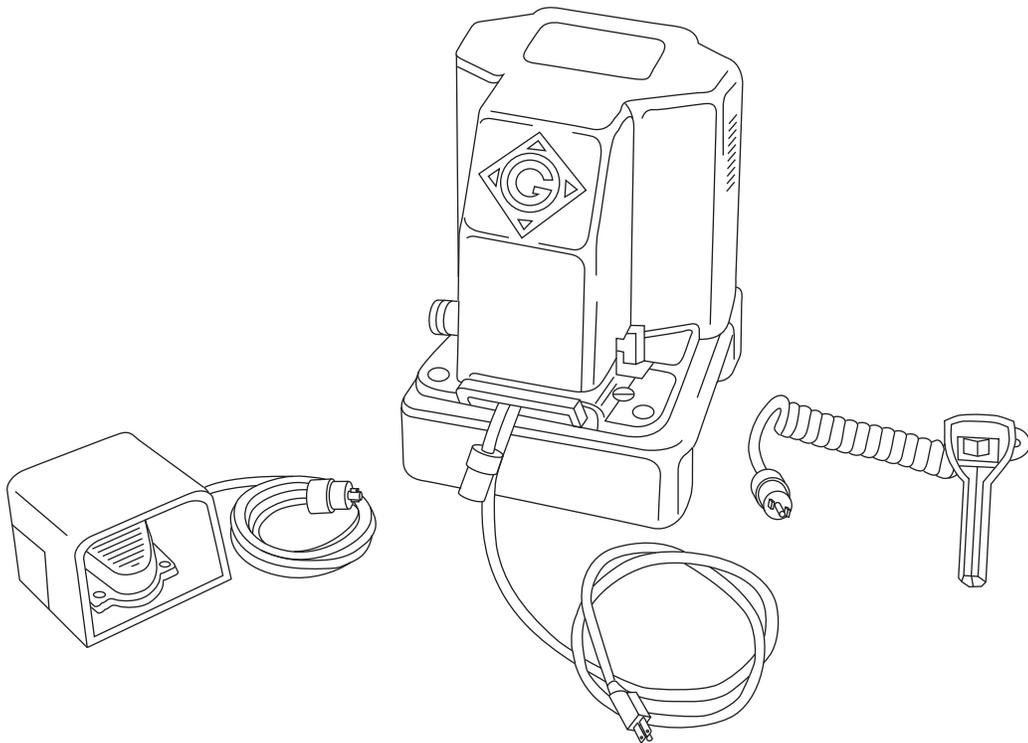


# SERVICE MANUAL



## 976-22 and 980-22 Hydraulic Power Pumps

Serial Codes YD and ABZ



**Read and understand** all of the instructions and safety information in this manual before operating or servicing this tool.

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## Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

## Purpose of this Manual

This manual is intended to familiarize all personnel with the safe service procedures for the following Greenlee tools:

976-22 Hydraulic Power Pump (Serial Code YD)

980-22 Hydraulic Power Pump (Serial Code ABZ)

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge.

## Other Publications

Instruction Manual: 999 9138.1 (IM 1036)



**Do not discard this product or throw away!**

For recycling information, go to  
[www.greenlee.com](http://www.greenlee.com).

All specifications are nominal and may change as design improvements occur. Greenlee Tools, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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# ***KEEP THIS MANUAL***

## IMPORTANT SAFETY INFORMATION



### SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

#### **⚠ DANGER**

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

#### **⚠ WARNING**

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

#### **⚠ CAUTION**

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



#### **⚠ DANGER**

Read and understand all of the instructions and safety information in this manual before operating or servicing this tool. Refer also to the Instruction Manual, which is listed under "Other Publications."

Failure to observe this warning will result in severe injury or death.

#### **⚠ DANGER**

Do not connect the pump to any system or system component other than those supplied by Greenlee. Other manufacturers' components may not withstand the maximum pressure and may fail. Nearby personnel can be injured by flying components and hydraulic oil.

Failure to observe this warning will result in severe injury or death.

#### **⚠ DANGER**

Do not alter the internal high-pressure relief valve setting. Altering this setting will change the maximum pressure the pump can develop, which can cause a component failure. Nearby personnel can be injured by flying components and hydraulic oil.

Failure to observe this warning will result in severe injury or death.



#### **⚠ DANGER**

Do not use this pump in a hazardous environment. Hazards include flammable liquids, gases, or other materials. Using this pump in a hazardous environment can result in a fire or explosion.

Failure to observe this warning will result in severe injury or death.

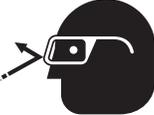
## IMPORTANT SAFETY INFORMATION

	<b>⚠ WARNING</b>
	<p>Electric shock hazard:</p> <ul style="list-style-type: none"> <li>• Do not expose power tools to rain.</li> <li>• Do not immerse the pendant switch in water or other liquid.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>

	<b>⚠ CAUTION</b>
	<p>Fill unit with hydraulic oil before operating pump.</p> <p>Failure to fill unit with oil will result in damage to the pump.</p>

	<b>⚠ WARNING</b>
	<p>Skin injection hazard:</p> <p>High-pressure oil easily punctures skin causing serious injury, gangrene, or death. If injured, seek medical help immediately to remove oil.</p> <ul style="list-style-type: none"> <li>• Do not use fingers or hands to check for leaks.</li> <li>• Depressurize hydraulic system before servicing or disconnecting the hose.</li> </ul>

<b>⚠ CAUTION</b>
<ul style="list-style-type: none"> <li>• The pump is heavy and requires two persons to lift. Improper lifting can result in injury.</li> <li>• Do not use hose or cord to pull, lift, or carry the equipment. Misuse will damage the hose or cord.</li> </ul> <p>Failure to observe these precautions may result in injury or property damage.</p>

	<b>⚠ WARNING</b>
	<p>Wear eye protection when operating or servicing this tool.</p> <p>Failure to wear eye protection could result in serious eye injury from flying debris or hydraulic oil.</p>

<b>IMPORTANT</b>
<p>Make sure all hose fittings are properly seated before starting the pump. Incomplete connections may not allow the accessory's ram to retract after the hydraulic operation is finished.</p>

*Note: Keep all decals clean and legible, and replace when necessary.*

<b>⚠ WARNING</b>
<p>Inspect pump, hoses, couplers, and fittings for wear or damage. Replace worn, damaged, or missing components with Greenlee replacement parts. Worn or damaged components can fail, resulting in injury.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

## Maintenance

### IMPORTANT

Procedure for depressurizing the hydraulic system:

1. Disconnect the pump from the power source.
2. Rotate the release lever to AUTO RELEASE and allow the ram to retract fully.
3. Disconnect the hose slowly to release any trapped pressure.

### Every Time the Pump Is Used

- Check the oil reservoir level. The oil level should be approximately 25 mm (1 inch) from the top of the reservoir. If the oil level is low, refer to “Adding Oil” in this section of the manual.
- Examine the condition of the hose, connectors, and O-rings for deterioration, wear, or other damage. Replace any missing or damaged components.
- Check the condition of all electrical cords, plugs, and connectors.
- Listen for unusual noises and observe the operation of the pump for changes in performance. Either situation may indicate that maintenance or repairs are necessary.

