ARMSTRONG

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INSTALLATION AND OPERATING INSTRUCTIONS

Pump Bowls

6" - 22"
Open Line Shaft Type

ARMSTRONG

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IMPORTANT NOTE

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE SERIOUS PERSONAL INJURY OR PROPERTY DAMAGE. STUDY THIS INSTRUCTION MANUAL.

The descriptions and instructions included in this manual cover the standard design of the equipment and any common deviations when possible. This book does not cover all design details and variations nor does it provide for every possible contingency which may be encountered. When information cannot be found in this book, contact the nearest representative.

Do not operate this equipment other than in accordance with the instructions contained in this manual. This equipment (or a prototype) has been shop tested and found satisfactory for the conditions for which it was sold.

The following instructions should be read completely before starting to install the pump. This equipment is capable of extended trouble-free operation when properly applied, installed and maintained. These instructions present the basic information and methods required for proper installation and maintenance of turbine pumps of the size and type indicated on the front cover.

Floway Pumps standard practice is to ship close coupled pumps assembled. Where long pump lengths, shipping limitations, handling limitations and headroom limitations prevent complete assembly, we will ship the pump subassembled. It is the responsibility of the installer to ask for assistance should it be required to properly assemble and install the pump.

CAUTION: The equipment supplied can cause serious personal injury or death if mishandled and extreme care is not exercised in the operation of the equipment. NO ONE SHOULD EVER BE ALLOWED NEAR THE SUCTION OR OPEN DISCHARGE OF THE PUMP DURING OPERATION. A double custody lock should be installed on circuit breaker before anyone should be allowed to do any checking, maintenance or other work on the equipment. If the unit is supplied from the factory with OSHA approved coupling guards they must be kept installed at all times during operation to prevent injury to personnel.

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SECTION 1: GENERAL INFORMATION AND DESCRIPTION

1.1. GENERAL INFORMATION

There are two basic methods of lubricating the lineshaft of turbine pumps which alters the bowl assembly arrangement accordingly. These are:

1. Open lineshaft construction uses the pumped fluid for lubrication. The lineshaft and bearings are “open” to the pumped fluid and depend on this fluid for bearing lubrication. This construction is often referred to as “water lubricated” since water is the most common lubricant. THIS MANUAL IS WRITTEN TO COVER THIS TYPE CONSTRUCTION.

2. Enclosed lineshaft construction wherein an enclosing tube is placed over the lineshaft and lubricants are supplied to the lineshaft bearings thru the enclosing tube. A SEPARATE INSTRUCTION MANUAL IS AVAILABLE COVERING THIS CONSTRUCTION.

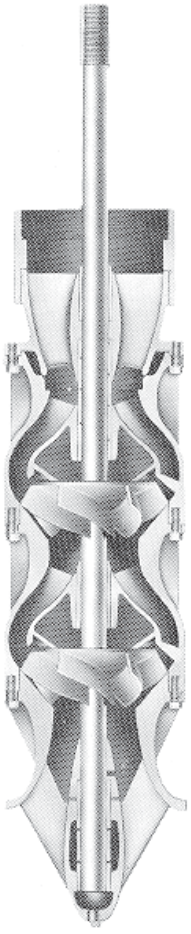


Fig. 1.1 Bowl Assembly General Construction Open Lineshaft Type

1.2. GENERAL DESCRIPTION

The bowl assembly consists of the following basic components:

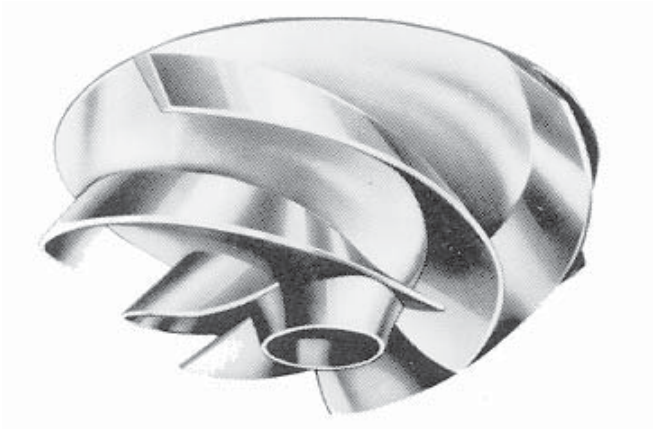
1. SUCTION CASE or SUCTION BELL - is the inlet of the pump. The suction case is provided with tapered threads for connecting a suction pipe or threaded strainer to it. The suction bell has a flared entrance and is preferred for sump applications; clip-on type strainers are available for attaching to the bell. Both case and bell house a grease packed bearing with a sand collar over the top of the bearing to keep out abrasives.

SUCTION BELL SUCTION CASE

Fig. 1.2 Types of Bowl Suction Pieces

2. BOWLS - Two types of bowl are used in bowl assemblies - intermediate and top. A single stage bowl assembly will utilize a top bowl only, this bowl directs the fluid from the impeller into the discharge case. A multiple stage assembly will contain one or more intermediate bowls and one top bowl at the top of the “stack”. All bowls contain an impeller mounted on the shaft and a bearing lubricated by the fluid being pumped. The top bowl (throttle) bearing on all models except 18MK and 20MK will extend into the bottom of the discharge case.

3. IMPELLERS - Two types of impellers are available - "semi-open" or "enclosed". The arrangement of the bowl assembly is identical with either type requiring only that the intermediate bowls and suction bell (or case) be designed to provide sealing surfaces for the type impeller used.



SEMI-OPEN TYPE IMPELLER

ENCLOSED TYPE IMPELLER

Fig. 1.3 Types of Impellers

4. DISCHARGE CASE - is the connecting piece between the top bowl and column pipe. All discharge cases contain a "Discharge Case Bearing" at the top. The 18MK and 20MK units also contain a second bearing at the bottom.

5. BOWL SHAFT - is a one piece shaft extending from the suction bell (or case) thru the intermediate and top bowls and thru the discharge case where it is connected by a threaded coupling to the lineshaft and hence to the surface mounted driver. The impellers are mechanically connected to the pumpshaft by means of tapered lock collets. The pumpshaft is supported above and below each impeller by bearings - extra long bearings being employed at top and bottom.

1.3. CAUSES FOR REDUCED PERFORMANCE

Before pulling the pump bowl from the well the Installation and Operation Manual should be reviewed for causes of reduced performance not related to the condition of the bowl assembly. Some of the possible causes of reduced performance could be:

1. Incorrect lateral adjustment. (This is especially critical with units utilizing semi-open impellers.)

2. Well conditions such as gas or air in the water.

3. Change in operating conditions such as increased pumping water level or increased discharge head requirements.

4. Slow motor speed due to overload, low voltage or low frequency.

5. Incorrect direction of rotation.

6. Strainer clogged or suction "sanded in".

7. Inadequate submergence of pump suction.

After the pump bowls have been pulled but before sending to the shop for repairs, check the bottom impeller for foreign material such as rocks or wood chips. Also check the strainer for obstructions.

