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Form No. 102637

Operating Instructions for:

		PE462S-HWBODY
4055	PE462A	PE462S-HWMAX
4056	PE462A-ACE	PE464
4057	PE462A-PARK	PE464-230
PE46-CIV	PE462S	PE464S
PE462	PE462S-CL	PE464S-230

ELECTRIC
TWO-STAGE HYDRAULIC PUMP

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

SAFETY PRECAUTIONS

WARNING: To help avoid personal injury,

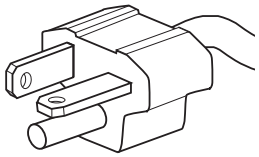
Hydraulic Hose
- **Before operating the pump, all hose connections must be tightened with the proper tools. Do not overtighten. Connections should only be tightened securely and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their 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 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, 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 hydraulic pressure 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 replenishing the oil level, retract the system to prevent overfilling the pump reservoir. An overfill can cause personal injury due to excess reservoir pressure created when cylinders are retracted.**

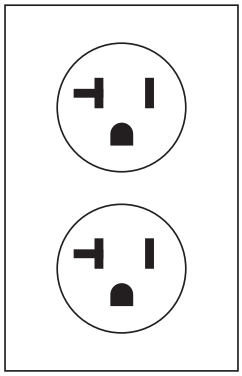
Cylinder
- **Do not exceed rated capacities of the cylinders. Excess pressure can result in personal injury.**
- **Do not set poorly-balanced or off-center loads on a cylinder. The load can tip and cause personal injury.**

⚠WARNING: cont'd

Power Supply (Electric)



20 AMP PLUG



20 AMP RECEPTACLE

- **IMPORTANT: In order to meet certain electrical safety requirements, pumps in this series wired for 115 Volt AC 60 Hz are required to contain a 20 AMP plug as shown to the right. Plug unit into the appropriate 20 AMP electrical female receptacle. Do not modify the pump power cord or plug in any way - doing so will VOID the product warranty on any electrical components.**
- **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.**
- **Pump must be plugged into corresponding voltage power source.**
- **Branch circuit must be sized properly for proper operation of pump. For best performance, plug pump into a circuit rated equal to or greater than the maximum amp rating of pump.**
- **If branch circuit breaker or fuse opens continuously, 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: The pump has been shipped without oil in the reservoir. A high-quality, approved hydraulic oil has been shipped with the pump in a separate container. If additional oil is required, use an approved hydraulic oil only.

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 cylinder(s) to their return position.
3. Remove the filler cap and insert a clean funnel with a filter. Fill the reservoir with a high-quality, approved hydraulic oil to within 1" of the cover plate. Replace the filler 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 avoid personal injury,

- **All electrical work must be done by a qualified electrician.**
- **Disconnect the power supply before removing motor casing cover or performing repairs or maintenance.**
- **All voltages must be wired for counterclockwise rotation when viewed from the lead end of the 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 and can be wired at 115 or 230 volts.

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 outlets, and couple the hose to the cylinder.
   IMPORTANT: Seal all external pipe connections with a high-quality, nonhardening thread sealant. Teflon tape can be used to seal hydraulic connections if only one layer of tape is used. Apply the tape carefully, two threads back, to prevent it from being pinched by the coupler and broken off inside the system. Any loose pieces of tape could travel through the system and obstruct the flow of oil or cause jamming of precision-fit parts.

Pump Operation

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. Activate the pump, and advance the cylinder(s) by pushing the UP button on the remote control switch. The motor shuts off when the UP button is released, and system pressure is held. Press the DOWN button or shift the manual valve to allow the cylinder(s) to retract.
3. Refer to the section titled "Bleeding Air from the System."
4. Check the oil level in the reservoir and add oil if necessary. The reservoir oil level should be within 1" of the pump cover plate.

PRESSURE REGULATING CONTROL ADJUSTMENTS

(NOTE: These options are not on all pump models.)

Adjusting the Pressure Regulating Valve

The pressure regulating valve can be adjusted to bypass oil at a given pressure 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 10,000 PSI.**

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.

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.**
- **Maintenance and repairs 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 a high-quality, approved 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 breather hole in the filler cap clean and unobstructed at all times.
5. Equipment connected to the pump must be kept clean.
6. Use only approved 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 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 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 a high-quality, approved 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 cap before removing the cap.
3. Use a clean funnel with filter when adding oil.
4. Use only approved hydraulic fluids.

