OWATONNA TOOL COMPANY
OWATONNA, MINNESOTA 55060, U.S.A. — TELEX: 201674

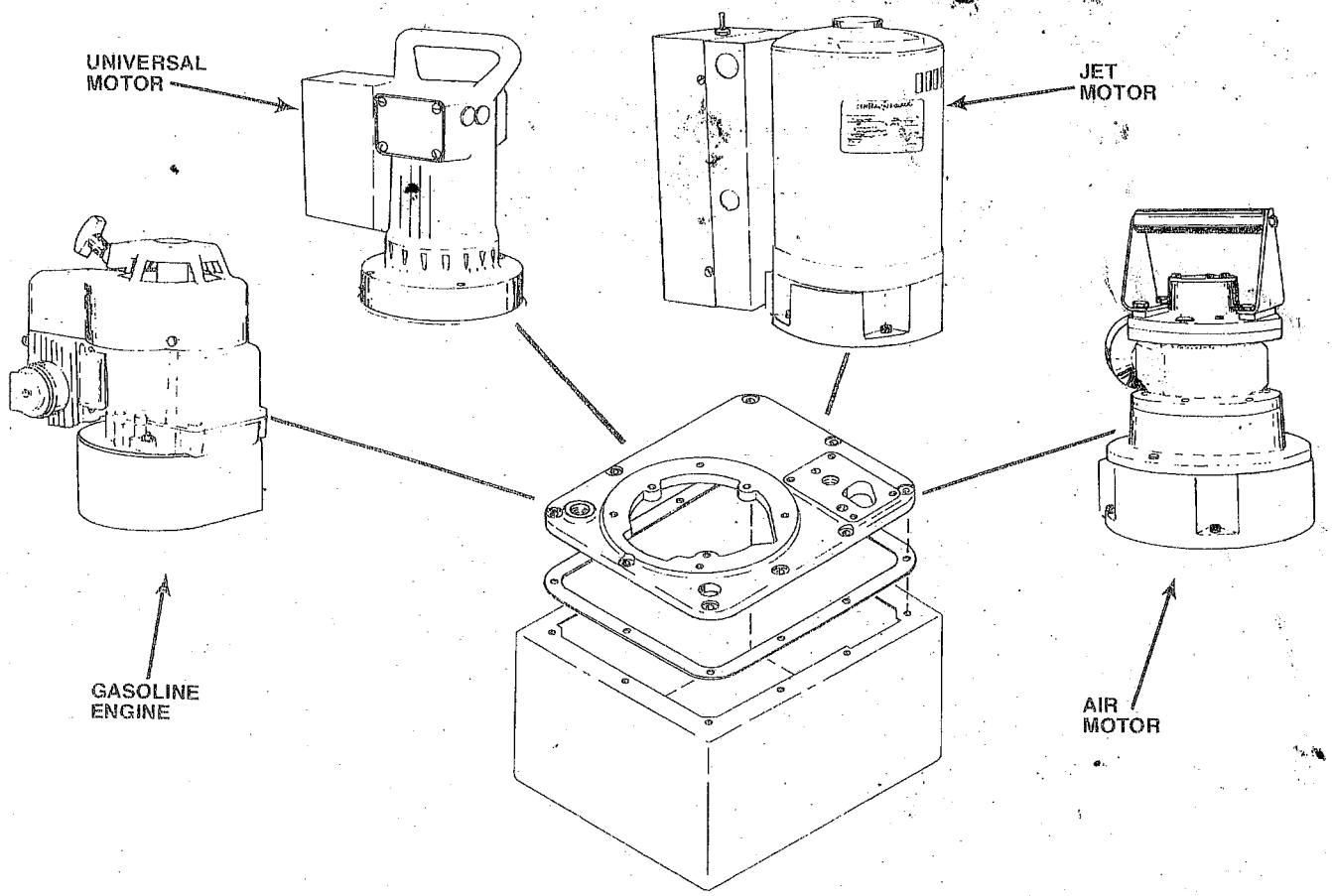
**OPERATING AND MAINTENANCE INSTRUCTIONS FOR**

