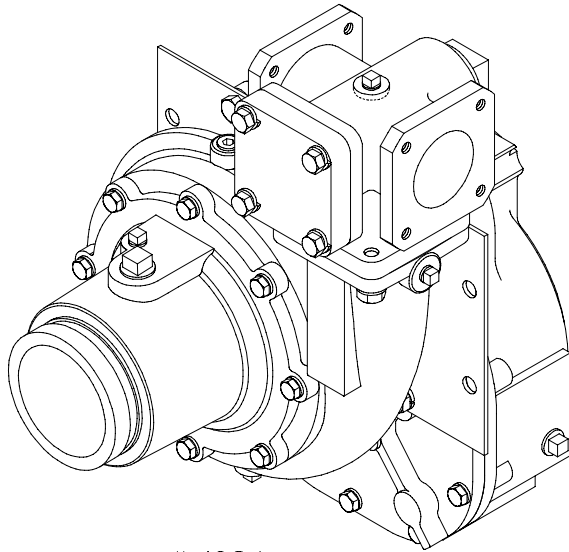


CL Series Centrifugal Fire Pumps

Installation Instructions

Form No.	Section	Issue Date	Rev. Date
F-1031	3020	12/08/03	03/06/12



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Read through the safety information and operating instructions carefully before using your Waterous Fire Pump.

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Safety Information



Read through and communicate safety information to the end user of this Waterous Fire Pump.

WARNING

Death or serious personal injury might occur if proper operating procedures are not followed. The pump operator, as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with pump operating instructions as well as other operating instructions and manuals for the apparatus, water hydraulics and component limitation.

WARNING

Pressure Hazard. May result in personal injury.

Prior to connection or removal of hoses, caps or other closures with pump intake or pump discharge connections, relieve pressure by opening drains or bleeder valves. Bleeder valves should also be used while filling a hose connected to an intake with water.

WARNING

Scalding Water Hazard. May result in serious burns.

When operating the pump, be sure to open at least one discharge valve slightly to prevent the pump from overheating. If the pump runs for a few minutes completely closed, it may heat the water enough to scald someone when the valve is opened. Overheating can damage the packing, seals and other pump parts. If the apparatus builder has installed a by-pass system or other provision designed to prevent overheating, opening a discharge valve may be unnecessary.

Introduction

This instruction covers the installation of a Waterous CL Series fire pump. The CL is rated at 500 gpm. Table 1 shows the three different CL models available.

Table 1. CL Models

Model	Descriptions
CLR	Intake: 4 in. NH or BSP thread Discharge: Head with 2-1/2 in. flanges, 3 in. NPT tapped flange, 3 in. Victaulic [®] or blank (without head or tapped flange or Victaulic [®] fitting)
CLV	Intake: 4 in. Victaulic [®] Discharge: Head with 2-1/2 in. flanges, 3 in. NPT tapped flange, 3 in. Victaulic [®] or blank (without head or tapped flange or Victaulic [®] fitting)
CLD	Direct drive with automatic piston primers. Intake: 4 in. or 4-1/2 in. flanged or threaded Discharge: 3 in NPT tapped flange or blank

The CLR and CLV pumps are available with the following transmissions:

- ❑ K Series - The K transmission is a gear driven transmission designed primarily to be driven by a power take-off or power divider. (see Figure 1).
- ❑ T Series - The T transmission is a gear driven transmission designed to be mounted directly to the engine bell housing. This provides a clean, compact arrangement and allows for complete pump and roll capability. (See Figure 3).
- ❑ PA Series - The PA transmission is an aluminum chain drive transmission designed to be driven off the ten-bolt power take-off (PTO) provision available on the left side of the Allison MD or HD automatic transmission. (See Figure 5).

The following installation instructions are available:

- ❑ Priming System, F-1031, Section 3006
- ❑ Manifold Drain Valves, F-1031, Section 3008
- ❑ Pressure Control System, F-1031, Section 3010
- ❑ Separately Mounted Foam Manager Manifold, F-1031, Section 3012
- ❑ Overheat Protection Manager, F-1031, Section 3015

Before proceeding with the installation of the CL, read the instructions carefully. Check the appropriate dimensional drawings in the Engineering Manual as needed.

Pump Mounting - General Information

Select a mounting location which will make the pump and its accessories readily accessible for maintenance.

