

CECO Fybroc

Fybroc® series 5500/7500 vertical and cantilever pumps

INSTALLATION MANUAL



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ORDERING REPLACEMENT PARTS

For future reference fill in the following information from the pump nameplate. This will be necessary to ensure accuracy when ordering replacement parts.

Model _____
Size _____
Serial Number _____
Impeller Diameter Installed _____
Bearing Material _____
Material of Construction _____

CECO Fybroc

WARRANTY

FYBROC pumps are warranted by the Company, insofar as the same are of its own manufacture, against defects in materials and workmanship under proper and normal use and service, for a period of one year from the date of original shipment from the factory. FYBROC's obligation is limited, however, to furnishing without charge, F.O.B. its factory, new parts to replace any similar parts of its own manufacture so proving defective within said period, provided the Buyer has given FYBROC immediate written notice upon discovery of such defect. No allowance will be made for labor charges. FYBROC shall have the option of requiring the return of the defective material, transportation prepaid, to establish the claim.

FYBROC makes no warranty or guarantee whatsoever, either express or implied, of prime mover, starting equipment, electrical apparatus, parts or material not manufactured by Fybroc, except to the extent that warranty is made by the manufacturer of such equipment and material.

FYBROC assumes no liability for damages or delays caused by defective material, and no allowance will be made for local repair bills or expenses without the prior written approval or authority of FYBROC.

Under no circumstances will FYBROC be liable for indirect, special or consequential loss or damage of any kind and the Buyer assumes all liability for the consequences of its use or misuse by the Buyer, his employees, or others.

PERFORMANCE GUARANTEE

Is at the specified point of rating only and will not cover performance under conditions varying therefrom, nor for sustained performance over any period of time.

ACCEPTANCE TESTS

If required, shall be conducted in accordance with the practices as set forth in the Hydraulic Institute Standards. The expense of any such tests shall be borne by the buyer.

PERFORMANCE REPRESENTATIONS

Are based on shop laboratory tests with cold water as outlined in the Hydraulic Institute Standards.

FIELD TESTING

Due to the inaccuracies of field testing, the results of any such tests conducted by or for the Buyer shall be interpreted as being only indicative of the actual field performance of the pump. No equipment will be furnished on the basis of acceptance by results of field tests. If the buyer, after such a test, questions the performance of the pump, he may at his option request a test to establish the performance. Such tests will be conducted in accordance with the above paragraph entitled "Acceptance Tests."

ALL WARRANTIES

Are void if -

- a. Pipe strains are the cause of damage.
- b. Pump handles liquids other than those specified in detail.
- c. NPSH lower than required by pump impeller.
- d. Operating speed is higher than specified.
- e. Improper field installation.

RECOMMENDATIONS FOR SPECIAL MATERIALS

To combat corrosion, abrasion, erosion, or pumping solids, foreign objects, or pumping liquids at elevated temperature, any such recommendations will be based on the best available experience of FYBROC and the supplier of the material and industry, BUT WILL NOT CONSTITUTE A GUARANTEE AGAINST THESE EFFECTS.

The foregoing warranty is made in lieu of all other warranties, guarantees, obligations or liabilities, expressed or implied, by FYBROC or its representatives. All statutory or implied warranties, other than of title, are hereby expressly negated and excluded.

All illustrations and provisions in specifications are descriptive and are not intended as warranties. Penalty of any kind are not acceptable unless approved in writing by an officer of Met-Pro Corporation.

INSTALLATION 5500 SERIES AND 7500 SERIES PUMPS

GENERAL DESCRIPTION

Fybroc vertical (Series 5500) and cantilever (Series 7500) pumps are centrifugal wet pit type pumping units for installation in a pit or a tank vented to atmospheric pressure. All pump parts in contact with the fluid are constructed of glass reinforced vinyl ester (VR-1) or epoxy (EY-1) resin with the exception of the shaft and hardware, which are of an alloy selected for compatibility with the fluid pumped. Vertical pumps contain one or more non-metallic line bearings which require a source of fluid flush to lubricate and cool the bearings. Cantilever pumps are of the overhung shaft type and do not contain any bearings below the mounting plate.

PUMP INSTALLATION

- 1) Inspect pump and any accessories packed with the unit to assure no damage has occurred during transit.

MOTORS ARE SHIPPED SEPARATELY AND SHOULD ALSO BE INSPECTED.

Install the pump assembly in the pit before mounting the motor to prevent damage.

- 2) WHEN HANDLING THE PUMP UNIT, IT IS VERY IMPORTANT TO PICK UP THE UNIT BY THE TOP.

A rope or sling should be attached to the bearing pedestal (Item 81) or the mounting plate (Item 89). Serious damage may result if the unit is picked up by the column shaft (Item 91) or discharge pipe (Item 95). The pump assembly must be lowered carefully into the pit. Care must be taken to guide the pump as it is lowered into the pit to avoid striking the sides.

- 3) When the mounting plate is resting in the proper position, check the level of the plate, and shim if necessary to level the unit. The pump shaft must be vertical to avoid a bending stress on the shaft column, and to avoid bearing damage during operation. Check the shaft column (Item 91) with a level to be sure the unit is straight and plumb.
- 4) Bolt down the mounting plate, and be sure it is supported on all four sides. **There should be a minimum of 4 to 12 inches between**

the bottom of the suction strainer, and the bottom of the tank of pit. For higher flow pumps, this clearance may be specified as greater; check your outline drawing.

- 5) Be sure the source of lubrication to the line bearings on 5500 Series vertical pumps has been connected if an external flush source is required. Check all fittings at the line bearings to be sure no damage has occurred during shipment.
- 6) Connect level control, if the pump is so equipped.

IMPELLER ADJUSTMENT - ALL MODELS

ALL MODELS ARE PREADJUSTED BEFORE LEAVING THE FACTORY. CHECK TO SEE IF SHAFT TURNS FREELY BY HAND. IF NO BINDING IS NOTED, NO FURTHER ADJUSTMENT IS NEEDED. IF BINDING IS NOTED, FOLLOW ADJUSTMENT PROCEDURE BELOW. NEVER ADJUST IMPELLER WITH COUPLING CONNECTED.

The impeller must be adjusted with the pump mounted in the vertical position.

Impeller Adjustment for 5500 Series Vertical Sizes:
1x1 $\frac{1}{2}$ x6, 1 $\frac{1}{2}$ x3x6, 2x3x6, 1x1 $\frac{1}{2}$ x8, 1 $\frac{1}{2}$ x3x8, 2x3x8, 3x4x8, 1 $\frac{1}{2}$ x3x10, 2x3x10, 3x4x10, 4x4x10

- 1) Loosen bearing cap set screw (Item 12A).
- 2) Loosen clamping screw in adjusting collar (Item 66).
- 3) Slowly rotate adjusting collar counterclockwise while pushing down on shaft, and rotate shaft until you feel the impeller touch the casing face.
- 4) Place a dial indicator on the end of the shaft. Rotate the collar clockwise (CW), raising the shaft to the clearance specified in Table 1. NOTE: For "Quick Field" adjustment, rotate the collar 90° clockwise, while securing the shaft.
- 5) Re-lock adjusting collar clamping screw (Item 66).
- 6) Tighten set screw (Item 12A).