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SECTION 2: DISASSEMBLY

2.1. GENERAL

Floway bowl assemblies are designed for minimum maintenance; frequency of required maintenance will depend on severity of service, accumulate operating hours, and care given the unit during operation. Periodic performance checks are the best method of determining when repairs should be made. A significant change in the sound of the running pump or an increase in vibration may indicate the need for repairs.

2.2. SHOP REQUIREMENTS

Shop area should be sufficient to lay the parts out in order of disassembly. Parallel steel or wooden rails are recommended for cradling the bowl assembly although repairs can be effected on a flat bench or floor area of sufficient length to support the complete bowl assembly. The area should be kept clean through-out the repairs - remember this is a close toleranced, high speed machine and should be handled as such.

2.3. TOOLS

A good mechanics tool box will supply most of the tools required. The following should be available:

Hammers (both hard and soft), screwdriver, allen wrenches, chain tongs, open or box wrenches, fine flat file, fine triangular file, emery cloth, wire brush.

2.4. SPECIAL TOOLS

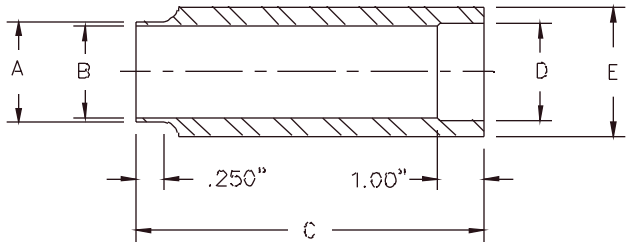
A collet driver for installing and removing the impeller lock collets is the only special tool required for bowl assembly repairs. This tool fits snugly over the shaft and is hand operated, the male end being used to seat the collet while the female end is used to knock the impeller off the collet.

2.5. DISASSEMBLY - FLANGED PUMP BOWLS

Figure 2.2 illustrates the parts of flanged pump bowl assemblies in sequence of disassembly.

CAUTION: Protect machined surfaces from burrs and scrapes which could cause mis-alignment on re-assembly.

In dismantling a bowl assembly for repair, it is advisable to mark the parts so they may be re-assembled in the same sequence.



HEAT TREAT - HARDEN & DRAW TO 45 - 48 ROCKWELL C

PUMP	SHAFT SIZE	DIMENSIONS IN INCHES				
		A	B	C	D	E
6LK, 6JK, 6JO	1	1.269 1.291	1.010 1.015	6	1.360 1.390	2
8JK, 8JO, 8XK, 8LK, 8FK	13/16	1.442 1.437	1.198 1.203	6	1.529 1.559	2 1/4
10XK, 10LK, 10DK, 10DO, 10HK	1 1/2	1.820 1.815	1.515 1.520	6 1/4	1.875 1.906	2 5/8
10FK, 12DK, 12DO, 12FK, 12LK	1 11/16	2.072 2.067	1.698 1.703	7 1/8	2.125 2.155	2 7/8
14DK, 14DO, 14FK, 14LK	1 15/16	2.348 2.343	1.948 1.953	8 3/16	2.438 2.468	3 1/8
15DK, 16MK, 18MK	2 1/4	2.691 2.686	2.260 2.265	10	2.750 2.780	3 1/4
20MK, 22BK	2 7/16	2.982 2.977	2.445 2.450	10	3.040 3.060	3 1/2

Fig. 2.1 Collet Driver Dimensions

1. Lay complete unit in horizontal position and block evenly.
2. Remove suction bell (or case) plug.
3. Measure end play of shaft by pushing the shaft all the way down and marking and then pulling all the way up until the impellers hit. Measure and record the distance traveled. (_____ inch end play.)
4. Remove shaft coupling. Threads are left hand.
5. Remove discharge case cap screws.
6. Slide discharge case off shaft.
7. Remove bowl cap screws and slide top bowl off shaft.

NOTE: Do not allow weight of bowl to rest on unsupported shaft.

8. Slide collet driver onto shaft - female end toward impeller. Pull shaft up so that impeller is not against bowl seat. Strike impeller sharply with collet driver. Repeat as necessary to loosen impeller - pull shaft up after each blow.
9. Insert screwdriver into the split in the impeller collet to spread and slide off shaft.

