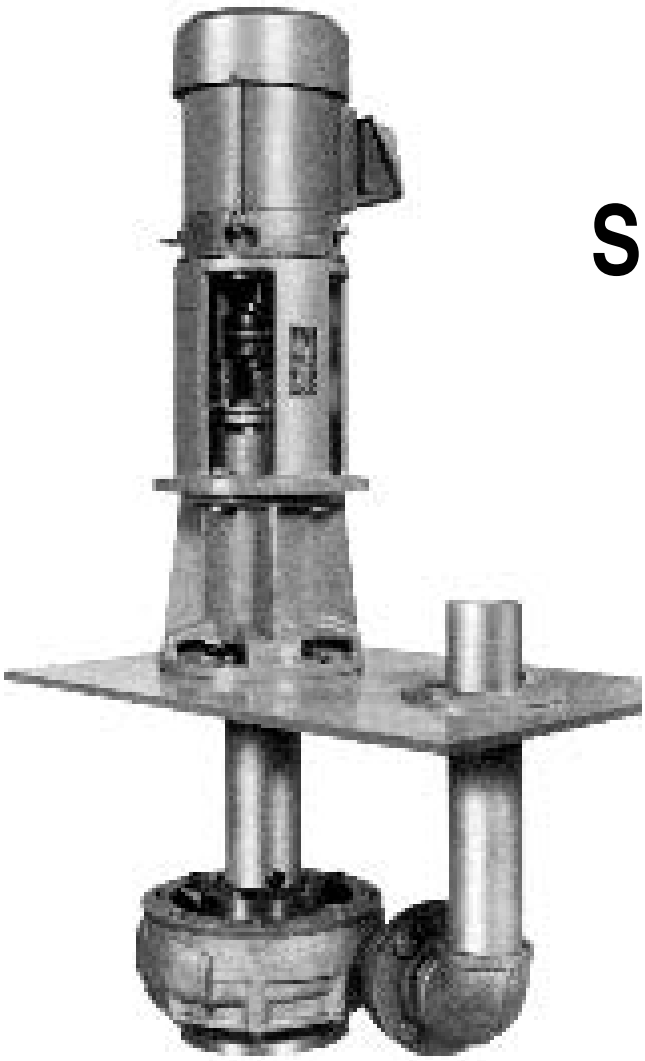
VERTIFLO

Installation, Operation & Service Instructions



SERIES 629/636

Industrial Vertical Process Pumps

IMPORTANT

HANDLING INSTRUCTIONS

Lifting equipment should be attached to motor support bracket or cover plate.

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I. INSTALLATION INSTRUCTIONS

Vertiflo Pump's vertical process pumps, series 629/636 are completely assembled, adjusted, and pre-lubricated at the factory.

A. Turn the pump shaft by hand. Shaft should turn freely without any interference. If any noted, complete each process below until remedied.

1. Position pump vertically and check.

2. If supplied with motor, loosen set screws, slide the couplings halves apart, (or remove motor) and check separately.

3. Re-adjust impeller clearance per instructions below.

4. Contact factory if re-adjustment does not eliminate interference.

B. Install pump in tank opening. Level the plate and secure it using the pump plate mounting holes. Re-check shaft for free rotation by hand.

C. Connect to the piping system. All external piping must be supported independently from the pump. The system should include a check valve and shutoff valve in the discharge. It is highly recommended that a connection be available for discharge pressure readings before any valves and as close to the pump as possible. This is required to set pump performance at design condition and will be the first requirement in any trouble shooting process.

D. The pump casing must be entirely submerged. Higher levels may be required if pump runs to the right of its' best efficiency point.

E. CONFIRM POWER SUPPLY IS DISCONNECTED TO THE MOTOR. — Install the motor if separate. Connect the power supply lines to the motor per the manufacturer's schematic for the appropriate voltage. Follow all state and local codes.

F. Check all piping connections, close discharge valve, open power supply to motor, and jog motor just long enough to confirm correct pump rotation. Rotation should be clockwise looking from above the motor. If incorrect, follow motor instructions to reverse. Jog once more if wiring was changed to confirm correct rotation.

