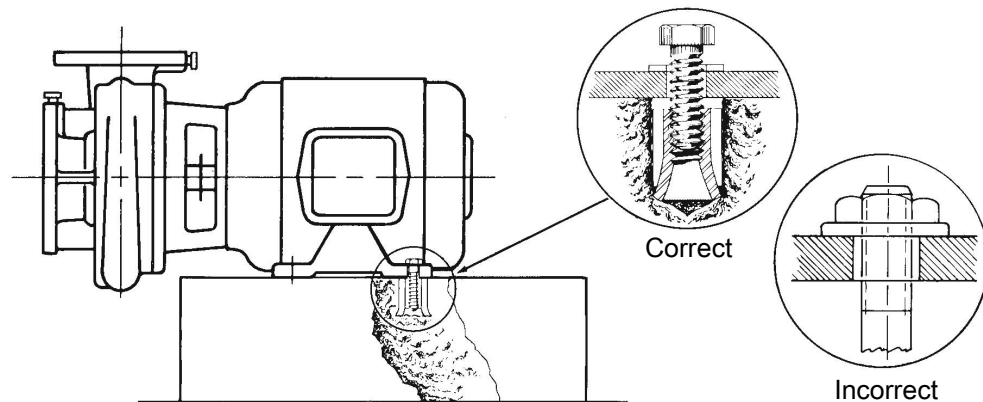
## 4.1.2 Foundation requirements

### 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. Tie the concrete pad in with the finished floor.

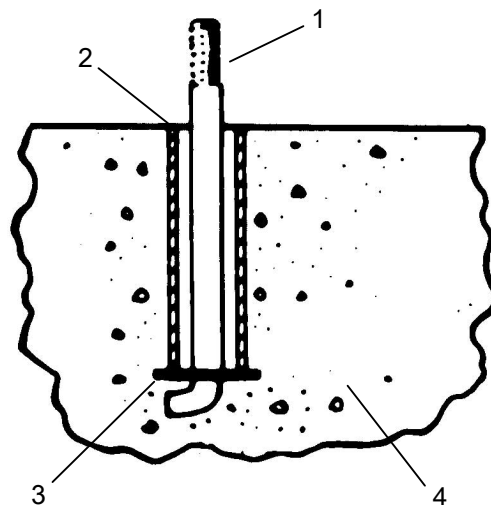
### Bolt installation – pump to concrete

- 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 with baseplate (e-1532)

- Sleeve-type and J-type foundation bolts are most commonly used. Both designs allow movement for the final bolt adjustment.
- Use foundation bolts and larger pipe sleeves to give room for final bolt location.