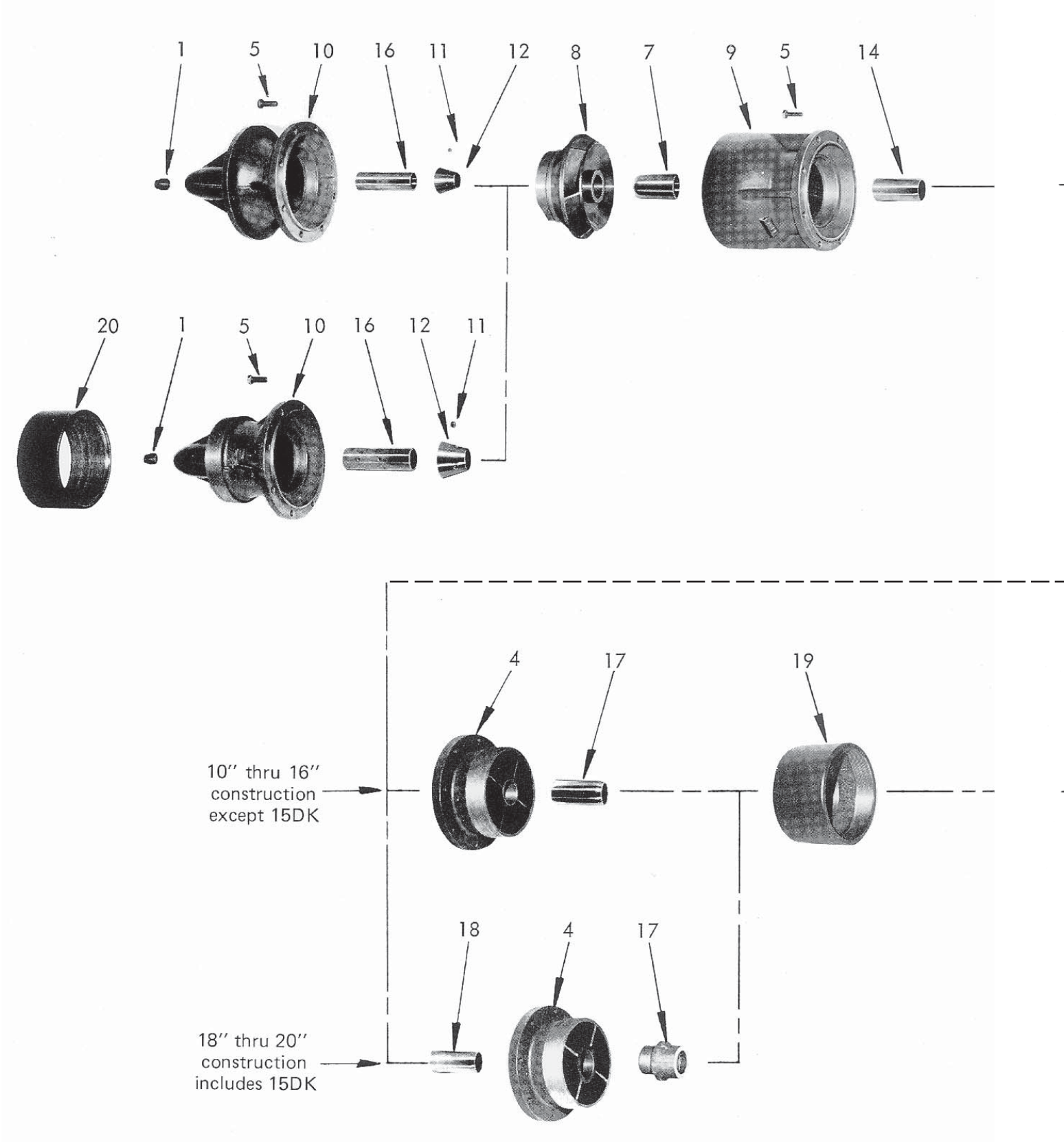
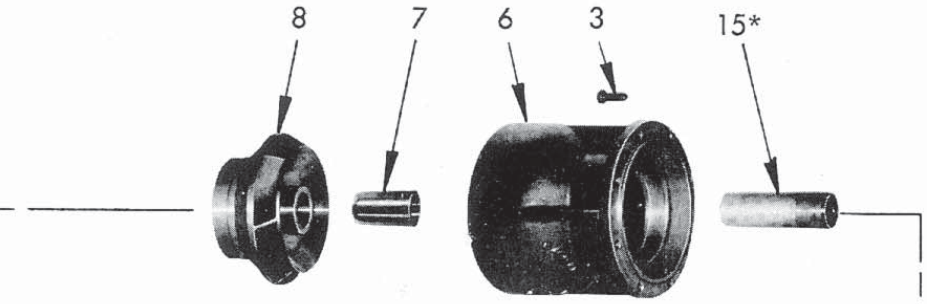


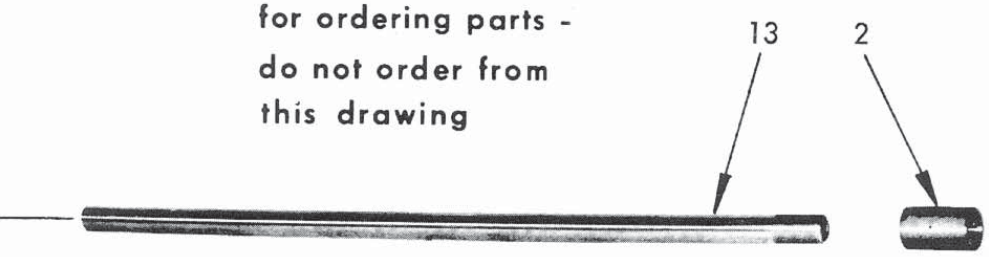
Fig. 2.2 10" and Larger Pump, Exploded View



18" thru 20" units will use bowl bearing (14) in place of throttle bearing (15)

1. Suction Plug
2. Shaft Coupling
3. Discharge Case Cap Screws
4. Discharge Case
5. Bowl Cap Screws
6. Top Bowl
7. Impeller Collet
8. Impeller
9. Intermediate Bowl
10. Suction Case (or Bell)
11. Sand Collar Set Screws
12. Sand Collar
13. Pumpshaft
14. Bowl Bearing
15. Throttle Bearing
16. Suction Bearing
17. Discharge Case Bearing (Top)
18. Discharge Case Bearing (Bottom)
19. Column Adaptor
20. Suction Adaptor

Refer to section V for ordering parts - do not order from this drawing



Certain close coupled units will not use parts #4, 17 & 19 - throttle bearing #15 would then be replaced by bowl bearing #14

Fig. 2.2 (cont.) 10" and Larger Pump, Exploded View

10. Remove impeller.

11. Repeat steps 7 through 10 until all intermediate bowls and impellers have been removed.

12. Slide suction bell (or case) off over bottom end of shaft.

NOTE: Do not remove sand collar unless the shaft or sand collar are to be replaced. The sand collar left on the shaft will automatically provide the proper impeller location when assembling.

13. If the sand collar is removed record the distance from the bottom of the shaft to the bottom of the sand collar. (_____")

14. To remove sand collar loosen two set screws located 90° apart and slide sand collar off shaft.

2.6. ALTERNATE DISASSEMBLY METHOD

Occasionally a bowl assembly will become "locked" due to foreign materials or seizure of parts in such a way that the above method of disassembly cannot be used. The Floway pump bowl can also be disassembled from the suction end as follows:

1. Follow steps 1 thru 4 above.

2. Remove suction bell (or case) cap screws.

3. Slide suction bell (or case) off shaft.

4. Measure and record sand collar location in relation to end of shaft. (_____")

5. Loosen two set screws located 90° apart and slide sand collar off shaft.

6. Slide collet driver onto shaft - male end toward impeller. Strike impeller collet sharply with collet driver. Repeat as necessary to loosen.

7. Slide impeller off shaft.

8. Place blade of screwdriver into the split in the impeller collet to spread and slide off shaft.

9. Remove cap screws from next intermediate bowl flange and slide intermediate bowl off shaft.

10. Repeat steps 6 through 9 until all intermediate bowls and impellers have been removed.

11. Slide discharge case off shaft.

12. Slide discharge case off shaft.

2.7. DISASSEMBLY - THREADED PUMP BOWLS

The disassembly of threaded bowls will be identical to the two methods outlined above except the discharge case, intermediate bowls and suction bell (or case) are connected by threaded joints rather than cap screws. The threads are right hand. A pair of chain tongs or large pipe wrenches will be required for disassembly.

NOTE: Tapping the casting while applying force to the chain tongs will help "break" stubborn joints. Use a light hammer - do not strike heavy blows.

