



HYDRAULIC LEVELING  
(4 POINT/3 VALVE SPRINTER)  
OEM INSTALLATION MANUAL

# TABLE OF CONTENTS

|                                                                   |           |
|-------------------------------------------------------------------|-----------|
| <b>System Information</b>                                         | <b>3</b>  |
| Component Description                                             | 3         |
| <b>Safety Information</b>                                         | <b>4</b>  |
| <b>Preparation</b>                                                | <b>4</b>  |
| Resources Required                                                | 4         |
| Preliminary Procedures                                            | 5         |
| <b>Installation</b>                                               | <b>6</b>  |
| Prior to Installation                                             | 6         |
| Jack Fitting Installation - Standard                              | 7         |
| Jack Fitting Installation - Gen II                                | 7         |
| Hydraulic Power Unit Installation                                 | 8         |
| Rear Jack Bracket and Jack Installation                           | 9         |
| <b>Front Jack Bracket and Jack Installation</b>                   | <b>10</b> |
| Road Side Jack Bracket Installation (Flat Bracket)                | 10        |
| Road Side and Curb Side Bracket Installation (U-Bracket)          | 10        |
| Curb Side Jack Bracket Installation (Flat Bracket)                | 11        |
| Jack Installation                                                 | 12        |
| Installing the Cross Tie Assembly                                 | 13        |
| Hydraulic Hoses                                                   | 14        |
| <b>Controller and Touchpad Installation</b>                       | <b>15</b> |
| Controller Installation                                           | 15        |
| Touchpad Installation                                             | 16        |
| System Wiring Requirements                                        | 17        |
| <b>Operation</b>                                                  | <b>17</b> |
| <b>Controls</b>                                                   | <b>17</b> |
| Features                                                          | 17        |
| Zero Point Calibration                                            | 19        |
| Automatic Leveling Descriptive Logic                              | 19        |
| Automatic Leveling Procedure                                      | 19        |
| Manual Leveling Procedure                                         | 20        |
| Automatic Jack Retract Procedures                                 | 20        |
| Manual Jack Retract Procedures                                    | 21        |
| <b>Troubleshooting</b>                                            | <b>21</b> |
| Manual Override of The Power System and Jacks                     | 21        |
| Automatic Safety Shutoff                                          | 22        |
| Drive Away Protection System                                      | 22        |
| Jacks Up Verification                                             | 22        |
| Error Mode                                                        | 23        |
| Excess Slope                                                      | 23        |
| User Alarm Mode                                                   | 23        |
| Miscellaneous                                                     | 23        |
| Low Voltage Signal                                                | 24        |
| Troubleshooting Table                                             | 24        |
| <b>Maintenance</b>                                                | <b>25</b> |
| Fluid Recommendation                                              | 25        |
| Purging the Hydraulic System                                      | 25        |
| Preventative Maintenance                                          | 26        |
| <b>Wiring Diagram - Overall System</b>                            | <b>27</b> |
| <b>Wiring Diagram - Controller and Touchpad (Water Resistant)</b> | <b>28</b> |
| <b>Hydraulic Plumbing Diagram</b>                                 | <b>29</b> |

## System Information

**NOTE:** The hydraulic leveling system was designed for use only on a Sprinter chassis.

The four-point three-valve hydraulic leveling system is a hydraulic system which includes four points of contact utilizing jacks and a three-valve system. A 12V DC electric motor drives a hydraulic pump that moves fluid through a system of hoses, fittings and jacks to level and stabilize the coach. Mechanical portions of the hydraulic leveling system are replaceable. Contact Lippert Components, Inc. to obtain replacement parts.

The hydraulic leveling system is primed and tested at the factory. However, the system is shipped dry to avoid hazardous material restrictions.

### Component Description

1. Jacks
  - A. Rated at a lifting capacity of 8,000 lbs each.
  - B. Standard 9" diameter (63.5 sq in) foot pad on a ball swivel for maximum surface contact on all surfaces.
  - C. System operation is powered by a 12V DC motor/pump assembly.
2. Motor/Pump Assembly
  - A. 12V DC motor
  - B. Hydraulic fluid reservoir tank, 1.2 gal
  - C. Control valve manifold
  - D. Solenoid valve for directing control
3. System Controls
  - A. Controlled electronically from the touchpad
  - B. Touchpad can be operated in manual mode or fully automatic mode
4. Fittings and Hoses
  - A. Fittings - High pressure O-Ring Face or JIC - Size 4
  - B. Hose - 1/4" I.D., 3000 psi - W.P. Rated

## Safety Information

Please read and study the operating manual before operating the leveling system.

### **WARNING**

The "WARNING" symbol above is a sign that an installation procedure has a safety risk involved and may cause death or serious injury if not performed safely within the parameters set forth in this manual.

### **CAUTION**

The "CAUTION" symbol above is a sign that a safety risk is involved and may cause personal injury and/or product or property damage if not safely adhered to and within the parameters set forth in this manual.

### **WARNING**

During servicing make sure that the coach is supported according to the manufacturer's recommendation. Lift the coach by the frame and never the axle or suspension. Do not go under the coach unless it is properly supported. Unsupported coaches can fall causing death or personal injury or product or property. Use proper personal protective equipment damage.

### **WARNING**

Failure to act in accordance with the following instructions may result in serious personal injury or death

### **CAUTION**

**Moving parts can pinch, crush, or cut. Keep clear and use caution**

The use of the Lippert Components, Inc. Hydraulic Leveling System to support the coach for any reason other than which it is intended, is prohibited by the Lippert Limited Warranty. The Hydraulic Leveling System is designed as a leveling system only and should not be used for any reason to provide service under the coach, e.g. changing tires or servicing the leveling system.

Lippert Components, Inc. recommends that a trained professional be employed to change the tires on the coach. Any attempts to change tires or perform other service while the coach is supported by the hydraulic leveling system could result in damage to the coach and/or cause serious injury or death.

## Preparation

### Resources Required

- Electric or cordless drill
- Assorted deep well sockets
- Ratchet wrench
- Open end wrenches
- Pliers
- Permanent marker or grease pencil
- Tape measure
- Assorted screwdrivers

## Preliminary Procedures

1. Make sure to park the coach on solid and level ground.
2. Clear all jack landing locations of debris and obstructions. Locations should also be free of depressions.
3. When parking the coach on extremely soft surfaces, utilize load distribution pads under each jack.
4. People and pets should be clear of coach while operating leveling system.
5. Keep hands and other body parts clear of fluid leaks. Hydraulic system leaks in the hydraulic leveling system may be under high pressure and can cause serious skin penetrating injuries.

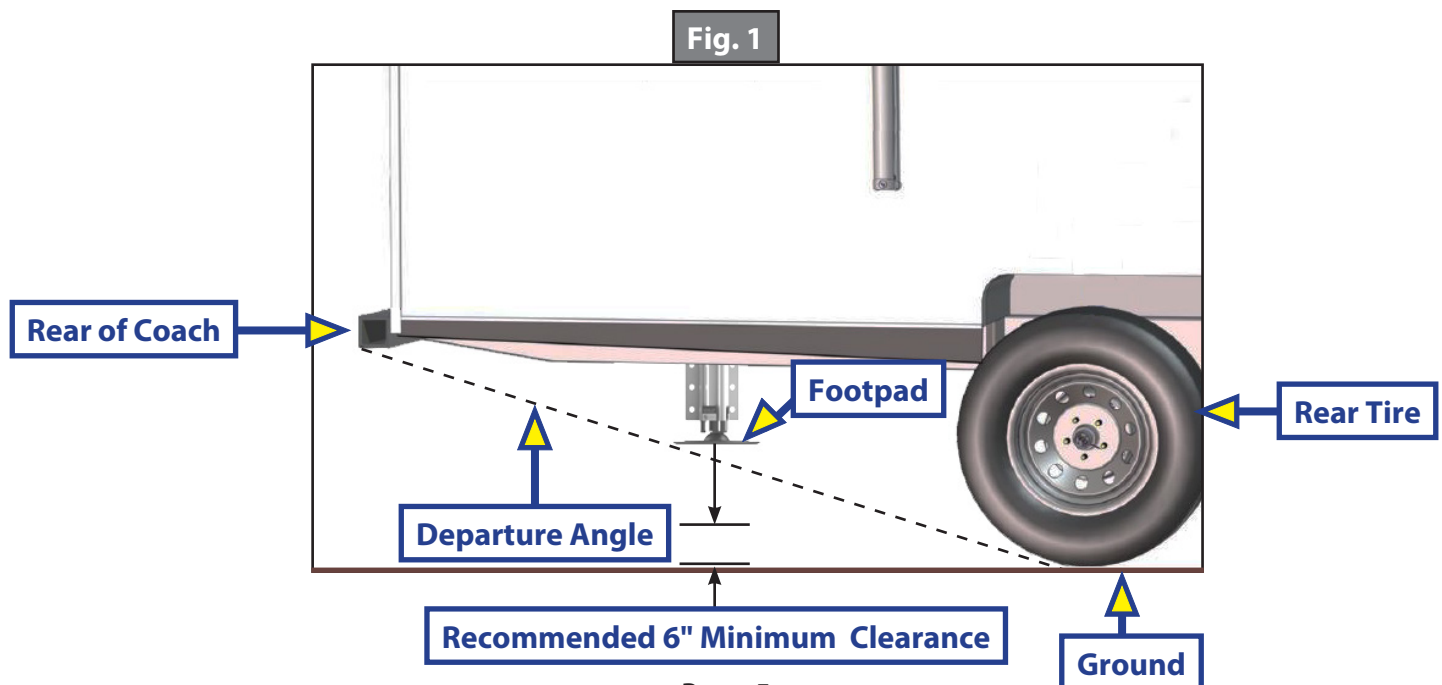
### **⚠ WARNING**

**Never lift the coach completely off the ground. Lifting the coach so the wheels are not touching the ground will create an unstable and unsafe condition. Do not lift the coach by the axles. The axles were not designed as a viable lift point.**

6. Using the properly-rated floor jack, support framework and lift the coach according to the manufacturer's recommendations.

**NOTE:** When fully retracted, the rear jacks must be mounted to achieve a minimum ground clearance equal to the departure angle in order to enable maximum leveling correction. Any additional ground clearance added to the jack location will decrease the amount of leveling correction available to the system. A recommended minimum ground clearance between the bottom of the jack footpad and the ground is 6" (Fig. 1).

7. Determine how and where the jack brackets will be bolted to the frame of the coach by dry fitting brackets. Mark location with a permanent marker or grease pencil.
  - A. The rear jacks should be mounted so that there is a minimum of 2" clearance between the jack and the rear tires, suspension and exhaust components, and aligned with each other.
  - B. The front jacks should be mounted approximately 12" behind the front axle.
  - C. Determine the location where the new power unit will need to be mounted near center of chassis, roadside frame rail.
8. Check for any obstructions, such as slide-out cross shafts, outriggers or manual override connections for slide-outs that will require modification of the brackets prior to bolting on.
9. Locate and move any wires, hoses, etc. that could be damaged while bolting on the jack brackets to the frame.
  - A. Check both the inside and outside of the frame.

