INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

FOR

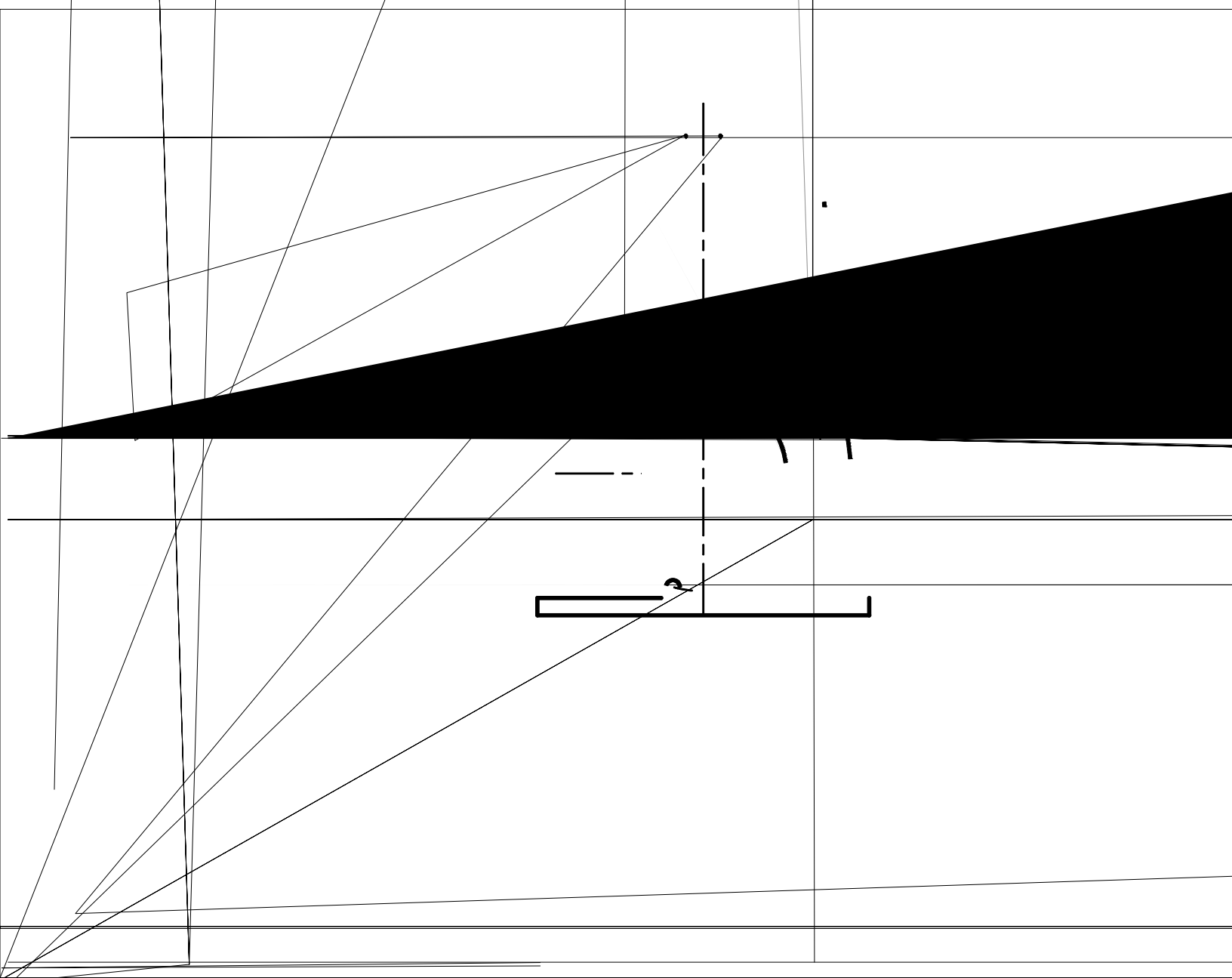
MODEL 442

HORIZONTAL SPLIT CASE

&

MODEL 492

SPLIT CASE FIRE PUMP



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PUMP IDENTIFICATION

STORAGE OF PUMPS AND CAUTION NOTES

3. MINIMUM SUBMERGENCE OF SUCTION PIPE AND PIT DESIGN

For installations where the pump draws fluid from a sump, the hydraulic characteristics of the pump, the suction inlet submergence and NPSH must be considered. Generally, it is required that an evenly distributed flow of non-aerated water be supplied to the suction bell. Improper pit design or insufficient suction pipe submergence can result in intake vortexing that 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 of the suction pit. Significant engineering data on design is provided in the Hydraulic Institute Standards.

4. LOCATION AND HANDLING

The pump should be located as near the fluid as possible so a short direct suction pipe can be used to keep suction losses at a minimum. If possible, locate the pump so the fluid will flow to the suction opening by gravity. The discharge piping should be direct and with as few elbows and fittings as possible. The total net positive suction head available ($NPSH_A$), which includes suction lift and pipe friction losses, must be greater than the net positive suction head required ($NPSH_R$) by the pump.

The pump and driver should be located in an area that will permit periodic inspection and maintenance. Head-room and access should be provided and all units should be installed in a dry location with adequate drainage.

WARNING: DO NOT LIFT THE COMPLETE UNIT BY THE DRIVER OR PUMP SHAFTS OR EYE BOLTS.

