TRUELINE LEVELING SYSTEM

Setup & Configuration Guide

Air/Hydraulic

FIRMWARE VERSIONS:
CONTROLLER 2.18
FRONT SENSOR 2.6
REAR SENSOR 2.9
PNEUMATIC I/O MODULE 2.4

Valid Manufacturing Ltd.
Advanced Technologies… Simple Solutions

Last revision: 2/22/05

SYSTEM SETUP & CONFIGURATION

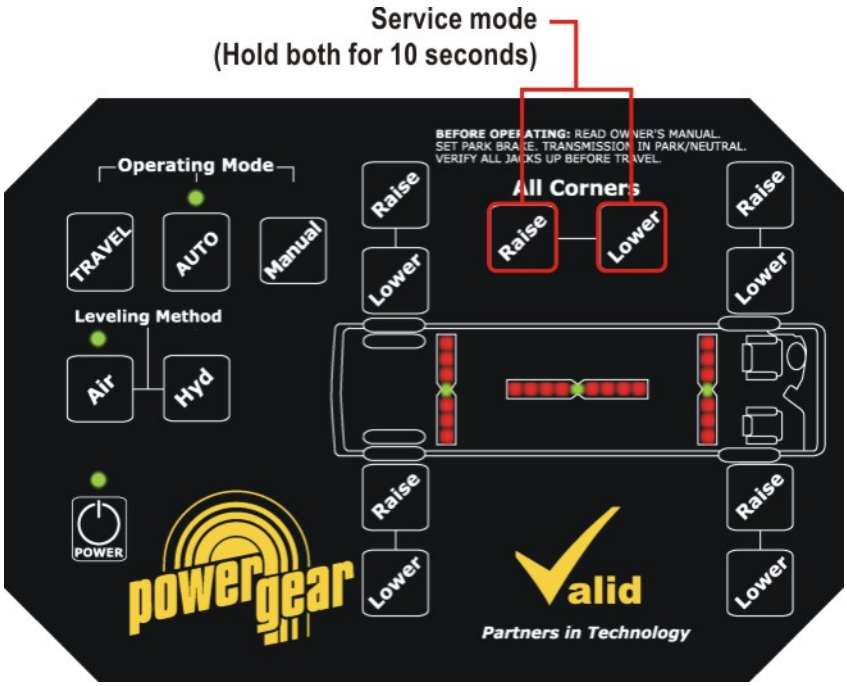
Leveling System Setup

The Trueline Leveling System has many user-selectable features that may need to be configured after installing the components. To access these features you must first place the system into service mode.

To place the unit into service mode:

1. Ensure the system is powered off.
2. Press **POWER** to turn the system on.
3. Press and hold **ALL CORNERS RAISE** and **ALL CORNERS LOWER** simultaneously for approximately 10 seconds until the **AUTO** and **MANUAL** indicators flash alternately and an alternating tone is sounded.
4. Release **ALL CORNERS RAISE** and **ALL CORNERS LOWER** and select the desired function button (see following pages).

Note: If you do not select a function within 5 seconds after the tone is heard, the system will exit service mode.



Once the system is installed, the following two steps must be completed as part of the initial setup. As stated previously, you must be in service mode to perform these operations.

1. Set configuration – air and hydraulic leveling parameters
2. Zero set

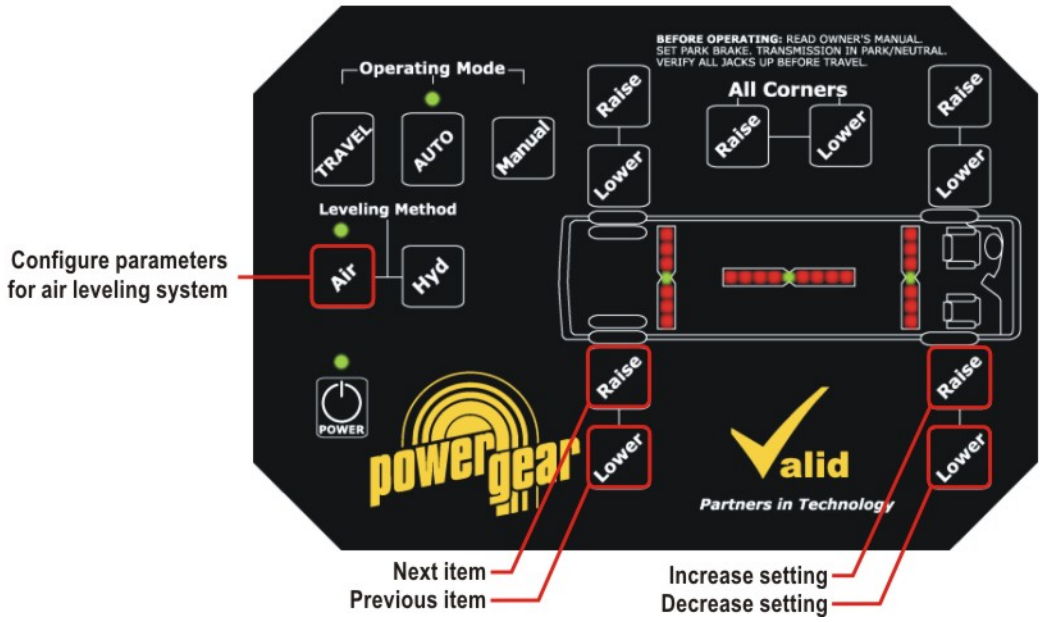
Set Configuration

A number of system configuration parameters can be used to 'tune' the leveling system. There are two main groups of parameters:

- Air leveling parameters
- Hydraulic leveling parameters

To configure the air leveling parameters:

Enter service mode (see page 3) and press **AIR** to access the air leveling configuration settings.