Form No. 10246

HYTEC ..... 100220 Serie
TOOLS & EQUIPMENT ... Y26, Y26A, B, L
Y60, Y60A or Y70 Series or 4060, 407
or 4080 Serie
POWER TEAM ..... PE55, PG5
PA55, PE90, PE120, PG120 Serie

# AIR, ELECTRIC, or GAS POWERED TWO-STAGE HYDRAULIC PUMP

## 5,000 or 10,000 PSI




NOTE:

- Carefully inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment.
- Read and carefully follow these instructions. Most problems with new equipment are caused by improper operation or installation.
- The hydraulic power unit can be ordered with "building block" flexibility. The customer may choose from a variety of motors, controls, reservoirs, and other options. Because of the many options available, these instructions will include directions for options that your particular pump may not have.
- Do not attempt to interchange motors without first consulting the OTC Technical Service Department at (507) 451-5860.

# SAFETY PRECAUTIONS

## ⚠ WARNING — Hydraulic Hose

- Before operating the pump, make sure all hose connections are tight — use the proper tools to tighten connections.
- Do not overtighten the connections. Connections need only be tightened securely and leak-free. Overtightening may cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Shut off the motor before breaking any connection in the system. Shift the flow control valve two times to release all system pressure.
- Should a hydraulic hose ever burst or rupture, immediately shut off the pump. *Never attempt to grasp a leaking hose under pressure with your hands. The force of the escaping hydraulic fluid could cause serious and permanent injury.*
- Avoid any conditions which could damage the hose and impair the pump's performance. Never allow the hose to kink, twist, curl or bend so tightly that the oil flow within the hose is blocked or reduced. This could damage the hose and possibly result in serious injury to persons working in the immediate vicinity.
- Do not subject the hose to any potential hazard (ex: fire, extreme heat or cold, heavy impact or sharp surfaces) which might rupture or weaken the hose.
- Do not use the hose to lift or move the equipment connected to it.
- Periodically inspect the hose for signs of wear. *Never use a defective hose with any pressurized equipment.*
- Always consult the manufacturer before painting the hose(s). Never paint the couplers!
- Hose material and coupler seals must be compatible with the hydraulic fluid used.
- Avoid contact with creosote-impregnated timber or fabrics.

### Pump

- Never exceed the PSI hydraulic pressure rating noted on the pump name plate.
- Never tamper with the internal high pressure relief valve!

### Cylinder (When in use with the Pump.)

- Do not exceed either the pump or the cylinder's rated capacity.
- Do not set poorly-balanced or off-center loads on a cylinder.

### Power Supply (Electric)

- Do not use an ungrounded (two-prong) extension cord with this unit.
- Avoid any conditions which could create an electrical hazard.
- Any electrical work must be done by a qualified electrician.
- If the power cord is damaged or wiring is exposed, replace or repair immediately.
- Changing the voltage on the jet motor versions (single, or three phase) is a complicated and, if not done correctly, dangerous procedure. Consult the manufacturer for specific information before attempting any rewiring. Rewiring voids CSA approval.
- Disconnect the power supply before removing the electrical box cover or performing repairs or maintenance.
- All voltages must be wired for CW rotation when viewed from the lead end (top) of the motor.
- Your line voltage must be the same as the voltage your pump is wired for (ex: 110/115 volt pump plugged into 110/115 volt power source.)
- Check the *total* amperage draw for the electrical circuit you will be using (ex: Do not plug a motor or motors that may draw 25 amps into a 20 amp fused electrical circuit).
- Do not attempt to increase the powerline capacity by replacing a fuse with another fuse of higher value. Overheating of the powerline and the possibility of a fire will result.
- To rewire a motor from one voltage to another or when a flow control valve is changed either from manual to solenoid or solenoid to manual, consult the electrical schematic section in the parts list.

