



1-800-846-9659
www.equalizersystems.com

Auto Level Installation-Troubleshooting & Warranty Guide

Trailer Version- Effective November 2011

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Equalizer Systems Auto-Level Installation Guide

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

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 ground wire (to connect battery -12V ground to 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 III Automatic Transmission Fluid

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

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

Danger: With any hydraulic application, holding position on a cylinder must be done with safety in mind. Failure in the system may cause the jack(s) 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.

Installation

Step 1: Determine where the jacks will be mounted. The jacks must be mounted to the chassis frame, as close as possible to the front and rear axle's.

Step 2 (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 7 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.

Reference Chart for Installing Jack Legs

The foot / pad must be mounted with-in the range suggested (see chart below) for proper operation of the system. Retract the jack leg 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 1-800-846-9659 ext: 339

SL-15 = 8 - 10 inches of ground clearance

SL-16 = 8 - 10 inches of ground clearance

SL / DP-18 = 10 - 12 inches of ground clearance

AJ / CJ / CM / AM / CT / SM -16, 20, 24, 30, 36

Jack travel (stroke)

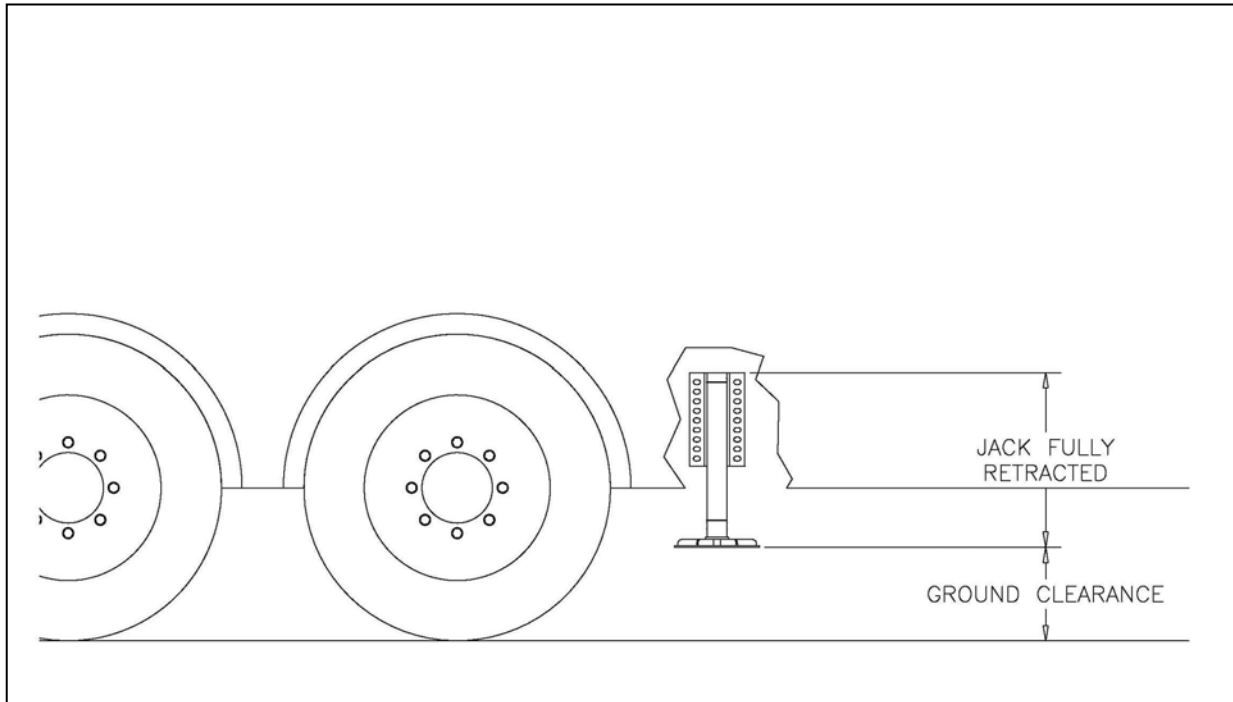
16" = 8 - 10 inches of ground clearance

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



Step 3 (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.

Step 4 (Fittings): Install the hydraulic adaptor fittings in the top and bottom of each jack and install the fittings into the manifold. The straight thread o-ring side always goes to the cylinder or manifold. The tapered side will get the hose attached to it. When installing straight fittings into the leg or 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.

Step 5 (Hoses): 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	T-1 Brown Solid
Left Front-BOTTOM	B-1 Brown Stripe
Right Front-Top	T-2 White Solid
Right Front Bottom	B-2 White Stripe
Left Rear-Top	T-3 Orange Solid
Left Rear-Bottom	B-3 Orange Stripe
Right Rear-Top	T-4 Yellow Solid
Right Rear-Bottom	B-4 Yellow Stripe

Connections: Keypad / Controller / Pump Assembly

Step 6: Mount the Controller- Equalizer Part # (Depending on the application). The controller must be mounted near to the center of the “X” that the jack legs form. It must be mounted to the underside of the floor or to a frame or cross member that “reacts” with the coach as the jack’s plant and lift the coach. All 4 mounting holes in the mounting plate must be used. There is a sticker on the controller indicating “UP and “Front”. It is imperative that the controller be mounted according to this sticker. Keep the controller away from high heat sources or moving objects.

Step 7 (Keypad): Fasten the keypad mount in the desired location (near the driver’s seat, if applicable). Attach the supplied wire harness between the keypad and the location of the controller (see step 3 above). This harness will connect the in-board 4-pin (J-1) connector on the keypad, and the mating connector on the controller. This 4 pin connector is the only connection made to the keypad.

Secure the harness with wire ties or loom clamps to the chassis. Refer to the attached diagram.

Optional Dual Leg Switch and Harness

There is an optional dual leg switch and harness available on trailer units. This option allows the front jacks to be operated from a separate control other than the Auto-Level Keypad. This dual leg switch and harness may be mounted in a convenient location on the outside of the trailer. It is considered to be weather resistant. It is connected via a 6 pin connector at the end of the dual leg switch and harness to the mating connector at the pump assembly.

The following interface connections (Steps 8, 9, 10) are primarily designed for motorized units. The connections described below may or may not be present in your harness. If they are present, they may or may not be used on a trailer unit. The disables described (step 8 and 9) are not required to be employed on a trailer. If disables are not required the black/yellow wire (if present) must be connected to ground (see step 9 below).

Chassis interface connections: Please note that Step 8 and 9 are required on motorized units. Step 10 is optional.

Step 8 (Keypad Ignition Disable Circuit): Note the “break-outs” near the end of the keypad harness. The **Pink** wire must receive a +12 VDC **Input** when the ignition key is in the “on” position. Connect this wire to the ignition positive. This will make the wire “hot” and will inhibit jack extension when the vehicle ignition key is in the on (engine run) position. This also provides for a “jacks down” warning in the event of a jack drifting from the stowed position during travel. **This connection is required on motorized units. Failure to make this connection may create an unsafe condition and may void the warranty. This connection is not required on trailer units.**

Step 9 (Park Brake Ground): The **Black w/ Yellow** wire must receive a **Ground Input**. This **Black w/ Yellow** wire is designed to connect to the park brake switch so that it is connected to ground when the brake is applied, and disconnected from ground when the brake is released.

