

(Read carefully before installation and operation)

GENERAL

Delavan roller pumps are available with a variety of options, such as a choice of roller numbers (4-roller, 5-roller, 6-roller, 7-roller, 8-roller), seal materials (Viton-A or Teflon), and a direction of rotation. Also, Ni-Resist and Diamond Cast pump bodies are available on all Delavan roller pumps. Stainless steel shaft is standard on all models.

4-ROLLER SIDE PORT PUMP

Series 4400

FEATURES:

- Max. flow: 9.2 gpm at 2600 rpm
- Max. fluid temperature: 140°F/60°C
- Port size: 3/4" NPT
- Shaft size: 5/8" Solid or 1/2" Hollow
- Cast iron, Ni-Resist or Diamond Series housing
- Pump shaft rotation: CW Standard/CCW Optional
- Weight: 5 lbs.
- Rollers: Ultra Rollers standard
- Shaft Seals: Viton standard
- Available PTO adapters



5-ROLLER SIDE PORT PUMP

Series 5500

FEATURES:

- Max. flow: 46.5 gpm at 1000 rpm
- Max. fluid temperature: 140°F/60°C
- Port size: 1" NPT
- Shaft size: 15/16" Solid Shaft
- Cast iron, Ni-Resist or Diamond Series housing
- Pump shaft rotation: CCW (CW available)
- Weight: 19 lbs.
- Rollers: Ultra Rollers standard
- Shaft Seals: Viton standard
- Available PTO adapters



6-ROLLER SIDE PORT PUMP

Series 6600

FEATURES:

- Max. flow: 19.6 gpm at 1000 rpm
- Max. fluid temperature: 140°F/60°C
- Port size: 3/4" NPT
- Shaft size: 5/8" Solid
- Cast iron, Ni-Resist or Diamond Series housing
- Pump shaft rotation: CCW (CW available)
- Weight: 9 lbs.
- Rollers: Ultra Rollers standard
- Shaft Seals: Viton standard
- Available PTO adapters



6-ROLLER BACK PORT PUMP

Series 6601

FEATURES:

- Max. flow: 19.6 gpm at 1000 rpm
- Max. fluid temperature: 140°F/60°C
- Port size: 3/4" NPT
- Shaft size: 5/8" Solid
- Cast iron, Ni-Resist or Diamond Series housing
- Pump shaft rotation: CCW (CW available)
- Weight: 9 lbs.
- Rollers: Ultra Rollers standard
- Shaft Seals: Viton standard
- Available PTO adapters
- Rear Ports



7-ROLLER SIDE PORT PUMP

Series 7000

FEATURES:

- Max. flow: 22.5 gpm at 850 rpm max.
- Max. fluid temperature: 140°F/60°C
- Port size: 3/4" NPT
- Shaft size: 15/16" Solid
- Cast iron, Ni-Resist or Diamond Series housing
- Pump shaft rotation: CCW (CW available)
- Weight: 14 lbs.
- Rollers: Ultra Rollers standard
- Shaft Seals: Viton standard
- Available PTO adapters



8-ROLLER SIDE PORT PUMP

Series 8800

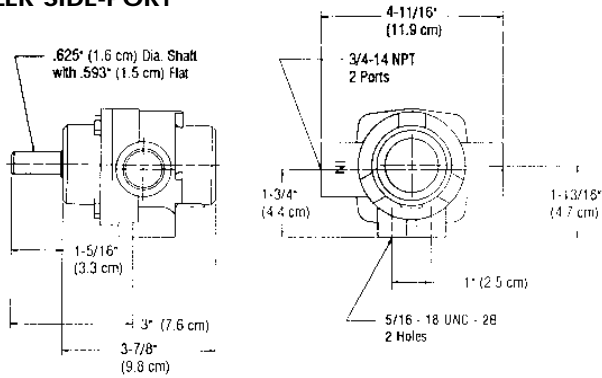
FEATURES:

- Max. flow: 24 gpm at 1000 rpm
- Max. fluid temperature: 140°F/60°C
- Port size: 3/4" NPT
- Shaft size: 15/16" Solid
- Cast iron, Ni-Resist or Diamond Series housing
- Pump shaft rotation: CCW (CW available)
- Weight: 14 lbs.
- Rollers: Ultra Rollers standard
- Shaft Seals: Viton seals standard
- Available PTO adapters

