

IA

2 - 125 HP @
1750 & 3500 RPM



IMPORTANT! - Read all instructions in this manual before operating or servicing a pump.

Before installation, read the following instructions carefully. Failure to follow instruction and safety information could cause serious bodily injury, death and/or property damage. Each Barmesa product is carefully inspected to insure proper performance. Closely following these instructions will eliminate potential operating problems, assuring years of trouble-free service.

⚠ DANGER "Danger" indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING "Warning" indicates an imminently hazardous situation which, if not avoided, MAY result in death or serious injury.


⚠ CAUTION "Caution" indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.


IMPORTANT! - Barmesa Pumps is not responsible for losses, injury or death resulting from failure to observe these safety precautions, misuse, abuse or misapplication of pumps or equipment.

ALL RETURNED PRODUCTS MUST BE CLEANED, SANITIZED, OR DECONTAMINATED PRIOR TO SHIPMENT, TO INSURE EMPLOYEES WILL NOT BE EXPOSED TO HEALTH HAZARDS IN HANDLING SAID MATERIAL. ALL APPLICABLE LAWS AND REGULATIONS SHALL APPLY.

⚠ WARNING Installation, wiring, and junction connections must be in accordance with the National Electric Code and all applicable state and local codes. Requirements may vary depending on usage and location.

⚠ WARNING Installation and servicing is to be conducted by qualified personnel only.

 Keep clear of suction and discharge openings. Do not insert fingers in pump with power connected; the impeller can cause serious injury.

 Always wear eye protection when working on pumps. Do not wear loose clothing that may become entangled in moving parts.

⚠ DANGER Pumps build up heat and pressure during operation. Allow time for pumps to cool before handling or servicing the pump or any accessory items associated with or near the pump. Do not block or restrict the discharge pipe/hose.

⚠ WARNING Do not pump hazardous materials (flammable, caustic, etc.) or use these pumps in water over 160 °F. Do not exceed manufacturers recommended maximum performance, as this could cause the motor to overheat.

⚠ DANGER This pump is not intended for use in swimming pools or water installations where there is human contact with pumped fluid.

⚠ DANGER Risk of electric shock. To reduce risk of electric shock, always disconnect pump from power source before handling any aspect of the pumping system. **Lock out power and tag.**

⚠ DANGER Do not lift, carry or hang pump by the electrical cables. Damage to the electrical cables can cause shock, burns or death. **Never** handle connected power cords with wet hands. Use appropriate lifting device.

⚠ DANGER Failure to permanently ground the pump, motor and controls before connecting to power can cause shock, burns or death.

⚠ WARNING If engine driven, never operate in an enclosed building or area where exhaust gases can accumulate, or near a building where gases can seep inside; always take provisions for adequate ventilation.

⚠ WARNING Do not breathe exhaust fumes when working in the area of the engine. (Exhaust gases are odorless and deadly poison.)

⚠ WARNING Never add fuel to the tank while the engine is running. Stop engine and allow to cool.

Do not smoke while refueling the engine. **Do not** refuel near open flame.

⚠ WARNING Carefully read instruction manuals supplied with motor or engine before operating or servicing.

IMPORTANT! - Prior to installation, record Model Number, Serial, Amps, Voltage, Phase and HP from pump name plate for the future reference. Also record the Voltage and Current Readings at Startup:

| 1 Phase Models | |
|----------------|-------------|
| Amps: | Volts: |
| 3 Phase Models | |
| Amps L1-2: | Volts L1-2: |
| Amps L2-3: | Volts L2-3: |
| Amps L3-1: | Volts L3-1: |

Model Number: _____

Serial: _____

PHASE: _____ HP: _____

| | |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SUCTION: | 1½" - 8" NPT or flange horizontal. |
| DISCHARGE: | 1" - 6" NPT or flange vertical. |
| LIQUID TEMPERATURE: | 160°F (71 °C) max. |
| VOLUTE: | Cast iron ASTM A-48 class 30. |
| INTERMEDIATE COUPLING: | Cast iron ASTM A-48 class 30. |
| IMPELLER: | Cast iron ASTM A-48 class 30 or stainless steel 304. Investment casting, dynamically balanced. |
| SEAL: | Mechanical, type 01. Ceramic stationary part, carbon ring seal and exclusion in the rotating part. Buna-N elastomer and stainless steel spring. |
| SHAFT SLEEVE: | Stainless steel. |
| O-RINGS: | Buna-N. |
| MOTOR: | High quality premium efficiency TEFC or ODP electric motors, 1 & 3 phases, 60 Hz, NEMA, with rated output from 2 up to 125 HP, 1750 & 3500 RPM and frame sizes from 182 JM to 405 JM. |
| HARDWARE: | Carbon steel. |
| PAINT: | Air dry enamel, water based. |

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► Receiving inspection

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. If the manual is removed from the packaging, do not lose or misplace.

► Storage

Any product that is stored for a period longer than six (6) months from the date of purchase should be bench tested prior to installation. A bench test consists of, checking the impeller to assure it is free turning and a run test to assure the motor (and switch if provided) operate properly.

At any time exceeding six (6) months, but no more than twenty four (24), the equipment must be stored in a controlled area, keeping it away from contact with rain, dust, etc., and the temperature is maintained between 43-104 °F. If there is a possibility of high humidity (coastlines, etc.), the entire unit must be sprayed with antioxidant liquid.

► Service Stations

To find the nearest Barmesa Pumps authorized service shop, please directly contact your distributor or the factory.

► Installation

The pump should be as close as possible to the liquid to be pumped, with a minimum number of couplings, adapters, etc., in order to reduce friction on the suction side.

The suction and discharge piping must be perfectly aligned in the pump volute and supported independently using support or anchors, this to prevent excessive load on the volute.

The anchors of the motor are to be anchor, on a raised base, approximately 4", this to prevent accumulated water from entering the motor.

***See Friction Table in pipes and fittings to determine the dimensions of the suction and discharge.*

► Suction

Use pipe or hose reinforced sufficiently robust to prevent collapsing by the difference in atmospheric pressure. Check for leaks at all joints.

A successful operation depends on the calculation of the friction loss in the suction, considering acceptable limits. The minimum suction pipe size to use can be determined by comparing the NPSH available at the pump suction against the NPSH required by the impeller, as shown in the performance curves.

Usually, we recommend using a pipe diameter of 1/2" to 1" greater as that of the suction volute or body.

A strainer or sieve should be installed in the suction to prevent the entry of objects. The strainer must have a free entry area at least three times the pipe diameter. Usually a suction valve is combined with a strainer *Figure 1*.

Figure 1 Proper installation.

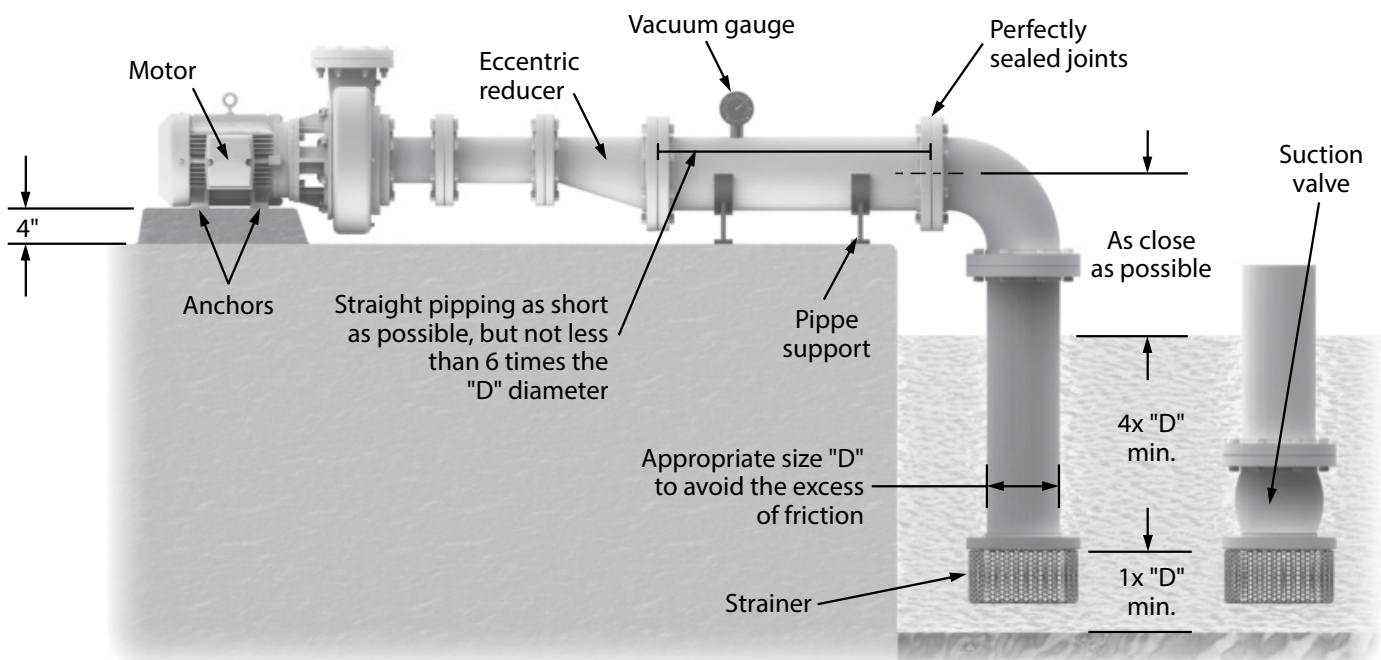


Table 1 Friction in meters x 100 m of piping.

| LITERS PER MINUTE | PIPING DIAMETER | | | | | | | | | | | GALLONS PER MINUTE |
|-------------------------|-----------------|------|-------|-------|-------|-------|------|-------|------|------|------|--------------------------|
| | 1" | 1¼" | 1½" | 2" | 2½" | 3" | 4" | 5" | 6" | 8" | 10" | |
| 30 | 4.54 | | | | | | | | | | | 8 |
| 37 | 6.86 | 1.77 | | | | | | | | | | 10 |
| 45 | 9.62 | 2.48 | | | | | | | | | | 12 |
| 57 | 16.2 | 4 | 1.53 | | | | | | | | | 15 |
| 68 | 20.6 | 5.22 | 2.42 | | | | | | | | | 18 |
| 76 | 25.1 | 6.34 | 2.94 | | | | | | | | | 20 |
| 95 | 38.7 | 9.6 | 4.48 | 1.2 | 0.54 | | | | | | | 25 |
| 113 | 54.6 | 13.6 | 6.26 | 1.82 | 0.75 | | | | | | | 30 |
| 151 | 95 | 23.5 | 10.79 | 3.1 | 1.28 | | | | | | | 40 |
| 170 | 119 | 29.4 | 13.45 | 3.85 | 1.6 | | | | | | | 45 |
| 189 | 146 | 36 | 16.4 | 4.67 | 1.94 | 0.66 | | | | | | 50 |
| 208 | | 43.2 | 19.7 | 5.51 | 2.33 | 0.79 | | | | | | 55 |
| 227 | | 51 | 23.2 | 6.59 | 2.72 | 0.92 | | | | | | 60 |
| 246 | | 59.6 | 27.1 | 7.7 | 3.17 | 1.07 | | | | | | 65 |
| 265 | | 68.8 | 31.3 | 8.86 | 3.63 | 1.22 | | | | | | 70 |
| 284 | | 78.7 | 35.8 | 10.15 | 4.14 | 1.39 | | | | | | 75 |
| 303 | | 89.2 | 40.5 | 11.4 | 4.66 | 1.57 | | | | | | 80 |
| 322 | | 100 | 45.6 | 12.6 | 5.27 | 1.77 | | | | | | 85 |
| 360 | | 125 | 56.5 | 15.8 | 6.49 | 2.18 | 0.57 | | | | | 95 |
| 378 | | 138 | 62.2 | 17.4 | 7.11 | 2.39 | 0.62 | | | | | 100 |
| 416 | | | 75.25 | 21.05 | 8.55 | 2.88 | 0.75 | | | | | 110 |
| 454 | | | 88.3 | 24.7 | 10 | 3.37 | 0.88 | | | | | 120 |
| 530 | | | 119 | 33.2 | 13.5 | 4.51 | 1.17 | 0.38 | | | | 140 |
| 568 | | | 137.5 | 38.1 | 15.45 | 5.16 | 1.33 | 0.43 | | | | 150 |
| 605 | | | 156 | 43 | 17.4 | 5.81 | 1.49 | 0.48 | | | | 160 |
| 643 | | | | 48.55 | 19.65 | 6.54 | 1.67 | 0.54 | | | | 170 |
| 681 | | | | 54.1 | 21.9 | 7.28 | 1.86 | 0.6 | | | | 180 |
| 757 | | | | 66.3 | 26.7 | 8.9 | 2.27 | 0.73 | 0.3 | | | 200 |
| 833 | | | | 80 | 32.2 | 10.07 | 2.72 | 0.87 | 0.35 | | | 220 |
| 908 | | | | 95 | 38.1 | 12.6 | 3.21 | 1.03 | 0.41 | | | 240 |
| 984 | | | | 111 | 44.5 | 14.7 | 3.74 | 1.2 | 0.48 | | | 260 |
| 1060 | | | | 128 | 51.3 | 16.9 | 4.3 | 1.38 | 0.56 | | | 280 |
| 1135 | | | | 146 | 58.5 | 19.2 | 4.89 | 1.58 | 0.63 | | | 300 |
| 1324 | | | | | 79.2 | 26.1 | 6.55 | 2.11 | 0.85 | | | 350 |
| 1514 | | | | | 103 | 33.9 | 8.47 | 2.72 | 1.09 | 0.27 | | 400 |
| 1892 | | | | | | 52.5 | 13 | 4.16 | 1.66 | 0.42 | | 500 |
| 2082 | | | | | | 63.2 | 15.7 | 4.94 | 2 | 0.5 | | 550 |
| 2271 | | | | | | 74.8 | 18.6 | 5.88 | 2.34 | 0.59 | 0.19 | 600 |
| 2649 | | | | | | 101 | 25 | 7.93 | 3.13 | 0.79 | 0.25 | 700 |
| 2838 | | | | | | | 28.7 | 9.07 | 3.59 | 0.91 | 0.29 | 750 |
| 3028 | | | | | | | 32.4 | 10.22 | 4.04 | 1.02 | 0.32 | 800 |
| 3217 | | | | | | | 36.6 | 11.56 | 4.5 | 1.13 | 0.36 | 850 |
| 3406 | | | | | | | 40.8 | 12.9 | 5.05 | 1.27 | 0.41 | 900 |
| 3595 | | | | | | | 45.5 | 14.35 | 5.61 | 1.42 | 0.45 | 950 |
| 3785 | | | | | | | 50.2 | 15.8 | 6.17 | 1.56 | 0.5 | 1000 |
| 4163 | | | | | | | | 19.15 | 7.41 | 1.87 | 0.6 | 1100 |
| 4542 | | | | | | | | 22.5 | 8.76 | 2.2 | 0.7 | 1200 |
| 4920 | | | | | | | | 26.45 | 10.2 | 2.56 | 0.81 | 1300 |