1. Foundation bolt
2. Pipe sleeve
3. Washer
4. Built-up concrete foundation

### 4.1.3 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.

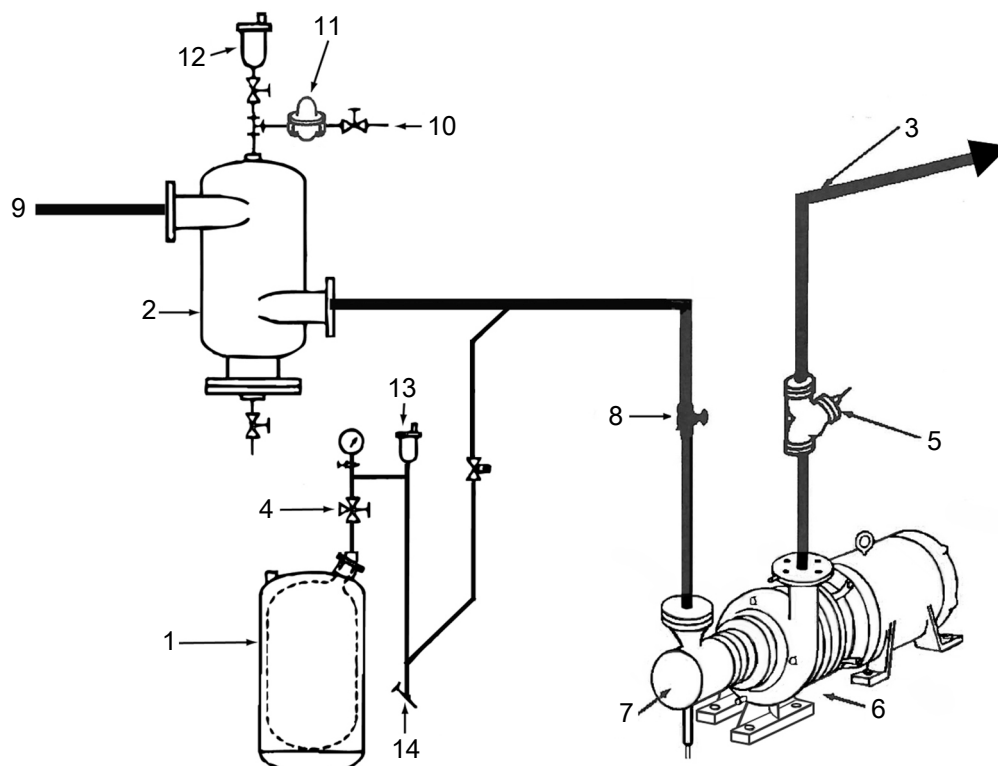
**NOTICE:**

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 B&G 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 you have a foot valve of equal or greater area than the pump suction piping when you use in an open system with a suction lift.	Prevent clogging by using a strainer at the suction inlet next to the foot valve. Make sure that the strainer has an area three times that of the suction pipe with a mesh hole diameter of no less than 0.25 in. (0.64 cm).	
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 B&G 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.	–	



#### 4.1.4 Typical installation



1. Expansion tank
2. B&G Rolairtrol® air separator
3. Supply to system
4. TPV Tank Purge Valve
5. B&G Triple Duty® valve
6. B&G Series e-1531 or e-1532 Pump
7. B&G Suction Diffuser
8. Isolation valve
9. Pipe from boiler, chiller, or converter
10. Cold water supply
11. B&G Pressure Reducing Valve
12. B&G Model 107A – High capacity vent
13. B&G #7 or #87 Air Vent
14. Drain valve

#### 4.1.5 Special installation

##### Installation with suction diffuser and triple-duty valve

Do not install and operate triple-duty valves and suction diffusers in closed systems unless the system is designed with these safety and control devices:

- Pressure relief valves
- Compression tanks
- Pressure controlling equipment
- Temperature controlling equipment
- Flow controlling equipment

Check that the control and safety devices have these characteristics:

- Properly sized for their purpose
- Placed correctly in the system before putting the system into operation

##### Installation with isolation base

When using an isolation base, flexible piping should be used on both suction and discharge sides to reduce the strain on the flanges.

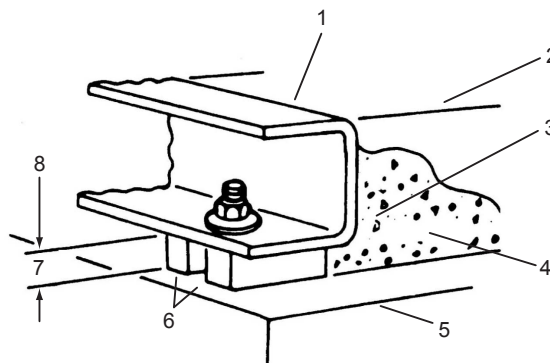
## 4.2 Install the pump with motor (e-1532)

1. Place the pump with motor where it will be mounted, on the floor, on a raised concrete pad or on a base, with two 0.060 in (1.5 mm) thick shims provided under each of the four hold down bolt locations of the pump volute feet. With certain tall motors and short pumps, one or two additional 1" (25.4 mm) thick steel shims will be provided to go under the pump casing feet to make the volute level with the bottom of the motor support or motor feet.
2. Then add additional shims at each of the four volute hold down bolt locations, as required, until the volute feet are fully supported, the pump discharge flange is level, and there is a gap under the motor saddle or motor feet. Tighten the four bolts at the volute feet.
3. Loosen the bolts between the motor and the motor saddle, when a saddle is used, and fill any gaps to fully support the motor by adding shims under the motor feet at each of the motor's four hold down bolt locations, as required, until all four hold down hole locations of the motor saddle or motor feet contact the floor, pad, or base. Tighten the bolting between the motor and motor saddle, when a saddle is used.
4. When mounted on a baseplate, then tighten the four hold down bolts at the corners of the motor support or motor feet. For pumps mounted directly on the floor or concrete pad, all four motor saddle or motor hold down bolt locations must be in contact with the floor or pad, but hold down bolting at these locations is optional.
5. If any hold down bolt tightening results in pump movement that could induce stress in the pump frame, stop and re-shim the pump volute, motor saddle or motor.

