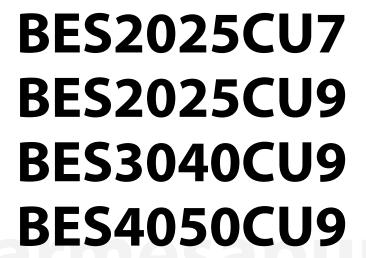


Installation, Operation & Maintenance Manual

End-Suction Centrifugal Pumps



Universal Drive





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 safetv 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 Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

|∆ WARNING Indicates an imminenty hazardous situation which, if not avoided, MAY result in death or serious injury.

△ 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 iunction 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.



△ DANGER Operation against a closed discharge valve will cause premature bearing and seal failure.

Heat build up on end-suction pumps may cause dangerous pressures. A high temperature switch or pressure relief valve is recommended to be installed in pump case.

⚠ WARNING Do not pump hazardous materials (flammable, caustic, etc.) or use these pumps in water over 180 °F. **Do not** exceed manufacturers recommended maximum performance, as this could cause the motor to overheat.

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

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

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

⚠ WARNING If engine driven, never operate in an enclosed building or area where exhaust gases can accumu-

late, or near a building where gases can seep inside; always take provisions for adecuate ventilation.

⚠ WARNING Pumps constructed with or fitted with bronze/brass may contain lead levels higher than considered

safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications.

IMPORTANT! - Prior to installation, record model and serial number from pump name plate for the future reference. Also record the Voltage and Current Readings at Startup:

Model Number: _	
Corial	
Serial:	

▶ BES2025CU7

SUCTION: 2½" 125 lb. ANSI flange.

DISCHARGE: 2" 125 lb. ANSI flange. It can be placed in 4 different locations depending on piping

requirements.

LIQUID TEMPERATURE: 225 °F (107 °C) continuous.

BODY: Cast iron ASTM A-48, class 30, back pull-out design, with removing suction and

discharge piping.

PEDESTAL: Cast iron ASTM A-48.

IMPELLER: Enclosed, dynamically balanced, ISO G6.3, max. spheres 0.375". Bronze C95200.

SHAFT: Stainless steel. SHAFT SLEEVE: Bronze C95200.

HARDWARE: Steel.

CASING WEAR RING: Bronze C95200.

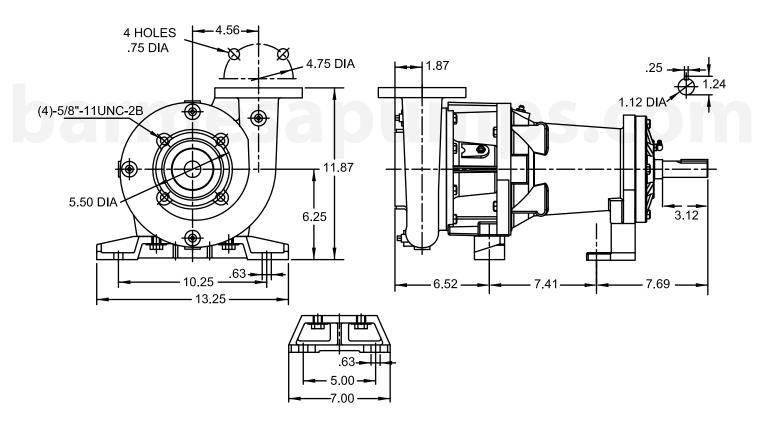
PAINT: Air dry enamel, water based.

MECHANICAL SEAL: Carbon / Ni-Resist / Buna-N.

BEARING-DRIVE END: Single row, ball, grease lubricated.

BEARING-PUMP END: Single row, ball, grease lubricated.

WEIGHT: 150 lb. (68 kg).



▶ BES2025CU9

SUCTION: 2½" 125 lb. ANSI flange.

DISCHARGE: 2" 125 lb. ANSI flange. It can be placed in 4 different locations depending on piping

requirements.

