

# **EQUALIZER**

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# SYSTEMS

A **DAYS** COMPANY

(800) 846-9659

[equalizersystems.com](http://equalizersystems.com)

## Level-Lite Installation and Operation Guide

Effective September 2016

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This manual is intended to be used by technicians installing Equalizer Systems Level-Lite systems. It is assumed that the reader is familiar with hydraulic, mechanical, and electrical systems; in addition to workplace safety.

## Required Tools & Parts

### Tools Required for Installation

- Ratchet, sockets and wrench set
- Wire cutters / crimpers
- Electric drill and bits
- Screw gun bits
- Welding equipment (if welding leg or bracket in place)

### Additional Items Required for Installation

- #4 AWG power wire (to connect battery + 12V positive to the pump)\*
- #4 AWG power wire (to connect battery - 12V positive to the pump)\*
- #4 AWG ring terminals
- Loom clips (to secure harnesses and hydraulic hoses to the coach)
- Self-tapping screws or pop rivets
- Wire ties
- 10 – 16 quarts Dexron Automatic Transmission Fluid

\*Note: These items must be #2 AWG if cable run is greater than 12ft

## \* Caution \*

Modification of any factory supplied item may result in the denial of all warranty claims. Call Equalizer Systems Technical Support prior to any modifications

With any hydraulic application, holding position on a cylinder must be done with safety in mind. Failure in the system may cause the jacks to retract or extend suddenly. When working under or near the coach, always use jack stands of appropriate rating to support the weight of the coach.

## Jacks

Secure the jack brackets in place with c-clamps and weld the brackets to the frame. Bolt the jack to the bracket using washers on the bolt head and the nut. The jacks must be installed with a minimum of 6 to 8 inches of ground clearance. See installation chart below. In any case, the bottom of the footpad should be no lower than any other item mounted on the coach. Pay particular attention to the angle of departure for the chassis when mounting the rear jacks – and the angle of approach when mounting the front jacks.

The foot/pad must be mounted within the range suggested (see chart below) for proper operation of the system. Retract the jack fully (jack leg up); ground clearance is determined by measuring from the bottom of the jack foot to the ground (jack retracted fully). When in doubt call Equalizer Systems 800-846-9659 ext 339

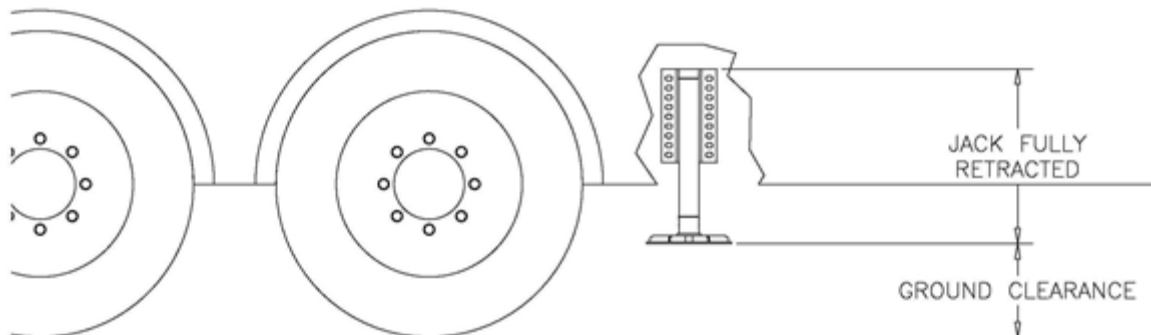
### Reference Chart for Installing Jacks:

#### Straight Leg Jacks (SL):

- 11 & 13: 6 – 8 inches of ground clearance
- 15 & 16: 8 – 10 inches of ground clearance
- 18: 10 – 12 inches of ground clearance

#### Tube in Tube Jacks (AJ, AM, CT, SM – 16, 20, 24, 30, 36)

- 16: 8 – 10 inches of ground clearance
- 20: 12 – 14 inches of ground clearance
- 24: 14 – 16 inches of ground clearance
- 30: 16 – 18 inches of ground clearance
- 36: 18 – 20 inches of ground clearance



## Pump

Install the pump kit on the coach. The pump must be mounted in a location that is reasonable to route all of the hydraulic hoses to the manifold. It must be accessible for filling the reservoir and monitoring the fill level. Take note if the unit is equipped with the manual override option. The pump handle, cartridge valves and directional valves must be accessible to manually override the system. If the pump is equipped with the manual override screw on the end of the motor, than be sure to allow access to that side of the pump. In most applications, a side storage compartment will provide the ideal location. An additional mounting box or tray may be used on other style coaches.

## Fittings

Install the hydraulic adaptor fittings in the top and bottom of each jack and install the fittings into the pump manifold. The straight thread o-ring side always goes to the cylinder or pump manifold. The tapered side will get the hose attached to it. When installing straight fittings into the leg or pump manifold, tighten to 15 lbs-ft. When using 90 degree fittings, turn until finger tight, position correctly, then tighten the jam nut to 15 lbs-ft.

## Hose

Install the hydraulic hoses according to the chart below. Route the hoses clear of all hot exhaust components and pinch points in the suspension/chassis system. Attach the hoses to the manifold and jack fittings (from step 4). Tighten to 15 lbs-ft. Secure the hydraulic hoses with wire ties or loom clamps to the chassis. Care should be taken to not kink or twist hoses. The minimum bend radius is 6 inches.

### Installation of Hoses to the Manifold:

<u>Jack Leg</u>	<u>Manifold Connection</u>
Left Front – Top	Brown Solid (T-1)
Left Front – Bottom	Brown Stripe (B-1)
Right Front – Top	White Solid (T-2)
Right Front – Bottom	White Stripe (B-2)
Left Rear – Top	Orange Solid (T-3)
Left Rear – Bottom	Orange Stripe (B-3)
Right Rear – Top	Yellow Solid (T-4)
Right Rear – Bottom	Yellow Stripe (B-4)

## Control Module (controller)

Mount the control module (controller part #3288) in a location where it is protected from the elements. It may appear to be sealed however, it is not considered weatherproof. The controller is mounted using 4 screws (one in each corner). It should be mounted in a location so the wire harness may be routed to it. There is a harness that will run from the controller to the keypad and a harness that runs from the controller to the pump assembly.

## Keypad (panel)

Mount the keypad (panel part # 3289) in an interior area of the coach where it is protected from the elements and will allow the user/vehicle driver to easily observe and operate the leveling system. The panel consists of switches to operate the jacks and a jack(s) down warning light and buzzer. The light will be on if the jacks are not fully stowed and the power switch is turned on. The light will come on when extending the jacks. The light and buzzer will sound if the jacks are not fully stowed and the ignition disable (key on) is present. This serves 2 purposes, first it is a warning not to drive off with the jacks down and second, it can serve as a warning during travel that one or more of the jacks may not be fully stowed. For these reasons the panel should be mounted in an area where the driver would be able to hear the warning buzzer. The mounting area should be where the harness can be routed to it. Mounting is performed using a screw in each of the 4 corners. The harness is attached to the panel with a 12 pin connector.

