

VALID TRUELINE LEVELING

Service Manual

Air and Hydraulic Leveling Systems

PART# VTL05M001-SM

This manual does not cover V1 or Electronic Ride Height systems



Valid Manufacturing Ltd.
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FOR YOUR SAFETY

Read and understand the entire operator's manual before using or servicing your Trueline Leveling System.

Do not use the vehicle's suspension to support the vehicle for servicing or inspection. Instead, install adequate blocking before working under any vehicle.

Ensure that the area around the vehicle is clear of obstructions before operating the leveling system.

Your Trueline Leveling System should be serviced only by qualified personnel.

Note: Leaks in a vehicle's air system can cause the vehicle to lower over time regardless of whether the Trueline Leveling System is operational.

INTRODUCTION

Using the latest accelerometer technology, the Valid Trueline Leveling System is able to provide exceptional leveling control. By measuring the amount of gravitational pull on the two mounted sensors, it is able to determine the amount of tilt that is being applied to the vehicle.

Each of the fully sealed leveling sensors is capable of very accurately measuring acceleration/tilt in two directions. The rear sensor measures across the rear axle as well as along the longitudinal axis of the vehicle, while the front sensor measures across the front axle of the vehicle and also any vertical acceleration that the vehicle may feel. In combination air and hydraulic leveling systems, there will also be a third module that provides only inputs and outputs; no position sensing.



Figure 1, Leveling Sensor

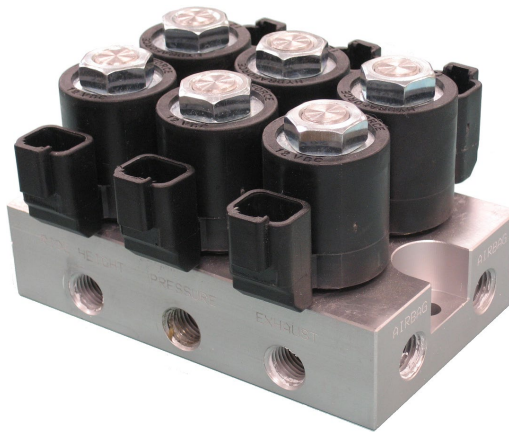


Figure 2, Valve Manifold

There are two valve manifolds that act on the information provided by the sensors. The manifolds control the air supplied to the air bags to raise or lower the vehicle, or else allow the vehicle's ride height valve to take control when the vehicle is moving at relatively higher speeds. (That is, higher than the Travel mode speed limit set in the initial system configuration, typically 10 mph).

Systems equipped with the tag lift option will include an additional 4 valve manifold. This manifold controls the raise and lower pneumatics of the tag axle as well as air supply to the air bags in conjunction with the 6 valve manifold.

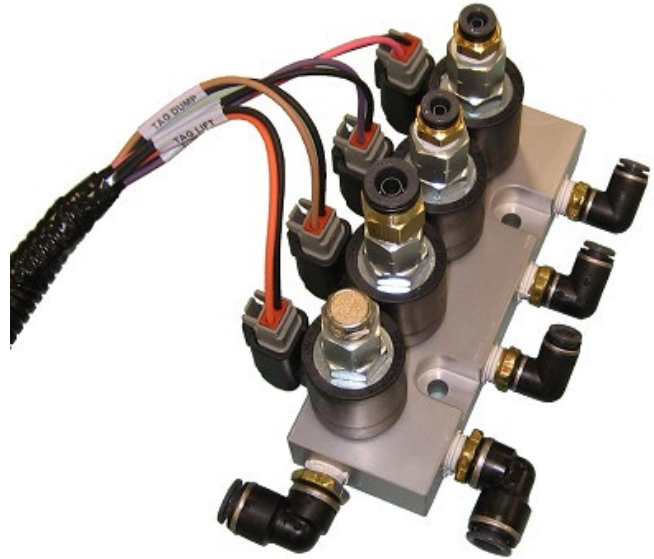


Figure 3, Tag Lift Manifold

The level controller (keypad) is the interface between the vehicle operator and the Trueline Leveling System. It allows the operator to enter commands and provides visual feedback of the vehicle's current status.

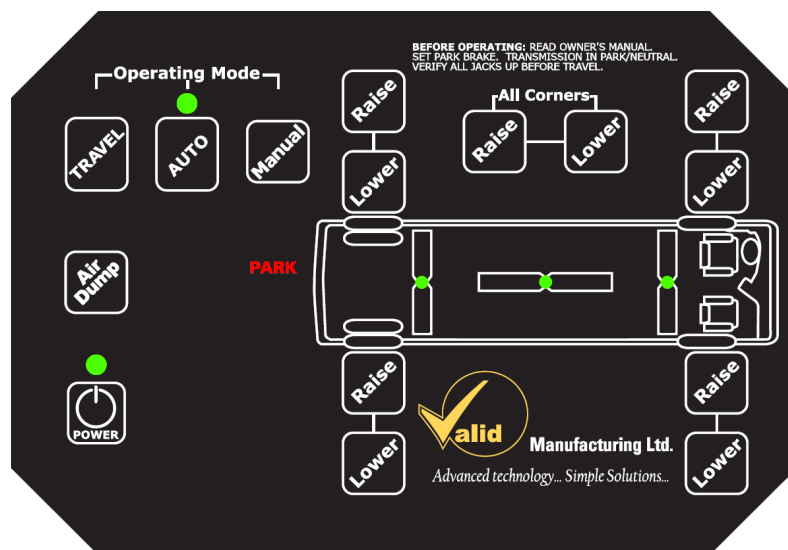


Figure 4, Level controller (keypad)

Keypads may include an air dump button (shown), tag lift button, air button and / or hydraulic button.

OPERATION

To activate any operational mode, the Trueline Leveling System must first be turned on by pressing and releasing POWER. Some systems will automatically turn on and off with the ignition key. There are three main operating modes of the Trueline Leveling System:

Auto Level Mode

This mode will automatically level your coach to your preset 'zero' point, and maintain that position during 'All Corners Raise' and 'All Corners Lower' operations. The system will also automatically wake up at preset interval (usually 2 hours) and re-level the coach if required.

Depending on the Auto Mode setting of your leveling system (in the initial configuration), when the vehicle has been put into Auto mode, it will go through one of the following procedures:

Level then lower

In the rear and then the front, the leveling system detects the lowest side and lowers the higher side to match. When the two ends are level, the system then lowers the higher end to the height of the lower end. Next, the vehicle continues to lower, and then is leveled by the system.

If hydraulic control is enabled, the vehicle is leveled with hydraulic jacks after having been lowered with the air system.

Level at height (raise)

The leveling system detects the highest corner of the vehicle, and then levels the remaining corners to it.

Level at height (lower)

The leveling system detects the lowest corner of the vehicle, and then lowers the remaining corners to match 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.

Lower then level

The leveling system releases all the air out of the airbags. It then detects the highest corner of the vehicle and raises the other three to that height. Finally, it levels the vehicle.

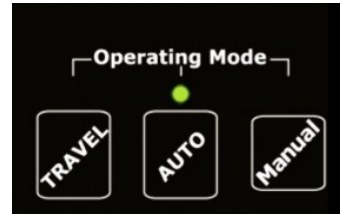


Figure 5, Level mode indicators

Raise to level

This procedure uses hydraulic jacks, and it will raise the lowest corner to level, and then raise/lower the other three corners. Then it will level the vehicle.

Manual Level Mode

Manual mode allows you to raise or lower each corner of the vehicle individually. This mode lets you have control over the vehicle position, within the limit of twist set in the configuration.

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 recommended that the operator enter this mode and inspect the vehicle's ride height before the vehicle begins moving. The leveling system can only be switched to travel mode if the ignition is turned on.

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.

