

SYSTEM ONE® PARTS

Vortex: Frame A and LD17

PN: 967106 **PARTS LIST**
1301-C03

Keep with Instructions 1301-C00 for Installation, Operation and Maintenance

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Effective	Nov 2017
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Recommended Spare Parts (Ref # is shaded)

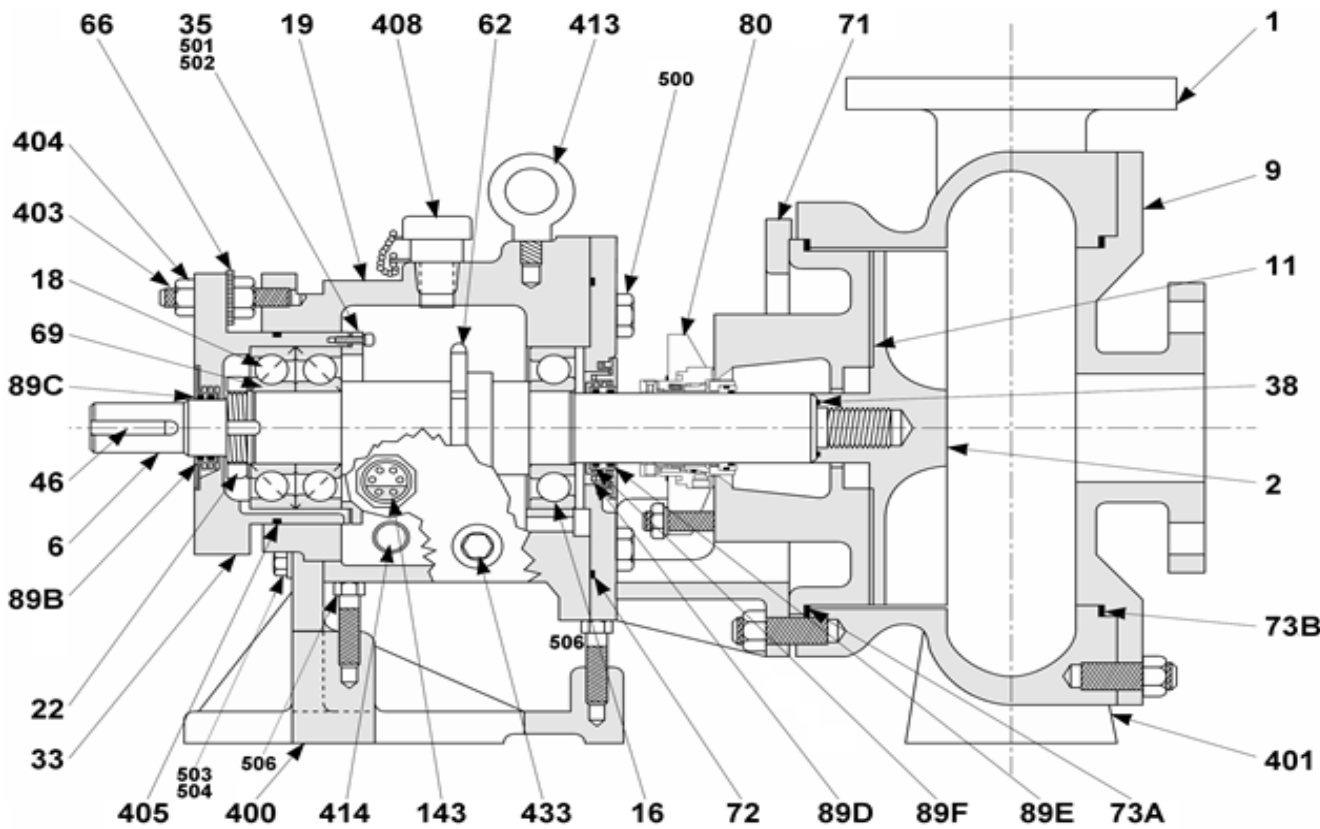
Ref #	Description
2	Impeller
6-RE	Rotating Element
72	Frame Adapter O-ring
73A	Casing Gasket
73B	Gasket, Suction Cover
80	Mechanical Seal
89B	Lab Seal Rotor (w/ O-ring), Thrust Bearing
89D	Lab Seal Stator (w/ O-ring), Radial Bearing
89E	Lab Seal Rotor (w/ O-ring), Radial Bearing
405	Cartridge O-ring



