

SOUTHWORTH

PUN Installation, Operation & Maintenance Manual



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1. Introduction

The Southworth Pallet Unloader (PUN) is designed to unload pallets. PUN units are designed to tilt and lift materials, to be removed from the pallet individually, in a general indoor industrial setting.

NOTICE

This manual is intended for PUN machines shipped during or after February 2018 with control panels supplied by Southworth Products. Please contact Southworth Products for information about PUN machines shipped before February 2018 or with control panels not as shown in the manual.

This manual contains instructions on the safe and proper installation, use, and maintenance of the PUN unit. Be sure that this manual is available to the people who install, use, or service the unit. Be sure that all personnel read this manual before they install, use, or service the unit.

The instructions in this manual are not necessarily all-inclusive, as Southworth cannot anticipate all conceivable or unique situations. In the interest of safety, please read this whole manual carefully. Please understand the material in this manual before you install, use, or service the PUN unit. If you have any questions about any of the instructions in this manual, please contact Southworth Products Corp.

Southworth's product warranty is shown on the rear cover of this manual. This instruction manual is not intended to be or to create any other warranty, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, all of which are hereby expressly excluded. As set forth more specifically in the product warranty, Southworth's obligation under that warranty is limited to the repair or replacement of defective components, which shall be the buyer's sole remedy, and Southworth shall not be liable for any loss, injury, or damage to persons or property, nor for any direct, indirect, or consequential damage of any kind resulting from the PUN unit.

1.1 Responsibilities of Owners and Users

Inspection and Maintenance – The device shall be inspected and maintained in proper working order in accordance with Southworth's owner's manual.

Removal from Service – Any device not in safe operating condition such as, but not limited to, excessive leakage, missing rollers, pins, or fasteners, any bent or cracked structural members, cut or frayed electric, hydraulic, or pneumatic lines, damaged or malfunctioning controls or safety devices, etc. shall be removed from service until it is repaired to the original manufacturer's standards.

Deflection – It is the responsibility of the user/purchaser to advise the manufacturer where deflection may be critical to the application.

Repairs – All repairs shall be made by qualified personnel in conformance with Southworth's instructions.

Operators - Only trained personnel and authorized personnel shall be permitted to operate the lift.

Before Operation – Before using the device, the operator shall have:

- Read and/or had explained, and understood, the manufacturer’s operating instructions and safety rules.
- Inspected the device for proper operation and condition. Any suspect item shall be carefully examined and a determination made by a qualified person as to whether it constitutes a hazard. All items not in conformance with Southworth’s specification shall be corrected before further use of the equipment.

During Operation – The device shall only be used in accordance with this owner’s manual.

- Do not overload.
- Ensure that all safety devices are operational and in place.

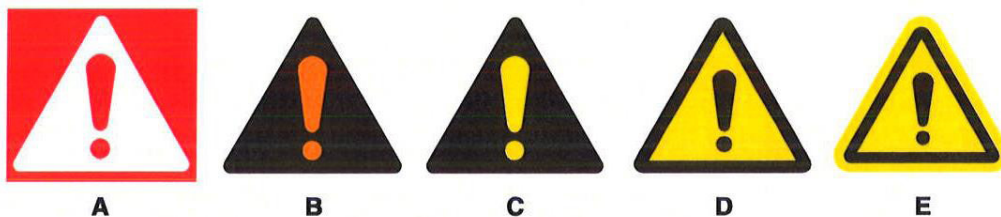
Modifications or Alterations – Modifications or alterations to any Southworth industrial positioning equipment shall be made only with written permission from Southworth.

2. Safety

Before installing, operating, or servicing this machine read, understand, and follow all safety instructions and warnings.

2.1 Safety Alert Symbols

A symbol that indicates a hazard. It is composed of an equilateral triangle surrounding an exclamation mark. The safety alert symbol is only used on hazard alerting signs. It is not used on safety notice and safety instructions signs.



A – For use with **DANGER** signal word; (safety white triangle, safety red exclamation mark, safety red background)

B – For use with **WARNING** signal word; (safety black triangle, safety orange exclamation mark)

C – For use with **CAUTION** signal word; (safety black triangle, safety yellow exclamation mark)

D & E – For use with **DANGER, WARNING, or CAUTION** signal words; (**D** is a safety yellow triangle with a safety black border and safety black exclamation mark; [**E**] is a safety yellow triangle with a safety black exclamation mark and a safety yellow border around a safety black band)

2.2 Signal Words

DANGER



Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION



Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE



Indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

2.3 Safety Devices

This machine is equipped with devices and features to protect the operator and nearby personnel from severe injury or death. These features and devices shall be installed and functioning correctly during operation.

Side Guarding – Protects operator and nearby personnel from moving parts.

Photo-eyes – Protects the operator and nearby personnel from entry into the load area while machine is operating.

