POWER TEAM®
SPX Hydraulic Technologies
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

powerteam.com

OTC®
SPX Corporation
655 Eisenhower Drive
Owatonna, MN 55060-0995 USA
Phone: (507) 455-7000
Tech. Services: (800) 533-6127
Fax: (800) 955-8329
Order Entry: (507) 455-1480
Fax: (800) 283-8665
International Sales: (507) 455-7223
Fax: (507) 455-7746

Form No. 102355

Operating Instructions for:

2P-5500	4033	201905
2P-5550	4035	D-01023-AA
4030	4036	D-01026-AA
4031	4037	PE18 Series
4032	89300-00	Y27 Series

MODEL C & D
HIGH SPEED
HYDRAULIC PUMP

Read and carefully follow these instructions. Most problems with new equipment are caused by improper operation or installation.

SAFETY PRECAUTIONS

WARNING: To help prevent personal injury,

HYDRAULIC HOSE

- **Before operating the pump, tighten all hose connections with the proper tools. Do not overtighten. Connections should only be secure and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.**
- **Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump and shift the control valve twice to release all pressure. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.**
- **Do not subject the hose to potential hazard such as fire, sharp surfaces, extreme heat or cold, 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 can 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 can result in personal injury.**

PUMP

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

CYLINDER

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

POWER SUPPLY

- **All electrical work must be done by a qualified electrician.**
- **Disconnect the power supply before removing the electrical box cover or performing repairs and maintenance.**
- **Never use an ungrounded (two-prong) extension cord with this unit.**

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Rev. 2 Date: 24 August 2009

SET-UP

Hose Connections

1. Clean all areas around the oil ports of the pump and cylinder.
2. Inspect all threads and fittings for signs of wear and damage. Replace as needed. Clean all hose ends, couplers, or union ends.
3. Remove thread protectors from hydraulic oil outlets. Connect the hose assembly to the hydraulic oil outlet, and couple the hose to the cylinder.

IMPORTANT: Seal all pipe connections with an approved thread sealant. Teflon tape can also be used to seal hydraulic connections if 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 parts.

4. Refer to Figure 1.
   a. If your pump has a **two-way, three-way or automatic valve,** attach one end of the hose to port "C" and the other end of the hose to advance port "B" of the cylinder.
   b. If your pump has a **four-way valve** for operating double-acting cylinders, attach one hose between the upper port "A" on the pump and the return port "D" of the cylinder. Attach a second hose between the lower port "C" on the pump and the advance port "B" on the cylinder.

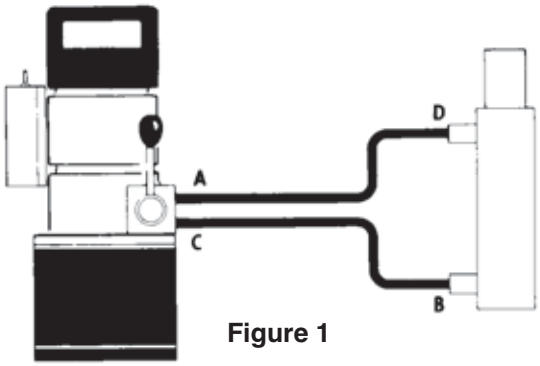

Figure 1

OPERATION

1. Open the filler plug two full turns to vent the reservoir.
2. Place the control valve in the neutral position. (Refer to the following information about valves.)
3. Insert the power cord into an outlet.

WARNING: To help prevent personal injury, check the voltage rating on the motor nameplate to be sure the outlet has the right voltage.

Priming The Pump

1. Back the priming screw out two complete turns. See Figure 2.
2. Jog the pump three times.
3. Tighten the priming screw to 15-25 in. lbs.

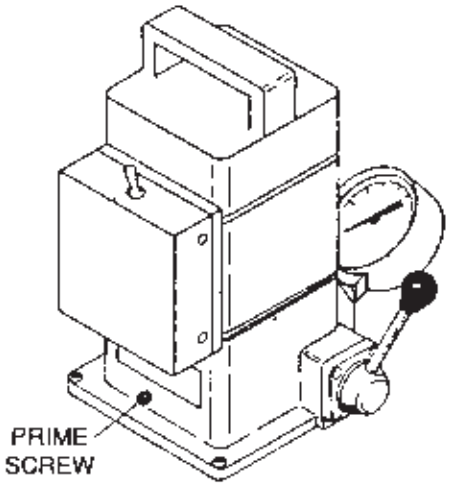

Figure 2

Two-Way Valve *(use with single-acting cylinders)*

1. Turn the valve handle all the way clockwise. Back the handle out until it reaches the stop. Always start the pump in this neutral position.
2. Using the toggle switch, jog the motor several times. Place the switch on RUN, and let the pump idle for a few minutes.
3. To advance the cylinder, turn the valve handle in all the way clockwise. See Figure 3.
4. To retract the cylinder, turn the valve handle counterclockwise until it reaches the stop. See Figure 3.
5. Place the cylinder at a lower level than the pump. Advance and retract the cylinder several times to remove air from the hydraulic system.

