



# 4000 Series 12-Volt Electric Driven Roller Pumps & 2530-0057 Speed Controller

Form 130R

## Installation, Operation, Repair, and Parts Manual

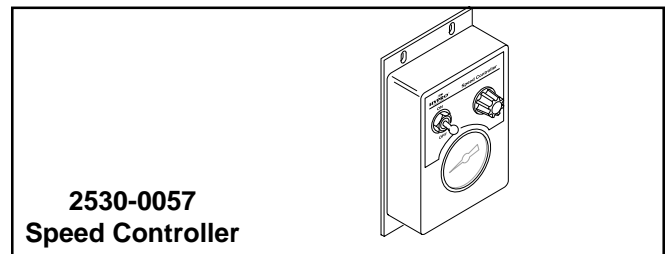
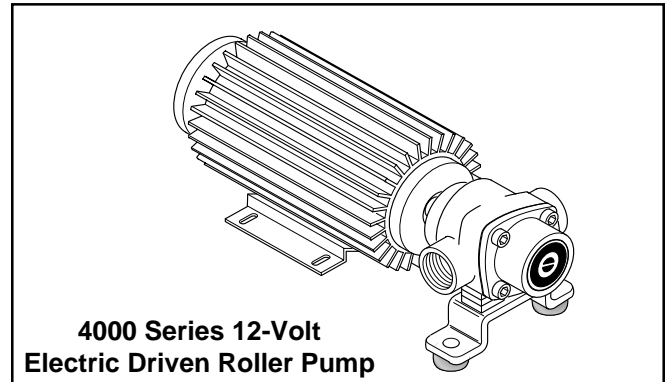
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### Description

Hypro Roller Pumps are designed for agricultural and industrial transfer of a variety of fluids and chemicals. The 4001 Series maximizes flow and the 4101 Series maximizes pressure. Both are coupled to 12 volt DC motors that are driven by a standard 12 volt battery. These systems are ideal for bulk chemical transfer, fertilizer placement, herbicide banding, nitrogen side dressing, and orchard, and cattle spraying.

The E2H Models have specially designed motors for situations where higher pressure is desired.

The 2530-0057 Speed Controller allows smooth variable speed operation to accurately set pressures for controlled application rates. Optional switched leads are included for a boom control solenoid valve. Maximum output is 25 amps. Refer to the performance charts for maximum performance at 25 amps.



### Model 4101N-EH and 4101XL-EH, Model 4101N-E2H and 4101XL-E2H Model 4001N-EH and 4001XL-EH, Model 4001N-E2H and 4001XL-E2H 12 Volt Roller Pump and Motor Unit

**Maximum Flow:**

4101N-EH and 4101XL-EH _____	7.5 gpm [28.4 lpm]
4101N-E2H and 4101XL-E2H _____	5.9 gpm [22.3 lpm]
4001N-EH and 4001XL-EH _____	10.4 gpm [39.4 lpm]
4001N-E2H and 4001XL-E2H _____	9.9 gpm [37.5 lpm]

**Maximum psi:**

4101N-EH and 4101XL-EH _____	50 psi [3.45 BAR] continuous
4101N-E2H and 4101XL-E2H _____	90 psi [6.20 BAR] continuous
4001N-EH and 4001XL-EH _____	30 psi [2.07 BAR] continuous
4001N-E2H and 4001XL-E2H _____	50 psi [3.45 BAR] continuous

Ports: \_\_\_\_\_ 3/4" NPT inlet  
 \_\_\_\_\_ 3/4" NPT outlet

Max Inlet Vacuum \_\_\_\_\_ 10" Hg [0.7 -BAR]

## General Safety Information

The following attention notices are used to notify and advise the user of this product of procedures that may be dangerous to the user or result in damage to the product.

### **NOTE**

Notes are used to notify of installation, operation, or maintenance information that is important but not safety related.

### **CAUTION**

Caution is used to indicate the presence of a hazard, which will or can cause minor injury or property damage if the notice is ignored.

### **WARNING**

Warning denotes that a potential hazard exists and indicates procedures that must be followed exactly to either eliminate or reduce the hazard, and to avoid serious personal injury, or prevent future safety problems with the product.

### **DANGER**

Danger is used to indicate the presence of a hazard that will result in severe personal injury, death, or property damage if the notice is ignored.

