PENTAIR

AURORA®

MODEL 664A
VERTICAL ONE STAGE SOLIDS HANDLING VORTEX PUMP
INSTRUCTION AND REPAIR MANUAL

NOTE! To the installer: Please make sure you provide this manual to the owner of the equipment or to the responsible party who maintains the system.

Part # A-03-304 | © 2012 Pentair Ltd. | 12/03/12

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CALIFORNIA PROPOSITION 65 WARNING:

⚠WARNING This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

SERVICE

Your Aurora pump requires no maintenance other than periodic inspection and occasional cleaning. The intent of inspection is to prevent breakdown, thus obtaining optimum service life.

LUBRICATION

The motor that drives your Aurora pump may or may not require lubrication. Consult the manufacturer's recommendations for proper maintenance instructions.

REPAIRS

The pump may be disassembled using the illustrations and text provided. Although complete disassembly is covered, it will seldom be necessary to completely disassemble your Aurora pump.

The illustration accompanying the disassembly instructions show an exploded view of the pump. The illustration is intended to aid in the correct identification of the parts mentioned in the text.

Inspect removed parts at disassembly to determine their reusability. Cracked castings should never be reused. Gaskets should be replaced at reassembly simply as a matter of economy; they are much less expensive to replace routinely than to replace as the need occurs. In general it is economical to return the motor and motor controller to the manufacturer for repair.

VORTEX PUMP 664A
(MOTOR FRAME 250 OR SMALLER)
DISASSEMBLY

This pump has been designed with back pull-out features, which allow the motor and rotating element or close coupled motor to be removed without disturbing the suction and discharge piping.

Disassemble only that which is needed to make repairs or accomplish inspection.

1. Disconnect electrical connections to prevent drive unit from being energized during disassembly.

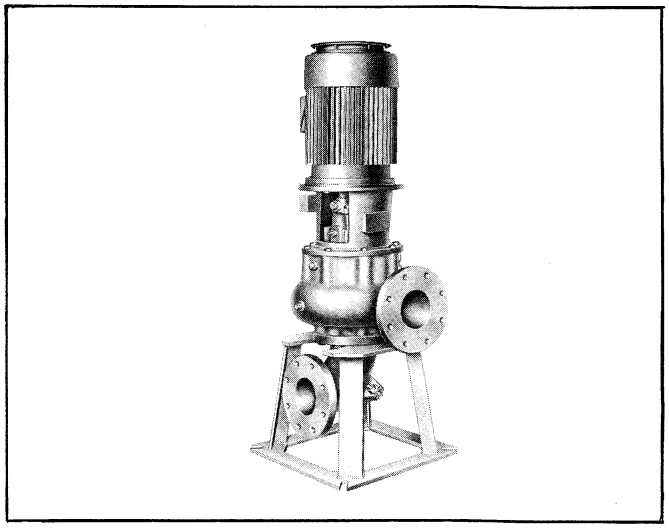
2. Close all valves or flow devices that control movement of liquids to or from pump. Remove drain plug (70) from suction elbow (65).

3. Remove all relief, cooling, flushing or drain lines from pump. Break suction and discharge connections unless the intention is to remove only the power frame assembly and leave the casing (1) in the line.

4. Remove capscrews (34). Screw eyebolt into the outboard end of the close coupled motor or use a sling under the motor lifting lugs to aid in lifting motor and rotating element from casing.

5. Remove gasket (17) from its position between bracket (8) and casing (1). Once the motor and rotating element have been withdrawn, inspect the sealing surface to ensure that it is clean and free of any gasket material that has stuck to parting surfaces. Replace this gasket with a new one when pump is reassembled.

6. Unscrew impeller screw (10) and remove o-ring gasket (11), and washer (12), taking care not to damage gasket (13).



NOTE

The Vortex Pumps have a tapered end impeller fit-up to facilitate impeller removal. Use caution in the removal of impeller as it has to be moved only a few thousandths of an inch to become entirely free.

7. Slide impeller (2) and impeller key (14) from the shaft, again taking care not to damage gasket (38) located behind impeller. Remove gasket (38).