Contact your chassis manufacturer to verify park brake wire connection and location. If a park-brake signal is not available; this **Black / Yellow** wire must be grounded to a permanent chassis ground. The connection to a park brake switch is optional. If this input is not connected to the park brake switch or to ground, AUTO-LEVEL and manual extend will be continuously denied. Also, the engage park brake light (If equipped) will be on if the panel is powered up or the key is in the on (engine run position, step 8).

***Note on items 8 and 9: If Black/Yellow is connected to a park brake switch (as in step 9) and the pink is connected (required on motorized) as in Step 8, an automatic “all retract” will be initiated if the key is turned on (engine run position) and the park brake is released.**

Step 10 (Suspension deflate/Inflate): If chassis is equipped- There are two additional wires that break out from the harness near the keypad. The grey wire provides a 12 VDC positive output for 2 minutes when the auto level button is pressed. This may be used to deflate the chassis air suspension. The Purple wire will provide a 2 minute 12 VDC positive output when the all retract is pressed. This may be used to inflate the chassis air suspension. The chassis must be equipped with an electric dump/inflate system for this interface. Check with the chassis mfg for the availability of this and the chassis side of this interface. If the chassis is not equipped or it is not to have this option, tape the 2 wires back to prevent shorting (do not use).

Step 11 (Pump harness connections): Recall the pump installation from Step 3. Attach the supplied wire harness between the pump and the location of the controller (see step #6). This harness will connect between the pump and the mating connector on the controller. Note the harness break-outs for the main harness at the hydraulic pump. There are (2) ea. connectors for the jacks. There may be other connectors if the pump unit will also be running slide-outs or other items. If slides or other items are involved, contact Equalizer Systems for direction on this. Plug each connector from the harness into the corresponding connector on the pump. Secure the harness with wire ties or loom clamps to the chassis. You should have no disconnected plugs (unless the coach is not equipped with chassis air ride or the disable described above). All of the connections at the pump should be completed- **Except the power and ground connections at the pump; which are completed next.**

Power Connections for Uni-Directional Motor Pump # 1551

These units can be identified by a single motor solenoid or the # 1551 on the pump data label

Step 12 (Pump +12V): Attach a # 4 gauge wire (# 2 gauge if the run is over 12ft.) between the positive +12v terminal on the battery and the open post at the motor solenoid on the pump. This supply 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 devices), and must be constant, non-switched +12v.**

Step 13 (Pump -12V) Attach a # 4 gauge wire (# 2 gauge if the run is over 12ft.) 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. **It is not acceptable to allow the pump mounting bolts to be the sole grounding connection.**

Purging for Uni-Directional Motor Pump # 1551

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.

***Do Not Manually Over-extend Individual Jacks Singularly.
This May Cause Unwanted Stress on the Coach or the Jacks***

Retraction Purge: The retraction side of the cylinders is the first to be purged of air. Fill the reservoir fully with Dexron Transmission fluid. This is the same fluid used in GM vehicles. Begin to purge the retraction side of the system by pushing the UP Button for each jack or by pressing All Retract. The jacks may be run in pairs (front pair & 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 jack(s). **Refill the reservoir to full.**

Full Purge: Next, 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 by holding both Down Buttons simultaneously. Monitor the fluid level and all fittings for leakage. Retract the jacks by pressing All Retract. Recheck the reservoir and fill to full. Note 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.

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

Power Connections for Bi-Rotational Motor Pump

These units can be identified as having 2 motor solenoids or # 2390, 2532, 2542 on the pump data label

Step 12 (Pump +12v): Attach a # 4 gauge wire (# 2 gauge if the run is over 12ft.) between the positive +12v terminal on the battery and the common posts on the motor solenoid. This supply 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 devices), and must be constant, non-switched +12v.**

Step 13 (Pump -12v): Attach a # 4 gauge wire (# 2 gauge if the run is over 12ft.) 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. **It is not acceptable to allow the pump mounting bolts to be the sole grounding connection.**

Purging for Bi Rotational units Pump # 2390, 2532, 2542, 3043

This procedure must be performed with the initial installation & running of hydraulic system, and following installation of the pump assembly and jack(s). This procedure applies only to MH-4 systems that are equipped with the Bi-Rotational pump. All electrical and hose connections must be completed before the purging process. **You Must Follow this Procedure Strictly. Any Deviation from the Process will cause the purging process to become difficult and time consuming.**

Fill the reservoir with ATF Dexron

1. Remove the fitting that is installed into port G-1 or attach a hose to the coupler. Place into a clean container. This will allow retract side air to escape to atmosphere.
2. Run the pump to extend the jacks(s). Maintain the fluid level in the reservoir between 1/4 and 1/2 full. Do not allow the reservoir to run empty. If jacks(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 the fluid level as described above.
3. Reinstall the fitting or plug into G-1 or remove the hose attached to the coupler. (See # 1 above)
4. Run the pump to retract the jack(s). Maintain the fluid level as above. Do not fill the reservoir to full until after the legs are fully retracted.
5. **IMPORTANT** - If fluid in reservoir appears to be aerated (foaming), allow unit to rest until foam dissipates (approx 5-10 minutes).
6. Fully extend and retract jack(s) a minimum of 3 times. Allow any foam in the reservoir to dissipate as needed. Maintain the fluid level in the reservoir as needed.

Additional Notes Regarding Purging

- 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
- Never allow the reservoir to go empty. Maintain the fluid level at least $\frac{3}{4}$ full when the jacks are retracted.
- Being patient helps. It does no good to run the pump and try to move the jacks when the reservoir is full of foam. Pumping foam will only reintroduce air into the system and will prolong the process unnecessarily.
- We want the air out. Allowing the air to dissipate through the reservoir and maintaining the reservoir fluid level will get things working faster

Equalizer Systems Operation

Prior to operating the system it is required that the operator perform a physical check around and under the unit to assure that nothing or no one could be harmed by the jacks extending or retracting and the vehicle moving up or down

Manual Operation using the Equalizer Systems Auto Level Keypad

Power On: Push and release the Power Keypad button to engage power. All lights should come on then most will go out. The LED light next to the Power button should be lit RED when power is on. If you have installed the ignition/disable circuit or the park brake disable (**probably not connected on trailers**) (step 8 & 9 Keypad Disable Circuit- Page 5), you will need to have the ignition key or disable in the “off” position and the park brake applied to extend the jacks. If you attempt to extend jacks by pressing the Down Keypad buttons or all the jacks with the Auto-Level button, you will hear a “deny” tone from the keypad if the ignition key is in the improper position or the park brake needs to be set and if equipped the LED lights for these will be on (see section below on panel LED’s)

Planting The Jacks: Using the Down Keypad buttons, extend the jacks until they contact the ground (this is referred to as “planting” the jacks). As you extend the jacks, an LED light on the Keypad will indicate the jack(s) out of the “stowed” position. Jacks may be operated individually or in pairs depending on the system supplied. **Do not manually overextend individual jacks. This may cause unwanted stress on the coach or the jacks.**

Leveling the Coach: Use a bubble level on a flat surface in the center of the coach. Level the vehicle by using the Down or Up Keypad buttons until the vehicle is level. Jacks may be operated individually or in pairs depending on the system supplied as long as they are operated in the same direction. Do not attempt to lift the vehicle’s tires off the ground. The Keypad may be left on once level has been achieved. The Keypad will enter “sleep mode” after five minutes of inactivity.

