



4 POINT MANUAL LEVELING SYSTEM

Installation/Operation

Effective March 2021

EQ015R7



(800) 846-9659
EQSystems.us

4 POINT MANUAL LEVELING SYSTEM

Installation, Troubleshooting

AM, AJ, SM, HM, SL, DP Hydraulic Leg Assemblies

Effective January 2021

Revised March 2017

Contents

<u>Required Tools & Parts</u>	<u>Page 3</u>
<u>Installation</u>	<u>Page 4 & 5</u>
<u>Manifold & Connections</u>	<u>Page 5</u>
<u>Hydraulic Fluid & Purging</u>	<u>Page 6 - 8</u>
<u>Operation</u>	<u>Page 8 & 9</u>
<u>Manual Override</u>	<u>Pages 9 - 12</u>
<u>Troubleshooting</u>	<u>Pages 13 & 14</u>
<u>Diagrams</u>	<u>Appendix</u>

EQ SYSTEMS 4 POINT LEVELING SYSTEM

INSTALLATION GUIDE

This manual is intended to be used by technicians installing EQ Systems 4 leg leveling 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/screw gun and 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 -12Vground 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 Automatic Transmission Fluid

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

Note: Modification of any factory supplied item may result in the denial of all warranty claims.
Call EQ 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.

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 within 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 EQ Systems (800) 846-9659

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 / AM / CT / SM -16, 20, 24, 30, 36

Jack travel (stroke)

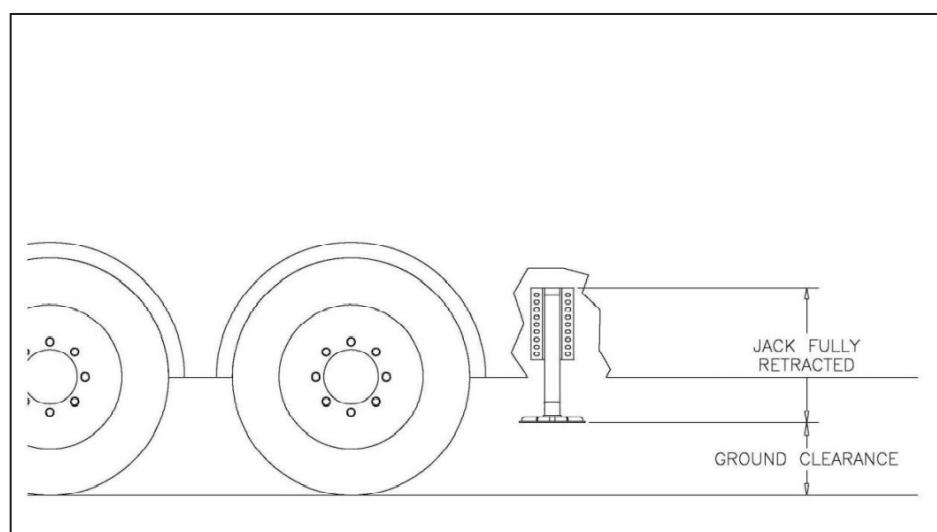
16" = 8 - 10 inches of ground clearance

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 vehicles.

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

Jack Leg	Manifold Connection
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

Step 6 (Pump harness connections): Recall the pump installation from Step 3. Attach the supplied wire harness between the pump and the dual/quad switch box(s). Depending on the switch/harness(s) supplied there could be multiple connectors involved for the jacks. If using a pair of dual leg switch and harnesses there will be a connector for each switch and harness set that are identical. If after installing the system the switches are desired to run the “other” legs simply switch the connectors. There may be other connectors if the pump unit will also be running slide-outs. If slides are involved, contact EQ 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. 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 7 (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 terminal (this terminal will have a yellow or red fused wire attached to it) 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).

Step 8 (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, both the cable from the pump to the frame and the battery negative to the frame must meet the requirement above. The connections 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.