Table 2 gives maximum universal joint angles for installations where propeller shaft flanges are parallel and yokes are aligned. Refer to this table when positioning a pump to determine proper shaft angles. Be sure to keep at least a minimum of 1° U-joint operating angle, but do not exceed those specified in the table. This is the preferred method of propeller shaft installation. For additional information on this method, or for alternative methods, see driveshaft installation guidelines such as Spicer[®]/Driveshaft Installation Techniques, J- 3311.

Table 2. Maximum U-joint Operating Angles

Driveshaft RPM	Maximum Operating Angle
5000	3.2°
4500	3.7°
4000	4.2°
3500	5.0°
3000	5.8°
2500	7.0°
2000	8.7°
1500	11.5°

CAUTION

Be sure the propeller shafts used are of the slip-joint design. Frame deflection, temperature changes and similar factors may cause a propeller shaft without slip-joints to produce severe axial loads on the bearings and damage the pump.

NOTE: The angles shown in Table 2 are the maximum recommended U-joint operating angles and are directly related to the speed of the driveshaft. Any U-joint operating angle greater than 3° will lower the U-joint life and may cause vibration¹.

¹From Spicer[®] Driveshaft Installation Techniques, Form J-3311 dated 5/94.

Pump Mounting - CLK Series

Figure 1 shows the mounting areas on a CLK pump. To mount the pump/transmission to the vehicle chassis, construct a bracket that will span the frame rails of the vehicle and attach to the transmission mounting holes (several locations are provided).

NOTE: Before installation, make sure your pump has the right rotation as compared to the driveshaft rotation (see dimensional drawings for correct rotation configurations).

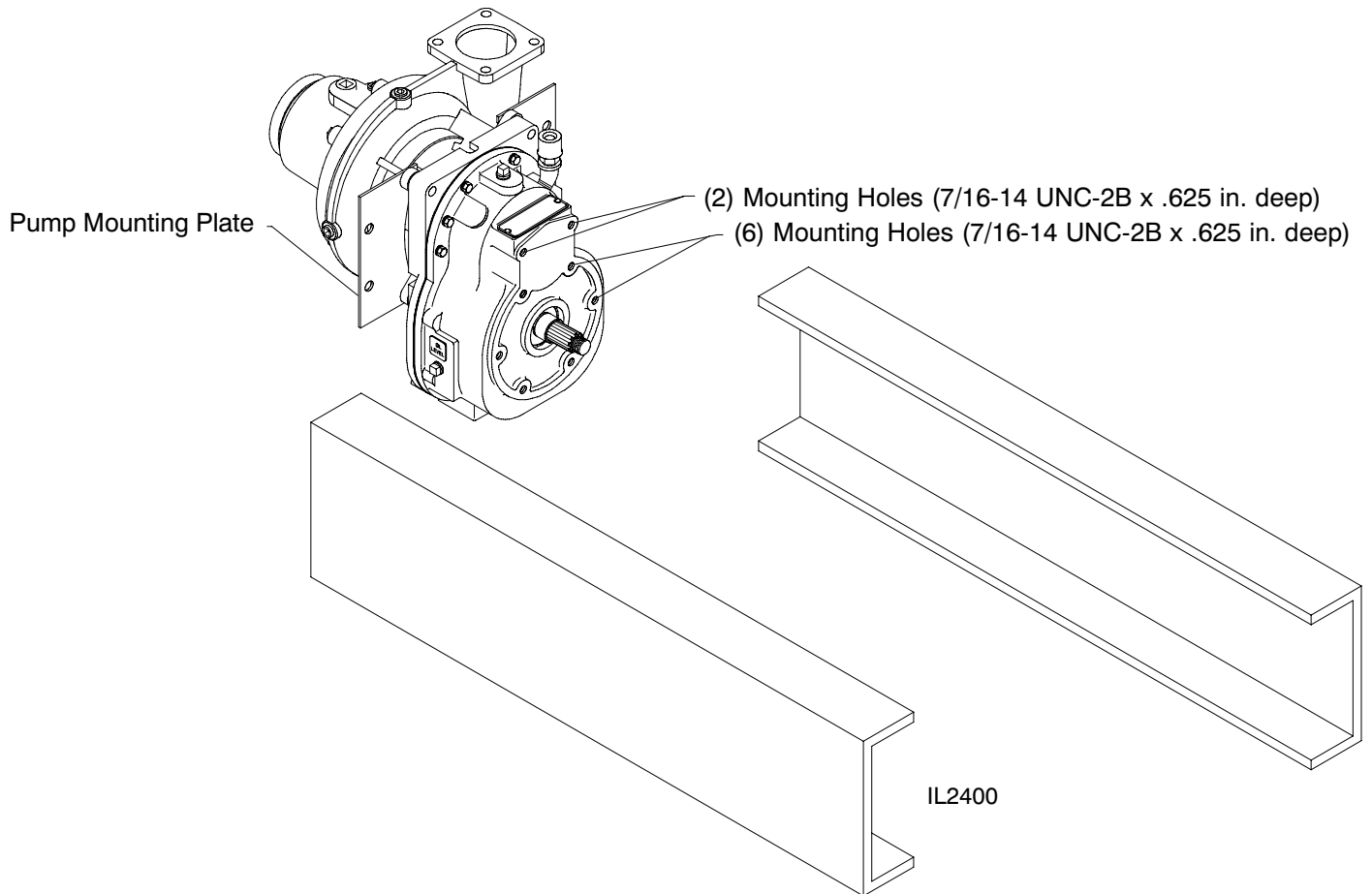
Position the pump/transmission within the vehicle frame rails and secure the brackets (not supplied) to the vehicle frame.