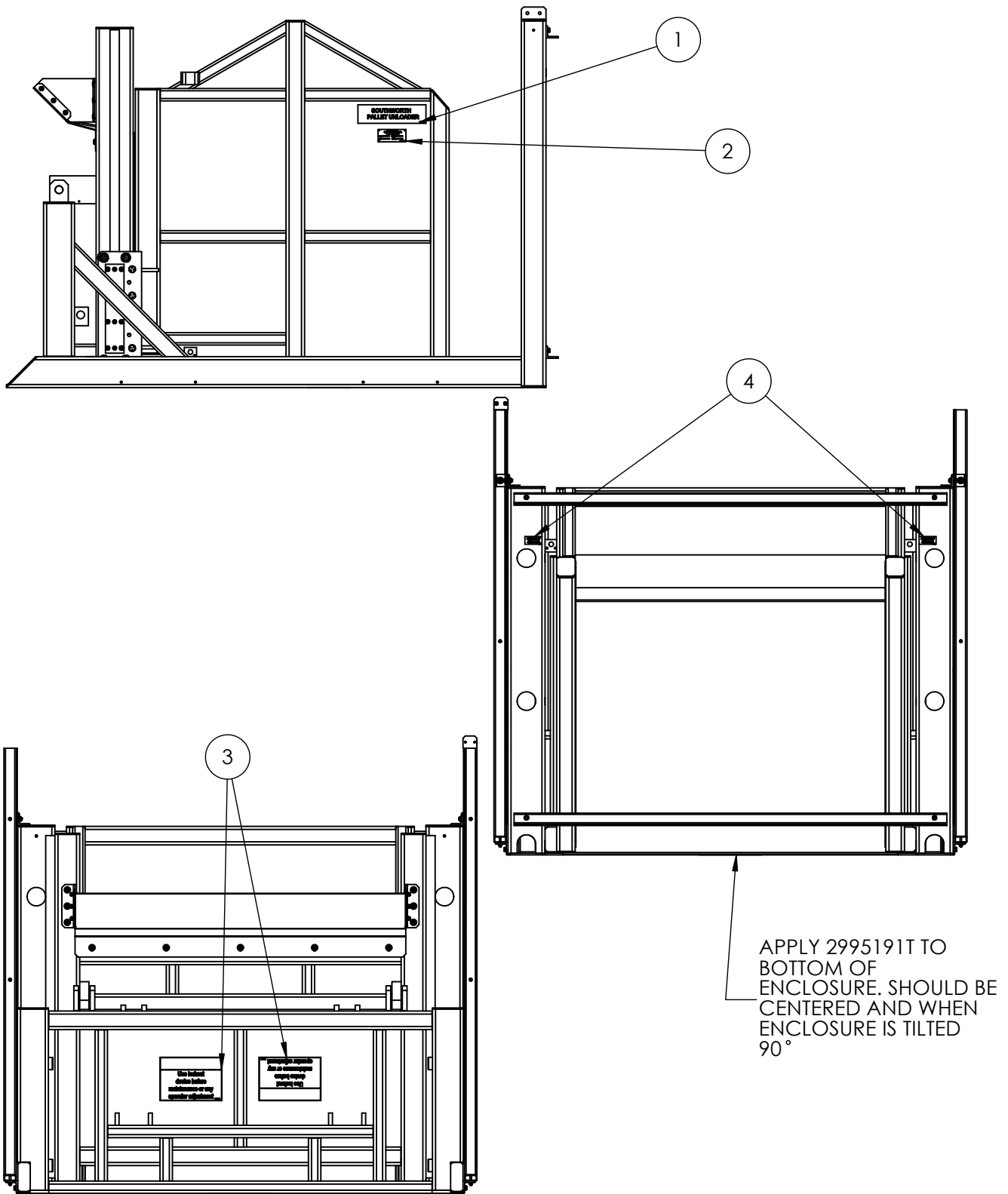
3. Labeling

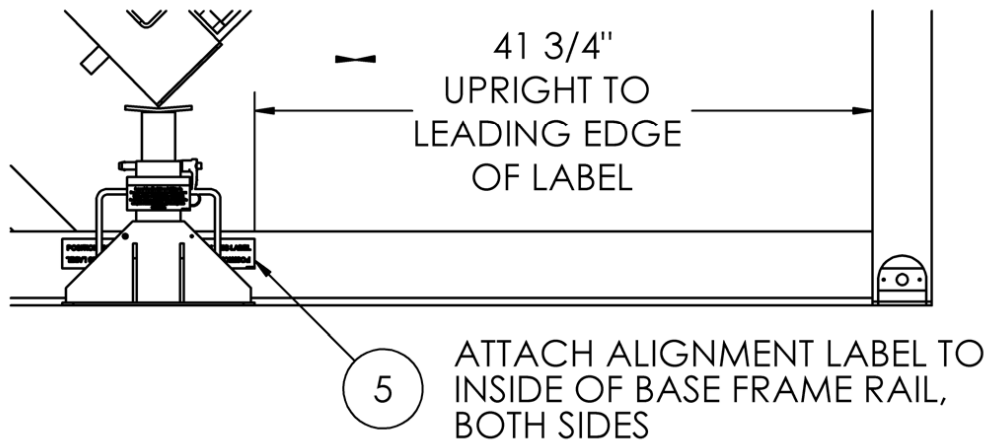
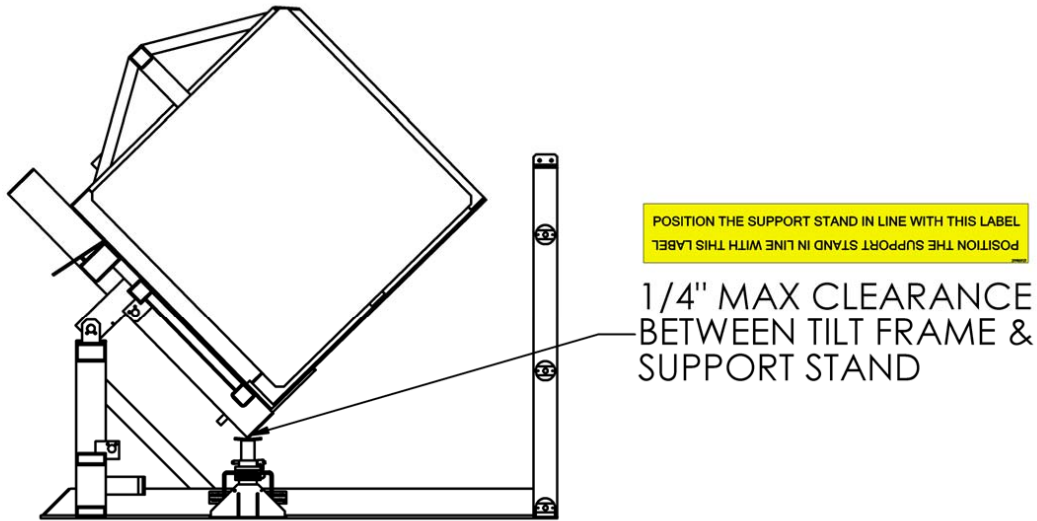
This machine has labeling to indicate potential hazards this machine may pose when operating and/or maintaining the machine. All labels must be legible. If any label is missing, damaged, or otherwise illegible contact the manufacturer for replacement labels.

3.1 Label Part Numbers & Quantity:

1. 2995290T - QTY. 2
2. 2995460T - QTY. 1
3. 2995191T - QTY. 3
4. 2995459T - QTY. 2
5. 2998592T - QTY. 2

3.2 Label Locations





4. Installation



WARNING

To avoid death or serious injury only trained and/or qualified personnel shall perform any installation.

4.1 Preparation

Before installation – check for local codes and ordinances which may apply. It is your responsibility to obtain any necessary permits. Read all of these installation instructions carefully. Be sure to read and understand all of the warnings.

Select the location where the unit will be installed. Choose a location where the floor is firm, flat and level. As the unit operates, it is very important that the front edge (the load edge) of the bucket touches the floor at the same time as the rest of the bottom plate touches.



NOTICE

If the middle or back edge of the bottom plate touches the floor before the front edge of the bucket, the machine may try to raise itself off the floor causing damage to the machine. This can happen if the floor surface is not flat.



WARNING To avoid serious death or serious injury:

- If the unit is mounted on an unstable surface, it may tip over when in use. You may be hurt, and the unit and load may be damaged.
 - Protect the unit from rain or moisture. If the electrical parts in the power unit get wet, workers may be hurt by electrical shock. The electrical parts may fail if they are wet.
 - The electric motor on the remote power unit can create sparks. Do not install the power unit in an area where flammable gases may be present.
4. You will need these tools to install the unit:
- A lift truck that can lift the unit safely.
 - Shims and appropriate lag bolts.
 - A masonry drill and bit to drill the holes for the lag bolts.
 - Extra hydraulic oil for flushing the hydraulic lines and refilling the tank.
 - Level.

4.2 Positioning the Machine

1. Remove the shipping material and unskid the unit. Move the unit into position, supporting the base of the unit.
2. Level the machine using shims as necessary. Grout beneath the entire base from – leave no gaps. Allow grout to fully cure before continuing.
3. Drill holes for lag bolts and install lag bolts.



NOTICE Do not hang the unit from the bucket. This can damage the unit.

4. Check the movement of the bucket through its full range.



WARNING To avoid serious injury

- Pinch points may exist that may cause injury. Keep hands, feet, and loose clothing away from moving parts.

4.3 Hydraulic Connections

1. Install the power unit. Run the hydraulic line between the power unit and the PUN but do not make the connections yet. Be sure that the hydraulic line is protected from passing traffic, and that it will not be damaged.



WARNING To avoid death or serious injury:

- Be sure that the hydraulic line will not be pinched by the unit as it raises or lowers. If you allow the line to be pinched, the unit may not work properly. A hose may break, the load enclosure may drop suddenly, and someone may be hurt.

2. Before connecting the power unit, blow out the hydraulic lines with compressed air.

NOTICE

The hydraulic lines must be clear of any contamination or damage to the hydraulic power unit will occur.

See Hydraulic Information section for specifications, plumbing schematic and location drawings:

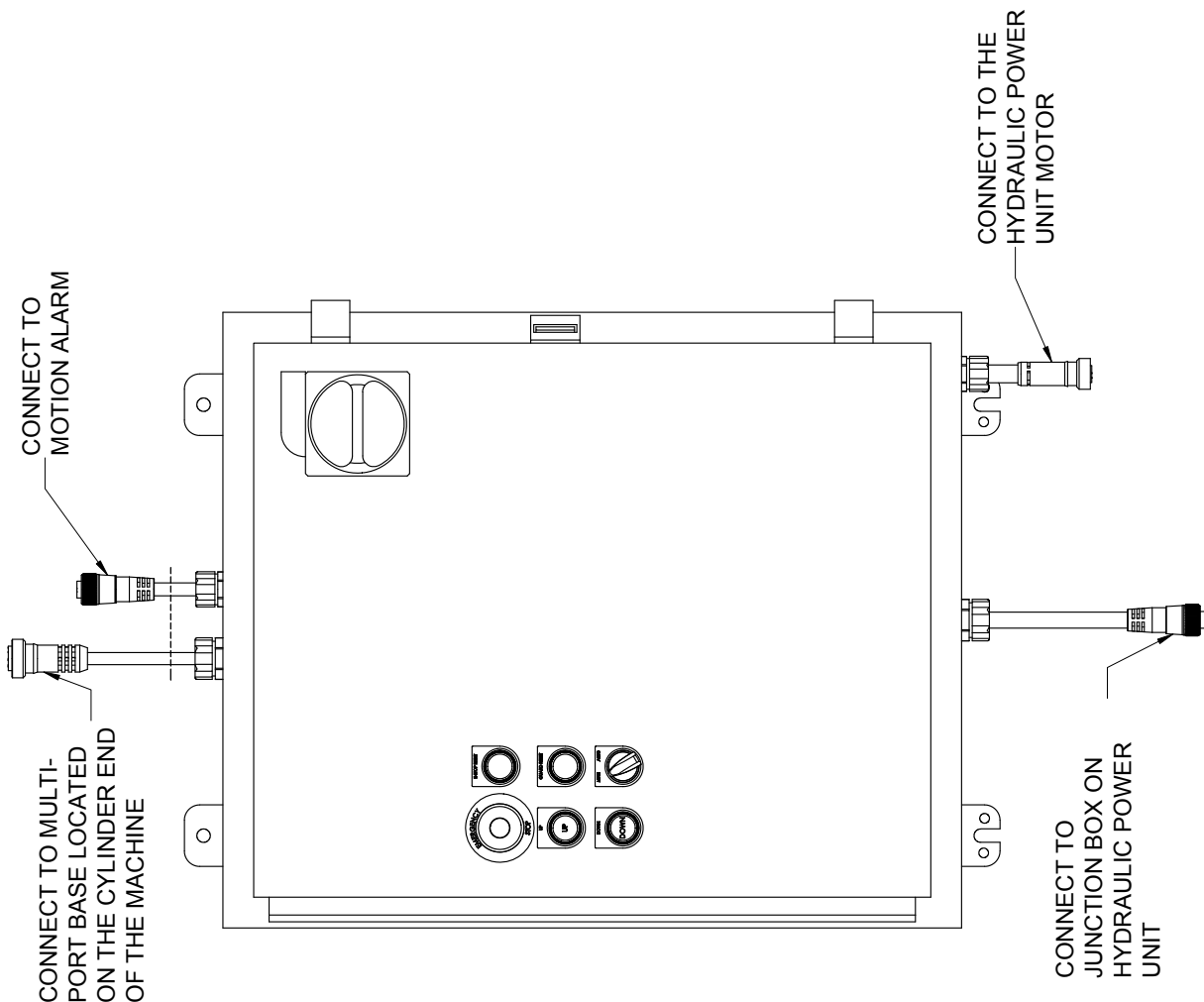
1. Connect port A to the top of the tilting cylinders
2. Connect port B to the base of the tilting cylinders.
3. Connect port C to the base of the lifting cylinders.
4. Connect Vent Line from top of lifting cylinders to the tank.

