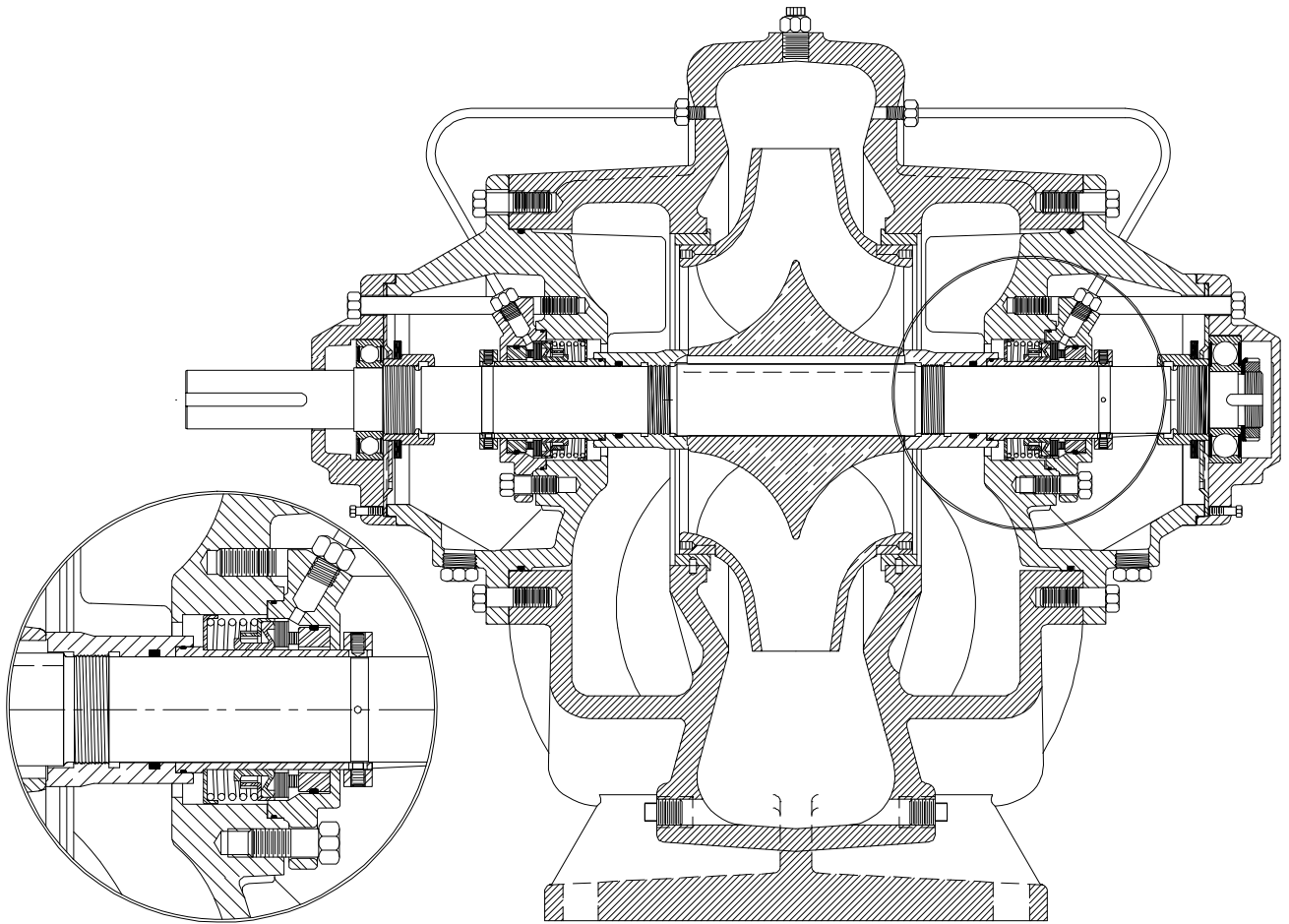


**INSTALLATION AND OPERATING INSTRUCTIONS
SERIES 4600 HORIZONTAL SPLIT CASE PUMP**



GENERAL

Armstrong innovative Series 4600 HSC pumps are designed for ease of maintenance. The pumps same level suction and discharge permits easy piping layout and pump installation. Design features such as the cartridge mechanical seal and the ability to remove the bearings with no special tools needed, will make the reliable HSC pump a trouble free pump for many years.

