

## ELECTRIC TWO-STAGE HYDRAULIC PUMP

### NOTE:

- Read and carefully follow these instructions. Most problems with new equipment are caused by improper operation or installation.
- Carefully inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment.

## SAFETY PRECAUTIONS



**WARNING:** To help avoid personal injury,

### Hydraulic Hose

- Before operating the pump, all hose connections must be tightened with the proper tools. Do not overtighten. Connections should only be tightened securely and leak-free. Overtightening can cause premature thread failure or may cause high pressure fittings to split at pressures lower than their rated capacities.
- Always shut off the electric motor before breaking any connection in the system.
- Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump. Never attempt to grasp a leaking hose under pressure with your hands. The force of escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard such as fire, extreme heat or cold, sharp surfaces, or heavy impact. Do not allow the hose to kink, twist, curl or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for wear, because any of these conditions can damage the hose and result in personal injury.
- Do not use the hose to move attached equipment. Stress may damage the hose, and cause personal injury.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials may result in personal injury.

### Pump

- Do not exceed the PSI hydraulic pressure rating noted on the pump name plate or tamper with the internal high pressure relief valve. Creating pressure beyond rated capacities may result in personal injury.
- Before replenishing the oil level, retract the system to prevent overfilling the pump reservoir. An overfill may cause personal injury due to excess reservoir pressure created when cylinders are retracted.

### Cylinder

- Do not exceed rated capacities of the cylinders. Excess pressure may result in personal injury.
- Do not set poorly-balanced or off-center loads on a cylinder. The load may tip and cause personal injury.

### Power Supply

- Never use an ungrounded power supply with this unit
- Pump must be compatible with existing line voltage.
- Disconnect the pump from the power supply when attempting any maintenance or repairs on the unit.
- If the power supply on the unit is damaged or the inner wiring exposed in any way, replace immediately.

## **SET-UP AND OPERATION**

### **Filling the Reservoir**

**NOTE:** The pump has been shipped without oil in the reservoir. High-grade Power Team hydraulic oil has been shipped with the pump in a separate container. If additional oil is required, use only Power Team hydraulic oil.

1. Clean the area around the filler cap to remove all dust and grit. Any dirt or dust in the oil can damage the polished surfaces and precision-fit components of this pump.
2. Retract all cylinders to the return position.
3. Remove the filler cap and insert a clean funnel and filter. Fill with hydraulic oil to within 1" from top of the filler hole. Replace filler cap and make sure the breather-hole in the filler cap is open.
4. Cycle the pump (with cylinders attached) several times. Retract the cylinders and recheck the oil level in the pump reservoir.

### **Electrical Hook-up and Operation**



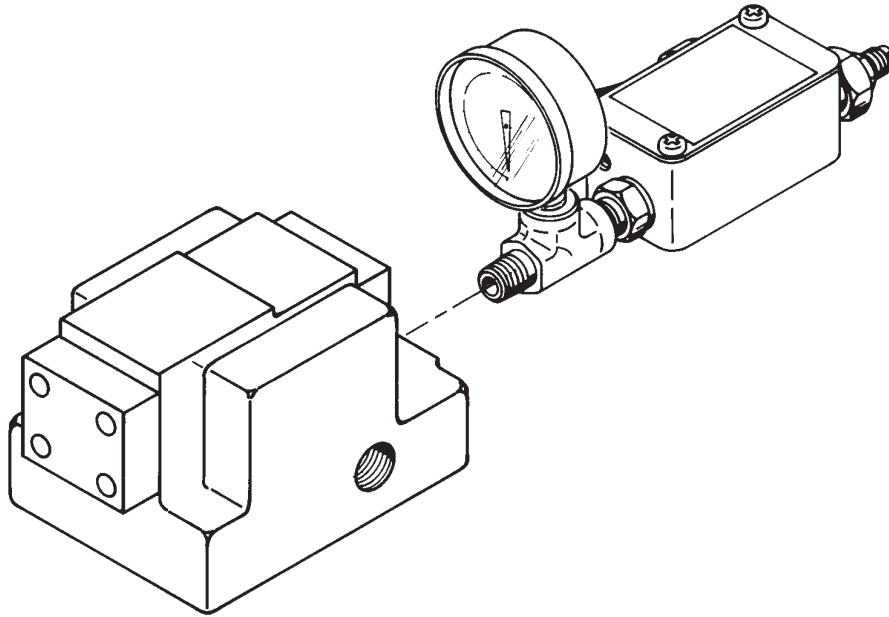
**WARNING:** To help avoid personal injury,