4.4 Electrical Connections

DANGER

To avoid death or serious injury:

- This unit requires three-phase 460V AC. This voltage can kill you. Don't work with the electrical parts unless you are a qualified electrician.
- The fuses or circuit breakers are designed to reduce any fire hazard. Be sure to install the fuses or circuit breakers.



NOTICE

The power unit is designed for three-phase AC. If you connect the power so the motor runs backwards, the bucket will not move, and you may damage the pump. Do not operate the unit for more than 2 or 3 seconds if you think the motor might be turning backwards.

4.5 Checking the Hydraulic System

Check the level of the hydraulic fluid in the system. With the bucket lowered completely, the hydraulic fluid can be checked by viewing the sight gauge on the reservoir of the power unit.

4.6 Testing

1. Clear the area around the unit. Remove any materials which might get in the way of the bucket as it raises or lowers. Be sure that the safety guards are in place on both sides of the unit.
2. Warn others to stay away from the unit. Operate the unit through its full range of travel. The bucket should rise smoothly with a quiet humming sound, and lower smoothly and quietly. Raise and lower the bucket a few times to check the operation.
3. As the bucket lowers, notice how the bottom of the enclosure meets the floor. The front edge (load edge) of the enclosure should touch at the same time as any other part of the enclosure. If any other part of the base of the bucket touches before the front edge, the floor is not flat. Insert shims above the low spots on the floor, so that the base is flat and level.

NOTICE

If another part of the bucket touches the floor before the front edge, the machine may not stop automatically at the correct moment. This may cause the machine to try to lift itself off of the floor.

NOTICE

If the “Tilt Down” proximity switch is out of adjustment, the machine may continue to run when it should be stopped. This may cause the machine to try to lift itself off of the floor. This could cause damage to the unit.

4. As a final step, clean up all spilled hydraulic fluid. Spilled hydraulic oil is slippery, and may present a fire hazard. If you clean up any spilled fluid, you will be able to tell right away if the unit begins to leak.

5. Operation

WARNING

To avoid death or serious injury:

- Only trained and/or qualified personnel may operate the machine.
- Crush, pinch, and shear points exist; keep hands, feet, and loose clothing away from moving parts.

WARNING

To avoid death or serious injury:

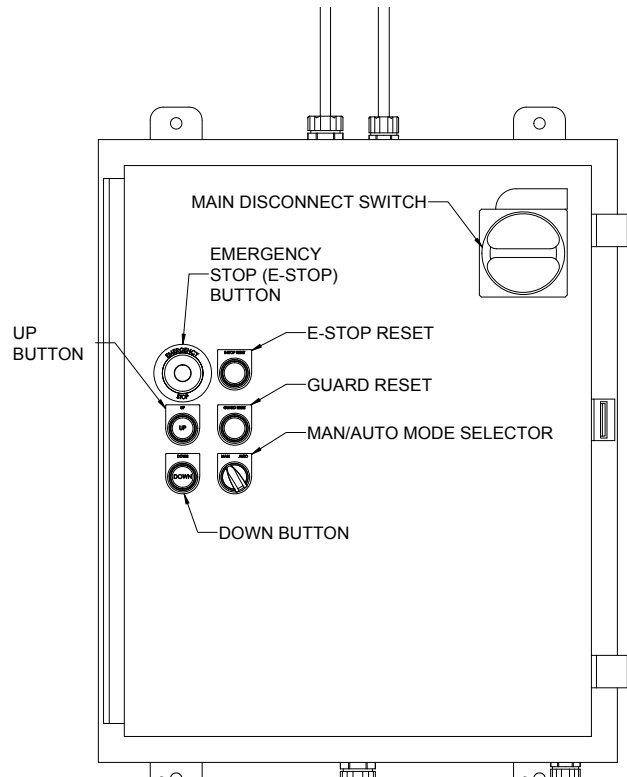
- Ensure all safety devices and guarding are installed and operating correctly.
- Verify that area in and around the machine are clear of debris and/or personnel before operating the machine.

NOTICE

Load shall not exceed the machines rated capacity. Overloading the machine can cause damage to the machine.

5.1 Operator Controls

- Main disconnect switch – Controls main power supply to the control panel.
- Emergency Stop – Used to stop the machine in the event of an emergency.
- E-STOP RESET – Used to reset the controls system after the Emergency Stop button has been pressed.
- GUARD RESET – Used to reset the control system after the photo eyes detect an obstruction.
- UP – Used to start the tilting and lifting sequence.
- DOWN – Used to start the lowering sequence.



5.2 Operational Sequence

With the machine turned off and the bucket in the fully lowered position.

1. Turn the main disconnect switch to the ON position. The red E-STOP light should turn on.
2. Pull the EMERGENCY STOP button and press the E-STOP RESET button. The red E-STOP light should turn off, the green E-STOP RESET light should turn on, and the GUARD RESET light should turn on.
3. Turn the selector switch to the AUTO position.
4. Press the GUARD RESET button. If the photoeyes do not detect an obstruction the GUARD RESET light will turn off and the machine will be ready to operate.
5. Move load into the bucket. Verify that load does not exceed the machine rated capacity. Loading will disrupt the photoeyes causing the GUARD RESET light to turn on.
6. Press the GUARD RESET button. If the photoeyes do not detect an obstruction the GUARD RESET light will turn off and the machine will be ready to operate.

7. Press and hold the UP button for one second. The motion alarm with flash and beep. Release the UP button. The bucket will tilt up until the Tilt Up proximity switch is reached.
8. To lift the bucket press and hold the UP button until enclosure reaches the desired height. The UP button must be held for three seconds before the machine begins to move. The motion alarm will flash and beep. To stop the enclosure release the UP button. This process can be repeated until the Lift Up proximity switch is reached.
9. To return the bucket to the full down position press the DOWN button. The DOWN button must be held for three seconds before the enclosure will begin to move. The motion alarm will flash and beep. After the enclosure begins to move the DOWN button can be released. The machine will tilt back until the Tilt Down proximity switch is reached then lower until the Lift Down proximity switch is reached.

Note: If the photoeyes detect an obstruction the machine will stop and the GUARD RESET light will turn on. The machine will not operate again until the obstruction is cleared and the GUARD RESET button has been pressed.

If the EMERGENCY STOP button has been pressed. Steps 2 & 3 must be performed to resume operation.

5.3 Run Time Fault Sequence

If the lift lowering motion takes longer than 25 seconds, or the other motions take longer than 15 seconds, a Run Time Fault has occurred. The fault could be caused by a tripped overload relay, blown fuses, damaged hydraulic lines, faulty valve, damaged wiring, or a damaged or faulty proximity switch.

When a Run Time Fault occurs the machine will stop and the GUARD RESET light will turn on. Trained and/or qualified personnel should examine the machine for the cause of the problem before it is return to operation.

To return the machine to operation:

1. Ensure the cause of the Run Time Fault has been corrected.
2. Turn the selector switch to the MANUAL position and press the GUARD RESET button for five seconds. The GUARD RESET light should turn off and operation can resume.

5.4 Manual Mode

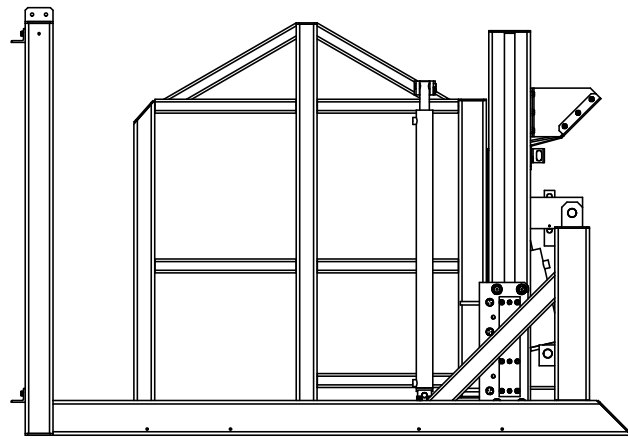
There are two uses of MANUAL mode:

1. To stop and correct and automatic motion started in error. Turning the selector switch to MANUAL position will stop all automatic motion. The machine can be manually operated with the UP and DOWN buttons to return the machine to a particular starting position.

