FINISH THOMPSON INC.

VKC22 Series
Sealless, Non-metallic
Vertical Mag Drive Centrifugal Pumps
Installation and Maintenance Instructions

Pat. No. 5,708,313

ASSEMBLY

WARNING: Magnetic field hazard. This pump contains powerful rare earth magnets. When the pump is disassembled (not connected to a motor) and the magnets are exposed, these magnets produce powerful magnetic fields. Individuals with cardiac pacemakers, implanted defibrillators, other electronic medical devices, metallic prosthetic heart valves, internal wound clips (from surgery), metallic prosthetic devices or sickle cell anemia must not handle or be in the proximity of the magnets contained inside the pump. Consult a health care provider for specific recommendations before working with this pump.

PUMPS WITH MOTORS

1. Unpack the pump, the motor, and the mounting hardware and examine for any signs of shipping damage. If damage is detected, save the packaging and notify the carrier immediately.
2. The customer can chose to install the pump end into the tank or lay it on its side prior to the motor installation. An overhead hoist of some sort may be needed to install the motor.
3. Install the coupling insert (item 11 onto the motor coupling half on the motor shaft. Install the mounting plate o-ring (item 14) into the o-ring groove on the mounting plate and lubricate with a chemically compatible lubricant. Insert the motor / motor adapter flange (items 1 and 3) into the top of the pump. Note that the splines on the pump shaft coupling half need to match up and seat into the coupling insert. Once the coupling has seated, rotate the motor until it is oriented correctly (avoid locating electrical box by the discharge piping). Insert and tighten the four bolts & washers (items 7, 8, & 9) down through the motor adapter flange (item 3) into the mounting plate.
4. Proceed to the “installation “ section of these instructions.

PUMPS WITHOUT MOTORS

1. Unpack the pump, the motor adapter flange, and the mounting hardware and examine for shipping damage. If damage is detected, save the packaging and contact the carrier immediately.
2. The customer can chose to install the pump end into the tank or lay it on its side prior to the motor installation. An overhead hoist of some sort may be needed to install the motor.
3. Install the motor coupling half (item 10 onto the motor shaft so that the shaft is recessed below the face of the coupling half. The correct recessed setting for 100/112 frame, 182/184 frame, and 215 frame motors is .170 plus or minus .010. For 90 frame motors the recessed setting is .100 plus or minus .010, and for 132 frame motors, it is .125 plus or minus .010. Install the key into the key slot and tighten the setscrews. Install the plastic coupling insert (item 11 onto the coupling on the motor shaft.
4. Install the motor adapter flange o-ring (item 2) into the o-ring groove in the motor adapter flange (item 3) and lubricate it with a chemically compatible lubricant. Making sure the o-ring stays in the groove place, situate the motor adapter flange (item 3) onto the motor and bolt it down with the correct hardware (items 4, 5, & 6).
5. Install the mounting plate o-ring (item 14) into the o-ring groove in the mounting plate and lubricate it. Insert the motor and motor adapter flange (items 1& 3) into the top of the pump. Note, the splines on the pump shaft coupling half need to match up and seat into the coupling insert. Once the coupling has seated, rotate the motor until it is oriented correctly (avoid locating the electrical box by the discharge piping). Insert and tighten the four bolts and washers (item 7, 8, & 9) through the motor adapter flange (item 3) into the mounting plate.
6. Proceed to the “installation” section of these instructions.

INSTALLATION

MOUNTING

The base plate must be securely fastened so that there is no vibration when the pump is running.

PIPING TO AND FROM THE PUMP

- Always support the piping near the pump to minimize stress and strain.
- Minimize frictional losses by increasing the piping size by one diameter.
- Use a minimal number of bends, keeping any bends within a distance of ten pipe diameters from the pump.
- Install valve on the discharge lines to control flow. Place the valve within a distance of ten pipe diameters from the pump.
- Ensure that the piping is leak free.