NOTE: The values in this table refer to frictions and clean water pipes and hoses smooth walls. As used pipe and / or hose rough walls increase the values about 50% to 100%.

Table 1 Equivalent length in meters of straight pipe and valve connections for calculating friction.

| PART | DESCRIPTION | DIAMETER | | | | | | | | | |
|-------------------------------------------------------------------------------------|--------------------------|----------|------|------|------|------|------|------|------|------|--|
| | | 1" | 1¼" | 1½" | 2" | 2½" | 3" | 4" | 5" | 6" | |
|  | STANDARD 90° ELBOW | 0.84 | 1.07 | 1.22 | 1.68 | 1.98 | 2.44 | 3.35 | 4.12 | 4.88 | |
|  | MEDIUM RADIUS ELBOW 90° | 0.69 | 0.92 | 1.07 | 1.37 | 1.68 | 2.14 | 2.75 | 3.51 | 4.27 | |
|  | LONG RADIUS ELBOW 90° | 0.54 | 0.69 | 0.84 | 1.07 | 1.37 | 1.6 | 2.14 | 2.75 | 3.36 | |
|  | STANDARD 45° ELBOW | 0.38 | 0.54 | 0.61 | 0.77 | 0.92 | 1.15 | 1.53 | 1.83 | 2.29 | |
|  | STANDARD TEE | 1.68 | 2.29 | 2.75 | 3.36 | 4.28 | 5.19 | 6.71 | 8.23 | 10.1 | |
|  | ANGLE GLOBE VALVE (OPEN) | 3.97 | 5.49 | 6.71 | 8.23 | 10.7 | 12.2 | 16.8 | 21.3 | 25.9 | |
|  | GLOBE VALVE (OPEN) | 7.93 | 10.7 | 13 | 16.8 | 21.3 | 24.4 | 35.1 | 42.7 | 48.8 | |
|  | GATE VALVE (OPEN) | 0.19 | 0.25 | 0.29 | 0.38 | 0.43 | 0.54 | 0.69 | 0.84 | 1.07 | |
|  | INCREASER | 1.21 | 1.52 | 1.82 | 2.74 | 3.35 | 4.26 | 6.09 | 7.92 | 10.1 | |
|  | REDUCER | 0.3 | 0.3 | 0.3 | 0.61 | 0.61 | 0.9 | 1.21 | 1.21 | 2.13 | |
|  | SUCTION VALVE | 0.91 | 1.21 | 1.52 | 2.13 | 2.74 | 3.35 | 4.87 | 6.4 | 7.92 | |

Figure 2 Wrong installation.

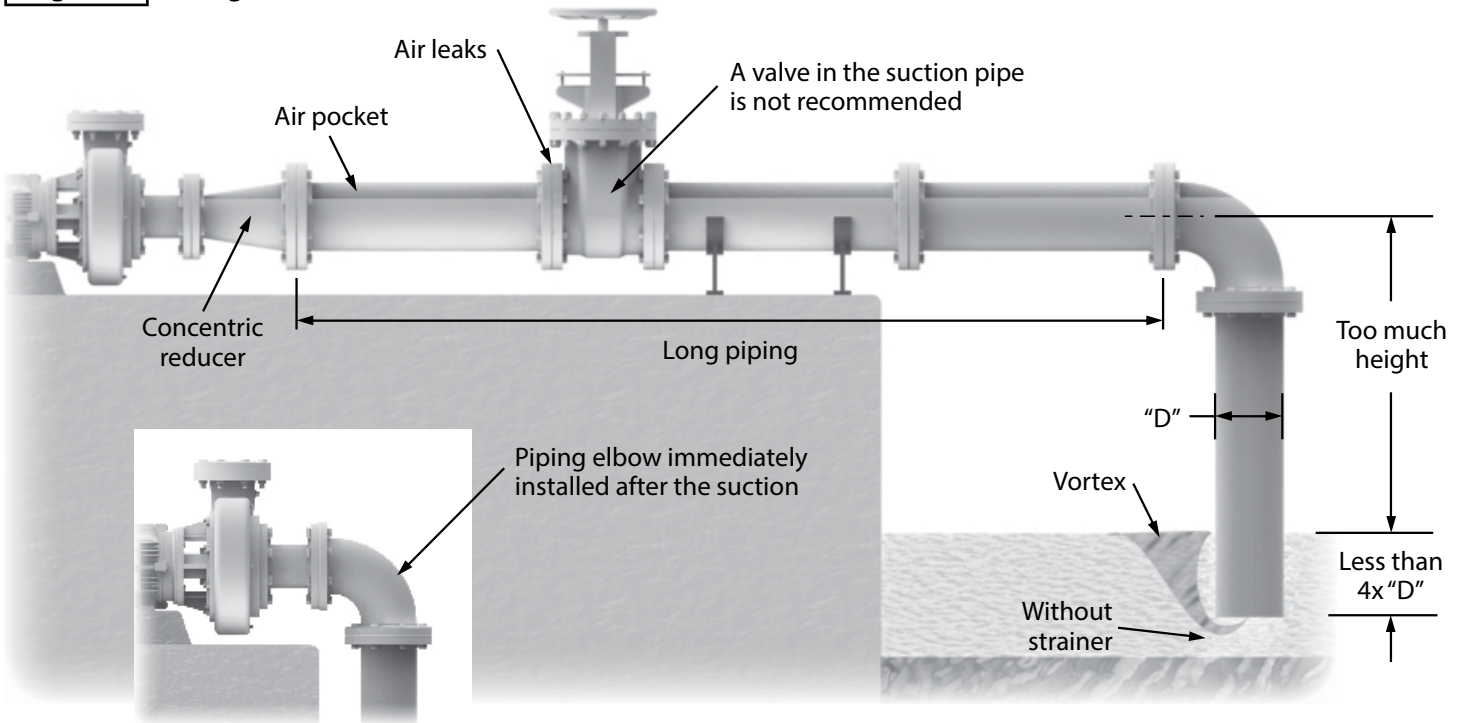


Figure 3 Inclination.

Suction Height - suction pipe should have a slope of 0.39" per 3.3 ft of suction. Never exceed 16.4 ft suction, considering friction. (Figure 3)

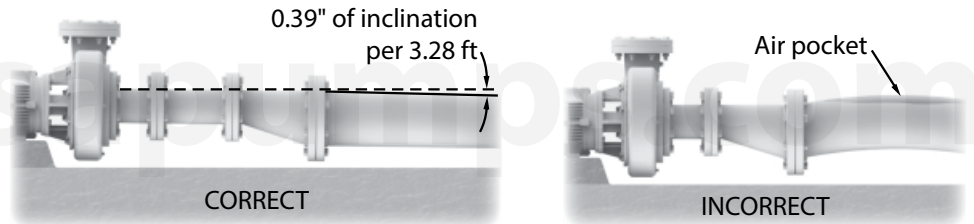
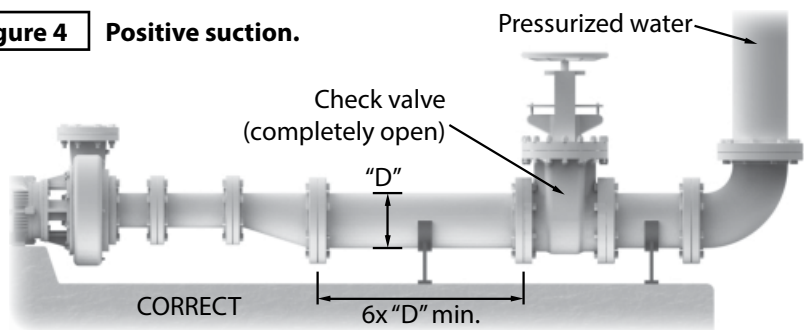


Figure 4 Positive suction.

Positive/Drowned Suction - A gate valve is installed in the suction pipe to service the pump (Figure 4). Volute or body have plugs, and these must be removed to allow trapped air to escape.



► **Discharge pipe**

Use pipe or hose reinforced sufficiently robust to prevent destruction due to high pressure.

Due to the cost of energy or BHP necessary to overcome the friction generated by using a smaller diameter pipe, a larger diameter discharge pipe is commonly used than the required by the volute or body.

Figure 5 Positive suction.

A retention valve in the suction pipe is not recommended. If required, better install the valve in the discharge pipe.

