



**TIFFIN MOTORIZED
HYDRAULIC LEVELING
OEM INSTALLATION MANUAL**

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Introduction

The Hydraulic Leveling System's purpose is to hydraulically actuate the leveling. Its function should not be used for any purpose or reason other than to actuate the leveling. To use the system for any reason other than what it is designed for may result in death, serious injury or damage to the coach.

The use of the Lippert 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 recommends that a trained professional be employed to change the tires on the coach. Any attempts to change tires or perform other service while coach is supported by the Hydraulic Leveling System could result in damage to the coach and/or cause serious injury or death.

Additional information about this product can be obtained from Lippert1.com/support or the myLippert app is available for free on Apple App Store® for iPhone® and iPad® and also on Google Play™ for Android™ users.

App Store® and iPad® are registered trademarks of Apple Inc.

Google Play™ and Android™ are trademarks of Google Inc.

For information on the assembly or individual components of this product, please visit:

<https://support.lci1.com/through-frame-selections>

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 or operating this product. Adhere to all 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, including voiding of the Lippert limited warranty.

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 installation make sure that the coach is supported according to the manufacturer's recommendations. 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, serious personal injury or severe product and/or property damage.

WARNING

Failure to follow instructions provided in this manual may result in death, serious personal injury and/or severe product and property damage, including voiding of the component warranty.

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

Always wear eye protection when performing service, maintenance or installation procedures. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the task.

CAUTION

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

Resources Required

- Cordless or electric drill or screw gun
- Ratchet and coupler
- Open-end/box-end wrenches
- Tape measure
- Torque wrench
- 1 1/8" wrench
- 1 1/16" wrench
- 3/4" socket or wrench
- 3/8" socket or wrench
- 3/8" lag screws or bolts
- Tripolymer sealant

Leveling Installation

The four-point hydraulic leveling system is a hydraulic system which includes four points of contact utilizing jacks and a four-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 to obtain replacement parts.

Component Description

1. Jacks
 - A. 8K or 14K steel Jacks
 - B. Rated at a lifting capacity for the coach.
 - C. Standard 9-inch diameter (63.5 square inch) footpad on a ball swivel for maximum surface contact on all surfaces.
 - D. Operational powered from a 12V DC motor/pump assembly.
2. Motor/Pump Assembly
 - A. 12V DC motor
 - B. Hydraulic fluid reservoir tank
 - C. Control valve manifold
 - D. Solenoid valve
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 J.I.C. - Size 4
 - B. Hose - 1/4" I.D., 3000 psi - W.P. Rated

Preparation

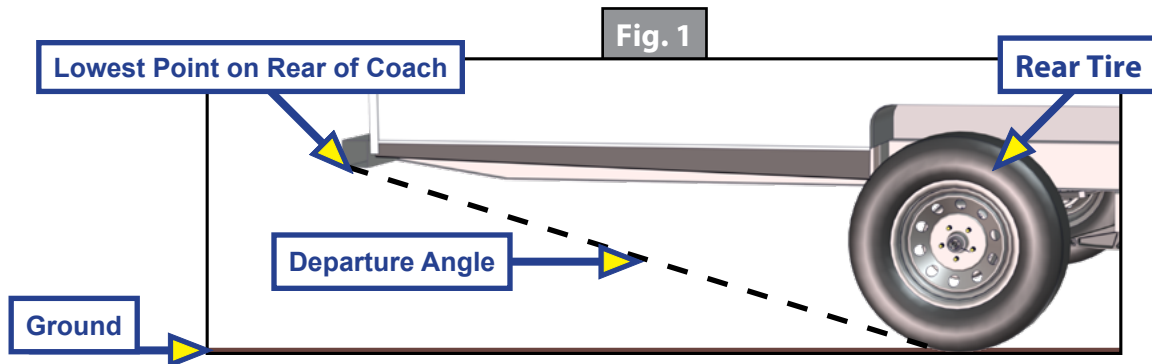
Jack bracket style, location and fastening method to chassis will be OEM specific and determined by OEM.

1. Make sure to 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

During installation make sure that the coach is supported according to the manufacturer's recommendations. 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, serious personal injury or severe product and/or property damage.

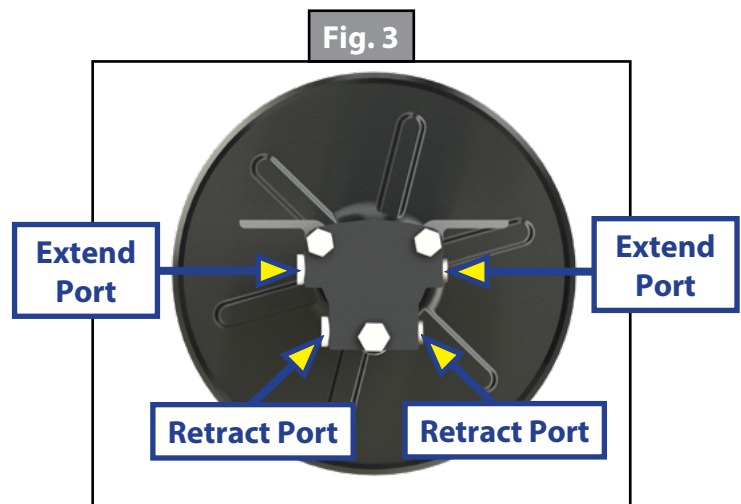
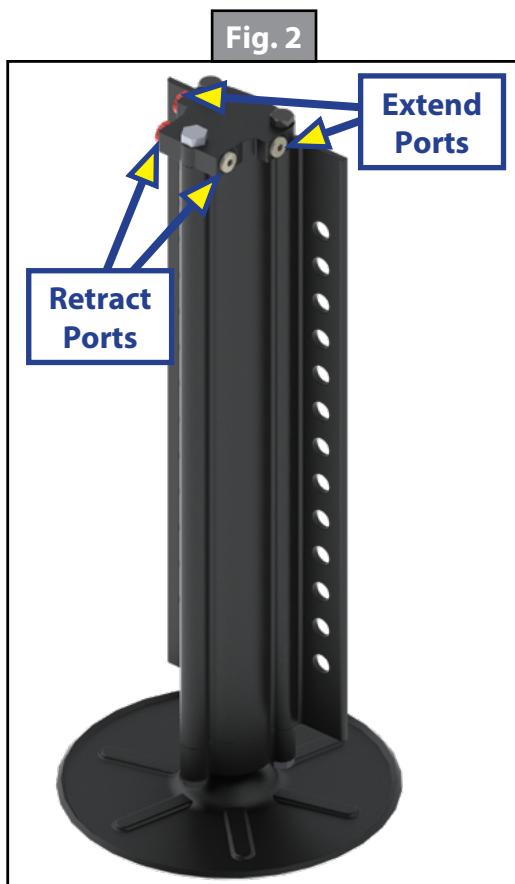
2. Never lift the coach completely off the ground. Lifting the coach so the wheels are not touching the ground will create an unstable and unsafe condition.
3. When fully retracted, the rear jacks must be mounted to achieve a minimum ground clearance equal to the departure angle (Fig. 1) in order to 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 minimum of 8" is required for aluminum jacks.



Labeling Jacks

Refer to the Hydraulic Plumbing Diagrams for the following steps:

1. Identify where the extend and retract ports are located on the jack (Figs. 2-3).
2. Verify that the ports (Figs. 2 and 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).

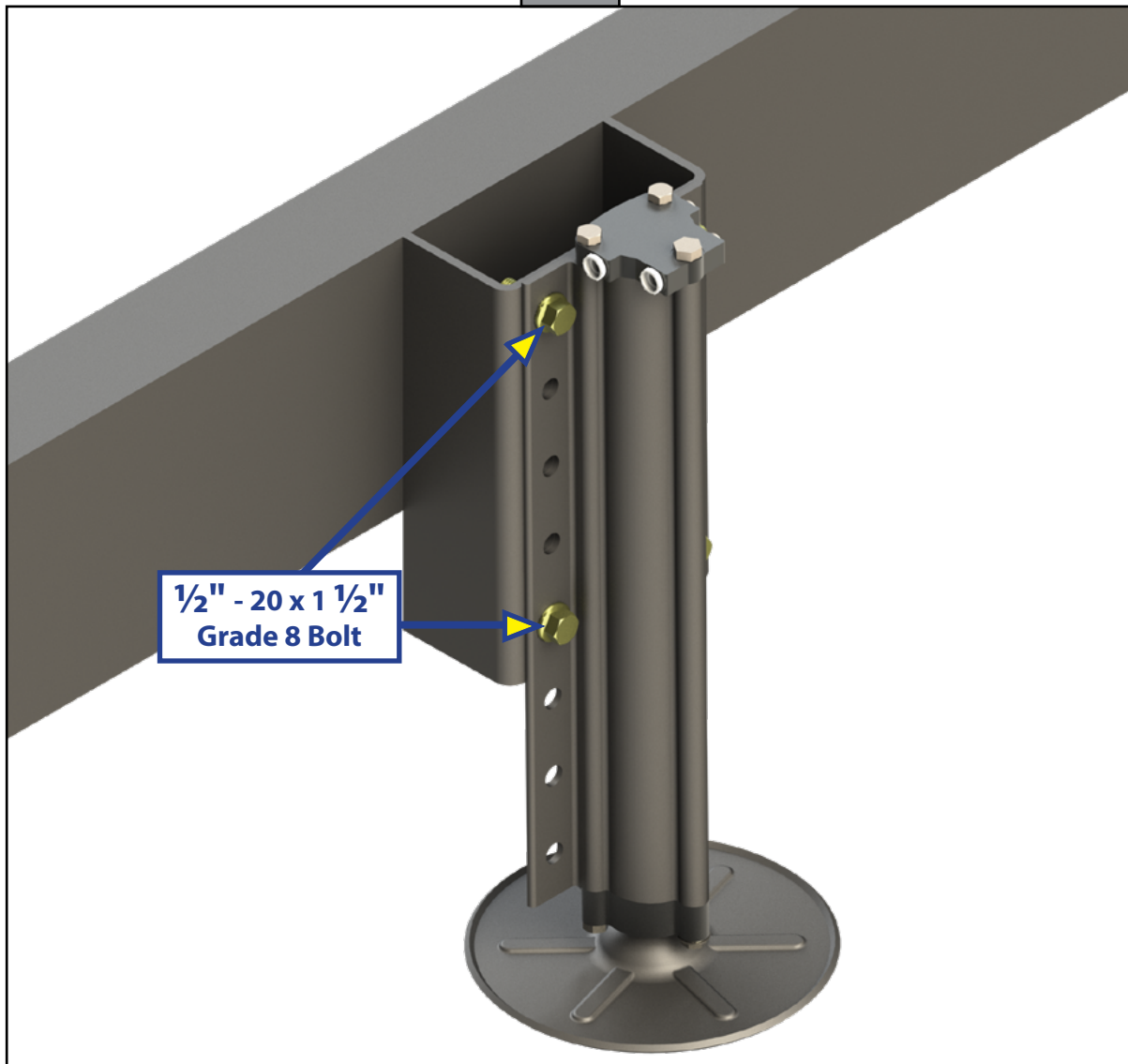


Viewed from the top of the jack,
without hydraulic fittings.