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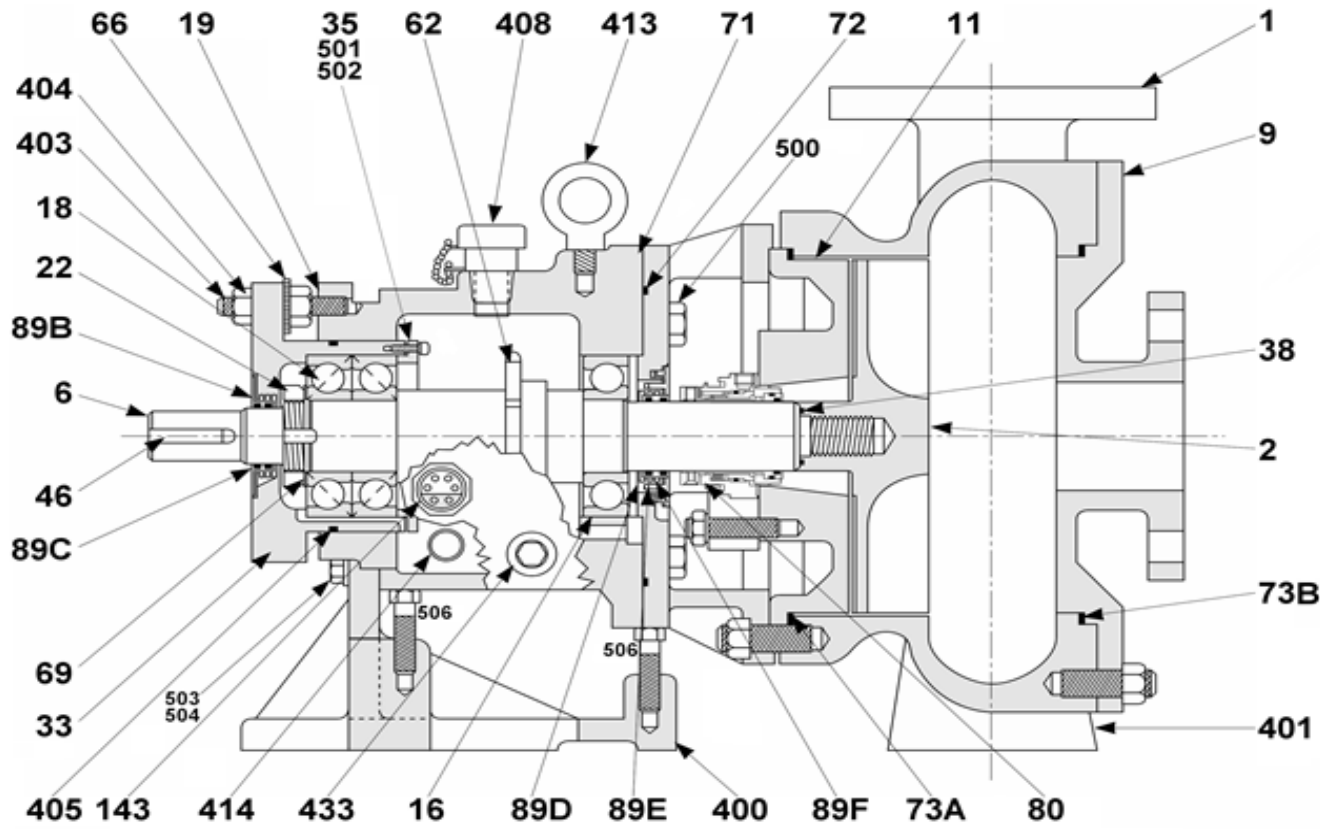
Vortex Frame-A Cross Section