## 4.3 Level the base on a concrete foundation for pumps with base (e-1532)

1. Place the pump on its concrete foundation.
2. Place 1.00 in. (25.40 mm) thick steel shims or wedges on both sides of each anchor bolt in order to support the pump.

This also provides a means of leveling the base.



1. Pump Base Rail
2. Grout only to top of base rail
3. Locate the shims to allow removal after grouting.
4. Grout
5. Concrete foundation
6. Shims
7. 1" (25.40 mm) Gap
8. Allow 1" for shims. Place on both sides of anchor bolts.

## 4.4 Grout the baseplate (e-1532)

Required equipment:

- Cleaners: Do not use an oil-based cleaner because the grout will not bond to it. See the instructions provided by the grout manufacturer.
- Grout: Non-shrink grout is required.

1. Clean all the areas of the baseplate that will come into contact with the grout.
2. Build a dam around the foundation.
3. Thoroughly wet the foundation that will come into contact with the grout.
4. Pour grout into the baseplate up to top of the base rails.  
Locate shims to allow removal after grouting.  
When you pour the grout, remove air bubbles from it by using one of these methods:
  - Puddle with a vibrator.
  - Pump the grout into place.
5. Allow the grout to set. It is recommended to remove shims, retighten anchor bolts, and fill shim gaps with grout.

## 4.5 Install the piping

Connect piping to pump without pipe strain on the pump.

# 5 Commissioning, Startup, Operation, and Shutdown

## 5.1 Preparation for startup



---

**WARNING:**

- Failure to follow these precautions before you start the unit will lead to serious personal injury and equipment failure.
- Do not operate the pump below the minimum rated flows or with the suction or discharge valves closed. These conditions can create an explosive hazard due to vaporization of pumped fluid and can quickly lead to pump failure and physical injury.
- 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.
- 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 clear 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.

## 5.2 Prime the pump



---

**CAUTION:**

Do not run the pump dry.

---

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.

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.

## 5.3 Start the pump




---

### CAUTION:

- Observe the pump for vibration levels, bearing temperature, and excessive noise. If normal levels are exceeded, shut down the pump and resolve the issue.
- 

Before you start the pump, you must perform these tasks:

- 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) Prime the pump again.
    - c) 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.

## 5.4 Pump operation precautions

### General considerations




---

### WARNING:

Do NOT exceed the maximum working pressure of the pump. This information is listed on the nameplate of the pump.

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### 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




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### 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.

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**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.

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**NOTICE:**

- 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

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**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.

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## 5.5 Shut down the pump

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

## 5.6 Note on the packed pump operation

### Tighten the gland nuts

Before you start the pump, back off the packing gland nuts or screws until the gland is loose.

Hand tighten until the gland is snug against the first packing ring. Initially, water might freely run from the packing. This is normal and should be allowed to continue for a period of time before you continue to tighten the gland. Tighten the gland nuts slowly and one flat at a time.

### Leakage rate

An adequate leakage rate is not one single value for all pumps and installations, but is the amount required to provide adequate cooling and lubrication. The required leakage is influenced by operating pressure, fluid temperature, shaft speed, and so forth. For fluid temperatures in the range of 32°F to 190°F (0°C to 88°C), average leakage rates of 60 to 80 drops per minute are recommended. However, each individual pump and installation has unique operating conditions that result in widely-variable leakage rate requirements.