Jack Installation

1. Lift the aluminum jack and bracket into place on the frame and weld both sides of the jack bracket to the frame.
NOTE: There should be a recommended minimum of 8" of ground clearance between the bottom of the jack footpad and the ground.
2. Make sure that the approach and departure angles (Fig. 1) are maintained after the jack is mounted to the jack bracket (Fig. 4).

Fig. 4



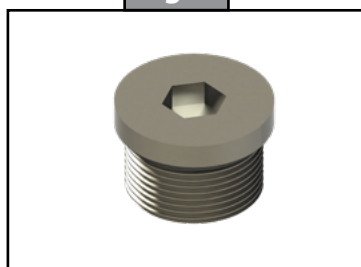
Due to the various installation possibilities, this manual will be detailed as if the hydraulic power unit is mounted on the drive side of the coach. Fittings and hose configuration will be OEM specific. Under normal installation procedures the jacks closest to the hydraulic power unit get plumbed first. See the Hydraulic Leveling Plumbing Diagram section.

Jack fittings

NOTE: The hydraulic fittings and 7/16" port plugs (Figs. 5-7) can be installed on the jacks (Fig. 8) as per the Hydraulic Plumbing Diagram (Aluminum Jacks).

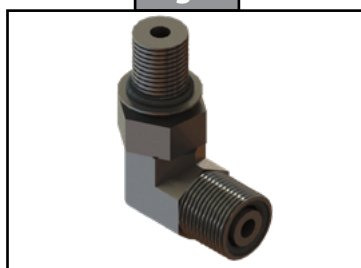
1. The Left Front (LF) jack requires three fittings.
2. The Right Front (RF) jack requires two fittings and two 7/16" port plugs.
3. The Left Rear (LR) jack requires three fittings and one 7/16" port plug.
4. The Right Rear (RR) jack requires two fittings and two 7/16" port plugs.

Fig. 5



7/16" Port Plug

Fig. 6



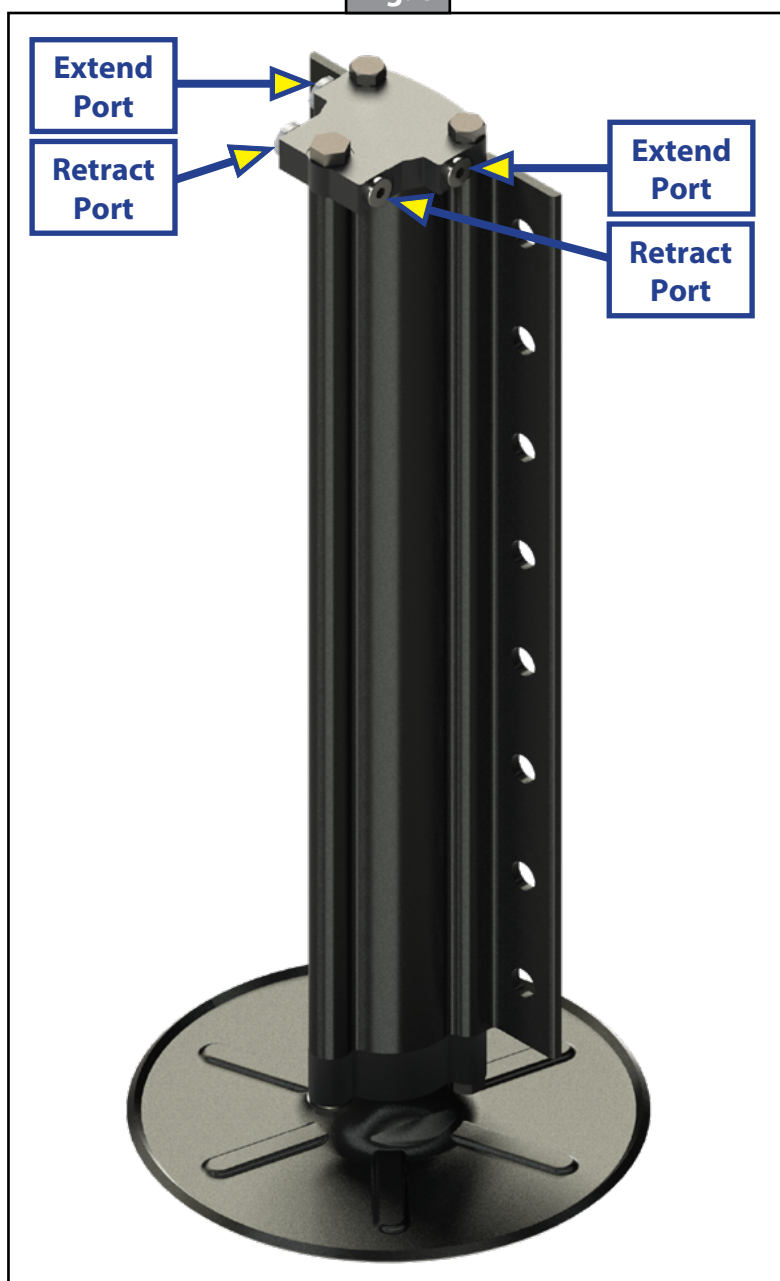
90-degree Fitting

Fig. 7



Straight Fitting

Fig. 8



Hydraulic Power Unit

For this manual the hydraulic power unit is mounted to the front of the driver's side compartment. If the hydraulic power unit is mounted to the front of the driver's side compartment, the driver's side jack (LF jack) will be the first jack in the system.

See figures 9-11 for hydraulic power unit feature identification and the following:

- Fittings - High Pressure O-Ring Face - Size 4
- Hose - 1/4" I.D. 3000PSI - W.P. Rated

Install the hydraulic power unit in accordance with RVIA Gas Codes, since the hydraulic power unit connections are not spark-proof.

NOTICE

All electrical wiring harnesses shall be loomed and secured to prevent possible damage and installed in accordance with RVIA electrical standards.