- Any electrical work should be done by a qualified electrician.
  - Disconnect power supply before removing electrical box cover.
  - All voltages must be wired for counterclockwise rotation viewed from lead end of motor.
  - Changing the voltage on this unit is an involved, and if improperly performed, hazardous procedure. Consult the manufacturer for specific information before attempting any rewiring.
1. The electric motor is a single-phase, 60 cycle motor and can be wired for 115 or 230 volts. The unit is wired at the factory for 115 volts and is supplied with a power cable without a plug.
  2. Line voltage and amperage ratings must be compatible with the voltage and amperage required by the pump. Assemble a plug to the power cable and insert into electrical outlet or provide wiring as required. To rewire motor from one voltage to another, refer to the diagram on the motor nameplate or the electrical schematic in the Parts List #100684.
  3. The thermal overload will kick out when the motor overheats. To restart the motor once the unit has cooled, push the "Start" button.
  4. In the case of a power outage, it will be necessary to restart the pump by pressing the "Start" button when power has been restored.

### **Hydraulic Connections**

Clean all the areas around the oil ports of the pump and cylinder. Inspect all threads and fittings for signs of wear or damage and replace as needed. Clean all hose ends, couplers or union ends. Remove the thread protectors from the hydraulic oil outlets. Connect the hose assembly to the hydraulic oil outlet and couple the hose to the cylinder. To seal all hydraulic connections, use Power Team HTS6 thread sealant. Teflon tape can be used to seal hydraulic connections if only one layer of tape is used. Apply carefully, two threads back, to prevent the tape from being pinched by the coupler and broken off inside the pipe end. any loose pieces of tape could travel through the system and obstruct the flow of oil.

## Valve Operation



### Automatic Dump Valve

When the pressure switch setting is reached, the switch shuts off the motor. All pressure is automatically dumped. Turn adjusting screw clockwise to increase pressure. Turn adjusting screw counterclockwise to decrease pressure. Refer to the section entitled "Adjusting the Pressure Switch" for more information.

## Priming the Pump

When operating the pump for the first time:

1. All valve and hose connections must be tight and the reservoir must be filled to the proper oil level. Plug in the electric motor.
2. Jog the pump several times to build pressure. If the pump doesn't build pressure, it may not be primed. Disconnect a hose from the system and route it back to the pump reservoir. Run the pump until a steady flow of oil is observed free of suspended air bubbles. Reconnect the hose to the system.
3. Run cylinder out to its full travel several times to eliminate air from the system. For more complete instructions refer to the section entitled "Bleeding Air from the System."
4. Pump is ready now to be put into regular operation.

**IMPORTANT:** After eliminating entrapped air from a large work-holding system, refill the pump reservoir to within 1" from the top of the filler hose with the system completely retracted.

## Adjusting the Pressure Regulating Controls

The pressure regulating valve and pressure switch are shown in the illustration below. The pressure regulating valve can be adjusted to bypass oil at a given pressure setting while the pump continues to run. The pressure switch can be adjusted to stop the pump motor at a given pressure setting. To insure accuracy and a low pressure differential (approx. 300 PSI) throughout the pressure range (1,000 to 5,000 PSI), the pressure switch should be used with the pressure regulating valve. The pressure switch must be set at a pressure lower than the pressure regulating valve to work properly.

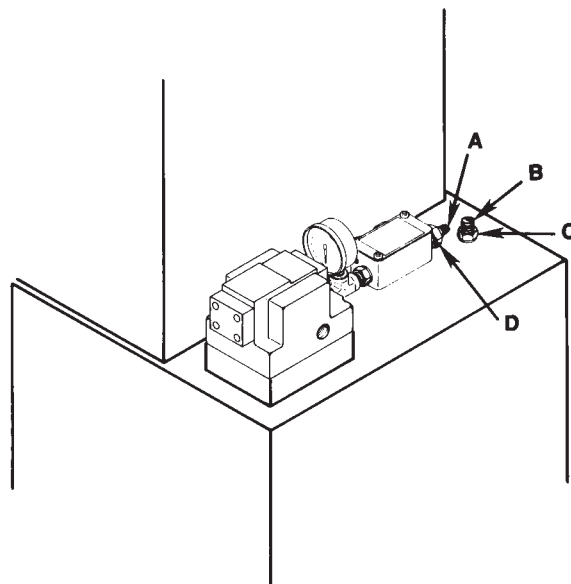
## Adjusting the Pressure Regulating Valve