8. The various types of stuffing boxes may be disassembled as follows:

DOUBLE MECHANICAL SEAL (STANDARD)

CAUTION

The mechanical seal is a precision product and must be treated as such. During removal great care must be taken to avoid dropping any part of the seal. Take particular care not to scratch the lapped faces on the washer or the sealing seat. Do not put a seal back into service until the sealing faces of the washer and seat have been lapped or replaced.

A. Remove seal gland bolts (45) and remove gland (44) carefully exposing seal (47).

B. Unscrew capscrews (33) and remove stuffing box assembly (27). Remove gasket (32).

C. Slide sleeve (36) with rotating parts of mechanical seal (47) from the shaft. Remove ceramic seal rings and stainless steel parts from sleeve with great care as ceramic parts are easily damaged.

The sleeve should be carefully cleaned to remove any residue that may be remaining in the seal area, as the rubber in the seal may have become partially adhered to the sleeve. The sleeve must also be checked for abrasion or corrosion that can occur when fluid residue penetrates between the seal (47) and sleeve (36). The sleeve under the seal may be polished lightly to a 32 RMS finish before reassembly. Do not reuse a pitted sleeve. Remove retaining ring (37).

D. Remove stationary seat and o-rings from gland (44) and stuff box (27), using care not to damage these parts.

PACKING WITH LANTERN RING (OPTIONAL)

A. Remove capscrews (45) and split accumulator gland halves (44) Remove o-ring gasket (42) and slinger (43) from stuffing box. The accumulator gland may be further disassembled by removing capscrews (44A), hose connector (44B), tubing (44C) and pipe plugs (44D).

Remove and discard old packing (40). Clean all parts to remove any packing that may have adhered.

C. Unscrew capscrews (33) and remove stuffing box (27) from bracket (8). The throat of adapter plate or stuffing box should be checked for excessive wear. Remove gasket (32).

D. Shaft sleeve (36) is a slip fit on the shaft and should be easily removed unless the pump has been in service for a long time. In this case it may be necessary to use a puller. A snap ring may be installed in the sleeve (36) groove to ease disassembly. Take care to prevent damaging the surface of the sleeve. Replace the sleeve if it is grooved from wear. Remove key (54) and retaining ring (37) from shaft.

9. Unscrew capscrews (35) to remove bracket (8) from close coupled motor.

10. Remove key (55) from the shaft.

11. Remove screws (72) and nameplate (73) only if replacement is necessary.

12. Elbow (65) and casing (1) may be removed from base (21) by removing capscrews (66B) with washers (66A), and capscrews (66). Handhole cover (68) is removed by unscrewing capscrews (69), nuts (66A) and washers (69B). Gaskets (64) and (67) should be replaced if these parts are removed.

VORTEX PUMP MODEL 664A
REASSEMBLY (MOTOR FRAME 250 OR SMALLER)

Reassembly will generally be in reverse order of disassembly. If disassembly was not complete, use only those steps related to your particular repair program.

1. Position bracket (8) on closed coupled motor and secure with capscrews (35). Tighten capscrews evenly to assure proper alignment.

2. If nameplate (73) was removed, install and attach with screws (72).

3. Reassemble the various types of stuffing boxes as follows.

DOUBLE MECHANICAL SEAL (STANDARD)

NOTE

The mechanical seal (47) cannot be installed as an assembly. It is necessary to have the seal seats properly in place before the balance of parts can be added.

A. Install retaining ring (37) and key (54) in shaft.

B. Wipe the sealing faces of the seat and seal washer clean. Lubricate the shaft sleeve (36) with a silicone base lubricant. Slide the entire rotating assembly onto the sleeve.

C. Thoroughly inspect the seal box cavity checking for burrs or nicks, which could damage the seat of the seal. Apply a film of liquid dishwashing detergent or rubber lubricant (do not use oil or grease) to the seal seats. Replace stationary seat and o-rings in gland (44) and stuffing box (27).