Warning: It is always recommended that the vehicle height be checked after entering travel mode and before driving to ensure the vehicle is raised high enough to safely do so. Failure to reach adequate ride height before travelling may result in personal injury and / or vehicle damage.
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UNDERSTANDING THE KEYPAD

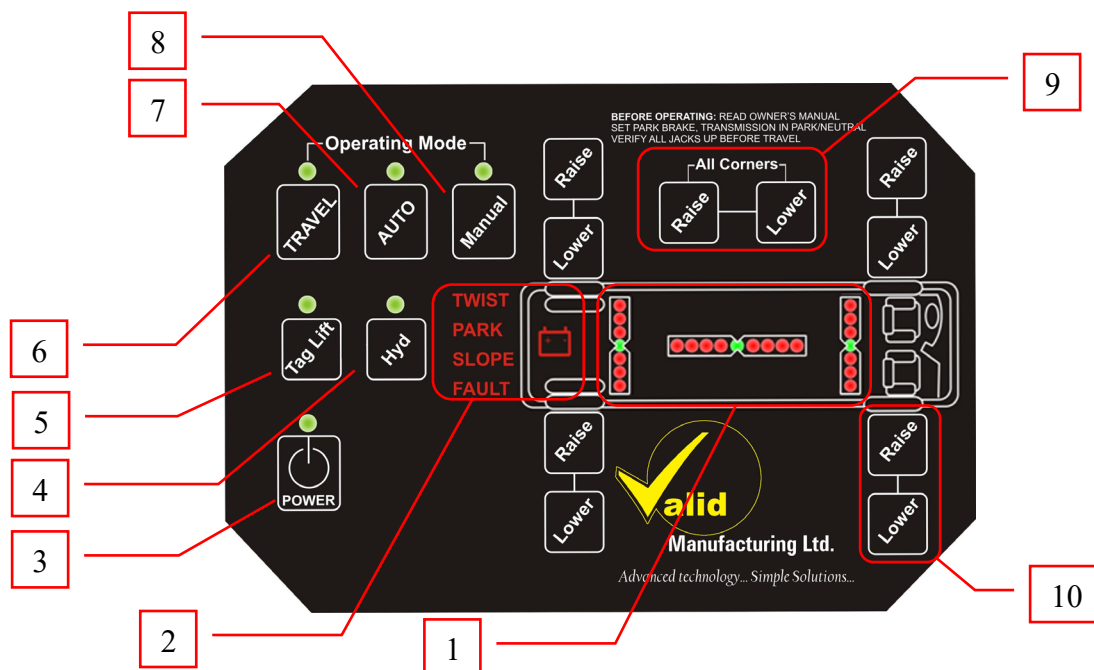
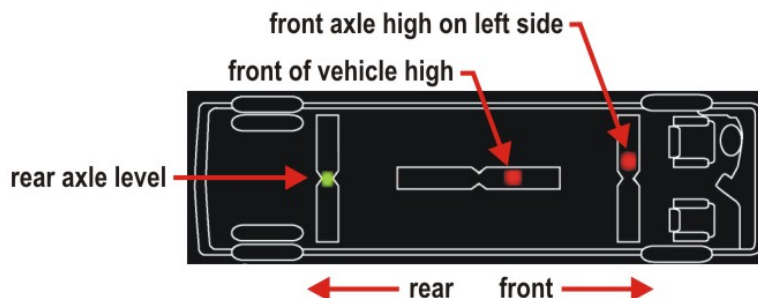


Figure 6

1 - Leveling Display

In each mode, the three level indication displays can be viewed in the same manner 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.



In Travel mode, the displays no longer show whether the coach is level, but rather measured acceleration as the vehicle moves, stops and corners. Sitting still or moving in a straight line at a steady speed will result in 3 green lights being shown, but this does not mean the coach is level, just that it is not accelerating (or decelerating) in any direction. On some systems the leveling display is turned off in travel mode.

2 - Status Indicators

Many of the indicators on the keypad have different meanings dependant on their illuminated state, i.e., whether or not the lamps are flashing, winking, or lit solidly.

Battery Light

The **BATTERY** light will indicate if system voltage drops below 10.5VDC, but will not prevent the system from operating. Note that system may not function correctly at less than 10.5 volts.

Twist Light

The **TWIST** light illuminates in manual mode only, when the amount of twist detected by the sensors exceeds the limit set in the configuration. For safety, the system will then not allow the manual adjustment of any corner in a direction that would increase the amount of twist in the coach.

To override the twist limit, press and hold the **MANUAL** button while adjusting each corner. By overriding the twist limit the operator is responsible for ensuring that such movements will not damage the coach.

Park Light

The **PARK** light is an input from the vehicle's parking brake, and for normal leveling operation must be lit steady. The **PARK** light will flash if the park brake is set and the transmission is not in neutral.

Note: System will not enter **AUTO** mode if **PARK** is not on steady.

Slope Light

If the system is unable to level, the **SLOPE** indicator will light solid, indicating that the vehicle must be moved to a more level surface. The slope indicator may flash for 20-seconds after pressing **AUTO** and then remain in Travel mode. This indicates that the vehicle should probably be moved to a more level surface. However, while the slope indicator is flashing, you may press **AUTO** again to bypass the slope warning and begin the auto level cycle. It should be noted that there is no guarantee that level will be achieved in this situation.

Fault Light

Warning: If the **FAULT** light is illuminated, this may indicate that the suspension is inoperative. **DO NOT DRIVE** the vehicle until it has been determined to be safe to do so by a qualified technician.

(Solid) If there is a fault in the system, the **FAULT** indicator light will illuminate along with one or more indicators in any one of the level displays.

(Flashing) Force Mode or Soft Fault.

Force Mode

Force mode is a special mode on some leveling systems that allows the operator to manually turn on or off pneumatic valve outputs. These outputs will remain in this state until force mode is exited. It is not possible to control hydraulic valves in this mode.

Note: Force mode has been discontinued in all current firmware versions.

Soft Faults

When a soft fault occurs the keypad will beep 3 times and flash the fault indicator with no further indication of the fault shown in the leveling displays. A soft fault differs from a normal fault in that a soft fault is able to be handled internally with minimal impact to the system.

Note: Force mode and soft fault mode do NOT exist in the same system. A system that contains the force mode feature does not also display the soft fault feature, and vice versa.

See diagnostics section for guidance troubleshooting all fault indications.

3 – Power Button

(Solid) Power on, Ignition on.

(Winking) Power on, but Ignition off; system will not enter Auto mode.

(Slow Blink) Low Power Mode; Auto leveling complete and system has gone to 'sleep'.

The **POWER** button is used for turning the keypad on and off. On some systems the keypad may not be turned off when the ignition is on.

4 – Hydraulic Button

This button will not be present in 'air only' or 'hydraulic only' leveling systems.

(Solid) Hydraulic Leveling mode selected.

(Flashing with Travel) Jacks are Retracting.

In combination air and hydraulic leveling systems, the **HYD** button is used to select Hydraulic mode for automatic or manual leveling operations.

5 – Air Dump / Tag Lift / Air Button

Air Dump Button

Lamp may or may not illuminate when pressed.

The **AIR DUMP** button is used to lower the coach in either Auto or Manual air leveling modes. In Auto mode, level is maintained as coach is lowered. In Manual mode, air is exhausted from all bags simultaneously, regardless of whether the vehicle is level. It will not, however, exceed the twist limit.

Tag Lift Button

(Slow Blink) 2 minute delay after ignition on; tag will not lift in this mode.

(Solid) Tag lift is disabled (lowered), but will re-enable (raise) when speed is decreased to less than 10 mph.

(Fast Blink) Tag axle lift enabled.

The **TAG LIFT** button is used to raise the tag axle in travel mode, at speeds less than the preset speed limit, to increase traction and improve turning ability at low speeds.

Air Button

(Solid) in Air and Hydraulic systems, Air leveling mode selected.

In combination air and hydraulic leveling systems, the **AIR** button is used to select air mode for automatic or manual leveling operations.

6 – Travel Button

(Solid) Vehicle is in travel mode.

(Flashing with HYD) Jacks are retracting.

The **TRAVEL** button is used to place the coach in travel mode for any occasion the coach is to be driven. The leveling system will also automatically enter Travel mode any time the vehicle speed exceeds the preset speed limit (10mph by default), if the park brake is released with the ignition on and the hydraulic jacks lowered, or if the vehicle is put in gear with the hydraulic jacks lowered.

