

# OPERATION, SERVICE AND PARTS INSTRUCTION MANUAL



## 940 & 960-PO-PS M3 Series HYDRAULIC POWER PUMPS For all pumps with Serial No. Code LE & MT



**Read and understand** this material before operating or servicing this tool. Failure to understand how to safely operate the tool could result in an accident causing serious injury or death.

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### SAFETY ALERT SYMBOL

The symbol above is used to call your attention to instructions concerning your personal safety. Watch for this symbol. It points out important safety precautions. It means **“ATTENTION! Become alert! Your personal safety is involved!”** Read the message that follows and be alert to the possibility of personal injury or death.

### **DANGER**

Immediate hazards which, if not avoided, **WILL** result in severe personal injury or death.

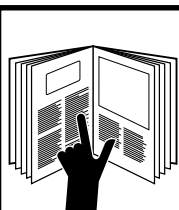
### **WARNING**

Hazards or unsafe practices which, if not avoided, **COULD** result in severe personal injury or death.

### **CAUTION**

Hazards or unsafe practices which, if not avoided, **COULD** result in minor personal injury or property damage.

Safety is a critical factor in the design of Greenlee equipment. The best program starts with a safety-conscious operator. The information highlighted in this bulletin describes operating practices for the benefit of the workers who will use our equipment in their daily jobs. Comments from users are appreciated.



### **DANGER**

A person who has not read and does not understand all operating instructions is not qualified to operate this tool.

Failure to read and understand safety instructions may result in injury or death.



## IMPORTANT SAFETY INSTRUCTIONS

### **⚠ DANGER**

- Do not connect the pump to any system or system component other than those supplied by Greenlee and rated at less than 10,000 psi (68,950 kPa).
- Do not alter the internal high-pressure relief valve setting.
- Do not use this pump in a hazardous environment. Hazards include open flame and flammable liquids or gases.

Failure to observe these warnings will result in severe injury or death.

### **⚠ WARNING**

- Inspect pump, hoses, couplers and fittings for wear or damage. Replace worn, damaged or missing components with Greenlee replacement parts.
- Do not twist, kink, curl, paint or cut the hydraulic hoses.
- Wear eye protection when operating this equipment.
- Disconnect the pump from the power supply, rotate the release valve lever to AUTO RELEASE and disconnect the hose from the ram and the pump before performing any service.

Failure to observe these warnings could result in severe injury or death.



### **⚠ WARNING**

Electric shock hazard:

- Do not expose power tools to rain.
- Do not immerse the pendant switch in water or other liquid.



### **⚠ WARNING**

Skin Injection Hazard:

High pressure oil easily punctures skin causing serious injury, gangrene or death. If injured seek medical help immediately to remove oil.

Do not use fingers or hands to check for leaks.

Depressurize hydraulic system before disconnecting the hose.

### **⚠ CAUTION**

- The pump is heavy, weighing up to 75 lbs. Follow NIOSH work practices for manual lifting. If in doubt, get help.
- Unplug pump when not in use and when changing accessories.
- Do not use the hose to pull, lift, or carry the equipment.
- Always work in an area providing good footing and support.
- Keep work area well-lit, free of clutter, and dry.

Failure to observe these precautions could result in injury or property damage.

## SAVE THESE INSTRUCTIONS

Additional copies of this manual are available upon request at no charge.

## Introduction

These are high-pressure hydraulic power pumps which are simple to operate, lightweight, durable and portable. These power pumps have a built-in, high volume / low pressure pumping feature which gives fast approach ram action and automatic change-over to low volume / high pressure when pressure exceeds 200 psi. The pumping unit consists of a one-piston radial-type capable of developing 10,000 psi. A safety valve set at 10,000 psi protects the unit against excessive pressures. It is also equipped with an automatic pressure-operated valve which provides high pressure advance of the ram while the motor is running. Pressure is automatically released when motor stops.

The pump is controlled by a two-position pendant switch which runs the pump motor when held in the down position. When released, the pump motor shuts off.