Maintain a flooded suction at all times. Use a float switch to turn off the pump at low level

CAUTION: Do not run the pump dry. This pump should never be started without liquid in the casing as this could damage the pump. The fluid being transferred by the pump lubricates the pump components. Even short periods of running the pump dry could damage the pump. It is recommended that run dry protection be used. Optional electrical power monitors are available to help protect against run dry.

ELECTRICAL CONNECTIONS

1. Perform the motor wiring according to NEC requirements and local electrical codes.
2. Wire the motor for clockwise rotation when facing the fan end of the motor.
3. To verify correct motor rotation
   a. Install the pump into the system
   b. Fully open the discharge valve.
   c. Allow fluid to flow into the pump. Do not allow the pump to run dry, as this may damage to the pump com ponents.
   d. Jog the motor (allow it to run for one to two seconds) and observe the rotation of the motor fan. Correct ro tation is clockwise when viewed from the fan end of the motor. Refer to directional arrow on the pump if needed.

Note: A pump running backwards will pump, but at a greatly reduced flow and pressure.

OPERATION

1. Partially open the discharge valves.
2. Start the pump and verify liquid is flowing. If there is not liquid flow, refer to the "Troubleshooting" section of these instructions.
3. Adjust the flow rate and pressure by regulating the discharge valve.

MAINTENANCE

DISASSEMBLY

1. Disconnect the power and remove the electrical wiring.
2. Close the discharge valve and disconnect the piping.
3. Remove the 4 bolts and washers (items 7, 8 and 9), and pull the motor and motor adapter flange (items 1 and 3) from the pump. If the motor is to be replaced, remove the 4 bolts and washers (items 4, 5, and 6) from the motor adapter flange (Item 3) and separate the flange from the motor. Remove the motor adapter flange o-ring (item 2) and the mounting plate o-ring (item 14).
4. Remove the 4 bolts and washers from the bearing housing (item 12). Install two jackscrews (item 13) into two jackscrew holes in top of bearing housing and screw them in until the bolt heads bottom out. Grip the bearing housing firmly and pull straight out of the column assembly (item 15). On extended length models, be sure to pull straight up until the drive hub clears the mounting plate to avoid damage to the lower bearing housing fingers.
5. Remove the bolts holding the mounting plate to the tank and remove the pump from the tank. Gently place the pump on the mounting plate (on a clean surface) with the pump suction pointing straight up.
6. Remove the 6 housing bolts, loosen the discharge union , and remove the impeller housing . Remove the housing o-ring (item 18), and remove the impeller assembly (items 16 and 17).

INSPECTION

1. Check impeller drive bushing (item 16A) and impeller thrust washer (item 17A). Replace if cracked, chipped, or scored. If the minimum groove height in the slotted areas of the drive bushing or the thrust washer is less than the minimum height recommended (.020), then replace them.
2. If the drive bushing's inside diameter is more than .780, then replace it. See figure 1.

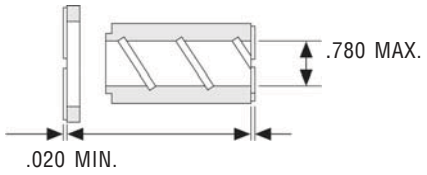


Figure 1

3. Check for loose magnets on the drive hub.
4. Check for any signs of rubbing by the drive assembly inside the column assembly from the motor end, or signs of rubbing inside the column assembly by the impeller assembly on the suction side. If there is any sign of rubbing, contact the factory.
5. Check for bearing wear on the drive shaft (upper and lower bearings on extended length models).

IMPELLER DISASSEMBLY

1. To separate the impeller drive (item 16) from the impeller (item 17), support the impeller in an arbor press using two 5-inch minimum spacer blocks
2. Insert a 1-1/2" diameter plastic or wooden shaft into the eye of the impeller and press the impeller drive out of the impeller. See figure 2.

