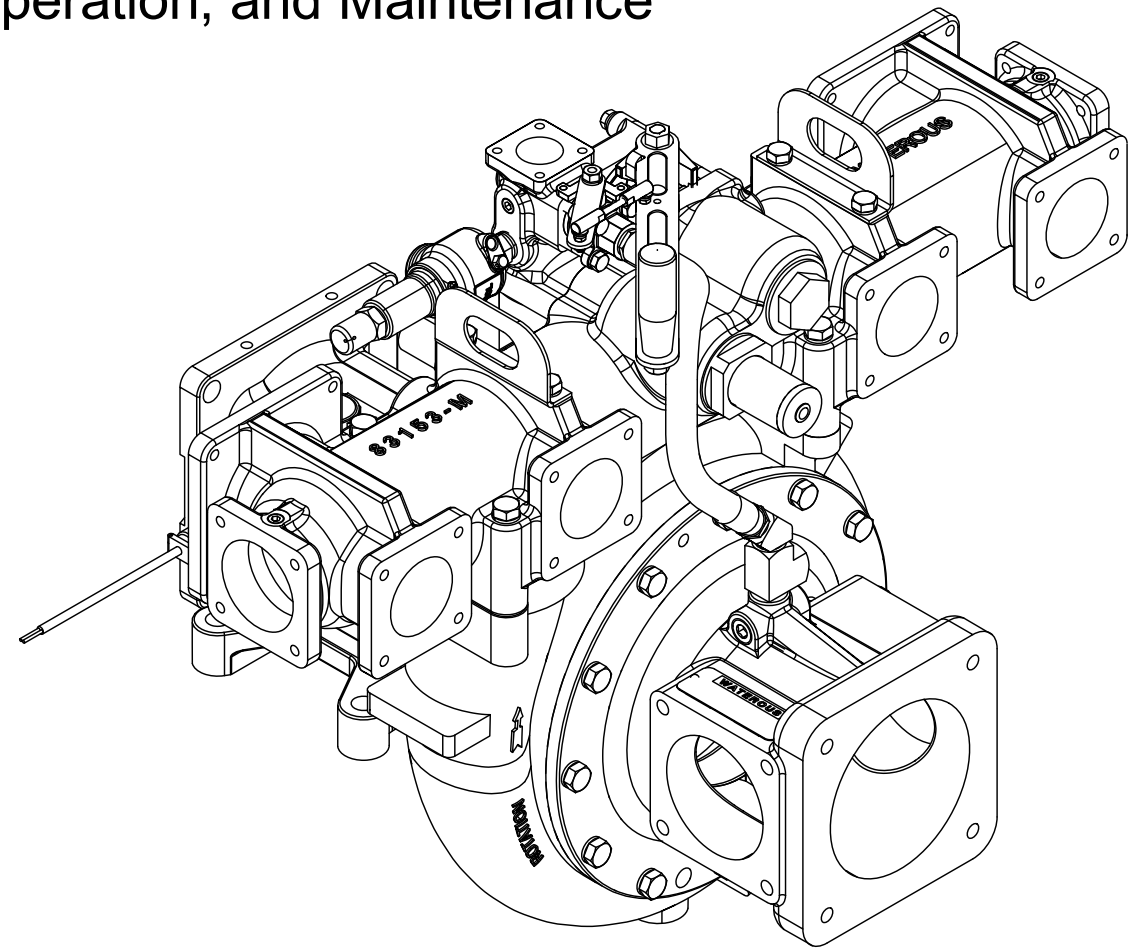
WATEROUS

Form Number: F-2868
Issue Date: Jan 30, 2020
Revision Date: Aug 23, 2021

HLU Fire Pump

Installation, Operation, and Maintenance



Waterous Company • 125 Hardman Avenue South • South Saint Paul, MN 55075 • (651) 450-5000
www.waterousco.com

Table of Contents

Safety Precautions

- Read and understand all the associated documentation before you begin the installation.
- Read and understand all the notices and safety precautions.
- Be aware that these instructions are only guidelines and are not meant to be definitive. Contact Waterous when you have questions about installing, operating, or maintaining the equipment.
- Do not install the equipment if you are not familiar with the tools and skills needed to safely perform the required procedures—proper installation is the responsibility of the purchaser.
- Do not operate the equipment when safety guards are removed.
- Do not modify the equipment.

Regularly check for leaks, worn, or deteriorated parts.

NOTICE

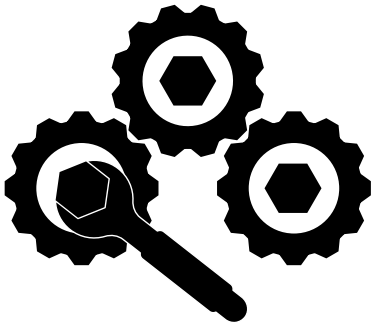
Before Operation

- **Read and understand all the instructions provided.**
- **Check all fluid levels and replenish if necessary.**
- **Remove all shipping plugs and install the operation plugs or caps.**

NOTICE

Modification

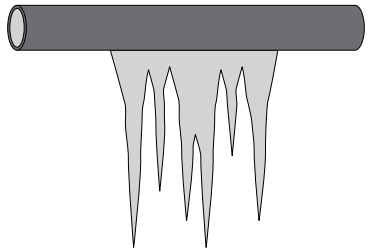
- **Modifying the equipment can damage components and void your warranty.**
- **Do not modify the system or any of its components.**



NOTICE

Freeze Damage

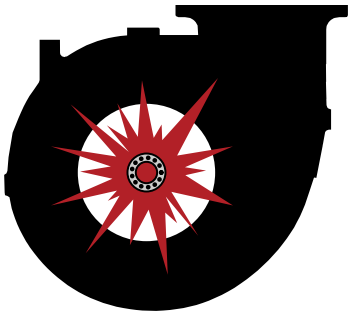
- **Do not allow fluid in the lines to freeze.**
- **Remove all freezable fluid from the lines before storing the apparatus.**



NOTICE

Premature Failure

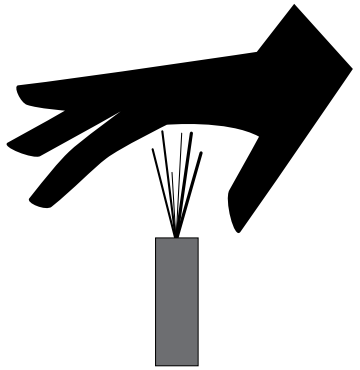
- Premature component failure occurs when operating beyond system specifications.
- Do not operate the system beyond specifications.



⚠ WARNING

High Pressure

- Liquid ejected at high pressure can cause serious injury.
- Drain the pump after use and before servicing.



⚠ WARNING

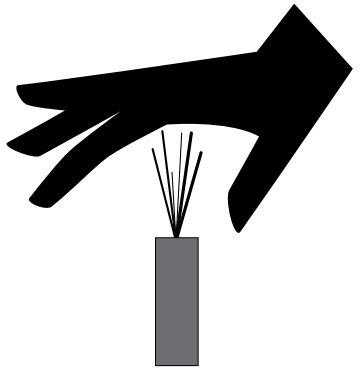
Hot Surface

- Hot surface can burn you.
- Do not touch the surface during operation—allow it to cool after operating.

⚠ WARNING

High Pressure

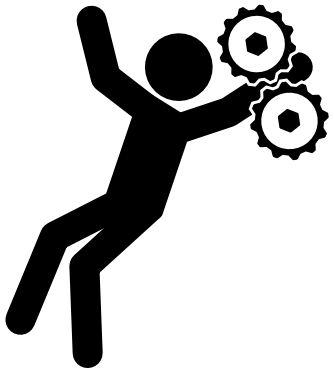
- Liquid ejected at high pressure can cause serious injury.
- Do not operate beyond recommended pressure.



⚠ WARNING

Moving Parts

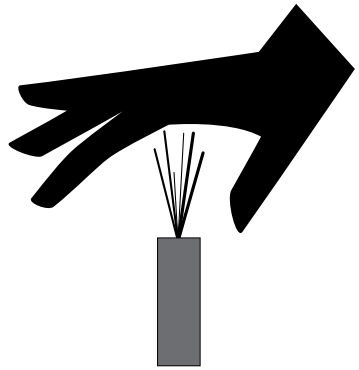
- Rotating parts can cause severe injury or death
- Keep clear of moving parts when the equipment is operating.



⚠ WARNING

High Pressure

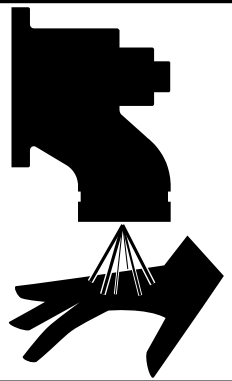
- Liquid ejected at high pressure can cause serious injury.
- Purge all pressure before servicing.



⚠ WARNING

High Pressure

- Discharge ejected at high pressure can cause serious injury and damage.
- Direct discharge away from people and equipment.



Use this document to install and operate your Waterous equipment. Understand the following conditions before continuing with the document:

- The instructions may refer to options or equipment that you may not have purchased with your system.
- The illustrations in this document are intended to convey concepts. Do not use the illustrations to determine physical attributes, placement, or proportion.
- Understand that your application may require additional steps, that are not described in the illustrations or instructions, to perform the installation.
- The equipment described in this document is intended to be installed by a person or persons with the necessary skills and knowledge to perform the installation.
- The equipment described in this document is intended to be operated by a person or persons with the basic knowledge of operating similar equipment.
- The information in this document is subject to change without notice.

This document is divided into the following sections:

SAFETY
This section describes general precautions and alert symbols that are in this document.

INTRODUCTION
This section is an overview of the document.

PRODUCT OVERVIEW
This section describes the components that make-up the system.

INSTALLATION
This section describes the installation and initial setup procedures.

OPERATION
This section describes the equipment operation.

MAINTENANCE
This section describes maintenance procedures.

WARRANTY
This section describes the equipment warranty

Using this Document

Use the guidelines below when viewing this document.

Viewing the Document Electronically

- View this document in landscape orientation.
- Use the table of contents to navigate directly to that section.
- Text **with this appearance** is linked to a reference.

Printing the Document

- The document is viewed the best when printed in color.
- The *print on both sides* and *flip on long edge* features can provide the best results.
- Use a 3-ring binder to store the document.

Symbols

Here are the symbols found in the document a their definitions.


Section reference—This symbol tells you to refer to the section reference for additional information.