Fig. 9

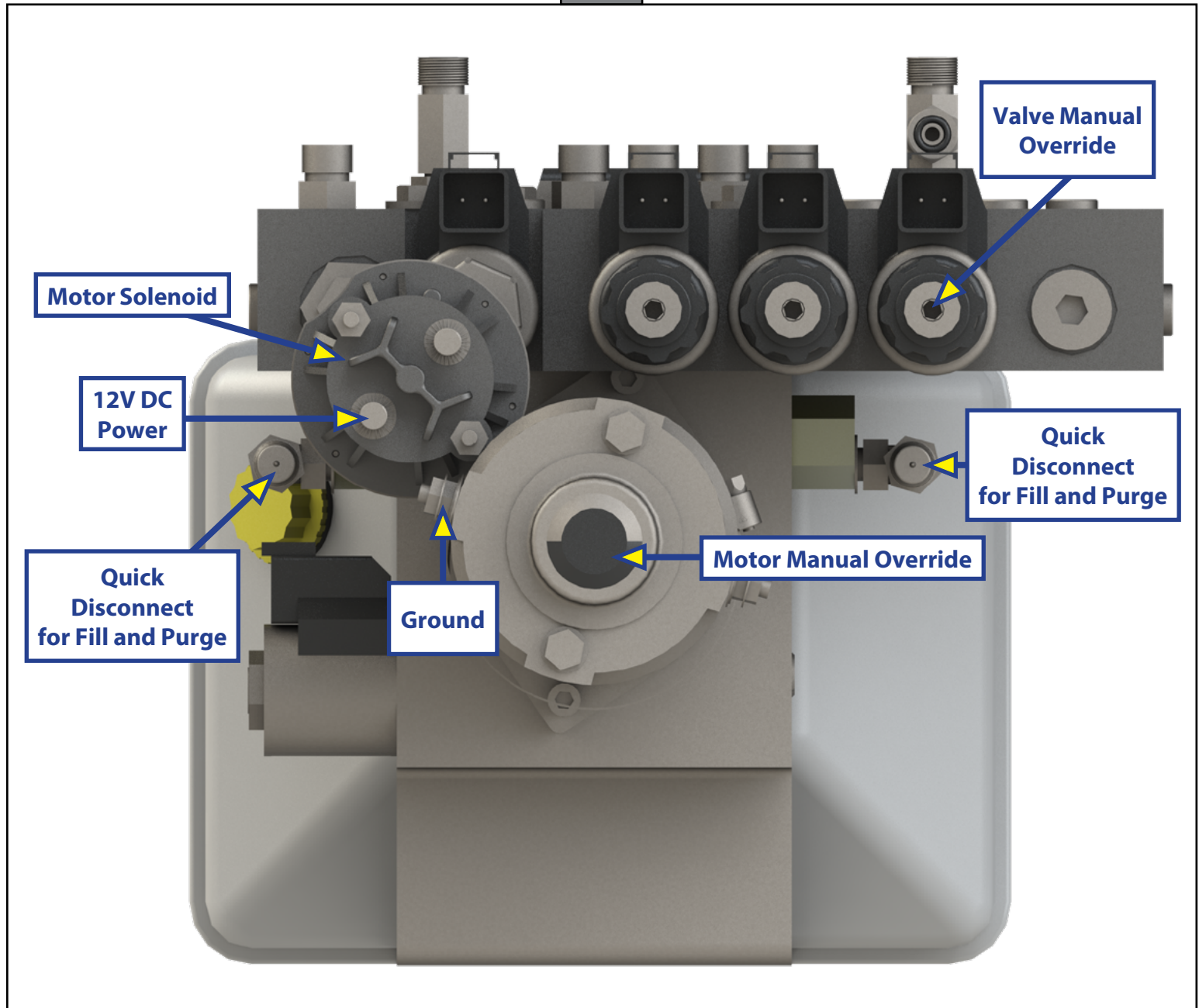


Fig. 10

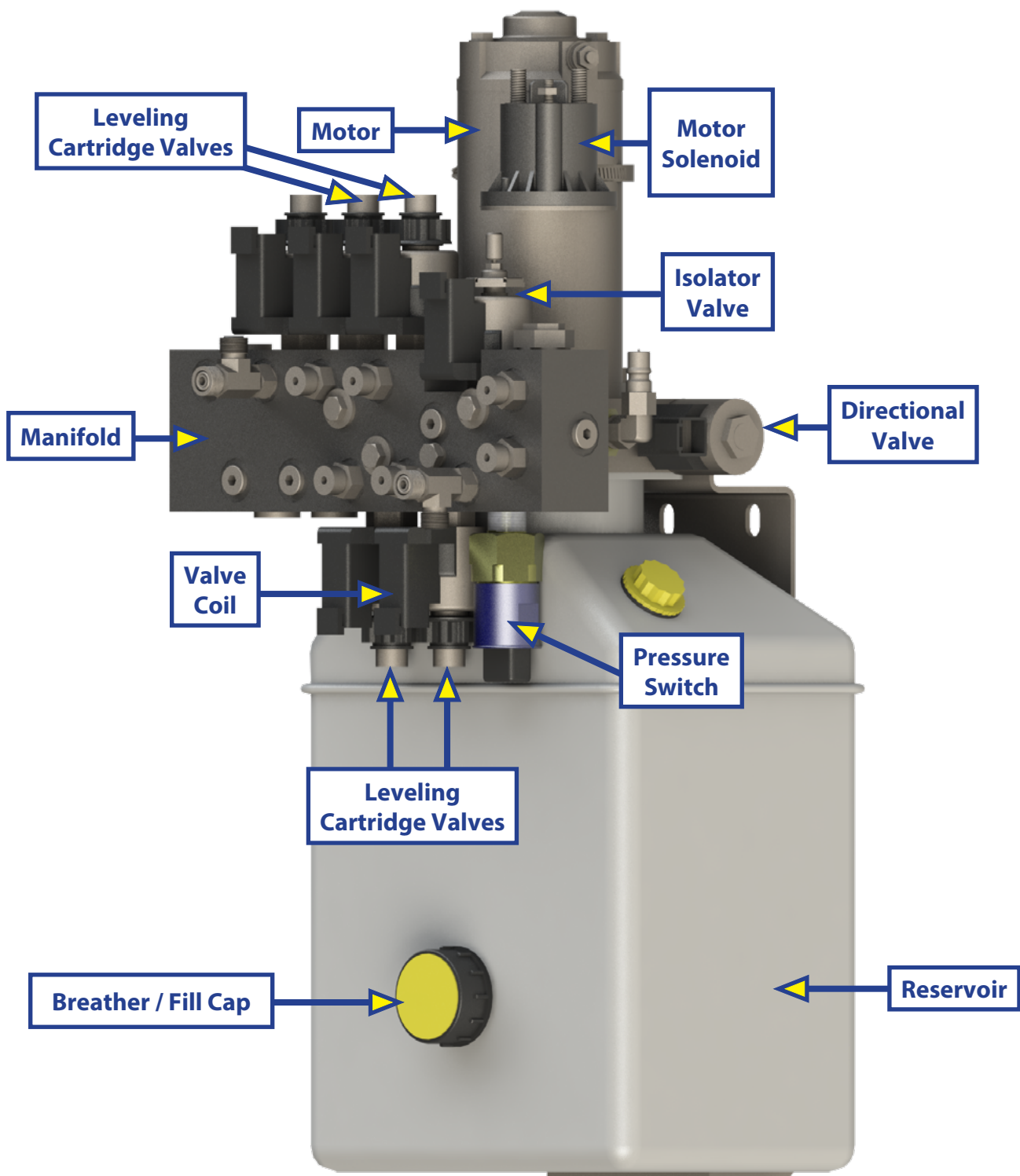
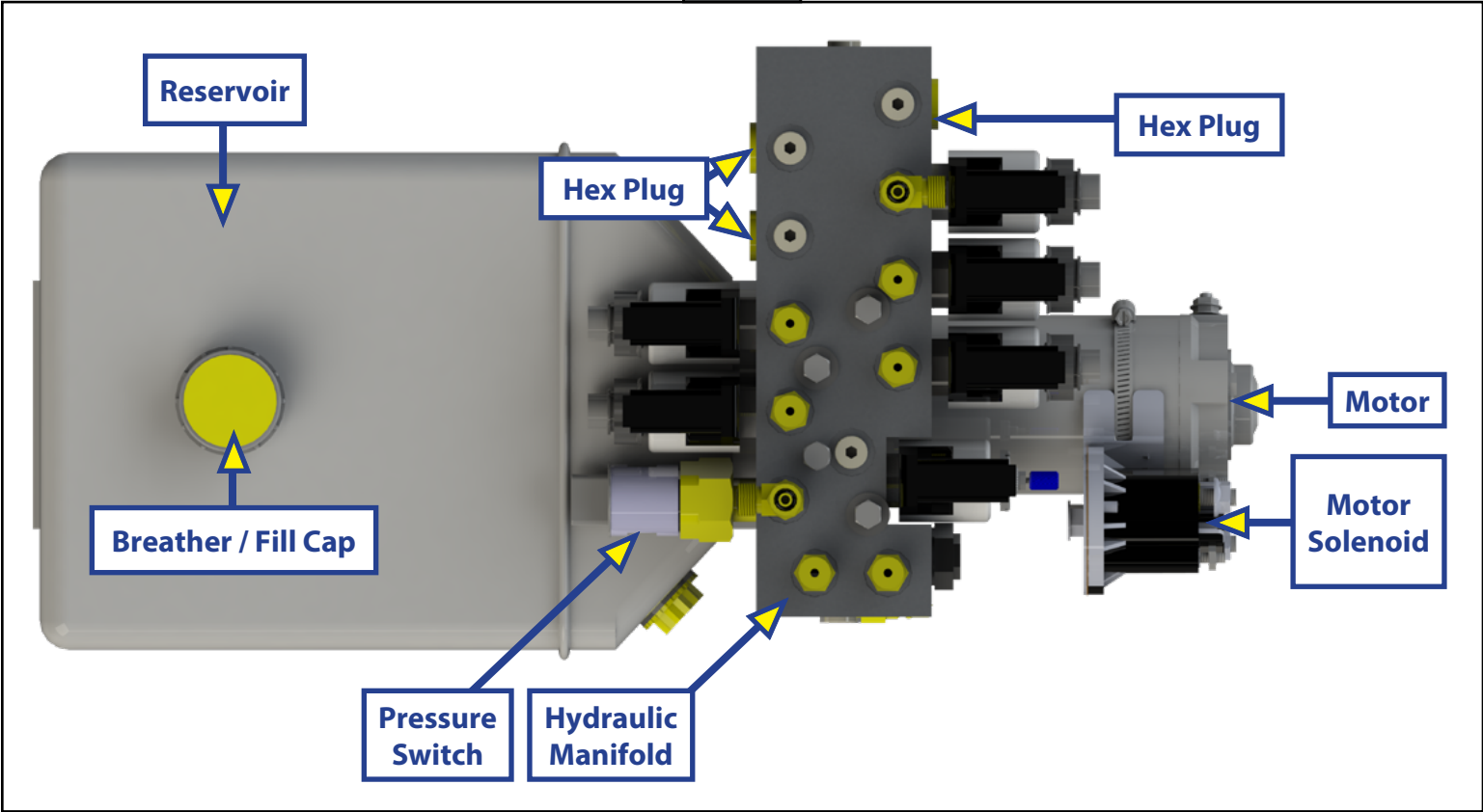


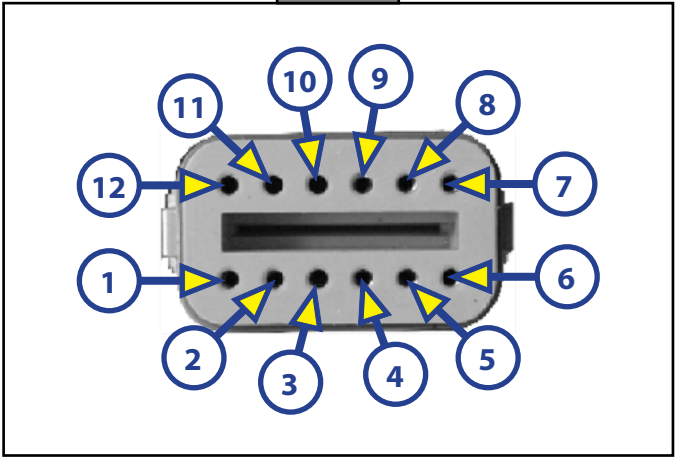
Fig. 11



12-pin Wire Harness

See figure 12, the 12-Pin Wire Harness Pin Definitions chart and the Leveling Wiring Diagram for installation.

Fig. 12



12-Pin Wire Harness Pin Definitions					
Pin #	Color	Function	Pin #	Color	Function
1	White	Chassis Power	7	Brown	Ground
2	Black/White	Pump Solenoid	8	Purple	Curbside Front Valve
3	Red	Curbside Rear Valve	9	Gray	Pump Solenoid
4	Green	Roadside Front Valve	10	— — —	Aux
5	Yellow	PSI Switch	11	— — —	Aux
6	Blue	Roadside Rear Valve	12	— — —	Aux



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 properly installed on the four jacks and hydraulic power unit. A 7/16" port plug will be used to seal any ports not used within the system for the aluminum jacks.

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

1. Measure the distance between the Left Front (LF) jack and the hydraulic 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 hydraulic power unit; this is an extend hose (C).
4. Measure from the Right Rear (RR) jack and the hydraulic power unit; this is an extend hose (D).
5. Measure from the hydraulic 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 hydraulic 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 hydraulic power unit fittings and the jack fittings. Make sure hose fittings are securely crimped onto hose lines.