NOTE

If it is not possible to insert seat with fingers, place cardboard protecting ring furnished with seal over lapped face of seat and press into place with a piece of tubing having end cut square. The tubing should be slightly larger than the diameter of the shaft. Remove cardboard after seat is firmly in place. Carefully slip the stuffing box assembly (27) over the shaft with the stationary seat facing away from the motor. Install gasket (46) into gland (44). Apply a film of liquid dishwashing detergent or rubber lubricant to the washer and bellows of the seal, and slide the remaining seal parts onto the sleeve, making sure the washer is seated against the seal seat.

D. The shaft sleeve (36) with the seal rotating assembly on it may now be replaced on the shaft. The shaft sleeve (36) should slide over shaft with keyway for key (54) toward close-coupled motor.

E. Replace gasket (32) on bracket (8) and carefully slip stuffing box (27), with stationary seal seat toward motor, over the shaft and secure with capscrews (33).

F. Position gland (44) onto stuffing box (27), taking care to seat it evenly and squarely. Secure by tightening capscrews (45) evenly, being careful not to damage gasket (46) between them.

PACKING WITH LANTERN RING (OPTIONAL)

A. Place gasket (32) on stuffing box (27), slide over shaft and secure to bracket (8) with capscrews (33).

B. Install retaining ring (37), and place key (54) in shaft and slide sleeve (36) over shaft. Packing (40) and lantern ring (41) may be replaced at this time. From impeller end of shaft, place two new rings of packing (40) around shaft sleeve, slide lantern ring (41) back in position and place remaining three rings of packing on shaft sleeve. Be sure to stagger joints of packing rings to avoid excessive leakage through the packing.

C. Place o-ring gasket (42) in stuffing box on top ring of packing (40). Be sure o-ring remains concentric against inside diameter of stuffing box. Replace pipe plugs (44D), hose connector (44B), and tubing (44C) in leakage accumulator glands (44). Place one half of leakage accumulator gland in stuffing box with connection for hose positioned to drain properly. Apply General Electric* Silicon Rubber Sealant on both ends of this gland half. Thread capscrews (45) into stuffing box (27) approximately ¼ in. Slide slinger (43) over shaft and position inside leakage accumulator gland (44). Place each half of gland (44) in stuffing box, being careful not to disturb o-ring gasket (42). Insert capscrews (44A) into each side of gland (44) to hold the two halves together. Tighten capscrews (44A) before tightening packing adjusting capscrews (45) to obtain proper sealing. Ensure capscrews (45) are tightened enough to hold parts in place. Final adjustment of packing box will have to be made after pump is returned to operation. When pump is running, gland capscrews (45) should be evenly turned down a flat at a time, allowing packing to work in until a leakage rate of approximately 60 to 120 drops per minute is obtained.

NOTE

Do not over tighten packing, as this will cause packing box to over-heat and the shaft sleeve to receive excessive wear.

5. Carefully place o-ring gasket (38) on shaft sleeve (36). Assemble key (14) and impeller (2) to shaft. Secure impeller with gasket (13), washer (12), o-ring (11) and impeller screw (10). Torque impeller bolt to 75 ft. lbs.

5. Install the pipe plugs (25) in the pump casing (1). Position gasket (17) and casing (1) against the bracket (8) and secure with capscrews (34).

6. Replace handhole cover (68) on elbow (65) using gasket (67), capscrews (69), nuts (69A) and washers (69B). Elbow (65) and gasket (67) are secured to casing (1) with capscrews (66B). Completed pump assembly is secured to base (21) using capscrews (66). Replace pipe plug or suction gauge (70) in elbow (65).

7. Make one last check to see that rotating element turns freely. If binding occurs, remove shim gasket (17) between bracket (8) and casing (1).

8. Replace all relief, cooling, flushings or drain lines from pump.

9. Secure suction and discharge piping to the pump. Make sure to install gaskets on flanged connections.

10. Connect electricity to the motor.

11. Open all valves or flow devices that control flow of to and from pump.

STARTING PUMP AFTER REASSEMBLY

Do not start pump until all air and vapor have been bled, making sure that there is liquid in the pump to provide the necessary lubrication. Without the fluid around it, a seal may be ruined in a few seconds of operation. It is possible that the mechanical seal may drip during the first few minutes to one hour of operation.

