

# Series 4030

## Base mounted pump

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### Installation and operating instructions

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## GENERAL

Armstrong Centrifugal Pumps, properly installed and given reasonable care and maintenance, will perform satisfactorily for a long period of time. These instructions describe the procedures which should be followed to ensure trouble-free operation. All work should be performed by qualified personnel.

## INSPECTION

Armstrong series 4030 Base Mounted 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 4030 BASE MOUNTED PUMP

### 1.0 LOCATION

Locate the unit as close as practical to the 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 location without special protection.

### 2.0 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 shaft in 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.

### 3.0 FOUNDATION AND MOUNTING

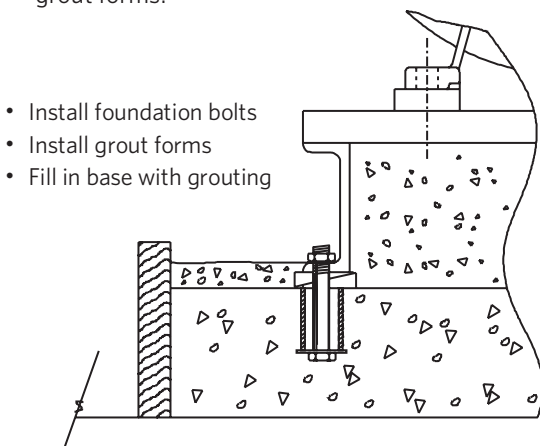
- The following text and illustrations are offered as general suggestions for the preparation of a satisfactory foundation.
- Foundation should be sufficiently substantial to absorb any vibration and permanently support the baseplate at all points. This is essential in maintaining the alignment of a 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 lifting any base mounted pumping unit ensure the unit is **Not** lifted by straps placed under the coupling, pump or motor. The (4) corner holes should be used as a minimum. All (6) holes can be used on larger bases. Secure evenly spaced straps placed under the baseplate is also acceptable for lifting the entire unit.
- 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  $\frac{3}{4}$ " (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.

#### 4.0 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.



#### 5.0 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.

Lay out 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.  $\frac{3}{8}$ " diameter perforations in the strainer are 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 (49°C). Armstrong suction guides may be used in place of the straight pipe run and in line strainer.

Install isolation valve(s) in both suction and discharge lines on flooded suction application; this is used mainly to isolate the pump for inspection or repair

Install a non-slam check valve in the 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.

#### 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.

## 6.0 ALIGNMENT

The pumping unit is accurately aligned at the factory prior to being shipped. All baseplates are flexible to some extent and should not be relied upon to maintain factory alignment.

**NOTE:** Shipping, handling, uneven foundations, and pipe loads may disrupt the factory alignment.

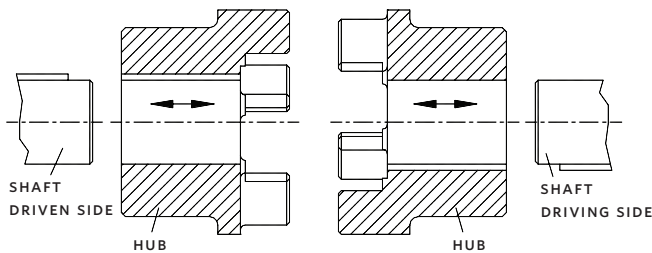
Alignment should be checked as follows:

- A** After the unit has been set level on the foundation.
- B** After the pipes have been connected.

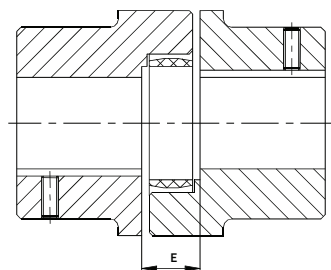
Accurate alignment is absolutely essential. Proper mechanical operation of the equipment cannot be guaranteed unless the factory alignment is reproduced in the field. All alignment should be made by moving or shimming the motor.

The below instructions should be following to put back the coupling during the alignment process:

- Mount the hubs on the shaft of driving and driven side (see **FIG 1**).
- Insert the spider or DZ elements into the cam section of the hub on the driving or driven side.
- Shift the power packs in axial direction until the distance dimension  $\epsilon$  is achieved (see **FIG 2**).
- Shift the hubs axially on the shaft to adjust the dimension  $\epsilon$  to values shown in **TABLE 1**.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torques see **TABLE 1**).