Warning: It is always recommended that the vehicle height be checked after entering Travel mode and before driving to ensure the vehicle is raised high enough to safely do so. Failure to reach adequate ride height before travelling may result in personal injury and / or vehicle damage.
--

7 – Auto Button

(Solid) Leveling cycle is complete.

(Flashing) Leveling cycle is in progress.

(Slow Blink) Low Power Mode; Auto leveling complete and system has gone to 'sleep'.

(Alternating with Manual) Entering service mode.

The **AUTO** button is used to initiate an auto leveling cycle, or re-level cycle if the keypad is in 'sleep' mode.

8 – Manual Button

(Solid) Leveling system is in Manual mode.

(With warning Tone) Vehicle speed has exceeded 2 MPH.

(Alternating with Auto) Entering service mode.

Manual mode gives the operator independent control of each corner of the coach, within the boundaries set by the twist limits and suspension travel, by the use of each raise and lower button (item 10) for each corner of the coach. In air mode, the operator may also move the coach at speeds less than the preset speed limit (10mph by default) to help negotiate obstacles, rough terrain or low overhangs.

9 – ‘All Corners’ Raise and Lower

The **ALL CORNERS** buttons have no lamps associated to them.

In Auto mode, the **ALL CORNERS RAISE** and **ALL CORNERS LOWER** buttons allow the operator to adjust the entry height of the vehicle, while maintaining level.

In Manual mode, All Corners Raise and All Corners Lower provide bulk raise and lower functions of the entire coach, but do not guarantee the vehicle will move evenly. Also, if held for 3 seconds, the **ALL CORNERS RAISE** button will ‘latch on’ for a period of one minute while sounding a periodic tone. To stop this feature, press the **MANUAL** button.

10 – Raise and Lower Buttons – Each Corner

The **RAISE** and **LOWER** buttons have no lamps associated to them.

In Auto mode these buttons have no function.

In Manual mode, these buttons are used to raise and lower each respective corner. See ‘8 – Manual Button’ above.

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.

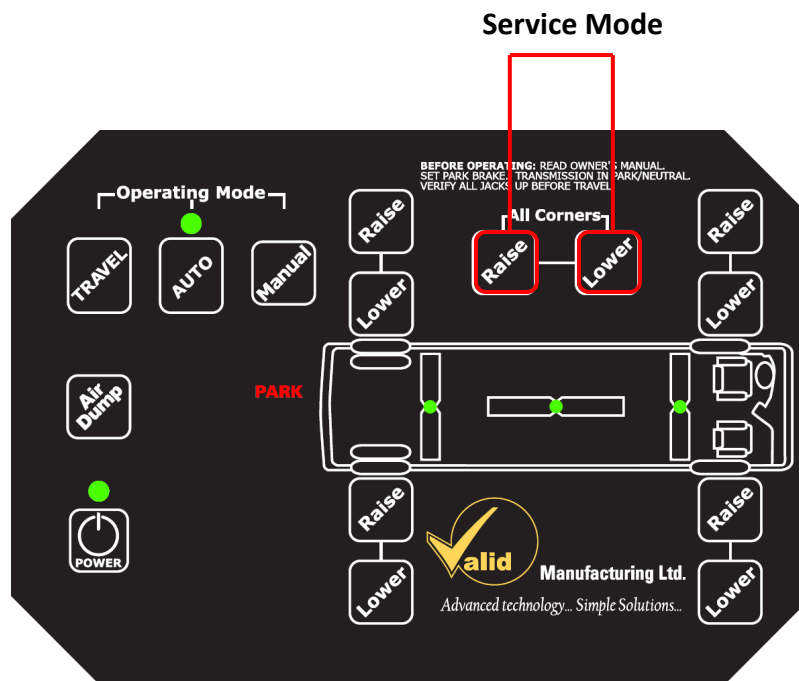


Figure 7

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

1. Set Orientation – ‘finding’ and defining the sensors, front and rear (*Only applies to systems with universal sensors*)
2. Set configuration – air and hydraulic leveling parameters (*Configuration items are factory set and should not normally require adjustment*)
3. Zero Set

Set Orientation

In systems where the front and rear sensors are the same part number, a ‘Set Orientation’ is required to automatically identify the **vertically** mounted front sensor and **horizontally** mounted rear sensor.

The ignition should be on with the engine running and the park brake set. The controller should be on; if not, press **POWER** to turn it on.

1. In preparation for accessing service mode, the controller must be in ‘power-on’ mode. Press the **POWER** button **twice** to cycle the power or press once to turn the keypad on if it is off.
2. To enter service mode, 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.

Note: If a button is not subsequently pressed within 5 seconds, the keypad will automatically exit service mode.

3. Momentarily press the **FRONT LEFT RAISE** button to set orientation. After a few seconds it will beep to indicate completion and automatically exit service mode.

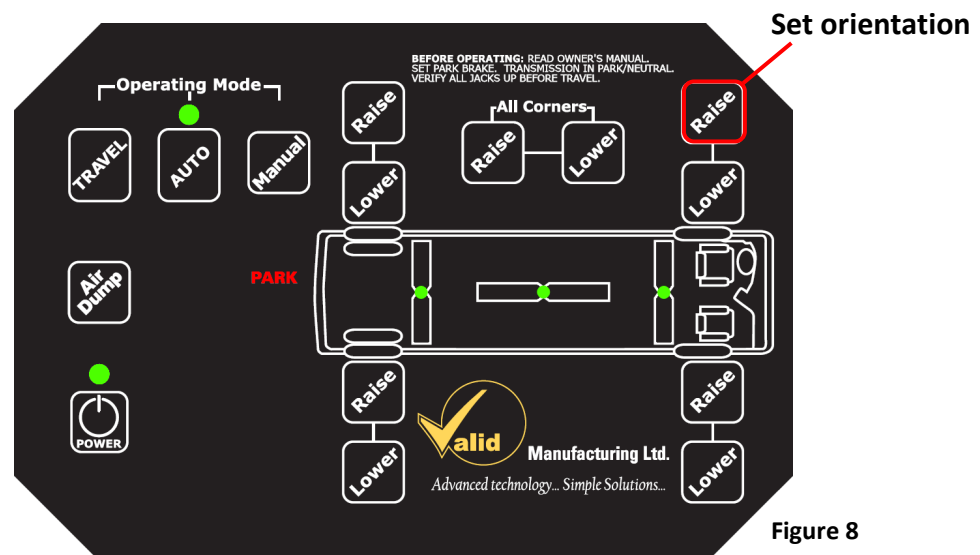


Figure 8

Set Configuration

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

1. Air leveling parameters

Hydraulic leveling parameters

To configure the air leveling parameters:

Enter service mode (see page 16) and press the button indicated below (may be "Tag Lift", "Air Dump", or "Air") to access the air leveling configuration settings.