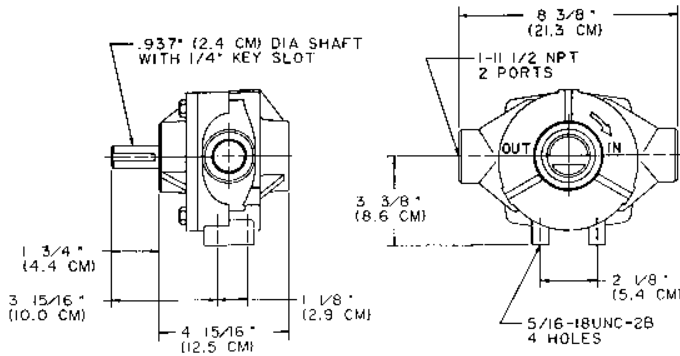


Figure 2. Dimensional Drawings

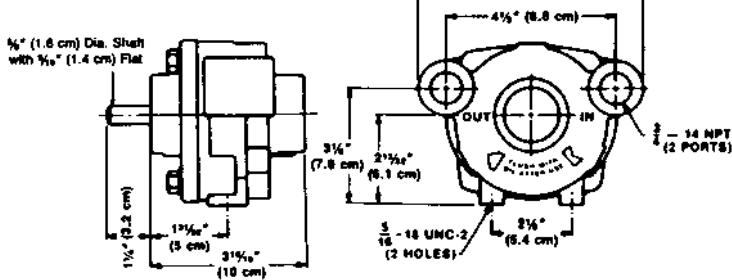
4-ROLLER SIDE-PORT



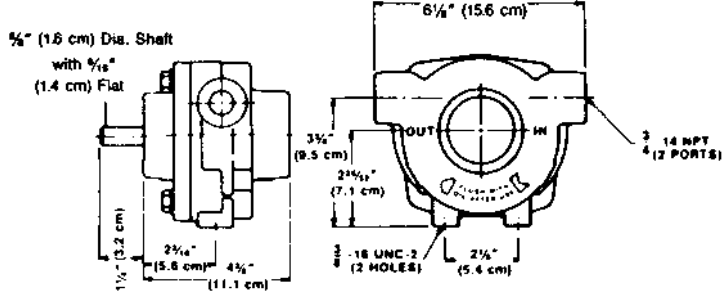
5-ROLLER SIDE-PORT



6-ROLLER BACK-PORT



6-ROLLER SIDE-PORT



Flow Rates and Horsepower Requirements for 4-Roller Pump 4400 Series (44-5111)

PRESSURE	1800 RPM GPM (HP)	2200 RPM GPM (HP)	2600 RPM GPM (HP)
0 psig	6.5 (.12)	7.7 (.15)	9.2 (.19)
25 psig	5.4 (.24)	6.7 (.31)	8.4 (.36)
50 psig	4.7 (.35)	5.9 (.42)	7.7 (.54)
75 psig	4.0 (.43)	5.3 (.54)	7.1 (.70)
100 psig	3.5 (.50)	4.8 (.65)	6.7 (.84)
125 psig	3.0 (.55)	4.3 (.75)	6.3 (1.02)
150 psig	2.6 (.60)	3.9 (.85)	5.9 (1.17)

Note: Horsepower listed above is for electric motor drives. For gas engine drives, follow gas engine manufacturers' recommendations. (As an estimate for gas engines, double the horsepower requirements for electric motors listed above.)

Flow Rates and Horsepower Requirements for 5-Roller Pump 5500 Series (55-5110)

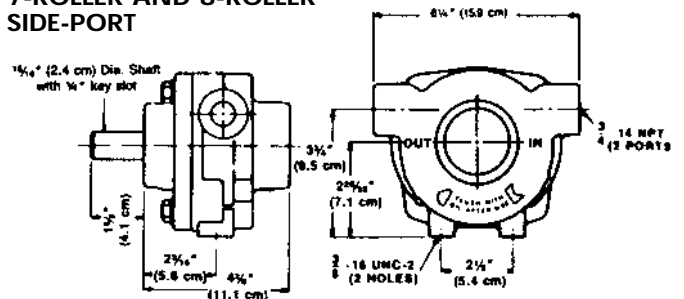
PRESSURE RPM	0 psi GPM (HP)	50 psi GPM (HP)	100 psi GPM (HP)	150 psi GPM (HP)	200 psi GPM (HP)
450°	20.8 (.18)	16.4 (.98)	14.4 (1.74)	11.4 (2.31)	7.5 (2.71)
540°	25.1 (.27)	20.5 (1.16)	17.8 (2.03)	15.4 (2.74)	12.2 (3.44)
650°	30.4 (.39)	25.7 (1.45)	22.6 (2.41)	20.3 (3.42)	17.3 (4.26)
750°	34.7 (.49)	30.7 (1.68)	26.6 (2.73)	24.4 (4.00)	22.0 (5.11)
850°	39.7 (.79)	35.1 (1.93)	31.0 (3.00)	28.1 (4.60)	26.2 (5.95)
1000°	46.5 (1.62)	42.5 (2.93)	38.5 (4.11)	35.1 (5.42)	—

Note: To achieve rated capacity 1" suction and pressure hose should be used.

Flow Rates in GPM for 6-7-8-Roller Pumps - 6600, 6601, 7000 and 8800 Series (66-5110, 77-5110, 88-5110)

MODEL	SPEED (RPM)	0 psig	25 psig	50 psig	100 psig	150 psig	200 psig
6-Roller Side & Back (11/16" Rollers)	540	10.8	9.6	8.5	6.9	5.6	4.6
	1000	19.5	18.6	17.8	16.3	15.0	13.8
7-Roller Side-Port (11/16" Rollers)	540	15.0	14.0	13.2	12.0	10.8	9.9
	750	20.0	19.2	18.4	17.2	16.1	15.2
8-Roller Side-Port (11/16" Rollers)	540	13.0	12.1	11.3	10.0	8.7	7.6
	1000	24.0	23.2	22.4	21.0	19.8	18.7

7-ROLLER AND 8-ROLLER SIDE-PORT



Tractor PTO Installation

1. Secure the PTO coupling to the pump shaft by sliding the coupling as far forward as possible without touching the bearing shield and tightening the set screws down on the key of the pump shaft. Slide coupling onto PTO shaft and secure by pulling collar back on PTO quick coupler, sliding onto PTO shaft and locking into place.
2. Check pump rotation. An arrow on the pump indicates proper rotation direction.
3. To keep the pump from rotating with the shaft, set a torque arm and short length of chain. Bolt one end of the chain to the torque arm and secure the other to a stationary part of the tractor. Be sure the chain is at a point directly above or below the torque arm. Fastening torque chain to a point forward or backward from pump center will create a bending force on pump. Do not fasten pump rigidly to the tractor.
4. With the pump in position, connect the suction hose to the "IN" port and the discharge hose to the "OUT" port. Make sure the suction hose connection is tight. A loose connection will permit air to be sucked in and the pump will not prime itself. Use at least a 3/4" diameter hose on the suction line.
5. Use a large suction strainer with a 40 mesh minimum screen. Either a Delavan #1700-2 suction strainer or a Delavan #39908-2 Y type line strainer is recommended.

Engine Installation

The pump base can be mounted on a frame and aligned for either direct-drive or belt and pulley drive. When mounting for direct-drive, be sure pump and engine shafts are in alignment. A flexible drive coupling will compensate for fractional misalignment. When mounting for pulley drive, be sure the engine and pump shafts are parallel. Align pulleys and keep them as close to the shaft bearings as possible. For gasoline engine requirements, follow engine manufacturer's recommendation.

