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Form No. 102647

Operating Instructions for:

100140
100140-50-220
100840
100198
100199

ELECTRIC

TWO-STAGE HYDRAULIC PUMP

for Automatic Pallet Coupling System
Max. Capacity: 5,000 PSI

Read and carefully follow the operating instructions before installation and use of these pumps. Most problems with new equipment are caused by improper operation or installation. Additional operating instructions are found in the Automatic Pallet Coupling System Operation and Maintenance Instructions received with the programmable logic controller.

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.**
- **Before operating the pump, thighten 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 rupture, burst or need to be disconnected, immediately shut the pump OFF. The valve will automatically release all pressure between the check valve and the pump. Never attempt to grasp a leaking pressurized hose 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, 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 possibly result in personal injury.**
- **Do not use the hose to move attached equipment. Stress can damage the hose and possibly 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 cresote-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.**
- **Do not exceed the hydraulic pressure rating of 5,000 PSI or tamper with the internal pressure relief valve. Creating pressure beyond rated capacity can result in personal injury.**
- **Before replenishing the oil level, retract the system actuators to prevent overfilling the pump reservoir. An overfill can cause personal injury due to excess reservoir pressure created when workholding components are retracted.**
- **Do not exceed the rated capacities of any component serviced by this pump. Excess pressure can result in personal injury.**

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WARNING cont'd

- **Avoid any conditions that could create an electrical hazard. All wiring must be done by a qualified electrician.**
- **All system interfaces must be designed and installed by a qualified electrician. Incorrect interfacing can result in personal injury and/or property damage.**
- **Never use an ungrounded power supply with this unit. If the power supply is damaged or the internal wiring exposed in any way, replace immediately.**
- **The pump must be compatible with the existing line voltage. Disconnect the pump from the power supply before attempting any maintenance or repairs on the unit.**
- **Check the total amperage draw for the electrical circuit you will be using. *Example: 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.**
- **Keep all shields in place to help prevent personal injury.**
- **Always keep hand clear of moving parts during clamp/unclamp cycles.**

PUMP SETUP AND INSTALLATION

Electrical Connections

WARNING

- **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 when viewed from lead end of motor.**
- **The supply line voltage and amperage ratings must be compatible with the voltage and amperage required by the pump. Provide wiring as required. To rewire motor from one voltage to another, see the diagram on the motor nameplate and the electrical schematic section in the pump parts list.**
- **Changing the voltage on any of these pumps is an involved, and if improperly performed, potentially hazardous procedure. Consult the manufacturer for specific information before attemping any rewiring.**
- **Never use an ungrounded power supply with these pumps. Avoid any conditions that could create an electrical hazard. The pump must be compatible with the existing line voltage. Disconnect the pump from the power supply before attempting any maintenance or repairs on the unit.**
- **If the power supply on the pump is damaged or the internal wiring exposed in any way, replace immediately.**

Refer to the electrical schematic in the parts list supplied with the pump for making electrical connections.

Catalog No.	Horse Power	Voltage	Frequency	Amps	Phase	Overload Protection	Reset Procedure
100140	1	115*/230	60 Hz	16/8	single	manual	If the pump overheats, a thermal overload protector will stop the pump. Once the pump has cooled, start the pump by pressing the manual reset, then the start button.
100140-50-220	1	110/220*	50 Hz	20.6/10.3	single	manual	
100840	1	230/460*	60 Hz	3.8/1.9	three	manual	
100198	2	115*/230	50/60 Hz	27/14	single	automatic	If the pump overheats, a thermal overload protector will stop the pump. Once the pump has cooled, start the pump by pressing the start button.
100199	2	230/460*	50/60 Hz	6.6/3.3	three	automatic	

* Factory wiring

NOTE: 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

WARNING

- **To help prevent personal injury, all components in the hydraulic system must be rated for 5,000 PSI working pressure (20,000 PSI minimum burst).**

1. Clean all the areas around the oil ports of the pump and base unit.
2. Inspect all threads and fittings for signs of wear or damage. Replace as needed.
3. Clean all hose ends, couplers or union ends.
4. Mount the pump in a suitable location as close to the base unit as possible. Remove the thread protectors from the hydraulic oil outlets.
5. Make the hydraulic connection between the pump and the base unit. Connect the top port of the pump to the top port of the base unit.
6. Connect the bottom port of the pump to the bottom port of the base unit.

