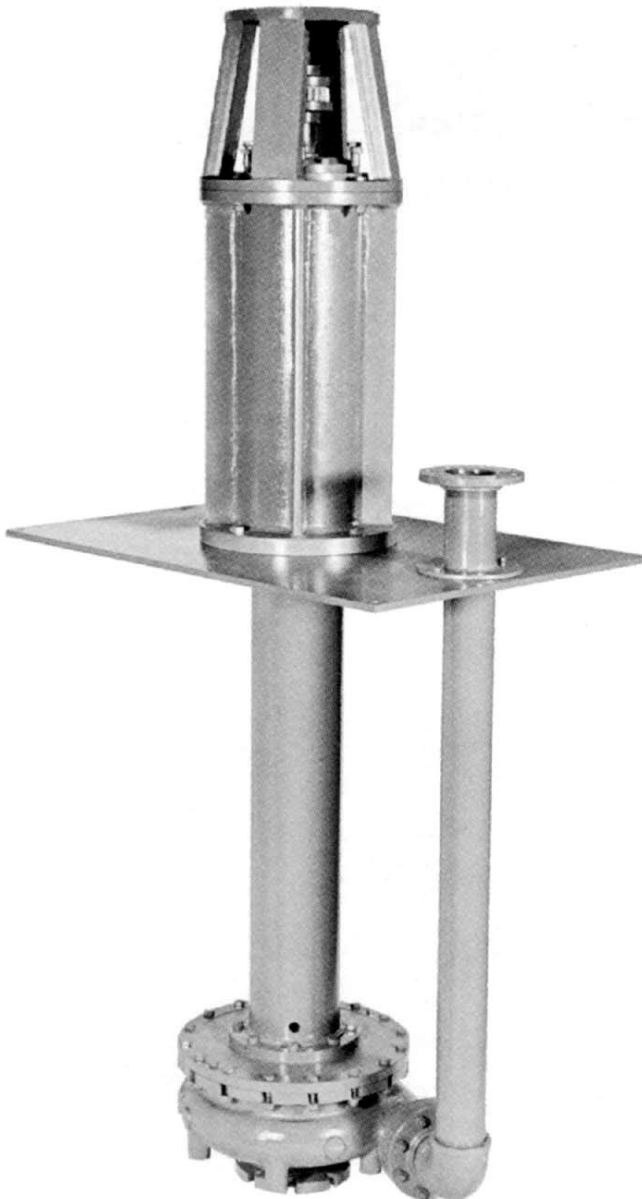




Installation, Operation
& Service Instructions

SERIES 1100-1200 Industrial Vertical Cantilever Pumps



1100 Series Pump



1200 Series Pump

I. INSTALLATION INSTRUCTIONS

Vertiflo vertical series 1100/1200 cantilever pumps are completely assembled and pre-lubricated at the factory before shipment.

1. Since this series of pumps are individually engineered to meet the customers required dimensions, proper lifting procedures are not identical for all. These pumps can be top heavy above the plate and lifting equipment must be attached accordingly to ensure a safe lift.
2. Lower unit into position so that the plate (14) rests evenly on the mounting surface. Level and secure the plate so that the pump is vertically plumb.
3. Turn pump shaft (18) at coupling (10) by hand. Rotation may be stiff, but should turn without any obvious impeller rub or interference contact at any point of rotation. Re-adjust impeller per section III if impeller rub is detected.
4. Install motor. Leave motor and pump couplings disengaged but fastened to shafts for rotation check before start up. Have a qualified electrician connect power supply and confirm that proper electrical protection is present for motor voltage and amperage requirements. Follow all state and local codes. **Always** lock out power when working on pump.
5. Connect the system piping to the pump discharge above the plate. It is highly recommended to install a pressure gage or provisions for one in the discharge pipe. It should be in a straight section equal to (10) lengths of pipe diameter as close to the pump plate flange as possible. This will provide means to troubleshoot or confirm pump performance if needed. A check valve should be installed to prevent back flow into sump and reverse pump rotation. A shutoff valve should be installed as well for future pump removal or flow control if needed.
6. Once all connections are complete, pump is sufficiently secured, and the coupling guard attached, the motor can be "jogged" to check rotation. Pump rotation is clockwise looking down from above the motor. If motor rotation is incorrect, have an electrician make the necessary wiring changes to correct. Lock out power and loosen coupling flanges from shafts and slide together to engage the transmission element. If coupling (10) is other than our standard flexible insert coupling, refer to the manufacturer's manual for instructions.
7. Before power is re-connected, check for free pump/motor shaft rotation by hand one last time before start up. Replace coupling guard, close the discharge valve and then partially open to avoid running pump at shut off. Re-connect power to motor, and start pump. Open discharge valve until desired flow is obtained. Check for acceptable motor amperage draw.