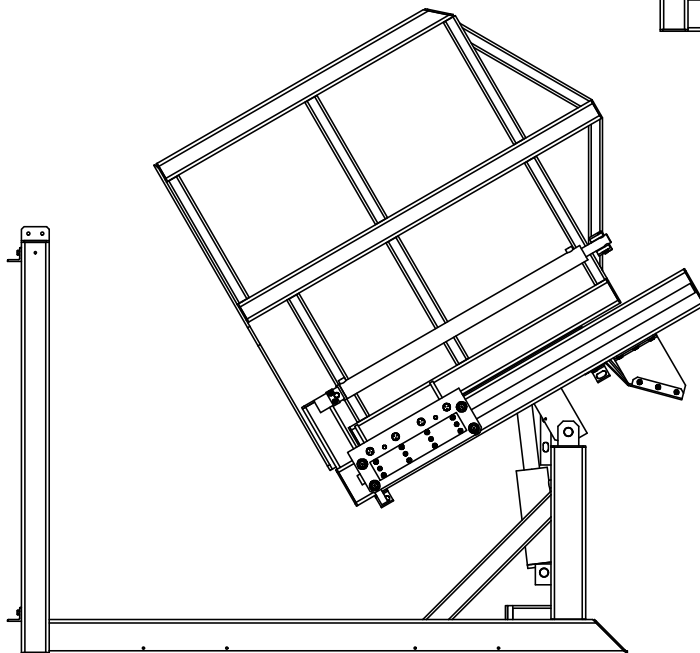
2. To test and diagnose problems with the machine by using the UP and DOWN buttons

5.5 Operational Sequence Illustration

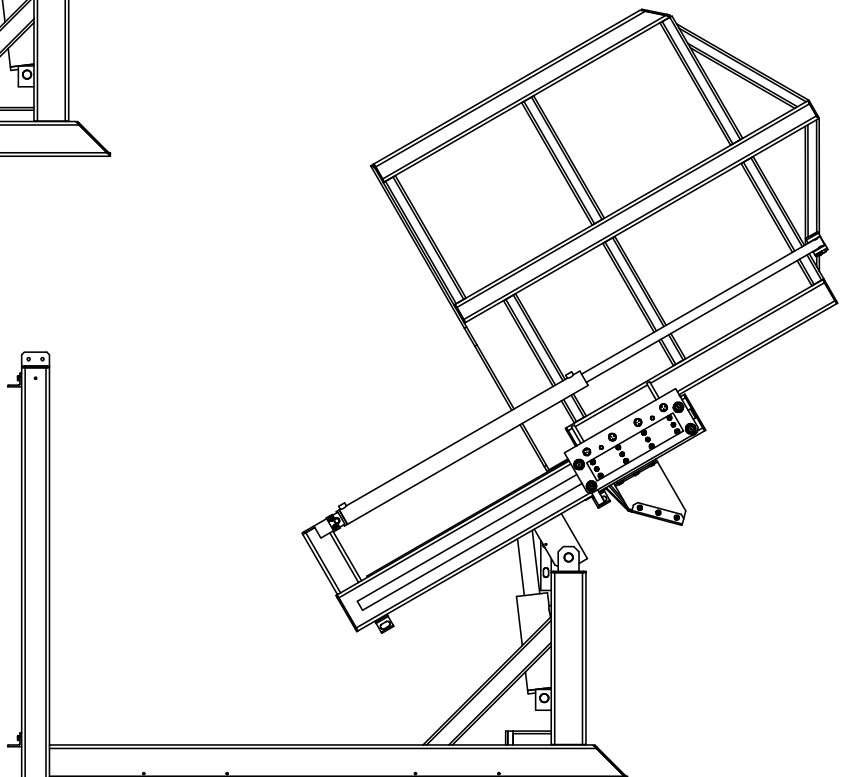
FULLY LOWERED POSITION



TILTED TO TILT UP PROXIMITY SWITCH



FULL TILT & FULL RAISED POSITION



6. Maintenance

 **WARNING** To avoid death or serious injury:


- Only trained and/or qualified personnel shall perform maintenance or repair.
- All maintenance shall be performed with the bucket in the fully lowered position.
- Ensure pressure has been released from the hydraulic system before performing any maintenance. Pressurized fluid can penetrate skin and cause death or severe injury.
- No adjustment to the hydraulic relief valve shall be made. Changing the relief valve setting may cause the machine to act in an unpredictable manner.
- All labeling shall be legible. If labels are missing, damaged, or otherwise illegible contact the manufacturer for replacement labels.

It is important to immobilize parts of the tilt and dump mechanisms before you service the unit. Please follow all of these steps whenever you work on the unit:

1. Lower the bucket completely to the loading position. The cylinders and other parts can be removed safely from either the tilt or dump mechanisms when the bucket is completely lowered. Normally, you should never need to work under the bucket. Always stay clear of the space under this enclosure.
2. Turn off the electrical power at the main disconnect or circuit breaker. Follow standard lock-out, tag-out procedures. Do not let anyone else use the controls on the unit.
3. When you are finished, operate the machine, without a load, through at least one cycle. Be sure that it is operating smoothly and properly before returning it to regular operation.

6.1 Optional Support Stands

The PUN Support Stands shall not be used for hydraulic, electrical, or mechanical maintenance.

 **NOTICE** Read and understand the Support Stand Use Procedure before using the support stands. Failure to follow the use procedure may result in damage to the machine.

6.1.1. Support Stand Use Procedure

To remove the machine from service:

1. Using the control pushbutton raise the tilt frame to the highest position.
2. Turn the main disconnect switch to the OFF position. Follow Lock Out Tag Out procedures.
3. Set the support stands at the highest extension pin position.

NOTICE

Both support stands must be used. Never use only one stand under the tilt frame.

4. Position each support in the load area as indicated by the alignment label on the inside of the base frame rail. See Support Stand Placement drawing.

Note: If not present attach alignment label (2998592T) to base frame rails according to Support Stand Placement drawing.

The load area must be clear of debris. Never have anything under the support stands when in use.

5. After all personnel are clear of the load area remove the lock out and turn the main disconnect switch to the ON position.
6. Using the control pushbutton lower the tilt frame until it is within 1/4" of the stands.

NOTICE

If the frame starts to contact the support stands the machine motion must be stopped by the operator. Do not over power the tilt frame on to the support stands. This may damage the machine and over stress the floor anchors.

7. Turn the main disconnect switch to the OFF position. Follow Lock Out Tag Out procedures.
8. It is now safe to access the load area.

To return the machine to regular service:

1. Remove the lock out and turn the Main Disconnect switch to the ON position.
2. Using the control pushbutton raise the tilt frame to the highest position.
3. Turn the main disconnect switch to the OFF position. Follow Lock Out Tag Out procedures.
4. Remove the support stands from the load area.
5. After personnel are clear of the load area remove the lock out and turn the Main Disconnect switch to the ON position.
6. Using the control pushbutton lower the tilt frame to fully lowered position.

6.2 Periodic Maintenance**6.2.1. Weekly Maintenance**

- On the tilt mechanism and dump mechanism, check all of the hydraulic fittings and hoses, and repair as necessary. Sometimes the fittings can be worked loose by the vibrations in the hydraulic system.



WARNING To avoid death or serious injury:

- If a hydraulic fitting becomes loose, or if a hydraulic hose breaks, the hydraulic fluid may escape from the system under pressure. If the bucket is elevated when this happens, this can cause it to drop. Someone may be hurt, or the unit or load may be damaged. Be sure all hydraulic fittings are free of leaks.
- Check the operation of the three photo eyes on the entry side of the machine. With the bucket in the fully lowered position, break the beam of each photo eye. Here are the test conditions for the photo eyes:
 - Beam unbroken - LED on photoeye is lit.
 - Beam is broken - LED on photoeye is out.
- When you break any beam, this should trigger a stop condition which requires the controls on the machine to be reset to return to “Ready” condition. The reflectors for the photo eyes should be replaced if they are cracked or otherwise damaged.
- Check and tighten all hardware.

6.2.2. Monthly Maintenance

- On the tilt and dump mechanisms, inspect the main pivot pins and bushings and the cylinder clevis pins and bushings for signs of wear.



WARNING To avoid death or serious injury:

- If you are going to repair the main pivot pins and bushings on either the tilt or dump mechanisms, you must return the bucket to the loading position.
- Check the level and appearance of the hydraulic fluid. When the bucket is fully lowered, the oil should be at the correct level as viewed through the sight glass on the reservoir. Add oil as necessary. Change the oil and filter if the oil has darkened, or feels gritty or sticky.

6.2.3. Every six months or 500 hours

- The hydraulic system includes a replaceable oil filter. Replace this filter as part of your routine maintenance. Inspect the oil, and replace it if necessary. If the oil is changed, thoroughly clean the reservoir, including the suction strainer.
- Be sure all of the warning labels are in position and legible. See Labeling Section. The warning labels are intended to protect your workers. If the labels are missing, or if they have been painted over, replace them.