NOTE: Hoses and tube lines should be 1/4 inch inside diameter or larger. If the connecting plumbing between the pump and base unit is over 10 feet long, larger sizes are recommended.

IMPORTANT: Although a high-grade non-hardening thread sealant is preferred, teflon tape can be used to seal hydraulic connections if only one layer of tape is used. Apply carefully 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.

OPERATION

Operating the Pump the first time

1. All connections must be tight and the reservoir filled to the proper level. Plug in the electric motor.
2. Run the actuator(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 actuator(s) and check the oil level. The reservoir oil level should be within 1-1/2" of the pump cover plate.**

Pump Operation in the Automatic Pallet Coupling System

NOTE: Refer to the instruction manual provided with your programmable logic controller for more specific information.

1. Press and release the Start (green) button. This puts the pump in a standby mode and is indicated by a light on the pump. **NOTE: Pressing this button does not start the pump. The pump will start and run only when called for by the programmable logic controller.**

WARNING

- **When in the standby mode the pump will start and stop automatically in response to signals from the programmable logic controller. NEVER assume the pump is off and will not restart. Pressing the Stop (red) button is the only way to ensure that the pump is completely off.**
- **When this system is integrated with other automated systems, the signal to operate can be sent or received at any time. Always shut down all components in the system before entering the work envelope.**

Setting System Operating Pressure

The system operating pressure is set at 1000 PSI at the factory. This involves the adjustment of the external pressure regulator on the pump and the corresponding setting of the pressure switch at the pump. To reset this pressure, refer to Figures 1 and 2 and follow this procedure:

1. Place the pump setup override switch on "setup" to prevent the pump from stopping because it hasn't developed pressure within a certain time period.
2. Raise the setting of the pressure switch by loosening the locknut (D) and turning the adjusting screw (A) clockwise several turns.
3. Index a pallet to the load/unload station.
4. Initiate the couple/unclamp cycle. With the pressure switch set significantly higher than the pump pressure, the pump will start in the unclamp mode and continue to run.
5. Set the system operating pressure by loosening the locknut (C) on the pressure regulating valve. Turn the adjusting screw (B) clockwise to increase pressure or counterclockwise to decrease pressure. Lock the adjusting screw in position.
   NOTE: For best results, always set the pressure regulating valve to the desired setting by adjusting the pressure lower and then INCREASING to the desired pressure setting. Do not adjust it by decreasing from a higher to a lower setting. If the pump shuts off during this procedure, the pressure switch must be set higher. Repeat steps 2 through 5.
6. Slowly, lower the pressure switch setting until the pressure switch opens and the pump stops.
   NOTE:
   - **There is a delay between the time that the pressure switch opens and the time the pump stops. The pressure switch must be adjusted slowly to insure that the switch is not set too low, causing the pump to shut off before reaching the proper pressure.**
   - **If the programmable logic controller indicator lights are visible during this procedure, the pressure switch setting can be monitored by watching Input 011. When the pressure switch opens, the input signal is immediately removed from Input 011. After a predetermined delay, the pump automatically shuts off.**
7. Place the pump setup override switch on "RUN" to enable the pump fault timer circuit.

