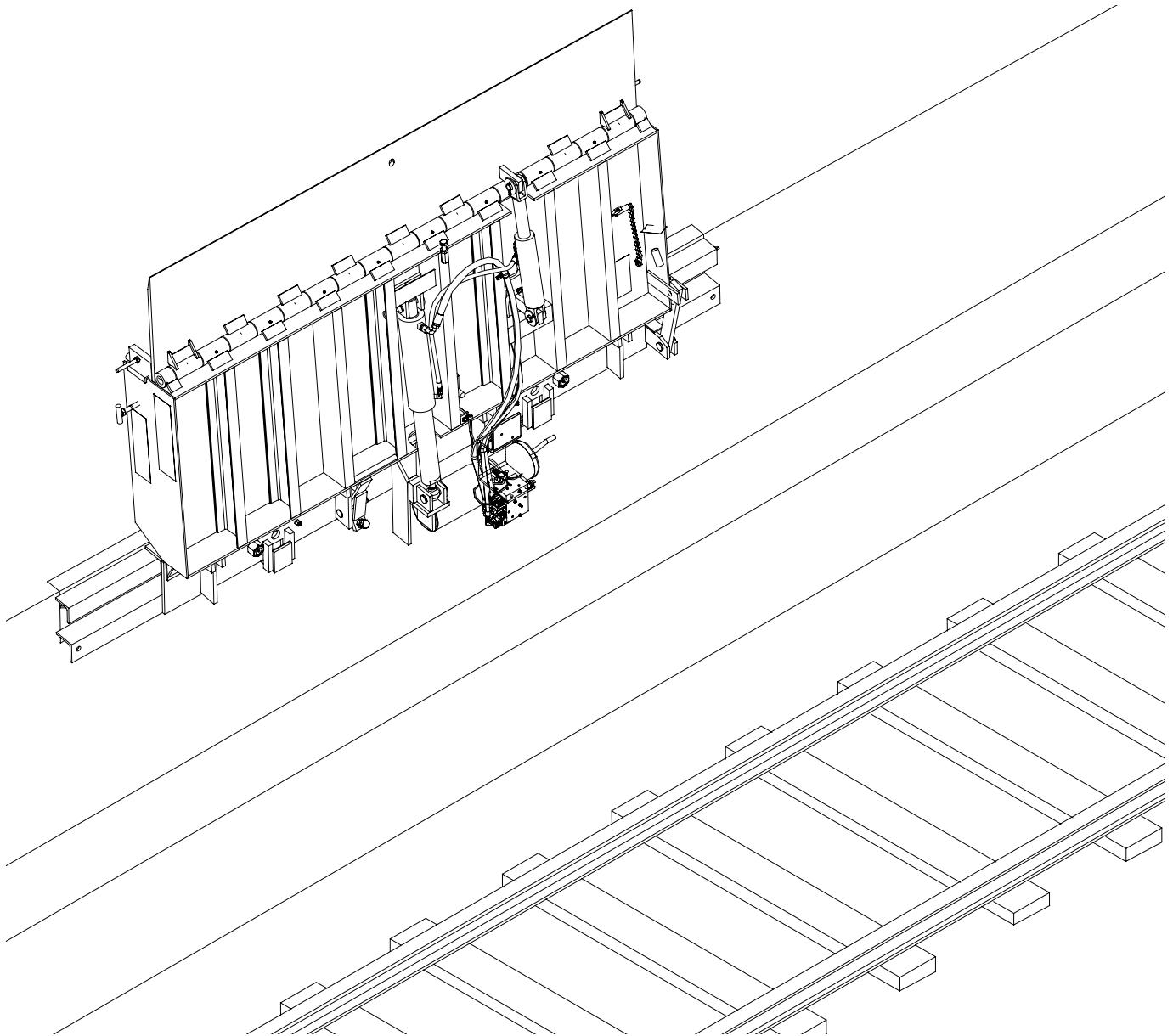


Hydraulic Rail Leveler



This manual applies to Hydraulic Rail Levelers manufactured beginning April 2012 with the serial numbers 61043720 and higher.

▲ WARNING

Do not install, operate or service this product unless you have read and understand the Safety Practices, Warnings, and Installation and Operating Instructions contained in this User's Manual. Failure to do so could result in death or serious injury.

User's Manual

Installation, Operations,
Maintenance and Parts

Part No. 6003936K

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INTRODUCTION

Welcome and thank you for choosing this hydraulic rail leveler for your material handling applications.

This User's Manual contains information that you need to safely install and identify parts for the hydraulic rail leveler. Please read and follow this User's Manual when installing the hydraulic rail leveler.

SAFETY SIGNAL WORDS

You may find safety signal words such as DANGER, WARNING, CAUTION or NOTICE throughout this Owner's Manual. Their use is explained below:



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

▲ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

▲ WARNING

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

▲ CAUTION

Indicates a potentially hazardous situation which, if not avoided may result in minor or moderate injury.

NOTICE

Notice is used to address practices not related to personal injury.

SAFETY PRACTICES

⚠ WARNING

Read these Safety Practices before installing, operating or servicing the dock leveler. Failure to follow the Safety Practices could result in death or serious injury.

If you do not understand the instructions, ask your supervisor to explain them to you or contact your local authorized distributor.

OPERATION

Restrict use of dock leveler to trained operators. Follow safe operating procedures described in this manual and in the operation placard which was shipped with the leveler. The placard should be posted near the leveler. If either labels or placard is lost, contact your local authorized distributor for a replacement.

Do not use the dock leveler to service rail cars outside of its intended working range. See page 5.

Do not operate the dock leveler when anyone is in front of it.

Do not operate the dock leveler with equipment, material or people on the ramp or lip.

Stay clear of the dock leveler when it is moving.

KEEP HANDS CLEAR OF HINGES AT ALL TIMES. Do not use hands to position dock leveler ramp or lip, or to store dock leveler.

Do not use the dock leveler if it appears damaged or does not operate properly. Inform your supervisor immediately.

Do not attempt to manually lift the dock leveler ramp or lip. If the dock leveler does not operate correctly using the operational procedures contained in this manual, do not use the leveler. Refer to the troubleshooting guide in this manual. If Leveler still does not operate properly call an authorized service representative.

Do not stand in the area between the dock leveler and the rail car.

Never drive on dock leveler unless green light is lit on the dock leveler control panel and the rail car supports the extended lip or the ramp is supported by the extendable arms.

OPERATION (continued)

Always restore leveler to its safe stored vertical position with lip extended and **LEVELER STOP** button pressed after servicing rail car.

DO NOT walk in front of dock leveler until you:

- Restore the leveler to its safe stored vertical position with lip extended.
- Press **LEVELER STOP** button to stop the leveler and lip from moving.
- Secure the maintenance strut with padlocked lock-out pin.

Move all equipment, material or people off the dock leveler and store the dock leveler after use.

Do not use a fork truck or other material handling equipment to lower the leveler.

INSTALLATION, MAINTENANCE AND SERVICE

Place barricades on the dock floor around the dock leveler and in the area in front of the dock leveler while installing, maintaining or repairing the dock.

If the leveler is left in a disabled condition, the lock-out pin must be padlocked in position.

Do not operate the dock leveler when anyone is standing in front of the dock leveler.

Before doing any maintenance or repair under the leveler be certain that the leveler is stored with the lock-out pin inserted through the maintenance strut and bracket on the deck, the **LEVELER STOP** button is pressed, the power is disconnected and properly tagged or locked out, and barriers are in place.

Disconnect the power and properly tag or lock out before doing any maintenance or electrical work on the leveler.

All electrical troubleshooting or repair must be done by qualified technician and must meet applicable codes.

If it is necessary to make troubleshooting checks inside the control box with power on, **USE EXTREME CAUTION!** Do not place fingers or uninsulated tools inside the control box. Touching wires or other parts inside the control box could result in electrical shock, serious injury or death.

Prior to complete electrical and hydraulic installation, levelers should be stored safely. If leveler is stored vertically, the lock-out pin must be inserted through the maintenance strut and the bracket on deck, and secured with a padlock until the leveler is completely wired, tested, and fully operational.

OWNER'S RESPONSIBILITIES

The owner's responsibilities include the following:

The owner should recognize the inherent danger of the interface between dock and rail car. The owner should, therefore, train and instruct operators in the safe use of dock leveling devices.

When a rail car is positioned at the dock, there shall be at least 4" of overlap between the front edge of the lip of the dock leveler and the edge of the floor or sill of the transport vehicle.

Nameplates, cautions, instructions and posted warnings shall not be obscured from the view of operating or maintenance personnel for whom such warnings are intended.

Manufacturer's recommended periodic maintenance and inspection procedures in effect at time of shipment shall be followed, and written records of the performance of these procedures should be kept.

A dock leveler that is structurally damaged or has experienced a sudden loss of support while under load, such as might occur when a transport vehicle is pulled out from under the dock leveler, shall be removed from service, inspected by the manufacturer's authorized representative, and repaired as needed before being placed back in service.

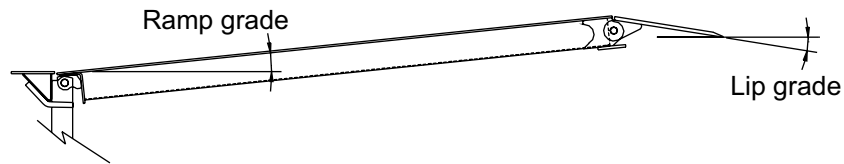
The owner shall see that all nameplates, caution and instruction markings or labels are in place and legible and that the appropriate operating and maintenance manuals are provided to users.

Modifications or alterations of dock leveling devices shall be made only with written permission of the original manufacturer.

The dock leveler should never be used outside its vertical working range or outside the manufacturer's labeled rated capacity. It must also be compatible with the loading equipment and other conditions relating to the dock.

WORKING RANGE

Fig. 1



Above dock

Rail floor position from dock	Deck and lip grades, % for centerline length					
	99" CL		108" CL		120" CL	
	Deck	Lip	Deck	Lip	Deck	Lip
6"	17.6	11	14.1	7.6	12.3	5.2
4"	13.2	6.1	10.5	3.6	8.7	1.7
2"	8.2	1.2	7.0	0.0	5.2	-1.7
0"	3.3	-3.7	2.8	-4.2	2.3	-4.7

Below dock

2"	-1.7	-8.7	-0.9	-7.9	-0.7	-7.7
4"	-6.1	-13.2	-5.2	-12.3	-4.2	-11.2
6"	-11.4	-18.5	-8.7	-15.8	-7.0	14.0

Deck and lip grade 4° crown, 20" lip.

INSTALLATION

INSTALLATION OF DOCK LEVELER

▲ WARNING

Before installing the dock leveler, read and follow the Safety Practices on page 3 and the operation section in this manual.

Important Installer Responsibility:

Prior to complete electrical and hydraulic installation, levelers must be stored safely. If leveler is mounted on hinges and stored vertically, maintenance strut must be secured with lock-out pin and padlock until the leveler is completely wired, tested and fully operational. Padlock must not be removed until leveler is completely wired, tested, and fully operational. Failure to follow Safety Practices could result in death or serious injury.

GENERAL INFORMATION

The successful installation of a dock leveler requires good coordination with other trades involved on the site. You must have a clear access to the dock area, inside and out. Ideally, the leveler should not be installed until the control panel is installed, has live power connected to the control panel, and field wiring to the power unit is complete. This will allow the complete installation at one time as opposed to making several trips.

The installed location of the control panel must be specified on a job specific "Approval Drawing". Check with the general contractor or sales person for this information.

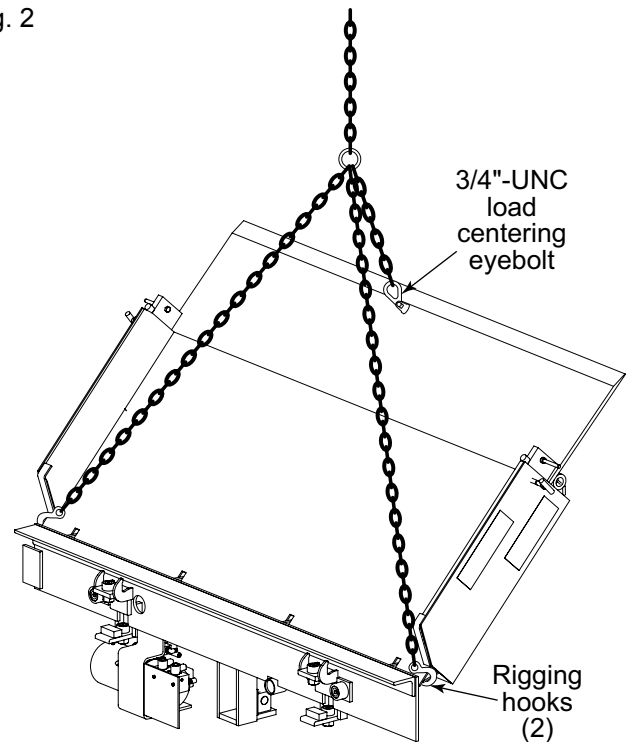
SITE CHECK

Check the entire mounting site for proper construction according to the job specific approval drawings. Check electrical service running to the control panel to ensure it agrees with the phase and voltage of the motor and control box supplied with the dock leveler. Check the control panel for wiring diagram, if unable to locate, follow the schematics located in this manual.

▲ WARNING

Make sure lifting devices are in good condition and have a rated capacity of at least 3000 lb. at the lifting angle they are being used. Stand clear of the dock leveler when it is being placed into the pit. Never allow anyone to stand on or near the dock leveler when it is being lifted or placed into the pit. The dock leveler can tip or swing into bystanders which could result in death or serious injury.

Fig. 2



NOTICE

Take care when moving the dock leveler to ensure that the electrical and hydraulic components are not damaged.

INSTALLATION, continued

HANDLING AND UNLOADING

The rear embed channel or track will be installed first by the concrete contractor. In most cases, these components will have arrived at the site much earlier than the levelers. The levelers will arrive on a truck laid flat with the hydraulic cylinders facing upward. Spacers will be inserted between the levelers to prevent damage to the leveler components. The levelers can be lifted off the truck in stacks of three. Using the forks to separate the levelers is not recommended as damage to the hydraulic components may occur. The levelers should be lifted individually by installing a 3/4" UNC load centering eyebolt through the hole supplied in the lip plate. See Fig. 2.

TO INSTALL

1. Mount and wire the control panel in the location as shown on the job specific approval drawing. Ensure that the voltage and phase of the incoming power agrees with the control panel and the decals on the pump and motor. Power to the control must come from a user supplied fused disconnect with correct fuse sizes for the voltage and phase of the motor. See electrical diagram for correct fuse size. Make sure there are no obstructions at the ends of the rail section since you will be sliding it on to the end of the rail.
2. Pick up the leveler using the load-centering eyebolt and suspend the leveler as shown in Fig. 2 using the eyebolt and two rigging hooks. Unpin the main cylinder on the rod end. See Fig. 23. The carriage can be allowed to rotate if desired after unpinning the main cylinder rod end from the carriage. Tie the loose end of the cylinder with wire so it does not swing. The carriage can also be held in position using the pin through the slot in the maintenance strut. See Fig. 3.
3. Align the carriage rollers with the track and feed the carriage onto the end of the rail section. Ensure the rollers in the carriage contact the rail properly. See Fig. 4.
4. Once the leveler is mounted, you must install the stop bolts at the end of the rail section which will prevent the leveler from sliding off the end of the rail. See Fig. 10.

▲ DANGER

The lock-out pin must be inserted through the slot in the maintenance strut and the bracket on the deck. The pin must be secured with a padlock before the lifting device is removed. Failure to do so could result in death or serious injury. See Fig. 5 for lock-out pin location.

5. Once the carriage is mounted and the stop bolts are secured, use the load-centering eyebolt and carefully raise the leveler to the stored position. Fit the lock-out pin through the hole in the end of the maintenance strut and the bracket on the deck. Place a padlock through the hole provided in the lock-out pin. See Fig. 5. This will prevent any unauthorized activation of the leveler and is essential to the personal safety of anyone near this leveler. Replace the main cylinder lower clevis pin that was removed in step 2.

Fig. 3

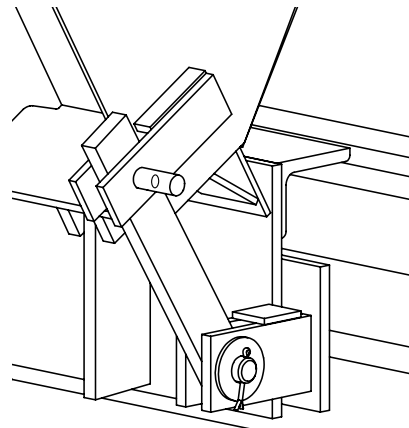


Fig. 4

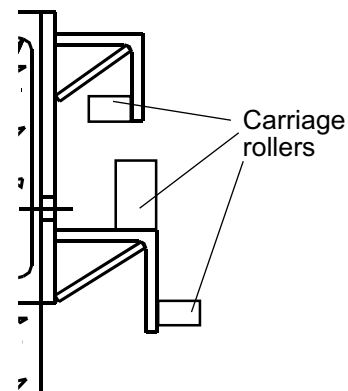
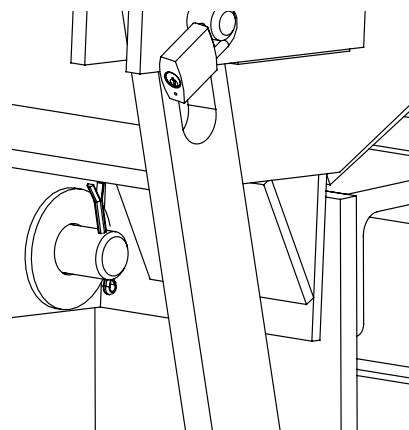


Fig. 5



INSTALLATION, continued

6. For levelers built with manual side-shift, install the brake pad and steel plunger into the guide tube indicated in Fig. 6. Adjust brake bolt to prevent rail leveler movement when in working range. The steel disk must contact the adjustment bolt. Too much pressure on brake pad can cause damage.

6B. OPTIONAL HYDRAULIC SIDE SHIFT MODELS ONLY - With the rail ramp in the stored vertical position with the side shift cylinder fully retracted and the leveler shifted fully right as shown in Fig. 18, attach the side shift cylinder to the mounting bracket with pin, cotter and washer as shown on page 43 and anchor the bracket with the 4 supplied 3/4" concrete anchors as shown in Fig. 7 and page 43.

7. Remove the lifting device from the leveler lip. Leave the lip fully extended.

▲ DANGER

Do not remove the lock-out pin from the maintenance post until steps 8 through 11 have been completed to ensure that the leveler is functioning properly. Failure to do so could result in death or serious injury.

8. Connect wires from control box to motor, solenoid manifold and if present, side shift solenoid. Ensure that wires have free movement through the entire carriage operating range before terminating. See electrical schematics located in this manual.

9. Remove shipping plug from the hydraulic reservoir and replace with the dipstick breather cap.

10. Pull out the **LEVELER STOP** button. The AMBER power light should be on. Press and hold the **RAISE** button for 5 seconds only. The main cylinder should be fully extended.

11. Ensure that the area in front of the leveler is clear. Remove the padlock from the lock-out pin. Press and hold the **RAISE** button until the maintenance strut pin slides freely. If the pump motor runs and the leveler does not move, the motor is likely turning in the wrong direction. Disconnect electrical power and switch motor wires to reverse rotation. (refer to troubleshooting guide and electrical schematics in this manual). Stand at the side of the leveler, reach in and remove the lock-out pin from the maintenance strut.

Fig. 6

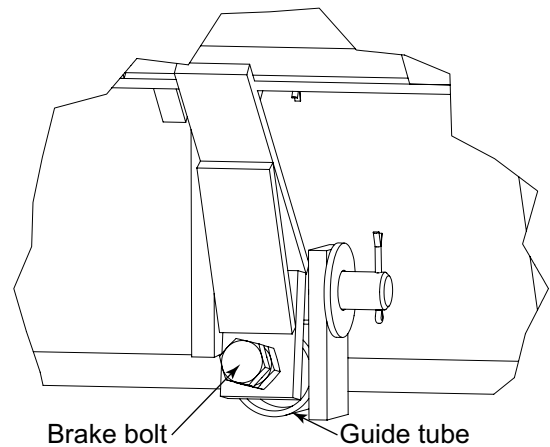
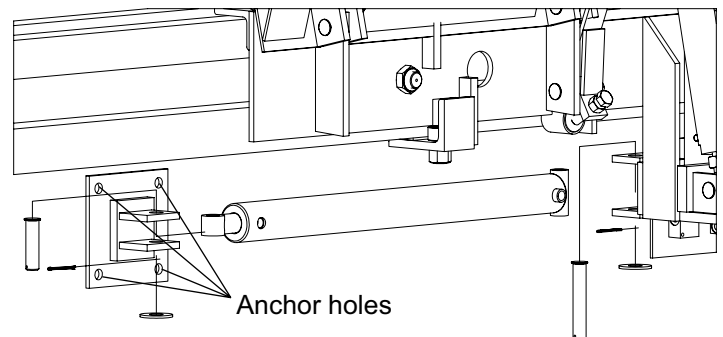


Fig. 7



INSTALLATION, continued

12. Press and hold the **LOWER** button. The pump will run and the leveler will move forward and start to lower. The horn will sound if the leveler is stopped between the lowered working range and the stored position. Continue to press the **LOWER** button until the pump stops. The leveler will hesitate momentarily when it reaches the working range, then continue to float down. Observe the lowering speed of the leveler after it reaches the working range. The leveler lowering speed in the working range should match the leveler power down portion of the lowering. Adjust needle valve as necessary, see pages 30-31. The GREEN light on the control panel should be on while in the working range.

13. Press and hold the **RAISE** button until the leveler is raised above the working range and the GREEN light goes off. Release the button. The leveler should remain in position and the horn should sound. Press and hold the **RAISE** button until leveler is fully raised and lip is extended.

14. Cycle the leveler from full up to full down 4 times.

15. Raise the leveler to the stored position. Fit the lock-out pin through the leveler deck bracket, through the hole (not the slot) in the maintenance strut, securing the maintenance strut. Lockout and tag the lock-out pin. Press the **LEVELER STOP** button. See page 16.

16. Check the reservoir fluid level with the leveler in the stored position with the lip extended (and hydraulic sideshift cylinder, if equipped, fully positioned to the right). The fluid level should be between the fill marks on the dip stick when using the fluid check procedure on page 17. Only use fluids specified on page 18.

17. The proper stored position shall be as shown in Fig. 9. The leveler deck should rest between 2° and 5° past vertical center line. The cylinder should be fully extended and the lockout pin free to slip in/out of deck bracket. Refer to maintenance section on page 24 for adjustment procedures.

INSTALL THE MAIN CYLINDER SUPPORT

18. Measure the wall run out. To do this, clamp the included wall bumper to the side of the cylinder mount near the main cylinder's lower clevis pin. See Fig. 8. Orient the bar so it is perpendicular to the wall and nearly touching the wall. Leave approximately a 1/8"-1/4" gap to the wall. Have an assistant slide the leveler frame to the left and right-hand limits of travel as you observe the bar's proximity to the wall. Find the spot on the wall where the gap is the smallest. It may be necessary to adjust the bar's position slightly if it scrapes the wall. Leave the leveler in this spot.

