

CADMAN

DODA

LIQUID MANURE PUMP



OPERATOR'S and PARTS MANUAL
2001 EDITION

Cadman
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Limited

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WHEN APPLYING LIQUID MANURE . . .

Environmental concerns seem to be driving legislative agendas in many agricultural areas across the continent. Current and pending laws in many agricultural regions of North America are changing the ways in which the agricultural community is expected to manage their liquid animal waste products.

The changes in legislation typically target two main issues; run-off prevention during and after application and soil nutrient loading.

Run off seems to be the largest concern with nutrient application. Run off may result from several different factors, most of which are controllable. These factors include; exceeding the soil intake rate; nutrient application on steep grades; high application amounts; leaking mainline fittings and seals; sudden rainfall during or immediately after application; ground frost; etc. Constant watch must be kept and immediate action taken when necessary to prevent run off from occurring.

Soil nutrient loading depends on many variables. Some of these variables (but certainly not all) are soil type, type of crop being grown in the irrigated area, application timing, nutrient value of the material being applied (nutrient value should be assessed at the time of application as it can change throughout the year), etc.

Soil type will determine the intake rate at which liquid may be applied. Cultivation of the field just prior to application can improve the intake rate of some soils.

Great potential benefit lies in using the nutritional value of the product being applied to replace some or all of the traditional chemical fertilizer used. Application timing and amount are important considerations. Soil analysis taken prior to planting and during the growth periods of the crop will help determine if there is room for further application amounts to be added prior to crop maturity. A total management plan should include provisions to end the crop season without surplus nutrients left as residual. These excess nutrients typically end up in the ground water supply. Local colleges, universities and agricultural extension services are usually a good source of information. They can usually help you determine an application program that prevents soil nutrient overload due to excess application.

Cadman Power Equipment Limited cannot possibly provide up-to-date recommendations with regard to the legal obligations you must deal with in your particular area. However, as a manufacturer of equipment used in nutrient application (liquid manure, milk house run-off, etc.), we feel it necessary to make you aware that the municipal, regional and state governing bodies in your area may have recently enacted new legislation or revised existing legislation with regard to nutrient handling practices and procedures.

It is your responsibility to make yourself aware of and abide by the current legislation in your area. Please take the time to contact your local agricultural representative to obtain the latest information regarding legal nutrient application and handling.

INTRODUCTION

Your new Doda Pump is an open impeller centrifugal pump capable of pumping various types of fluids and slurries at pressures in excess of 160 psi. It is of rugged construction and combines several innovative features.

Your pump has a mechanical seal to provide easy priming and positive leak-proof sealing. The standard seal is a tungsten and ceramic unit which provides good life in most pumping situations provided proper care is taken in using the pump.

Unlike many other pump manufacturers, Doda protects the pump gear case by providing an air gap between the pump case and the gearbox. This air gap prevents gearbox contamination in the event of a seal failure.

Static cutter blades will mulch any organic material passing through the pump. The result is greatly reduced chance of nozzle plugging. The mounting of the blades to the inside of the pump casing provides this benefit with no increase in power consumption. These blades are designed to break off should something solid come in contact with them. Replacement blades are available from your **Cadman Power Equipment** Dealer.

The ultimate obtainable pump pressure depends on several inter-related factors or conditions such as discharge volume, pump impeller speed and net suction pressure.

P.T.O. PUMP SAFETY

ALWAYS position your pump and tractor on firm level ground. Block the tractor wheels to prevent the tractor wheels to prevent the tractor from rolling during operation.

ALWAYS lock the pump cart draw pin in place to prevent accidental separation of the pump and tractor.

ALWAYS check the yoke locks of the P.T.O. shaft to ensure both ends are secured to the pump and the tractor, and no chance of separating exists.

ALWAYS attach the chain on the P.T.O. shaft guard to prevent it from rotating during operation. (Make sure to lubricate the P.T.O. shaft guard bushings)

ALWAYS stay clear of high pressure discharge lines especially during initial pressurization.

NEVER use a pump or P.T.O. shaft that is missing the guards.

OPERATION

1. Connect the Doda P.T.O. pump to a suitable tractor using a locking draw pin to prevent accidental pump-tractor separation. If the tractor has a “stepped” drawbar, set the drawbar so the pump trailer is as level as possible.
2. Install the P.T.O. drive shaft between the pump and tractor. Ensure that the yokes are securely locked to the mating shafts.
3. Attach the P.T.O. shaft guard retaining chain to the pump guard to prevent the shaft shield from rotating during operation.
4. Check the oil level in the pump gear case. The dipstick has two (2) marks on it. The lower mark indicates “Full” when the pump is cold. The upper mark indicates “Full” when the pump is hot. Use which ever is appropriate. Add oil if necessary. (85 W 140)
5. Couple the suction assembly to the rear of the pump.
6. Couple the discharge plumbing to the side of the pump.

**NOTE: Omit steps 7, 8 & 9 if using the Doda pump as a booster pump.
Positive pressure in the primer circuit will damage the primer.**

7. Close the discharge valve.
8. Open the valve in the primer line.
9. Operate the hand primer to evacuate all the air from inside the suction assembly and pump case. Listen carefully for air leaks which will prevent priming of the pump. Close the valve in the primer line as soon as fluid appears in the primer hose.
10. With the tractor running near idle, engage the P.T.O. drive **only AFTER** the pump has been primed. Running the pump dry will destroy the pump seal, in less than one minute.
11. Open the discharge valve slowly to allow fluid to flow. **BEFORE** raising the tractor RPM level, allow adequate time for **ALL** the air to be purged from the system. **AFTER** all the air has cleared the system, gradually increase tractor P.T.O. speed until the desired operating pressure is attained.
12. Make a visual check of the pump site to ensure that:
 - the pump is running smoothly without excess vibration
 - the suction screen is adequately submerged and no suction vortex is visible on the fluid surface.
 - the discharge fittings appear secure
 - there are no leaks

MAINTENANCE

DAILY (Before Each Use)

- Check the oil level in the gear case. Replenish with 85 W 140 as required.
- Drain primer surge tank.

WEEKLY

- Grease the P.T.O. shaft u-joints and shield bushings.

ANNUALLY

- Change gear case oil.

BEFORE STORING (After Use)

- Flush pump with clear water to clear corrosive fluids or slurries.
- Drain pump volute and primer surge tank.
- Lubricate the discharge valve to prevent seizing during idle periods.
- Coat gearbox input shaft and P.T.O. shaft yoke bores with grease to prevent corrosion.

The above maintenance will ensure trouble free use of your Doda Pump. Due to the harsh environment these pumps typically operate in, these maintenance items should be carried out without fail.

TROUBLE SHOOTING AND REMEDY

CONDITION	POSSIBLE CAUSE	SOLUTION (s)
Pump will not prime	<ul style="list-style-type: none"> • drain plug missing • suction screen or hose is plugged • air leak in the suction assembly • air is leaking into the pump through the pump seal • air is leaking into the pump through the discharge valve • primer pump not functioning properly 	<ul style="list-style-type: none"> • install plug (s) • clear hose or screen • check suction connection at the pump • check for leaks in the suction assembly • repair or replace defective parts • seal has failed • replace seal • clean and seal the discharge valve • service primer pump

CONDITION	POSSIBLE CAUSE	SOLUTION (s)
Pump will not prime (cont'd)	<ul style="list-style-type: none"> • primer line or surge tank plugged 	<ul style="list-style-type: none"> • clean as required
Pump will not prime	<ul style="list-style-type: none"> • air is leaking into the pump past the seal when P.T.O. is engaged • air is trapped in the pump case • discharged valve plate is stuck closed • suction lift is too high • slurry is too thick 	<ul style="list-style-type: none"> • replace the seal • operate hand primer to exhaust air • service valve • move pump closer to fluid surface • add water to thin consistency
Pump will not build pressure	<ul style="list-style-type: none"> • Suction hose partially blocked • Suction has a minute (tiny) air leak • Large object is partially blocking impeller • Discharge valve only partially opened • Suction assembly is too small for volume being pumped • P.T.O. speed too slow • Seal damaged allowing air entry at high rpm's • Suction lift too high 	<ul style="list-style-type: none"> • Clear blockage • Repair or replace leaking component • Remove object from the pump • Open valve • Replace with larger assembly • Check shaft rpm under loaded conditions • Replace seal • Re-position pump closer to fluid surface
Pump vibrates excessively	<ul style="list-style-type: none"> • pump input shaft is not parallel to the tractor output shaft • pump is not in line with the tractor • P.T.O. shaft angle is too severe • P.T.O. shaft u-joint has failed • foreign object has lodged in the pump impeller • pump cart tires are soft 	<ul style="list-style-type: none"> • adjust tractor drawbar height to level the pump frame • straighten pump position behind the tractor • correct shaft angle • replace u-joint • remove objects to restore balance • add air • block pump frame

SEAL REPLACEMENT PROCEDURE

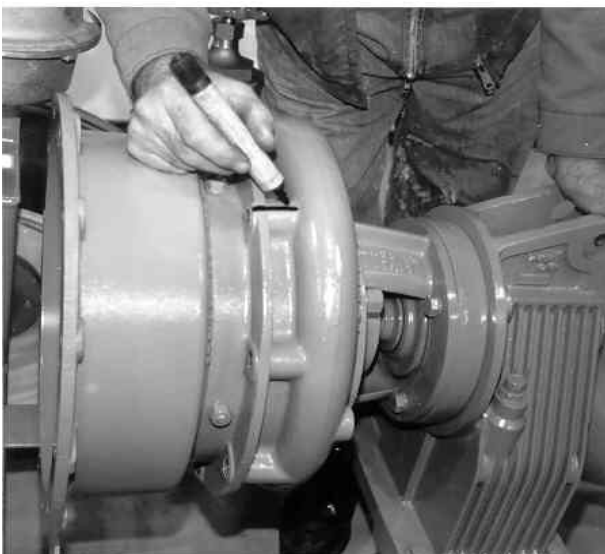
NOTE: Most fasteners used on the Doda Pump are metric sizes. Appropriate hand tools should be acquired before attempting to service this pump.

DISASSEMBLY



1. Remove the suction cone from the volute extension. The suction hose to the hand primer may be left attached if care is taken not to damage the hose.