To adjust settings while in configuration mode:

- Press Front Right **RAISE** to increase the setting.
- Press Front Right **LOWER** to decrease the setting.

- The settings for each item can be seen on the flashing indicator bar of the front axle level display.

To select a different configuration item:

- Press Rear Right **RAISE** to advance to the next item.
- Press Rear Right **LOWER** to return to the previous item.
- The item you have selected is illuminated on the indicator bar of the rear axle level display.
- The system will exit configuration mode if you do not increase or decrease a setting after 30 seconds.

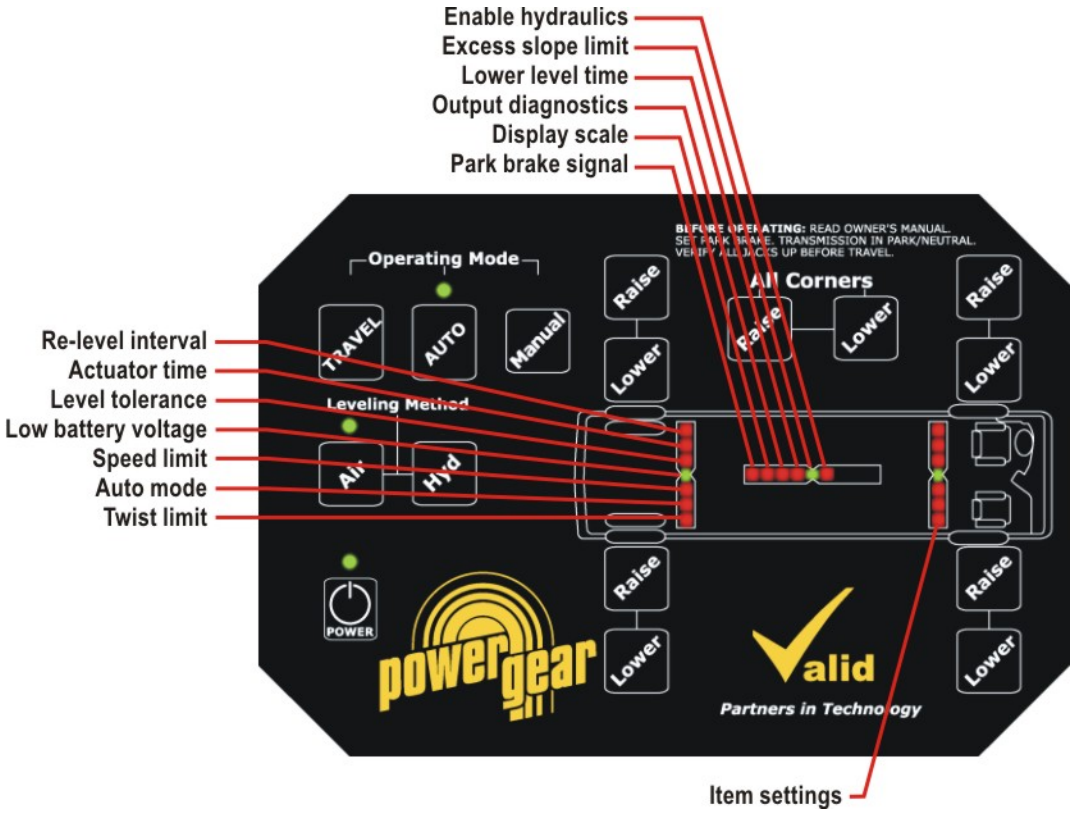
To save your configuration settings:

Press **MANUAL**. This permanently stores the new configuration settings into EEPROM memory.

Note: If you change any values without saving them, they will be used temporarily until the system is reset or the battery is disconnected. Then the system will re-load the saved values from EEPROM memory.

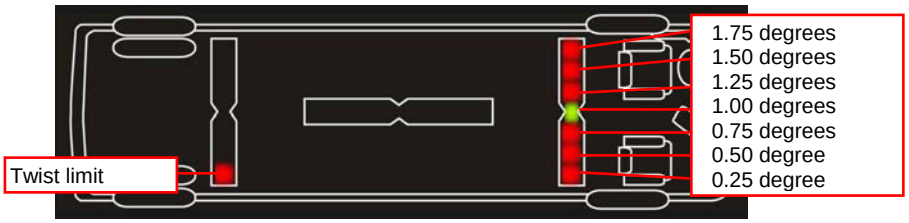
See the following pages for details of all air configuration settings. If you do not make any adjustments, the parameter's default setting is used.

Air Leveling Configuration Parameters



Twist Limit

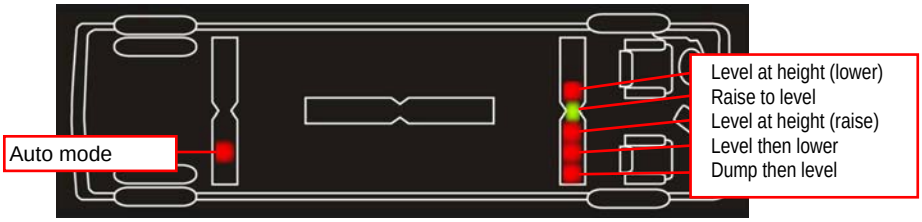
Select one of seven twist limits to be applied during manual operation of the system. This is the maximum ‘twist’ allowed between the front and rear sensors before manual control is restricted.



