SPX HYTEC®

SPX Corporation
5885 11th Street
Rockford, IL 61109-3699 USA

Tech. Services: (800) 477-8326
Fax: (800) 765-8326
Order Entry: (800) 541-1418
Fax: (800) 288-7031

Internet Address:
http://www.hytec.com

Form No. 102617

Operating Instructions for:

100178
100178-230
100178-LEX

ELECTRIC

TWO-STAGE HYDRAULIC PUMP

Max. Capacity: 5,000 PSI (For 100178 & 100178-230)
2,000 PSI (For 100178-LEX)

Read and carefully follow the operating instructions before installation and use of this pump. Most problems with new equipment are caused by improper operation or installation.

NOTE: Inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment.

SAFETY PRECAUTIONS

⚠ WARNING

- **All WARNING statements must be carefully observed to help prevent personal injury.**

Hydraulic Hose

- **Before operating the pump, tighten all hose connections using the proper tools. 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.**
- **Should a hydraulic hose ever burst, rupture, 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 the 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 signs of wear because any of these conditions can damage the hose and may 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 hydraulic pressure rating of 5,000 PSI (2,000 PSI for 100178-LEX) or tamper with the internal pressure relief valve. Creating pressure beyond rated capacity may result in personal injury.**
- **Before replenishing the oil level, retract the cylinder(s) in the system to prevent overfilling the pump reservoir. An overfill may cause personal injury due to excess reservoir pressure created when workholding components are retracted.**

Hydraulic System

- **Do not exceed the rated capacities of any component serviced by this pump. Excess pressure can result in personal injury.**

WARNING: cont'd

Power Supply (Electric)

- **Do not use an ungrounded (two-prong) extension cord with this unit.**
- **Avoid any conditions that 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.**
- **Disconnect the power supply before removing the motor control box cover or performing repairs or maintenance.**
- **The line voltage must be the same as the voltage for which the pump is wired.** ***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 amp into a 20 amp electrical circuit.***
- **Do not attempt to increase the power line capacity by replacing a fuse or breaker with another of higher value. Overheating of the power line and possibility of a fire will result.**

OPERATING PROCEDURE

Filling the Reservoir

NOTE: This pump has been shipped without oil in the reservoir. A high grade hydraulic oil has been shipped with the pump, and when additional oil is required, use only Power Team hydraulic fluids.

1. Clean the area around the filler/vent cap to remove all dust and grit. Any foreign material in the oil may damage the polished surfaces and precision-fit components of this pump.
2. Retract all cylinder(s) to their return position.
3. Remove the filler/vent cap and insert a clean funnel with a filter. Fill the reservoir with Power Team hydraulic oil to within 1" of the cover plate. Replace the filler/vent cap.
4. Cycle the pump (with the cylinder(s) attached) several times. Retract the cylinder(s) and check the oil level in the pump reservoir.

Electrical Hook-up and Operation

WARNING: To help prevent personal injury,

- **All electrical work must 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.**

1. The electric motor is a single phase, 60 cycle motor that has been wired for 115 volts.
2. **If the motor overheats**, a thermal overload protector will stop the pump. Once the pump has cooled, start the pump by pressing the start button. **NOTE: A limited production of pumps were wired with a Lesson brand of motor which had a manual reset thermal overload. If your pump is of this kind, once the motor has cooled, you must first press the manual reset button on the motor then the start button.**
3. **When the pump is in operation and there is a power failure**, the start button must be pushed to restart the unit once the power is restored.

Hydraulic Connections

1. Clean all the areas around the oil ports of the pump and cylinder(s).
2. Inspect all threads and fittings for signs of wear or damage, and replace as needed.
3. Clean all hose ends, couplers, or union ends.
4. Remove the thread protectors from the hydraulic oil outlets.
5. Connect the hose assembly to the hydraulic oil outlet, and couple the hose to the cylinder. **NOTE: Teflon tape may be used to seal hydraulic connections.** Carefully apply only ONE layer of tape. Any loose pieces of tape could be pinched and broken off inside the pipe end, causing the tape to travel through the system and possibly obstruct the flow of oil. Remove old tape from both fittings (male & female) and leave the first thread exposed (no tape).

Pump Operation

Pump Controls: The controls of this pump consist of a Start (green) button, a Stop (red) button and a Run/Jog toggle switch.