PURGE INSTRUCTIONS FOR UNI-DIRECTIONAL PUMP- 1551

Step 9 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 switch (If equipped with a keyed switch, the key must be in the on position) to Trailer Down for each jack(s). The jacks may be run in pairs (front pair & rear pair). You will know when the retraction side of the hydraulic circuit is pressurized when the fluid level in the reservoir stops and the pump changes sound (bypass mode). Release the switch(s) when this occurs. Refill the reservoir to full.

Full Purge: Next, cycle the system by lowering each jack to the ground, by pressing the switch to the Trailer UP position. Do not allow the jack to lift the coach. After all jacks are in contact with the ground, press the switch(s) to retract all of the jacks. Refill the reservoir to full. Next run the jacks in pairs (front pair & rear pair) to full extension by holding the switches (front pair or rear pair) in the Trailer Up position simultaneously. Monitor the fluid level and check all fittings for leakage. Retract the jacks by pressing the rocker switches to the Trailer down position (this should be done in pairs). 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.

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

POWER CONNECTIONS FOR BI ROTATIONAL PUMP

Step 7 (Pump +12v):

Pump # 2390, 2532, 2542: Attach a # 4 gauge wire (# 2 gauge if the run is over 12ft.) between the positive +12v terminal on the battery and the terminal on the motor solenoid. This terminal will have a cable that joins both of the motor solenoids. This terminal also will have a red or yellow fused wire attached to it. 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).

Pump # 3043: This unit will have a single reversing contactor. The positive battery connection is made to the + terminal on this contactor. There will also be a fused wire- red or yellow at this terminal. Use # 6 or # 4 gauge wire for this supply.

Step 8 (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, both the cable from the pump to the frame and the battery negative to the frame must meet the requirement above. The connections 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 OF BI ROTATIONAL PUMPS- 2390, 2532, 2542, 3043

Step 9: This procedure must be performed both with the initial installation & running of hydraulic system and following installation of the pump assembly and jack(s). This step applies only to 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) (This is done by pressing the rocker switch(s) to the Trailer Up position). 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) (this is done by pressing the rocker switch(s) in the trailer down position) Check instructions for operation for more on this. 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
- Maintain the fluid level at least $\frac{3}{4}$ full when the jacks are retracted.
- 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.
- Allowing the air to dissipate through the reservoir and maintaining the reservoir fluid level will get things working faster.

EQ SYSTEMS OPERATION

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

Keyed Switch:

A keyed switch is located at the switchgear assembly(s). The key needs to be turned to the “on” position for operation. This keyed switch is a security feature intended to help minimize the possibility of unauthorized system operation. The keyed switch should only be turned to the on position when it is desired to operate the jacks. At all other times, the keyed switch must be turned to the “off” position and the key removed. This includes when the trailer/vehicle is parked with the jacks in any position (extended or retracted). During transport of the vehicle, the keyed switch must be turned to the off position and the key removed.

Basic Operation:

There is a rocker switch for each jackleg. Your system will either have two switchgear assemblies, both with two rocker switches, or you will have one switchgear assembly with 4 rocker switches.

Identify the rocker switch for the jack(s) that you want to run and operate the rocker switch. Push 'Trailer Up' to extend the jack and lift the trailer, or operate the switch in the 'Trailer Down' position to retract the jack(s) and lower the trailer.

The jacks may be operated individually, in pairs, or in any multiples- as long as they are operated in the same direction (extend or retract).

The Recommended Process of Extending the Jacks to Lift and Level the Trailer:

Extend the front jacks as a pair by pressing the rocker switches for the front jacks in the "Trailer Up" position. When the front jacks are planted, move to the rear jacks. Run them as a pair- "Trailer Down" until they are planted. Then operate the jacks individually or in pairs to level the vehicle. Care should be taken to insure that over extending any individual jack(s) does not cause stress or twisting of the vehicle.

To Lower the Trailer, (Retract the jacks):

Prior to lowering the vehicle (retracting the jacks) check around and under the unit.

This is basically the reverse order of extending the jacks. Use the rocker switches in pairs by pressing the rocker switch(s) in the "Trailer Down" position. Care should be taken to avoid twisting the trailer as it is being lowered. Fully retract the jacks prior to moving the vehicle.