- 7) Rotate shaft by hand to insure that there is no binding or rubbing of parts.

TABLE 1

Impeller Diameter	Clearance
Up to 8"	.015"
8" to 10"	.020"
10" to 15"	.025"

Impeller Adjustment for Vertical Sizes:

4x6x10, 2x3x13, 3x4x13, 4x6x13, 6x8x13, 8x10x15, 10x12x16 and ALL CANTILEVER SIZES

- 1) Loosen three adjusting screws (Item 37C) evenly.
- 2) Tighten up equally on outer screw (Item 37A) until you can feel the impeller just starting to rub on the casing face. Rotate the shaft frequently while taking up on these bolts, so you know when it begins to bind.
- 3) Now loosen the outer screw (Item 37A) evenly until you can insert a feeler gauge, corresponding to the impeller clearance from Table 1 above, under each of the three bolt heads. NOTE: For "Quick Field" adjustment, loosen outer screw (Item 37A) two flats.
- 4) Tighten adjusting screw (Item 37C) evenly until the bearing housing is backed up against the outer screw (Item 37A).
- 5) Check to be sure the shaft turns freely.

MOTOR ASSEMBLY

When the motor is furnished by the customer, the motor coupling half must be installed. Place motor on motor support, start the mounting bolts into the motor, and securely tighten the motor mounting bolts.

ROTATION CHECK

Before coupling sleeve is connected, the motor should be wired and the direction of rotation checked. The motor should be rotating in a clockwise (CW) direction when looking down on top of the motor. SERIOUS DAMAGE COULD OCCUR IF PUMP IS OPERATED IN THE WRONG DIRECTION.

After the proper motor rotation direction is established, loosen the motor coupling half and install the coupling sleeve. Adjust the motor coupling half and tighten. Rotate the coupling to insure no binding occurs and install the coupling guard.

Proper alignment of the pump and motor is of extreme importance for trouble free mechanical operation. Check the coupling alignment by laying a straight-edge across both coupling hubs at four points, 90 degrees apart.

PIPING THE PUMP

The pump discharge pipe is connected to the process piping above the mounting plate. The piping should be as direct as possible with a minimum number of fittings. IT IS RECOMMENDED THAT A CHECK VALVE BE INSTALLED IN THE PUMP DISCHARGE LINE AS CLOSE AS POSSIBLE TO WHERE THE DISCHARGE PIPE COMES THROUGH THE MOUNTING PLATE. This will prevent backflow from the discharge line upon pump shutdown and reverse rotation of the pump shaft, which could cause serious pump damage. This is particularly critical when the pump is on level control operation with frequent start/stop cycles. IT IS ALSO HIGHLY RECOMMENDED FOR LONG PUMP LIFE THAT PROPERLY ANCHORED BELLOWS TYPE EXPANSION JOINTS BE INSTALLED AT THE DISCHARGE FLANGE CONNECTION. See Figure E-1-1 on page 10 for typical installations.

PUMP BEARINGS - VERTICAL 5500 SERIES

1) UPPER BALL TYPE (PEDESTAL)

All vertical pumps have one ball type thrust bearing (Item 18) located above the mounting plate. With the exception of sizes 4x6x10, 2x3x13, 3x4x13, 4x6x13, 6x8x13 and 8x10x15, the bearings are permanently lubricated sealed bearings, and require no further lubrication. To lubricate the bearing, shut off the pump and remove the coupling guard. Remove the grease vent plug opposite the grease fitting. Inject grease through the fitting until it appears at the opposite vent hole. Reinstall the coupling guard and run the pump until it reaches operating temperature (approximately 1-2 hours). This will allow excess grease to purge from the bearing cavity. Shut off the pump and reinstall the grease vent plug.

2) LOWER SLEEVE TYPE

5500 Series vertical pumps have one or more sleeve type line shaft bearings (Item 93A). The bearings are nonmetallic and are self-lubricating, but must have continuous clean liquid injected to flush the bearing surface to clean and cool the bearing. The various methods of flushing the bearing (s) are described as follows:

External Clean Flush - In this arrangement the pump unit is provided with flush tubing to all the line bearings through the mounting plate where a connection is provided for a CONTINUOUS SOURCE OF CLEAN LIQUID AT A RATE of 1/4 to 1/2 GPM PER BEARING AT 10-20 PSI. This is the most desirable method of bearing flush and will offer the greatest bearing life.

From the Pump Discharge - Bearings may be flushed in this manner when the pumped fluid is clean and free of solids. The flush tubing can be connected to the discharge pipe to provide the lubricating and cooling.

Cyclone Separator - When it is impossible to use an external clean flush and the pumped fluid is not clean, a cyclone separator may be used. The flush tubing is run from the pump discharge to the cyclone separator mounted on top of the mounting plate. The clean fluid out of the separator is run to the line bearings, and solids are returned back into the sump. This method will prolong bearing life, but eventual clogging of bearings must be expected, due to solid buildup. Clean external flush is the best bearing flush method.

REGARDLESS OF THE METHOD OF BEARING FLUSH, THE FLUSH SYSTEM MUST BE CHECKED PERIODICALLY TO INSURE FLUID IS BEING SUPPLIED TO ALL THE LINE BEARINGS.

PUMP BEARINGS - CANTILEVER 7500 SERIES

All cantilever pumps are provided with two ball type bearings (Items 16 and 18) above the mounting plate, which support the shaft. There are no bearings located below the mounting plate.

The two bearings are equipped with grease fittings for periodic lubrication. To lubricate the pump bearings, shut off the pump and remove the coupling guard. Remove the grease vent plugs opposite the grease fittings. Inject grease through the fitting until it appears at the opposite vent holes. Reinstall the coupling guard and run the pump until it reaches operating temperature (approximately 1-2 hours). This will allow excess grease to purge from the bearing cavity. Shut off the pump and reinstall the grease vent plugs.

STARTING THE PUMP

Before the pump is started, turn pump by hand at the coupling to insure it is free and does not rub or bind, and reinstall the coupling guard. Turn on the flush to the steady bearings if provided from an external source.

Inspect the pump casing to be sure it is submerged before engaging the motor.

DO NOT operate pump at reduced capacity or with discharge valve closed. At this point, all energy developed by the pump will convert to heat, which may cause either mechanical damage, or vaporizing of pump liquid in the impeller eye, causing cavitation.

DO NOT operate pump when tank level drops below minimum pump submergence.

DO NOT operate pump if surging occurs.