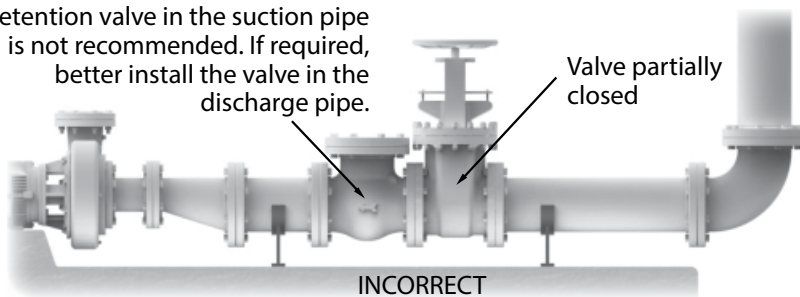
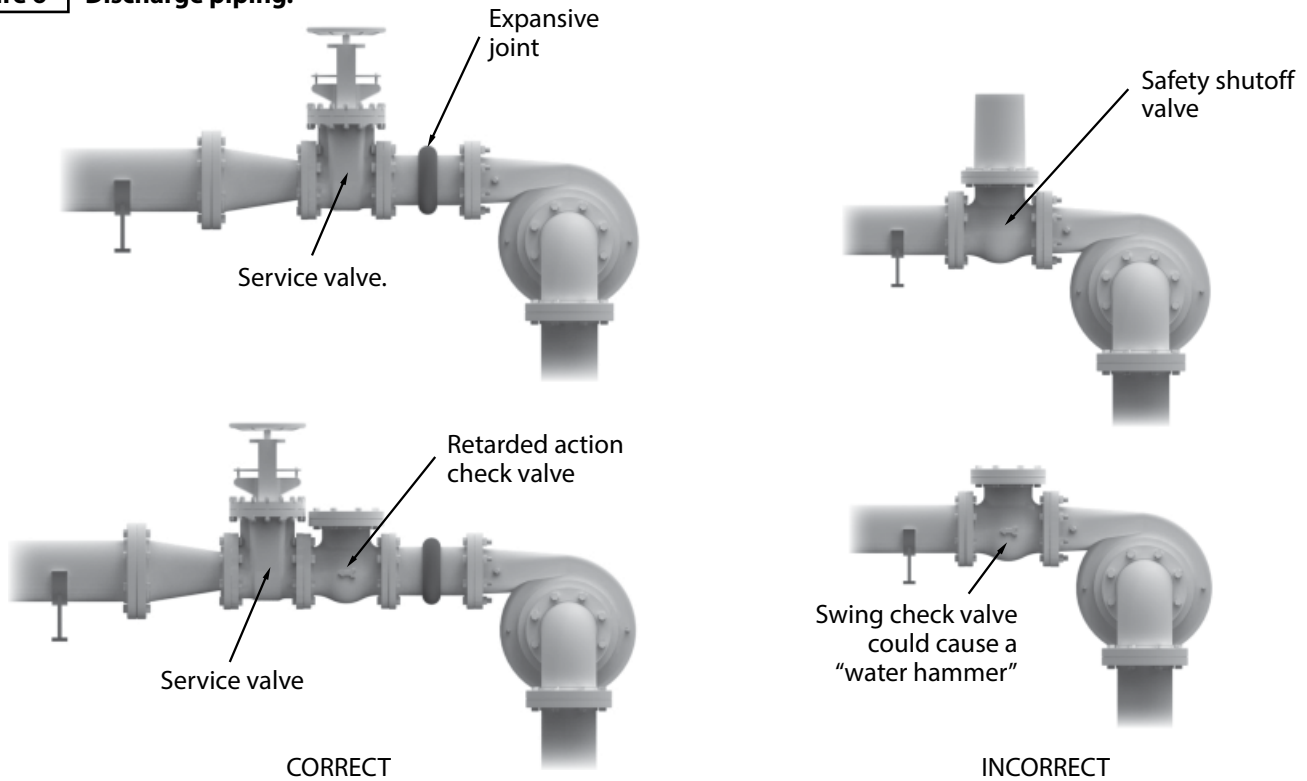


Figure 6 Discharge piping.



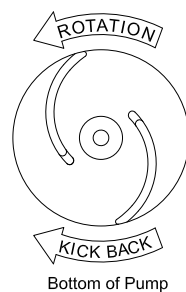
In order to determine the optimal size of the piping, compare the total cost of the equipment's operation (cost of the pump, control equipment, piping and energy consumption). By increasing the discharge diameter reasonably, it reduces the required BHP due to the low friction. Perform different tests using several piping diameters until you find the more convenient.

The pipe, valves, etc. should be perfectly align with the volutes suction and discharge centerlines, this to avoid any excessive loads on the pumps volute. If needed, install new expansive joints to protect the pump from excessive thermal or pressure forces.

► Pre-Operation

1. **Check Voltage and Phase** - Compare the voltage and phase information stamped on the pump name plate.

2. **Check Pump Rotation** - Improper motor rotation can result in poor pump performance and can damage the motor and/or pump. Check rotation on three phase units by momentarily applying power and observe the "kickback".



Kickback should always be in a counter-clockwise direction as viewed from motor end or opposite to impeller rotation. Impeller rotation is counter-clockwise as viewed from bottom of pump.

3. **Name Plate** - Record the information from the pump name plate to drawing in front of manual for future reference.

4. **Priming** - Every centrifugal pump must be primed (suction pipe and pump's body should have liquid), before operating.

Install the foot valve at the suction pipe *Figure 1* and fill with liquid the superior part of the pump's body. Sometimes air is trapped inside the body, to remove it you should uncap the male plug until the liquids spills out. Re-install the male plug using a sealant.



IMPORTANT! - *Do not operate pump without priming first. Operating dry will damage seal.*

▶ Starting

When starting for the first time your equipment check that the discharge valve is 90% closed. Gradually open the valve until the motor runs at full load (amperage plate). Never allow the amperage consumed by the pump exceeds the maximum permitted by the engine.

▶ Mechanical seal

Mechanical seals installed in this pumps are lubricated by water, there for the pump should not be operated dry. You will find the appropriate seal for each use and liquid to be pumped, check with your Barmesa Pumps distributor for more information.

▶ Stuffing box*

If the pump has graphite packing (stuffing box) consider the following:

- Y When the pump is placed into operation, the liquid will drip from the stuffing box; if this does not happen, loosen the nuts on the stuffing box until dripping occurs.
- Y After a few minutes of operation, gradually tighten the nuts until the drip decreases but does not stop.
- Y Once the pump has operated for a reasonable period and the dripping has not decreased to "a few drops per minute", it is necessary to tighten the nuts stuffing box. If tightening the nuts the required drip is not achieved, the graphite packing rings must be replaced.

▶ Frame*

All pumps come with factory lubricated bearings. It is very important to have oil in the oil tank. (Use oil DTE26). Change the oil every 1,000 hours of operation, considering a daily operation of 8 hours.

It is important not to overfill the oil tank because it would cause an increase in pressure by heating, affecting the bearings and seals. In normal operation, the frame temperature increases 122 °F above ambient temperature.

▶ Flexible coupling*

All pumps operated through flexible coupling or by pulleys and belts must be perfectly aligned to ensure smooth operation. In no case problems occur with flexible couplings if the pump-motor alignment is correct. All pumps are manufactured following this condition.

**For Barmesa pumps with universal transmission.*



IMPORTANT! - *Always unplug the pump before applying maintenance, service or repair to avoid electric shock.*

▶ Maintenance

Body and Impeller - All pump parts are removable by removing nuts and bolts. For body maintenance, disconnect the suction and discharge, and remove the body of the intermediate coupling. For maintenance of the impeller is not necessary to remove the suction or discharge, simply remove the body nuts; this would uncover the impeller. Examine and replace if it shows wear or damage.

When the impeller requires replacement, remove the screw of the shaft, and using a puller, remove the impeller being careful not to abuse the keyway of the shaft.

Mechanical Seal - To inspect or replace the shaft seal, remove the body and impeller. If any part shows wear or damage, replace both parts (stationary seat and rotary part). The rotating seal parts may be stuck together with the shaft, this happens when the seal has been assembled for a long time.

If the mechanical seal does not leak and there is need to open the pump for inspection or cleaning, *DO NOT* remove the seal, remove the spring only if the impeller needs to be removed. Once a seal has been in operation is very difficult to remove and reassembly without creating a seal leak.

▶ Disassembly

Mechanical Seal - Perform the steps above. Remove the rotating part. It may be necessary to remove the intermediate link to remove the stationary seat. To do this, remove the nuts and washers that attach the coupling to the motor. When removing the coupling, the steady part will move towards the front seat of the shaft and the sleeve. If the seat does not yield itself, push from the rear of the coupling.



Handle seal parts with extreme care. DO NOT damage lapped surfaces.

▶ Reassembly

Mechanical Seal - Identify all parts of *Figures 7 and 8*. The ring (6) and seat (1) are perfectly polished, so care must be taken not to scratch or smudge. The cleaning during the assembly process is very important.



IMPORTANT! - *All parts must be clean before reassembly.*

Step 1: Install the intermediate coupling if it was previously removed. Make sure the shaft and cavities, where will it seats, are clean. The shaft sleeve should not be sharp, but a radius of about 1/32". It is recommended that lightly polish the area of the shaft. If the shaft and its radius are perfectly polished, the seal can be relatively easily installed.

Step 2: Install the seat assembly (1 and 2) on the inside of the intermediate coupling, slightly moistening with water on the rubber parts (**do not use grease or oil**). This assembly should be done only manually, meaning without the use of an instrument.

Step 3: Install the rotating portion of the seal without the spring. Moisten the arrow and the inside of the seal with some water (**do not use grease or oil**). With clean, dry hands, insert the rotating portion to the shaft, sliding it abuts the stationary seat. Once the seal is in place, insert the spring (5).

Step 4: Place the impeller and washers; tighten the hex screw.

► Maintenance

Flexible Coupling - Universal type pumps generally use 2 different types of flexible couplings: the "Lovejoy" type with rubber spider, and the "Steelflex" type "F" with grids buffer.

The first mentioned coupling requires no lubrication, the second does require lubrication at least every twelve months. If the second type of coupling is exposed to excessive moisture, extreme temperatures, sudden loads applications, etc., it should be lubricated more often. For more information on the type of lubricant consult your distributor.

Figure 7 Mechanical Seal - Sectional View.

- 1 - Ceramic seat
- 2 - Seal seat Buna-N
- 3 - Inox. retainer
- 4 - Inox. jacket
- 5 - Inox. spring
- 6 - Carbon ring
- 7 - Elastomer Buna-N
- 8 - Inox. washer

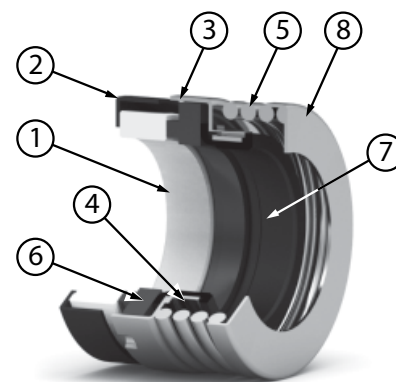
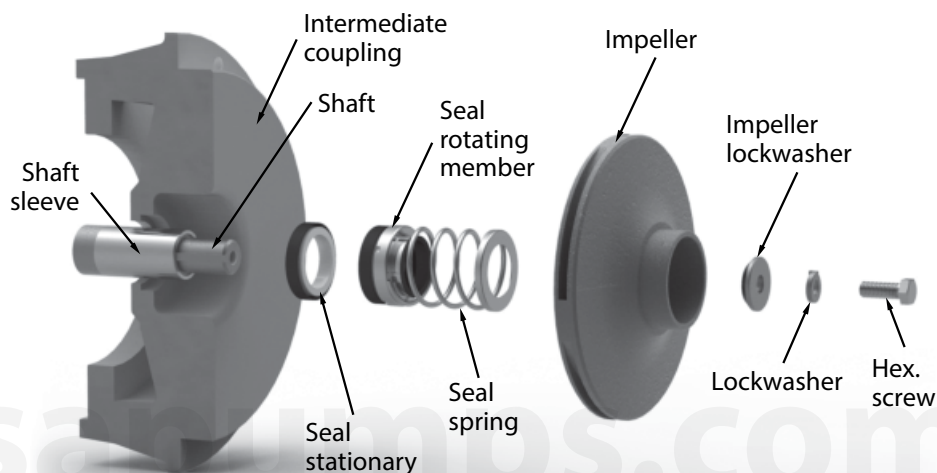


Figure 8 Mechanical Seal - Assembly.



► Flexible Coupling

"Lovejoy" type - To remove, just loosen the set screws on the hub. To reinstall, align the shaft and tighten the set screws. Should take in consideration a clearance of 1/16" (1.574 mm) between jaws. As mentioned earlier, a good alignment is essential for optimal operation.

"Steelflex" type - Identify the parts in *Figure 10*. The most relevant issue in the assembly of a coupling of this type is the clearance point that should be left between the hubs; to determine this see *Table 3*.

► Disassembly Flexible Coupling

ÿ Separate coupling covers, removing the nuts and bolts. Be sure not to damage the seal.

ÿ To remove the grid, use a round bar or a screwdriver to fit the curves of the grid.

ÿ Insert the tool into the open end of the grid toward the curved end, pry out gradually. Alternate procedure on each side to pop out half of the grating.

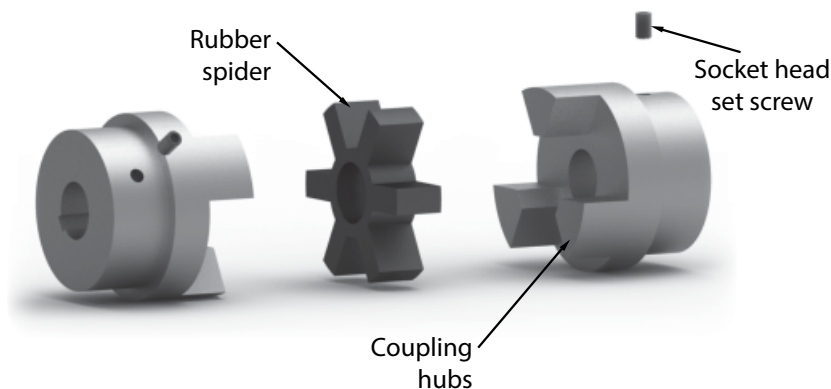
ÿ Repeat for each side until it clears the grid.