### Maximum fluid temperature

At fluid operating temperatures near the upper limit of 190°F (88°C), the maximum temperature rise of the leakage is important. Never operate a packed pump with steam forming at the gland. This limits the temperature rise to a maximum of about 20°F (-7°C). If the formation of steam persists at higher leakage rates, you must provide cooling water by means of an external supply, or a heat exchanger used to cool the bypass flush.

# 6 Maintenance

## 6.1 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.

## 6.2 Disassembly

### 6.2.1 Disassembly precautions

This manual clearly identifies accepted methods for disassembling units. These methods must be adhered to.




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**WARNING:**

- 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.

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### 6.2.2 Drain the pump




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**CAUTION:**

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

1. Close the isolation valves on the suction and discharge sides of the pump.

You must drain the system if no valves are installed.

2. 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.

3. 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.

4. Drain the liquid from the piping and flush the pump if it is necessary.

5. Disconnect all auxiliary piping and tubing.

### 6.2.3 Remove the rotating assembly and motor

1. Remove the motor foot capscrews.
2. Loosen the volute capscrews but do not remove them.

3. Loosen the rotating assembly from the volute.

**WARNING:**

Make certain that the internal pressure of the pump is relieved before you continue. Failure to follow these instructions could result in serious personal injury or death, or property damage.

4. Remove the seal flushing tube if it is used.
5. Remove the volute capscrews.
6. Remove the rotating assembly and motor from the volute.
7. Remove the impeller capscrew, lock washer, and washer.
8. Remove the impeller.

#### 6.2.4 Remove the mechanical seal (e-1531/e-1532 and e-1531/e-1532-F)

1. Remove the rotating portion of the seal.  
If necessary, use a screwdriver to loosen the rubber ring.
2. Remove the seal insert, the insert gasket, and the retainer if it is used.

#### 6.2.5 Remove the seal or packing rings (e-1531/e-1532-S, e-1531/e-1532-D, and e-1531/e-1532-PF)

1. Remove the hex nuts from the seal cap bolts.
2. For the e-1531/2-PF, remove the hex nuts from the packing gland.
3. Remove the coverplate screws.
4. Remove the coverplate from the bracket.
5. Remove the seal assembly or packing rings.

#### 6.2.6 Impeller trimming guidelines

##### Machining

When it is necessary to reduce the pump flow rate and generated head by trimming the impeller diameter, the following guidelines apply for stainless steel impellers:

- Review the pump hydraulic selection data and consult your local Xylem representative to select the proper reduced diameter.
- For the e-1531 or e-1532 4AD model, before trimming the impeller refer to the 4AD angle cut guidelines.
- For machining recommendations, see P2002535 Stainless Steel Impeller Trimming Guidelines.

##### Balancing

It is recommended that impellers trimmed more than 5% in diameter be rebalanced per ISO 1940 grade G6.3.

##### Angle cut guidelines

Model e-1531 and e-1532 4AD pump impellers must be angle cut at reduced diameters according to the following information.



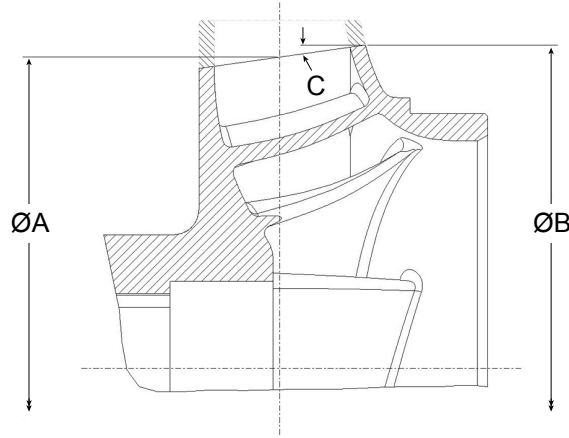


Figure 4: 4AD impeller trim – 0.125 in. (3.17 mm) increments

A	B	C
Hydraulic diameter, nominal, as shown on selection curves	Diameter at impeller inlet side shroud	Trim angle
From maximum diameter 7 in. (177.8 mm) to 6.125 in. (155.6 mm)	Use diameter from selection curves	0 degrees, no angle
6, 5.875, 5.75, 5.625 in. (162.4 to 142.9 mm)	B = A plus 0.250 in. (6.35 mm)	8 degrees
5.5, 5.375, 5.25, 5.125, minimum 5 in. (139.7 to 127.0 mm)	B = A plus 0.375 in. (9.53 mm)	8 degrees