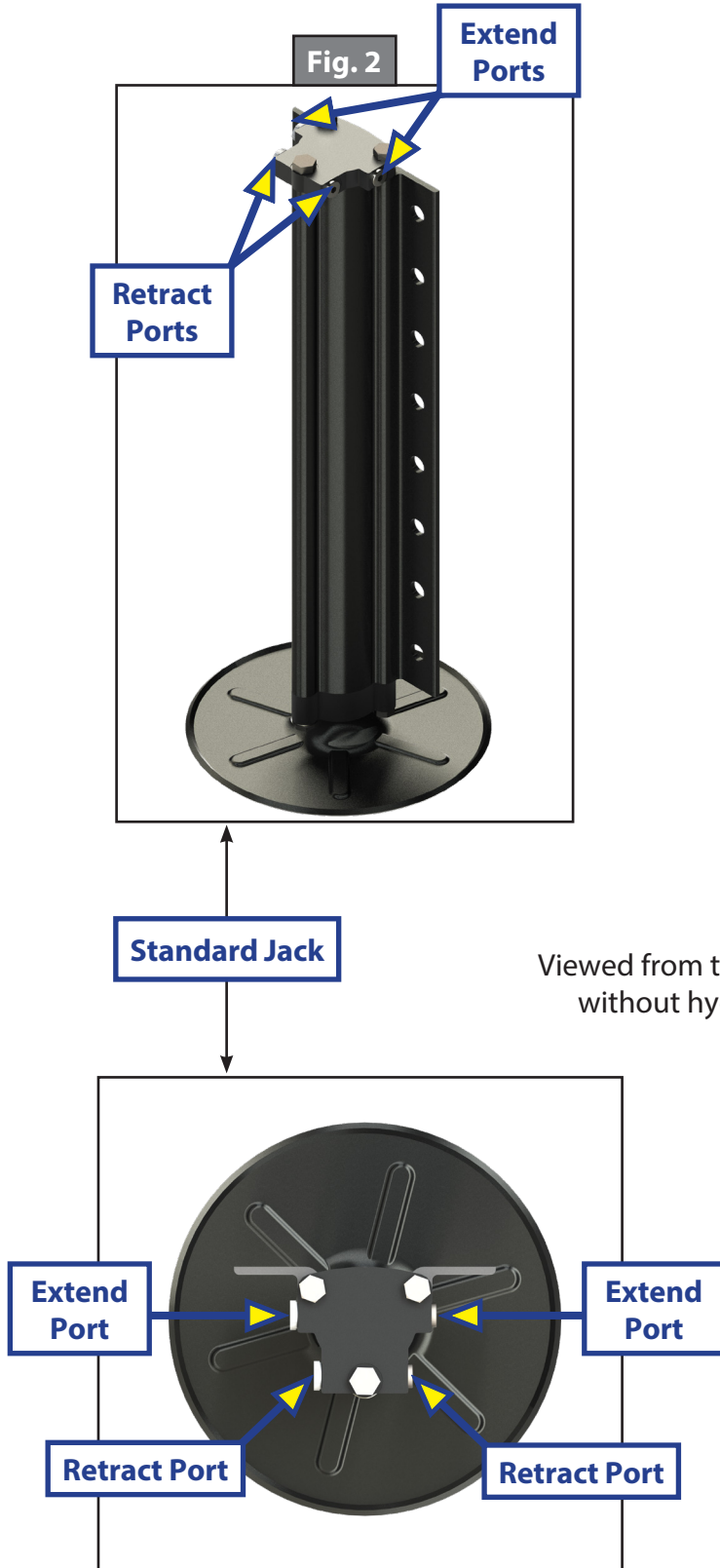


# Installation

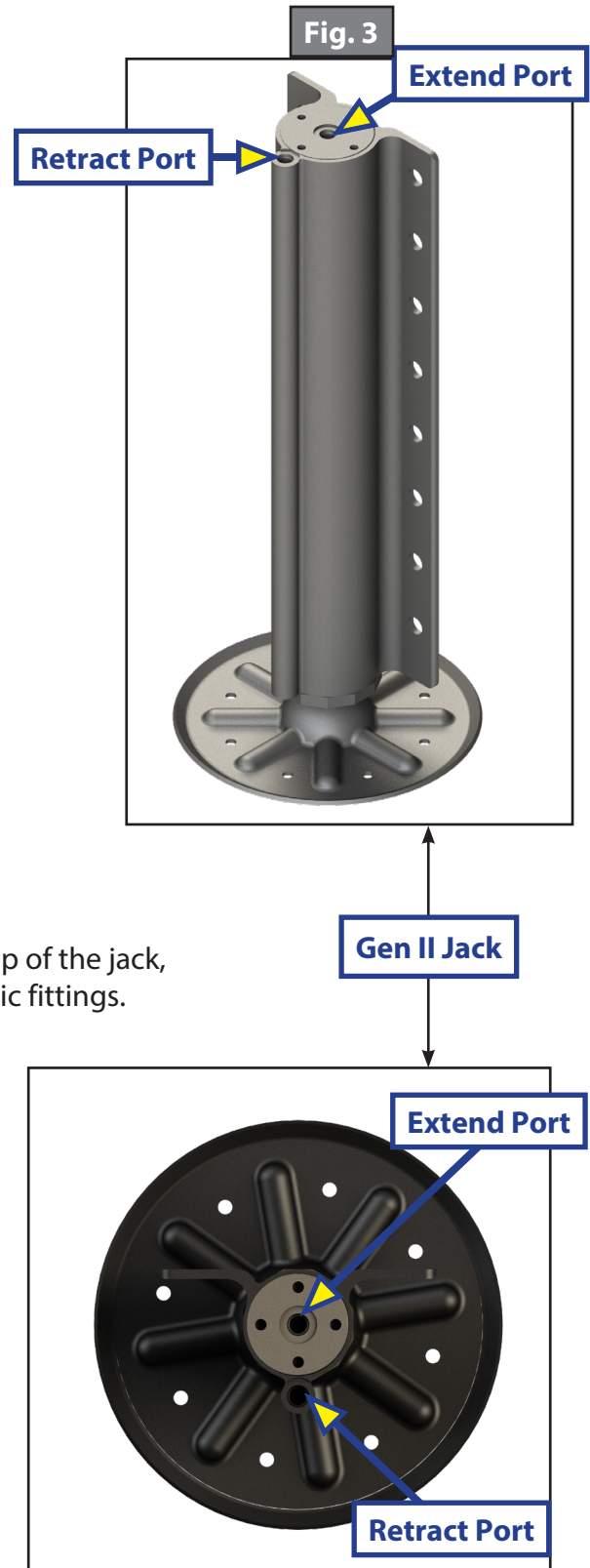
## Prior to Installation

Refer to the Hydraulic Plumbing Diagram (Page 29) for the following steps:

1. Identify where the extend and retract ports are on the jack (Fig. 2 and Fig. 3).
2. Verify that the ports are clear of any residual machining metal debris.
3. Label each jack Left Front (LF), Right Front (RF), Right Rear (RR) or Left Rear (LR).



Viewed from the top of the jack,  
without hydraulic fittings.



Because of various possible configurations, this manual will provide instructions with the power unit mounted near the center of the coach frame, roadside frame rail. Fittings and hose configurations may be OEM specific. Under normal installation procedures, the jacks closest to the power unit get plumbed first. See the Hydraulic Plumbing Diagram (Page 29) for the power unit located on the left side of the coach.

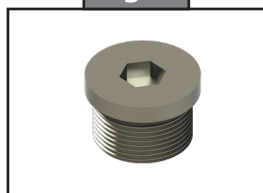
### Jack Fitting Installation - Standard

1. The Left Front (LF) jack requires two tees, two 90° elbows and two port plugs.
2. The Right Front (RF) jack requires two 90° elbows and two  $\frac{7}{16}$ " port plugs.
3. The Left Rear (LR) jack requires one tee, two 90° elbows and two  $\frac{7}{16}$ " port plugs.
4. The Right Rear (RR) jack requires two 90 degree elbows and two  $\frac{7}{16}$ " port plugs.
5. The hydraulic fittings and  $\frac{7}{16}$ " port plugs (Figs. 4, 5 and 6) can be installed into the jacks (Fig. 7 and 8) per the Hydraulic Plumbing Diagram (Page 29).

### Jack Fitting Installation - Gen II

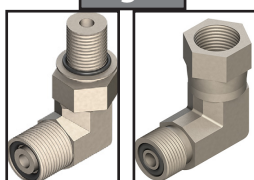
1. The Left Front (LF) jack requires two tees.
2. The Right Front (RF) jack requires two 90° elbows.
3. The Left Rear (LR) jack requires one tee, one 90° elbow
4. The Right Rear (RR) jack requires two 90 degree elbows.

**Fig. 4**



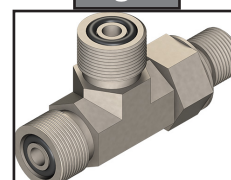
$\frac{7}{16}$ " Port Plug

**Fig. 5**



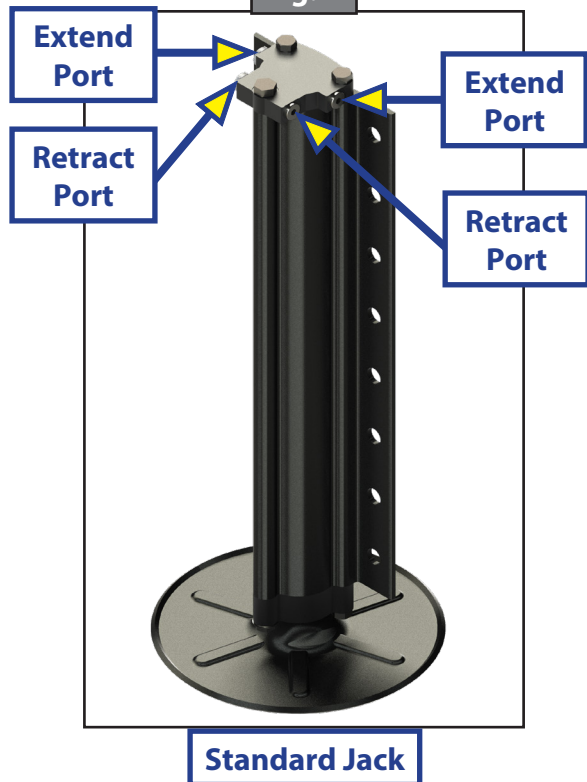
90° Fittings

**Fig. 6**

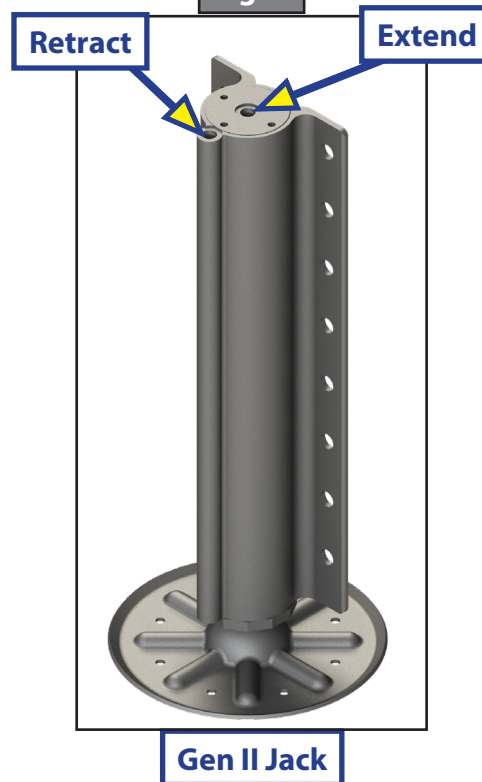


Tee Fitting

**Fig. 7**



**Fig. 8**

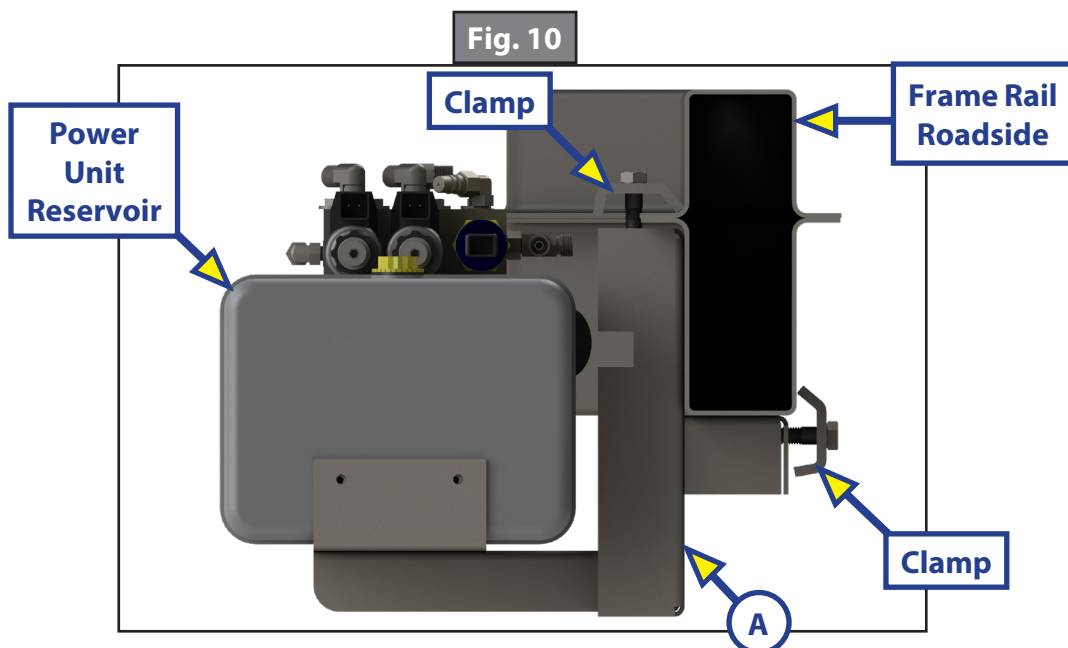
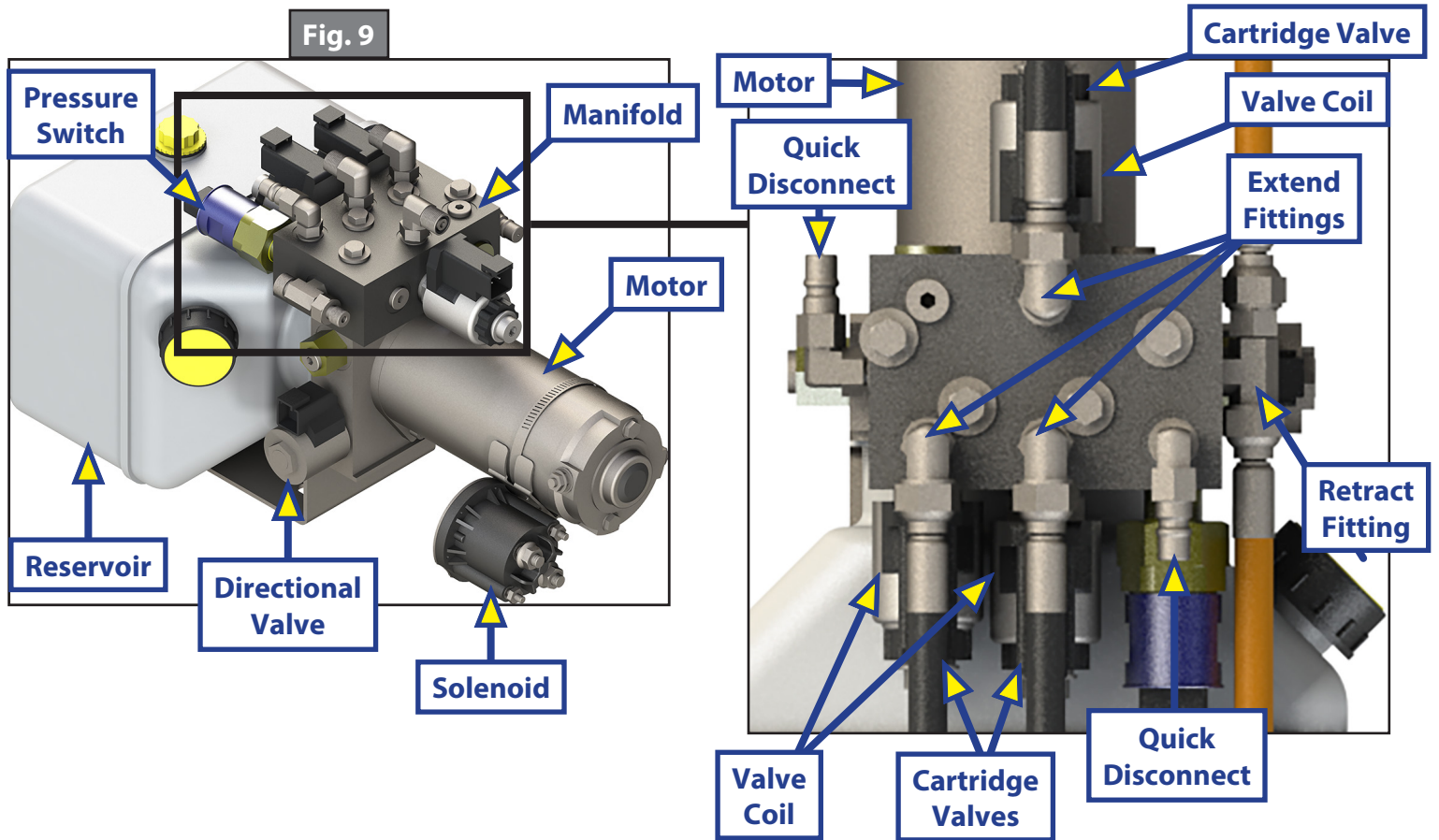