INSPECTION

Armstrong series 4600 HSC pumps are thoroughly tested and inspected before shipment to assure they meet with your order requirements. All units must be carefully examined upon arrival for possible damage during transit. Any evidence of mishandling should be reported immediately to the carrier and noted on the freight bill.

IMPORTANT

Do not run the pump for any length of time under very low flow conditions or with the discharge valve closed. To do so could cause the water in the casing to reach super heated steam conditions and will cause premature failure and could cause serious and dramatic damage to the pump and surrounding area.

INSTALLATION SERIES 4600 HORIZONTAL SPLIT CASE

1. LOCATION

- Locate the unit as close as practical to the storage container of liquid being pumped, with a short, direct suction pipe. Ensure adequate space is left around the unit for operation, maintenance, service and inspection of parts.
- Electric motor driven pumps should not be located in damp or dusty locations without special motor enclosure protection.

2. STORAGE

- Pumps not immediately placed into service, or removed from service and stored, must be properly prepared to prevent rusting and bearing damage.
- Bearings protected by oil or grease must be rotated every two to three months to return the lubricant to the upper half of the bearing and prevent ball damage. Do not leave the shaft in the same position each time.
- Internal rusting can be prevented by removing the plugs at the top and bottom of the casing and drain or air blow out all water to prevent rust buildup or the possibility of freezing. Be sure to reinstall the plugs when the unit is made operational. Rustproofing or packing the casing with moisture absorbing material and covering the flanges is acceptable. When returning to service be sure to remove the drying agent from the pump.

3. FOUNDATION AND MOUNTING

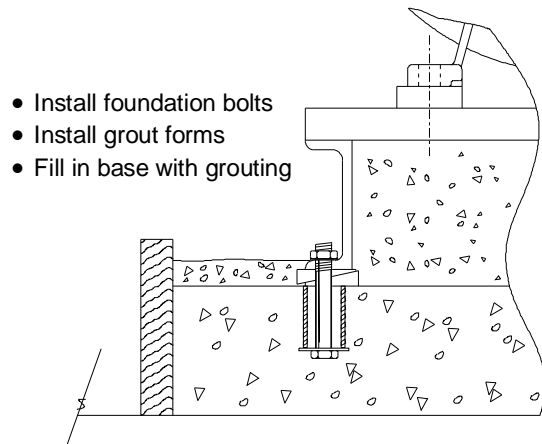
- The following text and illustrations are offered as general suggestions for the preparation of a satisfactory foundation.
- Foundation should be sufficiently substantial to absorb any vibration and permanently support the baseplate at all points. This is essential in maintaining the alignment of a direct coupled unit.

- The most satisfactory foundations are made of reinforced concrete and should be at least 2.5 times the shipping weight of the pumping unit. The foundation should be poured well in advance of the installation to allow proper time for drying and curing.
- Foundation bolts of suitable size should be embedded in the concrete located by a drawing or template. Pipe sleeves, 2.5 times the size of the anchor bolts, should be embedded in the concrete, to permit adjustment of the bolts after the concrete has been poured.
- If the unit is to be mounted on fabricated steel work or similar structure, the unit should be set over, or as near as possible to, the supporting beams or walls and to be so supported that the baseplate cannot be distorted nor the alignment disturbed by any yielding or springing of the structure or base.
- When the unit has been placed on the foundation, disconnect the coupling. Do not re-connect the coupling until after the unit has been piped, finally aligned and checked for correct direction of rotation.
- Place pumping unit on the foundation and insert metal wedges on either side of the foundation bolts under base plate. Leave approximately 3/4" (19mm) space if grouting.
- Carefully level the unit by adjusting the wedges until shafts of pump and driver are leveled.
- With the proper gauge, check coupling faces and suction and discharge flanges of the pump for vertical position.
- Slight misalignment at this point may be corrected by adjusting the wedges.
- When the baseplate is completely level, the foundation bolts should be tightened evenly and firmly.
- After unit has been in operation for about a week, check the leveling. Any misalignment may be corrected by placing shims between base and driver or pump feet.