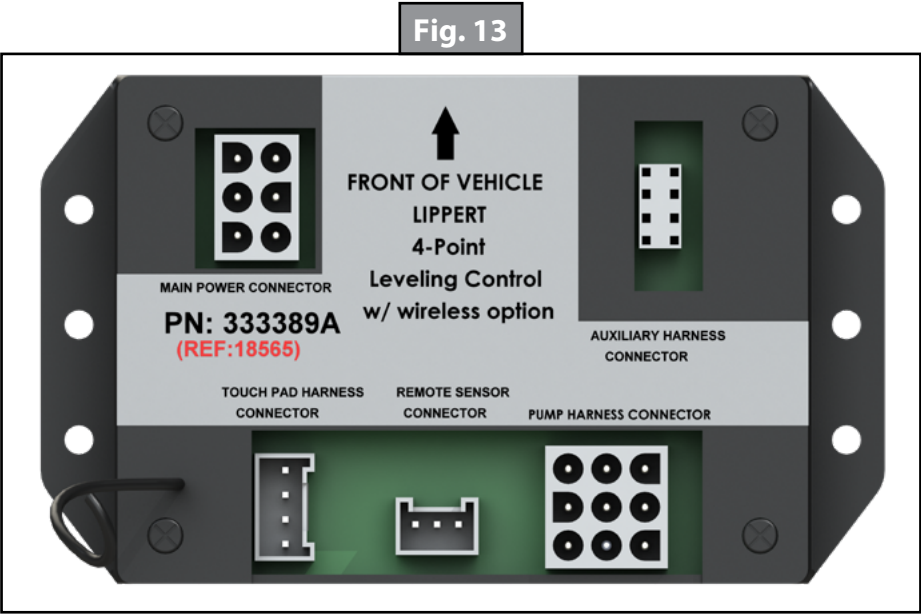
9. When running the hydraulic hoses from the hydraulic power unit to the rear jacks, bundle the hoses together and run them at once. Secure any loose hoses with zip ties as needed.
10. Install all hoses onto their respective jack and hydraulic power unit fittings.

Controller Installation

The Lippert hydraulic leveling system wiring is basically a "plug and play" system. The kit includes wiring harnesses for the entire system. If it does not, contact Lippert to have the proper wiring harness shipped.

NOTE: Refer to the Wiring Diagrams in this manual throughout this section.

- 1. Install the controller (Fig. 13) in a location close to the front of the coach. It must be centered side-to-side and oriented according to the arrows on the controller's label.



- 2. Connect the harness (Fig. 14) to the matching port on the controller. The harness contains a 9-pin end and a 12-pin end.

NOTE: Each connector on the controller is a different shape and has a different number of pins. Each harness (Fig. 14) has only one way of connecting to the controller. The harnesses are not interchangeable. This prevents installation of the wrong harness in the wrong connector.

Fig. 14

Hydraulic Power Unit to Controller Harness
(Non-Water Resistant)

Row 1: 16 GA red, 16 GA blue, 16 GA gray

Row 2: 16 GA black/white, 16 GA yellow, 16 GA purple

Row 3: 14 GA white, 16 GA green, 16 GA brown

Color	What it Controls
White	Controller power
Black/White	Solenoid extend/retract
Red	Right rear jack valve
Green	Left front jack valve
Yellow	Pressure switch
Blue	Left rear jack valve
Brown	Controller ground
Purple	Right front jack valve
Gray	Directional valve

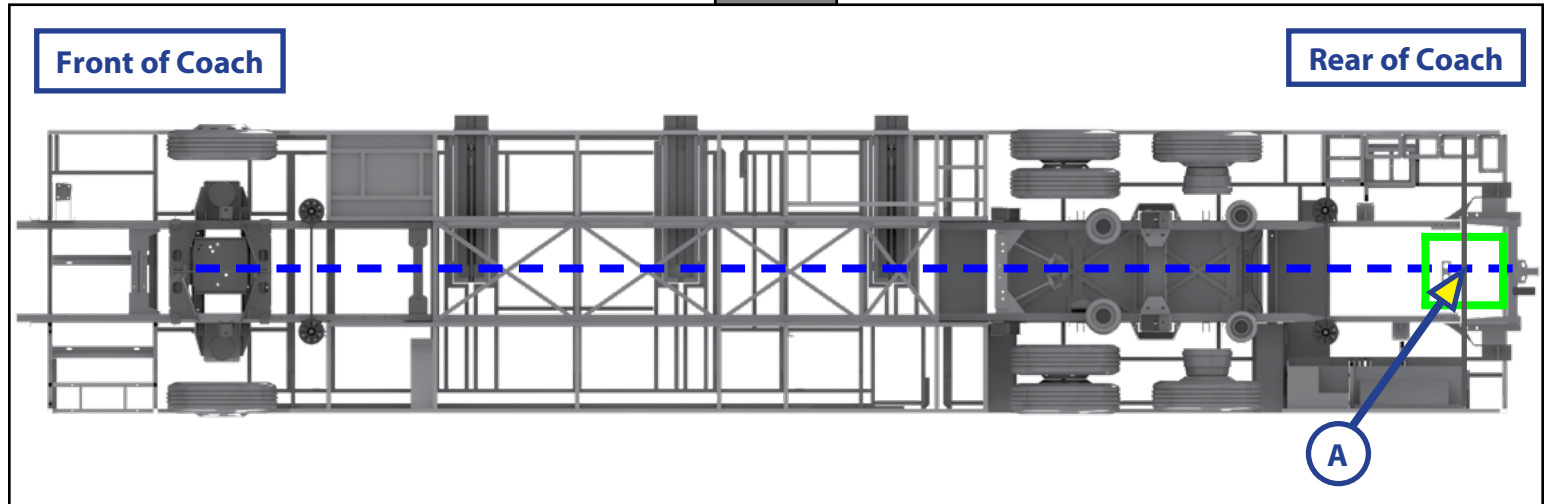
Row 1: 16 GA brown, 16 GA purple, 16 GA gray

Row 2: 16 GA blue, 16 GA yellow, 16 GA green, 16 GA red, 16 GA black/white, 14 GA white

Leveling Sensor Installation

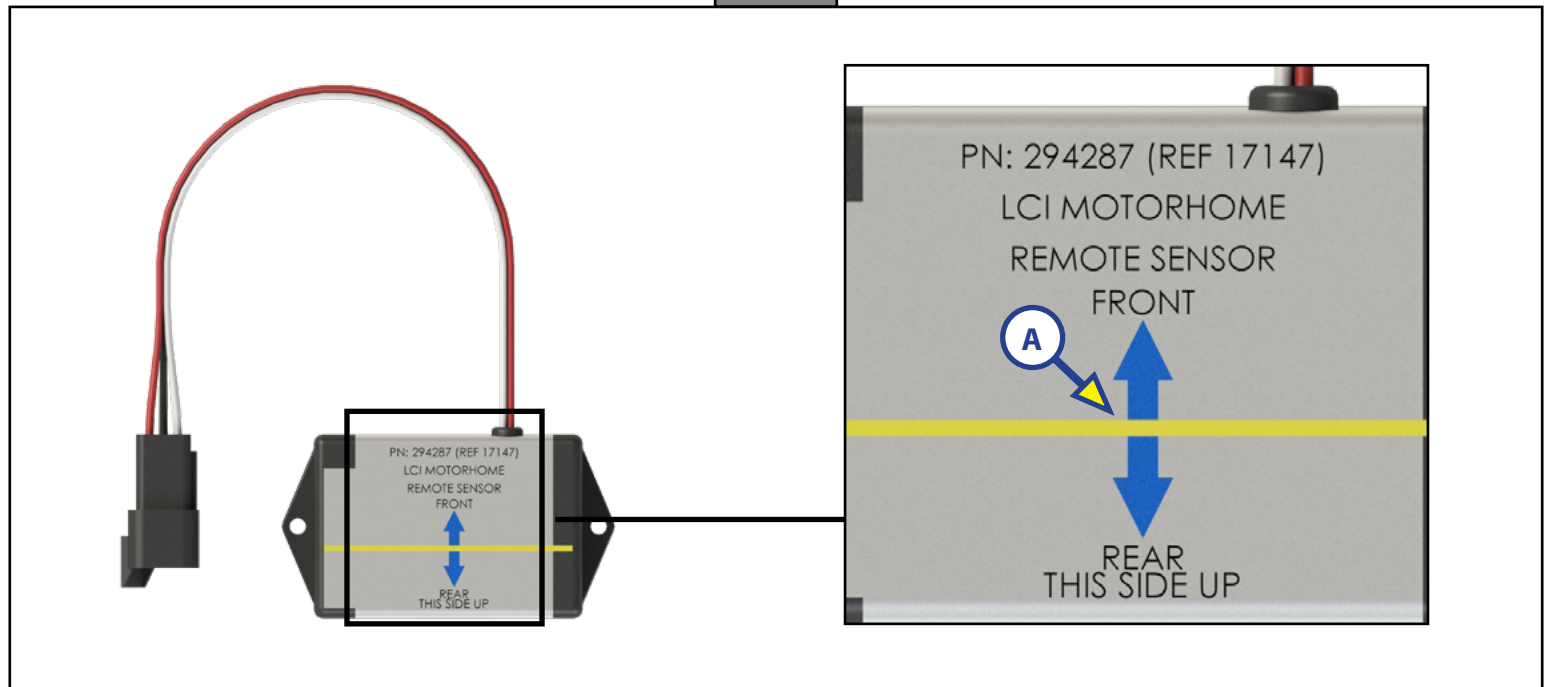
The leveling sensor has a limited mounting area for proper performance. The rear sensor must be in line with or behind the rear leveling jacks, as signified by area A indicated in Figure 15. The rear sensor must also be mounted in line with the center of the frame, as signified by the dotted blue line (Fig. 15).

Fig. 15



The leveling sensor (Fig. 16) must be oriented on the crossmember with the arrows on the top of the sensor pointing in the correct direction (Fig. 16A). See figure 15A for location clarification.

Fig. 16



1. Dry fit the mounting plate (Fig. 17C) and the leveling sensor (Fig. 17B) to the cross-member (Fig. 17A). The pre-drilled holes in the plate are for mounting the sensor to the plate. Mark on the plate where the sensor will set.