2.8. REMOVING BEARINGS

All intermediate bowl bearings and throttle bearing are pressed into their respective bores and can be either pressed out or machined on the inside diameter until the wall is thin enough to collapse.

The suction bearing must be pressed out from the bottom or machined on the inside diameter until the wall is thin enough to collapse. See Figure 2.3.

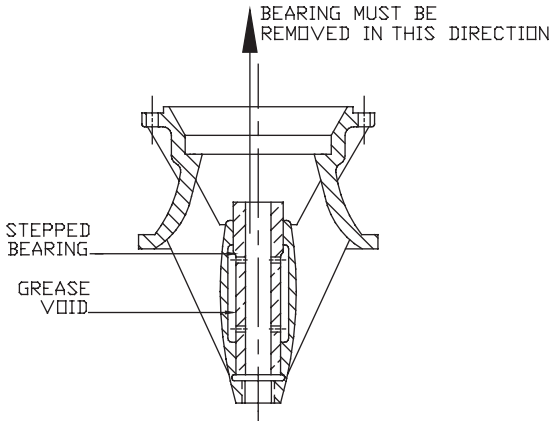


Fig. 2.3 Removing Suction Bearing

The discharge case bearing must be pressed out from the bottom or machined on the inside diameter until the wall is thin enough to collapse on the 6" thru 16" sizes. See Figure 2.4. The top discharge case bearing on the 15DK, 18MK and 20MK units is threaded (LEFT hand) and may be unscrewed; the bottom discharge case bearing may be pressed out from either end on 18MK & 20MK.

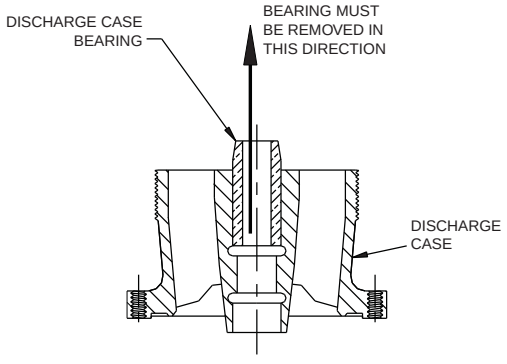


Fig. 2.4 Removing Discharge Case Bearing

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SECTION 3: INSPECTION AND REPAIR

3.1. INSPECTION AND CLEANING

After disassembly, all components of the bowl assembly should be thoroughly cleaned and examined for physical defects. The following components should be inspected for wear, corrosion and damage:

1. Impellers - check water passageways for signs of damage from abrasion or corrosion, check impeller skirts against “as new” dimension shown in Figure 3.1.

2. Shaft - check shaft for pitting and wear, “as new” dimensions are shown in Figure 3.1. Check for straightness - shaft must be straight within .005 total indicator reading.

3. Bowls - check water passageways for signs of damage from abrasion or corrosion, check impeller seat against “as new” dimension shown in Figure 3.1.

4. Bearings - check all bearings for total clearance over the shaft diameter. It is recommended that all bearings indicting wear be replaced. The following indicates suggested maximum diametrical clearance over existing shaft diameter:

1" through 1-3/4" shaft - .020" clearance
1-15/16" through 2-7/16" shaft - .025" clearance

PUMP SIZE	SHAFT DIA.	NOMINAL DIAMETRICAL CLEARANCE - SHAFT O.D. TO BEARING I.D.*	NOMINAL DIAMETRICAL CLEARANCE - IMPELLER SKIRT O.D. TO BOWL SEAL I.D.	NOMINAL DIAMETRICAL CLEARANCE - IMPELLER SKIRT O.D. TO WEAR RING I.D.	AXIAL CLEARANCE END PLAY
6LK	1	0.008	0.012	0.013	1/4
6JO	1	0.008			7/16
6JK	1	0.008	0.012	0.013	3/8
8FK	1 3/16	0.008	0.012	0.013	3/8
8JK	1 3/16	0.008	0.012	0.013	9/16
8JO	1 3/16	0.008			9/16
8LK	1 3/16	0.008	0.012	0.013	7/16
8XK	1 3/16	0.008	0.012	0.013	7/16
10LK	1 1/2	0.008	0.011	0.013	1/2
10XK	1 1/2	0.008	0.011	0.013	1/2
10DO	1 1/2	0.008			1/2
10DK	1 1/2	0.008	0.011	0.013	9/16
10HK	1 1/2	0.008	0.011	0.013	7/8
10FK	1 11/16	0.008	0.012	0.013	9/16
12LK	1 11/16	0.008	0.012	0.013	1/2
12DO	1 11/16	0.008			5/8
12DK	1 11/16	0.008	0.013	0.013	5/8
12FK	1 11/16	0.008	0.016	0.016	1/2
14LK	1 15/16	0.008	0.013	0.013	5/8
14DO	1 15/16	0.008			3/4
14DK	1 15/16	0.008	0.016	0.016	7/8
14FK	1 15/16	0.008	0.017	0.016	1
15DK	2 1/4	0.008	0.015	0.017	7/8
16MK	2 1/4	0.008	0.015	0.015	9/16
18MK	2 1/4	0.008	0.017	0.018	5/8
20MK	2 7/16	0.009	0.018	0.018	3/4
22BK	2 7/16	0.008	0.017	0.018	1 1/4
TOLERANCES: SHAFT DIAMETER = + .000 - .002 BEARING CLEARANCE = + .002 IMPELLER SKIRT TO BOWL (WITHOUT WEAR RINGS) = + .002 IMPELLER SKIRT TO BOWL (WITH WEAR RINGS) = + .004					
*BEARING PRESSED INTO HOUSING					
NOTE: DIMENSIONS SHOWN ARE FOR STANDARD CONSTRUCTION - SPECIAL MATERIALS OR CONSTRUCTION MAY CAUSE THESE TO CHANGE					

Fig. 3.1 Bowl Assembly Dimensions and Tolerances

3.2. TROUBLE SHOOTING

TROUBLE SOURCES	PROBABLE CAUSE	REMEDY
Crooked shaft.	Bent in installation.	Replace shaft. Check bushings.
Uneven wear on bearings.	Misalignment of shafts. Crooked Shaft.	Replace bearings and straighten or replace shaft.
Wear on bearings.	Abrasive action.	Replace bearings.
Wear on bowl seal and impeller skirt.	Abrasive action.	Apply wear rings (Figure III-4) if damage to bowl and impeller not too great.
Wear on bowl vanes and outside wall.	Abrasive action.	Replace bowls if wear is excessive.
Wear on impeller vances and shroud.	Abrasive action.	Replace impellers if wear is excessive.