ÿ If you need to remove the hubs, loosen the set screws if the model has them.

► Assembly Flexible Coupling

ÿ If the hubs are removed, adjust shaft shims.

Figure 9 "Lovejoy" coupling.



ÿ Fit the covers with the seals (lightly greased) on the shaft.

ÿ Mount hubs on the shaft, leaving the faces flush with the shaft ends.

ÿ Tighten the set screws if the model has them.

ÿ Determine the required clearance using Table 3. Using a spacer bar with the obtained thickness, insert between the hubs at the the same depth and in 90° intervals.

ÿ Use a feeler gauge to measure the gap between the space bar and hub face. The difference between the maximum and minimum must not exceed the specified angular limit.

ÿ Check that the pump-motor alignment is correct, resting one square object straight (ruler) at 90° intervals. Check the clearance with a feeler gauge.

ÿ Proceed to tighten the anchor and check alignment and clearance again; if necessary, repeat the process from the beginning until you get a proper alignment.

ÿ Insert the joint by the clearance between the hubs and rest it on any of the covers. Lubricate the slots and clearance with as much grease as possible.

ÿ To insert the grid, note that their segments are radial. To extend as little as possible, go partially inserting segments using a soft mallet. Once the segments are in position, push them to the bottom of the grids.

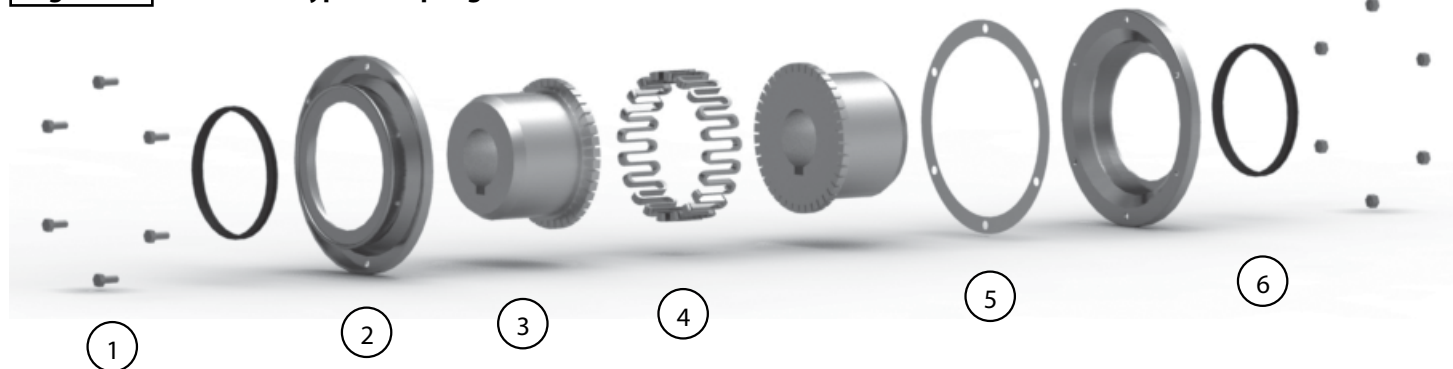
The grid the inner faces (INT) and external (EXT) are marked for easy identification.

ÿ Fill the spaces between the grid and around it with grease. Remove excess.

ÿ Oil the seals to slide on the hubs, align and assemble the covers, leaving a displacement of 180° between the lubrication holes.

ÿ Tighten the screws of the covers and check for proper assembly of the seals.

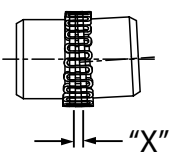
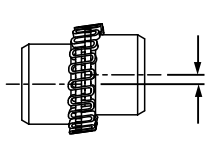
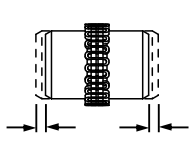
Figure 10 "Steelflex" type F coupling.



- 1 - Screws, nuts and washers
- 2 - Cover halves
- 3 - Gear hubs

- 4 - Grid members
- 5 - Gasket
- 6 - Seal rings

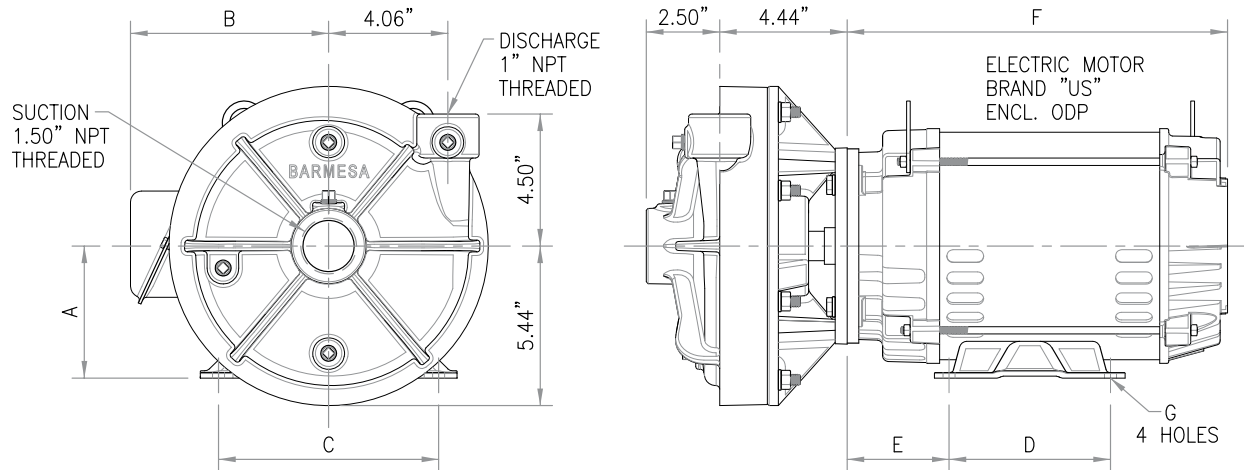
Table 3 Coupling installation.

| COUPLING SIZE | HUB GAP | MISALIGNMENT | | | | |
|---------------|---------|-----------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|
| | |  | |  | |  |
| | | ANGULAR MAX | RECOMMENDED ANGULAR | MECHANICAL PARALLEL OFFSET | MAX PARALLEL RECOMMENDED | TOTAL AXIAL |
| 3 | 1/8" | 0.026" | 0.005" | 0.015" | 0.005" | 0.156" |
| 4 | 1/8" | 0.028" | 0.005" | 0.02" | 0.007" | 0.188" |
| 5 | 1/8" | 0.033" | 0.005" | 0.02" | 0.007" | 0.188" |
| 6 | 1/8" | 0.038" | 0.005" | 0.02" | 0.007" | 0.188" |
| 7 | 1/8" | 0.045" | 0.005" | 0.02" | 0.007" | 0.188" |
| 8 | 1/8" | 0.052" | 0.01" | 0.03" | 0.01" | 0.25" |
| 9 | 1/8" | 0.057" | 0.01" | 0.04" | 0.01" | 0.25" |
| 10 | 3/16" | 0.063" | 0.01" | 0.04" | 0.01" | 0.375" |
| 11 | 3/16" | 0.071" | 0.01" | 0.04" | 0.01" | 0.375" |
| 12 | 3/16" | 0.078" | 0.012" | 0.04" | 0.012" | 0.375" |
| 13 | 3/16" | 0.091" | 0.012" | 0.04" | 0.012" | 0.375" |
| 14 | 1/4" | 0.098" | 0.012" | 0.045" | 0.012" | 0.5" |
| 15 | 1/4" | 0.1" | 0.012" | 0.045" | 0.012" | 0.5" |
| 16 | 1/4" | 0.1" | 0.012" | 0.045" | 0.012" | 0.5" |
| 17 | 1/4" | 0.105" | 0.012" | 0.045" | 0.012" | 0.5" |
| 18 | 1/4" | 0.125" | 0.012" | 0.045" | 0.012" | 0.5" |

NOTE 1: "X" is the difference between the measures of the clearance, taken at opposite ends of the hub flanges.

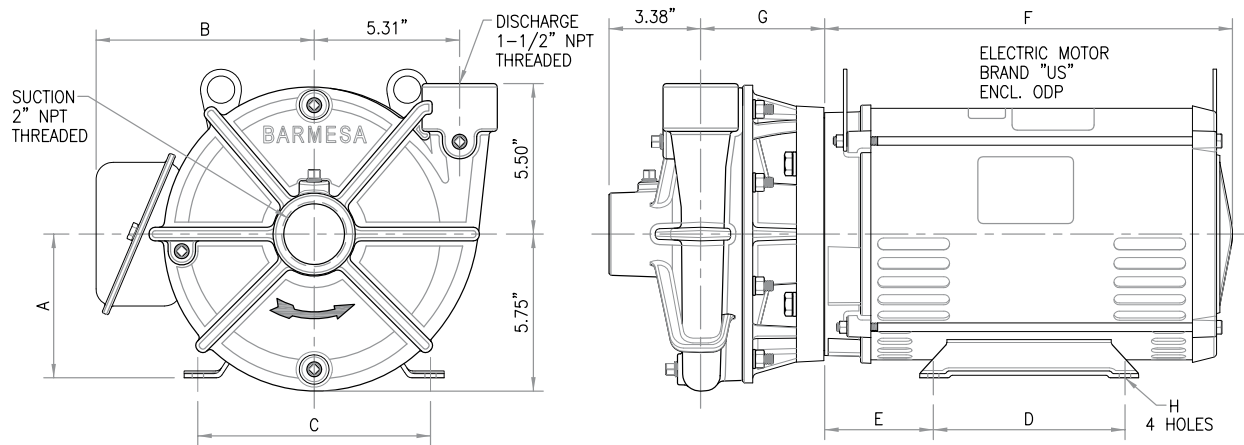
NOTE 2: the values of the parallel offset may be absorbed by the articulation between the hubs and the grid. In any case, the lifetime of the couplings will increase with a minimum maintenance if a precision alignment is performed.

HIGH PRESSURE CENTRIFUGAL PUMP MODEL IA1, GENERAL DIMENSIONS



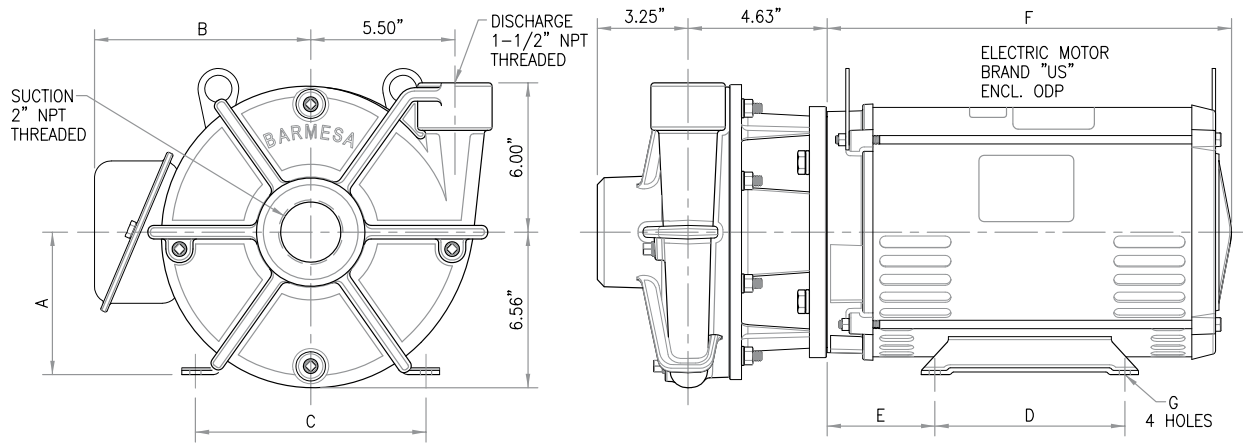
| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G |
|-----------|-----|------|-------|-------|-------|-------|------|------|-------|--------|-------|
| IA1-2-4 | 2 | 1735 | 3 | 145JM | 3.5" | | 5.5" | 5" | 2.75" | 12" | 0.34" |
| IA1-3-2 | 3 | 3510 | 3 | 182JM | 4.5" | 6.88" | 7.5" | 4.5" | 3.63" | 11.81" | 0.41" |
| IA1-5-2 | 5 | 3490 | 3 | 184JM | | | | 5.5" | 4.25" | 13.5" | 0.41" |
| IA1-7.5-2 | 7.5 | 3515 | 3 | 213JM | 5.25" | 7.6" | 8.5" | | | | |