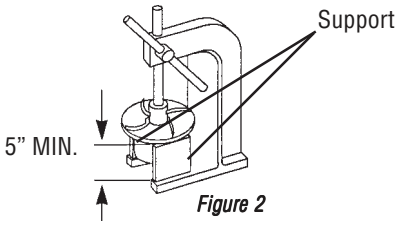


Figure 2

3. If an arbor press is not available, use two slotted screwdrivers to pry the impeller apart from the impeller drive. There are two slots located 180° apart in the top of the impeller drive. Insert the screwdriver tips into the slots and pry them apart.

BUSHING AND THRUST RING REPLACEMENT

1. To remove the bushing (item 16A), place the impeller drive in an arbor press with the slotted end of the bushing facing down. Insert a 1" diameter plastic or wooden shaft through the impeller eye and press the bushing out. See figure 3.

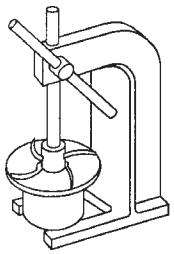


Figure 3

Note: The slotted end of the bushing is always located on and installed from the "bottom" of the impeller drive. The recessed, splined end that the impeller is inserted into is the "top" of the impeller drive.

2. To replace the bushing, place the impeller drive with the recessed splined end(the top) face down on a clean flat surface. Match up the flat on the bushing side with the flat in the eye of the impeller drive and insert the bushing, slotted face up, into the impeller drive. Gently push until the bushing bottoms out. The bushing should be flush with the impeller eye on the "top" side.
3. If replacement is necessary, the impeller thrust ring (item 17A) on the open impeller can be removed by gently pulling the ring out of the impeller. The thrust ring on the closed impeller must be removed by grasping the ring with pliers and twisting the ring out.
4. To replace the thrust ring, match up the corresponding flats on the thrust ring and the top of the impeller and press into place.

   Note: Protect the face of the thrust ring during installation with wood or plastic, and avoid tilting the ring.

REASSEMBLY

1. Align splines on the impeller into the impeller drive and press together (protect the face of the thrust ring during assembly).
2. With mounting plate down and the column section facing up, carefully install the impeller assembly onto the barrier spindle (white ceramic post).
3. Install and lubricate the housing o-ring (item 18), and place the impeller housing onto the pump. Align the discharge and start the discharge union (do not tighten yet). Using the correct hardware, bolt the housing to the column section and tighten to 70 in-lbs. of torque using the pattern shown in figure 4. **For pumps with PVDF hardware,** a Teflon® thread lubricant must be used on all plastic threads before each use. Insert the 5/16-18 x 3-1/4 PVDF bolts through the housing and barrier. Install PVDF nut. Tighten the nuts onto the bolts using the pattern shown in figure 4.