## Assembly

These pumps are completely assembled and are shipped to you as a complete pumping unit. The only assembly necessary is the connection of the ram to the pump and the power cord to the proper electrical outlet.

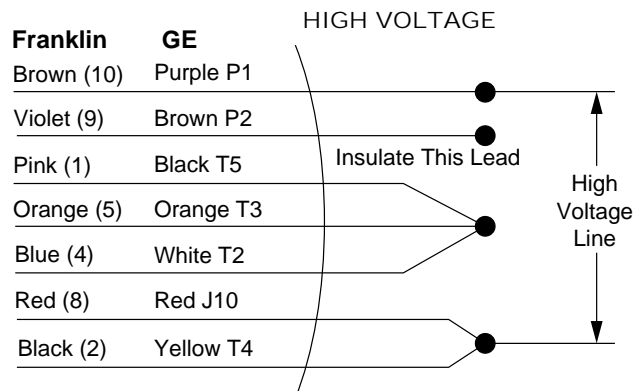
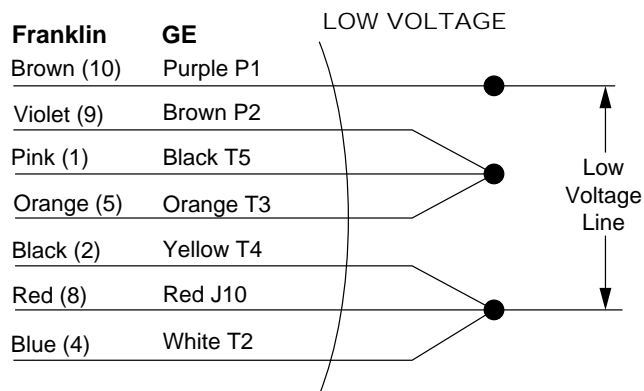
## Power Connection

The pumps are designed and shipped wired for 115 Volt, AC operation. They cannot be wired for 230 Volts without changing to a 230 Volt relay. If 230 Volts is required and has not been wired at the factory, the motor leads must be rewired in accordance with the wiring diagram shown.

### ⚠ CAUTION

For your protection, ground unit before using. The electric motor is equipped with an approved 3-conductor cord and 3-blade grounding-type attachment plug to be used with the proper grounding-type receptacle, in accordance with the National Electrical Code. The green-colored conductor in the cord is the grounding wire, which is attached to the metal frame of the unit inside the housing and to the longest blade of the attachment plug cap. A special grounding adapter is supplied (except in Canada or for use above 150 volts) to permit using two-wire receptacles until the correct receptacle is installed. The green grounding wire extending from the side of the adapter must be connected to a permanent ground such as a properly grounded outlet box, conduit or water pipe, before plugging in the unit. (If extension cords are used, they should have sufficient rated capacity and a properly connected grounding circuit.)

### CONNECTIONS FOR CW ROTATION (VIEW MOTOR FROM LEAD END)



## Operating Instructions

These power pumps are designed to operate at 10,000 psi intermittently. For continuous service, as on production work, the pressure should not exceed 6,000 psi. (This limitation is for motor protection only.)

Before operating pump, check the following to assure proper service:

1. Check for proper power connections and for tightness of hose connections before starting pump.
2. Check hydraulic oil with dipstick. Oil should be within 1/2" of reservoir top.
3. Start motor and allow pump to idle a few minutes. This will allow the hydraulic oil to work into moving parts and give prime to pump.

## Servicing

### Filling Oil Reservoir

The oil reservoir must be kept filled with a good grade of light hydraulic oil—Greenlee 905 0806.8 hydraulic oil or equal, in order for the pump to operate properly.

### CAUTION

Never use synthetic fluids or fluids with poor lubricating qualities (i.e., brake fluids, etc.) as permanent injury to the pump will result.

Eight quarts are required, of which 6-1/2 quarts are usable. A minimum of 1-3/4 quarts must be at the bottom of the reservoir at all times during operation. Be sure that your complete operation does not require more than the usable amount of oil.

To refill or add oil to the reservoir, proceed as follows:

1. Remove vent unit from top of reservoir (B).
2. Add oil to within 1/2" of top of reservoir when ram is retracted.
3. Install vent unit (B) securely in place.

