

**INSTALLATION,
OPERATION AND
MAINTENANCE
INSTRUCTIONS**

VORTEX SUBMERSIBLE PUMPS

**U. L. LISTED SLIDE RAIL WATER AND SEWAGE PUMPS
FOR USE IN HAZARDOUS (CLASSIFIED) LOCATIONS**

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PUMP IDENTIFICATION

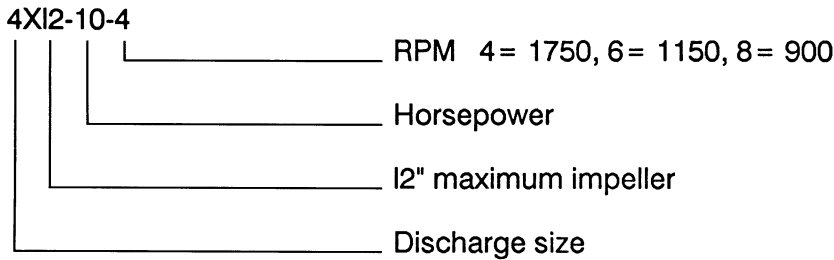
Congratulations! You are the owner of the very best vortex pump commercially available. With proper care and maintenance it will provide you with reliable service for many years.

ESSCO pumps are of the heavy duty design with 100% recessed impellers. ESSCO offers a wide variety of impeller designs to allow for equipment flexibility. ESSCO pumps are ideally suited for applications such as sewage, grit (heavy and/or fine), slurry, food waste handling, food handling and a variety of other services. Standard construction is cast iron with a carbon ceramic lower mechanical seal. Standard optional materials are available such as 316 S.S. (CF8M), CD4MCu, bronze, alloy 20 and many others. ESSCO pumps are engineered to accept a wide variety of mechanical seal materials.

This manual applies to:

All sizes of submersible vortex pumps.

PUMP DESCRIPTION



In some cases the discharge size will be preceded by the suction size such as 6X4XI2-10-4.

PUMP

Model: _____ Serial No. _____

_____ GPM at _____ Ft. TDH Impeller Dia.: _____

MOTOR

Manufacturer _____

H.P. _____ Serial Number _____

Frame _____ Speed _____ Voltage _____

CAUTION NOTES AND STORAGE OF PUMPS

These instructions apply to the pump only and are intended to be general and not specific. If the operating conditions change, refer to the factory or local factory representative or distributor for reapplication. Always refer to the manuals provided by manufacturers of the other equipment for their separate instructions and maintenance schedules.

CAUTION IMPORTANT SAFETY NOTICE

The installation, use and operation of this type of equipment is affected by various federal, state and local laws and the regulations concerning OSHA. Compliance with such laws relating to the proper installation and safe operation of this type of equipment is the responsibility of the equipment owner and all necessary steps should be taken by the owner to assure compliance with such laws prior to operation of the equipment.

STORAGE OF PUMPS

If the equipment is not to be immediately installed and operated, store it in a clean, dry, well ventilated place, free from vibrations, moisture, rapid and wide variations in temperature.

SPECIAL INSTRUCTIONS

Rotate the shaft for several revolutions at least once every week to:

1. Coat the bearing with lubricant
2. Retard oxidation or corrosion and
3. Prevent possible false brinelling

A UNIT IS IN STORAGE WHEN;

1. It has been delivered to the jobsite and is awaiting installation.
2. It has been installed but operation is delayed pending completion of construction.
3. There are long (30 days or more) periods between operation cycles.
4. The pump is shut down for periods of longer than 30 days.

NOTE; Storage requirements vary depending on the length of storage, the climatic environment and the equipment. For storage periods of three months or longer, contact the manufacturer for specific instructions. Improper storage could damage the equipment which would result in non-warranty covered restoration or non-warranty covered product failures.

INTRODUCTION

This manual contains information which is the result of engineering research and experience. It is designed to supply instructions for the installation, operation and maintenance of your pump. Failure or neglect to properly install, operate or maintain your pump may result in personal injury, property damage or unnecessary damage to the equipment.

Variations exist in both the equipment used with these pumps and in the particular installation of the pump and motor. Specific operating instructions are not within the scope of this manual. The manual contains general rules for installation, operation and maintenance of the pump.

Observe and heed all caution or danger tags attached to the equipment or included in this booklet.