Note: There maybe specific instances when manual extension of one or more jacks may inhibited (deny tone when Down is depressed). This situation is caused by the ‘anti-twist’ protocol in the software installed in the Controller. Simply stated, the ‘anti-twist’ protocol denies jack extension if the system senses that a specific corner of the coach is approximately 3 degrees higher than the rest. You will be able to extend the other jacks to overcome the slope. *If the system incorrectly senses excessive slope, this can be overcome by re-setting the null. This will allow manual extension of all jacks.*

Retracting the Jacks: Use the All Retract button to retract the jacks prior to travel. The Equalizer System does provide the ability to retract the jacks using the UP buttons for jacks. However, these buttons are not intended to be used for retracting the jacks to their stowed position prior to travel. The Up arrows are to be used only for retracting the jacks to help level the coach. The All Retract button must be pressed to insure the system is ready/safe for travel. All jacks (rear only) will automatically retract and return to stowed position when the ALL RETRACT button is pressed and released. On a trailer version the front jacks will need to be retracted using the UP arrow(s) to the stowed position after coupling to the tow vehicle. When All retract is pressed the pump will run in retract for approximately 5 seconds after the last (rear jack on a trailer version) jack has been fully retracted- or until a time limit of 90 seconds has been reached.

****It is always the responsibility of the coach operator to visually confirm that the jacks are fully retracted and safe for travel****

Optional Dual Leg Switch and Harness

Trailer Version Auto-Level systems may have a dual leg switch and harness that allows the independent operation of the front jack legs. This is primarily so that the front legs can be extended to lift and support the trailer from the tow vehicle. This dual leg switch control includes a key switch to disconnect it so that unauthorized operation of the front jacks can be avoided. During travel this key switch must be turned to the off position and the key removed. To operate insert the key turn it to the on position then the rocker switches can be used to operate the front jacks independently or as a pair up or down. Do not attempt to operate jacks in opposite directions at the same time.

Auto-Level Operation

Power On: Push and release the Power Keypad button to engage power. All lights should come on then most will go out. The LED light next to the Power button should be lit RED when power is on. Other lights should go out, if they do not refer to the Keypad LED section. If the jacks down lights are on they must be cleared by pressing the all retract button prior to performing Auto-Level.

Front Jacks: On a trailer version AutoLevel it is required that tow vehicle be disconnected from the trailer prior to leveling with AutoLevel. Use the down arrow(s) on the control panel (or use the dual leg switch, if equipped) to extend the front jacks to support the trailer and lift the trailer from the tow vehicle. After the tow vehicle is removed, lower the front of the trailer so that the trailer is level front to rear (visually level). Generally, it will work best if the front is slightly lower than the rear. This is somewhat a trial and error/learning as all trailer units seem to be slightly different.

Auto-Level: Press the Auto-Level button and release. The system will send out a continuous series of beeps and the "Operating" LED will flash RED to let you know Auto-Level is operation the rear legs will be deployed and then the system will use the front and the rear legs to automatically level the coach. When completed, the Keypad will signal the successful completion with a dual-stage tone. The Keypad may be left on once level has been achieved. The Keypad will enter "sleep mode" after five minutes of inactivity. If the unit is not level after the process is complete see the section on setting the Null.

Retracting the Jacks: Use the ALL RETRACT button to retract the jacks prior to travel

The Equalizer System does provide the ability to retract the jacks using the UP buttons for jacks. However, these buttons are not intended to be used for retracting the jacks to their stowed position prior to travel. The Up arrows are to be used only for retracting the jacks to help level the coach. The All Retract button must be pressed to insure the system is ready/safe for travel. All jacks (rear only) will automatically retract and return to stowed position when the ALL RETRACT button is pressed and released. On a trailer version the front jacks will need to be retracted using the UP arrow(s) to the stowed position after coupling to the tow vehicle. When All retract is pressed the pump will run in retract for approximately 5 seconds after the last (rear jack on a trailer version) jack has been fully retracted- or until a time limit of 90 seconds has been reached.

****It is always the responsibility of the coach operator to visually confirm that the jacks are fully retracted and safe for travel****

Setting the Null: Null is the term used to indicate the levelness of the coach

If the coach is not level following an attempt to Auto-Level, you will need to level the coach and reset the null. To set the null, push and release the Power button on the Keypad to engage power. The LED light next to the Power button should be lit RED when the power is on. Level the coach by deploying jacks manually, or by simply parking the coach on a level site. You do not need to have the jacks deployed to set the null. Use a bubble level on a flat surface in the center of the coach as a reference. Once the coach is level, turn the power off at the panel. Depress and hold the Auto-Level button and press and release the Power button and listen for a series of beep. After the Keypad has beeped 5 to 6 times, release the Auto-Level button (the Keypad will continue to beep as long as the Auto-Level button is held). You should receive 2 beeps indicating that the new Null has been set the panel will maintain this setting. Press and release the All Retract button to retract the jacks to the stowed position.

Helpful Hints

- If your unit is equipped with air suspension, and the deflate/inflate connections were made (step 10) it is recommended to allow the chassis air to build before pressing All Retract. This will ensure adequate air supply to the chassis air valves.
- Do not allow excessive motion in the unit during the Auto-Level operation (don't move around in the unit). This could cause the system to level improperly.
- The Auto-Level is a microprocessor controlled system. Proper and adequate battery voltage and permanent chassis ground are essential.
- Your system may be equipped with a manual override option. Refer to the procedure for proper operation of this option. It is usually better to review this procedure prior to its actual use, rather than having to learn a new procedure in difficult environments.
- If the system has not been used (with the jacks stowed) for over 24 hours, it is recommended that you engage the All Retract button prior to travel in order to re-pressurize the system.
- A lubricant, like WD40, may be used to clean and lubricate the cylinder shafts.



AUTO-LEVEL Operation- Keypad # 3104 Trailer Version Starting Date- Approximately January 2012

• **Power On:** Press and release the POWER button to engage power. All LED's on the panel will come on then most will go out. The LED next to the POWER button should be lit RED when power is on.

Front Jacks: The Auto-Level process for trailers will begin with the front jacks extended and supporting the front of the trailer. Use the manual front down arrow to extend the front jacks to the ground and disconnect the tow vehicle from the trailer. If the unit is equipped with the optional dual leg switch and harness, it may be used to extend the jacks to the ground, support the trailer and remove the tow vehicle.

• **AUTO-LEVEL:** Press the AUTO-LEVEL button and release. The system will send out a continuous series of beeps, the 'OPERATING' LED will flash RED to let you know AUTO-LEVEL is operating and will automatically level the coach. When completed, the keypad will signal a successful level with a dual-level tone. Press and release the POWER button. Note: The keypad may be left on once level has been achieved. The keypad will enter "sleep mode" after five minutes of inactivity.

Note: The rear jacks down LED lights must be off for Auto-Level to function. If needed, press the ALL Retract button to clear and then Auto-Level should function.

