

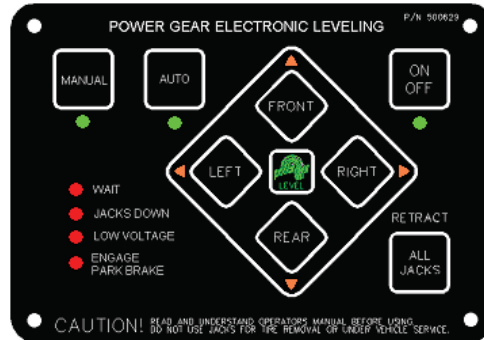


Owner's Manual Hydraulic Leveling

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PowerLevel series Operation Guide

Winnebago Industries Hydraulic Leveling System by Power Gear

Introduction

The Power Gear leveling and stabilizing system is an electronically controlled/hydraulically operated unit that consists of a 12 volt DC powered motor/pump/manifold assembly with fluid reservoir, hydraulic hoses, four hydraulically operated jacks and a control unit with switch panel. It is designed to meet the varying requirements of vehicles ranging from class "C" motorhomes to the large class "A" motorhome.

If, after thoroughly reading this manual, you still have questions in regard to the operation and maintenance of this Power Gear PowerLevel system, please contact the LCI Service Department at 574-537-8900.



READ ALL OPERATING INSTRUCTIONS FIRST BEFORE USING POWER GEAR LEVELING SYSTEM.



Do not use the Power Gear PowerLevel system as a lift for changing tires or working under the vehicle.

Never check for hydraulic fluid leaks using your hands and/or any other body part. Keep people clear of the coach prior to turning the leveling system on and while operating the leveling system.

When extending the rear jacks, do not lift the wheels beyond ground contact. This overrides the braking effect of both the transmission park and parking brake. Without this braking, it is possible for the vehicle to roll unexpectedly forward (or backward) off the jacks.

Holding a control switch in the "extend" or "retract" position for a time period longer than necessary to fully extend or retract the hydraulic cylinders can cause overheating and damage to the pump motor as well as the electrical components.

Do not use the leveler as an emergency brake. They are not designed for any type of vehicle braking purpose.

Do not use the levelers on icy or slick surfaces on which the foot pads may slip.

Failure to heed any of these warnings may result in serious injury or death.



NOTE: To prevent improper operation of the leveling system, which could result in damage to the levelers and/or the vehicle itself, read the operating instructions carefully before using the leveling jacks.

Operation

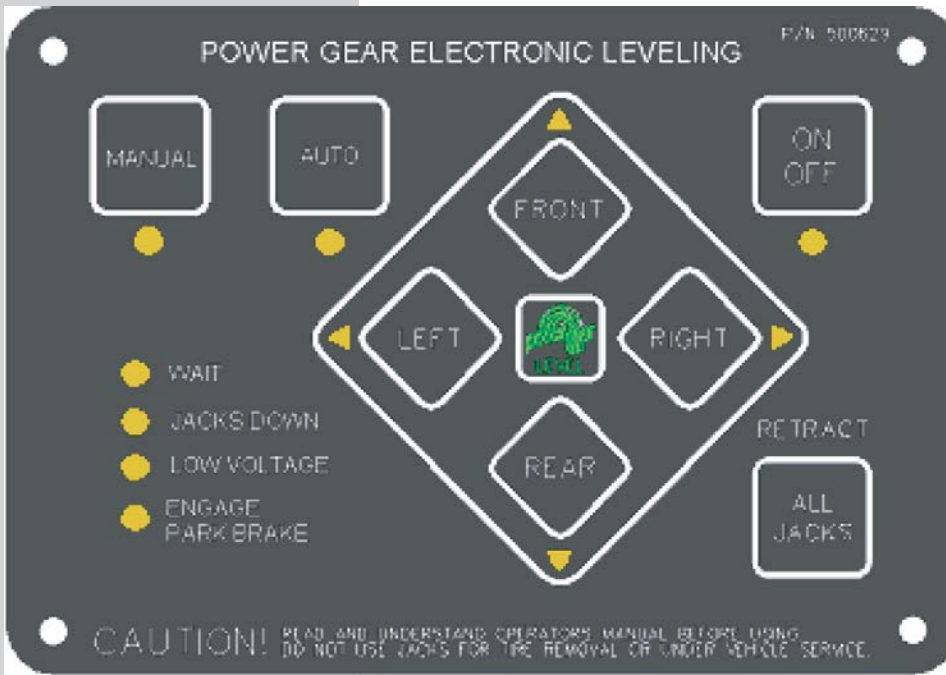
The PowerLevel system performs the dual function of leveling the vehicle and, once a level plane has been achieved, stabilizing the vehicle. When leveling the vehicle, it may not be necessary to use all of the leveling jacks. However, to stabilize the vehicle, all jacks should be extended to contact the ground.