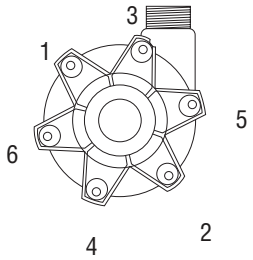


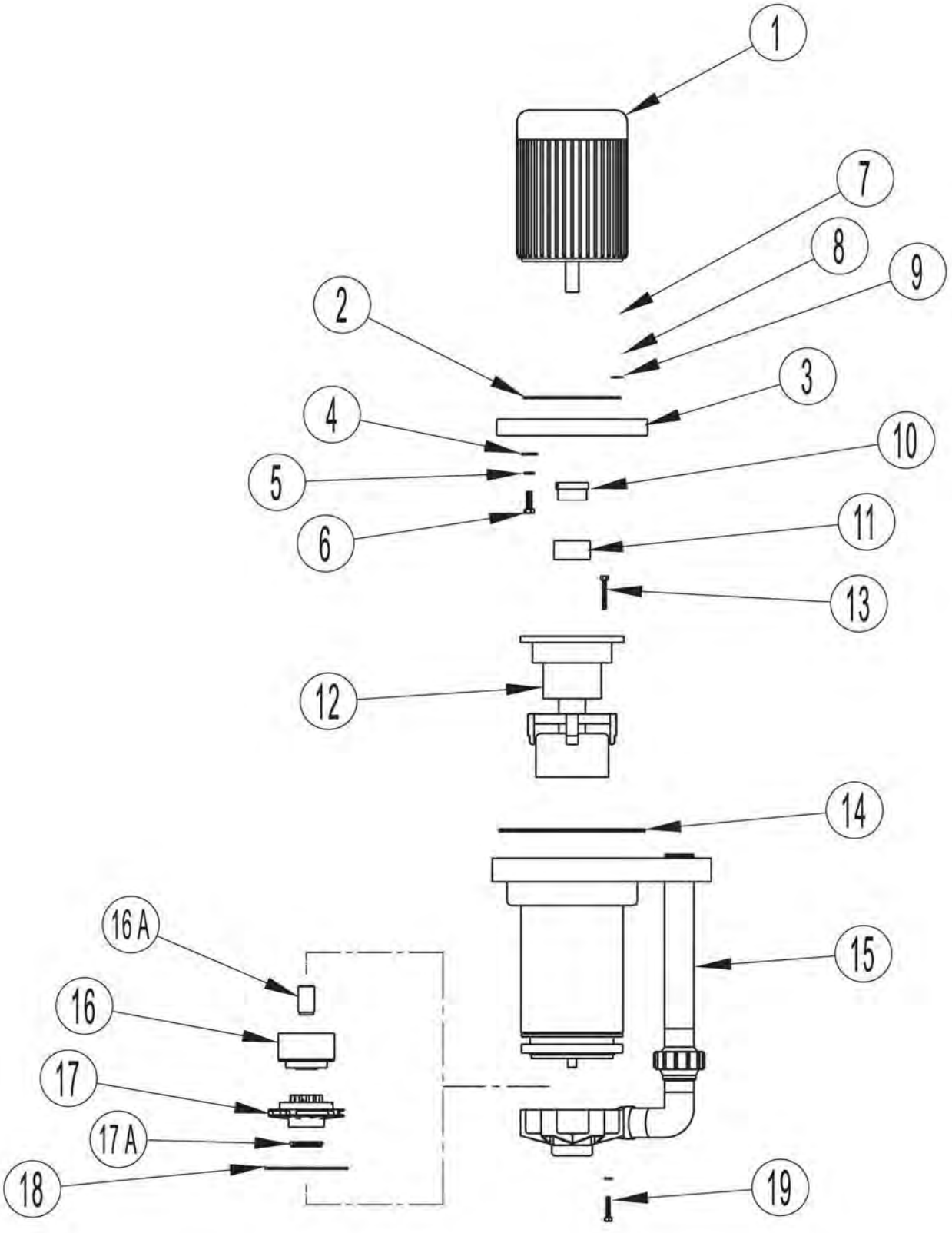
Figure 4

CAUTION: Do not tighten more than maximum torque of 25 inch pounds on all PVDF hardware.

Next install the three 5/8-11 x 4-3/4 PVDF bolts using the same maximum torque setting. Tighten the discharge pipe union nut.