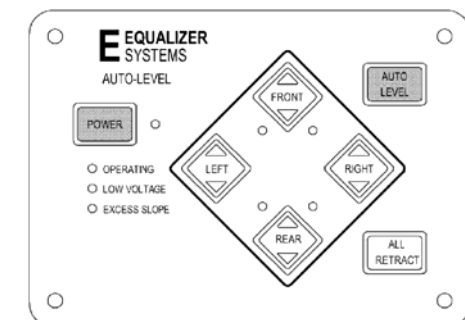
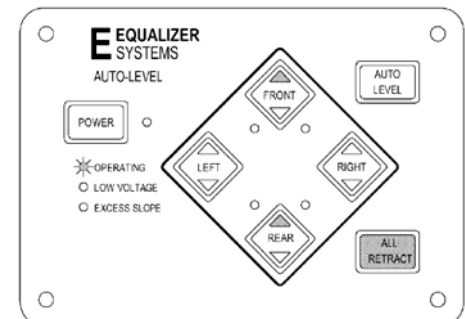
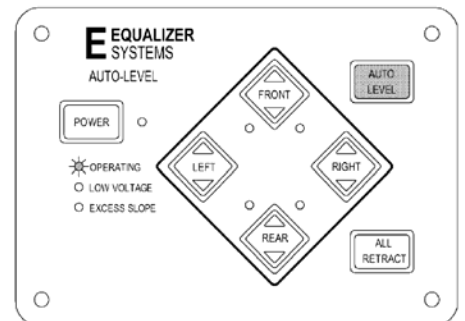
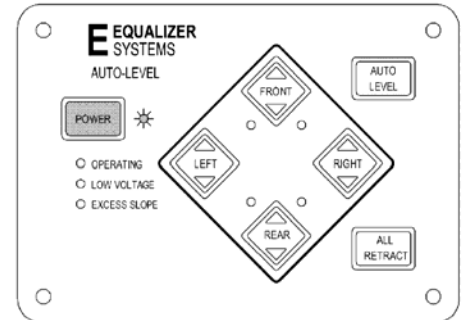
• **Retracting the Jacks:** To retract the rear jacks, press and release the All RETRACT button. Only the rear jacks will automatically retract and return to stowed position. The pump will run in retract mode until the rear jacks are fully stowed (plus an additional 5 seconds- up to a maximum of 60 or 90 seconds). This is the proper method for retracting the rear jacks prior to travel. You may stop the ALL RETRACT by pressing any button on the keypad. Jacks may be retracted in pairs by using the UP ▲ button for each end or side for leveling purposes, however the all retract must be used to fully stow the jacks prior to travel. The jacks down LED's will turn off, indicating the jacks are in the "stowed" position. Use the UP ▲ arrow for the front jacks to lower the front of the trailer onto the tow vehicle and fully retract the front legs. The (Optional) dual switch gear may also be used.

• **Power OFF:** Press and Release the POWER Keypad Button

Visually Confirm all Jacks are Retracted Prior to Travel

• **Setting the Null:** The null or "level position" has been preset from the factory. However, if the coach is not level following an attempt to AUTOLEVEL, the Null is easy to reprogram. To set the null, push and release the POWER keypad button to engage power. The LED next to the POWER button should be lit RED when power is on. Level the coach by deploying jacks manually (using the DOWN ▼ keypad buttons, extend jacks until the coach is level), or by simply parking the coach on a level site. You do not need to have jacks deployed to set the null. Use a bubble level on a flat surface in the center of the coach as a reference. Once the coach is level, turn the POWER off at the panel. Depress and hold the AUTO-LEVEL keypad button. Continue to hold the AUTO-LEVEL button and press then release the POWER button, and listen for a series of beeps. After the panel has beeped 5 to 6 times, release the AUTO-LEVEL button (the keypad will continue to beep as long as the AUTO-LEVEL button is held). The new null has been set and the system will maintain this setting. Press and release the ALL RETRACT button to retract the rear jacks to the stowed position. Use the front up arrow to retract the front jacks.

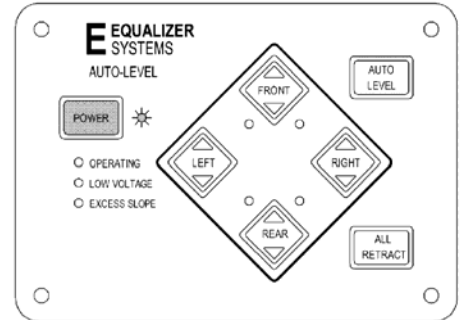
Note: There may be specific instances when manual extension of one (or more) jack is inhibited (deny tone when DOWN ▼ is depressed). This situation is caused by the 'anti-twist' protocol in the software contained in the controller. Simply stated, the 'anti-twist' protocol denies jack extension if the system senses that a specific corner of the coach is approximately 3 degrees higher than the rest. You will be able to extend other jacks to overcome the slope. *If the system incorrectly senses excessive slope, this can be overcome by re setting the null. This will allow manual extension of all jacks. Remember to re-set the null after manually leveling the coach.*





Manual Operation- Keypad # 3104 Trailer Version Starting Date- Approximately January 2012

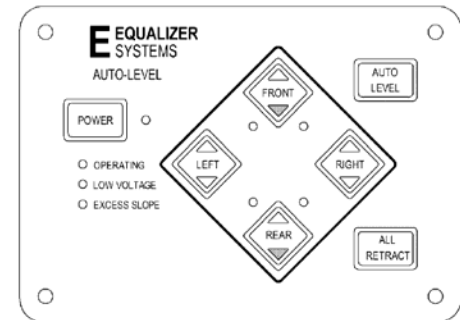
- **Power On:** Press and release the POWER keypad button to engage power. All LED's will come on then most will go out. The LED next to the POWER button should be lit RED when power is on.



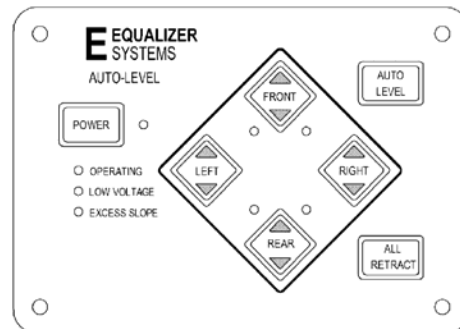
- **Planting the Jacks:** The jacks will be extended in pairs Fronts or Rears or Left or Right Using the DOWN ▼ (extend) keypad buttons, extend the jacks until they contact the ground (this is referred to as "planting" the jacks). As you extend each pair of jacks the corresponding LED jack status lights will come on to indicate jack(s) are out of the "stowed" position. Jacks will be operated in pairs. Extend and plant the front jacks first. Then extend and plant the rear jacks. Only after planting the fronts and then the rears, should side to side corrections (leveling) be attempted. This process will stabilize all four corners and minimize twist prior to the leveling process.

Do not manually over extend jacks.

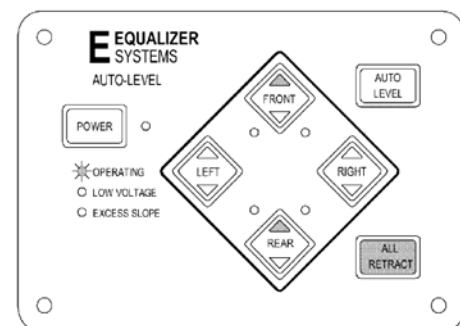
This may cause unwanted stress on the coach or the jacks.