Packing should be adjusted as previously discussed in this manual.

VORTEX PUMP MODEL 664A
DISASSEMBLY (6x6x12 & 6x6x15)

1. Break electrical connections to prevent drive unit from being energized during disassembly.

2. Close all valves or flow devices that control movement of liquids to or from pump. Remove pipe plug (70) from base elbow (65).

3. Remove all relief, cooling, flushings or drain lines from the pump.

4. Remove capscrews (34) that secure bracket (8) to casing (1). Screw eyebolt into the outboard end of the close coupled motor or use a sling under the motor lifting lugs to aid in handling the power frame and rotating element.

5. Remove gasket (17) from its position between bracket (8) and casing (1). Once the motor and rotating element has been withdrawn, inspect sealing surface to ensure that they are clean and free of any gasket material, which may have stuck to parting surfaces. Replace gasket with a new one when pump is reassembled.

6. Remove impeller capscrew (10), gasket (11), washer (12) and gasket (13), which allow impeller (2), key (14) and gasket (38) to be removed.

NOTE

The Vortex Pumps have a tapered hub impeller to facilitate impeller removal. Use caution in the removal of impeller, as it has to be removed only a few thousandths of an inch to become entirely free.

7. When the close coupled motor assembly is clear of impeller, place it on its side. At this point, either of the sealing box arrangements can be removed as a complete assembly by unscrewing capscrews (33). Slide complete assembly, including shaft sleeve (36), off shaft (48) with the aid of a pinch bar or other lever. Remove gasket (32).

NOTE

The shaft sleeve incorporates a snap ring designed to interfere with the base of the seal box assembly. Therefore, when removing seal box the shaft sleeve is also removed.

For further disassembly of sealing box, proceed as follows:

A. Double Mechanical Seal (Standard)

I. Remove seal gland bolts (45) and remove gland (44), exposing mechanical seal (47).

II. Use great care in removing ceramic seal rings and stainless steel metal parts from sealing box, as ceramic parts are easily chipped or cracked.

III. Remove the carbon stationary seats and o-rings only if necessary, using care not to damage these parts.

B. Packing Box (Optional)

I. Remove capscrews (45), and split accumulator gland halves (44). Slinger (43) is now exposed and can be removed from shaft sleeve. Remove o-ring gasket (42) from stuffing box. The accumulator gland may be further disassembled by removing capscrews (44A), hose connector (44B), tubing (44C) and pipe plugs (44D).

Remove and discard old packing (40). Clean all parts to remove any packing that may have adhered during removal.

8. Now set close coupled motor assembly on two benches, so that its shaft rests between them or on a bench with a hole cut in it large enough for shaft. Remove retaining ring (37) by twisting it in a spiral movement toward end of shaft.

9. Unscrew capscrews (35) to remove bracket (8) from motor register (56). Lift the stuffing box away from the close coupled motor shaft.

10. If total disassembly is required, break connections to suction and discharge pipe and remove nuts from foundation bolts that hold support (21) to its foundation.

11. Secure casing and support assembly in a sling and move it away from the piping. Invert this assembly and set casing (1) on wood blocks so as not to mar the surface that mates with bracket (8).

12. Elbow (65) and casing (1) may be removed from base (21) by removing capscrews (66) and (15). Handhole cover (68) is removed by unscrewing capscrews (69). Gaskets (67) and (64) should be replaced if these parts are removed.

VORTEX PUMP MODEL 664A
REASSEMBLY (6x6x12 & 6x6x15)

1. Place support (21) in place and fasten to casing (1) with capscrews (15). Tighten capscrews evenly to ensure perfect register of mating parts.

2. Turn above sub-assembly over so it lies with suction facing down. Replace drain plugs (25) and rodding hole plus (26) in casing (1). Replace elbow (65) with gasket (67) on casing (1) using capscrews (66). Replace drain plug (70) in elbow. If handhole cover (68) was removed during disassembly, replace using new gasket (67) with capscrews(69).

3. Retainer ring (37) can be set in its groove by turning it in a spiral motion up the shaft. When in position, outside diameter of ring should slope toward impeller end of shaft.

