HYDRAULIC LEVELING

(4 POINT/3 VALVE SPRINTER)

OEM INSTALLATION MANUAL (UK)

LIPPERT COMPONENTS®

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Introduction

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 van. 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 3629 kg each.
   - **B.** Standard 229 mm diameter (40968 sq mm) footpad 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, 4.54 L
   - **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 - 6.4 mm I.D., 20684 kPa - W.P. Rated

For information on the assembly or individual components of this product, please visit: https://support.lci1.com/hydraulic-leveling-lcd-br4-point3-valve .

NOTE: Images used in this document are for reference only when assembling, installing and/or operating this product. Actual appearance of provided and/or purchased parts and assemblies may differ.

Safety

Read and understand all instructions before installing and/or operating this product. Adhere all to safety labels. This manual provides general instructions. Many variables can change the circumstances of the instructions, i.e., the degree of difficulty, operation and ability of the individual performing the instructions. This manual cannot begin to plot out instructions for every possibility, but provides the general instructions, as necessary, for effectively interfacing with the device, product or system. Failure to correctly follow the provided instructions may result in death, serious personal injury, severe product and/or property damage.

⚠WARNING

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

⚠WARNING

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

⚠WARNING

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

⚠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.

⚠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 van 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 van, 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 van. Any attempts to change tires or perform other service while the van is supported by the hydraulic leveling system could result in damage to the van and/or cause serious injury or death.

Preparation

Resources Required

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

Preliminary Procedures

1. Make sure to park the van 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 van on extremely soft surfaces, utilize load distribution pads under each jack.
4. People and pets should be clear of van 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.

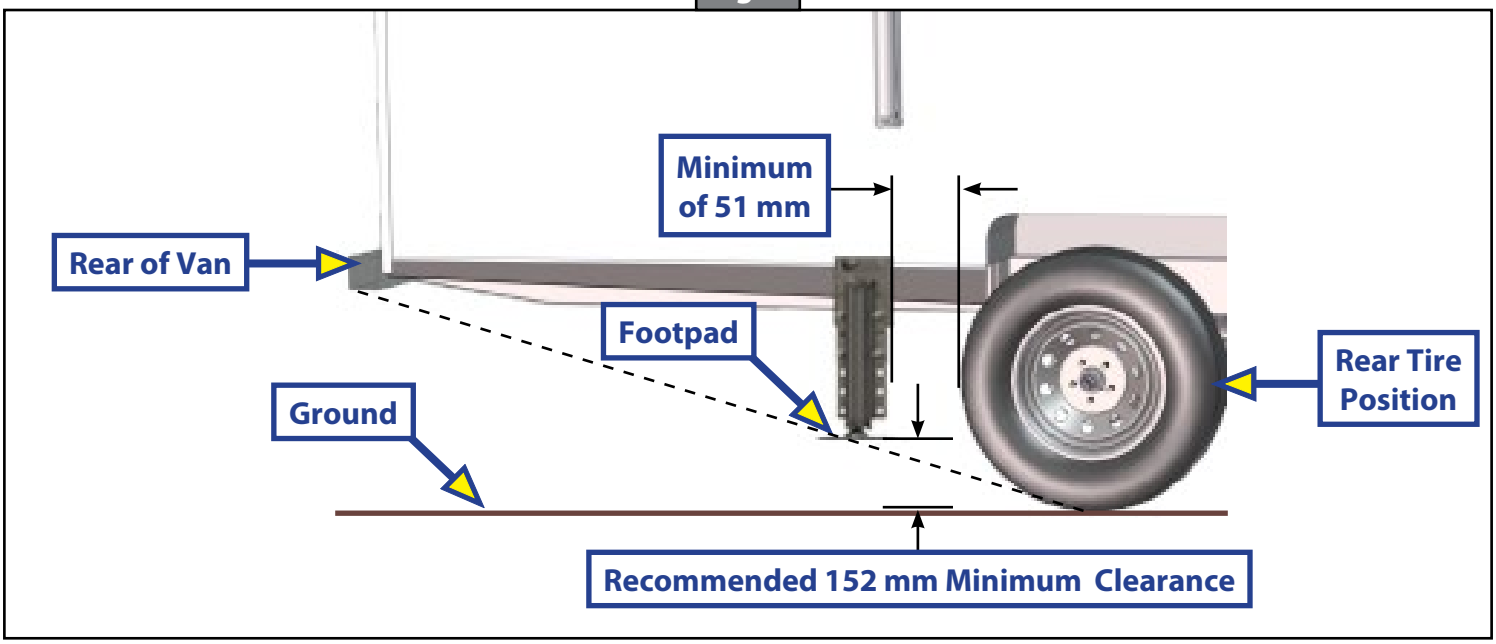
⚠WARNING

Never lift the van completely off the ground. Lifting the van so the wheels are not touching the ground will create an unstable and unsafe condition. Do not lift the van 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 van 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 152 mm (Fig. 1).

Fig. 1



7. Determine how and where the jack brackets will be bolted to the frame of the van by dry fitting brackets. Mark location with a non-permanent marker or grease pencil.
   - **A.** The rear jacks should be mounted so that there is a minimum of 51 mm 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 305 mm 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. Check both the inside and outside of the frame.

Prior to Installation

Refer to the Hydraulic Plumbing Diagram (Fig. 31) 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 (Fig. 3) 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).

Fig. 2

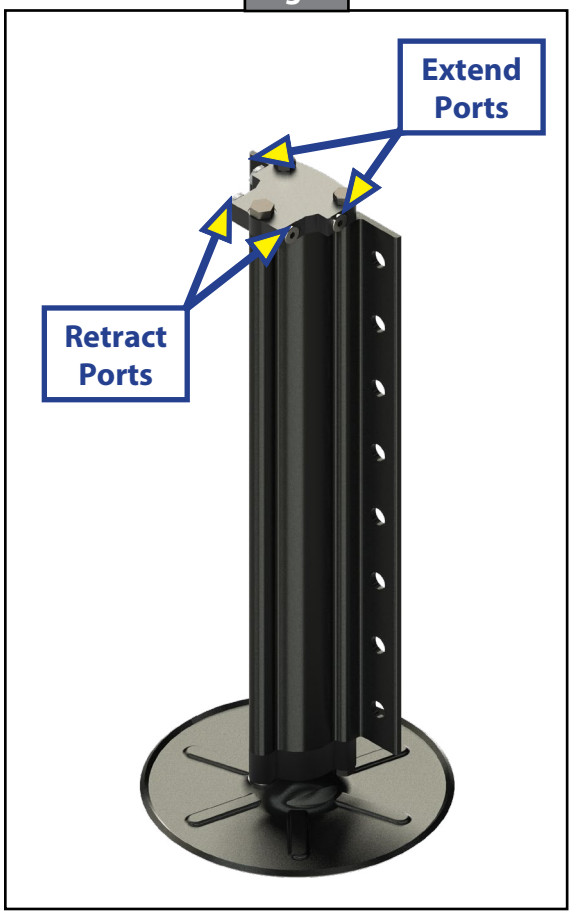
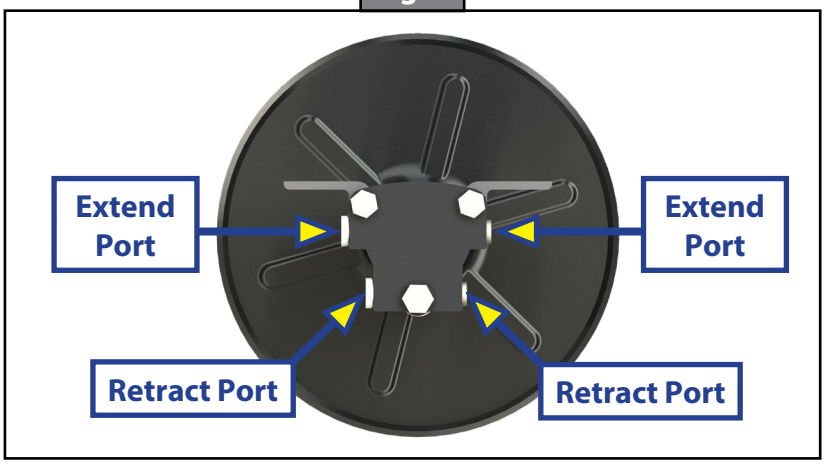


Fig. 3



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

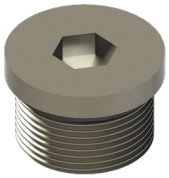
Installation

Because of various possible configurations, this manual will provide instructions with the hydraulic power unit mounted near the center of the van 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 (Fig. 31) for the power unit.

Jack Fitting Installation

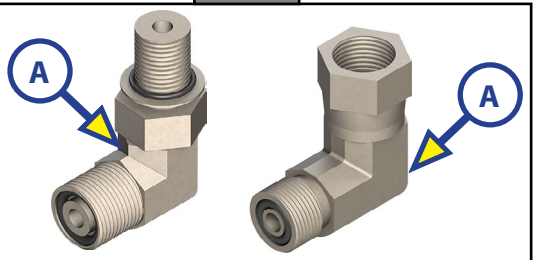
1. The Left Front (LF) jack requires two tees, two 90 degree elbows and M4 two port plugs.
2. The Right Front (RF) jack requires two 90 degree elbows and two M4 port plugs.
3. The Left Rear (LR) jack requires one tee, two 90 degree elbows and two M4 port plugs.
4. The Right Rear (RR) jack requires two 90 degree elbows and two M4 port plugs.
5. The hydraulic fittings and M4 port plugs (Figs. 4-6) can be installed into the jacks (Fig. 7) per the Hydraulic Plumbing Diagram (Fig. 31).