To lift a horizontal mounted unit, a chain or suitable lifting device should be attached to each corner of the unit base. The driver by itself may be lifted using the proper eyebolts provided by the manufacturer, but these should not be used to lift the entire assembledhuee0-rse5eDTf6 0 1ee0-rse5cTm0 Tce pump. a1(unit, a chai)e5cTmoda.1

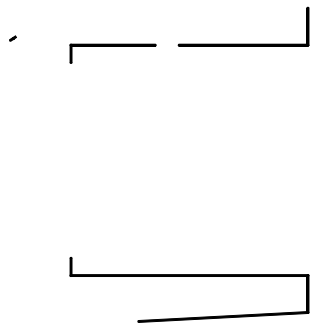
INSTALLATION (continued)

13. MECHANICAL SEALS

CAUTION: DRY OPERATION OF THE PUMP MAY CAUSE DAMAGE TO THE MECHANICAL SEAL AND IMPELLER.

Model 442 pumps can be supplied with optional single face mechanical shaft seals. Mechanical seals are installed and adjusted in the factory and require no further adjustments in the field.

For further information, refer to the seal manufacturer's instructions.



OPERATION

Because variations exist in both the equipment used with these pumps and in the particular installation of the pump and driver, specific operating instructions are not within the scope of this manual. However, there are general rules and practices that apply to all pump installations and operation.

CAUTION: BEFORE STARTING OR OPERATING THE PUMP, READ THIS ENTIRE MANUAL, ESPECIALLY THE FOLLOWING INSTRUCTIONS:

A. BEFORE STARTING THE PUMP, INSTALL CLOSED GUARDS AROUND THE COUPLING.

B. BEFORE STARTING THE PUMP, ROTATE THE UNIT OR ASSEMBLY BY HAND TO ASSURE ALL MOVING PARTS ARE FREE.

C. OBSERVE ALL CAUTION AND DANGER TAGS ATTACHED TO THE EQUIPMENT.

D. NEVER RUN THE PUMP DRY AS THE CLOSE RUNNING FITS WITHIN THE PUMP ARE WATER LUBRICATED. RUNNING DRY MAY RESULT IN PUMP SEIZURE.

E. BEFORE STARTING THE PUMP, FILL THE CASING AND SUCTION LINE WITH LIQUID. THE PUMP MAY BE PRIMED USING AN EJECTOR OR VACUUM PUMP.