HIGH PRESSURE CENTRIFUGAL PUMP MODEL IA1½ & IA1½H GENERAL DIMENSIONS



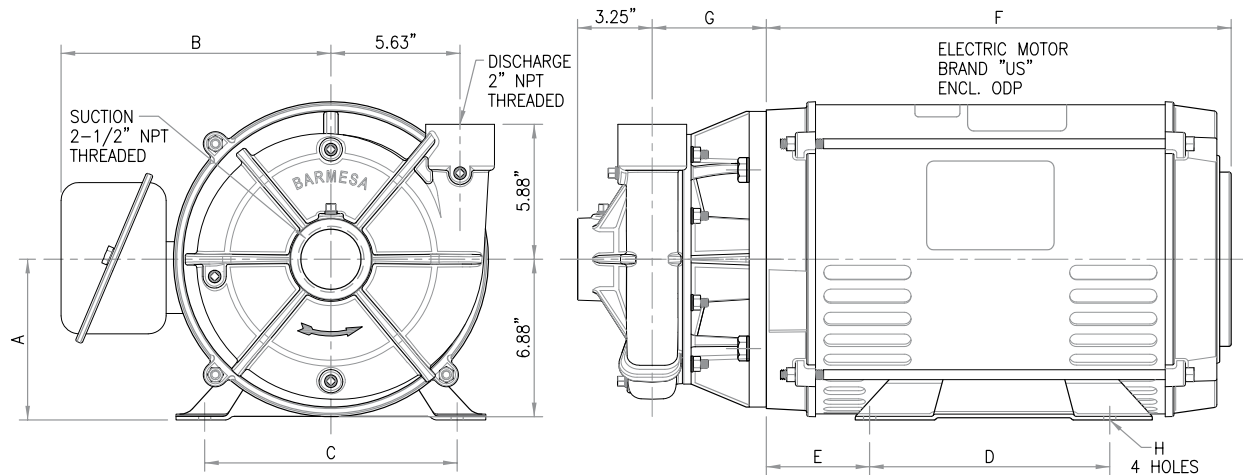
| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G | H |
|------------|-----|------|-------|-------|-------|--------|------|-------|-------|--------|-------|-------|
| IA1½-5-2 | 5 | 3490 | 3 | 184JM | 4.5" | 6.88" | 7.5" | 5.5" | 3.63" | 11.81" | 4.25" | 0.41" |
| IA1½-7.5-2 | 7.5 | 3515 | 3 | 213JM | 5.25" | 7.6" | 8.5" | 5.5" | 4.25" | 13.25" | | |
| IA1½-10-2 | 10 | 3505 | 3 | 215JM | | | | 7" | | 14.75" | | |
| IA1½-15-2 | 15 | 3530 | 3 | 254JM | 6.25" | 10" | 10" | 8.25" | 4.5" | 19.06" | 4.54" | 0.53" |
| IA1½-20-2 | 20 | 3525 | 3 | 256JM | | | | 10" | | 19.65" | | |
| IA1½H-3-4 | 3 | 1740 | 3 | 182JM | 4.5" | 6.88" | 7.5" | 4.5" | 3.63" | 11.81" | 4.25" | 0.41" |
| IA1½H-15-2 | 15 | 3530 | 3 | 254JM | 6.25" | 10" | 10" | 8.25" | 4.5" | 19.06" | 4.54" | |
| IA1½H-20-2 | 20 | 3525 | 3 | 256JM | | | | 10" | | 19.65" | | 0.53" |
| IA1½H-25-2 | 25 | 3525 | 3 | 284JM | 7" | 11.75" | 11" | 9.5" | 4.75" | 20.5" | 5.18" | |
| IA1½H-30-2 | 30 | 3525 | 3 | 286JM | | | | 11" | | | | |

HIGH PRESSURE CENTRIFUGAL PUMP MODEL IA1½XH GENERAL DIMENSIONS



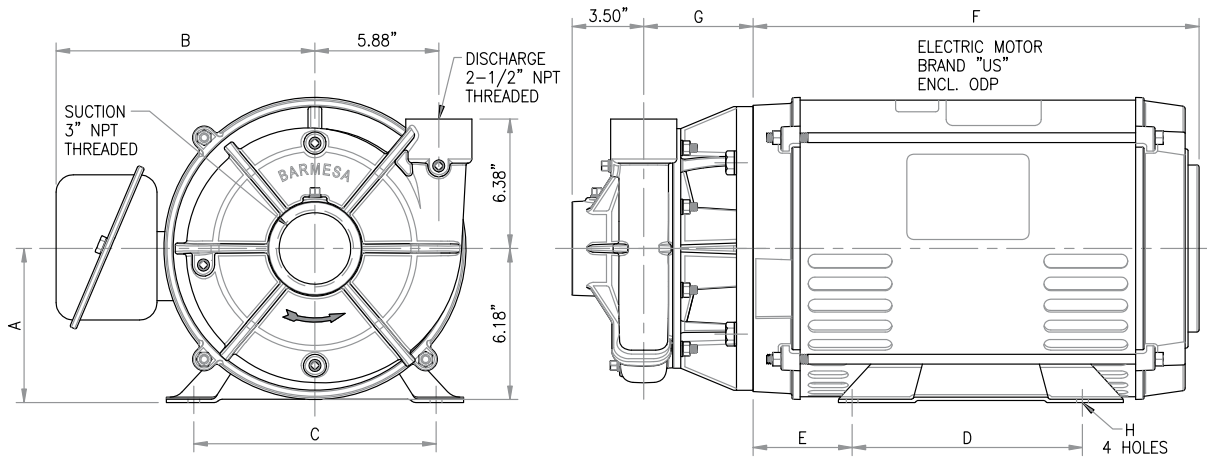
| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G |
|-------------|----|------|-------|-------|-------|--------|------|-------|-------|--------|-------|
| IA1½XH-3-4 | 3 | 1750 | 3 | 182JM | 4.5" | 6.88" | 7.5" | 4.5" | 3.63" | 11.81" | 0.41" |
| IA1½XH-5-4 | 5 | 1730 | 3 | 184JM | | | | 5.5" | | | |
| IA1½XH-15-2 | 15 | 3530 | 3 | 254JM | 6.25" | 10" | 10" | 8.25" | 4.5" | 19.06" | 0.53" |
| IA1½XH-20-2 | 20 | 3525 | 3 | 256JM | | | | 10" | | 19.65" | |
| IA1½XH-25-2 | 25 | 3525 | 3 | 284JM | 7" | 11.75" | 11" | 9.5" | 4.75" | 20.5" | |

HIGH PRESSURE CENTRIFUGAL PUMP MODELS IA2 & IA2H GENERAL DIMENSIONS



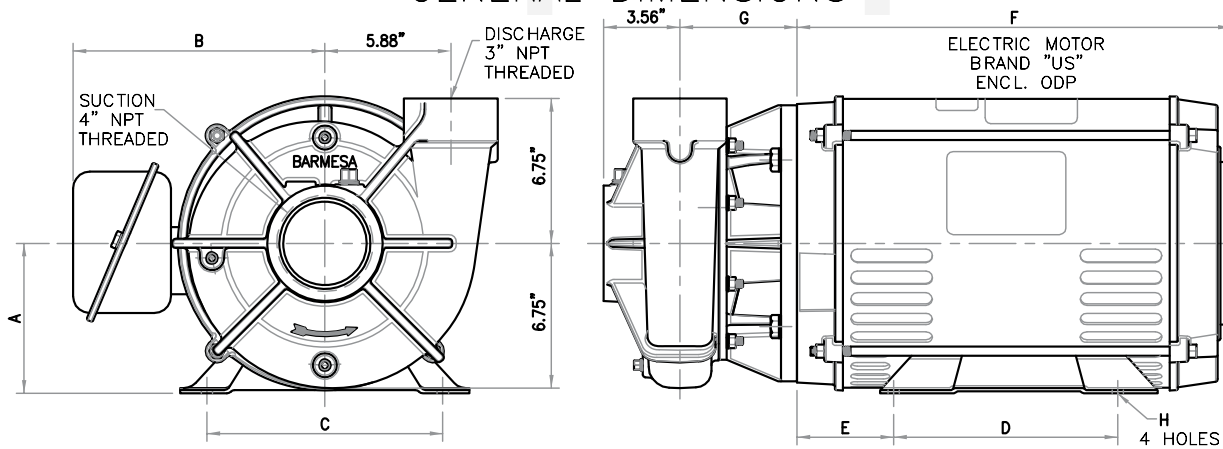
| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G | H |
|-----------|----|------|-------|-------|-------|--------|------|-------|-------|--------|-------|-------|
| IA2-2-4 | 2 | 1735 | 3 | 145JM | 3.5" | 6.88" | 5.5" | 5" | 2.75" | 12" | 4.03" | 0.34" |
| IA2-10-2 | 10 | 3505 | 3 | 215JM | 5.25" | 7.6" | 8.5" | 7" | 4.25" | 14.75" | 4.28" | 0.41" |
| IA2-15-2 | 15 | 3530 | 3 | 254JM | 6.25" | 10" | 10" | 8.25" | 4.5" | 19.06" | 4.03" | |
| IA2-20-2 | 20 | 3525 | 3 | 256JM | | | | 10" | | | | |
| IA2-25-2 | 25 | 3525 | 3 | 284JM | 7" | 11.75" | 11" | 9.5" | 4.75" | 20.5" | 5" | 0.53" |
| IA2-30-2 | 30 | 3525 | 3 | 286JM | | | | 11" | | | | |
| IA2H-25-2 | 25 | 3525 | 3 | 284JM | | | | 9.5" | | | | |
| IA2H-30-2 | 30 | 3525 | 3 | 286JM | | | | 11" | | | | |

HIGH PRESSURE CENTRIFUGAL PUMP MODEL IA2½ GENERAL DIMENSIONS



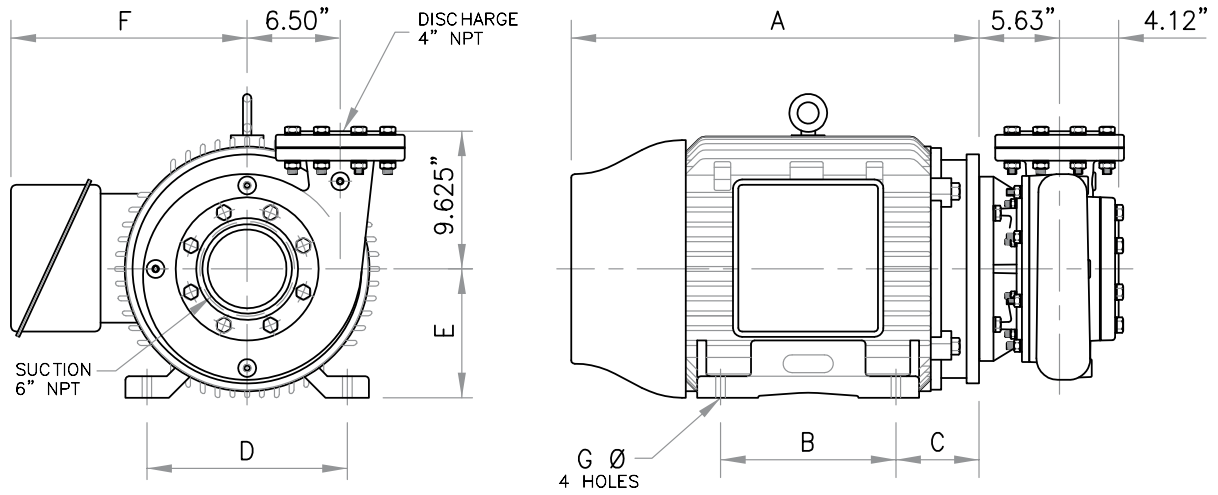
| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G | H |
|-----------|----|------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|
| IA2½-3-4 | 3 | 1740 | 3 | 182JM | 4.5" | 6.88" | 7.5" | 4.5" | 3.63" | 11.81" | 4.47" | 0.41" |
| IA2½-5-4 | 5 | 1730 | 3 | 184JM | | | | 5.5" | | | | |
| IA2½-10-2 | 10 | 3505 | 3 | 215JM | 5.25" | 7.6" | 8.5" | 7" | 4.25" | 15" | 4.72" | 0.53" |
| IA2½-15-2 | 15 | 3530 | 3 | 254JM | 6.25" | 10" | 10" | 8.25" | 4.75" | 19.31" | | |
| IA2½-20-2 | 20 | 3525 | 3 | 256JM | | | | 10" | | | 20.5" | 5.44" |
| IA2½-25-2 | 25 | 3525 | 3 | 284JM | 7" | 11.75" | 11" | 9.5" | | | | |
| IA2½-30-2 | 30 | 3525 | 3 | 286JM | | | | 11" | | | | |
| IA2½-40-2 | 40 | 3530 | 3 | 324JM | 8" | 14.75" | 12.5" | 10.5" | 5.25" | 22.25" | | 0.69" |