19. Clamp the new brace in position, perpendicular to the wall. Leave a 1/8"-1/4" gap between the brace and the wall. Weld the brace securely to the leveler frame.

NOTE:

Make sure the welding machine's ground clamp is attached to the carriage assembly and not on the leveler.

20. Permanently mount the laminated DANGER and OPERATION instruction placard near the dock leveler control panel. Make sure the customer gets the User's Manual and is properly trained.

Fig. 8

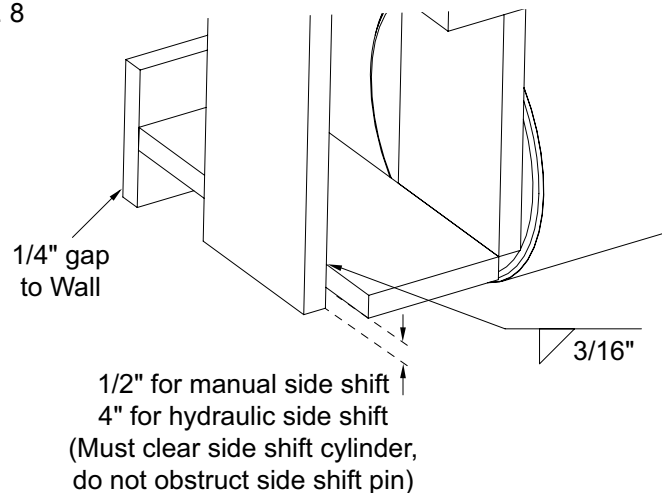
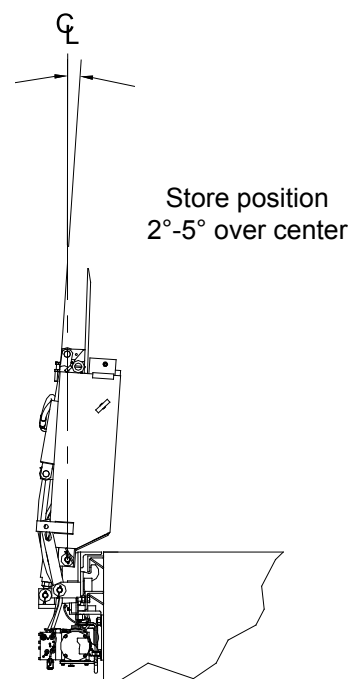


Fig. 9



COMPONENTS AND SPECIFICATIONS

The main components of the leveler are shown below. See the Parts List for specific part numbers.

Fig. 10

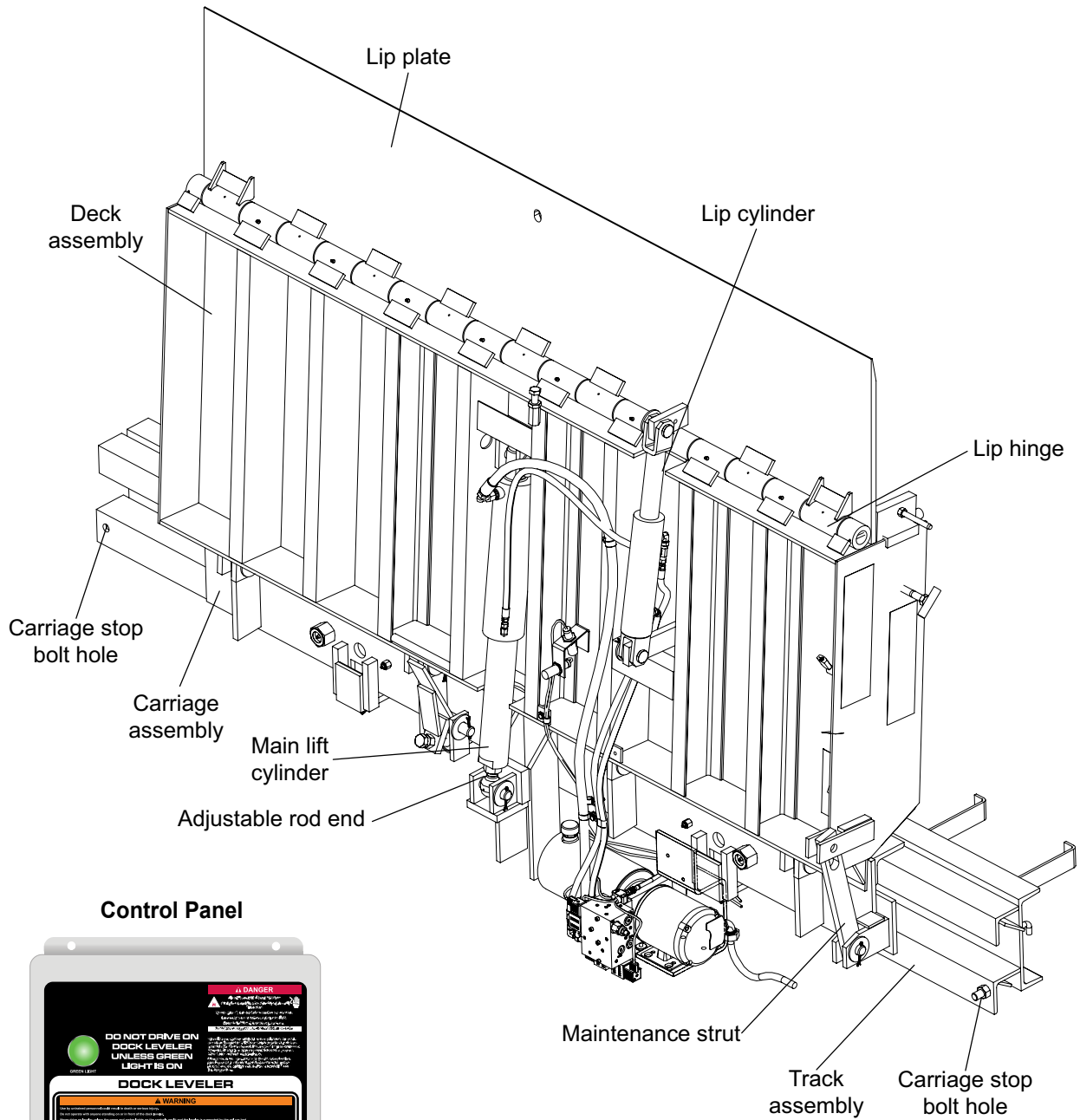
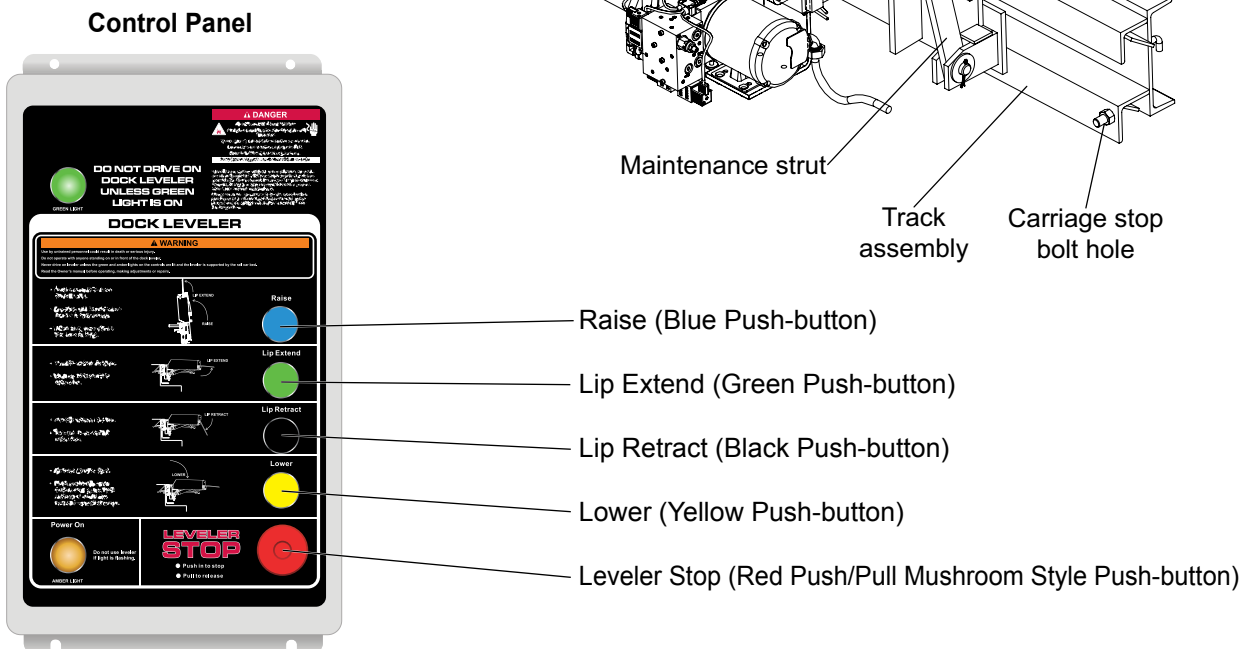


Fig. 11



COMPONENTS AND SPECIFICATIONS , continued

Control Panel (Standard) - NEMA 12, motor starter, thermal overload, U.L. approved.

Pilot Light - LED.

Solenoid Valves - 24VAC.

Motor - NEMA Standard T.E.N.V. / 48YZ frame, 1 h.p. @ 15 mi. duty cycle, single or three phase.

Pump - Fixed displacement gear pump, 1 gpm, primary relief valve factory set at 2500 PSI, sequence valve factory set at 2000 PSI.

Cycle Times - Lower: 16 sec. (± 3 sec.); Raise: 30 sec. (± 5 sec).

Reservoir Capacity - 1 U.S. gal., (3.8 lit.) level measured by dipstick.

Hydraulic Fluid - Acceptable Hydraulic fluids:

Shell Tellus T 15

Mobil Aero HFA (49011)

Exxon Univis Grade J13

Texaco Aircraft Oil #1554

U.S. Oil Co., Inc #ZFI-5606 (Low Temp.)

HYDRAULIC SYSTEM OPERATION

AUDIBLE HORN

- Sounds when leveler stops between float and fully stored position.
- Will silence when leveler is raised to stored position or **LEVELER STOP** is pressed.

LEVELER STOP BUTTON

Push in

- Control circuit disabled.
- AMBER pilot light turns off.
- Solenoid valves SV2 and SV3 deenergize preventing leveler movement.

Pull out

- Control circuit disabled.
- AMBER pilot light turns on.
- Main solenoid valves SV2 and SV3 remain closed except when pump is running or leveler is lowered to working range.

LOWER BUTTON

- Pump starts.
- Power down solenoid valve SV1 opens to retract main cylinder. When leveler lowers to working range, the pumps stops, the power down solenoid valve SV1 closes and Main solenoid valves SV2 and SV3 open to allow leveler to float down to rail car floor.
- GREEN pilot light turns on when leveler reaches working range

RAISE BUTTON

- Pump starts.
- Main solenoid valves SV2 and SV3 open to extend main cylinder.
- GREEN pilot light turns off when leveler raises above working range.

Fully Raised

- Leveler stored sensor closes.
- Pressure increases
- Sequence valve shifts
- Lip cylinder extends.

LIP RETRACT BUTTON

- Pump starts fluid directed to lip circuit.
- Lip solenoid SV4 energizes and opens.
- Once the lip reaches full retract the pressure increases until the sequence valve shifts and the lip will begin to raise.
- GREEN pilot light turns off when leveler raises above the working range.

LIP EXTEND BUTTON

- Pump starts and pressure flows to extend the lip.
- Main cylinder solenoid valve is closed.
- Pressure builds and extends the lip.

SIDE SHIFT LEFT (SIDE SHIFT ONLY)

- Main solenoid valves SV2 & SV3 are opened.
- SV5 solenoid valve shifts to divert flow to side shift cylinder
- Pump starts and pressure flows to Extend the side shift cylinder.
- Deck will shift left.

SIDE SHIFT RIGHT (SIDE SHIFT ONLY)

- (Feature only available on assemblies with hydraulic side shift.)
- Power down solenoid valves SV1 is opened.
 - SV5 solenoid valve shifts to divert flow to side shift cylinder.
 - Pump starts and pressure flows to retract the side shift cylinder.
 - Deck will shift right.

OPERATIONS

▲ WARNING

Before operating the dock leveler, read and follow the Safety Practices on page 3.

Restrict use of dock leveler to trained operators. Follow safe operating procedures described in this manual and in the operation placard which was shipped with the leveler. The placard should be posted near the leveler control panel. If either labels or placard is lost, contact your local authorized distributor for replacement.

DO NOT USE DOCK LEVELER IF IT LOOKS DAMAGED, OR DOES NOT SEEM TO WORK PROPERLY. *Inform your supervisor immediately.*

Always secure the rail car to make sure it cannot move before operating the dock leveler.

Always keep hands and feet clear of all moving parts.

Never drive on dock leveler unless GREEN LIGHT is lit on the dock leveler control panel AND rail car supports either the extended lip or both arm assemblies with at least 4" of overlap.

▲ DANGER

Do not operate the dock leveler with anyone standing on or in front of it.

DO NOT walk in front of dock leveler until you:

- *Restore the leveler to its safe stored vertical position with lip extended.*
- *Press the LEVELER STOP button to stop the leveler from moving.*

Always return the dock leveler to its safe stored vertical position with lip extended with the LEVELER STOP button pressed and the GREEN and AMBER LIGHTS OFF after servicing rail car.

Failure to observe these warnings could result in death or serious injury.

If the dock leveler will not raise with the RAISE pushbutton, and it must be raised by external mechanical means to close the dock door, use extreme caution and do not allow anyone to stand in front of the leveler. Ensure that the lock-out pin is inserted through the maintenance strut and bracket on deck before the mechanical lifting means is removed.

During lifting of the leveler by mechanical means it is likely that hydraulic fluid will vent itself through the breather of the hydraulic reservoir. Lift the leveler slowly and without getting in front of the leveler, place a container under the reservoir if possible to catch the fluid.

The lock-out pin must not be removed until the hydraulic system has been bled of air and all hydraulic functions have been tested by a qualified service technician.

If the dock leveler has been raised to the stored position by external means, the main cylinder will be full of air and there may be a vacuum exerting a strong retracting force on the cylinder rod. A technician will need to perform a bleed procedure to remove the air from the hydraulic cylinder. With the lock-out pin in place, the technician should loosen the hydraulic hose fitting on the top port of the main cylinder and allow air to fill the vacuum before attempting to remove the pin from the cylinder rod (lower) end. With the lock-out pin in place, the technician must remove the pin from the main cylinder rod (lower) end and perform the cylinder bleed procedure shown on page 25-27.

Failure to follow this instruction can allow the leveler to free fall rapidly and may result in severe injury or death.

INTRODUCTION

The hydraulic rail leveler is designed to span and compensate for space and height differences between a loading dock and rail car floor to allow safe, efficient freight transfers.

The hydraulic rail leveler uses push-button controls to raise and lower the ramp. Pressing and holding the **LOWER** button operates a hydraulic pump and retracts a hydraulic cylinder to lower the ramp. When the ramp is lowered to the working range, it floats down to rest on the rail car floor forming a bridge. After loading, pressing and holding the **RAISE** button extends the hydraulic cylinder to raise the ramp to the stored position. When the dock leveler reaches its full raised position, a second hydraulic cylinder extends the dock leveler lip.

Push the **LEVELER STOP** when the leveler is stored to prevent operation. With the dock leveler in its fully stored position, a maintenance strut may be secured with a lock-out pin to prevent inadvertent operation.

Before lowering, the leveler can be side shifted manually within a certain range (if necessary) to line up with the opening in the rail car. (hydraulic side shift is an option.)

OPERATIONS, continued

NORMAL OPERATION

1. To lower the dock leveler pull the **LEVELER STOP** button on control panel to switch on power. AMBER light indicates power on. Press and hold **LOWER** button. The pump will start and the leveler will start to lower. Release the **LOWER** button when the GREEN light on the control panel turns on. (GREEN light on leveler control panel indicates leveler has reached operating range) The leveler will float down to the rail car floor. See Fig. 12.
2. To stop the leveler, release the **LOWER** button. Audible horn will sound if the button is released before the leveler is in its operating range. Push the **LEVELER STOP** button at any time to stop all operation and silence the audible horn. If this condition persists, a short duration tone will sound periodically to remind the operator of the illegal leveler condition. AMBER and GREEN lights will turn off. To resume operation of the leveler, pull the **LEVELER STOP** button (AMBER light on) and press and hold the **LOWER** button and leveler will float down to the rail car floor. Release the **LOWER** button when GREEN light on leveler control panel indicates leveler has reached the operating range. See Fig. 13.

NOTE:

Audible horn pulses and green lamp goes off if the **LEVELER STOP** button is pressed while leveler is in float range. AMBER lamp flashes if both LS1 and LS2 are on or an overload condition exists.

▲ WARNING

Never drive on dock leveler unless GREEN LIGHT is lit on the dock leveler control panel AND rail car supports either the extended lip or both arm assemblies with at least 4" of overlap.

Fig. 12

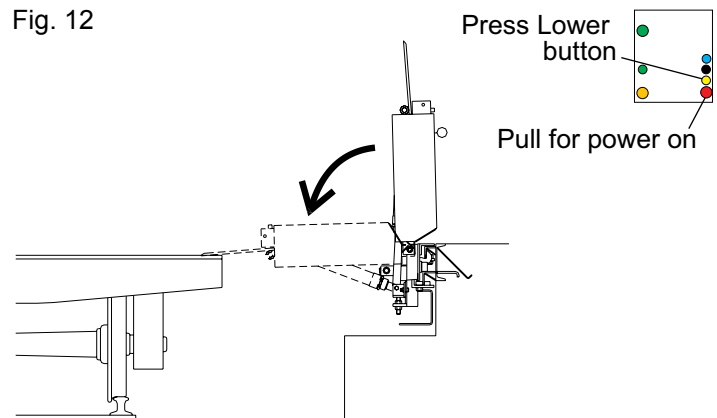
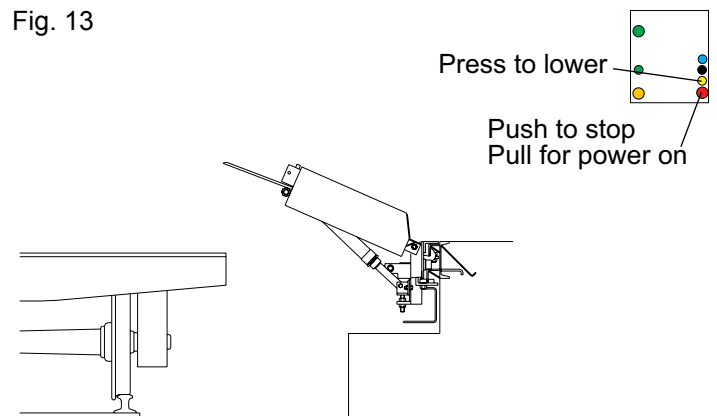


Fig. 13



OPERATIONS, continued

3. To return the leveler to its vertical stored position, press and hold the **RAISE** button. GREEN light will turn off. Audible horn will sound if the button is released before the leveler is fully raised. When the leveler is fully raised and the lip is extended, release the **RAISE** button. Push the **LEVELER STOP** button to turn off power (AMBER light off). See Fig. 14.

END LOADING OPERATION

1. If the leveler lip will interfere with adding or removing a pallet, an end load must be performed. Pull the **LEVELER STOP** button to switch on power. AMBER light indicates power on. Press **LOWER** button until the leveler is partially lowered. Press **LIP RETRACT** button until lip is fully retracted. Press **LOWER** button until leveler is just above working range. Push in **LEVELER STOP** button to halt leveler movement. Extend both arm assemblies so that arms will land on the floor of rail car with at least 4" of overlap. Make sure the T-bolts are tightened. Pull out **LEVELER STOP** button and press **LOWER** button until GREEN light on leveler control panel indicates leveler has reached the operating range. Leveler will float down to the rail car floor. See Fig. 15.
2. To reposition the leveler for normal loading/unloading, press the **RAISE** button and hold until lip is clear of the rail car. Press the **LEVELER STOP** button. Retract both arm assemblies. Press the **LIP EXTEND** button until the lip is fully extended. Press and hold the **LOWER** button until GREEN light on leveler control panel indicates the leveler has reached the operating range. Leveler will float down to the rail car floor. See Fig. 16.

3. To return the leveler to its vertical stored position, press and hold the **RAISE** button. GREEN light will turn off. Audible horn will sound if the button is released before the leveler is fully raised. When the leveler is fully raised and the lip is extended, release the **RAISE** button. Push the **LEVELER STOP** button to turn off power (AMBER light off). See Fig. 14.

Fig. 14

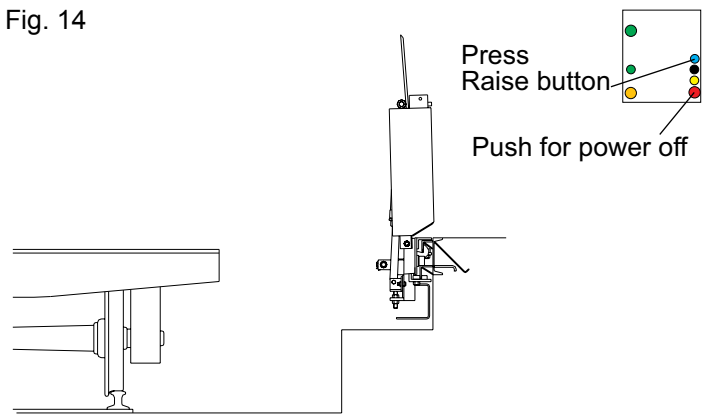


Fig. 15

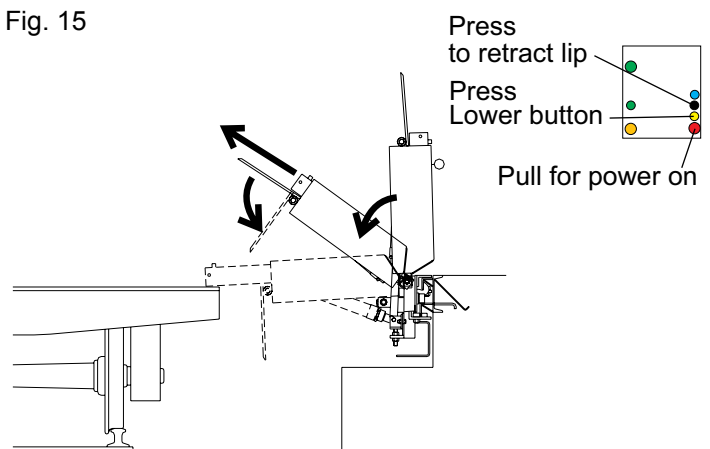
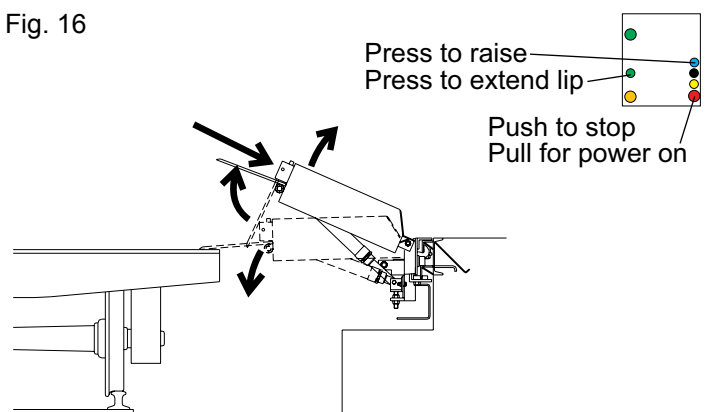


Fig. 16



HYDRAULIC SIDE SHIFT OPERATION (If equipped)

The optional hydraulic side shift feature on the hydraulic rail levelers is operated by a hydraulic cylinder that positions the entire dock leveler left or right along the rail connected to the embed channel.