Fig. 4



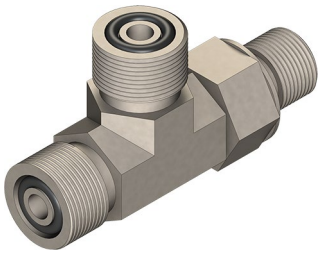
M4 Port Plug

Fig. 5



90° Fittings

Fig. 6

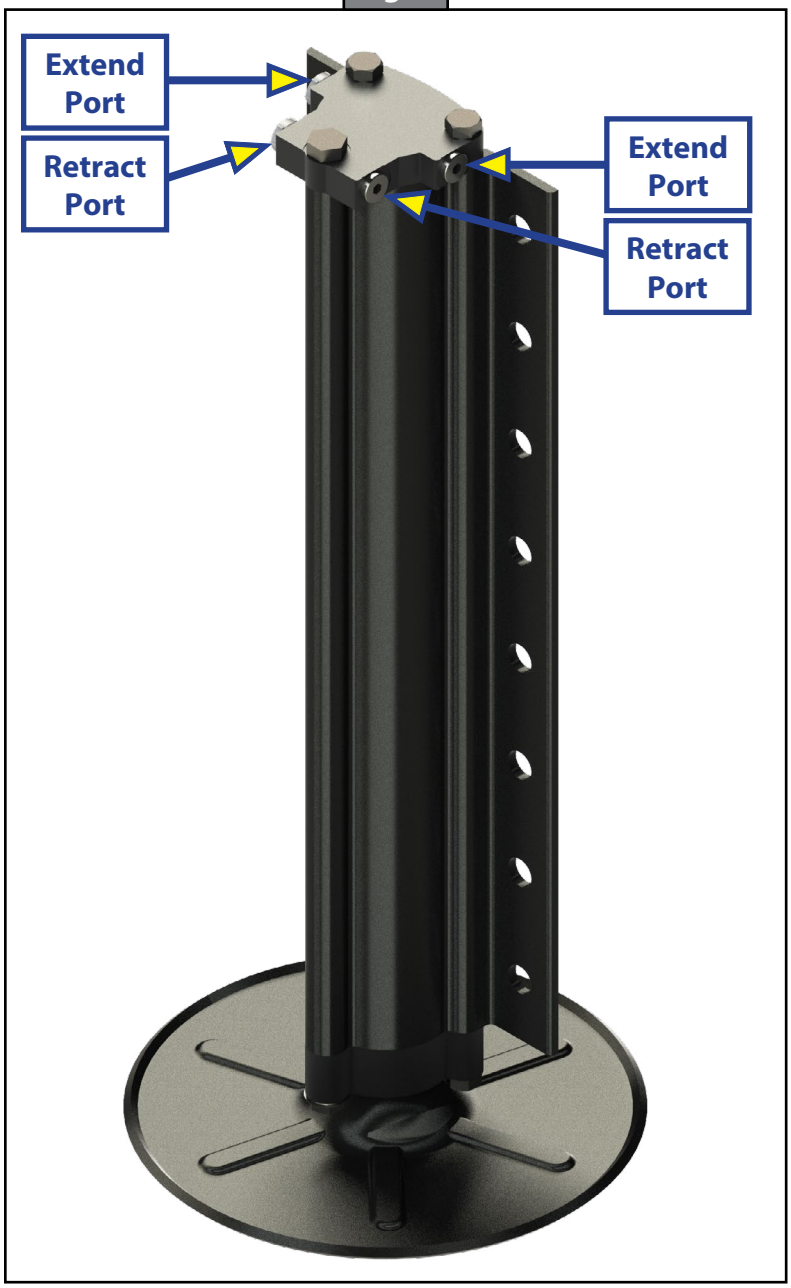


Tee Fitting

Jack Specifications

CAPACITY - 3628 kg max.
STROKE - 317 mm.
FOOTPAD - 229 mm dia. standard

Fig. 7



Hydraulic Power Unit Installation

1. Identify the hydraulic power unit mounting location. This will determine the orientation of the hydraulic fittings (Fig. 8). For this manual, the power unit is mounted near the center of the caravan frame, roadside frame rail.

NOTE: The location where the power unit will be installed should be as near center on the van 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. 9A) to the van frame.
3. Bolt the hydraulic power unit to the bracket assembly.

Fig. 8

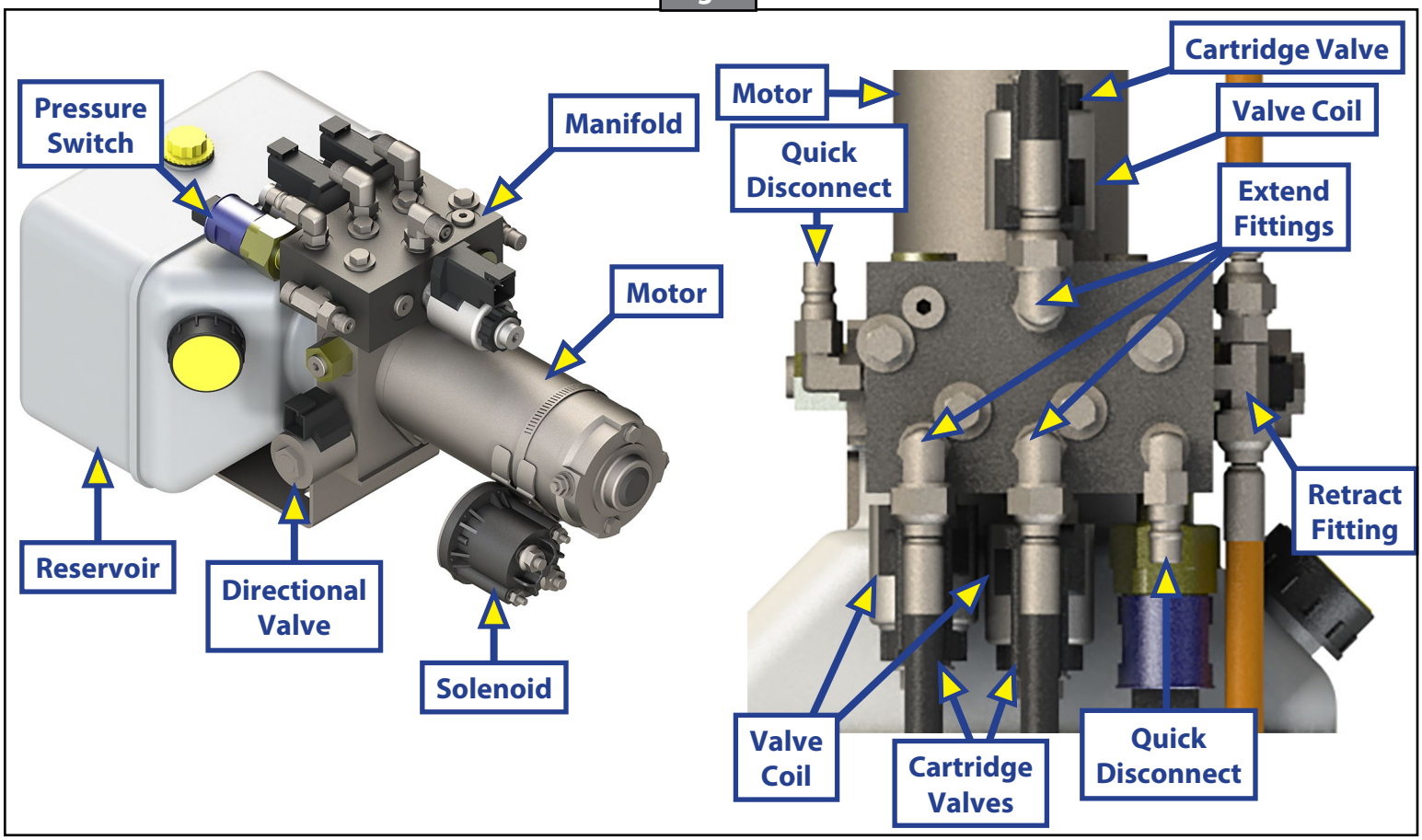
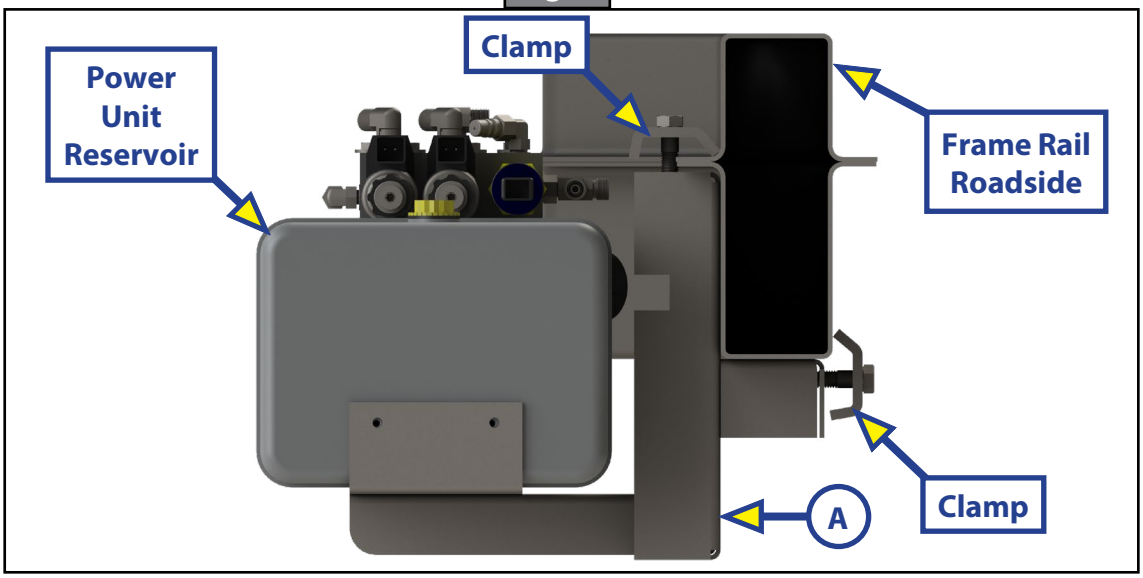