NOTE: Leave space between the sensor (Fig. 17B) and cross-member (Fig. 17A) so the wire harness will not be pinched.

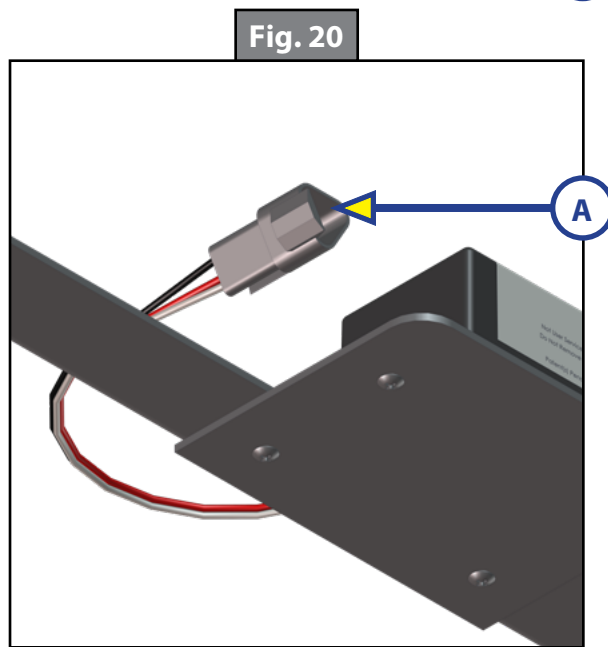
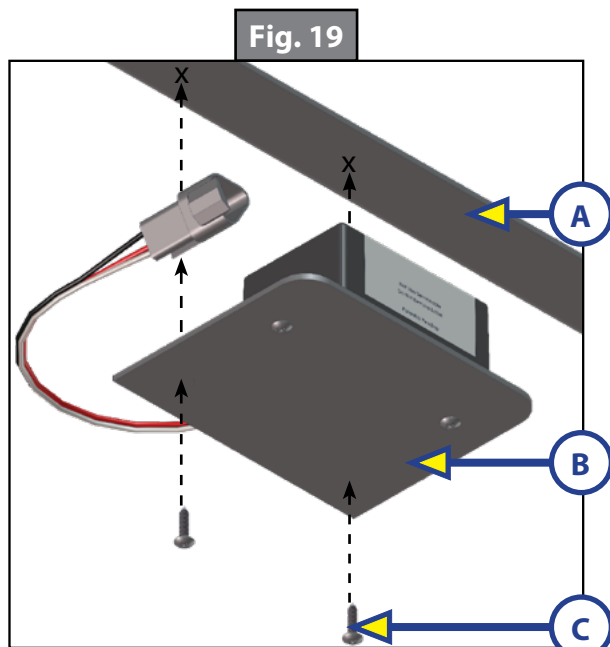
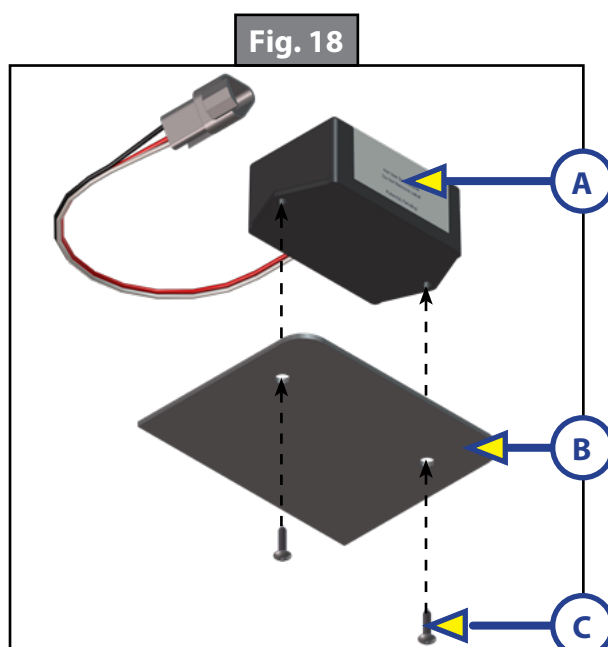
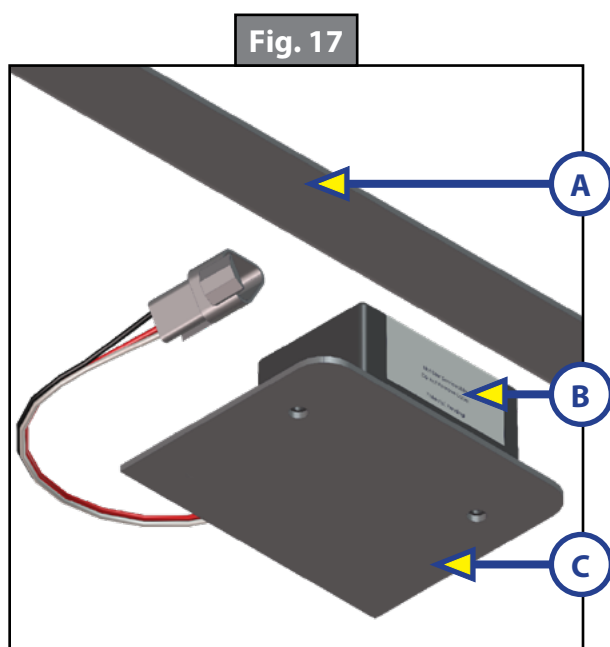
NOTE: The wire harness must be oriented towards the front of the coach (Fig. 15 and Fig. 16).

Proper orientation of the wire harness is imperative for correct operation of the leveling system.

2. Attach the sensor (Fig. 18A) to the mounting plate (Fig. 18B) using two #12 - 14 x 1" hex head self-drilling screws (Fig. 18C).

NOTE: To avoid cracking the mounting sensor housing, do not over-tighten the screws.

3. Attach the mounting plate and sensor assembly (Fig. 19B) to the cross-member (Fig. 19A) using two #12 - 14 x 1" hex head self-drilling screws (Fig. 19C). Ensure that the plate is centered side to side on the frame and that the sensor is oriented properly. See (Fig. 15A) location clarification.
4. Connect the sensor harness to the 3-Pin connector on the sensor (Fig. 20A) and run the harness through the frame and up to the compartment where the controller will be mounted.



Leveling Touchpad Installation

1. Remove the faceplate of the touchpad from the mounting bezel (Fig. 21).
2. Cut a hole 3 3/8" W x 2 3/4" H in the location chosen for installation (Fig. 22).
3. Feed the touchpad harness through the pre-cut hole, and run the wires to the compartment where the controller is mounted. Plug the harness into the appropriate connector on the controller.
4. 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 sufficient length to thread into the mounting surface (Fig. 23).
5. Plug the touchpad harness into the connector on the back of the touchpad faceplate, and snap the faceplate into the bezel (Fig. 24).

Fig. 21

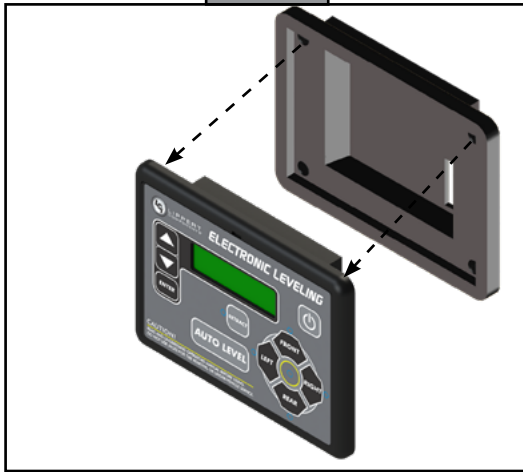


Fig. 22

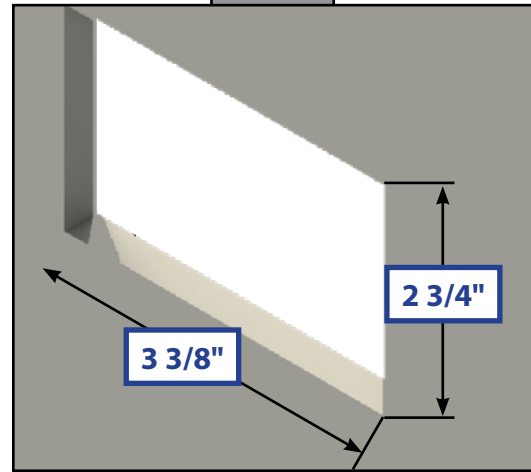


Fig. 23

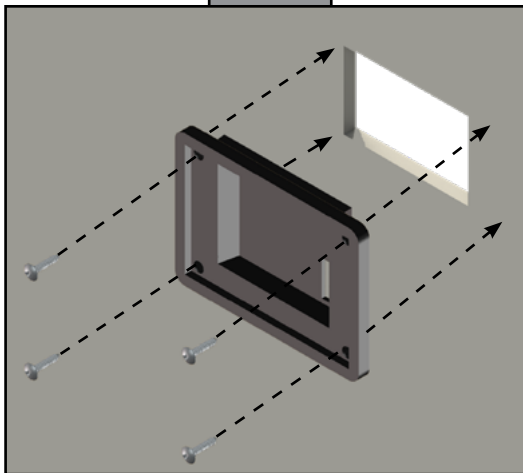
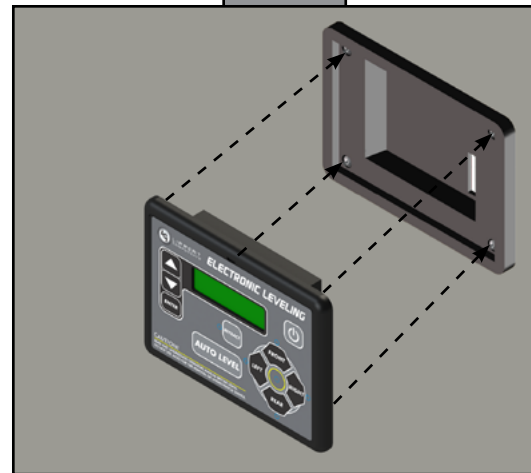


Fig. 24



System Wiring Requirements

OEM-supplied circuit protection to be rated as determined by the OEM. All OEM-supplied wiring is to conform to RVIA Standards.