Support the pump by constructing brackets (not supplied by Waterous) and mount them to the the mounting plates located on either side of the pump.

NOTE: Tighten the mounting screws to standard torque specifications.

Finally, provide adequate support for any intake and discharge piping assemblies.

Figure 1. CLK Mounting Diagram

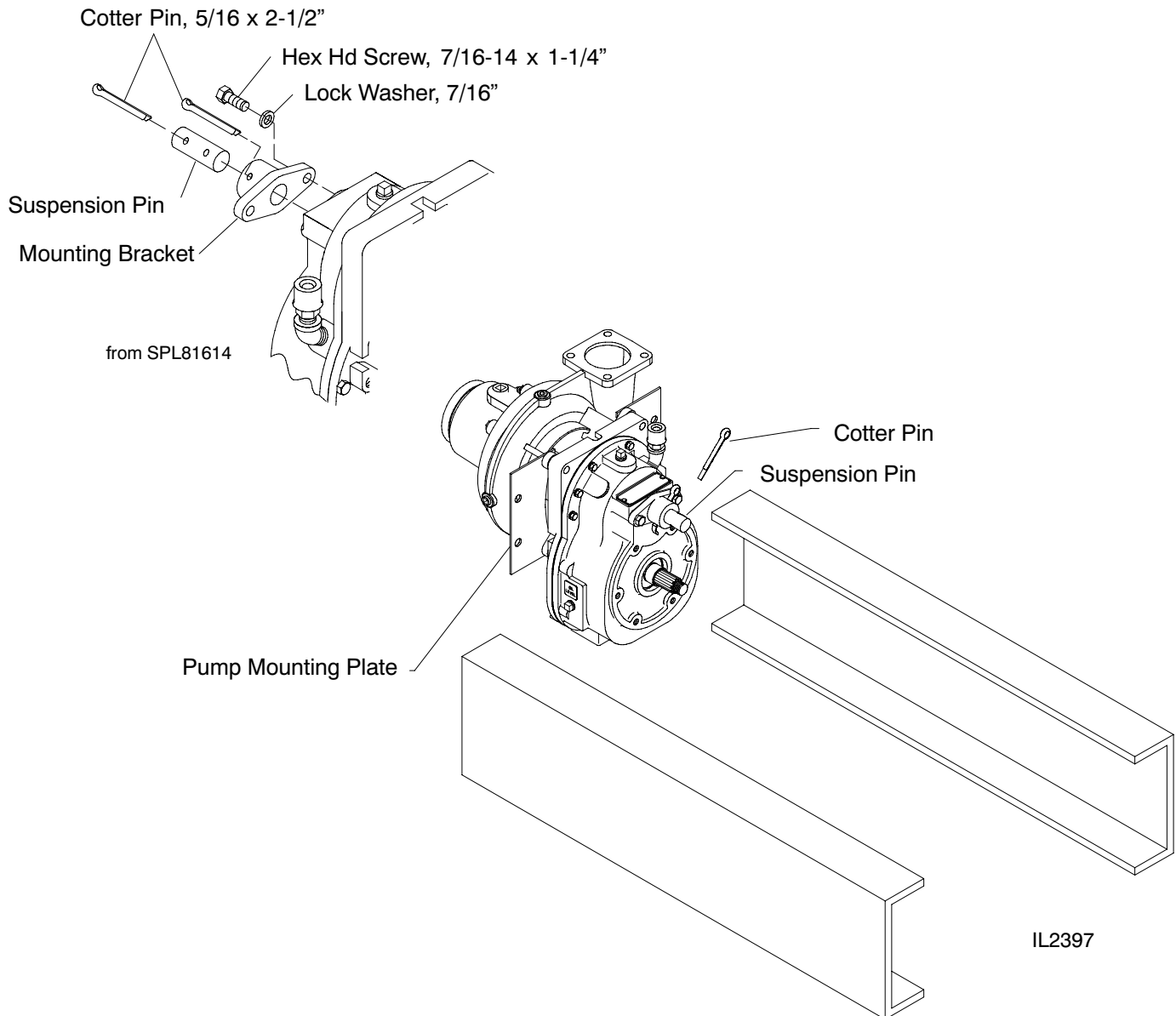


Optional Suspension Pin Mounting Kit (K520)

An optional mounting technique on the CLK pump is the Suspension Pin Mounting Kit. The kit consists of a bracket, two 7/16" screws, two lock washers, two cotter pins and the suspension pin. To mount the transmission using this kit, follow the instructions below:

1. Mount the bracket to the transmission using the top two mounting holes. Secure the bracket with the two 7/16" screws and lock washers.
2. Insert the suspension pin into the bracket.
3. Line up the hole in the bracket with the hole in the suspension pin and insert a cotter pin.