Operation

1. With a clear suction line and open discharge line, the pump should displace liquid within 15 seconds. A squirt of oil in the suction side of the pump before starting will accelerate priming action.
2. Never run the pump dry. Excessive heat will damage rollers and seals.
3. Do not pump abrasive white wash, paints or other abrasive liquids.
4. Do not use rusty supply barrels or sandy water.
5. Do not close the discharge line of the pump while it is running unless a means of bypassing the liquid has been installed. A simple relief or bypass valve can be easily installed in the dis-

charge side. A Delavan #37562 or #13895 pressure relief valve is recommended.

Maintenance

1. Your Delavan pump is equipped with permanently lubricated ball bearings. They do not require further lubrication.
2. Do not inject oil or grease into the two weep holes on the underside of the bearing housings. These holes are to reveal seal leakage and to prevent the solution from forcing its way into the bearings. The holes must be kept clean.
3. **AFTER SPRAYING** — Thoroughly flush the pump with clear water or use a solution of approximately one cup of ammonia in 10 gallons of water. This will dissolve most residue remaining in the pump. Squirt a light oil in the pump and rotate to cover the inner surfaces with a protective film.
4. **STORAGE.** If the pump is to be out of service for several days or stored, flush pump with clear water or use a solution of one cup of ammonia in 10 gallons of water. Then pump a 50 percent permanent antifreeze solution through the pump. Plug ports.

Caution: Do not use gasoline, kerosene, or fuel oil.

Pump Disassembly

Note: The numbers in parentheses used in the following text are reference numbers that are found in the exploded views.

1. With a screwdriver, remove snap ring (1). Lift out nameplate (2).
2. With a 9/16-inch wrench unscrew capscrews (3).
3. With cover plate down, cradle pump on "IN" and "OUT" ports on fixture under an arbor press (Fig. 4). A cradle can be constructed of 2" x 4" lumber. Press the shaft and rotor assembly (6) down through the pump body, bearing the seal. The shaft and rotor assembly will remain in the end plate.
4. Lift off seal ring (4). Slide out rollers (5).
5. Check body for wear. File off any burrs that appear on rotor.
6. Make sure rollers (5) move freely in rotor slots. Replace rollers if out-of-round, swollen or badly worn.
7. If further disassembly is required:
 - a. Press out shaft and rotor assembly (6) from end plate (7) with an arbor press while supporting the end plate on a cradle. Remove snap ring (1).
 - b. To remove bearing, use a small piece of brass rod and gently tap with hammer on the inner edges of the bearing. Drive the seal out with a screwdriver and hammer. Discard seal.