## Harness Routing and Connection

### Controller to panel:

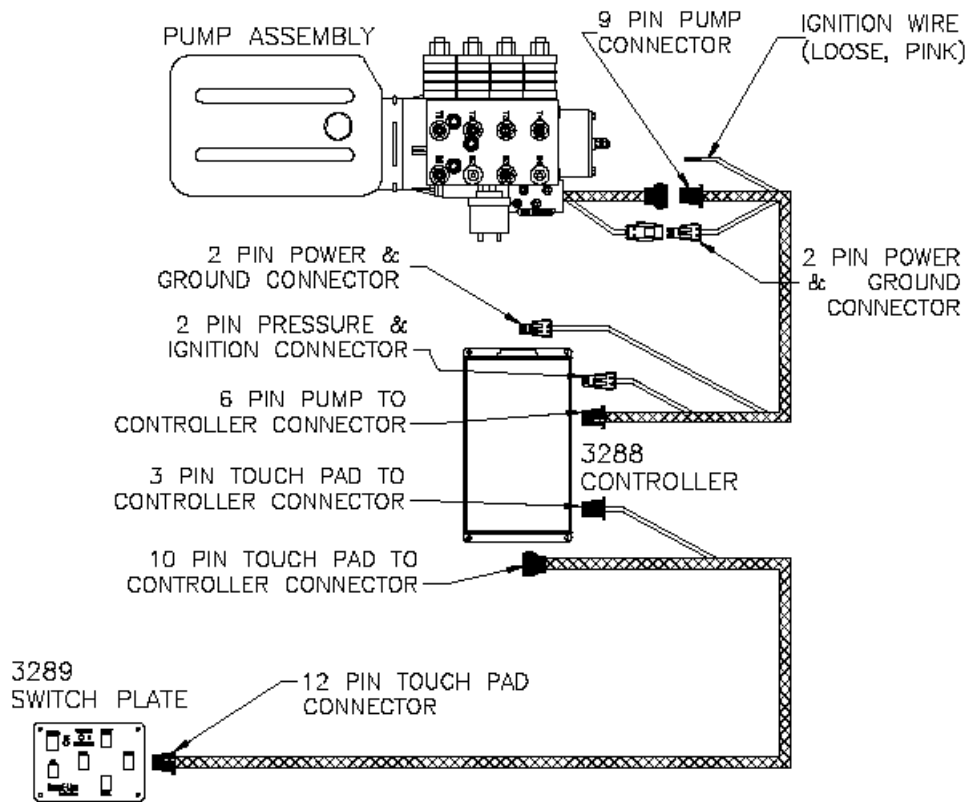
This harness has 1 connector (12 pin) at the panel and 2 connectors (a 10 pin and a 3 pin) at the controller. The harness should be routed and secured in a manner that protects it from heat and chaffing. Plastic wire ties and or loom clamps may be used to secure in place. Care should be taken to not stress the harness or the connectors.

### Controller to pump assembly:

This harness has 3 connectors at the controller (one 6 pin and two 2 pin) and 2 connectors at the pump assembly (9 pin and 2 pin).

## \* Caution \*

At the controller, watch the two 2 pin connectors as it is possible to connect them to the wrong connector. The 2 pin with the red and black are the power and ground, it goes to the connector marked +12V and GND (this is the connector below the fuse). If they are connected wrong the system will not operate.



\* Caution \*

Applicable to motorized vehicles only - The loose pink wire (shown in the drawing above) must be connected to an ignition hot (12 VDC key on source). This is the ignition on disable/jacks down warning light/buzzer. Failure to connect this wire could create an unsafe situation and will void the warranty.

## Uni-Directional Pump #1151 & 3218

### Power Connections:

Attach a #4 gauge wire (#2 gauge if the run is over 12 ft.) between the positive +12V terminal on the battery and the battery post at the motor solenoid on the pump. This solenoid post will generally have a yellow fused wire attached to it that supplies power to the controller. This battery connection may be fused at the source with a 150-amp circuit breaker. This +12V supply must be a dedicated and isolated circuit (not shared with other device), and must be constant, non-switched +12V

Attach a #4 gauge wire (#2 gauge if the run is over 12 ft.) between the negative -12V terminal on the battery and the ground stud on the pump. This ground stud is located on the port plate. This is the preferred method of grounding. If grounding the pump to the chassis, the connection must be sound, free of paint and not susceptible to corrosion. The battery connection to the frame must also be of #4 gauge or larger cable. It is not acceptable to allow the pump mounting bolts to be the sole grounding connection.

### Purging:

The jacks are shipped in the fully retracted position. The retraction side of the cylinders is the first to be purged of air. This procedure outlines the steps taken if the jacks need to be purged of air following repairs, etc. See section on operation to operate during purge process.

Retraction purge: The retraction side of the cylinders is the first to be purged of air. Fill the reservoir fully with Dexron Transmission fluid. Begin to purge the retraction side of the system by pushing the UP button for each pair of jacks or by pressing All Retract. The jacks may be run in pairs (front & rear pair). You will know when the retraction side of the hydraulic circuit is purged when the fluid level in the reservoir stops and the pump changes sound (bypass mode). Release the keypad button(s). Repeat this process for the rear jacks. Refill reservoir to full.

Full purge: Cycle the system by lowering each jack to the ground manually using the DOWN buttons on the keypad. Do not allow the jack to lift the coach. After all jacks are in contact with the ground, press All Retract to retract the jacks. Next run the jacks in pairs (front pair & rear pair) to full extension. Monitor the fluid level and all fittings for leakage. Retract the jacks by pressing All Retract. Recheck the reservoir and fill to full. The fluid level in the reservoir is at maximum when all jacks are fully retracted and minimum when jacks are fully extended. This full extension and retraction in pairs should be repeated 3-4 times.

Allowing the air to dissipate through the reservoir and maintaining the reservoir fluid level will get things working faster.

## Bi-Rotational Pumps #2532, 2542, 3195

### Power Connections:

Pump #s 2532, 2542 (on the pump data label)

Attach a #4 gauge wire (#2 gauge if the run is over 12 ft.) between the positive +12V terminal on the battery and the battery post at the common posts on the motor solenoid. This battery connection may be fused at the source with a 120-amp circuit breaker. This +12V supply must be a dedicated and isolated circuit (not shared with other device), and must be constant, non-switched +12V

Attach a #4 gauge wire (#2 gauge if the run is over 12 ft.) between the negative -12V terminal on the battery and the ground stud on the pump. This is the preferred method of grounding. If grounding the pump to the chassis, the connection must be sound, free of paint and not susceptible to corrosion. The battery connection to the frame must also be of #4 gauge or larger cable. It is not acceptable to allow the pump mounting bolts to be the sole grounding connection.