HIGH PRESSURE CENTRIFUGAL PUMP MODEL IA3 & IA3H GENERAL DIMENSIONS



| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G | H |
|-----------|-----|------|-------|-------|-------|--------|-------|--------|-------|--------|-------|--------|
| IA3-3-4 | 3 | 1740 | 3 | 182JM | 4.5" | 6.88" | 7.5" | 4.5" | 3.63" | 11.81" | 4.53" | 0.41" |
| IA3-5-4 | 5 | 1730 | 3 | 184JM | | | | 5.5" | | | | |
| IA3-7.5-4 | 7.5 | 1750 | 3 | 213JM | 5.25" | 7.6" | 8.5" | 5" | 4.25" | 13.5" | 4.78" | 0.53" |
| IA3-15-2 | 15 | 3530 | 3 | 254JM | 6.25" | 10" | 10" | 8.25" | 4.75" | 19.31" | 5.53" | |
| IA3-20-2 | 20 | 3525 | 3 | 256JM | | | | 10" | | | | 19.94" |
| IA3-25-2 | 25 | 3525 | 3 | 284JM | 7" | 11.75" | 11" | 9.5" | | 20.5" | 5.46" | |
| IA3-30-2 | 30 | 3525 | 3 | 286JM | | | | 11" | | | | |
| IA3-40-2 | 40 | 3530 | 3 | 324JM | 8" | 14.75" | 12.5" | 10.5" | 5.25" | 22.25" | | 0.69" |
| IA3-50-2 | 50 | 3530 | 3 | 326JM | | | | 12" | | | | |
| IA3H-30-2 | 30 | 3525 | 3 | 286JM | 7" | 11.75" | 11" | 11" | 4.75" | 20.5" | | 0.53" |
| IA3H-40-2 | 40 | 3530 | 3 | 324JM | 8" | 14.75" | 12.5" | 10.5" | 5.25" | 22.25" | 5.46" | 0.69" |
| IA3H-50-2 | 50 | 3530 | 3 | 326JM | | | | 12" | | | | |
| IA3H-60-2 | 60 | 3565 | 3 | 364JM | 9" | 16.31" | 14" | 11.25" | 5.88" | 23" | | |
| IA3H-75-2 | 75 | 3565 | 3 | 365JM | | | | 12.25" | | | 24" | |

HIGH PRESSURE CENTRIFUGAL PUMP MODEL IA4 GENERAL DIMENSIONS



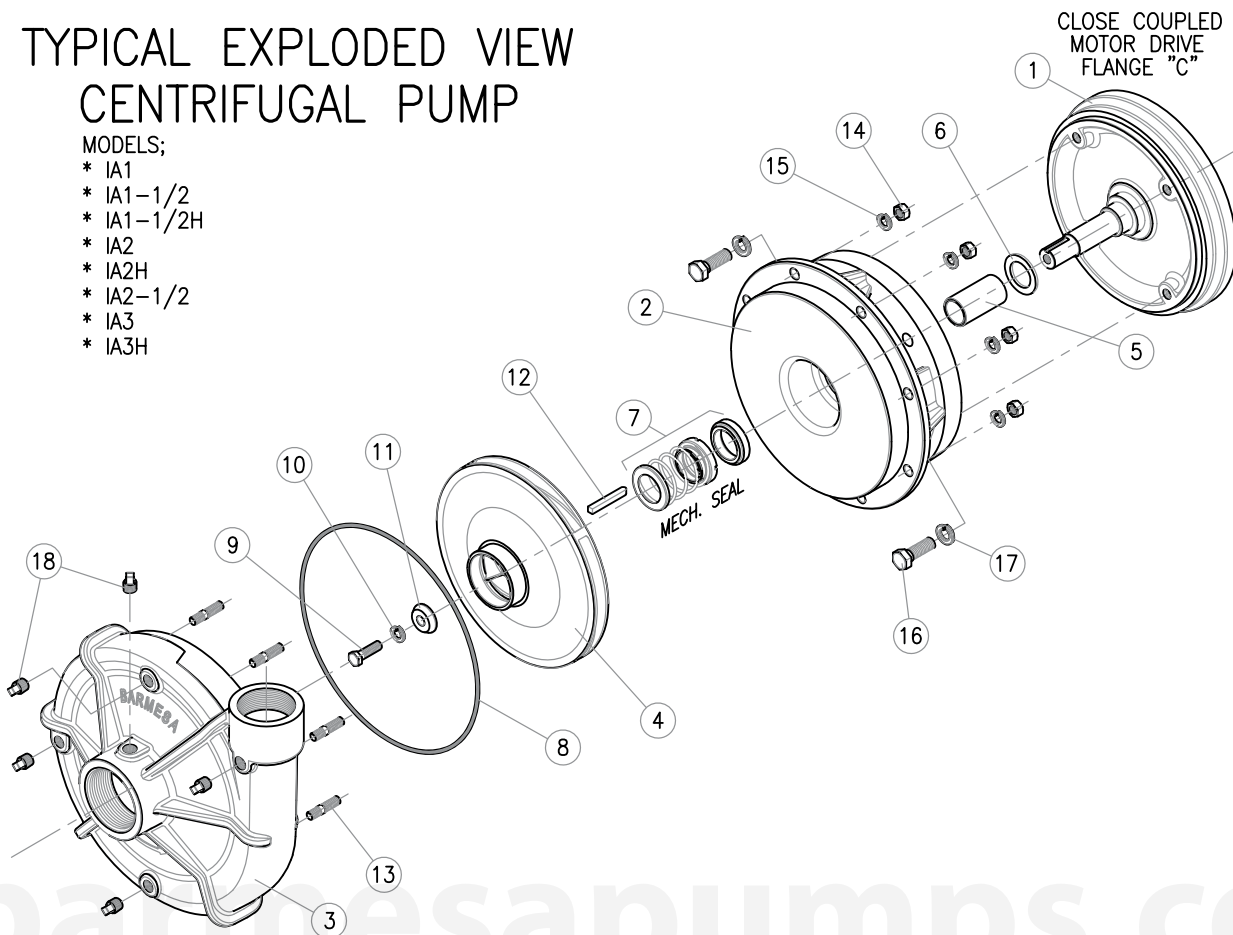
| MODEL | HP | RPM | PHASE | FRAME | A | B | C | D | E | F | G |
|-----------|-----|------|-------|--------|--------|--------|-------|-------|-----|--------|-------|
| IA4-40-2 | 40 | 3530 | 3 | 324TSC | 24" | 10.5" | 5" | 12.5" | 8" | 12" | 0.66" |
| IA4-50-2 | 50 | 3530 | 3 | 326TSC | 25.5" | 12" | | 12.5" | 8" | 12" | 0.66" |
| IA4-60-2 | 60 | 3565 | 3 | 364TSC | 28" | 11.25" | 5.75" | 14" | 9" | 16.5" | 0.66" |
| IA4-75-2 | 75 | 3555 | 3 | 365TSC | 29" | 12.25" | 6.38" | 16" | 10" | 18.75" | 0.81" |
| IA4-100-2 | 100 | 3560 | 3 | 405TSC | 30.5" | 13.75" | | 16" | 10" | | |
| IA4-125-2 | 125 | 3570 | 3 | 444TSC | 37.75" | 14.5" | 8.75" | 18" | 11" | | |

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TYPICAL EXPLODED VIEW CENTRIFUGAL PUMP

MODELS;

- * IA1
- * IA1-1/2
- * IA1-1/2H
- * IA2
- * IA2H
- * IA2-1/2
- * IA3
- * IA3H



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► IA1

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|---------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 2 HP, 1750 RPM, 3 PH, FRAME 145T JM | |
| | | 3 HP, 3510 RPM, 3 PH, FRAME 182T JM | |
| | | 5 HP, 3490 RPM, 3 PH, FRAME 184T JM | |
| | | 7.5 HP, 3515 RPM, 3 PH, FRAME 213T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 2 TO 5 HP | 03010028 |
| | | INTERMEDIATE COUPLING, FOR 7.5 HP | 03010018 |
| 3 | 1 | VOLUTE CASE | 03090038 |
| 4 | 1 | IMPELLER IA1-3-2, Ø5.75" | 03140031 |
| | | IMPELLER IA1-5-2, Ø6.81" | 03140031B |
| | | IMPELLER IA1-2-4 & IA1-7.5-2, Ø7.50" | 03140031C |
| 5 | 1 | SHAFT SLEEVE | 30400808 |
| 6 | 1 | SLINGER | 92010014 |
| 7 | 1 | MECHANICAL SEAL | 31030131 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW | 91010345C |
| 10 | 1 | LOCK WASHER 3/8" SS | 91010061 |
| 11 | 1 | IMPELLER WASHER | 30400418 |
| 12 | 1 | SHAFT KEY | 30400631 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| | | | |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| | | | |
| 15 | 8 | LOCK WASHER 3/8" STEEL | 91010012 |
| | | | |
| 16 | 4 | CAP SCREW 3/8-16 X 1.25" | 91010243 |
| | | CAP SCREW 1/2-13 X 1.50" | 91010263 |
| 17 | 4 | LOCK WASHER 3/8" STEEL | 91010012 |
| | | LOCK WASHER 1/2" STEEL | 91010014 |
| 18 | 5 | PIPE PLUG 1/4" NPT | 93010143 |

▶ IA1½

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|------------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 5 HP, 3490 RPM, 3 PH, FRAME 184T JM | |
| | | 7.5 HP, 3515 RPM, 3 PH, FRAME 213T JM | |
| | | 10 HP, 3505 RPM, 3 PH, FRAME 215T JM | |
| | | 15 HP, 3530 RPM, 3 PH, FRAME 254T JM | |
| | | 20 HP, 3525 RPM, 3 PH, FRAME 256T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 5 HP | 03010028 |
| | | INTERMEDIATE COUPLING, FOR 7.5 TO 15 HP | 03010018 |
| | | INTERMEDIATE COUPLING, FOR 20 HP | 03010051 |
| 3 | 1 | VOLUTE CASE | 03090039 |
| 4 | 1 | IMPELLER IA1½-5-2, Ø6.22" | 03140032 |
| | | IMPELLER IA1½-7.5-2, Ø7.13" | 03140032B |
| | | IMPELLER IA1½-10-2, Ø8.00" | 03140032C |
| | | IMPELLER IA1½-15 & 20-2, Ø9.00" | 03140032E |
| 5 | 1 | SHAFT SLEEVE, FOR 5 TO 10 HP | 30400808 |
| | | SHAFT SLEEVE, FOR 15 & 20 HP | 30400812 |
| 6 | 1 | SLINGER, FOR 5 TO 10 HP | 92010014 |
| | | SLINGER, FOR 15 & 20 HP | 92010016 |
| 7 | 1 | MECH. SEAL, FOR 5 TO 10 HP | 31030131 |
| | | MECH. SEAL, FOR 15 & 20 HP | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW, FOR 5 TO 10 HP | 91010345C |
| | | IMPELLER'S SCREW, FOR 15 & 20 HP | 91010351 |
| 10 | 1 | LOCK WASHER, 3/8" SS, FOR 5 TO 10 HP | 91010061 |
| | | LOCK WASHER, 1/2" SS, FOR 15 & 20 HP | 91010062 |
| 11 | 1 | IMPELLER WASHER, FOR 5 TO 10 HP | 30400418 |
| | | IMPELLER WASHER, FOR 15 & 20 HP | 30400416 |
| 12 | 1 | SHAFT KEY, FOR 5 TO 10 HP | 30400631 |
| | | SHAFT KEY, FOR 15 & 20 HP | 30400633 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW, 3/8-16 X 1.25" FOR 5 TO 10 HP | 91010243 |
| | | CAP SCREW, 1/2-13 X 1.50" FOR 15 & 20 HP | 91010263 |
| 17 | 4 | LOCK WASHER, 3/8" STEEL, FOR 5 TO 10 HP | 91010012 |
| | | LOCK WASHER, 1/2" STEEL, FOR 15 & 20 HP | 91010014 |
| 18 | 5 | PIPE PLUG 1/4" NPT | 93010143 |