INSTALLATION OF U. L. LISTED SUBMERSIBLE WATER AND SEWAGE PUMPS FOR USE IN HAZARDOUS (CLASSIFIED) LOCATIONS

***CAUTION; CAREFULLY READ ALL SECTIONS IN THIS MANUAL AND
ALL OTHER INSTRUCTION MANUALS PROVIDED BY MANU-
FACTURERS OF OTHER EQUIPMENT SUPPLIED WITH THIS PUMP***

Upon receipt, carefully unpack and inspect the pump and driver assemblies and individual parts to insure none are missing or damaged. Inspect all boxes and packing material for loose parts before discharging and report immediately to the factory involved, any missing parts or damage incurred during shipment. You must file a "damaged or lost in shipment" claim with the carrier immediately.

MINIMUM SUBMERGENCE OF PUMP SUCTION AND PIT DESIGN

Generally it is required that an evenly distributed flow of non-aerated water be supplied to the pump suction. Improper pit design or insufficient suction submergence can result in intake vortexing which reduces the pump's performance and can result in severe damage to the pump.

We recommend that you secure the advice of a qualified Consulting Engineer for the analysis and design of the suction pit. Significant engineering data on pit design is provided in the Hydraulic Institute Standards.

Upon request, ESSCO will review plans and give general comments on the installation, but will not approve such plans for a specific installation and will accept no responsibility or liability for the performance of the pump intake structure.

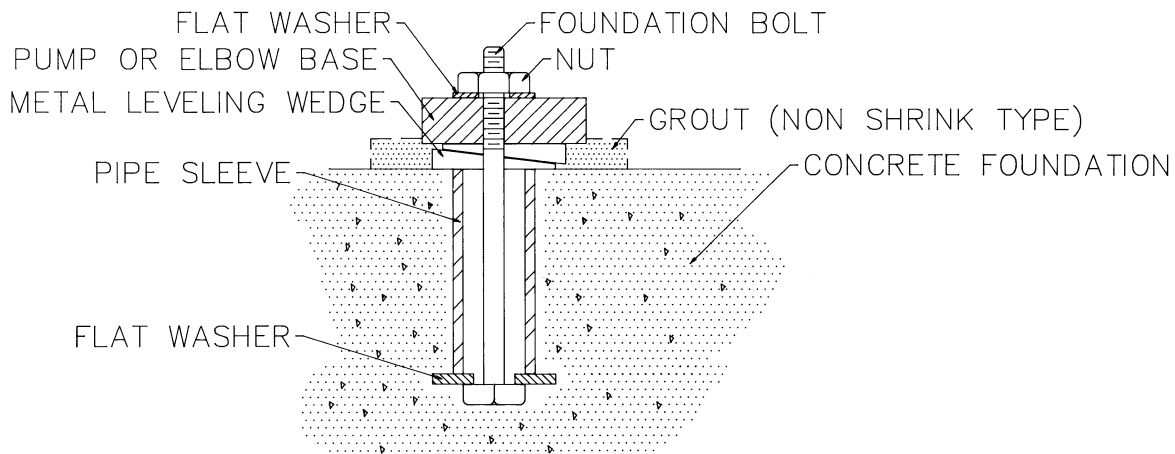
CAUTION; UNDER NO CIRCUMSTANCES SHALL THE MINIMUM SUBMERGENCE LEVEL BE BELOW THE PUMP VOLUTE AND MOTOR BRACKET ADAPTER PLATE.

BASE ELBOW INSTALLATION

FOUNDATION FOR THE BASE ELBOW (SLIDE RAIL ELBOW)

The foundation should have a level surface and be of sufficient mass to prevent vibration and form a permanent rigid support for the unit. The most satisfactory foundations are concrete with anchor bolts of adequate size embedded in the foundation in pipe sleeves with an inside diameter 2-1/2 times larger than the bolt diameter. This will allow for final accurate positioning of the unit.

Recommended anchor bolt design is shown below.



LEVELING OF THE UNIT

Lower the discharge base elbow onto the foundation, positioning the base elbow so the anchor bolts are aligned in the middle of the holes.

Set the base elbow on metal shims or metal wedges placed directly under the part of the base carrying the greatest weight, and spaced close enough to give uniform support and stability.

Adjust the metal shims or wedges until the discharge flange of the base elbow is level and plumb. Make sure that all shims or wedges fit firmly between the foundation and the base elbow.

If leveling nuts are installed on the anchor bolts and are used for alignment, follow the same procedure as with shims or wedges. Support the base with additional shims or wedges if necessary. Make sure that all nuts and shims are in firm contact with the base elbow. Tighten the foundation bolts snugly, but not too firmly, and recheck for alignment before grouting.

CAUTION; DO NOT OVERTIGHTEN ANCHOR BOLTS OR THE BASE ELBOW MAY BE DISTORTED.

GROUTING

When the alignment is correct, the unit should be grouted using a high grade nonshrinking grout.

Do not fill the pipe sleeves with grout.