### **DANGER**

Do not pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in explosive atmospheres. The pump should be used only with fluids that are compatible with the pump component materials. Failure to follow this notice can result in severe personal injury, death, and/or property damage and will void the product warranty.

### **DANGER**

Never use your hand to check the condition of hydraulic lines or hoses. If hydraulic fluid penetrates the skin, get medical attention immediately. Failure to proper medical attention may result in loss of limb or life. The safest way to check hydraulic lines or hoses is by holding a piece of cardboard next to the hydraulic line or hose.

### **WARNING**

- Use a pressure relief device on the discharge side of the pump to prevent damage from pressure buildup when the pump discharge is blocked or otherwise closed and the power source is still running.
- Do not pump at pressures higher than the maximum recommended pressure.
- Do not pump liquids at temperatures higher than the recommended maximum temperature.
- Disconnect the power before servicing the pump.
- Release all pressure within the system before servicing any component.
- Drain all liquids from the system before servicing any component.
- Check hoses for weak or worn condition before each use. Make certain that all connections are tight and secure.
- Periodically inspect the pump and the system components. Perform routine maintenance as required.
- Use only pipe, hose, and fittings rated for the maximum pressure rating of the pump.
- Do not use these pumps for pumping water or other liquids for human or animal consumption.
- The sound pressure level of the Pump is 82 dBA. Observe all safety precautions when operating the Pump within close proximity for extended periods by wearing hearing protectors. Extended exposure to elevated sound levels will result in permanent loss of hearing acuteness, tinnitus, tiredness, stress, and other effects such as loss of balance and awareness.

# Installation Instructions

## PLUMBING HOOK-UP

See Figure 1 for recommended plumbing installation.

### INLET LINE

Use a 3/4" 2-braid suction hose or 3/4" pipe to prevent collapsing. Avoid all unnecessary bends, elbows, or kinks in the inlet line. The less restrictions in the inlet line, the better the pump will perform. Avoid loops in the inlet line. Loops in the inlet line will permit air to be trapped in the line, preventing the pump from priming. Make sure all connections are tight and do not leak air.

### STRAINER

A strainer should be installed on the inlet side of the pump.

#### NOTE

**Check the strainer periodically to insure that it is not clogged with debris.**

### DISCHARGE HOSE AND FITTINGS

Use only hose, pipe, pipe fittings, and accessories that are rated at or above the maximum operating pressure of the pump.

### PRIMING

This pump is not designed to "self prime" more than 3 ft. [0.9 m] above liquid level. Ideally the pump should be located below the tank. If this is not possible, a pipe tee

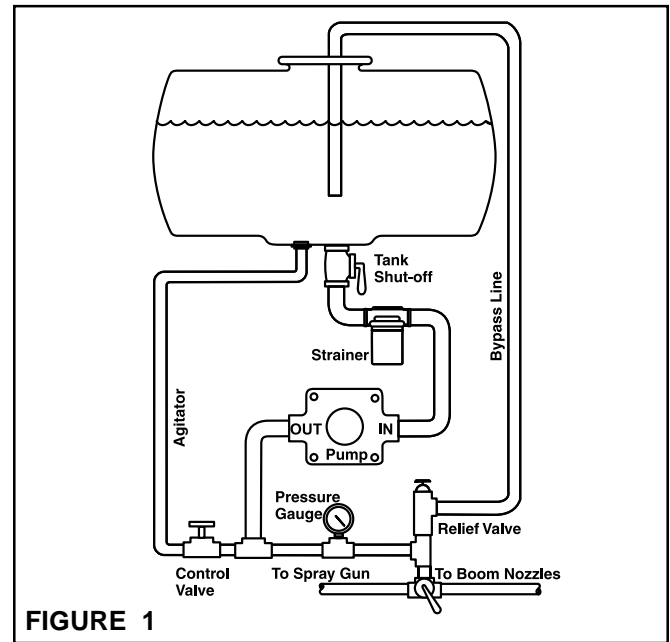


FIGURE 1

should be installed in the inlet line to allow liquid to be poured into the inlet line to facilitate priming. Installation of a foot valve is also recommended onto the inlet line on the bottom of the tank (See Figure 1).