MANUAL OVERRIDE PROCEDURE FOR 4 JACK SYSTEM

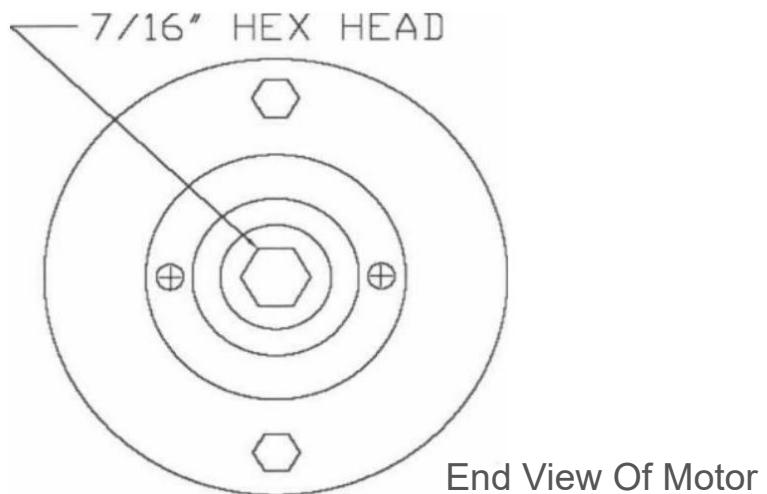
Most systems manufactured after January 2012 have some type of override system that will allow the operation of the jacks if there is a failure of the power supply, control circuit, or motor failure. It is in place to restore the vehicle to transportable so that the issue can be dealt with at a later time and place. It is not designed to be used for general operation. It is recommended that if the failure is simply a dead battery, that the batteries be charged so that the system can be operated normally rather than going through the following procedure(s).

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

- Your hydraulic motor may be equipped with a manual override output shaft. You must use a drill with a 7/16" socket driver.
- 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 and/or 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" (11mm) socket driver.

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



- 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

UNI-DIRECTIONAL PUMPS

Pump #s 2015, 2017, 1551

Retracting your jack(s) using the manual override (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. 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 side of the manifold adjacent 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.

Following manual override operation, failure to return all valves to normal position may cause one or more jack legs to drift 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 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 or 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)

Locate the individual cartridge valves that 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 does have this valve, turn the screw clockwise until seated in as above.

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. The 3043 pump will have a foil sticker override which will need a 1/4 Allen drive with the drill..

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.

Following manual override operation, failure to return all valves to normal position may cause one or more jack legs to drift 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" counterclockwise position.