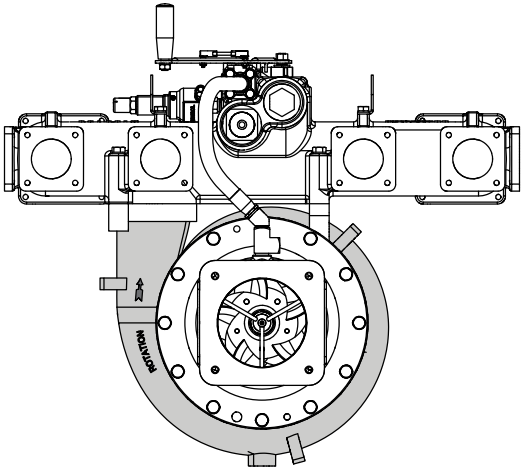

Drill—This symbol tells you to drill the mounting holes in the apparatus.


Jig saw—This symbol tells you to make a cutout in the apparatus.

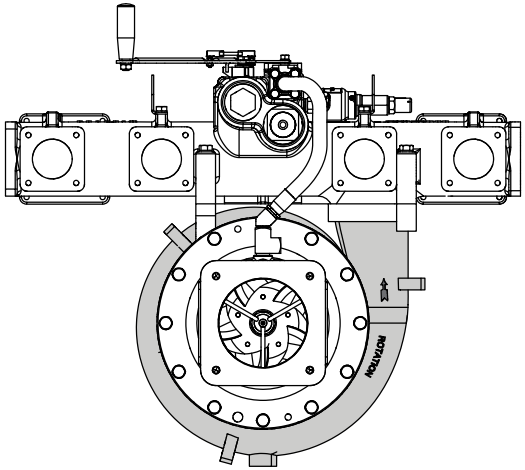
HLU Pump Overview and Versions

The HLU pump has a discharge manifold with 8 normal pressure discharges, and 1 high-pressure discharge. A lever on the pump opens a transfer valve to divert a portion of the incoming water into the high-pressure discharge, while simultaneously operating the remaining discharges.

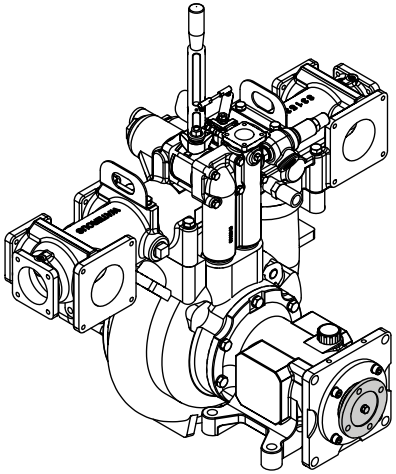
The pump is available in several variations. Pump variations include clockwise and counterclockwise rotation, as well as direct drive, or with a transmission. Optional priming and foam generation systems are also available.



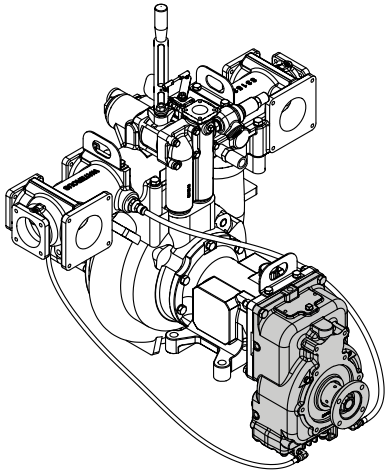
Clockwise Rotation



Counterclockwise Rotation



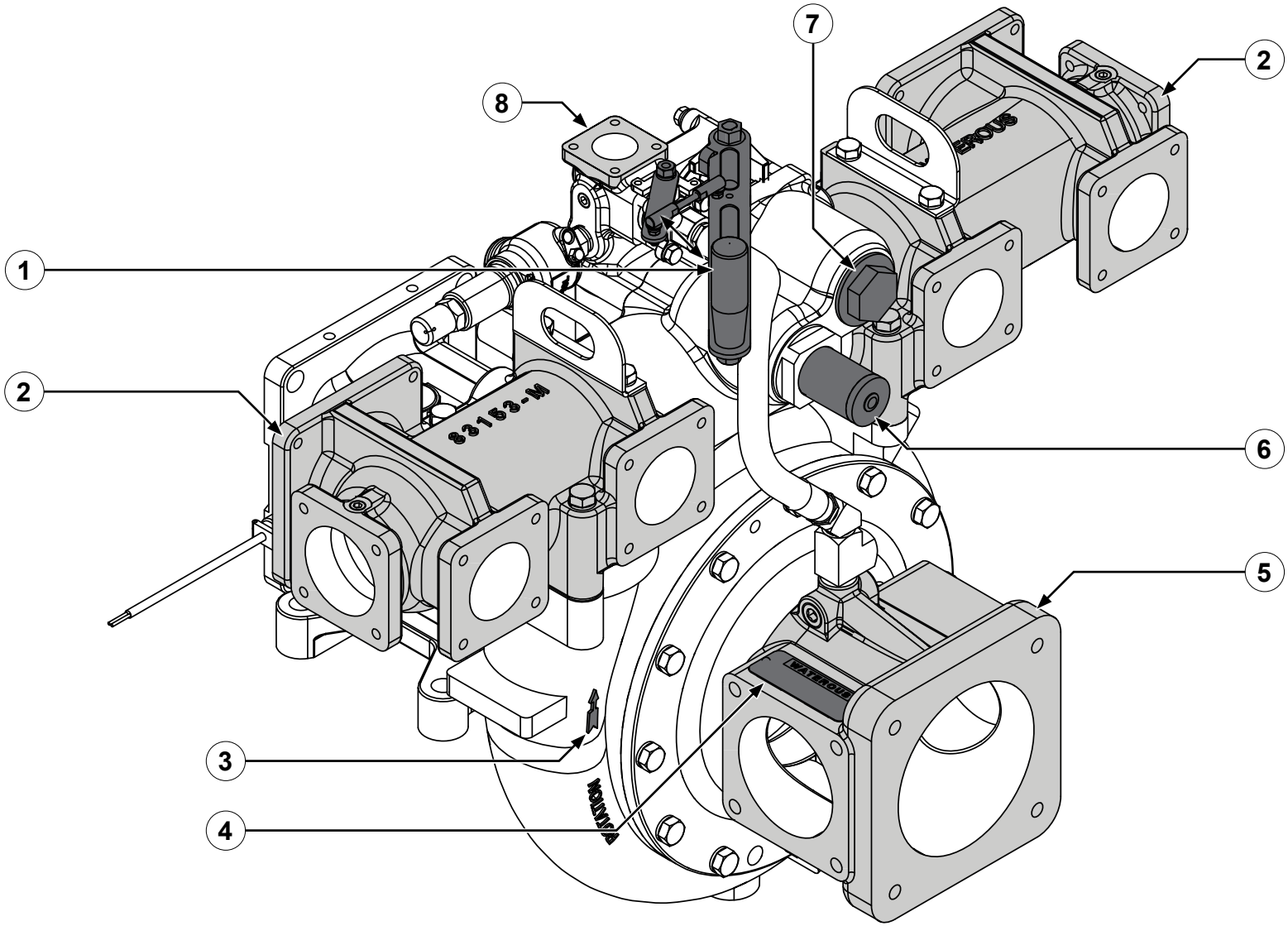
With Direct Drive



With Transmission

Notes

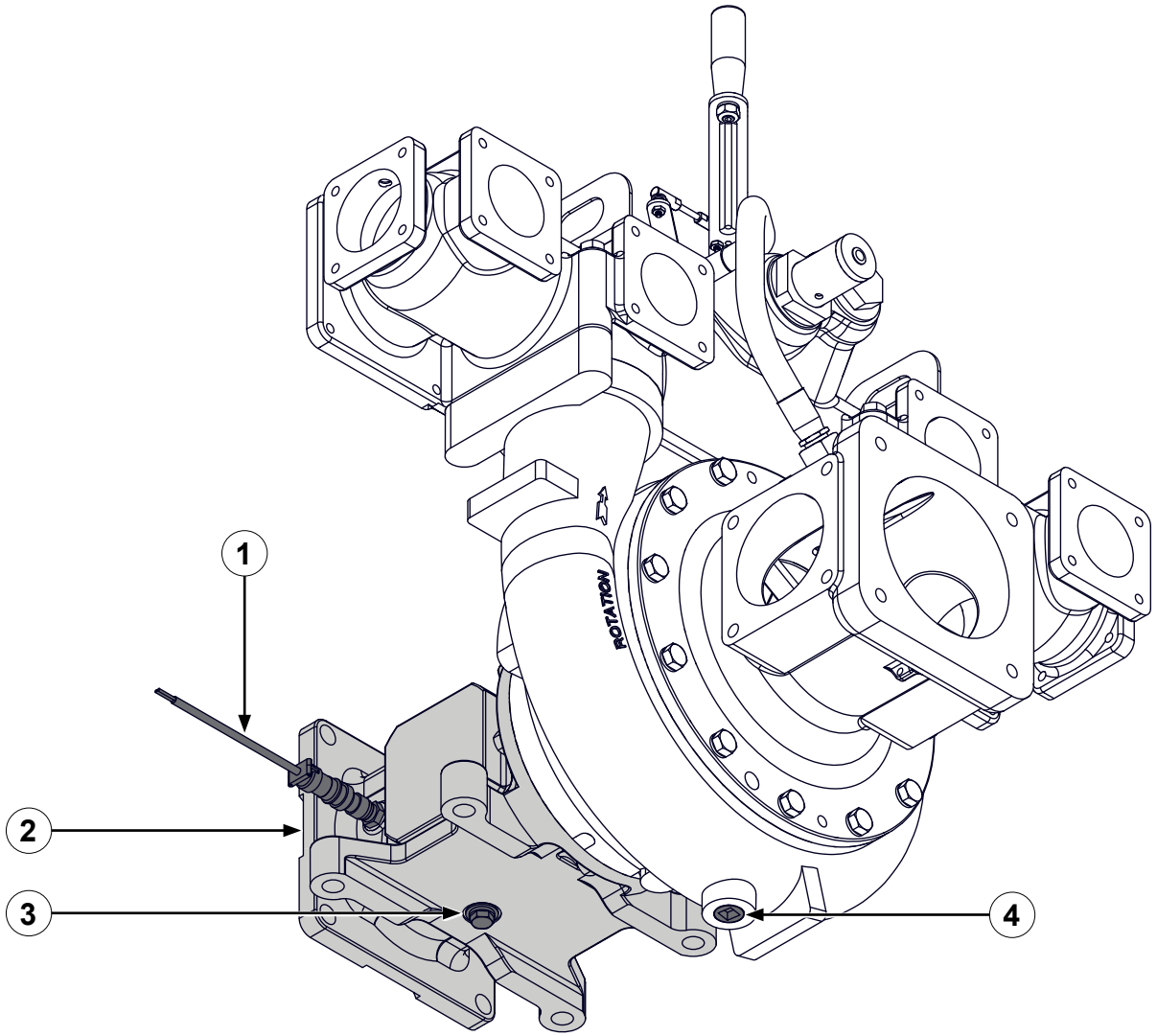
Pump Components—Intake Side



Fire Pump Components—Intake Side

	Feature	Description
1	Crossover-valve handle	This opens and closes the transfer valve that diverts a portion of the incoming water into the high-pressure discharge system.
2	Discharge manifold	This distributes water to the various discharges on the apparatus. The manifold offers 6 outlets for 65 mm adapters, and 2 outlets for 80 mm adapters. You can install a blind flange or 1 to 2-1/2-inch tapped flanges to the outlets. Contact Waterous for more information.
3	Rotation indicator	This indicates the impeller rotation.
4	Serial number plate	This displays the pump serial number.
5	Intake manifold	This is the inlet for the pump. The manifolds offers 1 inlet for 146 mm adapter and 2 inlets for 101 mm adapters.
6	Internal-pressure relief valve	This pressure relief valve opens when a predetermined pressure is reached in the discharge manifold.
7	Intake strainer	This collects debris that would otherwise flow through the system.
8	High-pressure discharge	This is the discharge for the high-pressure line.