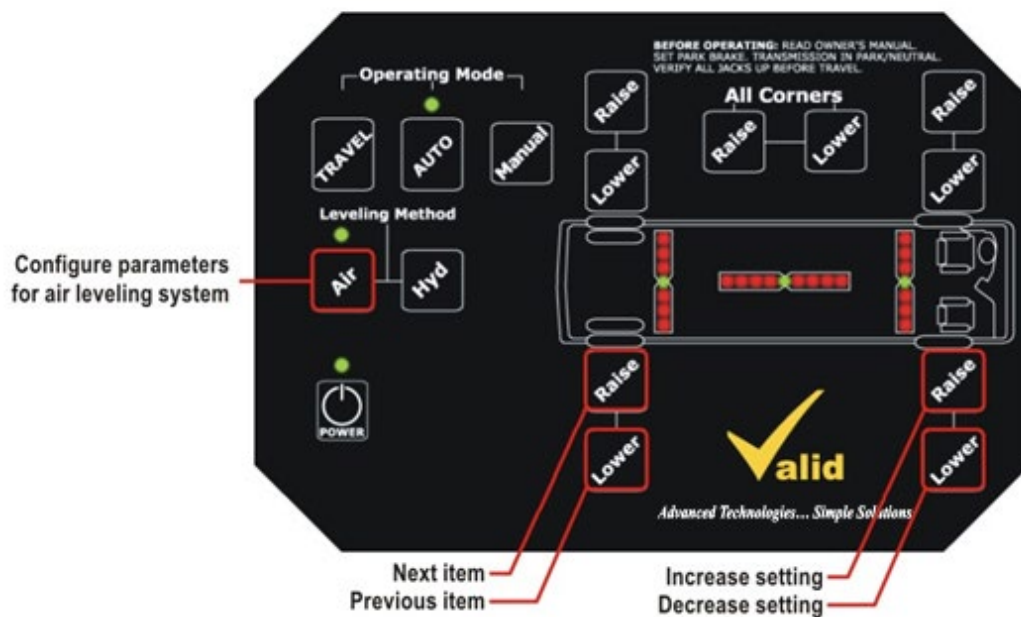


Figure 9

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:

1. 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

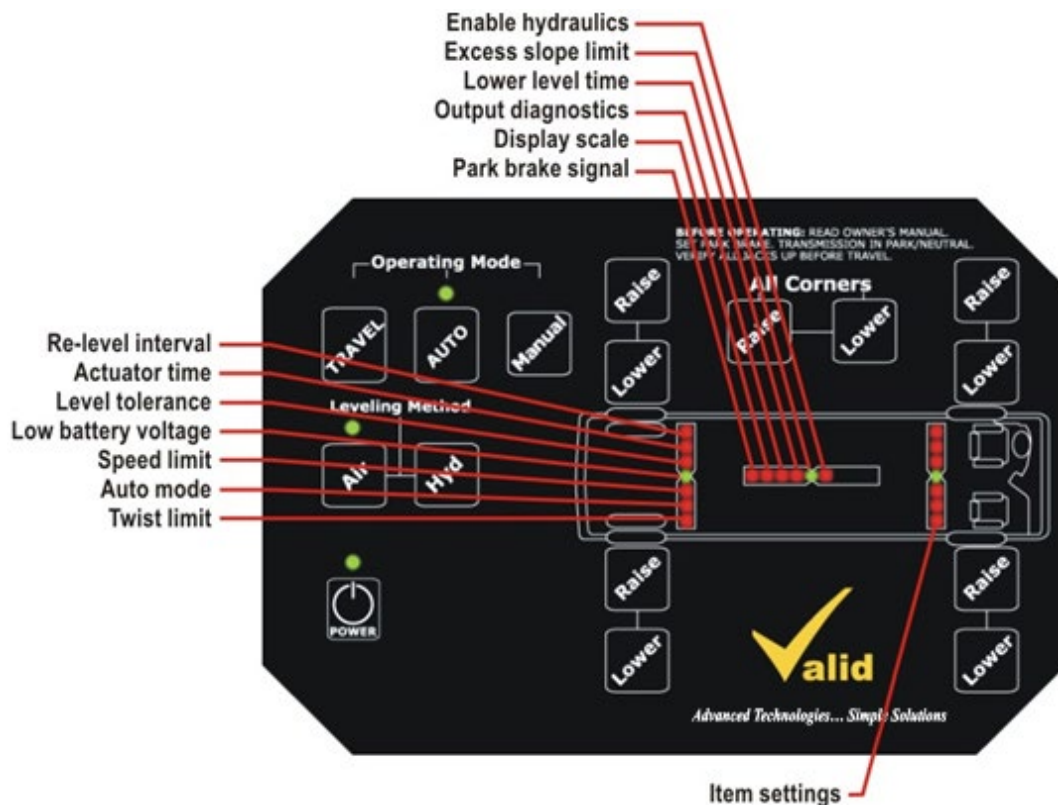
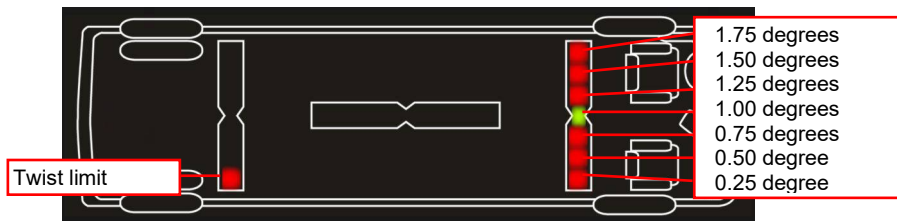


Figure 10

Twist Limit

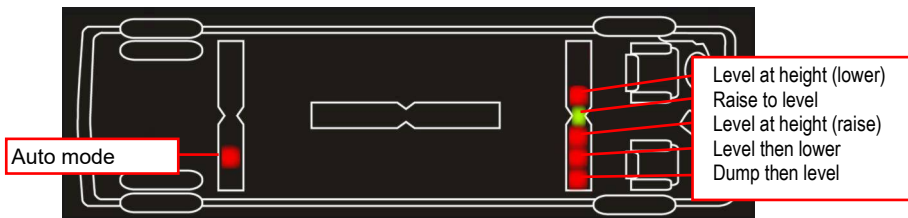
Select one of seven twist limits to be applied during manual operation of the system. This is the maximum twist allowed between the front and rear sensors before manual control is restricted.



Auto Mode

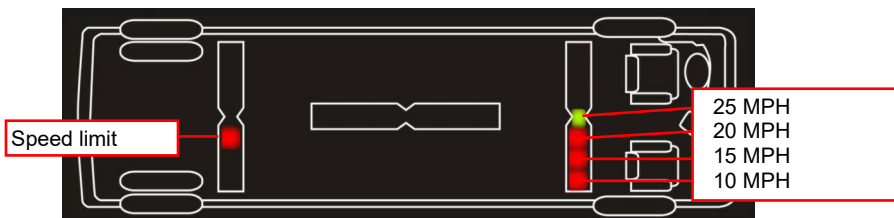
Select one of five leveling options for automatic mode. See the Operation instructions for descriptions of how each of these leveling methods works.

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 23.



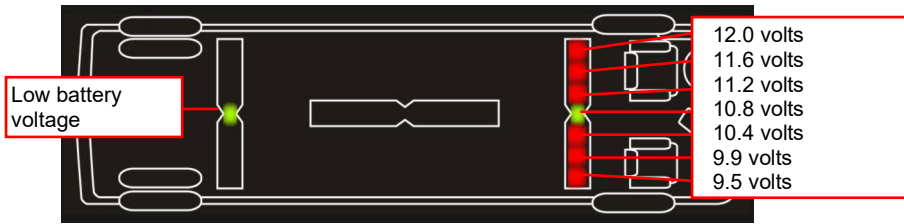
Speed Limit

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



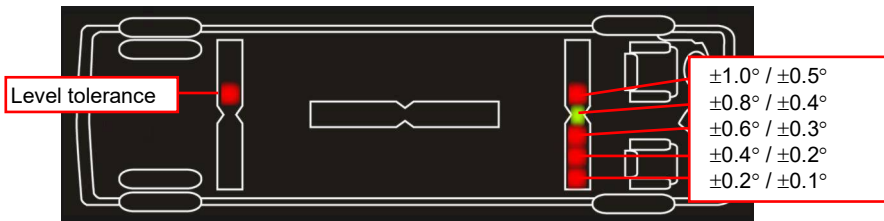
Low Battery Voltage

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.