▶ IA1½H

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|------------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 3 HP, 1740 RPM, 3 PH, FRAME 182T JM | |
| | | 15 HP, 3530 RPM, 3 PH, FRAME 254T JM | |
| | | 20 HP, 3525 RPM, 3 PH, FRAME 256T JM | |
| | | 25 HP, 3530 RPM, 3 PH, FRAME 284T JM | |
| | | 30 HP, 3525 RPM, 3 PH, FRAME 286T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 3 HP | 03010028 |
| | | INTERMEDIATE COUPLING, FOR 15 HP | 03010018 |
| | | INTERMEDIATE COUPLING, FOR 20 HP | 03010051 |
| | | INTERMEDIATE COUPLING, FOR 25 & 30 HP | 03010020 |
| 3 | 1 | VOLUTE CASE | 03090039B |
| 4 | 1 | IMPELLER IA1½H-15-2, Ø7.94" (SHAFT Ø1¼") | 03140065 |
| | | IMPELLER IA1½H-20-2, Ø8.63" (SHAFT Ø1¼") | 03140065B |
| | | IMPELLER IA1½H-25 & 30-2, Ø9.00" | 03140065C |
| | | IMPELLER IA1½H-3-4, Ø9.00" (SHAFT Ø7/8") | 03140032G |
| 5 | 1 | SHAFT SLEEVE, FOR 3 HP TO 20 HP | 30400808 |
| | | SHAFT SLEEVE, FOR 25 TO 30 HP | 30400812 |
| 6 | 1 | SLINGER, FOR 3 HP TO 20 HP | 92010014 |
| | | SLINGER, FOR 25 & 30 HP | 92010016 |
| 7 | 1 | MECH. SEAL, FOR 3 TO 20 HP | 31030131 |
| | | MECH. SEAL, FOR 25 & 30 HP | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW, FOR 3 TO 20 HP | 91010345C |
| | | IMPELLER'S SCREW, FOR 25 & 30 HP | 91010351 |
| 10 | 1 | LOCK WASHER, 3/8" SS, FOR 3 TO 20 HP | 91010061 |
| | | LOCK WASHER, 1/2" SS, FOR 25 & 30 HP | 91010062 |
| 11 | 1 | IMPELLER WASHER, FOR 3 TO 20 HP | 30400418 |
| | | IMPELLER WASHER, FOR 25 & 30 HP | 30400416 |
| 12 | 1 | SHAFT KEY, FOR 3 TO 20 HP | 30400631 |
| | | SHAFT KEY, FOR 25 & 30 HP | 30400633 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW, 3/8-16 X 1.25" FOR 3 HP | 91010243 |
| | | CAP SCREW, 1/2-13 X 1.50" FOR 15 & 20 HP | 91010263 |
| | | CAP SCREW, 5/8-11 X 1.50" FOR 25 & 30 HP | 91010282 |
| 17 | 4 | LOCK WASHER, 3/8" STEEL, FOR 3 HP | 91010012 |
| | | LOCK WASHER, 1/2" STEEL, FOR 15 & 20 HP | 91010014 |
| | | LOCK WASHER, 5/8" STEEL, FOR 25 TO 30 HP | 91010015 |
| 18 | 5 | PIPE PLUG 1/4" NPT | 93010143 |

▶ IA2½

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|-------------------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 3 HP, 1740 RPM, 3 PH, FRAME 182T JM | |
| | | 5 HP, 1730 RPM, 3 PH, FRAME 184T JM | |
| | | 10 HP, 3505 RPM, 3 PH, FRAME 215T JM | |
| | | 15 HP, 3530 RPM, 3 PH, FRAME 254T JM | |
| | | 20 HP, 3525 RPM, 3 PH, FRAME 256T JM | |
| | | 25 HP, 3525 RPM, 3 PH, FRAME 284T JM | |
| | | 30 HP, 3525 RPM, 3 PH, FRAME 286T JM | |
| | | 40 HP, 3530 RPM, 3 PH, FRAME 324T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 2 HP, 1750 RPM | 03010028 |
| | | INTERMEDIATE COUPLING, FOR 10 & 15 HP, 3500 RPM | 03010018 |
| | | INTERMEDIATE COUPLING, FOR 20 HP, 3525 RPM | 03010051 |
| | | INTERMEDIATE COUPLING, FOR 25 & 30 HP, 3525 RPM | 03010020 |
| 3 | 1 | VOLUTE CASE | 03090041 |
| 4 | 1 | IMPELLER IA2½ FOR 3 HP, Ø9.00" (SHAFT Ø7/8") | 03140034K |
| | | IMPELLER IA2½ FOR 5 HP, Ø9.00" (SHAFT Ø7/8") | 03140034K |
| | | IMPELLER IA2½ FOR 10 HP, Ø6.94" (SHAFT Ø7/8") | 03140034 |
| | | IMPELLER IA2½ FOR 15 HP, Ø6.94" (SHAFT Ø1¼") | 03140034 |
| | | IMPELLER IA2½ FOR 20 HP, Ø7.69" (SHAFT Ø1¼") | 03140034B |
| | | IMPELLER IA2½ FOR 25 HP, Ø8.44" (SHAFT Ø1¼") | 03140034C |
| | | IMPELLER IA2½ FOR 30 HP, Ø8.88" (SHAFT Ø1¼") | 03140034D |
| 5 | 1 | SHAFT SLEEVE, FOR 3 & 10 HP | 30400808 |
| | | SHAFT SLEEVE, FOR 15 TO 40 HP | 30400812 |
| 6 | 1 | SLINGER, FOR 3 TO 10 HP, Ø1¼" | 92010014 |
| | | SLINGER, FOR 15 TO 40 HP, Ø1¾" | 92010016 |
| 7 | 1 | MECH. SEAL, FOR 3 TO 10 HP | 31030131 |
| | | MECH. SEAL, FOR 15 TO 40 HP | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW, FOR 3 TO 10 HP | 91010345C |
| | | IMPELLER'S SCREW, FOR 15 TO 40 HP | 91010351 |
| 10 | 1 | LOCK WASHER, 3/8" SS, FOR 3 TO 10 HP | 91010061 |
| | | LOCK WASHER, 1/2" SS, FOR 15 TO 40 HP | 91010062 |
| 11 | 1 | IMPELLER WASHER, FOR 3 TO 10 HP | 30400418 |
| | | IMPELLER WASHER, FOR 15 TO 40 HP | 30400416 |
| 12 | 1 | SHAFT KEY, FOR 3 HP TO 10 HP | 30400631 |
| | | SHAFT KEY, FOR 15 TO 40 HP | 30400633 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW, 3/8-16 X 1.25" FOR 3 & 5 HP | 91010243 |
| | | CAP SCREW, 1/2-13 X 1.50" FOR 10 TO 20 HP | 91010263 |
| | | CAP SCREW, 5/8-11 X 1.50" FOR 25 TO 40 HP | 91010282 |
| 17 | 4 | LOCK WASHER, 3/8" STEEL, FOR 3 & 5 HP | 91010012 |
| | | LOCK WASHER, 1/2" STEEL, FOR 10 TO 20 HP | 91010014 |
| | | LOCK WASHER, 5/8" STEEL, FOR 25 & 40 HP | 91010015 |
| 18 | 5 | PIPE PLUG 1/4" NPT | 93010143 |

▶ IA2H

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|---------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 25 HP, 3525 RPM, 3 PH, FRAME 284T JM | |
| | | 30 HP, 3525 RPM, 3 PH, FRAME 286T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 25 & 30 HP | 03010020 |
| 3 | 1 | VOLUTE CASE | 03090040B |
| 4 | 1 | IMPELLER IA2H-25-2, Ø8.63" | 03140034H |
| | | IMPELLER IA2H-30-2, Ø9.00" | 03140034I |
| 5 | 1 | SHAFT SLEEVE | 30400812 |
| 6 | 1 | SLINGER | 92010016 |
| 7 | 1 | MECHANICAL SEAL | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW | 91010351 |
| 10 | 1 | LOCK WASHER 1/2" SS | 91010062 |
| 11 | 1 | IMPELLER WASHER | 30400416 |
| 12 | 1 | SHAFT KEY | 30400633 |
| 13 | 8 | STUD 3/8-16 X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW 5/8-11 X 1.50" | 91010282 |
| 17 | 4 | LOCK WASHER 5/8" STEEL | 91010015 |
| 18 | 5 | PIPE PLUG 1/4" NPT | 93010143 |

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► IA3

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|--------------------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 3 HP, 1740 RPM, 3 PH, FRAME 182T JM | |
| | | 5 HP, 1730 RPM, 3 PH, FRAME 184T JM | |
| | | 7.5 HP, 1750 RPM, 3 PH, FRAME 213T JM | |
| | | 15 HP, 3530 RPM, 3 PH, FRAME 254T JM | |
| | | 20 HP, 3525 RPM, 3 PH, FRAME 256T JM | |
| | | 25 HP, 3525 RPM, 3 PH, FRAME 284T JM | |
| | | 30 HP, 3525 RPM, 3 PH, FRAME 286T JM | |
| | | 40 HP, 3530 RPM, 3 PH, FRAME 324T JM | |
| | | 50 HP, 3530 RPM, 3 PH, FRAME 326T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 3 TO 5 HP, 1750 RPM | 03010028 |
| | | INTERMEDIATE COUPLING, FOR 7.5 HP, 3500 RPM | 03010018 |
| | | INTERMEDIATE COUPLING, FOR 15 & 20 HP, 3500 RPM | 03010051 |
| | | INTERMEDIATE COUPLING, FOR 25 TO 50 HP, 3525 RPM | 03010020 |
| 3 | 1 | VOLUTE CASE | 03090042 |
| 4 | 1 | IMPELLER IA3 FOR 3 HP, Ø7.50" (SHAFT Ø7/8") | 03140035I |
| | | IMPELLER IA3 FOR 5 HP, Ø8.40" (SHAFT Ø7/8") | 03140035J |
| | | IMPELLER IA3 FOR 7.5 HP, Ø9.00" (SHAFT Ø7/8") | 03140035H |
| | | IMPELLER IA3 FOR 15 & 20 HP, Ø6.94" (SHAFT Ø1¼") | 03140035B |
| | | IMPELLER IA3 FOR 25 HP, Ø7.50" (SHAFT Ø1¼") | 03140035C |
| | | IMPELLER IA3 FOR 30 HP, Ø8.00" (SHAFT Ø1¼") | 03140035D |
| 5 | 1 | SHAFT SLEEVE, FOR 3 TO 7.5 HP | 30400808 |
| | | SHAFT SLEEVE, FOR 15 TO 50 HP | 30400812 |
| 6 | 1 | SLINGER, FOR 3 TO 7.5 HP, Ø1¼" | 92010014 |
| | | SLINGER, FOR 15 TO 50 HP, Ø1¾" | 92010016 |
| 7 | 1 | MECH. SEAL, FOR 3 TO 7.5 HP | 31030131 |
| | | MECH. SEAL, FOR 15 TO 50 HP | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW, FOR 3 TO 7.5 HP | 91010345C |
| | | IMPELLER'S SCREW, FOR 15 TO 50 HP | 91010351 |
| 10 | 1 | LOCK WASHER, 3/8" SS, FOR 3 TO 7.5 HP | 91010061 |
| | | LOCK WASHER, 1/2" SS, FOR 15 TO 50 HP | 91010062 |
| 11 | 1 | IMPELLER WASHER, FOR 3 TO 7.5 HP | 30400418 |
| | | IMPELLER WASHER, FOR 15 TO 50 HP | 30400416 |
| 12 | 1 | SHAFT KEY, FOR 3 HP TO 7.5 HP | 30400631 |
| | | SHAFT KEY, FOR 15 TO 50 HP | 30400633 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW, 3/8-16 X 1.25" FOR 3 & 5 HP | 91010243 |
| | | CAP SCREW, 1/2-13 X 1.50" FOR 7.5 TO 20 HP | 91010263 |
| | | CAP SCREW, 5/8-11 X 1.50" FOR 25 TO 50 HP | 91010282 |
| 17 | 4 | LOCK WASHER, 3/8" STEEL, FOR 3 & 5 HP | 91010012 |
| | | LOCK WASHER, 1/2" STEEL, FOR 7.5 TO 20 HP | 91010014 |
| | | LOCK WASHER, 5/8" STEEL, FOR 25 & 50 HP | 91010015 |
| 18 | 1 | PIPE PLUG 1/2" NPT | 93010142 |
| 19 | 3 | PIPE PLUG 1/4" NPT | 93010143 |