TROUBLE-SHOOTING

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

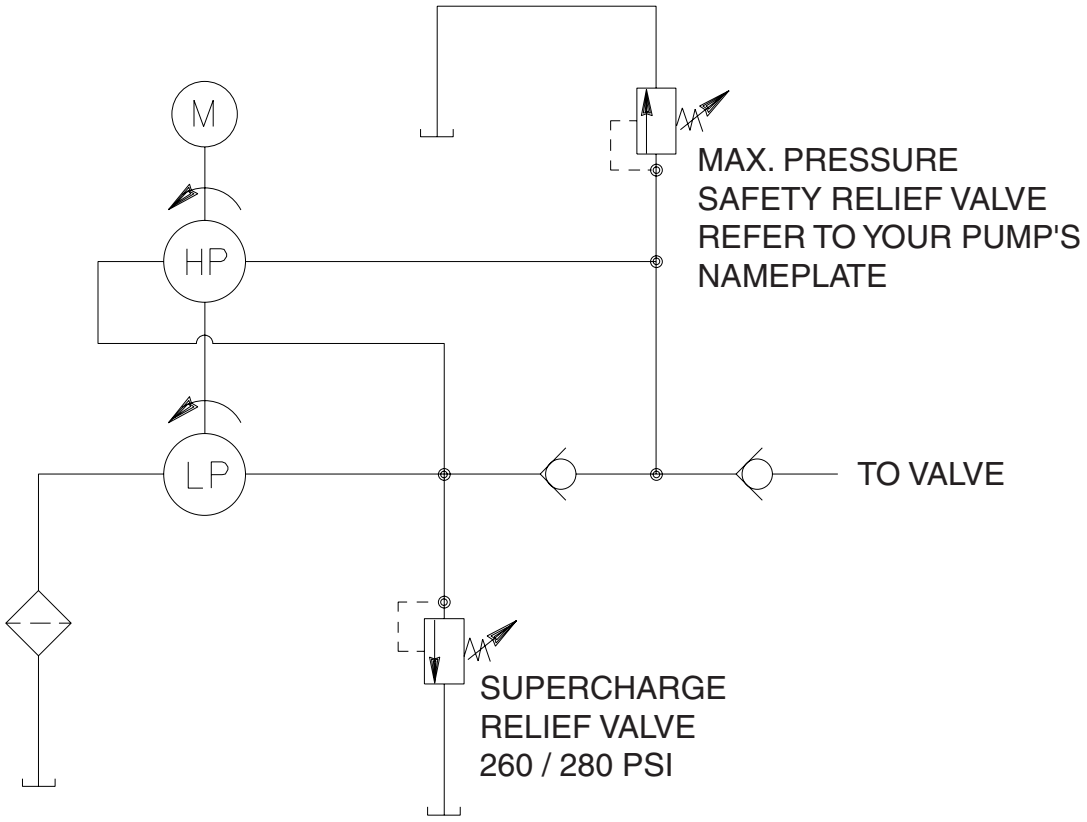
North American & International Color Codes

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 your pump's appropriate parts list and the hydraulic and electrical schematics when using this trouble-shooting guide.**

HYDRAULIC SCHEMATIC



PROBLEM	CAUSE	SOLUTION
Electric motor does not run. **⚠ WARNING** **Disconnect power supply before removing cover. Any electrical work should be performed by a qualified electrician.**	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. Replace switches. 5. Replace defective parts. 6. 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, or push red reset button on tip of the motor (if so equipped). 9. Replace. 10. Replace or repair motor.
Pump is not delivering oil or delivers only enough oil to advance ram(s) partially or erratically. **⚠ WARNING** **The force of escaping hydraulic fluid could cause serious injury. Keep hands, face, etc. clear of any hydraulic leaks.**	1. Oil level too low. 2. Loose fitting coupler to ram. 3. Air in the 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 ram(s) used. 9. Defective directional valve. 10. Release poppet not seating in solenoid valve. 11. Sheared drive shaft key(s). 12. Motor rotating in wrong direction. 13. Vacuum in reservoir. 14. Low pressure pump worn.	1. Fill reservoir to within 1" of filler plug with all rams retracted. 2. Check quick-disconnect couplings to rams. 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. 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 ram(s) or larger reservoir. 9. Inspect all parts carefully and replace if necessary. 10. Disassemble, inspect, and clean pump to remove any dirt. 11. Replace after checking pump cavity for broken pieces. 12. Refer to electrical schematic on motor. 13. Check for plugged vent in filler plug. 14. Repair or replace gerotor pump.

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.	1. Reseal leaking pipe fittings with pipe sealant.
	2. To test for a leaking control 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 Trouble-shooting Guide.	2. Clean, reseat or replace control valve parts. If the internal check valve is leaking, the check valve must be disassembled and the seat area repaired, poppet replaced, etc.
Pump will not build full pressure.	1. Faulty pressure gauge.	1. Calibrate gauge.
	2. Check for external leakage.	2. Seal any faulty pipe fitting with pipe sealant.
	3. Check the relief valve setting.	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 just prior to relief valve pressure.
	4. Check for leaks in the solenoid valve.	4. Clean and reseat or replace parts.
	5. Inspect the pump for internal leakage. Check high pressure pump inlet or outlet ball checks.	5. 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 for any damage to the seat area. Clean and reseat if necessary. Inspect for damage and replace parts if necessary, then reassemble.
	6. Sheared key(s).	6. Replace after checking pump cavity for broken pieces.
	7. Automatic valve leakage.	7. Check automatic valve seat.
Cylinder(s) will not retract.	1. Check the system pressure; if the pressure is zero, the solenoid valve is releasing pressure and the problem may be in the cylinder, (mechanical linkage connected to cylinders), or quick-disconnect couplings.	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. Defective valve.	2. Check valve operation and inspect parts. Replace if nec.

PROBLEM	CAUSE	SOLUTION
Pump delivers excess oil pressure	1. Check pressure gauge. 2. Relief valve not properly set.	1. Calibrate gauge. 2. Reset the relief valve.
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.