Ensure the leveler is stored in the upright vertical position. Turn selector switch left or right to position the leveler along the rail. When lip is aligned with the area of the railcar to form a bridge, release the selector switch. Proceed with leveler use.

Fig. 17

Side shift selector switch (Left/Right is viewed from the building side of the leveler)

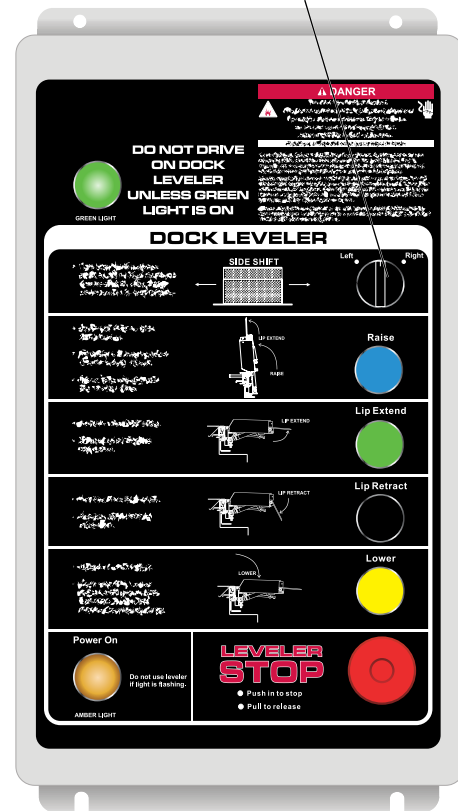
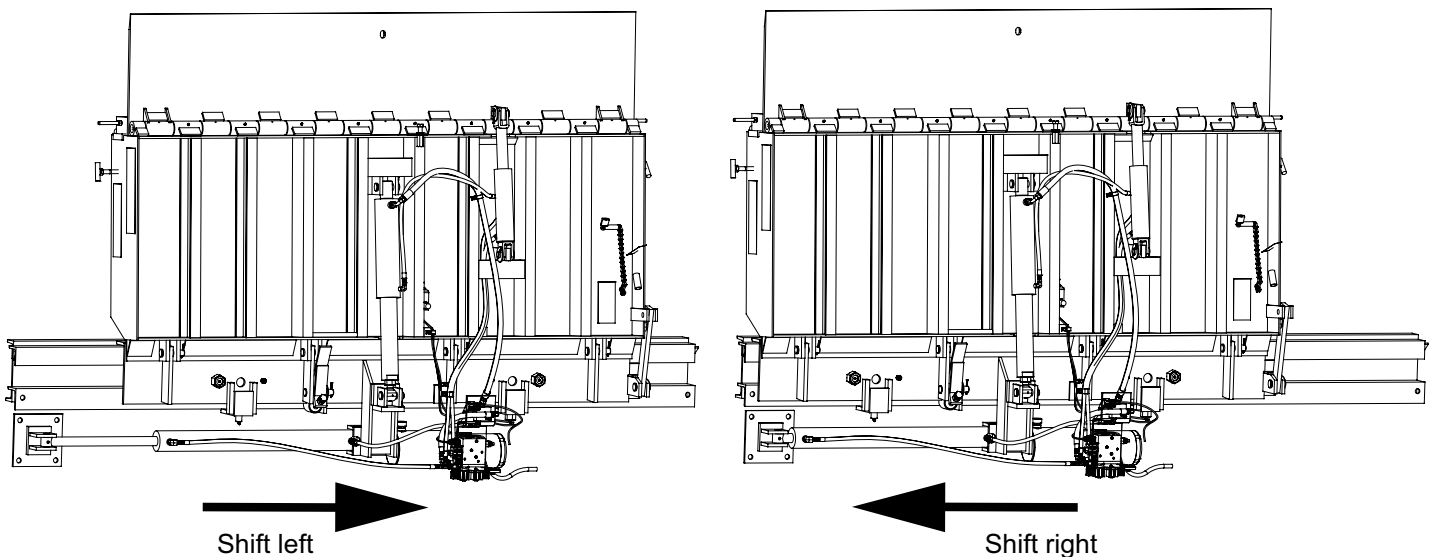


Fig. 18



SERVICE TOOLS

▲ DANGER

Before servicing the dock leveler, read and follow the Safety Practices on page 3 and the Operation section in this manual.

Before doing any maintenance or repair on the dock leveler, be certain that:

- 1) THE LEVELER IS STORED IN THE VERTICAL POSITION WITH THE LIP EXTENDED AND THE LOCK-OUT PIN INSERTED THROUGH THE MAINTENANCE STRUT AND BRACKET ON DECK.**
- 2) The LEVELER STOP button is pressed.**
- 3) Barriers are in place.**
- 4) The power is disconnected and properly tagged or locked out.**

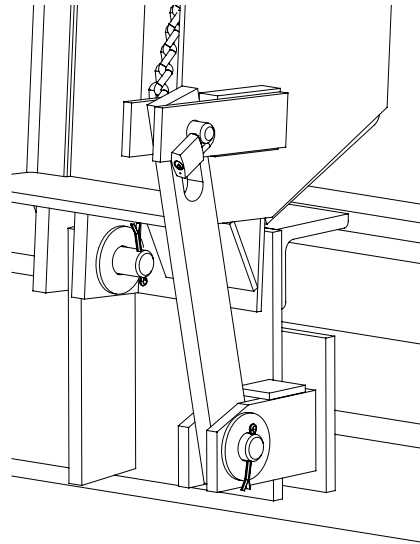
Failure to do so could result in death or serious injury.

MAINTENANCE STRUT

The vertical dock leveler is equipped with a maintenance strut to hold the leveler in the stored position during maintenance. Always follow the procedure below when performing maintenance or adjustments of any kind to the dock leveler.

1. Raise the leveler to its fully stored position with the lip extended.
2. Press the **LEVELER STOP** button on the control panel.
3. Swing the maintenance strut into position and insert the lock-out pin through the hole (not the slot) in the maintenance strut and the bracket on the deck (reach from the side of the leveler while inserting lock-out pin). The lock-out pin should insert freely.
4. Place a padlock through the hole in the lock-out pin to prevent accidental activation of the dock leveler. See Fig. 19.
5. Place barricades around the dock leveler to show leveler is out of service.

Fig. 19



PLANNED MAINTENANCE

▲ DANGER

Before servicing the dock leveler, read and follow the Safety Practices on page 3 and the Operation section in this manual.

Before doing any maintenance or repair on the dock leveler, be certain that:

- 1) THE LEVELER IS STORED IN THE VERTICAL POSITION WITH THE LIP EXTENDED AND THE LOCK-OUT PIN INSERTED THROUGH THE MAINTENANCE STRUT AND BRACKET ON DECK.**
- 2) The LEVELER STOP button is pressed.**
- 3) The power is disconnected and properly tagged or locked out.**
- 4) Barriers are in place.**

Failure to do so could result in death or serious injury.

WEEKLY

1. Check that the lock out pin can be freely inserted through the maintenance strut and the bracket on the deck when the leveler is fully raised.
2. Check the full operation of the leveler to ensure there is no hesitation in the hydraulic system. Any loss of fluid will affect the safety valve operation.
3. Verify both control panel indicator LEDs are working. Replace if necessary.
4. Clean away any debris from the operating area. If washing out, take care not to direct spray at any electrical parts. See page 18.
5. Clean away any dirt and debris from the lip hinge. See page 18.
6. Clean away any dirt and debris from the surfaces of the wall mounted track so the leveler will slide freely from side to side. See page 18.

QUARTERLY

1. Inspect and lubricate all mechanical pivot points on the leveler with S.A.E. 30 oil. Cycle the leveler when lubricating. See Fig. 20.
2. Inspect the hydraulic cylinders, valves and hoses for any leaks or chaffing. Check the reservoir fluid level with the leveler in the stored position with the lip extended. If hydraulic side shift is present, the leveler should be fully positioned to the right. Unscrew the oil level dip stick and remove. Wipe the dipstick clean. Re-insert the dipstick into the reservoir but do not screw in. Read the dipstick. The fluid level should be between the fill marks. Refill as required using only the fluids specified on page 18.
3. Inspect all welds under leveler for fatigue or failure, particularly the lip plate hinge and under the top plate.
4. Inspect all safety labels and placard. Replace as required. See page 19 for part numbers and label location.
5. Grease all locations shown on page 18.

PLANNED MAINTENANCE, continued

Hydraulic Fluid - Acceptable Hydraulic fluids:

- Shell Tellus T 15
- Mobil Aero HFA (49011)
- Exxon Unavis Grade J13
- Texaco Aircraft Oil #1554
- U.S. Oil Co., Inc #ZFI-5606 (Low Temp.)





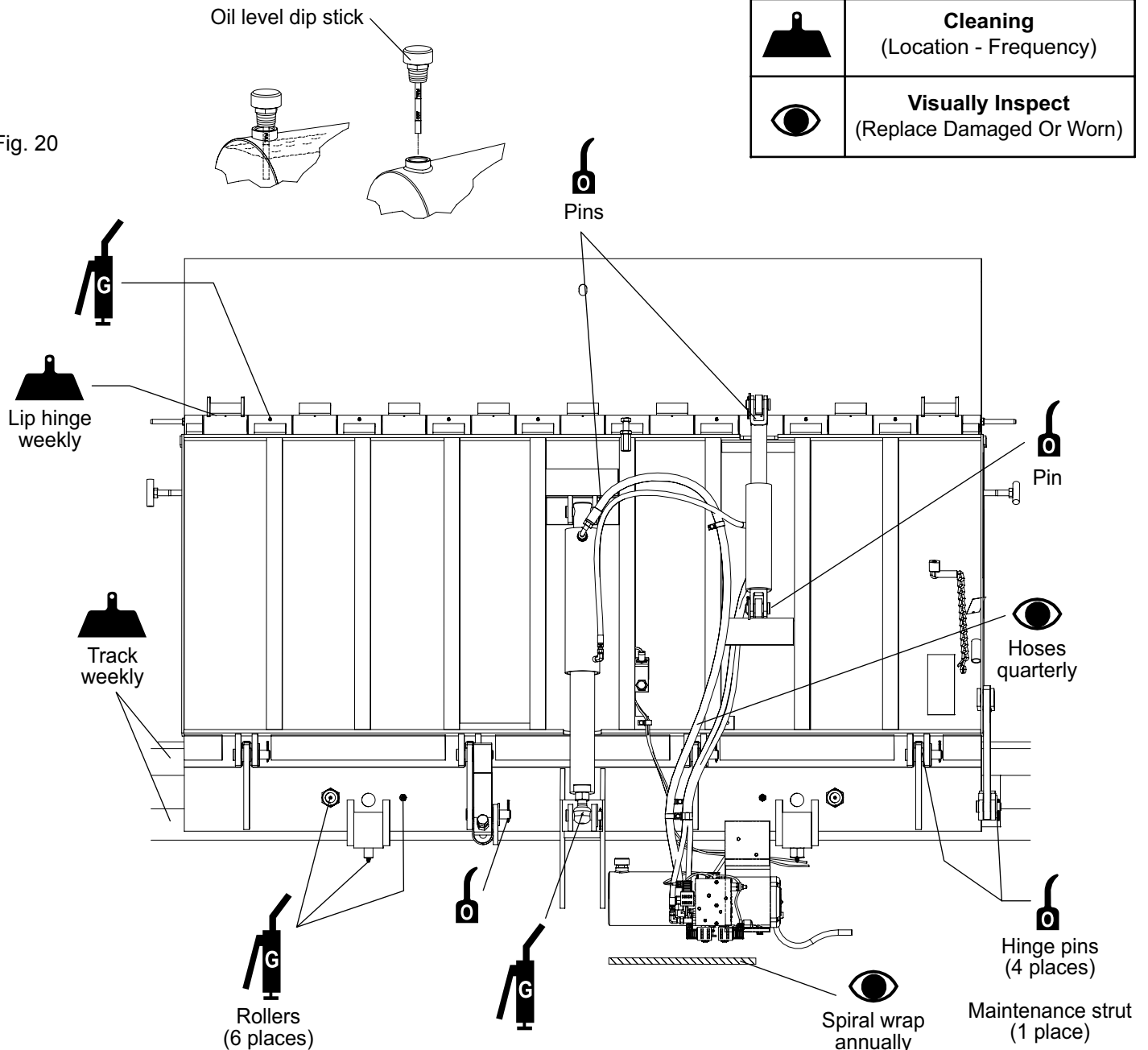
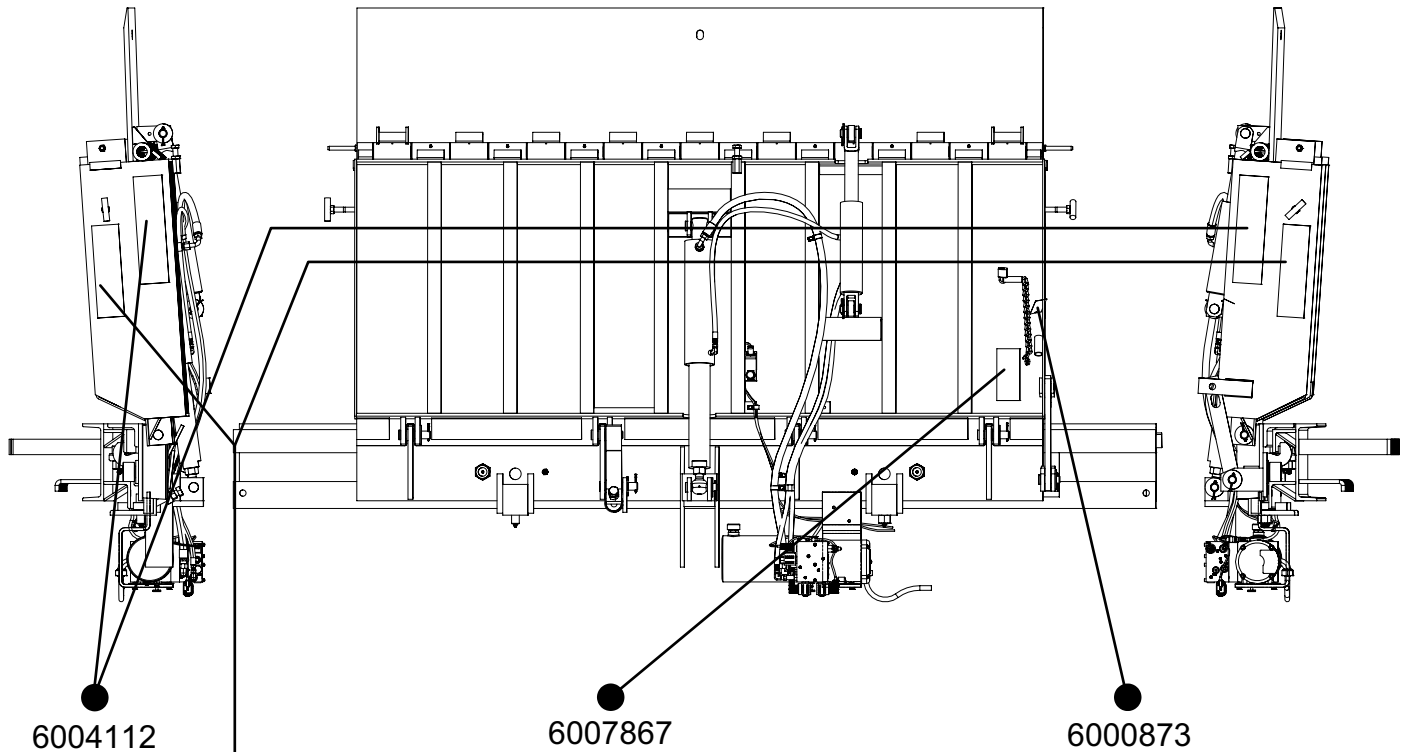
Legend	
Symbol	Description
	Lubricate - Oil Light Oil - SAE 30
	Lubricate - Grease Molybdenum Disulfide NLGI #2
	Cleaning (Location - Frequency)
	Visually Inspect (Replace Damaged Or Worn)

Fig. 20



PLANNED MAINTENANCE, continued

Fig. 21



⚠ DANGER

CRUSH HAZARD
DO NOT WALK IN FRONT OF DOCK LEVELER until you:

- Restore the dock leveler to its safe stored vertical position with lip fully extended.
- Press the Leveler Stop button to stop leveler from moving.

Unsupported dock levelers can lower unexpectedly. Ensure dock leveler is properly supported by lip, or arm assemblies.

When loading is completed, always:

- Ensure that no equipment, material or people are on dock leveler.
- Restore dock leveler to its safe stored vertical position with lip fully extended.
- Press the Leveler Stop button to stop leveler from moving.

SAFETY INSTRUCTIONS

OPERATION

1. Read and follow all instructions and warnings in user's manual.
2. Use of dock leveler restricted to trained operators.
3. Always restrain rail car from moving before operating dock leveler or beginning to load or unload.
4. Never use hands or equipment to move ramp or lip.
5. Before activating dock leveler:
 - Check rail car alignment. If misaligned, side shift leveler as required before lowering.
6. Ensure rail car supports extended lip or arm assemblies and green light is on before driving on ramp.
7. Stay clear of hinges and front and sides of moving dock leveler.
8. Never use damaged or malfunctioning dock leveler. Report problems immediately to supervisor.

MAINTENANCE/SERVICE

1. Read and follow all instructions, warnings and maintenance schedules in user's manual.
2. Maintenance/Service of dock leveler restricted to trained personnel.
3. Place barriers in front of leveler and on dock floor to show service work is being performed.
4. **DO NOT SERVICE LEVELER** unless dock leveler is securely supported by maintenance lock-out pin.
5. Turn off power and use OSHA lockout/tagout procedures.
6. Secure the lock-out pin with a padlock if the hydraulic system is disabled.

Failure to follow posted instructions could result in death or serious injury.

6004112E

⚠ DANGER

CRUSH HAZARD

Before doing any maintenance, repair, or adjustments on the dock leveler, store the leveler in a vertical position with lip extended, and engage the lock-out pin in the maintenance strut.

Do not remove the lock-out pin from the maintenance strut until you are sure the hydraulic system is in proper working condition. Do not stand in front of the dock leveler while removing the lock-out pin. Reach from the side of the leveler.

Do not force the lock-out pin out of the maintenance strut. If the pin does not slide freely, support the leveler securely using other means and determine the cause of the interference.

Failure to follow these instructions will result in death or serious injury.

Refer to user's manual for proper procedure

6007867A

⚠ DANGER

Do not remove the lock-out pin from the maintenance post unless authorized personnel have confirmed that the hydraulic cylinders, valve and hoses have been properly installed and filled with fluid. Failure to do so could result in death or serious injury. Refer to user's manual for proper procedure 6000873D

6004101

⚠ DANGER	OPERATING INSTRUCTIONS

WARNING AND OPERATION PLACARD (MOUNTED NEAR CONTROLS)

KEEP CLEAR

TROUBLESHOOTING GUIDE

Use the Troubleshooting Guide if ever the leveler fails to perform properly. Find the condition that most closely matches your situation and make the recommended adjustments. Observe all safety warnings before attempting any maintenance procedure.

▲ DANGER

Before servicing the dock leveler, read and follow the Safety Practices on page 3 and the Operation section in this manual.

Be certain before doing any maintenance or repair on the dock leveler, that:

- 1) THE LEVELER IS STORED IN THE VERTICAL POSITION WITH THE LIP EXTENDED AND THE LOCK-OUT PIN INSERTED THROUGH THE MAINTENANCE STRUT AND BRACKET ON DECK and***
- 2) The power is disconnected and properly tagged or locked out.***

Do not enter the area in front of, or under the leveler unless the leveler is fully raised and lip extended, lock-out pin is inserted through the maintenance strut and bracket on deck, the LEVELER STOP button is pressed, and barriers are in place.

If the dock leveler will not raise with the RAISE pushbutton, and it must be raised by external mechanical means to close the dock door, use extreme caution and do not allow anyone to stand in front of the leveler. Ensure that the lock-out pin is inserted through the maintenance strut and bracket on deck before the mechanical lifting means is removed.

During lifting of the leveler by mechanical means it is likely that hydraulic fluid will vent itself through the breather of the hydraulic reservoir. Lift the leveler slowly and without getting in front of the leveler, place a container under the reservoir if possible to catch the fluid.

The lock-out pin must not be removed until the hydraulic system has been bled of air and all hydraulic functions have been tested by a qualified service technician.

If the dock leveler has been raised to the stored position by external means, the main cylinder will be full of air and there may be a vacuum exerting a strong retracting force on the cylinder rod. A technician will need to perform a bleed procedure to remove the air from the hydraulic cylinder. With the lock-out pin in place, the technician should loosen the hydraulic hose fitting on the top port of the main cylinder and allow air to fill the vacuum before

attempting to remove the pin from the cylinder rod (lower end. With the lock-out pin in place, the technician must remove the pin from the main cylinder rod (lower) end and perform the cylinder bleed procedure shown on page 25-27

Failure to follow this instruction can allow the leveler to free fall rapidly and may result in severe injury or death.

▲ DANGER

Do not disconnect hoses unless the leveler is fully raised with lip extended, the lockout pin is inserted through the maintenance strut, LEVELER STOP button is pressed, and barriers are in place. After replacing hoses and/or motor/pump, cycle the leveler at least 4 times to remove air from the cylinder. After replacing hoses and/or motor/pump, perform the cylinder bleed procedure shown on page 25-27 before removing the lock-out pin from the maintenance strut and bracket on deck.

Failure to do so could result in death or serious injury.

TROUBLESHOOTING GUIDE, continued

▲ DANGER

Do not disconnect hoses or any hydraulic components unless the leveler is fully raised with lip extended, the lock-out pin is inserted through the maintenance strut, LEVELER STOP button is pressed, and barriers are in place.

▲ DANGER

If you disconnect any hydraulic components remove the pin from the main cylinder and perform the Hydraulic System Bleed Procedure found on page 25-27 before removing the lock-out pin from the maintenance strut and bracket on deck.

Failure to do so could result in death or serious injury.