Fig. 9



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 non-permanent marking method is required to assist in assembly.

The rear jacks should be mounted so that there is a minimum of 51 mm 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 152 mm.
   - **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. 10).
3. Position angle weldment (Fig. 11) on the inside of the frame rail, within the previously-marked location.
4. Working from the outside of the frame rail, first install the M10 x 1.5 x 133 mm hex bolts through the top of the brackets, the angle weldments (Fig. 12) and into the attached nuts. Torque bolt to 41 Nm.
5. Working from the outside of the frame rail, next install the M10 x 1.5 x 64 mm hex bolts through the bottom of the brackets, angle weldments (Fig. 12) and into the attached nuts. Torque bolt to 41 Nm.
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 M12 nuts (Fig. 13).
9. Torque the nuts to 122 Nm.
10. Repeat steps 1-9 for the remaining rear jack brackets.

Fig. 10

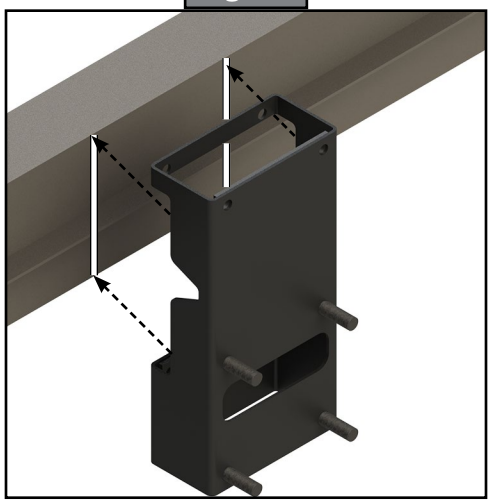


Fig. 11

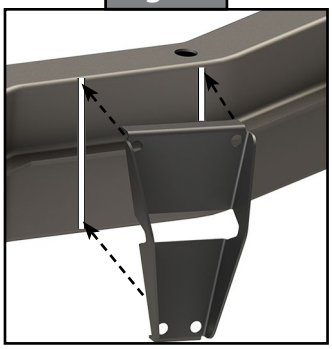


Fig. 12

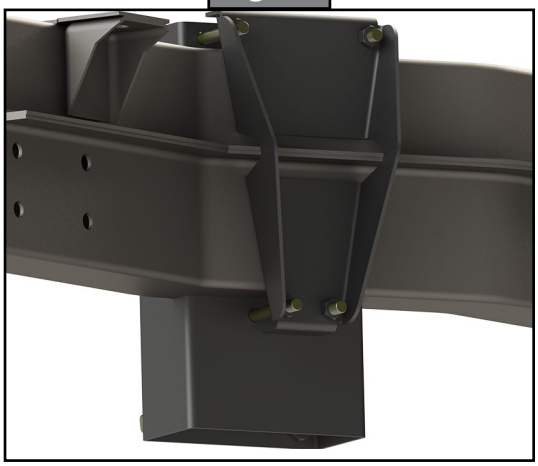
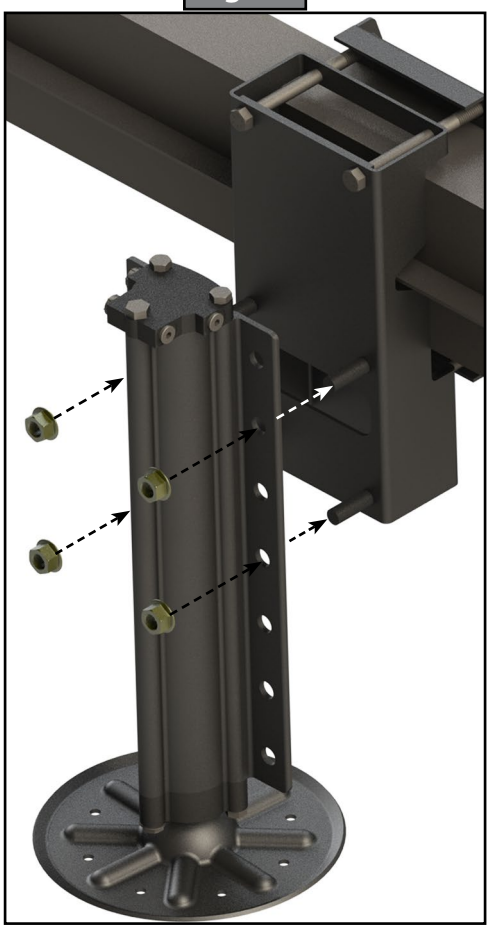


Fig. 13



Front Jack Bracket and Jack Installation

The front roadside jack bracket installation is different from the curbside. Torque all M10 bolts to 41 Nm.

Driver's Side Jack Bracket Installation

1. Prior to positioning the roadside jack bracket (Fig. 14A) onto the frame rail (Fig. 14B), insert a M10 x 64 mm hex head bolt (Fig. 14C) through the left side hole on the bracket and attach the hook weldment.
2. Position the driver's 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 M10 x 114 mm hex head bolt (Fig. 14D) 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. 14E) and secure loosely with a M10 nut (Fig. 14F).
6. Insert the hook weldment into drain hole of frame rail (Fig. 15).
7. Tighten the bolt (Fig. 14C) to draw the hook weldment and jack bracket together, securing the jack bracket against frame rail.
8. Tighten the other bolt (Fig. 14D) to pull C-channel secure against frame rail.

Fig. 14

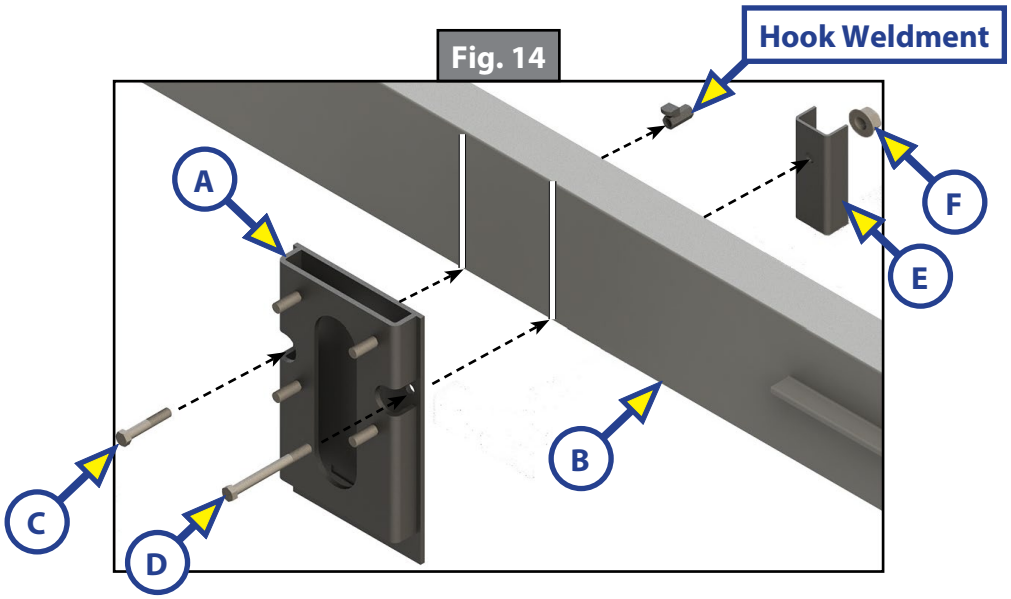
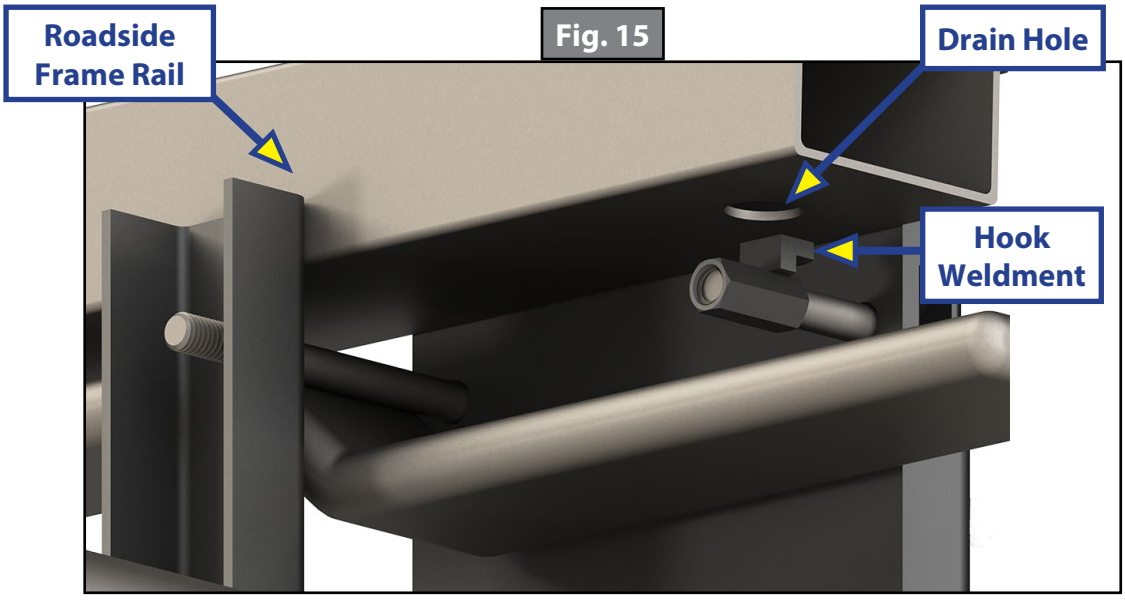