## 6.3 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.

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#### NOTICE:

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

---

### Areas to inspect

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

#### 6.3.1 Shaft and sleeve inspection

##### Inspection criteria

Inspect the shaft and sleeve according to this criteria:

- Thoroughly clean the shaft and sleeve.
- Thoroughly clean the coverplate seal cavity.
- Inspect the surface for damage such as pitting, corrosion, nicks, and scratches.

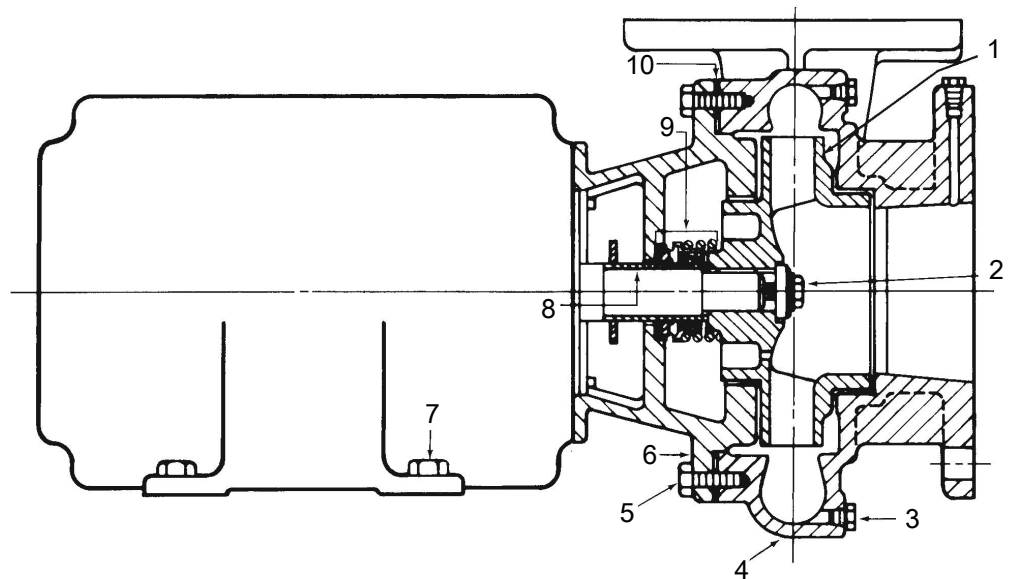
Replace these parts if they are damaged.

## 6.4 Reassembly

### 6.4.1 Seal assembly

#### 6.4.1.1 Assemble the standard mechanical seal (e-1531/e-1532 and e-1531/e-1532-F)

1. Lubricate the shaft sleeve and coverplate seal cavity with soapy water.  
Do not use a petroleum lubricant.
2. Install a new cup gasket and a new seal insert with the indentation side down into the cup.
3. Slide a new rotating seal assembly onto the shaft sleeve.
4. Push the top of the compression ring with a screwdriver until the seal is tight against the seal insert.
5. Install the seal spring and point the narrow end toward the seal.



1. Impeller
2. Impeller capscrew
3. Drain plug
4. Volute
5. Volute capscrews
6. Motor bracket
7. Motor foot capscrews
8. Shaft sleeve
9. Seal assembly
10. Volute gasket