1. Battery power with OEM-supplied breaker conforming to RVIA Standards.
2. Battery ground as per RVIA Standards.
3. Logic power (switched via ignition).
4. Power brake signal (open=park brake disengaged, GND=park brake engaged).
5. Four-wire harness connecting controller to touchpad.

6. Jacks status input - Switched to GND.
 - A. Jacks not all up – switch closed to ground.
 - B. Jacks all up – switch open.
7. Connect a ground wire from the 12V battery to the ground post on the hydraulic power unit motor. Ground wires are OEM supplied.
8. Connect the controller harness power wire to the "Ignition On" wire.
 - A. White - Parking Brake
 - B. Red - Ignition

Purging the Hydraulic system

NOTE: Before operating the Lippert hydraulic leveling system, make sure the system has been purged of air introduced into the hydraulic lines during installation.

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](https://lci-support-doc.s3.amazonaws.com/technical-information-sheets/leveling-and-stabilization/ccd_0002088.pdf) (https://lci-support-doc.s3.amazonaws.com/technical-information-sheets/leveling-and-stabilization/ccd_0002088.pdf).

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 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 Lippert 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 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.
8. Repeat these steps until no foam is present in the reservoir. If no foam is present, the system is purged of air.

Level Zero Point Calibration

Before auto leveling features are available, the Level Zero Point must be set. This is the point to which the system will return when an auto leveling cycle is initiated.

To set the zero point (controller module must be fully secured in production-intent location), first run a manual leveling sequence to get the coach to the desired level point. Then activate the Level Zero Point configuration mode by performing the following sequence:

1. Turn touchpad off (Fig. 25K).
2. Press the FRONT button (Fig. 25G) 5 times.
3. Press the REAR button (Fig. 25J) 5 times.
4. A tone will sound and the LCD screen display (Fig. 25E) will read "ZERO POINT CALIBRATION."
5. Press the ENTER button (Fig. 25C) to set the zero point.
6. The LCD screen will then display "Zero Point Stability Check" and "PLEASE WAIT."
7. A tone will sound and the LCD screen display will read "ZERO POINT SUCCESSFUL."
8. The touchpad will then turn off.

Prior to Operation

Selecting a Site

When the coach is parked on an excessive slope the leveling requirements may exceed the jack lift stroke capability. If the coach is parked on an excessive slope, the coach should be moved to a more level surface before the leveling system is deployed.

EXCESS ANGLE will appear on the LCD screen if the coach is 3.5 to 5 degrees out of level front-to-rear or side-to-side. See Touchpad Error Codes chart in Troubleshooting section.

The leveling system **MUST** 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 neutral or park position.
4. Be sure all persons, pets and property are clear of the coach while Leveling system is in operation.
5. Persons inside of coach need to remain still during leveling operation.
6. Clear all jack landing locations of debris and obstructions. Locations should also be free of depressions.
7. When parking the coach on extremely soft surfaces, utilize load distribution pads under each jack.
8. Make sure hands and other body parts are clear of fluid leaks. Oil leaks in the Leveling system may be under high pressure and can cause serious skin penetrating injuries.
9. 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.

WARNING

Never lift all wheels off the ground. Lifting all wheels off the ground creates an unsafe condition which may result in serious personal injury or death. Make sure coach is supported in accordance with manufacturer's recommendations.

CAUTION

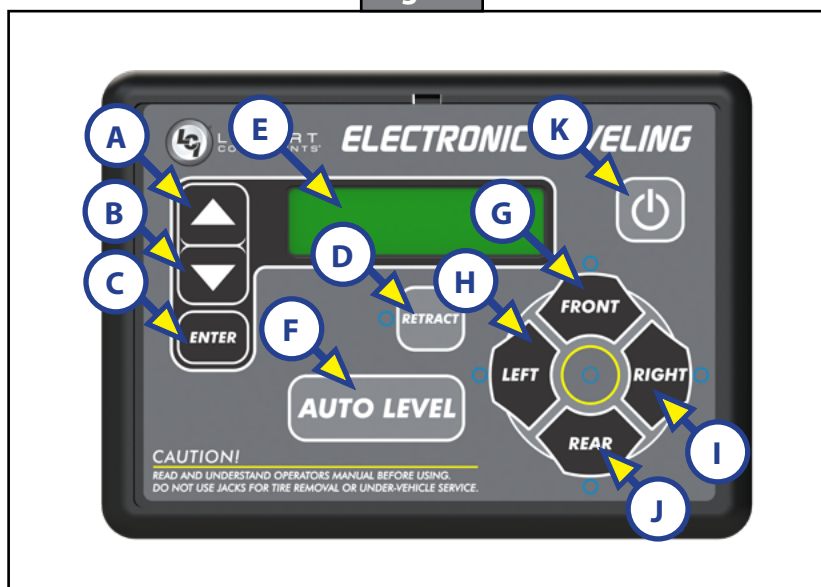
After starting the automatic leveling cycle it is very important there is no movement inside the coach until the coach is level and the green LED light illuminates in the center of the touchpad. Failure to remain still during the leveling cycle could have an effect on the performance of the leveling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

System Features

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

Touchpad Diagram

Fig. 25



Callout	Description
A	Up Arrow - Scrolls up through the menu on LCD.
B	Down Arrow - Scrolls down through the menu on LCD.
C	ENTER - Activates modes and procedures indicated on LCD.
D	RETRACT - Places leveling system into retract mode. 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 - Activates both front jacks in manual mode.
H	LEFT - Left (Driver Side) Activates both Front and Rear Jacks together in Manual Mode
I	RIGHT - Right (Passenger Side) Activates Both Front and Rear Jacks together in Manual Mode
J	REAR - Activates both rear jacks in manual mode.
K	Power Button - Turns leveling system on and off.

Operation

Automatic Leveling Descriptive Logic

Grounding: Steps 1-3 describe the process of how the AUTO LEVEL LOGIC extends the jacks to the ground.

1. Depending on which end of the coach is lowest to the ground, the level sensor will activate the jacks, one at a time on the lowest end first, either front or rear.
 - A. Ground lowest side jack first e.g., front passenger side (curbside).
 - B. Ground remaining side jack next i.e., front driver side (roadside).
2. Together, both jacks will lift lowest end until level i.e., front of coach will lift briefly until the coach is level.
3. The system will then ground remaining jacks, one at a time e.g., rear jacks.
 - A. Ground lowest side jack first e.g., rear passenger side.
 - B. Ground remaining side jack next e.g., rear driver side.

Leveling: Steps 4-6 describe the process of how the AUTO LEVEL LOGIC levels the coach after the jacks have been grounded. This process may repeat several times until the coach is level.

4. Front-to-rear
5. Side-to-side
6. Individual

NOTE: Minor adjustments will be made throughout the leveling process to limit or prevent frame twisting.

NOTE: After starting the automatic leveling cycle it is very important that there is no movement within the coach until the coach is level and the touchpad LCD display indicates "Auto Level - Success!". Failure to remain still during the leveling cycle may have a negative effect on the performance of the leveling system.

Automatic Leveling Procedure

Coach must be running for Leveling system to operate.

1. Press the ON/OFF (power) button (Fig. 25K) on the touchpad to turn the leveling system on. The leveling system is now operational and the electronic level lights will activate.
2. Check to see that the Control Pad ENGAGE PARK BRAKE is engaged.
3. Press the AUTO LEVEL (Fig. 25F) button to begin the automatic leveling cycle.
4. Once system is finished Leveling, turn touch pad off or it will shut itself off after a brief period.

Low Voltage Signal

1. The vehicle requires 12.7V DC to operate in the AUTO mode.
 - A. If the voltage is too low, the touchpad's LCD screen (Fig. 25E) will display "LOW VOLTAGE."
 - B. If voltage drops below 12.7V DC, the leveling system will only operate in manual mode and continue to display "LOW VOLTAGE."
2. If voltage drops below 9.5V DC during automatic or manual operation "LOW VOLTAGE" will appear in the LCD screen and the leveling system will stop operating.

Manual Leveling Procedure

When leveling the coach, the coach should be leveled front-to-rear first, then leveled left-to-right.

NOTE: The coach requires 12.7V DC to begin the auto leveling function. If voltage at the hydraulic power unit is below 12.7V DC, run the engine.

1. Press the ON/OFF (power) button (Fig. 25K) on the touchpad to turn the leveling system on. The leveling system is now operational and the electronic level lights will activate.
2. Press the Down Arrow button (Fig. 25B) to display "MANUAL LEVEL" on the LCD screen (Fig. 25E). Press the ENTER button (Fig. 25C) to set.
3. Press the FRONT button (Fig. 25G) until the front jacks contact the ground and lift the front of the coach 1-2 inches.

4. Press the REAR button (Fig. 25J) until the rear jacks contact the ground and lift the rear of the coach. Keep the button depressed until the level indicator displays "LEVEL."
5. Press the LEFT or RIGHT button (Fig. 25H or 25I).
 - A. If the level indicator is towards the left (roadside) of the coach, press the LEFT button (Fig. 25H).
 - B. If the level indicator is towards the right (curbside) of the coach, press the RIGHT button (Fig. 25I).
 - C. Keep either button (RIGHT or LEFT) depressed until the level indicator displays "LEVEL."

NOTE: The right and left jacks are used to level the coach side-to-side. Pressing the LEFT button on the touchpad will extend both left jacks. Pressing the RIGHT button on the touchpad will extend both right jacks. Jacks always work in pairs; both front jacks, both right side (curbside) jacks, etc.

6. Repeat steps 2-5 if needed.
7. Press the ON/OFF (power) button (Fig. 25K) to turn the leveling system off.
8. Visually inspect all jacks to ensure all footpads are touching the ground. For example, if one of the rear jack footpads is not touching the ground, press the corresponding LEFT or RIGHT button to lower the non-compliant jack to the ground.

Jack Retract Procedures

1. Press the ON/OFF (power) button (Fig. 25K) to turn the leveling system on. The LCD screen (Fig. 25E) will display "JACKS DOWN."
2. Press the Down Arrow button (Fig. 25B) to display "AUTO RETRACT" on the LCD screen.
3. Press the ENTER button (Fig. 25C) to begin automatically retracting the jacks.

NOTE: To stop the jacks from retracting, turn the leveling system off, then back on again by pressing the ON/OFF (power) button twice. Do steps 1-5 of the Manual Leveling Procedure section to manually level the coach. Press the ENTER button to acknowledge.