Auto Mode

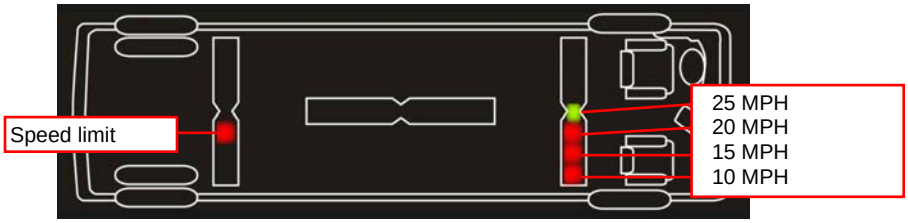
Select one of five leveling options for automatic mode. See the Operation instructions for descriptions of how each of these leveling methods works.

There is another air parameter that can only be activated if you are using either Level at Height (Lower) or Level then Lower. See ‘Level No-Change Time’ on page 9.



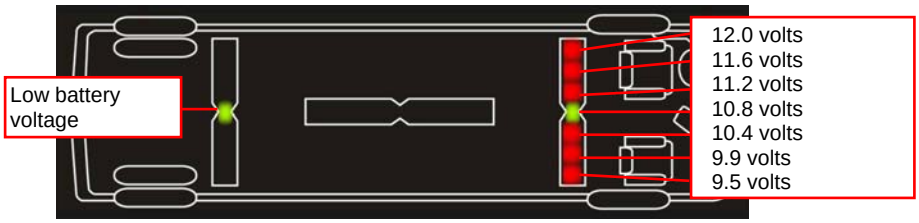
Speed Limit

Select one of four values to limit the maximum vehicle speed at which manual operation is allowed (before the system switches to Travel mode).



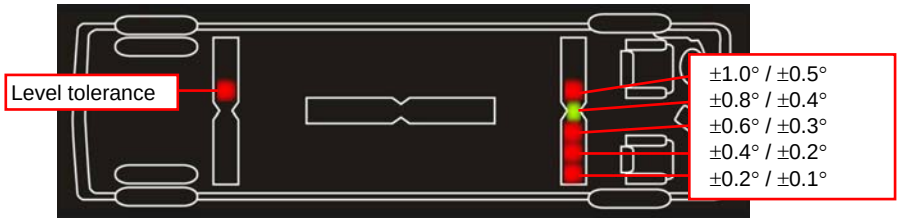
Low Battery Voltage

Select the vehicle voltage level below which the low battery indicator will illuminate. The voltage level is adjustable from 9.5 to 12.0 volts.



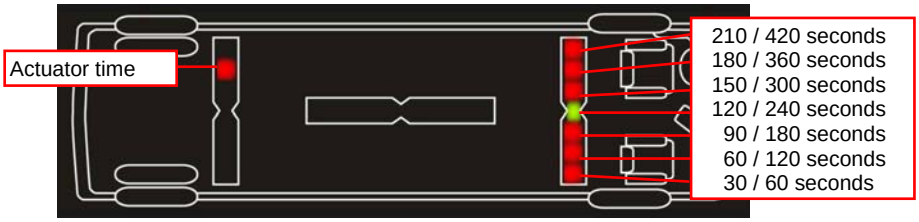
Level Tolerance

This is the window on either side of true level that will be considered level during automatic operation. The left-to-right value is shown first (before the '/'). The front-to-rear value (after the '/') is always half of left-to-right.



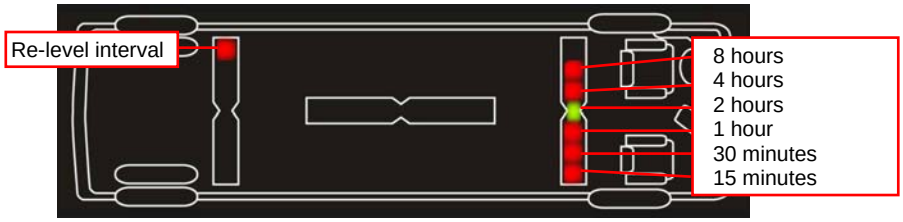
Actuator Time

Select one of seven actuator lower/raise time limits (maximum amount of time required to lower and raise an air spring). Choose the lowest setting that allows for complete movement in each actuator.



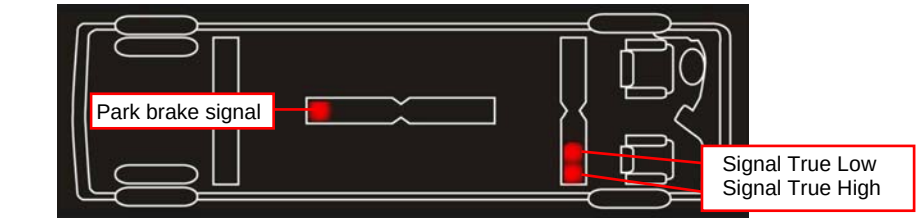
Re-level Interval

Select one of six values which sets the time between 're-checks' for a level state while the system is in Auto mode.