PROBLEM	POSSIBLE CAUSE	SOLUTION
1. Leveler does not raise or lower. Motor not running.	<ul style="list-style-type: none"> a) No electrical power to control panel. b) Electrical connections incorrect or broken. c) No electrical power to PLC. d) PLC not running. e) Both leveler float and stored inputs ON. 	<ul style="list-style-type: none"> a) Check that voltage is present at terminal connections to the control panel. b) Check that wiring matches the wiring diagram. c) No electrical wiring to the PLC. d) If the fault light is flashing, replace PLC. e) Inspect, repair or replace proximity sensors.
2. Leveler does not raise or lower; motor starts then stops, motor starter relay chatters.	<ul style="list-style-type: none"> a) Loose wiring connection. b) Voltage drop due to long wiring distance from power source. 	<ul style="list-style-type: none"> a) Check all wiring connections from line to motor starter relay, overload and to motor. b) Check voltage when motor is started. Voltage drop is more often a problem on single phase motors. Verify wire gage is adequate for length of wire.
3. Overload relay tripping (check full load amperage and relay setting).	<ul style="list-style-type: none"> a) Overload relay set too low. b) Loss of 1 phase (Three phase only) 	<ul style="list-style-type: none"> a) Set overload to full load current specified for voltage on motor nameplate. b) Check for voltage at all three motor connections (T1, T2, T3) at output of overload in control panel.
4. Leveler does not raise or lower. Motor hums.	<ul style="list-style-type: none"> a) Voltage drop. b) Loss of 1 phase (Three phase only) 	<ul style="list-style-type: none"> a) See solution 2. b). b) Check for voltage at all three motor connections (T1, T2, T3) at output of overload in control panel.

TROUBLESHOOTING GUIDE, continued

PROBLEM	POSSIBLE CAUSE	SOLUTION
5. Leveler does not raise or lower. Motor runs.	<p>a) Low fluid in reservoir.</p> <p>b) Main solenoid valve SV2 and/or SV3 does not open.</p> <p>c) Pump running in reverse</p> <p>d) Pump damaged or broken internally.</p> <p>e) Insufficient pressure. Primary relief valve (RV1) setting too low.</p>	<p>a) Check fluid level with leveler fully lowered. Oil level should be 1/2-3/4" below top of reservoir with lip pendant. Add oil if required.</p> <p>b) Check for magnetism at solenoid coil. If magnetism present, remove and inspect valve for contamination and then replace solenoid valve.</p> <p>c) Check motor rotation and reverse electrical connections T1 and T2 if necessary.</p> <p>d) With the leveler safely secured by the lock-out pin inserted in the maintenance strut and bracket on deck, remove the hose from the upper port of the main lift cylinder and point free end into the reservoir opening. If no fluid is pumped, replace hydraulic power unit.</p> <p>e) Set primary relief valve (RV1) to 2500 PSI. See page 30 and 31.</p>
6. Leveler will not lower. Motor runs and leveler raises.	<p>a) Lower solenoid valve SV1 does not open.</p> <p>b) NV1 (needle valve) set too tight.</p>	<p>a) Check for magnetism at solenoid coil. If magnetism present, remove and inspect valve for contamination and then replace solenoid valve.</p> <p>b) Adjust NV1 (needle valve) CCW. See hydraulic power unit adjustment on pages 30-31.</p>
7. Leveler floats down too fast or too slowly in "float" range.	<p>a) Needle Valve FNV requires adjustment.</p>	<p>a) Adjust Needle Valve FNV. Turn counter clockwise to increase lowering speed or clockwise to decrease speed. The speed of the deck, while lowering, in the float range should be equal to the speed in the powered range. See pages 30-31.</p>
8. Leveler will not raise. Motor runs.	<p>a) Solenoid valve SV1 not closed.</p>	<p>a) Confirm SV1 solenoid coil is de-energized. Inspect SV1 for contamination and then replace solenoid valve.</p>

TROUBLESHOOTING GUIDE, continued

PROBLEM	POSSIBLE CAUSE	SOLUTION
9. Lip plate will not extend, or extends too slowly.	<p>a) Low fluid level in reservoir.</p> <p>b) Sequence valve pressure set too high.</p> <p>c) Lip hinge binding.</p> <p>d) Primary relief valve pressure set too low.</p>	<p>a) Check the reservoir fluid level with the leveler in the stored position with the lip extended (and hydraulic sideshift cylinder, if equipped, fully positioned to the right). The fluid level should be between the fill marks on the dip stick when using the fluid check procedure on page 17. Only use fluids specified on page 18.</p> <p>b) Decrease sequence valve setting. See pages 30-31.</p> <p>c) Inspect hinge area for damage or trapped debris.</p> <p>d) Set primary relief valve (RV1) to 2500 PSI. See pages 30-31. Do not adjust relief valve without a pressure gauge. Reference TSB 2008-0722G for equipment requirements.</p>
10. Lip plate extends too soon.	<p>a) Sequence valve pressure set too low.</p>	<p>a) Turn sequence valve clockwise to increase pressure so the lip plate does not extend until the leveler is fully raised. See pages 30-31.</p>
11. Lip plate will not stay out/falls as leveler is lowering.	<p>a) Pilot check valve is leaking.</p> <p>b) Lip solenoid not closing.</p> <p>c) Lip cylinder is damaged.</p>	<p>a) Inspect and clean pilot check valve.</p> <p>b) Inspect and clean SV4.</p> <p>c) Replace cylinder.</p>
12. Lock-out pin can not be freely inserted through the maintenance strut and the bracket on the deck when the leveler is fully raised.	<p>a) Main cylinder adjustable rod end needs adjustment.</p>	<p>a) Adjust as required. See page 24.</p>
13. Audible alarm sounds when leveler is in the stored position.	<p>a) Main cylinder rod end adjuster not adjusted correctly.</p> <p>b) Leveler stored proximity sensor damaged or connection to sensor lost or bracket out of position.</p>	<p>a) Adjust main cylinder - see page 24.</p> <p>b) Replace proximity sensor or repair wiring between sensor and control panel and/or adjust bracket angle.</p>
14. Leveler will not enter "Float" range when lowered (no green light on control panel, alarm continues to sound and leveler stops when in working range).	<p>a) Sensor mounting bracket out of position.</p> <p>b) Leveler float proximity sensor damaged or connection to sensor lost.</p>	<p>a) Adjust sensor bracket angle.</p> <p>b) Replace proximity sensor or repair wiring between sensor and control panel.</p>

MAIN CYLINDER — ADJUSTMENT TO ALIGN LOCK-OUT PIN

NOTE:

This procedure is to be performed **ONLY** when the leveler is working properly but when properly stored vertically with the lip extended, the lock-out pin will not fit into the hole in the maintenance strut. This procedure requires a 1-1/2" and 2" open end wrenches. It will describe how to change the length of the main cylinder without disconnecting the upper or lower pins.

▲ DANGER

Before starting this procedure read and follow the Safety Practices on page 3 and the Operation section in this manual and be certain that:

- 1) **THE LEVELER IS STORED IN A VERTICAL POSITION WITH THE LIP EXTENDED.**
- 2) **The LEVELER STOP button is pressed.**
- 3) **Barriers are in place.**

▲ WARNING

There must not be more than 1-1/2" of thread showing on the adjustable rod end below the jam nut. If more than 1-1/2" of thread shows, do not proceed.

Failure to do so could result in death or serious injury.

1. Pull the **LEVELER STOP** button out.
2. Press and hold the **LOWER** button until the leveler deck is vertical instead of leaning back away from the rail tracks.
3. Press the **LEVELER STOP** button in.

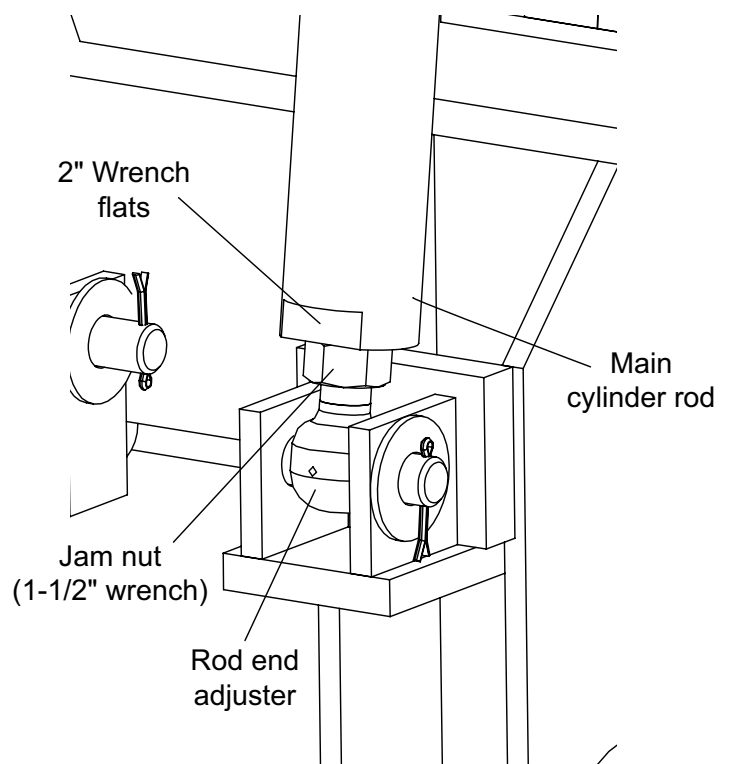
▲ WARNING

There must not be more than 1-1/2" of thread showing on the adjustable rod end below the jam nut. If more than 1-1/2" of thread shows, do not proceed.

4. Loosen the jam nut on the rod end adjuster at the bottom end of the main lifting cylinder with the 1-1/2" wrench, and using the 2" wrench, rotate the cylinder rod by the flats machined in the end of the rod to make the cylinder/cylinder rod end assembly longer or shorter.
5. Re-tighten the lock nut securely.

6. Press the **RAISE** button until the leveler is fully raised with the lip extended.
7. Try to insert the lock-out pin. The pin must insert freely. If there is any resistance, repeat these steps until the pin does insert freely.

Fig. 22



HYDRAULIC SYSTEM BLEED PROCEDURE

▲ DANGER

Before servicing the dock leveler, read and follow the Safety Practices on page 3 and the Operation section in this manual. Before doing any maintenance or repair on the dock leveler, be certain that:

- 1) **THE LEVELER IS STORED IN THE VERTICAL POSITION WITH THE LIP EXTENDED AND THE LOCK-OUT PIN INSERTED THROUGH THE MAINTENANCE STRUT AND BRACKET ON DECK.**
- 2) *The LEVELER STOP button is pressed.*
- 3) *Barriers are in place.*
- 4) *The power is disconnected and properly tagged or locked out.*

Failure to do so could result in death or serious injury.

1. With the leveler in the stored position, install the lock-out pin and place a padlock through the hole provided in the lock-out pin. See page 16.
2. Remove the lower main cylinder pin.

▲ DANGER

Do not remove the lock-out pin from the maintenance strut until the following steps have been completed to ensure that the leveler is functioning properly. Failure to do so could result in death or serious injury.

3. Pull out the **LEVELER STOP** button. Press the **LOWER** button and hold until the main cylinder is fully retracted. This will eliminate excess air from the main cylinder. Then press the **LIP RETRACT** button and hold until the lip is fully retracted. Then press the **LIP EXTEND** button and hold until the lip is fully extended. Then press the **LIP RETRACT** button again and hold until the lip is fully retracted. This will eliminate air from the lip cylinder. Run both cylinders in/out a minimum of 4 times until any abrupt motion is eliminated.

NOTE:

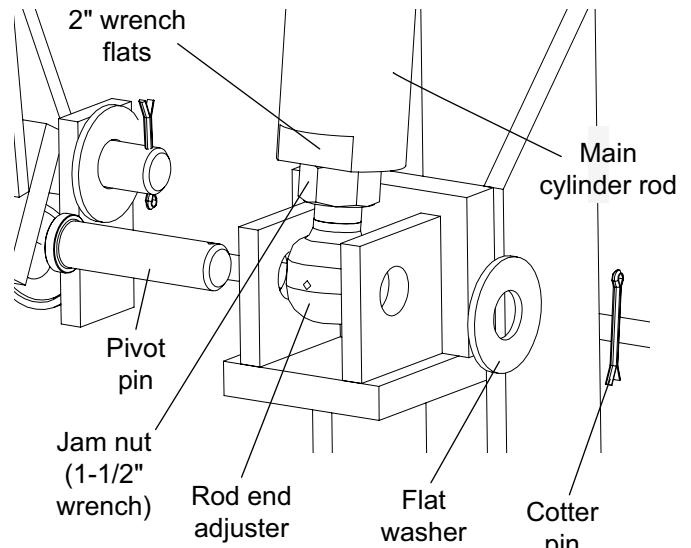
Place a block behind the main cylinder bracket so the cylinder rod is in the clear.

If the sound of the pump changes before the cylinder reaches its full stroke (12"), stop the pump and retract the main cylinder. Check the oil level. See step 4. Continue to run the pump until the main cylinder is fully extended. Add more fluid if required.

HYDRAULIC SYSTEM BLEED PROCEDURE, continued

4. With the lip cylinder and main cylinder fully retracted (and hydraulic side shift cylinder if equipped, retracted) check the oil level in the reservoir. Add fluid as required (fluid level should be 1/2"-3/4" from top of reservoir. Only use fluids specified on page 18. If the oil is foamy, leave for approximately 15 minutes to let the oil settle before checking oil level.
5. This step requires 1-1/2" and 2" open end wrenches. Loosen the jam nut on the threaded rod end of the main cylinder. Press the **RAISE** button and hold until the main cylinder is fully extended. With the main cylinder rod fully extended, rotate the rod end so that the pivot pin can be inserted freely through the cylinder pivot on the carriage. Secure the pivot pin with the cotter pins provided. See Fig. 23. Ensure the grease fitting faces away from the dock face.
6. Using the 2" wrench to hold the chrome cylinder rod, tighten the jam nut using the 1-1/2" wrench.

Fig. 23



HYDRAULIC SYSTEM BLEED PROCEDURE, continued

▲ WARNING

There must not be more than 1-1/2" of thread showing on the adjustable rod end. If more than 1-1/2" of thread shows, do not proceed.

▲ WARNING

Ensure that the leveler is leaning away from the rail tracks. If the leveler is standing vertical or leaning towards the rail tracks, then the leveler is not in a safe stored position. Correct immediately using the steps above. Failure to do so could result in death or serious injury.

7. Ensure that the pit area is clear. Remove the padlock from the lock-out pin. Stand at the side of the leveler, reach in and remove the lock-out pin from the maintenance strut.
8. Press and hold the **LOWER** button. The pump will run and the leveler will move forward and start to lower. The horn will sound if the leveler is stopped between the lowered working range and the stored position. Continue to press the **LOWER** button until the pump stops. The leveler will hesitate momentarily when it reaches the working range, then continue to float down. The GREEN light on the control panel should be on. Press the **LIP RETRACT** button on the control panel until the lip is pendant.
9. Press and hold the **RAISE** button until the leveler is raised above the working range and the GREEN light goes off. Release the button. The leveler should remain in position and the horn should sound.
10. Cycle the leveler from full up to full down 4 times.
11. Press and hold the **RAISE** button until the leveler reaches the stored position and the lip is fully extended. The GREEN light on the control panel should remain off and the horn should not sound. The lock-out pin must insert freely. If there is any resistance, adjust the hydraulic cylinder as described on page 24.

PLC DIAGNOSTICS

⚠ WARNING

Do not service this product unless you have read and followed the Safety Practices, Warnings and Operating Instructions in this manual. Failure to follow these safety practices could result in death or serious injury.

The dock leveler is controlled by a Programmable Logic Controller (PLC) which reads input signals from push buttons and proximity sensors, and closes the appropriate output relays to the motor, solenoid valves, audible horn and warning lights.

INPUTS		OUTPUTS	
0	Leveler Stored Sensor	0	Lower Valve SV1
1	Float Sensor	1	Main Valve SV2/SV3
2	Raise Push Button	2	Lip Valve SV4
3	Lip Extend Push Button	3	Motor
4	Lip Retract Push Button	4	Amber Lamp – (Pilot)
5	Lower Push Button	5	Green Lamp
6	Leveler STOP	6	Audible Horn
7	Overload Tripped	7	Side Shift Valve, SV5
8	Spare	8	Spare
9	Door Opened Interlock	9	Leveler Stored – (No Horn Condition)
10	Spare		
11	Spare		
12	Side Shift Selector (Left)		
13	Side Shift Selector (Right)		

Physical layout of Display.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
														INPUTS
														OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

The charts below show all of the valid conditions for the PLC Unit.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●					●			●						INPUTS
●	●							●					●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler Stored. No push buttons pressed. **LEVELER Stop** pulled out.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
					●	●			●					INPUTS
●	●				●		●	●					●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler Stored. **LOWER** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
					●	●			●					INPUTS
●	●			●			●	●						OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler between float and stored. **LOWER** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●		●			●				●					INPUTS
●	●				●		●	●					●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler stored. **RAISE** button pressed.

PLC DIAGNOSTICS, continued

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
	●				●	●			●					INPUTS
●	●				●			●	●					OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler in float range. **LOWER** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●				●		●			●					INPUTS
●	●					●	●	●					●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler stored. **LIP RETRACT** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
	●					●			●					INPUTS
●	●				●			●	●					OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler in float range. No buttons pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●			●			●			●					INPUTS
●	●						●	●					●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler stored. **LIP EXTEND** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
	●	●				●			●					INPUTS
●	●				●		●	●						OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler in float range. **RAISE** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
						●			●					INPUTS
●	●							●		●				OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler between float and stored. No push buttons pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
		●				●			●					INPUTS
●	●				●		●	●						OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler between float and stored. **RAISE** button pressed.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●	●					●	●							INPUTS
●	●				●			F					●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Horn condition: LS1 and LS2 both on or overload tripped. No buttons pressed

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●						●			●				●	INPUTS
●	●				●		●	●			●		●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler stored. **SHIFT LEFT** selected.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	
●						●			●				●	INPUTS
●	●				●		●	●			●		●	OUTPUTS
PWR	RUN	ERR	STAT	0	1	2	3	4	5	6	7	8	9	

Leveler stored. **SHIFT RIGHT** selected.

HYDRAULIC POWER UNIT ADJUSTMENT

Fig. 24

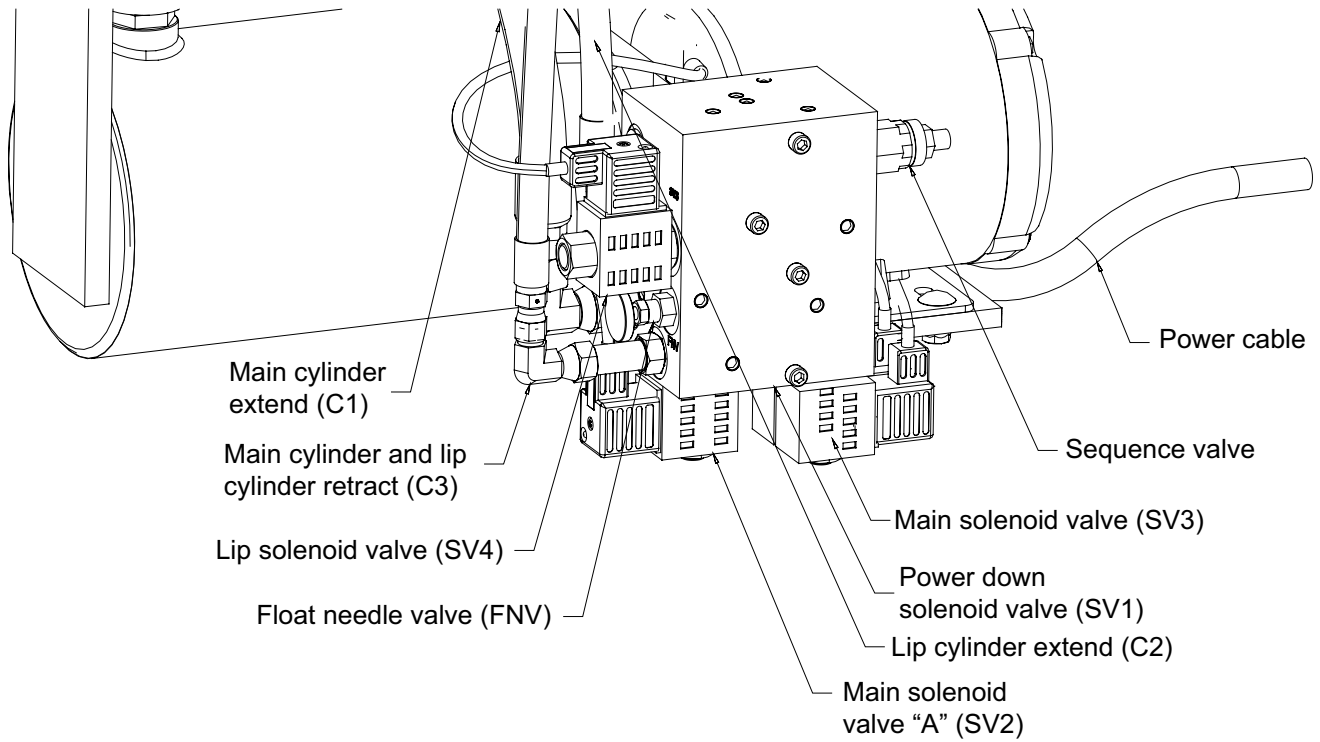
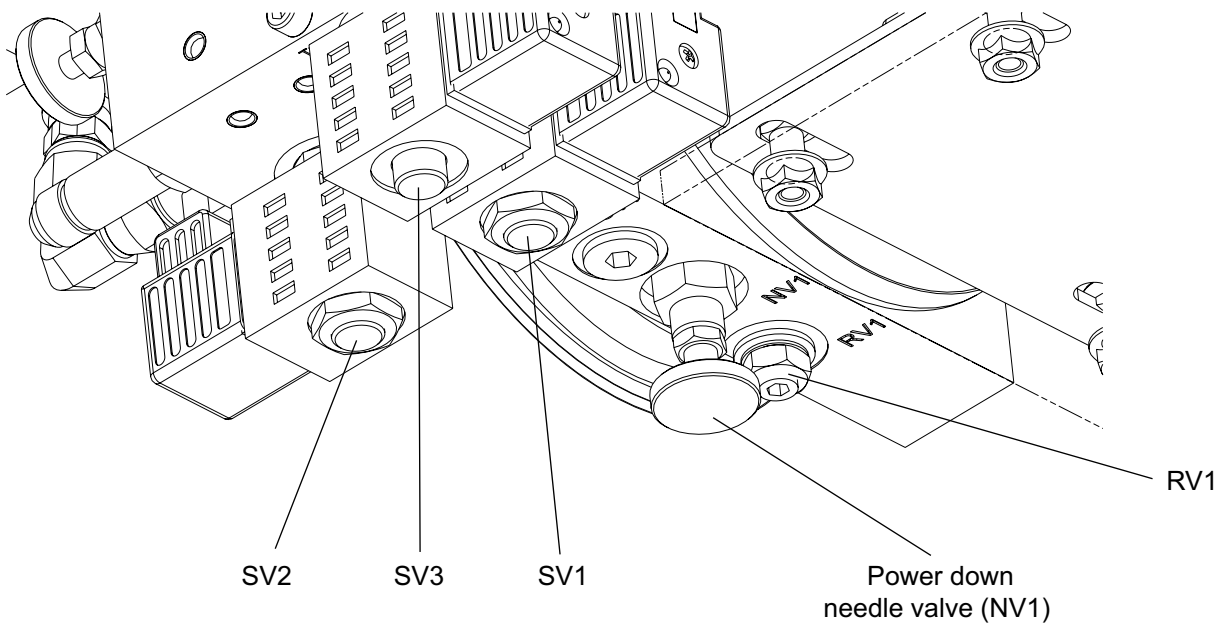


Fig. 25



HYDRAULIC POWER UNIT ADJUSTMENT, continued

▲ DANGER

Do not perform any maintenance or repair in the area in front of, or under the leveler unless the leveler is fully raised and lip extended, lock-out pin is inserted through the maintenance strut and bracket on deck, the Leveler Stop button is pressed, and barriers are in place.