2. Remove the eight (8) bolts holding the volute extension to the volute.



3. Before separating the extension from the volute, mark the two (2) parts as a re-assembly guide.

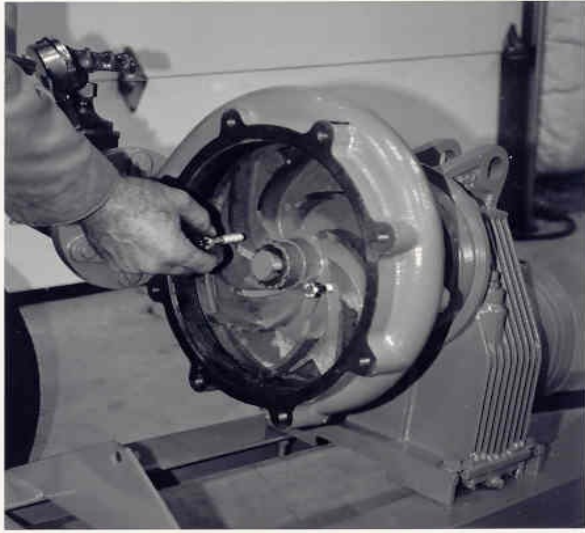


4. Using a block and hammer, carefully work around the volute extension until the two pieces separate. The impeller cover should be left attached to the volute extension

5. Once the extension seal is broken, remove the extension from the volute.

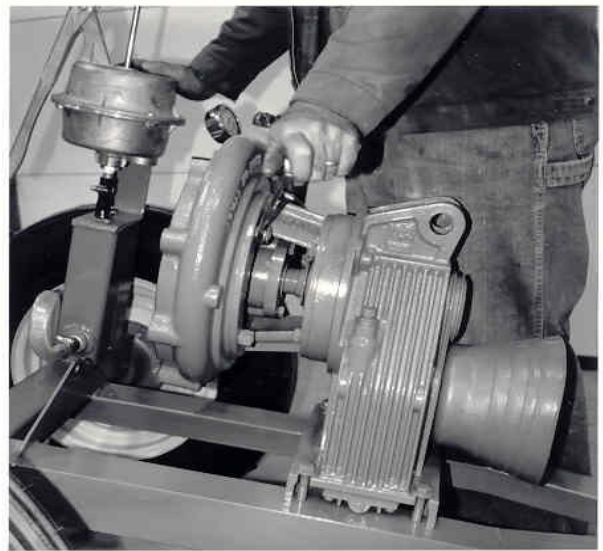


6. Remove the impeller nut.



7. Install two (2) of the bolts from the suction cone into the impeller. Tighten each 1/2 turn at a time until the impeller separates from the shaft.

8. After the impeller is removed, the volute may be removed from the gearbox extension. Remove the four (4) nuts (arrows) to remove the volute. Once the extension seal is broken, remove the extension from the volute.



9. Remove the glad plate from the volute. Remove the impeller nut.



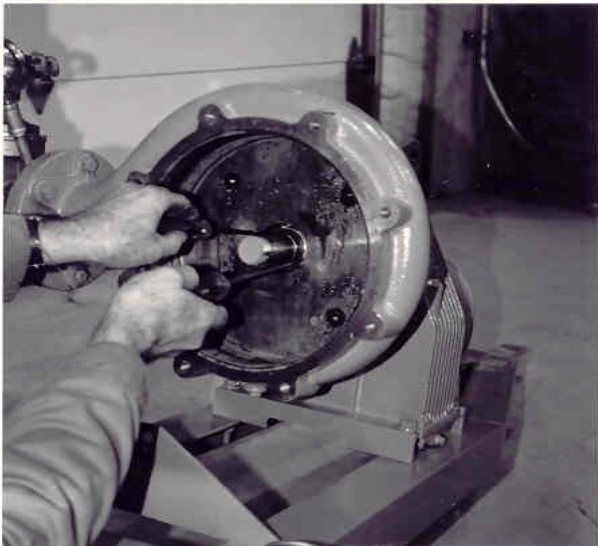
10. Old seal components are stationary seal face (A), rotating seal face (B), spring and spring washer. Remove the glad plate from the volute. Remove the impeller nut.

DODA RE-ASSEMBLY

After thoroughly cleaning the pump components to ensure ease of assembly and proper parts fit, re-assembly may begin.

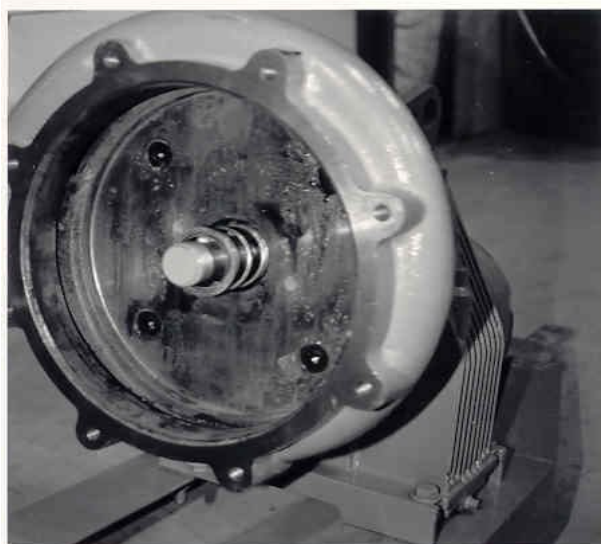
- 1 Assemble the gland plate to the volute using silicone gasket maker to seal the mating surfaces.
- 2 Assemble the volute to the gearbox spacer using silicone gasket maker under the bolt heads to seal them.
- 3 Lightly oil the o-ring of the stationary seal face and install into the gland plate. Use only finger pressure to push the seal face into place.

NOTE: Only one side of the stationary seal face is ground smooth. The un-ground face is marked with four (4) pen marks. Be sure that the unmarked surface is in the gland plate.



- 4 Using clean light oil, such as 10W30, lubricate the bellows of the rotating half of the seal. Taking care not to damage the ground seal face, carefully slide the rotating half of the seal into the shaft. Using two screwdrivers to push against the metal portion of the drive ring, apply even pressure to push the rotating seal half until it seats against the stationary half of the seal.

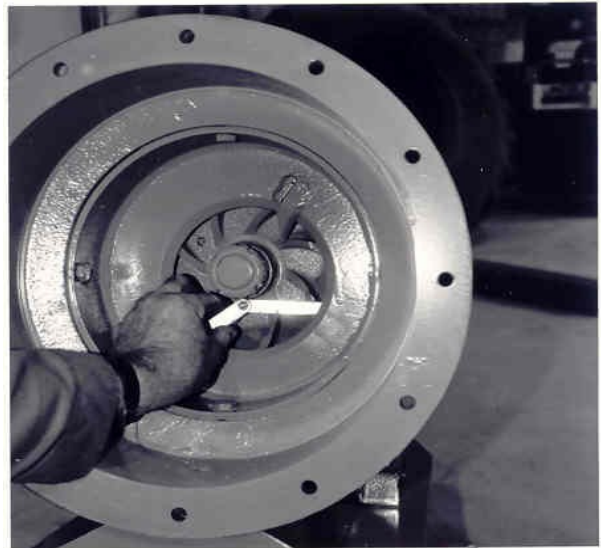
- 5 Assemble the spring, followed by the spring washer onto the shaft. After lubricating the bore of the impeller with an anti-seize compound or grease, assemble the impeller to the shaft. Tighten the impeller until the shaft protrudes slightly from the nut.





- 6 Lubricate the volute bore with anti-seize or grease. Apply silicone to the mating face of the volute. Install and secure the volute extension using the mark made in disassembly to align the housing properly.

- 7 Reassemble the remainder of the pump.



NOTE: Impeller plate hole is offset to the lower right.

Check impeller to impeller cover clearance. It should be between 0.030" - 0.060".
Adjust as required.

Hand rotation of pump is required to ensure there is no contact with the impeller.

PRIMER PUMP SERVICE

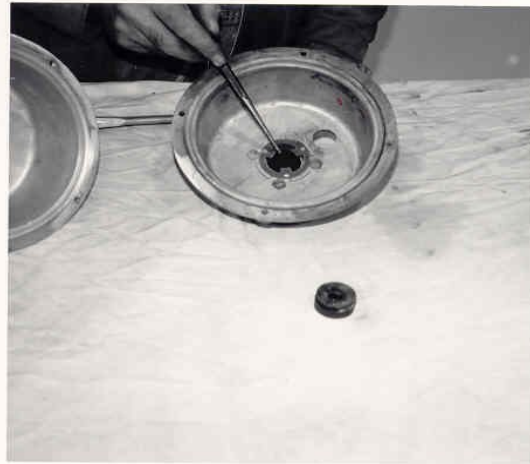
The Carnevali hand primer illustrated below is standard equipment on the Doda pump. If the unit you have is from a different manufacturer, the service procedure is basically the same. Most differences will be in the intake and exhaust valve style and location.

DISASSEMBLY



- 1 Remove the primer unit from the pump.
- 2 Remove the four (4) bolts securing the upper and lower sections together.
- 3 Remove the clevis pin securing the diaphragm pushrod to the handle.

- 4 Remove the exhaust check valve.
- 5 Remove the brass retaining ring (arrow) to remove the intake check valve.
- 6 Thoroughly clean all the parts. Inspect all the rubber components for damage (cracks, punctures, etc.). Replace all damaged or worn components.



RE-ASSEMBLY



- 1 Install the exhaust check valve in the primer base.



- 2 Using a sharp cold chisel, remove the three (3) aluminum studs from the inside of the primer base.

- 3 Using the brass retainer as a guide, drill three (3) small holes to take #6 x 1/4" Lg. sheet metal screws in the base of the primer. Install the check valve and brass retainer using #6 x 1/4" sheet metal screws to secure the retainer.



- 4 Place the diaphragm assembly into the primer base. Assemble the top to the base ensuring that the bead on the edge of the diaphragm lays in the groove around the edge of the primer base.

- 5 Install the four (4) bolts to hold the primer top and bottom together. Care should be taken not to over tighten these bolts. The top and bottom do not need to be clamped tightly together. Install the clevis pin to connect the diaphragm pushrod to the handle.