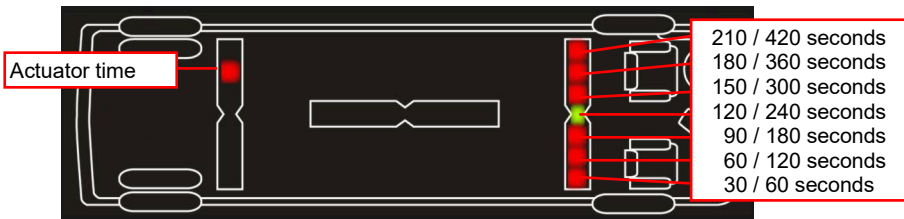
Level Tolerance

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

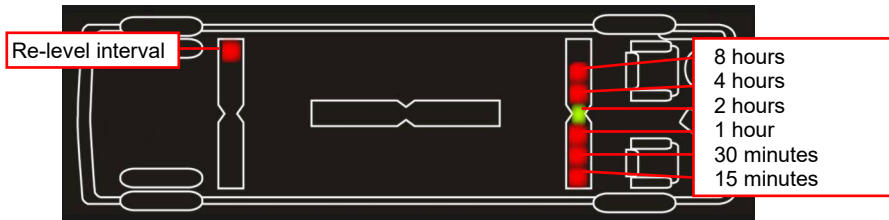
Select one of seven actuator lower/raise time limits (maximum amount of time required to lower and raise an air spring). Choose the lowest setting that allows for complete movement in each air spring.



Re-level Interval

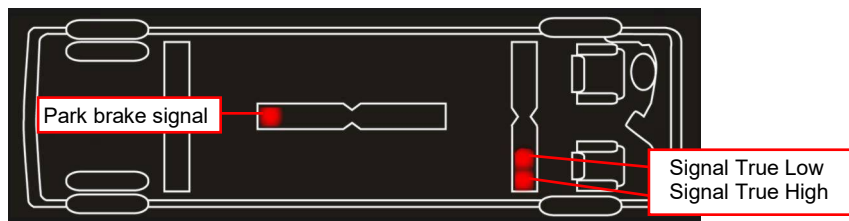
Select one of six values which sets the time between 're-checks' for a level state while the system is in Auto mode.

Note: Some coaches are also equipped with a 'never' value for re-check time. They will not re-check once the initial level is achieved.



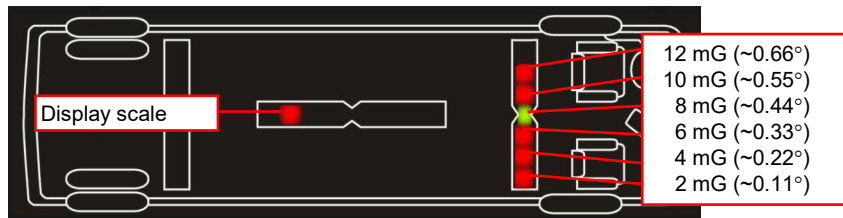
Park Brake Signal

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



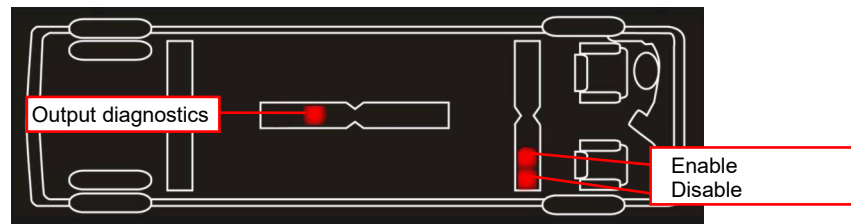
Display Scale

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 real-time output diagnostics that will indicate a fault if an output has an open or short circuit when energized.



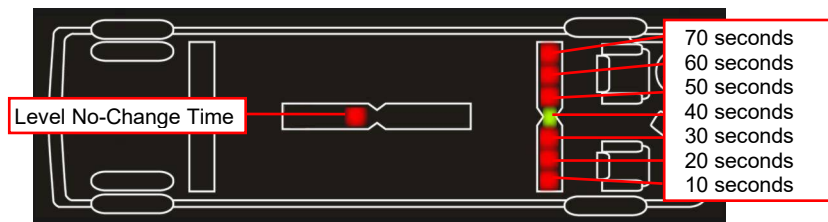
Level No-Change Time

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:

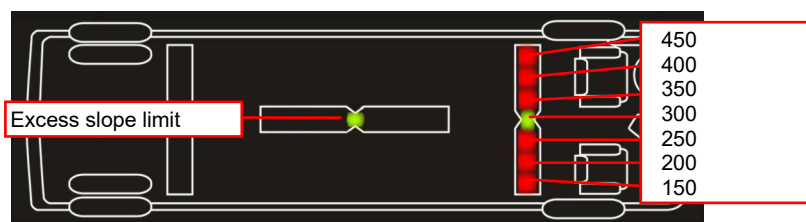
Level at Height (Lower)

Level then Lower



Excess Slope Limit

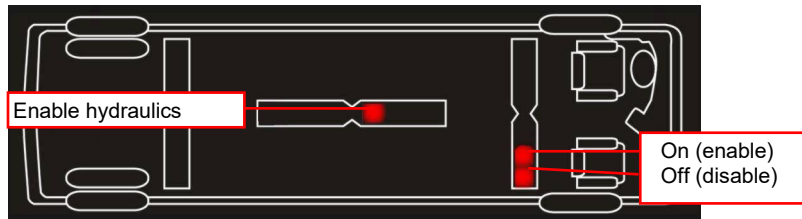
This value sets the threshold used to determine if the vehicle can be leveled based upon the attitude (at ride height) of the vehicle just prior to entering an automatic leveling mode. The value is a function of the angles measured by each sensor and takes into account the amount of slope on each axle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



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. Press MANUAL to save.

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 24).

To configure the hydraulic leveling parameters:

Enter service mode (see page 16) and press **HYD** to access the hydraulic leveling configuration settings.

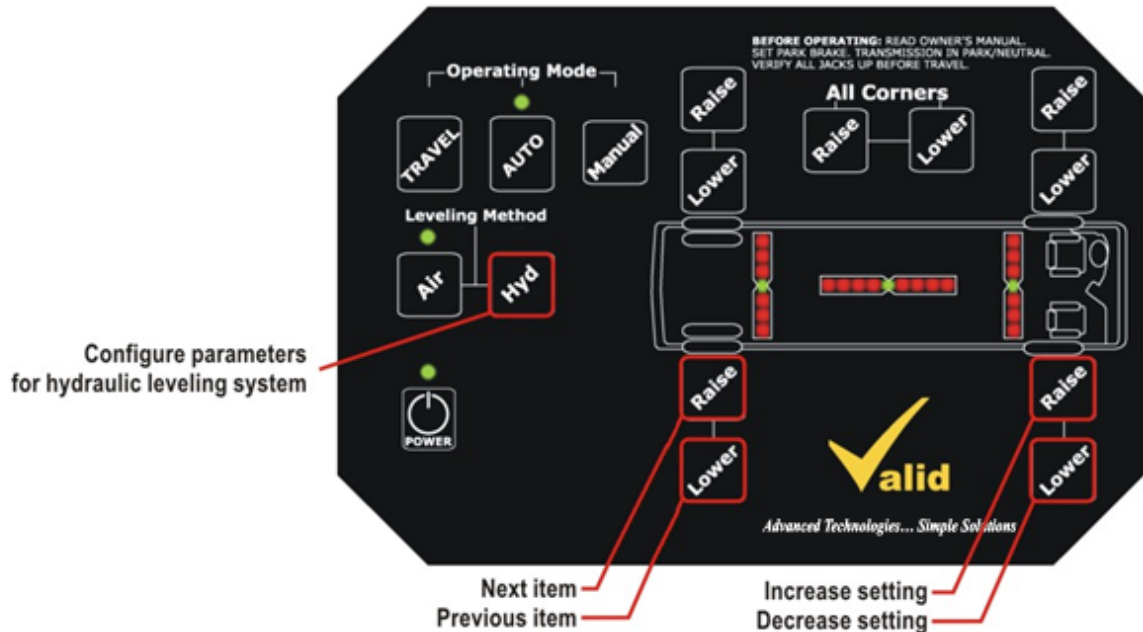


Figure 11

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.