### Circuit Breakers

If motor stops due to an overload or power outage:

- Universal Motor — Move motor switch to "off" and control valve to neutral. Allow motor to cool or wait until power is restored, then reset circuit breaker switch in your power panel (pump motor does not have circuit breaker.)
- Single-phase motor — Thermal overload switch will break circuit to the motor. Move motor switch to "off" and control valve to neutral. Allow motor to cool before switching on again or wait until power is restored.
- Three-phase motor — Magnetic starter switch will break circuit to the motor. Move motor switch to "off" and control valve to neutral. Remove cover on the motor control box, allow motor to cool or wait until power is restored. One of three reset buttons must be pushed in to reset motor. Replace cover.

### ⚠ WARNING — Power Supply (Gasoline Engine)

- Read the instruction manual for the gasoline engine before using.
- Do not allow fuel to splash on the engine when refueling.
- Do not add fuel when the engine is running or very hot.

### Power Supply (Air Driven Motor)

- Disconnect the air supply when the pump is not in use or when breaking any connection in the hydraulic system.
- It is recommended that a shut-off valve or quick disconnect be installed in the air line to the pump unit. Close the shut-off valve before connecting the air line to the pump.

## HYDRAULIC PUMP SET-UP PROCEDURE

### Motor Hook-up and Operation

**I. Universal Motor Version**

The universal motor is wired at the factory for 115 or 230 volts, 50/60 cycles according to the customers request. **This motor cannot be rewired.**

**II. Jet Motor Version, Single Phase**

The single phase jet motor is wired at the factory for 115 or 230 volts and 50 or 60 cycles, according to the customers request.

**III. Jet Motor Version, Three Phase**

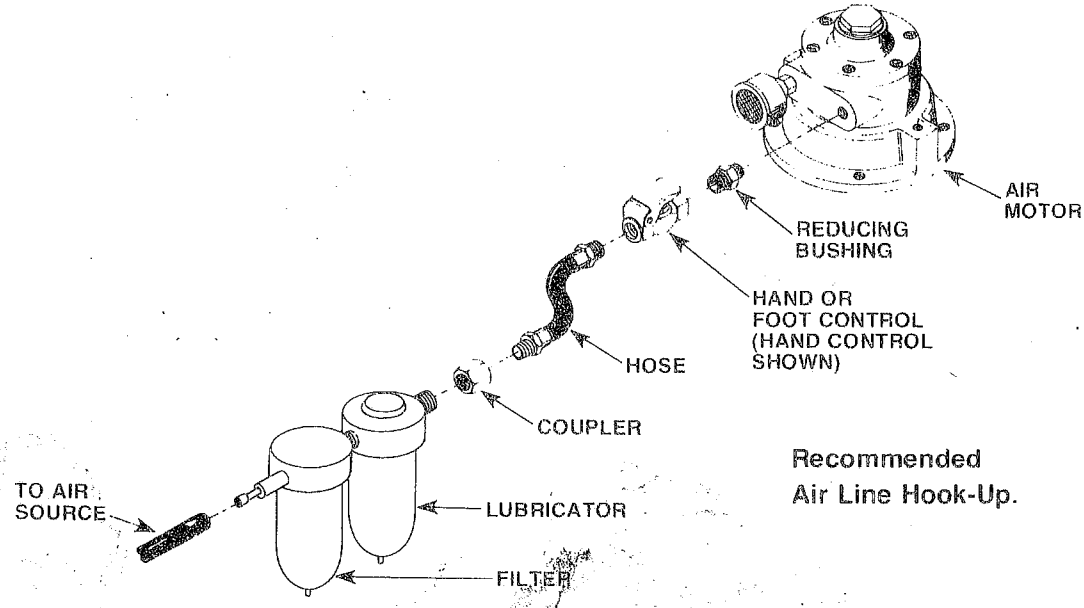
The three phase jet motor is wired at the factory for 230 or 460 volts and 50 or 60 cycles, according to the customers request.

**IV. Gasoline Powered Version**

Consult the instruction manual included for the gasoline engine.

**V. Air Motor Version**

Remove the thread protector from the air inlet and install the air supply fittings (not included) as shown (air supply must be minimum 50 CFM and 80 PSI, with 100 PSI maximum).




Recommended Air Line Hook-Up.