- **Leveling the Coach:** Use a bubble level on a flat surface in the center of the coach as a reference. Level the vehicle by using DOWN ▼ (extend) or UP ▲ (retract) keypad buttons until the vehicle is level. Front to rear then side to side. Jacks will be operated in pairs. Do not attempt to lift the vehicle tires off of the ground. Only lift (extend) enough to level and stabilize the unit. Once level, press and release the POWER button to turn off the keypad. Note: The keypad may be left on once level has been achieved. The keypad will enter "sleep mode" after five minutes of inactivity.



- **Retracting the Jacks:** To retract the rear jacks, press and release the ALL RETRACT button. The rear jacks will automatically retract and return to stowed position. The pump will run in retract mode until all of the jacks are fully stowed (plus an additional 5 seconds, up to a maximum of 60 or 90 seconds). This is the proper method for retracting the jacks prior to travel. You may stop the ALL RETRACT by pressing any button on the keypad. Jacks may be retracted in pairs by using the UP ▲ button for each end or side for leveling purposes. However, the all retract must be used to fully stow the rear jacks prior to travel. The rear jack down status LED lights will turn off indicating the jacks are in the stowed position. Use the UP ▲ arrow for the front jacks to lower the front of the trailer onto the tow vehicle and fully retract the front legs. The (Optional) dual switch gear may also be used.



- **Power OFF:** Press and Release the POWER keypad button.

Visually Confirm all Jacks are Retracted Prior to Travel

Panel Indicator LED's

There are a total of ten (10) LED indicators on the Equalizer Keypad. The function of these LED's is detailed below.

During typical operation, the LED's on the bottom left hand corner of the keypad should NOT be illuminated. The only LED that should light is the "OPERATING' LED, which should flash during operation.

'POWER' LED	ON Red when power is ON OFF when power is OFF FLASH every 1 sec. In Sleep Mode
'JACK' LED (4 each)	ON Red when jack(s) are deployed OFF when jack(s) are stowed
'OPERATING' LED	FLASHING Red w/ Auto Level or All Retract OFF when keypad is idle or 'sleeping'
'LOW VOLTAGE' LED	ON Red when voltage is below 10.5 VDC OFF when voltage is above 10.5 VDC
'ENGAGE PARK BRAKE' LED May not be present on newer trailer version units -See Step 9 (installation)	ON Red when park brake is not set Off when park brake is set.
'IGNITION ON' LED May not be present on newer trailer version units- See Step 8 (installation)	ON Red when ignition is in the ON position OFF when ignition is off
'EXCESS SLOPE' LED	ON Red following an Auto Level attempt, if system cannot overcome slope OFF when slope is not excessive

- If the LOW VOLTAGE, ENGAGE PARK BRAKE, IGNITION ON or EXCESS SLOPE LED's illuminate, you have an 'error' condition that must be corrected prior to operating the jacks.
- If the jacks down status lights are on (rear lights on trailer version) AutoLevel will be denied. Press the all retract to clear.

Manual Override Procedure for 4 leg Systems

Note: Not all systems have this manual override option

Pump #s 2390, 2532, 2542, 2015, 2017, 3043

- **Your hydraulic motor may be equipped with a manual override output shaft. You must use a drill with a 7/16" socket driver. Pump # 3043 will use a 1/4" Allen.**
- **The drill must be capable of producing a minimum of 2000 r.p.m. for the pump to develop appropriate pressure output.**
- **Your pump assembly may have a hand pump in place of the motor with manual override shaft. If this is the case, you may pump the hand pump in lieu of using the 2000 r.p.m. drill and the 7/16" socket driver or 1/4" Allen.**

END VIEW OF MOTOR

- **Care must be taken to ensure neither the drill nor the socket contact any wires or hydraulic hoses while in use.**
- **Note: Pump # 1551 will not have the above hex for the drill.**
- **The hand pump may be found on pump #s 1551, 2015, 2017**

Manual Override for Uni-Directional Pumps. Pump #'s 1551, 2015, 2017

Retracting your jack(s) using manual override (With Hand Pump, if Equipped)

- The individual cartridge valves are clustered together on the side of the pump manifold. They are labeled 1 thru 4. Locate the screws on the appropriate cartridge valve(s). Using a small flat blade screwdriver or 1/8" Allen wrench, turn the screw(s) clockwise until seated in.
- Locate valve DV-2. This will have either an Allen override screw or a red knurled knob. This valve will be on the opposite side of the manifold from the cluster of cartridge valves. If equipped with the Allen screw type, turn the Allen screw in until seated in. If equipped with the red knurled knob, pull the red knob out and turn 1/4 turn clockwise. The knob will remain in the 'out' position.
- To retract: locate DV-1. This valve will be on the adjacent side of the manifold to the cluster of cartridge valves. Pull the red knob out and turn 1/4 turn clockwise. The knob will remain in the 'out' position.

If equipped with override hex on motor:

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

If equipped with Hand Pump:

Insert 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

Caution: Following manual override operation, failure to return all valves to normal position may result in one or more jack legs 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 to the normal position or return the Allen screw to the original "out" counter-clockwise position.

***Note:** The normal operating position of the screw in the cartridge valve(s) is the counter-clockwise 'out' position. The only time the valve should be shifted manually is when attempting to operate jack(s) via manual override.

****Note:** The normal operating position of the red knob on the directional valve(s) is the 'in' position. The ONLY time the valve should be shifted manually is when attempting to operate jack(s) via manual override.

To Extend The Jack(s):

To extend the jack(s), follow all of the above steps EXCEPT DO NOT manually shift directional valve DV1 as described in step # 3 above.

Manual Override for MTE Bi-Rotational Style Pumps

Pump #'s 2390, 2532, 2542, 3043

- **Your hydraulic pump may be equipped with a Bi Rotational motor. You will use a 2000 r.p.m. drill and a 7/16" socket. Pump # 3043 will use a 1/4" Allen drive.**
- **Care must be taken to ensure neither the drill nor the socket contact any wires or hydraulic hoses while in use.**

To operate your jack(s) using the manual override (with bi-rotational motor)

- The individual cartridge valves are clustered together on the side of the pump manifold. They are labeled 1 thru 4. Locate the screws on the appropriate cartridge valve(s). Using a small flat blade screwdriver or 1/8" Allen wrench,(depending on valve type) turn the screw(s) clockwise until seated in.
- The pump may or may not have a DV-2 valve on the opposite side of the manifold. If it is the Allen type, turn the screw clockwise until seated in. If it has a red knob, pull out on it and turn 1/4 turn, it should stay in the out position.
- Remove the black plastic cap from the end of the motor. Use a small flat head screwdriver. Place the drill with the 7/16" socket on the manual override shaft located at the end of the motor.
- To retract your jack(s) run the drill in the counter-clockwise direction.
- To extend your jack(s), run the drill in the clockwise direction.
- When manual override is complete, return the cartridge valve(s) to the normal position(s). Reinstall black plastic cap on motor.