SITE SELECTION

1. When selecting a site for parking the vehicle, choose a spot that is as flat as possible - this will minimize the extent of leveling.
2. Check that the area under the vehicle is free from any obstacles that might interfere with the operation of the levelers. Check the ground surface to assure the leveler feet have a flat, solid surface for contact.

NOTE: In occasional adverse driving conditions, it is possible for mud, ice and other debris to accumulate around the leveler units. This debris may interfere with the operation and should be cleaned off prior to using the system.

Figure 1



POWER GEAR CONTROL PANEL LAYOUT

The control panel consists of switches and light emitting diode indicators (Figure 1).

The switches include main power ON/OFF, ALL JACKS retract, manual and auto leveling and four jack indicator lights (FRONT, RIGHT, LEFT and REAR). The position of the jack indicator lights corresponds to the position of the jack legs on your motor home, with the front of the vehicle indicated by FRONT and the rear of the vehicle indicated by REAR.

Control Panel Functions

The ON/OFF switch, located in the upper right hand corner, controls the supply of power for all panel functions. Activation of this switch is indicated by its green LED.

The ALL JACKS retract switch is located in the lower right hand corner of the control panel. Activation of this switch causes all legs to retract to the travel position. When the retract sequence is completed, the JACKS DOWN and the dash indicator light will go out to indicate that it is now safe to move the motorhome.

The diamond shaped buttons, located in the center of the panel activate the extension of the leveling jacks.

The control has an automatic shut-off feature. Following the last operation, the control will automatically shut off in 4 minutes.

NOTICE

COACHES EQUIPPED WITH AIR SUSPENSION & THE AIR DUMP FEATURE:

When operating in the Manual Mode, air will be dumped from the vehicle suspension in approximately 20 seconds.

When operating in Auto Mode, there will be a 20 second delay before the jacks begin to extend, while the air dumps from the vehicle suspension.

NOTICE

For Manual, Automatic and Remote Leveling the vehicle engine must be running, the transmission in park and the parking brake set. Securely block the rear wheels using wheel chocks.

Locate the "ON/OFF" button on the upper right of the control panel. Momentarily depress this switch to activate the leveling system.

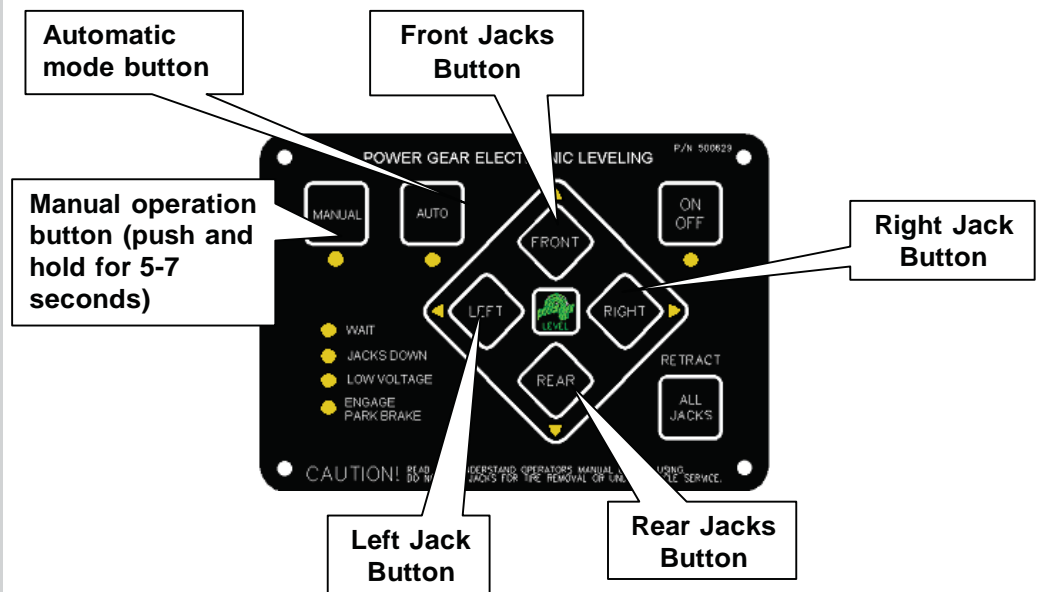
The LED will light up indicating that the system is ready. If the Park Brake LED lights up, it is an indication that the parking brake is not engaged.