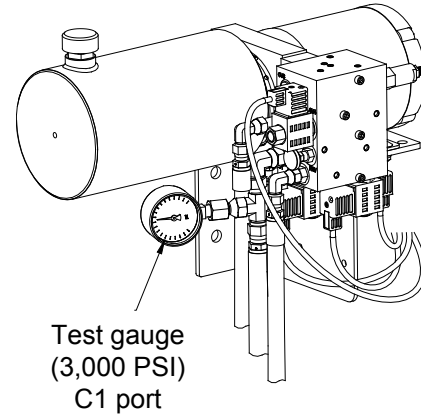
NOTICE

Before making any adjustments to the power unit, always install a hydraulic pressure gauge (3000 PSI liquid filled), in line, on the C1 port.

TOOLS REQUIRED

- Pressure gauge (3000 PSI, liquid filled)
- 3/16" hex wrench
- 7/16" open end wrench
- 9/16" open end wrench.

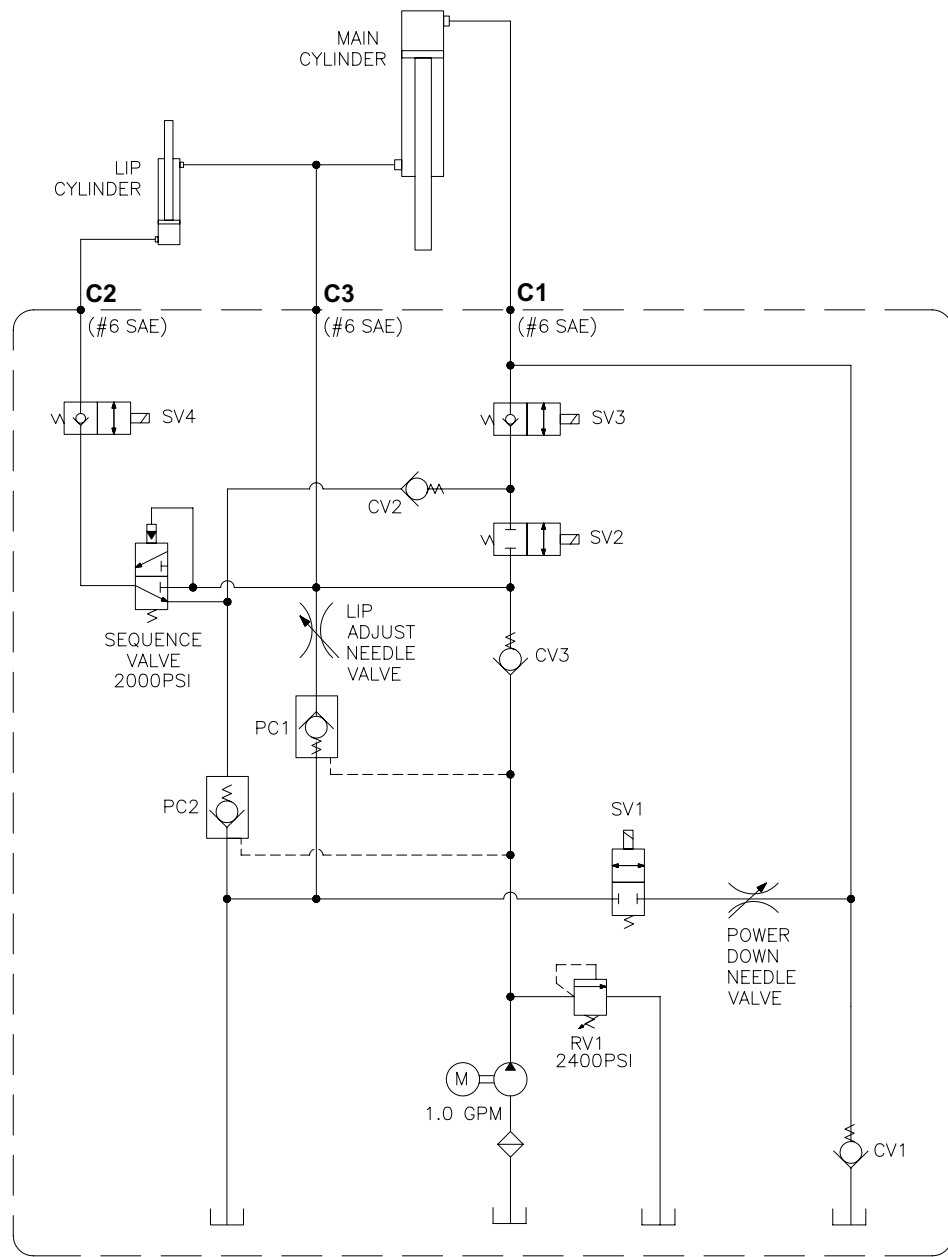
Fig. 26



Description	Purpose	Adjustment										
Primary relief valve (RV1)	Controls maximum pressure in the hydraulic system and protects the other components from excessive force.	Loosen the lock nut. Turn screw clockwise to increase relief pressure. Relief pressure is factory set at 2,500 PSI and should not require adjustment. Do not adjust without a pressure gauge or pump may be damaged. Reference TSB2009-0722G equipment requirements.										
Needle valve FNV	Controls the lowering speed of the leveler in the float range when the green light is on.	Loosen jamb nut with 7/16" wrench. Turn the knob clockwise to decrease lowering speed. The speed of the deck, while lowering, in the float range should be equal to or slower than the speed in the powered range.										
Sequence valve	Controls lip plate retraction and extension.	Loosen locknut. turn set screw CW (inward) to increase pressure, CCW (outward) to reduce pressure. If the lip extends before the deck is fully raised, the valve should be turned clockwise. Tightening the valve too far will cause very slow lip extension, or no extension at all.										
Power down needle valve (NV1)	Controls the lowering speed of the leveler while under power.	<p>Trial run the leveler, lowering it from stored to below dock position. Record time observed.</p> <p>NV1 Adjustment: With the leveler at rest in below dock position, loosen the NV1 needle valve lock nut and turn the knob clockwise to slow lowering speed, or counter-clockwise to increase speed. Hold the adjustment knob in place while tightening the lock nut. Raise the leveler and test lowering speed. Make adjustments in 1/4 to 1/2 turn increments with each test.</p> <table border="1" data-bbox="1226 1627 1526 1879"> <thead> <tr> <th colspan="2">Recommended settings</th> </tr> <tr> <th>Leveler Size (ft)</th> <th>Descent Time (Sec)</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>6-14</td> </tr> <tr> <td>4</td> <td>8-15</td> </tr> <tr> <td>5</td> <td>8-15</td> </tr> </tbody> </table>	Recommended settings		Leveler Size (ft)	Descent Time (Sec)	3	6-14	4	8-15	5	8-15
Recommended settings												
Leveler Size (ft)	Descent Time (Sec)											
3	6-14											
4	8-15											
5	8-15											

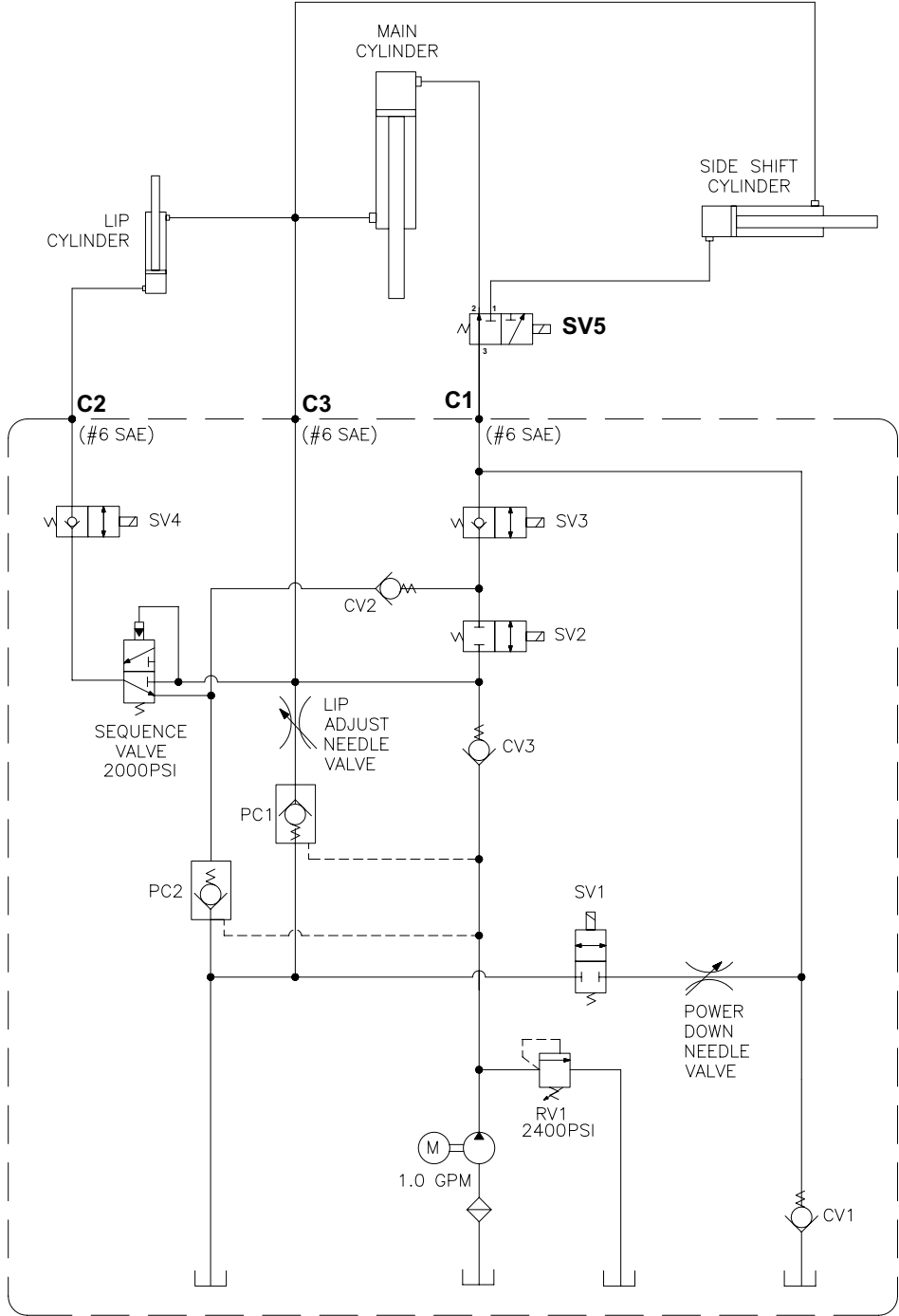
HYDRAULIC SCHEMATIC — STANDARD

Fig. 27



HYDRAULIC SCHEMATIC — WITH HYDRAULIC SIDE SHIFT

Fig. 28

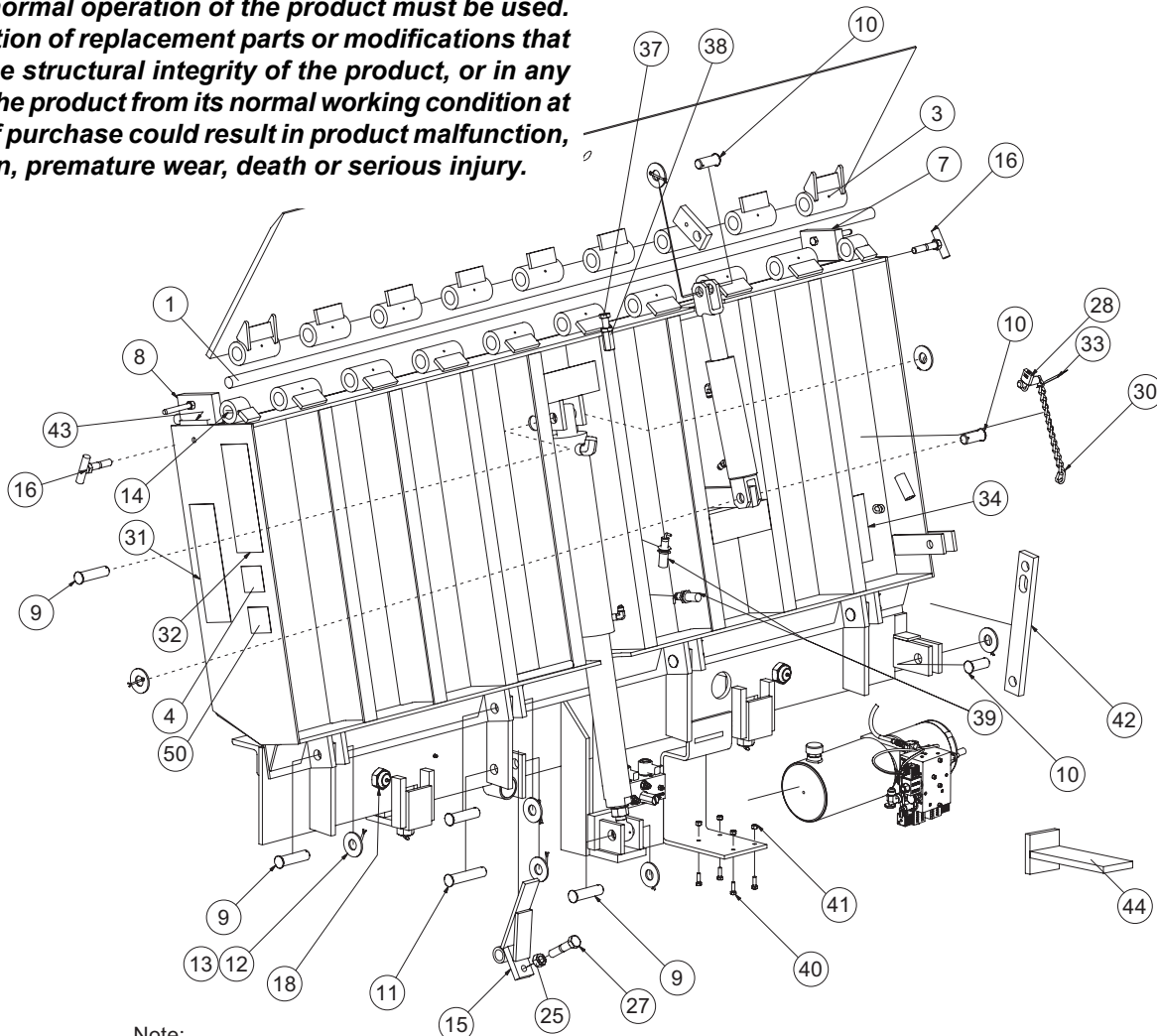


PARTS LIST — DOCK LEVELER

⚠ WARNING

To ensure proper function, durability and safety of the product, only replacement parts that do not interfere with the safe, normal operation of the product must be used. Incorporation of replacement parts or modifications that weaken the structural integrity of the product, or in any way alter the product from its normal working condition at the time of purchase could result in product malfunction, breakdown, premature wear, death or serious injury.

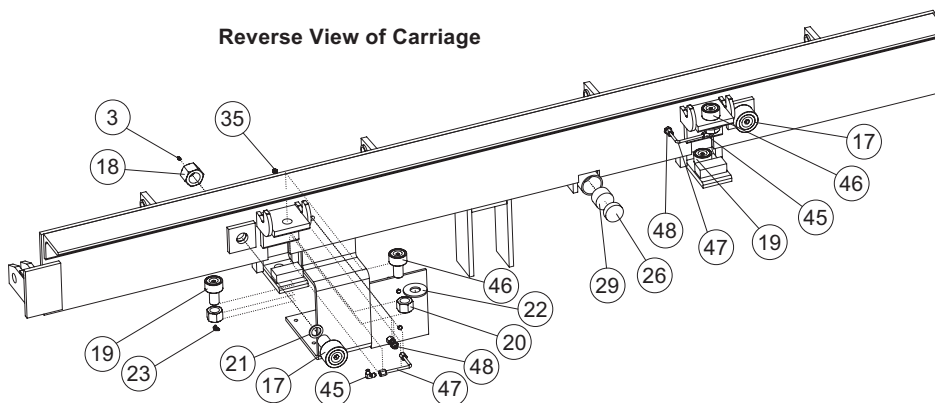
Fig. 29



Note:

- 1) Items 2, 36 and 48 not shown.
- 2) Assemble 65° grease zerk for vertical rollers with ball port toward opening in carriage.
- 3) See preventive maintenance for label placement and items 24 and 25.

Reverse View of Carriage



PARTS LIST — DOCK LEVELER, continued

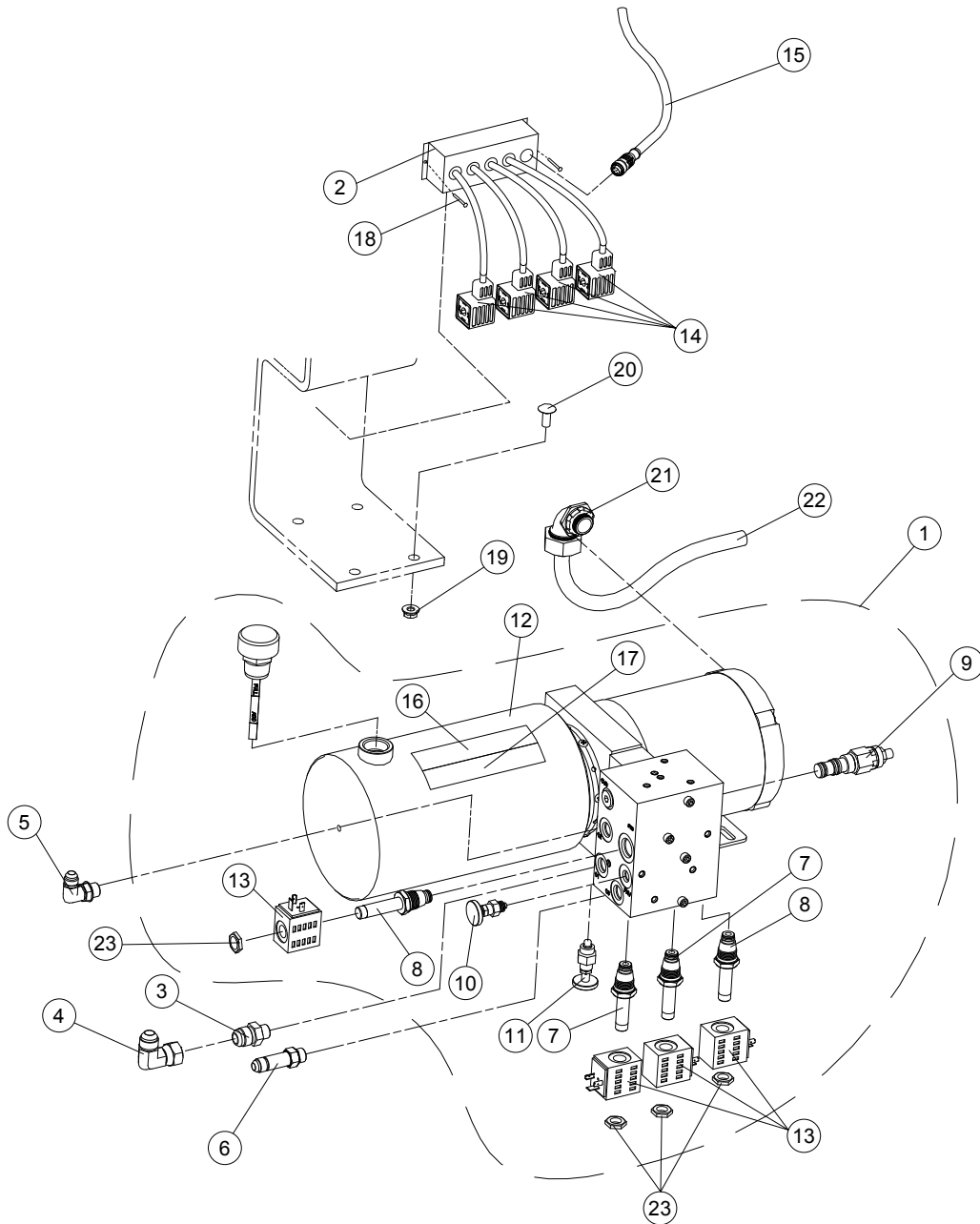
Item	Quantity	Description	Part Number
1	1	RFC 6.5' Lip Hinge Pin 50K	5861495
	1	RFC 7' Lip Hinge Pin 50K	5860392
	1	RFC 7.5' Lip Hinge Pin 50K	6001714
	1	RFC 8.5' Lip Hinge Pin 50K	035460
	1	RFC 9' Lip Hinge Pin 50K	6001736
2	1	Operation Placard (Not Shown)	6004101
3	2	Grease fitting, drive fit	417113
4	2	Kelley Identifier	6001713
	2	Serco Identifier	6001712
5	6	HHMS 1/4-20 UNC X 2 Zinc	212008
6	6	LN 1/4-20 Eslok #10020	214502
7	1	Arm, Support Assy, LS, — Size Varies Per Position	Consult Factory
8	1	Arm, Support Assy, RS, — Size Varies Per Position	Consult Factory
9	6	Pin - Rear Hinge, Hyd Cyl	5861066
10	3	Pin - 1 Dia X 2-3/16 GR-Rng	5861063
11	1	Pin - 1 Dia-4-1/2 GR-Rng	5861068
12	10	Pin, Cotter 5/32x2 Zinc Pld	6001832
13	10	PW 1" Bolt Size 1-1/16 Hole	234161
14	2	Roll Pin 1/4 X 2-1/4	231126
15	1	Lateral Lock Assy	89150
16	2	T-bolt Assy	89156
17	2	Cam, 2-1/2 follower bearing	341002
18	2	NIn - 1-1/4-12 UNF	214388
19	2	Cam, 1-7/8 follower bearing	341001
20	4	Jam nut 1"-14 UNF Nylock	6004139
21	2	PW 1 1/32 - 1.03125ID x 0.134 OD	234163
22	2	PW 1" Bolt Size 1-1/16 Hole	234161
23	2	Angled grease fitting	417120
24	2	HHMB 3/4-10 UNC X 2" ZP (shipped loose)	131515
25	3	HN 3/4-10 finished zinc plt bulk (shipped loose)	214301
26	1	Brake pad - 5/8 thick 2" dia (shipped loose)	152050
27	1	HHMB 3/4-10 UNC X 3.5" LG full thrd	212328
28	1	Padlock - lockout (shipped loose)	341034
29	1	Steel plunger (shipped loose)	5863242
30	1	Lock out pin assy	6000307
31	2	Decal "Keep Clear"	824001
32	2	User safety label,	6004112