4. Construct a bracket that will span the vehicle's chassis. Cut out a hole in the bracket that will allow the suspension pin to pass through.
5. Install the bracket on the suspension pin and hold in place by inserting a cotter pin through the hole on the suspension pin.
6. Support the pump by constructing brackets (not supplied by Waterous) and mount them to the the mounting plates located on either side of the pump.

Figure 2. Suspension Pin Mounting



Pump Mounting - CLT Series

Figure 3 shows the CLT pump. The CLT is a direct-engine mounted pump. The bellhousing attaches to the vehicles fly-wheel housing.

NOTE: Before installation, make sure your pump has the right rotation as compared to the driveshaft rotation (see dimensional drawings for correct rotation configurations).

To install the CLT pump, perform the following:

1. Provide for an input shaft support bearing.

NOTE: Input shaft support bearing is not supplied by Waterous.

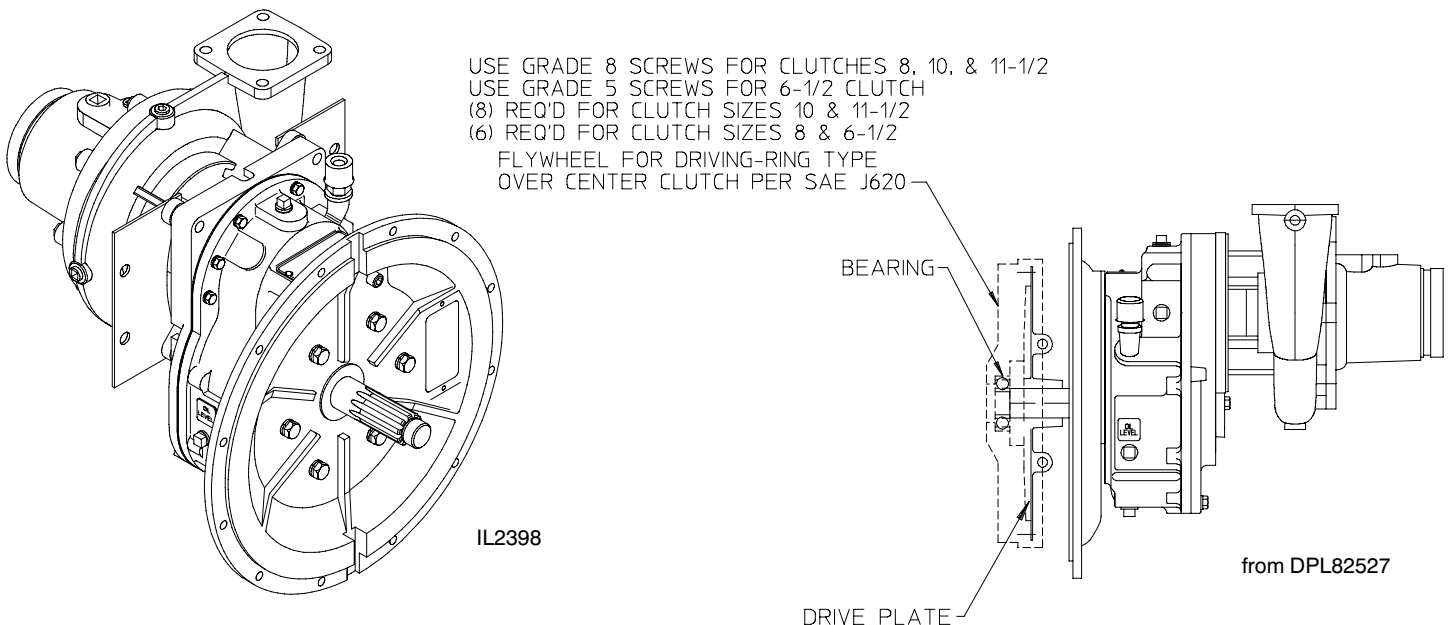
2. Install the drive plate assembly according to the manufacturer's instructions