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

***Note* The normal operating position of the screw in the cartridge valve is the counter-clockwise 'out' position. The only time the valve should be shifted manually is when attempting to operate jack(s) via manual override.**

Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
Keypad will not turn on	Blown fuse at pump harness	Replace fuse
	Faulty ground or power wire	Trace and repair
	Low battery voltage	Charge chassis and/or coach batteries
	Defective Keypad or Controller	Call Equalizer Systems
	Defective Keypad or Controller Harness	Trace and repair
Keypad turns on, Jacks will not operate	Low battery voltage to pump	Charge chassis and/or coach batteries
	Faulty electrical connection	Trace and repair
	Defective Keypad or Controller	Call Equalizer Systems
	Defective pump motor or solenoid	Replace motor and/or solenoid
	Other system defect	Call Equalizer Systems
Jacks will retract but will not extend	Low battery voltage to pump	Charge chassis and/or coach batteries
	Park brake not set	Set park brake
	If Birotational Pump, bad motor or solenoid	Replace motor and/or solenoid
	Anti-twist software protocol has been initiated	Lower opposite side of coach and/or re-set Null and level coach
	Ignition switch in wrong position	Check and change as needed
	Defective Keypad or Controller	Call Equalizer Systems
	Faulty electrical connection	Trace and repair
	System defect	Call Equalizer Systems
Jacks will extend but will not retract	Low battery voltage	Charge chassis and/or coach batteries
	Incorrect hose connection at pump or jackleg	Trace and repair
	If Unirotational pump, DV 1 valve/coil/wire circuit defective	Check and repair as needed
	Defective Keypad or Controller	Call Equalizer Systems
	If Birotational Pump, bad motor or solenoid	Replace motor and/or solenoid
Auto-Level will not level	System Null not set	Set Null
	Controller installed improperly or has moved	Check controller orientation
	Ignition switch in wrong position	Check and change as needed
	Damaged or defective Keypad or Controller harness	Call Equalizer Systems
	Defective Keypad or Controller	Call Equalizer Systems
	Other system defect	Call Equalizer Systems

Symptom	Possible Cause	Corrective Action
Auto-Level stops mid-cycle	Low battery voltage	Charge chassis and/or coach batteries
	Excessive vehicle motion during leveling sequence	Reset Keypad and re-try
	Damaged or defective Controller	Check and change as needed
	Damaged or defective Keypad or Controller harness	Call Equalizer Systems
	Other system defect	Call Equalizer Systems
Jack LED's on keypad stay on	Defective pressure switch or wiring	Trace and repair or replace
	Defective Keypad, Controller, or Pump harness	Trace and repair or replace
	Defective Keypad or Controller	Call Equalizer Systems
	Low system pressure caused by fluid leak or low fluid level	Correct leak or fluid level
Hydraulic pump inoperative	Low battery voltage	Charge chassis and/or coach batteries
	Blown fuse or breaker at fuse panel	Replace fuse or reset breaker
	Faulty electrical connection	Trace and repair
	Defective pump motor or solenoid	Replace
Jack(s) bleed down from leveled or stowed position	Air in hydraulic system	Purge air
	External fluid leak	Trace and repair
	Defective valve in pump	Clean or replace valve
	Defective jackleg	Replace jackleg
Jack(s) are jerky when retracting	Air in hydraulic system	Purge air
	Fluid level low	Check fluid level and add
Jack(s) will not retract from extended position	Low battery voltage at pump	Charge chassis and/or coach batteries
	Low battery voltage or poor ground	Charge chassis and/or coach batteries and ensure proper grounding
	Damaged/defective harness from Keypad to Controller or Controller to pump	Trace and repair
	Fluid level low	Check fluid level and add
	Defective pump motor or solenoid	Replace

Avoid headaches! Always ensure & verify proper charge of the batteries!

Proper and adequate grounding of the pump is essential

80% of the calls we receive are found to be a discharged battery or poor ground

**If your problem is not listed, call Equalizer Systems at (800) 846-9659
Prior Authorization for warranty is required**



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 **two years** 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 Parts 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 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.

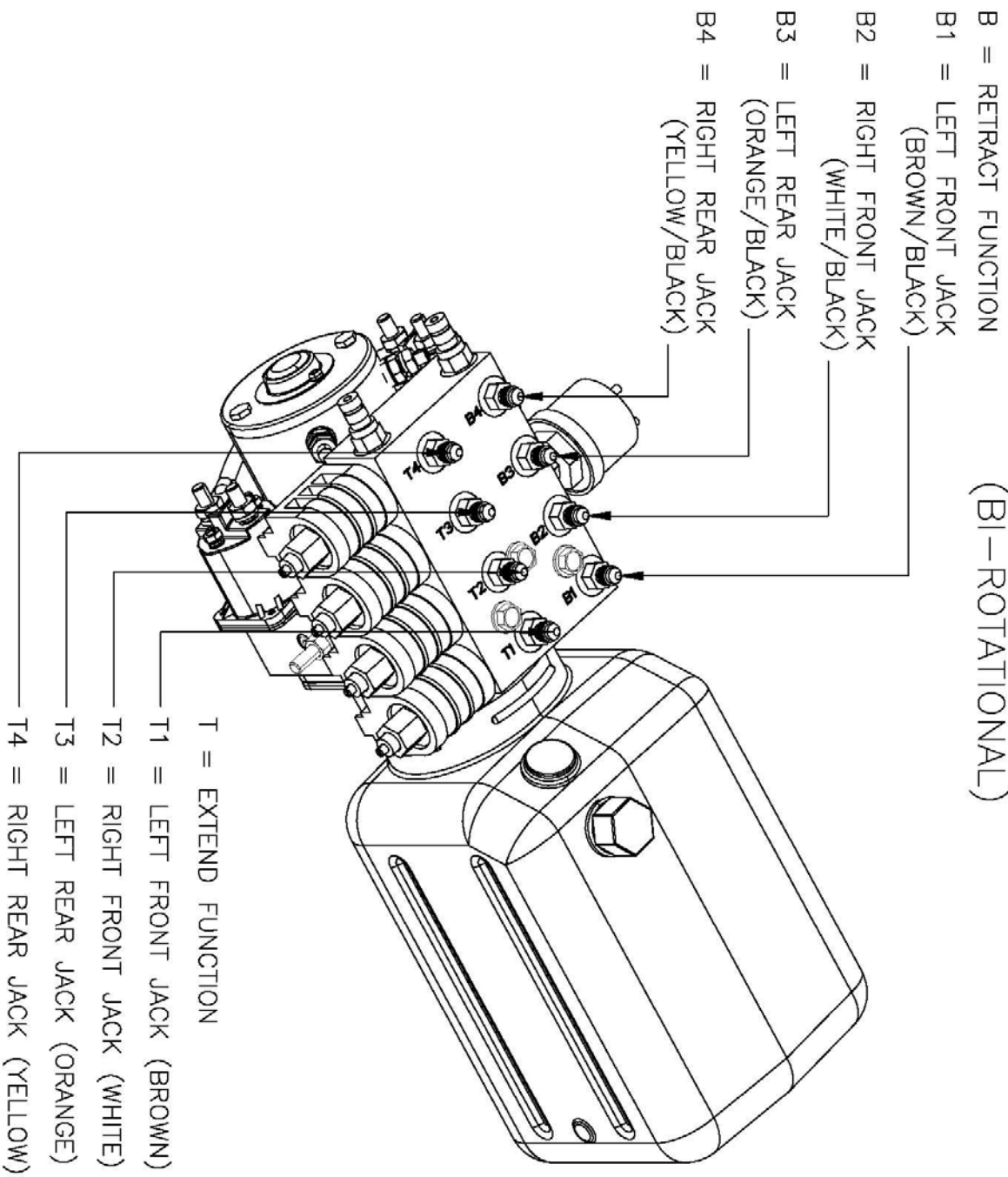
No additional warranties, expressed or implied, are authorized by Equalizer Systems

This warranty voids all previous issues.