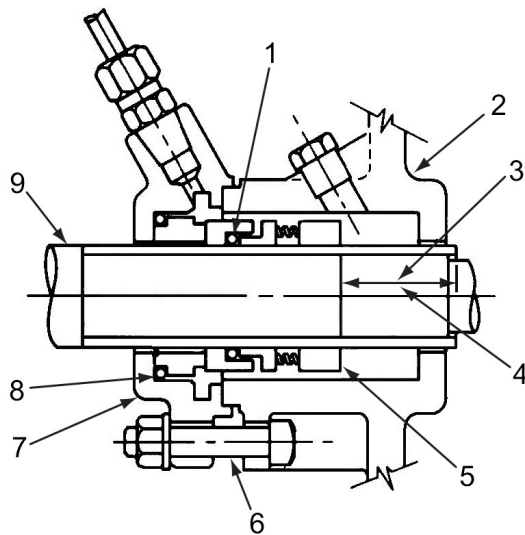
#### 6.4.1.2 Assemble the single mechanical seal (e-1531/e-1532-S)

1. Lubricate the shaft sleeve and seal cap with soapy water.  
Do not use a petroleum lubricant.
2. Insert a stationary seal with an O-ring into the seal cap and slide it onto the shaft.
3. Replace the seal cap gasket.
4. Slide the rotating portion of the seal assembly onto the shaft sleeve and lock it in place.

ID seal size	Distance between collar and impeller end of the shaft sleeve
1-1/4 in. (3.175 cm)	1-13/32 in. (3.571 cm)
1-5/8 in. (4.128 cm)	1-1/4 in. (3.175 cm)

5. Assemble the coverplate onto the bracket.
6. Tighten the capscrews according to the Capscrew torque table.

7. Attach the seal cap to the coverplate.
8. Tighten the hex nuts on the seal cap bolts according to the Capscrew torque table.

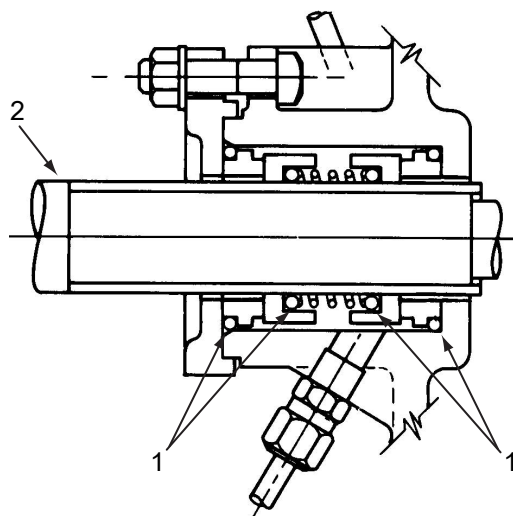


1. O-ring
2. Coverplate
3. For 1-1/4 in. seal: 1-13/32 in. (3.571 cm)
4. For 1-5/8 in. seal: 1-1/4 in. (3.175 cm)
5. Seal locking collar
6. Seal cap bolt
7. Seal cap
8. O-ring
9. Motor end

Figure 5: Single mechanical seal (e-1531/e-1532-S)

#### 6.4.1.3 Assemble the double mechanical seal (e-1531/e-1532-D)

1. Lubricate the shaft sleeve, seal cap, and coverplate cavity with soapy water. Do not use a petroleum lubricant.
2. Insert a stationary seal and O-ring into the seal cap. For the 1-1/4 in. ID seal, both parts are housed in the coverplate. A seal cap gasket is not used.