#### NOTE

**Make certain all inlet fittings are tight. Loose or leaking fittings will decrease the pumps ability to prime.**

## ELECTRICAL HOOK-UP

#### NOTE

**The motor must be fused to protect the electrical system. Use a 30 amp slow-blow fuse or circuit breaker.**

The motor lead wires are identified with (+) and (-) tags on each corresponding lead wire. For proper pump rotation, the connections should be made as follows:

- Positive Motor Lead (+) to Positive Power Lead (Red, +).
- Negative Motor Lead (-) to Negative Power Lead (Black, -).

### ON/OFF TOGGLE SWITCH INSTALLATION

See Figure 2.

1. The **ON/OFF** Switch must be rated at or above 35 amps.
2. If additional lead wire is required, use 10 gauge or larger wire.

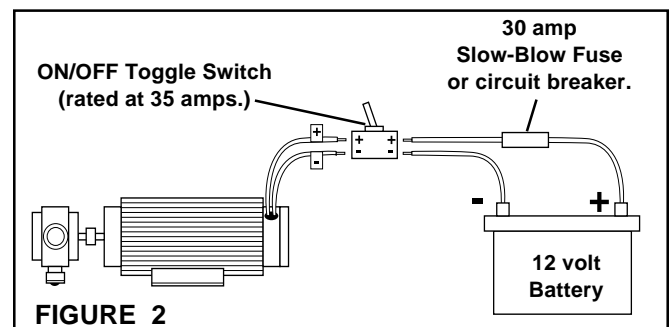


FIGURE 2

3. Performance may be improved by shortening the motor lead wires. Minimize wire length where possible.

## 12 VOLT DC SPEED CONTROLLER (2530-0057)

See Figure 3.

### NOTE

Shortening the length of the motor leads and Speed Controller leads to remove excess lead wire will improve performance and lower amp draw. The amount to shorten these leads will vary with each specific installation.

The recommended Speed Controller to motor lead connection is solder with shrink tube or wire nut wrapped with electrical tape. The use of crimp type connectors is not recommended.

1. Mount the Controller in a remote but safe location, accessible, but protected from the elements.
2. Connect the red (+) positive 20 ft [6.09 m] provided Power Lead (lead with ring terminals fastened on one end) to the (+) positive battery terminal.
3. Connect the black (-) negative 20 ft [6.09 m] provided Power Lead (lead with ring terminals fastened on one end) to the (-) negative battery terminal.
4. Set the Controller Main Power Switch to **OFF** (See Figure 4).
5. Connect the Controller Battery Leads to the Power Leads from the battery. Connecting Red (+) to Red (+) and Black (-) to Black (-) (See Figures 3 and 4).
6. Connect the red (+) positive 20 ft [6.09 m] provided Power Lead (lead without ring terminals fastened on one end) to the (+) positive motor lead.
7. Connect the black (-) negative 20 ft [6.09 m] provided Power Lead (lead without ring terminals fastened on one end) to the (-) negative motor lead.