7. Troubleshooting



WARNING To avoid death or serious injury:

- All maintenance, repair, and diagnosis shall be performed by trained and/or qualified personnel only.

- Follow steps in Maintenance section to make the machine safe to inspect and maintain.



WARNING To avoid death or serious injury:

- All maintenance and repair shall be performed with the bucket in the fully lowered position.
- Ensure pressure has been released from the hydraulic system before performing any maintenance. Pressurized fluid can penetrate skin and cause death or severe injury.

Symptom	Possible Cause	Remedy
Neither lift mechanism is working: CAUTION! If the tilt function does not begin right away, don't continue to operate the "up" control for more than 2 or 3 seconds. You may damage the pump.	The power for the unit may be switched off.	Turn on the "Main Disconnect" switch.
	One of the fuses or circuit breakers may have opened.	Replace the fuse, or reset the circuit breaker. If the condition repeats, determine the cause of the problem.
	The Emergency Stop switch may have been pressed.	Reset the Emergency Stop switch, and reset the control system.
	One of the protective light beams at the front of the unit may be blocked.	Be sure the space in front of the unit is clear.
	There may be a problem with one of the photo eyes.	Check the alignment of each photo eye and its reflector. When the eye can "see" the reflector, the LED on the photo eye should light. Check the power supply to the photo eye. Replace the part if it is faulty.
	The motor for the pump may have stopped. The motor controls have built-in over current protection in case of an overload.	The protective circuit will reset after it has cooled. Look for anything which may be preventing the motor from turning.
	The motor may be running backwards.	If this is happening, the pressure valve will indicate zero pressure even though the motor is running. Reverse any two electrical leads on the motor.
	The motor may be "single phasing".	This causes the motor to hum, but not turn. Check for a break in one lead to the three-phase motor. Check the motor wiring and line fuses.
	The motor may be running backwards.	If this is happening, the pressure valve will indicate zero pressure even though the motor is running. Reverse any two electrical leads on the motor.
	The motor may be "single phasing"	This causes the motor to hum, but not turn. Check for a break in one lead to the three-phase motor. Check the wiring and line fuses.
	The voltage to the motor may be too low.	Check the voltage at the starter when the motor is under load. The supply voltage should be within $\pm 10\%$ of the rating.
	The level of the hydraulic oil may be low.	When the unit is lowered completely, check the oil level by viewing the reservoir sight gauge.
	The filler/breather cap on the hydraulic tank may be plugged.	Remove the cap and clean the baffles inside it.
	There may be a vacuum leak in the suction line. (This could cause cavitation and loss of suction in the pump.)	Check the suction line hose and fittings. CAUTION! Do not allow cavitation to continue -- this may damage the pump.
The coupling between the pump and motor may be missing.	Remove the pump as described in this section. Check to see that the coupling is in place.	

Symptom	Possible Cause	Remedy
The tilt mechanism will not raise.	The up-proximity switch for the tilt lift function may be out of adjustment.	Check the adjustment of the switch. (See the section on "Adjustment and Alignment".)
	The "up" side of the control valve for this function may not be working.	The "up" side of the valve must be energized and fully open. Check the solenoid on the "up" side of the valve with a voltmeter. Check for a problem with the wiring to the control valve. The valve must be clean and free to operate. Release the pressure from the system and clean the valve. (See the section on "Inspecting and Cleaning a Control Valve".)
The tilt mechanism raises slowly.	The counter-balance valve in this circuit may be plugged.	Release the pressure from the system and clean the valve.
The tilt mechanism does not lower. Warning! Before working under any raised parts of the unit, support the body of the unit using a set of strong supports.	The "down" side of the control valve for this part of the system may not be working.	The "down" side of the valve must be energized and fully open. Check the solenoid on the "down" side of the valve with a voltmeter. Check for a problem with the wiring to the control valve. The valve must be clean and free to operate. Release the pressure from the system and clean the valve. (See the section on "Inspecting and Cleaning a Control Valve".)
When the load enclosure is lowered, the center or rear touches the floor before the front edge (load edge).	The floor is not flat.	Insert shims above the low spots in the floor. The base frame of the machine must be flat and level.
The pump motor continues to run after the front edge (load edge) of the load enclosure touches the floor.	The proximity switch for the "Tilt Down" function may be out of adjustment.	Adjust the position of the target for this switch.
The "Tilt Down" part of the cycle begins prematurely.	The tilt frame may be hitting the stop pads at the upper limit of travel too hard.	Adjust the position of the target for the "Tilt Up" proximity switch.
The dump mechanism will not raise.	The up-proximity switch for the dump lift function may be out of adjustment.	Check the adjustment of the switch. (See the section on "Adjustment and Alignment".)
The pump motor continues to run after the load enclosure has reached the upper limit of the dump travel.	The "Lift Up" proximity switch may be out of adjustment.	Check the adjustment of the switch. (See the section on "Adjustment and Alignment".)
At the end of the cycle, the load enclosure drops onto the base frame.	The proximity switch for the "Dump Down" function may be set too high. When the motor is shut off, this allows the load enclosure to drop.	Check the adjustment of the switch. (See the section on "Adjustment and Alignment".)

8. Adjustment & Replacement Procedures

8.1 Aligning the Photo-Eyes

1. The photo-eyes are part of a system which protects the operators from moving parts which are potentially dangerous. If an operator moves close to the loading end of the machine, and breaks any of the 3 light beams, the unit will stop immediately. The unit will not run again until the control system has been reset. Each eye sends a light beam to a matching reflector. The beam is then returned to the light sensor.
2. When the machine is turned on, check the LED indicator on the side of the photo-eye. If the photo eye is properly aligned and is not blocked, with the beam returning from the reflector, the LED will light. If the photo-eye cannot see the reflector, or the beam is blocked, the LED will be out. If necessary, move the reflector until the LED lights.

3. If the LED will not light, yet the reflector seems to be aligned, check that the photo eye is receiving power.

8.2 Proximity/Limit Switches:

1. On this machine, proximity switches are used as limit switches. Each switch has two parts a sensor and a target. Each switch is a “normally open” type.
2. The nominal distance between each sensor and its target is 3/16”. If the sensor can see the target, the LED on the side of the sensor will light. If necessary, change the alignment of the target or sensor until the LED lights.
3. If the LED will not light, yet the target seems to be aligned, check that the proximity switch is receiving power.

8.3 Setting End of Travel for Tilt Down Function

NOTICE

If any part of the base plate contacts the floor, except for the front lip, you must shim the base of the machine.

NOTICE

If the motor continues to run after the front of the bucket touches the floor, the unit may try to lift itself off of the floor. This can damage the machine. To correct this problem, move the target so that it activates the switch sooner.

Set the unit so that the loading edge of the bucket is touching the floor.

Position this switch so that the bucket stops lowering when the front lip of the bucket just contacts the floor. When the bucket reaches this limit, the switch should send a signal to stop the motor on the hydraulic power unit.

8.4 Setting End of Travel for Tilt Up Function

NOTICE

If the frame of the bucket is allowed to hit the stop pads with too much force, it will have an erratic motion. It may even bounce off of the pads and begin the Tilt Down part of the cycle by itself.

Set this switch so that the tilt function of the bucket stops just as the frame of the bucket hits the stop pads, or just a moment before. When the bucket reaches this limit, the switch should send a signal to stop the motor on the hydraulic power unit. A clearance of 1/8” from the pads is acceptable.

8.5 Inspecting and Cleaning the Control Valve

1. Check that the valve is receiving the correct control voltage. When the valve is supposed to be energized, the solenoid should receive 24V DC.
2. Check the continuity through the solenoid coil. With the power off, check the resistance through the coil using an Ohmmeter. There should be a low resistance (a few Ohms). If the meter shows no resistance, the coil may be shorted. Substitute a coil which is known to be good. If the meter shows an infinitely high resistance, the coil should be replaced.

3. Each valve used on this machine is designed with a solenoid coil which can be changed without removing the valve or spilling any hydraulic fluid. To change the solenoid:
 - Disconnect the wire leads to the solenoid.
 - Loosen the knurled nut at the top of the solenoid, and remove the nut and O-ring.
 - Slide the solenoid off of the core tube.
4. To clean the parts on the valve spool, you must remove it from the valve body. De-pressurize the hydraulic system by lowering both lifting mechanisms completely. Be sure to turn off the power to the machine.
5. Unscrew the core tube. Remove the valve plunger and inspect it for dirt or metal chips which could block the valve action. Clean the valve plunger as required, then blow it clean with compressed air. Before reassembly, verify that the inside of the valve body is clean and free of debris. Depress the plunger by hand several times to be sure it moves freely.
6. To reassemble, reverse the steps listed above. The nut which holds the solenoid should be finger-tight only!