4. Position bracket (8) to motor and secure in place by evenly tightening capscrews (35).

5. The following procedure is used in assembling the sealing box:

A. Double Mechanical Seal (Standard).

I. Press one stationary seat with o-ring gently into stuffing box body (27) and the other into gland plate (44).

II. Place gasket (46) in position in the gland register.

III. Snap retainer ring (39) onto sleeve (36) with a pair of truarc external pliers.

IV. Slide sleeve through the bottom of stuffing box and place one seal (47) over sleeve and slide it down to stationary seat. Place metal parts over the shaft sleeve and then second seal ring.

V. Position gland (44) over shaft sleeve and fasten to seal box with capscrews (45).

NOTE

Do not put mechanical seal back into service until seal ring and stationary seat faces have been relapped or replaced.

B. Packing Box (Optional)

I. Place two pieces of packing (40) into stuffing box cavity (27) being careful to get each piece firmly in place. Install lantern ring (41), then add remaining three pieces of packing. When packing is tightened lantern ring should align with holes for plugs (29), flushing lines, or cooling lines.

NOTE

Be sure to stagger joints of packing rings to avoid excessive leakage.

II. Snap retainer ring (39) onto shaft sleeve (36) with a pair of truarc external snap ring pliers. Slide shaft sleeve carefully into inboard end of packing box.

III. Place o-ring gasket (42) in stuffing box (27) on top ring of packing (40). Be sure o-ring remains concentric against inside diameter of the stuffing box. Slide slinger (43) over shaft extension and adjust to ¼" below top of leakage accumulator after stuffing box assembly has been reattached to bracket. Replace pipe plugs (44D), hose connector (44B) and tubing (44C) in leakage accumulator glands (44). Place one half of leakage accumulator gland in stuffing box with connection for hose to drain positioned properly. Apply General Electric* Silicon Rubber Sealant on both ends of the gland half. Thread capscrews (45) into stuffing box (27) approximately ¼ in. Insert other half of gland (44) in stuffing box being careful not to disturb o-ring gasket (42). Insert capscrews (44A) into each side of gland (44) to hold the two halves together. Tighten packing adjusting capscrews (45) to obtain proper sealing.

IV. Ensure capscrews (45) are tightened enough to hold assembled gland in place. Final adjustment of packing box will have to be made after pump is returned to operation.

When pump is running, gland capscrews (45) should be evenly turned down a flat at a time, allowing packing to work in until a leakage rate of approximately 60 to 120 drops per minute is obtained.

NOTE

Do not over tighten packing as this will cause packing box to over-heat and the shaft sleeve (36) to receive excessive wear.

V. Place gasket (38) in radial corner groove that is machined around inboard end of shaft sleeve to complete assembly.

6. Place gasket (32) in groove of bracket (8).

7. Place key (54) in its keyway on shaft. Slide stuffing box assembly onto shaft, so that, key and keyway in shaft sleeve mate. Continue to slide assembly forward until shaft sleeve is in contact with retainer ring (37).

8. Align stuffing box (27) with gasket (32) and bracket (8). Fasten assembly to bracket (8) with capscrews (33).

9. Place impeller key (14) in keyway on tapered portion of motor shaft and set impeller (2) in position. Put gasket (13) inside impeller suction eye with washer (12) next and gasket (11) last. Secure impeller in place with capscrew (10) according to chart below.

IMPELLER BOLT TORQUE

Close Coupled Motor Register	Impeller Bolt Size Torque Value	Torque Value
8½	⅝ in.	75 FT-LBS.
12½	¾ in.	100 FT-LBS.

10. Place a gasket (17) on bracket (8). Slide close coupled motor and rotating element into casing (1) and join them with capscrews (34).

11. Make one last check to see that all parts of the rotating element turn freely. If binding occurs, remove shim gasket (17) between bracket (8) and casing (1).