FIGURE 1

Note: Connections may be sealed with Bakerseal or Teflon tape. Use one layer of tape if tape is used, and apply carefully to prevent tape from being "pinched" and broken off inside the pipe. Loose pieces of tape

## Hydraulic Hook-up and Valve Operation

- Clean the areas around the oil ports of the pump and hydraulic cylinders.
- 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 plastic thread protectors from the hydraulic oil outlets.
- Refer to literature included with valve(s) for valve operation and installation instructions.

## Filling the Reservoir

**NOTE: The pump has been shipped without oil in the reservoir. A high grade of hydraulic oil has been shipped with the pump — but if additional oil is required, use an approved hydraulic oil such as OTC 16355.**

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 built 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 ½" from the 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.

# ACCESSORY INSTALLATION

**IMPORTANT: Seal all external pipe connections with a high quality, nonhardening pipe sealant. Teflon Tape may also be used to seal hydraulic connections, provided only one layer of tape is used. Apply the tape carefully to prevent it 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 or cause jamming of precision-fit parts.**

## Hydraulic Gauge (Optional)

1. Remove the pipe plug from the gauge port as shown (Figure 2).
2. Apply Bakerseal or Teflon tape to the threads and install. Wrench tighten.

**NOTE: "POSI-CHECK" VALVES**

**If a "Posi-Check" valve is used, the gauge will show zero pressure when the valve is switched to the Neutral (Hold) position. Cylinder pressure, however, will be held without loss. If line pressure must be continuously monitored, a tee adapter and hydraulic gauge should be mounted in the hydraulic line between the valve and the cylinder.**

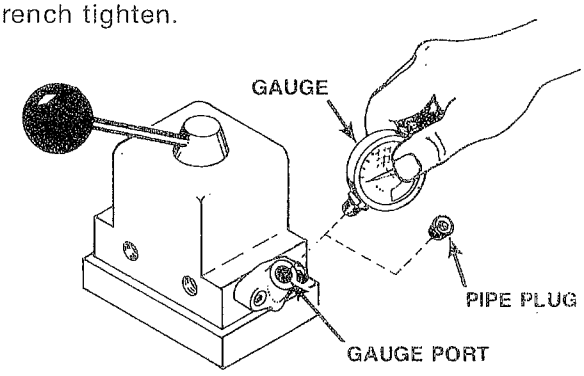



FIGURE 2

## Reservoir Vent Air Filter (Optional)

1. Remove the filler cap and replace it with either the 45° fitting or the straight fitting as needed. The "O" ring equipped end of the fitting is to be fastened into the pump.
2. If the 45° fitting is used, place the included rubber spacer on the top threaded portion and then thread the air filter on until it is finger-tight.
3. If the straight fitting is used, thread the air filter on until it is finger-tight.

**NOTE: If instructions for accessory components requiring special installation or electrical wiring information is needed, call the OTC Technical Services Dept. at (507) 451-5660 for specific instructions.**

# HYDRAULIC PUMP OPERATION

When operating the pump for the first time:

1. Check all valve and hose fittings to insure proper tightness, check the oil level in the reservoir, and start the pump motor.
2. Set the hydraulic control valve in the "neutral" or "return" position. Move the switch to "jog" several times, then set it on "run" and let the pump idle for a few minutes.
3. Set the hydraulic cylinder at a lower level than the pump and extend the ram out to its full travel several times to bleed air out of the system. Refer to section titled "Bleeding Air from the System" if the cylinder still responds in an unstable or slow manner.
4. Recheck the oil level in the reservoir, add oil if needed. The hydraulic system is now ready for full operation.

   NOTE: If an optional pressure switch has been ordered with the pump, adjust it now. Refer to the section titled "Pressure Regulating Control Adjustments".

# PREVENTIVE MAINTENANCE

**IMPORTANT:**

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

## Bleeding Air from the System

After use, air may accumulate in the hydraulic system if the reservoir oil level had been permitted to get too low. This air will cause the cylinder to respond in an unstable or slow manner. To remove this air:

1. The hydraulic cylinder(s) must be positioned on their side with the couplers located upward.
2. Remove any load from the cylinder(s) and cycle the hydraulic system through several cycles (fully extend and retract the cylinders).