NOTICE

The Engage Park Brake LED indicates "Not Engaged" when lit.

Automatic Leveling

1. Turn on the ignition and start the coach. Your leveling control will start a self-check sequence indicated by the lights on the panel blinking in a rotating pattern. It will turn off when it has finished its self-check.
2. Push the "On/Off" button on control panel. The system is now operational and the "On/Off" LED will turn on.
3. Check to see that the engage park brake light is not illuminated. If so, engage the parking brake. (Your coach will have to be in neutral or park to operate the system).
4. Push the "AUTO" button. The automatic leveling system will begin its leveling procedure. Please avoid movement in the coach during automatic leveling as it can cause errors in the results. It will signal that it has completed the process by illuminating the center green "LEVEL" light. Check to make sure that all jacks are on the ground. Also check to make sure that no tire is off the ground. If so, your leveling process is complete. If further adjustments are needed, refer to the "Manual Operation" section.
5. You can then turn the system off by pushing the on/off button again.



Manual Leveling

There are certain conditions where manually leveling your coach may be desirable.

1. Turn on the ignition and start the coach.
2. Push the "On/Off" button to turn on the system.
3. Push and hold the "MANUAL" button for 5-7 seconds in order for the system to switch to the manual mode. It will signal it is in the manual mode when the light under the "MANUAL" button is illuminated.
4. Push "FRONT" button until the front of the coach rises at least 3 inches. This is important and necessary to allow the coach to pivot when leveling side to side. If there is insufficient jack stroke to lift the front of the coach at least 3 inches the coach will have to be moved to an area with less front to back slope, or a weight distribution block will have to be placed under the jack.
5. Push the "REAR" button until jacks contact the ground.

6. Level the coach from front to rear by pushing the "REAR" button if the light under the "REAR" button is illuminated. If the light is illuminated above the "FRONT JACKS" button, push the "FRONT" button. In either case, keep button depressed until the green center "LEVEL" light is illuminated, or both front and rear lights are dark.

7. Level the coach from side to side by pushing the "RIGHT" button if the light beside the "RIGHT" button is illuminated. If the light beside the "LEFT" button is illuminated, push the "LEFT" button until the "LEVEL" light is illuminated.

NOTE: The right and left rear jacks are used to level the coach side to side. Pushing the "LEFT" button on the control panel will extend the left rear jack. Pushing the "RIGHT" button on the control panel will extend the right rear jack. There is no individual control of the right or left front jacks on 4 jack systems. The pressure equalization built into the system shifts the 2 front jacks.

8. Repeat steps 6 and 7 if needed.

9. Turn power off to leveling system by pushing "ON/OFF" button.

10. Visually inspect jacks to ensure all pads are touching ground. Should one of the rear jacks not be touching the ground, press the corresponding left or right rear jack buttons to lower the appropriate jack to the ground. Never lift the wheels off the ground to level the coach. This can lead to an unsafe condition and damage to the leveling system or coach.

NOTE: If the "Wait" LED is ever flashing by itself, it means the control is busy and you cannot operate the jacks. After a short period of time (from 5 to 30 seconds), the "Wait" LED will go off again, and you can resume operation as normal.



To prevent the possibility of damaging the levelers and/or vehicle, it is good practice to confirm the retracted position by visual inspection.



For Remote Leveling, the vehicles engine must be running, the transmission in park and the parking brake set. Securely block the rear wheels using wheel chocks.

If the Park Brake LED lights upon the main operators panel, it is an indication that the parking brake is not engaged.