G. Start pump and open discharge valve until correct pressure reading achieved to match nametag conditions of service. Pump should run smooth at this point without noticeable vibration or noise. ***Note: High fluid velocities will increase noise level accordingly.***

II. LUBRICATION

All Vertiflo Pumps are pre-lubricated at the factory. Further on site lubrication schedules are dependent upon operating conditions. For the average application, the 600 series pumps should be re-lubricated every 1,000 -1,500 hours of operation. Two separate grease fittings (8) (8A) require 1.5 - 2 ounces each for re-lubrication. A lithium base grease is required for compatibility with good corrosion inhibiting properties.

III. IMPELLER ADJUSTMENT

External impeller adjustment is available for a close running tolerance between the impeller face and internal suction face of the casing. This insures the pump is running at peak performance and efficiency. Adjustment is accomplished by three equally space jackscrews (6) and three pull down bolts (7) in thrust bearing housing directly below the pump to motor coupling.

1. Back out three pull down bolts (7) and three jackscrew locknuts (6A). Back out three jackscrews (6) until impeller binds against suction and becomes difficult to turn by hand. If shaft and thrust bearing housing (and impeller) fails to drop, use the three pull down bolts (7) to assist then back out when impeller contacts casing.

2. Turn three jackscrews (6) down by hand until all three touch the top of frame.

3. Turn each jackscrew (6) one flat each (1/6th turn) and turn shaft by hand. If still tight, continue one flat at a time until shaft turns freely. Turn one additional flat after free rotation and tighten down the three pull down bolts (7).

4. Tighten jackscrew locknuts down. Check for free rotation.

5. ***NOTE: Do not loosen the two bolts 180 degrees apart. Remove only for bearing replacement.***

IV. LIQUID END INSPECTION / DISASSEMBLY

NOTE: Match mark all parts prior to disassembly with center punch for assistance in re-assembly.

1. Turn off power supply.

2. Close all pipe valves.

3. Disconnect power lines if required.

4. Remove motor.

5. Disconnect piping and plate mounting bolts to allow removal of pump with plate and pump piping as an assembly.

6. Lie pump horizontally on floor or bench.

7. Remove discharge flange bolts on casing.

8. Remove case bolts.

9. Remove cotter pin and impeller nut.

10. To remove impeller, thread two or three 1/2-13 all-thread bolts approximately 2-1/2" long into threaded balance holes of impeller. Evenly tighten until impeller breaks free of taper fit.

Model 636 impeller has a straight shaft bore (vs. tapered bore of 629) and must be carefully pried off once impeller bolt and washer is removed. The balance holes are not tapped for jackscrews. Do not pry under the back shroud between the impeller vanes. Wedges can be made to allow multiple points of pressure. Care must be taken to prevent damage to impeller. You can also remove adjusting screws and bottom impeller out against case adaptor. Install impeller bolt short of touching impeller and press through impeller. If unsuccessful, balance holes may be drilled out and tapped for jackscrews on most sizes.

V. BEARING FRAME DISASSEMBLY

21" column pumps differ from 12 & 15" in that both ball bearings are removed over the coupling end of the shaft. No insert ring (17) or deflector 23) is required.

636 thrust bearing (12) is two bearings mounted "DF".

Continue as follows after liquid end disassembly.

1. Remove motor and motor support.
2. Loosen set screws and remove shaft coupling.
3. Remove three pull down bolts (7) from bearing housing.
4. Loosen set screws (23A) in deflector (23) through drain hole at bottom of column (22).
5. Use the three jackscrews (6) to assist in removing thrust bearing housing (4&10) and shaft (22A) from bearing frame. (14) Shaft and bearing assembly are a "slip fit" in bearing frame. If difficult to remove, tap impeller end of shaft with rubber mallet being careful not to bend or damage threaded stub.
6. With the shaft and bearing assembly removed, remove "all" bolts and jackscrews from thrust bearing housing.
7. Slide thrust bearing cap (4) off the shaft and press out top cap lip seal (5).
8. Push the thrust bearing housing (10) down over thrust bearing (12) until the bearing locknut (11) and washer (11A) are accessible. Bend washer tab out of locknut slot and remove locknut and washer.
9. Slide housing off thrust bearing (12) and press off coupling end of shaft.
10. Press radial bearing (15) off impeller end of shaft.
11. Unbolt column (22) from frame (14).
12. Press out bottom lip seal (16) and insert ring (17) through bottom of frame.
13. Remove top column lip seal (20).
14. Position the loose deflector (23) out of the way, or position on top of the throttle bushing (24) and press out through the bottom of the column.