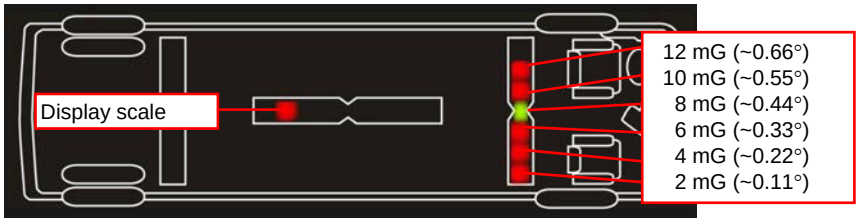
Park Brake Signal

Select if the signal to indicate activation of the park brake is either true high (+12v/24v) or true low (ground).



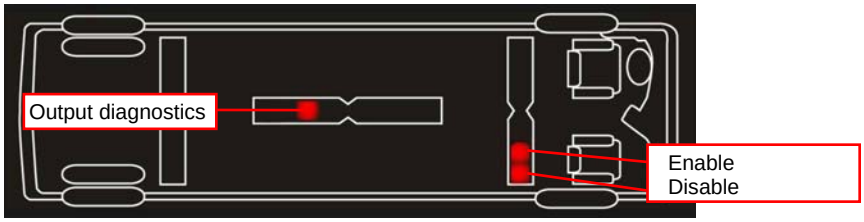
Display Scale

Select one of 6 display resolutions for indicating tilt. Each indicator (LED) will represent a change in tilt of the value chosen. For example, choosing ‘6 mG’ means that each LED will indicate 1/3 of a degree (this is the default).



Output Diagnostics

Select whether to enable the online (realtime) output diagnostics that will indicate a fault if an output has an open or short circuit when energized.

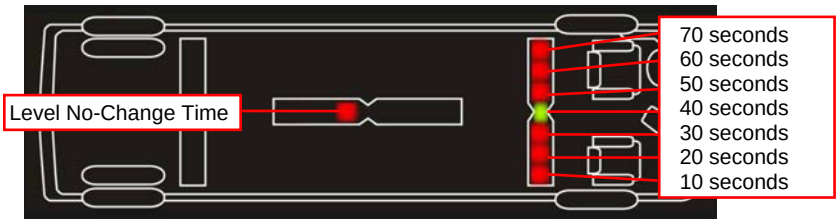


Level No-Change Time

If the leveling system detects no significant change in the tilt angle after this amount of time, it assumes that it cannot lower the coach any further and begins to raise any low corners to level the coach instead.

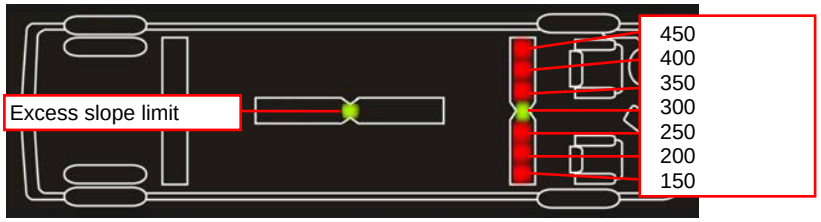
This parameter is only effective if you are using either of the following Auto Mode settings:

- Level at Height (Lower)
- Level then Lower



Excess Slope Limit

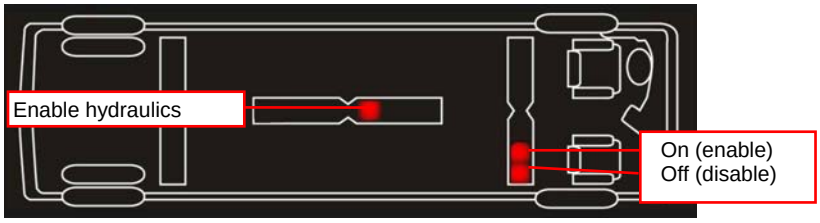
This value sets the threshold used to determine if the vehicle can be leveled based upon the attitude (at ride height) of the vehicle just prior to entering an automatic leveling mode. The value is a function of the angles measured by each sensor and takes into account the amount of slope on each axle as well as the longitudinal axis. A higher value will make the system less sensitive to vehicle slope.



Enable Hydraulics

Select whether to allow hydraulic leveling control, either manual or automatic. By default, this option is turned on.

Regardless of this setting, if a hydraulic control module is installed, it will operate autonomously (failsafe mode) and will also respond to system travel mode requests (e.g. to store the jacks).