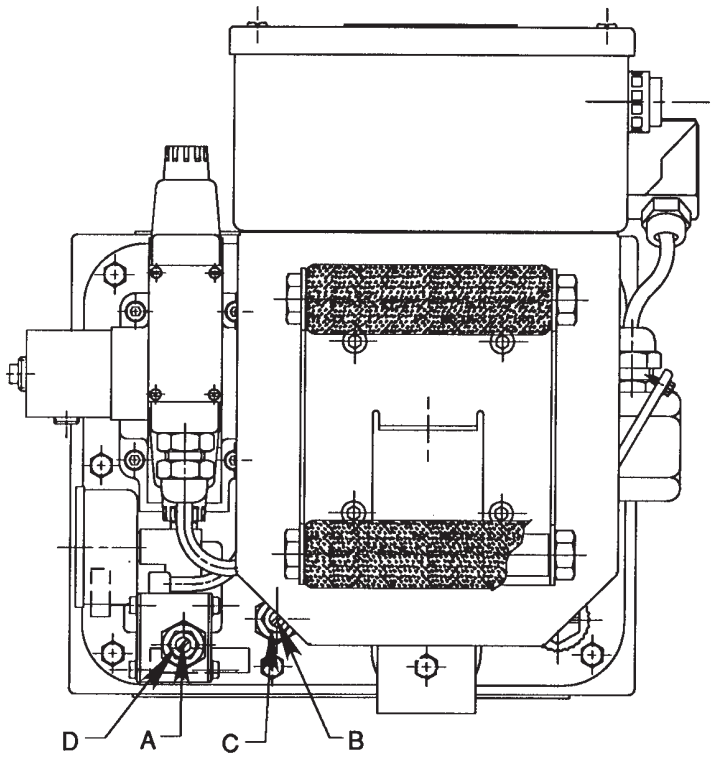


FIGURE 1
Top View of 100140 and 100840

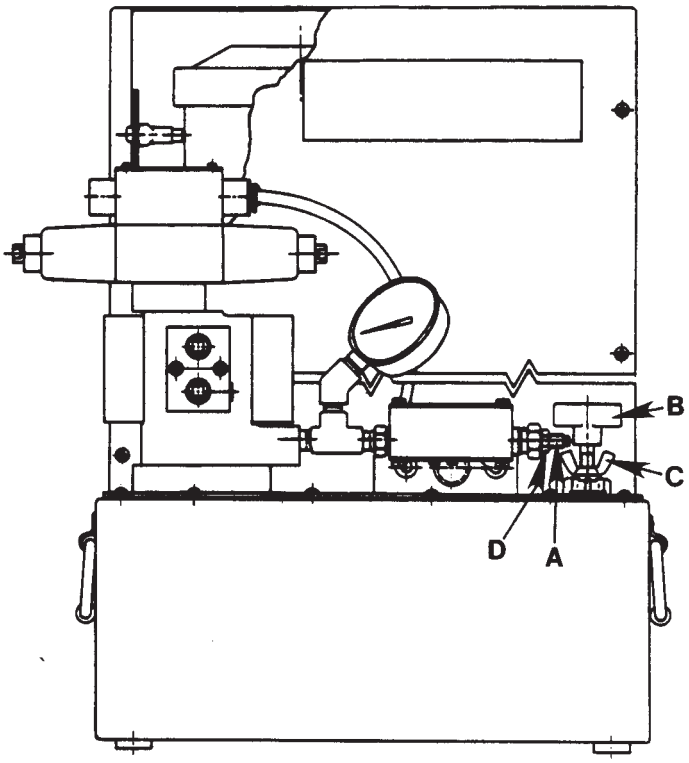


FIGURE 2
Side View of 100198 and 100199

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 be 1-1/2" from the pump cover plate with all actuator(s) retracted. Drain, flush 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.

IMPORTANT: Drain and clean the other hydraulic system components (hoses, tubes, cylinders, clamps, etc.) before reconnecting them to the pump. This will prevent contaminated oil from re-entering the pump. Then, if required, bleed air from the system.

Adding Oil to the Reservoir

1. Actuator(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

Use this trouble-shooting guide only after it is certain that the pump is receiving the proper control signals from the programmable logic controller. Refer also to the operation and maintenance instructions for the Automatic Pallet Coupling System.

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

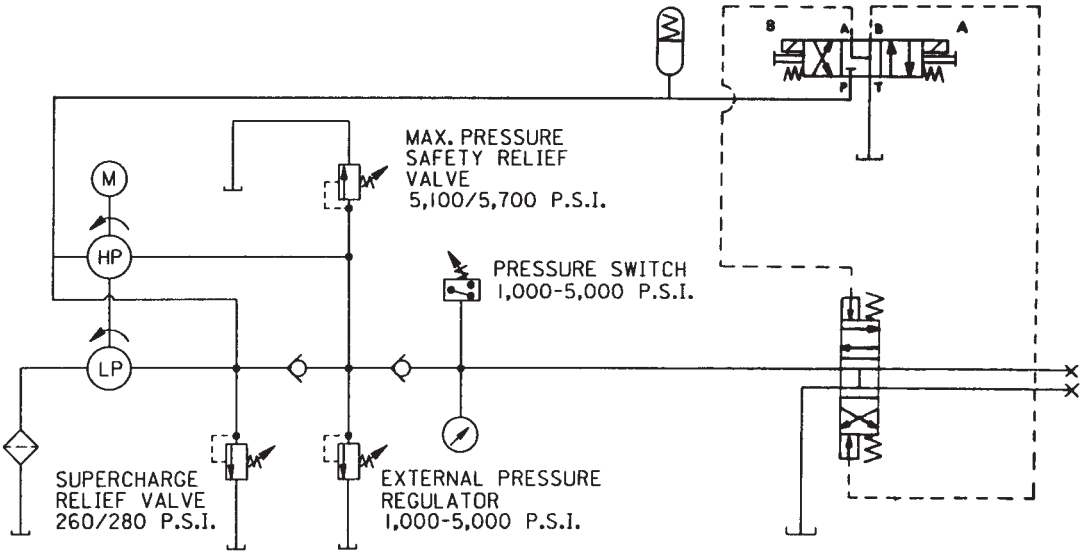
North American & International Color Codes (Single Phase Only)