1. To jog the pump for setup and trouble-shooting purposes, set the Run/Jog switch to the Jog position. Press and hold the Momentary switch for as long as the pump needs to run. Release the switch to stop the pump.
2. For normal operation, set the Run/Jog switch to the Run position. Press and release the Start (green) button. The pump will start and continue to run until system pressure reaches the pressure switch setting. To stop the pump, press the Stop (red) button.

When operating the pump for the first time:

1. All valve and hose connections should be secure, and the reservoir should be filled to the proper level. Connect the power supply.
2. Jog the pump several times to build pressure. If the pump does not build pressure, it needs to be primed. To prime the pump, disconnect the pump from the system, and route a hose from the pump pressure port back to the pump reservoir. Jog the pump until you see a steady flow of oil that is free of suspended air bubbles. Reconnect the hose to the system.
3. Run the cylinder(s) out to full travel several times to eliminate air from the system. For more complete instructions, refer to the section titled "Bleeding Air from the System." **IMPORTANT: After bleeding air from the system, retract the cylinder(s) and check the oil level. The reservoir oil level should be within 1" of the pump cover plate.**

Adjusting the Pressure Regulating Valve

The pressure regulating valve can be adjusted to bypass oil at a given pressure setting while the pump continues to run.

IMPORTANT:

- **For easy adjustment of the pressure regulating valve, always adjust the pressure by *increasing* it to a desired pressure setting. The pressure range for this unit is from 1,000 PSI to 5,000 PSI (1,000 PSI to 2,000 PSI for 100178-LEX).**

1. Loosen the locknut on the pressure regulating valve, and turn the adjusting screw a few turns counterclockwise (CCW) to decrease the pressure setting to a lower than desired pressure.
2. Connect the pump completely. Place the motor control switch in the Run position and push the Start button.
3. Slowly turn the adjusting screw in a clockwise (CW) direction to gradually increase the pressure setting. When the desired pressure setting is reached, lock the adjusting screw into position by tightening the locknut. If the pump stops during this procedure, raise the pressure switch setting by turning its adjusting screw clockwise (CW).

Pressure Regulating Switch

A pressure switch can be adjusted to stop the pump motor at a desired pressure setting and restart the motor when the pressure falls below that setting.

It is recommended that a pressure switch be used with a 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 PSI.

Adjusting the Pressure Switch Setting

1. Loosen the locknut on the pressure switch. Slowly turn the pressure switch adjusting screw in a counterclockwise (CCW) direction, decreasing the pressure switch setting until the pump motor shuts off. Tighten the locknut to lock the adjusting screw.
2. Release the hydraulic pressure. Run the pump to check the pressure setting and automatic shutoff of the motor. It may be necessary to make a second fine adjustment.

PREVENTIVE MAINTENANCE

WARNING: To help prevent personal injury,

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

Bleeding Air from the System

Upon initial start up or after prolonged use, air can accumulate within the hydraulic system. This entrapped air can 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. Tighten the fitting.

Inspecting the Hydraulic Fluid Level

Check the oil level in the reservoir periodically. The oil level should come to within 1" of the pump cover plate with all cylinders retracted. Drain, clean and replenish the reservoir with Power Team hydraulic oil yearly or more often if necessary. 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

1. Keep the outer surface of the pump as free from dirt as possible.
2. Protect all unused couplers.
3. Keep all hose connections free of dirt and grime.
4. Keep the filler/vent cap clean and unobstructed at all times.
5. Equipment connected to the pump must be kept clean.
6. Use only Power Team hydraulic fluids in this pump. Change as recommended.

Draining and Cleaning 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: Lift the pump and motor off the reservoir carefully to avoid damaging the gasket or any internal components.**
2. Clean the inside of the reservoir and fill half full with clean Power Team hydraulic fluid.
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 pressure 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 fluid. Place the pump and motor assembly (with gasket) on the reservoir and install all the screws. Tighten securely and evenly.

Adding Oil to the Reservoir

1. Cylinder(s) must be fully retracted and the power supply disconnected when adding oil to the reservoir.
2. Clean the entire area around the filler/vent cap before removing the filler/vent cap.
3. Use a clean funnel with filter when adding oil.
4. Use only Power Team hydraulic fluids.