PARTS LIST — DOCK LEVELER, continued

Item	Quantity	Description	Part Number
33	1	Lockout Tag	6000873
34	1	Warning Label	6007867
35	2	Grease fitting, 1/8 NPT	6007687
36	1	Manual (Not Shown)	6003936
37	1	Nut, 5/8-11 UNC ZP	214282
38	1	CB 5/8-11 X 4-1/2 Lg ZP	131543
39	2	Float/Store Sensor	6000749
40	4	HHMS 5/16-18 UNC X 1 zinc	000115
41	4	LN 5/16-18 Nylok #10022 Zinc	214522
42	1	Maintenance Strut	6002637
43	2	Pull Out Arm Stop	6004111
44	1	Wall bumper	6004948
45	2	Male elbow, 37° flare, NPTF	6007686
46	2	WHL 1-7/8" OD 1" WD - camrol, tapped	6007681
47	2	Grease line assy	6007682
48	2	Female pipe, (NPTF) x SAE 37° flare (JIC) bulkhead union with locknut	6007688
49	1	J-box, 4 port	6008051
50	1	Serial tag	6009761

PARTS LIST — STANDARD POWER UNIT, continued

Fig. 30

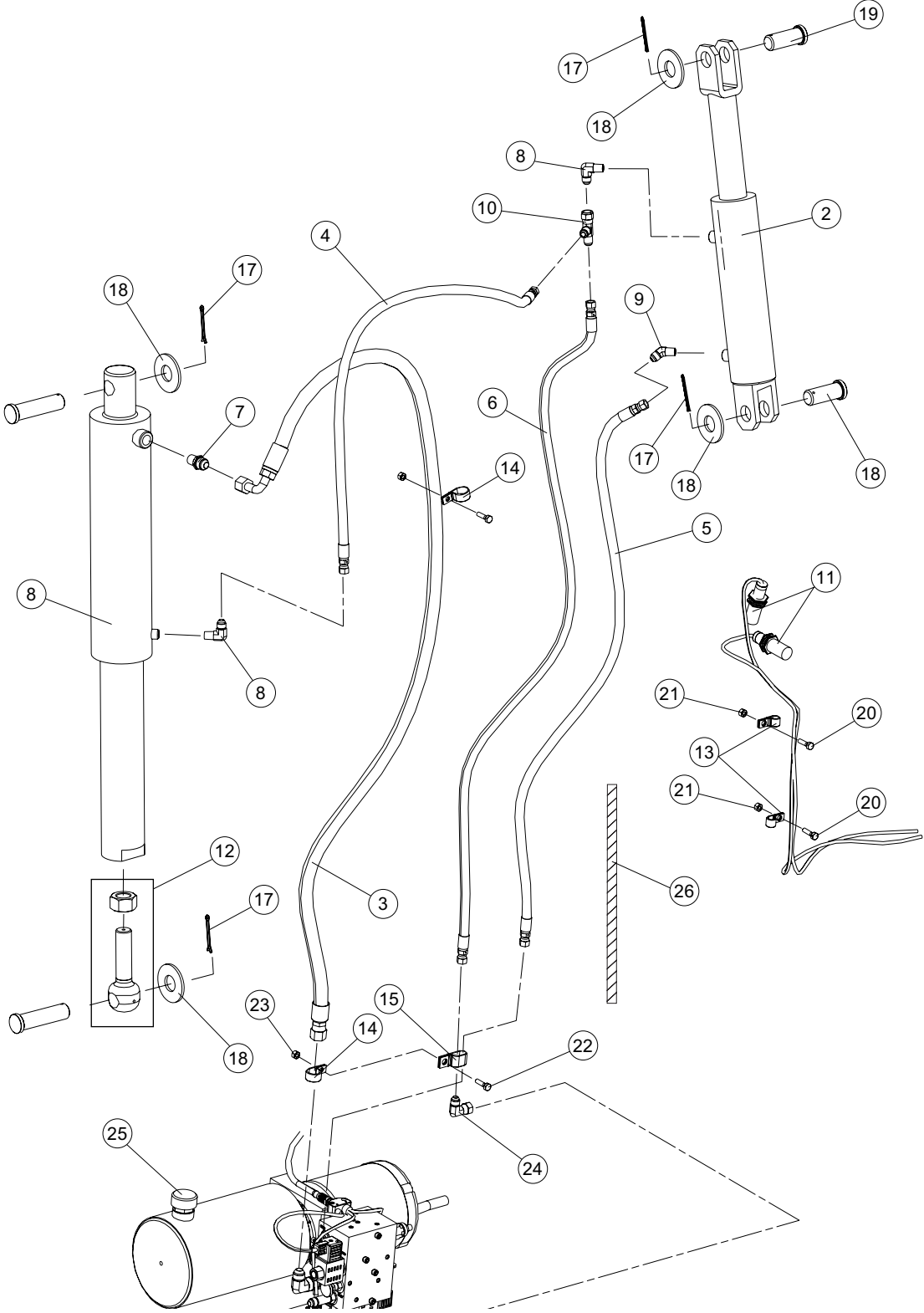


PARTS LIST — STANDARD POWER UNIT, continued

Item	Quantity	Description	Part Number
1	1	BUCHER 120V, 1PH/ 50-60 HZ PUMP UNIT BUCHER 220V, 1 PH/ 50-60 HZ PUMP UNIT BUCHER 240V/ 3 PH/ 50-60 HZ PUMP UNIT BUCHER 480V/ 3 PH/ 50-60 HZ PUMP UNIT BUCHER 575V / 3 PH/ 50-60 HZ PUMP UNIT	6012602 6012602 6012603 6012603 6012604
2	1	J-BOX, 4 PORT, QD	6008051
3	1	FTG, STR THD CONN, 8-JIC-M X 6-SAE ORB-M, STL	6006640
4	1	FTG.,ELBOW- 90 SWIVEL NUT, 8-JIC-M X 8 JIC-F SW, STL	6011446
5	1	FTG, STR THD ELBOW-90, 6 JIC-M X 6-SAE ORB-M, STL	313214
6	1	FTG, LNG STR THD CONN ,6 JIC-M X 6-SAE ORB-M, STL	6008754
7	2	SOLENOID VALVE, 2W2P, #8, NC, SPOOL (SV1, SV2)	6011935
8	2	SOLENOID VALVE, PB-S2B, NC, POPPET (SV3)	313258
9	1	VALVE, PRESS. SEQ. DIRECT ACT CARTRIDGE	6011698
10	1	VALVE, NEEDLE, CARTRIDGE, ADJ, SAE 4 THRD (FNV)	6011699
11	1	VALVE, NEEDLE, CARTRIDGE, ADJ, SAE 4 THRD (NV1)	6012012
12	1	RES KIT, 0.94 GAL, STEEL (TANK, FILTER O-RING, RET. SCREWS)	6012633
13	3	COIL, 1/2 SOLENOID 24VAC, DELTROL SERIES 8	6011937
14	4	SOLENOID VALVE CABLE, 0.5M	6008053
15	1	HOME RUN CABLE, QD, 8 LEAD	6008848
16	1	VOLTAGE LABEL - EXT. (ON PUMP) 120 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 208 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 240 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 480 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 575 VOLT	921051 921050 921052 921053 921054
17	1	PHASE LABEL- EXT. (ON PUMP) "SINGLE PHASE" PHASE LABEL- EXT. (ON PUMP) "THREE PHASE"	921026 921027
18	2	#8-32 X 7/8" LG, PAN HEAD TAPPING SCREW - TYPE F	6011671
19	4	SERRATED FLANGE HEX LOCKNUT, 5/16-18UNC, ZP	6010661
20	4	5/16-18UNC X 1" LG ROUND HEAD CARRIAGE BOLT, ZP	6010662
21	1	STRAIN RELIEF CONNECTOR, 90 DEG , 1/2 IN, -5/8 CBL	145084
22	1	POWER CABLE, SO 14/4 X 60" LG POWER CABLE, SO 14/3 X 60" LG	172603 172607
23	4	RETAINING NUT, 1/2" SOLENOID	6011725

PARTS LIST — STANDARD HYDRAULIC ASSEMBLY

Fig. 31

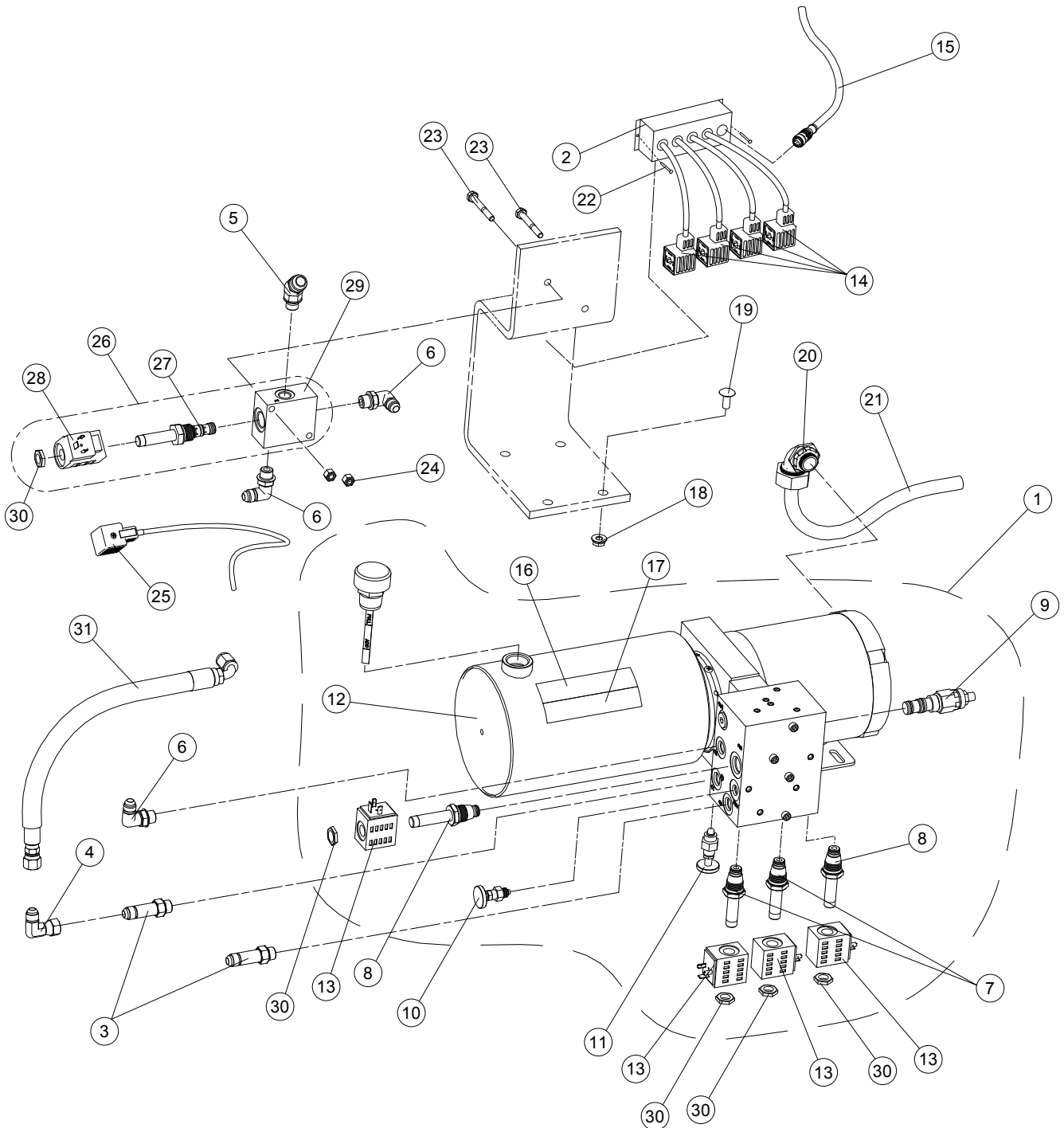


PARTS LIST — STANDARD HYDRAULIC ASSEMBLY, continued

Item	Quantity	Description	Part Number
1	1	MAIN CYL, 3.5 X 12IN DBL ACT	6007123
2	1	LIP CYL, 2.5 X 6 STROKE DBL AC	313043
3	1	HOSE ASSY, 1/2ID X 72.5" LOA, 90° EL-8 JIC-F SW X STR-8 JIC-F SW	6008056
4	1	HOSE ASSY, 1/4 ID X 45.5" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	6001021
5	1	HOSE ASSY, 1/4 ID X 60" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	31958
6	1	HOSE ASSY, 1/4 ID X 66" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	6000724
7	1	FTG, STR MALE CONNECTOR, 1/2 NPTM X 8 JIC- M	6013208
8	2	FTG, 90° EL 6 JIC-M X 1/4-18 NPT-M	313106
9	1	FTG, 45° EL 6 JIC-M X 1/4-18 NPT-M	313219
10	1	FTG, SWIVEL NUT RUN TEE, 6 JIC-F X 6 JIC-M X 6 JIC-M	313105
11	2	FLOAT/STD SENSOR ASSY, V2	6000749
12	1	ADJUSTMENT ASSY, ROD END, VSL	6001315
13	2	HOSE CLAMP BRACKET 1/4 DIA	6008795
14	2	HOSE CLAMP BRACKET 7/8 DIA X 3/4	031472
15	1	HOSE CLAMP, DOUBLE TUBE, 9/16" DIA.	6000837
16	1	HOSE CLAMP BRACKET	5861624
17	4	PIN,COTTER 5/32X2 ZINC PLT	6001832
18	4	PW 1" BOLT SIZE 1-1/16 HOLE	234161
19	2	PIN 1IN DIA X 2-3/16 LG	5861063
20	2	HEX BOLT, 1/4-20 X 1" LG	000369
21	2	NYLOCK NUT, 1/4-20 UNC	214502
22	2	HEX BOLT, 5/16-18 X 1" LG	212064
23	2	NYLOCK NUT, 5/16-18 UNC	214522
24	1	FTG.,ELBOW- 90 SWIVEL NUT,6-JIC-M x 6-JIC-F STL	313595
25	1	BREATHER CAP- DIPSTICK	6012637
26	12"	PROTECTIVE HOSE WRAP, POLY, SPIRAL	6013570

PARTS LIST — SIDE SHIFT POWER UNIT, continued

Fig. 32

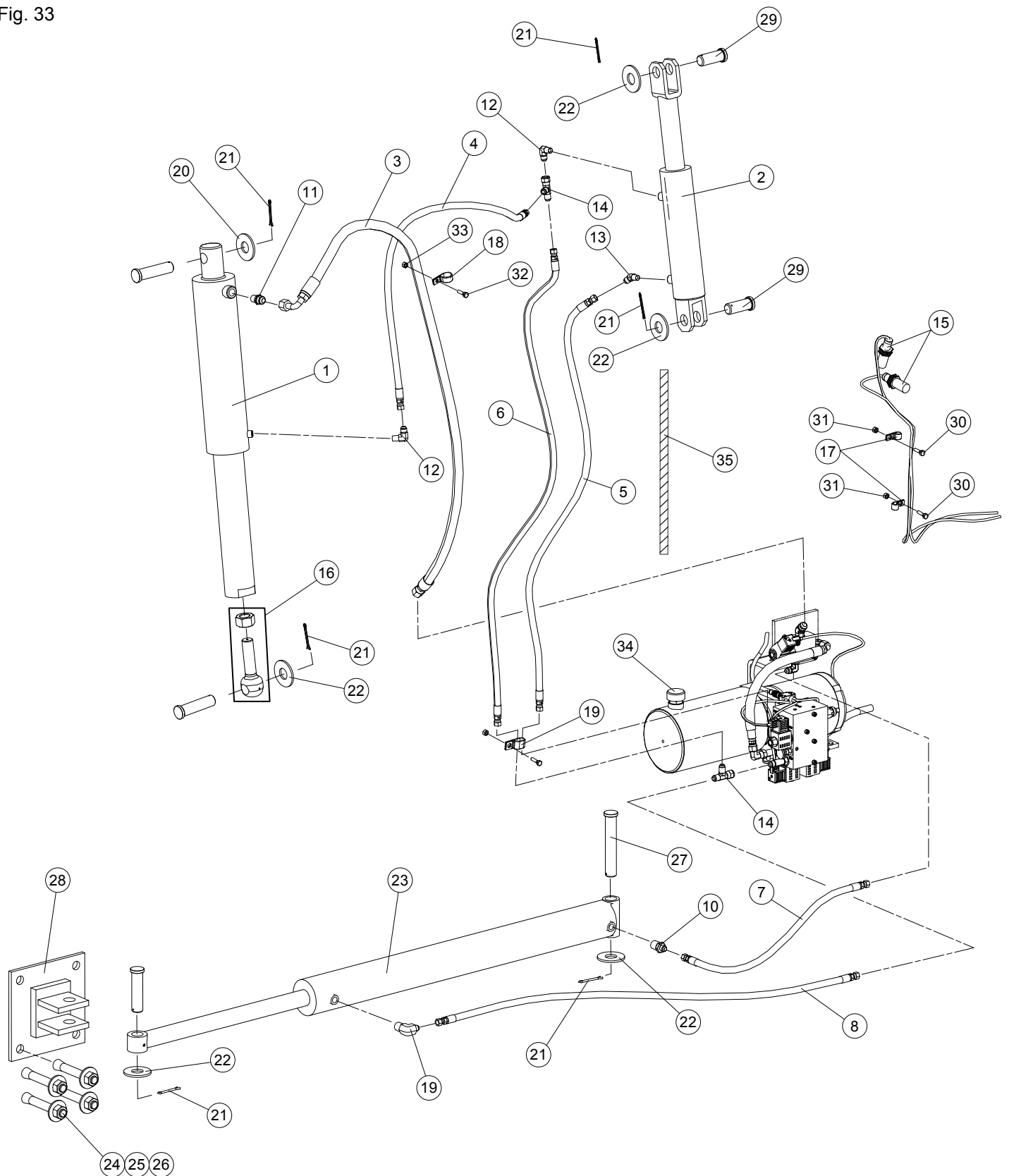


PARTS LIST — SIDE SHIFT POWER UNIT, continued

Item	Quantity	Description	Part Number
1	1	BUCHER 120V, 1 PH/ 50-60 HZ PUMP UNIT BUCHER 220V, 1 PH/ 50-60 HZ PUMP UNIT BUCHER 240V, 3 PH/ 50-60 HZ PUMP UNIT BUCHER 480V, 3 PH/ 50-60 HZ PUMP UNIT BUCHER 575V, 3 PH/ 50-60 HZ PUMP UNIT	6012602 6012602 6012603 6012603 6012604
2	1	J-BOX, 4 PORT, QD	6008051
3	2	FTG, LNG STR THD CONN ,6-37° FLARE MALE X , 6 JIC-M X 6 SAE-ORB, STL	6008754
4	1	FTG.,ELBOW- 90 SWIVEL NUT,6-JIC-M X 6-JIC-F STL	313595
5	1	FTG, 45 STR THD ELBOW, 8 JIC-M X 6 SAE-ORB, STL	6013212
6	3	FTG, STR THD ELBOW-90, 6-JIC-M X 6-SAE ORB-M, STL	313214
7	2	SOLENOID VALVE, #8, NC, SPOOL, SV1 & SV2 (DSV2-080-2NCS-N)	6011709
8	2	SOLENOID VALVE, 2W2P, #8, NC, POPPET, SV3 & SV4 (DSV-080-2NCP-BNC-3)	6011724
9	1	VALVE, PRESS. SEQ. DIRECT ACT CARTRIDGE	6011698
10	1	VALVE, NEEDLE, CARTRIDGE, ADJ, SAE 4 THRD (FNV)	6011699
11	1	VALVE, NEEDLE, CARTRIDGE, ADJ, SAE 4 THRD (NV1)	6012012
12	1	RES KIT, 0.94 GAL, STEEL (TANK, FILTER O-RING, RET. SCREWS)	6012633
13	3	COIL, 1/2 SOLENOID 24VAC, DELTROL SERIES 8	6011937
14	4	SOLENOID VALVE CABLE, 0.5M	6008053
15	1	HOME RUN CABLE, QD, 8 LEAD	6008848
16	1	VOLTAGE LABEL - EXT. (ON PUMP) 120 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 208 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 240 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 480 VOLT VOLTAGE LABEL - EXT. (ON PUMP) 575 VOLT	921051 921050 921052 921053 921054
17	1	PHASE LABEL- EXT. (ON PUMP) "SINGLE PHASE" PHASE LABEL- EXT. (ON PUMP) "THREE PHASE"	921026 921027
18	3	SERRATED FLANGE HEX LOCKNUT, 5/16-18UNC, ZP	6010661
19	3	5/16-18UNC X 1" LG ROUND HEAD CARRIAGE BOLT, ZP	6010662
20	1	STRAIN RELIEF CONNECTOR, 90 DEG , 1/2 IN, -5/8 CBL	145084
21	1	POWER CABLE, SO 14/4 X 60" LG POWER CABLE, SO 14/3 X 60" LG	172603 172607
22	2	#8-32 X 7/8" LG, PAN HEAD TAPPING SCREW - TYPE F	6011671
23	2	HEX BOLT, 1/4-20 X 2" LG	000369
24	2	NYLOCK NUT, 1/4-20 UNC	214502
25	1	PLUG ASSY, DIN 43650, 2 LEAD X 33FT LG	6013058
26	1	VALVE ASSEMBLY, 3W2P, DIRECTIONAL CONTROL SPOOL (PP-S3A), SOLENOID	6013057
27	1	VALVE 3W2P, DIRECTIONAL CONTROL SPOOL (PP-S3A), SOLENOID	6013055
28	1	COIL, 1/2 SOLENOID 125VAC TYPE P , DELTA POWER COIL, 1/2 SOLENOID 24VAC TYPE P , DELTA POWER	313259 313564
29	1	VALVE BODY, 3W2P,	6013056
30	5	RETAINING NUT, 1/2" SOLENOID	6011725
31	1	HOSE ASSY, 3/8ID X 15.8" LOA, 90° EL-6 JIC-F SW X STR-6 JIC-F SW	6013004