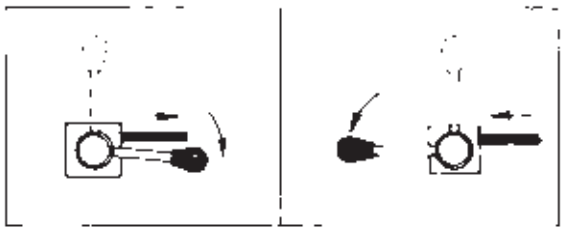

Figure 3

Three-Way Valve *(use with single-acting cylinders)*

1. Place the valve handle in the neutral position as shown in Figure 4.
2. Jog the motor toggle switch several times. Place the switch on RUN, and let the pump idle for a few minutes.
3. To advance the cylinder, position the valve handle as shown in Figure 4. Place the valve handle in neutral again to stop the cylinder and hold pressure.
4. To retract the cylinder, position the lever as shown in Figure 4. Place the valve handle in neutral to stop the cylinder.
5. Place the cylinder at a lower level than the pump. Advance and retract the cylinder several times to remove air from the hydraulic system.

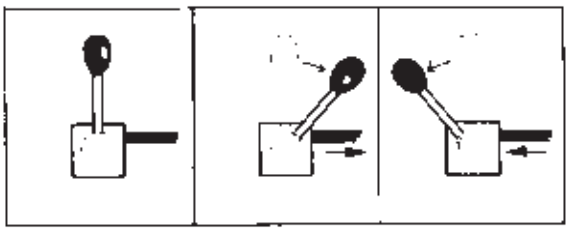

Figure 4

Four-Way Valve *(use with double-acting cylinders)*

WARNING: To help prevent personal injury, the retract port on a double-acting cylinder must be unrestricted when extending the cylinder.

1. Place the valve handle in the neutral position as shown in Figure 5.
2. Jog the motor toggle switch several times. Place the switch on RUN, and let the pump idle for a few minutes.
3. To advance the cylinder, position the valve handle as shown in Figure 5.
4. To retract the cylinder, position the lever as shown in Figure 4. Place the valve handle in neutral to stop the cylinder.
5. Place the cylinder at a lower level than the pump. Advance and retract the cylinder several times to remove air from the hydraulic system.

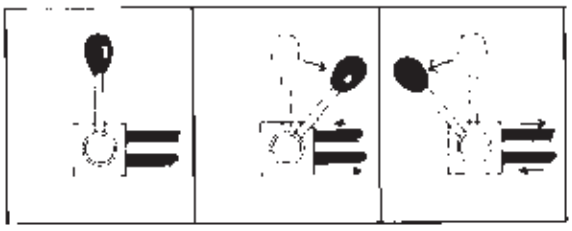

Figure 5

Automatic Valve *(use with single-acting cylinders only)*

NOTE: Pumps with an automatic valve do not have a valve handle. The valve is built into the unit and should be used only with single-acting cylinders.

1. Place the cylinder lower than the level of the pump.
2. Start the motor to extend the cylinder. When the cylinder reaches the end of its stroke, stop the motor. The cylinder automatically returns.
3. Extend and return the cylinder several times to remove air from the hydraulic system.

PREVENTIVE MAINTENANCE

WARNING: To help prevent personal injury, disconnect the pump from the power supply before performing maintenance or repair.

Periodic Cleaning

IMPORTANT: The greatest single cause of failure in hydraulic pumps in dirt. Keep the pump and attached equipment clean to prevent foreign matter from entering the system.

1. Use only clean hydraulic oil, and change oil after every 300 hours of use.
2. Seal the hydraulic oil outlet and all unused couplers with thread protectors when the pump is not in use.

Bleeding Air From The System

Air can accumulate in the hydraulic system during the initial set-up or after prolonged use causing the cylinder to respond slowly or in an unstable manner. To remove the air:

1. Open the filler plug two full turns.
2. Place the cylinder at a lower level than the pump.
3. Extend and retract the cylinder several times without putting a load on the system. Air will be released through the pump reservoir.