NOTE: Since both bearings are slip fits in their housings, bearing failure can cause the outer races of bearings to turn. Check bearing bores for any wear patterns and replace if oversized.

VI. RE-ASSEMBLY OF BEARING FRAME

NOTES: New bearings must be protected from contamination during assembly. Ball bearings are a press fit on shaft. Never press on the outer race of the bearings during assembly. Use the inner race to press onto shaft or use a bearing heater for installation.

Lubricate all lip seals, fits, and bores with a film of lithium base grease during assembly. Hand pack ball bearings with grease before assembly into bearing frame.

1. Replace insert ring (17) and bottom frame lip seal. (16) with spring side facing impeller.
2. Install radial bearing (15). If supplied with a shield on one side, install it with the shielded side towards the motor. Pack with grease.
3. Slide thrust bearing housing (10) over the coupling end of shaft before thrust bearing. Install thrust bearing (12) with shielded side towards impeller. Replace bearing locknut (11) and washer (11A). Tighten locknut and bend lock washer tab into slot. Slide housing up over bearing until seated in bore. Hand pack bearing with grease and fill cavity above bearing with grease.
4. Replace cap lip seal (5) in thrust bearing cap (4) with spring side towards coupling. Slide over shaft and bolt to thrust bearing housing with two 3/8" bolts located 180 degrees apart.
5. Re-insert three all thread jackscrews and locknuts in thrust bearing housing until end flush with underside.
6. Insert shaft and bearing assembly back into bearing frame. Process requires shaft and bearings be aligned with bores to prevent binding.
7. Replace pull down bolts (7&7A) loosely through thrust bearing housing (10) into bearing frame (14).
8. Press in top column lip seal with spring side towards impeller.
9. Drop deflector (23) into column (22) and press in throttle bushing (24).
10. Apply a thin film of grease on shaft extending from frame. Position deflector inside column so it can be held through drain holes in column and slide column assembly over shaft. Bolt column to frame.
11. Insert woodruff impeller key (29A) in shaft if removed.

VII. ASSEMBLY OF LIQUID END TO FRAME

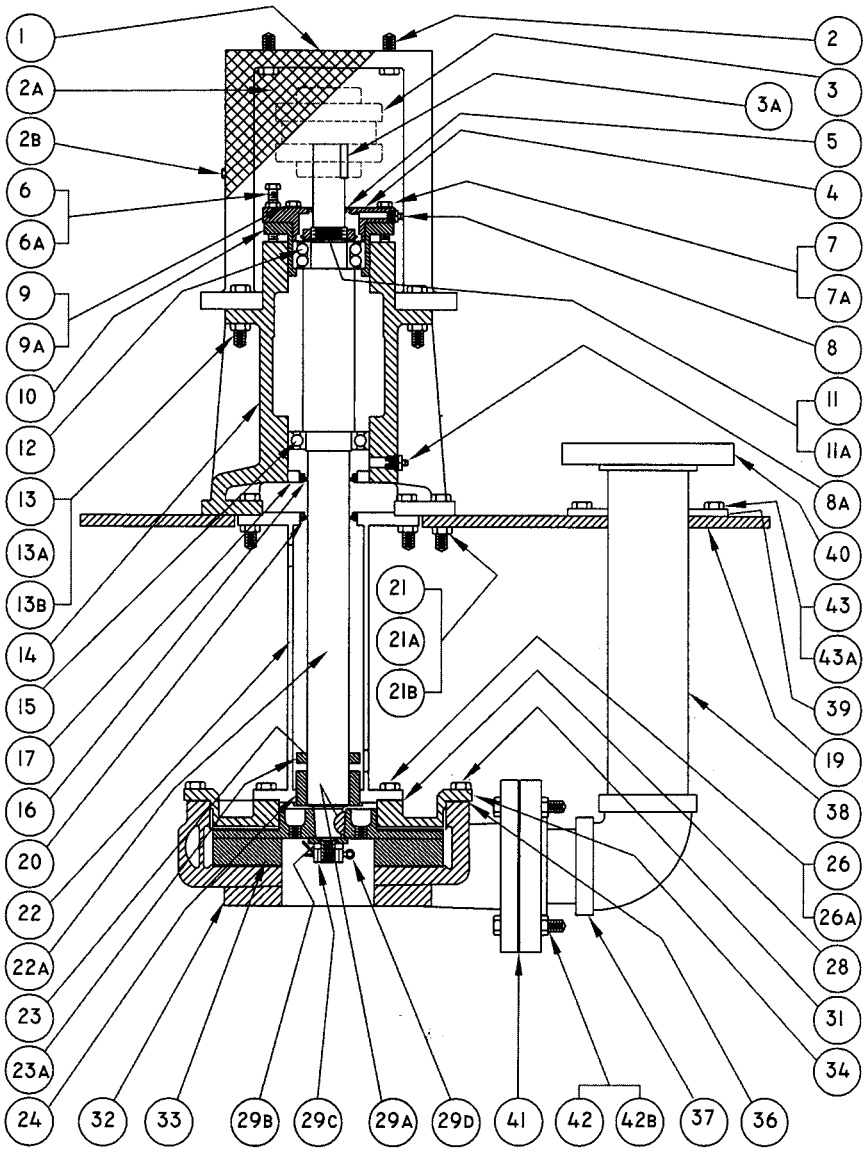
NOTES: During liquid end assembly, the adjusting bolts (6&7) in the thrust bearing housing must be loose. (Three jackscrews and three pull down bolts) Shaft and bearings must be allowed to move up or down without any restriction during impeller and case installation.