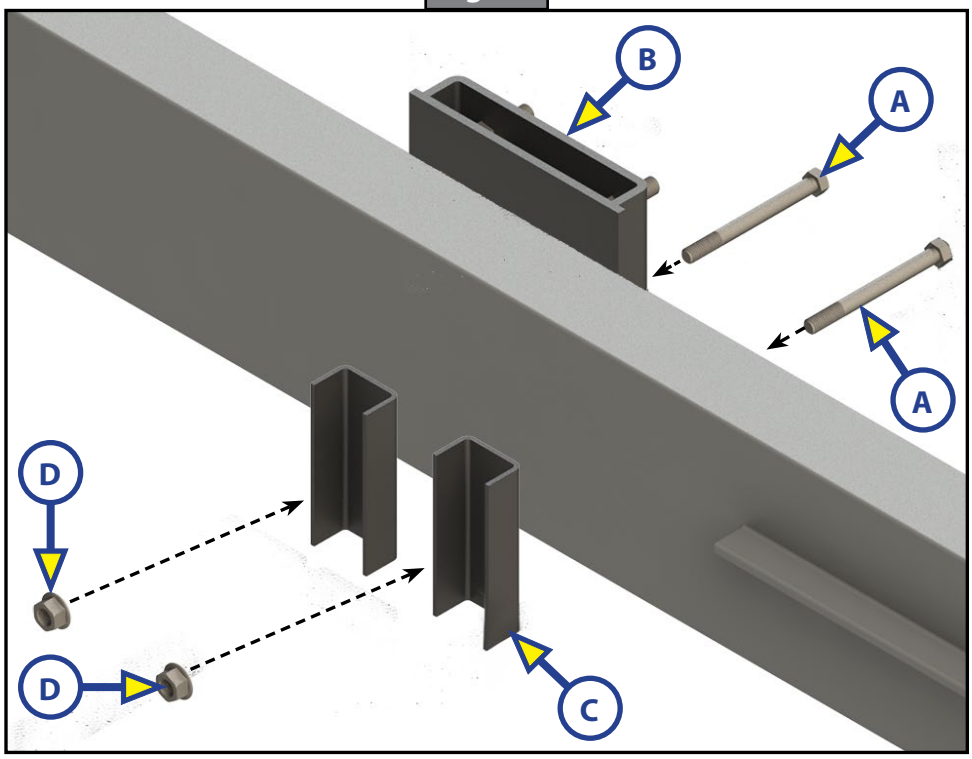
Fig. 15



Passenger Side Jack Bracket Installation

1. Position the passenger side jack bracket onto the outside of the frame rail within the previously-marked location.
2. Insert two M10 x 114 mm hex head bolts (Fig. 16A) into the holes of the jack mounting bracket (Fig. 16B) and position both mounting bolts between frame rail and traction bar.
3. Install two C-channels (Fig. 16C) onto the bolts and secure with M10 nuts (Fig. 16D).
4. Tighten the bolts, which will pull the plates securely against frame rail.

Fig. 16



Installing the Cross Tie Assembly

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

1. Starting with the front curbside, attach one rod (Fig. 17A) and angle weldment (Fig. 17B) to the jack mounting bracket (Fig. 17C). Insert M10 x 44 mm bolts (Fig. 17D) through the bracket and attach M10 serrated flange nuts (Fig. 17E) to the bolts.
2. Attach the other rod and angle weldment to the mounting bracket. Insert M10 x 44 mm bolts through the bracket and attach M10 serrated flange nuts to bolts.

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

3. After both ends have been attached, spread the brackets on the crosstie 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. 18) is positioned below the welded lip, on inside of the bracket. The edge of the stabilizer bar will be rest on top of the right front rod and angle weldment.

Fig. 17

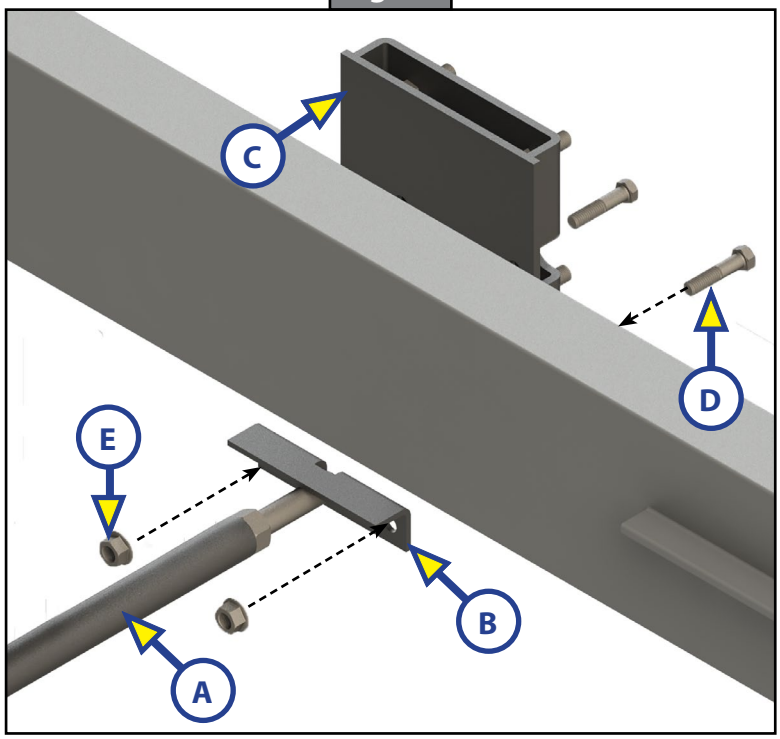
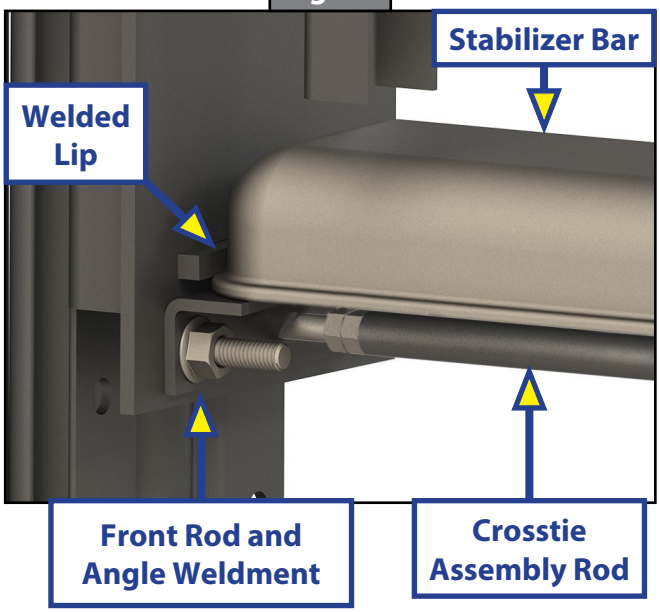