Ref.	Description	Ref.	Description	Ref.	Description
1	Casing	69	Lockwasher, Thrust Bearing	403	Stud, Cartridge
2	Impeller	71	Frame Adapter	404	Locknut, Cartridge
6	Shaft	72	O-Ring, Frame Adapter	405	O-Ring, Cartridge
9	Suction Cover	73A	Gasket, Casing	408	Oil Filler Assembly
11	Back Cover	73B	Gasket, Suction Cover	413	Bolt, Eye
16	Bearing, Radial	80	Mechanical Seal	414	Plug, Magnetic
18	Bearing, Thrust	89A	Seal, Labryinth Stator, Thrust *	433	Plug, Bearing Frame
19	Bearing Frame	89B	Seal, Labryinth Rotor, Thrust	500	Cap Screw, Frame Adapter
22	Locknut, Thrust Bearing	89C	Seal, Labryinth O-Ring, Thrust	501	Screw, Retainer Cover
33	Bearing Cartridge	89D	Seal, Labryinth Stator, Radial	502	Washer for 501
35	Retainer Cover	89E	Seal, Labryinth Rotor, Radial	503	Screw, Bearing Frame Foot
38	O-Ring, Impeller Hub	89F	Seal, Labryinth O-Ring, Radial	504	Washer for 503
46	Key, Coupling	143	Oil Sight Glass	505	Jackscrew
62	Flinger	400	Foot, Bearing Frame	506	Bolt, Bearing Frame Support
66	Micrometer Nut	401	Foot, Casing		

* 89A Incorporated as part of the cartridge in 2000 (not shown)

Vortex LD17 Cross Section



Ref.	Description	Ref.	Description	Ref.	Description
1	Casing	69	Lockwasher, Thrust Bearing	403	Stud, Cartridge
2	Impeller	71	Frame Adapter	404	Locknut, Cartridge
6	Shaft	72	O-Ring, Frame Adapter	405	O-Ring, Cartridge
9	Suction Cover	73A	Gasket, Casing	408	Oil Filler Assembly
11	Back Cover	73B	Gasket, Suction Cover	413	Bolt, Eye
16	Bearing, Radial	80	Mechanical Seal	414	Plug, Magnetic
18	Bearing, Thrust	89A	Seal, Labryinth Stator, Thrust *	433	Plug, Bearing Frame
19	Bearing Frame	89B	Seal, Labryinth Rotor, Thrust	500	Cap Screw, Frame Adapter
22	Locknut, Thrust Bearing	89C	Seal, Labryinth O-Ring, Thrust	501	Screw, Retainer Cover
33	Bearing Cartridge	89D	Seal, Labryinth Stator, Radial	502	Washer for 501
35	Retainer Cover	89E	Seal, Labryinth Rotor, Radial	503	Screw, Bearing Frame Foot
38	O-Ring, Impeller Hub	89F	Seal, Labryinth O-Ring, Radial	504	Washer for 503
46	Key, Coupling	143	Oil Sight Glass	505	Jackscrew
62	Flinger	400	Foot, Bearing Frame	506	Bolt, Bearing Frame Support
66	Micrometer Nut	401	Foot, Casing		

* 89A Incorporated as part of the cartridge in 2000 (not shown)