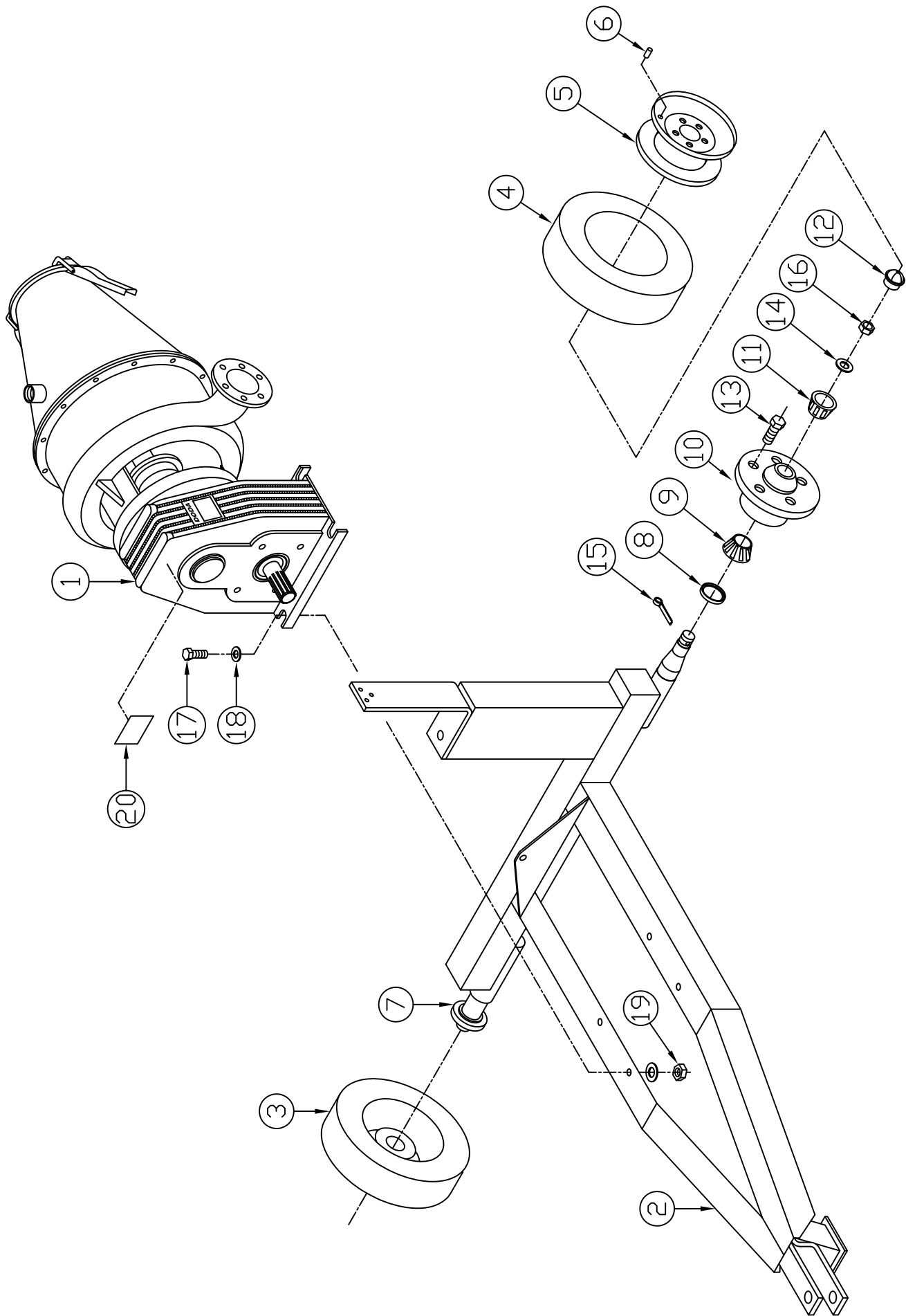
- 6 Test primer action by covering the intake opening with your hand while operating the handle of the pump. Strong suction should be felt on the intake stroke indicating the exhaust valve is closing properly. After bench testing, reassemble the primer unit to the pump.



Notes

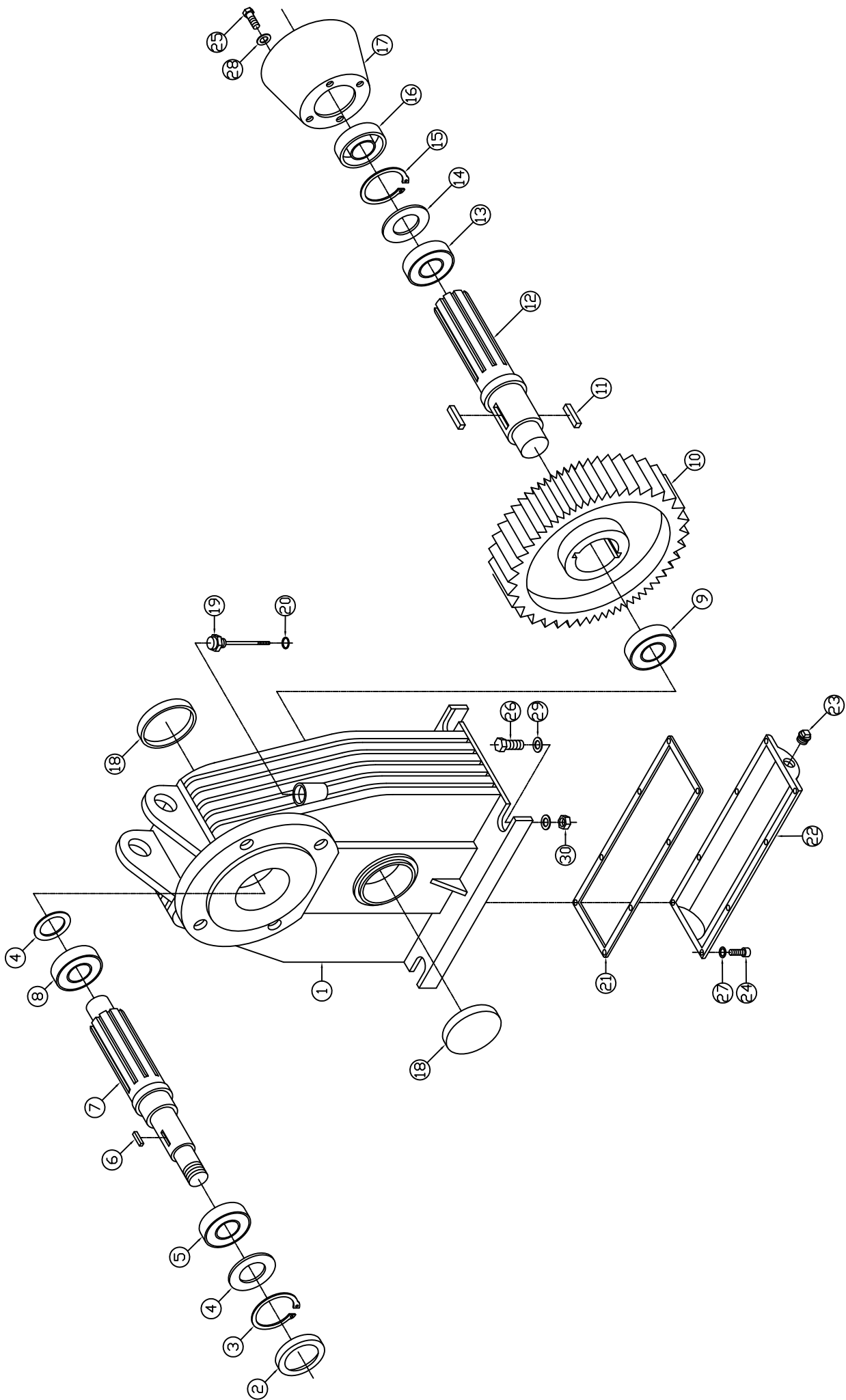
PARTS SECTION

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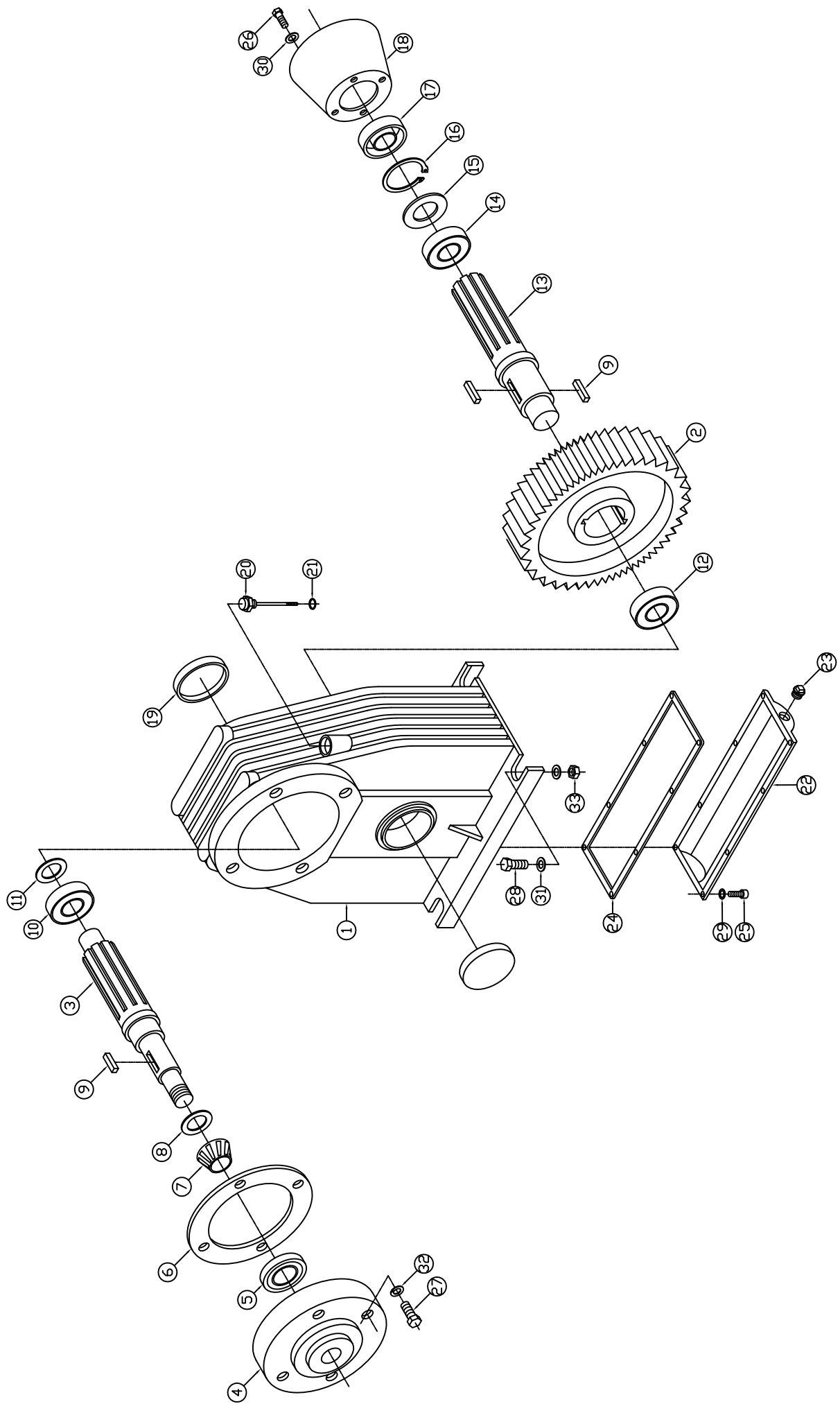
Trailer Assembly

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
	AFI-L27 - AFI-L35				AFI-L20 - AFI-L24		
1	Doda Pump and Gear Box	----	1				
2	Pump Trailer	DO-PRT-30200C	1	2	Pump Trailer (Not as shown)	DO-PRT-30100	1
3	Wheel Ass'y Consisting of;		2	3	Wheel Assembly	55-056	2
4	Tire	55-071	1		Tire	----	1
5	Rim	----	1		Rim	----	1
6	Valve Stem	----	1		Valve Stem	----	1
7	Hub Ass'y; Consisting Of		2	7	Hub Assembly (4 bolt)	55-002	2
8	Grease Seal	55-018	1				
9	Inner Bearing - Cone	55-015	1				
-	Inner Bearing - Cup (Not Shown)	55-020	1				
10	Wheel Hub, 5 Bolt	55-019	1				
-	Outer Bearing - Cup (Not Shown)	55-018A	1				
11	Outer Bearing - Cone	55-021	1				
12	Dust Cap	55-022	1				
13	Wheel Bolt, 1/2" - 20 UNF	55-023	1				
14	Washer	55-007	5				
15	Cotter Pin	55-024	2				
16	Spindle Nut	55-009	2				
		55-008	2				
17	Bolt, 1/2" -13 x 3" Lg.	90-BLT-05013X300	4				
18	SAE Flatwasher, 1/2"	90-WSR-SAE050	4				
19	Locknut, 1/2" - 13	90-NUT-LOC05013	4				
20	Decal, "Do Not Engage PTO..."	40-259	1				
	Not Shown						
	Bondlioli #6 540 RPM PTO Shaft	BP-PTO-613861386	1				
	or						
	Bondlioli #6 1000 RPM PTO Shaft	BP-PTO-6138211386	1				