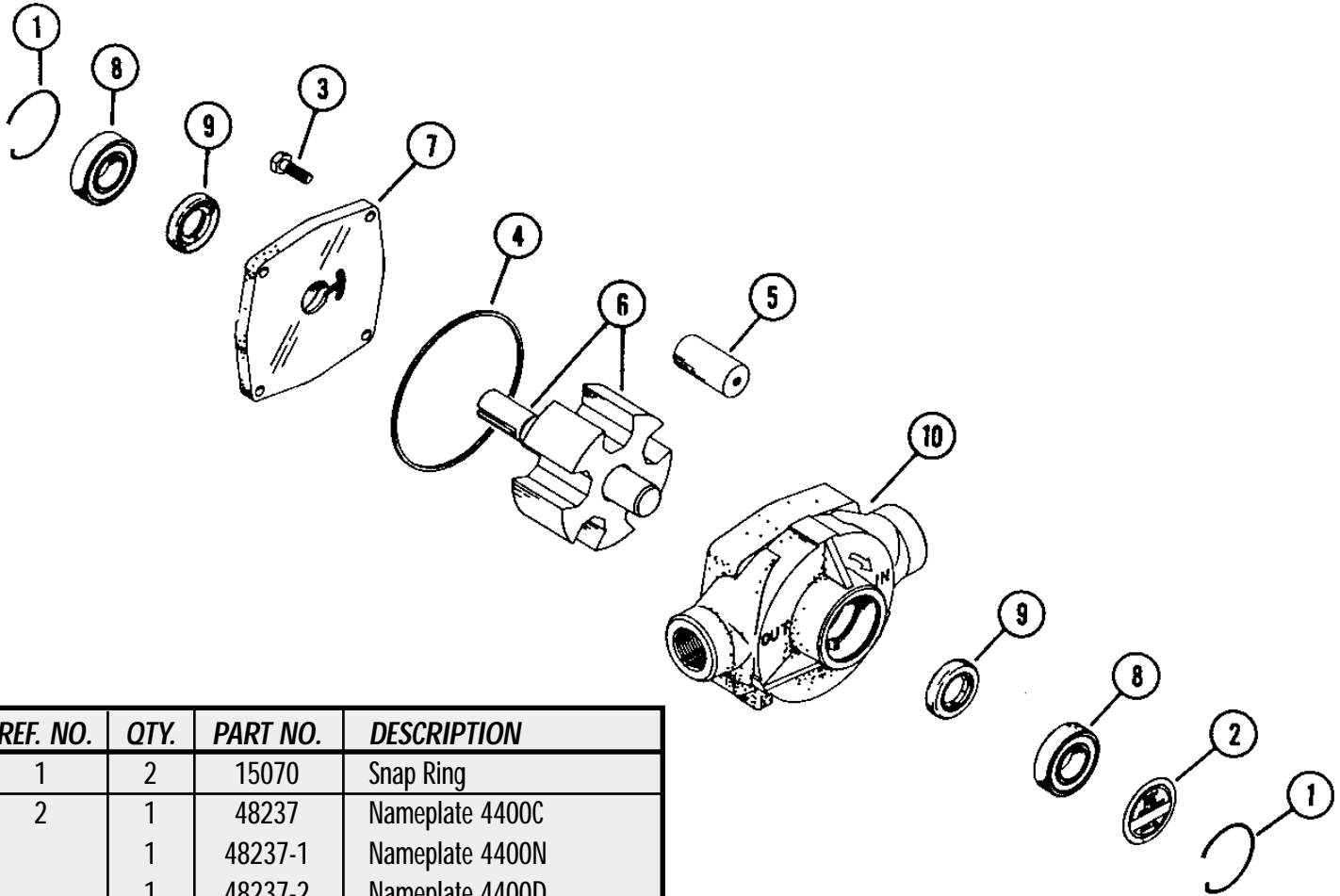
Assembly

1. A repair kit including 4, 5, 6, 7 or 8 rollers, 2 seals, and a seal ring is available (see parts list).
2. Position a new seal in seal housing with folded edge down. Press seal down on outer edge until it "bottoms."
3. Position bearing (8) in bearing housing and press downward until it "bottoms." Apply pressure to outer bearing race.
4. File off any burrs on the rotor faces and roller slots that may have been caused by disassembly and handling.
5. Apply a light oil to shaft, end plate surface, and inside pump body.
6. Press shaft and rotor into body, by easing the rotor shaft through the seal; then press shaft with an arbor press while supporting body bearing inner race.
7. Insert rollers (5), one in each slot.
8. Place seal ring (4) in groove.
9. Position end plate (7) for pressing down on pump body (10), easing the shaft carefully through the seal. Carefully line up matching holes of pump body and end plate.
10. Press pump together in an arbor press (Fig. 4), making sure the pressing force is applied to the inner race of the ball bearing. A sleeve with at least a 1 inch bore (that does not exceed 2 inches outside diameter) should be used.
11. Secure end plate with four capscrews (3).
12. After tightening capscrews, turn the shaft to make sure rotor is not binding in pump. (It may be necessary to hold shaft in vise when rotating body to check for binding.)
13. Tap shaft with a brass hammer. If this fails to center rotor, tap the other end of the shaft lightly. The rotor should turn freely.

TROUBLESHOOTING GUIDE

<i>PROBLEM</i>	<i>CAUSES AND REMEDIES</i>
1. NO PRESSURE OR NO CAPACITY	<ul style="list-style-type: none"> a. Inlet line not fully immersed in tank, or low tank level. b. Pump not properly primed. c. Clogged inlet strainer. d. Suction line air leaks. Use plumber's joint compound or Teflon tape. Tighten all connections. Check hoses for cracks or pin holes. e. Suction line blocked or hose collapsed. f. Pump is air-bound. Check for dry tank, or "traps" in the line. Try removing one nozzle until pump starts priming. g. Worn and leaking seals. Replace. h. Pump turning in wrong direction. (A reverse direction pump will not work on a tractor PTO).
2. PUMP RUNS, BUT LOW PRESSURE AND CAPACITY	<ul style="list-style-type: none"> a. Suction line and fittings partially blocked or too small. Hose kinked. b. Worn rollers. Replace with new (see parts list). c. Clogged inlet strainer.
3. PUMP PRESSURE GOOD, BUT LOW OUTPUT THROUGH THE NOZZLES	<ul style="list-style-type: none"> a. Nozzle orifices too small. Install larger sizes. b. Outlet line too small or blocked. c. Bypass partially open. Close it.
4. EXCESSIVE NOISE OR VIBRATION	<ul style="list-style-type: none"> a. Possible loose coupler...bent or damaged shaft. b. Excessive PTO speed...1000 rpm maximum. c. Suction line leaks or clogged strainer (See 1-d above). d. Worn rollers. Replace with new (see parts list).
5. IMPOSSIBLE TO ROTATE SHAFT	<ul style="list-style-type: none"> a. Improper assembly. Tap shaft with brass hammer (Refer to assembly instructions). b. Corrosion or foreign object in pump. Disassemble and thoroughly clean all parts. Replace worn parts. See section on Maintenance.

Delavan Models 4400C, 4400N, 4400D, 4401C, 4401N, 4401D



REF. NO.	QTY.	PART NO.	DESCRIPTION
1	2	15070	Snap Ring
2	1	48237	Nameplate 4400C
	1	48237-1	Nameplate 4400N
	1	48237-2	Nameplate 4400D
3	4	48236	Cap Screw
4	1	31350-142	Seal Ring
5	4	48234	Ultra Rollers 1/2"
6	1	31661-14	Shaft & Rotor Assy. Cast Iron
	1	31661-14	Shaft & Rotor Assy. Ni-Resist
	1	31661-17	Shaft & Rotor Assy. Diamond
	1	31661-18	Hollow Shaft & Rotor Assy. Cast Iron
	1	31661-18	Hollow Shaft & Rotor Assy. Ni-Resist
1	31661-23	Hollow Shaft & Rotor Assy. Diamond	
7	1	46231-1	Endplate Cast Iron
	1	46231-2	Endplate Ni-Resist
	1	46231-3	Endplate Diamond
8	2	15072	Bearing STD#6203ZZ
9	2	20468	Lip Seal Viton
10	1	48229-1	Pump Body Cast Iron
	1	48229-2	Pump Body Ni-Resist
	1	48229-3	Pump Body Diamond