LIQUID TEMPERATURE: 225 °F (107 °C) continuous.

BODY: Cast iron ASTM A-48, class 30, back pull-out design, with removing suction and

discharge piping.

PEDESTAL: Cast iron ASTM A-48.

IMPELLER: Enclosed, dynamically balanced, ISO G6.3, max. spheres 0.625". Bronze C95200.

SHAFT: Stainless steel. SHAFT SLEEVE: Bronze C95200.

HARDWARE: Steel.

CASING WEAR RING: Bronze C95200.

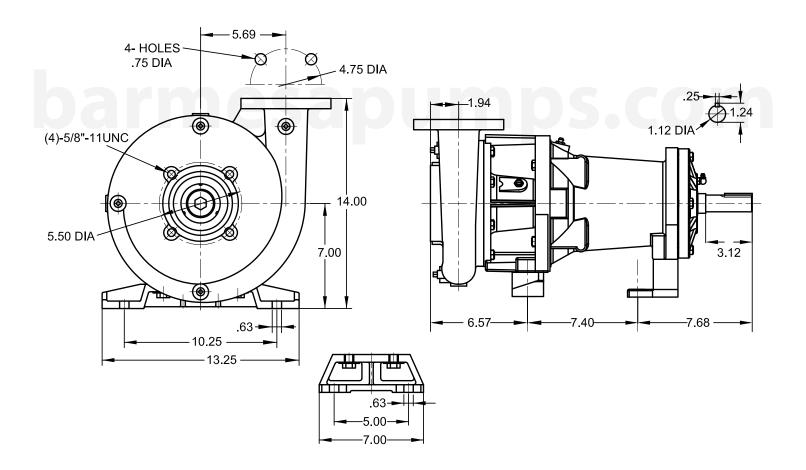
PAINT: Air dry enamel, water based.

MECHANICAL SEAL: Carbon/Ni-Resist/Buna-N.

BEARING-DRIVE END: Single row, ball, grease lubricated.

BEARING-PUMP END: Single row, ball, grease lubricated.

WEIGHT: 167 lb. (75.7 kg).



▶ BES3040CU9

SUCTION: 4" 125 lb. ANSI flange.

DISCHARGE: 3" 125 lb. ANSI flange. It can be placed in 4 different locations depending on piping

requirements.

LIQUID TEMPERATURE: 225 °F (107 °C) continuous.

BODY: Cast iron ASTM A-48, class 30, back pull-out design, with removing suction and

discharge piping.

PEDESTAL: Cast iron ASTM A-48.

IMPELLER: Enclosed, dynamically balanced, ISO G6.3, max. spheres 0.75". Bronze C95200.

SHAFT: Stainless steel. SHAFT SLEEVE: Bronze C95200.

HARDWARE: Steel.

CASING WEAR RING: Bronze C95200.

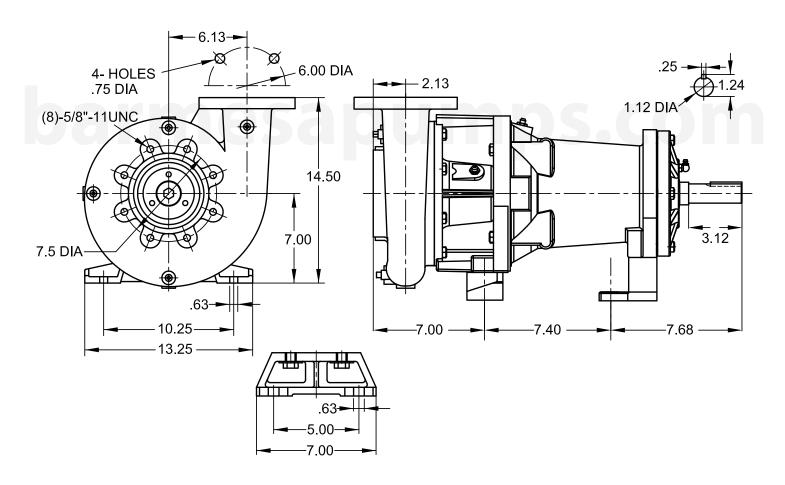
PAINT: Air dry enamel, water based.