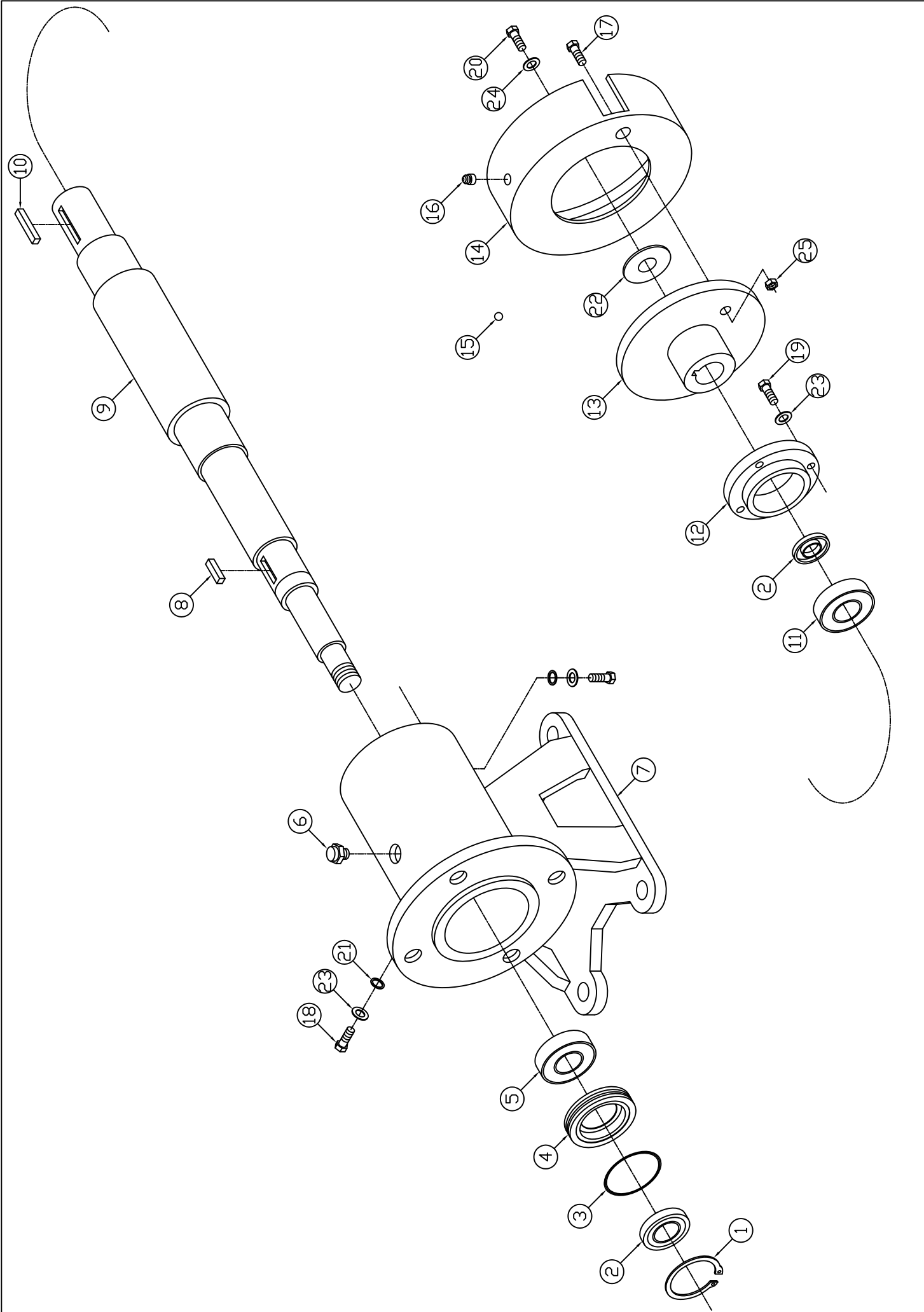
Gear Box Assembly, AFI-L20

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Gear Case	DO-PRT-33010	1				
2	Oil Seal	DO-PRT-33001	1				
3	Snap Ring	DO-PRT-33002	1				
4	Shim	----	A.R.				
5	Bearing	DO-PRT-33003	1				
6	Key	DO-PRT-33022	1				
7	Pinion Shaft	DO-PRT-33005	1				
8	Bearing	DO-PRT-33006	1				
9	Bearing	DO-PRT-30045	1				
10	Crown Gear	DO-PRT-33011	1				
11	Key, 10 mm x 8 mm x 35mm Lg.	DO-PRT-33007	2				
12	Input Shaft	DO-PRT-33008	1				
13	Bearing	DO-PRT-30045	1				
14	Shim	----	A.R.				
15	Snap Ring	DO-PRT-33009	1				
16	Input Shaft Seal, 35 x 80 x 10mm	DO-PRT-30013	1				
17	P.T.O. Guard Cone	DO-PRT-30012A	1				
18	Bore Plug, 72 mm x 10mm	DO-PRT-30051	2				
19	Dip Stick / Breather Plug Ass'y	DO-PRT-30026	1				
20	Breather Plug Gasket	DO-PRT-30027	1				
21	Seal	DO-PRT-33012	1				
22	Oil Pan	DO-PRT-33013	1				
23	Oil Drain Plug	DO-PRT-33014	1				
24	Oil Pan Bolt, VSP 8mm X 25mm	DO-PRT-30048	8				
25	Bolt, M8 x 1.25 - 16 mm Lg.	90-BLT-M8125X016	4				
26	Bolt, 1/2" -13 x 3" Lg.	90-BLT-05013X300	4				
27	Flatwasher, 8mm	90-WSR-FLTM8	8				
28	Flatwasher 5/16"	90-WSR-FLT031	4				
29	Flatwasher, 1/2"	90-WSR-FLT050	8				
30	Locknut, 1/2" - 13	90-NUT-LOC05013	4				



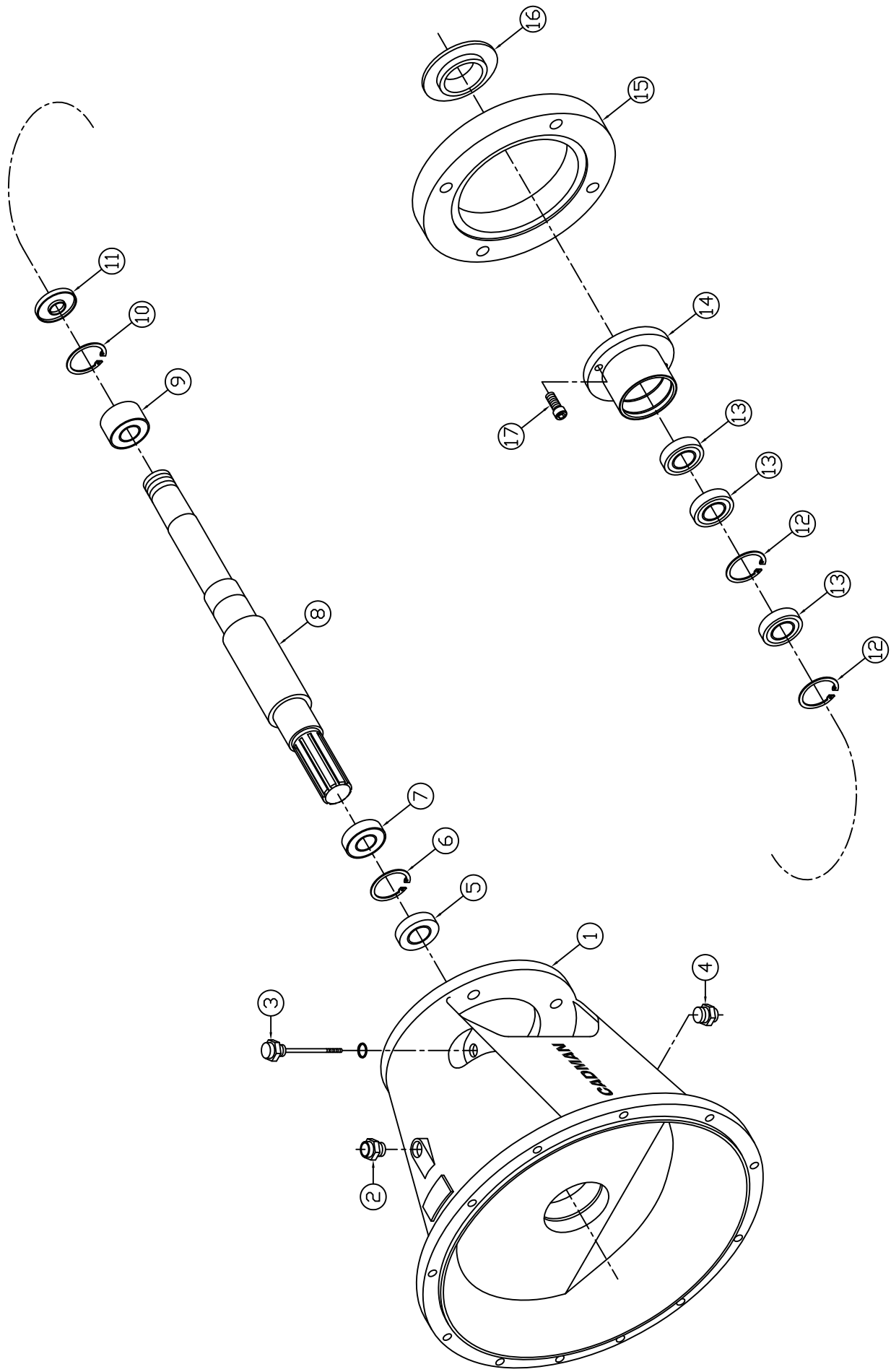
Gear Box Assembly, AFI-L24 ~> AFI-L35

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	GearCase	DO-PRT-30001	1	26	Bolt, M8 x 1.25 - 16 mm Lg.	90-BLT-M8125X016	4
2	Crown Gear			27	Bolt, M12 x 1.75-60mm Lg.	90-BLT-M12175X060	4
	540 RPM (4.93 : 1) 69 Tooth	DO-PRT-30022A	1	28	Bolt, 1/2" -13 x 3" Lg.	90-BLT-05013X300	4
	1000 RPM (3.35 : 1) 64 Tooth	DO-PRT-30022B	1	29	Flatwasher, 8 mm	90-WSR-FLTM8	8
3	Pinion Shaft			30	Flatwasher, 5/16"	90-WSR-FLT031	4
	540 RPM (4.93 : 1) 14 Tooth	DO-PRT-30023A	1	31	Flatwasher, 1/2"	90-WSR-FLT050	8
	1000 RPM (3.35 : 1) 19 Tooth	DO-PRT-30023B	1	32	Lockwasher, 1/2"	90-WSR-LOC050	4
4	Bearing Plate	DO-PRT-30002	1	33	Locknut, 1/2" - 13	90-NUT-LOC05013	4
5	Pinion Shaft Seal	DO-PRT-30014	1				
6	Bearing Plate Gasket	DO-PRT-30030	1				
7	Taper Roller Bearing	DO-PRT-30020	1				
8	Shim	----	A.R.				
9	Crown Gear Key, 10 x 8 x 45mm	DO-PRT-30028	3				
10	Ball Bearing	DO-PRT-30019	1				
11	Shim	----	A.R.				
12	Bearing	DO-PRT-30018	1				
13	Input Shaft	DO-PRT-30017	1				
14	Bearing	DO-PRT-30045	1				
15	Bearing Adjustment Shim	DO-PRT-30029	A.R.				
16	Snap Ring	DO-PRT-30021	1				
17	Input Shaft Seal, 35 x 80 x 10mm	DO-PRT-30013	1				
18	P.T.O. Guard Cone	DO-PRT-30012A	1				
19	Bore Plug, 72 mm x 10mm	DO-PRT-30051	2				
20	Dip Stick / Breather Plug Assy	DO-PRT-30026	1				
21	Breather Plug Gasket	DO-PRT-30027	1				
22	Oil Pan	DO-PRT-30043	1				
23	Oil Drain Plug, 1/8" - 28 TPI (British Thread, Fine)	DO-PRT-30044	1				
24	Gearbox Oil Pan Gasket	DO-PRT-30047	1				
25	Oil Pan Bolt, VSP 8mm X 25mm	DO-PRT-30048	8				