Fig. 3.2 Troubleshooting Chart

3.3. REPAIRS

Parts showing signs of damage, cracks or excessive wear should be replaced. Use only genuine Floway parts for replacements. Order replacement parts as indicated in Section 5.

CAUTION: When repairing a bowl assembly that has been in service for several years, the physical condition or strength of all parts such as cap screws, bowls and bowl threads must be carefully checked.

CAUTION: When attempting to re-work any part extreme care must be taken to maintain alignment of mating parts and “as new” tolerances.

A. REPLACING BEARINGS

Replacement bearings are furnished “to size” for press fitting into their respective bores with a .001" to .003" interference fit, if the bearing bore is heavily scarred or corroded the part should be replaced or reworked to provide a true bore for the bearing.

B. REPLACING SHAFT

Shaft damage is usually best corrected by replacing the shaft. If an attempt is made to re-build the shaft, the O.D. must be held within the tolerance shown in Figure 3.1 and straight within .005" total indicator reading. Due to the possibility of interim damage, replacement shafts should always be checked for straightness before installing.

C. REPAIRING ENCLOSED IMPELLER AND BOWL SEAL SURFACES

Enclosed impeller skirt and bowl seal surface wear can be corrected by installing wear rings if the damage is not excessive. This is usually accomplished by turning the impeller skirt to obtain a smooth surface and then boring the bowl and installing wear rings on either, or both, surfaces. If the original unit was furnished with either bowl or impeller (or both) wear rings, these should be removed completely and replaced.

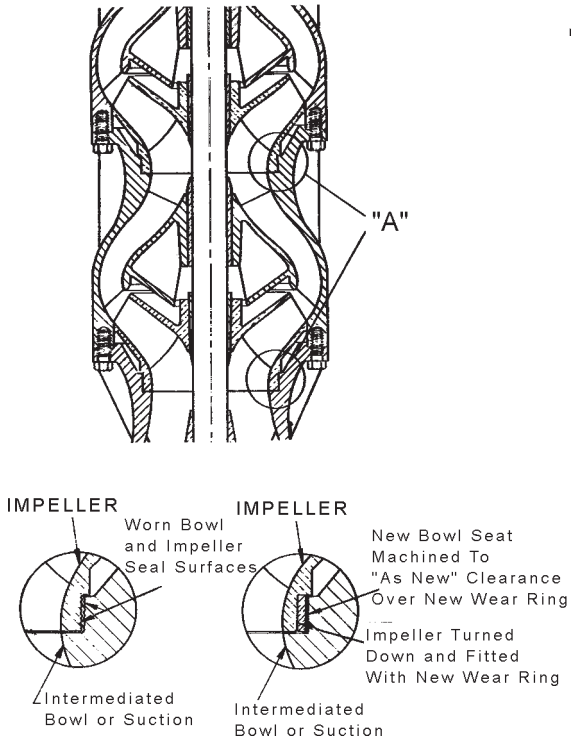


Fig. 3.3 Repairing Enclosed Impeller and Bowl Seal Surfaces

When wear rings are installed on the impeller it is recommended that a shrink fit be utilized - the interference should be heavy to prevent slippage, 0.010" on the smaller units and up to 0.015" to 0.020" on the larger sizes. Sufficient heat is then applied to the wear ring to expand it and allow the wear ring to drop over the impeller.

When wear rings are installed in the bowl a .003" to .005" press fit should be used. The wear ring can be installed by carefully tapping into place. A wooden block should be used to protect the wear ring.

D. REPAIRING SEMI-OPEN IMPELLER SEAT

Semi-open impeller and bowl seat wear can be corrected by refacing the surfaces if the damage is not excessive. Depending on the type and extent of wear it may only be necessary to reface one surface. After refacing, the two surfaces must be parallel to each other and concentric to the shaft centerline.

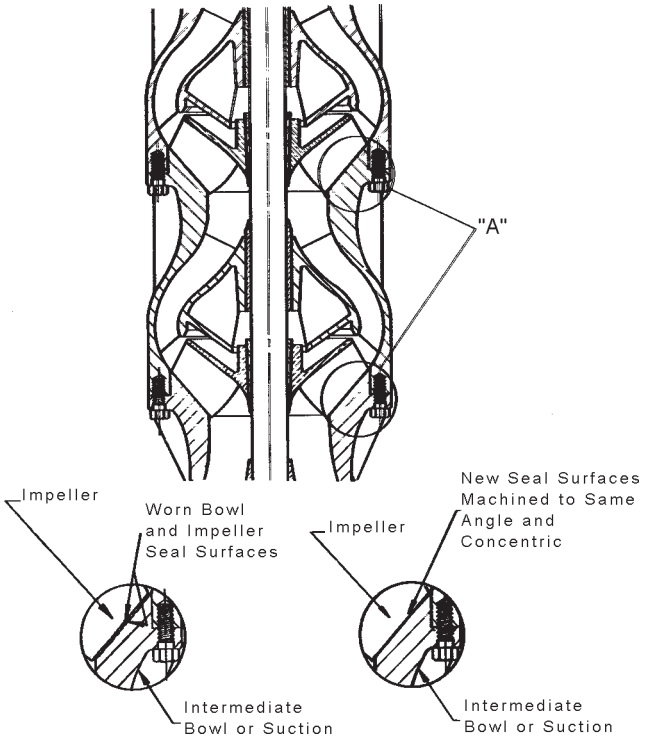


Fig. 3.4 Repairing Semi-Open Impeller Seat

3.4. LUBRICATION

Re-pack suction bearing with insoluble grease such as Marfax #2. Lubricate all bearings and impeller skirts with clean grease or oil. Thoroughly clean all bolts, nuts, threaded connections, and flanges and paint with white lead and oil, or pipe joint compound.

SECTION 4: ASSEMBLY

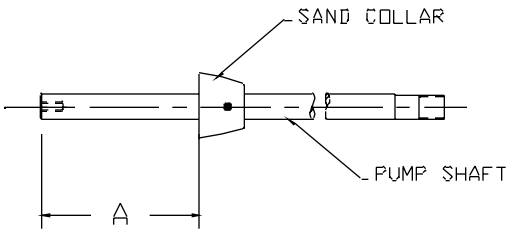
Assembly of the unit is basically the reverse of disassembly. Before proceeding with assembly, clean thoroughly and check all threads, registers and mating faces for burrs. Clean up with file where required. Lubricate as outlined in paragraph 3.4. It is important that the lower sand collar and first impeller are properly located on the shaft since the shaft projection is determined by this.

CAUTION: Cleanliness and proper lubrication are very important since one small chip, burr or one dry bearing can be cause for re-doing the whole job.

Assembly procedure is as follows:

The parts reference numbers refer to Figure 2.2.