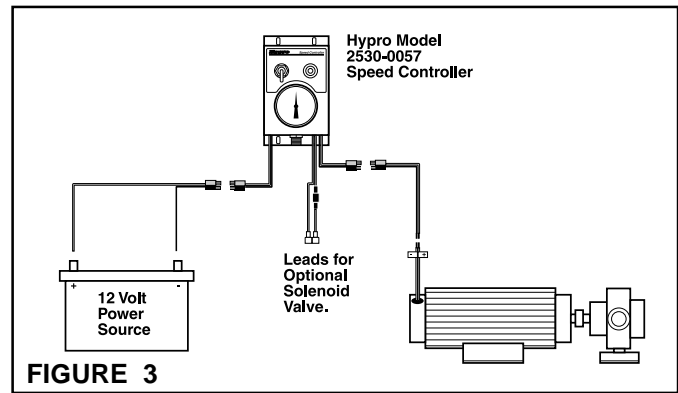


FIGURE 3

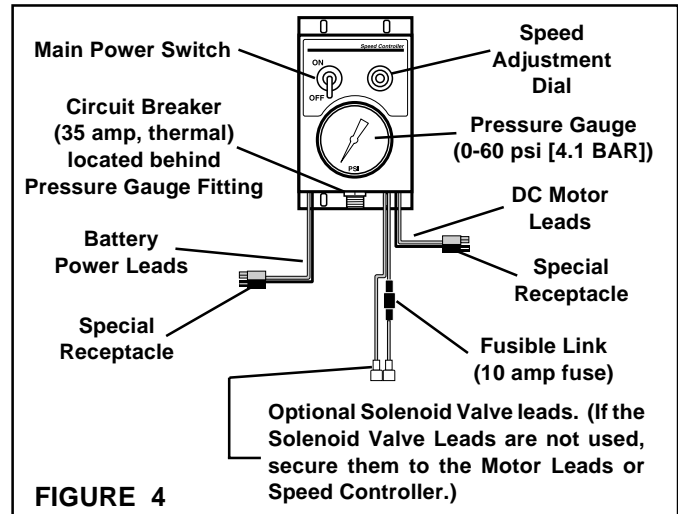


FIGURE 4

8. Connect the Controller Motor Leads to the Power Leads from the motor. Connecting Red (+) to Red (+) and Black (-) to Black (-) (See Figures 3 and 4).
9. Run a small pressure hose from the Pump to the Controller. Connect this hose to the Pressure Gauge using a pipe thread sealant to insure a positive seal.

## Operation with 12 Volt DC Speed Controller

1. Rotate the Speed Adjustment Dial fully counter clockwise (See Figure 5).
2. Set the Main Power Switch to the **ON** position (See Figure 5).
3. Slowly rotate the Speed Adjustment Dial clockwise until the desired pressure is indicated on the Pressure Gauge (See Figure 5).
4. The solenoid will energize and open the valve the instant the Power Switch is switched to **ON**.

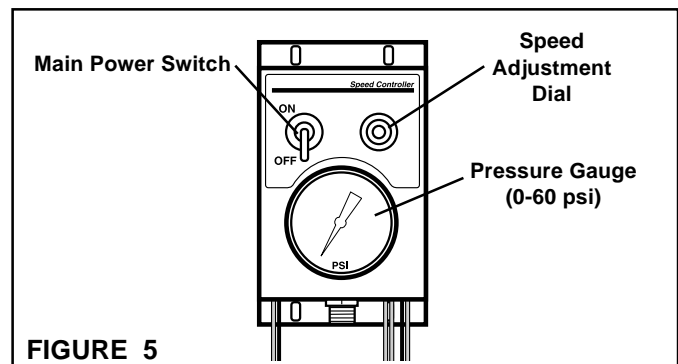


FIGURE 5

## Fertilizer Application (Special Instructions)

Popular uses for the 4101N-E2H include starter fertilizer application for row crop planting. Starter fertilizer is heavier than water per gallon (approx. 1.40 specific Gravity) and is also more viscous. These two characteristics will affect the performance as compared to water like herbicide/pesticide applications. Refer to the Performance Chart on page 7 for examples of performance using 10-34-0 fertilizer.

### NOTE

**Liquid fertilizers also have a tendency to cause gumming if left in the Pump. Thoroughly flush the Pump after each use as described in Care of the Pump.**

## Care of the Pump

### NOTE

**Before starting the Pump, make sure it can be freely rotated by hand.**

### TIGHT PUMP

#### CORROSION

If the Rotor is stuck due to rust or failure to clean the Pump after use, the Rotor can be freed by loosening each End Plate Bolt one full turn.

### NOTE

**A few drops of oil poured into the ports will help free the Rotor.**

Using an adjustable wrench, turn the Shaft to break the Rotor loose. Keep turning the Shaft as the End Plate Bolts are alternately and evenly tightened.

#### FOREIGN OBJECT

If something is lodged in the Pump (wire, straw, rust flake, stick, etc.) the pump will have to be partially disassembled to remove the object. Refer to Hypro Form 100R for disassembly instructions.

### LUBRICATION

This Pump is equipped with factory lubricated Ball Bearings and requires no further lubrication. Do not allow kerosene or oil to enter into the Ball Bearings as this will wash the grease out of the Ball Bearings. The two drain holes under the bearing housings serve to relieve the pressure behind the Bearing Seals and

prevent any liquid which may get behind the Bearing Seals from being forced into the Ball Bearings. Do not plug or inject oil into these two drain holes. Excessive dripping from these drain holes indicates Seal or Shaft wear and these worn parts must be replaced. Refer to Hypro Form 100R for repair instructions.