### Periodically

- Examine the hydraulic oil for changes in color or viscosity, and the presence of dirt or other contamination.
- Occasionally check the oil temperature after the pump is operated. The recommended operating temperature is 38 °C to 50 °C (100 °F to 125 °F).

### Cleaning

- Periodically clean the exterior of the pump and motor. Use a vacuum cleaner to clean the ventilation openings.
- Clean the area around the reservoir vent, and be sure the vent breather hole is open.
- Keep all hose connections clean. Use protective caps or plugs when couplers are not in use.

### Oil Condition

Visual inspection of the oil may be used as a guide to determine the need to replace the oil. A change in appearance, such as darkening or thickening, indicates a need for replacement. The continued use of oil after it should be replaced causes accelerated wear of system components and voids the warranty.

### Adding Oil

### ⚠ CAUTION

Do not use brake fluid. Brake fluid will ruin the seals.

Refer to the “Parts List” in this manual for Greenlee hydraulic oil specification and Greenlee part number.

1. Place the control lever in the AUTO RELEASE position.
2. Unplug the electrical cord from the power source.
3. Thoroughly clean the area around the fill hole.
4. Remove the vented reservoir plug.
5. Use Greenlee hydraulic fluid or an equivalent high-grade light hydraulic oil.
6. Pour the oil through a clean funnel with a filter screen.
7. Add oil until the oil level is 25 mm (1 inch) from the top of the reservoir cover.

## Maintenance (cont'd)

### Purging (Bleeding) Air

#### **⚠ CAUTION**

When purging air from the system:

- Do not advance the ram more than 3/4 of its stroke. Overextending the ram allows hydraulic fluid to leak out, and the ram may damage the O-rings when it retracts.
- Do not restrict the ram travel to run the pump up to full pressure.

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

Erratic performance may indicate air in the hydraulic fluid.

1. Remove the ram from the accessory (conduit bender frame, cable cutter, etc.).
2. If possible, position the pump so that it is located higher than the ram. This will allow air to travel up the hydraulic hose to the pump reservoir.
3. Place the ram in a vertical position with the hose coupler upward.
4. Rotate the control lever counterclockwise (to MANUAL RELEASE).
5. Start the pump and, using the ram scale as a reference, advance the ram 3/4 of its stroke. Stop the pump. **Do not overextend the ram.**
6. Rotate the control lever clockwise (to AUTO RELEASE). The ram will retract, forcing any air out through the hose, into the pump reservoir, and through the vented plug.
7. Check the oil level of the reservoir. Add oil if necessary.

### Draining and Flushing the System

*Note: Thoroughly clean the pump exterior before removing the reservoir.*

1. Remove the reservoir cover screws.
2. Remove the pump system from the reservoir.

*Note: Be careful not to damage the cover gasket, inlet strainer, or relief valve when removing the pump.*

3. Clean the interior of the reservoir and fill with clean kerosene. Do not use solvents. Rinse the inlet strainer.
4. Place the pump system into the reservoir and replace the four cover screws.
5. Connect a hose to the pump as usual. Insert the other end of the hose into the pump reservoir at the fill hole.
6. Run the pump for several minutes. While the pump is running, rotate the control lever between MANUAL RELEASE and AUTO RELEASE several times. Start and stop the pump several times to cycle the pilot-operated valve.
7. Remove the hose and remove the pump assembly from the reservoir. Drain and clean the reservoir interior. Allow the reservoir to dry. Drain the hose.
8. Reassemble the pump system.
9. Refill the reservoir as instructed under "Adding Oil" in this section of the manual.

### Motor Maintenance

Disconnect the pump from the power source before servicing or cleaning the motor. The exposed motor bearings and shaft should be cleaned periodically.

### Lubrication

Lubricate the motor according to the motor manufacturer's instructions, which are on the nameplate or the terminal box cover.

## Troubleshooting—Hydraulic Pump

Repair work must be done by qualified personnel familiar with this equipment.

If possible, use a hand pump to apply back pressure when checking for leaks.

**How to use this table:** If your hydraulic pump does not

operate properly, find the description of the problem under the “Problem” column. Read the “Probable Cause” and the “Possible Remedy.” Begin with the solution listed first, and proceed through all of the solutions until the problem is solved. Where repairs are necessary, refer to the appropriate schematic and item listed in the “Possible Remedy” column.

Problem	Probable Cause	Possible Remedy
Motor will not start.	<p>No power to motor.</p> <p>Motor is damaged or worn out.</p>	<p>Plug electric cord into a properly rated power source. Unplug cord and inspect the contacts. Clean contacts if necessary.</p> <p>Replace low voltage control. The voltage should be 220 VAC (±10%).</p> <p>Replace the electric cord.</p> <p>Replace switch cord or ON/OFF switch.</p> <p>Replace motor.</p>
Motor will not start under load.	<p>Voltage supplied to motor is too low.</p> <p>Current rating of extension cord is too low.</p> <p>Pilot-operated valve will not open, will not open fully, or opens too slowly.</p>	<p>Unplug cord and check power source with a voltmeter. The voltage should be 220 VAC (±10%).</p> <p>See “Extension Cord Specifications” in the “Setup” section of the Instruction Manual.</p> <p>See “Troubleshooting—Pilot-Operated Valve” at the end of this troubleshooting section.</p>
Motor starts, but stops when it encounters a load.	<p>Voltage supplied to motor is too low.</p> <p>Current rating of extension cord is too low.</p> <p>Motor is overheated.</p> <p>Misalignment of the motor shaft and low-pressure pump drive shaft.</p> <p>The counterweight needs adjustment.</p> <p>Motor is damaged or worn out.</p>	<p>Unplug cord and check power source with a voltmeter. The voltage should be 220 VAC (±10%).</p> <p>See “Extension Cord Specifications” in the “Setup” section of the Instruction Manual.</p> <p>Let motor cool. Do not run motor continuously in a hot environment.</p> <p>Replace reservoir cover plate (22).</p> <p>See “Motor Face Seal” and Figure A1 for the correct setting of the counterweight.</p> <p>Replace motor.</p>

## Troubleshooting—Hydraulic Pump (cont'd)

Problem	Probable Cause	Possible Remedy
<p>Ram will not advance.            Ram advances slowly.            Ram will not advance completely.</p>	<p>Low-pressure system has a partial or complete failure.</p> <p>Unvented plug has not been replaced.</p> <p>Oil level is too low.</p> <p>Wrong oil viscosity.</p> <p>Oil is dirty.</p> <p>Oil is cold.</p> <p>The intake strainer is dirty or clogged.</p> <p>Motor rotates in the wrong direction.</p> <p>Low-pressure relief valve is dirty or is set incorrectly.</p> <p>Broken internal part.</p> <p>Worn or damaged internal part.</p> <p>Pilot-operated valve will not close.</p> <p>Internal hydraulic fluid leak.</p>	<p>See “Hydraulic Schematic” (1, 3, 7) and refer to Figure A4 in the “Service” section of this manual.</p> <p>Remove the unvented plug and install the vented plug.</p> <p>Add oil per instructions in the “Maintenance” section of this manual.</p> <p>Replace oil with the type recommended in the “Parts List” of this manual.</p> <p>Replace oil with the type recommended in the “Parts List” of this manual.</p> <p>Preheat oil. Without an accessory connected to the coupler, run the pump to build pressure, then release. Repeat until oil is warm.</p> <p>Remove the strainer and clean with kerosene.</p> <p>Correct the motor wiring. See the “Motor Control, Schematic Diagram” in the “Service” section of this manual.</p> <p>To clean and adjust this valve, see “Low-Pressure Relief Setting” and Figure A4 in the “Service” section of this manual.</p> <p>Inspect and/or replace drive pin (78), motor shaft key (34), rollpin (39), or drive shaft (77).</p> <p>Inspect and/or replace the gerotor (80), eccentric shaft (38), or bearings (37 and/or 41).</p> <p>See “Troubleshooting—Pilot-Operated Valve” at the end of this troubleshooting section.</p> <p>Inspect and replace as necessary: O-ring plug (79) and pump block cover (50).</p>