### **Jack Specifications**

CAPACITY - 8,000 lbs max. STROKE - 12 ½" in. FOOT PAD - 9.00 in. dia. standard

## Hydraulic Power Unit Installation

1. Identify the hydraulic power unit mounting location. This will determine the orientation of the hydraulic fittings (Fig. 9). For this manual, the power unit is mounted near the center of the coach frame, roadside frame rail.
- NOTE:** The location where the power unit will be installed should be as near center on the coach as possible. Install the power unit in accordance with RVIA Gas Codes, since the power unit connections are not spark proof.
2. Attach hydraulic power unit bracket assembly (Fig. 10A) to the coach frame.
  3. Bolt the hydraulic power unit to the bracket assembly.



## Rear Jack Bracket and Jack Installation

To ease system installation, LCI recommends beginning with the rear brackets and leveling jacks.

**NOTE:** White lines with black borders indicate where marking on the frame rail with a permanent or non-permanent marking method is required to assist in assembly.

The rear jacks should be mounted so that there is a minimum of 2" clearance between the jack and the rear tires, suspension and exhaust components.

1. The rear jacks must be mounted within the rear departure angle (Fig. 1).
  - A. Rear jacks must be aligned left-to-right of each other.
  - B. Recommended minimum ground clearance between the bottom of the jack footpad and the ground is 6".
  - C. Mark the location on both the inside and outside frame rails that satisfies the minimum clearance requirements.
2. Position the bracket on the outside of the frame rail within the previously marked location (Fig. 11).
3. Position the angle weldment (Fig. 12) on the inside of the frame rail, within the previously-marked location.
4. Working from the outside of the frame rail, first install the  $\frac{3}{8}$ "-16 X 5  $\frac{1}{4}$ " hex bolts through the top of the brackets, the angle weldments (Fig. 13) and into the attached nuts. Torque the bolt to 30 ft-lbs.
5. Working from the outside of the frame rail, next install the  $\frac{3}{8}$ "-16 X 2  $\frac{1}{2}$ " hex bolts through the bottom of the brackets, the angle weldments (Fig. 13) and into the attached nuts. Torque the bolt to 30 ft-lbs.
6. Dry fit the jack on the jack bracket installed on the chassis frame.
7. Determine the mounting holes for the jack on the jack bracket.
8. Secure the jack onto the mounting bolts with the  $\frac{1}{2}$ " nuts (Fig. 14).
9. Torque the nuts to 90 ft-lbs.
10. Repeat steps 1-8 for the remaining rear jack brackets.

Fig. 11

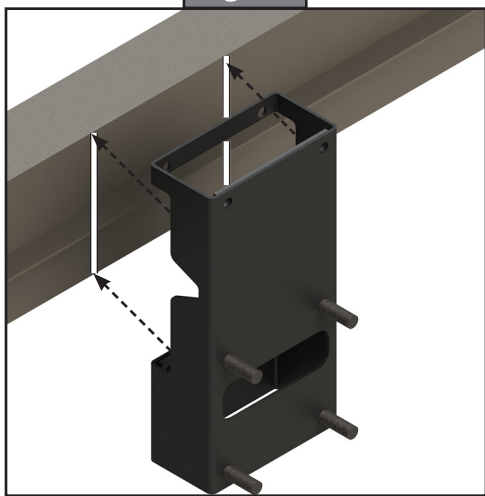


Fig. 12

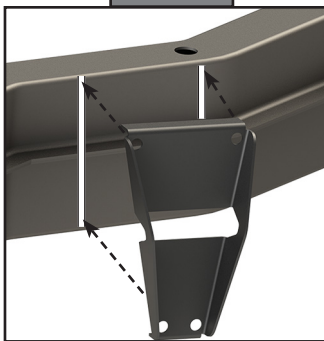


Fig. 14

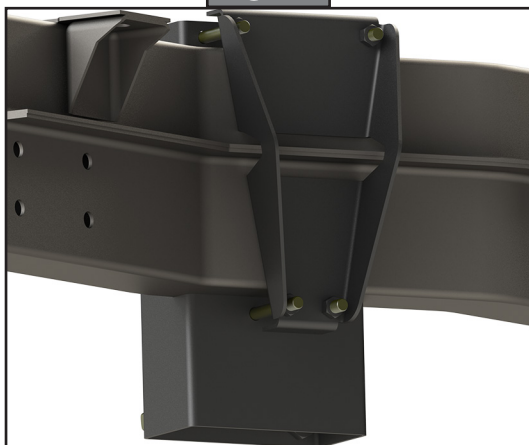
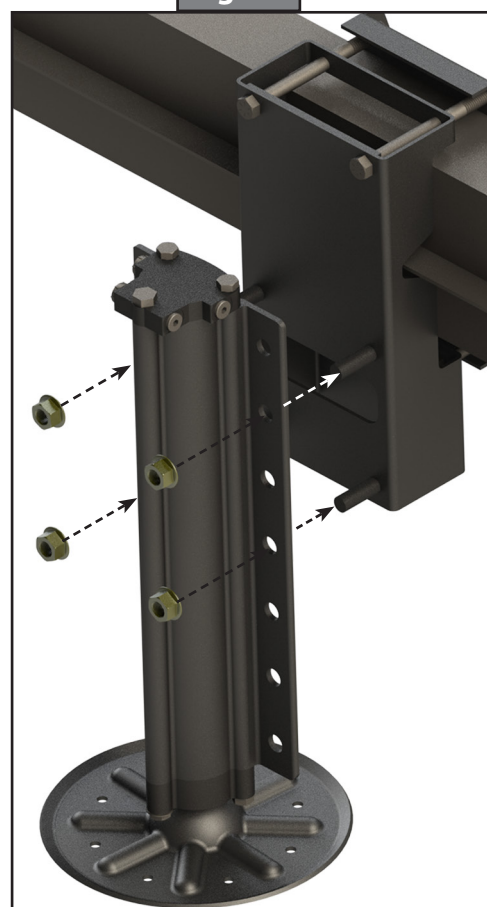


Fig. 13



## Front Jack Bracket and Jack Installation

**NOTE:** The front road side jack bracket installation is different from the curb side jack.

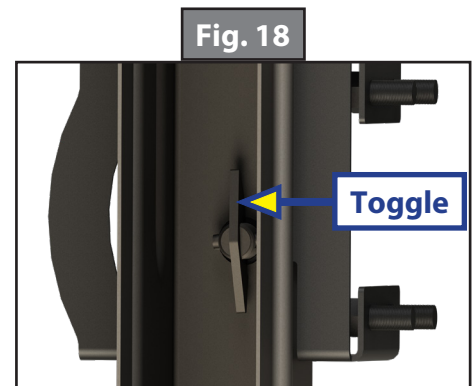
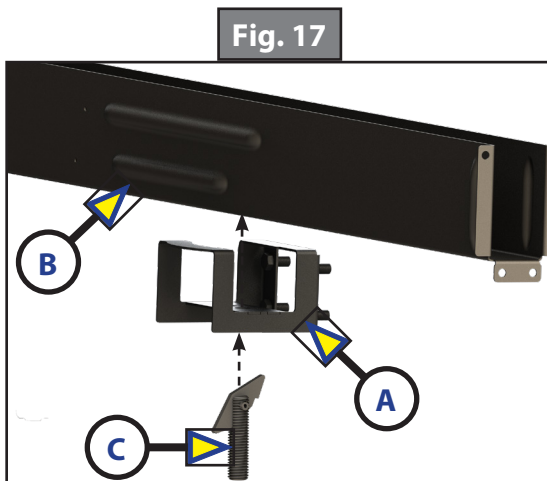
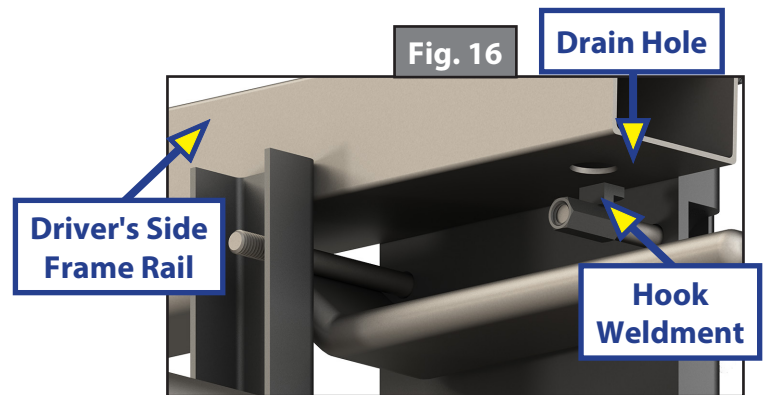
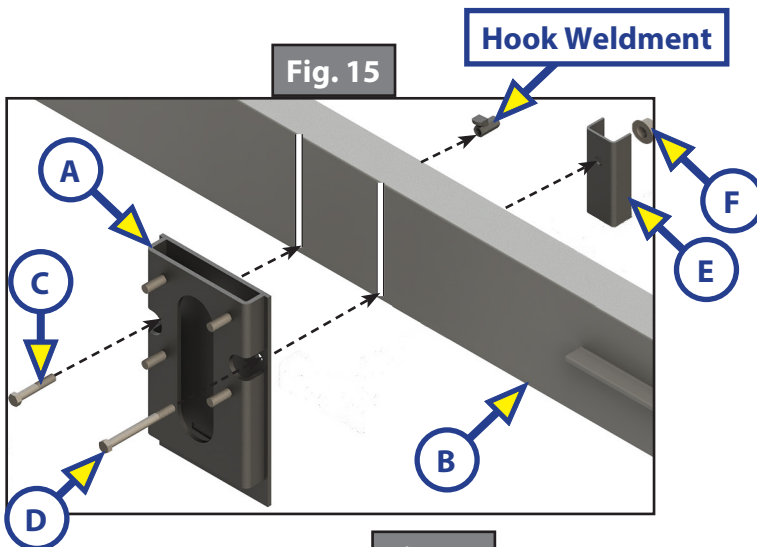
**NOTE:** Torque all  $\frac{7}{16}$ " bolts to 40 ft-lbs.

### Road Side Jack Bracket Installation (Flat Bracket)

1. Prior to positioning the road side jack bracket (Fig. 15A) onto the frame rail (Fig. 15B), insert one  $\frac{7}{16}$ " x  $2\frac{1}{2}$ " hex head bolt (Fig. 15C) through the left side hole on the bracket and attach the hook weldment.
2. Position the road side jack bracket on the outside of the frame rail within the previously-marked location.
3. Make sure that the edge of the stabilizer bar is positioned below the lip welded on inside of bracket (Fig. 16).
4. Insert one  $\frac{7}{16}$ " x  $4\frac{1}{2}$ " hex head bolt (Fig. 15D) in the remaining hole of the jack mounting bracket and position both mounting bolts between frame rail and traction bar.
5. Install one C-channel onto the rear bolt (Fig. 15E) and secure loosely with a  $\frac{7}{16}$ " nut (Fig. 15F).
6. Insert the hook weldment into drain hole of frame rail (Fig. 15).
7. Tighten the bolt (Fig. 15C) to draw the hook weldment and jack bracket together, securing the jack bracket against frame rail.
8. Tighten the other bolt (Fig. 15D) to pull C-channel secure against frame rail.