MECHANICAL SEAL: Carbon / Ni-Resist / Buna-N.

BEARING-DRIVE END: Single row, ball, grease lubricated.

BEARING-PUMP END: Single row, ball, grease lubricated.

WEIGHT: 254 lb. (115.2 kg).



▶ BES4050CU9

SUCTION: 5" 125 lb. ANSI flange.

DISCHARGE: 4" 125 lb. ANSI flange. It can be placed in 4 different locations depending on piping

requirements.

LIQUID TEMPERATURE: 225 °F (107 °C) continuous.

BODY: Cast iron ASTM A-48, class 30, back pull-out design, with removing suction and

discharge piping.

PEDESTAL: Cast iron ASTM A-48.

IMPELLER: Enclosed, dynamically balanced, ISO G6.3, max. spheres 0.75". Bronze C95200.

SHAFT: Stainless steel. SHAFT SLEEVE: Bronze C95200.

HARDWARE: Steel.

CASING WEAR RING: Bronze C95200.

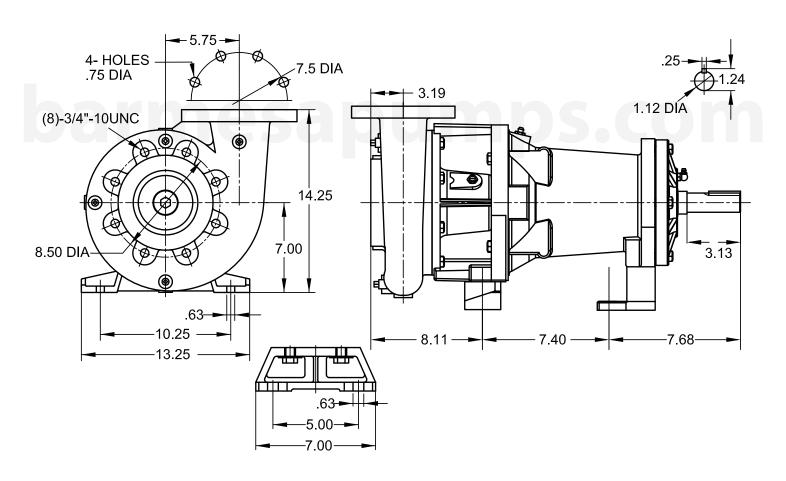
PAINT: Air dry enamel, water based.

MECHANICAL SEAL: Carbon / Ni-Resist / Buna-N.

BEARING-DRIVE END: Single row, ball, grease lubricated.

BEARING-PUMP END: Single row, ball, grease lubricated.

WEIGHT: 270 lb. (122.4 kg).



▶ 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. Do not pump out of liquid.

▶ Installation

Foundation - The pump foundation should be sufficiently substantial to form a level, rigid support for the combined weight of the pump and driver and maintain alignment of the installed unit. Foundation bolts, of the proper size, should be imbedded in the concrete. A pipe sleeve, about 2½" diameters larger than the bolt, should be used to allow for final positioning of the bolts. See Figure 1.

Mounting - Mount pump and driver on a common base plate with coupling, must be aligned. Preliminary alignment is necessary after the complete unit has been leveled on the foundation, and again, after the unit is piped, and rechecked periodically as outlined in the following paragraphs. Position unit on foundation and level the base plate, using rectangular metal blocks and shims, or wedges having a small taper as shown in Figure 1.

A gap of 3/4" to 1½" should be allowed between the base plate and foundation for grouting. Adjust the metal supports or wedges until the shafts of the pump and driver are level.