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

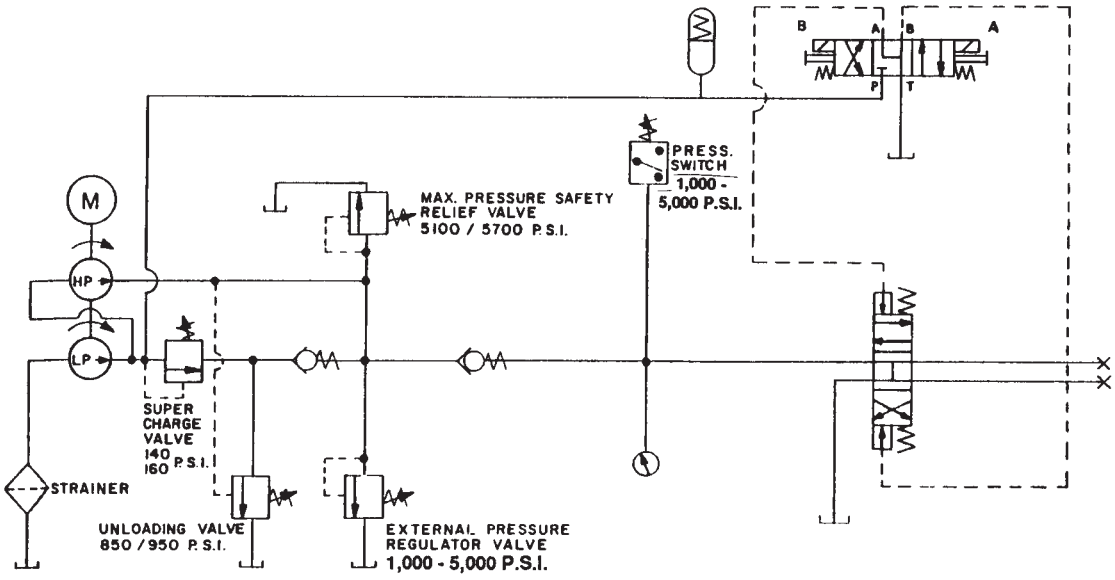
NOTE:

- **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.**
- **Refer to the pump parts list and hydraulic and electrical schematics when using this trouble-shooting guide.**

HYDRAULIC SCHEMATIC FOR 100140, 100140-50-220, & 100840 PUMPS



HYDRAULIC SCHEMATIC FOR 100198 & 100199 PUMPS



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. 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. Circuit breaker tripped because total amperage draw too high for existing circuit. 7. Overheated motor. 8. Faulty thermal protector. 9. 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. Add a new circuit or use alternate circuit. 7. Wait for motor to cool before restarting. Follow reset procedure on back sheet 1 of 4. 8. Replace. 9. Replace or repair motor.
Pump is not delivering oil or delivers only enough oil to advance actuator(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 actuator(s) used. 8. Sheared drive shaft key 9. Motor rotating in wrong direction 10. Vacuum in reservoir. 11. Low pressure pump worn.	1. Fill reservoir to be 1-1/2" from cover plate cover with all actuator(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 actuator(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.

PROBLEM	CAUSE	SOLUTION
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 at relief valve pressure.
	4. Inspect the pump for internal leakage. Check high pressure pump inlet or outlet ball checks.	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. Sheared key.	5. Replace.
Actuator(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.	1. Check the actuator(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. Defective valve.	2. Check valve operation and inspect parts. Replace if nec.
	3. Air in system.	3. Bleed system.
	4. Pressure in reservoir.	4. Clean filler/vent cap.
Pump delivers excess oil pressure	1. Pressure gauge not calibrated.	1. Calibrate gauge.
	2. Relief valve not properly set.	2. Adjust the relief valve.