1. Locate sand collar on shaft and lock in position with the two set screws. The sand collar should be located in the same position as found when disassembled and recorded (see page 6). If the sand collar location was not recorded refer to Figure 4.1 for standard dimension.



BOWLS	6LK 6JK 6JO	8LK 8JO 8JK 8FK	8XK	10DO 10DK	10LK	10HK	10XK	10FK 12LK 12DO 12DK 12FK	14LK 14DO 14DK 14FK	15DK	16MK 18MK	20MK	22BK
SUCTION BELL	3-9/16	4-3/32	3-3/4	5-1/4	5-7/8	7	3-27/32	5-7/8	6-3/4	9-1/4	9-1/16	10-1/16	10-5/32
SUCTION CASE	3-9/16	4-3/32	3-3/4	5-1/4	5-7/8	7	3-27/32	5-7/8	6-3/4	9-1/4	9-1/16	10-1/16	

NOTE: Add 1/8" to above dimensions for all semi open impeller pumps.

Fig. 4.1 Sand Collar Setting

2. Check shaft closely for nicks or burrs - smooth with emery cloth as required.

3. Check shaft for straightness - shaft must be straight within .005" total indicator reading. Figure 4.2 indicates a recommended method for checking shaft straightness. If the shaft is not straight it must be straightened or replaced. If the deflection is gradual over a considerable length the shaft can usually be straightened by supporting on two blocks straddling the crooked section and applying pressure to the high side to deflect the shaft in the opposite direction. If the shaft has a sharp crook (dog-leg) it is recommended that the shaft be replaced since the shaft will not always remain straight even if satisfactorily straightened.

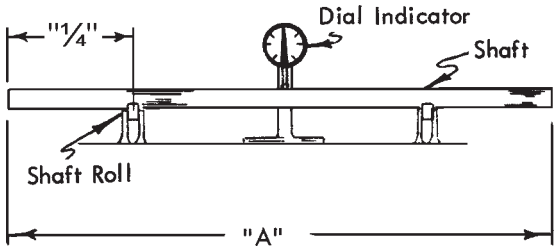


Fig. 4.2 Checking Shaft for Straightness

4. Insert shaft into suction bearing, sliding in until the sand collar rests against the bearing housing.

NOTE: Semi-Open impeller pumps require a 1/8" spacer be inserted between the sand collar and bearing housing.

Install the tie down bolt (1/2" N.C.) thru the bottom of the suction bell (or case) and thread into tapped hole in end of shaft as illustrated in Figure 4.3. Tighten the tie down bolt enough to hold the sand collar firmly against the bearing housing or spacer. Do not tighten enough to move sand collar on shaft.

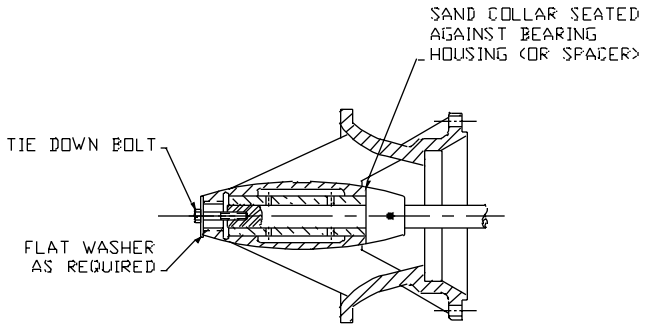


Fig. 4.3 Locking Shaft for Assembly

5. Slip the first impeller over shaft and seat in suction bell (or case).

6. Open collet with screwdriver blade and slide over shaft and into tapered impeller bore.

7. Using the male end of the collet driver, drive the collet securely into the tapered impeller bore. Remove collet driver.

8. Tighten the tie down bowl securely at this time. If the sand collar has been raised slightly off the bearing housing by installation of the first impeller this is O.K.

9. Slide intermediate bowl onto shaft and mate with suction bell (or case). On bolted bowl assemblies rotate bowl to align ribs with ribs on suction bell (or case).

10. Insert and uniformly tighten cap screws on flanged bowls; use heavy chain tongs to tighten threaded bowls. Recommended torque values are shown in Figure 4.4 and 4.5.

FASTNER SIZE	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4
TORQUE (FT.-LB.)	5.4	10	17	27	40	60	84	135
Torque values shown are for standard fasteners lubricated with a high stress lubricant (graphite and oil, moly-disulphite, etc.).								

Fig. 4.4 Torque Values for Standard Fasteners

BOWL SIZE	6LK	6JO 6JK	8JK, 8JO, 8LK, 8FK	10HK
TORQUE (FT.-LB.)	760	1000	1200	1600
Torque values shown are for standard fasteners lubricated with a high stress lubricant (graphite and oil, moly-disulphite, etc.).				

Fig. 4.5 Torque Values for Standard Threaded Bowls

11. Repeat steps 6, 7, 8, 9 and 10 until all bowls are in place, including the top bowl (the top bowl is easily identified by the extra long throttle bearing which projects out the top on all models except 18MK and 20MK).

12. Slide discharge case over pumpshaft. Install and tighten cap screws, or screw discharge case onto top bowl if threaded.

13. Remove tie down bolt installed in step 4 (and sand collar spacer if used).

14. Grasp shaft and rotate by hand to check for binding, also check and play by pulling all the way up and measuring distance traveled. Check this against end play recorded in paragraph 2.5 or nominal dimensions shown in Figure 3.1.

15. If the suction bearing cavity was not packed with grease previously this should be done now. After greasing work shaft up and down several times to remove excess grease.

NOTE: Remove enough grease so that plug will not force shaft up when installed (step 16).

16. Install suction bell (or case) plug and tighten.

17. Screw column adaptor into place and tighten.

18. Screw shaft coupling onto shaft.

19. (Flanged bowls) Check bolts and nuts for tightness, also check column adaptor and tube adaptor bearing for tightness.

    (Threaded bowls) Put one chain tong on column adaptor and the other on the suction bell (or case) and check complete bowl assembly for tightness, also check tube adaptor bearing for tightness.

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SECTION 5: PARTS

5.1. ORDERING PARTS

When ordering spare or replacement parts the pump serial number and size and type of pump must be given. This can be found on the nameplate furnished with the unit. Give the complete name of each part as indicated on the applicable sectional drawing (Fig. 5.1, 5.2 or 5.3) and the quantity required.

5.2. STOCKING SPARE PARTS

Spare parts to be kept in inventory will vary according to service, field maintenance anticipated, allowable down time and number of units. A minimum inventory of one complete set of bearings, gaskets, “O” rings, and packing (or Mechanical seal) and one spare of each moving part is suggested.