### CAUTION

Check to see that vent unit is not clogged before attempting to operate pump.

### Draining Oil Reservoir

Unscrew and remove 3/4 inch pipe plug (74) from side of pump base. Turn pump on its side to drain all oil from reservoir. Be sure to replace plug before refilling reservoir with oil.

### Flushing System

As long as the pump is used as outlined in the operating instructions, long, trouble-free performance can be expected. To maintain this performance, it is absolutely essential that dirt or other foreign matter be kept out of the system as this is the most common cause of hydraulic system failure. Therefore, when opening up the pump for any reason, be sure to exercise extreme care in cleanliness and to use clean tools and cloths. If, at any time, dirt is suspected to have found its way into the system, the entire oil system should be flushed as follows:

1. Drain oil from reservoir.
2. Fill reservoir with any recommended flushing oil or clean kerosene and operate pump.  
*Note: Do not operate pump for a very long time as system is not designed to operate with flushing oil or kerosene.*
3. Drain flushing oil or kerosene from reservoir and refill with new oil.

## Pump Specifications

Model No.	Motor 115V 60 Hz 1 ph	Pumping Capacity In. Cu./Min.		Dimensions In Inches		Approx. Weight (lbs.)
		100 psi	10,000 psi	Height	Base	
940-M3-PO-PS	1 hp	150	30	18-1/4	12 x 10-1/2	82
960-M3-PO-PS	1-1/2 hp	300	60	20	12 x 10-1/2	92

## Motor Maintenance

If the pump motor is in need of repair, it should be done by the manufacturer of the motor or a qualified service center.