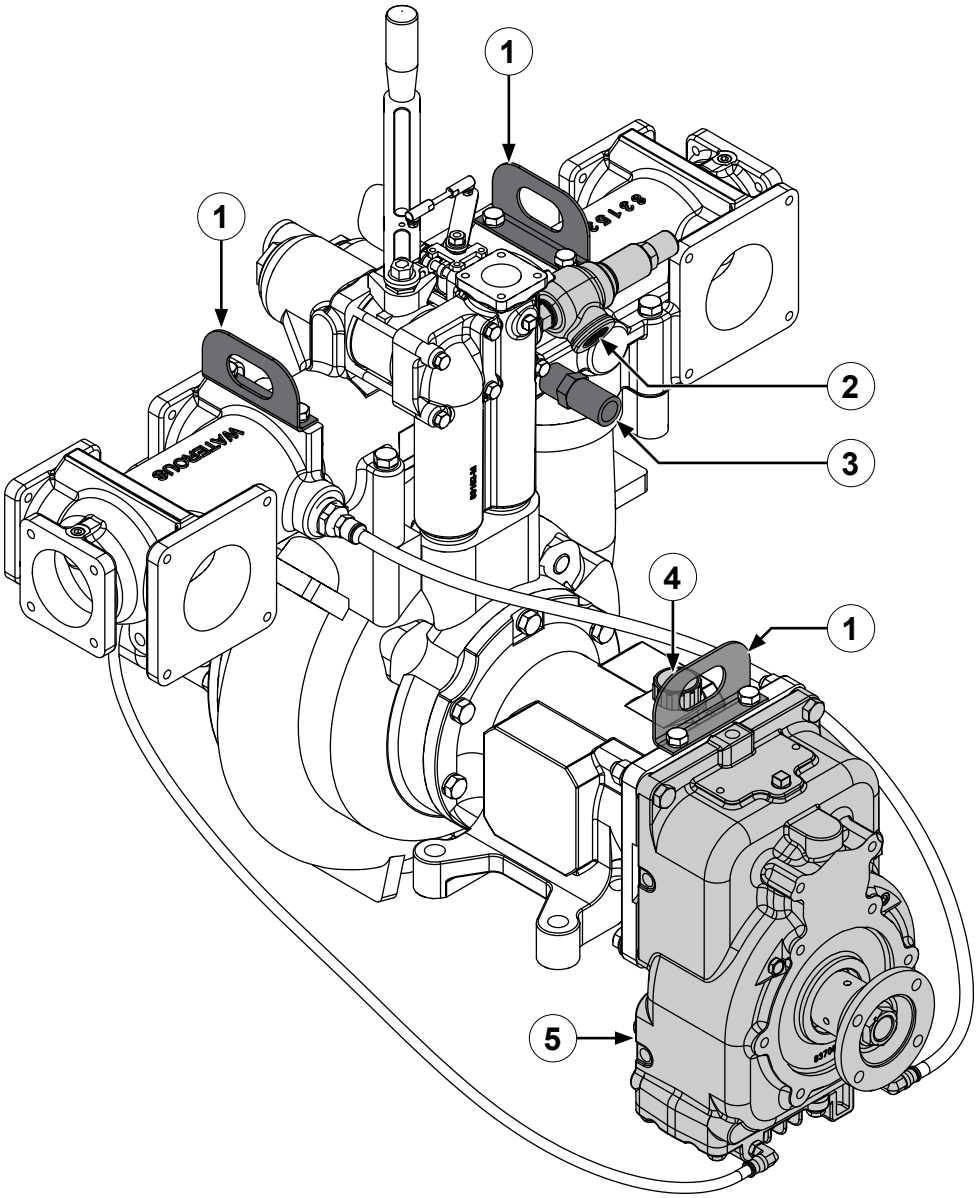
Pump Components—Underside

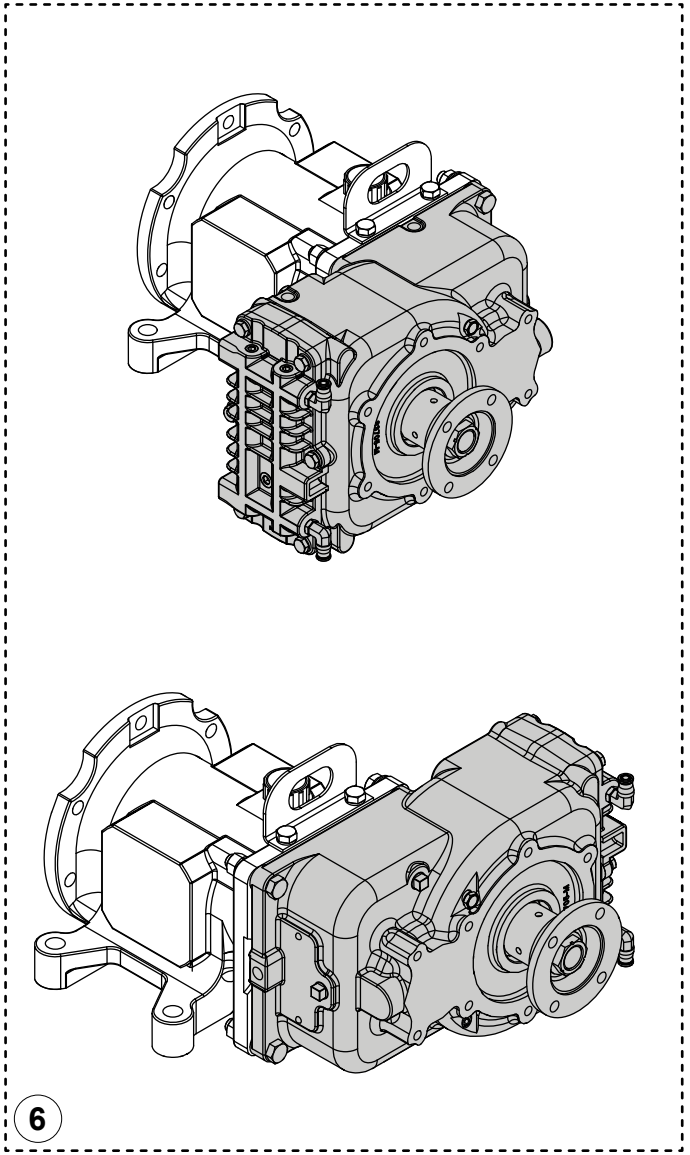


Pump Components—Underside

	Feature	Description
1	Tachometer	This measures the impeller shaft rotational speed.
2	Pedestal	This mounts the pump to the apparatus.
3	Pedestal drain plug	This drains the oil from the pedestal.
4	Pump drain plug	This drains the water from the pump.