4. GROUTING

Armstrong's fabricated steel base plate is manufactured to ANSI/HI 1.3.5 rigidity standards for free-standing base plates. As such, no grouting in place is necessary for the base plate to hold shaft alignment. The following instructions are for installers who wish to also secure the base in place with grout:

- Construct a dam around the foundation with grout forms, as shown in the illustration
- Use a good mixture of non-shrinking grout. The grout should be the consistency of heavy cream.
- Spaces are provided in the base plate to permit pouring of the cement and stirring. Fill under the base completely, stirring to assure proper distribution of the grout. Check to see that the grout flows under the base plate evenly.
- When the grout has hardened thoroughly, usually after 48 hours, final tighten the anchor bolts and remove the grout forms.



5. PUMP PIPING - GENERAL

- Never connect a pump to piping, always start piping from pump.
- Use as few bends as possible and preferably long radius elbows.
- Install good supports under suction and discharge piping with anchors near but independent of the pump.
- Make sure piping exerts no strain on pump as this would distort the casing and cause pump misalignment.
- Suction and discharge pipes may be increased at pump nozzle to suit pump capacity and particular conditions of installation. Use eccentric reducers on suction connection.
- Layout the suction line with a continual rise towards the pump without high points, thus eliminating possibility of air pockets that may prevent the pump from operating.
- A strainer of three or four times the area of the suction pipe, installed in the suction line, will prevent the entrance of foreign materials into the pump. 1/8" diameter perforations in the strainer is typical.
- Test suction line for air leaks before starting; this becomes essential with long suction line or static lift.
- Install, at pump suction, a straight pipe of a length equivalent to 4 or 6 times its diameter; this becomes essential when handling liquids above 120°F. Armstrong suction guides may be used in place of the straight pipe run and in line strainer.
- Install isolation valve in both suction and discharge lines on

CAUTION

Discharge valve only must be used to reduce the pump flow, not the suction valve

Care must be taken in the suction line layout and installation, as it is usually the major source of concern in centrifugal pump applications

flooded suction application; this is used mainly to isolate the pump for inspection or repair.

- Install a non-slam check valve in discharge line between pump and isolation valve to protect pump from excessive back pressure and to prevent water running back through the pump in case of driver failure. Armstrong Flo-Trex valve may be used in place of check valve and isolation valve on pump discharge.

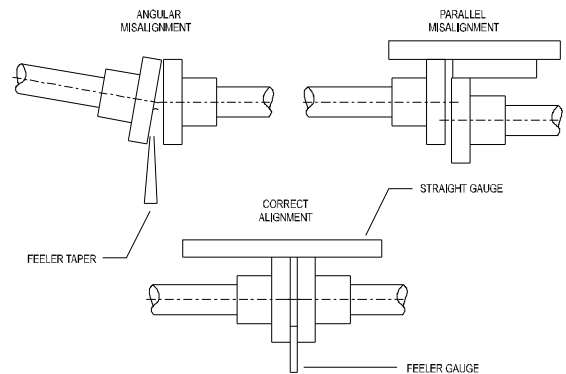
6. ALIGNMENT

- The pumping unit is accurately aligned at the factory prior to being shipped. All base plates are flexible to some extent and should not be relied upon to maintain factory alignment. Realignment is necessary as follows:
 - A After the unit has been set level on the foundation.
 - B After the grout has set and the foundation bolts final tighten.
 - C After the pipes have been connected.
- Accurate alignment is absolutely essential. Proper mechanical operation of the equipment cannot be guaranteed unless the factory alignment is reproduced in the field. All alignment should be made by moving or shimming the motor.
- The flexible coupling compensates for temperature changes and permits end movement of shafts without them interfering with

each other; it will not compensate for misalignment. Faulty alignment will result in noisy pump operation, reduced bearing life, excessive coupling wear and wasted power.

CAUTION

Be sure to reinstall any temporarily removed coupling guards, prior to starting the pumping unit.