Fig. 18



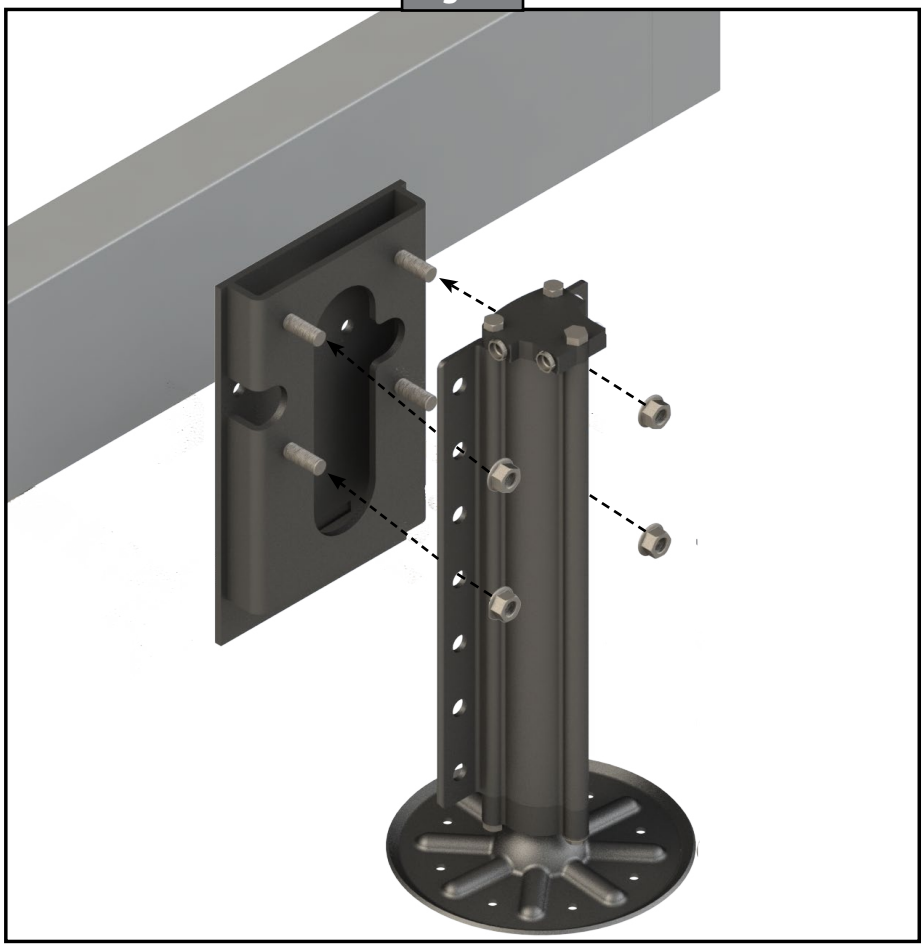
Jack Installation

1. Secure the roadside jack to the jack bracket with M12 x 1.25 mm serrated flange nuts (Fig. 19).
2. Torque all flanged nuts to 122 Nm.
3. Repeating this process, secure the curbside jack to the jack bracket with M12 x 1.25 mm serrated flange nuts (Fig. 19).
4. Torque all flanged nuts to 122 Nm.

NOTE: A recommended minimum ground clearance between the bottom of the jack footpad and the ground, is 152 mm when the van 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 van 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. 19



Hydraulic Hoses

⚠ CAUTION

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.

Verify that the hydraulic fittings were installed on the four jacks and power unit correctly. A M12 port plug will be used to seal any ports not used within the system.
Refer to the Hydraulic Plumbing Diagram (Fig. 32) for fitting placements and for steps 1-8.
Labels on hoses:

- Front extend
- Front cross
- Rear driver
- Rear pass
- Front return
- Rear return
- Rear cross

1. Measure the distance between the LF jack and the power unit; this is an extend hose (Fig. 31A).
2. Measure the distance between the LF jack and the RF jack; this is an extend hose (Fig. 31B).
3. Measure from the LR jack and the power unit; this is an extend hose (Fig. 31C).
4. Measure from the RR jack and the power unit; this is an extend hose (Fig. 31D).
5. Measure from the power unit to the LF jack; this is a retract hose (Fig. 31E).
6. Measure from the LF jack to the RF jack; this is a retract hose (Fig. 31F).
7. Measure from the power unit to the LR jack; this is a retract hose (Fig. 31G).
8. Measure from the LR jack to the RR jack; this is a retract hose (Fig. 31H).

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 the hose lines.

9. When running the hydraulic hoses from the power unit to the jacks, bundle the hoses together. Secure any loose hoses with zip ties as needed.
10. Install all hoses onto the corresponding jacks and power unit fittings, as per Hydraulic Plumbing Diagram (Fig. 31).

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.

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.

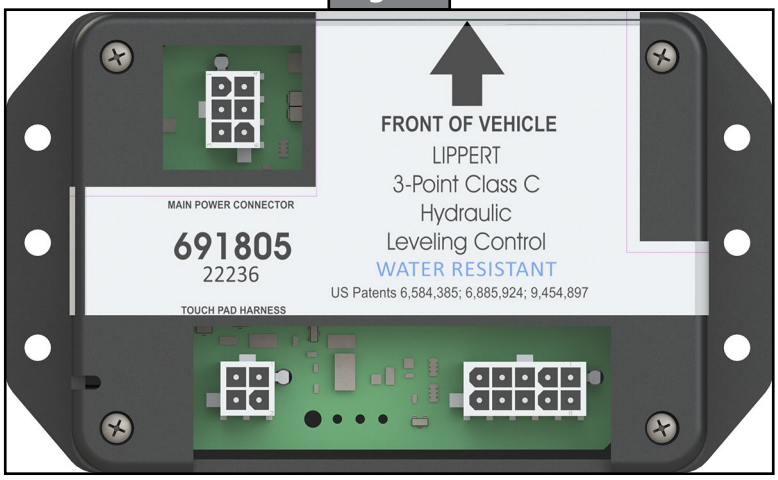
Controller and Touchpad Installation

The Lippert Components, Inc. hydraulic leveling system 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.
Refer to the Wiring Diagram throughout this section.

Controller Installation

1. Install the controller (Fig. 20) in a location close to the center of the van. It must be centered side-to-side and oriented according to the arrows on the controller's label.

Fig. 20



2. Connect the multi-colored, nine-wire harness, onto the matching port of the controller. The harness contains a 10-pin end (Fig. 21A) and a 12-pin end (Fig. 21B).

NOTE: Each connector on the controller is a different shape and has a different number of pins. Each harness (Fig. 21) 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.

Fig. 21

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. 22).
2. In the designated mounting location, cut a hole 86 mm x 70 mm for the touchpad (Fig. 23).
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 Diagram.
5. Feed the touchpad harness through the mounting bezel, inserting the touchpad bezel into the cutout hole, and attaching it to the mounting surface with four M4 x 25 mm wood screws. Verify that the screws are of sufficient length to thread into the mounting surface (Fig. 24).
6. Plug the touchpad harness into the connector on the back of the touchpad faceplate, and snap the faceplate into the bezel (Fig. 25).

Fig. 22

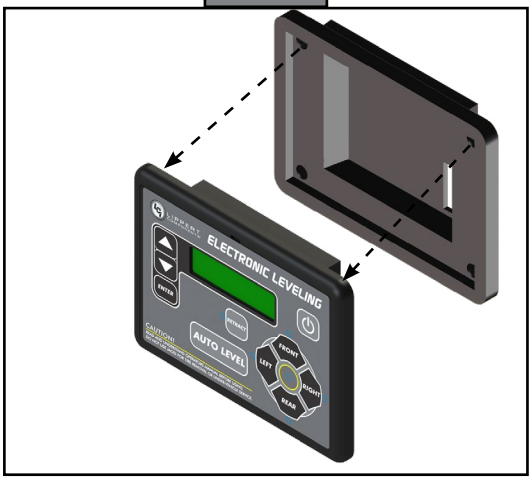


Fig. 23

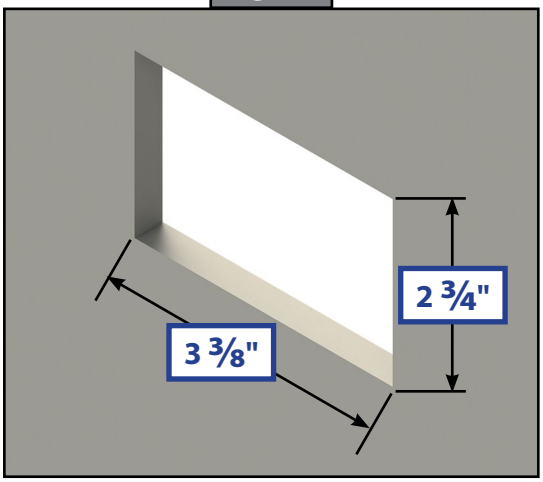


Fig. 24

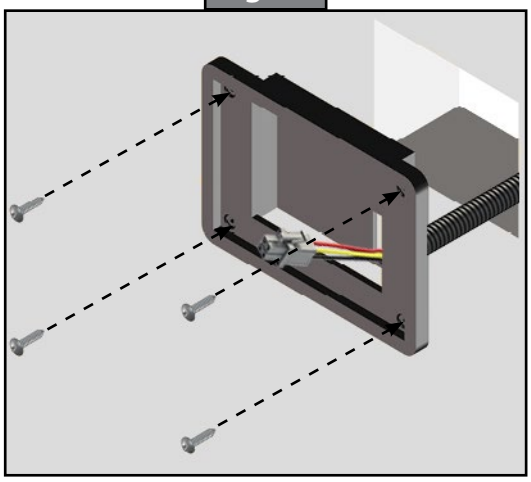
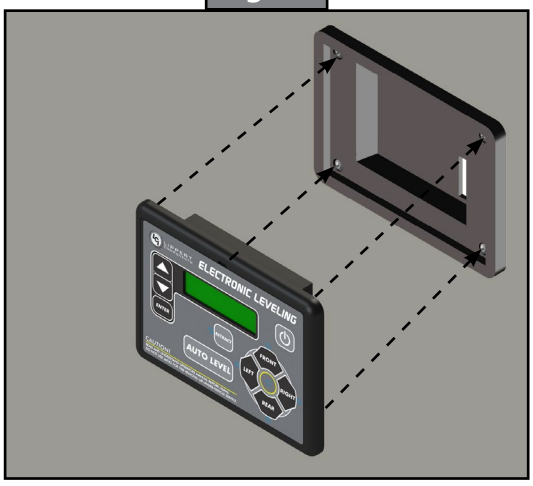