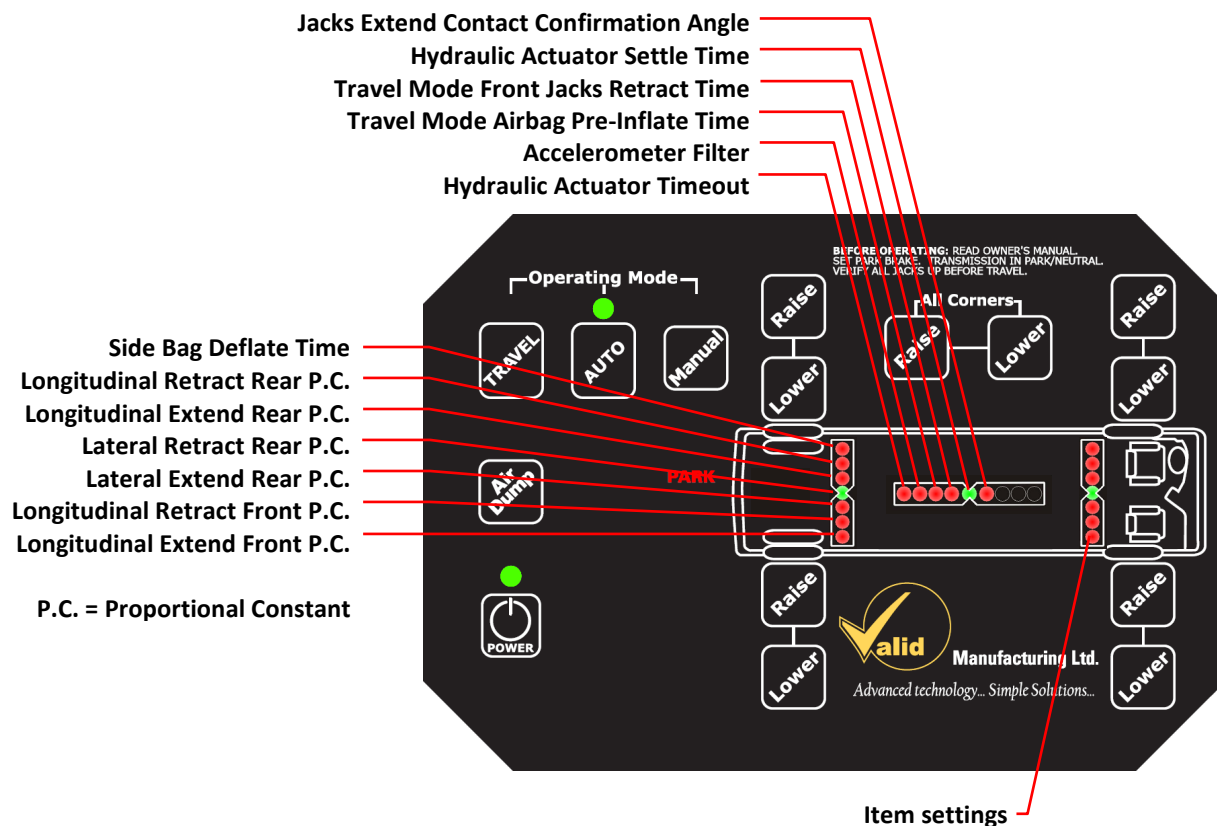
The item you have selected is illuminated on the solid indicator bar of the rear axle level display.

To save your configuration settings:

1. 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. Press **MANUAL** to save.

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.



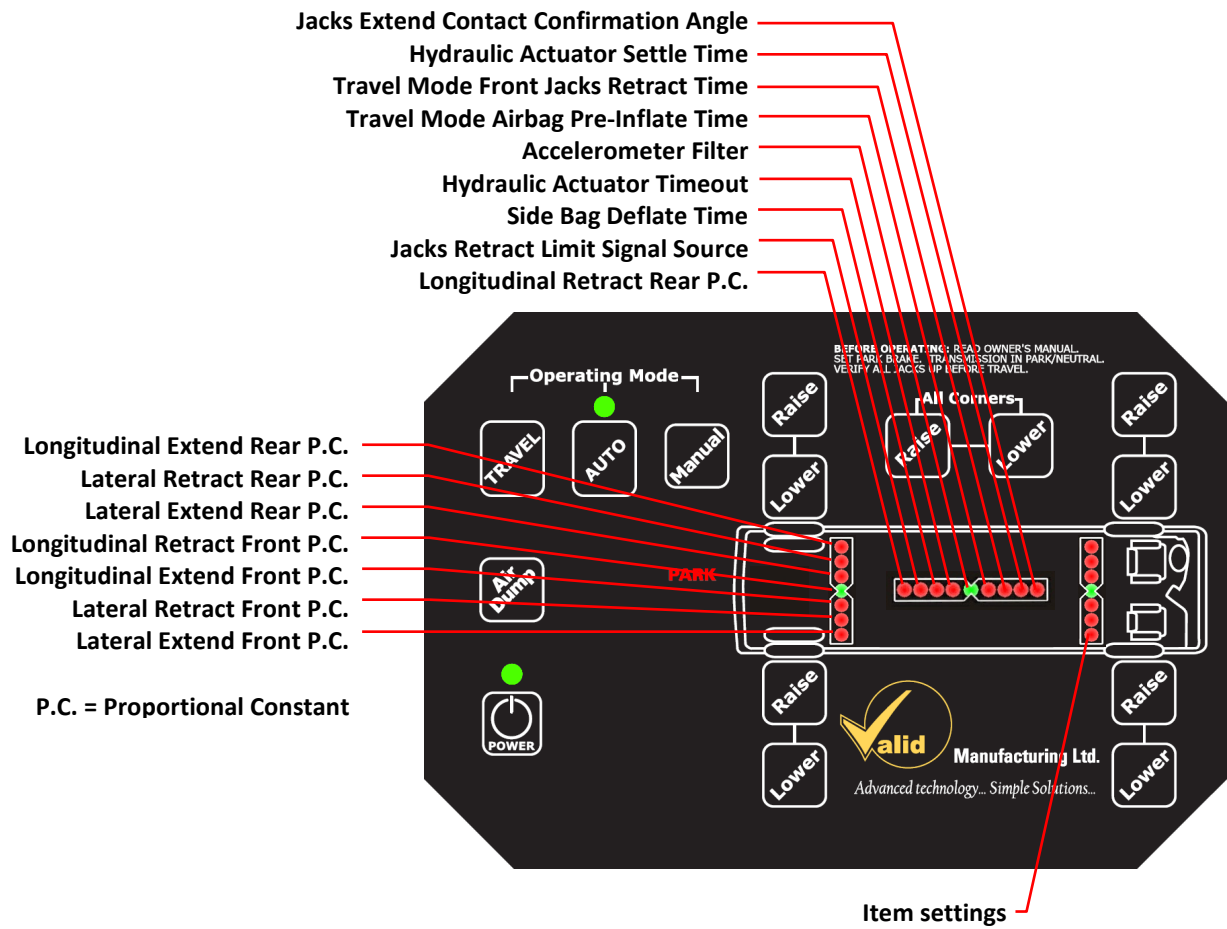
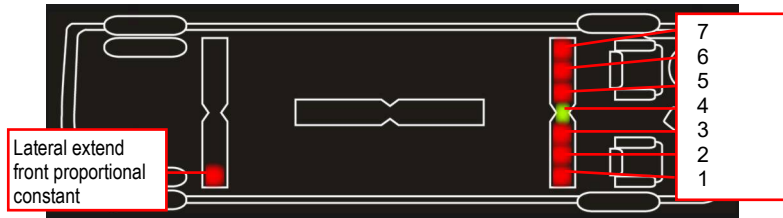


Figure 13 – 4 Jack systems

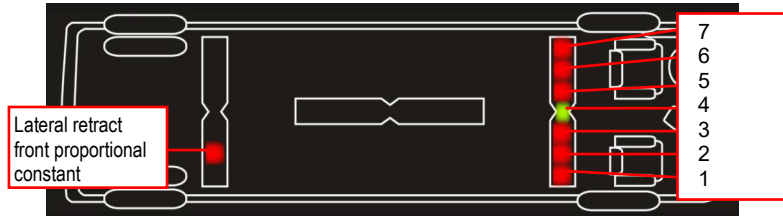
Lateral Extend Front Proportional Constant

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.