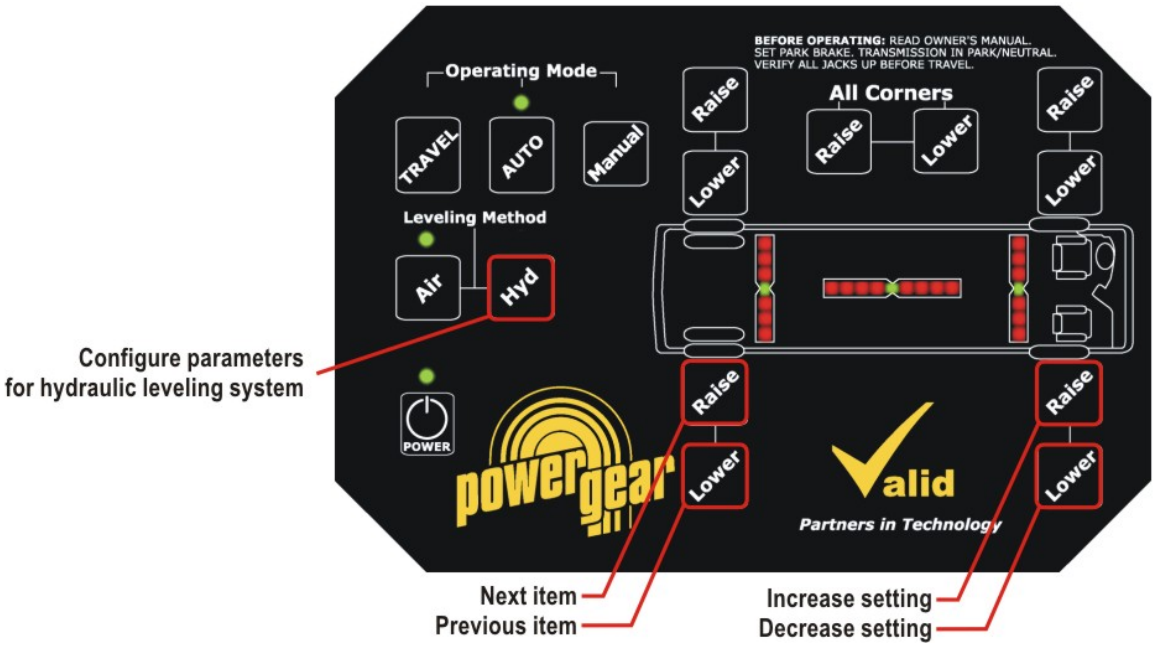


Hydraulic Configuration Parameters

Note: None of these settings will affect leveling operation if the Enable Hydraulics setting in the Air configuration options has been disabled (see Enable Hydraulics, on page 10).

To configure the hydraulic leveling parameters:

Enter service mode (see page 3) and press **HYD** to access the hydraulic leveling configuration settings.



To adjust settings while in configuration mode:

- Press Front Right **RAISE** to increase the setting.
- Press Front Right **LOWER** to decrease the setting.
- The settings for each item can be seen on the flashing indicator bar of the front axle level display.
- The system will exit configuration mode if you do not increase or decrease a setting after 30 seconds.

To select a different configuration item:

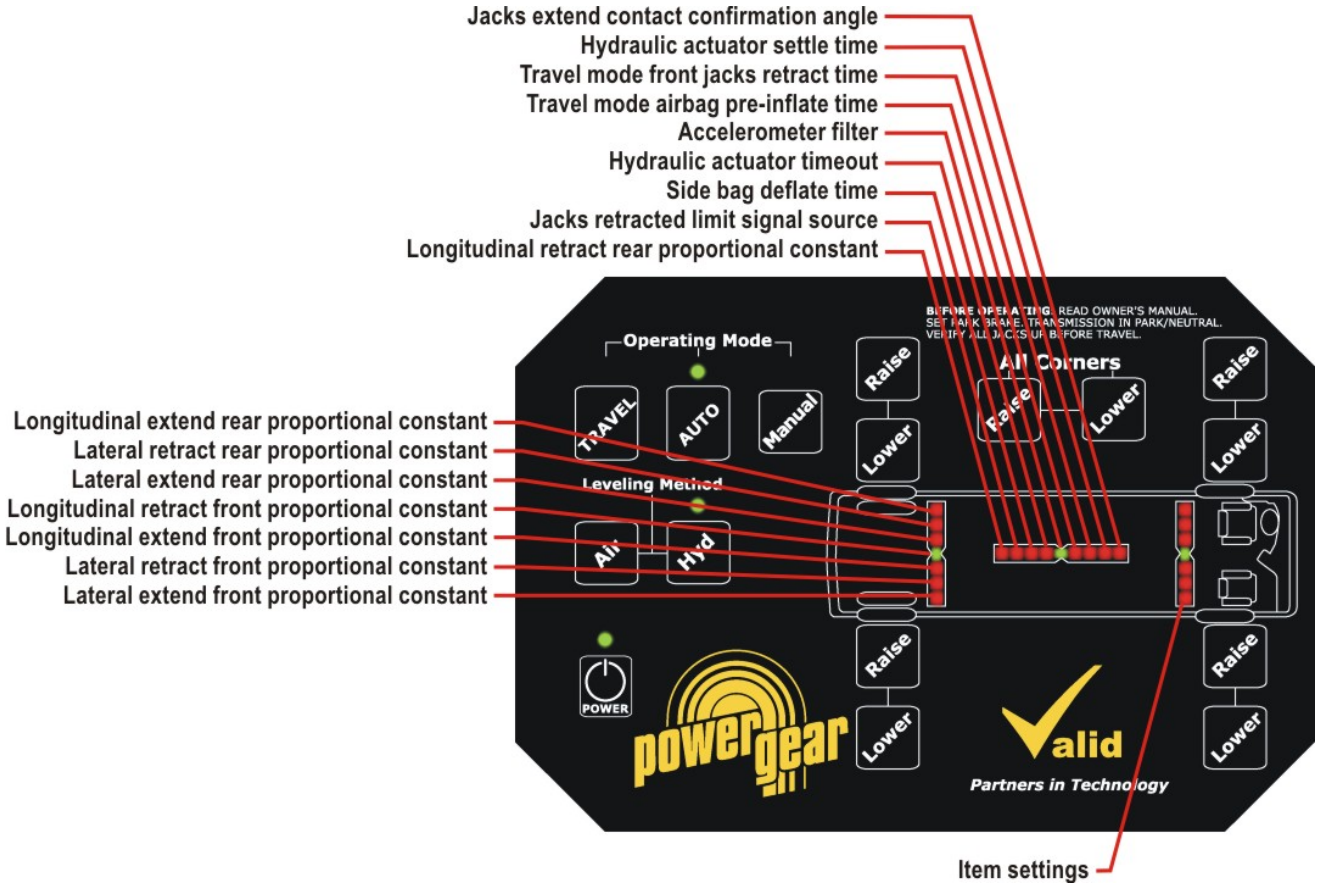
- Press Rear Right **RAISE** to advance to the next item.
- Press Rear Right **LOWER** to return to the previous item.
- The item you have selected is illuminated on the solid indicator bar of the rear axle level display.