Fig. 25



System Wiring Requirements

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

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

⚠ CAUTION

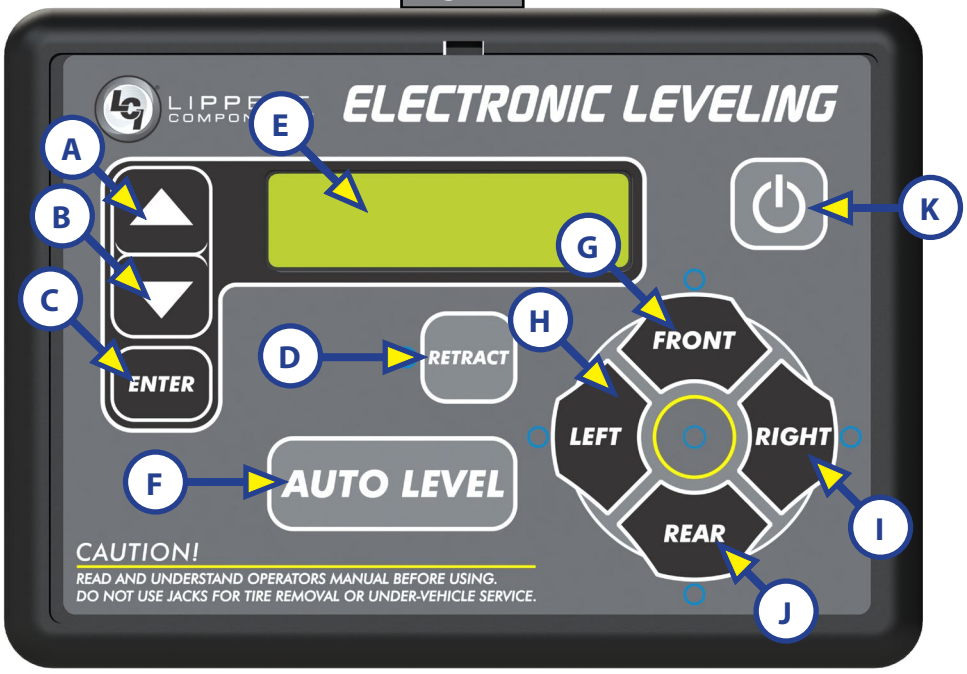
After starting the automatic leveling cycle, it is very important that there is no movement inside the van until the van is level and the green LED light illuminates in the center of the touchpad. Failure to remain still during the leveling cycle could have a negative effect on the performance of the 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. 26



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 van 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 van 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. 26G) five times.
   - **B.** Press REAR (Fig. 26J) 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. 26C) 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 Procedure

The van requires 12.75V DC to start the auto-leveling function.
Refer to Component Description listing in the System Information section for questions regarding component locations and functions of the hydraulic leveling system.
The engine **MUST** be running and the parking brake **MUST** be engaged for the hydraulic leveling system to operate.
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. 26K) to turn the system on. The green light will illuminate.
2. Press AUTO LEVEL (Fig. 26F). The LCD screen will display "Remain Still."
3. The van will then level automatically and indicate "Auto Level - Success" in the LCD display (Fig. 26E).

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.

Automatic Leveling Descriptive Logic

⚠ CAUTION

After starting the automatic leveling cycle it is very important that there is no movement inside the van until the van 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 van from the controllers calibrated Zero Point, either individually or in pairs depending on your systems 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 caravan, 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

Manual Leveling Procedure

The van should be leveled front-to-rear first, then leveled side-to-side.
The engine MUST be running and the parking brake MUST be engaged for the hydraulic leveling system to operate.

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

1. Press the Power Button (Fig. 26K) to turn the system on.
2. Press the Up Arrow (UP) or the Down Arrow (DOWN) (Fig. 26A or Fig. 26B) to scroll through control features until “Manual Mode” is displayed.
3. Press Enter (Fig. 26C).
4. Press Front (Fig. 26G) to extend the front jacks to the ground.
5. Press Rear (Fig. 26J) to extend the rear jacks to ground, then level the van front-to-back.
6. Press the appropriate Left or Right button to level the van side-to-side.

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

NOTE: The front jacks will work simultaneously, i.e., FRONT operates both of the front jacks. The right and left rear jacks are used to level the van from side-to-side. Pressing the LEFT button (Fig. 26H) on the touchpad will extend the left rear jack. Pressing the RIGHT button (Fig. 26I) on the touchpad will extend the right rear jack.

7. Repeat steps 4-6 as needed.
8. Press the Power Button (Fig. 26K) to turn the system off.

⚠WARNING

All van 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 are not touching the ground, press LEFT or RIGHT (Fig. 26H or Fig. 26I) to lower the non-compliant jack to the ground.

Automatic Jack Retract Procedures

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. 26K) on the touchpad. The LCD screen will display "READY Jacks: Down."
2. Press Up Arrow or Down Arrow (Fig. 26A or Fig. 26B) to display "Auto Retract All" on the touchpad.
3. Press ENTER (Fig. 26C) to begin.

NOTE: “AUTO RETRACT” can also be commenced by pressing and holding RETRACT (Fig. 26D) 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. 26K) twice. The van 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. 26K) on the touchpad to turn off the system.
   - **C.** Perform a brief visual inspection around the van to verify the jacks are fully retracted.

Manual Jack Retract Procedures

1. To retract in the MANUAL mode, press RETRACT (Fig. 26D) until the green indicator light comes on.
2. Pressing FRONT or REAR (Fig. 26G or Fig. 26J) will operate the respective jacks in pairs.
3. Pressing RIGHT (Fig. 26I) will operate the right rear jack.
4. Pressing LEFT (Fig. 26H) will operate the left rear jack.

Troubleshooting

Manual Override of The Power System and Jacks

⚠ CAUTION

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

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 handheld drill is all that is required.

⚠ CAUTION

Do not overtighten override set screws, as this can damage the valves.

1. Use a 5/32" hex key to turn the manual override clockwise (Fig. 27) on each of the three cartridge valves (Fig. 8) to open the valves.
2. Disconnect or shield power cables on the motor.
3. Remove plastic cap (Fig. 28A) from motor coupler.