## Troubleshooting – Hydraulic Pump (cont'd)

Problem	Probable Cause	Possible Remedy
Ram advances erratically and retracts erratically.	Air in the hydraulic fluid.	Refer to “Purging (Bleeding) Air” in the “Maintenance” section of this manual.
Pump will not build enough pressure to complete the job. Ram advances slowly.	High-pressure system is faulty.	See “Hydraulic Schematic” (5) and refer to Figure A5-1 in the “Service” section of this manual.
	System has an external hydraulic leak.	Visually inspect hoses, connectors and fittings for leaking hydraulic fluid. Replace faulty components.
	Pilot-operated valve will not close.	See “Troubleshooting – Pilot-Operated Valve” at the end of this troubleshooting section.
	Low-pressure system is at fault.	Find “Low-pressure system has a partial or complete failure” under “Probable Cause” in this troubleshooting section.
	At high-pressure inlet, the check ball has too much travel.	See “Check Ball Travel at High-Pressure Inlet” and Figure A5-1. If the seats are leaking, see “Ball Seat Refinishing” and Figure B2 in the “Service” section of this manual.
	The high-pressure piston is stuck.	Disassemble, clean, and inspect the high-pressure bushing (75) and high-pressure piston (76). Replace parts as necessary.
	Internal hydraulic fluid leak.	Inspect and replace as necessary: O-ring plug (68) Cavity insert (74) High-pressure bushing (75) High-pressure relief valve (72)
	High-pressure relief valve failure.	Readjust, re-seat, or replace valve (72).

## Troubleshooting—Hydraulic Pump (cont'd)

Problem	Probable Cause	Possible Remedy
Ram will not hold pressure.	System has an external leak.	Visually inspect hoses, connectors and fittings for leaking hydraulic fluid. Replace faulty components.
	Manual control valve needs adjustment or repair.	See “Hydraulic Schematic” (8) and refer to Figures A2 and A3 in the “Service” section of this manual.
	The manual control valve is not in correct position.	Rotate the manual control valve to AUTO RELEASE position.
	The manual control valve needs to be adjusted.	See “Manual Release/Automatic Release Valve Handle Setting” and Figure A3 in the “Service” section of this manual.
	Check ball does not seat properly.	See “Manual Release/Automatic Release Valve Handle Setting” and Figure A2, and “Ball Seat Refinishing” and Figure B4 in the “Service” section of this manual.
Ram will not retract.	The manual control valve is not in correct position.	Rotate the manual control valve to AUTO RELEASE position.
	The manual control valve needs to be adjusted.	Adjust the handle. See “Manual Release/Automatic Release Valve Handle Setting” and Figure A3 in the “Service” section of this manual.
	Quick couplers are not fully threaded together.	Disconnect the hydraulic hoses and clean the couplings. Reconnect the hydraulic hoses. Hand-tighten couplings firmly until all threads are engaged. Do not use a wrench.
	Manual control valve set incorrectly.	See “Hydraulic Schematic” (8) and refer to Figures A2 and A3 in the “Service” section of this manual.
	The pilot-operated valve will not open, will not open fully, or opens too slowly.	See “Troubleshooting—Pilot-Operated Valve” at the end of this troubleshooting section.
	Hydraulic cylinder of the accessory has failed.	Troubleshoot the accessory that is connected to the pump.

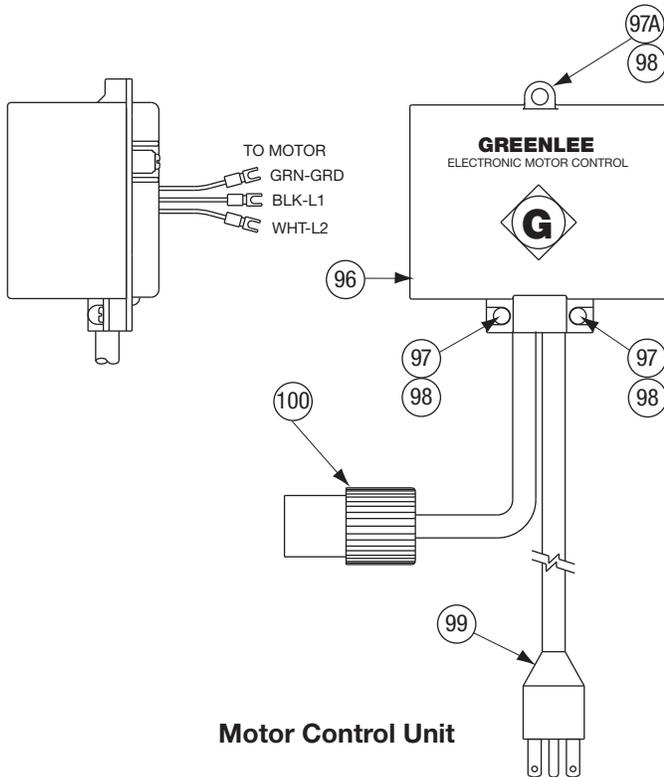
## Troubleshooting – Pilot-Operated Valve

Problem	Probable Cause	Possible Remedy
<p>Pilot-operated valve will not open. Pilot-operated valve will not open fully. Pilot-operated valve opens too slowly.</p>	<p>The pilot piston does not return freely.</p> <p>Oil is cold.</p> <p>Wrong oil viscosity.</p> <p>Oil is dirty.</p> <p>Oil is cold.</p> <p>Pilot piston components may be worn or damaged.</p> <p>Low-pressure bypass check valve is set incorrectly.</p> <p>The ball seat of the low-pressure bypass check valve is damaged.</p>	<p>See “Hydraulic Schematic” (7) and refer to “Low-Pressure Relief Setting” and Figure A4 in the “Service” section of this manual.</p> <p>Preheat oil. Without an accessory connected to the coupler, run the pump to build pressure, then release. Repeat until oil is warm.</p> <p>Replace oil with the type recommended in the “Parts List” of this manual.</p> <p>Replace oil with the type recommended in the “Parts List” of this manual.</p> <p>Preheat oil. Without an accessory connected to the coupler, run the pump to build pressure, then release. Repeat until oil is warm.</p> <p>Clean and inspect items 42–49. Replace parts as necessary.</p> <p>See “Hydraulic Schematic” (4).            If set too low: The pump cannot shift to the high-pressure stage. See “Pressure Adjustment for the Low-Pressure Bypass Check” and Figure A5 in the “Service” section of this manual.            If set to high: The pump cannot restart under pressure. See “Pressure Adjustment for the Low-Pressure Bypass Check” and Figure A5 in the “Service” section of this manual.</p> <p>See “Ball Seat Refinishing” and Figure B2 in the “Service” section of this manual.</p>