F. BEFORE STARTING A PACKED BOX PUMP, ADJUST THE PACKING GLAND SO THERE IS SUFFICIENT LEAKAGE TO LUBRICATE THE PACKING AND ASSURE A COOL PACKING BOX. (SEE MAINTENANCE INSTRUCTIONS).

G. **IF EXCESSIVE VIBRATION OR NOISE OCCURS DURING OPERATION, SHUT THE PUMP DOWN AND CONSULT AN AURORA PUMP REPRESENTATIVE.**

1. OPERATING AT REDUCED CAPACITY

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 Aurora Pump distributor before operating the pumps for any condition other than that for which it was sold.

2. PRIMING

Since the pump medium is used to lubricate various internal parts, running a centrifugal pump dry can result in extensive damage and possible seizing. It is therefore imperative that the pump be primed prior to initial start-up and that prime be maintained through subsequent start-stop cycles.

The priming method is different for positive and negative suction head systems, and the following procedures should be followed.

A. Positive Suction Head –

1. Open the vent on the highest point on the pump casing.
2. Open all suction valves.
3. Allow the pumped liquid to flow from the vent hole until all air bubbles are vented, then close the vent.
4. The pump is now primed.

B. Negative Suction Head – (not applicable for fire pump applications)

1. Install an ejector or vacuum pump on the vent at the highest point on the pump casing.
2. Close the discharge valve.
3. Open the suction valve.
4. Start ejector or vacuum pump.
5. Allow the liquid to flow until a continuous flow is exhausted from the ejector, then close the valve to the vent.
6. The pump is now primed.

2. INSPECTIONS AND PREVENTIVE MAINTENANCE REQUIREMENTS

To assure satisfactory operation of the pump, daily inspections and periodic maintenance are required. We suggest that an inspection and maintenance log be kept and that the inspector immediately report any problems. A guide for preventive maintenance for normal applications is given below. Unusual applications, with abnormal heat, moisture, dust, etc. may require more frequent inspections and service.

ITEM	ACTION REQUIRED	FREQUENCY (HOURS OF OPERATION)
Packing Box	Adjust gland, inspect packing for possible replacement	150 Hours
Pump Alignment	Check for change in alignment	ANNUALLY
Vibration	Check for change in vibration	ANNUALLY
Bearings:	Lubricate	
Grease lubricated		Every 2000 hours of operation, but at least once a year.

3. BEARING LUBRICATION

Grease Lubricated Bearings

Under normal operating conditions, the bearings must be lubricated after every 2000 hours of running time, but at least once a year regardless of total operating hours.

5. PACKING REPLACEMENT (continued)

PUMP MODEL (PUMP SIZE)

6. PUMP DISASSEMBLY (continued)

E. Remove the capscrews that secure the bearing cartridge covers (159) to the bearing cartridges and remove the cartridges from the rotating assembly.

WARNING: TO PREVENT POSSIBLE SERIOUS PERSONAL INJURY, EXTREME CARE SHOULD BE EXERCISED TO SELECT THE PROPER PULLER, AND APPROVED SAFETY GLASSES SHOULD BE WORN.

CAUTION: BECAUSE OF POSSIBLE DAMAGE OR CONTAMINATION DURING REMOVAL, BEARINGS SHOULD NOT BE REUSED AND NEW BEARINGS SHOULD ALWAYS BE INSTALLED.

F. Remove the bearing locknut (161) and bearing lock washer (162) from the outboard bearing end of the rotating assembly, and use a wheel/bearing puller to remove the outboard / thrust (168) and inboard / radial (163) bearings.

G. Remove bearing cartridge covers (159), water slingers (126), casing wearing rings (16), lantern rings (10), and packing (212). If the pump is equipped with mechanical seals (456), refer to the seal manufacturer's instructions.

H. Remove the shaft sleeves (14). Depending on the pump service, shaft sleeves are supplied in two different configurations. The removal procedure for each configuration differs:

WARNING: TO PREVENT POSSIBLE SERIOUS PERSONAL INJURY, HEAT RESISTANT GLOVES MUST BE WORN WHEN HANDLING HEATED PARTS.