Pump #3195

Attach a #4 gauge wire from the positive +12V terminal on the battery to the + terminal on the motor contactor (solenoid). This terminal has a + beside it on the contactor, also there will be a yellow fused wire on this terminal. The ground (negative) connection is the 5/15 stud in the port plate. (Do not ground to the contactor or the motor)

### Purging:

Fill the reservoir fully with Dexron Transmission fluid. Remove the fitting that is installed into port G-1 or attach a hose to the coupler and place into a clean container. Extend the jacks. Maintain the fluid level in the reservoir between  $\frac{1}{4}$  and  $\frac{1}{2}$  full. Do not allow the reservoir to run empty. If jack(s) will not fully extend, crack loose the upper hose(s) at the jack(s) and run the pump to extend until air is expelled. Use Caution – hydraulic fluid will be under high pressure. Retighten the hoses and complete the extension of the jack(s). Maintain fluid level as described above. Reinstall the fitting or plug into G1 or remove the hose to the coupler.

Run the pump to retract the jacks. Maintain the fluid level as above. Do not fill the reservoir to full until after the jacks are fully retracted. If the fluid in the reservoir appears to be aerated (foaming), allow unit to rest until foam dissipates (approx. 5-10 minutes). Fully extend and retract jacks a minimum of 3 times. Maintain the fluid level at least  $\frac{3}{4}$  full when the jacks are retracted.

The reservoir fluid level will be greatest when all jacks are fully retracted; the fluid level will be lowest when all jacks are fully extended.



## Operation

To operate the Level-Lite system, press the power switch so that the power light comes on and then press and hold the appropriate switches to extend or retract the jacks in pairs until your coach is level. The rocker switches are pressed in the direction of the jack's movement i.e. pressing the rocker switches down will extend the jacks, pressing the switch up will retract the jacks. The jacks may be extended or retracted in pairs for leveling using one of the 4 switches arranged in the diamond pattern. Also, the ALL switch may be used to extend all 4 of the jacks by pressing the ALL switch down. When the ALL switch is pressed to retract (up) it sets an automatic retract process that will stop when the jacks are fully retracted. The jacks downlight will come on as soon as an extend command occurs and should stay on any time that the jacks are not in the fully retracted position. The jacks down light will go out after the all retract process is complete.

### Leveling Suggestions

- Press the power switch so that the power light comes on
- Using the ALL rocker switch, push down and hold. The pump should come on and the jacks should extend to the ground, you should be able to feel the coach lift.
- Use the rocker switches for the front or the rear to level front to rear.
- After the unit is level front to rear, use the left or right switch to level side to side.

### Retraction

Use the ALL switch to retract the jacks prior to travel. The jacks down light will only go out after the ALL switch is pressed (not the independent rocker switches) and the jacks are fully retracted. Check visually to verify that the jacks are fully retracted prior to travel.

## Override - Uni-Directional Pump #1151 & 3218

The individual cartridge valves are clustered together on the side of the pump manifold. They are labeled 1 thru 4 (there is one for each jack). Locate the screws recessed in the end of the stem on the appropriate cartridge valve(s). Using a 1/8" allen wrench, turn the screw(s) clockwise until seated in.

Locate valve DV2. This will have an allen screw recessed in the end of the stem. This valve will be on the opposite side of the manifold from the cluster of cartridge valves. Turn the allen screw in until seated in.

To retract: Locate valve DV1. This valve will be on the adjacent side of the manifold to the cluster of cartridge valves. (On pump #3218 it will be in the pump port plate.) Pull the red knob out and turn ¼ turn clockwise. The knob will remain in the 'out' position. This valve is the directional control, the normal 'in' position is for extension of the jacks and the shifted 'out' position is for retraction of the jack(s).

If equipped with override hex on motor: Pump # 3218

Remove the black plastic cap from the end of the motor (can use a small flat head screw driver). Place the drill with the 7/16 inch socket on the manual override shaft located at the end of the motor. Run drill clockwise direction at 2000 r.p.m. (minimum). The jack(s) will retract.

If equipped with hand pump: Pump #s 1551 & 3218 may have a hand pump located in the manifold. (The hand pump is an option, not all units have the hand pump.) Insert the handle into hand pump and operate back and forth until jacks are fully retracted. This will take multiple operations to fully retract the jacks. It may take 50 strokes prior to getting the jacks to move.

To extend: Follow all of the above steps except do not manually shift directional valve DV1 to the 'out' position.

**\* Caution \***

Following manual override operation, failure to return all valves to normal position may result in one or more jacks drifting down from their retracted (stowed) position. For cartridge valves, rotate the center screw fully counter-clockwise. For directional valves, rotate the red knob until it 'snaps' back into the normal 'in' position or return the allen screw to the original 'out' counter-clockwise position.

## Manual Override - Bi-Rotational Pumps #2532, 2542, 3195

The individual cartridge valves are clustered together on the side of the pump manifold. They are labeled 1 thru 4 (there is one for each jack). Locate the screws recessed in the end of the stem on the appropriate cartridge valve(s). Using a 1/8" allen wrench, turn the screw(s) clockwise until seated in.

The pump may or may not have a DV2 valve on the opposite side of the manifold. Using a 1/8 inch allen wrench, turn the allen screw clockwise until seated in.

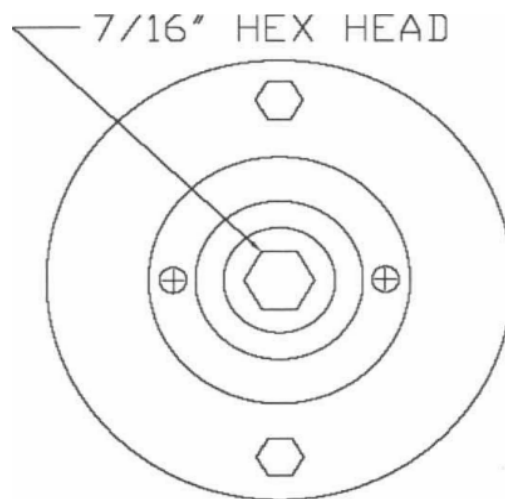
Remove the black plastic cap from the end of the motor (can use a small flat head screw driver). Place the drill with the 7/16 inch socket or 1/4 inch allen on the manual override shaft located at the end of the motor.

To retract: Run the drill in the counter-clockwise direction at 2000 r.p.m. (minimum).