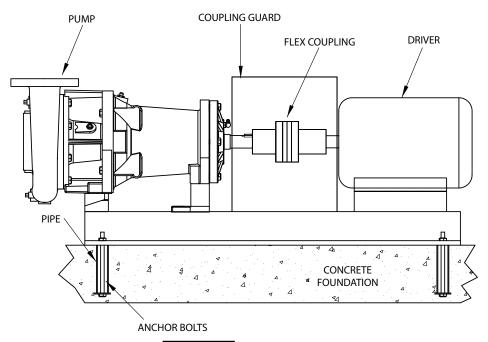


Figure 1

Check the coupling faces, as well as the suction and discharge flanges of the pump for horizontal or vertical position by means of a level. Correct the positions, if necessary, by adjusting the supports or wedges under the base plate, as required.

NOTE: A flexible coupling should not be used to compensate for misalignment of the pump and driver shafts. The purpose of the flexible coupling is to compensate for temperature changes and to permit end movement of the shafts without interference with each other, while transmitting power from the driver to the pump.

A CAUTION Remove and lock out power to driver.

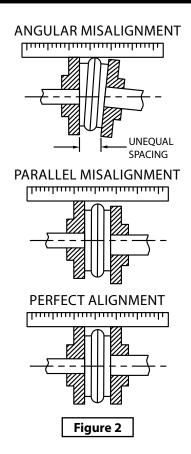
Field alignment - The faces of the coupling halves should be spaced far enough apart so that they cannot strike each other when the driver rotor is moved toward the pump.

The necessary tools for checking the alignment of a flexible coupling are a straight edge and a taper gauge or a set of feeler gauges.

NOTE: In most cases where extreme accuracy is necessary, a dial indicator may be used to align coupling. Angular alignment check is made by inserting a taper gauge or feelers between the coupling faces at 90 degree intervals around the coupling.

The unit will be in angular alignment when the coupling faces are exactly the same distance apart at all points. See Figure 2.

Parallel alignment check is made by placing a straight edge across both coupling rims at the top, bottom and at both sides. The unit will be in parallel alignment when the straight edge rests evenly on the coupling rim at all positions. Allowance may be necessary for temperature changes and for coupling halves that are not of the same outside diameter. Care must be taken to have the straight edge parallel to the axis of the shafts. Correction for angular and parallel misalignment is made by adjusting the shims under the driver. After each change, it is necessary to recheck the alignment of the coupling halves, as adjustment in one direction may disturb adjustments already made in another direction.



The permissible amount of coupling misalignment will vary with the type of pump and driver, but should be limited to approximately 0.002 inches per inch of shaft diameter when final adjustment is made. When the units are lined up cold, it is necessary to make allowance for the vertical rise of the driver caused by heating when in operation. When the preliminary alignment has been completed the foundation, bolts should be tightened evenly, but not too firmly.

△ WARNING Coupling guards must be used to avoid serious injury to operating personnel.

Grounting - Grouting compensates for unevenness in the foundation and prevents vibration and shifting after mounting is complete. Build a form around the base plate to contain the grout, and sprinkle area with water to obtain a good bond.

The base should be completely filled with a good quality, non-shrinking grout. The usual mixture for grouting is one part Portland cement and two parts sand with sufficient water to flow freely. It is also desirable to grout the leveling pieces, shims or wedges in place. Foundation bolts should be fully tightened when grout has hardened, usually about 48 hours after pouring.

Piping - The pump suction and discharge connections are not intended to indicate the required suction and discharge pipe sizes. The pipe diameter must be selected according to the requirements of the pumping system and recommended friction losses for the liquid being pumped.

Usually, it is advisable to increase the size of both the suction and discharge pipes at the pump nozzles to have minimum acceptable friction loss, suction pipe should never be smaller in diameter than the pump suction nozzle. When suction pipe is of larger diameter than the pump suction nozzle, an eccentric reducer is required to eliminate possible air or vapor pockets at the pump suction inlet.

