powergear®

# Trueline Leveling System

# Operation Guide

Air Leveling System

Valid Manufacturing Ltd.
*Partners in Technology*

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Revision: 5/3/05

# SAFETY INSTRUCTIONS

## WARNING

- **DO NOT USE THE VEHICLE'S SUSPENSION TO SUPPORT THE VEHICLE FOR SERVICING OR INSPECTION. INSTEAD, INSTALL ADEQUATE BLOCKING BEFORE WORKING UNDER ANY VEHICLE. THE SYSTEM IS DESIGNED AS A 'LEVELING' SYSTEM ONLY.**

- **KEEP PEOPLE CLEAR OF COACH WHILE LEVELING SYSTEM IS IN USE.**

CAUTION - READ AND UNDERSTAND THE ENTIRE OPERATOR'S MANUAL BEFORE USING OR SERVICING YOUR LEVELING SYSTEM.

CAUTION - ENSURE THAT THE AREA AROUND THE VEHICLE IS CLEAR OF OBSTRUCTIONS BEFORE OPERATING THE LEVELING SYSTEM.

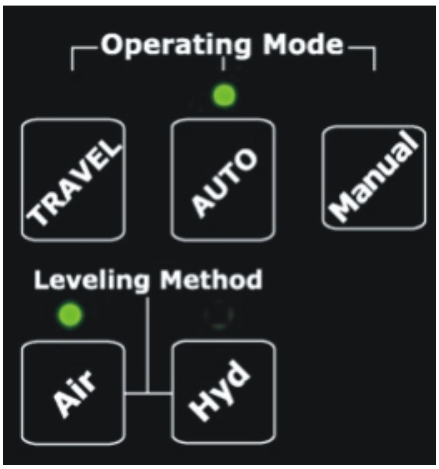
CAUTION - YOUR LEVELING SYSTEM SHOULD BE SERVICED ONLY BY QUALIFIED PERSONNEL.

CAUTION - LEAKS IN A VEHICLE'S AIR SYSTEM CAN CAUSE THE VEHICLE TO LOWER OVER TIME REGARDLESS OF WHETHER THE LEVELING SYSTEM IS OPERATIONAL.

# LEVELING SYSTEM OPERATION

There are three main operating modes of the Trueline Leveling System:

- **Auto Level Mode (Air or Hydraulic):** Auto mode should be used by default when the vehicle is at a stop. This mode is the easiest to use and is suitable for most situations. Note that hydraulic control in Auto mode can only be used when the vehicle is parked and the ignition is on.
- **Manual Level Mode (Air or Hydraulic):** Manual mode allows you to raise or lower each corner of the vehicle individually, to the level you want. This mode lets you have more control over the leveling process.




**Level Mode Indicators**

- With air leveling, manual mode can also be used at low traveling speeds when an uneven surface must be negotiated.
- With hydraulic leveling, manual leveling can only be used when the vehicle is parked and the ignition is on.
- **Travel Mode:** Travel mode is used when the vehicle is in motion. By default, this mode will initiate when the vehicle moves at a speed higher than the designated speed limit (set in the initial configuration of the system). However, it is best for the operator to enter this mode before the vehicle begins moving. The leveling system can only be switched to travel mode if the ignition is turned on. Placing the vehicle in travel mode causes the hydraulic jacks to retract and the suspension to go to ride height.

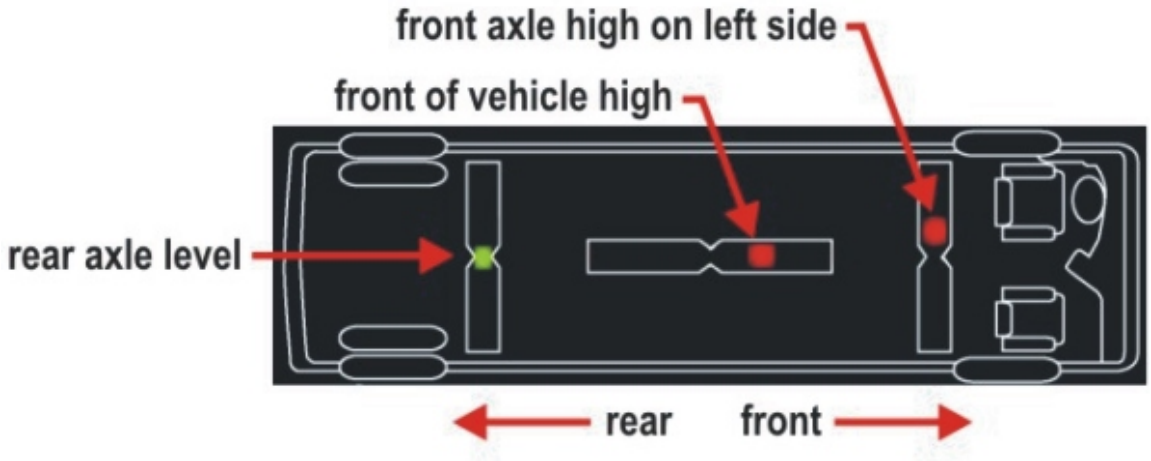
**Note:** If the vehicle engine is started and either the park brake is released or the vehicle is put in gear, the jacks leveling system will go into 'Emergency Retract' which retracts and stores the jacks and puts the air suspension in travel mode.