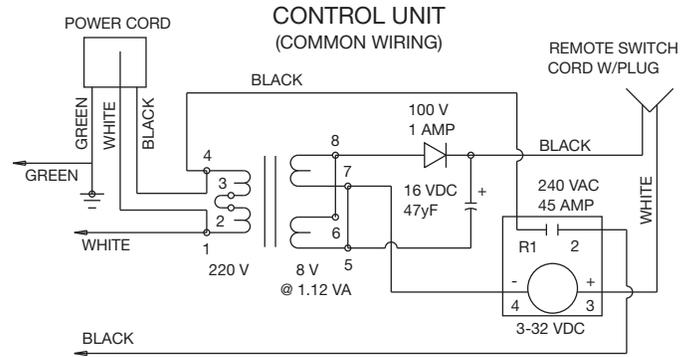
## Troubleshooting – Pilot-Operated Valve (cont'd)

Problem	Probable Cause	Possible Remedy
Pilot-operated valve will not close.	<p>A particle of dirt or some other foreign object is holding the low-pressure bypass check valve open.</p> <p>Low-pressure bypass check valve is faulty.</p> <p>The ball seat of the low-pressure bypass check valve is damaged.</p> <p>Low-pressure bypass check ball seat is oversized.</p> <p>A particle of dirt or some other foreign object is holding the low-pressure relief valve open.</p> <p>Low-pressure relief valve is set too low.</p> <p>Low-pressure bypass check ball seat is damaged.</p> <p>Low-pressure bypass check seat is oversized.</p> <p>The pilot piston does not advance freely.</p> <p>Valve seat is damaged.</p>	<p>Disassemble, clean, and inspect spring (70) and 9/32" ball (71). Replace parts as necessary.</p> <p>See "Hydraulic Schematic" (4). If set too low: The pump cannot shift to the high-pressure stage. See "Pressure Adjustment for the Low-Pressure Bypass Check" and Figure A5 in the "Service" section of this manual. If set too high: The pump cannot restart under pressure. See "Pressure Adjustment for the Low-Pressure Bypass Check" and Figure A5 in the "Service" section of this manual.</p> <p>See "Ball Seat Refinishing" and Figures B2, B3, and B4 in the "Service" section of this manual.</p> <p>Replace the pump block (84).</p> <p>Disassemble, clean, and inspect the valve piston (48), spring (47), ball (46), spring (45) and stem (44). Replace parts as necessary.</p> <p>See "Low-Pressure Relief Setting" and Figure A4 in the "Service" section of this manual.</p> <p>See "Ball Seat Refinishing" and Figures B2, B3, and B4 in the "Service" section of this manual.</p> <p>Replace the pump block (84).</p> <p>See "Hydraulic Schematic" (7).</p> <p>See "Low-Pressure Relief Setting" and Figure A4 in the "Service" section of this manual. Clean and inspect items 42–49. Replace parts as necessary.</p> <p>See "Hydraulic Schematic" (3, 7).</p>

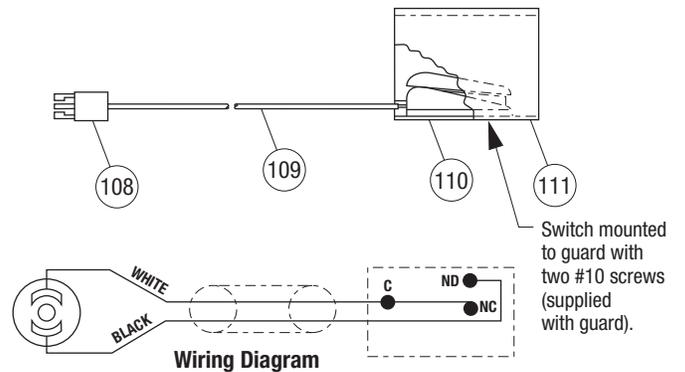
**Service**



**Motor Control Unit**

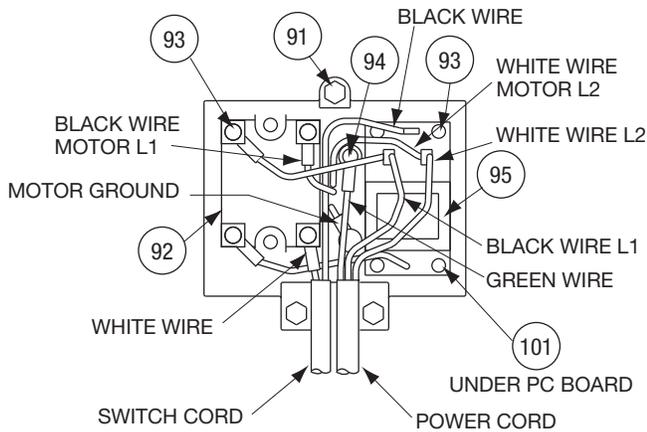


**Motor Control, Schematic Diagram**

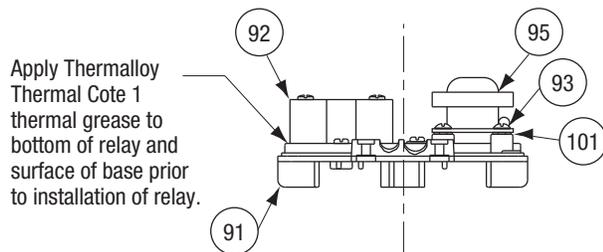


**Wiring Diagram**

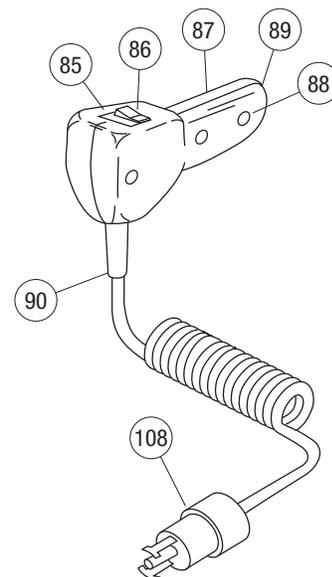
**Foot Switch**



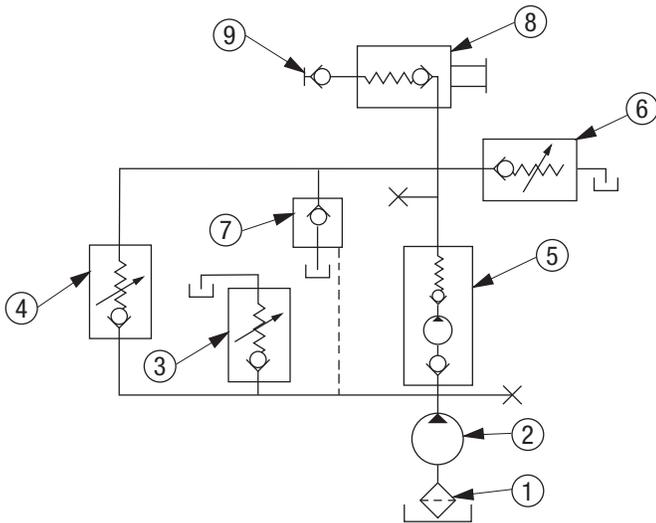
**Motor Control with Cover Removed**



**Motor Control with Cover Removed, Side View**



**Pendant Switch**

**Service (cont'd)**
**Hydraulic Schematic**


- ① Intake strainer, #50 mesh brass screen
- ② Low-pressure pump—  
3.4 l/min (208 in<sup>3</sup>/min) at 3000 rpm (100%)
- ③ Low-pressure relief valve—19 bar (275 psi),  
located in pilot-operated valve ⑦ piston
- ④ Low-pressure bypass check valve
- ⑤ High-pressure pump—  
976-22: 0.25 l/min (15 in<sup>3</sup>/min) at 2850 rpm (100%)  
980-22: 0.73 l/min (45 in<sup>3</sup>/min)
- ⑥ High-pressure relief valve—  
717/690 bar (10,400/10,000 psi)
- ⑦ Pilot-operated directional control valve,  
3-way, 2-position
- ⑧ Manually operated check valve
- ⑨ Female coupler half