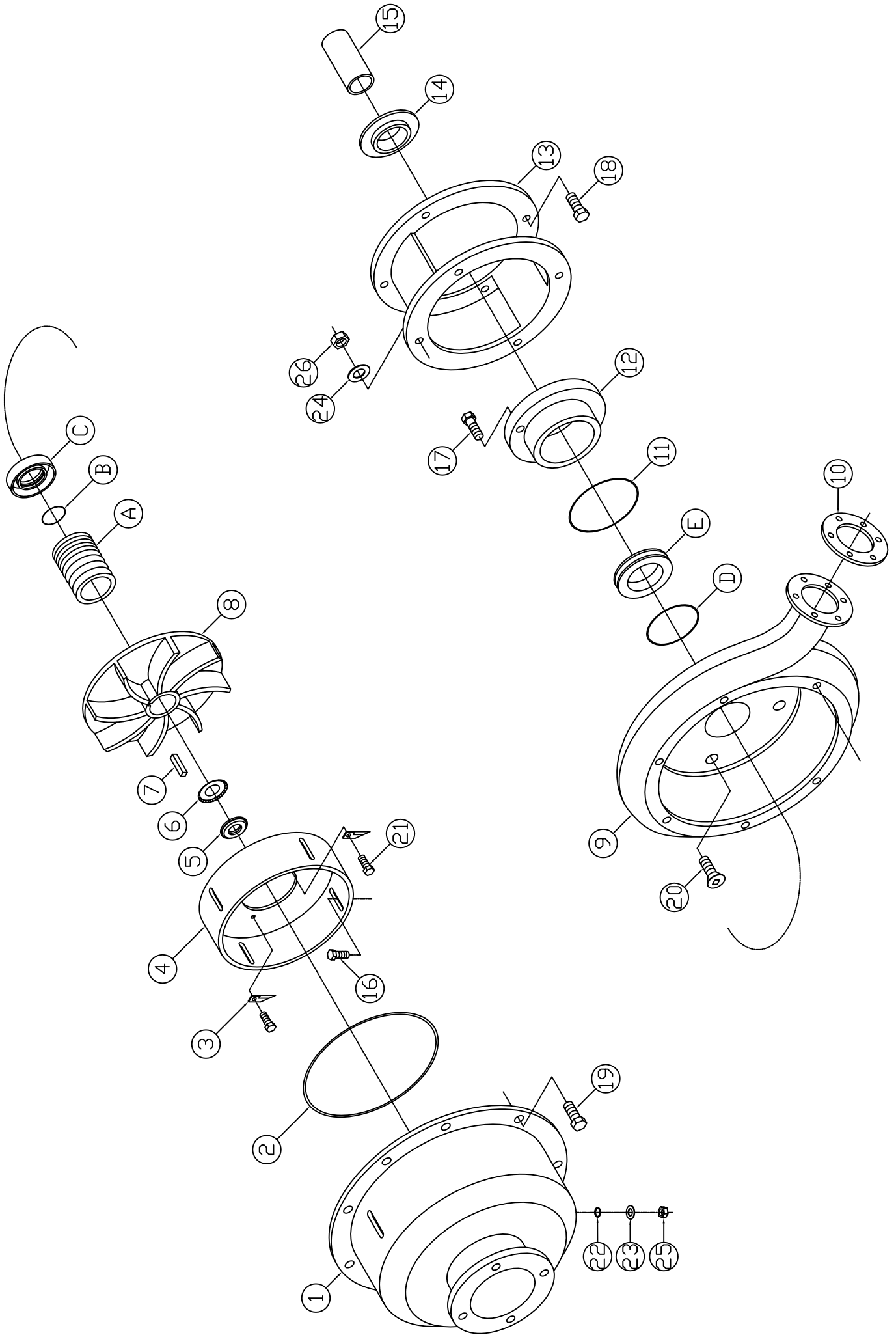
Gear Box Assembly, Pedestal Mount

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Snap Ring	DO-PRT-34-001	1				
2	Oil Seal, 45 x 60 x 10	DO-PRT-34-002	2				
3	O-ring	DO-PRT-34-003	1				
4	Cover (Bearing Retainer)	DO-PRT-34-004	1				
5	Bearing	DO-PRT-34-005	1				
6	Oil Breather Plug	DO-PRT-34-006	1				
7	Bearing Support (Pedestal)	DO-PRT-34-007	1				
8	Key, 8mm x 7mm x 45mm	DO-PRT-30-039	1				
9	Shaft	DO-PRT-34-008	1				
10	Key, 12mm x 8mm x 70mm	DO-PRT-34-009	1				
11	Bearing	40-142	1				
12	Cover	DO-PRT-34-010	1				
13	Safety Flange	---					
14	Flange	---					
15	Ball	---					
16	Grease Fitting, M10	---					
17	Safety Bolt	---					
18	Bolt, M10 x 1.50-20mm Lg.	90-BLT-M10150X020					
19	Bolt, M10 x 1.50-25mm Lg.	90-BLT-M10150X025					
20	Bolt, M12 x 1.75-30mm Lg.	90-BLT-M12175X030					
21	Aluminum Flatwasher, 10mm	DO-PRT-30-049					
22	Washer	---					
23	Flatwasher, 10mm	90-WSR-FLTM10					
24	Flatwasher, 12mm	90-WSR-FLTM12					
25	Locknut, 10mm	---					



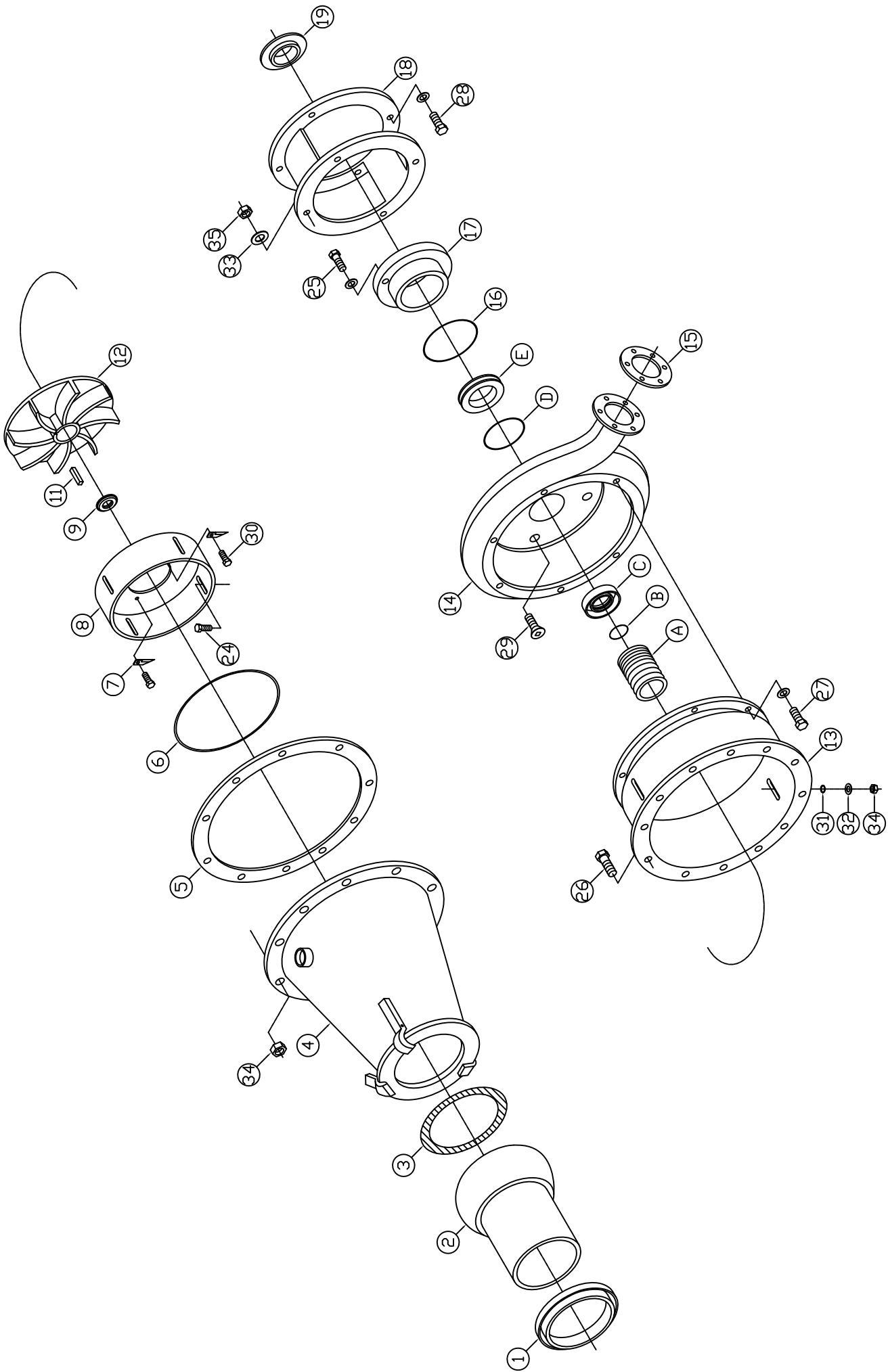
SAE 3 Pump Mount

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	SAE 3 Pump Mount Housing	DO-PRT-SAE3 DO-PRT-35018A 88-BLT-03824X100 88-WSR-LOC038	1 1 4 4				
2	Air Vent	DO-PRT-35014	1				
3	Oil Dip Stick	CA-PRT-31819	1				
4	Galv. Drain Plug	40-NPT-PLG075G	1				
5	Shaft Seal, 45x85x10	DO-PRT-35006	1				
6	85mm Internal Snap Ring	40-141	1				
7	Bearing, 45mm 6209	40-142	1				
8	Pump Shaft	DO-PRT-35002-E	1				
9	Wear Sleeve	DO-PRT-35003	1				
10	Bearing 5309	DO-PRT-35008	1				
	Bearing 5309 (Alt.)	DO-PRT-35017	1				
11	100mm Internal Retaining Ring	DO-PRT-35009	1				
12	Shaft Seal 45x100x10	DO-PRT-35010	1				
13	Seal Retaining Ring	DO-PRT-35011	2				
14	Pump Seal	DO-PRT-35007	3				
15	Seal Gland	DO-PRT-35004	1				
16	Spacer Ring	DO-PRT-35001	1				
17	Slinger	BE-PRT-S10964	1				
18	SHCS, M10-1.50 x 30 mm Lg.	90-SCR-SHM10150X0	4				
	Bearing Plate	DO-PRT-35-007 DO-PRT-35-018-A	1 1				
	Cadman Serial Number Tag	40-238	1				