Sleeves Affixed With Loctite: Remove the shaft sleeve nuts (213) (if they are provided), heat the sleeves to approximately 450^{o}F to break the bond, then tap them with a brass or copper mallet.

CAUTION: BECAUSE OF POSSIBLE DAMAGE DURING DISASSEMBLY, O-RINGS SHOULD NOT BE REUSED AND NEW O-RINGS SHOULD ALWAYS BE INSTALLED.

Sleeves Keyed To Shaft: Remove the shaft sleeve nuts (213), shaft sleeves (14) and the shaft sleeve O-rings (452).

7. PUMP ASSEMBLY

CAUTION: READ THIS ENTIRE PROCEDURE BEFORE CONTINUING.

Following are step-by-step instructions for assembly of the pump and are essentially the reverse order of the instructions for disassembly.

A. Thoroughly clean all parts to remove oil, grease and foreign material. Inspect for wear or damage and replace if required. Remove all parts to a clean and dust-free location for assembly. Gaskets, grease seals and bearings should not be reused and should always be replaced with new parts.

B. If the impeller wear rings (17) require replacement, they are a light press fit and will be secured by one of the following methods. You should proceed as follows:

Rings Secured With Loctite: Apply a light film of Loctite No. 290 to the impeller part of the impeller/wear ring fit and install the rings.

CAUTION: BE CAREFUL NOT TO DRILL THROUGH THE IMPELLER AND BE SURE TO PRESS THE WEAR RING COMPLETELY IN PLACE. THEY SHOULD BE FIRMLY BUTTED AGAINST THE CORRESPONDING IMPELLER SHOULDER.

Rings Secured With Set Screws: Press the rings in place and drill and tap them using the same size and number of setscrews as originally provided. The new holes should be 15^{o} to 20^{o} from the old holes. Install and tighten the set screws.

CAUTION: IF THE SHAFT SLEEVES ON YOUR PUMP ARE SECURED WITH LOCTITE ONLY, REFER TO THE SHAFT SLEEVE INSTALLATION INSTRUCTIONS BEFORE MPELLER.

shaft (4) and slide the impeller (1) over the key, centering it between ure 5.

7. PUMP ASSEMBLY (continued)

CAUTION: THIS PUMP MAY BE SUPPLIED IN SEVERAL DIFFERENT CONFIGURATIONS. EACH USES DIFFERENT BEARING COVERS AND HOUSINGS WITH DIFFERENT DRAWING REFERENCE NUMBERS. DESPITE THE FOLLOWING INSTRUCTIONS, ALWAYS REFER TO THE SECTIONAL DRAWINGS CONTAINED IN THIS MANUAL BEFORE PROCEEDING, TO INSURE THAT YOU HAVE INSTALLED ALL REQUIRED

7. PUMP ASSEMBLY (continued)

CAUTION: BE SURE BEARING HOUSING/CASING MATING SURFACES ARE CLEAN AND FREE FROM BURRS, AS THIS WILL AFFECT THE ALIGNMENT OF THE ROTOR/CASING.

L. Attach the bearing cartridges to the lower casing using the appropriate dowel pins (158B).

M. Inspect the upper casing (3) to assure that the water passage is clean and free from foreign material. Apply a light coat of grease to the upper and lower casing mating surfaces and install a new casing

REPAIR PARTS

ORDERING PARTS

There are a variety of options available for this pump. When ordering parts, give the pump serial number, size and figure number and a complete description and item number of each part. Refer to the drawings and parts list in the back of this manual. You should order parts from your local Aurora Pump distributor. Consult your local telephone yellow pages for the office nearest you.