**Sealing Instructions for Assembly**
**MOTOR**

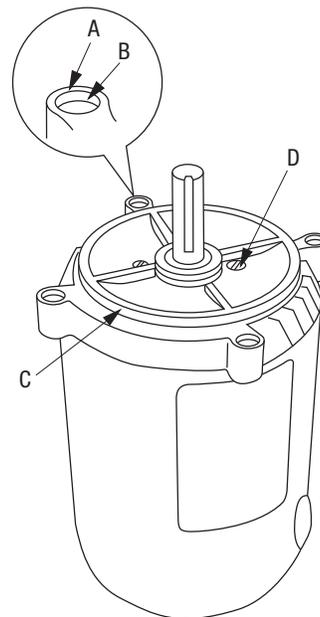
If the motor has been disassembled, seal with a 3 mm (1/8") bead of a silicone-based gasket/flange sealant, such as Loctite® 587 Ultra Blue®, as follows:

- (A) To the mounting surface around the threads (four locations)
- (B) To the chamfer (four locations)
- (C) Around the innermost machined circumference of the mounting surface

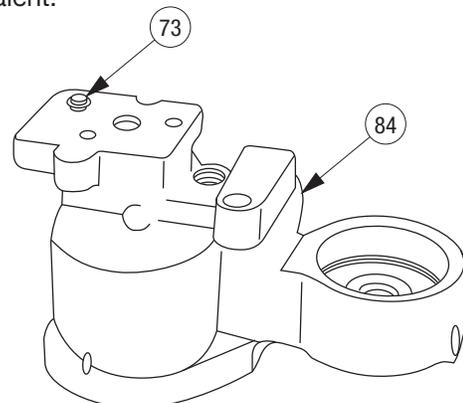
Apply a 1.5 mm (1/16") bead of an RTV-type silicone-based sealant, such as Dow Corning 732™ Multipurpose Sealant, as follows:

- (D) Around the motor bearing screws (two locations)

Assemble immediately.


**DRIV-LOK PIN**

Seal the Driv-Lok® pin (73) to the pump block (84) with a 1.5 mm (1/16") bead of an RTV-type silicone-based sealant, such as Dow Corning 732 Multipurpose Sealant or equivalent.

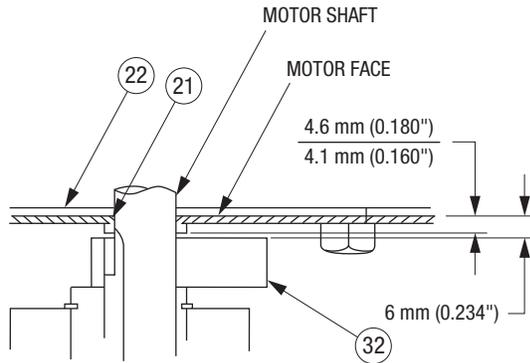


## Service (cont'd)

The following sections and figures describe pertinent details for refinishing ball seats and component reassembly and adjustments.

### Motor Face Seal

When reassembling the motor, refer to Figure A1 for the face seal seating dimension. Also, refer to this figure for setting the vertical position of counterweight (32).

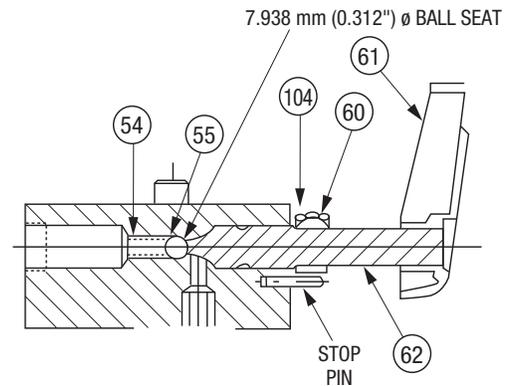


**Figure A1** ⑧

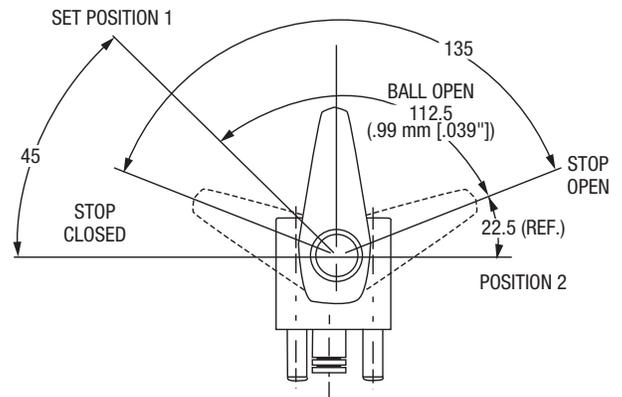
### Manual Release/Automatic Release Valve Handle Setting

Refer to Figures A2 and A3.

1. Thread in the shaft (62) until it just touches the check ball (55) (in its spring-loaded closed position).
2. Slide collar (104) on the shaft.
3. Position the handle (61) at the location "Position 1" (Figure A3), with the other surface of the handle flush with the end of the shaft. Lock in place.
4. Rotate the handle to "Position 2" (Figure A3).
5. Slide the collar toward the valve body until it contacts the 15.9 mm (5/8") diameter portion of the control shaft. Rotate the lock collar clockwise until it touches the stop pin, and lock in place.
6. When locking control handle and lock collar in place, torque set screws to 2.8 Nm to 3.4 Nm (25 in-lb to 30 in-lb).



**Figure A2** ⑧

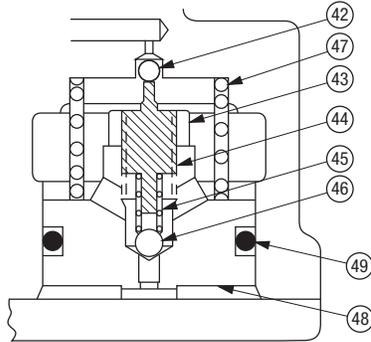


**Figure A3** ⑧

## Service (cont'd)

### Low-Pressure Relief Setting

Refer to Figure A4. Lightly bottom the stem (44) on the ball (46). Then back out the stem 3-1/2 turns. Tighten nut (43). The resulting pressure setting should be approximately 19.3 bar (280 psi).