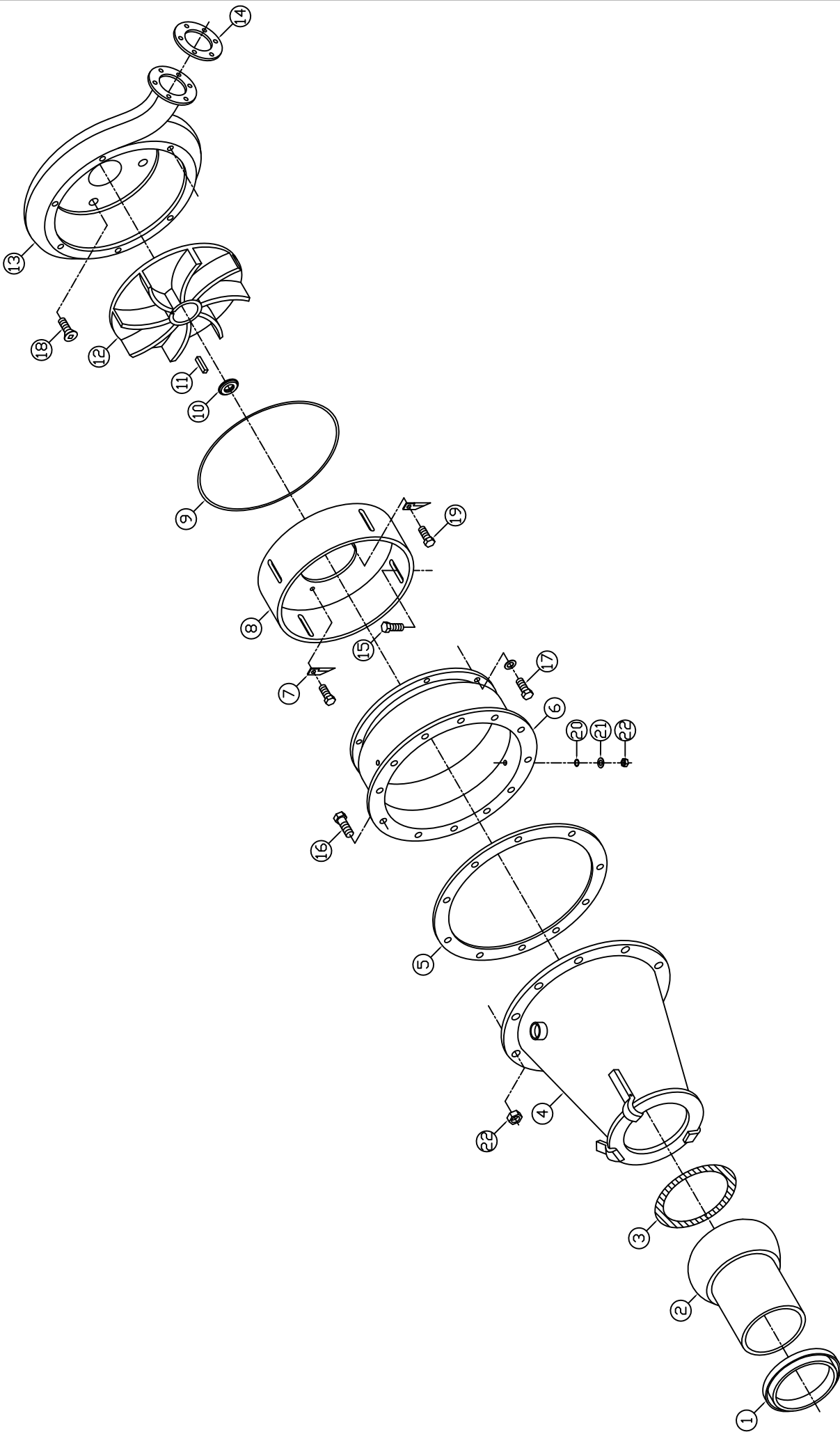
Pump Case Assembly, AFI-L20

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Suction Housing	DO-PRT-33015	1	25	Locknut, M10 x 1.50	90-NUT-LOCM10150	16
2	O-Ring	DO-PRT-31002	1	26	Locknut, M14 x 2.00	90-NUT-LOCM14200	4
3	Impeller Knife	DO-PRT-30038	2		PTO Guard Cone	DO-PRT-30-012A	1
4	Impeller Cover	DO-PRT-33016	1				
5	Impeller Nut	DO-PRT-33017	1				
6	Impeller Nut Lockwasher	DO-PRT-30024	1				
7	Impeller Key, 8mm x 7mm x 45mm	DO-PRT-30039	2				
8	Impeller	DO-PRT-33018	1				
9	Volute	DO-PRT-33019	1				
10	Discharge Gasket	DO-PRT-30040	1				
11	Gland Plate O-Ring		1				
12	Gland Plate	DO-PRT-30007	1				
13	Volute Spacer	DO-PRT-33020	1				
14	Bearing Shield	DO-PRT-30042A	1				
15	Stainless Steel Shaft Bushing	DO-PRT-33021	1				
	Tungsten Seal Kit Consisting of;	DO-PRT-30016T	1				
A	Spring	----	1				
B	Seal Drive Assembly O-Ring	----	1				
C	Seal Drive Assembly	----	1				
D	Stationary Seal O-Ring	----	1				
E	Stationary Seal Ring	----	1				
16	Bolt, M10 x 1.50 - 30mm Lg.	90-BLT-M10150X030	4				
17	Bolt, M10 x 1.50 - 40mm Lg.	90-BLT-M10150X040	2				
18	Bolt, M12 x 1.75 - 30mm Lg.	90-BLT-M12175X030	4				
19	Bolt, M12 x 1.75 - 60mm Lg.	90-BLT-M12175X060	8				
20	C.S. Bolt, M14 x 2.00 - 30mm Lg.	DO-PRT-30-050	4				
21	Bolt, 5/16" - 18 x 1/2" Lg.	90-BLT-03118X050	2				
22	Aluminum Seal Washer, 10mm	DO-PRT-30049	4				
23	Flatwasher, 10mm	90-WSR-FLTM10	4				
24	Lockwasher, 14mm	90-WSR-LOCM14	4				