Both suction and discharge pipes must be supported independently near the pump, so that when piping is connected to the pump, no strain will be transmitted to the pump. Piping should be arranged with as few bends as possible, and preferably with long radius elbow whenever possible.

Suction piping - A horizontal suction line must have a gradual rise to the pump. Any high point in the suction pipe can become filled with air and prevent proper operation of the pump and may cause loss of prime. The pipe and fittings must be free of all air leaks.

Any valves or fittings should located at a distance equal to 5 to 10 times the diameter of the suction pipe from the pump suction nozzle. If an elbow must be installed at the pump suction, it should be installed in a vertical position to reduce unequal flow into the pump, which may cause cavitation in the pump.

NOTE: A gate valve in the suction piping should not be used as a throttling device, as this may cause the liquid to overheat during operation.

Wiring - For electric motor drives, connect power supply to conform with national and local codes. Line voltage and wire capacity must match the ratings stamped on the motor nameplate.

Rotation - Before starting the pump, check the required direction of rotation of the pump. The proper direction is indicated by a direction arrow on the pump casing. Separate the coupling halves, then start motor to see that it rotates in the direction required by the pump. If it does not, reverse any two main leads of the 3 phase wiring to the motor. The coupling halves can be reconnected and the pump primed for starting.

▶ Pre-operation

Priming - CAUTION: Before starting the pump, the casing and suction line must be filled with liquid, and air-vented through the vent pipe plugs. The pump must not be run until it is completely filled with liquid, because of danger of injuring some of the parts of the pump which depend upon liquid for lubrication. The discharge gate valve should be closed during priming. Be sure the mechanical seal and power frame are supplied with the proper lubrication.

Priming by suction pressure - When operating with suction pressure (flooded suction), remove the pipe plug at the top of the casing and when pump is filled with liquid, replace plug.

Priming with foot valve and strainer and be installed on the lower end of the suction pipe to keep pump filled with liquid. Incorporate filler pipe in discharge pipe between pump and check valve. Remove pipe plug at top of casing, then fill suction pipe and pump with liquid. When pump is full of liquid, replace plug and close filler pipe.

⚠ CAUTION When a foot valve and strainer are installed on the suction pipe, a spring loaded type check valve MUST be installed next to the pump in the discharge piping to prevent pump rupture from water hammer shock.

Priming by means of primer pump or ejector, attached to the pump, will also remove air from suction pipe and pump casing. When pump is filled with liquid, start motor and slowly open discharge gate valve.

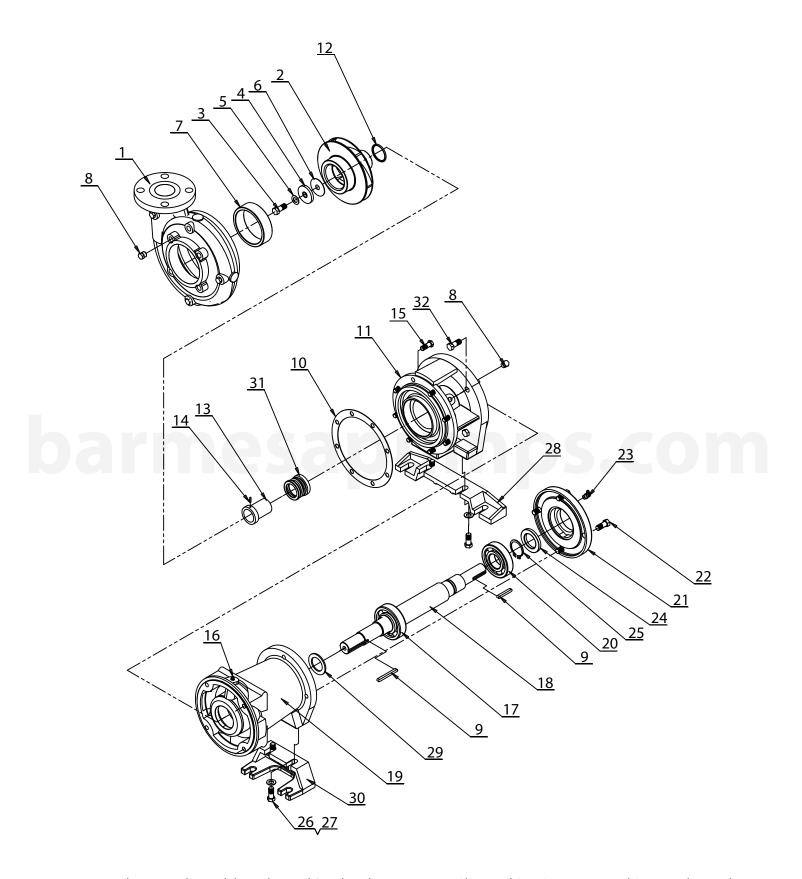
Starting the pump - On initial start up, the gate valve in the discharge piping should be closed and slowly opened after pump is up to speed and pressure developed.