II. LUBRICATION

All Vertiflo standard cantilever pumps are properly lubricated at the factory. Further on-site lubrication schedules depend upon bearing size, rpm, cycle run time per day, and individual operating conditions. A maintenance schedule should be implemented to add new grease on a regular basis. Grease should be high quality No.2 Lithium base grease with oxidation inhibitors and good water resistance. A typical hand held grease gun produces approximately (1) gram per stroke, but can vary

widely and should be tested to confirm actual amount. It is recommended to re-lubricate with smaller amounts on a more frequent schedule to ensure a constant renewed supply of oil. This will also prevent overfilling and increased bearing temperatures until bearing can clear excess grease. The figures below are based upon 1000 to 2000 hours of operation at 1750 RPM. Your knowledge of your particular application which may include monitoring ambient and bearing temperatures, noise and vibration levels, and past experience with similar equipment, should be invaluable in determining what re-lubrication schedule best suits your pump. For a complete re-lubrication of bearings only, use the following as a guide to develop your schedule.

Model 1102/1202 Top thrust bearing: 36g. Bottom radial: 28g.

Model 1103/1203 Top thrust bearing: 74g. Bottom radial: 43g.

III. IMPELLER ADJUSTMENT

Impeller running clearance is set by raising or lowering the thrust bearing housing, bearings, shaft, and impeller assembly. The assembly is raised by turning (3) equally spaced jackscrews after (3) evenly spaced hold down bolts are loosened. Lower by loosening jackscrews and turning hold down bolts. These are located within the motor stand support and around the pump shaft below the coupling. Impellers on the **1200** series pump should be adjusted as close to the suction of the casing as possible without any contact between the impeller and case. Adjust impeller down until contact is felt and then raise until shaft turns freely. Adjust bolts evenly and use inside calipers or a feeler gage between the thrust bearing housing and the top of support head to ensure the gap is even at any point around housing. Make sure all bolts and locknuts are tightened. For **1100** series vortex pumps, adjust the impeller up until contact then lower for free rotation. (See parts illustration for impeller location reference)

IV. LIQUID END DISASSEMBLY

With pump pulled and resting horizontally on the floor or suitable working surface, match mark all mating parts with a number or center punch for simplification of re-assembly.

1. Remove discharge case flange bolts.
2. Support discharge pipe with sling or remove backup ring bolts and slide up through plate hole until it rests out of the way.
3. Support the pump end weight by blocking up or slinging the column so that the case is not contacting the floor or bench.
4. Remove the case bolts and remove case.
5. Remove impeller bolt and washer.
6. Slide or pry the straight bored impeller off the shaft. If thrust bearings are being replaced, impeller adjustment jackscrews can be used to pull the shaft out of the impeller.
7. If separate set of bolts are present for the case adaptor to column fit, remove and pull case adaptor and throttle bushing from column.

V. BEARING AND FRAME DISASSEMBLY

1. Remove motor and motor stand.
2. Support or sling by plate (14) so that no weight is

supported by the column (17).

3. Remove column (17) to bearing frame (9) bolts and carefully slide column off over shaft.
4. Remove pump shaft coupling (10) and key (7).
5. Remove (3) hold down thrust bearing bolts.
6. Support or sling both ends of shaft and slide shaft and bearing assembly out of the bearing frame (9). Bearing housing (6) and bearing fits (11) to frame bore are close tolerance slip fits. Any radial forces on the shaft may cause binding and difficult shaft assembly removal.
7. With shaft and bearing assembly resting on bench, remove the thrust bearing housing cap (5) with top lip seal (2).
8. Slide bearing housing (6) down over bearings (8) until top bearing starts to protrude above the housing bore.
9. Remove excess grease, pry out washer tang from bearing locknut (3) and remove nut and washer (4).
10. Pull thrust bearing housing (6) back into position until bearing is seated in the bottom of the bore. The thrust bearing housing and bearings can now be pressed off the coupling end of the shaft.
11. Bend out radial bearing lock washer (12) tab from nut (13), remove, and press bearing (11) off the impeller end of shaft.
12. Bottom bearing frame lip seal (16) can be pressed out, with or without the lip seal housing ring (15). Check radial bearing bore for any apparent wear pattern from bearing.