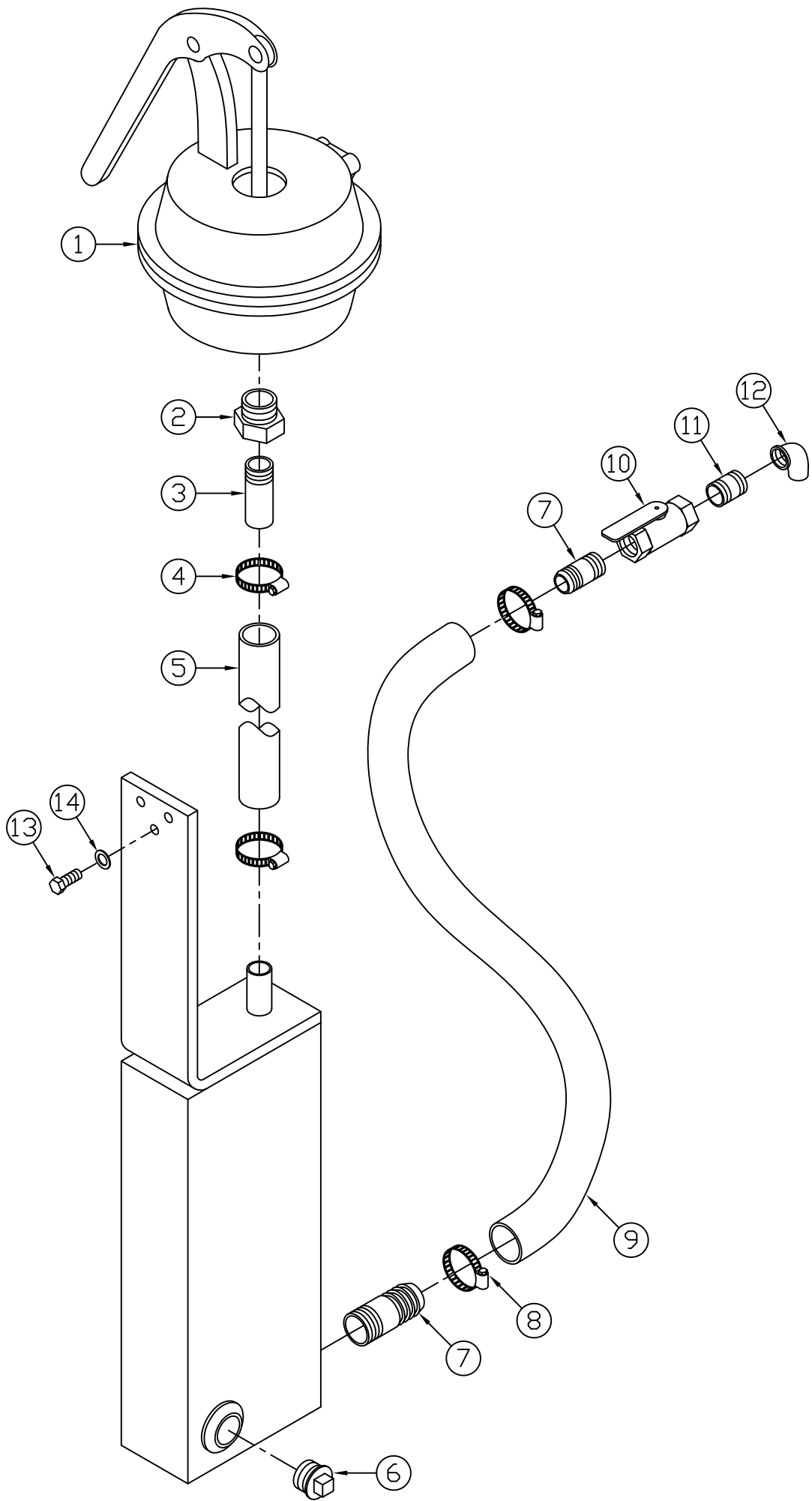
Pump Case Assembly, AFI-L24 ~> AFI-L35

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Ball Clamp Ring, 150mm	DO-PRT-30011	1		Tungsten Seal Kit Consisting of;	DO-PRT-30016T	1
2	Doda Ball and Shank - 4"	DO-PRT-300104	1	A	Spring	----	1
-	Doda Ball and Shank - 5"	DO-PRT-300105	1	B	Seal Drive Assembly O-Ring	----	1
-	Doda Ball and Shank - 6"	DO-PRT-300106	1	C	Seal Drive Assembly	----	1
3	Suction O-ring, 150 mm	DO-PRT-30035	1	D	Stationary Seal O-Ring	----	1
4	Check Valve Housing	DO-PRT-30006	1	E	Stationary Seal Ring	----	1
-	Rubberized Plate (Not Shown)	DO-PRT-30037	1				
-	Valve Holder (Not Shown)	DO-PRT-30037A	1	24	Bolt, M10 x 1.50 - 30mm Lg.	90-BLT-M10150X030	4
-	Valve Support (Not Shown)	DO-PRT-30037B	1	25	Bolt, M10 x 1.50 - 35mm Lg.	90-BLT-M10150X035	2
5	Check Valve Housing Gasket	DO-PRT-30036	1	26	Bolt, M10 x 1.50 - 40mm Lg.	90-BLT-M10150X040	12
6	O-Ring	DO-PRT-31002	1	27	Bolt, M12 x 1.75 - 30mm Lg.	90-BLT-M12175X030	8
7	Impeller Knife	DO-PRT-30038	2	28	Bolt, M12 x 1.75 - 60mm Lg.	90-BLT-M12175X060	4
8	Impeller Cover			29	C.S. Bolt, M14 x 2.00 - 30mm Lg.	DO-PRT-30-050	4
	AFI-L24 Pump	DO-PRT-32002	1	30	Bolt, 5/16" - 18 x 1/2" Lg.	90-BLT-03118X050	2
	AFI-L27 Pump	DO-PRT-30008-A	1	31	Aluminum Seal Washer, 10mm	DO-PRT-30049	4
	AFI-L35 Pump	DO-PRT-31003-A	1	32	Flatwasher, 10mm	90-WSR-FLTM10	4
9	Impeller Lock Nut	DO-PRT-30025L	1	33	Lockwasher, 14mm	90-WSR-LOCM14	4
	Impeller Nut (Used with 30024)	DO-PRT-30025	1	34	Locknut, M10 x 1.50	90-NUT-LOCM10150	16
	Impeller Lock Washer	DO-PRT-30024	1	35	Locknut, M14 x 2.00	90-NUT-LOCM14200	4
11	Impeller Key, 8mm x 7mm x 45mm	DO-PRT-30039	2				
12	Impeller						
	AFI-L24 Pump	DO-PRT-32001	1				
	AFI-L27 Pump	DO-PRT-30009	1				
	AFI-L35 Pump	DO-PRT-31004	1				
13	Volute Suction Extension	DO-PRT-30005	1				
	(AFI-L35 Pump only)	DO-PRT-31001	1				
14	Volute (AFI-L 27)	DO-PRT-30004	1				
	(AFI-L35 Pump only)	DO-PRT-31005	1				
15	Discharge Gasket	DO-PRT-30040	1				
16	Secondary Seal O-ring	DO-PRT-35015	1				
17	Gland Plate	DO-PRT-30007	1				
18	Volute Spacer	DO-PRT-30003	1				
19	Bearing Shield	DO-PRT-30042A	1				



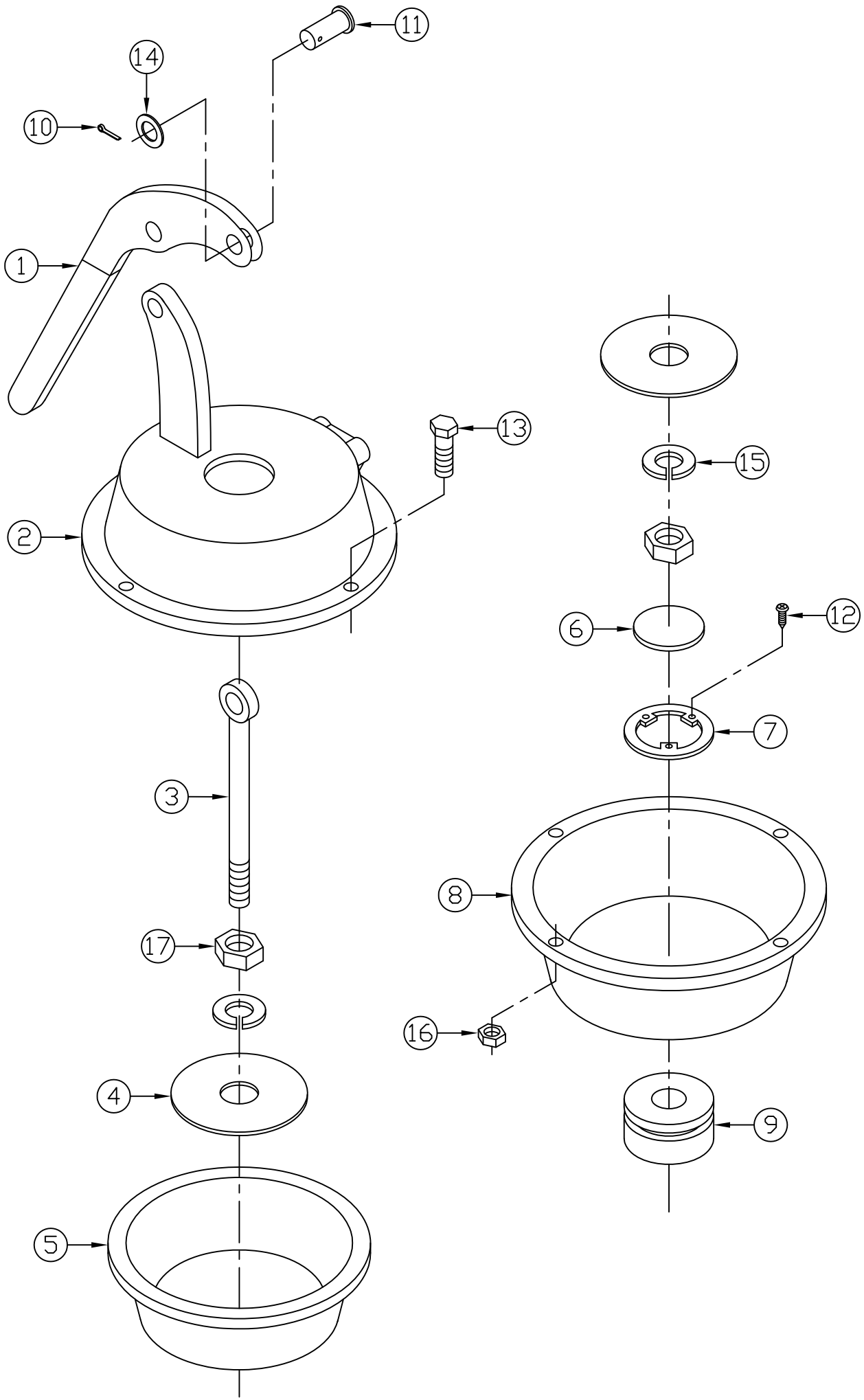
Pump Case Assembly, SAE 3

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Ball Clamp Ring, 150mm	DO-PRT-30011	1	15	Bolt, M10 x 1.50 - 35mm Lg.	90-BLT-M10150X035	4
2	Doda Ball and Shank - 4"	DO-PRT-300104	1	16	Bolt, M10 x 1.50 - 40mm Lg.	90-BLT-M10150X040	12
-	Doda Ball and Shank - 5"	DO-PRT-300105	1	17	Bolt, M14 x 2.00 - 30mm Lg.	90-BLT-M14200X030	12
-	Doda Ball and Shank - 6"	DO-PRT-300106	1	18	C.S. Bolt, M14 x 2.00 - 30mm Lg.	DO-PRT-30-050	4
3	Suction O-ring, 150 mm	DO-PRT-30035	1	19	Bolt, 5/16" - 18 x 1/2" Lg.	90-BLT-03118X050	2
4	Check Valve Housing	DO-PRT-30006	1	20	Aluminum Seal Washer, 10mm	DO-PRT-30049	4
-	Rubberized Plate (Not Shown)	DO-PRT-30037	1	21	Flatwasher, 10mm	90-WSR-FLTM10	4
-	Valve Holder (Not Shown)	DO-PRT-30037A	1	22	Locknut, M10 x 1.50	90-NUT-LOCM10150	16
-	Valve Support (Not Shown)	DO-PRT-30037B	1				
5	Check Valve Housing Gasket	DO-PRT-30036	1				
6	Volute Suction Extension						
	(AFI-L35)	DO-PRT-31001	1				
	(AFI-L27)	DO-PRT-30005	1				
7	Impeller Knife	DO-PRT-30038	2				
8	Impeller Cover						
	(AFI-L35)	DO-PRT-31003	1				
	(AFI-L27)	DO-PRT-30008	1				
9	O-Ring	DO-PRT-31002	1				
10	Impeller Lock Nut	DO-PRT-30025L	1				
11	Impeller Key, 8mm x 7mm x 45mm	DO-PRT-30039	2				
12	Impeller						
	(AFI-L35)	DO-PRT-31004	1				
	(AFI-L27)	DO-PRT-30009	1				
13	Volute						
	(AFI-L35)	DO-PRT-31005	1				
	(AFI-L27)	DO-PRT-30004	1				
14	Discharge Gasket	DO-PRT-30040	1				