Ref #1 Casing Assembly Vortex Frame A and Vortex LD17							
Casings assemblies do not include gaskets (see item 73Aand 73B) or feet (see item 401).							
Flange	Other	DI	CF8M	CD4MCu	CN7M	HB	HC
2x2-8		Part Number for Casing Assembly					
150FF	- DR	099118	363651				
150RF	- DR						
300FF	- DR	099119					
300RF	- DR						
3x3-10		Part Number for Casing Assembly					
150FF	- DR	099120 981020	090722	628937			
150RF	- DR						
300FF	- DR	099121					
300RF	- DR						
4x4-12		Part Number for Casing Assembly					
150FF	- DR	099122 983049	090033	0977365. 983224			
150RF	- DR						
300FF	- DR	099123					
300RF	- DR						
Hardware included in STANDARD casing assemblies (material may differ from casing)							
Stud for adaptor*	8**			098281			
Nut for stud*	8**			098289			
Bolt for Scn Cov*	8**			098331			
Washer for bolt*	8**			350396			
Bolt for cg foot*	4			098278 (2X2)	350726 (3X3 and 4X4)		
Washer for bolt*	4			098318 (2X2)	360668 (3X3 and 4X4)		
** 12 for 4x4-12							
Optional Hardware for Casing Assemblies							
Plug for drain*	1		098280		098008		981101
435 Plug for tap*	1		098395		350664	628482	628343

* Not depicted in drawing

Ref #2 Impeller Assembly Vortex FRA and Vortex LD17			
Impeller assembly includes trim, ISO G 6.3 balance and PTFE O-ring (098296).			
Specify impeller trim at time of order. There is a charge for retrim after shipment (981631).			
Ref #	Size	CD4MCu	
2	2.0x2.0-8	099799	
	3.0x3.0-10	090725	
	4.0x4.0-12	090032	

Vortex Frame-A and LD17 SPARE PARTS

6 Shaft Assemblies and Rotating Elements.

Ref# 6-SA: **Shaft Assembly** Includes shaft (6), locknut (22), locknut washer (69), and key (46).

Ref# 6-RE: **Rotating Element** Includes shaft assembly (6-SA), bearings (16&18), bearing cover (35), flinger filter (62).

Ref.#	Description	Parts/pump	Part #	Note
6-SA FRA	Shaft Assembly FRA CS/316	1	364153	
	Shaft Assembly FRA CS/17-4		099918	
	Shaft Assembly FRA CS/A20		097721	
	Shaft Assembly FRA CS/HC		097745	
	Shaft Assembly FRA CS/HB		628850	
6-SA LD17	Shaft Assembly LD17 CS/316	1	098422	
	Shaft Assembly LD17 CS/17-4		099922	
	Shaft Assembly LD17 CS/A20		628942	
	Shaft Assembly LD17 CS/HC		685256	
	Shaft Assembly LD17 CS/HB		628331	
6-RE FRA	Rotating Element FRA CS/316	1	364152	
	Rotating Element FRA CS/316 Vertical		059353	
	Rotating Element FRA CS/17-4		099917	
	Rotating Element FRA CS/17-4 Vertical		364242	
	Rotating Element FRA CS/A20		097722S	
	Rotating Element FRA CS/HC		097746	
6-RE LD17	Rotating Element LD17 CS/316	1	099706	
	Rotating Element LD17 CS/316 Vertical		059340	
	Rotating Element LD17 CS/17-4		099920	
	Rotating Element LD17 CS/17-4 Vertical		090964	
	Rotating Element LD17 CS/A20		628943	
	Rotating Element LD17 CS/HC		685255	
	Rotating Element LD17 CS/HB		628333	

Note: Original design uses 5310 thrust bearing and shaft is 1.125" at the coupling end.

If ordering a shaft assembly or a rotating element for an original ANSI Fame-A power end, it is highly recommended that the power end be converted to the current standard with angular contact thrust bearings. This can be accomplished by using a current design rotating element (as listed above), thrust labyrinth seal, and a new coupling half for the larger shaft diameter.

Parts required to convert ANSI Original FR A Power End (1.125" cplg. end) to current design (1.375" cplg. end):

1 ea	Rotating Element FRA CS/316	364152	(or as appropriate for options)
1 ea	Thrust Lab seal Stationary 1.50" NPS**	364238**	
1 ea	Thrust Lab Seal Rotary 1.50" 316SS	090697	
1 ea	Coupling half for 1.375" shaft	by others	

** If cartridge is also being replaced, this item is unnecessary.

Ref #9 Suction Cover Assemblies for Vortex Pumps

Does not include gasket (73B).