DO NOT operate pump if motor overloads. This will cause overheating of the motor and possible motor damage.

TROUBLE CHECK LIST

Refer to the following diagnostic section if hydraulic problems are encountered in the pump operation.

PROBLEM: No liquid delivered.

CHECK: Priming, casing is not completely filled; no liquid in pit; insufficient submergence.

Speed too low. (Result reduced TDH.)

Impeller eye or suction strainer is completely plugged.

PROBLEM: Not enough liquid delivered.

CHECK: Cavitation.

Air leakage through suction tailpipe.

Speed too low.

Impeller and strainer are plugged.

Impeller clearance too great.

Impeller is damaged.

PROBLEM: Not enough pressure.

CHECK: Cavitation.

Air or gases in liquid.

Impeller diameter too small.

Impeller clearance too great.

Impeller is damaged.

PROBLEM: Pump works awhile, then stops.

CHECK: Float controls.

Insufficient submergence.

Air or gases in liquid.

Impeller eye or strainer plugged.

PROBLEM: Pump takes too much power.

CHECK: Speed too high.

Head is lower than rating; pumping beyond design point.

Liquid heavier than specified; check viscosity and specific gravity.

Rotating element binds.

Impeller binding; check clearance.

Check line voltage to motor.

PROBLEM: Pump is noisy.

CHECK: Pump is cavitating.

Pump is running close to shut-off.

Shaft is bent.

Rotating parts bind, are loose or broken.

Bearings are worn out.

Pump and drive misaligned.

Check lock collar on the discharge pipe to be sure it is not putting stress on discharge pipe, causing distortion of pump casing, and thus bending of shaft and column.

MAINTENANCE

- 1) Periodically lubricate the upper ball bearing(s) when equipped with grease fittings.
- 2) Check for noise (mechanical or hydraulic) and vibration.
- 3) Check float switch operation
- 4) Check flush line to the line shaft bearings for buildup.
- 5) Check discharge pressure gauge periodically.

DISASSEMBLY - Vertical 5500 Series

- 1) Shut off motor. Shut off all valves controlling flow of liquid from the pump. Disconnect the power to the motor.
- 2) Disconnect discharge pipe and flush piping.
- 3) Unbolt motor and remove from motor support.
- 4) Remove the pump unit from the pit unless the pit can be drained and the pump can be worked on from the pit.
- 5) When the pump is lying in the horizontal position, the pump column and shaft should be supported to remove any bending stress from the shaft.
- 6) Disconnect discharge pipe flange at the pump casing.
- 7) Remove casing bolts (Item 1D) and remove casing (Item 1) from cover (Item 11).
- 8) Fix the pump shaft at the coupling and remove the impeller (Item 2) by turning the impeller in a counterclockwise (CCW) direction facing the impeller. A strap wrench or similar device may be required to disengage the screw threads. Remove the sleeve cap (Item 14A) and O-ring (Item 14B) if the pump is so equipped.
- 9) Shaft removal for sizes: 1x1¹/₂x6, 1¹/₂x3x6, 2x3x6, 1x1¹/₂x8, 1¹/₂x3x8, 2x3x8, 3x4x8, 1¹/₂x3x10, 2x3x10, 3x4x10, 4x4x10
 - a) Remove coupling from the pump shaft and remove slinger (Item 40) and bearing snap ring (Item 12B).
 - b) Slide pump shaft (Item 6) up through the column and pedestal. If resistance is encountered, tap on the impeller end with a soft mallet, or use wood as a buffer.
BE CAREFUL NOT TO DAMAGE SCREW THREADS AT THE IMPELLER END.

- c) Remove set screw (Item 12A).
- d) Loosen lock screw in the threaded collar (Item 66) and unscrew from shaft.
- e) Slide bearing holder and bearing off shaft. If bearing (Item 18) is to be replaced, it must be pressed off the bearing holder (Item 12).
- f) Unscrew the shaft sleeve if the pump is so equipped. **Care must be taken not to mar or scratch the shaft in removal or handling.**

- 9A) Shaft removal for sizes: 4x6x10, 3x4x13, 6x8x13, 2x3x13, 4x6x13, 8x10x15
 - a) Remove coupling and outer screws (Item 37A).
 - b) Turn adjusting screws (Item 37C) clockwise completely and jack shaft and bearing assembly until bearing is clear.
 - c) Pull shaft and bearing assembly through the pedestal.
 - d) Remove bearing housing snap ring (Item 21A).
 - e) Slide bearing housing (Item 21) from thrust bearing.
 - f) Remove snap ring (Item 18B) and press bearing off shaft.
- 10) Remove the bearing flush line(s) (127).
- 11) Remove the column-cover nuts (Item 11B) and disengage cover (Item 11) from the column. Note position of cover relative to column flange.
- 12) Remove cover snap ring and slide cover sleeve bearing (Item 93B) and pin (Item 93D) from the cover.
- 13) Remove bearing holder nuts (Item 93F) and remove bearing holders (Item 93) from the column. Slide the sleeve bearing (Item 93A) from the bearing holder.

REASSEMBLY - Vertical 5500 Series

Replace all worn or defective parts as required. Clean all those to be reused. Reassemble in reverse order of disassembly, with the following notes:

- 1) After the shaft is installed in the pedestal and column, adjust the shaft downward, prior to installing the impeller.

- 2) When the impeller (and shaft sleeve, if so provided) is installed, be certain the threads are firmly seated against the shaft shoulder.
- 3) After the impeller is installed, adjust the shaft upward until the back of the impeller starts to touch the face of the cover, before the casing is installed.
- 4) With the casing assembled, check discharge pipe and shaft column alignment. Trim or shim thrust collar (Item 41) as required.
- 5) Adjust impeller as outlined under "IMPELLER ADJUSTMENT" (Page 3 and 4).
- 6) Check motor rotation prior to connecting and adjusting the coupling.
- 7) Install coupling guard.

DISASSEMBLY - Cantilever 7500 Series

- 1) Shut off all valves controlling flow of liquid from the pump. Disconnect the power to the motor.
- 2) Disconnect discharge pipe.
- 3) Unbolt motor and remove from motor support.
- 4) Remove the pump unit from the pit unless the pit can be drained and the pump can be worked on from the pit.
- 5) When the pump is lying in the horizontal position, the pump column and shaft should be supported to remove any bending stress from the shaft.
- 6) Disconnect discharge pipe flange at the pump casing.
- 7) Remove casing bolts (Item 1D) and remove casing (Item 1) from the cover (Item 11).
- 8) Fix the pump shaft at the coupling and remove the impeller (Item 2) by turning the impeller in a counterclockwise (CCW) direction facing the impeller. A strap wrench or similar device may be required to disengage the screw threads.
- 9) Remove the column-cover nuts (Item 11B) and disengage cover (Item 11) from the column. Note position of cover relative to the column flange.
- 10) Remove the snap ring (Item 63A) and slide the restriction bushing (Item 63) and pin (Item 63B) from the cover.