To save your configuration settings:

Press **MANUAL**. This permanently stores the new configuration settings into EEPROM memory.

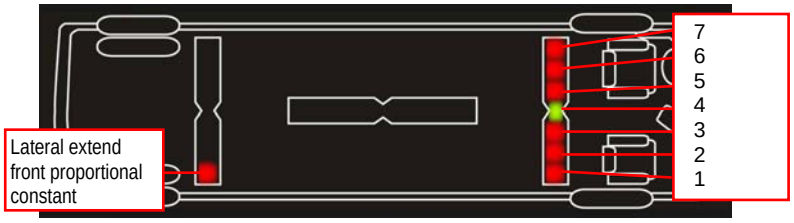
Note: If you change any values without saving them, they will be used temporarily until the system is reset or the battery is disconnected. Then the system will re-load the saved values from EEPROM memory.

See the following pages for details of all hydraulic configuration settings. If you do not make any adjustments, the parameter's default setting is used.



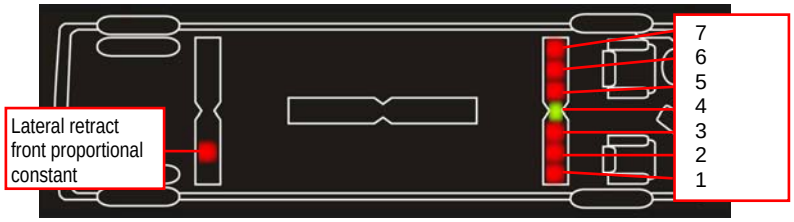
Lateral Extend Front Proportional Constant

This parameter sets the relative amount of coach roll that will occur over a known amount of time when one of the two front jacks extends.



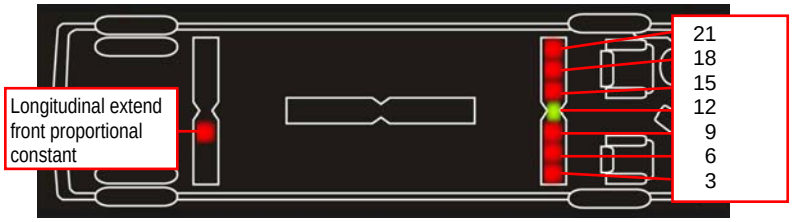
Lateral Retract Front Proportional Constant

This parameter determines the relative amount of coach roll that will occur over a known amount of time when one of the two front jacks retracts.



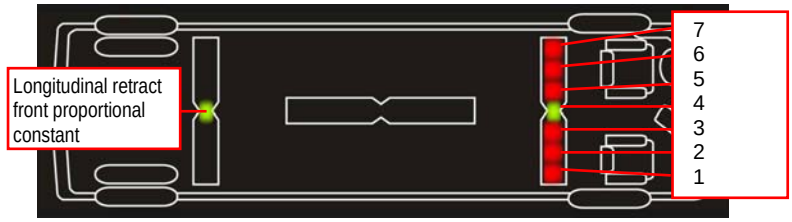
Longitudinal Extend Front Proportional Constant

This parameter sets the relative amount of coach pitch that will occur over a known amount of time when both front jacks extend.



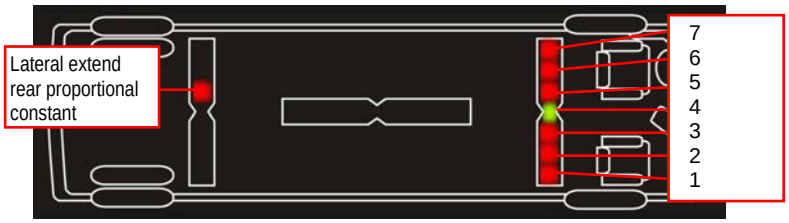
Longitudinal Retract Front Proportional Constant

This parameter determines the amount of coach pitch that will occur over a known amount of time when both front jacks retract.



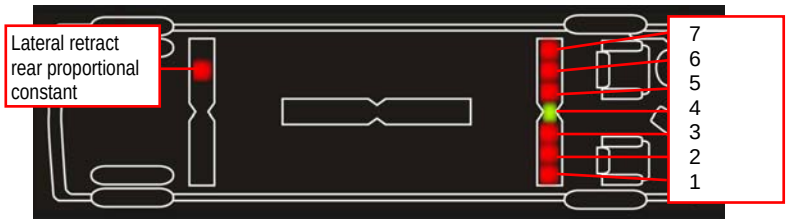
Lateral Extend Rear Proportional Constant

This parameter sets the relative amount of coach roll that will occur over a known amount of time when one of the two rear jacks extends.