Includes Jackin Screw (098278).

Ref #	Flange type and Pump Size	DI	CF8M	CD4MCu
9	150FF 2x2-8	099126	363650	
	150RF 2x2-8			
	300FF 2x2-8	099127		
	300RF 2x2-8			
	150FF 3x3-10	099128	090724	628936
	150RF 3x3-10			
	300FF 3x3-10	099129		
	300RF 3x3-10			
	150FF 4x4-12	099130	090031	097734S.
	150RF 4x4-12			
	300FF 4x4-12	099131		
	300RF 4x4-12			

Vortex Frame-A and LD17 SPARE PARTS

REF #11 Back Cover Assemblies for Frame-A

Cover includes integral seal chamber and is backwards compatible with old two piece design.
 Cover assembly does not include gasket (73A).
 Cover assembly machined for bushing does not include bushing.
 Cover assembly machined for jacket does not include the jacket.
 Cover assembly machined for tap includes plug for tap (361388). CN7M, HB, HC covers use same alloy plugs.

Bush/Other options	DI	CF8M	CD4MCu	CN7M	HB	HC
8 inch Part Number for Back Cover Assembly						
Standard for carbon bush	363764	364159	364188	685083	628845	097753
For jacket	059457	059459				
With tap						
For jacket/with tap						
Optional for Enviroseal	644443					
For jacket						
With tap						
For jacket/with tap						
10 inch Part Number for Back Cover Assembly						
Standard for carbon bush	363765	364160	364189	059442		059322
For jacket	059463	059465	981017			
With tap						
For jacket/with tap						
Optional for Enviroseal	640663	644457	983074			
For jacket		801204				
With tap						
For jacket/with tap						
12 inch Part Number for Back Cover Assembly						
Standard for carbon bush	363766	364161	364190	685160	644170	628587
For jacket	059469	059471	059473	643228		981095
With tap	628812					
For jacket/with tap		801543	982900			
Optional for Enviroseal	644079	628860				
For jacket	981415	982369				
With tap						
For jacket/with tap						

Hardware included with standard Frame-A Back Cover Assemblies

Ref.	Description	Parts per Pump			Part Number	Comment/Note
		8"	10"	12"		
*	Gland Stud	4	4	4	360642	
*	Nut for Gland Stud	4	4	4	098316	
*	Mounting Stud	2	2	NA	098301	
*	Nut for Mounting Stud	2	2	NA	098302	
*	Adaptor Stud	NA	NA	8	098281	
*	Nut for Adaptor Stud	NA	NA	8	098289	

Optional Seal Chamber Jacket for Frame-A (NA for LD17, requires Back Cover for Jacket)

Ref.	Description	Parts /pump	Part No.	Comment/Note
*	Jacket Assembly for Seal Chamber	1	090873	
*	Jacket for Seal Chamber FRA only	1	363015	Included in Jacket Assembly
*	O-Ring for Seal Chamber Jacket FRA	2	360976	Included in Jacket Assembly
*	Screw for Seal Chamber Jacket FRA	1	360362	Included in Jacket Assembly

* Not depicted in drawing

REF #11 Back Cover Assemblies LD17

Cover includes integral seal chamber and is backwards compatible with old two piece design.
 Cover assembly does not include gasket (73A).
 Cover assembly machined for bushing does not include bushing.
 Cover assembly machined for tap includes plug for tap (361388). CN7M, HB, HC covers use same alloy plugs.
 Seal chamber jacket not available on LD17.