Pump Components—Drive Side with Transmission

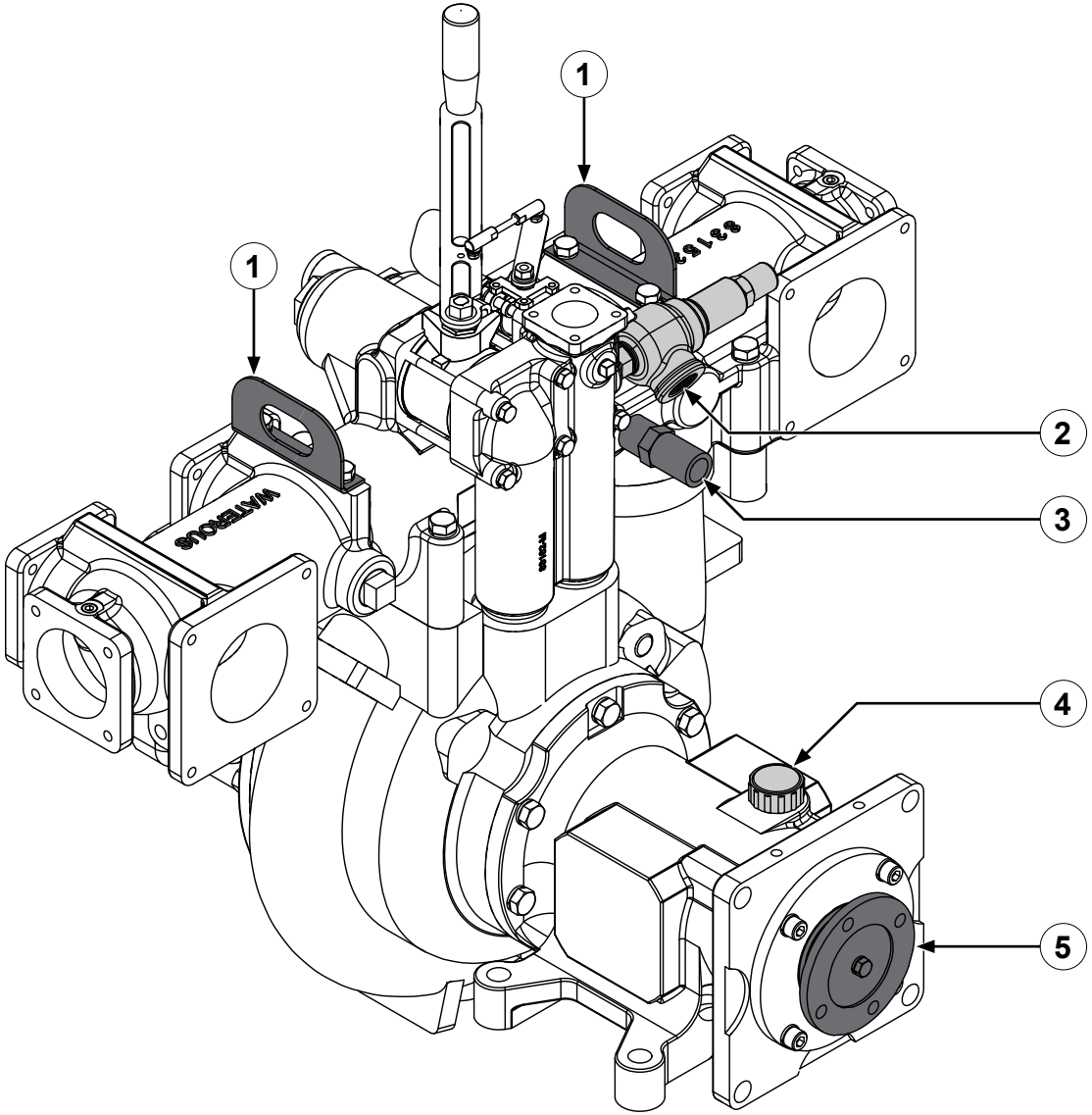




Pump Components—Drive Side with Transmission

	Feature	Description
1	Lift point	This provides access for a lift or hoist to position the pump assembly into the install location.
2	External pressure relief valve	This pressure relief valve is set to open at approximately 650 psi (45 bar) at the factory. When open, the valve flows about 100 gpm (379 l/min), and resets when the pressure reduces to approximately 580 psi (40 bar). Alternatively, you can choose to substitute the external pressure-relief valve with one with the same specifications as the valve supplied by Waterous, or employ a speed-governor system that limits the pump speed to 3450 rpm when the high-pressure discharge is enabled. Contact Waterous for more information. ***Note:*** *The discharge plumbing for the* external *high-pressure relief must be directed away from people to avoid injury and equipment to avoid damage. It is the responsibility of the purchaser to make sure that a high-pressure control system for the high-pressure discharge is installed and operating properly, before the pump is placed into service. Contact Waterous for more information.*
3	Thermal relief valve	This opens when circulating water reaches a predetermined temperature, allowing cooler water to replace it.
4	Oil-fill cap	This is where oil is added to the pedestal.
5	Transmission	This provides an increase in the drive-line speed that is required by some applications.
6	Transmission orientation	This illustrates additional transmission orientations that are required by some applications.

Pump Components—Drive Side with Direct Drive



Pump Components—Drive Side with Direct Drive

	Feature	Description
1	Lift point	This provides access for a lift or hoist to position the pump assembly into the install location.
2	External pressure relief valve	This pressure relief valve is set to open at approximately 650 psi (45 bar) at the factory. When open, the valve flows about 100 gpm (379 l/min), and resets when the pressure reduces to approximately 580 psi (40 bar). Alternatively, you can choose to substitute the external pressure-relief valve with one with the same specifications as the valve supplied by Waterous, or employ a speed-governor system that limits the pump speed to 3450 rpm when the high-pressure discharge is enabled. Contact Waterous for more information. ***Note:*** *The discharge plumbing for the* external *high-pressure relief must be directed away from people to avoid injury and equipment to avoid damage. It is the responsibility of the purchaser to make sure that a high-pressure control system for the high-pressure discharge is installed and operating properly, before the pump is placed into service. Contact Waterous for more information.*
3	Thermal relief valve	This opens when circulating water reaches a predetermined temperature, allowing cooler water to replace it.
4	Oil-fill cap	This is where oil is added to the pedestal.
5	PTO companion flange	This provides a connection for the PTO drive.

Operating Limits

Every application has operating limits. Do not exceed the maximum pressure or speed listed below during operation.

Maximum pressure

- Low pressure mode—250 psi
- High pressure mode—600 psi

Maximum speed

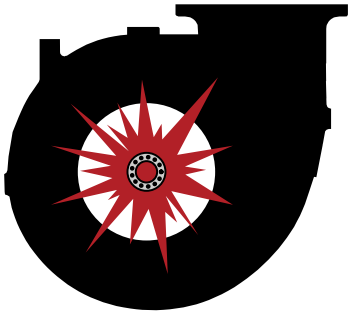
- Low pressure mode—3950 rpm
- High pressure mode—3450 rpm

Operating the pump beyond specified limits causes accelerated wear on components such as seals, bearings, and other parts—this can cause premature component failure.

NOTICE

Premature Failure

- **Premature component failure occurs when operating beyond system specifications.**
- **Do not operate the system beyond specifications.**



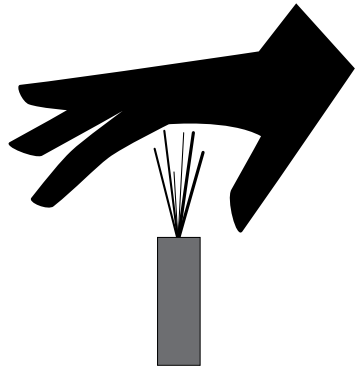
Operating the system beyond the operating limits or system specifications will void your warranty. Contact Waterous for more information.

Operating the pump beyond recommended maximum pressure can causes liquid to eject at high pressure—this can cause injury to the operator and/or bystanders.

WARNING

High Pressure

- **Liquid ejected at high pressure can cause serious injury.**
- **Do not operate beyond recommended pressure.**



Operating the system beyond the operating limits or system specifications will void your warranty. Contact Waterous for more information

Installation Overview

This equipment is intended to be installed by a person or persons with the basic knowledge of installing similar equipment. Contact Waterous with questions about installing the equipment. The installation may require the following tasks and abilities:

- Locating, drilling, and cutting features into the apparatus.
- Welding
- Installing and securing plumbing.
- Routing and securing the wiring.
- Calibration and final testing.

Preparing for the Installation

Use the following guidelines before, during, and after the installation.

- Read and understand all the installation instructions before installing the equipment.
- Prepare a suitable, well-lit area, and gather all the necessary tools before you begin the installation.
- Make sure that you remove any shipping plugs or caps before installing the component.
- Make sure that you bring all fluids to operating levels before using the equipment.

NOTICE

Before Operation

- **Read and understand all the instructions provided.**
- **Check all fluid levels and replenish if necessary.**
- **Remove all shipping plugs and install the operation plugs or caps.**

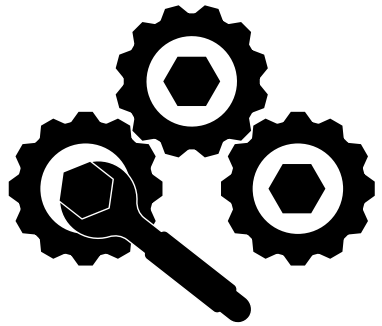
Modifying the Equipment

This equipment is intended to operate as designed. Do not remove, modify, or change the components in the system. Doing so will void the warranty. Contact Waterous for more information.

NOTICE

Modification

- **Modifying the equipment can damage components and void your warranty.**
- **Do not modify the system or any of its components.**



Do not modify the system or any components. Doing so will void your warranty.

Determining the Pump Location

Use the following guidelines to determine a location to install the pump:

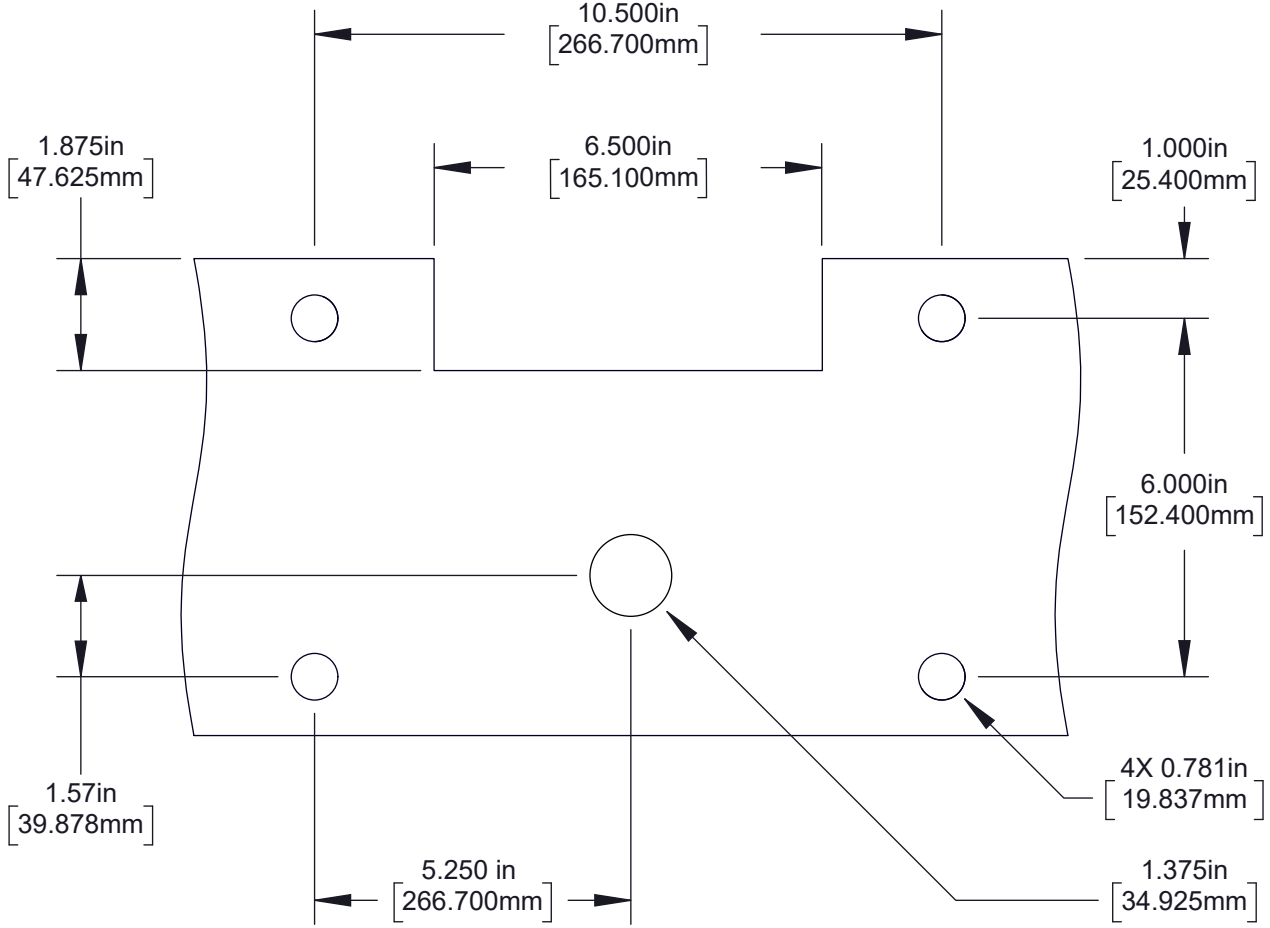
- Consider how the location influences the drive-shaft alignment.
- Consider hose and cable routing.
- Consider accessibility for operation and maintenance.
- Install the pump where it has minimal exposure to excessive dirt, road debris, and heat buildup.