⚠ WARNING DO NOT operate pump for any appreciable length of time against a closed discharge valve, as this may heat trapped liquid excessively and damage the pump or seal.

The following important items should be checked as pump is started and placed in operation.

- a) Pump and driver securely bolted.
- b) Coupling properly aligned.
- c) Piping completed.
- d) Correct pump rotation.
- e) Pump shaft turns freely.
- f) Discharge valve closed.
- g) Suction valve open (if used).
- h) Coupling guard installed
- i) Pump fully primed
- j) Pump and driver properly lubricated.

Only after these items have been checked should the pump be started.



For repair part please supply: Model Number and Serial as shown on Name Plate, and Part Description and Part Number as shown on Parts List.

▶ BES2025CU7

ITEM	QTY.	DESCRIPTION
1	1	Casing, cast Iron
2	1	Impeller, bronze
3	1	Capscrew, 1/2"-13 x 1.25"
4	1	Washer, 1/2"
5	1	Capscrew seal, 13.2 mm x 1.8 mm
6	1	Gasket
7	1	Case ring
8	6	Pipe plug, 1/4"-18 NPT
9	2	Drive key, 1/4" x 1.75
10	1	Gasket
11	1	Bracket
12	1	O-ring, 41.2 mm O.D. x 3.55
13	1	Sleeve
14	1	Pin, 1/8" x 3/8", included with item #13
15	8	Capscrew 3/8"-24 x 1"
16	1	Grease fitting, M10x1
17	1	Inner bearing, 6308, 6310
18	1	Shaft, Ø1.125" at coupling end
19	1	Frame
20	1	Outer bearing, 6308NR, 6310NR
21	1	Bearing cap
22	4	Capscrew, 1/2"-13 x 1.50"
23	1	Grease fitting, M10x1
24	1	Lip seal
25	1	Ret ring
26	4	Capscrew, 1/2"-13 x 1.25"
27	4	Washer, 1.375 x .5625 x 0.09375
28	1	Support
29	1	Slinger, 2.5 x 1.5625 x 0.3125
30	1	Support
31	1	Shaft seal, 1.50"
32	8	Capscrew 3/8"-24 x 1"

For repair part please supply: Model Number and Serial as shown on Name Plate, and Part Description and Part Number as shown on Parts List.