12. Connect any flushing lines or cooling lines that were removed.

13. Open all valves or flow devices that control flow of liquids to and from the pump.

14. Connect power.

NOTE

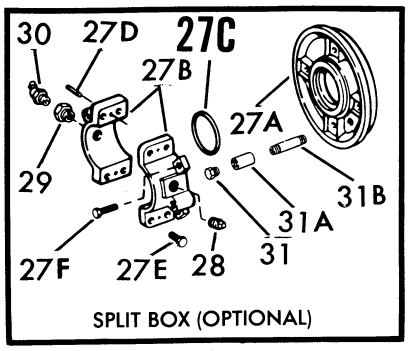
Do not start up a pump until all air and vapor have been bled, making sure that there is liquid in the pump to provide necessary lubrication. It is possible that the mechanical seal may drip during first few minutes of operation.

Turn on power momentarily to check for proper rotation. Rotation should be clockwise as viewed from driver (see arrow on casing).

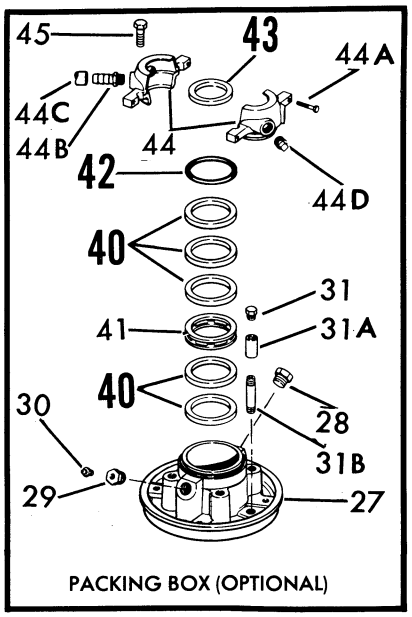
*General Electric is a registered trademark of the General Electric Corporation.