Determining Cable and Wire Routing

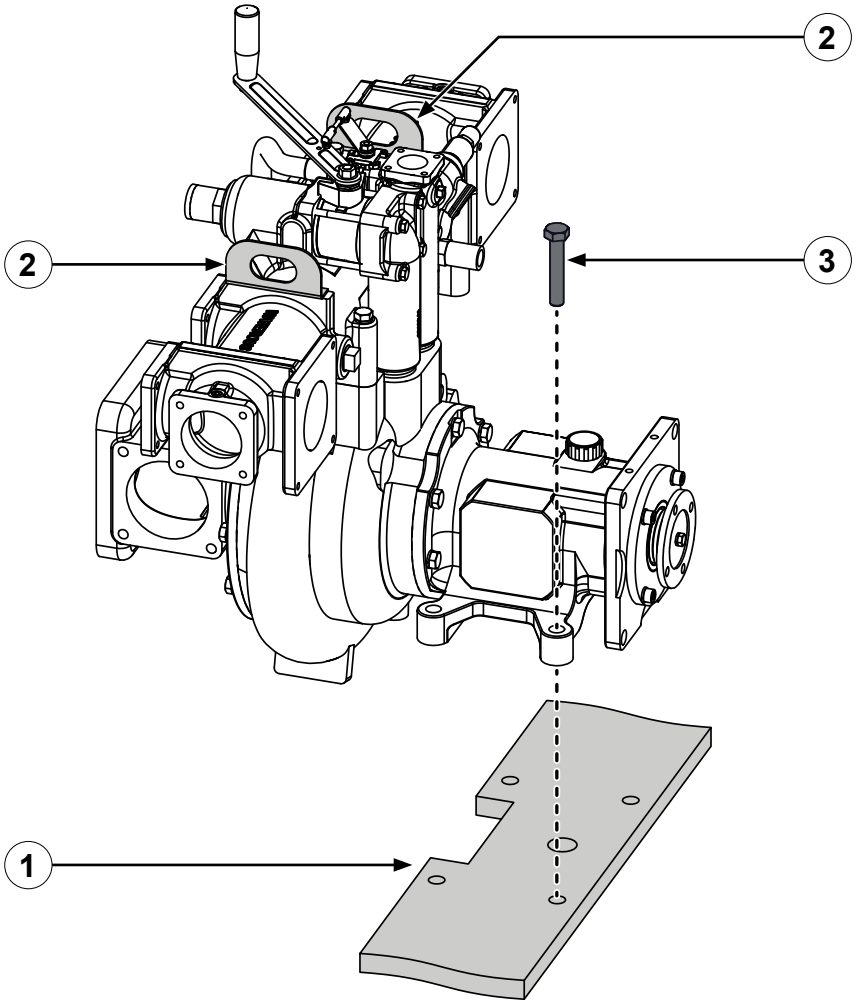
Use the *Wiring Best Practices* document, available at www.waterousco.com, as a guide to select and route wiring for your application.

Mounting Holes and Flange Cutout

Use the illustration to locate and drill the pedestal mounting holes, the pump flange cutout, and drain-plug hole.



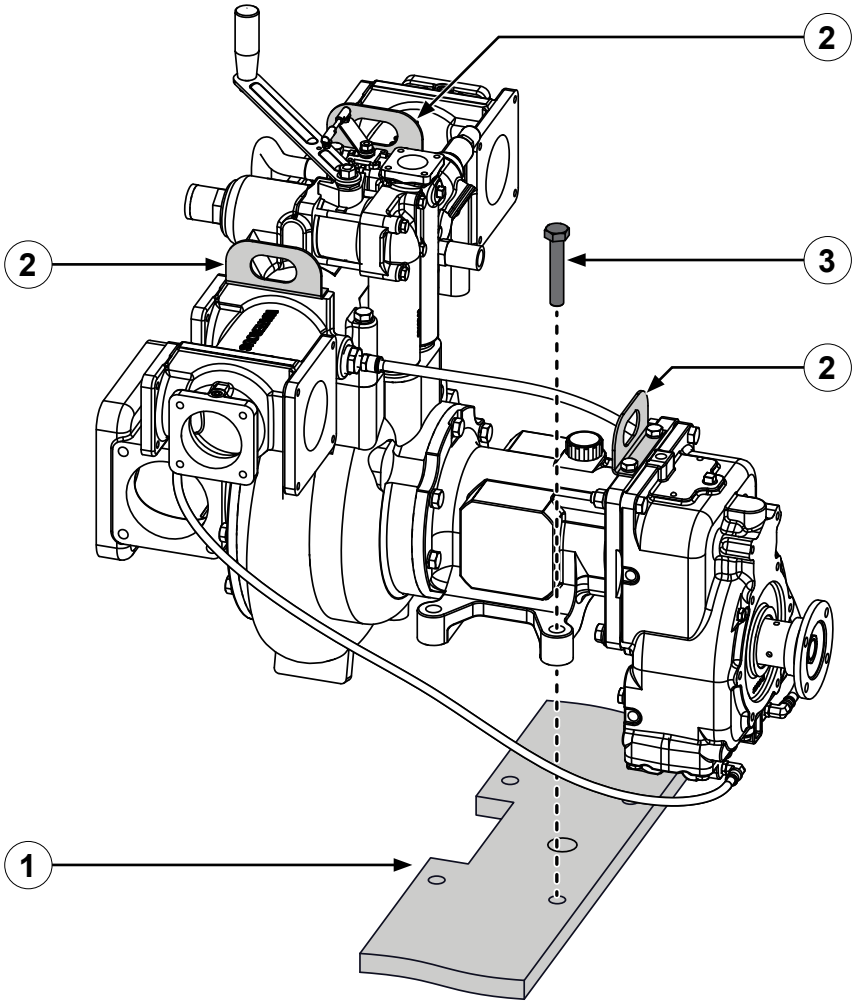
Installing the Pump—Direct-Drive Version



Use the illustration and instructions to install the pump. Locate the pump where you can access the mode handle, and perform regular maintenance. Contact Waterous for more information. The pump location must comply with the drive-shaft requirements. Contact the drive shaft manufacturer for more information.

1. Locate and drill the mounting holes, and cut the flange cutout on the mounting plate. Refer to: **"Mounting Holes and Flange Cutout" on page 20**.
2. Use the lift-points to position the pump assembly into the install location.
3. Locally source the appropriate hardware to securely mount the apparatus.

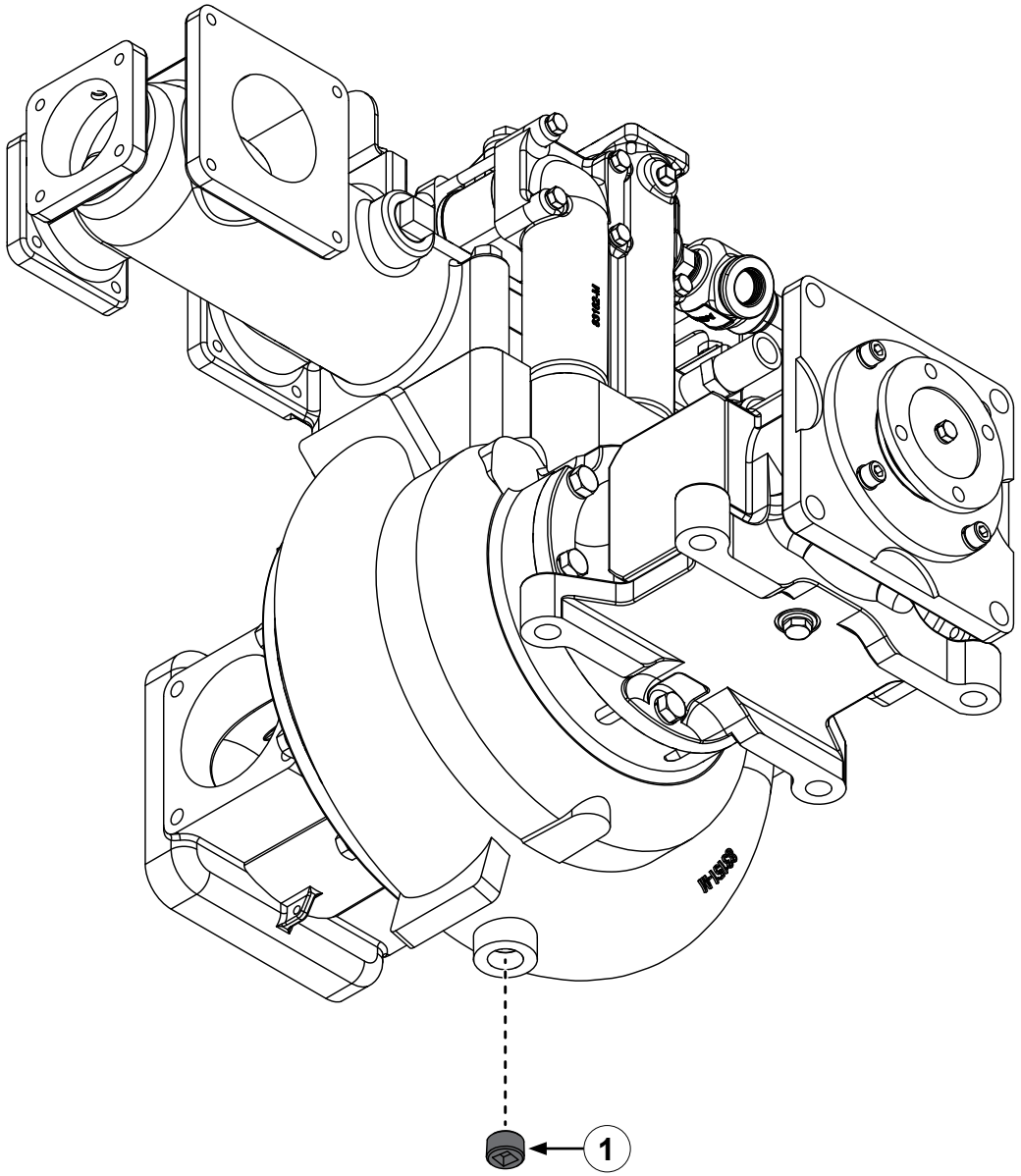
Installing the Pump—Transmission Version



Use the illustration and instructions to install the pump. Locate the pump where you can access the mode handle, and perform regular maintenance. Contact Waterous for more information. The pump location must comply with the drive-shaft requirements. Contact the drive shaft manufacturer for more information.

1. Locate and drill the mounting holes, and cut the flange cutout on the mounting plate. Refer to: **"Mounting Holes and Flange Cutout" on page 20**.
2. Use the lift-points to position the pump assembly into the install location.
3. Locally source the appropriate hardware to securely mount the apparatus.

Installing the Pump Drain Lines

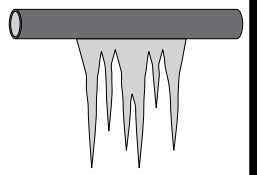


Use the illustration and instructions to install the pump drain lines. All freezable fluids must be drained from the pump to prevent damage.