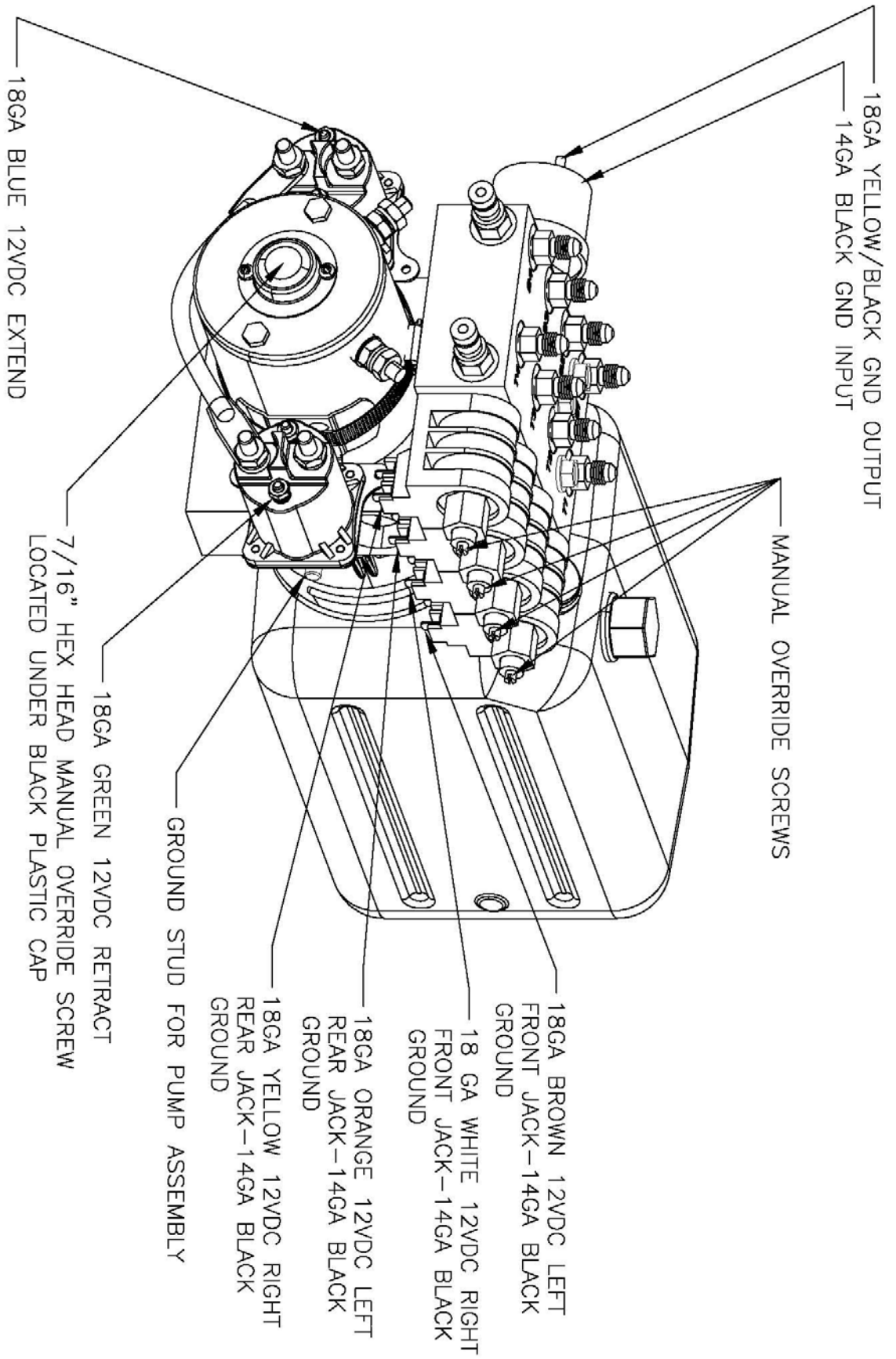
Questions concerning this warranty should be directed to:

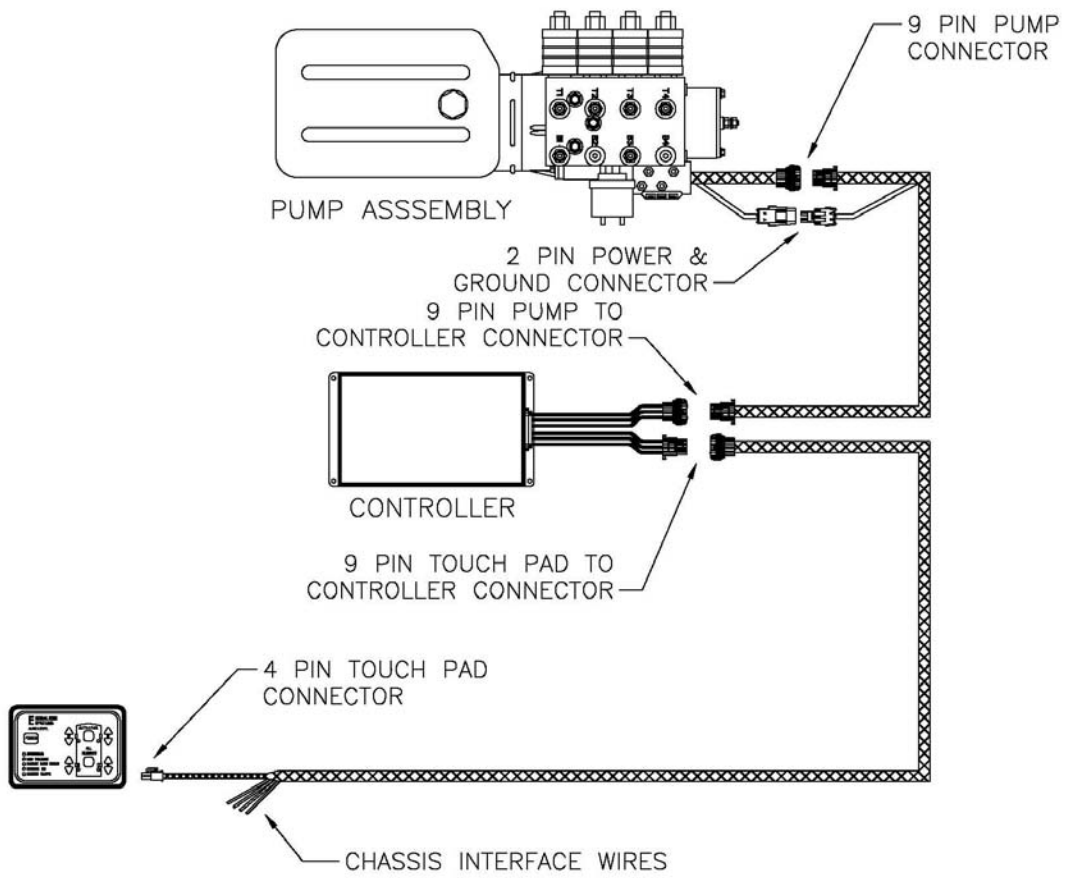
Equalizer Systems
P.O. Box 668
Elkhart, IN 46515
1-(800) 846-9659
1-(574) 266-6083 fax