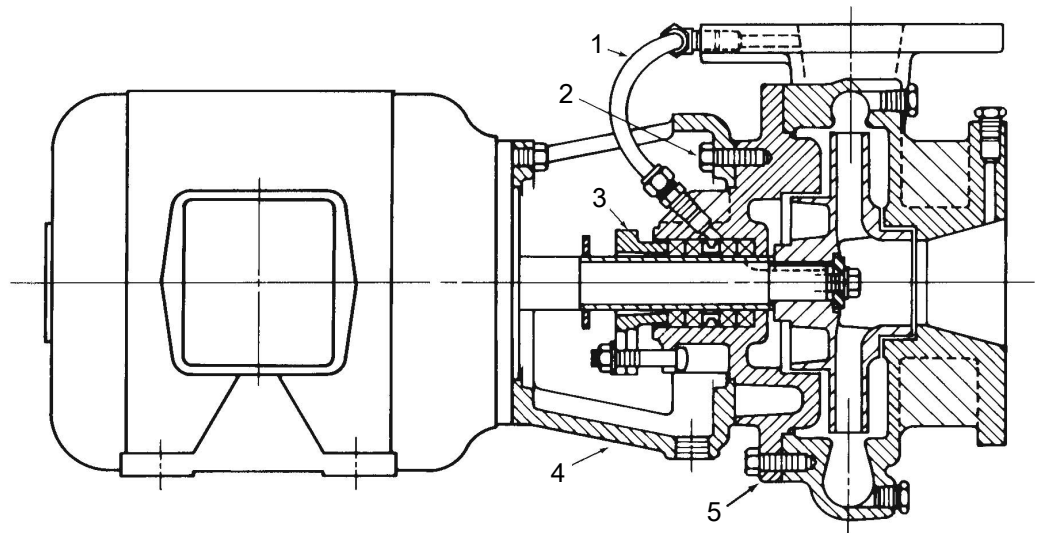
1. O-rings
2. Motor end

**Figure 6: Double mechanical seal (e-1531/e-1532-D)**

3. Insert another stationary seal and O-ring into the coverplate.
4. Slide the seal cap onto the shaft.
5. Replace the seal cap gasket.
6. Slide the rotating portion of the seal assembly onto the shaft sleeve.
7. Assemble the coverplate onto the bracket.
8. Tighten the capscrews according to the Capscrew torque values table.
9. Attach the seal cap to the coverplate.
10. Tighten the hex nuts on the seal cap bolts according to the Capscrew torque values table.

#### 6.4.2 Assemble the packed stuffing box (e-1531/e-1532-PF)

1. Insert two packing rings into the stuffing box.
2. Insert the lantern ring and the last two pieces of packing.  
Make sure that the joints on the packing rings are staggered 90°.
3. Install, but do not tighten, the packing gland.
4. Install the coverplate over the pump shaft.
5. Tighten the capscrews according to the Capscrew torque table in the Maintenance chapter.
6. Tighten the packing gland to compress the packing.  
See the note on the packed pump operation in the Operations chapter for more information.



1. Flushing tube
2. Coverplate capscrew
3. Packing gland
4. Bracket
5. Coverplate

#### 6.4.3 Reinstall the rotating assembly and motor





1. Install the impeller, impeller washer, lock washer, and capscrew, and then tighten per the Capscrew torque values table.
2. Install a new volute gasket.
3. Install the rotating assembly and motor into the volute.
4. Tighten the volute capscrews according to the Capscrew torque values table.

5. Install a seal flushing tube if it is used.
6. Install the drain plug and close the drain valve.
7. Open the isolation valves and inspect the pump for leaks.

Return the pump to service if you do not detect any leaks. See the Note on the packed pump operation in the Commissioning, Startup, Operations, and Shutdown chapter.

#### 6.4.4 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)

#### Pipe plug torque values

Table 2: Pipe plug torque, ft-lb (Nm)

Size	Turns past finger tight	Approximate torque
1/8 in NPT	1.5 to 3	12 (16)
1/4 in NPT	1.5 to 3	25 (34)
3/8 in NPT	1.5 to 3	40 (54)
1/2 in NPT	1.5 to 3	54 (73)

#### 6.4.5 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

# 7 Product warranty

## Commercial warranty

**Warranty.** For goods sold to commercial buyers, Seller warrants the goods sold to Buyer hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be (i) be built in accordance with the specifications referred to in the quotation or sales form, if such specifications are expressly made a part of this Agreement, and (ii) free from defects in material and workmanship for a period of one (1) year from the date of installation or eighteen (18) months from the date of shipment (which date of shipment shall not be greater than thirty (30) days after receipt of notice that the goods are ready to ship), whichever shall occur first, unless a longer period is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render the Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

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Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render this Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. The Warranty is conditioned on Buyer giving written notice to Seller of any defects in material or workmanship of warranted goods within ten (10) days of the date when any defects are first manifest.

Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

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To make a warranty claim, check first with the dealer from whom you purchased the product or visit [www.xyleminc.com](http://www.xyleminc.com) for the name and location of the nearest dealer providing warranty service.









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- 2) a leading global water technology company.

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