If leveling nuts are used, make sure they are not embedded in grout. Provide access in the grout to the leveling nuts so that they can be backed off after the grout has cured. Allow the grout to fully cure before backing off the leveling nuts (if used) and firmly tightening the foundation bolts. Then recheck the alignment before connecting the piping.

PIPING

CAUTION; ALL PIPING CONNECTIONS MUST BE MADE WITH THE PIPE IN A FREE SUPPORTED STATE, AND WITHOUT THE NEED TO APPLY VERTICAL OR SIDE PRESSURE TO OBTAIN ALIGNMENT OF THE PIPING WITH THE BASE ELBOW FLANGE.

GUIDE RAIL ASSEMBLY

Insert guide pipes into rail sockets mounted on the base elbow first.

Insert top (or intermediate) guide bracket and position rails so they are plumb with discharge elbow.

Secure top (or intermediate) guide bracket to hatch curb (or intermediate guide support)

Tighten base elbow anchor bolts.

Tighten guide bracket anchor bolts.

Attach a lifting chain or lifting cable to lifting yoke supplied with pump and lower into position in the wet well. Lifting cable should be slack when pump is in correct position with discharge flange mated to discharge elbow. The pump requires no bolting or other fastening.

Check for proper seating between pump discharge flange and base elbow discharge flange.

Wire pump motor per manufacturer's instructions.

CAUTION; The motor thermal circuit and moisture detectors must be connected per motor manufacturer's requirements, otherwise the motor warranty will be void.

OPERATING AT REDUCED CAPACITY

In a typical application covering a wide range of flow rates, a variable speed driver is often used to adjust pump capacity and this is taken into consideration by ESSCO when selecting the pump and impeller trim. Although these pumps are applicable over a wide range of operating conditions, care should be exercised when doing so, especially when the actual conditions differ from the sold for conditions. You should always contact your nearest ESSCO representative before operating the pumps at any condition other than that for which they were sold.

STARTING THE PUMP

MECHANICAL SEALS

CAUTION; DRY OPERATION OF THE PUMP WILL CAUSE DAMAGE TO THE MECHANICAL SEAL.

- A. After the pump is installed and with the discharge valve closed, start the motor according to the manufacturer's instructions.
- B. Open the discharge valve slowly to prevent water hammer, and to allow the discharge line to fill completely.
- C. Monitor the motor amperage as the discharge gate valve is opened. Do not exceed the service factor of the motor or extreme damage to the motor may occur.

IF THE PUMP IS OPERATING IN THE REVERSE ROTATION, THE MOTOR WILL DRAW UP TO 50% MORE AMPERAGE THAN WHEN OPERATING IN THE CORRECT ROTATION.

TROUBLESHOOTING OPERATING PROBLEMS

If you have followed the installation and startup procedures outlined in this manual, your pump should provide reliable service and long life. However, if operating problems do occur, significant time and expense can be saved if you use the following check list to eliminate the most common causes of those problems.

CAUTION; TO REDUCE POSSIBILITY OF IGNITION OF HAZARDOUS MATERIALS DO NOT OPEN ELECTRICAL EQUIPMENT UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS, AND ALL ELECTRICAL POWER IS DISCONNECTED TO ELECTRICAL EQUIPMENT.

INSUFFICIENT DISCHARGE PRESSURE OR FLOW

1. Pump not primed.
2. Speed too low. Check driver.
3. Discharge head too high.
4. Impeller damaged.
5. Air in liquid.
6. Impeller diameter too small.
7. Insufficient net positive suction head.
8. Discharge valves not open.

LOSS OF SUCTION DURING OPERATION

1. Air or gases in liquid.
2. Wrong direction of rotation.

EXCESSIVE POWER CONSUMPTION

1. Pumps are running in wrong direction.
2. Speed too high.
3. Head lower than rating, pumps too much liquid.
4. Specific gravity or viscosity of liquid pumped is too high.
5. Mechanical defects: Shaft bent. Rotating element bind
6. System head lower than design.
7. Incorrect diameter impeller.

VIBRATION OR NOISE

1. Foundation bolts loose or defect in grouting.
2. Mechanical defects: Shaft bent. Rotating element binds
3. Head lower than rating, pumps too much liquid.
4. Pump strain - improperly supported or aligned.
5. Pump running at shut-off condition.
6. Air in liquid.
7. Suction partially plugged.

CAUTION

ALL ELECTRICAL EQUIPMENT INSTALLED IN THE WET WELL SHALL BE RATED FOR HAZARDOUS LOCATIONS OR BE INTRINSICALLY SAFE.

CAUTION

U. L. LISTING APPLIES ONLY TO CLASS I, DIVISION 1, GROUPS C AND D WHEN USED WITH A RELIANCE SUBMERSIBLE MOTOR.

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