### AFTER USE PUMP CARE

#### GUMMING

Gumming or corrosion inside the Pump can be prevented by thoroughly flushing the Pump with water or a liquid that will neutralize the liquid pumped. For many liquids a solution of 1 gallon [3.785 liter] of ammonia mixed with 6 gallons [2.271 liters] of water may be used as a flushing solution. If the pump has been used for liquid fertilizer or similar liquids, it should be flushed after each use.

- Flush the Pump with a 50-50 solution of a permanent type automotive antifreeze containing a rust inhibitor, and water; then, plug the pump ports to prevent air from getting into the Pump.
- Cleaning and rust protection should be performed whenever the Pump will be stored for more than two to three days.

#### CORROSION PREVENTION

To prevent corrosion Hypro recommends:

- Flush the Pump as described in Gumming.

#### DO NOT

- Do not use a screwdriver or hammer to force the Pump apart. Follow the Repair Instructions in Hypro Form 100R.

- Do not run the Pump dry. Doing so may damage the Roller and Seals.
- Do not pump sandy or gritty liquids. Avoid pumping solutions containing abrasive material.
- Do not pump hot liquids (over 140° F. [59.9° C]).
- Do not pump copper sulphate or corrosive acids with cast iron, Ni-Resist or XL Series Pumps. Roundup™ type herbicides are only compatible with XL Series pumps.

## Performance

In Water						
Volts	Model 4101N-EH and 4101XL-EH			Model 4101N-E2H and 4101XL-E2H		
	psi [BAR]	AMPS	GPM [LPM]	psi [BAR]	AMPS	GPM [LPM]
12.0 (Battery) Engine Off	0 [0.00]	10.0	6.3 [23.8]	0 [0.00]	---	---
	5 [0.34]	11.3	6.0 [22.7]	10 [0.69]	8.4	5.3 [20.0]
	10 [0.68]	12.5	5.8 [21.9]	20 [1.4]	11.8	4.8 [18.2]
	15 [1.03]	13.7	5.6 [21.2]	30 [2.1]	13.7	4.65 [17.60]
	20 [1.38]	15.1	5.4 [20.4]	40 [2.8]	16.4	4.4 [16.6]
	25 [1.72]	16.7	5.2 [19.7]	50 [3.4]	19.6	4.05 [15.33]
	30 [2.07]	18.6	5.0 [18.9]	60 [4.1]	22.8	3.65 [13.82]
	35 [2.41]	20.3	4.8 [18.2]	70 [4.8]	25.8	3.20 [12.11]
	40 [2.76]	22.3	4.6 [17.4]	80 [5.5]	28.9	3.00 [43.50]
	45 [3.10]	24.1	4.4 [16.6]	90 [6.2]	31.5	2.75 [10.41]
13.5 (Alternator) Engine Running	psi [BAR]	AMPS	GPM [LPM]	psi [BAR]	AMPS	GPM [LPM]
	0 [0.00]	10.4	7.5 [28.4]	0 [0.00]	---	---
	5 [0.34]	11.7	7.0 [26.5]	10 [0.69]	9.1	5.9 [22.3]
	10 [0.68]	13.0	6.6 [25.0]	20 [1.4]	11.2	5.6 [21.0]
	15 [1.03]	14.2	6.4 [24.2]	30 [2.1]	13.9	5.25 [19.87]
	20 [1.38]	15.8	6.2 [23.5]	40 [2.8]	16.9	5.0 [18.9]
	25 [1.72]	17.4	6.0 [22.7]	50 [3.4]	19.5	4.7 [17.8]
	30 [2.07]	19.6	5.8 [22.0]	60 [4.1]	22.7	4.35 [16.46]
	35 [2.41]	20.9	5.6 [21.2]	70 [4.8]	25.7	4.0 [15.1]
	40 [2.76]	22.5	5.4 [20.4]	80 [5.5]	29.2	3.6 [13.6]
45 [3.10]	24.3	5.2 [19.7]	90 [6.2]	31.9	3.4 [12.9]	
50 [3.45]	26.1	5.0 [18.9]	100 [6.9]	34.8	3.2 [12.1]	