4. Clamp or somehow secure the mounting plate (item 21) to a table with the pump end down. Making sure the jackscrews (item 13) are threaded all the way into the bearing housing (item 12), carefully set the drive hub into the column assembly until the jackscrews touch. Extended length models require lowering the drive hub and lower bearing mount straight down into the column section until the jackscrews make contact. To be centered correctly, the four fingers on the lower bearing mount must seat inside locating bore in base of the column. Avoid pinching your fingers by gripping the top flange of the bearing housing and keeping fingers away from the jackscrews. Use the jackscrews to slowly lower the bearing housing into the column section and remove the jackscrews. Install and tighten the four bolts and washers that secure the bearing housing to the column assembly.
5. If the motor was replaced, install and lubricate the motor adapter flange o-ring (item 2) and bolt the flange (item 3) onto the motor using the correct hardware (items 4, 5, & 6). Install the coupling half onto the motor shaft (see instructions on page 1, step 3, under "Pumps Without Motors").
6. The customer can choose to either lay the pump end on its side and then install the motor, or place the pump end into the tank prior to the motor installation. An overhead hoist of some sort may be needed to install the motor.
7. Install the plastic coupling insert (item 11) onto the motor coupling half on the motor shaft. Install the mounting plate o-ring (item 14) into the o-ring groove on the mounting plate and lubricate with a chemically compatible lubricant. Insert the motor / motor adapter flange (items 1 & 3) into the top of the pump. Note that the splines on the pump shaft coupling half need to match up and seat into the coupling insert. Once the coupling has seated, rotate the motor until it is orientated correctly (avoid locating electrical box by the discharge piping). Insert and tighten the four bolts & washers (items 7, 8, and 9) down through the motor adapter flange (item 3) into the mounting plate.
8. Refer to the "installation" section in this manual if needed.

VKC 22 EXPLODED VIEW



VKC22 SPARE PARTS LIST

ITEM	QTY	DESCRIPTION	Frame Size	PART NO.	
				Polypropylene	PVDF
1	1	Motor		See Sales	
2	1	O-Ring 266 - Viton	184/213/215TC	J103966	
		O-Ring 266 - EPDM		J103997	
		O-Ring 250 - Viton	90	J102960	
		O-Ring 250 - EPDM		J103003	
		O-Ring 255 - Viton	100/112	J103993	
		O-Ring 255 - EPDM		J103994	
		O-Ring 263 - Viton	132	J103998	
		O-Ring 263 - EPDM		J103999	
3	1	Motor Adapter Flange	184TC	M102250	
			213/215TC	M102249	
			90	M102266	
			100/112	M102252	
			132	M102267	
4	4	1/2" Flat Washer	184TC	J103851	
			213/215TC		
		3/8" Flat Washer	90	J100128	
			100/112		
			132		
5	4	1/2" Lock Washer	184TC	J101023	
			213/215TC		
		3/8" Lock Washer	90	J100115	
			100/112		
			132		
6	4	C/S Hex Hd 1/2-13 x 2-1/4" Lg	184TC	J103208	
		C/S Hex Hd 1/2-13 x 2-3/4" Lg	213/215TC	J103253	
		C/S Hex Hd M8 x 30mm	90	J103781	
		C/S Hex Hd M8 x 40mm	100/112	J102760	
		C/S Hex Hd M8 x 70mm	132	J104100	
7	4	C/S Hex Hd 3/8-16 x 1-3/4" long SSTL	184TC	J103161	
		C/S Hex Hd 3/8-16 x 2-3/4" long SSTL	213/215TC	J100126	
		C/S Hex Hd 3/8-16 x 1-1/4" long SSTL	90	J103118	
		C/S Hex Hd 3/8-16 x 1-3/4" long SSTL	100/112	J103161	
		C/S Hex Hd 3/8-16 x 2-3/4" long SSTL	132	J100126	
8	4	3/8" Lock Washer	All	J100115	
9	4	3/8" Flat Washer	All	J100128	
10	1	Motor Shaft Coupling Half	184TC	J103830	
			213/215TC	J103831	
			90	J103904	
			100/112	J103905	
			132	J103908	
11	1	Coupling Insert	184/213/215TC	J103829	
			90/100/112	J103829	
			132	J103906	
12	1	Shaft Assembly - 12"	184/213/215/90/100/112	A103197	
		Shaft Assembly - 12"	132	A103197-1	
		Shaft Assembly - 18"	184/213/215/90/100/112	A103197-2	
		Shaft Assembly - 18"	132	A103197-3	
		Shaft Assembly - 24"	184/213/215/90/100/112	A103197-4	
		Shaft Assembly - 24"	132	A103197-5	
		Shaft Assembly - 30"	184/213/215/90/100/112	A103197-6	
		Shaft Assembly - 30"	132	A103197-7	
		Shaft Assembly -36"	184/213/215/90/100/112	A103197-8	
		Shaft Assembly - 36"	132	A103197-9	
		Shaft Assembly - 42"	184/213/215/90/100/112	A103197-10	
		Shaft Assembly - 42"	132	A103197-11	
		Shaft Assembly - 48"	184/213/215/90/100/112	A103197-12	
		Shaft Assembly - 48"	132	A103197-13	
		Shaft Assembly - 54"	184/213/215/90/100/112	A103197-14	
		Shaft Assembly - 54"	132	A103197-15	
		Shaft Assembly - 60"	184/213/215/90/100/112	A103197-16	
		Shaft Assembly - 60"	132	A103197-17	
13	2	Jack Screws - Hex Hd 3/8-16 x 2-1/2"	All	J103913	
14	1	Mounting Plate O-ring - Viton	All	J103837	
		Mounting Plate O-ring - EPDM		J103838	