NOTE: Drive plate may be purchased as an option from Waterous or from another manufacturer.

3. With a suitable hoist, guide the pump drive shaft into the drive plate and pilot bearing. Align screws holes in the pump mounting flange with those in the flywheel housing. Install the twelve (12) screws and tighten securely.
4. Finally, provide adequate support for any intake and discharge piping assemblies.

NOTE: Tighten the mounting screws to standard torque specifications.

Figure 3. CLT Mounting Diagram



Pump Mounting - CLD Series

Figure 4 shows the mounting areas on a CLD pump. To mount the pump to the vehicle chassis, construct a bracket that will span the frame rails of the vehicle and attach to the bearing housing mounting holes (four locations are provided).

NOTE: Before installation, make sure your pump has the right rotation as compared to the driveshaft rotation (see dimensional drawings for correct rotation configurations).

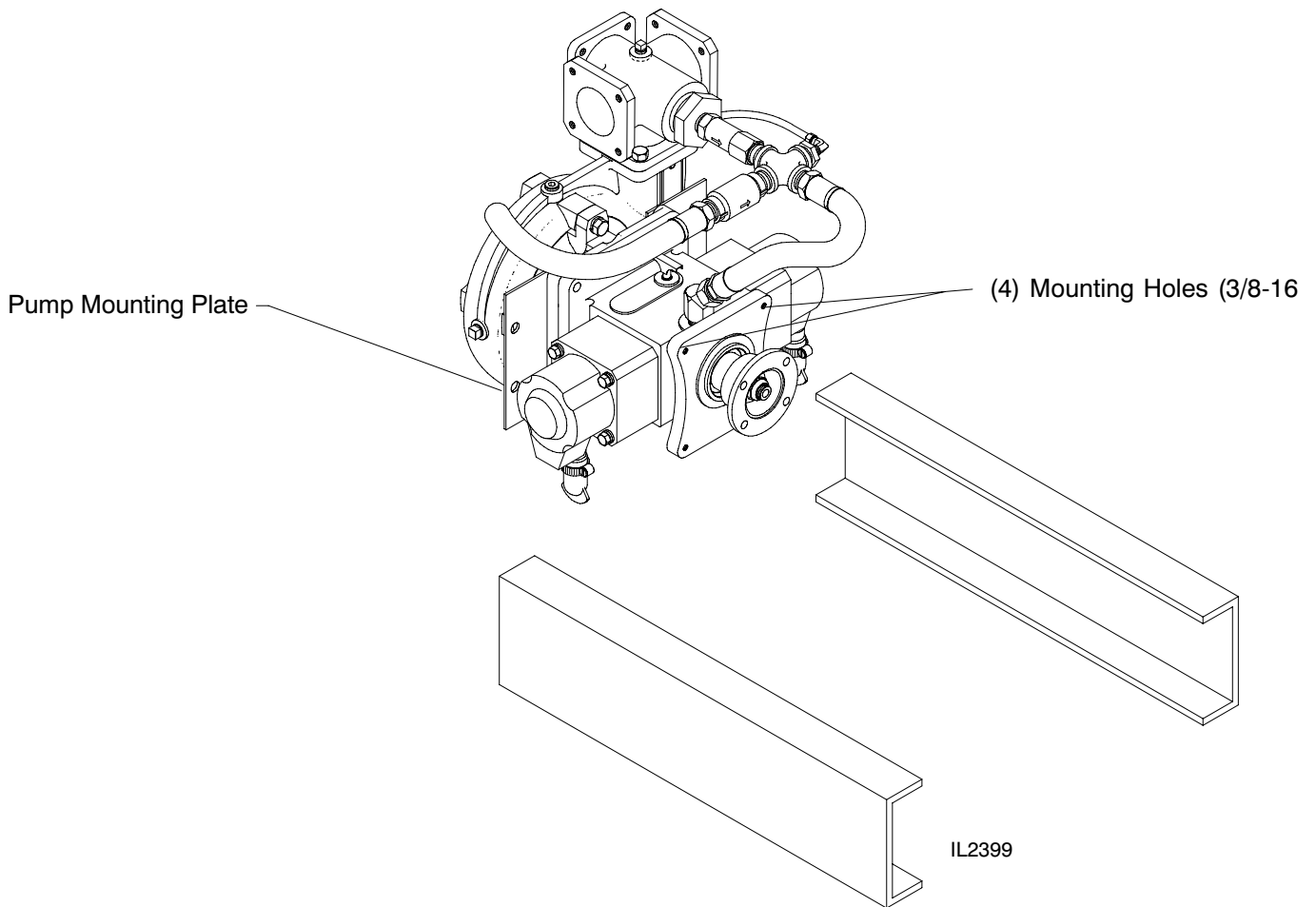
Position the pump within the vehicle frame rails and secure the brackets to the vehicle frame.