8.6 Removing a Cylinder



WARNING To avoid death or serious injury:

- **All repair or maintenance shall be performed with the bucket in the fully lowered position. See the Maintenance section before beginning any work.**
- **Hydraulic Cylinders are heavy. Falling cylinders can cause serious injury.**

This section will tell you how to remove a cylinder from the tilt mechanism or the dump mechanism. Two cylinders are used on each mechanism. Both types of cylinders are double-acting, and both have the same bore diameter. The following procedure will apply to both cylinder types.

Before beginning this procedure, please read and understand this entire section.

1. Before you remove a cylinder, be sure that you have these items on hand:
 - Replacement cylinder or cylinder packing kit.
 - A supply of new hydraulic oil. Contaminated oil may damage the new packing.
 - Containers to catch the used oil.
 - A clean place to work which will not be damaged if you spill some oil (especially if repacking the existing cylinder).
2. Lower the bucket completely to the loading position (as discussed earlier).
3. Turn off the electrical power at the main disconnect or circuit breaker. Follow

standard lock-out/tag-out procedures.

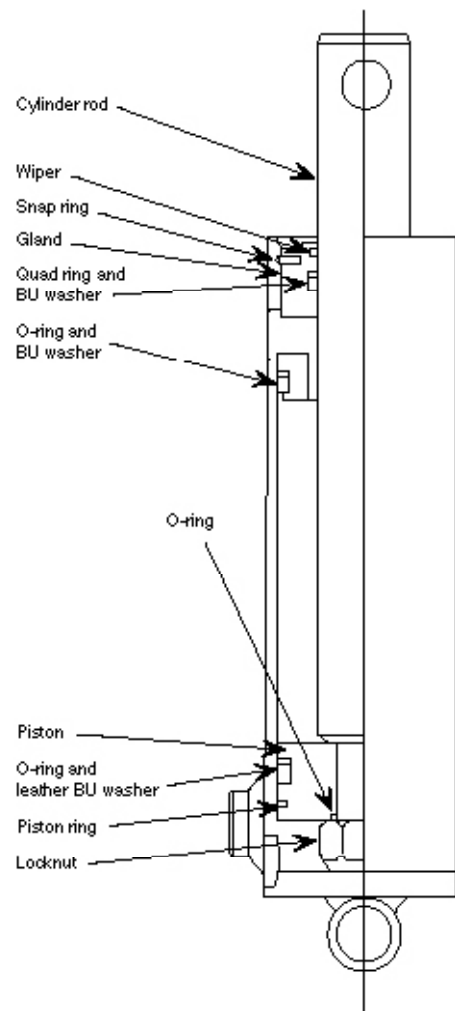
4. Disconnect the hydraulic supply line to the bottom end of the cylinder. Place the free end into a container to collect the used oil.
5. Repeat the same procedure for the hydraulic supply line to the top end of the cylinder.
6. At the top end of the rod remove the “keeper” from the upper cylinder clevis and drive out the upper clevis pin. Repeat the same procedure to remove the lower cylinder clevis pin.
7. Push the rod back into the cylinder to drive the hydraulic fluid out through the hose and into the container. You may use air pressure at the hydraulic port to do this.
8. Now the cylinder can be removed for repacking or replacement.

8.7 Repacking a Cylinder

Repacking the cylinders requires special training and tools. If you are not familiar with repacking procedures, this work should be left to a qualified hydraulic repair shop.

During reassembly, it is very important to keep all of the parts free of dirt, dust, metal chips, water, and other contamination. Most of the problems with hydraulic systems are caused by contamination in the oil.

1. Begin by removing the cylinder as described in the last section.
2. The image shows the parts inside a cylinder. Secure the cylinder in a vise so that it cannot turn. Clear the work area so that you can lay the parts on a clean surface.
3. At the upper end of the cylinder, remove the snap ring. Pull the rod to within 3 inches of full extension. Compress the ring and, at the same time, pull outward on the rod. This will pull the gland out of the cylinder.
4. Pull the rod and piston all of the way out of the cylinder. This assembly is heavy! Be careful not to drop it as it comes free.
5. Remove the piston from the cylinder rod. (Be careful to protect the cylinder rod as you do this. Any burrs on the rod could damage the packing.) Note the position of the piston ring and remove it. Remove the leather BU washer and larger O-ring from the piston.



Remove the smaller O-ring which fits around the cylinder rod.

6. Remove the gland from the cylinder rod by sliding it off of the end which holds the piston. Notice how the wiper ring sits in the gland. Note the positions of the quad ring and BU washer. Remove the wiper ring, quad ring and BU washer from the gland.
7. Clean all of the surfaces on the gland. Install a new quad ring and BU washer. Install a new wiper ring in the correct orientation. Coat the inner diameter of the gland with light grease and replace it on the rod.

Be careful not to install the wiper backwards.

8. Clean the piston surfaces. Install a new larger O-ring and leather BU washer on the piston. Install a new piston ring. Install a new smaller O-ring. Attach the piston to the rod and tighten the large nut.
9. Clean the bore of the cylinder tube thoroughly. Inspect the bore of the tube for scratches which run up and down, along the length of the cylinder. If you do see any scratches, hone the inner surface of the cylinder. Be sure to clean the tube thoroughly after you do this.
10. Lubricate the inner diameter of the cylinder tube with a light coating of hydraulic oil. Carefully insert the piston and rod back into the cylinder. Be very careful not to damage the piston ring, O-ring or BU washer as you do this. It may be helpful to tip the rod assembly and twist it as you slide it into the cylinder. Once the piston is inside the cylinder, it should slide easily.
11. Slide the gland assembly into the cylinder. Rotate the gland so the port lines up with the hole in the cylinder tube. Install a new snap ring. Compress the snap ring, tap the gland into place, then relax the snap ring. Be sure that the snap ring is in place in the groove.
12. Install the cylinder in the unit as described below.

8.8 Replacing a Cylinder

Before beginning this procedure, please read and understand this entire section.

1. Before beginning, read steps 2 through 4 in the procedure "Removing a Cylinder" listed above.
2. Place the cylinder near the point where it will fit into the mechanism. Be sure the cylinder ports are oriented correctly.
3. Align the lower cylinder with each lower cylinder clevis and insert the lower cylinder clevis pin. Be careful! The cylinder is heavy! Replace the "keeper" and secure it with the button-head cap screws (supplied). Repeat the same procedure to replace and secure the clevis pin for the upper cylinder.

4. Attach the lower and upper hydraulic supply lines.
5. Be sure everyone is clear of the equipment. Turn on the power and test the unit. Run the mechanism through a couple of cycles to completely purge any air trapped in the hydraulic lines.

8.9 Ordering Replacement Parts

Southworth has carefully chosen the components in your lift to be the best available for the purpose. Replacement parts should be identical to the original equipment. Southworth will not be responsible for equipment failures resulting from the use of incorrect replacement parts or from unauthorized modifications of the machine.

Southworth will gladly supply you with replacement parts for your Southworth lift. With your order, please include the model number and the serial number of the lift. You can find these numbers on the name plate, which is located on the crossbar at the base of the cylinder(s). When you are ordering parts for a cylinder, also include the cylinder number. This is stamped on the base of the cylinder housing.

To order replacement parts, please call the Parts Department. See Warranty & Contact Information section.

- Parts are shipped subject to the following terms:
- FOB factory
- Returns only with the approval of our parts department.
- Payment net 30 days (except parts covered by warranty).
- Freight collect (except parts covered by warranty).
- The warranty for repair parts is 30 days from date of shipment.

Parts replaced under warranty are on a “charge-credit” basis. We will invoice you when we ship the replacement part, then credit you when you return the worn or damaged part, and we verify that it is covered by our warranty. Labor is not covered under warranty for Parts orders.

9. Hydraulic System Information

9.1 Hydraulic Power Unit

HYDRAULIC POWER UNIT SPECIFICATIONS

MOTOR: Baldor: 5HP, 1750 RPM 208/230 - 460V / 3 / 60, 184TC wired for 460.

PUMP: Parker gear pump: 0.61 CUIIN / Rev with pump adapter and flex coupling for 1750 PSI operation.

RESERVOIR: 15 gallon with suction strainer, return filter and drip pan.

VALVE MANIFOLD: Parker 2-station parallel manifold with system relief valve, dual counter balance valves and pump unloading valve.

PRESS GAUGE: 0 - 2,000 PSI

RECOMMENDED FLUID: If the lift will be used at normal ambient temperatures, the machine is supplied the unit with Conoco AW 32 oil. This may be replaced by any other good quality oil with 150 SSU at 100° F and rust and oxidation inhibitors and anti-wear properties. If the lift will be used at ambient temperatures below 0°F, use aircraft hydraulic oil. Use Type 15 aircraft hydraulic oil.