To extend: Run the drill in the clockwise direction at 2000 r.p.m. (minimum).

### \* Caution \*

Following manual override operation, failure to return all valves to normal position may result in one or more jacks drifting down from their retracted (stowed) position. For cartridge valves, rotate the center screw fully counter-clockwise.



End view of motor

## **Equalizer Systems Limited Warranty Policy October 2010**

1. Only warranty claims with prior written or verbal authorization from Equalizer Systems will be recognized, all other claims will be denied.
2. Equalizer Systems warrants slide out and leveling system components for a period of one year from the date of original sale of the vehicle- This warranty covers defects in material and workmanship only. Equalizer Systems is not liable for any damage due to abuse, neglect, misuse, negligence, misapplication, error of operation, accidental or purposeful damage or damage due to an "act of God" such as, wind or rain damage, flood, lightning or other natural occurrence of the like. Equalizer Systems limited warranty is applicable to the Equalizer Systems components only and does not apply to the vehicle, apparatus or property to which it is attached. Warranty parts will be shipped at no charge if the repair is authorized by an Equalizer Systems representative. Purchased components used in authorized warranty repairs will be reimbursed at the original purchase price.
3. Labor and freight expenses due to warrantable parts defects or workmanship will be reimbursed for a period of one year from the date of original sale of the vehicle. Freight expenses will either be prepaid by Equalizer Systems or reimbursed at the UPS Ground rate only. Any additional shipping charges or requirements are the obligation of the vehicle owner or service center performing the warranty repair. The owner or service center's obligation may include overseas shipping charges, border fees, brokerage fees and any other additional fee of the like,
4. Warranty labor will be reimbursed only for claims that have prior written or verbal authorization from an Equalizer Systems representative. Warranty labor compensation is required to correspond with the "Warranty Paris Replacement Time Guideline" published by Equalizer Systems. Any warranty repair not listed on this guideline will require prior authorization from an Equalizer Systems representative. A reasonable time allowance will be determined by the Equalizer Systems representative. Any warranty repair that is not listed on this guideline that is performed without prior authorization will be denied without exception. Time associated with learning about the repair or excessive diagnostic and installation time will not be reimbursed. Warranty labor will be reimbursed at the authorized service center's published shop rate if the rate is reasonable for that region. Overtime labor will not be reimbursed without exception.
5. Labor, parts and freight credit (if applicable) will be sent after the parts are tested and the warranty claim is validated. Returned parts that are found to be in normal operating condition are not warrantable and will be charged to the owner or service center. Equalizer Systems reserves the right to charge back the service center for labor claim payments previously submitted if the installation of the warranted part is found to be inadequate at a later date.
6. Claims will be denied if the date submitted is greater than 30 days from the repair date.
7. Prior authorization is required before parts may be sent back to Equalizer Systems. A Return Authorization Number is required for items to be accepted.
8. Complete systems are not warranted unless authorized by an Equalizer Systems representative. There are absolutely no exceptions to this clause.
9. Consideration should be taken regarding the location and protection of Equalizer Systems' components prior to installation. Please reference our installation manuals for recommended locations and maintenance, or visit [www.equalizersystems.com](http://www.equalizersystems.com) for more information. The failure of any Equalizer Systems' component due to extreme environmental conditions, improper installation, or lack of maintenance will not be covered under warranty.
10. Warranty coverage for parts or systems sold by non-authorized resellers (such as live or internet auctions) will be at the discretion of Equalizer Systems.
11. This warranty begins upon the original sale date of the vehicle and is transferable, with limitation, to subsequent owners upon furnishing the original sale date of the vehicle and proof of purchase. Only the remainder of the two year parts warranty is applicable. Warranty labor and freight are only applicable to original owner of the vehicle.
12. Equalizer Systems is not liable for loss of time, manufacturing costs, labor, material, loss of profits, direct or indirect damages incurred by the vehicle manufacturer.
13. Excessive warranty labor resulting from inadequate access to the Equalizer Systems product will not be reimbursed.
14. Equalizer Systems will not pay a markup on warranty parts unless required by law.
15. Travel expenses, hotel, telephone, fuel or any other expenses of the like are not covered under warranty.

### **Replacement Parts:**

1. Replacement parts are warranted under the same guidelines listed above for the remainder of the original warranty or 90 days, whichever is longer. Proof of warranty repair date and original vehicle purchase date are required.

No additional warranties, expressed or implied, are authorized by Equalizer Systems

This warranty voids all previous issues.

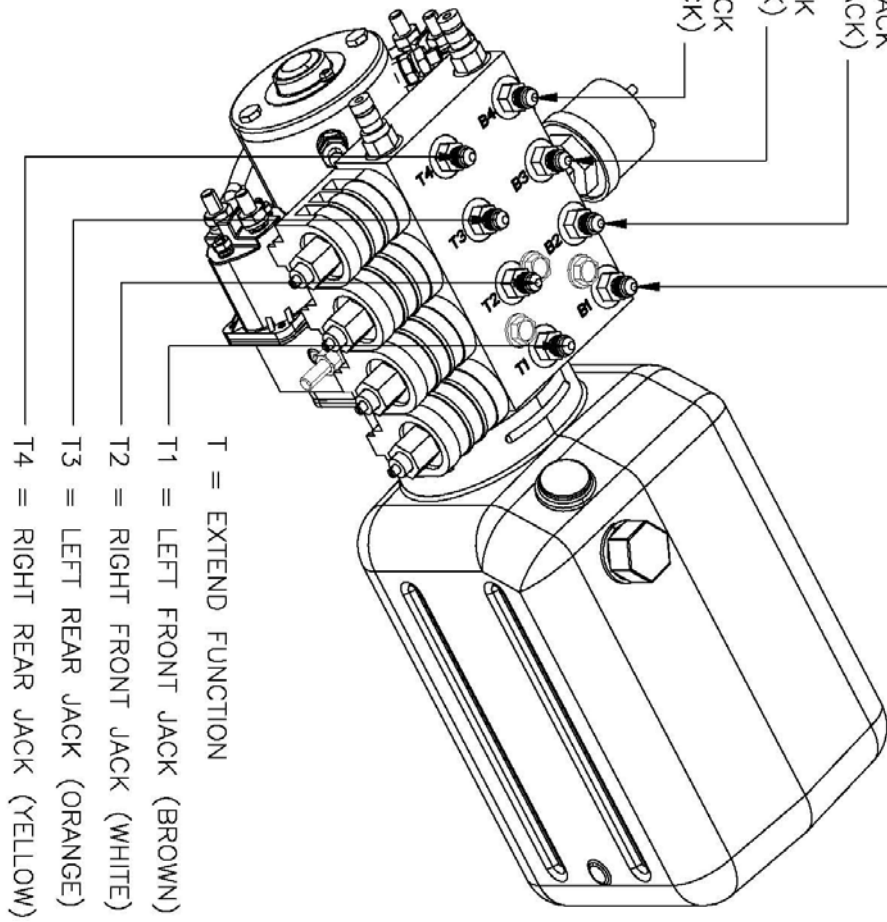
Questions concerning this warranty should be directed to:

Equalizer Systems  
55169 CR 3 North  
Elkhart, IN 46514  
800-846-9659

To activate your warranty, please visit our website at <http://equalizersystems.com/service/activate-warranty>

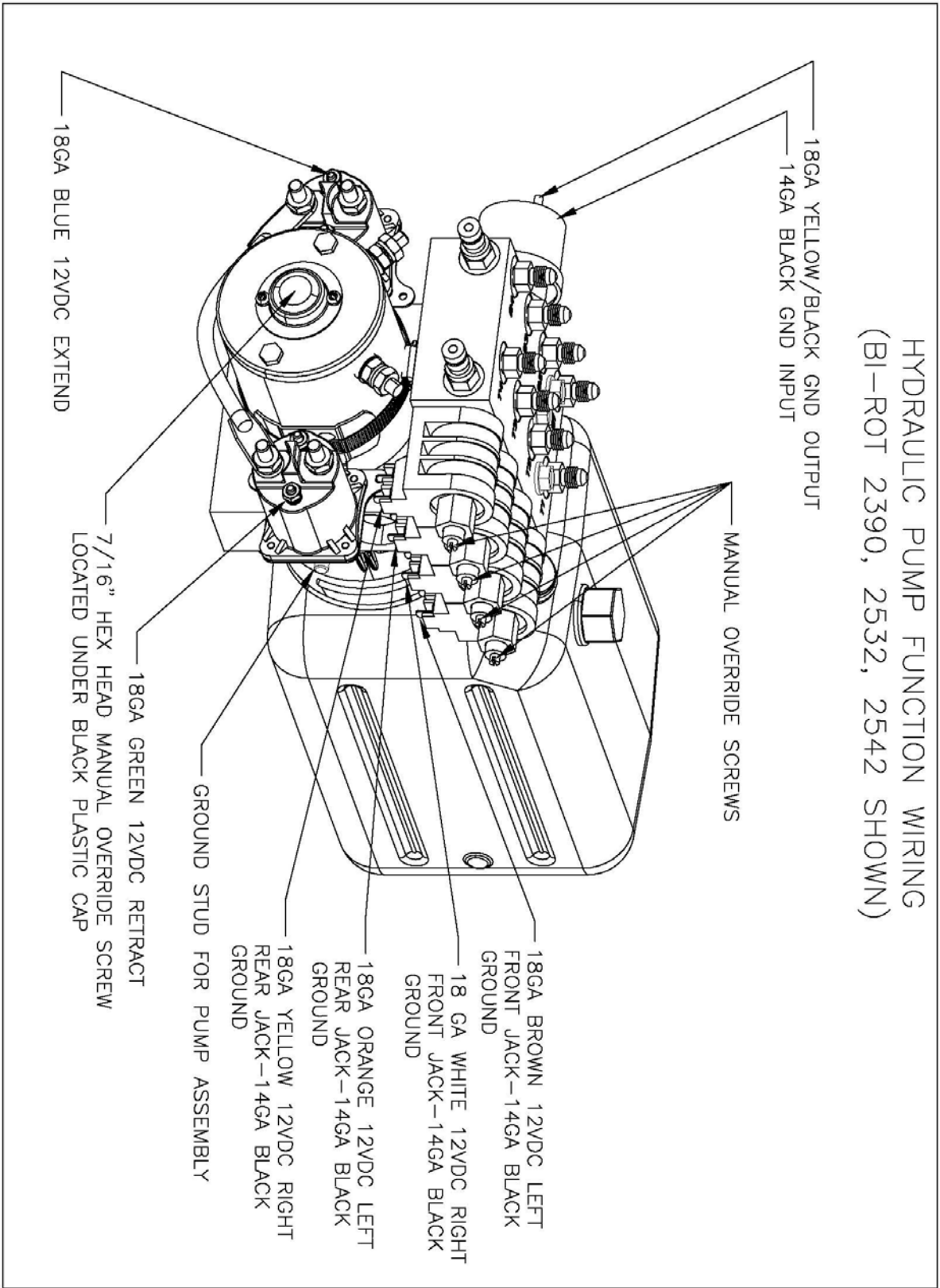
## HOSE IDENTIFICATION (BI-ROTATIONAL)

- B = RETRACT FUNCTION
- B1 = LEFT FRONT JACK  
(BROWN/BLACK)
- B2 = RIGHT FRONT JACK  
(WHITE/BLACK)
- B3 = LEFT REAR JACK  
(ORANGE/BLACK)
- B4 = RIGHT REAR JACK  
(YELLOW/BLACK)