Bush/Other options	DI	CF8M	CD4MCu	CN7M	HB	HC
8 inch Part Number for Back Cover Assembly						
No bushing with tap	363995	685047	685295		CF628338	628740
Carbon/14K with tap	685185	685421				
EnviroSeal with tap	628856	643124				
10 inch Part Number for Back Cover Assembly						
No bushing with tap	363937	685050	697836	090999		982400
Carbon/14K with tap	097404	685287				
EnviroSeal with tap	643283	643410	628769			
12 inch Part Number for Back Cover Assembly						
No bushing with tap	363936	685053	685474			
Carbon/14K with tap	097407	697732	644361			
EnviroSeal with tap	801264	801118	644158			

Hardware included with standard LD17 Back Cover Assemblies						
Ref.	Description	Parts per Pump			Part Number	Comment/Note
		8"	10"	12"		
*	Gland Bolt	4	4	4	364229	
*	Washer for Gland Bolt	4	4	4	090696	
*	Mounting Stud	2	2	NA	098301	
*	Nut for Mounting Stud	2	2	NA	098302	
*	Adaptor Stud	NA	NA	8	098281	
*	Nut for Adaptor Stud	NA	NA	8	098289	

* Not depicted in drawing

Vortex Frame-A and LD17 SPARE PARTS

Ref.#	Description	Parts/pump	Part No.	Note	
16	Radial Bearing 6310 C3	1	098381	Included in #6-RE	
	Radial Bearing 6310-Z C3 (Vertical)		098732	Included in #6-RE	
18	Thrust Bearing 7310 BEGAY (2 required)	2	098054	Included in #6-RE	
19	Bearing Frame Assembly Includes: bearing frame (19), sight glass (143), stud (403), oil cap (408), eyebolt (413), plugs (414 and 433).	1	098299		
	Bearing Frame Assy Vertical		099537		
22	Bearing Locknut N10	1	098383	Included in #6-SA	
33	Cartridge Thrust Bearing Assembly Includes: cartridge (33), screw (501), washers (502), O-ring (405).	1	801140		
	Cartridge Vertical		099513		
35	Retainer cover	1	098371	Included in #6-RE	
	Retainer cover Vertical		361491		
38	O-ring Impeller PTFE 2-027	1	098296	Included in #2 assy	
46	Key	1	059241	Included in #6-SA	
62	Flinger Filter	1	098385	Included in #6-RE	
66	Micrometer Nut SS	3	098376		
69	Bearing Lockwasher W10	1	098384	Included in #6-SA	
71	Frame Adapter FRA	1	098297		
	Frame Adapter LD17		099605		
	Frame Adapter FRA Vertical		364243		
	Frame Adapter LD17 Vertical		099796		
72	Frame Adapter O-ring (2-265 Buna)	1	098396	Included in #71 assy	
Casing Gaskets for FRA and LD17 - Vortex 8" and 10"					
73A	Casing Gasket Vortex 8/10 CFN .06		363409		
	Casing Gasket Vortex 8/10 RG0 .12		059209		
	Casing Gasket Vortex 8/10 RPE .06		808314		
	Casing Gasket Vortex 8/10 PTFE .06		099543		
	Casing Gaskets for FRA and LD17 - Vortex 12"				
	Casing Gasket Vortex 12 CFN .06		363411		
	Casing Gasket Vortex 12 RG0 .12		059208		
	Casing Gasket Vortex 12 PTFE .06		099583		
Suction Cover Gaskets - Vortex Pumps					
73B	Gasket Suction Cover Vortex 2x2 CFN		363409	8 inch Sizes	
	Gasket Suction Cover Vortex 2x2 RG0		059209		
	Gasket Suction Cover Vortex 2x2 RPE		808314		
	Gasket Suction Cover Vortex 2x2 PTFE		099543		
	Gasket Suction Cover Vortex 3x3 CFN		363421	10 inch Sizes	
	Gasket Suction Cover Vortex 3x3 RG0				
	Gasket Suction Cover Vortex 3x3 RPE				
	Gasket Suction Cover Vortex 3x3 PTFE		644005		
	Gasket Suction Cover Vortex 4x4 CFN		363411	12 inch Sizes	
	Gasket Suction Cover Vortex 4x4 RG0		059208		
	Gasket Suction Cover Vortex 4x4 RPE				
	Gasket Suction Cover Vortex 4x4 PTFE		099583		