Figure 4. CLD Mounting Diagram

Support the pump by constructing brackets (not supplied by Waterous) and mount them to the the mounting plates located on either side of the pump.

NOTE: Tighten the mounting screws to standard torque specifications.

Finally, provide adequate support for any intake and discharge piping assemblies.



Pump Mounting - CLPA Series

Figure 5 shows the mounting areas on a CLPA pump. To mount the pump/transmission to the vehicle chassis, fashion a bracket that will span the frame rails of the vehicle and attach to the transmission mounting holes.

Position the pump/transmission within the vehicle frame rails, blocking temporarily to provide correct shaft angularity. With the pump/transmission in the correct position, secure the brackets (not supplied) to the vehicle.

Support the pump by fashioning a bracket (not supplied by Waterous) and mount it to the intake side of the pump using the existing intake mounting screw holes.

NOTE: You will need to remove one or more intake mounting screws from the intake side of the pump and replace them with longer screws to compensate for the thickness of the bracket.

NOTE: Tighten the mounting screws to standard torque specifications.

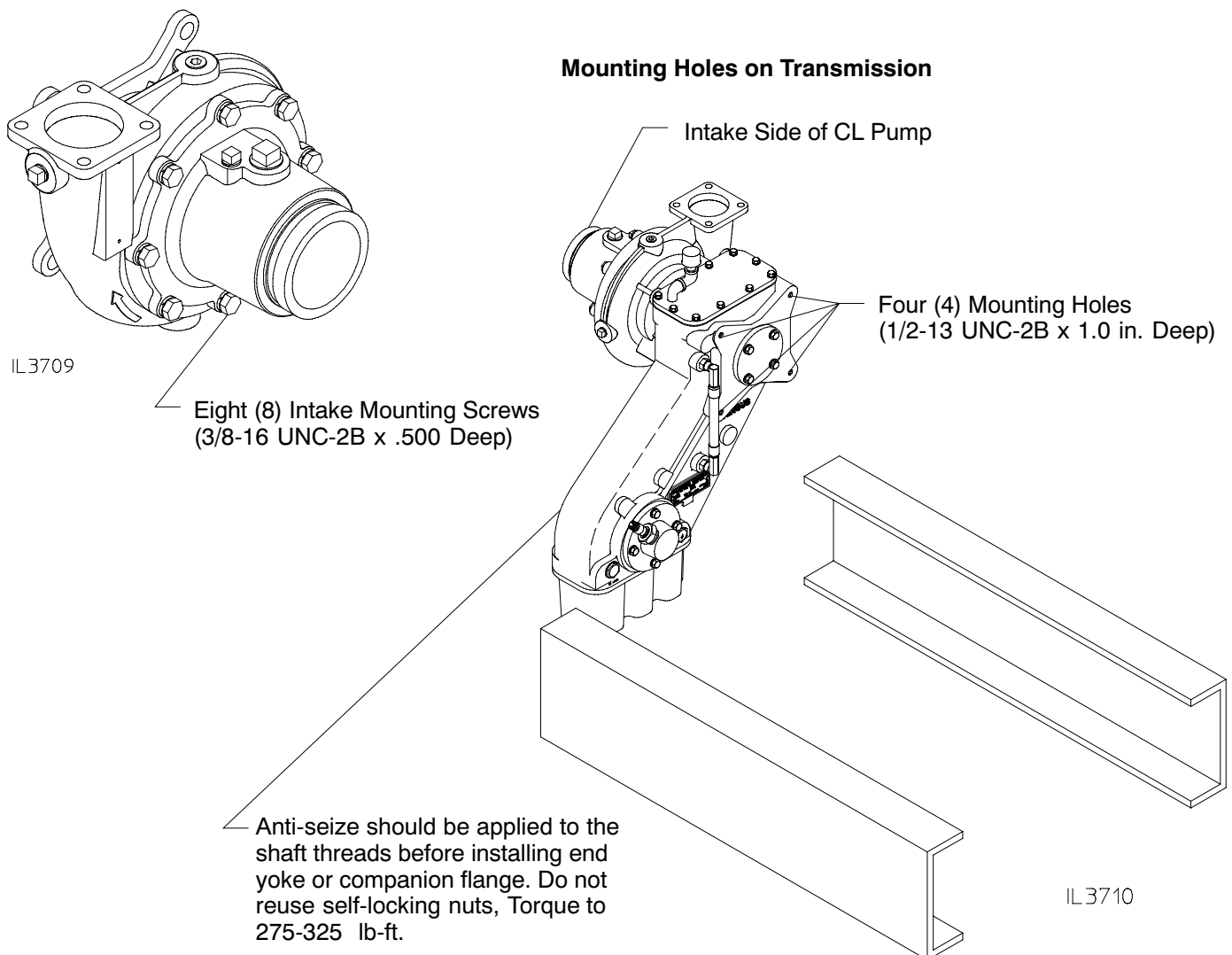
Finally, provide adequate support for any intake and discharge piping assemblies.

Figure 5. CLPA Mounting Diagram