### Road Side and Curb Side Bracket Installation (U-Bracket)

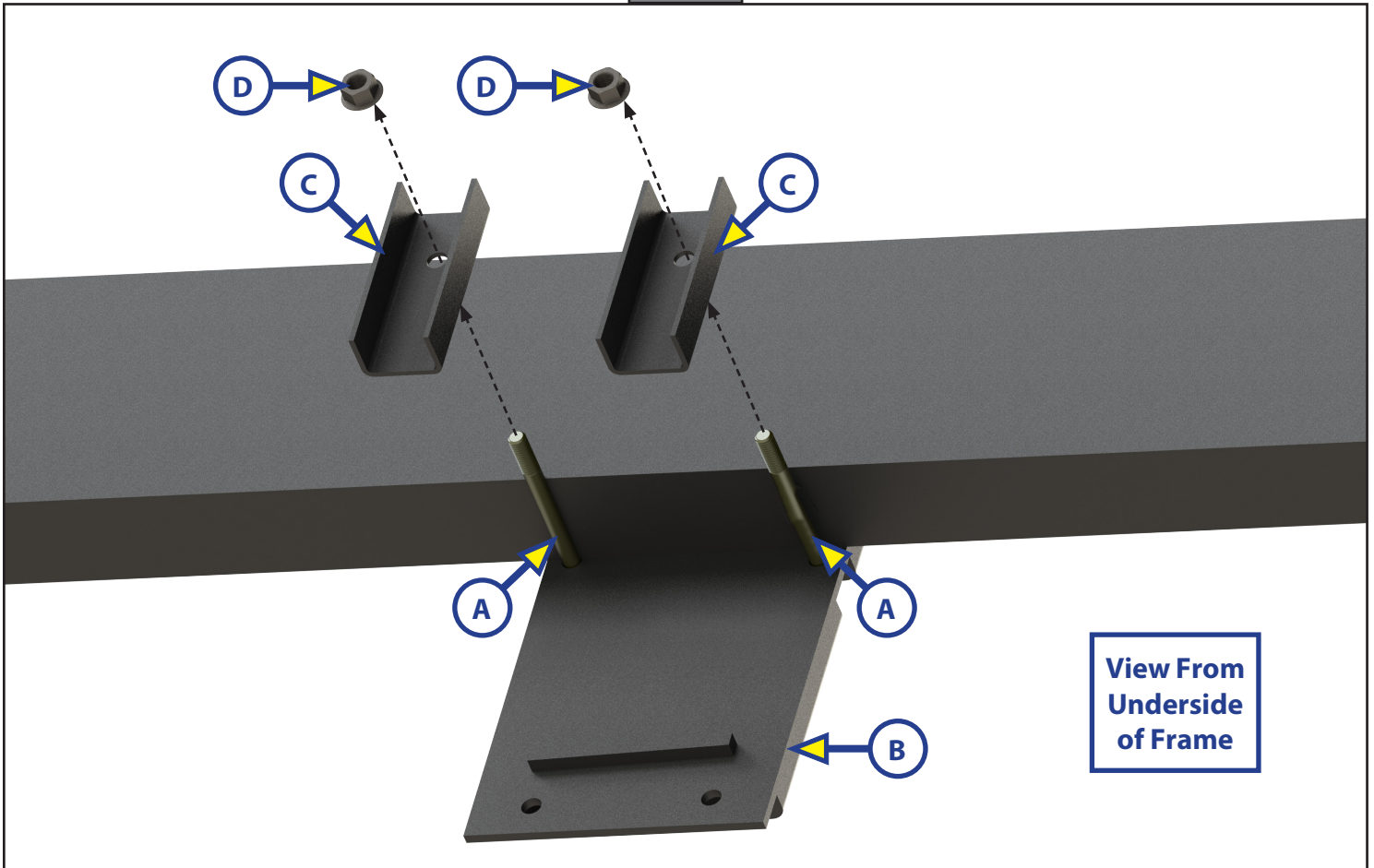
1. With jack mounting bolts facing outward, position bracket (Fig. 17A) under frame rail (Fig. 17B) aligned with mounting hole.
2. Position bracket on frame rail.
3. Depressing toggle so a pointed end is up (Fig. 17C), insert toggle of anchor bolt through mounting holes until toggle "flips", locking it into position (Fig. 18).
4. Secure bolt and bracket to chassis using a  $\frac{3}{4}$ "- 10 Hex nut.



## Curb Side Jack Bracket Installation (Flat Bracket)

1. Position the curb side jack bracket onto the outside of the frame rail within the previously-marked location.
2. Insert two  $\frac{7}{16}$ " x 4  $\frac{1}{2}$ " hex head bolts (Fig. 19A) into the holes of the jack mounting bracket (Fig. 19B) and position both mounting bolts between frame rail and traction bar.
3. Install two C-channels (Fig. 19C) onto the bolts and secure with  $\frac{7}{16}$ " nuts (Fig. 19D).
4. Tighten the bolts, which will pull the plates securely against frame rail.

Fig. 19



## Jack Installation

### Flat Bracket

1. Secure the road side jack to the jack bracket with  $\frac{1}{2}$ " - 20 serrated flange nuts (Fig. 20A).
2. Torque all flanged nuts to 90 ft-lbs.
3. Repeating this process, secure the curbside jack to the jack bracket with  $\frac{1}{2}$ " - 20 serrated flange nuts (Fig. 20A).
4. Torque all flanged nuts to 90 ft-lbs.

### U-Bracket

1. Secure the road side jack to the jack bracket with  $\frac{3}{4}$ " - 10 Hex nuts (Fig. 21A).
2. Torque all flanged nuts to 90 ft-lbs.
3. Repeating this process, secure the curbside jack to the jack bracket with  $\frac{3}{4}$ " - 10 Hex nuts (Fig. 21A).
4. Torque all flanged nuts to 90 ft-lbs.

**NOTE:** A recommended minimum ground clearance between the bottom of the jack footpad and the ground, is 6" when the coach is at its maximum rated weight. When installing the jacks on a bare chassis, keep in mind that some ground clearance will be lost as the coach is built, and to adjust the installation height accordingly.

**NOTE:** Make sure that the approach and departure angles are maintained after the jack is mounted to the jack bracket.

Fig. 20

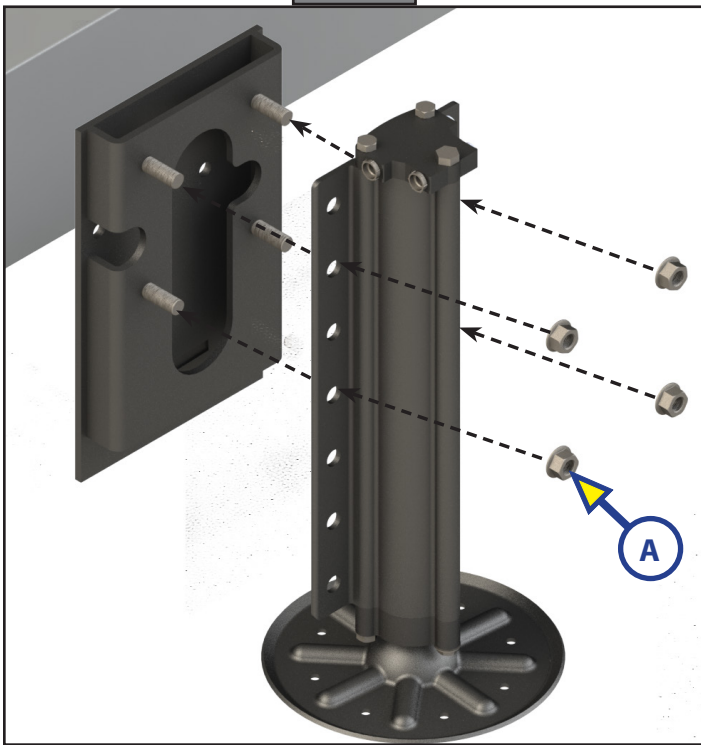
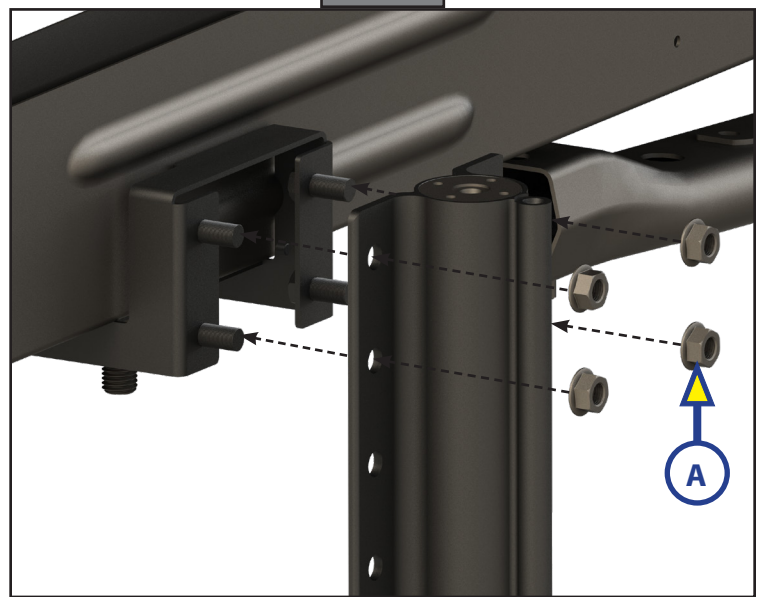


Fig. 21



## Installing the Cross Tie Assembly

**NOTE:** It is important to orient the cross tie ends properly for the left- and right-hand threads on the rod and angle weldments.

### Flat Bracket

1. Beginning at the front curb side, attach one rod (Fig. 22A) and angle weldment (Fig. 22B) to the jack mounting bracket (Fig. 22C). Insert  $\frac{7}{16}$ " x  $1 \frac{3}{4}$ " bolts (Fig. 22D) through the bracket and attach  $\frac{7}{16}$ " serrated flange nuts (Fig. 22E) to the bolts.
2. Attach the road side rod and angle weldment to the mounting bracket. Insert  $\frac{7}{16}$ " x  $1 \frac{3}{4}$ " bolts through the bracket and attach  $\frac{7}{16}$ " serrated flange nuts to bolts.
3. After both ends have been attached, spread the brackets on the cross tie assembly so that and the mating surfaces all come together, then tighten the locking nuts and bolts on the rod and angle weldments.
4. Make sure that the edge of the stabilizer bar (Fig. 23) is positioned below the welded lip, on the inside of the bracket. The edge of the stabilizer bar will be rest on top of the right front rod and angle weldment.

### U-Bracket

1. Beginning at the front curb side, attach one rod (Fig. 24A) and angle weldment (Fig. 24B) to the jack (Fig. 24C). Insert  $\frac{5}{8}$ " x  $1 \frac{1}{2}$ " bolts (Fig. 24D) through the jack and attach  $\frac{3}{4}$ " Hex nuts (Fig. 24E) to the bolts.
2. Attach the road side rod and angle weldment to the mounting bracket. Insert  $\frac{5}{8}$ " x  $1 \frac{1}{2}$ " bolts (Fig. 24D) through the jack and attach  $\frac{3}{4}$ " Hex nuts (Fig. 24E) to the bolts.

**NOTE:** It may be necessary to turn the assembly rod clockwise or counter clockwise in order to properly secure the brackets.