Fig. 27

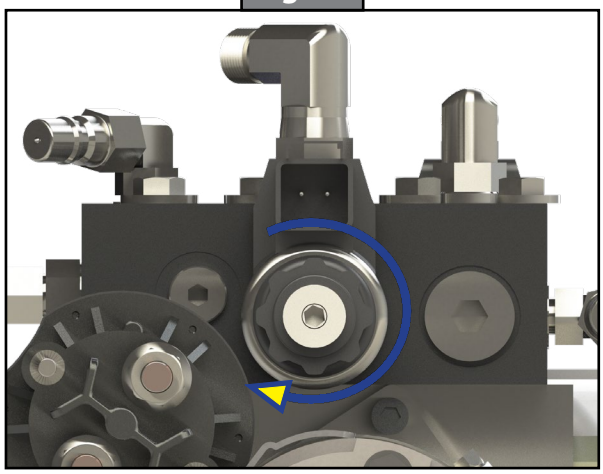


Fig. 28

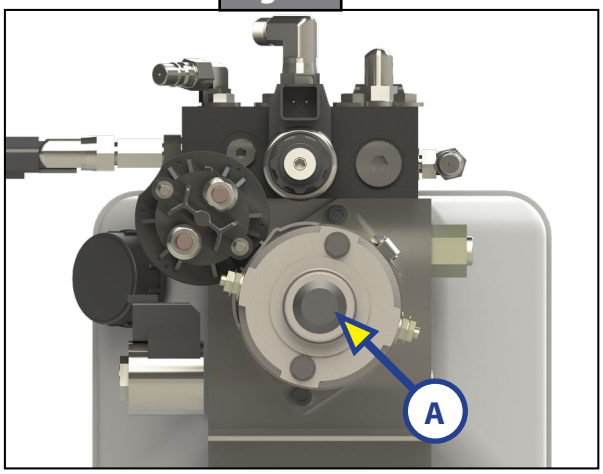


Fig. 29

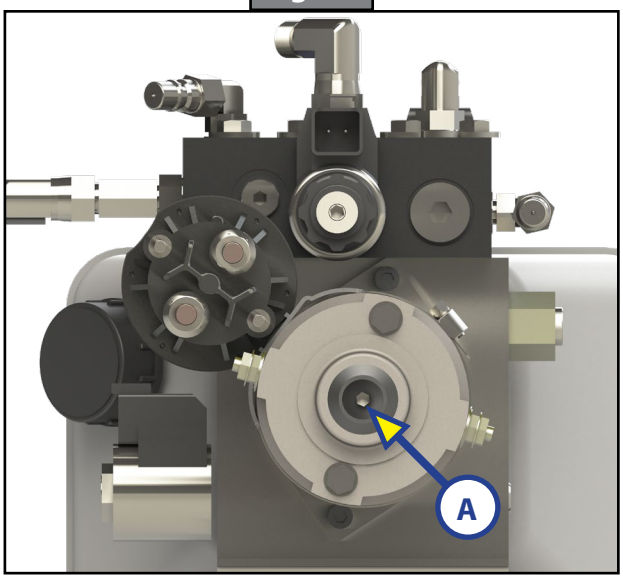
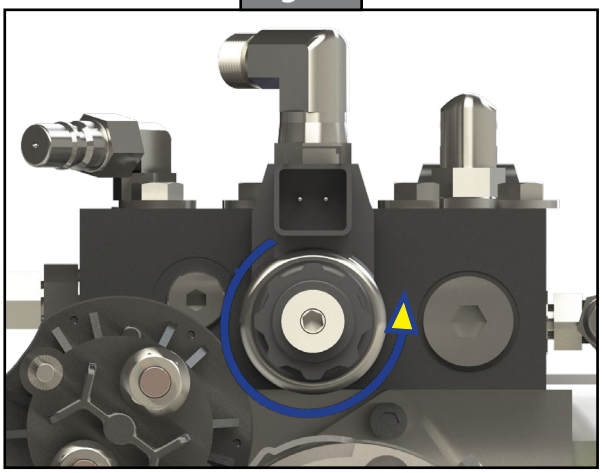


Fig. 30



Counterclockwise for Normal Operation

4. Unplug the wire harness from the directional valve. See Wiring Diagram (Fig. 31).
5. Using a 12-13 mm socket and auxiliary drive device, e.g. cordless or power drill, insert the 12-13 mm socket into coupler (Fig. 29A).
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. 30).
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 van ignition off, then back on. Press the touchpad's Power Button (Fig. 26K) 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 van 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. 26E) and an alarm will sound. To reset common ERROR displays, press ENTER (Fig. 26C).

NOTE: To reset "Return for Service" errors, press ENTER (Fig. 26C) and RETRACT (Fig. 26D) 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	Van not parked on level ground. Zero Point incorrectly calibrated.	Move van to level ground prior to starting auto leveling sequence. Recalibrate Zero Point.
Excessive Angle	Occurs only in manual mode when the angle of the van is too severe.	Use the manual functions to return van 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 van during auto leveling sequence.	Discontinue movement inside van during auto level sequence.
Engage Park Brake	Parking brake not set prior to starting auto leveling sequence.	Set parking brake prior to starting auto leveling sequence.
Comm Error Check Wiring **NOTE**: Screen will not back light.	Wiring connections loose or faulty between touchpad and controller.	Check connections, replace communication harness if necessary.
Retract Timeout Return Levelers for Service	Pressure switch did not sense retract pressure and pump timed out. Leaking hose or fitting.	Return levelers for service. Check for leaks, repair if necessary. 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 van's display indicates “Excess Angle” or “Out of Stroke “ during an auto-level cycle, move the van 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.1F), 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 van 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: Van 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 the on/off indicator light does not illuminate.	Van ignition is not in RUN position.	Turn ignition to RUN position.
	Touchpad has been on, but inactive for more than four minutes and has timed out.	Turn ignition OFF and then back ON.
Touchpad turns on, but turns off when jack directional buttons are pressed or touchpad displays "low voltage."	Tripped or blown circuit protection.	Reset or replace circuit protection.
	Low voltage on battery.	Start van to charge battery.
Touchpad turns on, van will not auto-level, "jacks down" displayed, jacks are retracted.	Faulty pressure switch or low pressure in system.	Press RETRACT button on touchpad. If "JACKS DOWN" light remains on, call LCI Customer Service.
Jacks will not extend to ground while pump is running.	Little or no fluid in reservoir.	Add fluid as recommended.
	Cartridge valve is inoperative.	Clean, repair or replace cartridge valve.
	Electronic signal is lost between controller and coil.	Trace wires for voltage drop or loss, or no valve signals. Repair or replace necessary wires or replace controller.
Any one or two jacks will not retract.	Hose damaged or unconnected.	Replace with new hose or reconnect hose.
	Cartridge valve is inoperative.	Replace inoperative cartridge valve.
	Electronic signal is lost between controller and coil.	Attempt to retract jacks in MANUAL mode. If successful, replace touchpad; if not, test for voltage drop between touchpad and coil, repair bad wiring or replace defective controller or cartridge valve.
"READY - Jacks: Up" does not display when all jacks are retracted.	Low pressure in system.	Contact LCI Customer Service.
	Retract pressure switch inoperable.	Check connection or replace pressure switch.
Alarm sounds and "jacks down" light starts flashing while traveling; jacks are fully retracted.	Low pressure in system.	Contact LCI Customer Service.
	Retract pressure switch inoperable.	Check connection or replace pressure switch.

What Is Happening?	Why?	What Should Be Done?
Van bleeds down after jacks are extended. Jack bleeds down after being retracted.	Possible fluid leak.	Check for fluid leaks and repair or replace components as necessary.
	Cartridge valve manual override open.	Close override, see Manual Override of The Power System and Jacks.
Touchpad powers up; screen displays "low voltage."	Loose ground wire at power unit.	Check for loose wires.
	Engine not running.	Start van engine.
No power to touchpad.	Tripped or blown circuit protection.	Reset or replace circuit protection.
	Ignition not ON.	Turn ignition ON.
Auto level function does not finish.	Error code "Unable to finish leveling."	Move van to a level site.

Maintenance

⚠WARNING

The van 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 0° C) 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 van as if the van 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 6 mm from the top of the reservoir and no more than 13 mm 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 13 mm 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 van off the tires. If the van 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

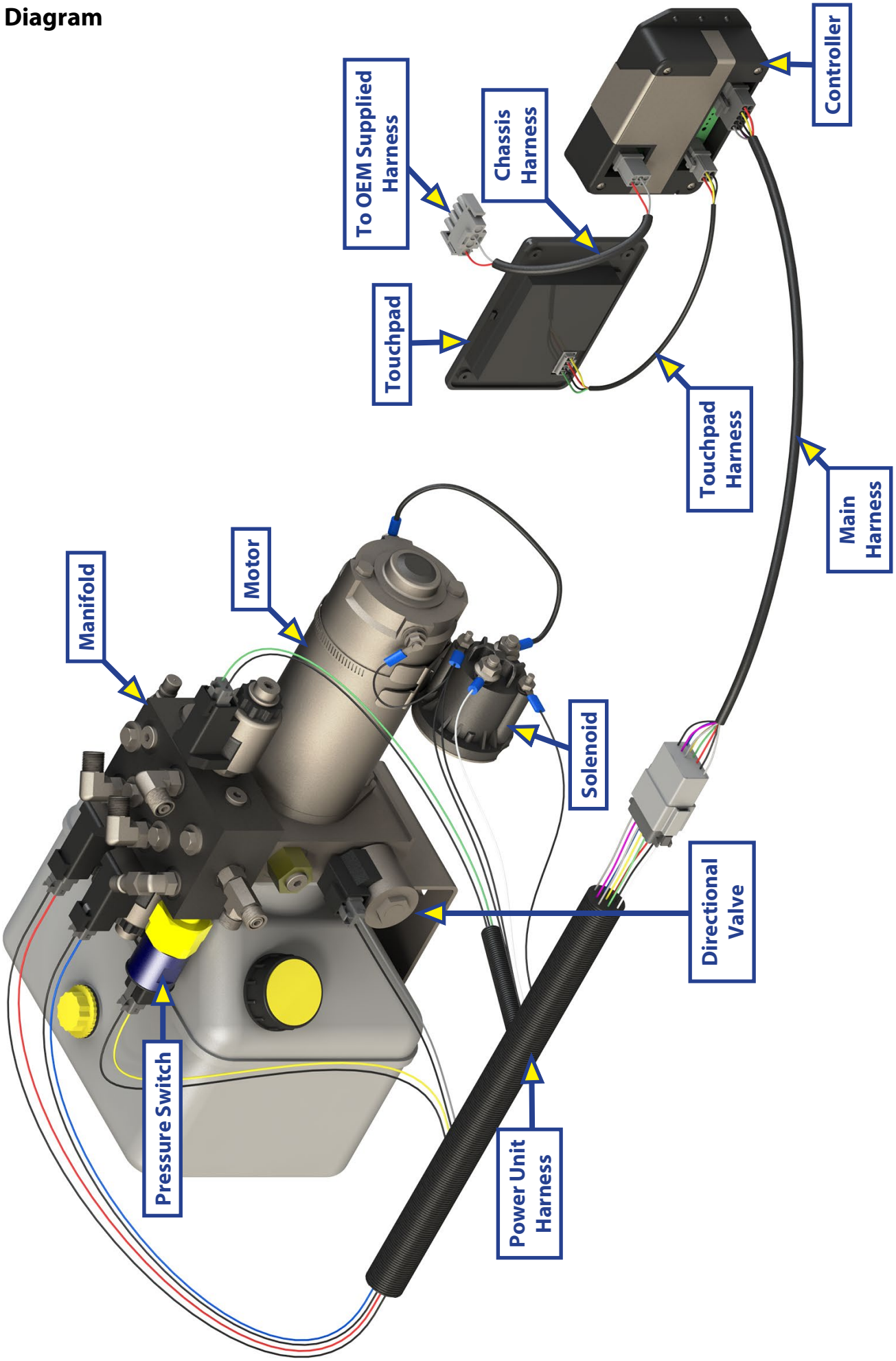
1. Check hydraulic fluid in reservoir every 12 months. If fluid is a clear, red color, do not change. If fluid is milky, pink and murky, and not clear red in color, drain reservoir and add new fluid. Hydraulic fluid in reservoir should be changed a minimum of every five years.