PARTS LIST — SIDE SHIFT HYDRAULIC ASSEMBLY, continued

Fig. 33



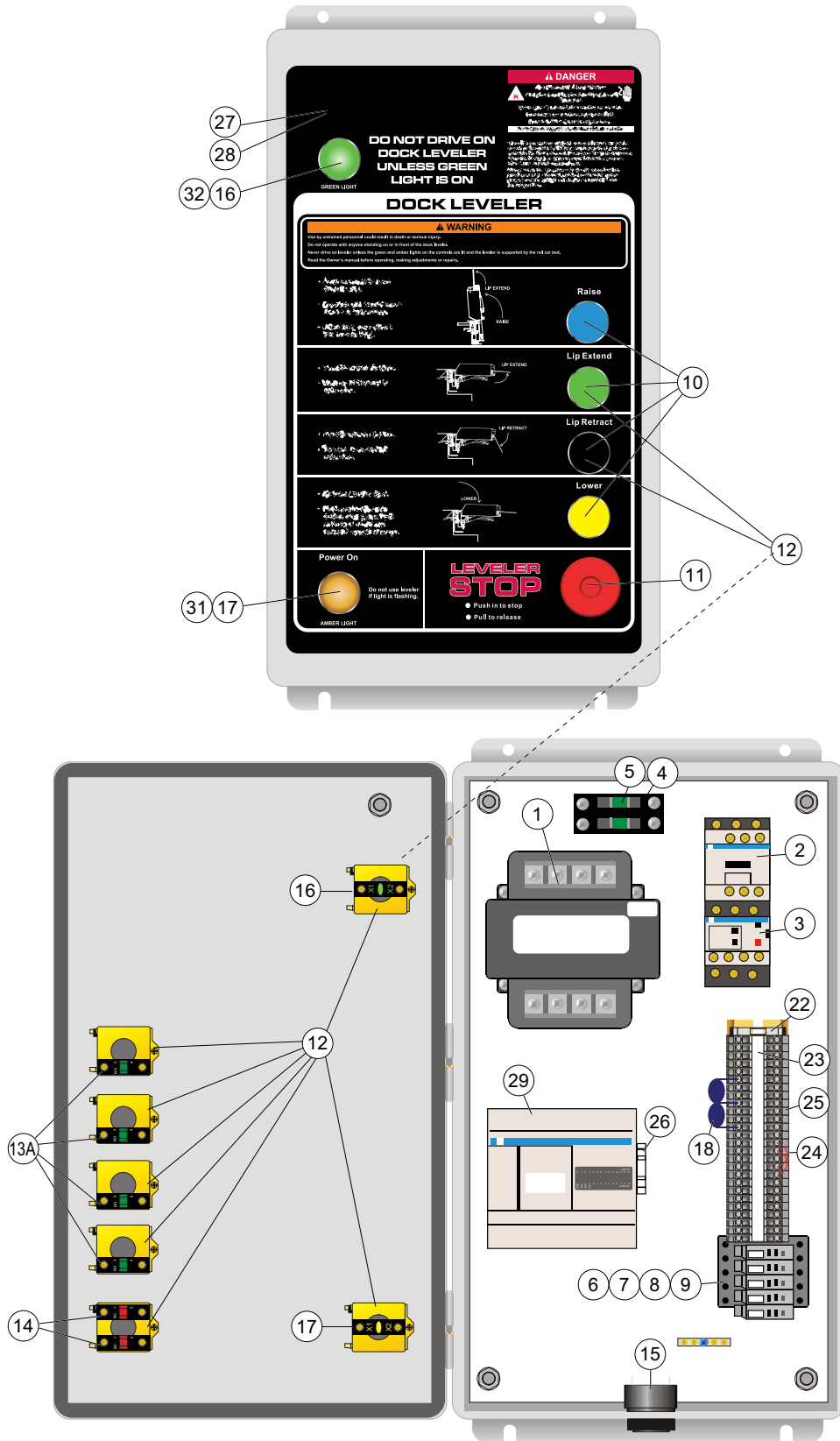
PARTS LIST — SIDE SHIFT HYDRAULIC ASSEMBLY, continued

Item	Quantity	Description	Part Number
1	1	MAIN CYL, 3.5 X 12IN DBL ACT	6007123
2	1	LIP CYL, 2.5 X 6 STROKE DBL AC	313043
3	1	HOSE ASSY, 1/2ID X 72.5" LOA, 90° EL-8 JIC-F SW X STR-8 JIC-F SW	6008056
4	1	HOSE ASSY, 1/4 ID X 45.5" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	6001021
5	1	HOSE ASSY, 1/4 ID X 60" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	31958
6	1	HOSE ASSY, 1/4 ID X 66" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	6000724
7	1	HOSE ASSY, 1/4 ID X 26.5" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	31961
8	1	HOSE ASSY, 1/4 ID X 51" LOA, STR-6 JIC-F SW X STR -6 JIC-F SW	6002304
9	1	FTG, 90° EL , 6 JIC-M X 1/2" NPT-M	206074
10	1	FTG, STR MALE CONNECTOR, 1/2 NPTM X 6 JIC-M	6013209
11	1	FTG, STR MALE CONNECTOR, 1/2 NPTM X 8 JIC- M	6013208
12	2	FTG, 90° EL 6 JIC-M X 1/4-18 NPT-M	313106
13	1	FTG, 45° EL 6 JIC-M X 1/4-18 NPT-M	313219
14	2	FTG, SWIVEL NUT RUN TEE, 6 JIC-F X 6 JIC-M X 6 JIC-M	313105
15	2	FLOAT/STD SENSOR ASSY, V2	6000749
16	1	ADJUSTMENT ASSY, ROD END, VSL	6001315
17	2	HOSE CLAMP BRACKET 1/4 DIA	6008795
18	2	HOSE CLAMP BRACKET 7/8 DIA X 3/4	031472
19	1	HOSE CLAMP, DOUBLE TUBE, 9/16" DIA.	6000837
20	1	HOSE CLAMP BRACKET	5861624
21	6	PIN,COTTER 5/32X2 ZINC PLT	6001832
22	6	PW 1" BOLT SIZE 1-1/16 HOLE	234161
23	1	HYD SS CYLINDER, 3" BORE X "LG"	CONTACT FACTORY
24	4	3/4"DIA X 5" WEDGE ANCHOR	6001187
25	4	3/4-10 UNC LOCK NUT	214558
26	4	3/4 ID WASHER	234141
27	1	SIDE SHIFT CYLINDER PIN, LG	5861070
28	1	SIDE SHIFT CYL WALL MOUNT BRACKET	6000374
29	2	PIN 1IN DIA X 2-3/16 LG	5861063
30	2	HEX BOLT, 1/4-20 X 1" LG	000369
31	2	NYLOCK NUT, 1/4-20 UNC	214502
32	2	HEX BOLT, 5/16-18 X 1" LG	212064
33	2	NYLOCK NUT, 5/16-18 UNC	214522
34	1	BREATHER CAP- DIPSTICK	6012637
35	12"	PROTECTIVE HOSE WRAP, POLY, SPIRAL	6013570

PARTS LIST — CONTROL PANEL

Without Optional Side Shift

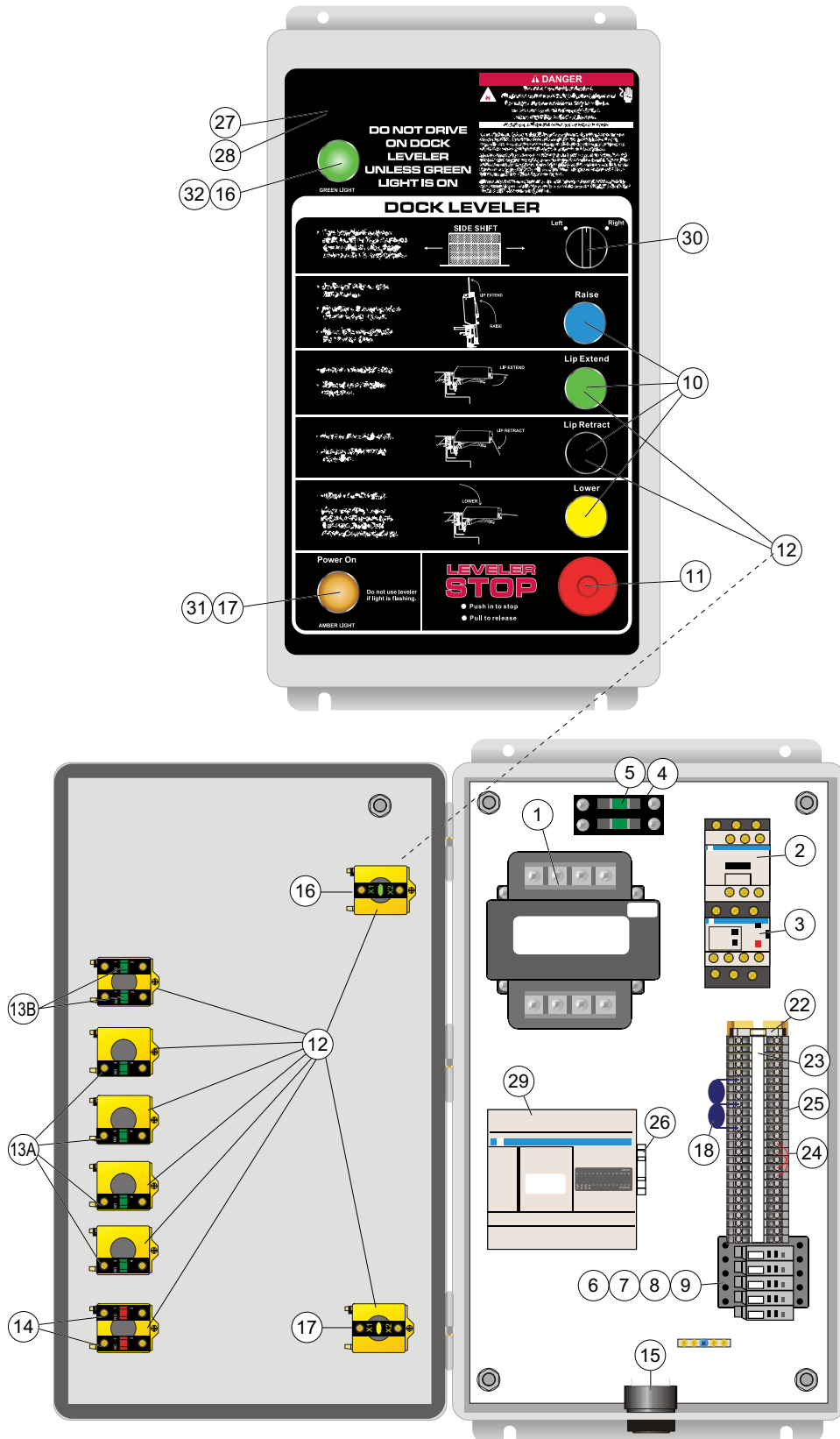
Fig. 34



PARTS LIST — CONTROL PANEL, continued

With optional hydraulic side shift

Fig. 35



PARTS LIST — CONTROL PANEL, continued

Complete Control Panel Assy. No			Where Used / QTY					
			Kelley (Standard)	6004100V1	6004100V2/3	6004100V4/5	6004100V6	6004100V7
Serco (Standard)			6004090V1	6004090V2/3	6004090V4/5	6004090V6	6004090V7	6004090V8
Kelley (Sideshift)			6004809V1	6004809V2/3	6004809V4/5	6004809V6	6004809V7	6004809V8
Serco (Sideshift)			6004810V1	6004810V2/3	6004810V4/5	6004810V6	6004810V7	6004810V8
Item	Part Description	Part #	110-120/1/60	208-240/1/60	208-240/3/60	380/3/60	480/3/60	575-600/3/60
1	Transformer 120V/24	6001045	1					
	Transformer 480-240/120-24	6001046		1	1	1	1	
	Transformer 575/120-24	6001047						1
2	Contactor	6000467	1					
	Contactor	6000457		1	1	1	1	1
3	Overload 12 - 18 AMPS	6000478	1					
	Overload 9 - 13 AMPS	6000477		1 (V2)				
	Overload 5.5 - 8 AMPS	6000476		1 (V3)				
	Overload 4 - 6 AMPS	6000475			1			
	Overload 1.6 - 2.5 AMPS	6000473				1	1	1
4	Block, Fuse, 2 Pole	6000556		1	1	1	1	1
5	(F1) - 4A, 600V time-delay	FNQ-R-4	1					
	(F1) - 2.5A, 600V time-delay	FNQ-R-2-1/2		2 (208/1)	2 (208/3)			
	(F1) - 2A, 600V time-delay	FNQ-R-2		2 (240/1)	2 (240/3)			
	(F1) - 1A, 600V time-delay	FNQ-R-1				2	2	
	(F1) - 0.8A, 600V time-delay	FNQ-R-8/10						2
6	(F2) - 0.25A	ACG1/4	1	1	1	1	1	1
7	(F3) - 1A, 250V, time-delay	MDA1	1	1	1	1	1	1
8	(F5,7,8) - 2A, 250V, time-delay	MDA2	3	3	3	3	3	3
9	(F6,9) - 3A, 250V, time-delay	MDA3	2	2	2	2	2	2
10	Push-button, Universal	6000506	4	4	4	4	4	4
11	Push-button, 40mm Red	632-215	1	1	1	1	1	1
12	Body, Mounting Collar	6000515	7	7	7	7	7	7
13A	Block, Contact, NO *	632-228	4	4	4	4	4	4
13B	Block, Contact, NO **	632-228	2	2	2	2	2	2
14	Block, Contact, NC	632-229	2	2	2	2	2	2
15	Horn	832-109	1	1	1	1	1	1
16	Pilot Light, Head, Green, LED	633-001	1	1	1	1	1	1
17	Pilot Light, Head, Amber, LED	633-002	1	1	1	1	1	1

*Non hydraulic side shift

**Hydraulic side shift only

PARTS LIST — CONTROL PANEL, continued

Complete Control Panel Assy. No		Where Used / QTY						
		Kelley (Standard)	6004100V1	6004100V2/3	6004100V4/5	6004100V6	6004100V7	6004100V8
		Serco (Standard)	6004090V1	6004090V2/3	6004090V4/5	6004090V6	6004090V7	6004090V8
		Kelley (Sideshift)	6004809V1	6004809V2/3	6004809V4/5	6004809V6	6004809V7	6004809V8
		Serco (Sideshift)	6004810V1	6004810V2/3	6004810V4/5	6004810V6	6004810V7	6004810V8
Item	Part Description	Part #	110-120/1/60	208-240/1/60	208-240/3/60	380/3/60	480/3/60	575-600/3/60
18	Suppressor (Mov)	6001055	3	3	3	3	3	3
19	(F4) - 8A, 250V, TIME-DELAY	MDA8	1	1	1	1	1	1
20	Operating Sticker (Not Shown)	6000534	1	1	1	1	1	1
21	Terminal, Fused (Not Shown)	6000538	5	5	5	5	5	5
22	Terminal, Endplate	6000539	1	1	1	1	1	1
23	Plain Marker	6000540	1	1	1	1	1	1
24	Jumper, Terminal, 2 Way	6000541	2	2	2	2	2	2
25	Terminal, 2 conductor	6000542	24	24	24	24	24	24
26	End Stop, Screwless (NS)	6000549	2	2	2	2	2	2
27A	Control Panel Label (Serco)*	6004114	1	1	1	1	1	1
27B	Control Panel Label (Serco)**	6004781	1	1	1	1	1	1
28A	Control Panel Label (Kelley)*	6004115	1	1	1	1	1	1
28B	Control Panel Label (Kelley)**	6004782	1	1	1	1	1	1
29	TWIDO PLC 14 in 10 Out	6001056	1	1	1	1	1	1
30	3 Position Selector Switch **	632220	1	1	1	1	1	1
31	Amber Pilot Light Module	6006842	1	1	1	1	1	1
32	Green Pilot Light Module	6006841	1	1	1	1	1	1

NOTE:

See electrical schematics located at the end of this manual.

LIMITED WARRANTY

THIS LIMITED WARRANTY IS 4FRONT'S SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO THE DOCK LEVELER AND IS IN LIEU OF ANY OTHER GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED

4FRONT warrants that this DOCK LEVELER will be free from flaws in material and workmanship under normal use for a period of one (1) year from the earlier of 1) 60 days after the date of initial shipment by 4FRONT, or 2) the date of installation of the DOCK LEVELER by the original purchaser, provided that the owner maintains and operates the DOCK LEVELER in accordance with this User's Manual.

Hydraulic Limited Warranty: The hydraulic power unit and cylinders for this dock leveler are warranted to cover the cost of replacement costs only for an extended period of four (4) years beyond the base warranty period.

In the event that this DOCK LEVELER proves deficient in material or workmanship within the applicable Limited Warranty period, owner shall so notify 4FRONT, and 4 Front will, at its option:

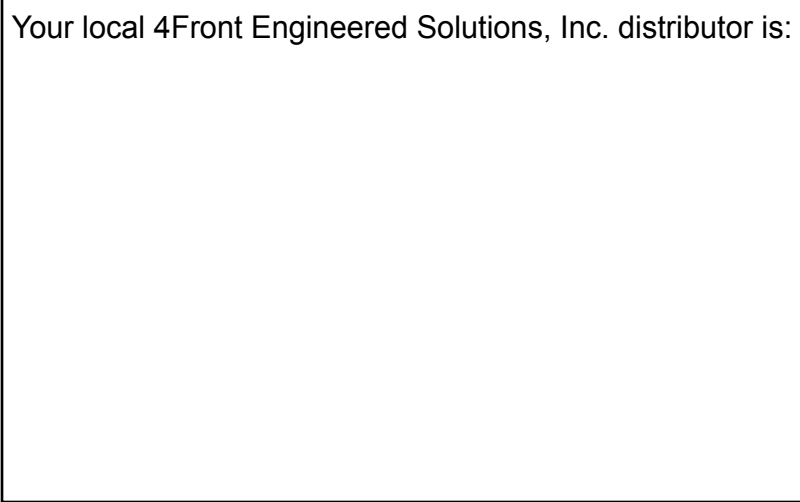
1. Replace the DOCK LEVELER, or the deficient portion(s) thereof, without charge to the owner; or
2. Alter or repair the DOCK LEVELER, on site or elsewhere, without charge to the owner.

This Limited Warranty does not cover any failure caused by improper installation, abuse, improper operation, negligence, or failure to maintain and adjust the DOCK LEVELER properly. Parts requiring replacement due to damage resulting from vehicle impact, abuse, or improper operation are not covered by this warranty. 4FRONT DISCLAIMS ANY RESPONSIBILITY OR LIABILITY FOR ANY LOSS OR DAMAGE OF ANY KIND (INCLUDING WITHOUT LIMITATION, DIRECT, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR LOST PROFITS OR LOST PRODUCTION) arising out of or related to the use, installation or maintenance of the DOCK LEVELER (including premature product wear, product failure, property damage or bodily injury resulting from use of unauthorized replacement parts or modification of the DOCK LEVELER). 4FRONT's sole obligation with regard to a DOCK LEVELER that is claimed to be deficient in material or workmanship shall be as set forth in this Limited Warranty. This Limited Warranty will be null and void if the original purchaser does not notify 4FRONT's warranty department within ninety (90) days after the product deficiency is discovered.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, INCLUDING, BUT NOT LIMITED TO, A WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH 4FRONT HEREBY DISCLAIMS.

Please direct questions about your hydraulic rail leveler to your local distributor or to 4Front Engineered Solutions, Inc.

Your local 4Front Engineered Solutions, Inc. distributor is:



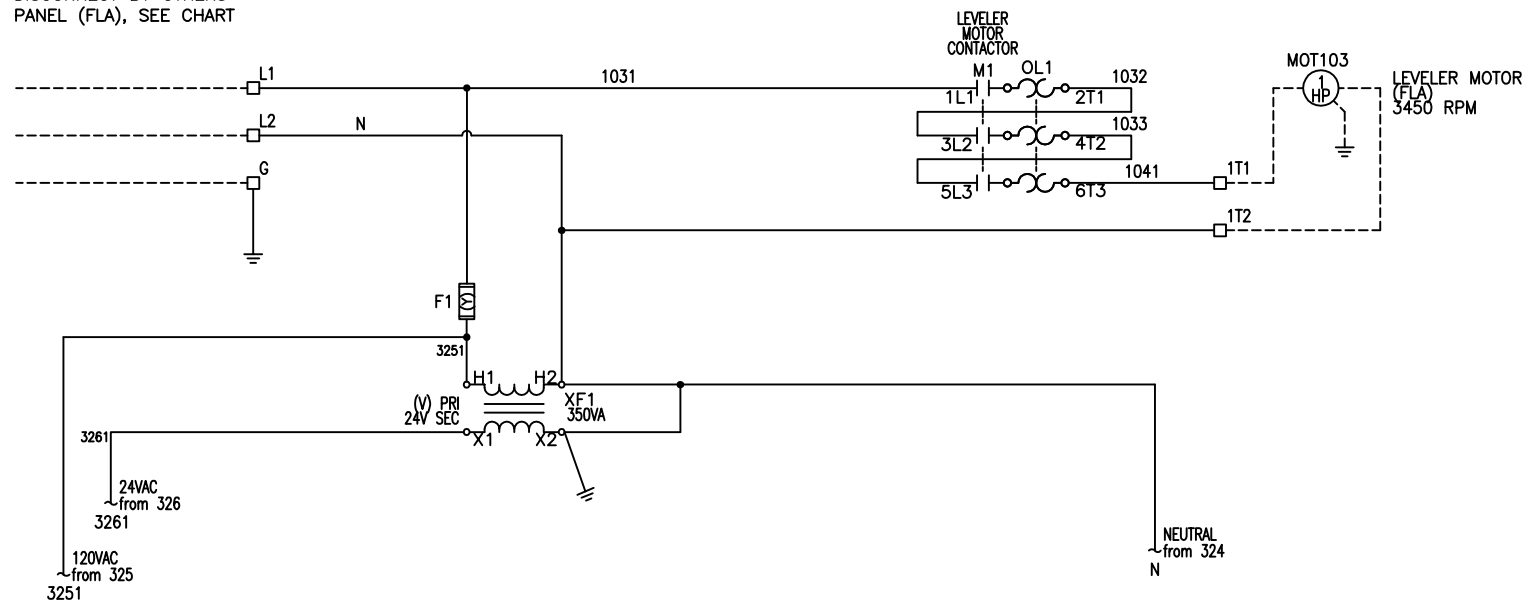
Corporate Head Office:

1612 Hutton Dr. Suite 140
Carrollton, TX. 75006
Tel. (972) 466-0707
Fax (972) 323-2661

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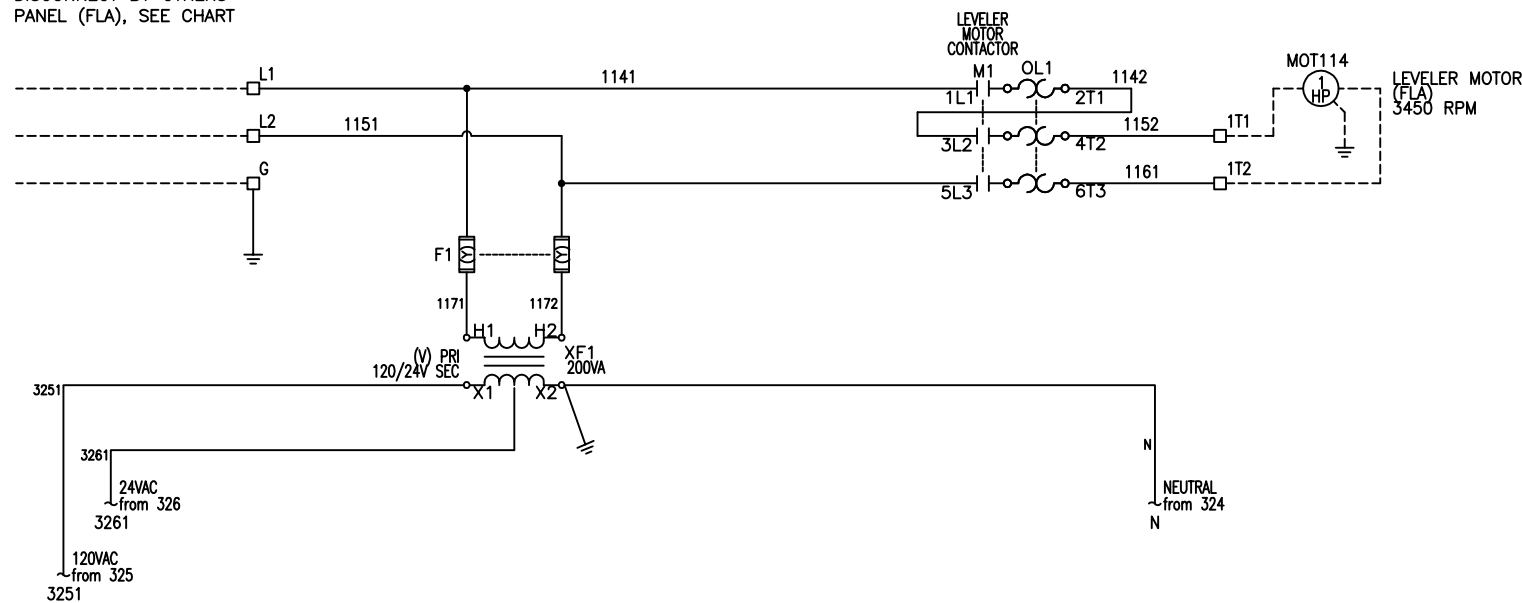
120V/1PH/60HZ

PRIMARY FUSING AND DISCONNECT BY OTHERS PANEL (FLA), SEE CHART



208-240V/1PH/60HZ

PRIMARY FUSING AND DISCONNECT BY OTHERS PANEL (FLA), SEE CHART



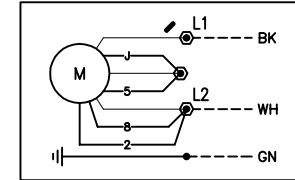
SINGLE PHASE PANEL REFERENCE								
VOLTS (V)	FUSES (X)	FUSES (Y)	MOTOR (FLA)	PANEL (FLA)	STANDARD		SIDESHIFT	
					SERCO P/N	KELLEY P/N	SERCO P/N	KELLEY P/N
120	-	* 4A	16.0FLA	18.92FLA	6004090V1	6004100V1	6004810V1	6004809V1
208	-	* 2.5A	9.6FLA	10.56FLA	6004090V2	6004100V2	6004810V2	6004809V2
240	-	* 2A	8.0FLA	8.83FLA	6004090V3	6004100V3	6004810V3	6004809V3

* USE CLASS CC TIME DELAY FUSES

DECAL REFERENCE	
PANEL P/N	DECAL P/N
6004100V1-8	6004115
6004090V1-8	6004114
6004809V1-8	6004782
6004810V1-8	6004781

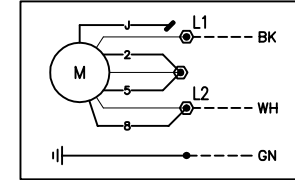
MOTOR DETAIL

110-115V, SINGLE PHASE



NOTE: VISUALLY CONFIRM MOTOR TAG

208-230V, SINGLE PHASE, 50/60HZ



NOTE: VISUALLY CONFIRM MOTOR TAG

LEGEND
 ———— PANEL WIRING
 - - - - - FIELD WIRING (BY OTHERS)

NOTES:
 1.