VI. REASSEMBLY OF BEARING FRAME

1. Hand-pack both new bearings and wipe off excess to reduce chance of contamination during assembly. Wipe off again after installation to remove any contaminants on the surface. If bearings heaters are used instead of pressing bearings onto shaft, even closer attention to cleanliness must be made to ensure bearings remain clean throughout assembly.
2. Replace bottom lip seal housing (15) and seal (16) in bearing frame (9). Apply some grease to lip seal. Spring side should be facing out towards liquid end. Remove spring and discard.
3. Press new radial bearing (11) onto shaft with single shielded side towards the impeller (24) end of the shaft.
4. Install lock washer (12) and tighten locknut (13) onto shaft. Bend washer tang into slot of nut.
5. Slide thrust bearing housing (6) onto shaft. See parts illustration for correct "DF" mounting of duplex bearings. Incorrect arrangement can cause immediate failure. Press thrust bearing (8) (two angular contact) onto shaft until seated against shoulder. Make sure inner bearing races are seated together. Hand-pack all bearings with grease if not done previously.
6. Install locknut (3) and washer (4). Bend washer tang into locknut slot.
7. Replace top thrust bearing housing cap lip seal (2). Fill cavity above bearing with grease and bolt cap to housing.
8. Apply a thin film of grease in bearing frame (9) bores. Support or sling shaft and bearing assembly by shaft

at coupling (10) area and close below the radial bearing (11). Line up shaft (18) with frame bores and slide into bearing frame (9) until shaft exits bottom lip seal (16) several inches. Support shaft (18) and remove sling from radial bearing area and move to impeller end of shaft. Continue to maneuver shaft assembly into bearing frame (9) until hold down bolts can be threaded through thrust bearing housing (6) into bearing frame (9) or thrust bearing housing flange contacts top of frame. Use lip seal as guide to keep shaft centered in bore. Do not force. This is a slip fit.

9. Replace thrust bearing (6) jack screws "loosely".

VII. ASSEMBLY OF LIQUID END

1. Press in new throttle bushing (20) if required.
2. Make sure all mating surfaces are free of nicks or foreign material. Install and bolt column (17) to bearing frame, tightening bolts slow and evenly.
3. Install case adaptor (21) and bolt to column (17) if separate from case bolts. Insert and tighten a couple bolts with nuts if sandwiched style case adaptor to seat in registered counter bore. Check shaft (18) for free rotation. Shaft clearance in throttle bushing can be checked with feeler gages. Shaft (18) should not contact bushing (20). If it does, disassemble back to frame to column fits. Re-check all mating surfaces and clean to ensure a good flat fit at all joints. Re-assemble paying close attention to tightening bolts evenly and alternately across from each other.
4. Install impeller key (25), impeller (24), impeller washer (27), and bolt (26). Install optional sleeve (19) before impeller if so designed. Contact factory for specific sleeve options and instructions if supplied. Adjust shaft (18) so that impeller (24) does not contact case adaptor (21) before it is tight on shaft.
5. Make sure top thrust bearing housing (6) bolts are loose enough to allow free up and down movement of shaft without tightening or bottoming out. Install case (23), gasket (22), and bolt in place making sure the shaft (18) moves up freely if case (23) contacts impeller (24) before it is tight. (1200 series only)
6. Re-assemble discharge piping to case.
7. Adjust impeller running clearance per section III.
8. Replace motor stand and motor.

Note: We try to provide a comprehensive process to follow for working on this series of pumps. It is an engineered product that has fewer "standards" than other series and has gone through several changes and improvements over the years. It is impossible to provide all the details to all the pumps in service to ensure the best results with the least amount of effort and resources. Available equipment and facility resources are not within our control and small details may affect results. There are many assumptions made in the guidelines and instructions. We assume that those performing the work required are qualified and familiar with common knowledge aspects and requirements of pumps and their systems. Any details required for any specific pump are available upon request by contacting our engineering department.

SCHEMATICS

Vertiflo Cantilever Pumps Models 1102/1103/1202/1203

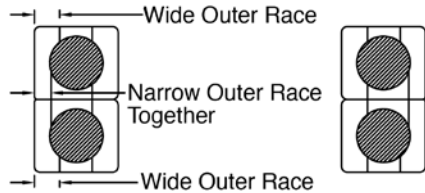
Top thrust bearing consists of (2) single row angular contact ball bearings for duplex mounting in the "DF" face-to-face mounting.

Thick outer race of top bearing should be on top.