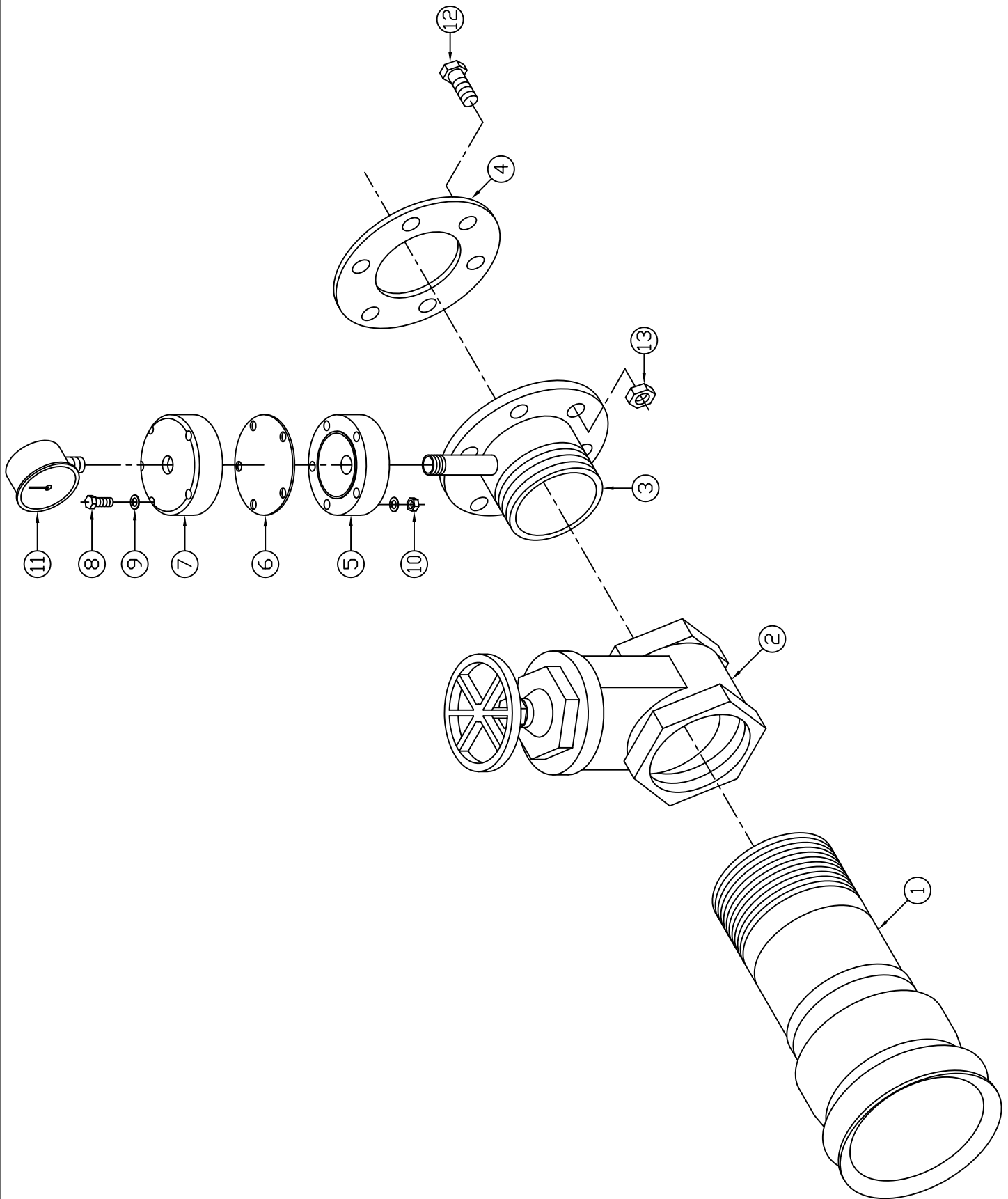
Primer Assembly

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Hand Primer	IR-PMR-CAR46-000	1				
2	Gal. Reducing Bushing, 3/4" x 3/8"	40-NPT-RB075X038G	1				
3	Galv. Nipple (cut in half)						
	3/8" NPT x 4" Lg.	40-NPT-NPL038X400G	1				
4	Gear Clamp, #8	50-024	2				
5	Suction Hose, 5/8"	IR-HOZ-SUC063	4 in.				
6	Galvanized Plug, 3/4"	40-NPT-PLG075G	1				
7	Barb Fitting						
	3/4" NPT. x 3/4" Hose Barb	40-NPT-BRB075G	2				
8	Gear Clamp, #12	50-027	2				
9	Suction Hose, 3/4"	IR-HOZ-SUC075	48 in.				
10	Brass Ball Valve, 3/4"	40-NPT-VLV075BLLFF	1				
11	Galvanized Close Nipple, 3/4"	40-NPT-NPLC075G	1				
12	Galvanized Street Elbow, 3/4"	40-NPT-ELS075X90G	1				
13	M8 x 1.25 - 25 mm Lg. Bolt	90-BLT-M8125X025	3				
14	Lockwasher, 8 mm	90-WSR-LOCM08	3				



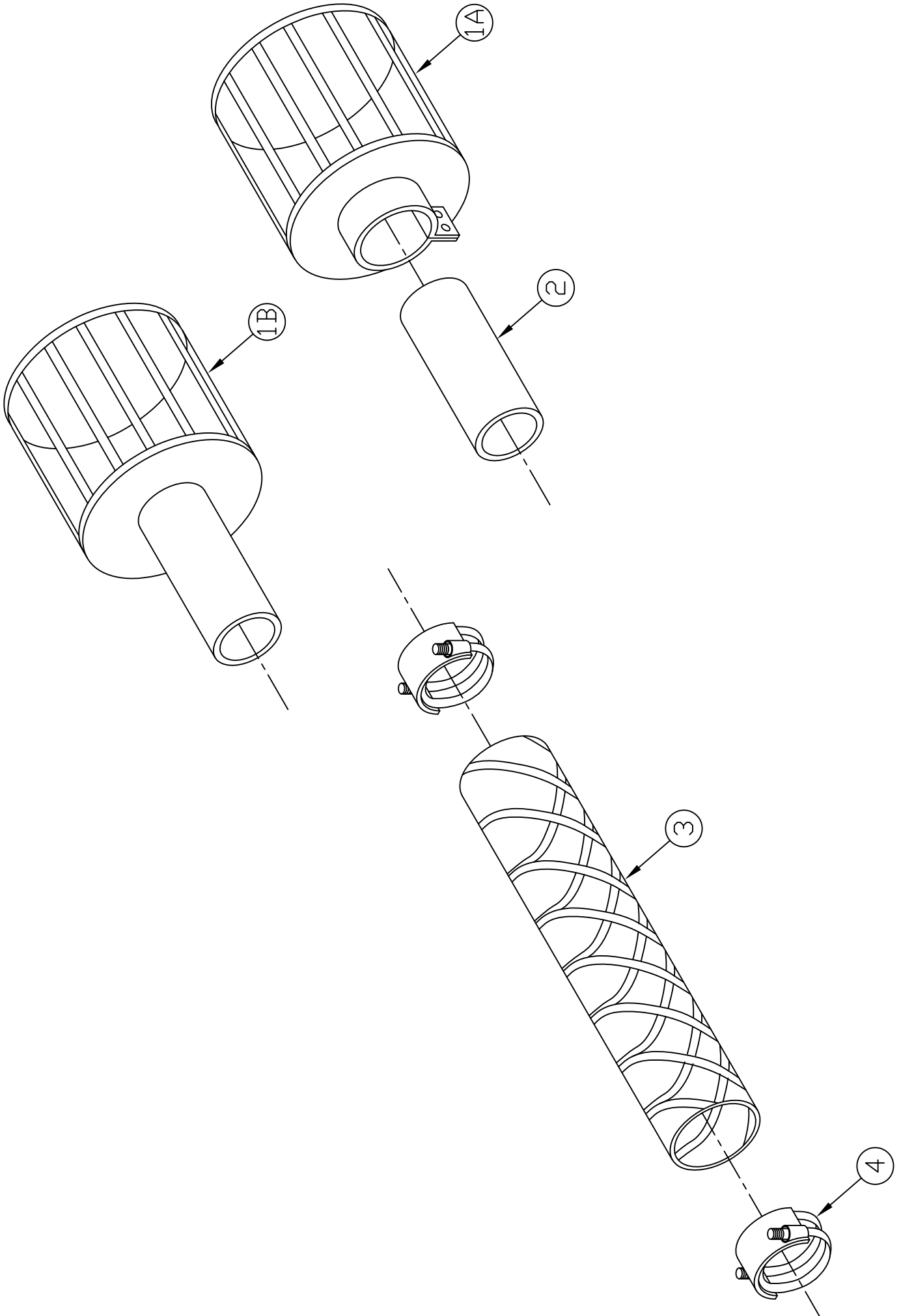
Hand Primer Assembly

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Handle	IR-PMR-CAR46501	1				
2	Top Cover	IR-PMR-CAR46502	1				
3	Diaphragm Connecting Rod	IR-PMR-CAR46503	1				
4	Diaphragm Plate	IR-PMR-CAR46504	2				
5	Diaphragm	IR-PMR-CAR46505	1				
6	Intake Rubber	IR-PMR-CAR46506	1				
7	Retaining Washer	IR-PMR-CAR46509	1				
8	Base	IR-PMR-CAR46507	1				
9	Exhaust Valve	IR-PMR-CAR46508	1				
10	Cotter Pin, 3/32" x 3/4" Lg.	IR-PMR-CAR46501A	2				
11	Clevis Pin, 3/8" x 1 7/16" Lg.	IR-PMR-CAR46501B	2				
12	Retaining Screw, #6 x 1/4" Lg.	90-SCR-RM0632X025	3				
13	Bolt, M6 x 1.00 - 30mm Lg.	90-BLT-M6100X030	4				
14	Flatwasher, 3/8"	90-WSR-FLT038	2				
15	Lockwasher, 10mm	90-WSR-LOCM10	2				
16	Hex Nut, M6 x 1.00	90-NUT-HEXM6100	4				
17	Hex Nut, M10 x 1.50	90-NUT-HEXM10150	2				



Discharge Assembly

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1	Discharge Adapter 3" NPT x 4" Rain Way Ringlock	IR-TC3-4RWAY/RL IR-TC3-5RWAY/RL	1 --- ---				
	Note: Many other adapters available						
2	3" Gate Valve 4" Gate Valve (Std. on AFI -L35) 3" Ball Valve (Not Shown) 4" Ball Valve (Not Shown)	40-NPT-VLV300GATFF 40-NPT-VLV400GATFF 40-NPT-VLV300BLLFF 40-NPT-VLV400BLLFF	1 Opt. Opt. Opt.				
3	Discharge Flange Weldment (AFI-L24, AFI-L27) (AFI-L20 only) (AFI-L35 only)	DO-PRT-30041A DO-PRT-33025 DO-PRT-35013	1 --- --- ---				
4	Discharge Gasket	DO-PRT-30040	1				
5	Gauge Protector Kit Consisting of;	IR-GAU-PROTECT-KIT	1				
6	Gauge Protector Body, 3/4 NPT	15-082-075	1				
7	Gauge Protector Diaphragm	15-083	1				
8	Gauge Protector Body, 1/4 NPT	15-082-025	1				
9	Bolt, 5/16" x 2 1/2" Lg.	90-BLT-03118X250	5				
10	SAE Flatwasher, 5/16" Locknut, 5/16" - 18	90-WSR-FLT031 90-NUT-LOC031	10 5				
11	0-200 PSI Liquid Filled Gauge	45-018	1				
12	M10 x 1.50 - 50 mm Lg. Bolt	90-BLT-M10150X050	6				
13	Locknut, M10 x 1.50	90-NUT-LOCM10	6				



Suction Hose Assembly

Item	Description	P/N	Qty.	Item	Description	P/N	Qty.
1A	Suction Screen, 4" (w / clamp)	IR-SUC-45004C	1				
	Suction Screen, 5" (w / clamp)	IR-SUC-45049C	1				
	Suction Screen, 6" (w / clamp)	IR-SUC-45005C	1				
1B	Suction Screen, 4"	IR-SUC-45004T	1				
	Suction Screen, 5"	IR-SUC-45049T	1				
	Suction Screen, 6"	IR-SUC-45005T	1				
2	4" Aluminum Tube, Rolled (1) end	IR-TUB-4HEAVY	1 Ft.				
	6" Aluminum Tube, Rolled (1) end	IR-TUB-6HEAVY	1 Ft.				
3	4" ID. Suction Hose	IR-HOZ-SUC400TF	25 Ft.				
	5" ID. Suction Hose	IR-HOZ-SUC500TF	25 Ft.				
	6" ID. Suction Hose	IR-HOZ-SUC600TF	25 Ft.				
4	SDBC 400 Clamp (4")	50-023	2				
	SDBC 600 Clamp (6")	50-021	2				