- 11) Remove outer screws (Item 37A).
- 12) Turn adjusting screws (Item 37C) clockwise completely and jack shaft and bearing assembly until bearing is clear.
- 13) Pull shaft and bearing assembly through the pedestal.
- 14) Remove upper bearing housing snap ring (Item 21B) and slinger (Item 40).
- 15) Slide bearing housing (Item 21) from thrust bearing (Item 18).
- 16) Remove snap ring (Item 18B) and press upper bearing (Item 18) off shaft.
- 17) Remove lower snap ring (Item 16A) and press lower bearing (Item 16) off shaft.
- 18) Remove column to pedestal nuts (item 70H) and remove column (Item 91).
- 19) Remove pedestal to coverplate screws (Item 70B) and remove pedestal (Item 81). Press grease seal (Item 47) from pedestal.

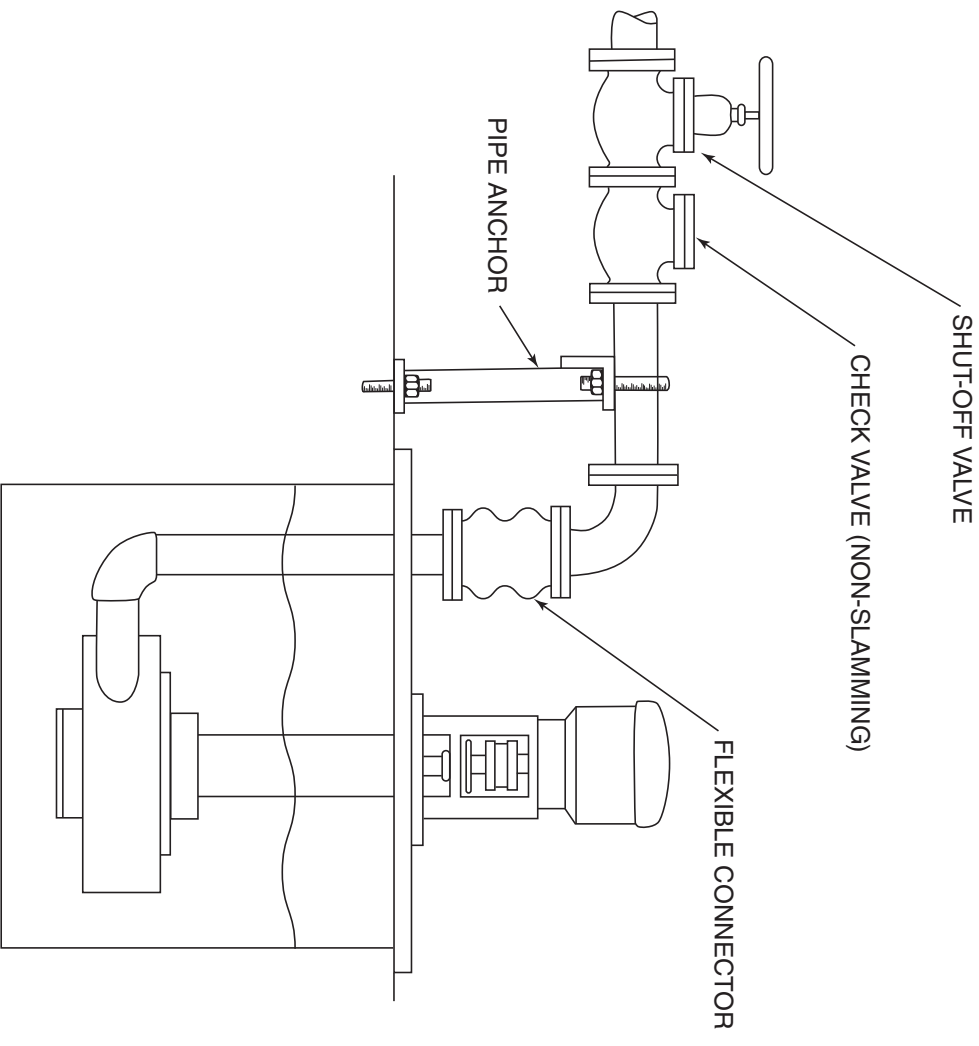
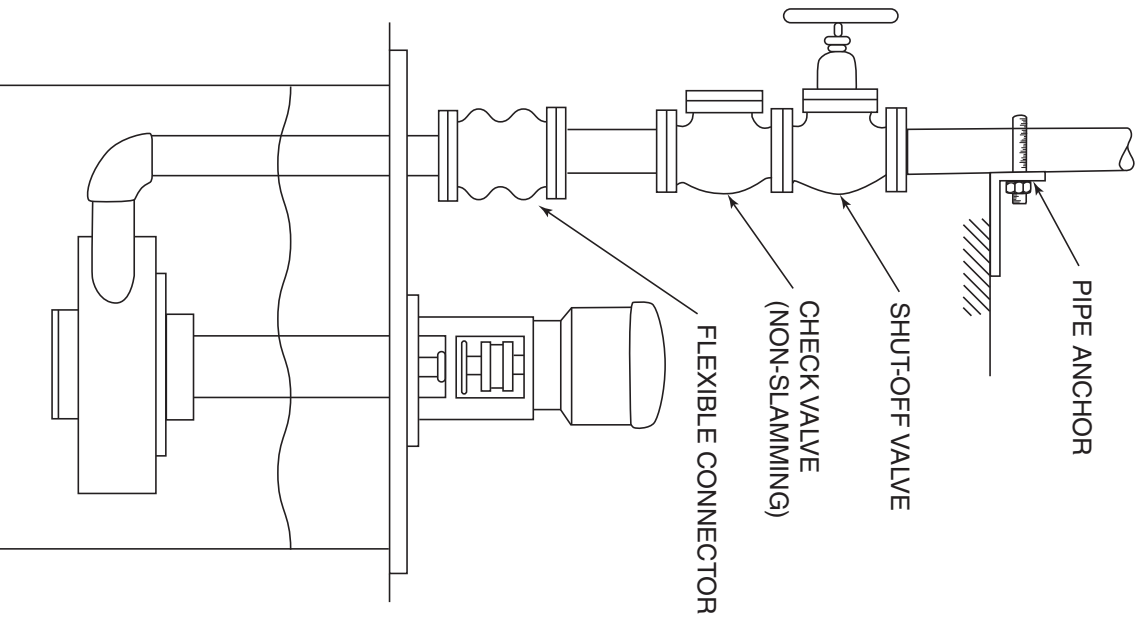
REASSEMBLY - Cantilever 7500 Series

Replace all worn or defective parts as required. Clean all those to be reused.