	Type	Manufacturer
The following are equivalent to Conoco AW 32:	DTE 24	EXXON/MOBIL
	NUTO H32	EXXON/MOBIL
	AMOCO AW32	CHEVRON (AMOCO CO.)
	AW32	CITGO

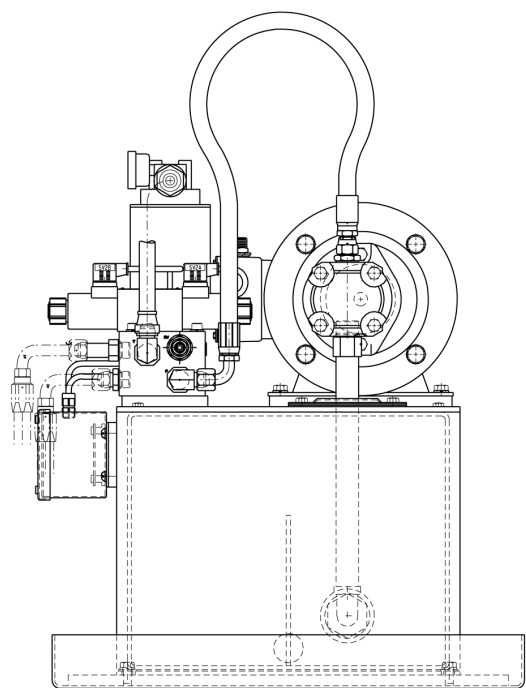
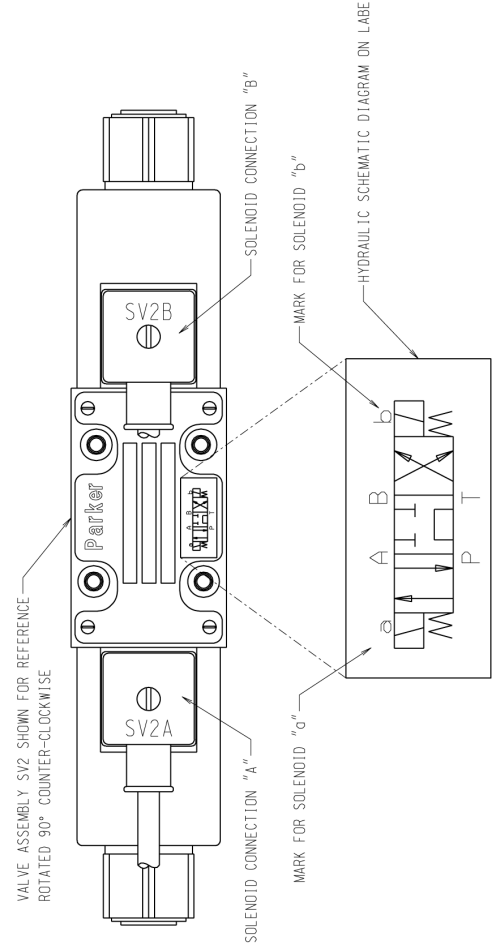
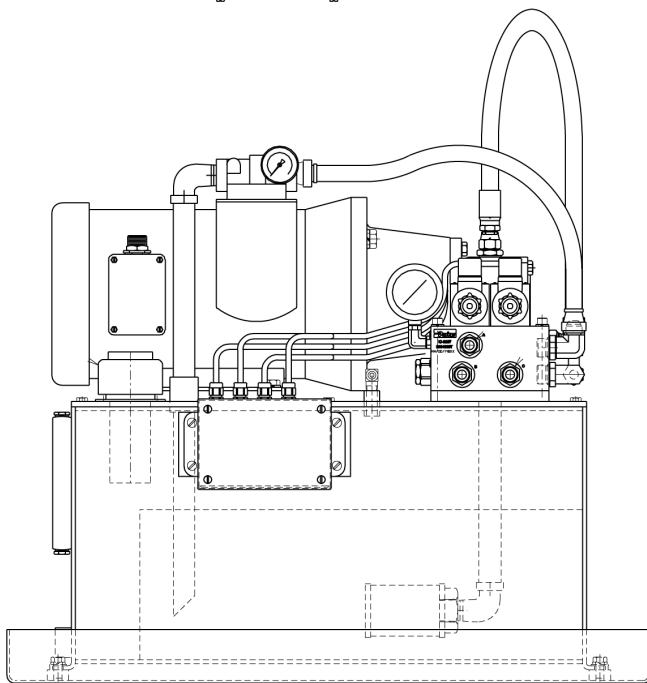
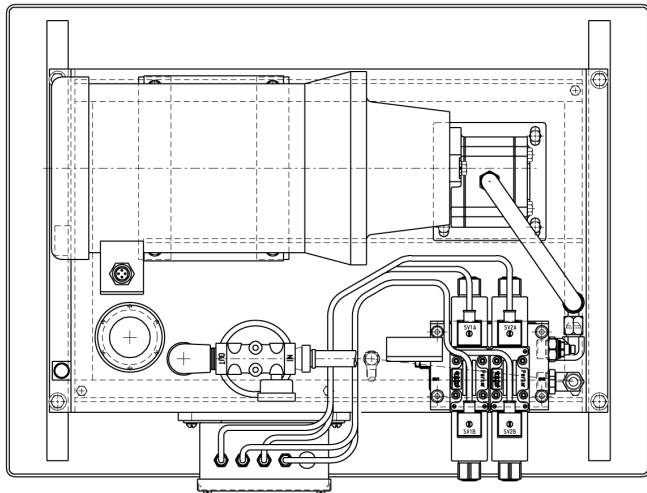
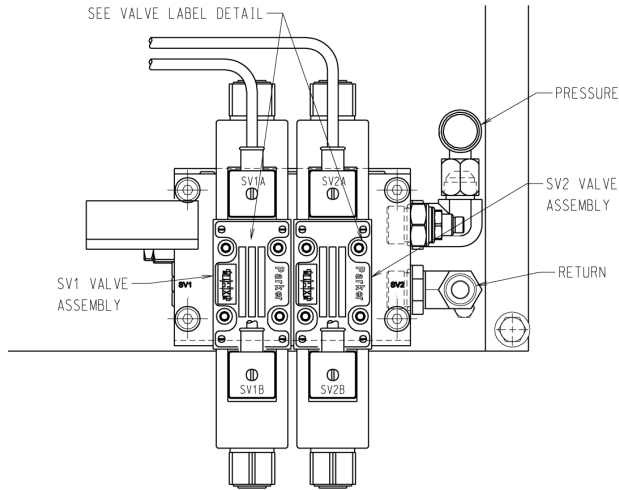
NOTICE

Debris in the hydraulic system can damage the hydraulic pump. Make sure tank and lines are clear of debris before operating the machine.

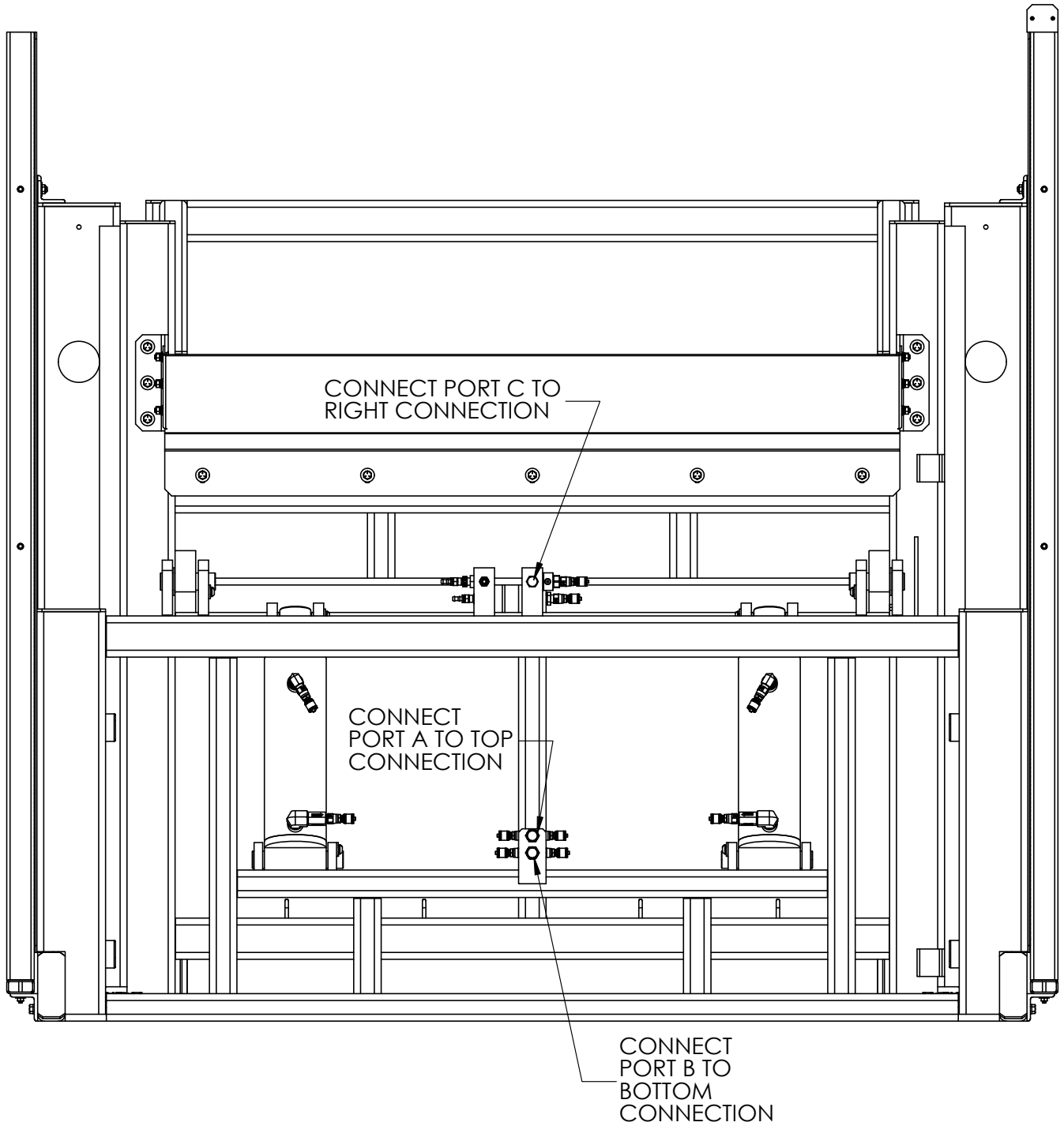
NOTES:

- Cleanliness of inside of hydraulic tank must be maintained at all times. Wipe inside of tank clean of all loose debris, metal chips, dust and dirt. Inside of tank must be dry and free of moisture before adding hydraulic oil.
- Fill tank to the proper level indicated on tank level / temperature gauge before operating system. Be sure not to overfill and thoroughly clean any spills.
- For long term storage make sure all exposed ports and fittings are capped or plugged.

9.3 Hydraulic Arrangement

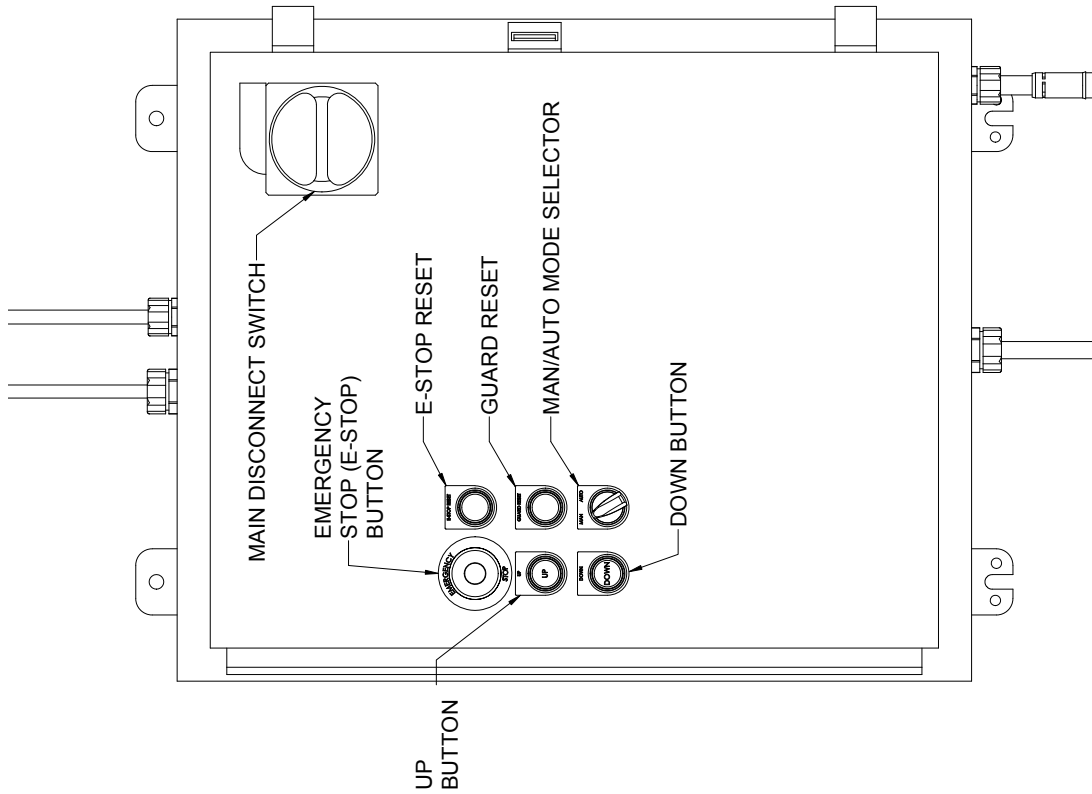
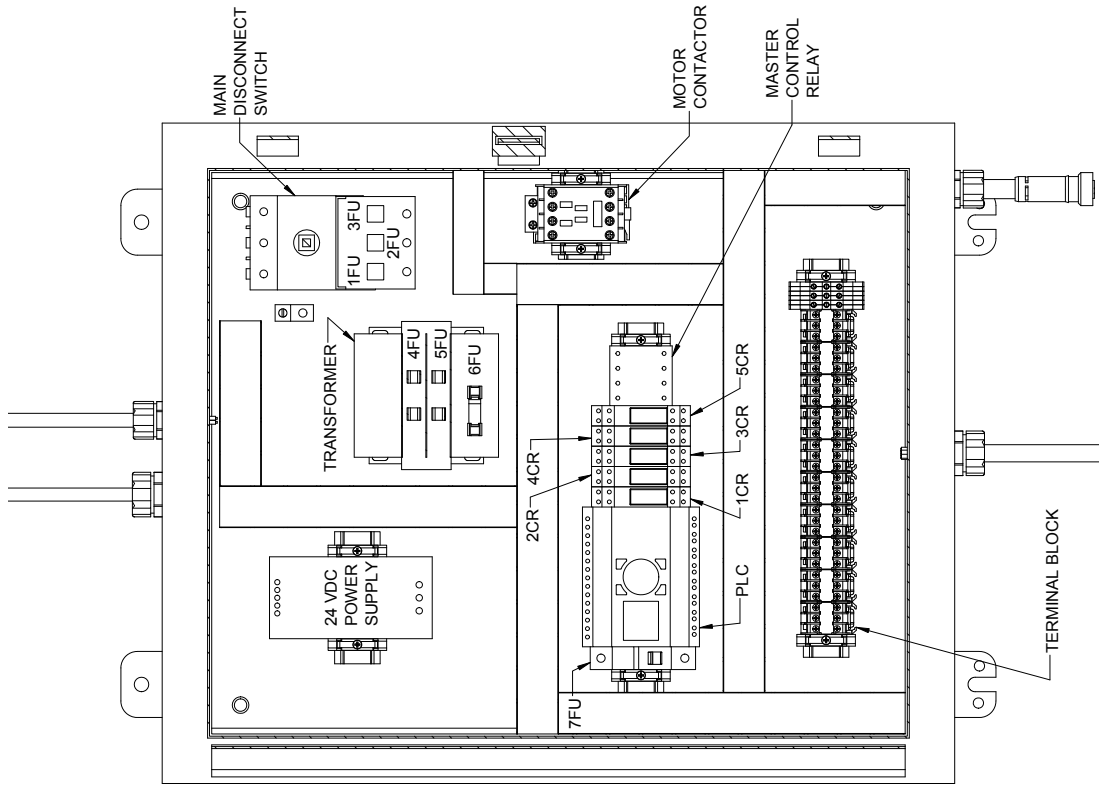


9.4 Hydraulic Connections



10. Electrical Information

10.1 Control Panel



11. Warranty & Contact Information

Southworth Products Corp. warrants this product to be free from defects in material or workmanship for a period of one (1) year from date of shipment, providing claim is made in writing within said year. This warranty shall not cover failure or defective operation caused by misuse, misapplication, negligence or accident, exceeding recommended capacities, or altering or repairing, unless alteration is authorized by Southworth Products Corp. Except as set forth herein, there are no other warranties, express or implied, including the warranties of merchantability and fitness for a particular purpose, all of which are hereby excluded.

Southworth Products Corp. makes no warranty or representation with respect to the compliance of any product with state or local safety or product standard codes, and any failure to comply with such codes shall not be considered a defect of material or workmanship under this warranty. Southworth Products Corp. shall not be liable for any direct or consequential damages arising out of such noncompliance.

Southworth Products Corp.'s obligation under this warranty is limited to the replacement or repair of defective components at its factory or another location at Southworth Products Corp.'s discretion. The Southworth Warranty is for product sold with in North America. For products shipped outside North America the warranty will be for replacement of defective parts only. Labor is not included. This is buyer's sole remedy. Except as stated herein, Southworth Products Corp. will not be liable for any loss, injury, or damage to persons or property, nor for direct, indirect, or consequential damage of any kind resulting from failure or defective operation of said material or equipment.

This warranty may be altered only in writing by Southworth Products Corp., Portland, Maine.

Southworth Products Corp. is widely acknowledged as the leading maker of hydraulic lifts and materials-handling equipment. Southworth machines are rugged and reliable, and are designed to provide years of trouble-free service. The designs are based on extensive engineering experience. These are good reasons for specifying Southworth machines in your plant.

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