IMPORTANT: Some spring return cylinders have a capacity in the rod that forms an air pocket. Bleed this type of cylinder when positioned upside down or lying on its side with the port facing upward.

Lubrication

To check the level of lubricant in the gear box:

1. Mark the motor housing parts for alignment during reassembly.
2. Remove the four machine screws holding the motor assembly to the pump housing. See Figure 6. Lift the motor assembly away from the pump housing to uncover the gear box.
3. If the largest driving gear is not completely covered by oil, add SAE 90 gear lubricant.
4. Assemble the motor to the pump housing again, aligning the marks made in Step 1.

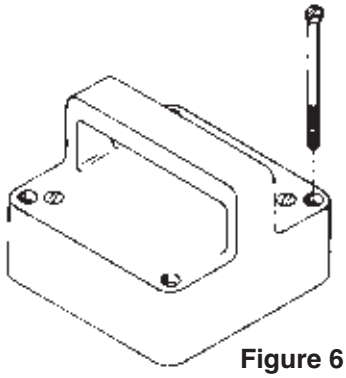

Figure 6

Hydraulic Fluid Level

1. Check the oil level in the reservoir after every 10 hours of use. The correct level of oil is 1/2" from the top the filler plug hole with all cylinders retracted.
2. Drain, flush, and fill the reservoir with approved high-grade hydraulic oil after every 300 hours of use. The frequency of oil changes will depend upon working conditions and the overall amount of use and maintenance given the pump.

Draining And Flushing The Reservoir

The reservoir should be drained and flushed with a nonflammable flushing fluid after every 300 hours of use. **IMPORTANT: Clean the outside of the pump first to keep dirt from entering the reservoir.**

1. Remove the four screws that fasten the pump assembly to the reservoir. Carefully remove the pump assembly from the reservoir without damaging the gasket, filter, or safety valves.
2. Clean the inside of the reservoir, and fill it with a nonflammable flushing oil. Rinse the filter clean.
3. Place the pump assembly on the reservoir again, and secure it with two of the four screws assembled in opposite corners of the pump housing.
4. Start the pump and let it idle for several minutes. **IMPORTANT: Run the pump with the valve in neutral, or run the hose back to the reservoir. Do NOT build pressure.**
5. Remove the pump assembly from the reservoir again. Drain and clean the reservoir.
6. Fill the reservoir to 1/2" from the top of the filler hole with an approved high-grade hydraulic oil.
7. Place the pump assembly (with gasket) on the reservoir. Assemble the four reservoir screws again and tighten securely.

Adding Oil To The Reservoir

1. Retract the cylinder, and disconnect the power supply.
2. Clean the area around the filler plug. Remove the filler plug, and insert a clean funnel with a filter.
3. Fill with approved, high-grade hydraulic oil (215 SSU @ 100° F) to 1/2" from top of filler hole.

Checking Brushes on Universal Motors

To help prevent premature failure of the armature the brushes should be checked periodically.

1. Remove the brush holder caps and brush assemblies.
2. Replace the brush assemblies if they are 1/4" long or less. See Figure 7.
3. Install brush assemblies and brush holder caps.

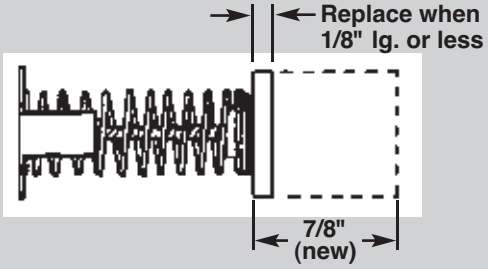

Figure 7

Note: Shaded areas reflect last revision(s) made to this form.

OPTIONAL ACCESSORIES

Pressure Regulating Controls

The pressure range for this pump is from 1000 PSI to 10,000 PSI. A **pressure regulating valve** can be adjusted to bypass oil at a certain pressure setting while the pump continues to run. A **pressure switch** can be adjusted to stop the pump motor at a certain pressure setting. Once the pressure falls below the setting, the switch starts the motor again.

Generally, a pressure switch should be used with a pressure regulating valve. A pressure switch stops the motor at a selected setting, but the hydraulic pump continues building pressure as it slows to a stop. A pressure regulating valve bypasses this oil, preventing it from going into the system. As a result, the pressure differential can be held at about 300 PSI across the pressure range.

Adjusting The Pressure Regulating Valve

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

1. See Figure 8. Loosen the locknut (A) on the pressure regulating valve. Using a screwdriver, turn the adjusting screw (D) a few turns counterclockwise to decrease the pressure setting.
2. Connect the pump's power supply, and place the valve in the advance position. Place the motor control toggle switch on RUN.
3. Slowly turn the adjusting screw (D) clockwise to gradually increase the pressure setting. When the desired pressure setting is reached, lock the adjusting screw in position by tightening the locknut (A).