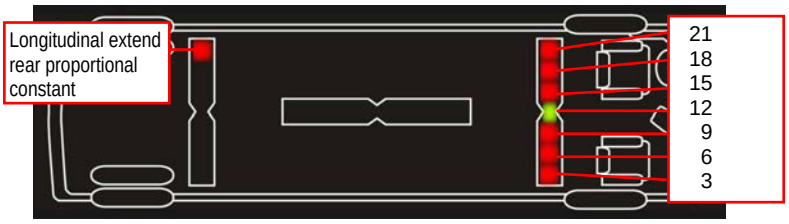
Lateral Retract Rear Proportional Constant

This parameter sets the relative amount of coach roll that will occur over a known amount of time when one of the two rear jacks retracts.



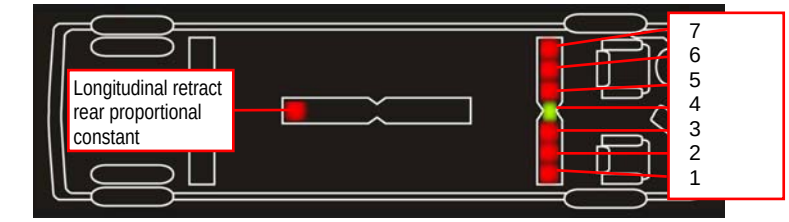
Longitudinal Extend Rear Proportional Constant

This parameter sets the relative amount of coach pitch that will occur over a known amount of time when both rear jacks extend.



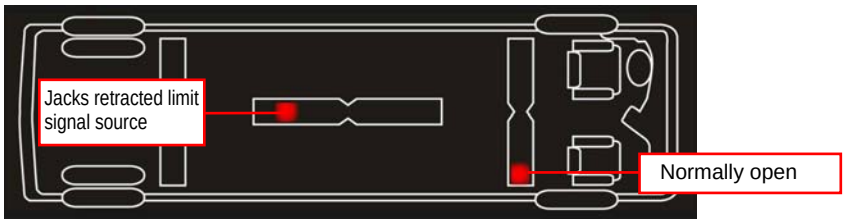
Longitudinal Retract Rear Proportional Constant

This parameter sets the relative amount of coach pitch that will occur over a known amount of time when both rear jacks retract.



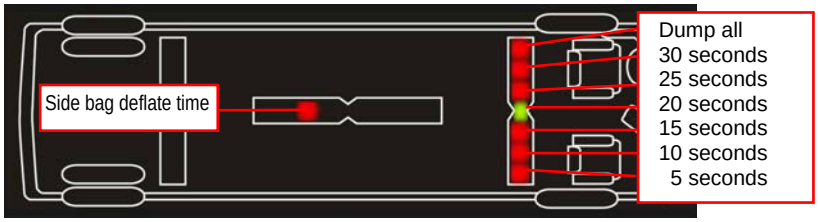
Jacks Retracted Limit Signal Source

This setting indicates that the retract pressure switch is normally open. Note that this parameter cannot be changed.



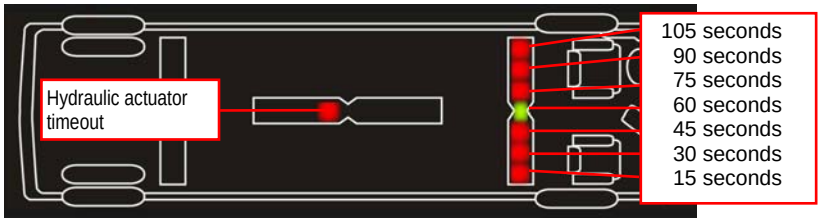
Side Bag Deflate Time

Select the number of seconds for the leveling system to deflate the air bags on a given side before the jacks on the opposite side extend. The top setting (Dump All) will dump all air for the Actuator time (set in the air section) at once, rather than one side at a time, prior to automatic hydraulic leveling.



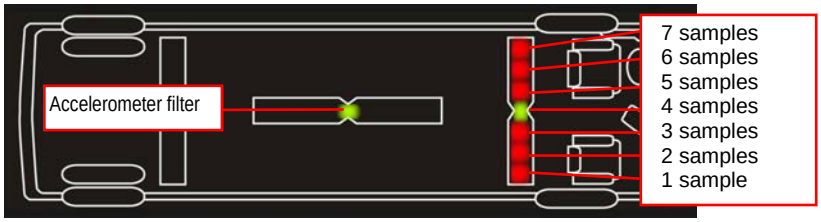
Hydraulic Actuator Timeout

This parameter indicates to the leveling system the maximum allowable time to extend one side's jacks to the ground during automatic leveling before causing a system fault.



Accelerometer Filter

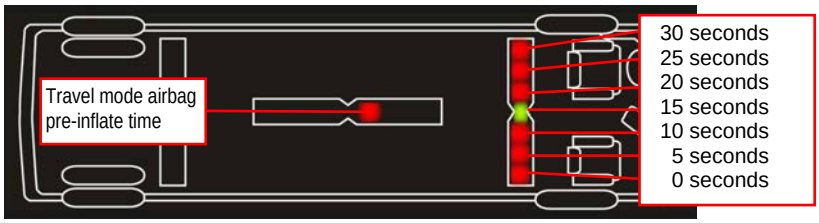
This setting tells the leveling system how much to filter the acceleration values that come from the accelerometer. A higher number makes the system less susceptible to sensing vibration but may introduce latency in measurement.



Travel Mode Airbag Pre-Inflate Time

This parameter indicates to the leveling system the amount of time to pre-charge the coach air bags prior to retracting the leveling jacks when putting the coach into travel mode.