Fig. 22

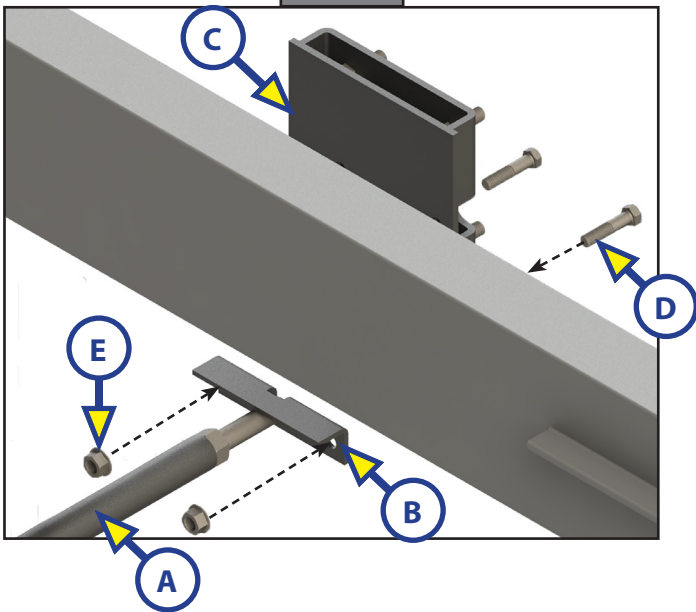


Fig. 23

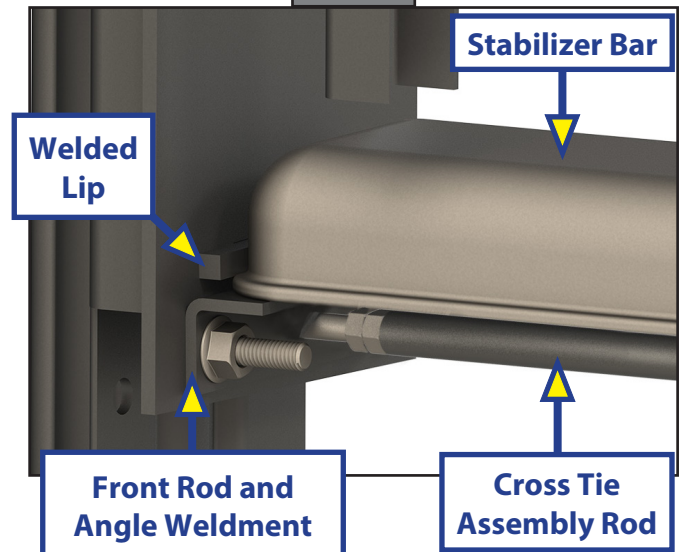
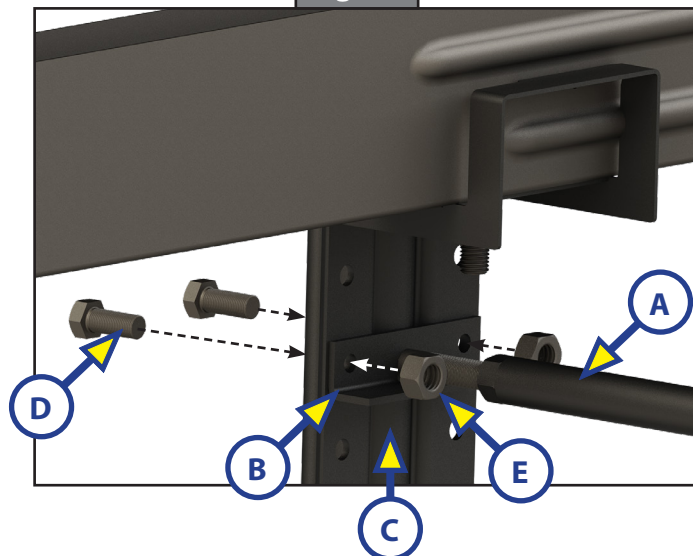


Fig. 24





**When installing hydraulic hoses, avoid areas of high heat, e.g. exhaust outlets. Do not use sharp or abrasive materials on or near hydraulic hoses.**

**NOTE:** Verify that the hydraulic fittings were installed on the four jacks and power unit correctly. A  $\frac{7}{16}$ " port plug will be used to seal any ports not used within the system.

**NOTE:** Refer to the Hydraulic Plumbing Diagrams for fitting placements and for steps 1-8.

1. Measure the distance between the Left Front (LF) jack and the power unit; this is an extend hose (A).
2. Measure the distance between the Left Front (LF) jack and the Right Front (RF) jack; this is an extend hose (B).
3. Measure from the Left Rear (LR) jack and the power unit; this is an extend hose (C).
4. Measure from the Right Rear (RR) jack and the power unit; this is an extend hose (D).
5. Measure from the power unit to the Left Front (LF) jack; this is a retract hose (E).
6. Measure from the Left Front (LF) jack to the Right Front (RF) jack; this is a retract hose (F).
7. Measure from the power unit to the Left Rear (LR) jack; this is a retract hose (G).
8. Measure from the Left Rear (LR) jack to the Right Rear (RR) jack; this is a retract hose (H).

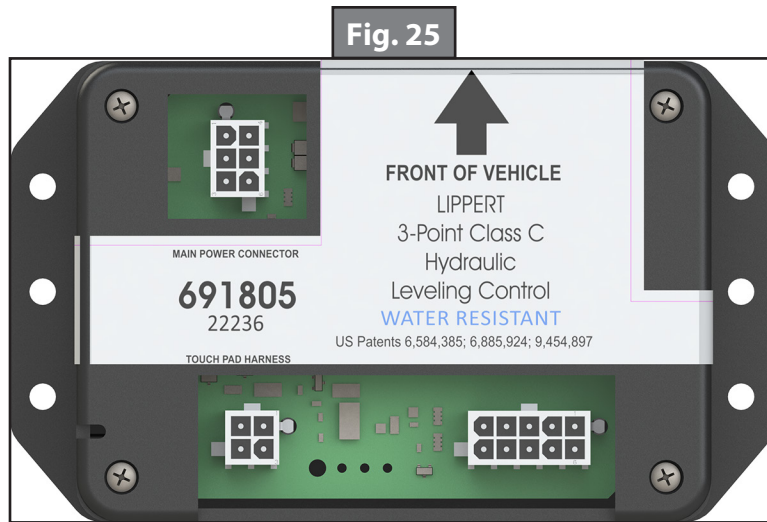
**NOTE:** Make sure hydraulic hose line fittings are compatible with the power unit fittings and the jack fittings. Make sure hose fittings are securely crimped onto hose lines.

9. When running the hydraulic hoses from the power unit to the rear jacks, bundle the hoses together and run them at once. Secure any loose hoses with zip ties as needed.
10. Install all hoses onto their respective jack and power unit fittings.

**NOTE:** Hose loops should be secured in the horizontal position to prevent trapped air pockets.

**NOTE:** Before operating the Lippert Components, Inc. hydraulic leveling system, make sure the system has been properly purged of air that was introduced into the hydraulic lines during the installation.

**NOTE:** If necessary, refer to [TI-118](#). Or go to <https://www.lci1.com/support-hydraulic-leveling-lcd-br4-point3-valve> then select the Technical Information Sheets tab and choose TI - 118: Basic Purge Procedure For Hydraulic Pump Units from the list of documents.



## Controller and Touchpad Installation

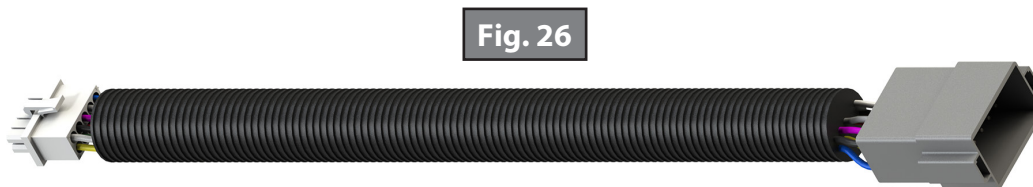
The Lippert Components, Inc. hydraulic leveling system wiring is a "plug and play" leveling system. The leveling kit includes a total of four wiring harnesses for the entire system. If it does not, contact Lippert Components so that the proper wiring harness can be shipped. Three harnesses are shipped loose, and the fourth wiring harness is pre-installed onto the power unit.

**NOTE:** Refer to the Wiring Diagrams (pages 27 and 28) throughout this section.

### Controller Installation

1. Install the controller (Fig. 25) using the 4 #8 x1 inch fastener in a location close to the center of the coach. It must be centered side-to-side and oriented according to the arrows on the controller's label.
2. Connect the multi-colored, nine-wire harness, onto the matching port of the controller. The harness contains a 10-pin end and a 12-pin end (Fig. 26).

**NOTE:** Each connector on the controller is a different shape and has a different number of pins. Each harness (Fig. 26) has only one way of connecting to the controller. They are not interchangeable. This prevents the installation of the wrong harness onto the wrong connector.



**Row 1:** 16 AWG RED, 16 AWG BLU, 16 AWG GRY

**Row 2:** 16 AWG BK/WT, 16 AWG YEL, 16 AWG PUR

**Row 3:** 14 AWG WT, 16 AWG GN, 16 AWG BLK

| Main Harness          |                       |
|-----------------------|-----------------------|
| Wire Color            | Connection            |
| White (WHT)           | Controller Power      |
| Black/White (BLK/WHT) | Start Relay           |
| Red (RD)              | Right Rear Jack Valve |
| Green (GN)            | Front Jacks Valve     |
| Yellow (YEL)          | Pressure Switch       |
| Blue (BLU)            | Left Rear Jack Valve  |
| Black (BLK)           | Controller Ground     |
| Purple (PUR)          | Not Used              |
| Gray (GRY)            | Directional Valve     |

**Row 1:** 16 AWG BLK, 16 AWG PUR, 16 AWG GRY

**Row 2:** 16 AWG BLU, 16 AWG YEL, 16 AWG GN, 16 AWG RED, 16 AWG BK/WT, 14 AWG WT

## Touchpad Installation

1. Remove the faceplate of the touchpad from the mounting bezel (Fig. 27).
2. In the designated mounting location, cut a hole  $3 \frac{3}{8}" \times 2 \frac{3}{4}"$  for the touchpad (Fig. 28).
3. Feed the touchpad four-wire harness through the pre-cut hole, running the wires into the compartment where the controller is to be mounted.
4. Plug the harness into the appropriate connector on the controller. See Wiring Diagrams (Pages 27 and 28).
5. Feed the touchpad harness through the cutout in the wall (Fig. 29A) and the mounting bezel (Fig. 29B).
6. Insert the touchpad bezel into the cutout hole, and attach it to the mounting surface with four #8 x 1" wood screws. Verify that the screws are of sufficient length to thread into the mounting surface (Fig. 29).
7. Plug the touchpad harness into the connector on the back of the touchpad faceplate, and snap the faceplate into the bezel (Fig. 30).

Fig. 27

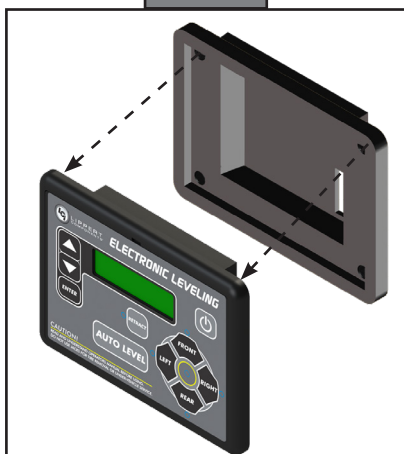


Fig. 28

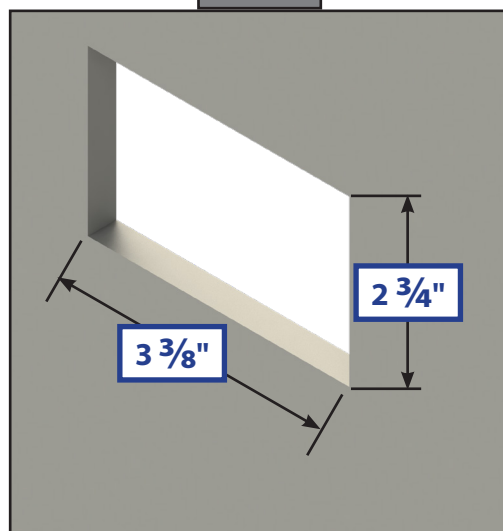


Fig. 29

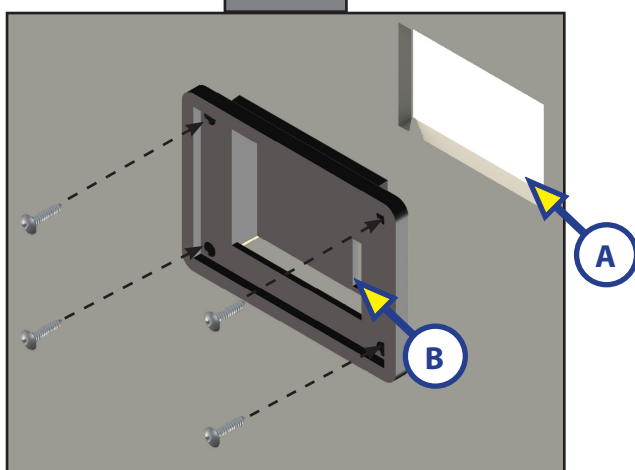
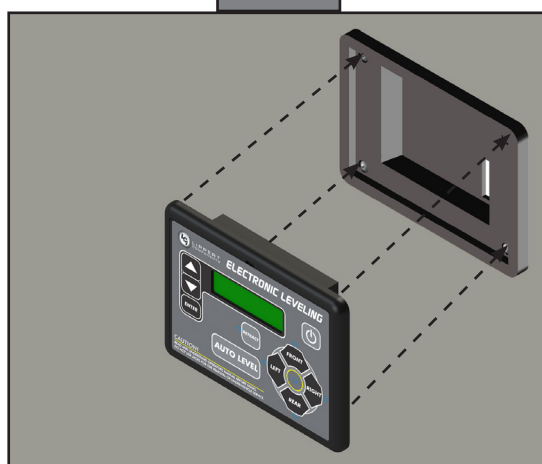


Fig. 30



## System Wiring Requirements

**NOTE:** This document identifies the features on the hydraulic power unit (HPU) used in installation of the system. An OEM-supplied circuit protection of at least 50 amps to 100 amps is to be used for supplying voltage to the power unit. The OEM can determine the capacity within this range, as the capacity need will vary by application. All wiring is to conform to RVIA standards. See Wiring Diagram.