- 1) Press or shrink lower bearing (Item 16) on shaft and pack bearing with grease. Bearing grease seal should face motor end of shaft.
- 2) Install lower snap ring (Item 16A) and slide internal snap ring (Item 21B) over the shaft.
- 3) Press or shrink upper bearing (Item 18) on shaft and pack bearing with grease. Bearing grease seal should face pump end of shaft.
- 4) Install external snap ring (Item 18B) and slide bearing housing (Item 21) over bearing.
- 5) Install internal snap ring (Item 21B).
- 6) Install complete shaft assembly in pedestal (Item 81) and install lower grease seal (Item 47).
- 7) Back-off adjusting screws (Item 37C) and tighten outer screws (Item 37A). This will adjust shaft in the down position.
- 8) Fasten pedestal assembly to mounting plate (Item 89).
- 9) Slide column (Item 91) over shaft, being careful not to damage vapor seal (Item 91B) and secure to pedestal.

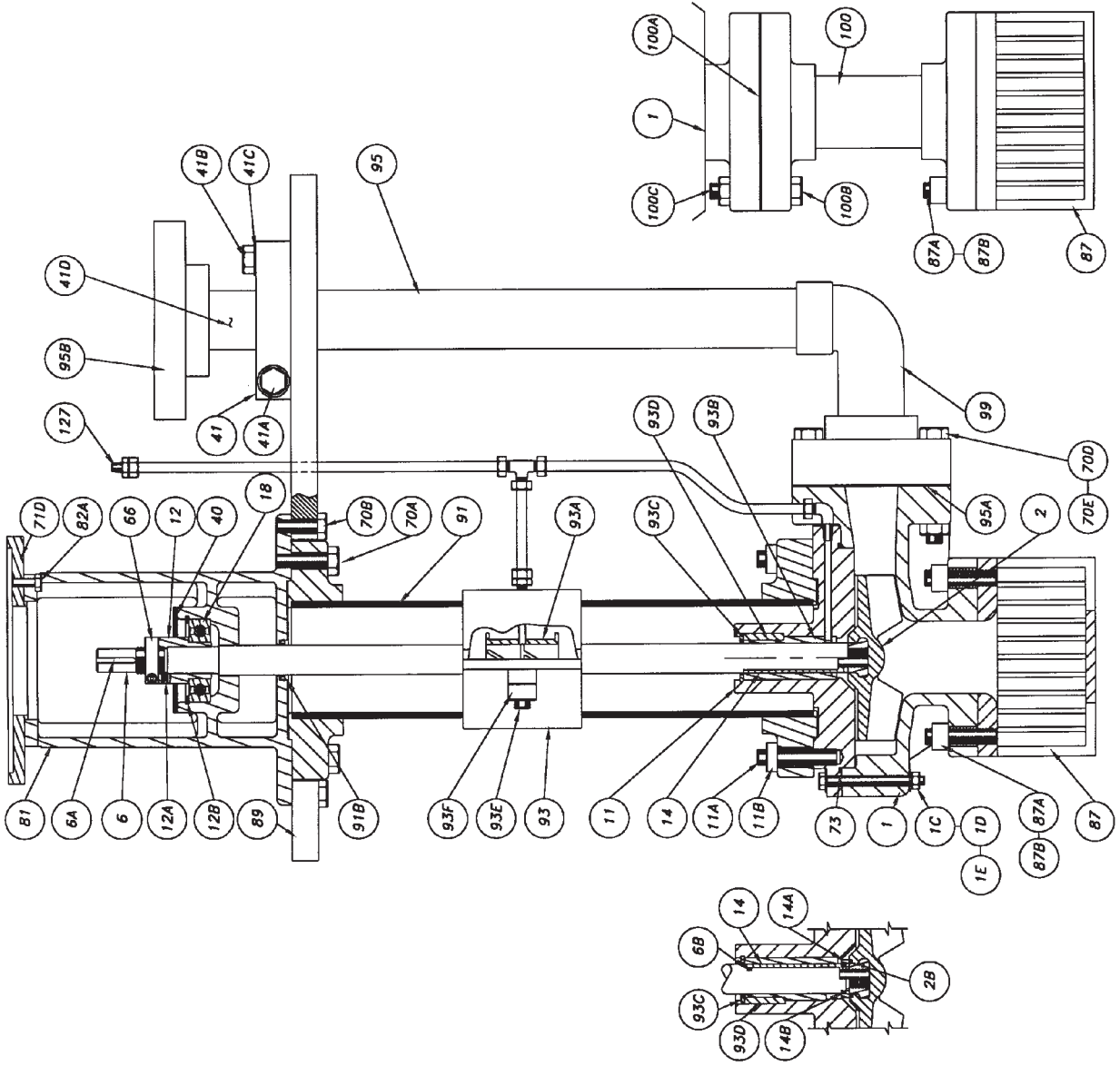
- 10) Install restriction bushing (Item 63) with pin (Item 63B) in cover (Item 11) and secure with snap ring (Item 63A).
- 11) Assemble casing cover (Item 11) to column (Item 91) using cover nuts (Item 11B). Be sure cover is oriented the same way as removed.
- 12) Reinstall impeller (Item 2), being certain the impeller threads are firmly seated against the shaft shoulder.
- 13) Back-off outer screws (Item 37A) and tighten adjusting screws (Item 37C) until impeller starts to rub the face of the casing cover (Item 11).
- 14) Install casing and discharge pipe assembly. Check discharge column and shaft column alignment. Trim or shim thrust (discharge lock) collar (Item 41) as required.
- 15) Adjust impeller as outlined under "IMPELLER ADJUSTMENT" (Page 4).
- 16) Lubricate bearings.
- 17) Check motor rotation prior to connecting and adjusting the coupling.
- 18) Install coupling guard.

TYPICAL VERTICAL PUMP INSTALLATIONS



5500 SERIES SECTIONAL DRAWING - GROUP I VERTICAL PUMPS

For Sizes: 1x1¹/₂x6, 1¹/₂x3x6, 2x3x6, 1x1¹/₂x8, 1¹/₂x3x8, 2x3x8, 3x4x8, 1x2x10, 1¹/₂x3x10, 2x3x10, 3x4x10, 4x4x10