4. When the "JACKS DOWN" message on the LCD display goes off, press the ON/OFF (power) button to turn the leveling system off.
 - A. Do a visual inspection around the coach to verify all jacks are fully retracted.
 - B. If all jacks are fully retracted, the coach is ready for travel.
5. To retract jacks while in MANUAL mode:
 - A. Press the RETRACT button (Fig. 25D) until it lights.
 - B. By pressing any of the jack buttons (Fig. 25G-J), the jacks will retract in pairs i.e., pressing the FRONT button makes both front jacks retract in unison.
6. An "auto retract" sequence can also be performed by pressing and holding the RETRACT button (Fig. 25D) for one second.

NOTE: In cold weather operation, always check to make sure all jacks, slide rooms and steps are fully retracted before traveling.

Leveling System Safety Features

1. The leveling system will automatically shut down after four minutes of no operation.
2. Auto leveling cycle cannot be started until all jacks are fully retracted.
 - A. Make sure jacks are retracted before attempting to auto level.
 - B. The leveling system will automatically perform a full retract of all jacks if jacks are down when there is a request for an auto cycle.
3. The leveling system will refuse any operation when a low voltage condition is present.
4. The leveling system will automatically sound an alarm and retract all jacks if the PARK BRAKE is disengaged and jacks are not retracted with any change in sensor readings.

NOTE: When the leveling system is in alarm mode, only the "retract all jacks" feature is available.

5. If the "WAIT" message displays in the touchpad's LCD screen (Fig. 25E), this indicates the status of Air/Auxiliary features.

Automatic Safety Shutoff

The touchpad will automatically turn off after four minutes of inactivity. To reset the leveling system, the coach ignition must be turned off, then back on and the ON/OFF (power) button (Fig. 25K) must be pressed.

Drive Away Protection System

If the coach's ignition is in the "RUN" position, jacks are down and the operator releases the parking brake, all indicator lights will flash and the alarm beeper will activate. The system will then automatically retract the jacks until the jacks are fully retracted or the operator resets the parking brake.

The hydraulic power unit will also operate to keep the jacks retracted in the event the leveling system loses pressure as the coach is being driven.

"Jacks Down" Alarm

The leveling system is designed to sound an alarm and illuminate the touchpad in the event of two possible scenarios:

1. A retract hose leak.
2. The pressure holding the jacks in the retracted position falls to approximately 1500 psi, which activates the alarm. If the alarm sounds and the touchpad illuminates and flashes while driving the vehicle:
 - A. Immediately find an area to safely pull the vehicle off of the roadway.
 - B. Set the PARKING BRAKE.
 - C. Inspect all jacks, hoses and valves for leaks.
 - D. If no leaks are observed:
 - I. Turn leveling system touchpad on.
 - II. Press RETRACT button (Fig. 25D).
 - III. Inspect jacks. If jacks are retracted and no leaks are observed, vehicle can be driven.
 - E. If system is leaking or alarm does not subside after applying step 2, disconnect wires from pressure switch and proceed immediately to a service center.

NOTE: The pressure switch is a blue and gold colored valve located on the hydraulic power unit manifold identified by the spark proof style connector with yellow and black wires. See figure 11.

NOTE: For prolonged travel to the service center, periodically stop and check the disposition of the leveling jacks to make sure they are not extending.

For Diesel Coaches with Air Bag Suspensions ONLY

The leveling control will automatically detect an air bag system. If the coach does not use air bags, the touchpad LCD screen will display "NO" for air bag control. If the LCD screen reads "NO," but an air bag system is present on the coach:

1. Confirm harness is connected properly.
2. Run the auto level function.
3. Recalibrate the Zero Point.
4. If the air bag system is still not being detected, contact the OEM for more information.

User Alarm Mode

If the alarm system detects that the park brake has been disengaged while at least one jack is not fully retracted and the sensor value changes in any axis more than the predefined amount, the touchpad will signal this error to the user.

When in alarm mode:

1. All LEDs will flash.
2. The buzzer alarm will beep.
3. The status LEDs will show the current leveling system status.
4. The leveling system will begin retracting all jacks.

NOTE: No other leveling system features will be available when in alarm mode.

Manual Jack Retract Procedures

1. To retract in the MANUAL mode, press RETRACT (Fig. 25D) until the green indicator light comes on.
2. Pressing FRONT (Fig. 25G) or REAR (Fig. 25J) will operate the respective jacks in pairs.
3. Pressing RIGHT (Fig. 25I) will operate the right rear jack.
4. Pressing LEFT (Fig. 25H) will operate the left rear jack.

Troubleshooting

⚠ CAUTION

Make sure all jacks are fully retracted before travel.

Manual Override

In the event that the leveling jacks do not retract, the system can be manually overridden.

Resources Required

- Cordless or electric drill
- 1/2" socket
- 5/32" or 5/64" hex wrench

NOTE: Cartridge valves should be opened prior to operating with any auxiliary power device. The 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 leveling jacks can be used.

⚠ CAUTION

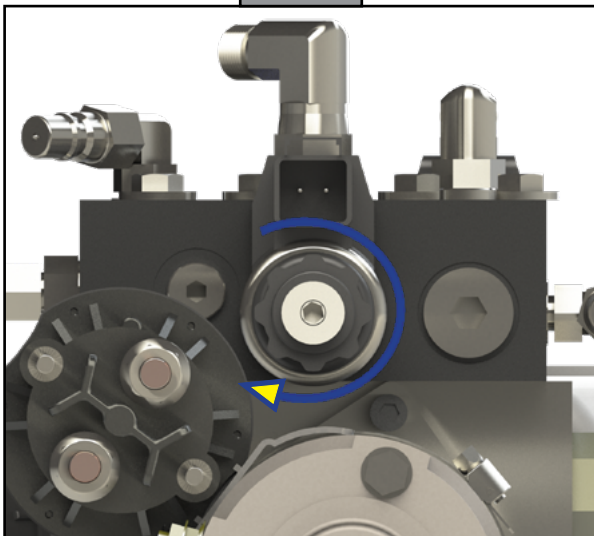
Do not over-tighten override set screws as this can damage the valves.

1. Use a 5/32" hex key wrench to turn the manual override clockwise (Fig. 26) on all of the cartridge valves to open the valves.

NOTE: If a 5/32" hex wrench will not fit in the end of the valve, use a 5/64" hex wrench.

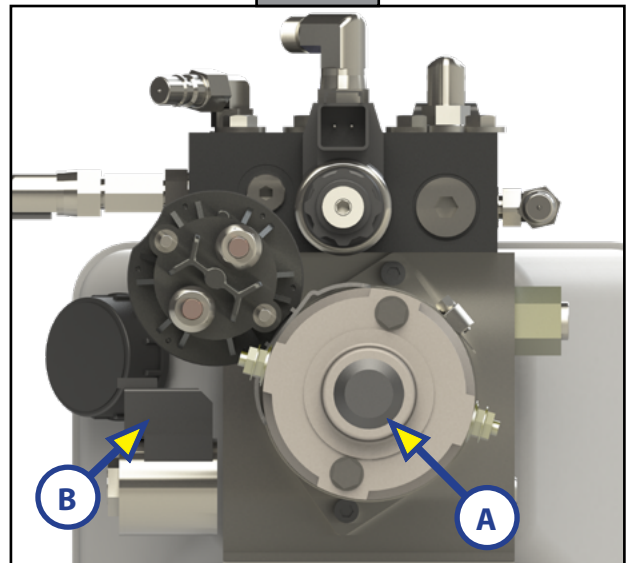
2. Disconnect or shield power cables on the motor.
3. Remove plastic cap (Fig. 27A) from motor coupler.
4. Unplug the wire harness from the directional valve (Fig. 27B). See Wiring Diagrams.

Fig. 26



Clockwise for Manual Override

Fig. 27



5. Using a 1/2" socket and auxiliary drive device, e.g. cordless or power drill, insert 1/2" socket onto coupler (Fig. 28A).
6. Run drill in reverse, or counterclockwise direction, to simultaneously retract all leveling jacks and slide out rooms.
7. After all leveling jacks and slide out rooms have been retracted, turn cartridge valve manual overrides, counterclockwise (Fig. 29).
8. Reinsert previously removed protective plastic motor coupler cap (Fig. 27A).
9. Reattach previously unplugged wire harness to directional valve (Fig. 27B).

Fig. 28

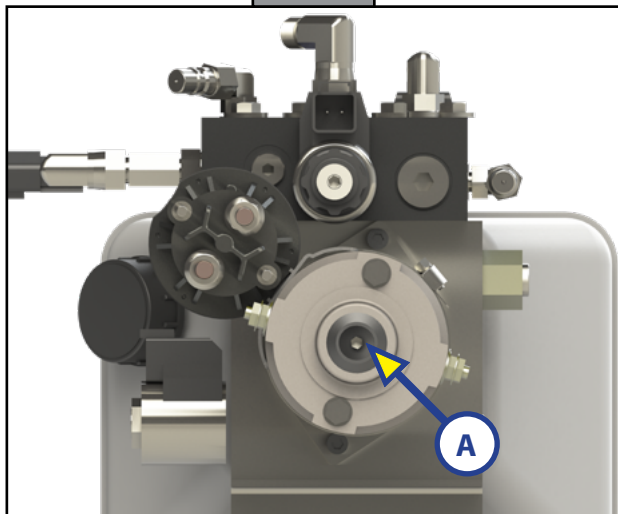
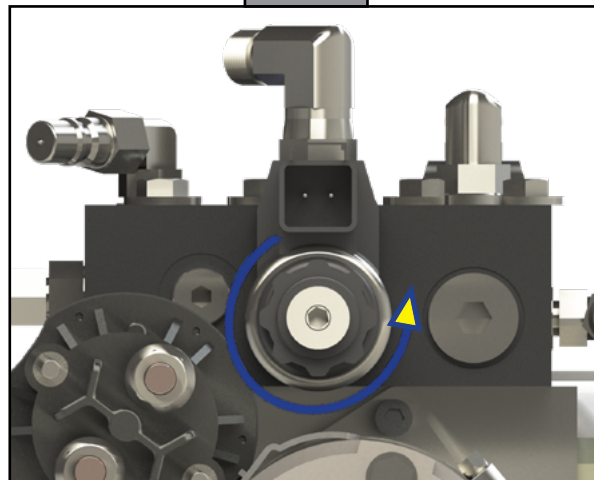


Fig. 29



Counterclockwise for Normal Operation

Jacks Up Verification

If the coach's ignition is in the "RUN" position, the parking brake is released and the vehicle is in motion, the leveling system may activate the hydraulic 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 shut off. No beeping will occur and the "JACKS DOWN" dash light will not illuminate.