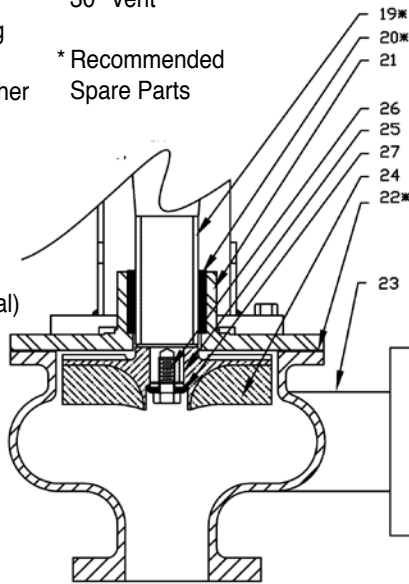
Thick outer race of bottom bearing should be on the bottom.

Thin side of outer races should be mated together between the bearings.

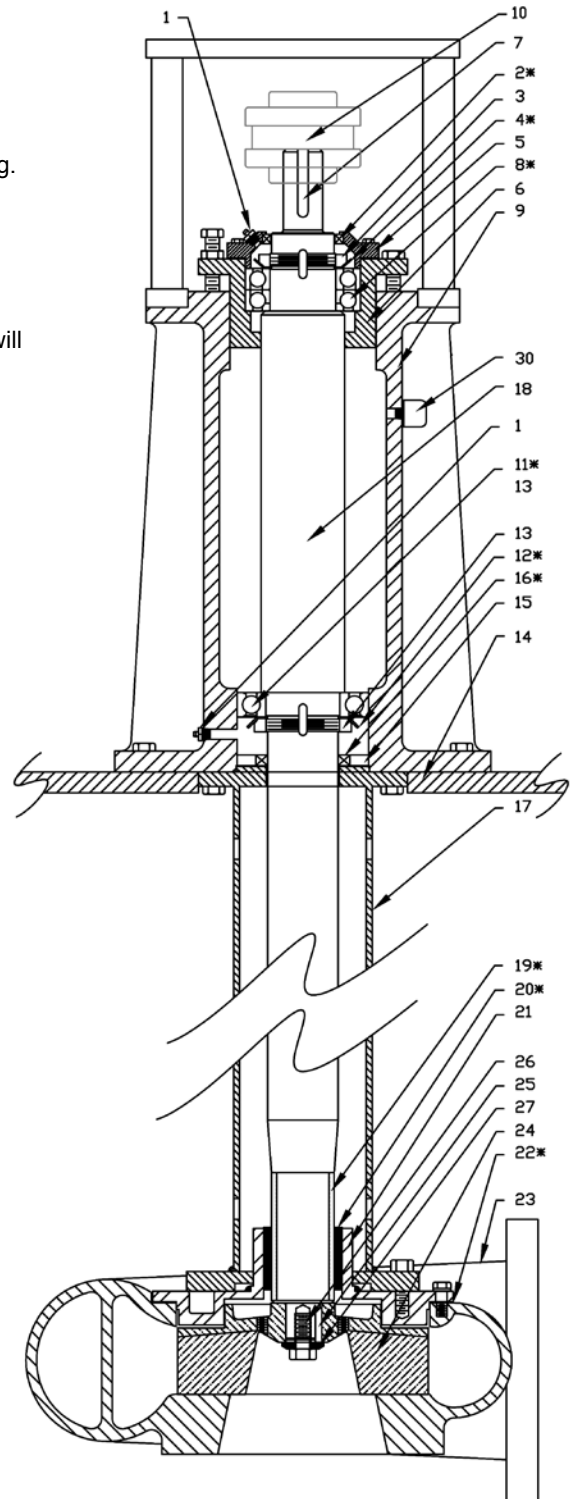
The bottom bearing will support down thrust and the top bearing will support any upthrust and add stability to the arrangement.



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|------------------------------|---------------------------|
| 1 Grease Fitting | * 20 Throttle Bushing |
| * 2 Top Lip Seal | 21 Case Adaptor |
| 3 Bearing Lock Nut | * 22 Case Gasket |
| * 4 Bearing Lock Washer | 23 Casing |
| 5 Thrust Bearing Cap | 24 Impeller |
| 6 Thrust Bearing Housing | 25 Impeller Key |
| 7 Shaft Coupling Key | 26 Impeller Bolt |
| * 8 Thrust Bearing Set | 27 Impeller Washer |
| 9 Support Head | 30 Vent |
| 10 Pump/Motor Coupling | |
| * 11 Radial Bearing | * Recommended Spare Parts |
| * 12 Radial Brg Lock Washer | |
| 13 Radial Brg Lock Nut | |
| 14 Support Plate | |
| 15 Lip Seal Housing | |
| * 16 Bottom Lip Seal | |
| 17 Column | |
| 18 Shaft | |
| * 19 Shaft Sleeve (Optional) | |



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

VERTIFLO