VKC22 SPARE PARTS LIST (continued)

ITEM	QTY	DESCRIPTION	Frame Size	PART NO.	
				Polypropylene	PVDF
15	1	Column Assembly - 12"	All	A103296-1	A103296-10
		Column Assembly - 12" PVDF	All	A103296-37	A103296-46
		Column Assembly - 18"	All	A103296-2	A103296-11
		Column Assembly - 18" w/PVDF	All	A103296-38	A103296-47
		Column Assembly - 24"	All	A103296-3	A103296-12
		Column Assembly - 24" w/PVDF	All	A103296-39	A103296-48
		Column Assembly - 30"	All	A103296-4	A103296-13
		Column Assembly - 30" w/PVDF	All	A103296-40	A103296-49
		Column Assembly - 36"	All	A103296-5	A103296-14
		Column Assembly - 36" w/PVDF	All	A103296-41	A103296-50
		Column Assembly - 42"	All	A103296-6	A103296-15
		Column Assembly - 42" w/PVDF	All	A103296-42	A103296-51
		Column Assembly - 48"	All	A103296-7	A103296-16
		Column Assembly - 48" w/PVDF	All	A103296-43	A103296-52
		Column Assembly - 54"	All	A103296-8	A103296-17
		Column Assembly - 54" w/PVDF	All	A103296-44	A103296-53
		Column Assembly - 60"	All	A103296-9	A103296-18
		Column Assembly - 60" w/PVDF	All	A103296-45	A103296-54
16	1	Imp Drive w/Car Bshg - Closed Imp	All	105563	105566
		Imp Drive w/PTFE Bshg - Closed Imp	All	105564	105567
		Imp Drive w/Cer Bshg - Closed Imp	All	105565	105568
		Imp Drive w/Car Bshg - Open Imp	All	A101944	A101946
		Imp Drive w/PTFEBshg - Open Imp	All	A101945	A101947
		Imp Drive w/Cer Bshg - Open Imp	All	A103231	A103232
16A	1	Closed Impeller Bushing - Carbon	All	M102240	
		Closed Impeller Bushing - PTFE	All	M102240-1	
		Closed Impeller Bushing - Ceramic	All	J103917	
		Open Impeller Bushing - Carbon	All	J101701-1	
		Open Impeller Bushing - PTFE	All	J101701-2	
		Open Impeller Bushing - Ceramic	All	J101701-3	
17	1	Closed Impeller w/ring - 6.37"	All	105569-1	105569-6
		Closed Impeller w/ring - 6.00"	All	105569-2	105569-7
		Closed Impeller w/ring - 5.50"	All	105569-3	105569-8
		Closed Impeller w/ring - 5.25"	All	105569-13	105569-14
		Closed Impeller w/ring - 5.00"	All	105569-4	105569-9
		Closed Impeller w/ring - 4.75"	All	105569-11	105569-12
		Closed Impeller w/ring - 4.50"	All	105569-5	105569-10
		Open Impeller w/ring - 6.00"	All	A101235-1	A101235-5
		Open Impeller w/ring - 5.50"	All	A101235-2	A101235-6
		Open Impeller w/ring - 5.00"	All	A101235-3	A101235-7
		Open Impeller w/ring - 4.50"	All	A101235-4	A101235-8
17A	1	Closed Impeller Thrust Ring	All	J103899	
	1	Open Impeller Thrust Ring	All	J101460	
18	1	Impeller Housing O-ring	All	J101085	
	1	Impeller Housing O-ring	All	J101086	
19	1	Housing Hardware Package - Titanium	All	A103297	
	1	Housing Hardware Package - Hastelloy	All	A103298	
	1	Housing Hardware Package - PVDF	All	105398	