Since the Trueline Leveling System collects information on the ground speed of the vehicle, the operational mode may change automatically depending on the state of the vehicle.

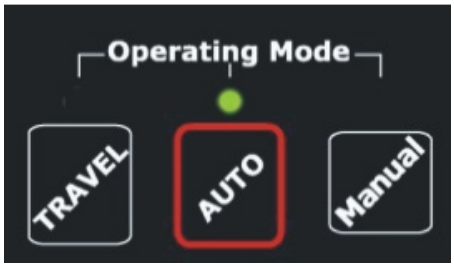
To activate any operational mode, the Trueline Leveling System must first be turned on by pressing and releasing POWER.

In each mode, the three level indication displays can be viewed as a building level, with the indicator lamp as the level's “bubble.” The lamp displays red if not level, and green if level.

*For example: If the indicator lamp is to the left of center on either of the axle displays, then the left side of that axle is high. If the indicator lamp is forward of center on the longitudinal display, then the front of the vehicle is high.*




## Auto Level Mode




As stated earlier, Auto Level Mode is the easiest to use and is suitable for most situations where you wish to level the vehicle when it is at a stop.

By default, Auto mode uses air only, and this method is described below. To use Auto mode with hydraulic control, refer to page 7.

When the vehicle has been put into Auto mode, it will go through the following procedure:

- The leveling system detects the lowest corner of the vehicle, and then lowers the remaining corners to it. If, after a preset amount of time, the system determines that it is unable to lower the vehicle to level, any corners that are low will then be raised so that the vehicle levels.

## Using Auto Level Mode (Air)

By default, Auto mode uses air only, and this method is described below. To use Auto mode with hydraulic control, refer to page 7.

**To use Auto Level Mode (air only):**

**1.** Ensure that:

a. The vehicle's engine is running and the air system is at full pressure,

b. The parking brake has been engaged,

c. The front wheels are straightened, and

d. The control panel is turned on. (If the **POWER** indicator is not lit, press and release **POWER.** If the **POWER** indicator is flashing, the ignition switch is off, and must be turned on.)

**2.** Press **AUTO** to initiate a leveling cycle.
If the level controller will not go into Auto mode it is most likely because the vehicle's parking brake has not been applied (Fig 1). Apply the parking brake to have the system go into Auto mode.

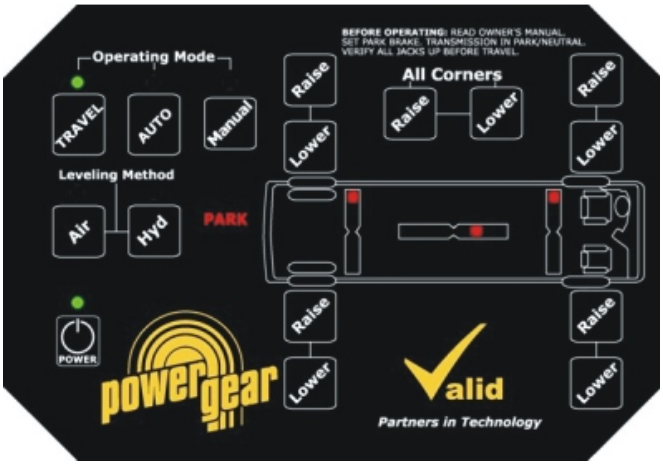



**Fig. 1**

**Note:** The PARK indicator will flash if the park brake is on but the vehicle is still in gear. Once the vehicle has been put in neutral with the park brake on, the PARK indicator will stop flashing and remain lit.

**3.** If you wish to level the vehicle at its current height (e.g. if it hasn't finished raising or lowering), press and hold AUTO for 3 seconds. Ensure that the vehicle is at a reasonable height before doing this, or it may be unable to level successfully.

**Note:** Due to the sensitivity of the leveling sensors, any noticeable movements within the coach can cause difficulty while leveling is in process. Therefore, if you are inside the vehicle while it is leveling, please sit quietly or walk lightly.