RETURNING PARTS

Unnecessary delays and wasted effort will be avoided if you use the p2.6(y R J19Ac.6(y Rdigurr treturnhe)5.5(a7(rto6(y R (r)

NOTES

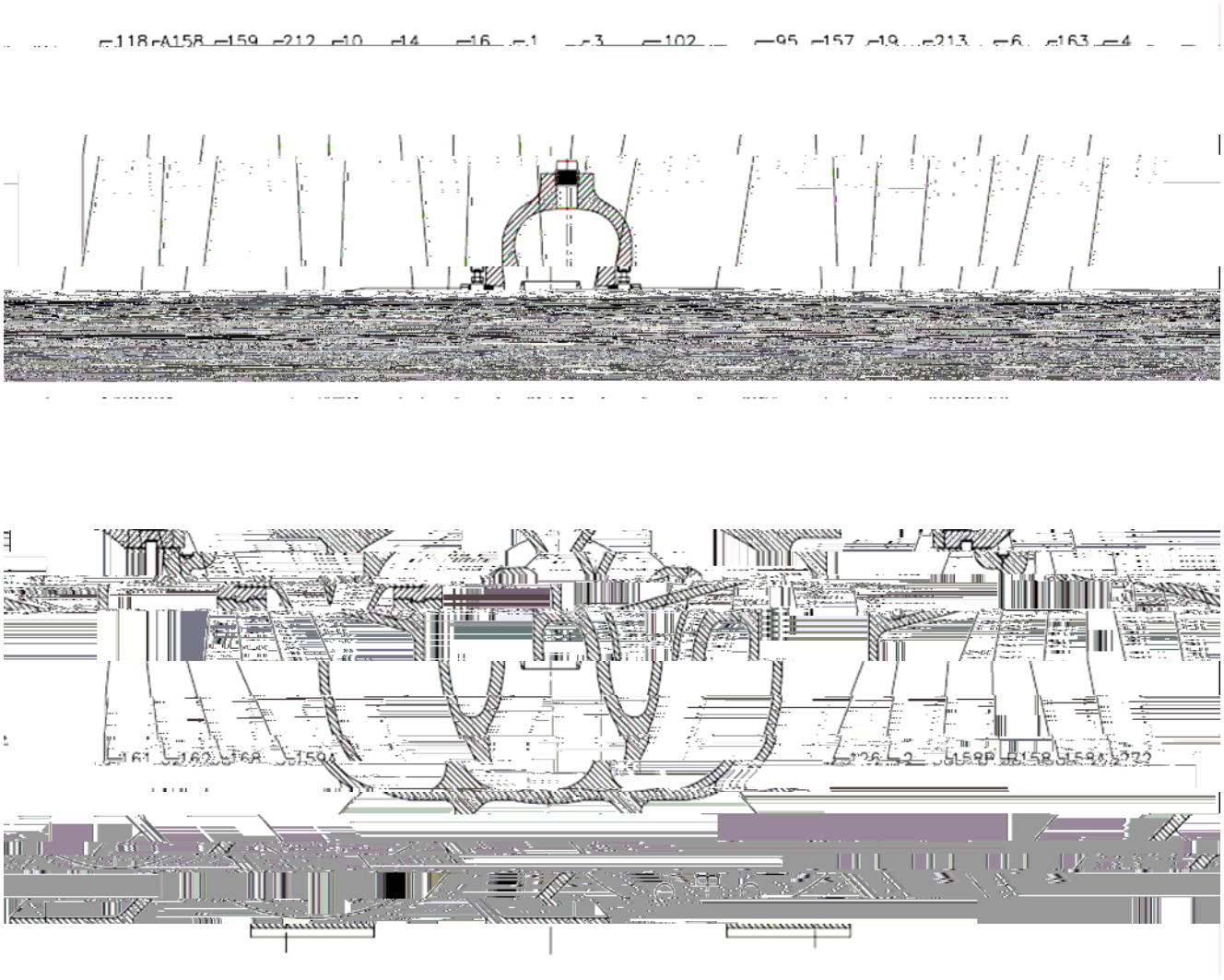


Figure 6
STANDARD CONSTRUCTION