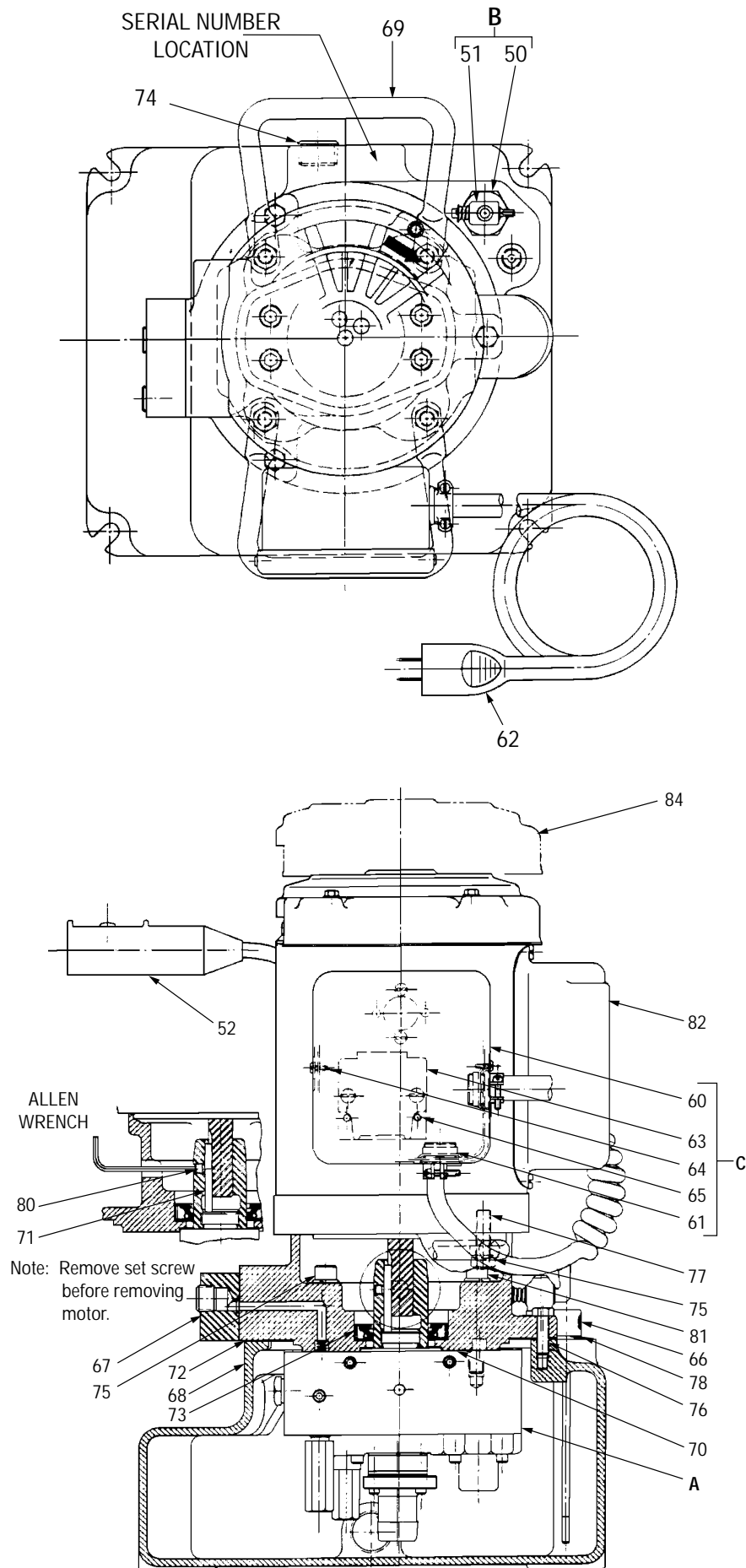
## Correcting Minor Hydraulic Problems

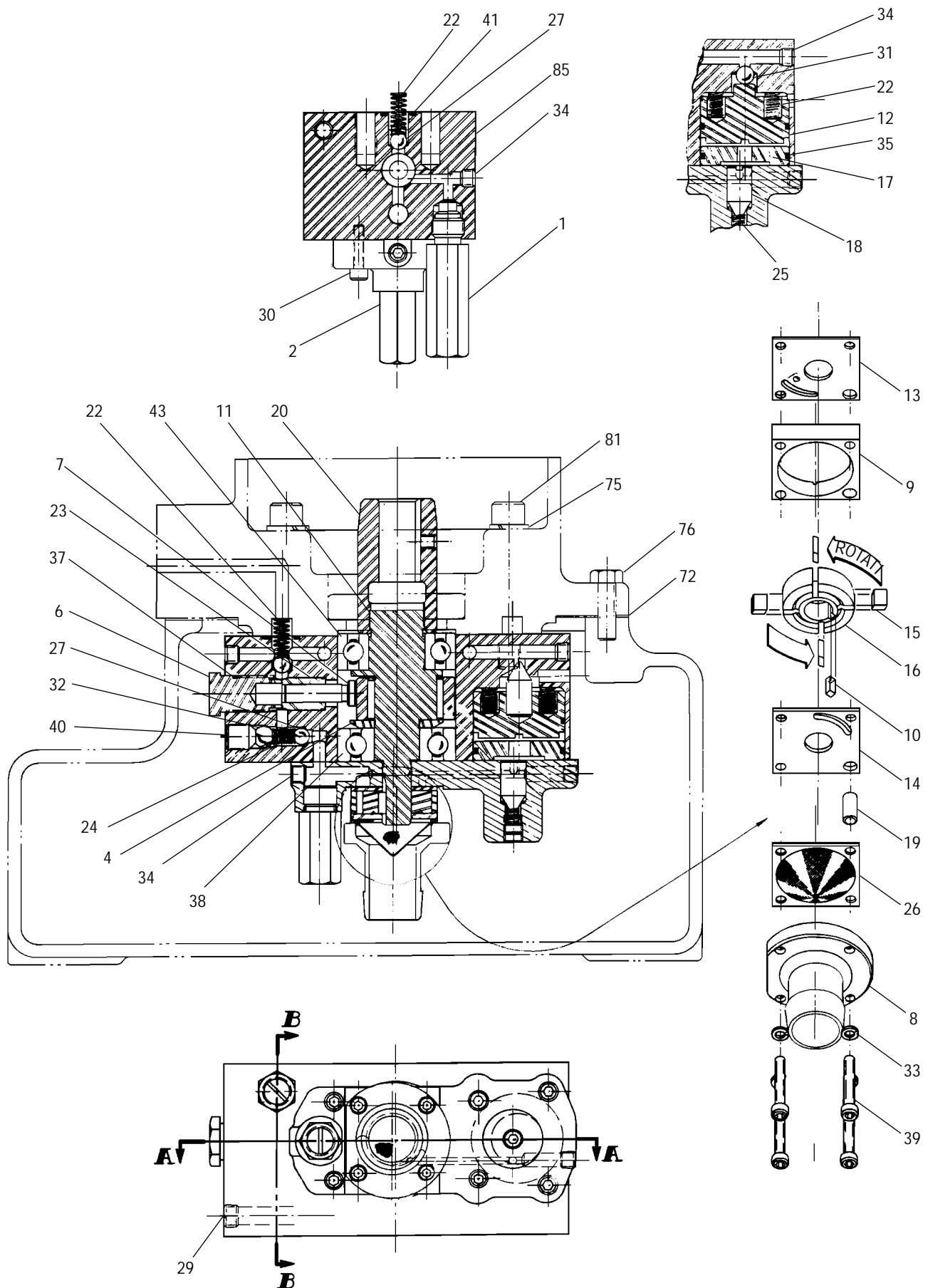
The hydraulic unit should be observed constantly for out-of-the-ordinary performance and unusual noises. If any of these are present, shut off pump and take corrective steps immediately to avoid possible expensive repairs later on. See Troubleshooting charts for some of the most common minor troubles and their solutions.