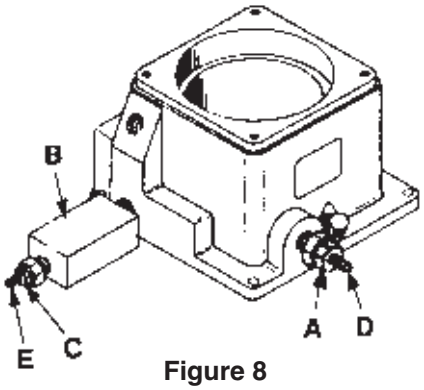

Figure 8

Adjusting The Pressure Switch

NOTE: The pressure regulating valve should be set *first* at the desired maximum pressure.

1. See Figure 7. Loosen the locknut (C) on the pressure switch (B). Slowly turn the adjusting screw (E)clockwise to increase the pressure setting.
2. Place the control valve in the advance position. Place the motor toggle switch on RUN. With the pump running and bypassing oil at the desired pressure, slowly turn the adjusting screw (E) counterclockwise, decreasing the pressure switch setting until the pump motor shuts off. Tighten the locknut (C) again.
3. Release pressure. Move the control valve to advance again, and check the pressure setting and motor cut-out. It may be necessary to make a second adjustment.

A pressure switch can be used alone for operating other electrical devices (motors, solenoids, relays, etc.) located elsewhere in the circuit.

Hydraulic Gauge

1. Remove the pipe plug from the gauge port located above the hydraulic outlet port(s). See Figure 9.
2. Apply a small amount of pipe thread sealant or teflon tape on the gauge threads, and insert the gauge into the port. DO NOT OVERTIGHTEN PIPE CONNECTIONS!

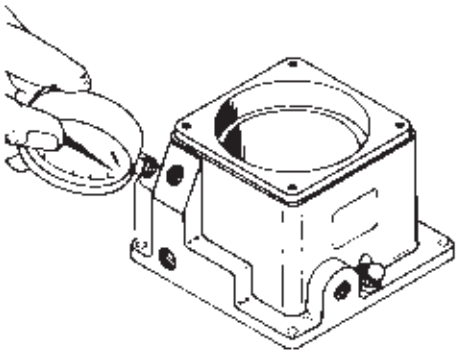

Figure 9

Amperage Draw

This pump can be used with portable generators because of the relatively low amperage draw of the electric motor. The standard 115 volt motor has a maximum amperage draw of 12 amps; optional 230 volt motor has a maximum amperage draw of only six amps.

TROUBLE-SHOOTING GUIDE

WARNING: To help prevent personal injury,

- **Trouble-shooting and repair work must be done by qualified technicians who are familiar with this equipment.**
- **Gauges and other equipment used during trouble-shooting must be rated for 10,000 PSI.**

North American & International Color Codes

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

Depending on the type of pump, 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. (This will not work on an automatic valve pump, because there won't be any pilot pressure to close the valve.) If there is a crack in the pump housing, oil can leak into the gear housing and be difficult to find. Always plug the outlet ports of the pump to eliminate the tool or cylinder as the cause of the leakage.

PROBLEM	CAUSE	SOLUTION
Motor does not run	1. Pump turned OFF. 2. Pump unplugged. 3. No voltage supply. 4. Broken lead wire or defective power cord plug. 5. Defective remote switch. 6. Worn brushes. 7. Defective motor.	1. Turn toggle switch ON. 2. Plug in pump. 3. Check line voltage. 4. Replace defective parts. 5. Check remote switch. 6. Replace brushes. 7. Replace defective parts.
Motor hums but does not rotate	1. Broken gear has jammed power train.	1. Replace broken gear and correct condition that caused failure.
Hydraulic oil leaking into gear case under motor	1. Damaged oil shaft seal and/or o-ring seal. 2. Crack in pump body.	1. Replace damaged seal(s). 2. Replace pump body.
Pump is not delivering oil	1. Oil level too low. 2. Pump is not primed. 3. Loose fitting coupler to cylinder. 4. Vacuum in reservoir. 5. Air in system. 6. Air leak in suction line. 7. Dirt in pump or filter plugged. 8. Oil bypassing through valve or cylinder. 9. Cold oil or oil is too heavy (of a higher viscosity than necessary)	1. Retract cylinders. Fill reservoir to 1/2" from top of filler hole. 2. Open priming screw - follow instructions. 3. See if quick disconnect couplings to cylinders are completely coupled. Sometimes couplers have to be replaced, because the ball check doesn't stay open due to wear. 4. Open filler plug two turns. 5. Bleed the system. 6. Tighten suction line. 7. Clean filter. Dismantle pump and clean all parts, if needed. 8. Remove cylinder and see if pump builds and holds pressure against coupler at hose ends. If it does, problem is in the cylinder. If it doesn't, observe valve drain line with pump running. If oil is running out of drain line, problem is in valve. If not the problem, disassemble pump and check for worn or damaged parts.