Mounting Holes on Pump Intake

Remove the screw(s) and install bracket (not supplied by Waterous). Tighten bracket to the intake of the pump using 3/8 in. screw(s).

Note: Use longer 3/8 in. screws to secure the bracket to the pump than were originally supplied with the pump to compensate for the thickness of the bracket.



Installation of Foam Manager™

If the fire pump is supplied with a Foam Manager™ (500 or 1000 GPM) the foam manifold and FoamPro® foam proportioner are shipped loose from the factory. Refer to the *FoamPro® Installation and Operation Manual* (P/N L-0825) for controller wiring and foam concentrate inlet plumbing instructions.

Optional Corrosion Protection

Zinc Intake Screens

Waterous offers zinc intake screens that fit 4, 4-1/2, 5 and 6 inch intake fitting sizes. The screen is designed to fit in the counter bore in the inside diameter of the fittings. There must be a strong electrical contact between the screen and the intake fitting. Remove any corrosion, debris or paint from the counter bore that will insulate the screen from the intake fitting. If the screen does not fit tightly, adjust the gap of the slot on the outside diameter of the screen to ensure a tight fit.

NOTE: Zinc intake screens are die-cast which results in a slight taper from one side to the other. Install the screen with the thinner cross-section facing out to minimize flow restriction.