NOTICE

Freeze Damage

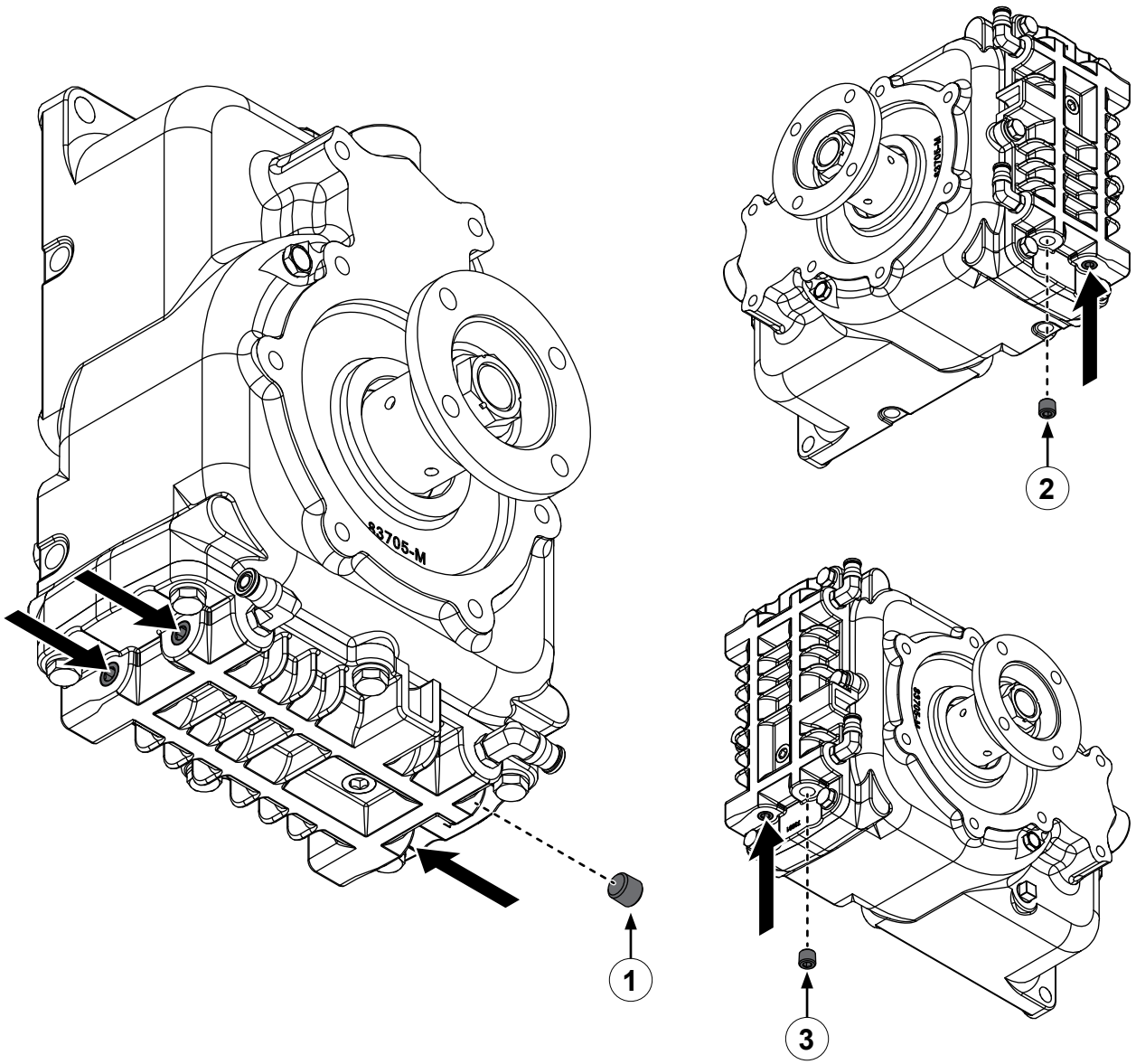
- **Do not allow fluid in the lines to freeze.**
- **Remove all freezable fluid from the lines before storing the apparatus.**



1 Install a drain line to the pump by performing the following:

- Locate the drain port on the volute bottom.
- Remove the drain plug.
- Install the drain line to the pump.

Installing the Transmission Drain Lines

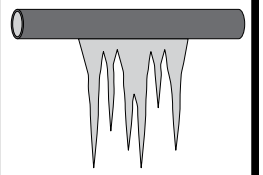


Use the illustration and instructions to install the transmission drain lines. All freezable fluids must be drained from the transmission to prevent damage.

NOTICE

Freeze Damage

- **Do not allow fluid in the lines to freeze.**
- **Remove all freezable fluid from the lines before storing the apparatus.**

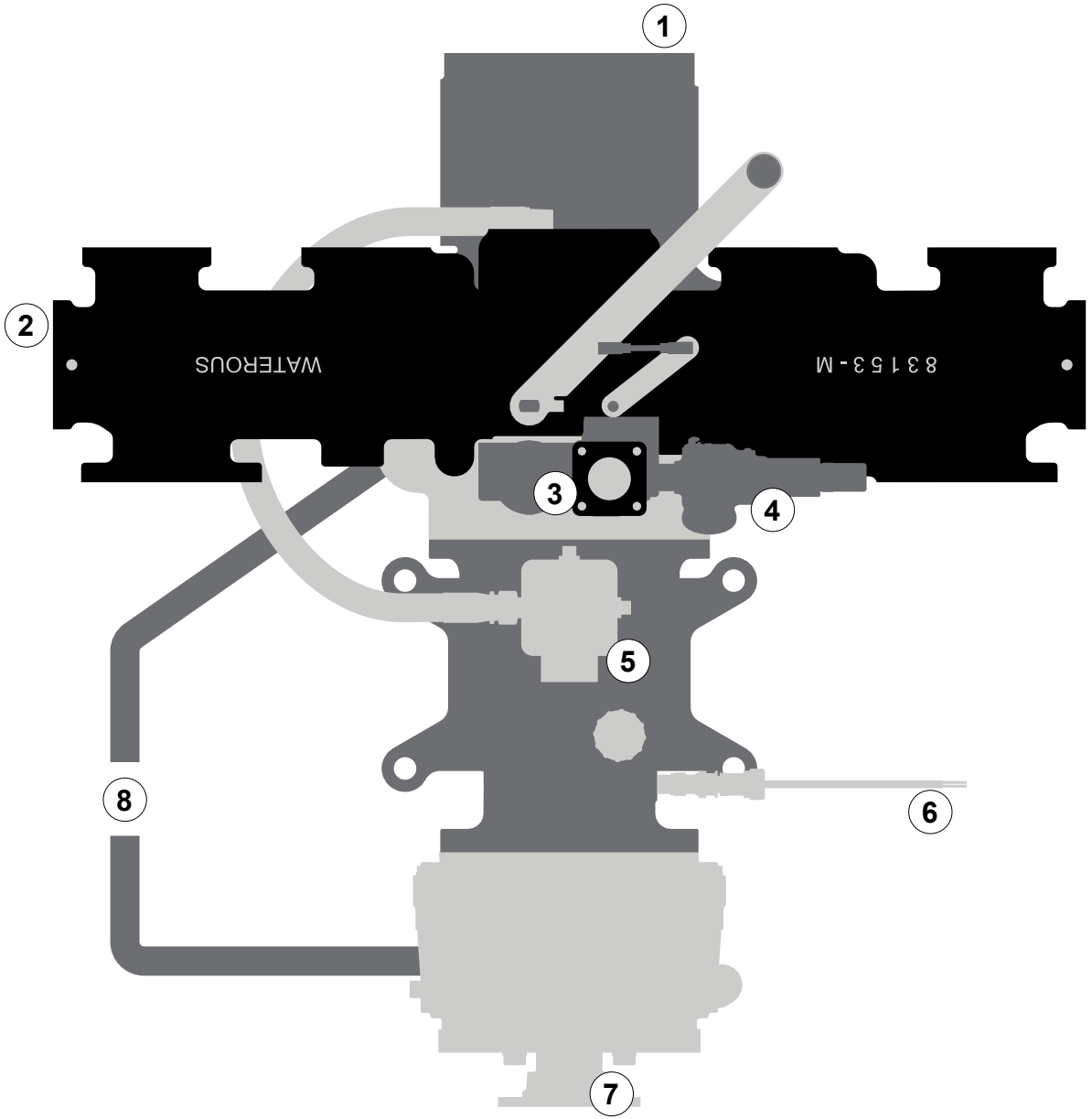


1 For applications with a vertically mounted transmission perform the following:
- Locate the 4 drain ports on the case bottom.
- Remove the appropriate drain plug.
- Install the drain line to the transmission.

2 For applications with a right-mount transmission perform the following:
- Locate the 2 drain ports on the case bottom.
- Remove the appropriate drain plug.
- Install the drain line to the transmission.

3 For applications with a left-mounted transmission perform the following:
- Locate the 2 drain ports on the case bottom.
- Remove the appropriate drain plug.
- Install the drain line to the transmission.

Connecting the Pump



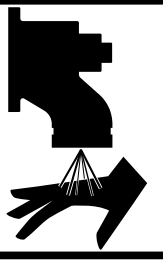
Use the illustration and instructions to connect the various pump components to the apparatus.

1. Connect the pump intake to a water source.
2. Connect the appropriate outlets on the manifold to the discharges on the apparatus.
3. Connect the high-pressure outlet to the high-pressure discharge on the apparatus.
4. Connect and plumb the external high-pressure relief valve.