PROBLEM	CAUSE	SOLUTION
Pump is not delivering oil (cont'd)	10. Relief valve or low pressure unloading valve set wrong.	10. Adjust as needed.
	11. Motor rotating wrong direction.	11. Looking at motor shaft end, motor must rotate clockwise. Reverse lead wires to brush holders, if necessary.
	12. Defective control valve.	12. Inspect all parts and replace, if needed.
	13. Sheared drive shift key.	13. Replace key and determine cause of key failure.
Pump delivers only enough oil to advance cylinder(s) partially or erratically	1. Low oil level.	1. Retract cylinder(s). Fill reservoir to 1/2" from top of filler hole.
	2. Air in system.	2. Bleed air from system.
	3. Reservoir capacity is too small for size of cylinder.	3. Use smaller cylinder or larger reservoir.
Pump builds but does not maintain pressure	1. Defective cylinder.	1. Remove cylinder from pump. If pump holds pressure, cylinder is defective.
	2. External leaks.	2. Seal leaking pipe fittings with pipe sealant.
	3. Internal leaks: Lift pump from reservoir, keeping filter in oil. Remove drain line and look for leaks from valve.	3. Clean, reseat or replace valve parts. If needed, dismantle check valve(s) and repair seat areas, replace ball and washer.
	4. Sheared drive shaft key.	4. Replace key and determine cause of key failure.
Pump does not build full pressure	1. Faulty pressure gauge.	1. Calibrate gauge.
	2. External leakage.	2. Seal leaking pipe fittings with pipe sealant.
	3. Relief valve set wrong.	3. Lift pump from reservoir, keeping filter in oil. Note pressure reading when relief valve begins to open. Adjust if needed.
	4. Cylinder is leaking.	4. Remove cylinder from pump. If pump builds full pressure, cylinder is defective.
	5. Leaking valve.	5. Clean and reseat parts.
	6. **Two-way valve:** Valve seat damaged. (Is oil leaking from return lin?)	6. Replace valve seat stem or reseat pump body.
	7. **Three-/four-way valve:** Valve shear seals or o-rings damaged. (Is oil leaking from return line?)	7. Replace shear seals and/or o-rings in valve.
	8. **Three-/four-way valve:** Valve rotor lapped surface damaged.	8. Lap rotor surface or replace motor.

PROBLEM	CAUSE	SOLUTION
Pump does not build full pressure (cont'd)	9. Internal leakage.	9. Look for leaks around entire inner mechanism. If there are no visible leaks, the low-to-high pressure ball check may be leaking. Remove all parts. Look for damage to the seat area in the end plate body. Clean and reseat, if needed. Inspect the ball for damage; replace if necessary.
	10. Sheared drive shaft key.	10. Replace key and determine cause of key failure.
	11. High pressure pump inlet or outlet ball checks are leaking.	11. Seat or replace valve head.
Cylinder(s) will not retract	1. Check system pressure. If pressure is zero, control valve is releasing pressure and problem could be in cylinder, linkage to cylinder, or couplings.	1. Look for broken return springs in cylinders. See if couplers are completely coupled. Sometimes couplers have to be replaced, because one check does not stay open due to wear.
	2. Defective valve.	2. Inspect and/or replace parts.
Pump delivers excess oil pressure	1. Relief valve set wrong.	1. Adjust relief valve.
Automatic valve will not allow pump to build full pressure	1. Pilot pressure is too low.	1. Increase pilot pressure.
	2. Defective or oversize seat in automatic valve.	2. Replace ball and seat.
	3. Short rollers in low pressure pump. A short roller will make the pilot pressure erratic, causing the valve to open partially and bypass oil into the reservoir past the ball seat.	3. Replace short roller(s).
Automatic valve will not release pressure	1. Piston is sticking.	1. Remove, clean and polish piston.
	2. High pressure oil leaking past the low-to-high pressure check back to the piston in the automatic valve, keeping the piston closed.	2. Seat ball check and carefully add greater spring force to ball. (Too much force causes priming problems.)