**NOTE:** Ground wires are OEM supplied.

1. Battery power cable with an OEM-supplied breaker (RVIA standard).
2. Battery ground cable (RVIA standard) connecting the 12V DC battery, to the ground post on the power unit motor.

**NOTE:** LCI recommends connecting the ground cable directly to the battery, rather than a chassis ground point.

3. Logic power (ignition switch controlled).
4. Parking brake signal (open = park brake disengaged, GND = park brake engaged).
5. A four-wire harness connecting the controller to the touchpad.
6. Leveling jack status input - pressure switch.
  - A. Jacks not all up – switch closed to ground.
  - B. Jacks all up – switch open.
7. Connect a ground wire.
8. Connect the four-pin chassis harness to the "Ignition On" wire and the parking brake signal wire.
  - A. White - Parking Brake
  - B. Red - Ignition

## **Operation**

**NOTE:** It is recommended that the engine be running, maintaining the minimum required voltage of 12.75V DC.

The leveling system should only be operated under the following conditions:

1. The coach is parked on a reasonably level surface.
2. The coach "PARKING BRAKE" is engaged.
3. The coach transmission should be in the "PARK" position.

### **CAUTION**

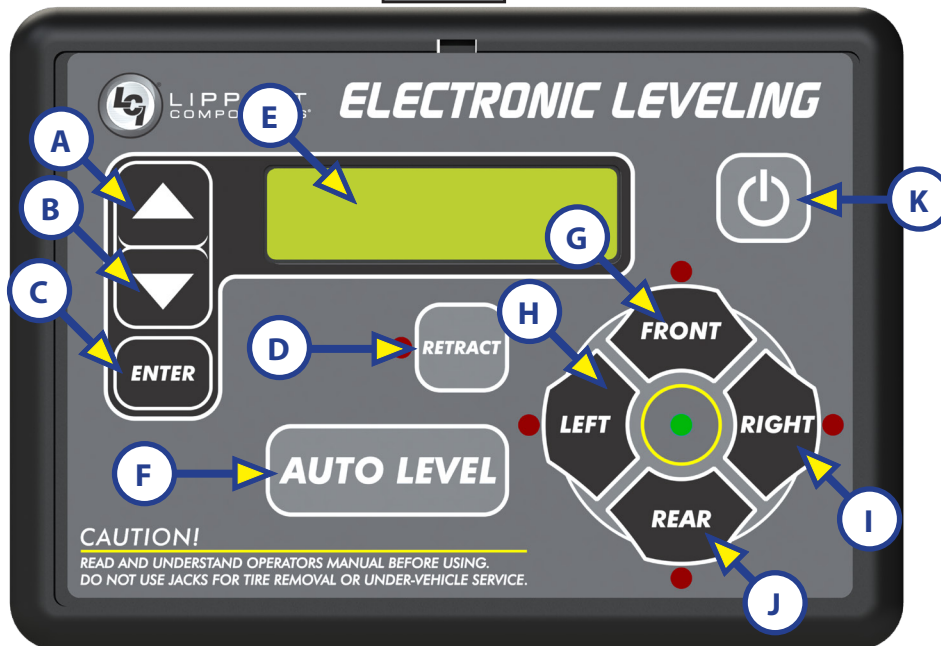
**After starting the automatic leveling cycle, it is very important that you do not move around in the coach until the coach is level and the green LED light illuminates in the center of the touchpad. Failure to remain still during the leveling cycle could have an effect on the performance of the leveling system.**

## **Controls**

### Features

- Automatic extension of jacks from full retract position (with automatic ground detection).
- Automatic leveling of jacks.
- Manual leveling of jacks
- Automatic retracting of jacks (with automatic full retract detection).
- Jacks Up Verification (jacks not retracted and parking brake is disengaged).
- Automatic jack error detection and error mode.
- Configurations mode for Zero Point.
- Remote operation.

Fig. 31



| Callout | Description                                                                                                                                  |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------|
| A       | Up Arrow (UP) - Scrolls up through menu on LCD.                                                                                              |
| B       | Down Arrow (DOWN) - Scrolls down through menu on LCD.                                                                                        |
| C       | ENTER - Activates modes and procedures indicated on LCD.                                                                                     |
| D       | RETRACT - Places leveling system into retract mode - Manual mode ONLY. Press and hold for several seconds to activate Auto Retract Function. |
| E       | LCD Display - Displays procedures and results.                                                                                               |
| F       | AUTO LEVEL - Places leveling system into auto level mode.                                                                                    |
| G       | FRONT Jack Button - Activates both front jacks in manual mode.                                                                               |
| H       | LEFT Jack Button - Activates left rear jack in manual mode.                                                                                  |
| I       | RIGHT Jack Button - Activates right rear jack in manual mode.                                                                                |
| J       | REAR Jack Button - Activates both rear jacks in manual mode.                                                                                 |
| K       | Power Button - Turns leveling system on and off.                                                                                             |

### **⚠ WARNING**

**While utilizing leveling blocks and jack pads, all coach wheels MUST NOT leave the ground during leveling. Lifting all the wheels off the ground creates a condition where severe property damage, serious personal injury or possible death may occur.**

## Zero Point Calibration

Before auto leveling features are available, the Zero Point **MUST** be set. This is the reference point that the system will return to when an auto leveling cycle is initiated.

To set the Zero Point, first run a manual leveling sequence to get the coach to the desired level point. Then activate the Zero Point configuration mode. This mode is enabled by performing the following sequence:

1. Turn the touchpad off.
2. With the touchpad off, perform the following:
  - A. Press FRONT (Fig. 31G) five times.
  - B. Press REAR (Fig. 31J) five times.
3. At this point, an alarm will sound and the display will read "\*\*\*ZERO POINT CALIBRATION\*\* ENTER to Set, POWER to Exit."
4. Press ENTER (Fig. 31C) to set the Zero Point.
5. The screen will then display "PLEASE WAIT."
6. An alarm will sound and the screen will display "ZERO POINT SUCCESSFUL."
7. The touchpad will then turn off.

## Automatic Leveling Descriptive Logic



**After starting the automatic leveling cycle it is very important that you do not move around in the coach until the coach is level and the green LED light illuminates in the center of the touchpad. Failure to remain still during the leveling cycle could have an effect on the performance of the leveling system.**

**Grounding:** Jacks will begin deploying on the lowest end of the coach from the controller's calibrated Zero Point, either individually or in pairs depending on your system's control logic. The opposite end will follow individually or in pairs, until all jacks are contacting the ground.

**Leveling:** The following steps describe the process of how the auto-leveling sequence levels the coach, once the jacks have been grounded. This process may repeat several times until level.

1. Front-to-Rear
2. Side-to-Side
3. Individually
4. Minor adjustments to confirm grounding

## Automatic Leveling Procedure

**NOTE:** The coach requires 12.75V DC to start the auto-leveling function.

**NOTE:** Refer to Component Description listing in the System Information section for questions regarding component locations and functions of the hydraulic leveling system.

**NOTE:** The engine **MUST** be running and the parking brake **MUST** be engaged for the hydraulic leveling system to operate.

**NOTE:** Pressing any button during an automatic sequence will stop the sequence and a "Function Aborted" error code will occur. Press ENTER to clear the code and then continue the operation or start a new function.

1. Press the Power Button (Fig. 31K) to turn the system on. The green light will illuminate.
2. Press AUTO LEVEL (Fig. 31F). The LCD screen will display "Remain Still."
3. The coach will then level automatically and indicate "Auto Level - Success" in the LCD display (Fig. 31E).

**NOTE:** The display will then read "Level - Jacks: Down." Do not press any buttons until this message appears or a "Function Aborted" error will be displayed.

4. Visually inspect all jacks to make sure all footpads are touching the ground. If either of the rear jack footpads is not touching the ground, press LEFT or RIGHT (Fig. 31H or Fig. 31I) to lower the non-compliant jack to the ground.

## Manual Leveling Procedure

**NOTE:** The coach should be leveled front-to-rear first, then leveled side-to-side.

**NOTE:** The engine **MUST** be running and the parking brake **MUST** be engaged for the LCI4A3LCD Hydraulic Leveling System to operate.

**NOTE:** Make sure the coach battery is fully charged. Performing manual leveling on a coach requires a minimum of 9.5V DC.

1. Press the Power Button (Fig. 31K) to turn the system on.
2. Press the Up Arrow (UP) or the Down Arrow (DOWN) (Fig. 31A or Fig. 31B) to scroll through control features until "MANUAL MODE" is displayed.
3. Press ENTER (Fig. 31C).
4. Press FRONT (Fig. 31G) to extend the front jacks to the ground.
5. Press REAR (Fig. 31J) to extend the rear jacks to ground, then level the coach front-to-back.
6. Press the appropriate LEFT or RIGHT to level the coach side-to-side.

**NOTE:** Red lights next to the buttons on touchpad will indicate which side(s) of the coach needs to be raised to achieve level condition.

**NOTE:** The front jacks will work in simultaneously, i.e., FRONT operates both of the front jacks.

**NOTE:** The right and left rear jacks are used to level the coach from side-to-side. Pressing LEFT (Fig. 31H) on the touchpad will extend the left rear jack. Pressing RIGHT (Fig. 31I) on the touchpad will extend the right rear jack.

7. Repeat steps 4-6 as needed.
8. Press the Power Button (Fig. 31K) to turn the system off.

## **WARNING**

**All coach wheels MUST NOT leave the ground during leveling. Lifting all the wheels off of the ground creates a condition where severe property damage, serious personal injury or possible death may occur.**

9. Visually inspect all jacks to make sure all footpads are touching the ground. If either of the rear jack footpads is not touching the ground, press LEFT or RIGHT (Fig. 31H or Fig. 31I) to lower the non-compliant jack to the ground.

## Automatic Jack Retract Procedures

**NOTE:** Pressing any button during an automatic sequence will stop the sequence and a "Function Aborted" error code will occur. Press ENTER to clear the code and then continue the operation or start a new function.

1. Turn on the system by pressing Power Button (Fig. 31K) on the touchpad. The LCD screen will display "READY Jacks: Down."
2. Press Up Arrow or Down Arrow (Fig. 31A or Fig. 31B) to display "Auto Retract All" on the touchpad.
3. Press ENTER (Fig. 31C) to begin.

**NOTE:** "AUTO RETRACT" can also be commenced by pressing and holding RETRACT (Fig. 31D) for one second.

4. The jacks will retract and shut off automatically.

**NOTE:** If stopping the jacks from retracting is necessary, cycle the system off and on by pressing Power Button (Fig. 31K) twice. The coach can then be manually leveled by following steps 1-9 in the Manual Leveling Procedure section. Press ENTER to acknowledge.

5. The jacks will retract and shut off automatically.
  - A. The display will read "READY - Jacks: Up."
  - B. Press Power Button (Fig. 31K) on the touchpad to turn off the system.
  - C. Perform a brief visual inspection around the coach to verify the jacks are fully retracted.

### Manual Jack Retract Procedures

1. To retract in the MANUAL mode, press RETRACT (Fig. 31D) until the green indicator light comes on.
2. Pressing FRONT or REAR (Fig. 31G or Fig. 31J) will operate the respective jacks in pairs.
3. Pressing RIGHT (Fig. 31I) will operate the right rear jack.
4. Pressing LEFT (Fig. 31H) will operate the left rear jack.

## Troubleshooting

### **⚠ CAUTION**

**Check to make sure all jacks are fully retracted before travel.**

### Manual Override of The Power System and Jacks

In the event that the jacks do not retract, the cartridge valves can be manually overridden.

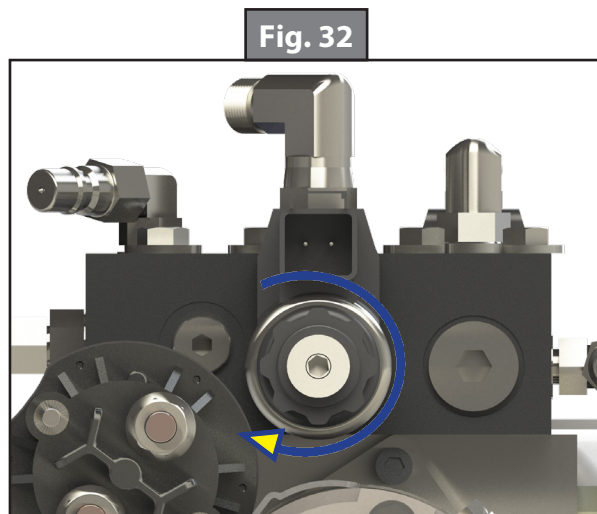
**NOTE:** Cartridge valves should be opened prior to operating with any auxiliary power device.

The hydraulic leveling system can be operated in conjunction with auxiliary power devices, like cordless or power drills. In the event of electrical or system failure, the manual method of retracting the jacks can be used. A standard hand-held drill is all that is required.