**FIG 1: ASSEMBLY OF THE HUBS**



**FIG 2: ASSEMBLY OF COUPLING**

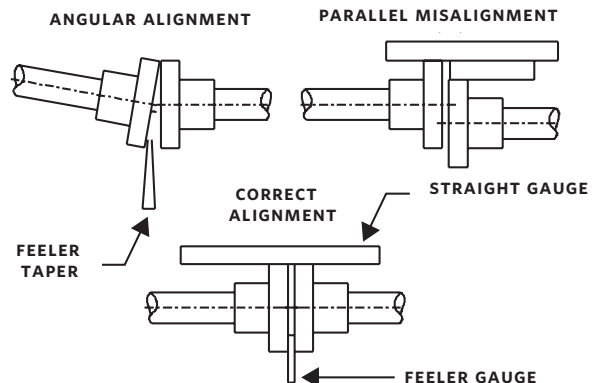
**TABLE 1:** Coupling installation

Size	Tightening torque TA Nm (ft.lbs)	Dimension $\epsilon$ mm (inch)
14	1.5 (1.1)	13 (0.51)
19	2 (1.5)	16 (0.63)
24	2 (1.5)	18 (0.71)
28	10 (7.4)	20 (0.79)
38	10 (7.4)	24 (0.94)
42	10 (7.4)	26 (1.02)
48	10 (7.4)	28 (1.10)
55	17 (12.5)	30 (1.18)
65	17 (12.5)	35 (1.38)
75	17 (12.5)	40 (1.57)
90	40 (29.5)	42 (1.65)
100	40 (29.5)	50 (1.97)
110	80 (59.0)	55 (2.17)
125	80 (59.0)	60 (2.36)
140	140 (103.3)	65 (2.56)
160	140 (103.3)	75 (2.95)
180	140 (103.3)	85 (3.35)

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.

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.



**TESTING ALIGNMENT**

### CAUTION



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

## OPERATION - SERIES 4030 BASE MOUNTED PUMP

### 7.0 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. Air trapped in the casing is automatically vented through the top centre line discharge.

When the piping is connected correctly and the final alignment completed, re-connect the coupling and reinstall the coupling guard.

'Bump' or energize the motor for a fraction of a second and check that the rotation corresponds with the directional arrow on the pump casing.

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.

### CAUTION



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

Check rotation arrow prior to operating the unit.

### 8.0 GENERAL CARE

Base Mounted 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.

Keep unit clean.

Provide the motor with correctly sized 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. Generally (Above 100°F(40°C)).

If mechanical seal environmental accessories are installed, ensure water is flowing through the sight flow indicator and that filter cartridges are replaced as recommended.

### WARNING



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

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

### 9.0 LUBRICATION

#### Pump

Series 4030 pumps are supplied, as standard, with maintenance free, sealed for life, grease lubricated bearings. Site regreasing 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 four months, inject a small quantity of grease (while the pump is running) EXXON MP type H or equal lithium based petroleum grease as follows:

- A** Remove relief hole plug.
- B** Inject grease at grease fitting.
- C** Fill until new grease is visible at relief hole.

If Oil lubricated bearings were ordered: Use non-detergent iso viscosity grade 150 oil, similar to Teresso/Teresstic 150 or Morlina/Tellus 150. Before start-up, check to make sure the oil level is within 0.125"(3mm) of the top of the oil sight glass. Under normal operating conditions, the oil should be changed every six months as follows:

- A** Drain the old oil from the bearing bracket through the drain hole at the bottom of the housing.
- B** Thoroughly flush the bearing bracket with kerosene.
- C** Refill the clean oil through the vent on the top of the bracket until the oil level reaches within 0.125" (3mm) of the top of the oil sight glass.

## CAUTION



- Oil lube pumps are not shipped with oil (unless Certified test specified) and must be filled prior to Operation
- Do not oil bearing assembly while the pump is Running.

## Motor

Follow the lubrication procedures recommended by the motor manufacturer. Many small and medium sized motors are permanently lubricated, particularly at the 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. 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.

## 10.0 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?
- J** Is the area around the pump clean?

## WARRANTY

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

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