GENERAL NOTES

1. Do not pump liquids containing metal fines.
2. If magnets decouple, stop the pump immediately. The rare earth magnets used in this pump are more resistant to de-magnetization, but operating the pump with the magnets decoupled will eventually weaken the magnets.
3. Plastic pumps will expand and contract with temperature so the plastic column sections.
4. Always use a chemically compatible lubricant on any o-ring.
5. An information sticker is attached to the mounting plate. The first line is the model number and the second line is the serial number.

TROUBLESHOOTING

NO OR INSUFFICIENT FLOW:

1. No liquid in sump.
2. Air lock in pump.
3. Closed valve.
4. Viscosity or specific gravity too high
5. Discharge head higher than anticipated.
6. Suction too close to the bottom of the sump.

INSUFFICIENT PRESSURE:

1. Air or gasses in liquid.
2. Clogged suction

EXCESSIVE POWER CONSUMPTION:

1. Head lower than rating. Excessive flow.
2. Specific gravity or viscosity of liquid is too high.

EXCESSIVE VIBRATION:

1. Loose piping or bolts.
2. Suction too close to the bottom of the sump

WARRANTY

Finish Thompson, Inc (manufacturer) warrants this product to be free of defects in materials and workmanship for a period of one year from date of purchase by original purchaser. If a warranted defect, which is determined by manufacturer's inspection, occurs within this period, it will be repaired or replaced at the manufacturer's option, provided (1) the product is submitted with proof of purchase date and (2) transportation charges are prepaid to the manufacturer. Liability under this warranty is expressly limited to repairing or replacing the product of parts thereof and is in lieu of any other warranties, either expressed or implied. This warranty does apply only to normal wear of the product or components. This warranty does not apply to products or parts broken due to, in whole or in part, accident, overload, abuse, chemical attack, tampering, or alteration. The manufacturer accepts no responsibility for product damage or personal injuries sustained when the product is modified in any way. If this warranty does not apply, the purchaser shall bear all cost for labor, material and transportation.

Manufacturer shall not be liable for incidental or consequential damages including, but not limited to process down time, transportation costs, costs associated with replacement or substitution products, labor costs, product installation or removal costs, or loss of profit. In any and all events, manufacturer's liability shall not exceed the purchase price of the product and/or accessories.

Call our toll free Technical Service Hot Line, 1-800-888-3743, if you have any questions regarding product operation or repair.

ORDERING SPARE PARTS

Spare parts can be ordered from your local distributor. Always refer to pump model number to avoid error.

OTHER FINISH THOMPSON PRODUCTS

Drum Transfer Pumps, available in sanitary construction, stainless steel, polypropylene, PVDF, and CPVC are capable of flows to 40 gpm, discharge head to 80 feet and viscosities to 100,000 cps.

Portable Mixers for turbine mixing and blending handle viscosities to 1,000 cps with gentle, non-vortexing circulation. Available in 316 stainless steel.

Centrifugal Pumps in corrosion resistant materials are offered in magnetic drive sealless or mechanical seal models. Pumps are capable of330 gpm, up to 325 feet discharge head, and 220°F (104°C) maximum.

For more information, contact Finish Thompson Inc.

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