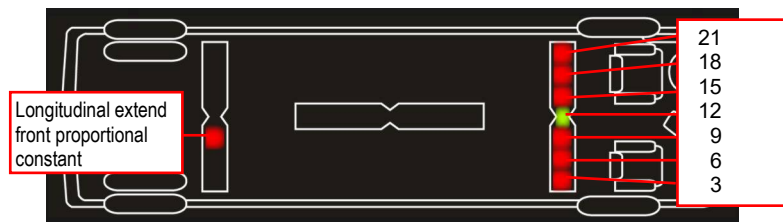
Lateral Retract Front Proportional Constant

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.



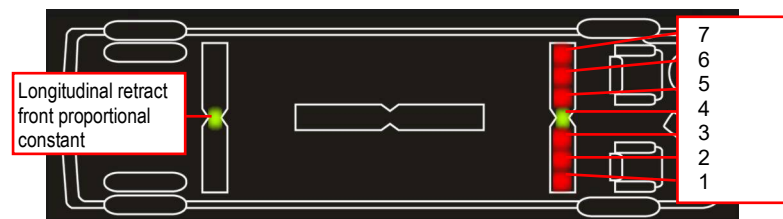
Longitudinal Extend Front Proportional Constant

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



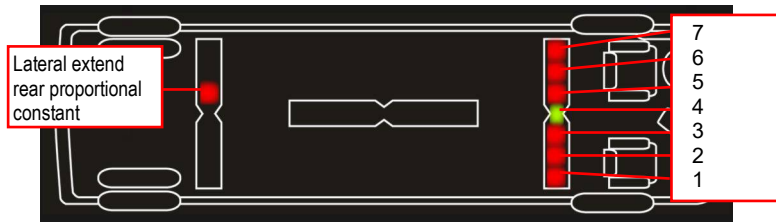
Longitudinal Retract Front Proportional Constant

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



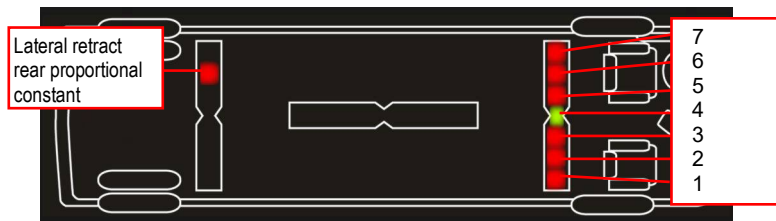
Lateral Extend Rear Proportional Constant

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.



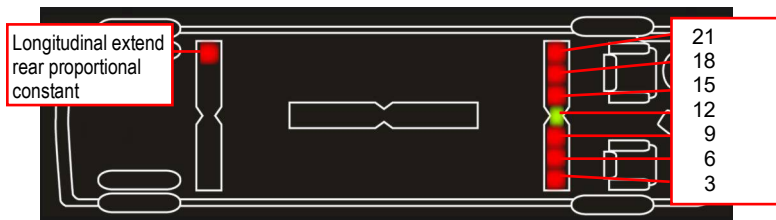
Lateral Retract Rear Proportional Constant

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.



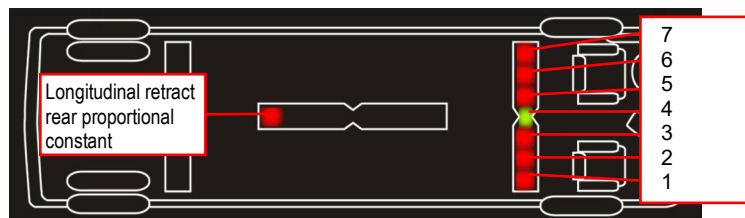
Longitudinal Extend Rear Proportional Constant

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



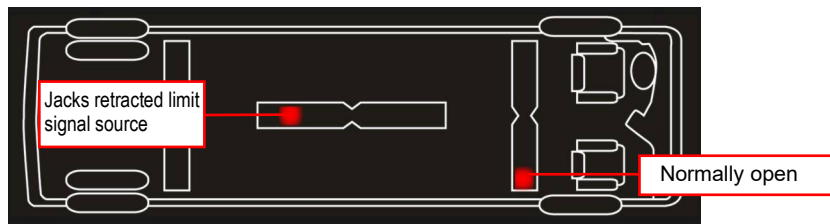
Longitudinal Retract Rear Proportional Constant

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



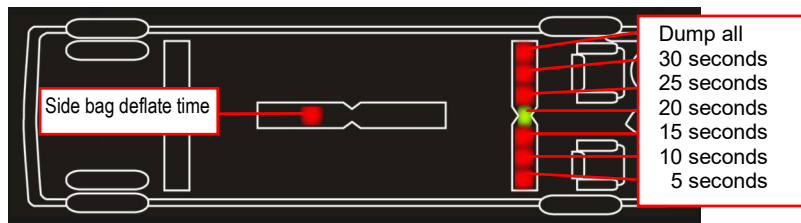
Jacks Retracted Limit Signal Source

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



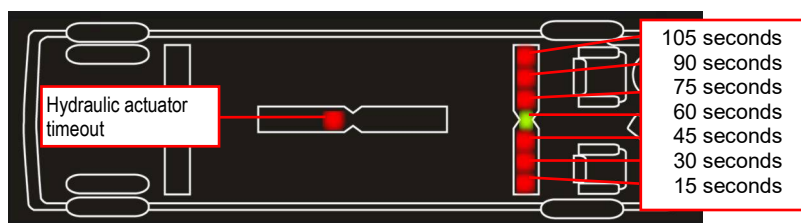
Side Bag Deflate Time

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.



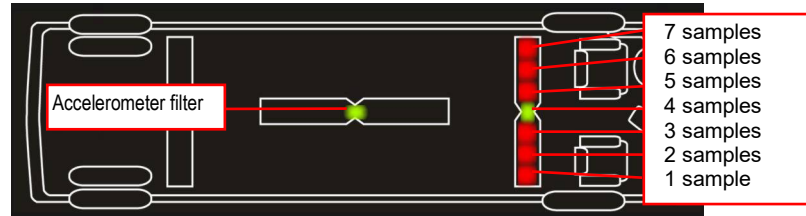
Hydraulic Actuator Timeout

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

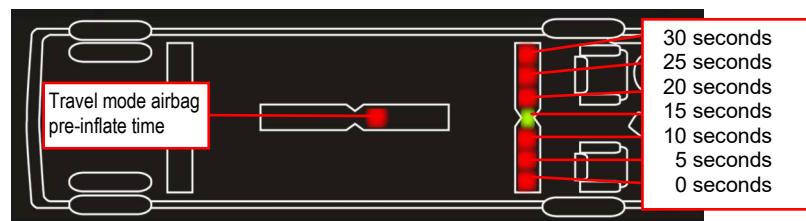
This setting tells the leveling system how much to filter the acceleration values that come from the accelerometer. A higher number makes the system less susceptible to sensing vibration but may introduce latency in measurement.



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.

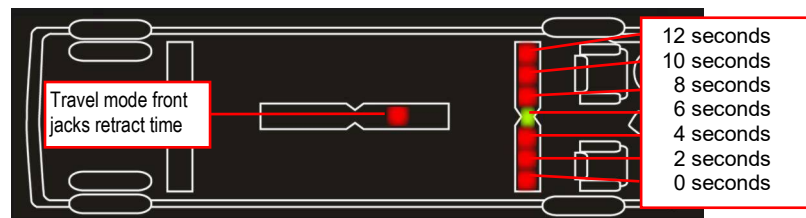
Note that the front jacks will begin to retract before the rear jacks if the setting for Travel Mode Front Jacks Retract Time (see following item) is anything other than 0 seconds.



Travel Mode Front Jacks Retract Time

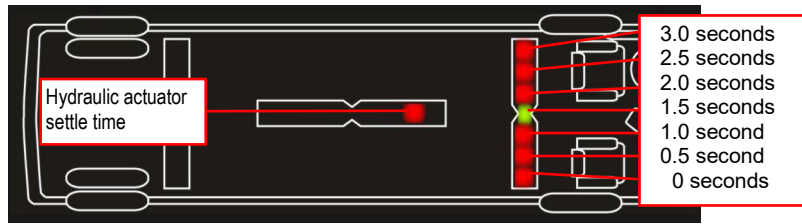
This parameter sets the amount of time to retract the front leveling jacks before starting to retract the rear jacks when putting the coach into travel mode.