MODEL 664A LIST OF PARTS

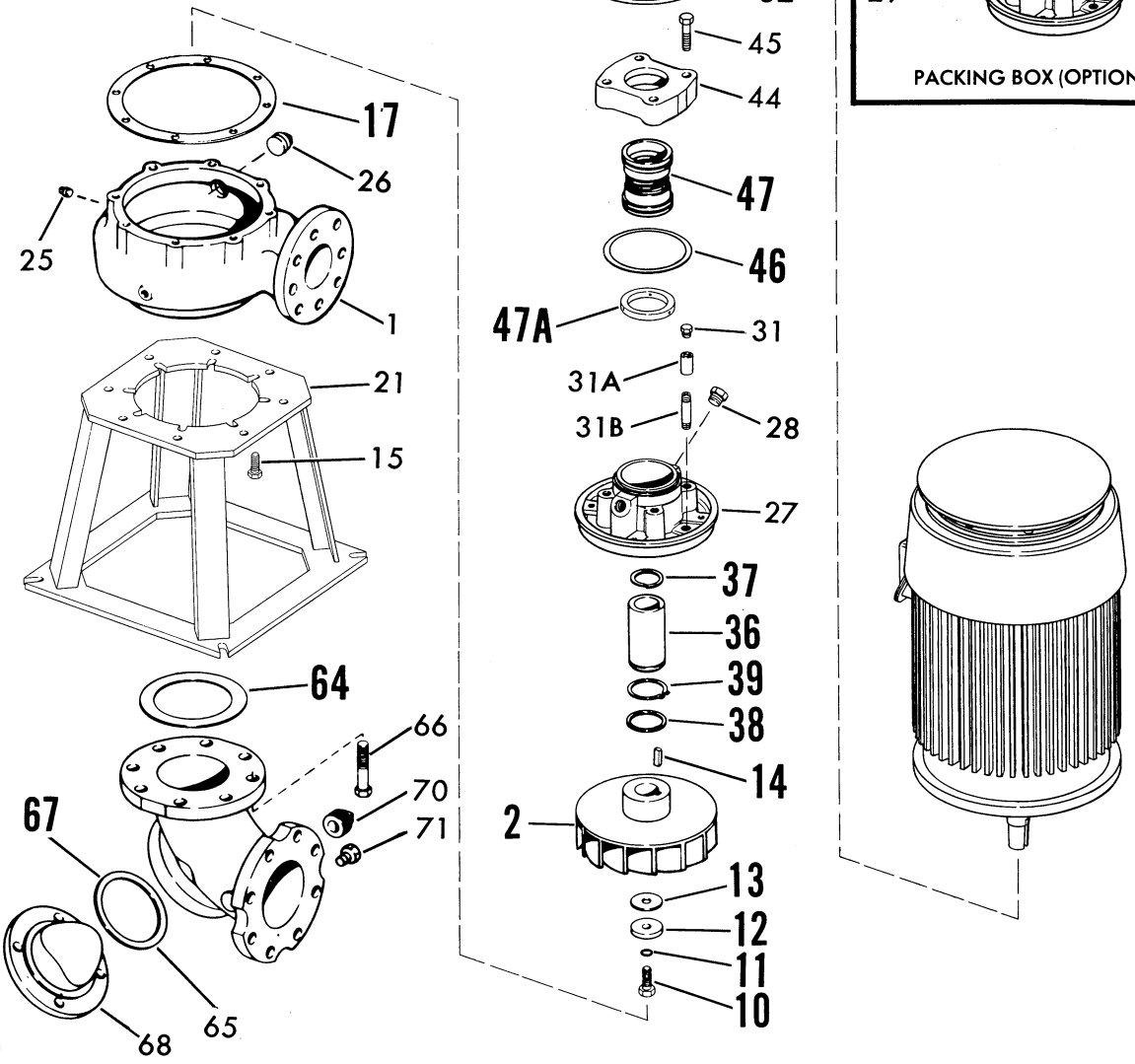
1. Casing
2. Impeller
8. Bracket
10. Imp. Bolt
11. Imp. Bolt Seal
12. Imp. Washer
13. Imp. Washer Gasket
14. Impeller Key
15. Capscrew
17. Gasket
21. Pump Support
25. Pipe Plug
26. Pipe Plug
27. Stuffing Box
27A. Adapter Plate
27B. Split Packing Box
27C. Gasket
27D. Pin
27E. Capscrews
27F. Capscrews
28. Pipe Plug
29. Bushing
30. Fitting
31. Pipe Plug
31A. Pipe Coupling
31B. Nipple
32. Gasket
33. Capscrew
34. Capscrew
35. Capscrew
36. Sleeve
37. Retaining Ring
38. Gasket
39. Retaining Ring
40. Packing
41. Lantern Ring
42. O-Ring
43. Slinger
44. Gland
44A. Capscrew
44B. Hose Connector
44C. Hose
44D. Pipe Plug
45. Capscrew
46. Gasket
47. Mechanical Seal
54. Sleeve Key
64. Gasket
65. Suction Elbow
66. Capscrew
67. Gasket
68. Handhole Cover
69. Capscrew
69A. Nut
69B. Washer
70. Pipe Plug
71. Suction Gauge or Pipe Plug
72. Drive Pins
73. Name Plate
74. Leakage Accumulator Kit
75. Sealant



SPLIT BOX (OPTIONAL)



PACKING BOX (OPTIONAL)



BOLD FACE NUMBERS INDICATE RECOMMENDED SPARE PARTS.