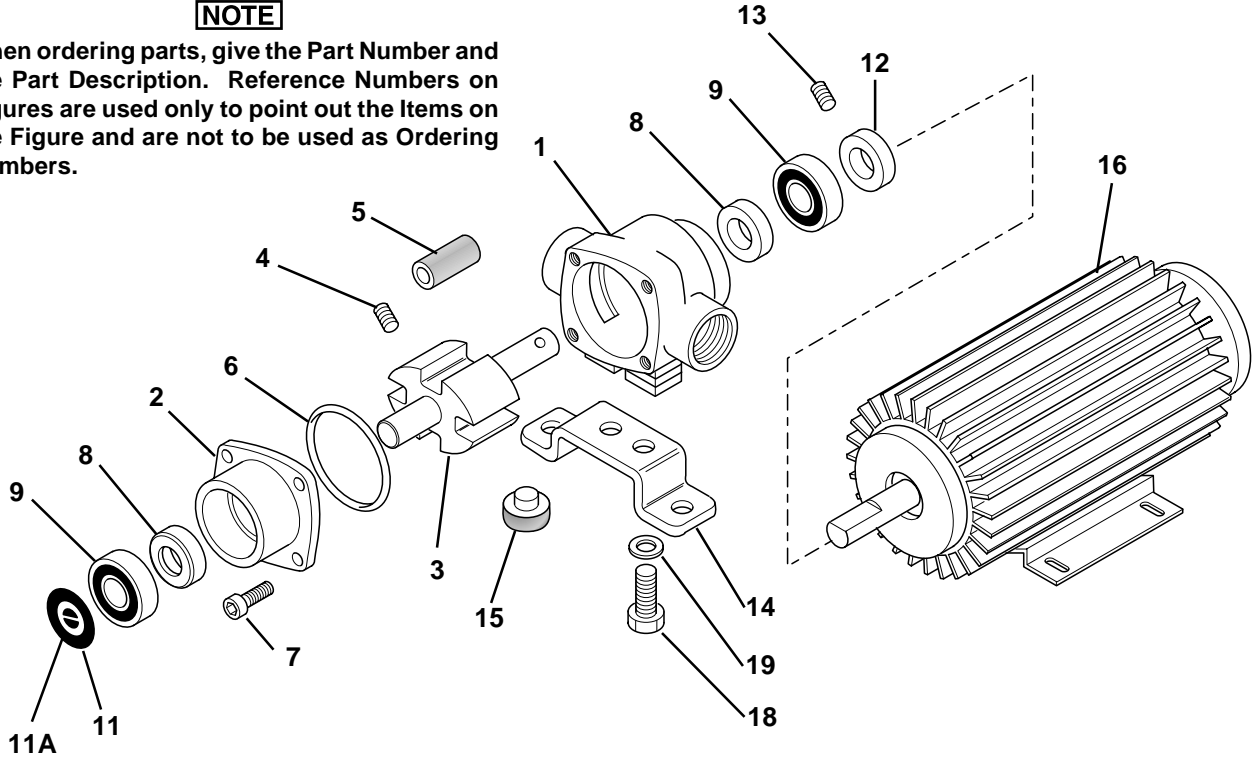
In Water						
Volts	Model 4001N-EH and 4001XL-EH			Model 4001N-E2H and 4001XL-E2H		
	psi [BAR]	AMPS	GPM [LPM]	psi [BAR]	AMPS	GPM [LPM]
12.0 (Battery) Engine Off	0 [0.00]	12.6	9.0 [34.1]	10 [0.69]	13.9	8.4 [31.8]
	5 [0.34]	14.1	8.3 [31.4]	20 [1.38]	18.0	7.9 [29.9]
	10 [0.68]	15.2	8.1 [30.7]	30 [2.07]	22.2	7.2 [27.3]
	15 [1.03]	17.3	7.8 [29.5]	35 [2.41]	25.0	6.9 [26.1]
	20 [1.38]	19.7	7.2 [27.3]	40 [2.76]	27.0	6.5 [24.6]
	25 [1.72]	22.1	6.7 [25.4]	50 [3.45]	31.6	5.9 [21.2]
	30 [2.07]	24.8	6.2 [23.5]	60 [4.12]	36.2	5.4 [20.4]
	13.5 (Alternator) Engine Running	psi [BAR]	AMPS	GPM [LPM]	psi [BAR]	AMPS
0 [0.00]		13.4	10.4 [39.4]	10 [0.69]	14.4	9.9 [37.5]
5 [0.34]		14.8	9.9 [37.5]	20 [1.38]	18.3	9.1 [34.4]
10 [0.68]		16.2	9.4 [35.6]	30 [2.07]	22.3	8.5 [32.2]
15 [1.03]		18.2	8.9 [33.7]	35 [2.41]	24.5	8.3 [31.4]
20 [1.38]		20.5	8.5 [32.2]	40 [2.76]	27.0	8.0 [30.3]
25 [1.72]		22.5	8.2 [31.0]	50 [3.45]	31.0	7.3 [27.6]
30 [2.07]		24.9	7.7 [29.1]	60 [4.12]	36.1	6.8 [25.7]