**What happens during the leveling cycle:**

1. During the entire cycle, the **POWER** indicator lamp remains on and the **AUTO** indicator lamp flashes until a level state has been achieved. Then the indicator remains on.
2. Once the vehicle is fully raised or lowered or the raising/lowering has been interrupted by the operator, the Trueline Leveling System will begin three leveling cycles. In each cycle, the rear axle, front axle, and longitudinal axis are leveled.
   If the vehicle achieves a level state at any time during these cycles, the Trueline Leveling System will simply skip to the next cycle and continue.
3. After the three cycles are complete, the vehicle should be level and all three level displays should be indicating green (Fig 2).

**Once the vehicle has been leveled:**

1. After 15 seconds, the two level sensors go into “sleep” mode in order to minimize parasitic current draw on the vehicle's battery system.
2. After 20 seconds, the level controller goes into “low power” mode indicated by the occasional flashing of the **AUTO** and **POWER** indicator lamps.
3. After a period of time* in low power mode, the level controller automatically wakes the two sensor units and checks to see if re-leveling is required.
   (*depending on the Re-level Interval setting in the initial configuration.)

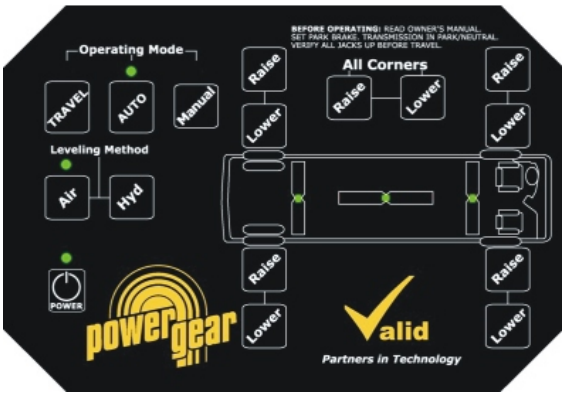



**Fig. 2**

If no leveling is required, the two sensors are allowed to go back to sleep and the level controller drops back into low power mode after 20 seconds.

**OR**

If leveling is required, the Trueline Leveling System again goes through the 3 cycles to properly level the coach.

**Auto Mode - Notes**

- Once a leveling cycle has been completed, you can perform additional leveling cycles if the leveling controller is in Auto mode or low power mode. Simply press and release **AUTO** once.
- If the vehicle begins to move and exceeds a speed of 2 MPH, the Trueline Leveling System automatically switches from Auto mode to Manual mode and sounds a warning tone. If the vehicle continues to accelerate, the leveling system automatically switches from Manual mode to Travel mode at speeds above the designated speed limit set in the initial configuration.

### Changing the Height of a Leveled Vehicle:

A leveled vehicle can be raised or lowered to adjust the entry doorstep height.

**1.** To ensure an adequate amount of air, the coach's engine should be running and its air system should be at full pressure.

**2.** Press the **ALL CORNERS RAISE** or **ALL CORNERS LOWER** button. This causes the vehicle to move up or down while still level.

**3.** The lateral level is adjusted on on the coach's rear. Then, the longitudinal level is adjusted. These three procedures are repeated until the coach is level.

**4.** Now the vehicle should be level and all three level displays should be indicating green (Fig 3). The **AUTO** indicator stops flashing and stays lit.

### Once the vehicle has been leveled:

1. After 15 seconds, the two level sensors go into “sleep” mode in order to minimize parasitic current draw on the vehicle's battery system.
2. After 20 seconds, the level controller goes into “low power” mode indicated by the occasional flashing of the **AUTO** and **POWER** indicator lamps.

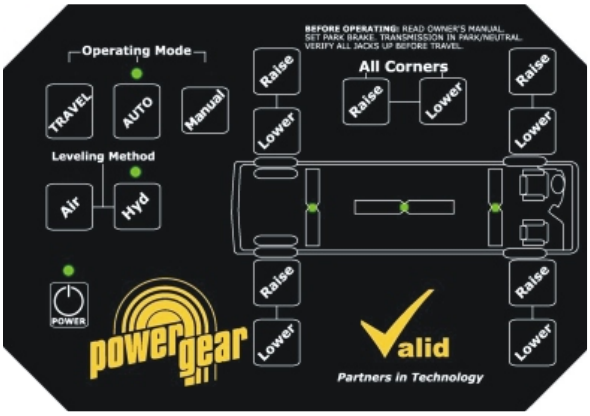
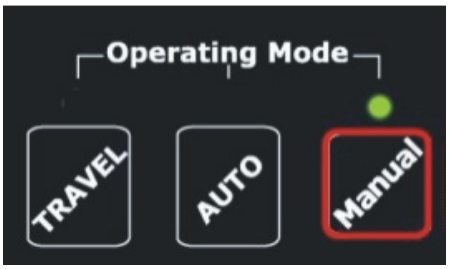



**Fig. 3**

## Manual Level Mode




Use manual leveling mode if you wish to have control over the leveling process. Manual control of the air system can be used while traveling at low speed when an uneven surface must be negotiated.