Leveling Troubleshooting Chart

For leveling system concerns, refer to the Leveling System Troubleshooting Chart.

Leveling System Troubleshooting Chart		
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.
Touch pad turns on but turns off when jack directional buttons are pressed or touch pad displays "low voltage".	Low voltage on battery.	Start coach to charge battery.
Touch pad turns on, coach will not auto-level, "Ready Jacks: Down" displayed, 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 Lippert 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.
"READY - Jacks: Up" does not display when all jacks are retracted.	Insufficient pressure in system.	Contact Lippert Customer Service.
	Retract pressure switch inoperable.	Check connection or replace.
Alarm sounds and lights start flashing while traveling; jacks are fully retracted.	Loss of pressure in leveling system.	Contact Lippert Customer Service.
	Retract pressure switch inoperable.	Check connection or replace.
Jack bleeds down after being extended.	Valve Manual Override open.	Close override.
Touch pad powers up; screen displays "low voltage".	Engine not running.	Start coach engine.
No power to touchpad.	Tripped circuit breaker.	Reset breaker.
	Ignition not on.	Turn on.

Leveling Touchpad Error Mode

1. If an error occurs before or during operation, the error will be displayed in the touchpad's LCD screen (Fig. 25E) and an alarm will sound. To reset common ERROR displays, press ENTER (Fig. 25C).
NOTE: To reset "Return for Service" errors, press ENTER (Fig. 25C) and RETRACT (Fig. 25D) simultaneously.
2. All normal functions will be disabled while the system is in Error Mode.

Leveling Touchpad Error Code Chart		
LCD Display	What is Happening?	What Should Be Done?
Excess Angle	Coach not parked on level ground.	Move coach to level ground prior to starting auto level sequence.
	Zero Point incorrectly calibrated.	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 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.	Return levelers for service.
	Leaking hose or fitting.	Check for leaks; repair if necessary. Press ENTER and RETRACT to clear error.

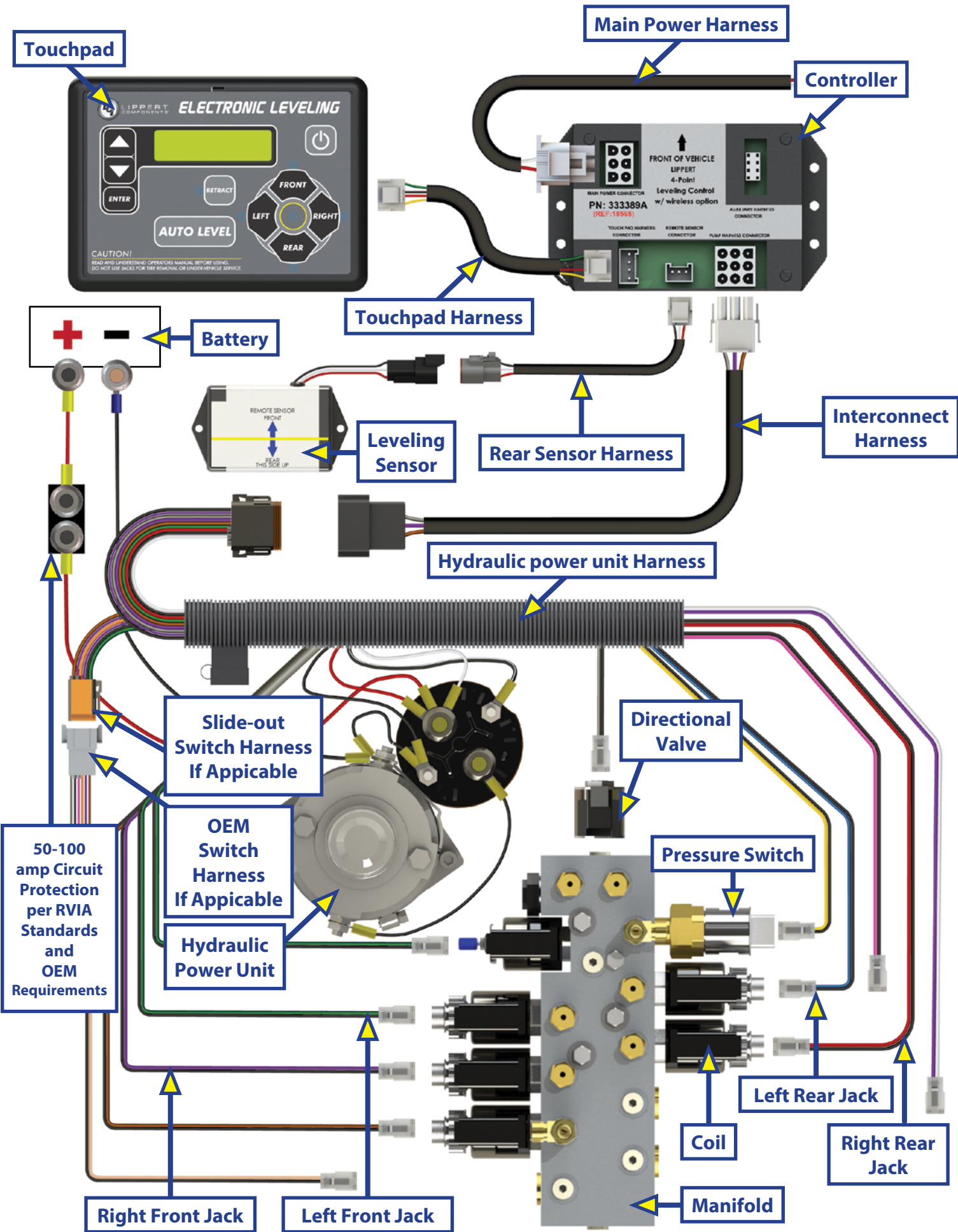
Excess Slope

1. The control will not operate at extreme slopes, i.e. 3.5 to 5 degrees front and rear and 3.5 to 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.

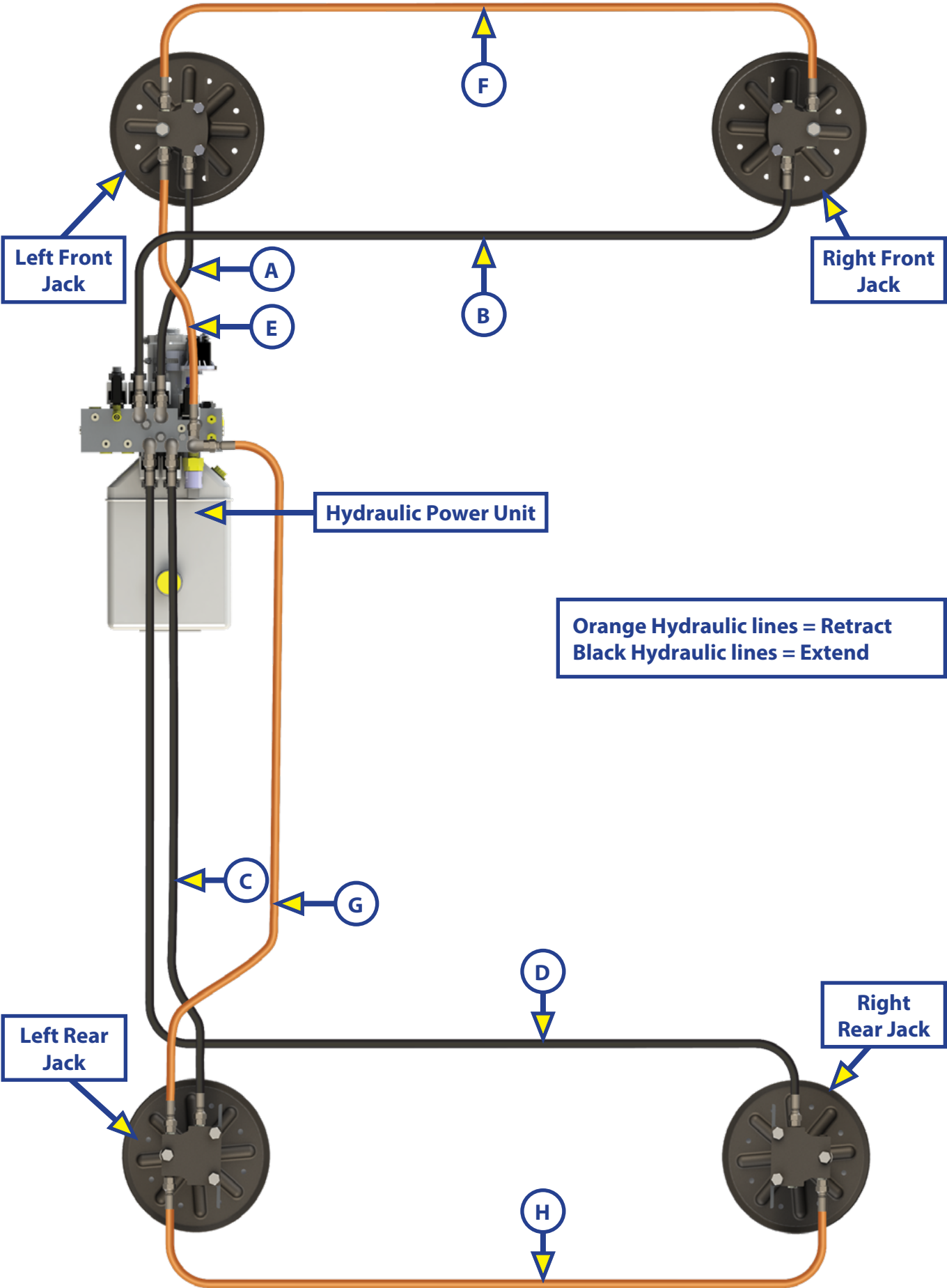
Miscellaneous

System will refuse any operation when a low voltage condition is present.

Leveling Wiring Diagram



Hydraulic Leveling Plumbing Diagram





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