Universal Repair Kit

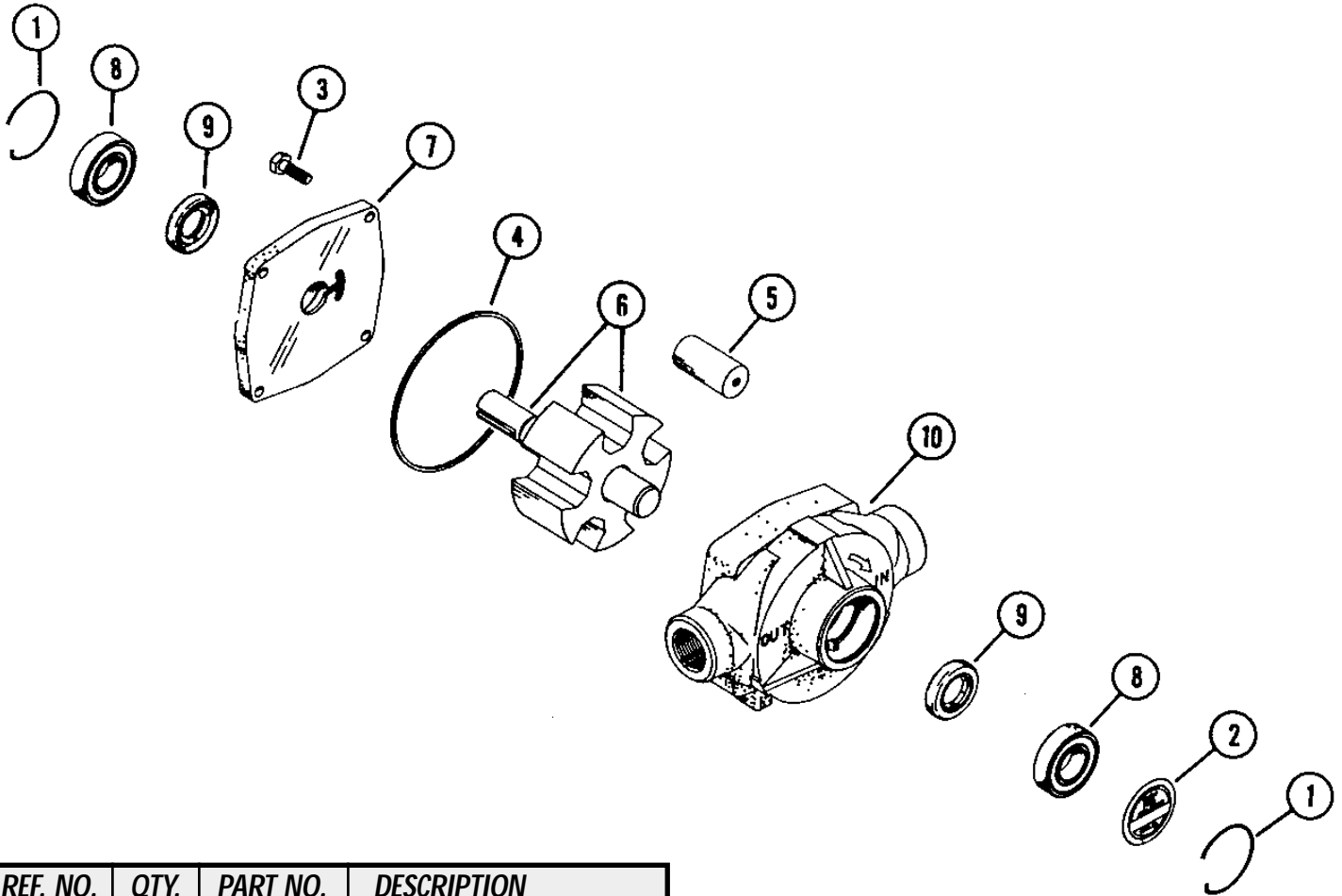
44-4000 RK

4-Roller Pump Repair Kit for 4400 Pump

PART NO.	DESCRIPTION	QUANTITY PER KIT
48234	Roller, Polypropylene, 1/2" diameter	4
20468	Lip Seal, Fluorocarbon (Viton)	4
31350-142	Seal Ring	2

Note: Repairs 44-XXXX

Delavan Models 5500C, 5500N, 5500D



REF. NO.	QTY.	PART NO.	DESCRIPTION
1	2	15334	Snap Ring
2	1	48255	Nameplate 5500C
	1	48255-1	Nameplate 5500N
	1	48255-2	Nameplate 5500D
3	4	15341	Cap Screw
4	1	48252	Seal Ring
5	5	48253	Ultra Rollers 1"
6	1	31661-15	Shaft & Rotor Assy. Cast Iron
	1	31661-15	Shaft & Rotor Assy. Ni-Resist
	1	31661-20	Shaft & Rotor Assy. Diamond
7	1	48248-1	Endplate Cast Iron
	1	48248-2	Endplate Ni-Resist
	1	48248-3	Endplate Diamond
8	2	16228	Bearing STD#6705ZZ
9	2	47927	Lip Seal Viton
10	1	48246-1	Pump Body Cast Iron
	1	48246-2	Pump Body Ni-Resist
	1	48246-3	Pump Body Diamond