In 10-34-0 Fertilizer & Speed Controller (2530-0057)				
12.0 Volt Pressure	Model 4101N-EH and 4101XL-EH		Model 4101N-E2H and 4101XL-E2H	
	GPM [LPM]	AMPS	GPM [LPM]	AMPS
0	5.1 [19.3]	18.8	4.41 [16.7]	15.4
10	4.64 [17.6]	21.1	4.26 [16.1]	17.4
20	4.32 [16.4]	23.4	3.67 [13.9]	19.4
30	4 [15.1]	25.1	3.41 [12.9]	21.1
40	3.46 [13.1]	25.6	3.34 [12.6]	23.1
50	3.04 [11.5]	25.5	3.33 [12.6]	25.2
13.5 Volt Pressure	Model 4101N-EH and 4101XL-EH		Model 4101N-E2H and 4101XL-E2H	
	GPM [LPM]	AMPS	GPM [LPM]	AMPS
0	5.39 [20.4]	20.1	4.98 [18.8]	16.5
10	4.99 [18.9]	21.9	4.44 [16.8]	18.6
20	4.65 [17.6]	24.0	4.27 [16.2]	20.5
30	4.25 [16.1]	25.2	4.1 [15.5]	22.4
40	3.6 [13.6]	24.7	3.77 [14.3]	24.1
50	3.07 [11.6]	24.2	3.7 [14.0]	25.4

# Replacement Parts

**NOTE**

When ordering parts, give the Part Number and the Part Description. Reference Numbers on Figures are used only to point out the items on the Figure and are not to be used as Ordering Numbers.



**FIGURE 6**

Ref. No.	Qty. Req'd	Part Number	Description
1	1	0100-4001N	Body (Ni-Resist) with Std. Seal (4001)
1	1	0100-4101N	Body (Ni-Resist) with Std. Seal (4101)
1	1	0100-4001X	Body (Silvercast) with Std. Seal (4001)
1	1	0100-4101X	Body (Silvercast) with Std. Seal (4101)
2	1	0200-4001N	Endplate (Ni-Resist) Std. Seal (4001)
2	1	0200-4101N	Endplate (Ni-Resist) Std. Seal (4101)
2	1	0200-4001X	Endplate (Silvercast) Std. Seal (4001)
2	1	0200-4101X	Endplate (Silvercast) Std. Seal (4101)
3	1	0301-4001N	Rotor (Ni-Resist) & Shaft Assy (4001)
3	1	0301-4101N	Rotor (Ni-Resist) & Shaft Assy (4101)
3	1	0301-4001X	Rotor (Silvercast) & Shaft Assy (4001)
3	1	0301-4101X	Rotor (Silvercast) & Shaft Assy (4101)
3A	1	0551-4001	Shaft Only
4	1	2230-0016	Rotor Set Screw (Silvercast Only)
4	1	2230-0002	Rotor Set Screw
5	4	1005-0002	Super Rollers (Standard)
5	4	1002-0002	Polypropylene Rollers (Optional)
5	4	1001-0002	Buna-N Rollers (Optional)
5	4	1055-0002	Teflon Rollers (Optional)
6	1	1720-0104	O-ring Gasket for Endplate
7	4	2220-0018	Endplate Screw