- To verify alignment, place a straight edge across the coupling as shown in the following illustration; this must rest evenly on both rims at top, bottom and both sides.
- With a pair of inside calipers or thickness gauge, check distance between coupling halves at points where straight edge was used; distance must be equal at all points.

OPERATION

SERIES 4600 HORIZONTAL SPLIT CASE

7. STARTING PUMP

- The pump must be fully primed on start up. Fill the pump casing with liquid and rotate the shaft by hand to remove any air trapped in the impeller. Remove air trapped in casing by means of manual air vent on top of casing.
- When the piping is connected correctly and the final alignment check completed, re-connect the coupling and re-install the coupling guard.
- "Bump" or energize the motor momentarily and check that the rotation corresponds with the directional arrow on the pump casing.

CAUTION

Centrifugal pump rotation is generally "clockwise" when viewing from the drive end.

Care must be taken with a series 4600 HSC pump as, depending on the suction location, rotation may be in either direction.

Check rotation arrow prior to operating the unit.

- To reverse rotation of a three phase motor, interchange any two power leads.
- Start the pump with the discharge valve closed and the suction valve open, then gradually open the discharge valve when the motor is at operating speed. The discharge valve may be "cracked" or open slightly at start up to help

eliminate trapped air.

- When stopping the pump: Close the discharge valve and de-energize the motor.

8. GENERAL CARE

- HSC pumps are built to operate without periodic maintenance with the exception of lubrication of motor bearings, if required. A systematic inspection made at regular intervals, giving special attention to the following, will ensure years of trouble-free operation.

CAUTION

Whenever any service work is to be performed on a pumping unit, disconnect the power source to the driver.

Any possibility of the unit starting while being worked on, must be eliminated.

- Keep unit clean.
- Provide the motor with correctly sized (not oversized) overload protection.
- Keep moisture, refuse, dust or other loose particles away from the pump and ventilating openings of the motor
- Avoid operating the unit in overheated surroundings (Above 100 °F)
- If mechanical seal environmental accessories are installed, ensure water is flowing through the sight flow indicator and that filter cartridges are replaced as recommended.

3. LUBRICATION

PUMP

- Series 4600 pumps are supplied, as standard, with maintenance free, sealed for life, grease lubricated bearings. Site re-greasing is not required.
- If re-greasable bearing were ordered: Grease lubricated bearings require very little attention. More trouble can be caused by overcharging than undercharging with grease
- Approximately every month, inject a small quantity of grease (Esso Andok No. 280 or equal)
- Inject new grease into grease fitting on top of bearing cover
- Remove plug under bearing cover to allow excess grease to flush
- Start and run pump for a short time to eject any excess grease
- Clean excess grease and replace plug

MOTOR

- Follow the lubrication procedures recommended by the motor manufacturer. Many small and medium sized motors are permanently lubricated, particularly at the drive (coupling) end bearing.
- Check the lubrication instructions supplied with the motor for the particular frame size indicated on the motor nameplate.

MECHANICAL SEAL

- Mechanical seals require no special attention. The mechanical seals are isolated in stuffing boxes and flushed from the pump casing. Seal environmental controls, installed in the flush lines, such as filters and separators, will prolong seal life in HVAC systems.
- Do not run the pump unless properly filled with water as the mechanical seals need a film of liquid between the faces for proper operation

10. SYSTEM CLEANLINESS

- Before starting the pump the system must be thoroughly cleaned, flushed and drained and replenished with clean liquid.
- Welding slag and other foreign materials, "Stop Leak" and cleaning compounds and improper or excessive water treatment are all detrimental to the pump internals and sealing arrangement.
- Proper operation cannot be guaranteed if any of these conditions are allowed to exist.

NOTE

Particular care must be taken to check the following before the pump is put into operation:

- A. Coupling guard installed?
- B. Pump primed?
- C. Alignment correct?
- D. Rotation OK?
- E. Lubrication OK?
- F. Pipe work properly supported?
- G. Voltage supply OK?
- H. Overload protection OK?
- I. Is the system clean?

Is the area around the pump clean?

WARRANTY

Refer to Armstrong General Terms and Warranty sheet. Contact your local Armstrong representative for full

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