**IMPORTANT: Some of the single-acting spring return cylinders have a cavity in the rod that will form an air pocket. This type of ram must be positioned upside down when the hydraulic system is to be bled.**

## Hydraulic Fluid Level

- Check the oil level in the reservoir after each 10 hours of use.
- Proper oil level is within ½" of the filler plug when all cylinders are retracted.
- Drain, flush, and refill the reservoir with an approved, high-grade hydraulic oil, such as OTC 16355, after approximately every 300 hours of use. The frequency of oil changes will depend upon the general working conditions, severity of use, and overall cleanliness and care given the pump.

## Lubrication (Air Driven Motor only)

If the pump is operated on a continuous duty cycle or at maximum speeds for extended periods, the manufacturer recommends an automatic air line oiler be installed in the air inlet line as close to the pumping unit as possible. Set the unit to feed 1-3 drops of oil per minute (one drop for every 50-75 CFM of air) into the system or refer to air pump manufacturer's instructions. Use SAE No. 10 oil.

## Maintenance Cleaning

- Keep the pumps outer surface 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.
- Be sure the breather hole in the filler cap is clean and unobstructed at all times.
- Equipment hooked up to the pump must be kept clean.
- Use only an approved, high-grade hydraulic oil such as OTC 16355 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 ten screws that fasten the motor and pump assembly to the reservoir.
   **IMPORTANT: Do not damage the gasket or bump the filter or hydraulic pressure regulating valves when lifting the pump and motor off the reservoir (See Figure 3).**
2. Clean the inside of the reservoir and fill with a suitable flushing oil. Rinse the filter clean.
3. Place the pump and motor assembly back onto the reservoir and secure with two machine screws assembled on opposite corners of the housing.

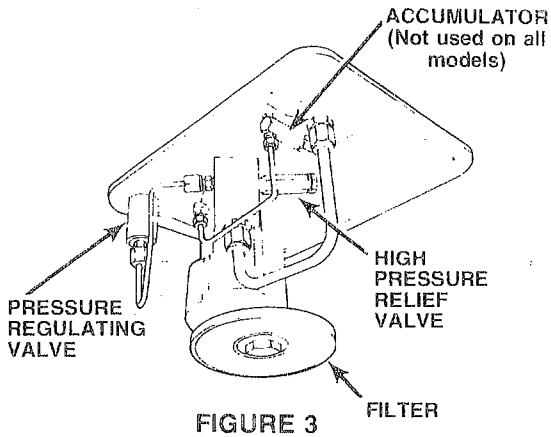


FIGURE 3

**IMPORTANT: The hydraulic flow control valve must be in the neutral position for the following step. If the pump is equipped with a valve that has only an advance or retract position, place the valve in the advance position and 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 an approved, high-grade hydraulic oil such as OTC 16355. Replace the pump and motor assembly (with gasket) on the reservoir and rethread the ten screws. Tighten securely and evenly.

## Adding Oil to the Reservoir

- Use only an approved, high-grade hydraulic oil (215 SSU @ 100°F) such as OTC 16355.
- 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 and the power supply disconnected when adding oil to the reservoir.

## Sound Reduction

The electrically powered hydraulic pump will operate in the 90-95 dBA range. If further sound reduction is desirable, any of the following options will help reduce the sound level.

1. Install a pressure switch. It will shut the motor off automatically when maximum pressure is reached (holding cycle).
2. Use a 3450 RPM, 1½ horsepower, 115 VAC, 60 Hz 1ϕ pumping unit.
3. Use a 3450 RPM, 1½ horsepower, 230 VAC, 60 Hz 3 ϕ pumping unit.
4. Install casters (2 gal. reservoir only) to reduce the noise level.

# PRESSURE REGULATING CONTROL ADJUSTMENTS

## Pressure Regulating Controls

The pressure regulating valve shown in Figure 4 can be adjusted to by-pass oil at a desired pressure setting and the pump will continue to run.