⚠ WARNING

High Pressure

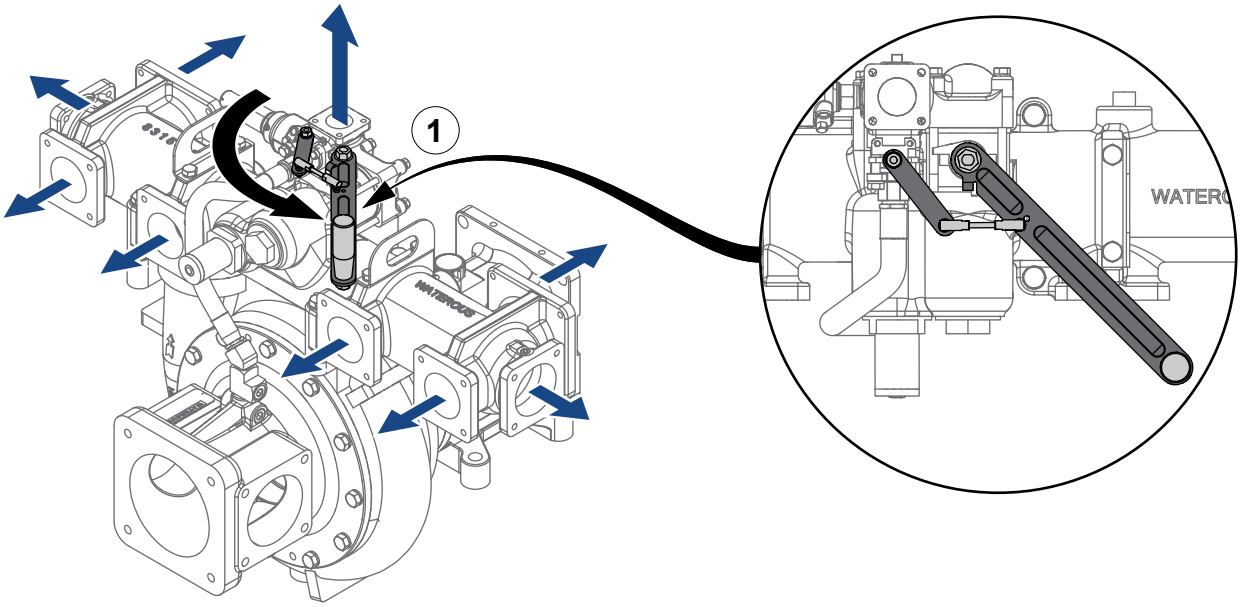
- **Discharge ejected at high pressure can cause serious injury and damage.**
- **Direct discharge away from people and equipment.**

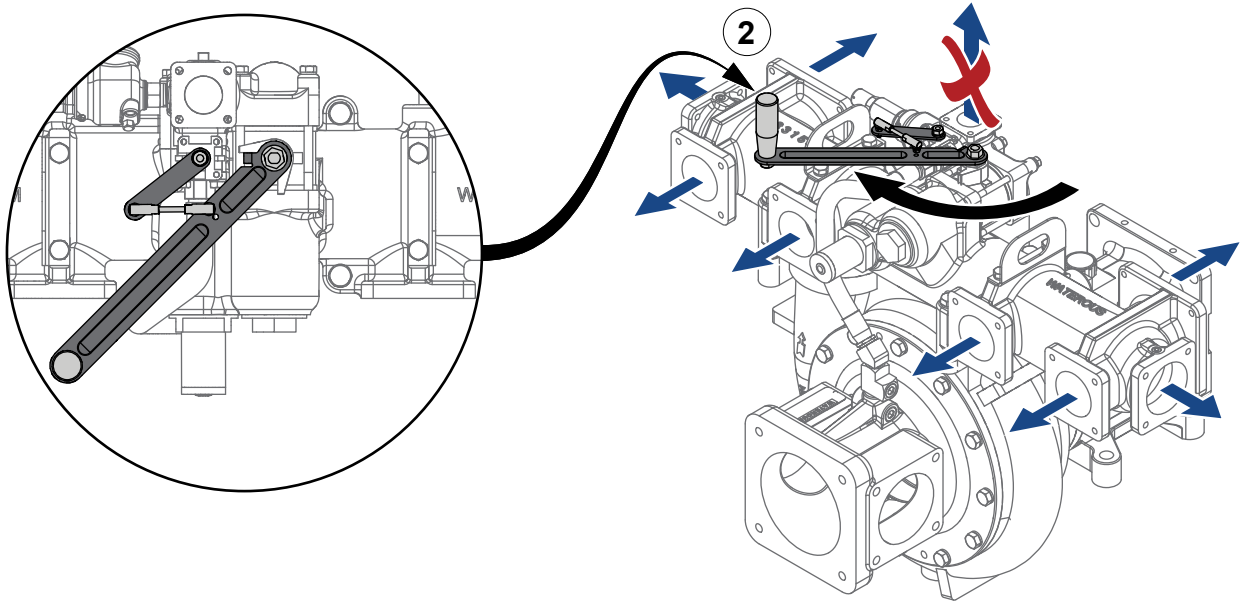


Note: *The discharge plumbing for the* external *high-pressure relief must be directed away from people to avoid injury, and equipment to avoid damage. It is the responsibility of the purchaser to make sure that a high-pressure control system for the high-pressure discharge is installed and operating properly, before the pump is placed into service. Contact Waterous for more information.*

5. Connect the priming system—if equipped.
6. Connect the speed sensor to the appropriate electronics.
7. Connect the drive to the transmission.
8. Install the drain lines.

Enabling the High-Pressure Discharge





Use the illustrations and instructions to enable the high-pressure discharge.

Note: *Make sure that the pump speed is below 3450 rpm before you engage the high-pressure discharge to avoid activating the external pressure relief valve or the speed governor system.*

1. Position the cross-over valve handle to the right to enable the high-pressure discharge.
2. Position the cross-over valve handle to the left to disable the high-pressure discharge.

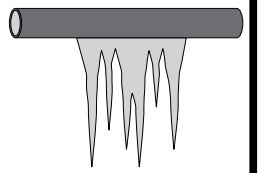
After operation, follow established procedures that include:

- Do not store the pump partially full. Completely fill, or drain, the pump before storage.
- Always drain the pump when freezing can occur.

NOTICE

Freeze Damage

- **Do not allow fluid in the lines to freeze.**
- **Remove all freezable fluid from the lines before storing the apparatus.**



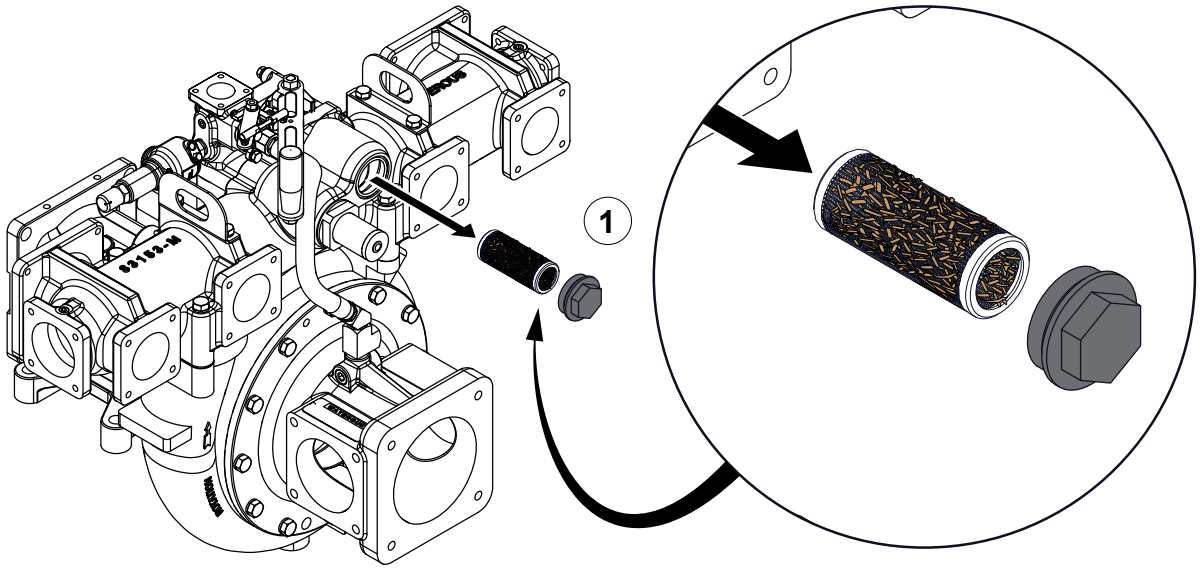
- Disable the pump drive when placing the apparatus into storage.

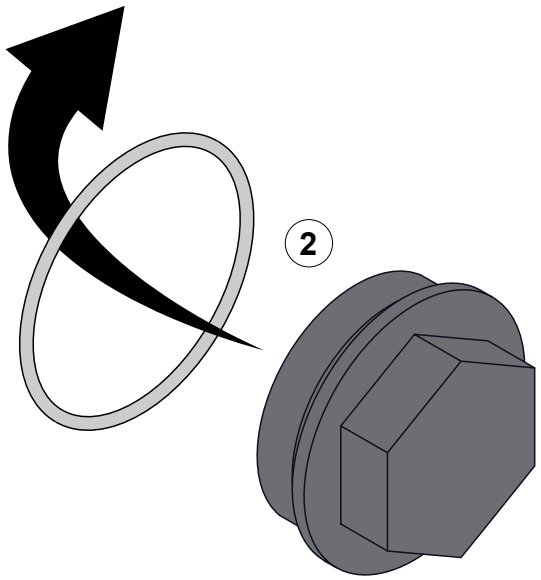
Maintenance Schedule

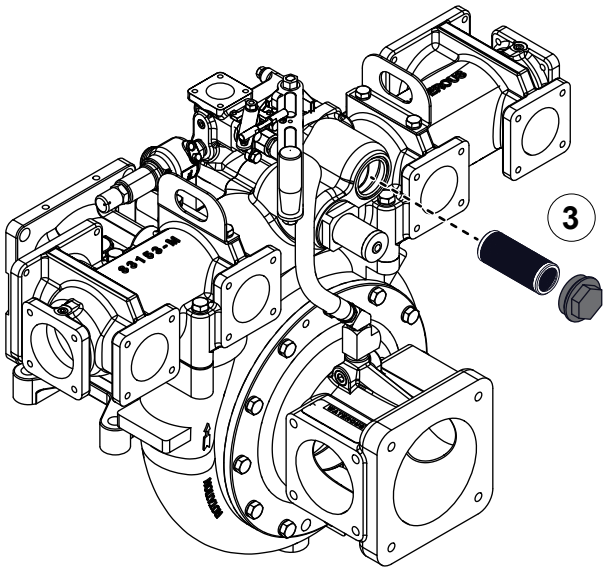
Perform the following procedures at the recommended intervals at a minimum. Environmental conditions determine the maintenance intervals. Inspect the components frequently, and create a maintenance schedule suitable to your application and environmental conditions. Replace wear components with equivalent components. Contact Waterous for more information.

Operation	Before Initial Operation	Weekly	Monthly	12 Months	Comment
Clean the intake strainer		X			More or less often as determined by usage, and the water quality used. Replace strainer cover O-ring—1-7/8 x 2-1/8 inches.
Check the pedestal oil level	X		X		
Change the pedestal oil				X	SAE 10W-30—standard or synthetic oil is acceptable
Inspect the mounting hardware				X	

Cleaning the Intake Strainer







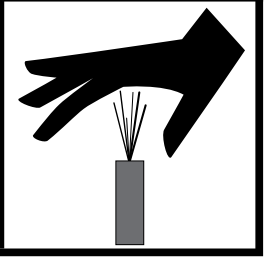
Use the illustrations and instructions to clean the intake strainer.