Ref. No.	Qty. Req'd	Part Number	Description
8	2	2107-0002	Viton Seal (Standard)
8	2	2102-0001	Buna-N Seal (Optional)
8	2	2103-0001	Leather Seal (Optional)
9	2	2000-0010	Ball Bearing
11	1	2300-0021	Bearing Cover
11A	1	6031-0258	Name Plate (Specify Pump Model No.)
12	1	1420-0001	Locking Collar
13	1	2230-0001	Set Screw
14	1	1501-0054	Base
15	2	1450-0003	Bumper
16	1	2570-0013	Electric Motor (12 vdc) (.33 hp) (gold)
16	1	2570-0015	Electric Motor (12 vdc) (.39 hp) (black)
17	1	4001N-H	Complete Roller Pump Assy (Not Shown)
17	1	4001XL-H	Complete Roller Pump Assy (Not Shown)
17	1	4101N-H	Complete Roller Pump Assy (Not Shown)
17	1	4101XL-H	Complete Roller Pump Assy (Not Shown)
18	2	2210-0003	Bolt
19	2	2260-0002	Lock Washer
20	2	1900-0150	Torsion Spring (.33 hp) (Not Shown)
21	2	3010-0246	Brush Assy (.33 hp) (Not Shown)
22	2	1900-0151	Torsion Spring (.39 hp) (Not Shown)
23	2	3010-0247	Brush Assy (.39 hp) (Not Shown)

## Limited Warranty on Hypro Pumps

Hypro Corporation ("Hypro") warrants to the original purchaser of its products (the "Purchaser") that such products will be free from defects in material and workmanship under normal use for the period of one (1) year for all products except: oil crankcase plunger pumps will be free from defects in material and workmanship under normal use for the period of five (5) years, and accessories will be free from defects in material and workmanship under normal use for the period of ninety (90) days. In addition, Hypro warrants to the purchaser all forged brass pump manifolds will be free from defects in material and workmanship under normal use and from damage resulting from environmental conditions for the life of the pump.

"Normal use" does not include use in excess of recommended maximum speeds, pressures, vacuums and temperatures, or use requiring handling of fluids not compatible with component materials, as noted in Hypro product catalogs, technical literature, and instructions. This warranty does not cover freight damage, freezing damage, normal wear and tear, or damage caused by misapplication, fault, negligence, alterations, or repair that affects the performance or reliability of the product.

**THIS WARRANTY IS EXCLUSIVE. HYPRO MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

Hypro's obligation under this warranty is, at Hypro's option, to either repair or replace the product upon return of the entire product to the Hypro factory in accordance with the return procedures set forth below. **THIS IS THE EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.**

**IN NO EVENT SHALL HYPRO BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, WHETHER FOR BREACH OF ANY WARRANTY, FOR NEGLIGENCE, ON THE BASIS OF STRICT LIABILITY, OR OTHERWISE.**

### Return Procedures

**All pumps or products must be flushed of any chemical (ref. OSHA Section 0910.1200 (d)(e)(f)(g)(h) and hazardous chemicals must be labeled before being shipped\* to Hypro for service or warranty consideration.** Hypro reserves the right to request a Material Safety Data sheet from the Purchaser for any pump or product Hypro deems necessary. Hypro reserves the right to "disposition as scrap" pumps or products returned which contain unknown substances, or to charge for any and all costs incurred for chemical testing and proper disposal of components containing unknown substances. Hypro requests this in order to protect the environment and personnel from the hazards of handling unknown substances.

For technical or application assistance, call the Hypro Technical/Application number: 1-800-445-8360.

To obtain service or warranty assistance, call the Hypro Service and Warranty number: 1-800-468-3428;

or call the Hypro Service and Warranty FAX: (651) 766-6618.

Be prepared to give Hypro full details of the problem, including the following information:

1. Model number and the date and from whom you purchased your pump.
2. A brief description of the pump problem, including the following:
  - Liquid pumped. State the pH and any non-soluble materials, and give the generic or trade name.
  - Temperature of the liquid and ambient environment.
  - Suction lift or vacuum (measured at the pump).
  - Discharge pressure.
  - Size, type, and mesh of the suction strainer.
  - Drive type (gas engine/electric motor; direct/belt drive; tractor PTO) and rpm of pump.
  - Viscosity (of oil, or other than water weight liquid).
  - Elevation from the pump to the discharge point.
  - Size and material of suction and discharge line.
  - Type of spray gun, orifice size, unloader/relief valve.

Hypro may request additional information, and may require a sketch to illustrate the problem.

Contact the factory to receive a return material authorization before sending the product. All pumps returned for warranty work should be sent shipping charges prepaid to:

HYPRO CORPORATION  
Attention: Service Department  
375 Fifth Avenue NW  
New Brighton, Minnesota 55112-3288

\*Carriers, including U.S.P.S., airlines, UPS, ground freight, etc., require specific identification of any hazardous materials being shipped. Failure to do so may result in a substantial fine and/or prison term. Check with your shipping company for specific instructions.