Universal Repair Kit

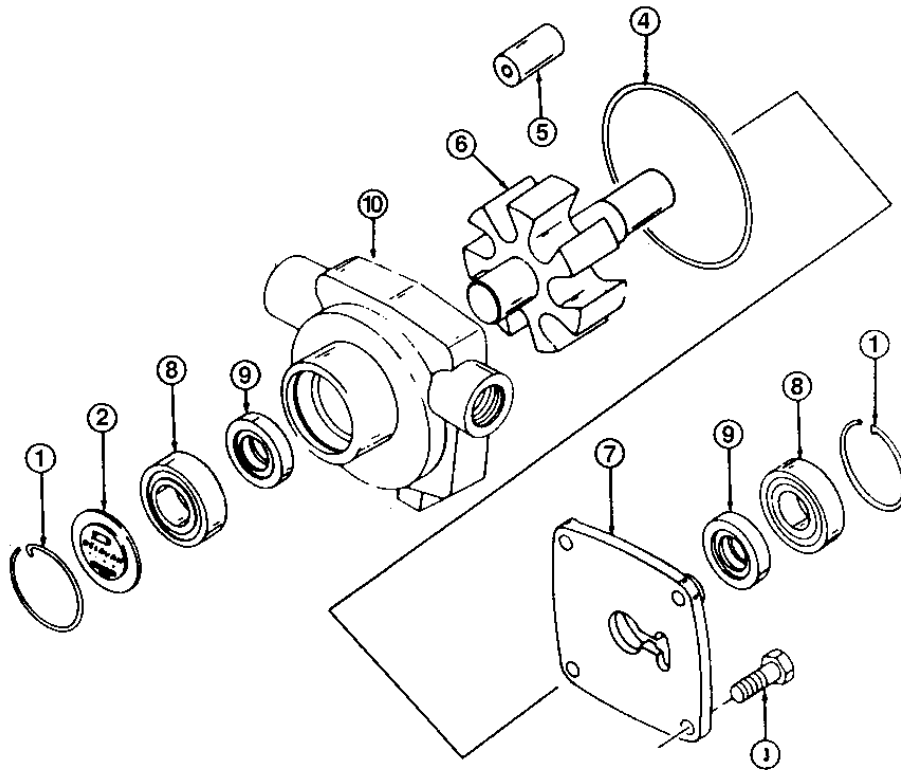
55-1700 RK

5-Roller Pump Repair Kit for 5500 Pump

PART NO.	DESCRIPTION	QUANTITY PER KIT
48253	Ultra Roller, 1" Diameter	5
47927	Lip Seal, Viton	2
48252	Seal Ring	2

Note: Repairs 55-XXXX

Delavan Models 6600C, 6600N, 6600D, 6601C, 6601N, 6601D



REF. NO.	QTY.	PART NO.	DESCRIPTION
1	2	15070	Snap Ring
2	1	46210-2	Nameplate 6600C
	1	46210-7	Nameplate 6600N
	1	46210-3	Nameplate 6600D
	1	46210-1	Nameplate 6601C
	1	46210-8	Nameplate 6601N
	1	46210-9	Nameplate 6601D
3	4	15077	Capscrew
4	1	24819	Seal Ring
5	6	19341	Ultra Rollers 11/16"
6	1	31661-8	Shaft & Rotor (Cast Iron/Ni-Resist)
	1	31661-9	Shaft & Rotor (Diamond)
7	1	31664-1	End Plate Cast Iron
	1	31664-2	End Plate Ni-Resist
	1	31664-3	End Plate Diamond
8	2	15072	Bearing (STD#6203ZZ)
9	2	20468	Lip Seal Viton
10	1	50073-1	Pump Body Cast Iron Side
	1	50073-2	Pump Body Ni-Resist Side
	1	50073-3	Pump Body Diamond Side
	1	24817-1	Pump Body Cast Iron Rear
	1	24817-2	Pump Body Ni-Resist Rear
1	24817-3	Pump Body Diamond Rear	

Universal Repair Kit

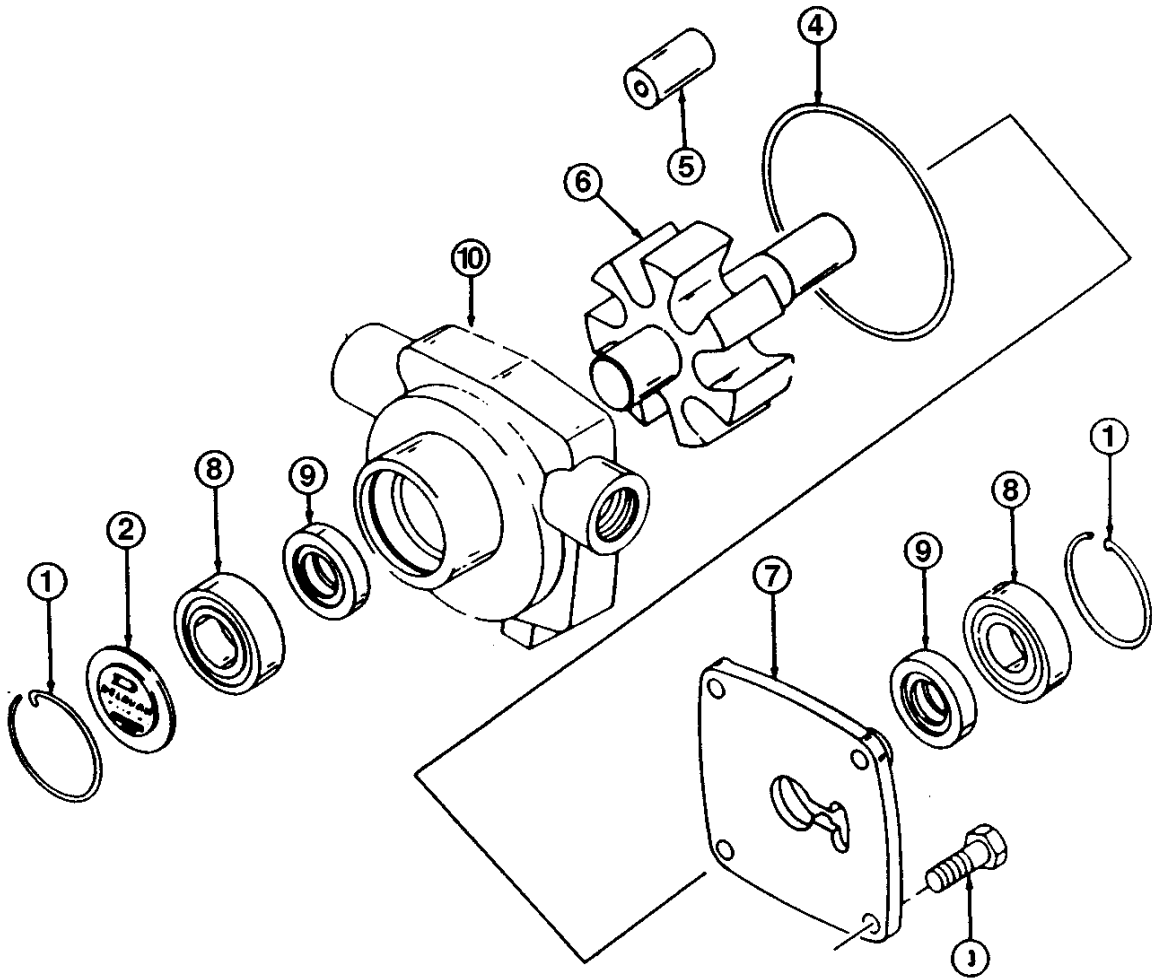
66-6500 RK

6-Roller Pump Repair Kit for 6600 & 6601 Pumps

PART NO.	DESCRIPTION	QUANTITY PER KIT
19341	Ultra Roller 11/16" Diameter	6
20468	Lip Seal, Viton	4
24819	Seal Ring	2