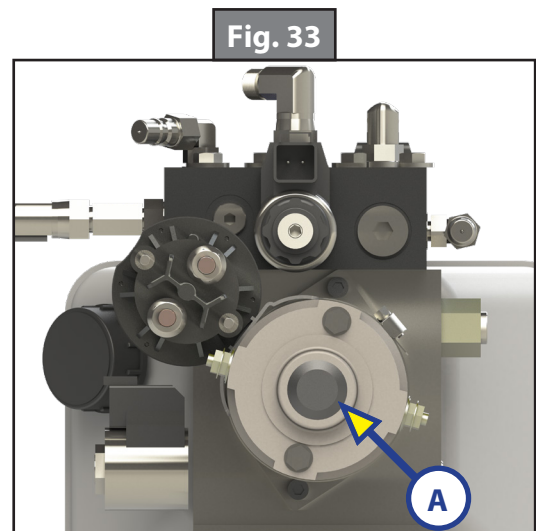
### **⚠ CAUTION**

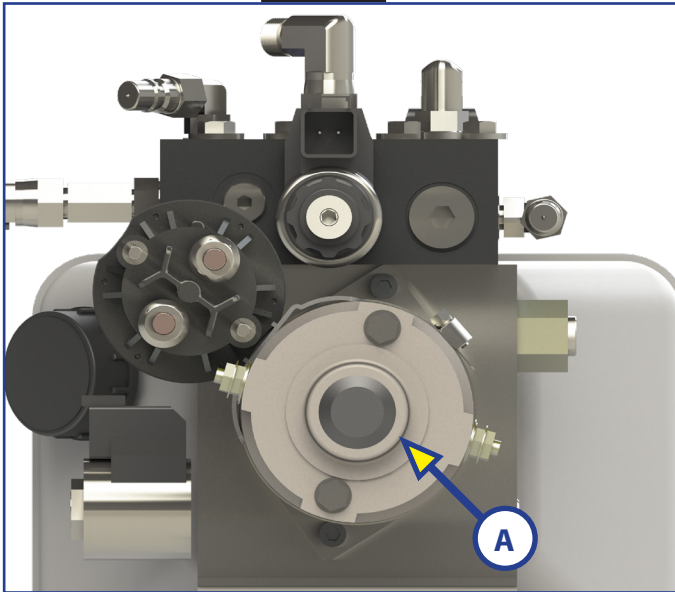
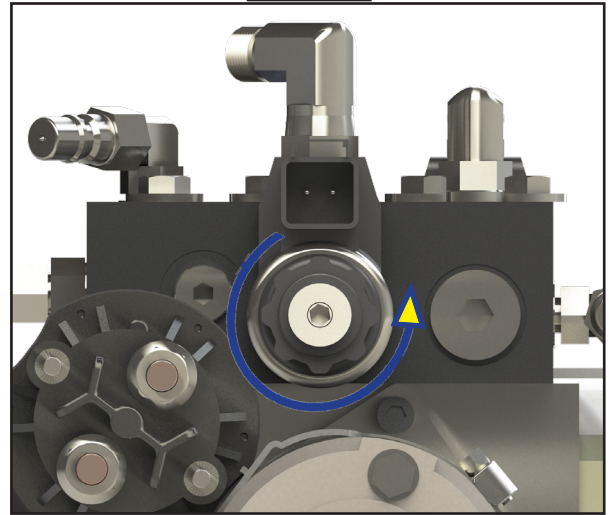
**Do not over-tighten override set screws, as this can damage the valves.**

1. Use a  $\frac{5}{32}$ " hex key to turn the manual override clockwise (Fig. 32) on each of the three cartridge valves (Fig. 9) to open the valves.
2. Disconnect or shield power cables on the motor.
3. Remove plastic cap (Fig. 33A) from motor coupler.



Clockwise for Manual Override



**Fig. 34****Fig. 35**

Counterclockwise for Normal Operation

4. Unplug the wire harness from the directional valve. See Wiring Diagram (page 27).
5. Using a 1/2" socket and auxiliary drive device, e.g. cordless or power drill, insert the 1/2" socket onto coupler (Fig. 34A).
6. Run drill in reverse, or counterclockwise direction, to simultaneously retract all jacks.
7. After all jacks have been retracted, turn all manual overrides counterclockwise (Fig. 35).
8. Reinsert previously removed protective plastic motor coupler cap.
9. Re-attach previously unplugged wire harness to directional valve.

### Automatic Safety Shutoff

The touchpad will automatically turn off after four minutes, if left inactive. To reset the system, turn the coach ignition off, then back on. Press the touchpad's Power Button (Fig. 31K) again.

### Drive Away Protection System

If the ignition is in the "RUN" position, the jacks are extended and the operator releases the parking brake, all indicator lights will flash and the alarm beeper will activate. The leveling system will automatically fully retract the jacks to clear the alarm, or, if the operator resets the parking brake, the alarm will shut off.

### Jacks Up Verification

If the coach ignition is in the "RUN" position, the parking brake is released and the vehicle is in motion; the leveling system may activate the power unit to ensure retract pressure is high enough to keep jacks fully retracted. The LCD screen will say "JACKS UP VERIFICATION" until the retract pressure returns to normal level. The touchpad will then turn off. No beeping will occur and the "JACKS DOWN" dash light will not illuminate.

## Error Mode

1. If an error occurs before or during operation, the error will be displayed in the touchpad's LCD screen (Fig. 31E) and an alarm will sound. To reset common ERROR displays, press ENTER (Fig. 31C).
- NOTE:** To reset "Return for Service" errors, press ENTER (Fig. 31C) and RETRACT (Fig. 31D) simultaneously. Refer to Error Code Chart for additional error codes.
2. All normal functions will be disabled while the system is in Error Mode.

| Error Code Chart                                                       |                                                                                                |                                                                                                                  |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| LCD Display                                                            | What is Happening?                                                                             | What Should Be Done?                                                                                             |
| Excess Angle                                                           | Coach not parked on level ground.<br>Zero point incorrectly calibrated.                        | Move coach to level ground prior to starting auto level sequence.<br>Recalibrate Zero Point.                     |
| Excessive Angle                                                        | Occurs only in manual mode when the angle of the coach is too severe.                          | Use the manual functions to return coach to a more level condition.                                              |
| Out of Stroke                                                          | Jack has insufficient length to complete the leveling procedure.                               | Check the disposition of the jack.                                                                               |
| Low Voltage                                                            | Battery voltage dropped below 9.5V DC during operation.                                        | Turn engine on, check battery voltage under load.                                                                |
| Function Aborted                                                       | A button was pressed on touchpad during Auto Level operation.                                  | Hit enter to acknowledge. Restart procedure.                                                                     |
| Unable to Finish Leveling                                              | Excessive movement inside coach during auto level sequence.                                    | Discontinue movement inside coach during auto level sequence.                                                    |
| Engage Park Brake                                                      | Parking brake not set prior to starting auto level sequence.                                   | Set parking brake prior to starting auto level sequence.                                                         |
| Comm Error<br>Check Wiring<br><b>NOTE:</b> Screen will not back light. | Wiring connections loose or faulty between touchpad and controller.                            | Check connections, replace communication harness if necessary.                                                   |
| Retract Timeout<br>Return Levelers for Service                         | Pressure switch did not sense retract pressure and pump timed out.<br>Leaking hose or fitting. | Return levelers for service.<br>Check for leaks, repair if necessary.<br>Press enter and retract to clear error. |

## Excess Slope

1. The control will not operate at extreme slopes, i.e. 3.5 degrees front and rear and 3.5 degrees side-to-side.
2. If the coach's display indicates "Excess Angle" or "Out of Stroke " during an auto-level cycle, move the coach to a level spot.

## User Alarm Mode

If the alarm system detects that the park brake has been disengaged while at least one jack is not fully retracted, the touchpad will buzz and the LED will signal a park break error to the user. The system will then perform an automatic retract sequence. No other features are available in this mode.

## Miscellaneous

1. A "Re-Level" feature is programmed into the controller. If the jacks are extended and the user presses AUTO LEVEL (Fig.31F), the system will re-level from that point. The system will not retract before performing the re-level.
2. System will refuse any operation when a low voltage condition is present.

## Low Voltage Signal

1. The vehicle requires 12.75V DC to operate in the AUTO mode. If the voltage is too low, the screen will display "Low Voltage."
2. Minimum Voltage - If voltage drops below 9.5V DC during AUTO or MANUAL operation, "Low Voltage" will appear in the screen and the system will cease operating.

**NOTE:** Coach will operate in manual mode between 9.5V DC and 12.75V DC.

## Troubleshooting Table

| What Is Happening?                                                                            | Why?                                                                 | What Should Be Done?                                                                                                 |
|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| System will not turn on and ON/OFF indicator light does not illuminate.                       | Coach ignition not in RUN position.                                  | Turn ignition to RUN position.                                                                                       |
|                                                                                               | Parking brake not set.                                               | Set parking brake.                                                                                                   |
|                                                                                               | Controls have been on for more than four minutes and have timed out. | Turn ignition off and then back on.                                                                                  |
| Touchpad turns on, but turns off when jack button is pushed.                                  | Low voltage on battery.                                              | Start coach to charge battery.                                                                                       |
| Touchpad turns on, coach will not auto level, JACKS DOWN light is on, jacks are retracted.    | Faulty pressure switch or low pressure in system.                    | Press RETRACT ALL JACKS button on touchpad. If JACKS DOWN light remains on, call LCI Customer Service.               |
| Jacks will not extend to ground, pump is running.                                             | Little or no fluid in reservoir.                                     | Fill reservoir with recommended ATF.                                                                                 |
|                                                                                               | Jack valve is inoperative.                                           | Clean, repair or replace.                                                                                            |
|                                                                                               | Electronic signal is lost between controller and jack valves.        | Trace wires for voltage drop or loss of signal. Repair or replace necessary wires or replace controller.             |
| Any one or two jacks will not retract.                                                        | Hose damaged or disconnected.                                        | Replace with new hose or reconnect hose.                                                                             |
|                                                                                               | Return valve inoperative.                                            | Replace inoperative return valve.                                                                                    |
|                                                                                               | Electronic signal is lost between controller and solenoid.           | Test for voltage drop between controller and jack valve. Repair bad wiring or replace defective controller or valve. |
| JACKS DOWN light does not go out when all jacks are retracted.                                | Insufficient pressure in system.                                     | Contact LCI Customer Service.                                                                                        |
|                                                                                               | Retract pressure switch inoperative.                                 | Check connection or replace.                                                                                         |
| Alarm sounds and JACKS DOWN light starts flashing while traveling; jacks are fully retracted. | Loss of pressure in leveling system.                                 | Contact LCI Customer Service.                                                                                        |
|                                                                                               | Retract pressure switch inoperative.                                 | Check connection or replace.                                                                                         |
| Jack bleeds down after being extended.                                                        | Valve Manual Override open.                                          | Close override.                                                                                                      |
| Touchpad powers up; LOW VOLTAGE light flashes.                                                | Engine not running.                                                  | Start coach engine.                                                                                                  |

| What Is Happening?          | Why?                     | What Should Be Done?                                                                                              |
|-----------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------|
| Low voltage light on solid. | Charging system faulty.  | Turn key OFF, then back ON again to reset. Check power and ground connections on battery, alternator and chassis. |
| No power to touchpad.       | Tripped circuit breaker. | Reset breaker.                                                                                                    |
|                             | Ignition not on.         | Turn on.                                                                                                          |

## Maintenance

### **WARNING**

**The coach should be supported at both front and rear axles with jack stands before working underneath. Failure to do so may result in death, serious personal injury or severe product or property damage.**

## Fluid Recommendation

Automatic transmission fluid (ATF) with Dexron®III or Mercon®V or a blend of both is recommended by Lippert Components, Inc. For a list of approved fluid specifications, see [TI-188](#). To obtain this Technical Information sheet on-line, go to <http://www.lci1.com/support-hydraulic-leveling-lcd-br4-point3-valve>. Then click on the Technical Information Sheets tab. Look for *TI-188: Hydraulic Operation Fluid Recommendation* within the listing.

**NOTE:** In colder temperatures (less than 10° F) the jacks may extend and retract slowly due to the fluid's molecular nature. For cold weather operation, fluid specially formulated for low temperatures may be desirable.

## Purging the Hydraulic System

**NOTE:** Make sure jacks are fully retracted prior to filling reservoir to prevent over-filling

1. Zip-tie any loose wiring or hydraulic lines.

**NOTE:** The basic purge procedure to bleed the LCI Hydraulic Systems can be performed without the use of any tools. The hydraulic system will purge the air from the hydraulic lines and cylinders by simply running the pump.

**NOTE:** It is recommended to perform a minimum of three complete cycles (steps 2-7) to ensure both proper function and adequate fluid level of the system.

2. Start with all hydraulic components in the fully retracted position, meaning all jacks and slide-outs are brought back inside the coach as if the coach were ready for travel.
3. Find the hydraulic pump location and note the amount of fluid currently in the reservoir. The fluid level should be about 1/4" from the top of the reservoir and no more than 1/2" from the top.

**NOTE:** When checking the fluid level after ensuring all hydraulic components are retracted, note if there are any bubbles, froth or foam on top of the fluid. This is an indication that air has been pushed back to the reservoir when the hydraulic components were retracted in the last cycle. Wait 15-20 minutes for the foam to dissipate before beginning the purge process.