Material Key			
Abrv	Description	Application	Old Type
CFN	Carbon Fiber with nitrile binder (Std DI-CF8-CD4)	General	197
RG0	Reinforced Graphite no binder	High Temperature	199
RPE	Reinforced PTFE	Hi Temperature/Pressure	196
PTFE	PTFE Style 2000 (Std A20-HB-HC)	Chemical Resistance	2000



Vortex Frame-A and LD17 SPARE PARTS

Ref.#	Description	Parts/pump	Part No.	Note
80	Mechanical Seal - See mechanical seal pages	1		
89A	Thrust Lab seal Stationary 1.50" NPS	1	364238	
Note: Thrust lab seal stationaries have been omitted on all FRA and LD17 pumps built after May 2000				
89B	Thrust Lab Seal Rotary 1.50" 316SS	1	090697	
89C	Thrust lab seal rotary O-ring 1.50" (2-128)	2	099924	Included in #89B assy
89D	Radial Lab Seal Stationary 1.87" NPS	1	364240	
89E	Radial Lab seal Rotary 1.87" 316SS	1	098478	
89F	Radial lab seal rotary O-ring (2-134)	2	098374	Included in #89E assy
143	Oil sight glass 1.00-11.5 NPT	1	098306	2nd SG optional
400	Bearing Frame Foot for 8.25" pumps without C-frame Adaptor	1	059293	Marked 2536
	Bearing Frame Foot 10.00" pumps without C-frame Adaptor		059295	Marked 2537
	C-Frame Adaptor Foot for 8.25" pumps		059297	Marked 2538
	C-Frame Adaptor Foot for 10.00" pumps		059293	Marked 2536
Note: If C-frame adaptor is used, use C-frame adaptor feet attached to adaptor rather than bearing frame foot attached to frame. Bearing Frame Feet and C-Frame Adaptor feet include ref. 503, 504 & 506.				
401	Casing Foot for Centerline Mount 2x2-8	2	098292	Marked - A306
	Casing Foot for Centerline Mount 3x3-10		098114	marked - D51496 or 307
	Casing Foot for Centerline Mount 4x4-12		098114	Marked - D51496 or 307
Notes: 098114 replaces 098305 on older pumps				
401	Casing Foot for Side Discharge	1	CF	
403	Micrometer stud 1/2-20 UNF SS	3	098366	
404	Cartridge Locknut 1/2-20 UNF SS	3	098377	
405	Cartridge O-Ring (2-248 Buna)	1	098375	Included in #33 assy
408	Oil Filler & Cap Assembly	1	098364	
413	Lifting Eyebolt .50-13	1	098365	
414	Magnetic Plugs .50-14 NPT (2 req'd)	2	098363	
433	Oil drain plug .25-18 NPT	1	099792	
435	Plug for suction or discharge tap	1 or 2	Varies by mat'l	See Ref #1 Casing Assemblies
436	Vortex Spacer Flange -Cast Iron, 150# FF - See Components and Accessories Price Page 10-1301-02.			
500	Hex Head Cap Screw, .62-11x1.25 (4 req.)	4	098331	
501	Retainer Cover Socket Head Cap Screws 10-32	8	098387	Included in #33 assy
502	Washer for 35A	8	098389	Included in #33 assy
503	Screw, Bearing Frame Foot	2	350729	
504	Washer for Screw 503	2	350727	
505	Jackscrew - Hex head Cap Screw	2	098278	Included in #71 assy
506	Screw, Bearing Frame Support	2	350728	
*	Temperature Monitor (Optional)	1	685361	
*	Bearing Housing Cooling Coil Assy (Optional)	1	098308	
*	Throat Bushings - See Components and Accessories Price Page 10-1301-02.			

* Not depicted in drawing

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