REV	DATE	BY	REVISION	APP
C	07/24/12	MDY	ADD BUCHER MOTOR DETAIL	
A	05/24/07	MDY	INITIAL RELEASE	

DWN	YOUNGBLOOD	DATE	2/21/2007
DSG		DATE	
CHK		DATE	
APP		DATE	

SERCO KELLEY 4FRONT ENGINEERED SOLUTIONS
 1612 HUTTON DR CARROLLTON TX 75006
 TEL: 972.466.0707 800.525.2010 FAX: 972.323.2663

HYDRAULIC RAIL LEVELER (HRL)
 SINGLE PHASE POWER DISTRIBUTION
 120-240V/1PH/60HZ

D	DWG. No.	6004100	SCALE:	NONE	FILE:	6004100C1	SHT.	1	OF	5	REV.	C
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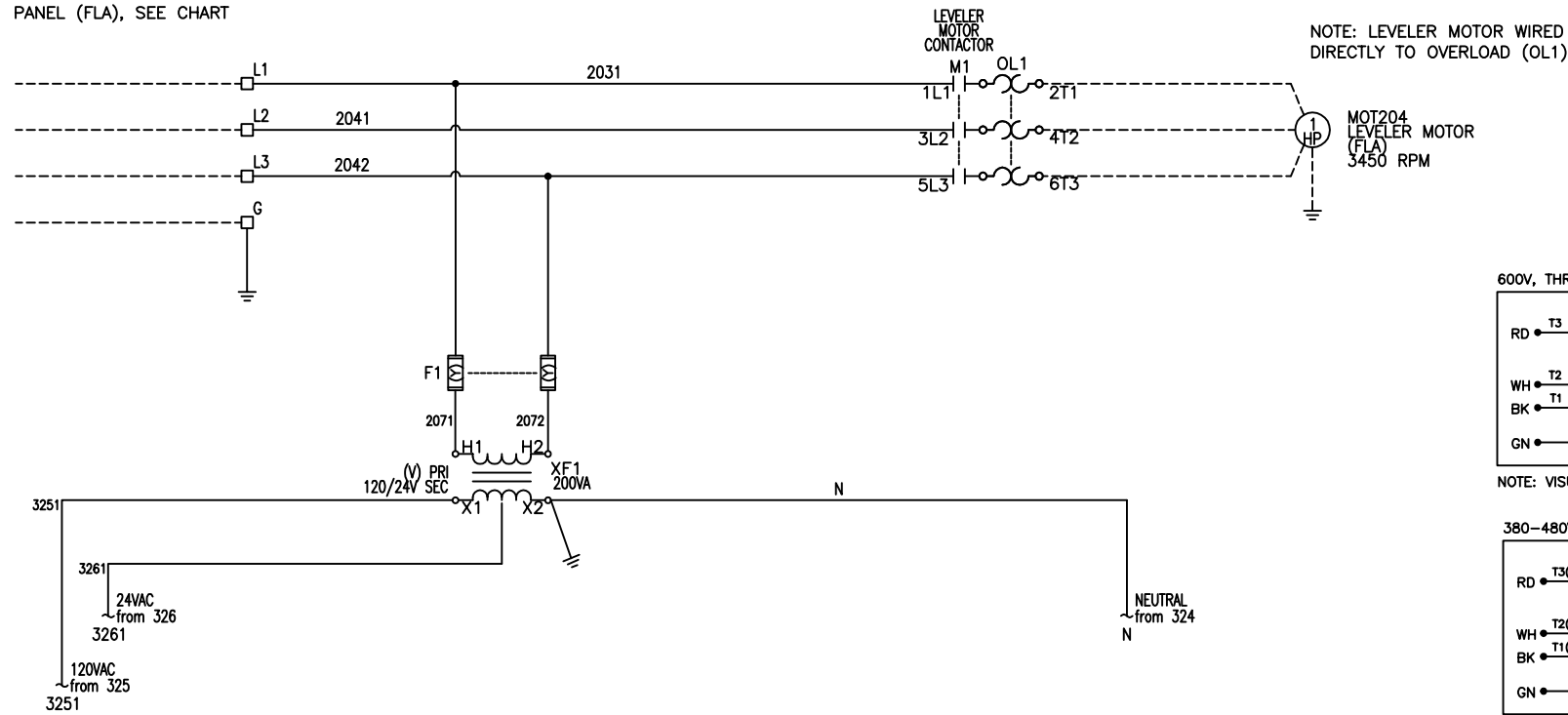
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 BAR IS ONE INCH LONG ON ORIGINAL DRAWING, IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

THIS DRAWING IS INTENDED FOR USE ON THE PROJECT LISTED HEREIN. REPRODUCTION IS AUTHORIZED BY 4FRONT ENGINEERED SOLUTIONS FOR USE ON THIS PROJECT ONLY.

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208-575V/3PH/60HZ, 380V/3PH/50HZ

PRIMARY FUSING AND DISCONNECT BY OTHERS
PANEL (FLA), SEE CHART

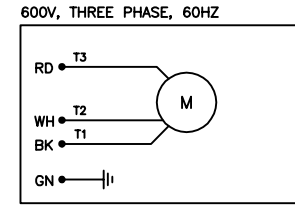


THREE PHASE PANEL REFERENCE				STANDARD		SIDESHIFT		
VOLTS (V)	FUSES (X)	FUSES (Y)	MOTOR (FLA)	PANEL (FLA)	SERCO P/N	KELLEY P/N	SERCO P/N	KELLEY P/N
208	-	* 2.5A	4.8FLA	5.76FLA	6004090V4	6004100V4	6004810V4	6004809V4
240	-	* 2A	4.2FLA	5.03FLA	6004090V5	6004100V5	6004810V5	6004809V5
380	-	* 1A	2.1FLA	2.51FLA	6004090V6	6004100V6	6004810V6	6004809V6
480	-	* 1A	2.1FLA	2.51FLA	6004090V7	6004100V7	6004810V7	6004809V7
575	-	* 0.8A	1.9FLA	2.25FLA	6004090V8	6004100V8	6004810V8	6004809V8

* USE CLASS CC TIME DELAY FUSES

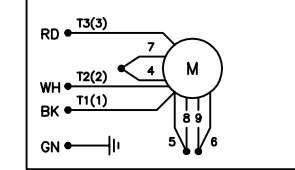
DECAL REFERENCE	
PANEL P/N	DECAL P/N
6004100V1-8	6004115
6004090V1-8	6004114
6004809V1-8	6004782
6004810V1-8	6004781

MOTOR DETAIL



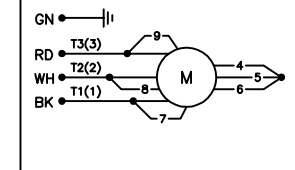
NOTE: VISUALLY CONFIRM MOTOR TAG

380-480V, THREE PHASE, 50/60HZ



NOTE: VISUALLY CONFIRM MOTOR TAG

200-240V, THREE PHASE, 50/60HZ



NOTE: VISUALLY CONFIRM MOTOR TAG



LEGEND
 ———— PANEL WIRING
 - - - - - FIELD WIRING (BY OTHERS)

NOTES:
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REV	DATE	BY	REVISION	APP
C	07/24/12	MDY	ADD BUCHER MOTOR DETAIL	
A	05/24/07	MDY	INITIAL RELEASE	

DWN	YOUNGBLOOD	DATE	2/21/2007
DSG		DATE	
CHK		DATE	
APP		DATE	

SERCO KELLEY 4FRONT ENGINEERED SOLUTIONS
 1612 HUTTON DR CARROLLTON TX 75006
 TEL: 972.466.0707 800.525.2010 FAX: 972.323.2663

0 1"
 BAR IS ONE INCH LONG ON ORIGINAL DRAWING, IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

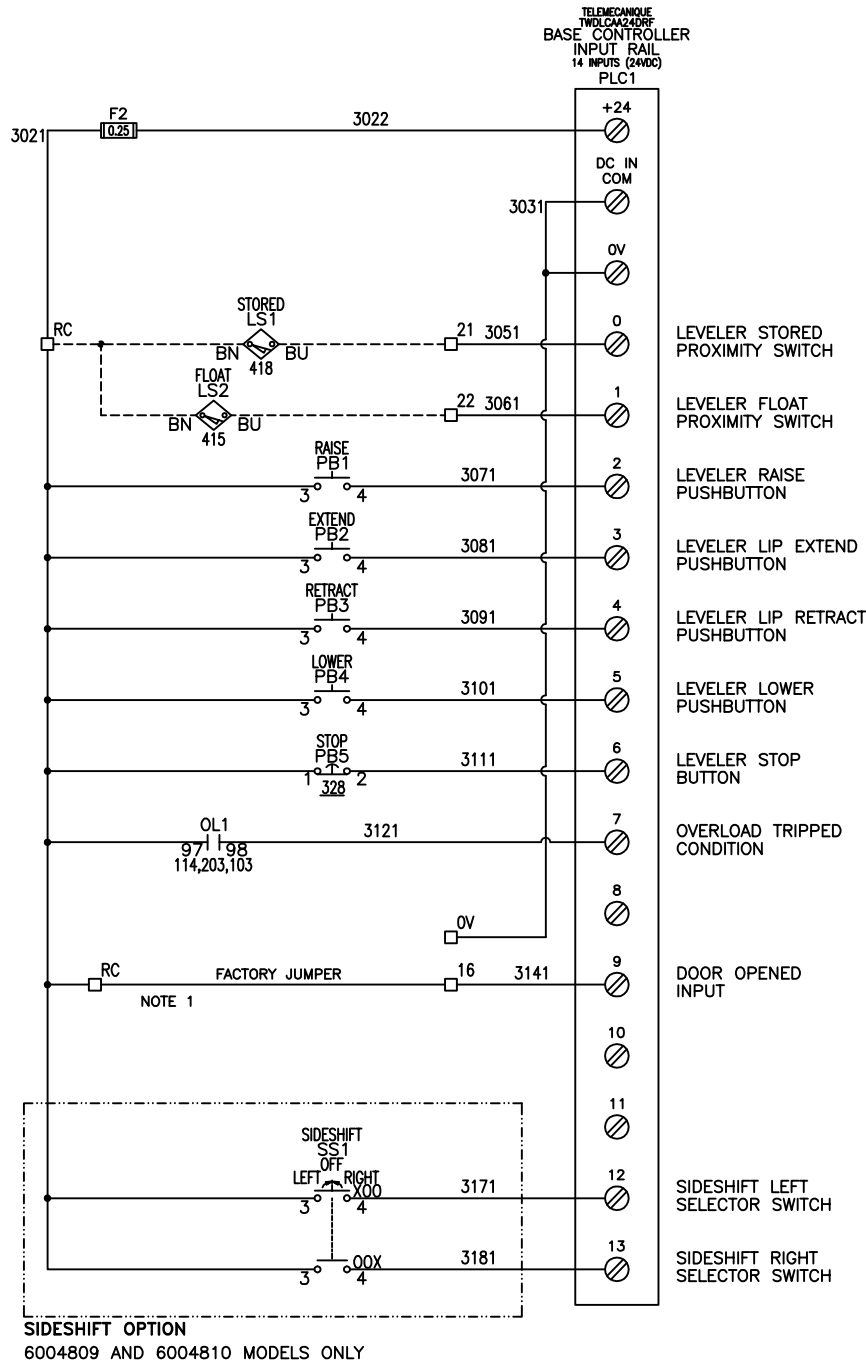
HYDRAULIC RAIL LEVELER (HRL)
 THREE PHASE POWER DISTRIBUTION
 208-575V/3PH/60HZ, 380V/3PH/50HZ

D	DWG. No.	6004100	SCALE:	NONE	FILE:	6004100C2	SHT.	2	OF	5	REV.	C
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- PROGRAM NOTES (RVS001):
- INSIDE GREEN LAMP IS ON WHEN THE LEVELER IS FLOATING UNLESS LEVELER STOP IS PRESSED WHILE LEVELER IS FLOATING OR WHEN THE LEVELER IS BETWEEN STORED AND FLOAT POSITIONS.
- AMBER PILOT LAMP IS ON WHEN LEVELER STOP IS PULLED (INDICATING POWER TO THE LEVELER).
- AMBER PILOT LAMP FLASHES WHEN A LEVELER FAULT EXISTS (AN OVERLOAD OR SIMULTANEOUS FLOAT AND STORED CONDITION).
- HORN SOUNDS STEADY IF THE LEVELER IS BETWEEN FLOAT AND STORED POSITIONS AND NO LEVELER PUSHBUTTONS ARE BEING PRESSED.
- HORN PULSES WHEN LEVELER STOP IS PRESSED WHILE LEVELER IS IN THE FLOAT RANGE.
- HORN CHIRPS PERIODICALLY WHEN LEVELER STOP IS PRESSED WHILE LEVELER IS BETWEEN FLOAT AND STORED POSITIONS AND NO LEVELER PUSHBUTTONS ARE BEING PRESSED. (THIS IS AN ILLEGAL STORAGE POSITION FOR A VERTICAL LEVELER. THE CHIRP SERVES AS A REMINDER OF THIS CONDITION).
- NOTE: SIDESHIFT ONLY: LEVELER MUST BE STORED BEFORE SIDESHIFT ADJUSTMENTS CAN BE MADE.



SIDESHIFT OPTION
6004809 AND 6004810 MODELS ONLY

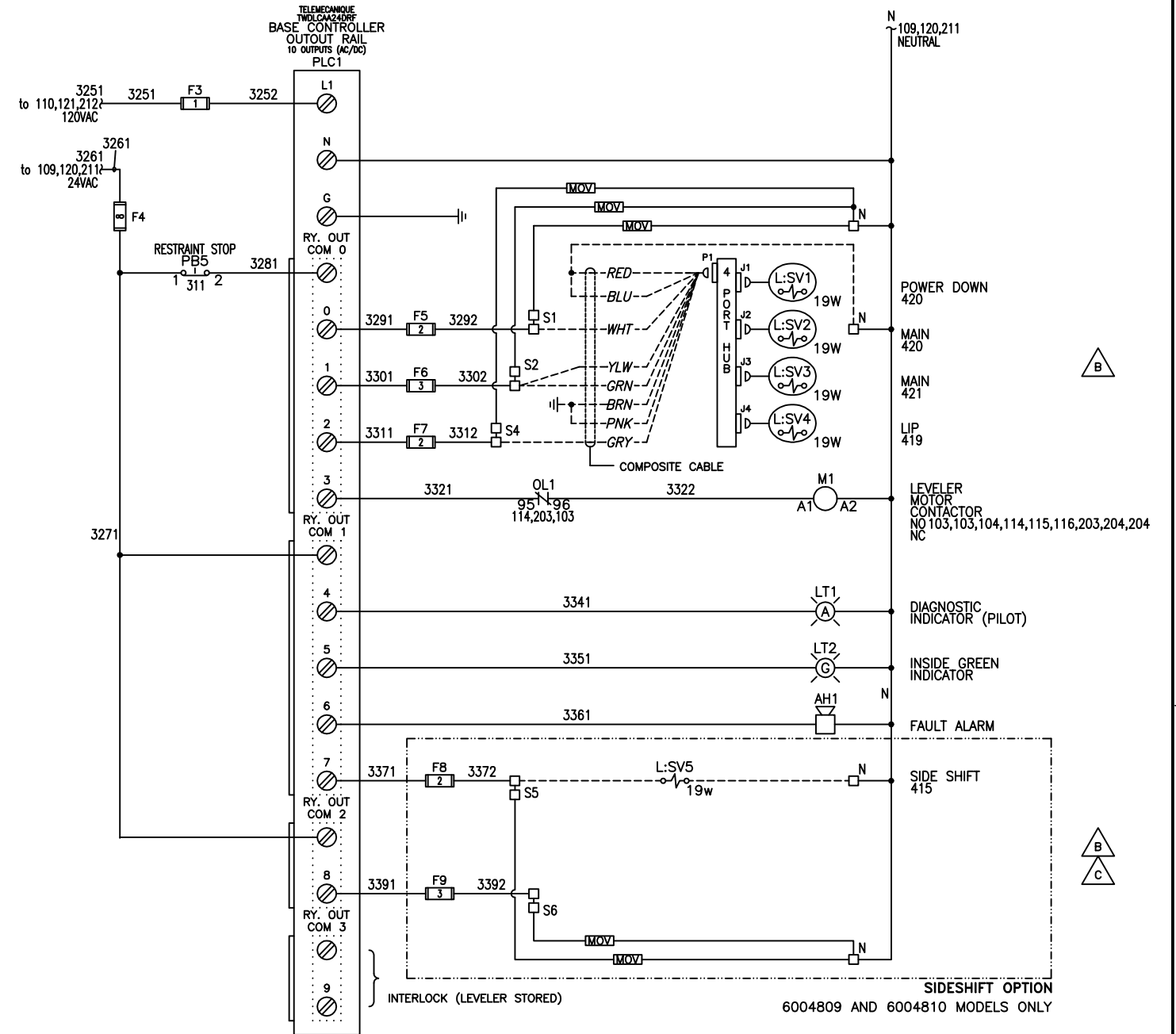
TELEMECANIQUE
TWO LCM24DRP
BASE CONTROLLER
INPUT RAIL
14 INPUTS (24VDC)
PLC1

- LEVELER STORED PROXIMITY SWITCH
- LEVELER FLOAT PROXIMITY SWITCH
- LEVELER RAISE PUSHBUTTON
- LEVELER LIP EXTEND PUSHBUTTON
- LEVELER LIP RETRACT PUSHBUTTON
- LEVELER LOWER PUSHBUTTON
- LEVELER STOP BUTTON
- OVERLOAD TRIPPED CONDITION
- DOOR OPENED INPUT
- SIDESHIFT LEFT SELECTOR SWITCH
- SIDESHIFT RIGHT SELECTOR SWITCH



PROGRAM NAME
6004090/4100 MODELS: RVS001
6004809/4810 MODELS: RVS101

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LEGEND
——— PANEL WIRING
- - - - - FIELD WIRING (BY OTHERS)

NOTES:
1. INSTALL INPUT DEVICES AS NECESSARY, IE: PHOTOELECTRIC, OR DRY CONTACT LIMIT SWITCH. CONSULT DRAWING 6001045 OR MANUAL FOR INSTALLATION DETAILS.

REV	DATE	BY	REVISION	APP
C	07/24/12	MDY	BUCHER COMPATIBILITY	
B	06/10/10	MDY	TURCK CONNECTIVITY	
A	05/11/06	MDY	INITIAL RELEASE	

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DWN	YOUNGBLOOD	DATE	5/11/06
DSG		DATE	
CHK		DATE	
APP		DATE	

0 1"
BAR IS ONE INCH LONG ON ORIGINAL DRAWING, IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

SERCO KELLEY 4FRONT ENGINEERED SOLUTIONS
1612 HUTTON DR CARROLLTON TX 75006
TEL: 972.466.0707 800.525.2010 FAX: 972.323.2663

HYDRAULIC RAIL LEVELER (HRL)
PLC BASE CONTROLLER

DWG. No.	SCALE	FILE	SHT.	OF	REV.
D 6004100	NONE	6004100C3	3	5	C

THIS SHEET INTENTIONALLY LEFT BLANK




NOTES:

REV	DATE	BY	REVISION	APP
B	06/10/10	MDY	REMOVE J-BOX INTERCONNECTION DETAIL	.
A	05/24/07	MDY	INITIAL RELEASE	.

THIS DRAWING IS INTENDED FOR USE ON THE PROJECT LISTED HEREIN. REPRODUCTION IS AUTHORIZED BY 4FRONT ENGINEERED SOLUTIONS FOR USE ON THIS PROJECT ONLY.

DWN	YOUNGBLOOD	DATE	2/22/2007
DSG		DATE	
CHK		DATE	
APP		DATE	

0  1"
 BAR IS ONE INCH LONG ON ORIGINAL DRAWING, IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

SERCO KELLEY 4FRONT ENGINEERED SOLUTIONS
 1612 HUTTON DR CARROLLTON TX 75006
 TEL: 972.466.0707 800.525.2010 FAX: 972.323.2663

HYDRAULIC RAIL LEVELER (HRL)
 INTERCONNECTION DETAIL

D	DWG. No.	6004100	SCALE:	NONE	FILE:	6004100C4	SHT.	4	OF	5	REV.	C
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