4. If there is no froth or foam in the reservoir and the fluid is not within  $\frac{1}{2}$ " of the top, fill the reservoir to within the level described in step 3.
5. With the fluid level full and no foam in the reservoir, begin cycling the hydraulic system.
6. Extend jacks fully, taking the coach off the tires. If the coach has hydraulic slide-outs, extend all slide-outs. Once all jacks and slide-outs are extended, immediately retract all slide-outs and then jacks.
7. Check the reservoir foam. If foam is present, see NOTE following step 3 and then repeat steps 4-6. Repeat these steps until no foam is present in the reservoir. If no foam is present, the system is purged of air.

### Preventative Maintenance

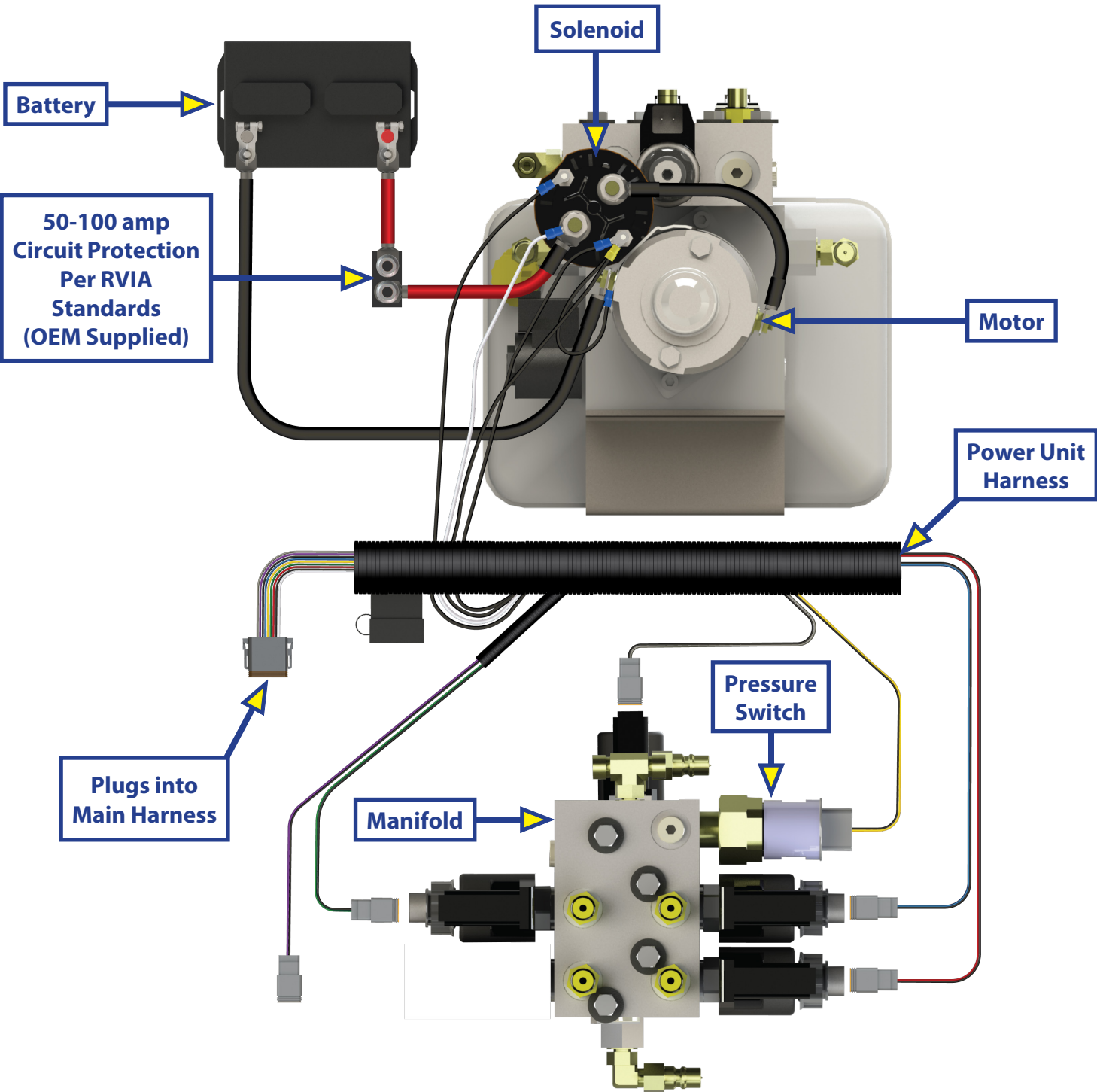
1. Check hydraulic fluid in reservoir every 12 months. If fluid is a clear, red color, do not change. If fluid is milky, pink and murky, and not clear red in color, drain reservoir and add new fluid. Hydraulic fluid in reservoir should be changed a minimum of every five years.

**NOTE:** Check the hydraulic fluid only when all the jacks are fully retracted.

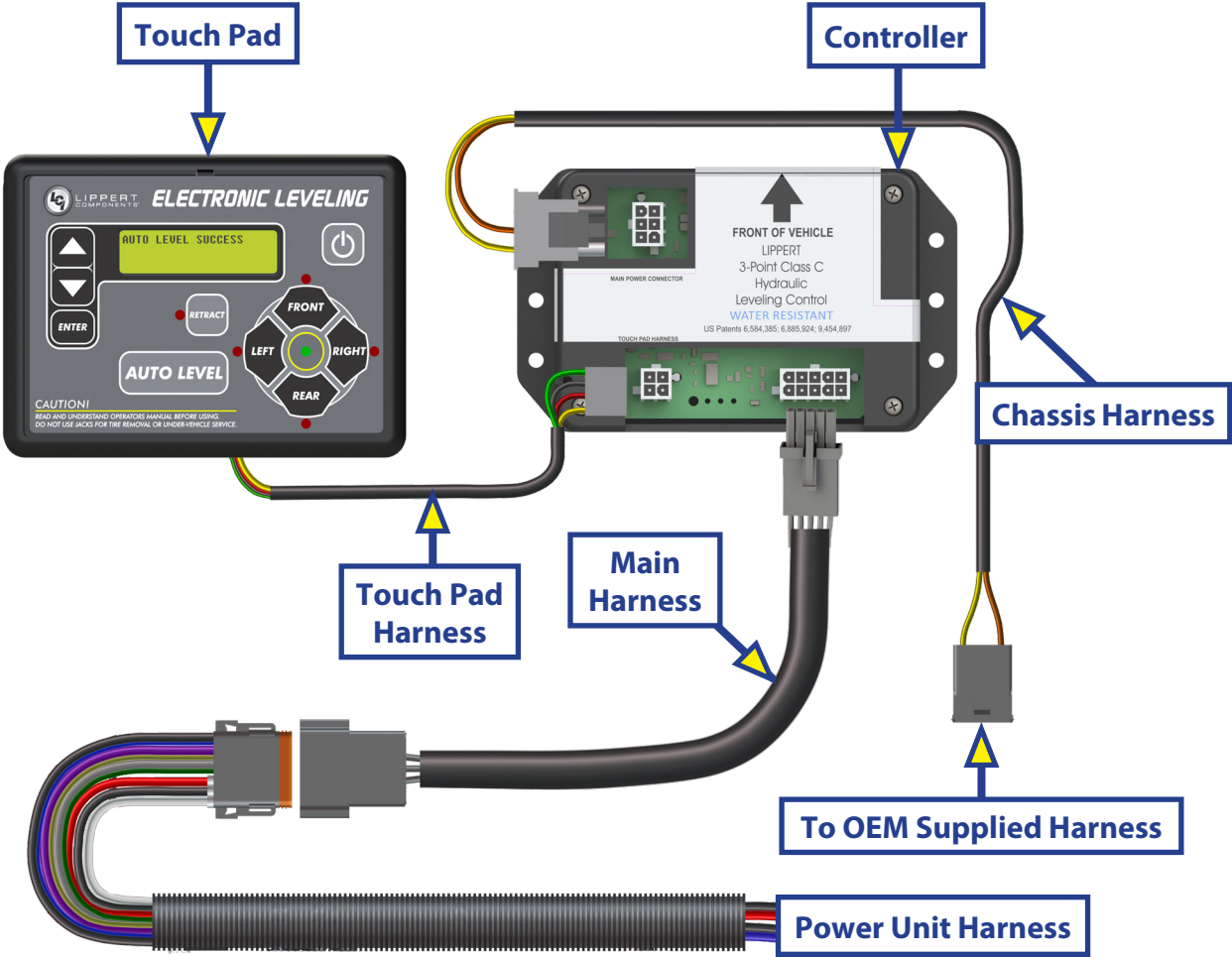
**NOTE:** When checking the hydraulic fluid level, fill reservoir to within  $\frac{1}{4}$ " to  $\frac{1}{2}$ " of fill spout.

2. Inspect and clean all power unit electrical connections every 12 months. If corrosion is evident, spray connections with electrical contact cleaner.
3. Remove dirt and road debris from jacks as needed.
4. If jacks are extended for long periods of time, it is recommended to spray exposed jack rods with a dry silicone lubricant every three months for protection. If the coach is located in a salty environment, it is recommended to spray the rods every four to six weeks.

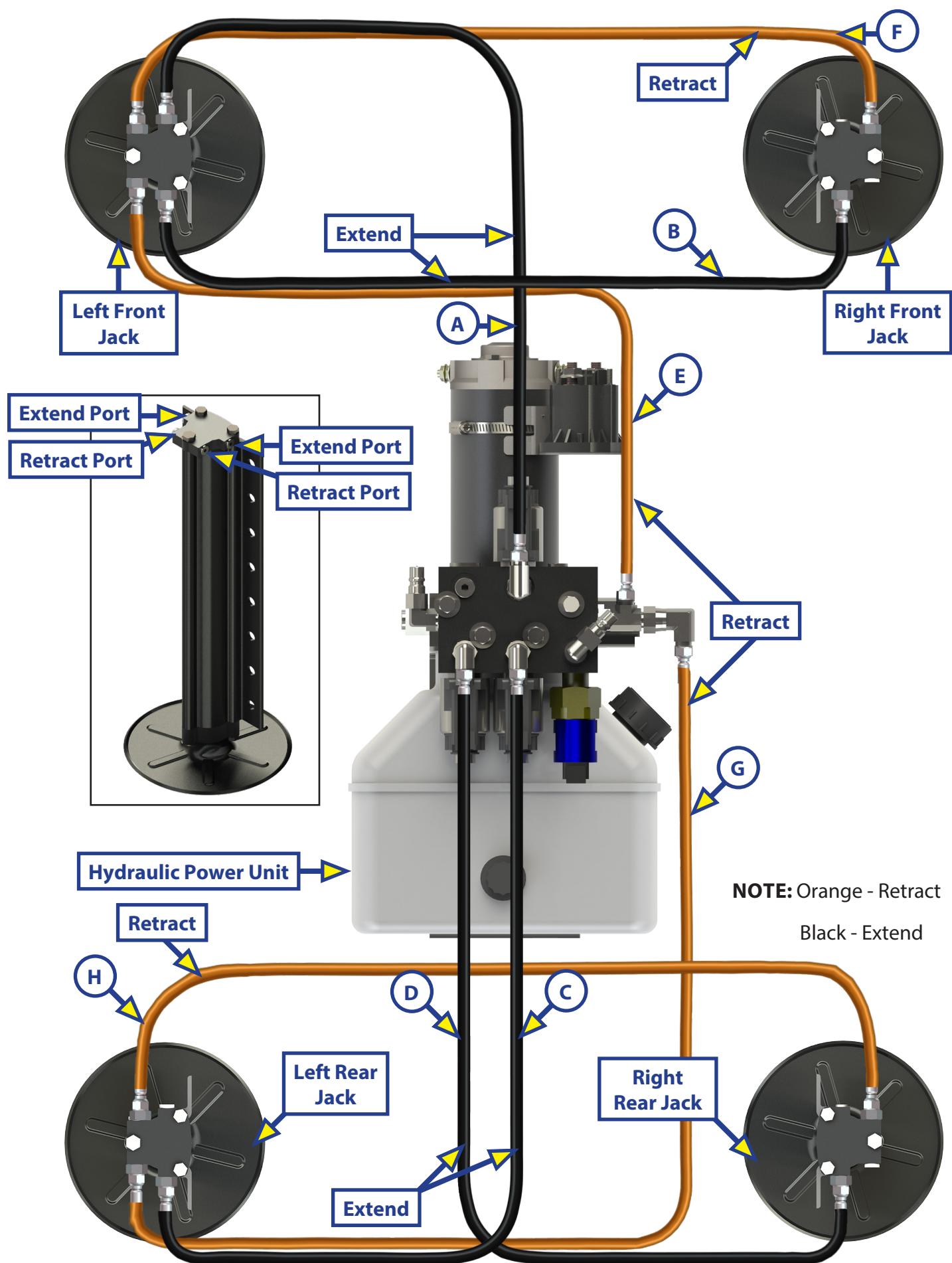
Wiring Diagram - Overall System



Wiring Diagram - Controller and Touchpad (Water Resistant)



Hydraulic Plumbing Diagram





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For all concerns or questions, please contact  
Lippert Components, Inc.

Ph: 432-LIPPERT (432-547-7378) | Web: [lippert.com](http://lippert.com) | Email: [customerservice@lci1.com](mailto:customerservice@lci1.com)

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Follow proper safety practices. If in doubt, consult a professional RV technician.