1. Loosen the locknut on the pressure regulating valve (C) and back the adjusting screw (B) out a few turns with a screwdriver by turning in a counterclockwise direction. This will decrease the setting to a lower than desired pressure.
2. Pump must be completely connected. Set the motor control toggle switch on "Run" and push the "Start" button.
3. With the screwdriver, slowly turn the adjusting screw (B) in a clockwise direction. This will gradually increase the pressure setting. When the desired pressure is reached, lock the adjusting screw in position by tightening the locknut.

**NOTE:** For easy adjustment of the pressure regulating valve, always adjust the pressure by **INCREASING** it to the desired pressure setting.

### IMPORTANT

- Pressure range is from 1,000 to 5,000 PSI.
- Pressure switch must be set at a higher pressure than working range to prevent shut down during adjustment. It is also possible to bypass the pressure switch contacts by holding the start switch or remote control switch so that the motor runs continuously.



## Adjusting the Pressure Switch

Generally, the pressure switch should be used with the pressure regulating valve. A pressure switch may be used alone for actuating electrical devices such as motors, solenoids, relays, etc., which are located elsewhere in the circuit. Refer to the illustration above.

1. Loosen the locknut on the pressure switch (D), and turn adjusting screw (A) in a clockwise direction. This will increase the pressure setting to a higher than desired pressure.
2. Adjust the pressure regulating valve to the desired pressure setting by using the procedure previously outlined.
3. With the pump running and bypassing oil at the desired pressure, slowly turn the pressure switch adjusting screw (A) in a counterclockwise direction, decreasing the pressure switch setting until the pump motor shuts off. Then lock the adjusting screw (A) in position by tightening the locknut.
4. Release pressure. Run the pump to check the pressure setting and cut-out of the motor. It may be necessary to make a second adjustment.

**NOTE:** When the pressure switch setting is reached, the motor will shut off. However, the "coast" of the motor continues to deliver oil for a brief period. The pressure regulating valve bypasses this surplus oil, preventing it from going into the system. As a result, the pressure differential can be held to approximately 300 PSI.

## PREVENTIVE MAINTENANCE

**IMPORTANT:**

- Disconnect the pump from the power supply before performing maintenance or repair procedures.
- Repairs or maintenance are to be performed in a dust-free area by a qualified technician.

### Bleeding Air from the System

After prolonged use, air may accumulate within the hydraulic system. This entrapped air may cause the system to respond slowly or behave in an unstable manner. To remove the air, loosen a fitting that is situated higher than the rest of the fittings in the system. Run the pump until a steady flow of oil free of suspended air bubbles is observed, then reconnect the fitting to the system.

### Inspecting the Hydraulic Fluid Level

Check the oil level in the reservoir after every 10 hours of use. The oil level should come to within 1" of the filler plug with all cylinders retracted. Drain, flush and replenish the reservoir with Power Team hydraulic oil after every 300 hours of use. The frequency of oil change will depend upon the general working conditions, severity of use and overall cleanliness and care given the pump.

### Maintenance Cleaning

- Keep the outer surface of the pump as free from dirt as possible.
- All unused couplers are to be sealed with thread protectors.
- Keep all hose connections free of dirt and grime.
- The breather hole in the filler cap must be clean and unobstructed at all times.
- Equipment hooked up to the pump must be kept clean.
- Use only Power Team hydraulic oil in this pump. Change as recommended (every 300 hours).

### Draining and Flushing the Reservoir

**IMPORTANT: Clean the pump exterior before the pump interior is removed from the reservoir.**

1. Remove the screws that fasten the motor and pump assembly to the reservoir.  
**IMPORTANT: Do not damage the gasket or bump the hydraulic pressure regulating valves when lifting the pump and motor off the reservoir.**
2. Clean the inside of the reservoir and fill with a suitable flushing oil.
3. Place the pump and motor assembly back onto the reservoir and secure with two machine screws assembled on opposite corners of the housing.  
**IMPORTANT: Connect a hose to the advance port on the valve. Place the other end of the hose into the oil filler plug hole.**
4. Run the pump for several minutes. Then disconnect the motor and pump assembly, and drain and clean the inside of the reservoir.
5. Fill the reservoir with Power Team hydraulic oil. Replace the pump and motor assembly (with gasket) on the reservoir and rethread the screws. Tighten securely and evenly.