**Figure A4** ③ ⑦

### Pressure Adjustment for the Low-Pressure Bypass Check

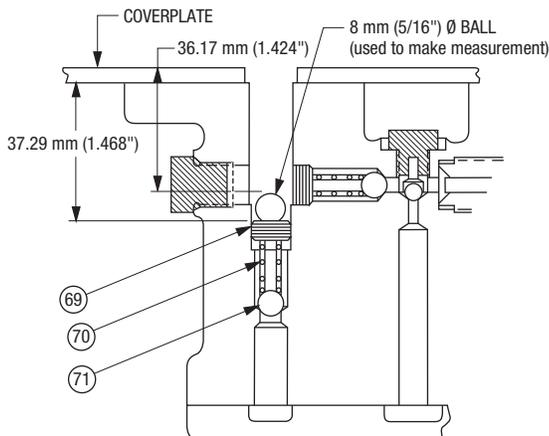
When properly set to the dimension shown in Figure A5, the high-pressure stage operation of the pump is delayed approximately 1 second after the motor starts. This delay is created by the closing time of the pilot-operated valve.

*Note: This dimension must be increased if ball seat depth is increased by more than 0.4 mm (1/64").*

Increasing the bypass pressure (CW rotation of adjusting screw—increase of set dimension) shortens delay. If delay becomes too short, the motor will not restart when high pressure is held in the line. The motor should restart with a maximum required off time of 1/2 to 1 second.

Decreasing the bypass pressure (CCW rotation of adjusting screw) increases delay. The pilot-operated valve will not close if pressure is set too low.

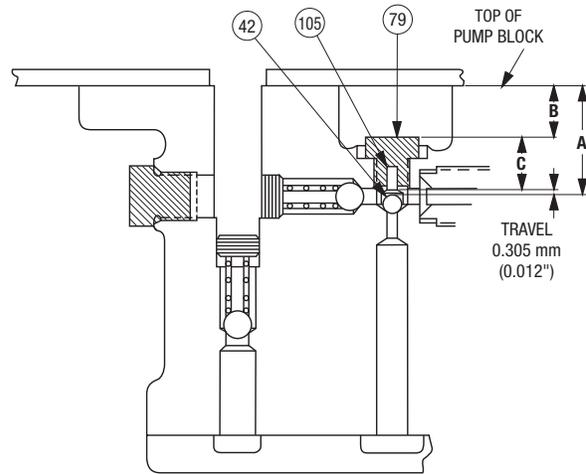
Changes in oil temperature (viscosity) affect the amount of delay. The pumping delay will increase with rising oil temperature (thinner oil).



**Figure A5** ④

### Check Ball Travel at High-Pressure Inlet

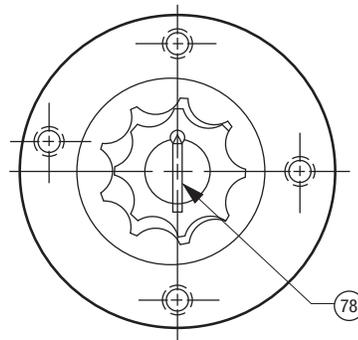
The amount of allowable ball travel is critical to the optimum high-pressure output (flow rate). Refer to Figure A5-1. Carefully and accurately measure (depth "mike") the "A" dimension (top of pump block to seated ball) and "B" dimension (top of pump block to head of plug—at center). Carefully and accurately set the "C" dimension (overall length of assembled plug and pin) of a new plug and pin equal to "A" minus "B" minus 0.305 mm  $\pm$  0.050 mm (0.012"  $\pm$  0.002").



**Figure A5-1** ⑤

### Low-Pressure Pump Drive Pin

Assemble with cone point end in half-round keyway.

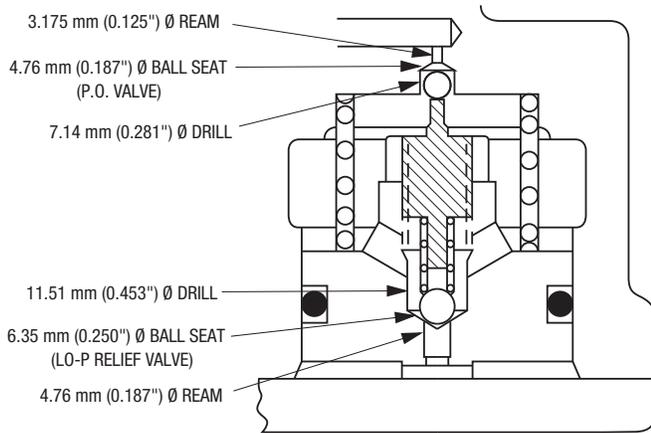


**Figure A6**

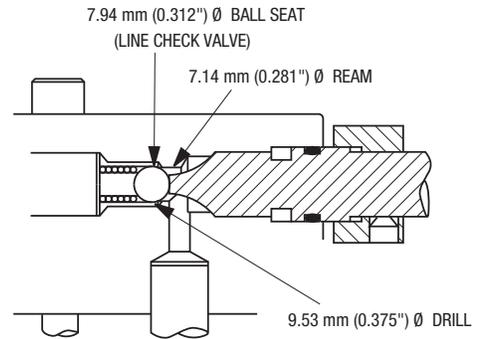
**Service (cont'd)**

**Ball Seat Refinishing**

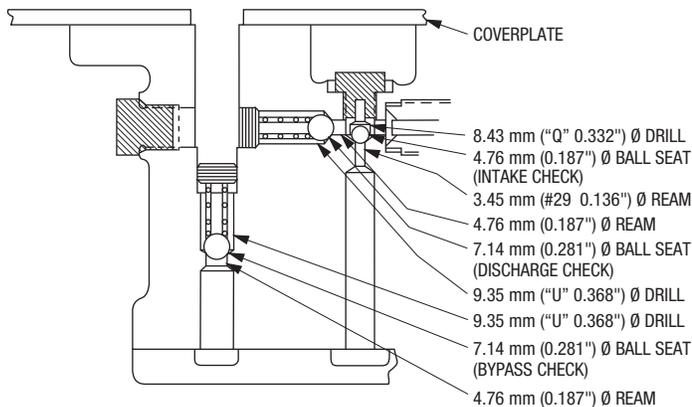
Refer to Figures B2, B3, and B4 for the proper drill size to refinish the conical seat and finish ream size. These operations must be performed with the pump or valve block properly held and using a drill press. Only a very small amount of material should be removed.