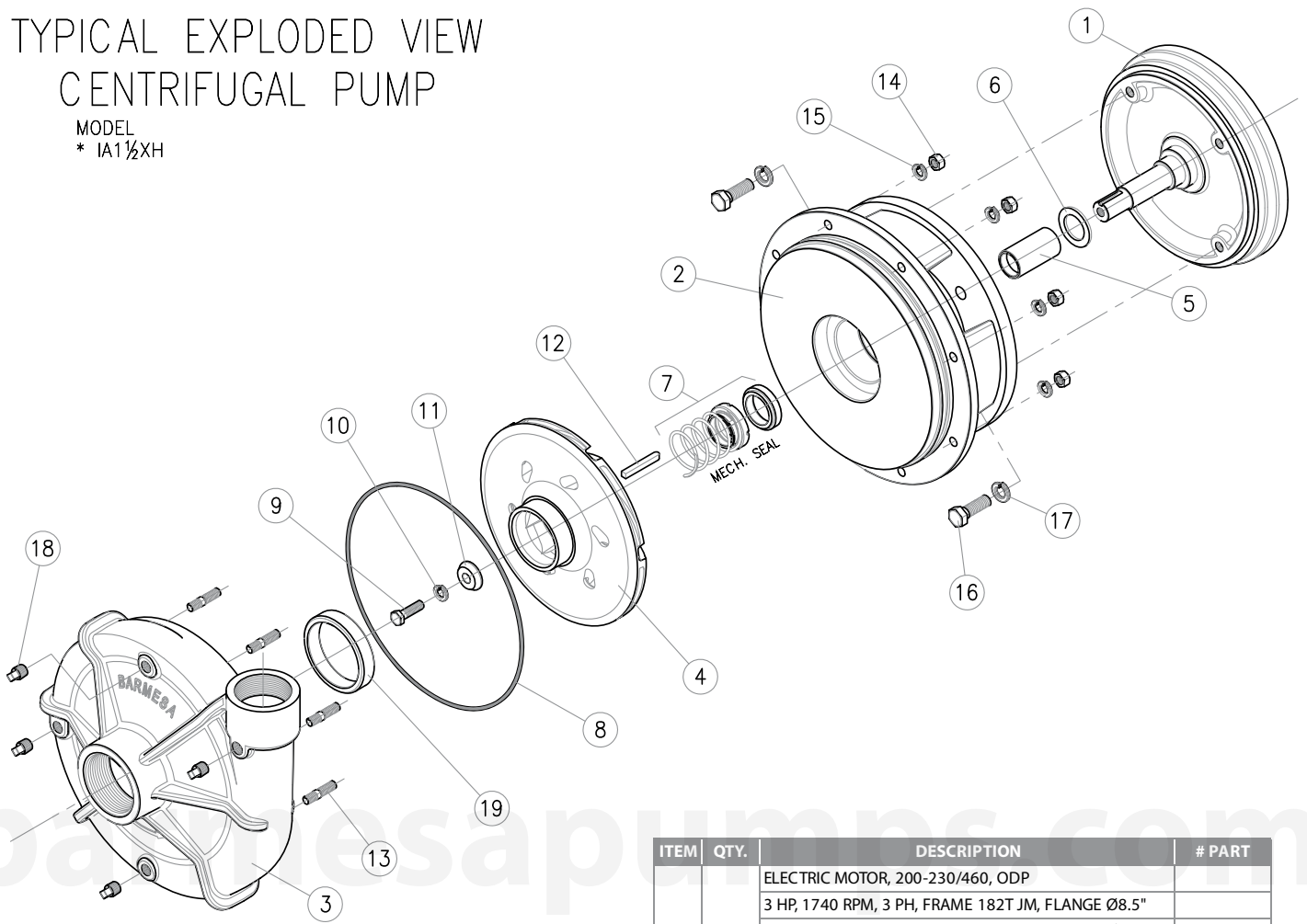
► IA3H

| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|---------------------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 30 HP, 3525 RPM, 3 PH, FRAME 286T JM | |
| | | 40 HP, 3530 RPM, 3 PH, FRAME 324T JM | |
| | | 50 HP, 3530 RPM, 3 PH, FRAME 326T JM | |
| | | 60 HP, 3565 RPM, 3 PH, FRAME 364T JM | |
| | | 75 HP, 3565 RPM, 3 PH, FRAME 365T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 30 TO 75 HP, 3500 RPM | 03010020 |
| 3 | 1 | VOLUTE CASE | 03090042 |
| 4 | 1 | IMPELLER IA3H FOR 30 HP, Ø7.50" (SHAFT Ø1¼") | 03140066B |
| | | IMPELLER IA3H FOR 40 HP, Ø7.94" (SHAFT Ø1¼") | 03140066C |
| | | IMPELLER IA3H FOR 50 HP, Ø8.50" (SHAFT Ø1¼") | 03140066D |
| | | IMPELLER IA3H FOR 60 TO 75 HP, Ø9.0" (SHAFT Ø1¼") | 03140066E |
| 5 | 1 | SHAFT SLEEVE, FOR 30 TO 75 HP | 30400812 |
| 6 | 1 | SLINGER, FOR 30 TO 75 HP, Ø1¾" | 92010016 |
| 7 | 1 | MECH. SEAL, FOR 30 TO 75 HP | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW | 91010351 |
| 10 | 1 | LOCK WASHER, 1/2" SS | 91010062 |
| 11 | 1 | IMPELLER WASHER | 30400416 |
| 12 | 1 | SHAFT KEY, FOR 30 TO 75 HP | 30400633 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW, 5/8-11 X 1.50" | 91010282 |
| 17 | 4 | LOCK WASHER, 5/8" STEEL | 91010015 |
| 18 | 1 | PIPE PLUG 1/2" NPT | 93010142 |
| 19 | 3 | PIPE PLUG 1/4" NPT | 93010143 |

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TYPICAL EXPLODED VIEW CENTRIFUGAL PUMP

MODEL
* IA1½XH



| ITEM | QTY. | DESCRIPTION | # PART |
|------|------|---------------------------------------------------|-----------|
| 1 | 1 | ELECTRIC MOTOR, 200-230/460, ODP | |
| | | 3 HP, 1740 RPM, 3 PH, FRAME 182T JM, FLANGE Ø8.5" | |
| | | 5 HP, 1730 RPM, 3 PH, FRAME 184T JM, FLANGE Ø8.5" | |
| | | 15 HP, 3530 RPM, 3 PH, FRAME 254T JM | |
| | | 20 HP, 3525 RPM, 3 PH, FRAME 256T JM | |
| 2 | 1 | INTERMEDIATE COUPLING, FOR 3 TO 20 HP | 03010050 |
| | | INTERMEDIATE COUPLING, FOR 25 HP | 03010050B |
| 3 | 1 | VOLUTE CASE | 03090079 |
| 4 | 1 | IMPELLER IA1½XH-15-2, Ø7.25" | 03140076 |
| | | IMPELLER IA1½XH-20-2, Ø8.38" | 03140076B |
| | | IMPELLER IA1½XH-25-2, Ø9.19" | 03140076C |
| | | IMPELLER IA1½XH-3-4, Ø9.19" | |
| 5 | 1 | SHAFT SLEEVE, FOR 3 TO 25 HP | 30400829 |
| 6 | 1 | SLINGER, FOR 3 TO 25 HP | 92010016 |
| 7 | 1 | MECH. SEAL, FOR 3 TO 25 HP | 31030133 |
| 8 | 1 | O-RING | 92010033 |
| 9 | 1 | IMPELLER'S SCREW, FOR 3 TO 25 HP | 91010351 |
| 10 | 1 | LOCK WASHER, 1/2" SS, FOR 3 TO 25 HP | 91010062 |
| 11 | 1 | IMPELLER WASHER, FOR 3 TO 25 HP | 30400416 |
| 12 | 1 | SHAFT KEY, FOR 3 TO 25 HP | 30400633 |
| 13 | 8 | STUD 3/8-16X 1.50" | 91010303 |
| 14 | 8 | HEX NUT 3/8" | 91010413 |
| 15 | 8 | LOCK WASHER 3/8" | 91010012 |
| 16 | 4 | CAP SCREW, 1/2-13 X 1.50" FOR 3 & 20 HP | 91010263 |
| | | CAP SCREW, 5/8-11 X 1.50" FOR 25 HP | 91010282 |
| 17 | 4 | LOCK WASHER, 1/2" STEEL, FOR 3 TO 20 HP | 91010014 |
| | | LOCK WASHER, 5/8" STEEL, FOR 25 HP | 91010015 |
| 18 | 4 | PIPE PLUG 1/4" NPT | 93010143 |
| 19 | 1 | WEAR RING | 30400324 |



Risk of electric shock. Always disconnect the pump from the power source before handling inspections or repairs.

| PROBLEM | PROBABLE CAUSE | CHECK |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A) The pump does not prime, the vacuum gauge indicates a lower reading than normal. | 1. Air leak in the suction system. | - Threaded joints in the suction tightness. - Gaskets for no wear. - The mechanical seal for leaks. - The drain plug has leaks. - The vacuum gauge may be leaking. |
| | 2. Insufficient liquid in the pump casing. | - That the pump's body is filled with water. |
| | 3. Low operating speed. | - The motor speed (RPM). |
| | 4. Bound pump. | - Impeller rotates freely. - Internal parts are clean. |
| | 5. Mechanical defect. | - That the internal parts are not worn. |
| B) The pump does not prime, the vacuum gauge reading indicates higher than normal. | 1. Pipe clogged suction. | - The suction line is clean. |
| C) The pump priming good vacuum gauge reading is normal, the manometer indicates a lower pressure than normal. | 1. The pump speed is very low. | - The voltage is correct. |
| | 2. Mechanical defects. | - The internal parts for wear. |
| D) The pump priming good vacuum gauge reading is almost normal, reading the manometer is greater. | 1. Discharge obstructed. | - The discharge is clear of obstructions. |
| | | - That the discharge valves operate correctly. |
| E) The pump loses its priming during operation, vacuum gauge reading drops to zero. | 1. suction dynamic level too high. | - When the pump is operating, never lacks water in the suction. |
| | 2. The pump is sucking air. | - For leaks in suction piping, angles and gaskets. |
| | | - That there is no vortex effect at the end of the suction, this lack of water. |
| F) The pump priming pumps well and satisfactorily but noisy. | 1. Pump base is loose. | - That screws are tight at the base. |
| | | - There are no cracks in the base. |
| | 2. Cavitation. | - The dynamic level is not too high - That the pumping capacity is not too much. - The pump is operating in the range of NPSHR - If reducing flow makes the noise gone, then the problem is in the point above; partially close the discharge valve. |
| | | |
| 3. Bearings. | - The bearings for wear. - That there is oil in the deposit. | |
| 4. Vibration. | - The impeller does not have any foreign material. - The pump is operating in the range. - That the alignment is correct. | |
| G) Motor overload. | 1. Low Voltage. | - The voltage is correct. |
| | 2. Overload. | - The amperage of the plate is not exceeded. - There is no foreign material that may force the impeller. - That the motor is suitable for the pump. |

NOTE: Barmesa Pumps assumes no responsibility for damage or injury due to disassembly in the field. Disassembly of the pumps or supplied accessories other than at Barmesa Pumps or its authorized service centers, automatically voids warranty.

BARMESA PUMPS FACTORY WARRANTY

Barmesa Pumps warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for 18 months from date of manufacture or 12 months from installation date whichever occurs first. This warranty gives you specific legal rights, which vary from state to state.

This warranty is a limited warranty, and no warranty related claims of any nature whatsoever shall be made against Barmesa Pumps, until the ultimate consumer or his/her successor notifies us in writing of the defect and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station as instructed by Barmesa Pumps. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE. PRODUCT SHALL BE EITHER REPLACED OR REPAIRED AT THE ELECTION OF BARMESA PUMPS. Guarantees relating to performance specifications provided in addition to the foregoing material and workmanship warranties on a product manufactured by Barmesa Pumps, if any, are subject to possible factory testing. Any additional guarantees, in the nature of certified performance specifications or time frame must be in writing and such writing must be signed by our authorized factory manager at time of order placement and/or at time of quotation. Due to inaccuracies in field testing and should a conflict arises between the results of field testing conducted by or for the user, Barmesa Pumps reserves the right to have the product returned to our factory for additional testing.

This warranty shall not apply when damage is caused by (1) improper installation, (2) improper voltage, (3) lightning, (4) excessive sand or other abrasive material, (5) corrosion build-up due to excessive chemical content or (6) uncontrollable acts of god. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective pumps, parts or systems. Barmesa Pumps will not accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY. No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

IMPORTANT!

If you have a claim under the provision of the warranty, contact Barmesa Pumps or your authorized Barmesa Pumps Distributor:
warranty@barmesapumps.com
www.barmesapumps.com