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WARRANTY

Seller warrants equipment (and its component parts) of its own manufacture against defects in materials and workmanship under normal use and service for one (1) year from the date of installation or start-up, or for eighteen (18) months after the date of shipment, whichever occurs first. Seller does not warrant accessories or components that are not manufactured by Seller; however, to the extent possible, Seller agrees to assign to Buyer its rights under the original manufacturer's warranty, without recourse to Seller. Buyer must give Seller notice in writing of any alleged defect covered by this warranty (together with all identifying details, including the serial number, the type of equipment, and the date of purchase) within thirty (30) days of the discovery of such defect during the warranty period. No claim made more than 30 days after the expiration of the warranty period shall be valid. Guarantees of performance and warranties are based on the use of original equipment manufactured (OEM) replacement parts. Seller assumes no responsibility or liability if alterations, non-authorized design modifications and/or non-OEM replacement parts are incorporated If requested by Seller, any equipment (or its component parts) must be promptly returned to Seller prior to any attempted repair, or sent to an authorized service station designated by Seller, and Buyer shall prepay all shipping expenses. Seller shall not be liable for any loss or damage to goods in transit, nor will any warranty claim be valid unless the returned goods are received intact and undamaged as a result of shipment. Repaired or replaced material returned to customer will be shipped F.O.B., Seller's factory. Seller will not give Buyer credit for parts or equipment returned to Seller, and will not accept delivery of any such parts or equipment, unless Buyer has obtained Seller's approval in writing. The warranty extends to repaired or replaced parts of Seller's manufacture for ninety (90) days or for the remainder of the original warranty period applicable to the equipment or parts being repaired or replaced, whichever is greater. This warranty applies to the repaired or replaced part and is not extended to the product or any other component of the product being repaired. Repair parts of its own manufacture sold after the original warranty period are warranted for a period of one (1) year from shipment against defects in materials and workmanship under normal use and service. This warranty applies to the replacement part only and is not extended to the product or any other component of the product being repaired. Seller may substitute new equipment or improve part(s) of any equipment judged defective without further liability. All repairs or services performed by Seller, which are not covered by this warranty, will be charged in accordance with Seller's standard prices then in effect.

THIS WARRANTY IS THE SOLE WARRANTY OF SELLER AND SELLER HEREBY EXPRESSLY DISCLAIMS AND BUYER WAIVES ALL OTHER WARRANTIES EXPRESSED, IMPLIED IN LAW OR IMPLIED IN FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Seller's sole obligation under this warranty shall be, at its option, to repair or replace any equipment (or its component parts) which has a defect covered by this warranty, or to refund the purchase price of such equipment or part. Under the terms of this warranty, Seller shall not be liable for (a) consequential, collateral, special or liquidated losses or damages; (b) equipment conditions caused by normal wear and tear, abnormal conditions of use, accident, neglect, or misuse of said equipment; (c) the expense of, and loss or damage caused by, repairs or alterations made by anyone other than the Seller; (d) damage caused by abrasive materials, chemicals, scale deposits, corrosion, lightning, improper voltage, mishandling, or other similar conditions; (e) any loss, damage, or expense relating to or resulting from installation, removal or reinstallation of equipment; (f) any labor costs or charges incurred in repairing or replacing defective equipment or parts, including the cost of reinstalling parts that are repaired or replaced by Seller; (g) any expense of shipment of equipment or repaired or replacement parts; or (h) any other loss, damage or expense of any nature.

The above warranty shall not apply to any equipment which may be separately covered by any alternate or special warranties.

PERFORMANCE: In the absence of Certified Pump Performance Tests, equipment performance is not warranted or guaranteed. Performance curves and other information submitted to Buyer are approximate and no warranty or guarantee shall be deemed to arise as a result of such submittal. All testing shall be done in accordance with Seller's standard policy under Hydraulic Institute procedures.

LIABILITY LIMITATIONS: Under no circumstances shall the Seller have any liability under the Order or otherwise for liquidated damages or for collateral, consequential or special damages or for loss of profits, or for actual losses or for loss of production or progress of construction, regardless of the cause of such damages or losses. In any event, Seller's aggregate total liability under the Order or otherwise shall not exceed the contract price.

ACTS OF GOD: Seller shall in no event be liable for delays in delivery of the equipment or other failures to perform caused by fires, acts of God, strikes, labor difficulties, acts of governmental or military authorities, delays in transportation or procuring materials, or causes of any kind beyond Seller's control.

COMPLIANCE WITH LAW: Seller agrees to comply with all United States laws and regulations applicable to the manufacturing of the subject equipment. Such compliance shall include: The Fair Labor Standards Acts of 1938, as amended; Equal Employment Opportunity clauses of Executive Order 11246, as amended; Occupational Safety and Health Act of 1970 and the standards promulgated thereunder, if applicable. Since compliance with the various Federal, State, and Local laws and regulations concerning occupational health and safety, pollution or local codes are affected by the use, installation and operation of the equipment and other matters over which Seller has no control, Seller assumes no responsibility for compliance with those laws and regulations, whether by way of indemnity, warranty, or otherwise. It is incumbent upon the Buyer to specify equipment which complies with local codes and ordinances.

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