The optional pressure switch, see Figure 4, can be adjusted to stop the pump motor at a desired pressure setting, and then restart the pump when the pressure falls below that setting.

**Note: The pressure switch is generally adjusted with the pressure regulating valve to insure accuracy when setting a maximum PSI level. A pressure switch alone will break the motor's energy supply at a selected setting but the hydraulic pump will continue building pressure as it slows to a stop. The pressure regulating valve is adjusted at a setting slightly above the pressure switch setting to compensate by releasing the pressure developed by the hydraulic pump as it "coasts" to a stop. As a result, the pressure limit requirement can be held to approximately 300 p.s.i.**

## Adjusting the Pressure Regulating Valve

**IMPORTANT:**

- **Adjust the pressure regulating valve by *increasing* it to a desired pressure setting. *Do not adjust it by decreasing* from a higher to a lower pressure.**
- **Place pipe plugs as shown in Figure 4, in valve ports when adjusting pressure regulating controls.**

**Note: Range of pressure settings is from 1,000 minimum to 10,000 PSI maximum — depending upon the PSI range preset for each pump model.**

1. Loosen the lock-nut on the pressure regulating valve and turn the adjusting screw a few turns counter-clockwise to decrease the pressure setting to a *lower than desired* pressure. (see Figure 4).
2. Connect the pump power supply and place the Hydraulic flow control valve in the "advance" position. Set the motor control toggle switch on "Run".
3. Slowly turn the adjusting screw in a clockwise direction. This will gradually increase the pressure setting. When the desired pressure setting is reached, lock the adjusting screw in position by tightening the locknut.

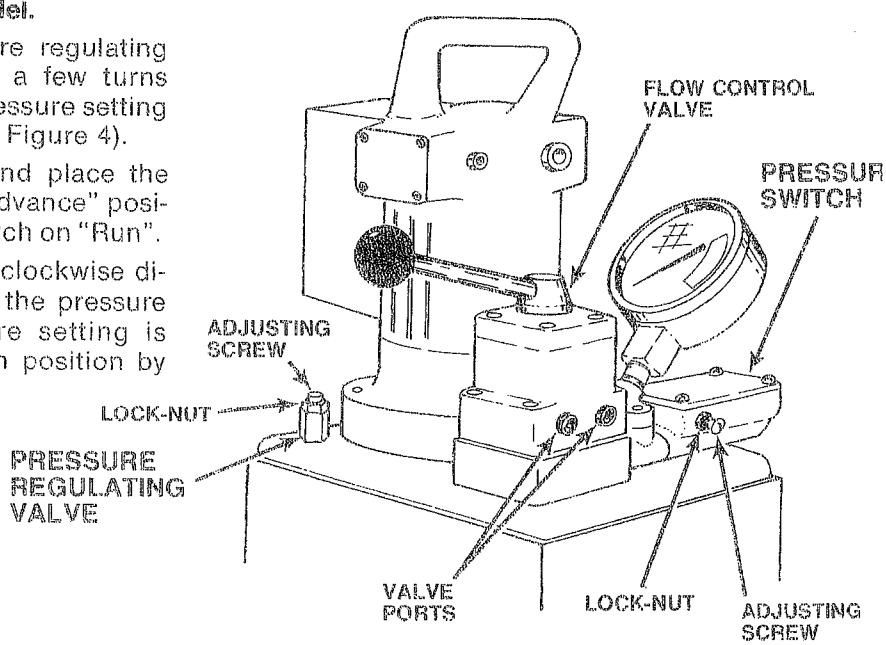



FIGURE 4

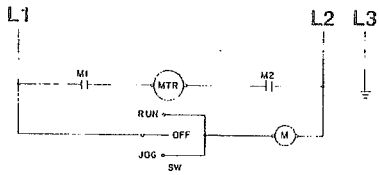
## Adjusting the Pressure Switch

The pressure switch is generally used and adjusted with the pressure regulating valve as explained above. A pressure switch may also be used alone for activating electrical devices such as motors, solenoids, relays, etc. which are located elsewhere in the circuit.