Pump plate (19) if supplied, must be in place before liquid end is re-assembled to frame.

1. Install bottom column gasket (28) and bolt case adaptor (34) to column.
2. Place impeller (33) on shaft (22A) with impeller keyway aligned with woodruff key in shaft. Replace washer (29B), nut (29C), and tighten. Check shaft and impeller for free rotation. Align slots in nut with hole in threaded stub and replace cotter pin (29D). Bend ends to retain. Re-check for free rotation.
3. Set case gasket (36) and replace case (32) so that discharge flanges are aligned. Adjustment can be made by rotating frame on plate before tightening.
4. Adjust pump per instructions under Impeller Adjustment section.
5. Slide deflector (23) on shaft until 1/16-1/8" space is achieved between bushing and deflector. Tighten set screws (23A) through column drain holes.
6. Re-connect discharge flange. Re-check for free rotation. If rubbing, re-align case and discharge flange and re-tighten.

SCHEMATIC

Item	Description
1	Motor Support
2	Motor Bolt
2A	Coupling Guard
2B	Coupling Guard Bolt
3	Flexible Coupling
3A	Shaft Coupling Key
4	Thrust Bearing Cap
5*	Thrust Bearing Cap Lip Seal
6	Jack Bolt Up
6A	Nut, Jack Bolt Up
7	Jack Bolt Down
7A	Washer, Jack Bolt Down
8	Thrust Bearing Grease Fitting
8A	Frame Grease Fitting
9	Thrust Bearing Cap Bolt
9A	Thrust Bearing Cap Washer
10	Thrust Bearing Housing
11	Thrust Bearing Lock Nut
11A*	Thrust Bearing Lock Washer
12*	Top Thrust Bearing
13	Mtr. Support Bolt
13A	Mtr. Support Washer
13B	Mtr. Support Nut
14	Bearing Frame
15*	Bottom Radial Bearing
16*	Bottom Radial Lip Seal
17	Insert Ring
19	Pump Support Plate
20*	Top Column Lip Seal
21	Bearing Frame Bolt
21A	Bearing Frame Nut
21B	Bearing Frame Washer
22	Column
22A	Shaft
23	Deflector
23A	Deflector Set Screw
24*	Throttle Bushing
26	Bottom Column Bolt
26A	Bottom Column Washer
28	Bottom Column Gasket
29A	Impeller Key
29B	Impeller Washer
29C	Impeller Nut
29D	Cotter Pin
31	Case Bolt
32	Volute Casing
33	Impeller
34	Case Adaptor
36*	Case Gasket



37	Discharge Elbow Assembly
38	Discharge Pipe
39	Back Up Ring
40	Top Discharge Flange
41	Case Flange Gasket
42	Case Flange Bolt
42B	Case Flange Nut
43	Back Up Ring Bolt
43A	Back Up Ring Washer

*RECOMMENDED SPARE PARTS

VERTIFLO PUMP CO., INC.
7807 Redsky Drive
Cincinnati, Ohio 45249
513-530-0888 - FAX 513-530-0893