Retracting the Jacks

1. Start the chassis engine or turn the key to the accessory position and turn the control panel power switch on. If any levelers are extended, the "JACKS DOWN" LED will light up, and the dash warning light will illuminate. The buzzer will sound only if the IGN switch is in IGN position (not ACC).

2. To retract all levelers simultaneously, press the "ALL JACKS" retract switch.

3. When all leveler legs retract to the travel position, the yellow "JACKS DOWN" LED and the dash warning light will go out. You can now turn off the power.

Remote Operation

The control may be turned on to start operation from inside using the on/off button or outside by pushing the rocker switch to the desired mode of operation. Once turned on from inside, the LED at the remote switch location will illuminate solid. If selected from outside the unit, operation will begin immediately.

AUTO MODE: Depress the rocker switch momentarily to the Auto Mode position. The LED will flash slowly, indicating operation and the system will begin the leveling process to completion.

Once the operation is complete, the LED at the rocker switch will flash quickly for 2 seconds, then stay illuminated until the control unit times out.

ALL UP: Depress the rocker switch momentarily to the All Up position. The LED will flash slowly, indicating operation and the system will begin the retraction process to completion.

Once the operation is complete, the LED at the rocker switch will flash quickly for 2 seconds, then stay illuminated until the control unit times out.


WARNING

Your coach must be supported at both ends of the chassis frame rails with jack stands before working underneath, failure to do so may result in personal injury or death.


NOTICE

It is recommended that during periods of vehicle inactivity and/or storage, the leveling system should be activated and cycled through the leveling/retracting procedures on a monthly basis to keep the leveling jack seals lubricated and in good operating condition.

STOPPING OPERATION IN MID CYCLE: To stop operation in the middle of a cycle, depress the remote rocker switch to either position to stop the function or press on/off on the operators control panel in the coach.

RESTARTING ALL UP AFTER MID-CYCLE STOP: To restart a cycle that had started and then was stopped by the operator, depress the rocker switch momentarily to the All Up position to start retracting the jacks again.

RESTARTING AUTO MODE AFTER MID-CYCLE STOP: To restart the Auto Mode process, depress the rocker switch momentarily to the ALL UP position to retract the jacks fully. Once completed depress the rocker switch to the Auto Mode position.

(The operator may go directly to the Auto Mode, skipping the retract cycle, however actual leveling results may vary depending on the stage of the Auto Mode cycle when stopped. No damage will result from this. If the results are unsatisfactory, retract the jacks fully and start the cycle over.)

Care and Maintenance

The Power Gear PowerLevel hydraulic leveling system should be routinely checked as part of a regular vehicle maintenance program. Power Gear recommends checking the system twice a year: in the spring prior to the heavy travel season and in the winter, prior to storage. The following checklist has been provided as a guideline for maintenance.

1. Check and/or fill the reservoir with the jacks and room(s) in the fully retracted position, each month. The fluid should be $\frac{3}{4}$ " onto the dipstick (on models so equipped) or to the bottom of the fill port on models without dipsticks.
2. Inspect and clean all hydraulic pump electrical connections every 12 months.
3. Remove dirt and road debris from jacks as needed.
4. If jacks are down for extended periods, it is recommended to spray exposed leveling jack chrome rods with a silicone lubricant every 5 to 7 days for protection.
5. In extreme conditions (within 60 miles of coastal areas), it is recommended to spray the rods every 2 to 3 days with a silicone lubricant.
6. To maintain proper seal lubrication, grease the fitting on the bottom of each jack cylinder with Lithium grease every 20-30 uses.

RECOMMENDED HYDRAULIC FLUIDS FOR YOUR HYDRAULIC PUMP

The Power Gear hydraulic system is pre-filled, primed and ready to operate direct from the manufacturer. Please consult with the manufacturer of the coach for the fluid type used in the hydraulic unit.

If operating in cold temperatures (less than -10° F) the jacks may extend and retract slowly.

For cold weather operation, fluid specially-formulated for low temperatures may be desirable.

Please consult LCI before using any other fluids than those specified here.

Troubleshooting

Locations of breakers, fuses, fuse panels, etc. are coach-specific. Consult your coach owner's manual or Winnebago Industries for locations of these components.

The following information will guide you to repairs that may be made on site. For problems not covered here, contact your service center or our website, www.lci1.com for more extensive troubleshooting information in the service manual for your system.