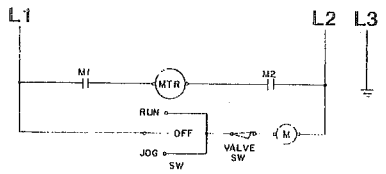
1. Loosen the lock-nut on the pressure switch as shown in Figure 4. Turn the adjusting screw in a clockwise direction to increase the pressure setting to a higher than desired pressure.
2. Connect the pump power supply and place the control valve in the "advance" position. Set the motor control toggle switch on "Run".
3. Slowly turn the pressure switch adjusting screw in a counter-clockwise direction, decreasing the pressure switch setting until the pump motor shuts off. Then tighten the lock-nut to lock the adjusting screw.
4. Move the hydraulic flow control valve to the "release" position to relieve the hydraulic pressure. Move the control valve back to "advance" and start the hydraulic pump again to check the pressure setting. It may be necessary to make a second fine adjustment.

# ELECTRICAL SCHEMATICS

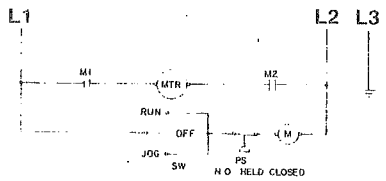
Electrical Schematic for units with a manifold, 2-way, 3-way, 4-way manual or automatic valve and no other electrical accessories.




Electrical Schematic for units with 3 positions, 3-way manual valve with motor switch ref. (9583/30601)



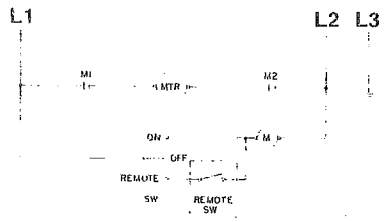

Electrical schematic for units with a pressure switch ref. (9624/40281)



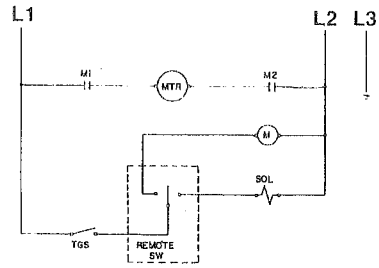

**NOTE:**

Regardless of circuit design, pressure switch must be installed so that motor will shut off when pressure setting is obtained.

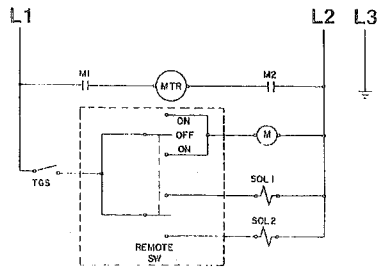
Electrical schematic for units with motor remote control.



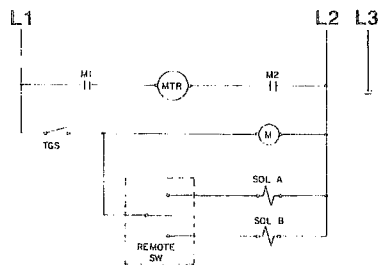

Electrical schematic for units with 2 position, 3-way solenoid valve ref. (9579/42621).




Electrical schematic for units with 2 position, 4-way solenoid valve ref. (9592/61084).

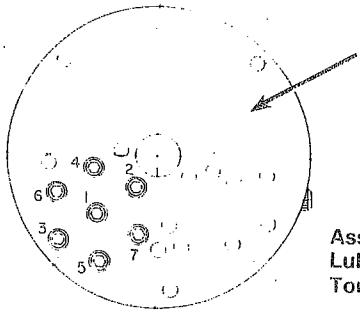



Electrical schematic for units with 3 position, 3-way solenoid valve ref. (9605/41825) and 3 position, 4-way valves ref. (9607/50951) and (9590/31057-C1-B).