▶ BES2025CU9, BES3040CU9, BES4050CU9

ITEM	QTY.	DESCRIPTION
1	1	Casing, cast Iron
2	1	Impeller, bronze
3	1	Capscrew, 1/2"-13 x 1.25"
4	1	Washer, 1/2"
5	1	Capscrew seal, 13.2 mm x 1.8 mm
6	1	Gasket
7	1	Case ring
8	6	Pipe plug, 1/4"-18 NPT
9	2	Drive key, 1/4" x 1.75
10	1	Gasket
11	1	Bracket
12	1	O-ring, 41.2 mm O.D. x 3.55
13	1	Sleeve
14	1	Pin, 1/8" x 3/8", included with item #13
15	8	Capscrew 1/2"-13 x 1.25"
16	1	Grease fitting, M10x1
17	1	Inner bearing, 6308, 6310
18	1	Shaft, Ø1.125" at coupling end
19	1	Frame
20	1	Outer bearing, 6308NR, 6310NR
21	1	Bearing cap
22	4	Capscrew, 1/2"-13 x 1.50"
23	1	Grease fitting, M10x1
24	1	Lip seal
25	1	Ret ring
26	4	Capscrew, 1/2"-13 x 1.25"
27	4	Washer, 1.375 x .5625 x 0.09375
28	1	Support
29	1	Slinger, 2.5 x 1.5625 x 0.3125
30	1	Support
31	1	Shaft seal, 1.50"
32	8	Capscrew 1/2"-20 x 1.25"

For repair part please supply: Model Number and Serial as shown on Name Plate, and Part Description and Part Number as shown on Parts List.



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

Symptom	Possible Cause(s)	Corrective Action
Little or no discharge and will not prime.	1. Pump body not filled with water. 2. Total head too high. 3. Suction head higher than pump designed for. 4. Impeller partially or completely plugged. 5. Leak in suction line. 6. Foot-valve too small. 7. Impeller damaged. 8. Foot-valve or suction line not submerged deep enough in water, pulling air. 9. Insufficient inlet pressure or suction head. 10. Suction piping too small. 11. Body gasket leaking. 12. Suction or discharge line valves closed. 13. Piping damaged. 14. Clogged strainer or foot-valve. 15. Incorrect engine speed.	 Fill pump body with water. Shorten suction head. Lower suction head, install foot-valve and prime. Disassemble pump and clean out impeller. Repair or replace suction line. Match foot-valve size to piping or install one larger size foot-valve. Disassemble pump and replace impeller. Submerge lower in water. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line partially closed. Increase pipe size to pump inlet size or larger. Replace. Open. Clean or replace. Increase speed.
Loss of suction after satisfactory operation.	1. Air leak in suction line. 2. When pump was last turned off, water siphoned out of pump body. 3. Suction head higher than pump designed for. 4. Insufficient inlet pressure or suction head. 5. Clogged foot-valve, strainer or pump. 6. Defective wear plate.	1. Repair or replace suction line. 2. Refill (reprime) pump body before restarting. 3. Lower suction head, install foot-valve and prime. 4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed. 5. Unclog or replace. 6. Replace.
Pump overloads driver.	1. Total head lower than pump rating, unit delivering too much water. 2. Specific gravity and viscosity of liquid being pumped different than the pump rating. 3. Speed too high.	Increase back pressure by turning gate valve on discharge line to partially closed position that will not overload motor. Consult factory. Check and correct speed.
Pump vibrates and/or makes excessive noise.	Mounting plate or foundation not rigid enough. Foreign material in pump causing unbalance. Impeller bent. Cavitation present. Piping not supported to relieve any strain on pump assembly.	1. Reinforce. 2. Disassemble pump and remove. 3. Replace impeller. 4. Check suction line for proper size and check valve in suction line if completly open, remove any sharp bends before pump and shorten suction line. 5. Make necessary adjustments.
Pump runs but no fluid.	 Air leak in suction piping. Pump located too far from fluid source. Gate valve closed. Clogged strainer. Fouled foot-valve. Discharge height too great. Fouled impeller. Faulty mechanical seal. 	 Replace. Replace. Open. Clean or replace. Clean or replace. Lower the height. Clean or replace. Replace.
Pump leaks at shaft.	Worn mechanical seal. Seal not installed properly.	Replace. Follow service instructions for installing seal.

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!