For your convenience, all Tip Sheets referenced below are in the Reference Section of the manual, starting on page 9.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
System will not turn on, indicator light does not light.	Coach ignition not in run position.	Turn ignition to run position.
	Transmission not in park or neutral.	Place transmission in park or neutral.
	Parking brake not set.	Set brake.
	Control has been left on for more than four minutes, auto shut off.	Push ON/OFF button twice.
Jacks will not extend, pump is not running.	Battery voltage is low.	Recharge battery.
Jacks will not extend, pump is running.	Fluid level is low.	Fill tank to proper level with ATF.
All jacks will not retract or will not retract fully.	System overfilled with fluid.	Drain fluid to recommended level, see TIP sheet 140.
Any one or two jacks will not retract at all.	Broken jack spring(s).	Replace jack spring, see TIP sheet 34.
	Jack rod guide is rusted or dirty.	Clean chrome rod, grease rod guide with lithium grease <i>if equipped with fittings</i> . Otherwise lubricate with silicone fluid. It may be necessary to replace the jack.
Any jack retracts very slowly.	Jack rod guide is rusted or dirty.	Clean chrome rod, grease rod guide with lithium grease <i>if equipped with fittings</i> . Otherwise lubricate with silicone fluid. It may be necessary to replace the jack.
Any jack retracts with no power, with possible popping sound.	Air in system.	Check for coils in hose. Remove coil, then fully extend all jacks, then retract. Repeat cycle 4 times waiting 3 minutes between cycles, check fluid between cycles.
	Contaminated fluid.	Replace fluid, see TIP sheets 140 and 141.
Panel jacks down light illuminated, buzzer is on and jacks are retracted.	Low fluid level.	Fill tank with ATF.
Panel jacks down light and alarm go on while driving, jacks retracted.	Low fluid level.	Fill tank with ATF.

Error Codes

An error code is indicated by certain lights (on the touch pad) flashing in a given pattern. Find the pattern you are seeing (under INDICATION) in the chart below to find the mode. Then find the mode in the paragraphs that follow to find a fix for the problem.

INDICATION (flashing lights)	MODE
Up, Right, Down & Left flash in clockwise pattern. Power Gear logo. Any two of the Up/Down/Left/Right lights. Park Brake. Wait. Low Voltage. All of the lights are flashing (and a buzzer is on and the jacks are retracting). All of the lights are flashing (no buzzer). Left, Right, Front, Rear & Power Gear logo all flashing. All of the lights are on solid constantly. On/Off, Jacks Down & Park Brake. Left, Right & Power Gear Logo.	Diagnostic check Already level Slightly out of level Park brake. Wait Low Voltage Emergency retract Zero mode Out of level tolerance Internal error Panel communication error Failure mode

Mode: Diagnostic Check **Indication:** For approximately 5 seconds the up, right, down, and left flash in a clockwise pattern. The Power Gear logo will also flash

Cause: This is a self-diagnostic check and is normal anytime the ignition is turned on.

Corrective Action: The control will turn back off after check is complete, or another error code will flash.

Mode: Already level **Indication:** Power Gear logo is flashing

Cause: Control "sees" coach as already level.

Corrective Action: No corrective action needed. Jacks may be deployed manually for stabilization if so desired.

Mode: Slightly out of level **Indication:** Any two of the up, down, left, right lights (they could be flashing, lit solid, or both).

Cause: Coach is slightly out of level

Corrective Action: This is normal anytime the coach is not already level. The arrows flashing or solid indicate which side(s) of the coach would need to be raised to reach level if manual mode were to be used.

Mode: Park Brake **Indication:** Park Brake light is flashing

Cause: Park brake is not engaged OR control is not receiving signal to indicate that brake has been set.

Corrective Action: Engage the park brake, or, check continuity between pin #1 of the 6-pin safety interconnect harness and ground. If there is no continuity, the switch is defective, the parking brake is not set, or the wires to the switch are defective.

Mode: Wait **Indication:** The wait light is flashing

Cause: The control is processing information.

Corrective Action: Wait light should go off in approximately 1 minute.

Mode: Low Voltage **Indication:** The low voltage light is flashing

Cause: The voltage at the control is too low.

Corrective Action: Charge or replace batteries. If a leveling procedure is being attempted, the coach should be running to ensure a good voltage supply at the control.