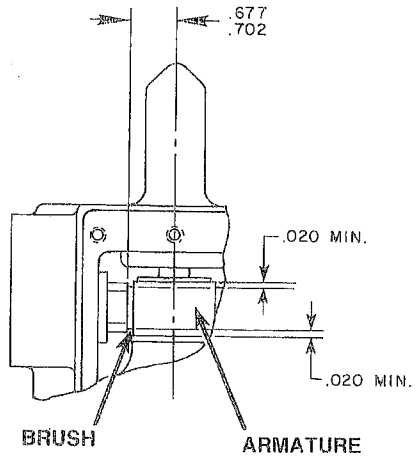
# REASSEMBLY SPECIFICATIONS

## HIGH PRESSURE PUMP ASSEMBLY BOLT TIGHTENING SEQUENCE



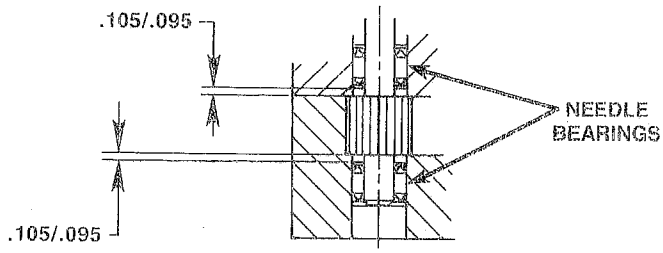

Assemble in sequence shown.
Lubricate under head and on threads.
Torque to 180 in. lbs.

## BRUSH HOLDER & ARMATURE INSTALLATION SPECIFICATIONS




When replacing brushes or the armature, the dimensions shown must be as specified.

## NEEDLE BEARING INSTALLATION SPECIFICATIONS




When replacing the needle bearings on the drive gear of the basic pump, the dimensions shown must be as specified.

# AIR, ELECTRIC, OR GAS POWERED TWO-STAGE HYDRAULIC PUMP

## 5,000 OR 10,000 PSI

## TROUBLESHOOTING GUIDE

**⚠ WARNING**

- To prevent injuries, any repair work or troubleshooting must be done by qualified personnel familiar with this equipment.
- Use the proper gauges and equipment when troubleshooting.

NOTE:

- 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.

**IMPORTANT: Refer to the Parts List included with your particular pump when using this troubleshooting guide.**

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| **Electric motor does not run**<br><br>**⚠ WARNING: Disconnect power supply before removing cover. Any electrical work should be performed by a qualified electrician.** | (1) Pump not turned to "On" position.<br>(2) Unit is not plugged in.<br>(3) No supply voltage.<br><br>(4) Broken lead wire or defective power cord plug.<br>(5) Defective switches.<br>(6) Defective motor.<br>(7) Defective starter relay.<br>(8) Defective remote switch.<br><br>(9) Worn brushes.<br>(10) Circuit breaker tripped because total amperage draw too high for existing circuit.<br>(11) Overheated motor (Single phase, Motor only). Magnetic starter disengaged (three phase motor only). Thermal protector open.<br>(12) Faulty thermal protector (single phase motor). Faulty magnetic starter (three phase motor). | *(1) Flip toggle switch to "Run" position.*<br>*(2) Plug in unit.*<br>*(3) Check line voltage. Check reset button on power panel.*<br>*(4) Replace defective parts.*<br><br>*(5) Check switches.*<br>*(6) Replace or repair motor.*<br>*(7) Replace defective parts.*<br>*(8) Repair or replace remote switch.*<br>*(9) Replace brushes.*<br>*(10) Add an additional circuit or use alternate circuit.*<br><br>*(11) Wait for motor to cool before restarting. Reset thermal protector (Single phase motor will reset automatically.)*<br><br>*(12) Replace.* |
| **Pump is not delivering oil or delivers only enough oil to advance ram(s) partially or erratically** | (1) Oil level too low.<br><br>(2) Loose fitting coupler to ram.<br><br>(3) Air in system.<br>(4) Air leak in suction line. | *(1) Fill reservoir to within ½" of filler plug with all cylinders retracted.*<br>*(2) Check quick-disconnect couplings to cylinders. Inspect couplers to insure that they are completely coupled. Occasionally couplers have to be replaced because the ball-check does not stay open due to wear.*<br>*(3) Bleed the system.*<br>*(4) Check and tighten the suction line.* |