**Figure B2** ③ ⑦

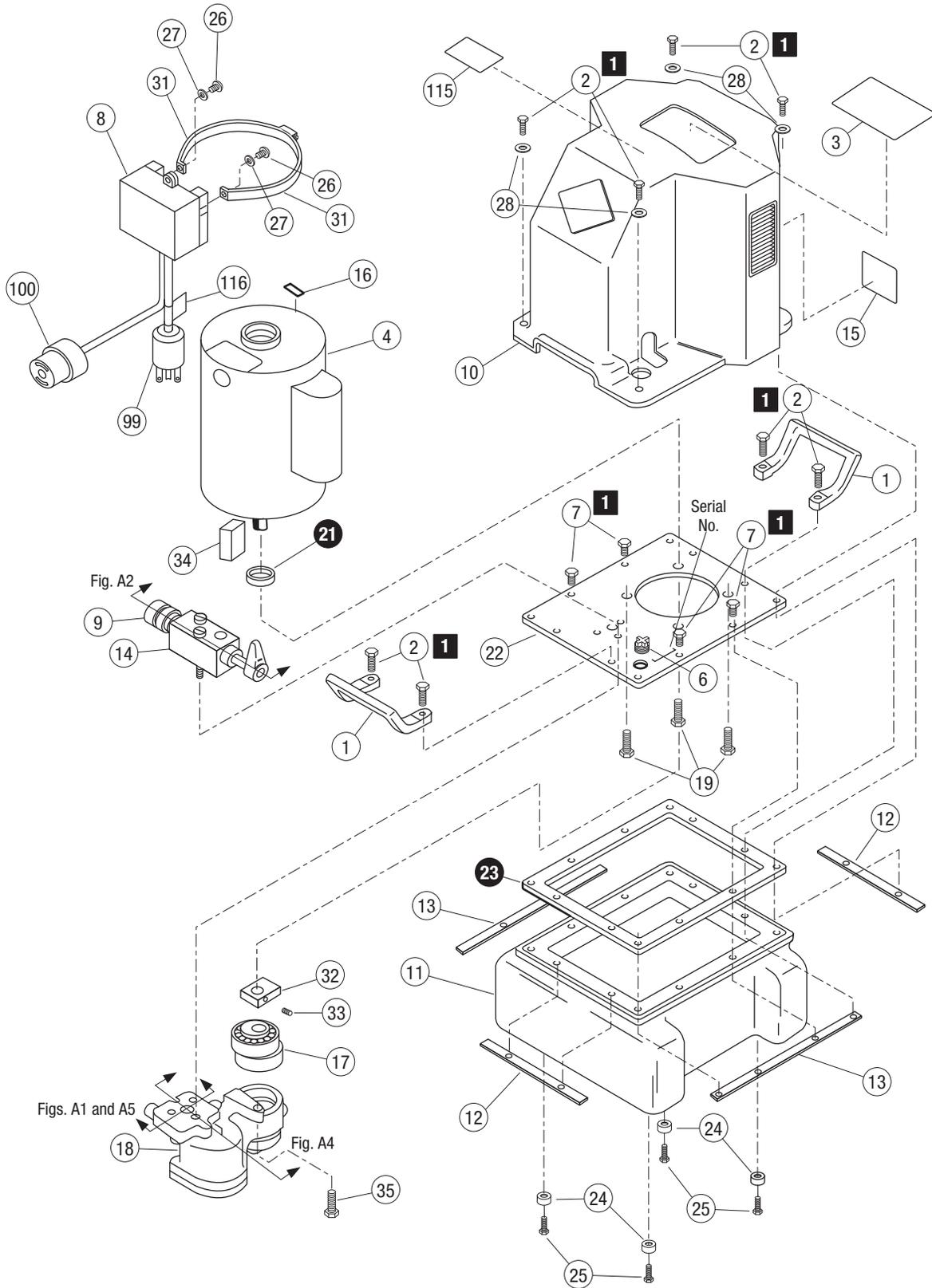


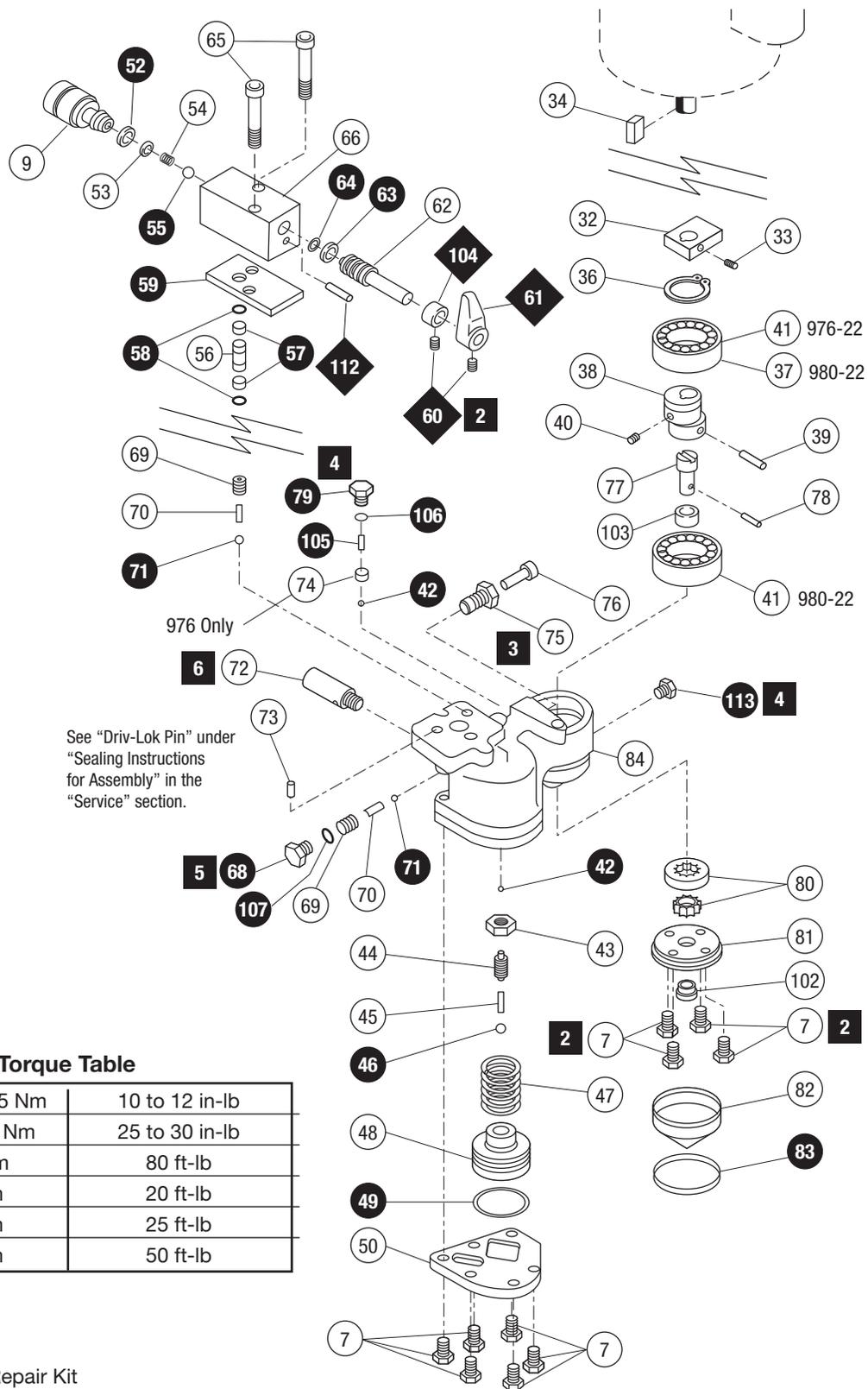
**Figure B4** ⑧



**Figure B3** ④ ⑤

**Illustration**



**Illustration—Pump Block**


See "Driv-Lok Pin" under "Sealing Instructions for Assembly" in the "Service" section.