By default, Manual mode uses air only, and this method is described below. To use Manual mode with hydraulic control, refer to page 10.

## Using Manual Level Mode (Air)

1. Ensure that the leveling system is turned on. If the **POWER** indicator is not lit, press and release **POWER**.
2. With the vehicle either parked (but still running) or traveling slower than the Travel mode speed limit, press **MANUAL**. If the vehicle is parked, make sure the front wheels are straightened.
3. Press **RAISE** or **LOWER** for each of the four corners you wish to manually adjust.
   OR
   To control all 4 corners simultaneously, use the **ALL CORNERS RAISE** and **ALL CORNERS LOWER** buttons. This can be useful if you wish to raise or lower the entry step height.

### All Corners Raise

When in manual mode, you may raise your vehicle while either parked or moving slowly. To allow you greater freedom, the **ALL CORNERS RAISE** button has a 'lock' feature that keeps the button activated after you have pressed it.

### To lock the All Corners Raise button:

In manual mode, hold **ALL CORNERS RAISE** for 3 seconds. This 'locks' the button on for a period of one minute.

- During this time, the coach elevates continuously and the control panel sounds a repeated beeping tone.
- After one minute is over, the coach stops elevating.
- You may repeat this process until the coach is at the height you want.
- To stop the elevating process during the one-minute period, press and release **MANUAL**.
- You may repeat this process until the coach is at the height you want.
- To stop the elevating process during the one-minute period, press and release **MANUAL**.

**Note:** Because of the risk of damage to your coach, the **ALL CORNERS LOWER** button does not have this lock feature.

## Manual Mode Notes

- If the Trueline Leveling System detects an excess amount of twist in the vehicle frame during the manual adjustments, any further actions that may cause more twist are not permitted by the leveling controller.

  *For example: if the vehicle is in a state as indicated by Fig. 4, the leveling controller will not allow the right front to be raised, the left front to be lowered, the right rear to be lowered, or the left rear to be raised.*

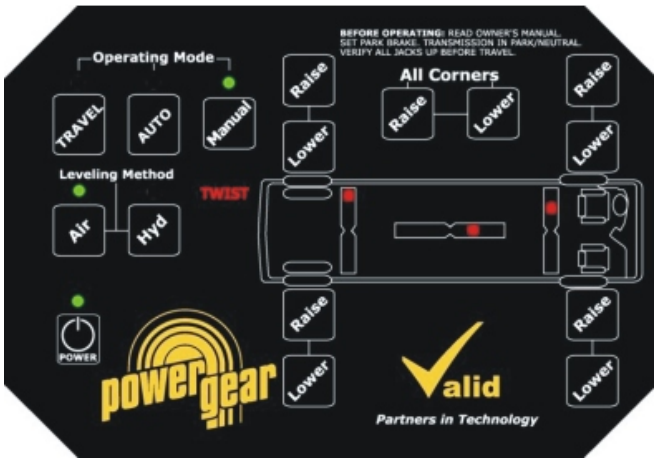
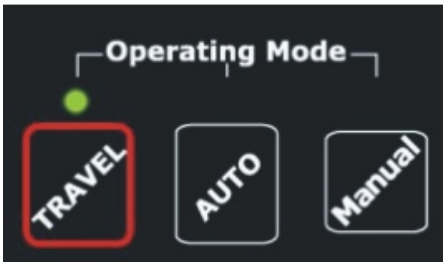



**Fig. 4**

- If the vehicle begins to move, the Trueline Leveling System automatically switches from Manual mode to Travel mode at speeds higher than the designated speed limit set in the initial configuration.

**Note:** If you are in Manual mode and wish to go to Auto mode with hydraulic control, you must first put the leveling system into Travel mode. This stores the hydraulic jacks, which is necessary before they can be used.

## Travel Mode




Travel mode is the operational mode used when the vehicle is in motion. This mode gives control of the vehicle's air suspension system to the ride height valves located on the frame of the vehicle.

**To use Travel Mode:**

Press **TRAVEL**.

- If the Trueline Leveling System is turned off or in any mode other than Travel, it will automatically turn on and switch to Travel mode if the vehicle speed exceeds its designated Travel mode speed limit.
- In Travel mode, the three level displays are scaled to indicate +/-0.75g of acceleration at full scale.

**Warning:** The time required to achieve travel height varies with coach design. It is the operator's responsibility to ensure that the coach is at an adequate height before driving. If the coach is too low, severe damage can result to the fenders when the wheels are turned.

## Optional Tag Lift

- Only functional in Travel Mode.
- The Tag lift feature is not functional until the engine has been running for 2 minutes
- An audible warning will be sounded when traveling with tag axle in raised position.
- The tag axle will be lowered automatically at speeds above 10 MPH.

## USER NOTES:

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