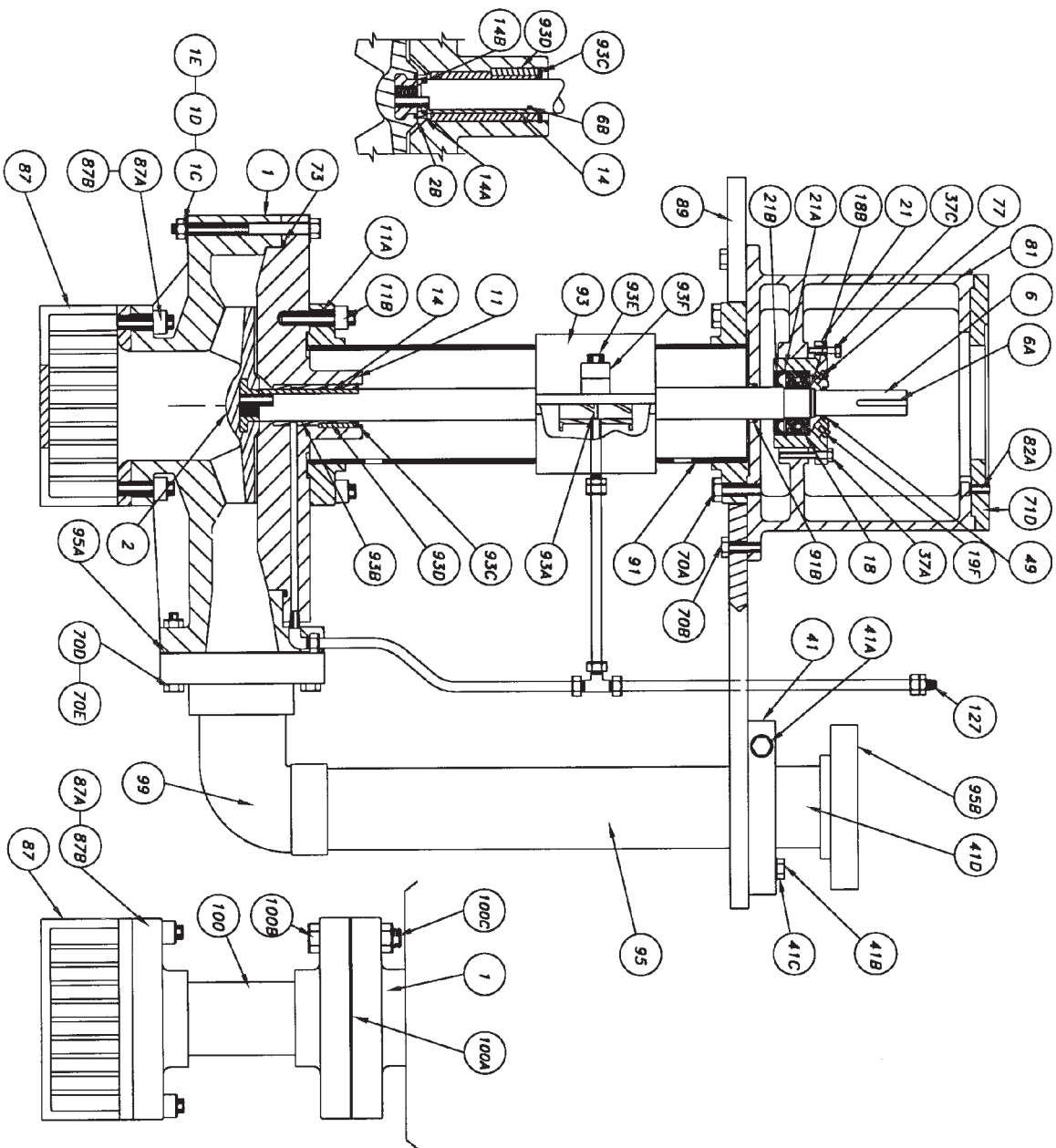


ITEM	DESCRIPTION	REQUIRED
1	Casing	1
1C	Nut, Casing	8-12
1D	Bolt, Casing	8-12
1E	Washer, Casing	16-24
2	Impeller	1
2B	O-ring, Impeller	1
6	Shaft	1
6A	Key, Coupling	1
6B	O-ring, Shaft	1
11	Cover, Casing	1
11A	Stud, Column - Cover	8
11B	Nut, Column - Cover	8
12	Bearing Holder	1
12A	Set Screw, Bearing Holder	1-2
12B	Snap Ring, Bearing	1
14	Shaft Sleeve (opt.)	1
14A	Sleeve Cap	1
14B	O-ring Cap	1
18	Ball Bearing	1
40	Slinger	1
41	Lock Collar, Discharge Pipe	1
41A	Screw, Lock Collar - Cover Plate	1-2
41B	Screw, Lock Collar - Cover Plate	1-2
41C	Washer, Lock Collar - Cover Plate	1-2
41D	Spacer, Discharge	1
66	Threaded Collar	1
70A	Screw, Column - Pedestal	4-8
70B	Screw, Pedestal - Cover Plate	4-8
70D	Bolt (Stud), Discharge Elbow	4
70E	Nut, Discharge Elbow	4
71D	Adaptor, Motor	1
73	O-ring Cover	1
81	Pedestal	1
82A	Screw, Pedestal - Motor Adaptor	4
87	Strainer	1
87A	Stud, Strainer	4
87B	Nut, Strainer	4
89	Cover Plate	1
91	Column	1
91B	Vapor Seal	1
93	Bearing Holder Set*	1
93A	Sleeve Bearing Set*	1
93B	Sleeve Bearing Cover	1
93C	Snap Ring, Sleeve Bearing, Cover	1
93D	Pin, Cover	1
93E	Stud, Bearing Holder*	2
93F	Nut, Bearing Holder*	8
95	Discharge Pipe	1
95A	Gasket, Discharge Flange	1
95B	Flange, Discharge	1
99	Elbow, Discharge	1
100	Tailpipe, Suction	1
100A	Gasket, Suction	1
100B	Bolt, Tailpipe	4
100C	Nut, Tailpipe	4
127	Flush Tubing Assembly	1

* Quantities vary with pump setting.