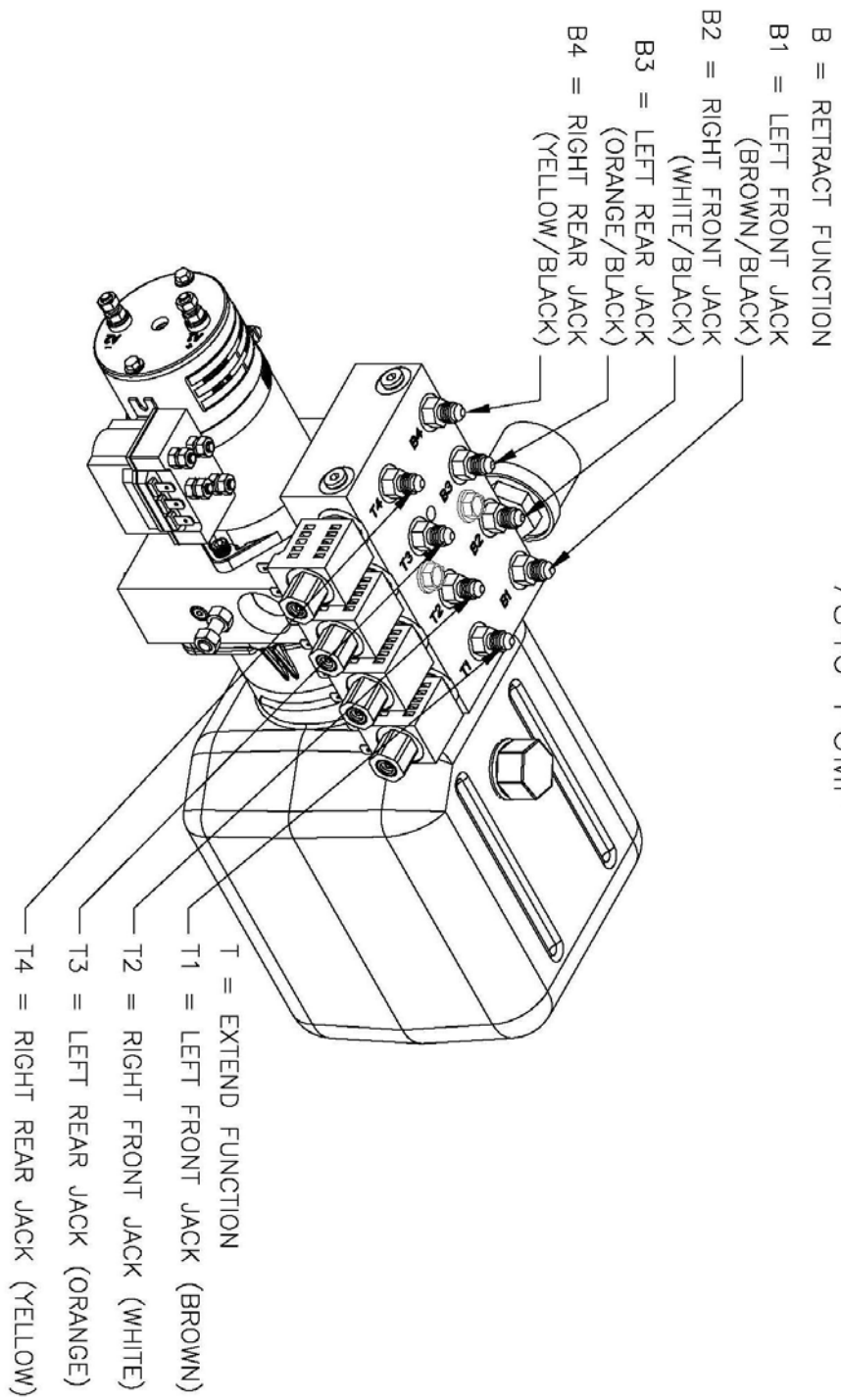
- T = EXTEND FUNCTION
- T1 = LEFT FRONT JACK (BROWN)
- T2 = RIGHT FRONT JACK (WHITE)
- T3 = LEFT REAR JACK (ORANGE)
- T4 = RIGHT REAR JACK (YELLOW)

HYDRAULIC PUMP FUNCTION WIRING  
(BI-ROT 2390, 2532, 2542 SHOWN)