HOSE IDENTIFICATION (BI-ROTATIONAL)

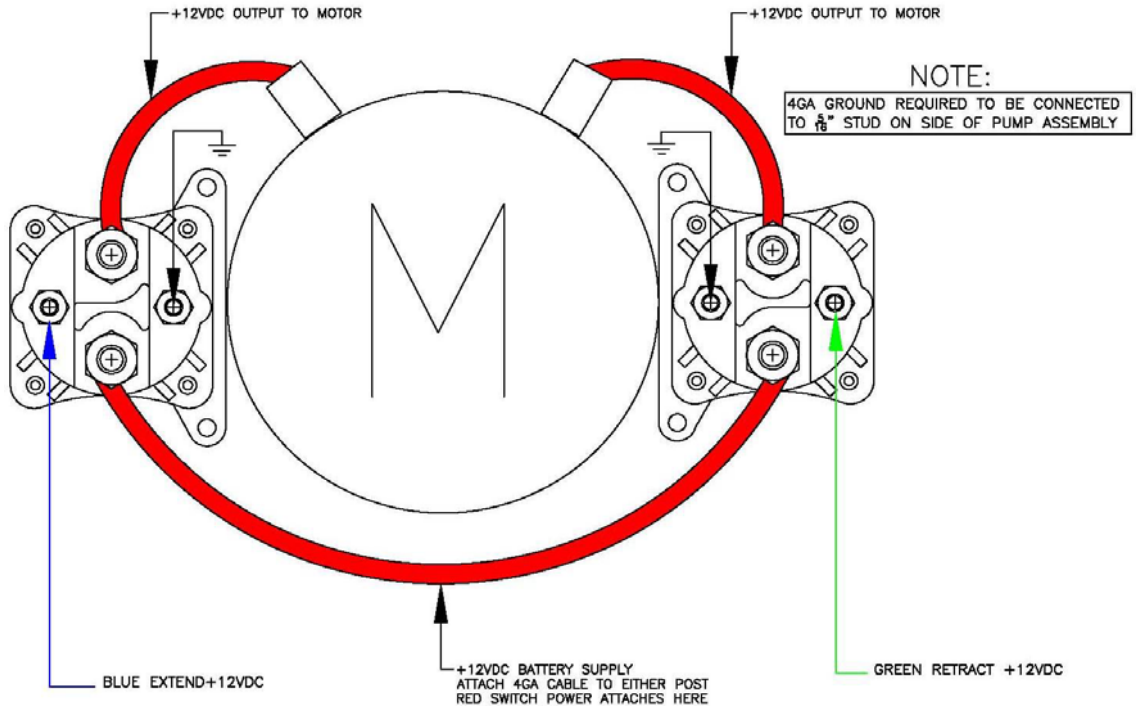


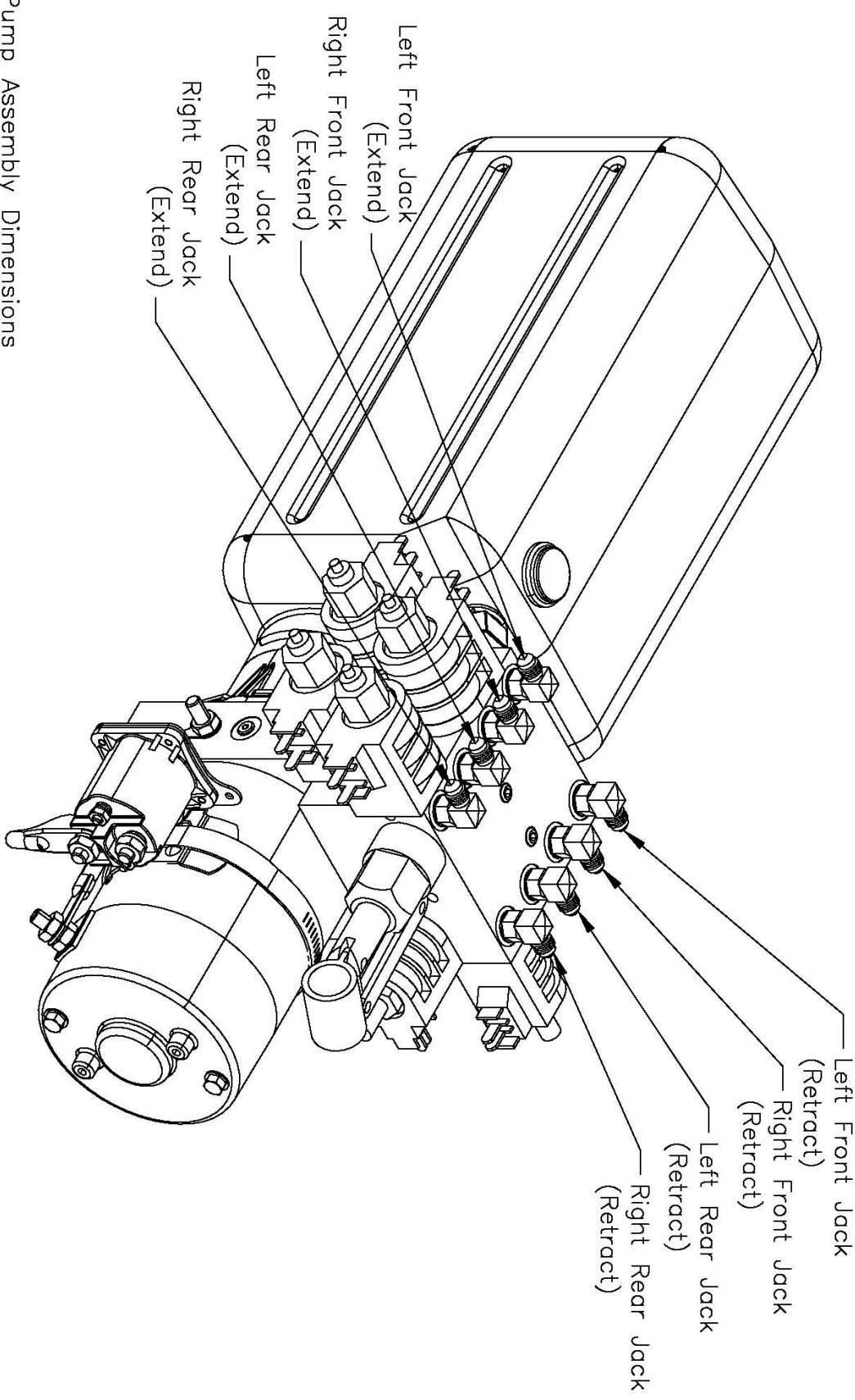
HYDRAULIC PUMP FUNCTION WIRING (BI-ROT 2390, 2532, 2542 SHOWN)





BIROTATIONAL WIRING CONFIGURATION





Pump Assembly Dimensions
 Length—24"
 Width—11"
 Height—10"

Equalizer SS169 COUNTY ROAD 3
 ELKHART, IN 46515

NOTICE - This drawing, including principles of design, is the property of Dage Corporation, Elkhart, Indiana, with the understanding that no confidential information, directly or indirectly to Dage Corporation, Appearance of this will be construed as an agreement of the above.

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