Figure 6. Zinc Intake Screen

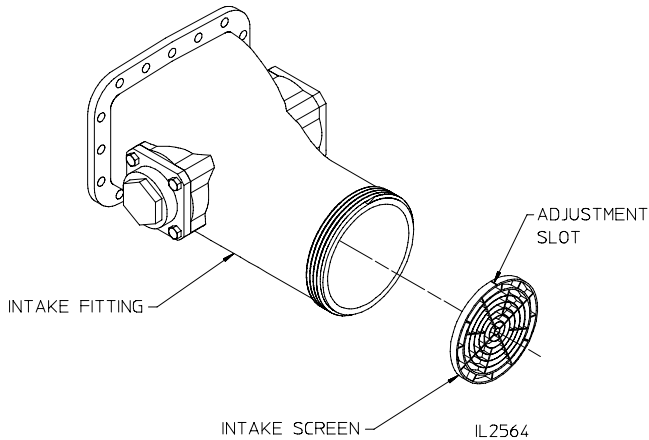


Figure 7. Zinc Anodes - Pads Machined with 2-1/2 in, 4-bolt Mounting Pattern

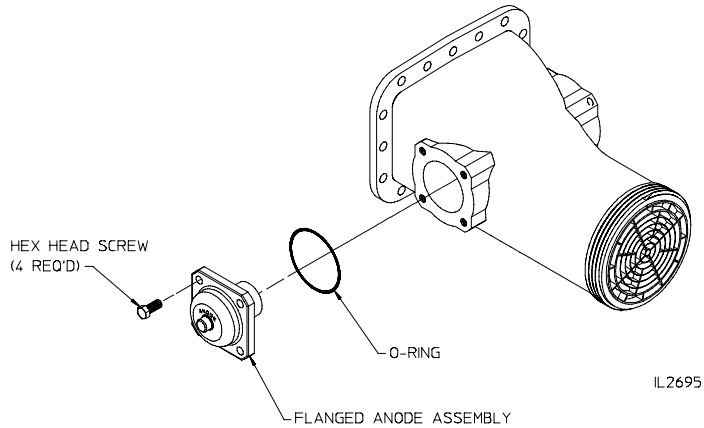
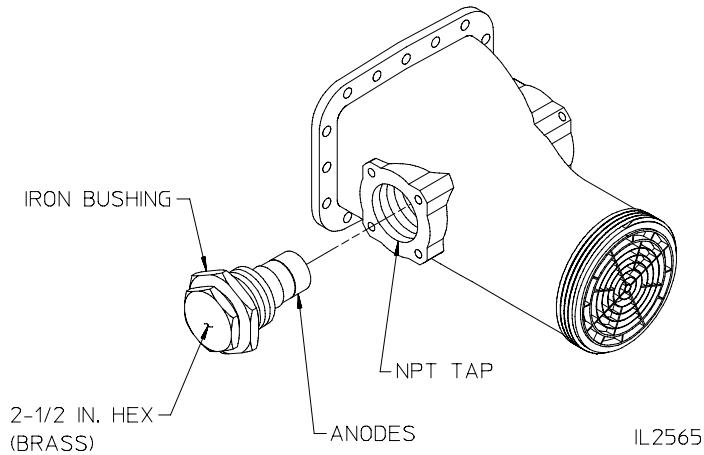


Figure 8. Zinc Anodes - Pads Machined with 2-1/2 in or 3 inch NTP Taps



Zinc Anodes

Zinc anodes may be mounted in the intake piping or, if no intake pads are available, in the discharge piping.

NOTE: The zinc must make contact with water to be effective. Do not paint or use any type of coating on the zinc element.

Zinc anodes are available for the following:

- ❑ Pads machined with 2-1/2 inch, 4-bolt mounting patterns, see Figure 7.
- ❑ Pads machined with 2-1/2 or 3 inch NTP taps, see Figure 8.

Final Checks

After the pump, accessories, piping and miscellaneous connections are completely installed, check the points listed below:

Lubrication

K & T Transmissions

Add any type of SAE 80W-90 gear oil through the fluid level hole or by removing the breather. Approximately 1 quart is required to fill the transmission when completely drained. The fluid should be level with bottom of the fluid level hole.

CLD Primers

Add any type of 10W-30 motor oil through the primer oil dipstick. Approximately 1/2 quarts (.5 Liters) is required to fill the primers when completely drained.

CAUTION

Failure to properly lubricate the pump, transmission or primers may result in serious damage to the equipment.
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Testing

Perform the tests listed in F-1031, Section 1000, "*Centrifugal Fire Pump Principles of Operation, Inspection Tests and Troubleshooting Guide.*" During the running tests, monitor the smoothness of operation, listen for unusual noises and check for leaks.