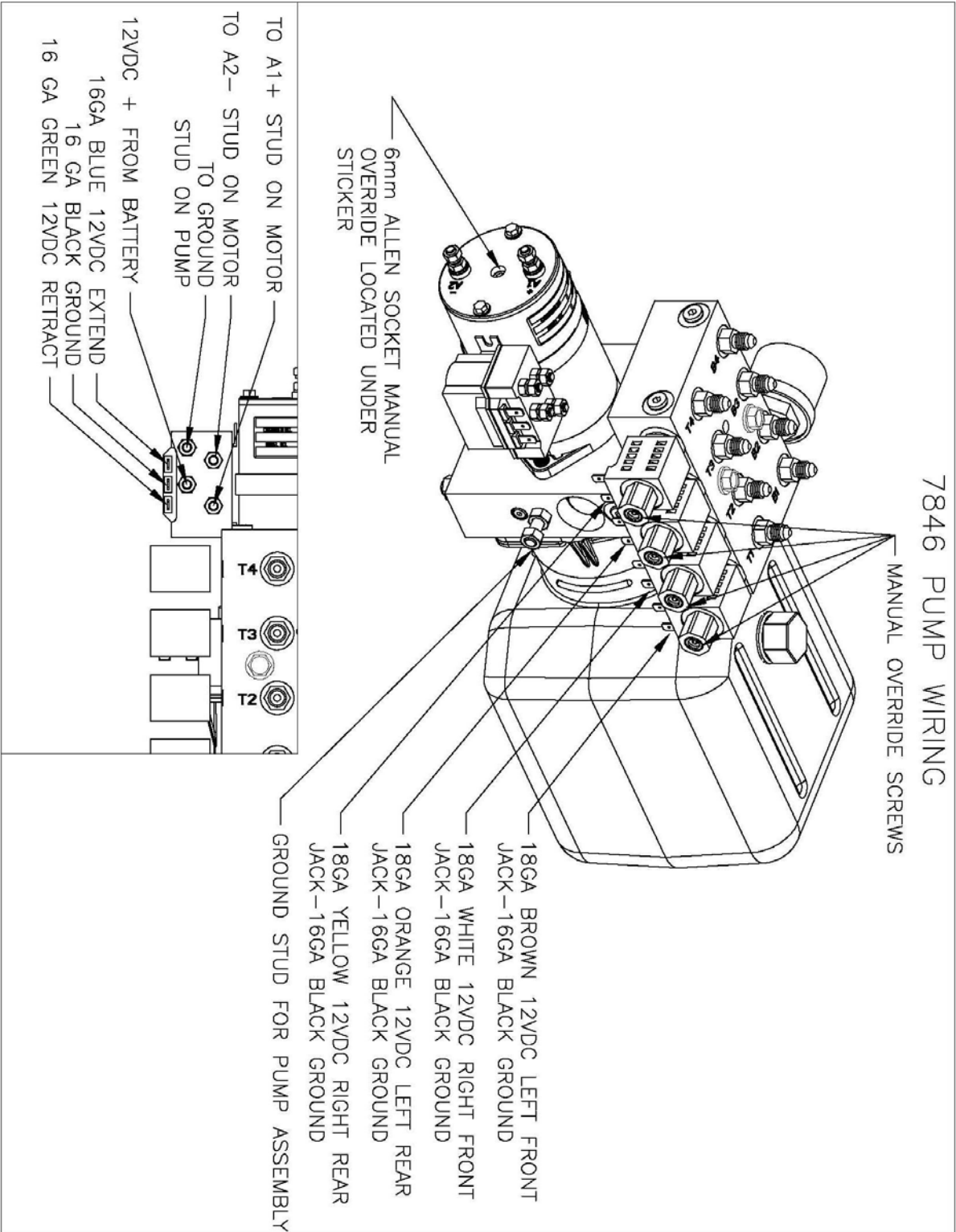


Bi directional Pump # 2390, 2532, 2542

## HYDRAULIC HOSE CONNECTIONS 7846 PUMP



**Bi directional Pump # 3195 & 3195KS**

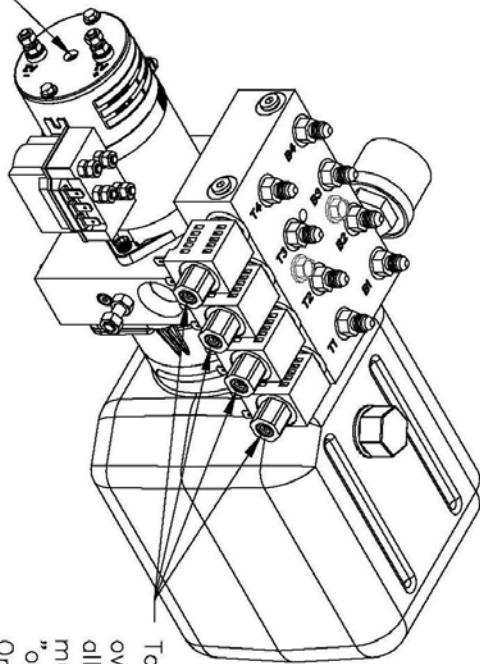


**Bi directional Pump # 3195 & 3195KS**



## Small Bi-Rotational Pump Assembly

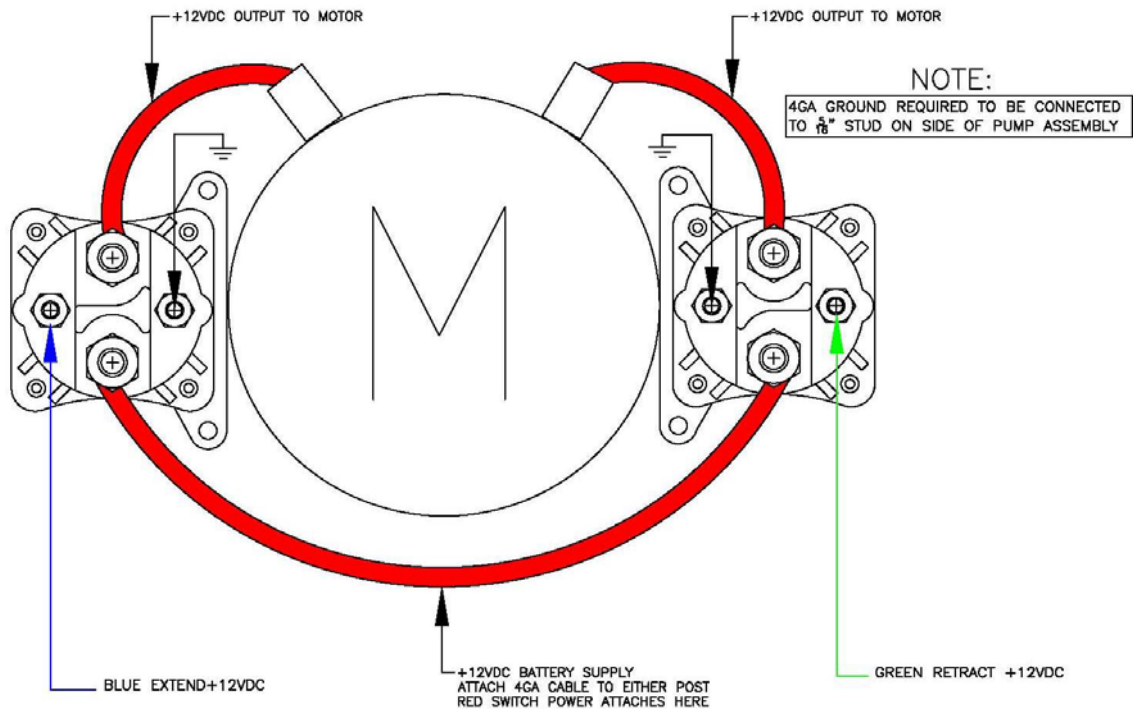
Manual override screw, 6mm allen head, is under this sticker. Using a 2000 rpm minimum drill, retract jacks by turning counter clockwise. To extend, turn screw clockwise.



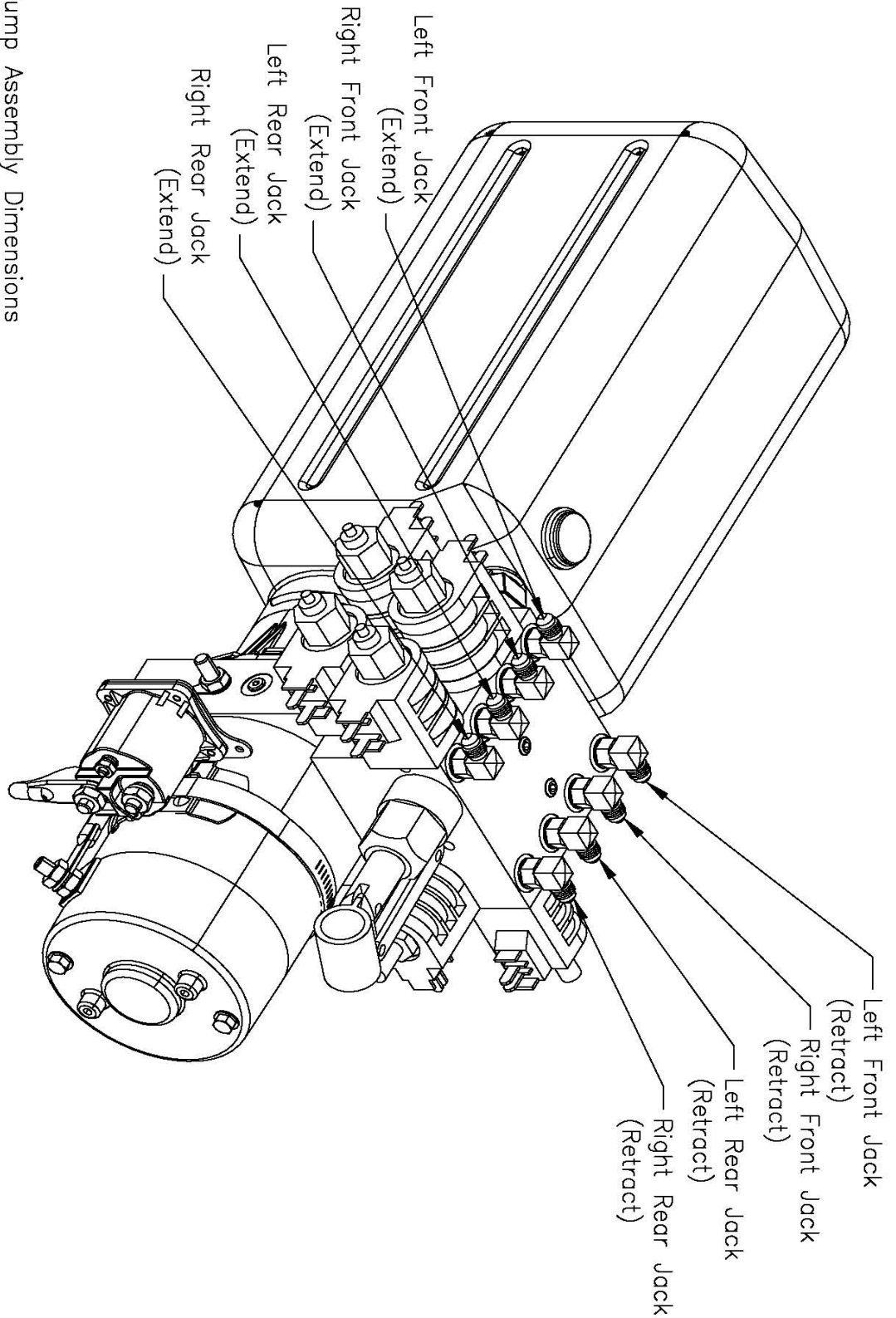
To perform the manual override procedure, using a 1" allen wrench, all set screws must be turned clockwise "open" until they are snug. Once all levelers are retracted, turn all valve screws counter clockwise "closed" until snug.