5500 SERIES SECTIONAL DRAWING - GROUP II VERTICAL PUMPS

For Sizes: 4x6x10, 2x3x13, 3x4x13, 4x6x13

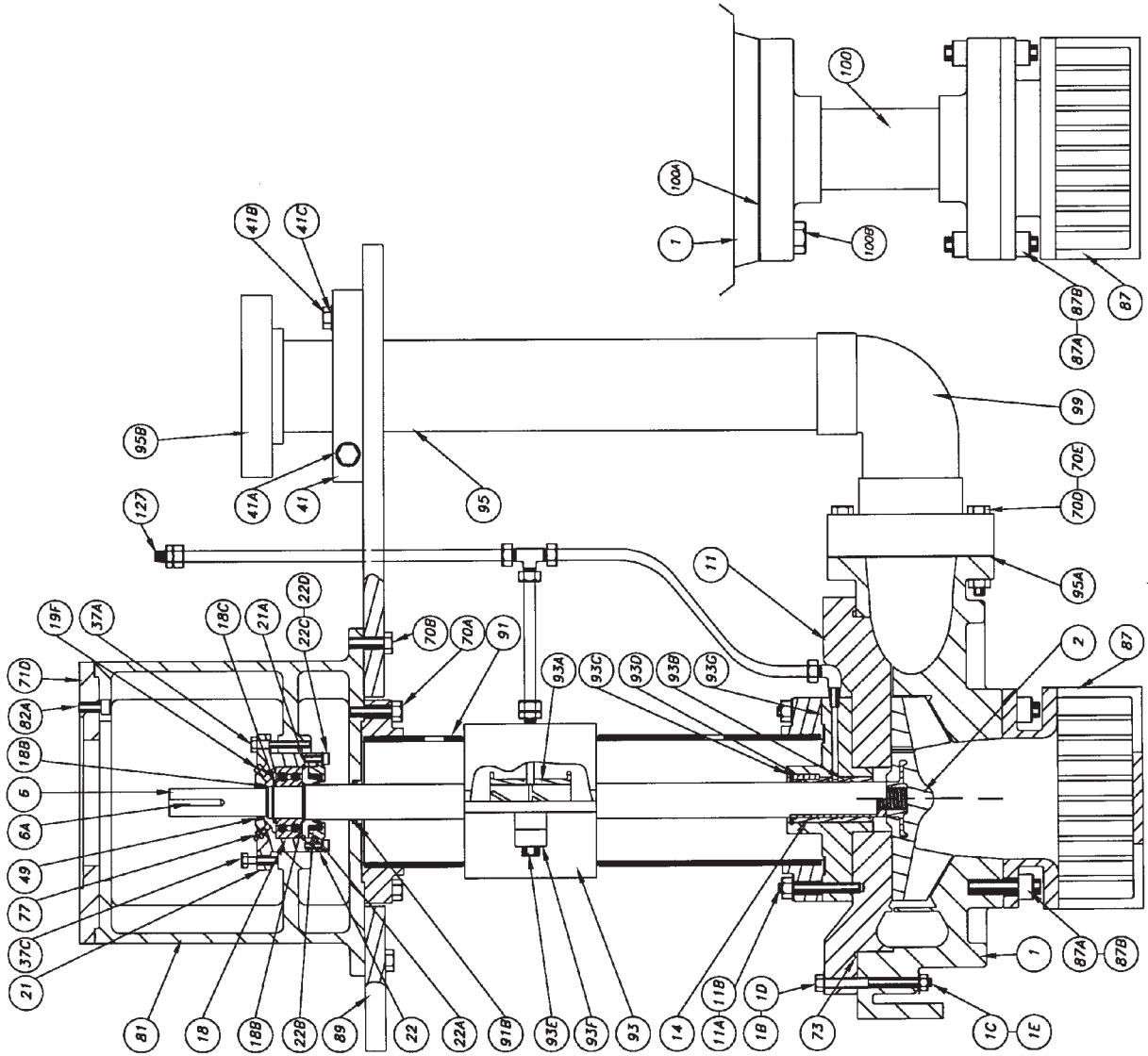


ITEM	DESCRIPTION	REQUIRED
1	Casing	1
1C	Nut, Casing	.16
1D	Bolt, Casing	.16
1E	Washer, Casing	.32
2	Impeller	1
2B	O-ring, Impeller	1
6	Shaft	1
6A	Key, Coupling	1
6B	O-ring, Shaft	1
11	Cover, Casing	1
11A	Stud, Column - Cover	8
11B	Nut, Column - Cover	8
14	Shaft Sleeve (opt.)	1
14A	Sleeve Cap	1
14B	O-ring Cap	1
18	Ball Bearing	1
18B	Snap Ring, Shaft	1
19F	Grease Plug	1
21	Bearing Housing	1
21A	Snap Ring, Bearing Housing	1
21B	Grease Seal	1
37A	Screw, Outer	3
37C	Screw, Adjusting	3
41	Lock Collar, Discharge Pipe	1
41A	Screw, Lock Collar	1-2
41B	Screw, Lock Collar - Cover Plate	1-2
41C	Washer, Lock Collar - Cover Plate	1-2
41D	Spacer, Discharge	1
49	Grease Seal - Bearing Housing	1
70A	Screw, Column - Pedestal	8
70B	Screw, Pedestal - Cover Plate	8
70D	Bolt, Discharge Elbow	4
70E	Nut, Discharge Elbow	4
71D	Adaptor, Motor	1
73	O-ring, Cover	1
77	Grease Fitting	1
81	Pedestal	1
82A	Screw, Pedestal - Motor Adaptor	4
87	Strainer	1
87A	Stud, Strainer	4
87B	Nut, Strainer	4
89	Cover Plate	4
91	Column	1
91B	Vapor Seal	1
93	Bearing Holder Set*	1
93A	Sleeve Bearing Set*	1
93B	Sleeve Bearing Cover	1
93C	Snap Ring, Sleeve Bearing Cover	1
93D	Pin, Cover	1
93E	Stud, Bearing Holder*	2
93F	Nut, Bearing Holder*	8
95	Discharge Pipe	1
95A	Gasket, Discharge Flange	1
95B	Flange, Discharge	1
99	Elbow, Discharge	1
100	Tailpipe, Suction	1
100A	Gasket, Suction	1
100B	Bolt, Tailpipe	4
100C	Nut, Tailpipe	4
127	Flush Tubing Assembly	1

* Quantities vary with pump setting.