Note: Repairs 66-XXXX

Delavan Models 7000C, 7000N, 7000D



REF. NO.	QTY.	PART NO.	DESCRIPTION
1	2	15334	Snap Ring
2	1	46209-3	Nameplate 7000C
	1	46209-4	Nameplate 7000N
	1	46209-7	Nameplate 7000D
3	4	15341	Capscrew
4	1	24829	Seal Ring
5	7	19341	Ultra Rollers, 11/16"
6	1	31661-10	Shaft & Rotor Assy. (Cast Iron /Ni-Resist)
	1	31661-11	Shaft & Rotor Assy. Diamond
7	1	31666-1	End Plate Cast Iron
	1	31666-2	End Plate Ni-Resist
	1	31666-3	End Plate Diamond
8	2	16228	Bearing (STD#6205ZZ)
9	2	47927	Lip Seal Viton
10	1	24842-1	Pump Body Cast Iron
	1	24842-2	Pump Body Ni-Resist
	1	24842-3	Pump Body Diamond

Universal Repair Kit

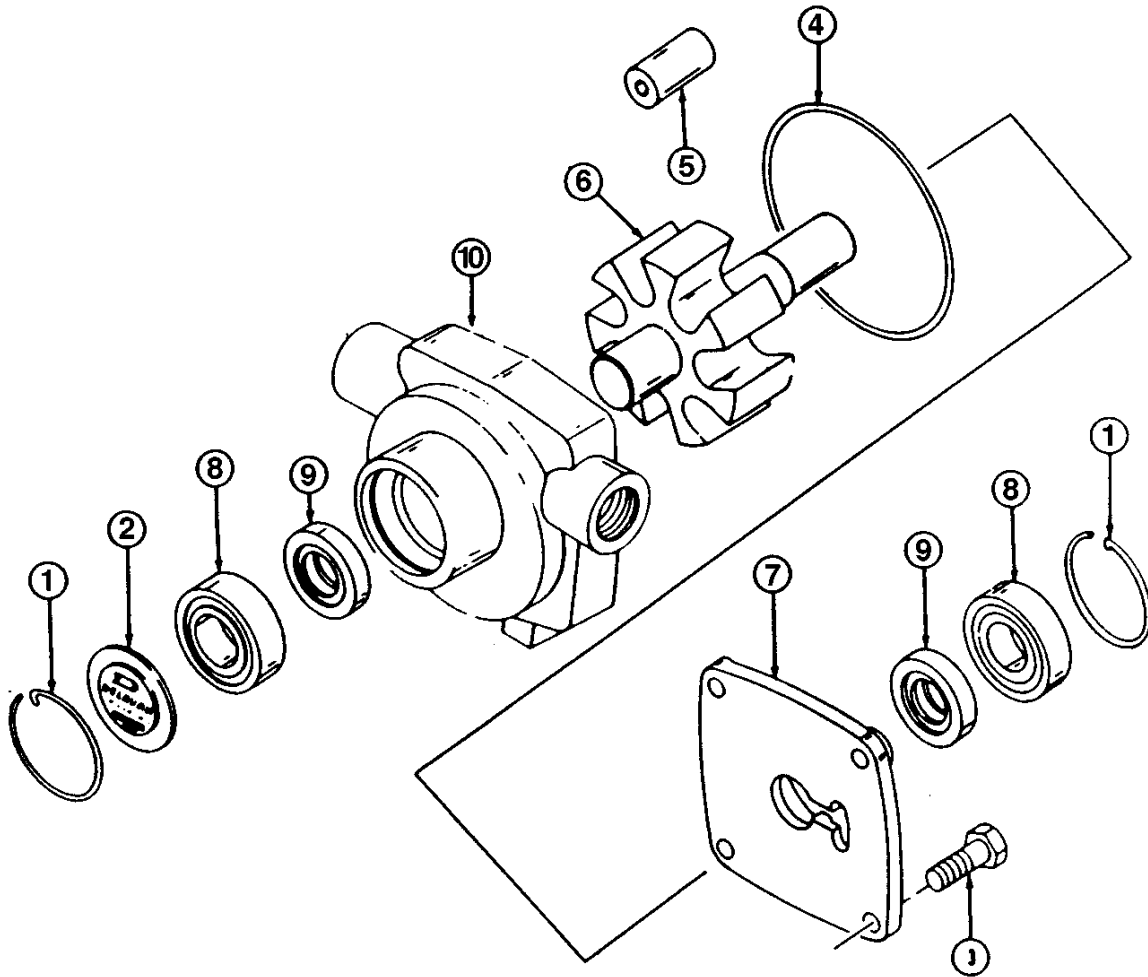
70-7700 RK

Pump Repair Kits

PART NO.	DESCRIPTION	QUANTITY PER KIT
19341	Ultra Roller 11/16" Diameter	7
47927	Lip Seal, Viton	2
24829	Seal Ring	2