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

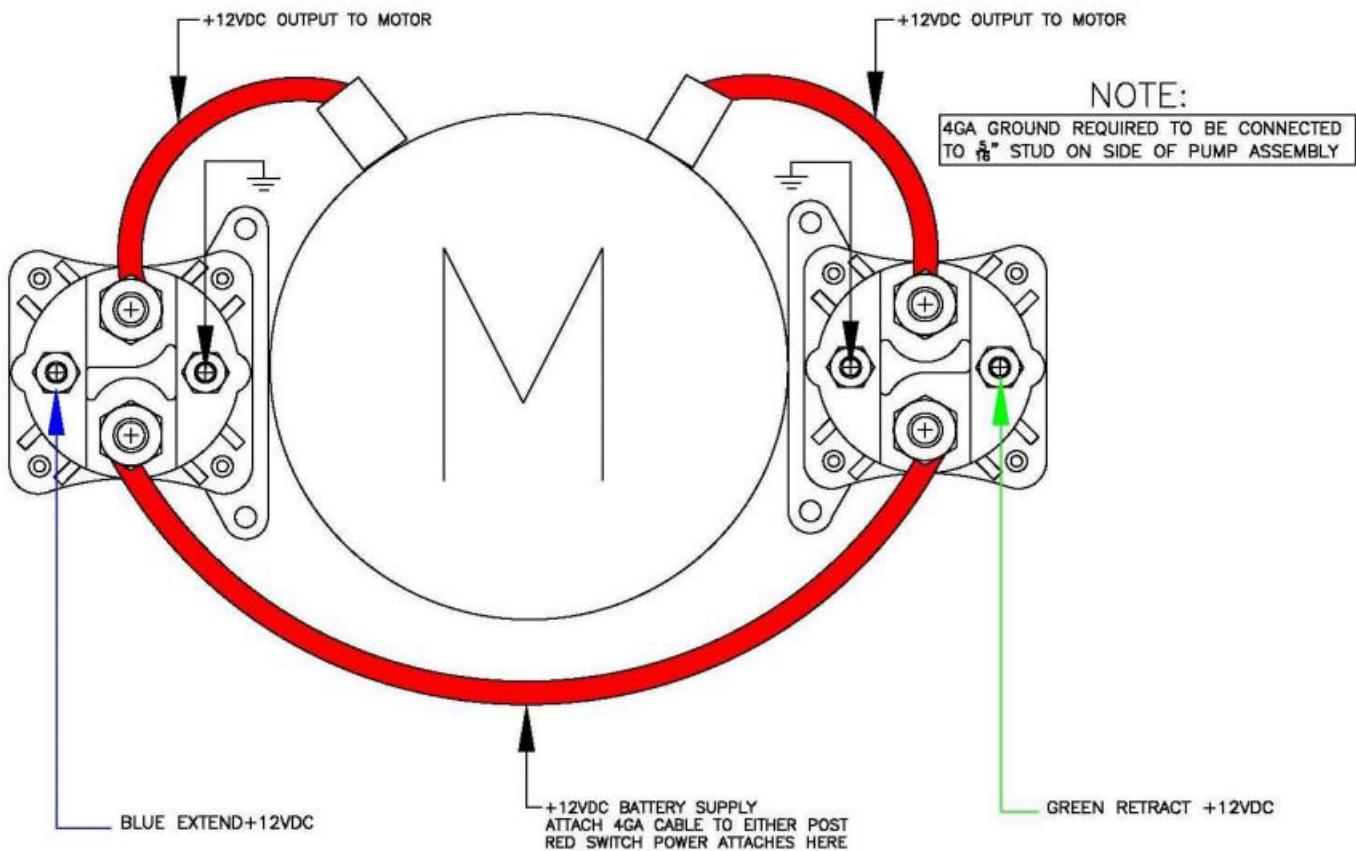
Troubleshooting Guide

Symptoms	Possible Cause	Corrective Action
Pump will not run	Blown fuse at pump harness	Replace fuse
	Faulty ground or power wire	Trace and repair
	Low battery voltage	Charge chassis and/or vehicle batteries
	Defective motor or motor solenoid	Replace motor or solenoid
	Defective control switch or wiring	Trace and repair/replace
Motor runs, but jacks do not move	Low battery voltage to pump	Charge chassis and/or vehicle batteries
	Faulty electrical connection to valve coil(s)	Trace and repair
	Directional control valve stuck	Replace directional control valve
Jacks will retract, but will not extend	Low battery voltage to pump	Charge chassis and/or vehicle batteries
	If Bi-Rotational Pump, bad motor or solenoid	Replace motor and/or solenoid
	If Uni-Directional pump, directional valve stuck	Remove valve and clean. Reassemble and test, or replace valve
	Plugged fitting or kinked hose	Locate and replace
Jacks will extend, but will not retract	Low battery voltage	Charge chassis and/or vehicle batteries
	Incorrect hose connection at pump or jackleg	Trace and repair
	If Uni-Directional pump, DVI valve/coil/wire circuit defective	Check and repair as needed
	Directional control valve - DVI stuck	Remove valve and clean. Reassemble and test, or replace valve
	If Bi-Rotational pump, bad motor or solenoid	Replace motor and/or solenoid