TROUBLE-SHOOTING GUIDE

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

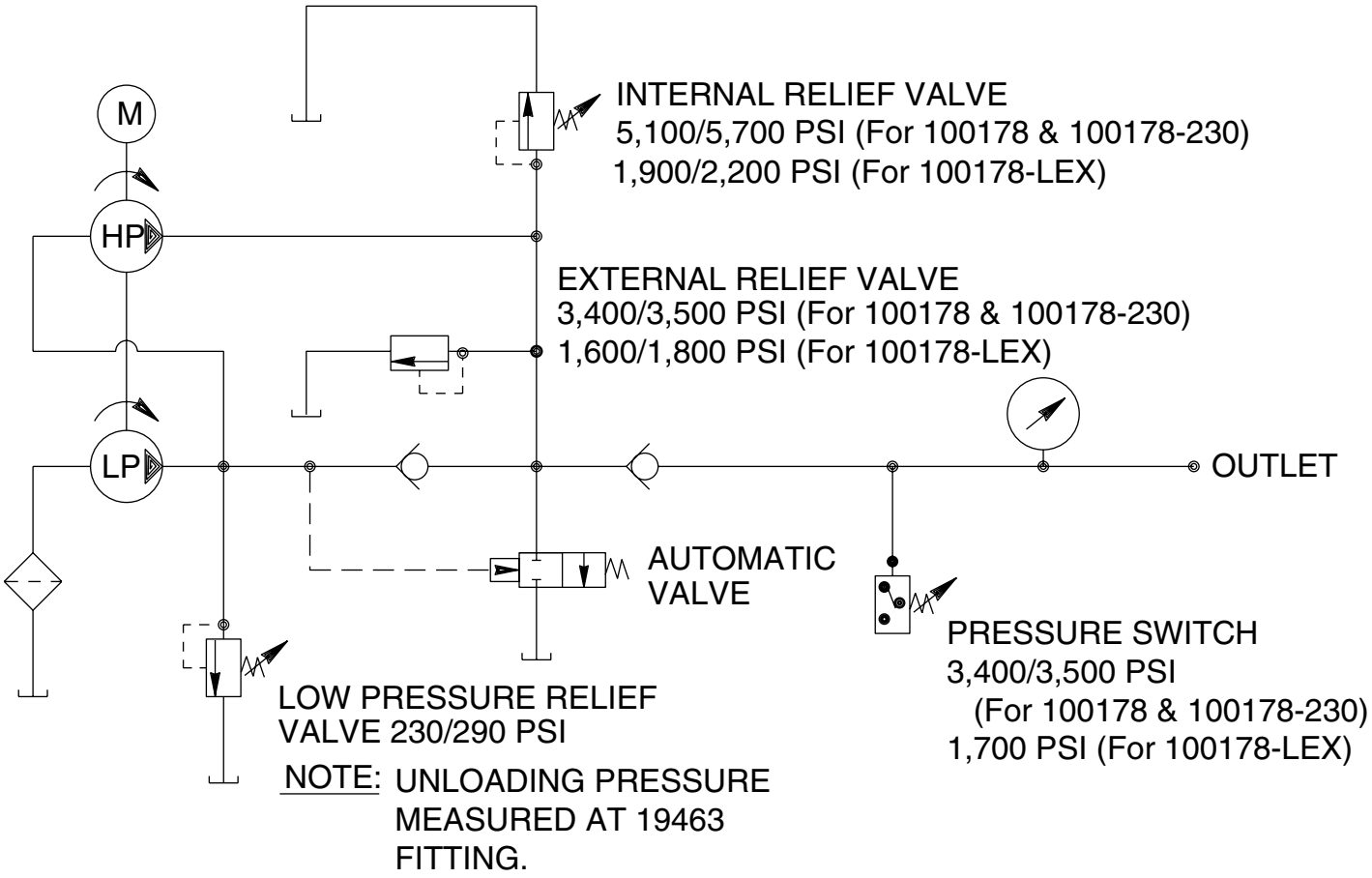
North American & International Color Codes

Conductors	North American	International
Line	Black	Brown
Neutral	White	Blue
Ground	Green	Green/Yellow

NOTE:

- **Use the proper gauges and equipment when trouble-shooting.**
- **It is 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 leak is in the pump or elsewhere in the system.**
- **Refer to Parts List #100819 and the hydraulic and electrical schematic when using this trouble-shooting guide.**