## Troubleshooting

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Improper advance or return.	Air in circuit, oil supply low.  Dirt in system, causing valves to lock open.  If trouble is not cleared up by above remedies, trouble may be due to dirty or plugged-up screen.	Add oil, run unit to work out air.  Flush out entire oil system and fill with new oil (see page 5).  Drain oil (see page 5). Next remove pumping unit cover and clean or replace screen (26). <b>CAUTION: Do not operate pump without screens, as particles of dirt will be sucked into pump and valve mechanisms, seriously damaging valve seats.</b>
Unable to reach pressure.	Same as above.	Same as above.
Necessary to add oil often.	Oil leaks.	Check for broken lines, loose fittings or connections.
Noise in hydraulic system.	Air in system. Low in oil.	Add oil (page 5). Run pump to work out air.

If the above corrective measures fail to make the pump function properly, it is recommended that you send the pump back to the factory or to an authorized Greenlee service center. Under no conditions, allow unqualified personnel to attempt to repair the pump (particularly the pump block unit or control valve unit), as serious irreparable damage may result.





## Hydraulic Power Pumps — Parts List

940-M3-PO-PS (501 8608.6)

960-M3-PO-PS (501 0860.6)

Key	Part No.	Description	Qty
A	501 8621.3	Block Unit, PO Pump (1-43) .....	1
1	500 6067.8.	Valve Unit, Relief .....	1
2	501 7766.4	Valve Unit, Relief .....	1
3	501 7345.6	Plate, Pump Mounting .....	1
4	501 8871.2	Spacer, Bearing .....	1
5	501 1855.2	Race, Outer .....	1
6	501 1862.5	Plug, Plunger .....	1
7	501 9060.1	Plunger, High Pressure .....	1
8	502 0424.6	Block, Intake .....	1
9	501 4861.3	Plate, Pump .....	1
10	501 4862.1	Key .....	1
11	501 4876.1	Shaft, Eccentric .....	1
12	501 5958.5	Piston, Valve .....	1
13	501 7130.5	Plate, Top .....	1
14	501 7131.3	Plate, Bottom .....	1
15	501 7135.6	Vane .....	4
16	501 7136.4	Rotor .....	1
17	501 7347.2	Stop, Valve Piston .....	1
18	501 7348.0	Plunger, Release .....	1
19	501 7467.3	Dowel, Hollow .....	1
20	501 8238.2	Adapter, Drive Shaft .....	1
21	501 8622.1	Block, PO Pump .....	1
22	500 6111.9	Spring, Compression .....	5
23	501 9059.8	Bushing, Plunger .....	1
24	501 4865.6	Spring, Compression .....	1
25	501 4893.1	Spring, Compression .....	1
26	502 1175.7	Screen, Intake .....	1
27	905 0436.4	Ball, 9/32 Chrome Steel .....	2
29	905 0501.8	Plug, 1/8 NPT Socket Head Pipe .....	1
30	905 0577.8	Screw, #10-32 NF x 3/4 Socket Head Cap .....	6
31	905 0680.4	Ball, 5/16 Chrome Steel .....	1
32	905 0681.2	Ball, 3/8 Chrome Steel .....	1
33	905 1526.9	Washer, #8 Hi-Collar Lock .....	4
34	905 0824.6	Plug, 1/16 NPT Socket Head Pipe .....	7
35	905 0839.4	O-Ring, 1-3/8 x 1-1/2 x 1/16 .....	2
36	502 2611.8	Roller, 1/8 x 3/4 .....	30
37	905 1524.2	O-Ring, 1/2 x 5/8 x 1/16 .....	1
38	905 0989.7	Bearing, .7874 ID x 2.0472 OD x .5906 Thick .....	1
39	905 0994.3	Screw, #8-32 NC x 1-1/4 Socket Head Cap .....	4
40	905 1111.5	Screw, 7/16-20 NF x 1/2 Cup Point Socket Set .....	1
41	905 1215.4	O-Ring, 7/16 x 9/16 x 1/16 .....	1
42	905 1337.1	Screw, 5/16-24 NF x 5/32 Socket Jam .....	2
43	905 1473.4	Bearing, .9843 ID x 2.0472 OD x .5906 Thick Ball .....	1
C	502 0721.0	Cord Unit, PS Power (52 & 60-65) .....	1
52	503 2363.6	Switch, Pendant .....	1
60	501 8443.1	Enclosure, Relay .....	1
61	918 5117.3	Connector .....	2
62	918 5264.1	Cord, 10-foot .....	1
63	918 5364.8	Relay, 115 Volt .....	1
64	905 1523.4	Screw, #6 x 3/8 Slotted Sheet Metal .....	2
65	905 1252.9	Screw, #6-32 NC x 1/4 Round Head Thread Cutting .....	2
66	501 5646.2	Dipstick Unit .....	1

## Parts - Hydraulic Power Pumps (cont'd)

940-M3-PO-PS (501 8608.6)

960-M3-PO-PS (501 0860.6)

Key	Control No.	Description	Qty
67	501 6152.0	Connection Unit, Hose .....	1
68	501 5695.0	Reservoir .....	1
69	501 2663.6	Handle, Lifting.....	2
70	501 8292.7	Plate, Motor Mounting .....	1
71	501 4852.4	Key .....	1
72	501 5701.9	Gasket, Reservoir .....	1
73	905 0320.1	Seal, 1-3/8 ID x 2-3/8 OD Oil .....	1
74	905 0734.7	Plug, 3/4 NPTF Socket Head Pipe .....	1
75	905 0506.9	Washer, 3/8 x .136 x .070 Lock.....	8
76	905 0522.0	Screw, 5/16-18 NC x 1" Hex Head Cap .....	3
77	905 0532.8	Screw, 3/8-16 NC x 1-1/4" Hex Head Cap .....	4
78	905 0713.4	O-Ring, 1/2 x 11/16 x 3/32 .....	1
80	905 1269.3	Screw, 1/4-20 NC x 1/4 Cup Point Socket Head Set .....	1
81	905 1474.2	Screw, 3/8-24 NF x 2-1/2 Socket Head Cap .....	4
82	918 5183.1	Motor, 1 HP, 1725 RPM (904-M3-PO-PS) .....	1
84	918 5300.1	Motor, 1-1/2 HP, 3450 RPM (960-M3-PO-PS) .....	1
85	502 0858.6	Block, PO Pump .....	1
86	501 7864.4	Piston, Valve.....	1
87	501 6608.5	Plunger, Release .....	2

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