**Bi directional Pump # 3195 & 3195KS**

# BIROTATIONAL WIRING CONFIGURATION



**Bi directional Pump # 2390, 2532, & 2542**



Pump Assembly Dimensions

Length—24"  
 Width—11"  
 Height—10"

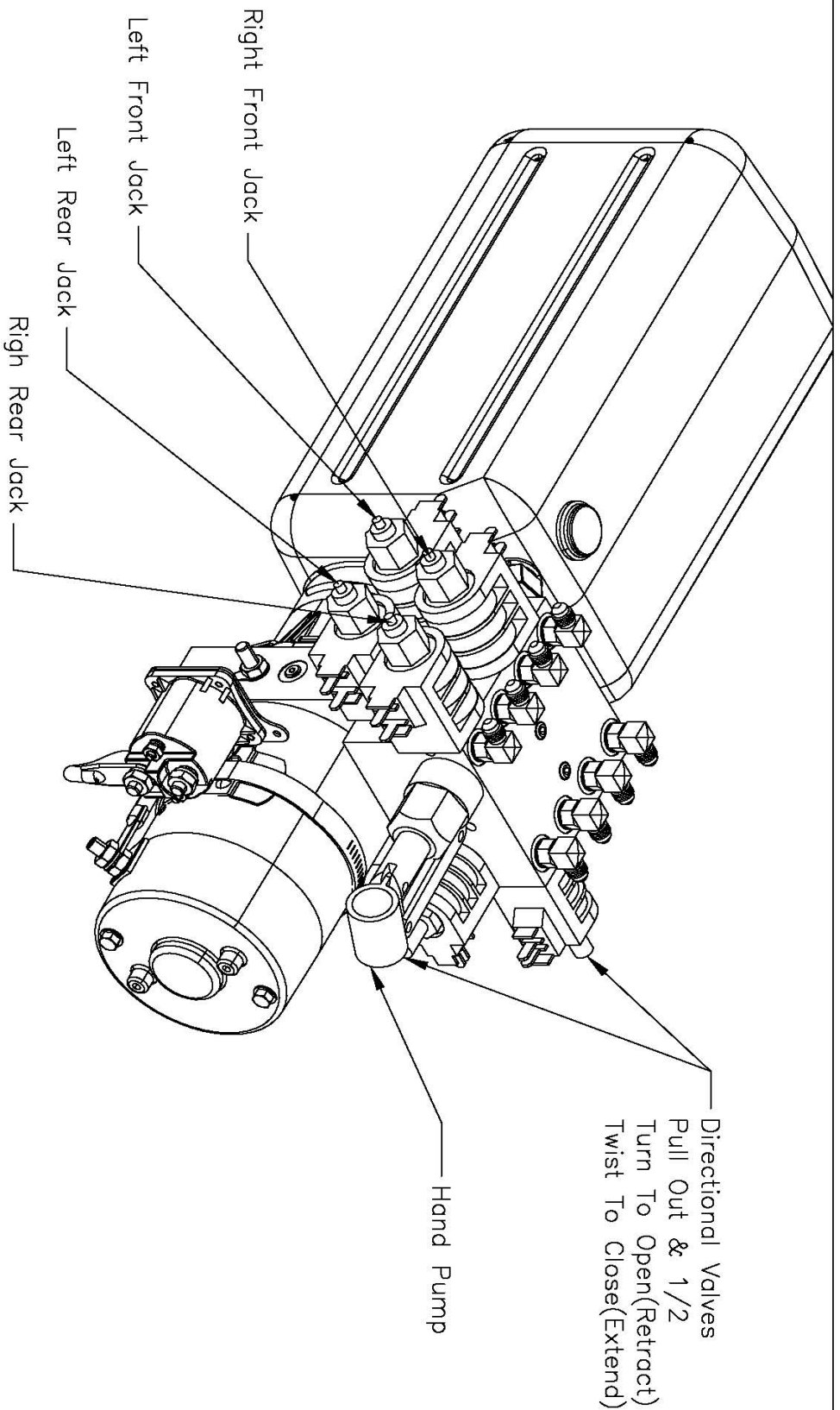
**Equalizer**

53169 COUNTRY ROAD 3  
 ELKHART, IN 46515

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#	REVISIONS	BY:	DATE:	TITLE	USED ON:
				HYDRAULIC DETAIL TRAILER AUTOLEVEL	
				UNLESS OTHERWISE SPECIFIED:	
				TOLERANCES:	
				.XXX ± 0.010	
				.XX ± 0.010	
				.X ± 0.030	
				ANG. ± 1/2°	
				REMOVE ALL BURRS AND SHARP EDGES .015 MAX	
				SIZE SCALE MATERIAL	
				A 1:1	
				DRW BY: SU	
				DATE: 10/16/06	
				APP'D BY DATE:	
				PART NAME: PUMP AND MANIFOLD	
				PAGE: 2 OF 2	
				DWG NO.: 7280	
				REV:	

Uni directional Pump # 1551 S103T\*4979



Turn Screw: Clockwise to Open(Man. Override) and Counter Clockwise to Close

**Equalizer**

55169 COUNTRY ROAD 3  
ELKHART, IN 46515

REVISIONS

BY: DATE:

UNLESS OTHERWISE SPECIFIED:  
TOLERANCES:  
XXX ± 0.010  
XX ± 0.010  
X ± 0.030  
ANG. ± 1/2°  
REMOVE ALL BURS AND SHARP EDGES .015 MAX

TITLE: MANIFOLD VALVE FUNCTIONS TRAILER AUTOLEVEL  
SIZE SCALE: MATERIAL  
A 1: 1

USED ON: TRAILER  
PART NAME: PUMP AND MANIFOLD  
PAGE: 1 OF 2  
DWG NO.: 7280  
REV: -

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