### Adding Oil to the Reservoir

- The power supply must be disconnected when adding oil to the reservoir.
- Use only Power Team hydraulic oil (215 SSU @ 100°F).
- Clean the entire area around the filler plug before removing the filler plug.
- Use a clean funnel with filter when adding oil.
- Cylinder(s) must be fully retracted when adding oil to the reservoir.

## TROUBLE-SHOOTING GUIDE



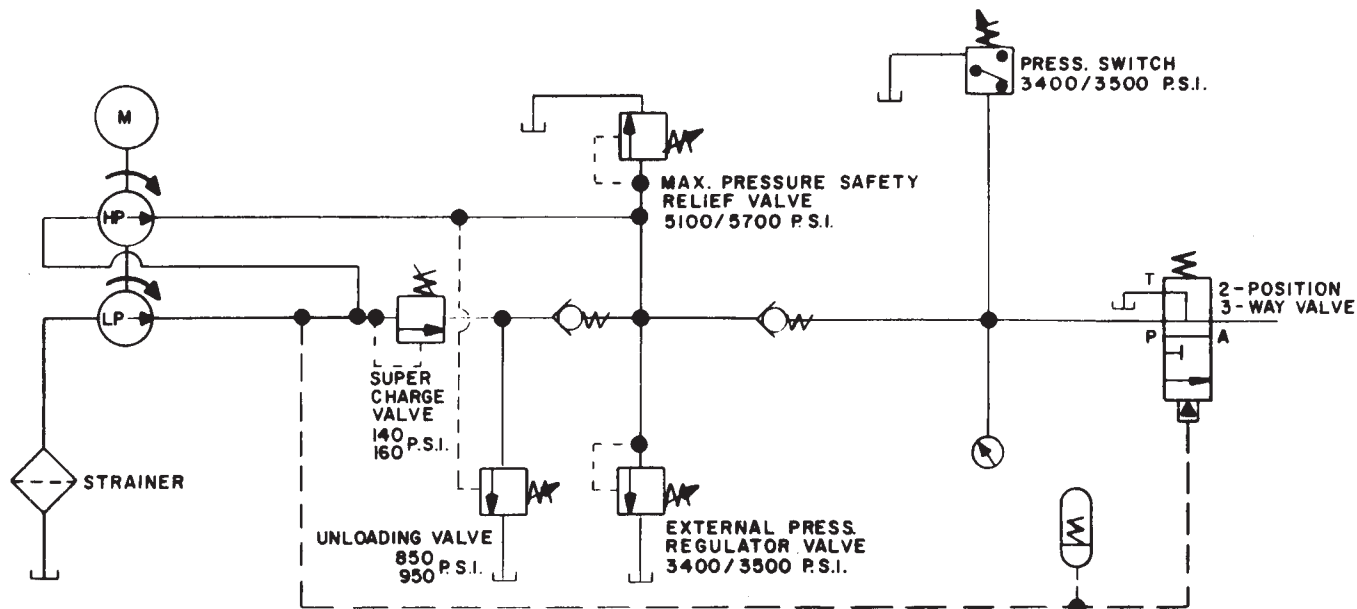
### WARNING


- To help prevent injuries, any repair work or trouble-shooting must be done by qualified personnel familiar with this equipment.

### NOTE:

- Use the proper gauges and equipment when troubleshooting.
- Depending on the pump version, it is often best to check for leaks by using a hand pump and applying pressure to the suspect area without the motor running. Watch for leaking oil and follow it back to its source.
- Plug the outlet ports of the pump when checking for leakage to determine if the leakage is in the pump or if it is in the cylinder or tool.
- Refer to Parts List #100663 and the hydraulic and electrical schematics when using this trouble-shooting guide.