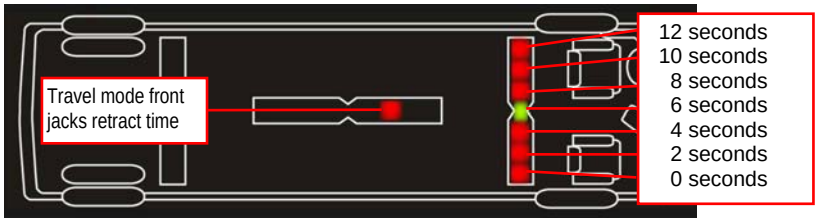
Note that the front jacks will begin to retract before the rear jacks if the setting for Travel Mode Front Jacks Retract Time (see following item) is anything other than 0 seconds.



Travel Mode Front Jacks Retract Time

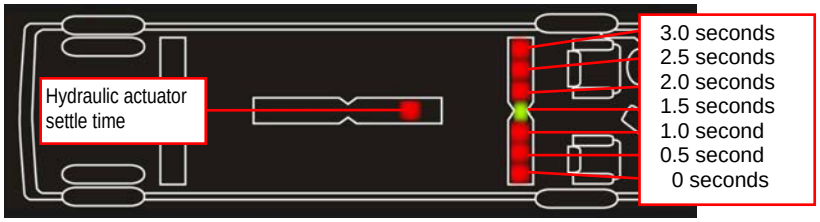
This parameter sets the amount of time to retract the front leveling jacks before starting to retract the rear jacks when putting the coach into travel mode.

As stated earlier, if the value for this setting is 0, all leveling jacks will retract together when going into travel mode. Otherwise, the front jacks will begin to retract first, followed by the rear jacks.



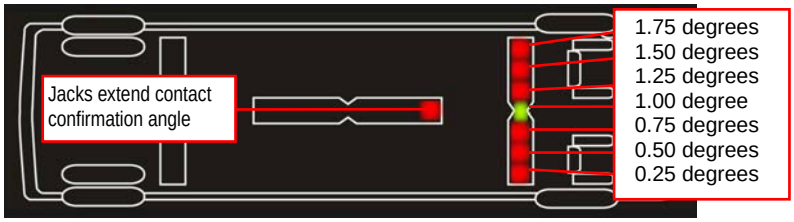
Hydraulic Actuator Settle Time

This indicates to the leveling system how long to let the coach settle between leveling corrections during automatic hydraulic leveling.



Jacks Extend Contact Confirmation Angle

This parameter regulates the amount by which to tilt the coach when contact is initially made with the ground during automatic hydraulic leveling.



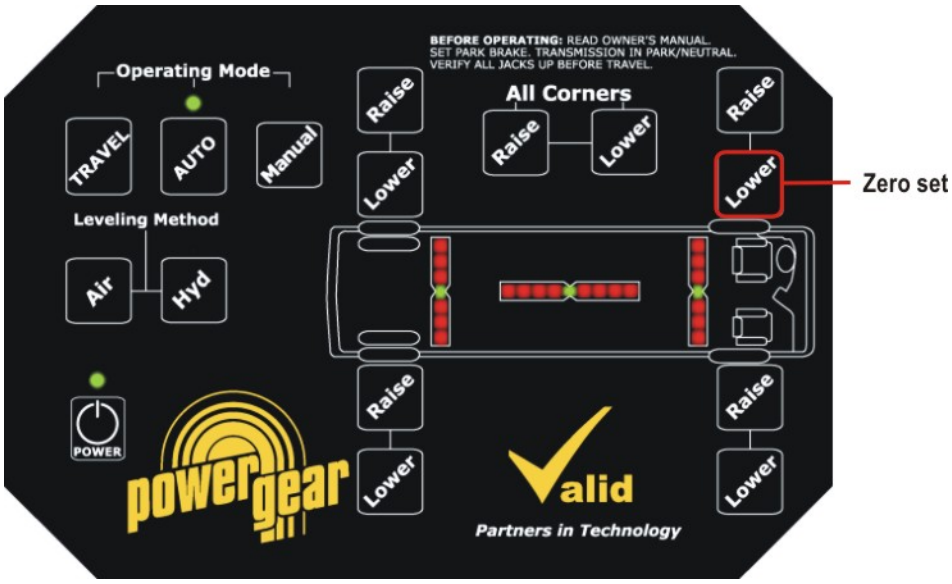
Zero Set

The Zero Set function resets the system's level reference to the current vehicle position. While it is necessary to do this step as part of the initial configuration of the leveling system, you may also perform this function any time you wish to re-zero the vehicle's level settings.

> **Note:** This procedure requires the use of at least one leveling tool (for example, a bubble-type level).

To set to zero:

1. Ensure that the vehicle is level and on a relatively flat and level surface.
2. Manually level the coach.
   - Note that the control panel's level display will not be accurate at this time, so use a leveling tool to determine where level is. You may wish to measure level in more than one place if you have several leveling tools. Otherwise, choose a key location in the coach such as a table or stove top.
   - To adjust the corners of the vehicle, press and hold **MANUAL**.
   - While holding **MANUAL**, press the appropriate **RAISE** or **LOWER** buttons to raise and/or lower corners.
3. Once the vehicle is manually leveled, go into service mode (see page 3) and press Front Left **LOWER** to select the Zero Set function. This tells the leveling system that the current position is to be considered level.



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