Symptoms	Possible Cause	Corrective Action
Jack(s) will not support vehicle weight	External fluid loss	Tighten fittings or replace component
	Internal fluid bypass (cylinder)	Replace cylinder
	Manifold valve not holding fluid pressure	Replace valve
	Manifold valve override screw in improper position	Return screw to proper (out) position
	Air in hydraulic system	Extend and retract jacks fully to purge
Jacks will not stay in the retracted position	External fluid leak	Tighten fittings or replace component
	Valve- DV2 override screw in improper position	Return screw to proper (out) position
	Valve- DV2 defective	Replace Valve
	Defective hydraulic cylinder	Replace hydraulic cylinder
	Air in hydraulic system	Extend and retract jacks fully to purge
Jacks operate 'jerky' or 'mushy'	Low fluid level	Add fluid (dexron ATF) as needed
	Air in hydraulic system	Extend and retract jacks fully to purge
Jacks pulsate or are 'jerky' in retraction (under load)	Air in hydraulic system	Extend and retract jacks fully to purge
	Improper restrictor fitting at top of jack	Install proper fitting

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

BIROTATIONAL WIRING CONFIGURATION



HOSE IDENTIFICATION

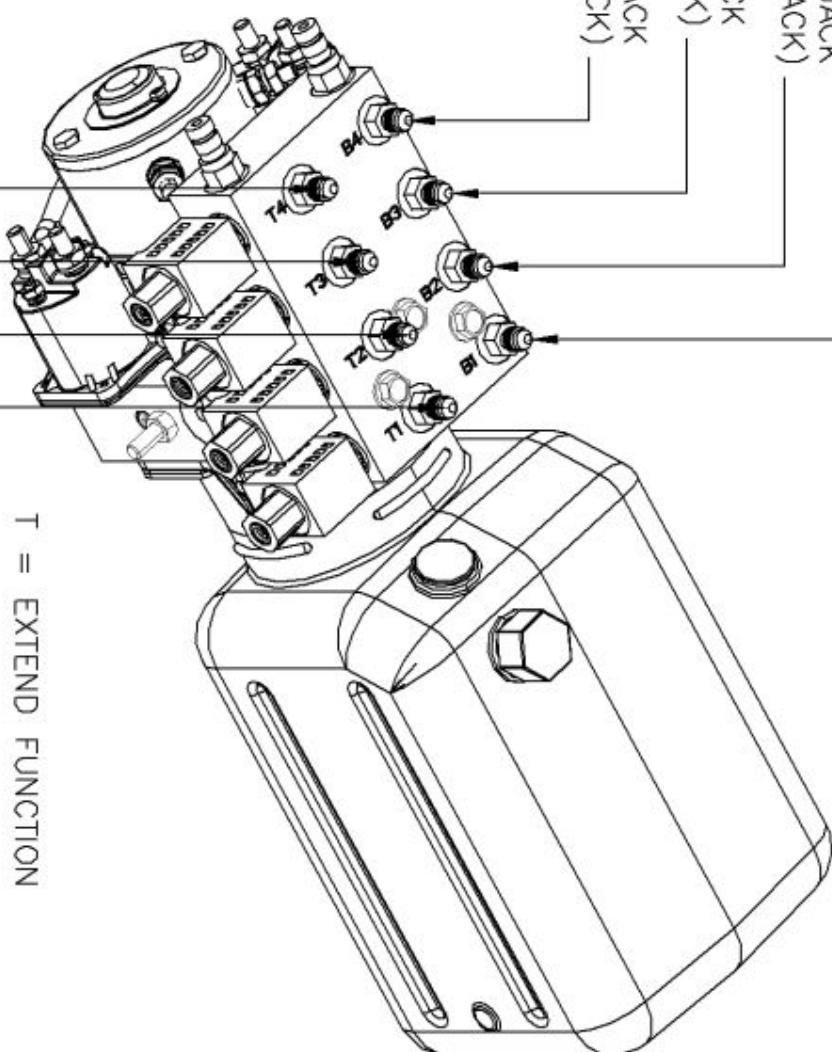
B = RETRACT FUNCTION

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 = LEFT REAR JACK (YELLOW)

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