5.3. RETURNING PARTS

All materials returned to the factory must be accompanied by a Returned Material Authorization (RMA) number. An RMA number can be obtained directly from the factory or through your local Dealer or local District Manager. The RMA Form must be filled in completely and forwarded as directed thereon. Parts being returned under warranty claim must have a complete written report submitted with the RMA Form.

CAUTION: Returned material must be carefully packaged to prevent transit damage - factory cannot assume any responsibility for parts damaged in transit.

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Bowl Assembly Parts List

6LK, 6JK, 6JO, 8LK, 8JK, 8JO, 8FK & 10HK Series

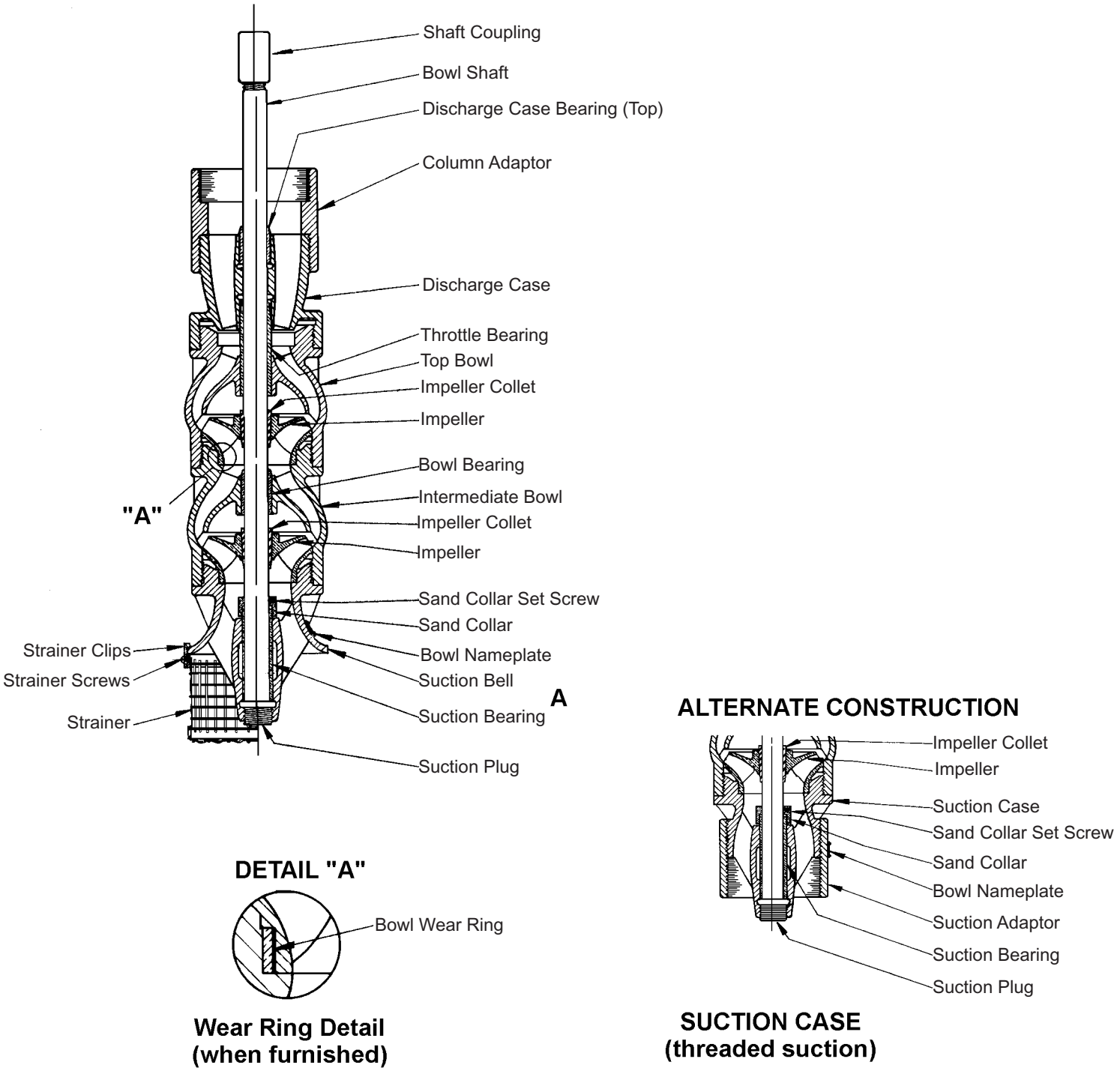

Fig. 5.1 Pump Bowl Sectional Drawing

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Bowl Assembly Parts List

8XK, 10XK, 10LK, 10DK, 10DO, 10FK, 12DK, 12DO,
12LK, 12FK, 14DK, 14DO, 14LK, 14FK, 16MK Series

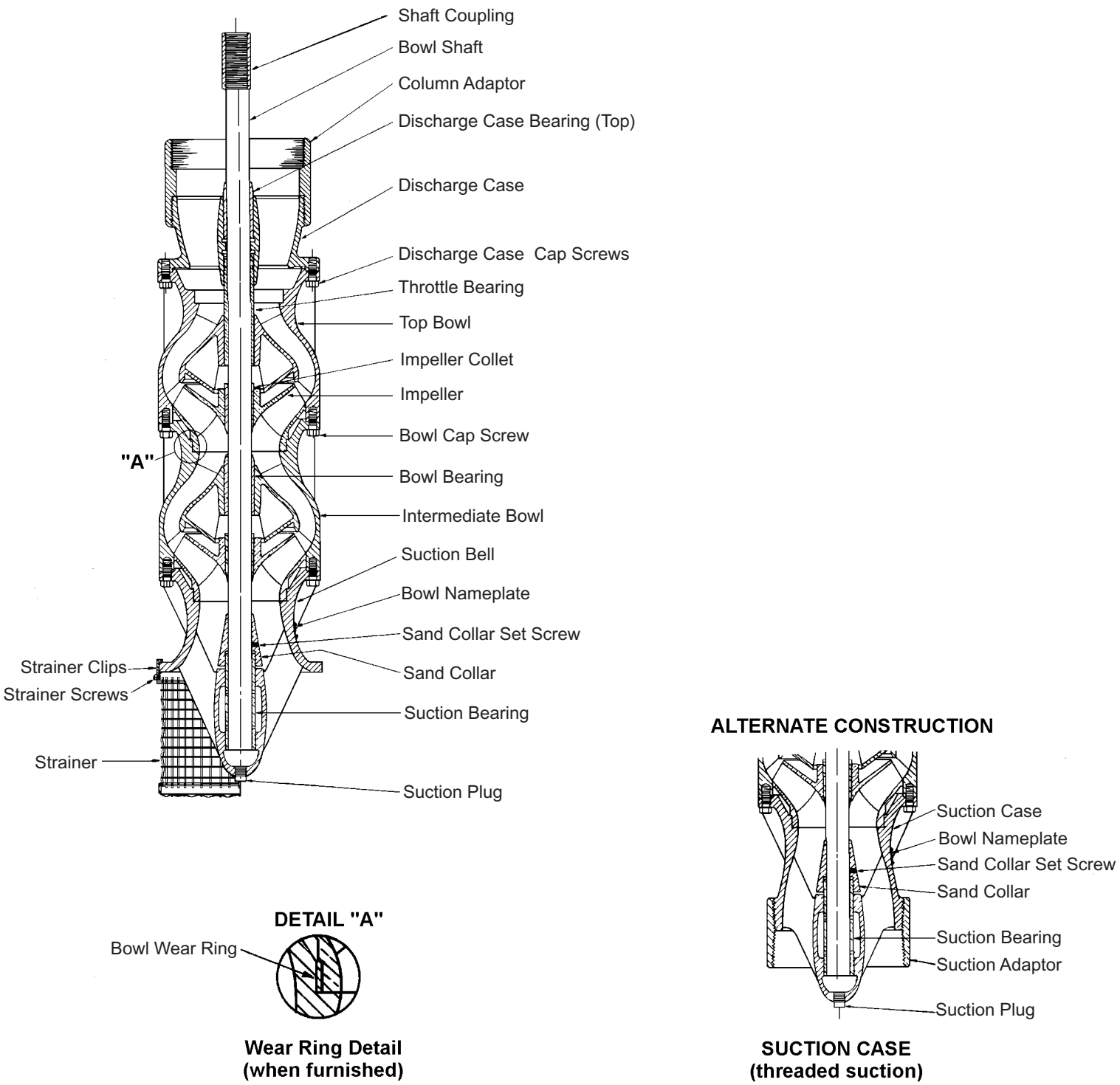


Fig. 5.2 Pump Bowl Sectional Drawing

Bowl Assembly Parts List

15DK, 18MK, 20MK Series

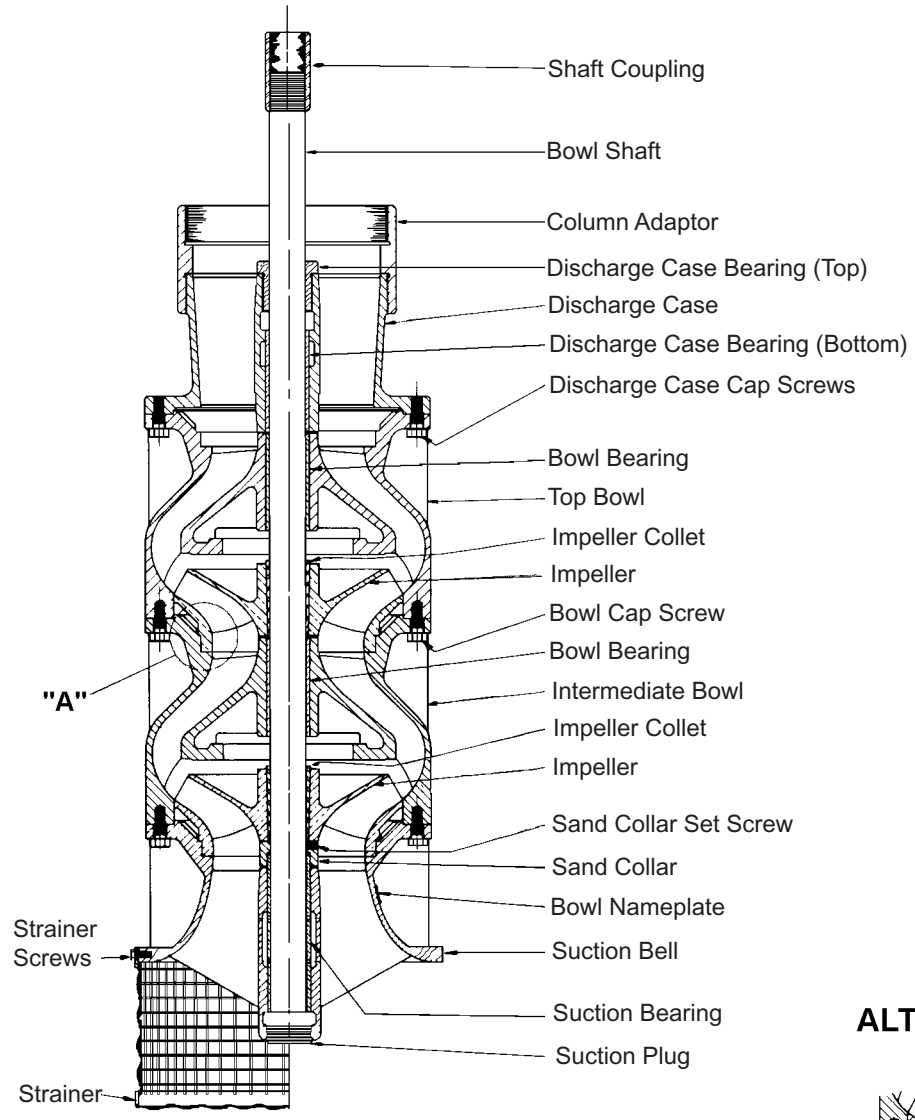
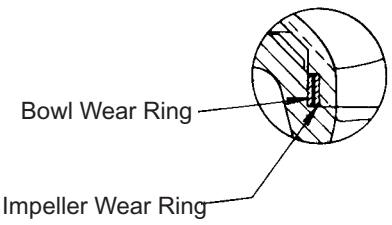


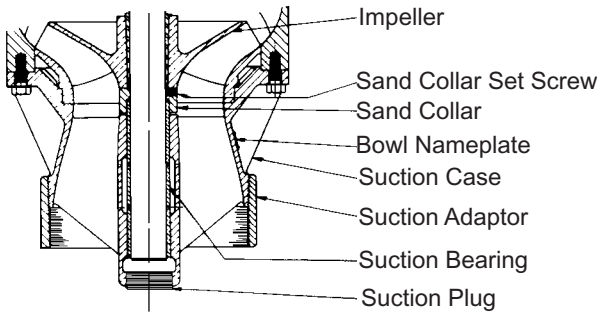
Fig. 5.3 Pump Bowl Sectional Drawing

DETAIL "A"



Wear Ring Detail (when furnished)

ALTERNATE CONSTRUCTION



SUCTION CASE (threaded suction)

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