Note: Repairs 77-XXXX

Delavan Models 8800C, 8800N, 8800D



REF. NO.	QTY.	PART NO.	DESCRIPTION
1	2	15334	Snap Ring
2	1	46209-1	Nameplate 8800C
	1	46209-2	Nameplate 8800N
	1	46209-6	Nameplate 8800D
3	4	15341	Capscrew
4	1	24829	Seal Ring
5	8	19341	Ultra Rollers, 11/16"
6	1	31661-12	Shaft & Rotor Assy (Cast Iron /Ni-Resist)
	1	31661-24	Shaft & Rotor Assy Diamond
7	1	31666-1	End Plate Cast Iron
	1	31666-2	End Plate Ni-Resist
	1	31666-3	End Plate Diamond
8	2	16228	Bearing (STD#6205ZZ)
9	2	47927	Lip Seal Viton
10	1	24842-3	Pump Body Cast Iron
	1	24842-4	Pump Body Ni-Resist
	1	24842-6	Pump Body Diamond

Universal Repair Kit

88-7560 RK

Pump Repair Kits

PART NO.	DESCRIPTION	QUANTITY PER KIT
19341	Ultra Roller 11/16" Diameter	8
47927	Lip Seal, Viton	2
24829	Seal Ring	2

Note: Repairs 88-XXXX

ROLLER PUMP COUPLERS

PICTURE	PART #	FITS PUMPS	RPM	PUMP SHAFT SIZE	PTO SHAFT	DESCRIPTION
	46814-1	6600 Series	540 & 1000	5/8"	1 3/8" Dual Speed	Dual Speed 540 & 1000 RPM, Corrosion Resistant, Cast Aluminum, Nylon Collar
	46814-2	7/8" shaft Old Style & Competitive Pumps	540 & 1000	7/8"	1 3/8" Dual Speed	
	46814-3	7- and 8-Roller Pumps 7000 & 8800 Series	540 & 1000	15/16"	1 3/8" Dual Speed	
	35735	5500, 8800, & 7000* Series (540 only)	540	15/16"	1 3/8"	540 RPM, Forged Steel Body Nylon Collar
	35979	5500 & 8800 Roller Pumps, Turbo 90	1000	15/16"	1 3/8"	1000 RPM, Forged Steel Body Nylon Collar, 1 3/4" PTO
	35992	5500 & 8800 Roller Pumps, Turbo 90	1000	15/16"	1 3/4"	1000 RPM, Forged Steel Body Nylon Collar, 1 3/4" PTO
	46935-1	5500 & 8800 Roller Pumps, Turbo 90	1000	15/16"	1 3/8"	*Collar Coupler (see below) 1 3/4 1000 RPM PTO,
	46647	5500 & 8800 Roller Pumps, Turbo 90	1000	15/16"	1 3/4"	
	50101	4400 Series	2600	5/8"	5/8"	Mild Steel Set Screw Coupler

***7000 Series Roller Pump Use on 540 RPM PTO Only**

**Collar Coupler reduces possible vibration by clamping a full 360 degrees on the pump shaft & PTO. This better centers the pump shaft to the tractor PTO, giving less chance of uneven wear. Both ends of the Coupler must be wrench-tightened onto the PTO & Pump shafts before operation.
NOTE: Do not force Coupler too far onto the PTO. After Coupler is in position, 1/4" - 3/8" of PTO should be visible.

***Do not use series 46814 Couplers for 5-Roller or Turbo 90 Pumps.

UNIVERSAL REPAIR KITS

REPAIR FOLLOWING PUMP

NEW REPAIR KIT	OLD REPAIR KIT	DELAVAN OLD #	DELAVAN NEW #	HYPRO #	DESCRIPTION
44-4000RK	48631-1	44-Cast Iron Ni resist Diamond	4400	4001/4101	4 Ultra Rollers 4 Viton Shaft Seals 2 Universal O-Rings
66-6500RK	48394-1	6/66-Cast Iron Ni resist Diamond	6600	6500	6 Ultra Rollers 4 Viton Shaft Seals 2 Universal O-Rings
70-7700RK	48394-2	77-Cast Iron Ni resist Diamond	7000	7700	7 Ultra Rollers 2 Viton Shaft Seals 2 Universal O-Rings
88-7560RK	48394-3	88-Cast Iron Ni resist Diamond	8800	7560	8 Ultra Rollers 2 Viton Shaft Seals 2 Universal O-Rings
55-1700RK	48632-1	55-Cast Iron Ni resist Diamond	5500	1700	5 Ultra Rollers 2 Viton Shaft Seals 2 Universal O-Rings

Returns

All Delavan products are warranted against manufacturing defects (see warranty, below). In the event you feel you have a warranty-covered, returnable item, return the pump to your dealer, who will replace a warrantable pump for you. Delavan's "No Hassle Warranty" puts you back in the field sooner!

Important:

Whether you are returning your pump for warranty or for repair, you must do the following:

1. Flush chemical residue from the pump (best done in the field).
2. Tag pump with type of chemicals having been sprayed.
3. Include complete description of operation problem, such as how pump was used, symptoms of malfunction, etc.

Since pumps can contain residues of toxic chemicals these steps are necessary to protect all the people who handle return shipments, and to help pinpoint the reason for the breakdown.

Delavan Products Warranty

All products sold by Delavan are warranted only to purchasers from Delavan for resale or for use in purchasers' own business or original equipment manufacture, against defects in workmanship or materials under normal use, maintenance and service (rental use excluded), if notice of said defect is received by Delavan at the factory within 90 days after installation or one year from date of shipment from the factory, whichever first occurs. The sole and exclusive obligation of Delavan under this or any implied warranty shall be to replace or, at its option, to repair, without charge, any product which is determined by Delavan to be defective in workmanship or materials after the product is returned to the Delavan factory, shipping costs pre-paid. In no event shall Delavan be liable to any person for indirect

or consequential damages or for injury or commercial loss resulting from any use or inability to use and Delavan product. Delavan expressly negates any other warranty, express or implied, including any warranty of merchantability or fitness for a particular purpose, or arising from any course of dealing or custom or usage of trade. No person, including any dealer or representative of Delavan, is authorized to make any representation or warranty on behalf of Delavan in addition to or inconsistent with these provisions. Purchasers to whom these provisions apply agree to hold Delavan harmless from claims by their customers in excess of the obligations of Delavan expressly set forth herein.



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