Note: *Make sure that you purge all pressure before continuing.*

⚠ WARNING

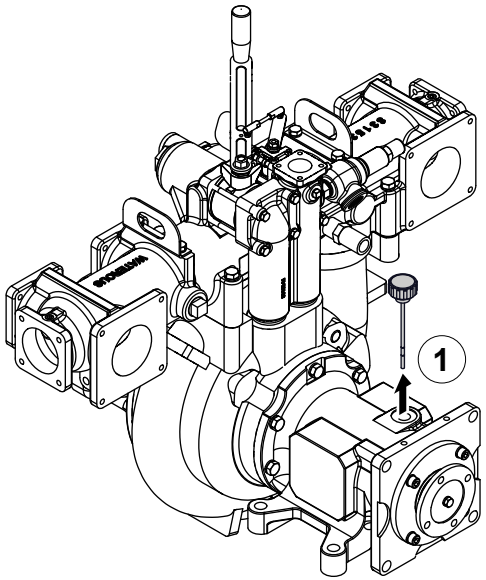
High Pressure

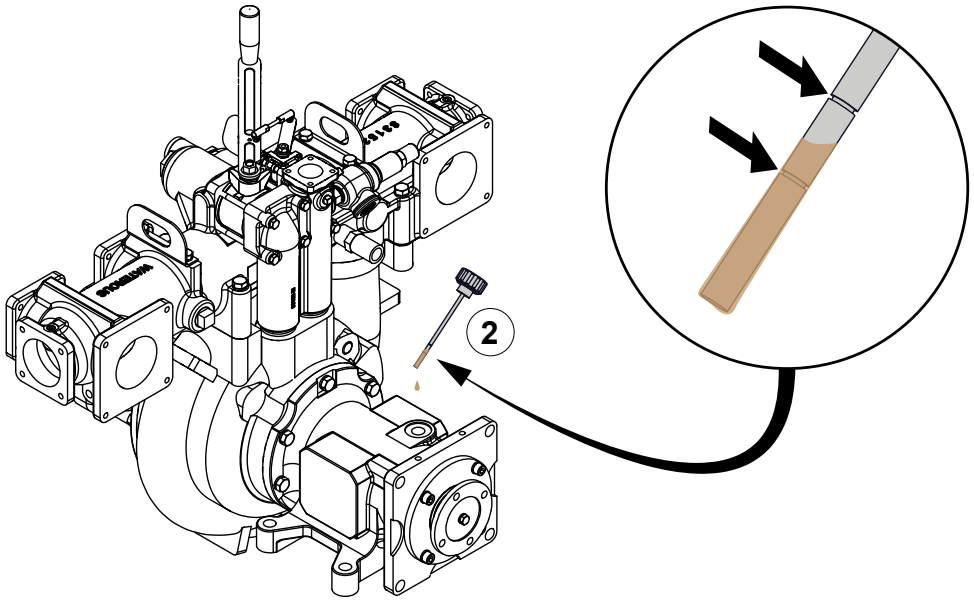
- **Liquid ejected at high pressure can cause serious injury.**
- **Purge all pressure before servicing.**



1. Remove the strainer cover and the strainer.
2. Remove and replace the strainer cover O-ring with an equivalent—1-7/8 x 2-1/8 inches. Contact Waterous for more information.
3. Install the strainer and securely install the strainer cover.

Checking the Pedestal Oil Level



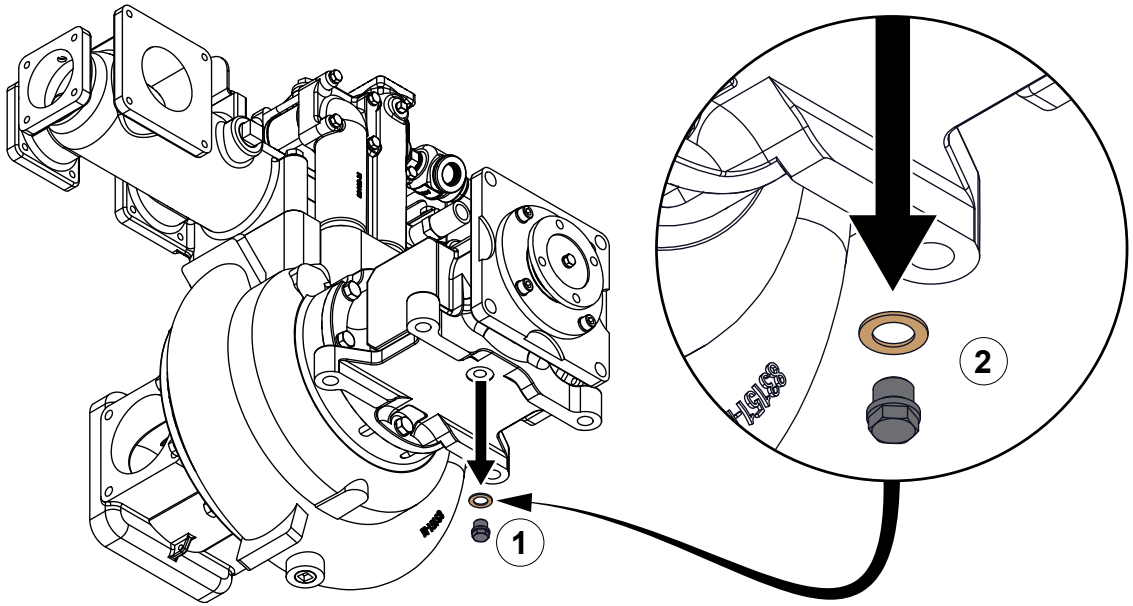


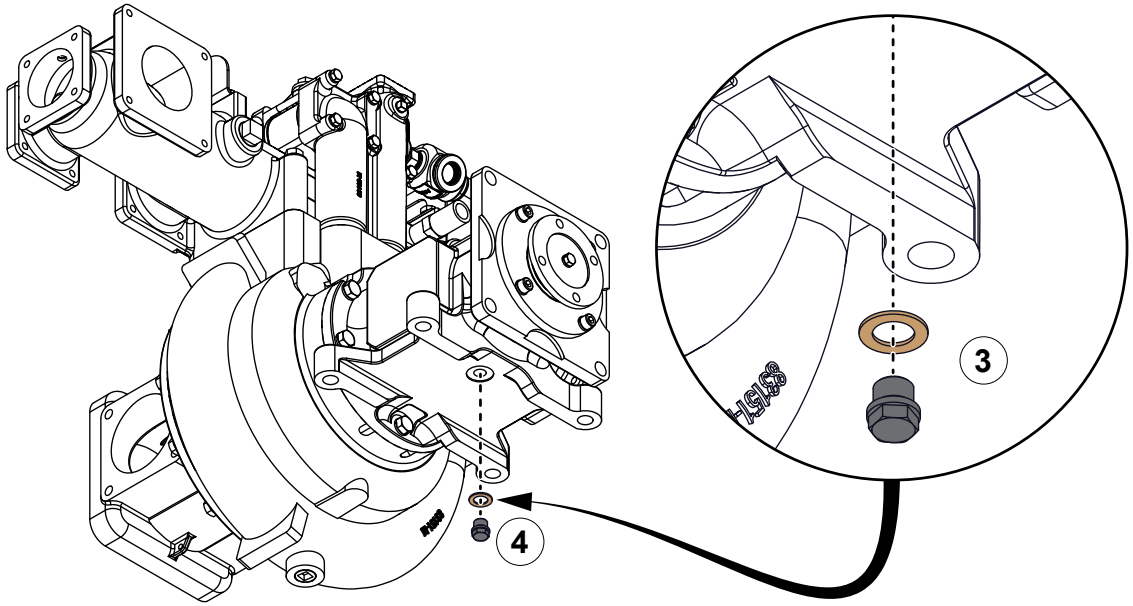
Use the illustrations and instructions to check the pedestal-oil level.

1. Remove the oil-fill cap containing the dipstick.
2. Inspect where the oil falls on the dipstick. The oil should fall between the grooves on the dipstick. Add oil to the pedestal if the oil level is low. Refer to: **"Adding the Pedestal Oil" on page 31**.

   Note: *You may need to clean the dipstick before checking the oil level to obtain an accurate reading.*

Draining the Pedestal Oil

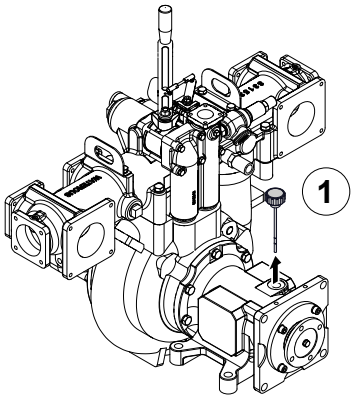


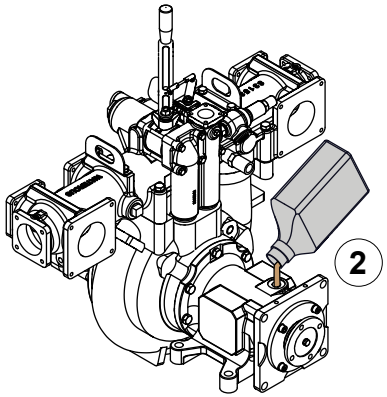


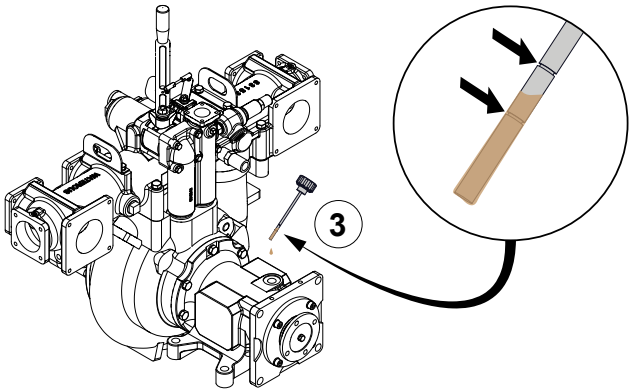
Use the illustrations and instructions to drain the pedestal oil.

1. Perform the following to drain the pedestal oil:
   - Place a suitable container under the pedestal to collect the oil.
   - Locate the drain plug and copper washer on the bottom of the pedestal.
   - Remove the drain plug and copper washer.
2. Continue the process by performing the following:
   - Set aside the drain plug.
   - Set aside the copper washer.
   - Completely drain the pedestal oil.
3. Inspect the copper washer for damage, and replace it if necessary. Only replace the washer with its equivalent. Contact Waterous for more information.
4. Perform the following to complete the procedure:
   - Locate the drain plug that you set aside, and the copper washer.
   - Securely install the drain plug and copper washer to the pedestal.
   - Dispose of the oil in accordance with local regulations.

Adding the Pedestal Oil







Use the illustrations and instructions to add the pedestal oil. Use 1 qt (0.95 L), SAE 10W-30, standard or synthetic.

1. Remove the oil-fill cap from the pedestal.
2. Add oil to the pedestal.
3. Check the oil level. Refer to: **"Checking the Pedestal Oil Level" on page 29**. Install the oil-fill cap when the oil is within specification.

WATEROUS

Waterous Company
125 Hardman Avenue South
South Saint Paul, MN 55075
(651) 450-5000
www.waterousco.com