Mode: Emergency Retract **Indication:** Audible alarm from touch pad, all lights are flashing, (if extended) jacks are retracting.

Cause: While the jacks are extended and the ignition is in the run position, the coach parking brake is disengaged OR low fluid in the reservoir.

Corrective Action: Engage park brake and make sure coach is not in gear while the jacks are down or while extending jacks. Check the fluid level in the reservoir. If problem persists, check the wiring of the neutral safety switch and/or the parking brake wire(s). Improper wiring of the parking brake wire(s).

Mode: Zero Mode**Indication:** All lights are flashing together, NO audible alarm**Cause:** Control box is brand new OR system has been put into this mode by the user.**Corrective Action:** Unit is waiting for a programmed level position. See Power Gear Tip Sheet #153 for instructions regarding re-setting the zero point. If unit is not new and you want to keep the previously stored level position, cycle the key off and then back on.**Mode:** Out of Level Tolerance**Indication:** The following lights are flashing together: left, right, front, rear, and all level**Cause:** Control "sees" that the coach is too far out of level to begin with and the jacks won't help OR Control was previously programmed at a position that was not level OR Control is or was not securely fastened in place when level was programmed..**Corrective Action:** Move coach to ground that is more level. If you know that you are on fairly level ground, then reprogram a new zero point. See Tip Sheet # 153. Verify that control is securely mounted to a flat, level surface and is mounted upside down with the arrow on the control facing the front of the vehicle.**Mode:** Internal Error**Indication:** All of the lights are on solid indefinitely**Cause:** This is an internal error**Corrective Action:** A new control box is needed. However, a new touch pad is not needed.**Mode:** Panel Communication Error **Indication:** The following LEDs are blinking together: On/Off, Jacks Down & Park Brake.**Cause:** Poor connection between components or faulty component. **Corrective Action:** Check to make sure that all connections are tight and properly connected. Cycle power to reset. If that does not work, try replacing components individually, starting with the wire harness, then the touch pad, and lastly the control.**Mode:** Failure Mode**Indication:** The following LEDs are blinking together: Left, Right, and Power Gear Logo.**Cause:** Retract timeout — when retract is active for 4 minutes and float switch does not indicate jacks up **Corrective Action:** Check the fluid level in the reservoir. Check to make sure that all hydraulic and electrical connections are tight and properly connected. Cycle power to reset. If jacks continue to retract too slowly, consider using a fluid formulated for cold temperatures such as Kendall Hyden Glacial Blu or any Mil Spec. H5606.

Reference Section



T.I.P. Troubleshooting Information on Power Gear

SPRING REPLACEMENT KIT:

PREPARATION:

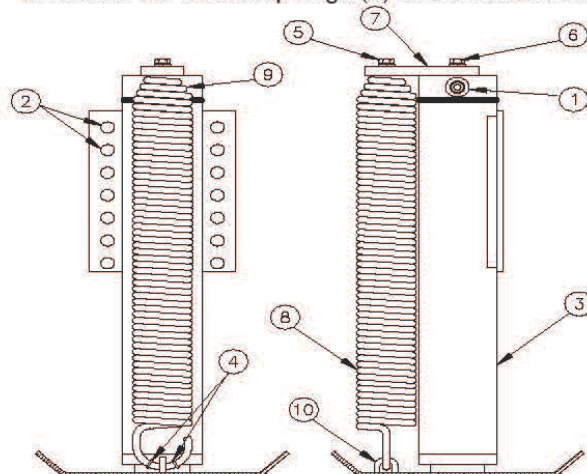
1. Collect the following tools:
 - air impact wrench
 - set of impact sockets
 - pliers
 - set of open end wrenches

REMOVAL:

1. Fully retract the jack. If the spring is broken, a hand jack may be needed for this. Have someone hold the "RETRACT" button on the touch panel while you raise the leveling jack with the hand jack. This should allow the fluid in the leg to drain back into the tank.
2. Remove the hose (1) from the jack.
3. Remove the six bolts (2) that hold the jack to the coach.
4. Remove the jack (3).
5. Remove the two snap rings (4) from the bottom hook of the spring with a pliers.
6. Remove the spring tension screw (5) with an air impact wrench.
7. Remove the anchor plate bolt (6) with an air impact wrench.
8. Remove the plate (7) and unhook the spring (8).