**Torque Table**

<b>1</b>	1.13 to 1.35 Nm	10 to 12 in-lb
<b>2</b>	2.8 to 3.4 Nm	25 to 30 in-lb
<b>3</b>	110 Nm	80 ft-lb
<b>4</b>	27 Nm	20 ft-lb
<b>5</b>	34 Nm	25 ft-lb
<b>6</b>	68 Nm	50 ft-lb

 503 4369.6  
Hydraulic Repair Kit

 503 5464.7  
Release Knob Retrofit Kit

## Parts List

Key	Part No.	Description	Qty
1	50335189	Carrying handle .....	2
2	90537092	1/4-20 x 1-1/4" Hex head screw .....	8
3	50344323	Decal, identification (976-22) .....	1
	50363077	Decal, identification and specification (980-22) .....	1
4	91863538	Motor, 220 VAC, 1/2 hp (976-22) .....	1
	91864445	Motor, 220 VAC, 1-1/2 hp (980-22)..... GE Motor 5KC49TG20T Stk #739 FE Motor 1103017407	1

SERVICE PARTS:		GE	FE
	Greenlee No.	91864992	52020801
Capacitor	Manufacturing No.		275464116
	Greenlee No.	91863791	52020802
Cover, Cap	Manufacturing No.	111B276AA1	276856101

6	50326619	Fill-Vent plug .....	1
7	90505204	1/4-20 x 3/4" Hex head screw .....	14
8	50343963	Motor control unit (includes items 91-101) .....	1
9	90508076	Coupling .....	1
10	50334883	Shroud .....	1
11	50334905	Reservoir (976-22) .....	1
	50335555	Reservoir (980-22) .....	1
12	50335359	Short retaining strap .....	2
13	50335367	Long retaining strap.....	2
14	50335375	Release valve unit (includes items 52-66) .....	1
15	50343980	I.D. decal, specifications and warning (976-22) .....	1
	50354914	I.D. decal, warning (980-22).....	1
16	50158325	Arrow decal.....	1
17		Eccentric unit (refer to "Illustration—Pump Block").....	1
18		Pump block unit (refer to "Illustration—Pump Block") .....	1
19	90505301	Hex head cap screw, 3/8-16 x 1.00" .....	3
*21	90536827	Seal.....	1
22	50335170	Cover plate .....	1
*23	50326279	Cover plate gasket.....	1
24	90538293	Rubber foot.....	4
25	90511859	Screw, 1/4-20 x 1/2" .....	4
26	90514602	Self-tapping screw 10 x 3/8" .....	2
27	90534689	#10 Flat washer .....	2
28	90523393	1/4" Flat washer.....	4
31	50398962	Mounting strap .....	1
32	50335278	Counterweight .....	1
33	90512693	Set screw, 1/4-20 x 1/4" .....	1
34	50145576	Motor shaft key, 3/16" x 1-3/8" .....	1
35	90505336	Hex head cap screw 3/8-16 x 1.50" .....	1
36	90537076	Retaining ring.....	1
37	90537580	Ball bearing #1206.....	1
38	50335260	Eccentric shaft.....	1
39	90506995	Rollpin, 3/16" x 1" .....	1
40	90507916	Set screw, 10-32 x 1/4" .....	1

**Parts List (cont'd)**

<b>Key</b>	<b>Part No.</b>	<b>Description</b>	<b>Qty</b>
	41	90537041	Ball bearing, #3206.....1
*	42	90506782	Ball, 3/16" .....2
	43	90500164	Jam nut, 1/2-20.....1
	44	50335200	Stem .....1
	45	50225345	Spring .....1
*	46	90506790	Ball, 1/4" .....1
	47	90537017	Spring .....1
	48	50335197	Auto valve piston .....1
*	49	90503406	O-ring, 1-5/8" x 2" x 3/16" .....1
	50	50335219	Pump block cover.....1
*	52	90535030	Retaining ring.....1
	53	90534689	Plain flat type "A" washer .....1
	54	90535103	Compression spring .....1
*	55	90506804	Ball, 5/16" .....1
	56	50326228	Coupling .....1
*	57	90512901	Backup ring, 3/8" x 1/2" x 1/16" .....2
*	58	90501683	O-ring, 3/8" x 1/2" x 1/16" .....2
*	59	50326260	Gasket .....1
+	60	90512693	Set screw, 1/4-20 x .38" .....2
+	61	50347969	Release valve knob.....1
	62	50335413	Control shaft .....1
*	63	90538277	Backup ring, 1/2" x 5/8" x 1/16" .....1
*	64	90509129	O-ring, 1/2" x 5/8" x 1/16" .....1
	65	90534964	Cap screw, 5/16-18 x 2.50" .....2
	66	50326236	Release valve body.....1
*	68	90536983	O-ring plug (includes item 107) .....1
	69	90537122	Jam screw, 7/16" .....2
	70	90537025	Spring .....2
*	71	90504364	Ball, 9/32" .....2
	72	50060678	High-pressure relief valve .....1
	73	90537068	Pin, type "D" Driv-Lok 1/4" x 1/2" .....1
	74	50343106	Insert, cavity (976-22 Only).....1
	75	50335316	High-pressure bushing (976-22) .....1
		50335308	High-pressure bushing (980-22) .....1
	76	50335324	High-pressure piston (976-22) .....1
		50335286	High-pressure piston (980-22) .....1
	77	50335251	Drive shaft.....1
	78	50329340	Drive pin.....1
*	79	90536991	O-ring plug (includes item 106) .....1
	80	90535170	Gerotor.....1
	81	50341979	Lower gerotor plate unit (includes item 102) .....1
	82	50335243	Filter.....1
*	83	90537661	O-ring, 2-3/8" x 2-5/8" x 1/8" .....1
	84	50335332	Pump block .....1
	85	50323709	Faceplate decal .....1
	86	91862655	Switch.....1
	87	50319027	Handle, right half .....1
	88	90534417	Self-tapping screw, 6-20 x 5/8" .....3
	89	50319019	Handle, left half.....1
	90	50323628	Cord.....1

## Parts List (cont'd)

Key	Part No.	Description	Qty
91	50334913	Motor control base .....	1
92	91862922	Relay, 240 VAC/8 VDC — 45 A.....	1
93	90538404	Self-tapping screw, 6–32 x 5/16" .....	6
94	90536959	Pan head type C screw, 6–32 x 1/4" .....	2
95	50343998	Transformer unit.....	1
96	50334921	Motor control cover .....	1
97	90535804	Pan head machine screw, 6–32 x 5/8" .....	2
97A	90548795	Pan head machine screw, 6–32 x 3/8" .....	1
98	90506324	Hex nut, 6–32 .....	3
99	91868459	96" Long cord.....	1
100	91860520	Female twist lock cord connector .....	1
101	90538315	Nylon spacer, .150" ID x 5/16" OD x .050".....	4
102	90538390	Bearings, bronze.....	1
103	90533208	Bearings, bronze.....	1
+104	50348868	Shaft stop collar .....	1
*105	90538161	Pin, 1/8" x 1/4" Driv-Lok.....	1
*106	90538781	O-ring.....	1
*107	90538803	O-ring.....	1
108	91860512	Plug, twist lock male.....	1
109	91863120	Cord, foot switch .....	1
110	91863554	Switch, foot.....	1
111	91863562	Guard, foot switch .....	1
+112	90500784	Roll pin, 3/16" x 3/4" .....	1
113	90505018	Plug pipe 1/8" socket head .....	1
114	90510593	Hydraulic oil, 1 gal, ea. ....	2.25
115	50025813	Decal, caution.....	1
116	50225103	Decal, caution.....	1

### Greenlee Hydraulic Oil (Mobil DTE® 13M)

90510593 / 4016GB	1 gallon
90508068 / 4017GB	1 quart

\* Parts included in Repair Kit No. 503 4369.6

+ Parts included in Release Knob Retrofit Kit 503 5464.7