5500 SERIES SECTIONAL DRAWING - GROUP III VERTICAL PUMPS

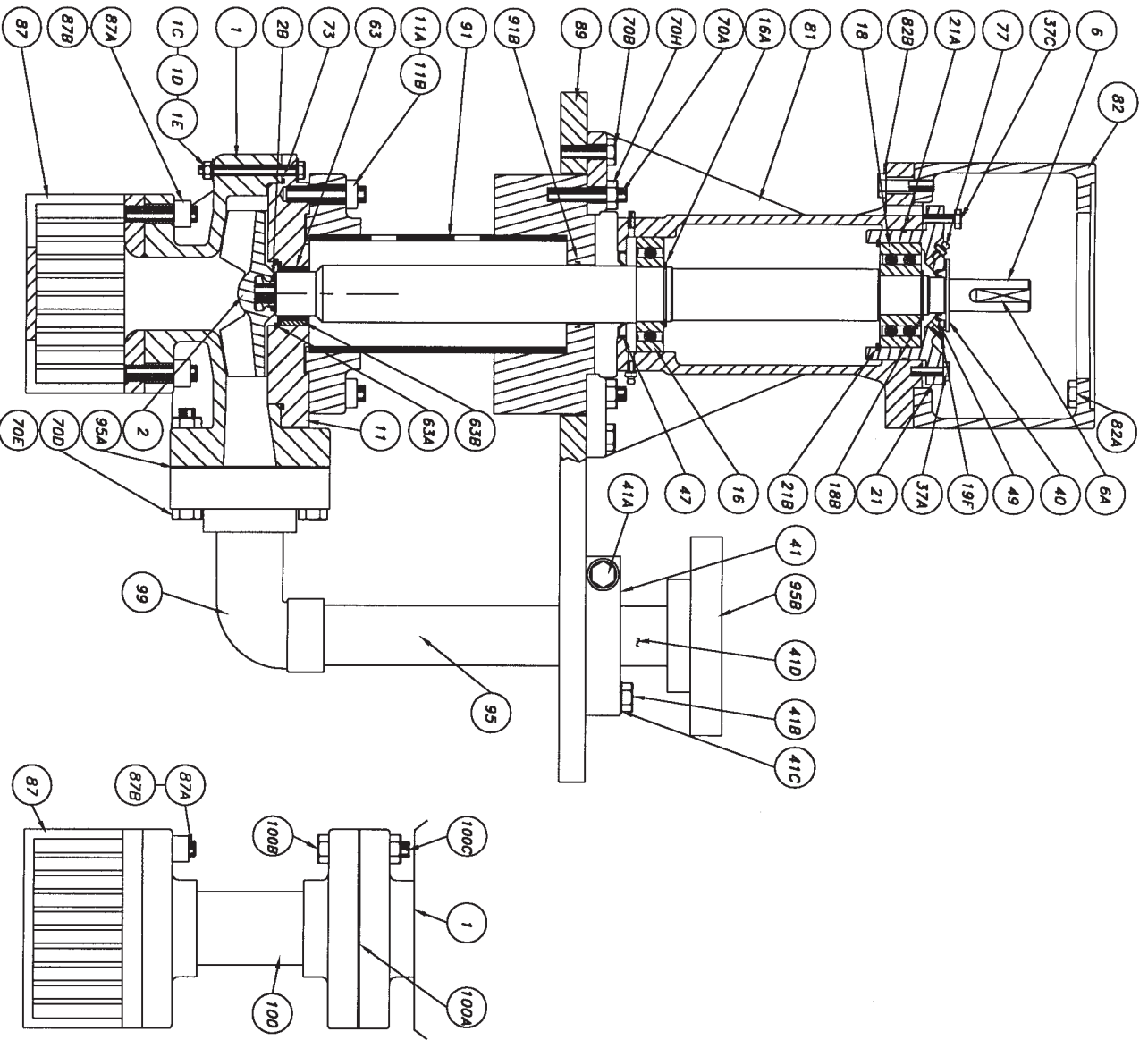
For Sizes: 6x8x13, 8x10x15, 10x12x16



ITEM	DESCRIPTION	REQUIRED
1	Casing	1
1B	Screw, Casing	2-3
1C	Nut, Casing	16-23
1D	Bolt, Casing	16-23
1E	Washer, Casing	34-49
2	Impeller	1
6	Shaft	1
6A	Key, Coupling	1
11	Cover, Casing	1
11A	Stud, Column - Cover	8
11B	Nut, Column - Cover	8
14	Shaft Sleeve (opt.)	1
18	Ball Bearing	1
18B	Snap Ring, Shaft	2
18C	Washer, Bearing	1
19F	Grease Plug	1
21	Bearing Housing	1
21A	Snap Ring, Bearing Housing	1
22	Bearing Cap	1
22A	O-ring, Bearing Cap	1
22B	Grease Seal, Bearing Cap	1
22C	Screw, Bearing Cap	6
22D	Lockwasher, Bearing Cap	6
37A	Screw, Outer	4
37C	Screw, Adjusting	4
41	Lock Collar, Discharge Pipe	1
41A	Screw, Lock Collar	2
41B	Screw, Lock Collar - Cover Plate	2
41C	Washer, Lock Collar - Cover Plate	2
49	Grease Seal, Bearing Housing	1
70A	Screw, Column Pedestal	8
70B	Screw, Pedestal - Cover Plate	8
70D	Bolt, Discharge Elbow	8
70E	Nut, Discharge Elbow	8
71D	Adaptor, Motor	1
73	O-ring Cover	1
77	Grease Fitting	1
81	Pedestal	1
82A	Screw, Pedestal - Motor Adaptor	4
87	Strainer	1
87A	Stud, Strainer	4-6
87B	Nut, Strainer	4-6
89	Cover Plate	1
91	Column	1
91B	Vapor Seal	1
93	Bearing Holder Set*	1
93A	Sleeve Bearing Set	1
93B	Sleeve Bearing Cover	1
93C	Snap Ring, Sleeve Bearing	1
93D	Pin, Cover	1
93E	Stud, Bearing Holder*	4
93F	Nut, Bearing Holder*	4
93G	Cover Bearing Holder	16
95	Discharge Pipe	1
95A	Gasket, Discharge Flange	1
95B	Flange, Discharge	1
99	Elbow, Discharge	1
100	Tailpipe, Suction (opt.)	1
100A	Gasket, Suction (opt.)	1
100B	Bolt, Tailpipe (opt.)	8-12
127	Flush Tubing Assembly	1

* Quantities vary with pump setting.

7500 SERIES SECTIONAL DRAWING - ALL CANTILEVER PUMPS



ITEM	DESCRIPTION	REQUIRED
1	Casing	1
1C	Nut, Casing	1
1D	Boil, Casing	6
1E	Washer, Casing	6
2	Impeller	12
2B	O-ring, Impeller*	1
6	Shaft	1
6A	Key, Coupling	1
11	Cover, Casing	1
11A	Stud, Column - Cover	4
11B	Nut, Column - Cover	4
16	Bearing, Lower	1
16A	Snap Ring, Lower Bearing	1
18	Bearing, Upper	1
18B	Snap Ring, Upper Bearing	1
19F	Grease Plug	2
21	Bearing Housing	1
21A	O-ring, Bearing Housing	1
21B	Retaining Ring, Internal	1
37A	Screw, Outer	3
37C	Screw, Adjusting	3
40	Slinger	1
41	Lock Collar, Discharge	1
41A	Screw, Lock Collar	1
41B	Screw, Lock Collar - Cover Plate	1
41C	Washer, Lock Collar - Cover Plate	1
41D	Spacer, Discharge	1
47	Grease Seal, Lower	1
49	Restriction Bushing	1
63	Pin, Bushing	1
63A	Snap Ring, Bushing	1
70A	Stud, Column Pedestal	8
70B	Screw, Pedestal - Cover Plate	8
70D	Nut, Discharge Elbow	4
70E	Nut, Column - Pedestal	4
70H	O-ring, Cover	8
73	Grease Nipple	1
77	Pedestal	2
81	Motor Support	1
82	Screw, Motor Support - Motor	1
82A	Screw, Pedestal - Motor Support	4
82B	Strainer	4
87	Stud, Strainer	4
87A	Nut, Strainer	4
89	Cover Plate	1
91	Column	1
91B	Vapor Seal	1
95	Discharge Pipe	1
95A	Gasket, Discharge Flange	1
95B	Flange, Discharge	1
99	Elbow, Discharge	1
100	Tailpipe, Suction	1
100A	Gasket, Suction	1
100B	Bot, Tailpipe	4
100C	Nut, Tailpipe	4

* With Titanium Shaft Only

NOTES

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CECO Fybroc