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

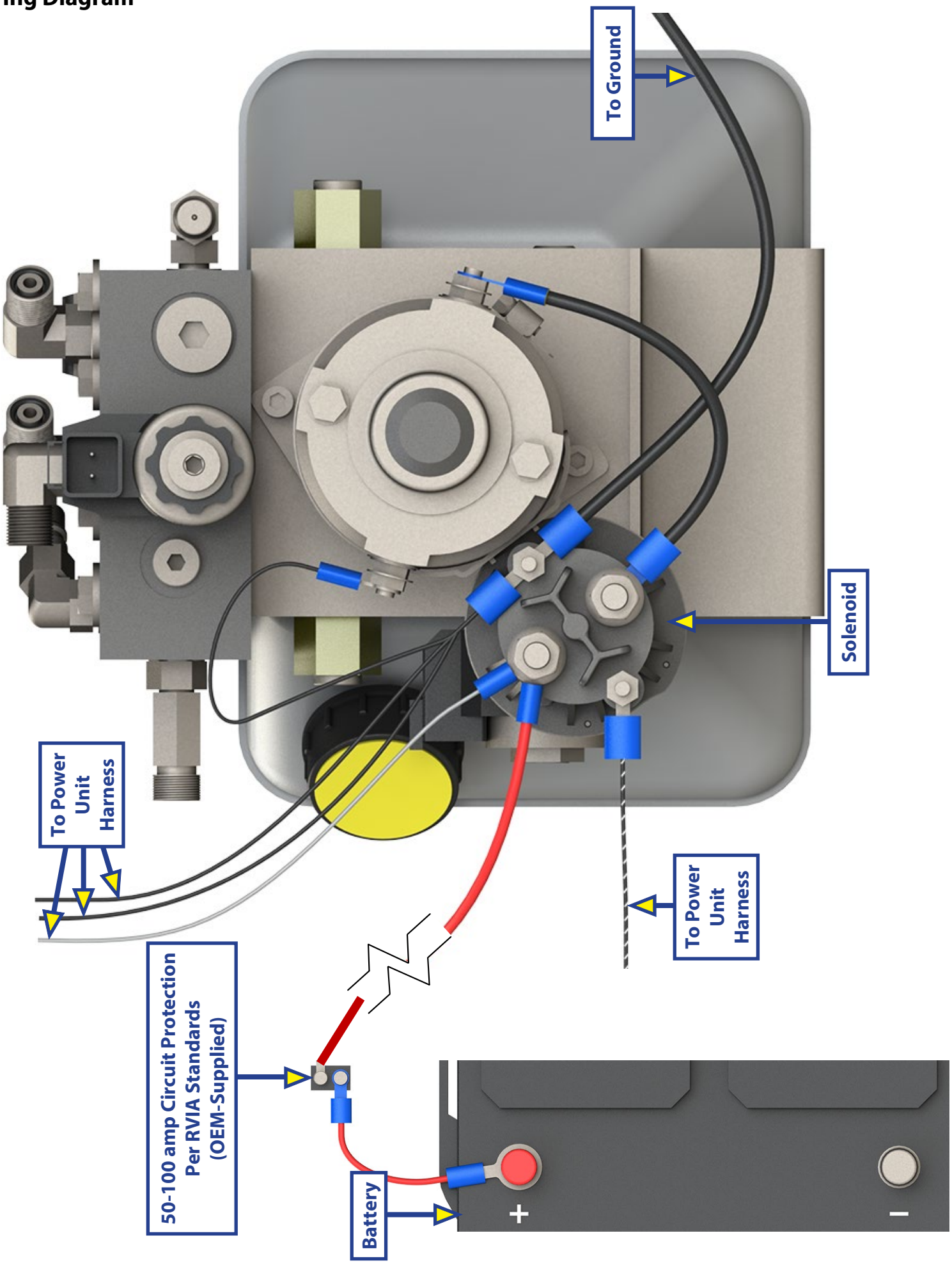
NOTE: When checking the hydraulic fluid level, fill reservoir to within 6 mm to 13 mm of fill spout.

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 van is located in a salty environment, it is recommended to spray the rods every four to six weeks.

Wiring Diagram

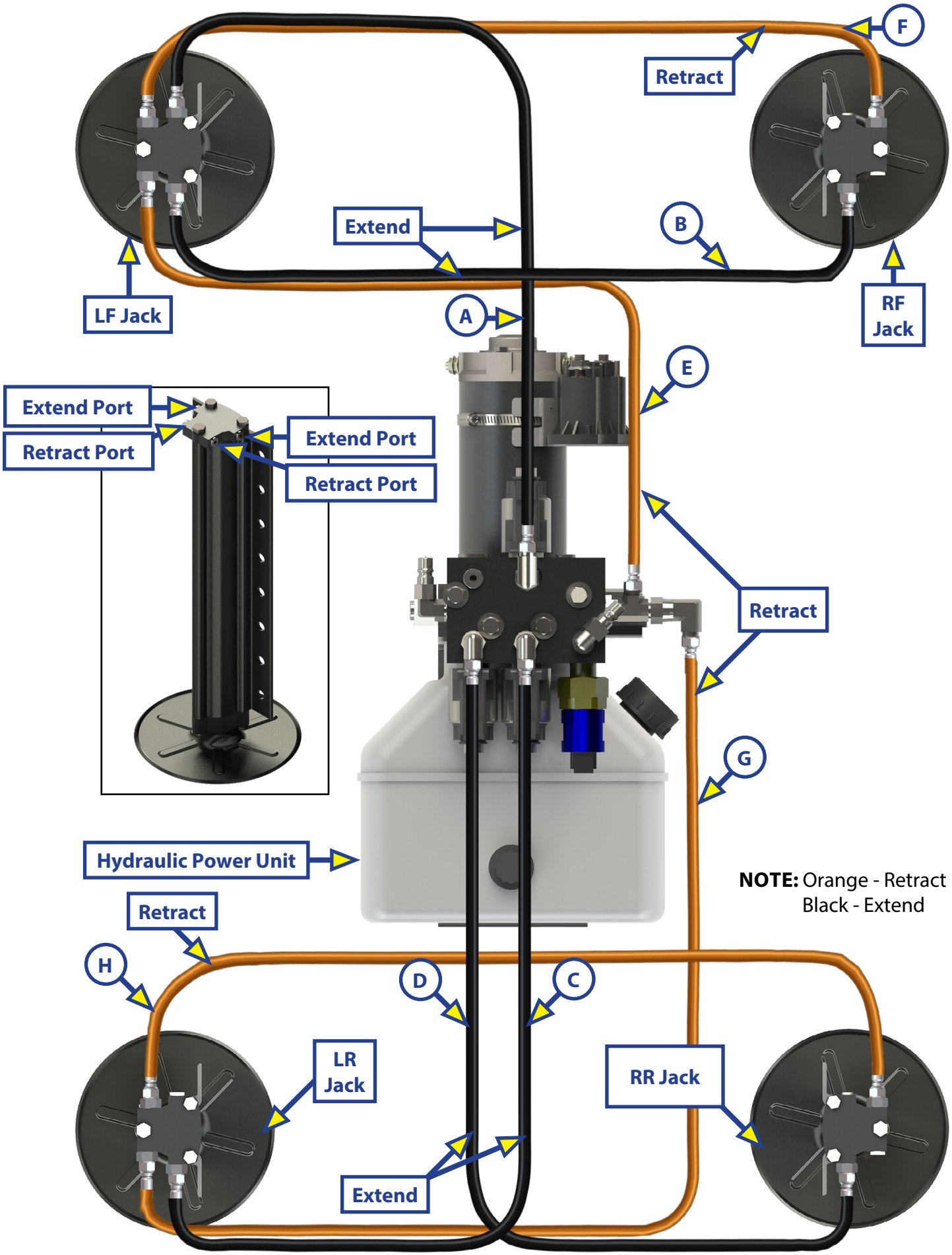


Wiring Diagram



Hydraulic Plumbing Diagram

Fig. 31



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