## HYDRAULIC SCHEMATIC



PROBLEM	CAUSE	SOLUTION
<b>Electric motor does not run.</b>   <b>WARNING: Disconnect power supply before removing cover. any electrical work should be performed by a qualified electrician.</b>	(1) Unit is not plugged in. (2) No voltage supply.  (3) Broken lead wire or defective power cord plug. (4) Defective switches. (5) Defective starter relay. (6) Defective remote switch. (7) Circuit breaker tripped because total amperage draw too high for existing circuit. (8) Overheated Motor.  (9) Faulty thermal protector. (10) Defective motor.	(1) Plug in unit. (2) Check line voltage. Check reset button on power panel. (3) Replace defective parts.  (4) Check switches. (5) Replace defective parts. (6) Repair or replace remote switch. (7) Add an additional circuit or use alternate circuit.  (8) Wait for motor to cool before restarting. Thermal protector will reset automatically. (9) Replace. (10) Replace or repair motor.
<b>Pump is not delivering oil or delivers only enough oil to advance cylinder(s) partially or erratically.</b>	(1) Oil level too low.  (2) Loose fitting coupler to cylinder.  (3) Air in system. (4) Air leak in suction line.  (5) Dirt in pump or filter plugged.  (6) Cold oil or oil is too heavy (Hydraulic oil is of a higher viscosity than necessary). (7) Relief valve or low pressure unloading valve out of adjustment. (8) Reservoir capacity is too small for the size of the cylinder(s) used. (9) Release poppet not seating in solenoid valve.  (10) Sheared drive shaft key(s). (11) Motor rotating in wrong direction.  (12) Vacuum in reservoir.  (13) Low pressure pump worn.	(1) Fill reservoir to within 1" of filler plug with all cylinders retracted. (2) Check quick-disconnect couplings to cylinders. Inspect couplers to insure that they are completely coupled. Occasionally couplers have to be replaced because the ballcheck does not stay open due to wear. (3) Bleed the system. (4) Check and tighten the suction line. (5) Pump filter should be cleaned and if necessary, pump should be dismantled and all parts inspected and cleaned. (6) Change to lighter oil.  (7) Readjust as needed.  (8) Use smaller cylinder(s) or larger reservoir.  (9) Actuate UP and DOWN buttons simultaneously on remote to flush foreign material or dismantle, inspect, and clean. (10) Replace. (11) Refer to electrical schematic on motor. (12) Check for plugged vent in filler plug. (13) Repair or replace Gerotor pump.



PROBLEM	CAUSE	SOLUTION
<b>Pump builds pressure but cannot maintain pressure.</b>	(1) Check to see if there are any external leaks. If no oil leakage is visible, the problem is internal. (2) To test for a leaking valve, lift the pump from the reservoir but keep the filter in the oil. Remove the drain line to see if the oil is leaking from the valve. If the valve is not leaking, the internal check valve could be leaking. Refer to the note concerning checking for oil leaks at the beginning of this Troubleshooting Guide.	(1) Reseal leaking pipe fittings with pipe sealant. (2) Clean, reseal or replace valve parts. If the internal check valve is leaking, the check valve must be dismantled and the seat area repaired, poppet replaced, etc.
<b>Pump will not build full pressure</b>	(1) Faulty pressure gauge. (2) Check for external leakage. (3) Check the relief valve setting. (4) Inspect the pump for internal leakage. Check high pressure pump inlet or outlet ball checks. (5) Sheared key (s).	(1) Calibrate gauge (2) Seal any faulty pipe fitting with pipe sealant. (3) Lift the pump from the reservoir but keep the filter immersed in oil. Note the pressure reading when the relief valve begins to open up. If functioning normally, it should start to leak off at relief valve pressure. (4) Same procedure as above but look for leaks around the entire inner mechanism. If there are no visible leaks, the high pressure pump subassembly may be leaking. Remove all parts. Check the valve head assembly body for any damage to the seat area. Clean and reseal if necessary. Inspect for damage and replace parts if necessary, then reassemble. (5) Replace.
<b>Cylinder(s) will not retract.</b>	(1) Check the system pressure; if the pressure is zero, the automatic valve is releasing pressure and the problem may be in the cylinder, (mechanical linkage connected to cylinders), or quick-disconnect couplings. (2) Defective valve.	(1) Check the cylinders for broken return springs and check couplers to insure that they are completely coupled. Occasionally couplers have to be replaced because one check does not stay open in the coupled position. (2) Check valve operation and inspect parts. Replace if necessary.
<b>Pump delivers excess oil pressure</b>	(1) Check pressure gauge. (2) Relief valve not properly set.	(1) Calibrate gauge. (2) Reset the relief valve.