HYDRAULIC SCHEMATIC



PROBLEM	CAUSE	SOLUTION
Electric motor does not run. **⚠WARNING: To help prevent personal injury, disconnect power supply before removing cover. Any electrical work should be performed by a qualified electrician.**	1. Pump not in "ON" position. 2. Unit is not plugged in. 3. No voltage supply. 4. Broken lead wire or defective power cord plug. 5. Defective switches. 6. Defective starter relay. 7. Circuit breaker tripped because total amperage draw too high for existing circuit. 8. Overheated motor. 9. Faulty thermal protector. 10. Defective motor.	1. Place motor control toggle or hand switch in Run position, push Start button. 2. Plug in unit. 3. Check line voltage. Check reset button on power panel. 4. Replace defective parts. 5. Check switches. 6. Replace defective parts. 7. Add a new circuit or use alternate circuit. 8. Wait for motor to cool before restarting. Thermal protector must be reset (only if motor is a manual reset). Press start button. 9. Replace. 10. Replace or repair motor.
Pump is not delivering oil or delivers only enough oil to advance ram(s) partially or erratically.	1. Oil level too low. 2. Air in system. 3. Air leak in suction line. 4. Dirt in pump or filter plugged. 5. Cold oil or oil is too heavy (Hydraulic oil is of a higher viscosity than motor can handle). 6. Relief valve or low pressure unloading valve out of adjustment. 7. Reservoir capacity is too small for the size of the cyinder(s) used. 8. Sheared drive shaft key 9. Motor rotating in wrong direction. 10. Vacuum in reservoir. 11. Low pressure pump worn. 12. Pump needs to be primed.	1. Fill reservoir to within 1" of filler plug with all cylinder(s) retracted. 2. Bleed the system. 3. Check and tighten the suction line. 4. Pump filter should be cleaned and if necessary, pump should be dismantled and all parts inspected and cleaned. 5. Change to lighter oil. 6. Adjust as needed. 7. Use smaller cylinder(s) or larger reservoir. 8. Replace. 9. See electrical schematic on motor. 10. Check for plugged vent in filler plug. 11. Repair/replace gerotor pump. 12. Prime pump.
Pump delivers excess oil pressure	1. Pressure gauge not calibrated. 2. Relief valve not properly set.	1. Calibrate gauge. 2. Adjust the relief valve.

PROBLEM	CAUSE	SOLUTION
Pump builds pressure but cannot maintain pressure.	1. Check to see if there are any external leaks. If no oil leakage is visible, the problem is internal. 2. Determine if leakage is from pump or system components. Refer to the note concerning checking for oil leaks at the beginning of this Trouble-shooting Guide.	1. Reseal leaking pipe fittings with pipe sealant. 2. Remove the pump from the system. Plug the pressure outlet port. Start pump. If pump does not build pressure, readjust pressure regulator. Repeat test. If pump builds pressure, the problem is caused by leakage somewhere in the system. Trouble-shoot individual system components. If the pump starts & stop repeatedly, the pump is leaking internally. See 3 & 4 below.
Pump will not build full pressure.	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.	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 reseat if necessary. Inspect for damage and replace parts if necessary, then reassemble. 5. Replace.
Cylinder(s) will not retract.	1. Check the system pressure; if the pressure is zero the problem may be in the cylinder, mechanical linkage connected to cylinders, or quick-disconnect couplings downstream of the pressure gauge. 2. Defective valve. 3. Air in system. 4. Pressure in reservoir.	1. Check the cylinder(s) for broken return springs and check couplers to ensure they are completely coupled. Occasionally couplers have to be replaced because the check does not stay open in the coupled position. 2. Check valve operation and inspect parts. Replace if nec. 3. Bleed system. 4. Clean filler/vent cap.

PROBLEM	CAUSE	SOLUTION
Automatic valve will not build full pressure	1. Unloading pressure is too low. 2. Defective or oversize seat on automatic valve.	1. Increase unloading pressure. 2. Replace ball and seat.
Automatic valve will not release pressure	1. Sticking piston. 2. High pressure oil is leaking past the lo-to-hi pressure check. This oil leaks back to the piston in the automatic valve keeping the piston closed.	1. Remove, clean and polish. 2. Seat the ball check. Inspect and replace any faulty components.