INSTALLATION:

1. Slide the new knurled cone (9) into the spring so that the taper matches the taper of the spring.
2. Secure the new anchor plate (7) to the top of the jack (3).
3. Secure the jack in an upside down position.
4. Hook the new spring (8) to the shoe of the jack (10).
5. Start the new spring tension screw (5) by hand and finish it with an air impact wrench.
6. Secure the new snap rings (4) to the hook of the spring.



Reference Section



T.I.P. Troubleshooting Information on Power Gear

Oil Fill Procedure Leveling Systems

Using oil filtered to 10 micron:

- 1) Fill pump to rim of fill port hole until just before oil starts to dribble out.
- 2) Cycle front legs to **fully extended position**, then retract fully.
- 3) Cycle rear legs to **fully extended position**, then retract fully.
- 4) Refill reservoir per step 1.
- 5) **Repeat steps 2, 3 and 4 in order; a minimum of 3 times.**
- 6) Extend front and rear legs.
- 7) Trip emergency brake, verify system alarms properly, alarm ceases when brake is reset and/or alarm ceases when legs are retracted.
- 8) Extend front and rear legs.
- 9) Remove transmission from "park" (if applicable), verify system alarms properly, alarm ceases when transmission is reset to "park", verify system alarms when transmission is taken out of neutral, verify system resets when transmission is reset to neutral, and verify alarm ceases when legs have fully retracted.
- 10) If alarm does not cease during steps 7 or 9, when legs are fully retracted, check liquid level and fill per step 1, if necessary.
- 11) Prior to road test, level coach and repeat steps 7-9.
- 12) After road test, level coach and repeat steps 7-9.

Note: All jacks should be cycled at least 5 times during this procedure.

PLEASE NOTE

The most common cause of hydraulic system malfunction or failure is contamination of hydraulic fluid (water, chips, dirt, etc.)

We have extensively cleaned this product during all phases of manufacture, assembly and testing.

Hydraulic hoses should be stored in an enclosed area with connector caps on and protected from moisture. Hydraulic pumps should be protected from wet environments to prevent corrosion of the electric motor. Hydraulic pumps should have caps on all hydraulic fittings and all holes should be plugged to prevent contamination from dust, water, chips, etc.

During assembly of the hydraulic system, it is imperative that any potential for contamination is minimized. Pump and leg connections should be kept capped until hoses are attached. Hoses should be kept capped until connected. Hydraulic fluid should be filtered to 10 microns absolute.

Reference Section



T.I.P. Troubleshooting Information on Power Gear

Oil Bleed Procedure Leveling Systems

READ ALL PROCEDURES AND UNDERSTAND THEM PRIOR TO STARTING

WARNING

At no time should the jacks touch the floor during this procedure. Lifting the coach could result in great bodily harm or death.

WARNING

The jacks may extend slightly during the procedure and care must be taken to avoid moving parts to avoid bodily injury.

WARNING

Chock the wheels to prevent the coach from moving prior to beginning this procedure.

NOTE: Prior to bleeding procedure, check hoses near pump and at legs to determine if they have been coiled vertically. Horizontally coiled hose is acceptable. Reroute to remove vertical coils if possible, or coil hose horizontally. Be sure to keep hoses at least 6" from all heat sources and protect from all sharp edges and screws. If hose cannot be permanently rerouted, temporarily straighten hose, and proceed with the bleeding procedure.

- 1) Repeat these procedures for each jack, working from the jack farthest away from the pump to the closest.
- 2) Select the jack farthest from the pump for the first procedure.
- 3) Place a container below the leg to collect excess fluid.
- 4) Loosen the hose connection at the leg just enough to allow flow, do not completely remove the hose.
- 5) Have a second person energize the leveling system and press the appropriate button to extend the jack selected.
- 6) As oil flows to the jack, air will escape through the loosened connection. At the point where a steady flow of oil is observed coming from the connection, retighten the hose connection to 18-22 ft-lbs.
- 7) Have the person operating the control stop pressing the button immediately after tightening the connection.
- 8) Retract the jack if necessary.
- 9) Top off the reservoir with Automatic Transmission Fluid.
- 10) Perform the procedure on the remaining jacks in the appropriate order.