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.



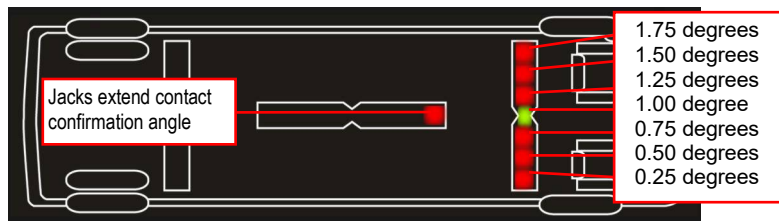
Hydraulic Actuator Settle Time

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.



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. Press MANUAL to save.

Performing Zero Set

Note: When leveling a coach to be zero set, always operate buttons in pairs

Press and hold the **MANUAL** button when manually leveling the coach for zero set to avoid the twist limits.

1. Verify coach is on a relatively flat and level surface.
2. Place level in the middle of the living area floor at center of coach, side to side.
3. Level coach left to right by operating both front and rear **RAISE** or **LOWER** buttons on one side simultaneously.
4. Rotate level to front to rear orientation in the middle of the living area floor at center of coach.
5. Level coach front to rear by pressing both front **RAISE** or both front **LOWER** buttons simultaneously.
6. Press the **POWER** button to shut the system off.
7. Press the **POWER** button again to turn the system on (in no-mode).
8. **SIMULTANEOUSLY** press and hold **ALL CORNERS RAISE** and **ALL CORNERS LOWER** buttons for 10 seconds (a set of double tones will be heard).
9. Press the front left **LOWER** button to select the zero set function. This tells the leveling system that the current position is to be considered level, and stores the values in the sensors.
10. The **AUTO** button light will come on, followed by a 2-tone beep. This indicates that the Zero Set was successful.

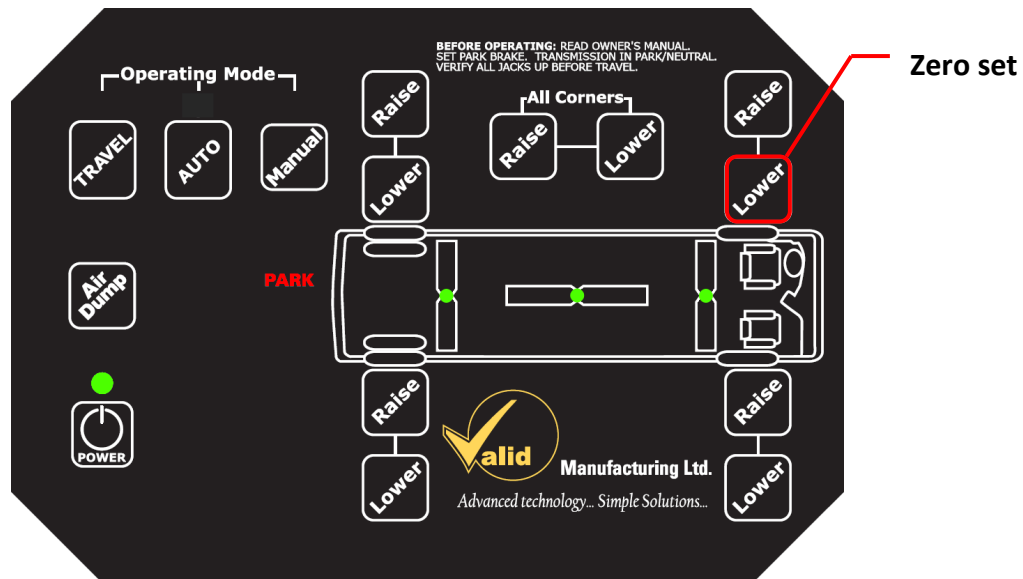


Figure 14

EMERGENCY OVERRIDE PROCEDURES

For certain types of problems your Trueline Leveling System may experience there is a procedure that can be followed to minimize potential damage until you can reach a service depot.

Warning: These procedures must only be used under the direction of qualified service personnel. Do not attempt to use them on your own.

Travel Override

To initiate a travel override if a loss of communication is detected:

If the leveling controller experiences a loss of communication from one or more of the leveling sensor modules, you may initiate a travel override procedure which allows the coach to be driven.

1. Remove all three fuses for the keypad and all sensors and I/O modules.
2. Plug in the fuses for the sensors and I/O modules **only**. (Do not replace the keypad fuse)
3. Wait for 30 seconds.

Once the power has been interrupted and restored with the ignition on, each front and rear leveling sensor will attempt to communicate to the keypad controller. If no communication is detected after 30 seconds, a sensor will automatically activate its travel valves; thus, both front and rear travel valves will be activated, which is the same state as normal travel mode.

The keypad will not be operational; it has no power.

Warning: Travel in this condition only in an emergency, and have the communication loss fixed by qualified service personnel as soon as possible.

WARNING IT IS THE COACH OPERATORS RESPONSIBILITY TO ENSURE THE COACH SAFELY ATTAINS CORRECT RIDE HEIGHT BEFORE TRAVELLING. EMERGENCY TRAVEL MODE WILL NOT WORK FOR FAILURE MODES OTHER THAN COMMUNICATION OR KEYPAD FAULTS. FAULTS RELATED TO PLUMBING, VALVING, POWER SUPPLY, PHYSICAL DAMAGE OR OTHER SIMILAR FAULTS CAN NOT BE CIRCUMVENTED USING THIS METHOD. EMERGENCY TRAVEL MODE IS INTENDED FOR USE WITH PHYSICAL NETWORK DAMAGE OR KEYPAD ISSUES ONLY.

To restore normal mode

In normal mode, all devices are powered up. The keypad will continue to indicate any faults.

1. Remove both fuses for the front and rear sensors.
2. Plug in all three fuses for the keypad, front and rear sensors.

DIAGNOSTICS

The Trueline Leveling System has a number of diagnostic features that provide information on the functioning of the system.

There are two types of diagnostic functions:

Test diagnostics – these allow you to test some keypad features.

Fault diagnostics – these alert you to problems detected in the system.

Test Diagnostics (*Keypad functions only*)

There are two test diagnostics available, to check the functionality of the indicator lamps and the GP outputs of the keypad (*this does not test leveling outputs from the other modules*). Both tests require the system to be in 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**. You are now ready to proceed with one of the test diagnostics.

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

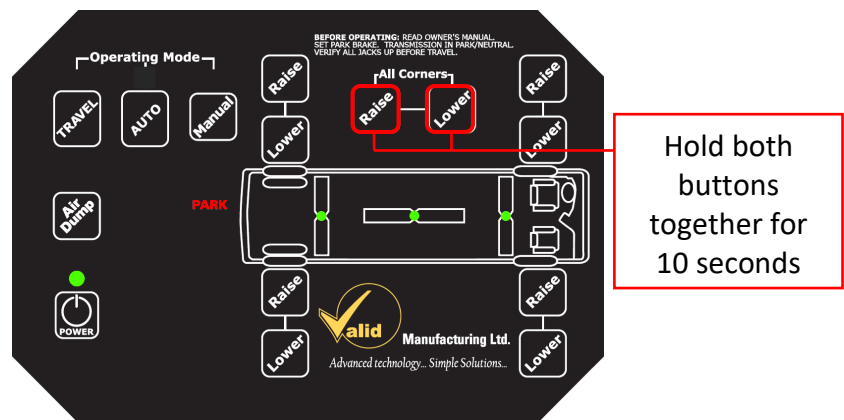


Figure 15

Lamp Test

Enter service mode and press the rear left **RAISE** button to initiate the Lamp Test. The system will then cycle through all of the indicators, illuminating them one at a time. Visually verify that each of the indicators illuminates.

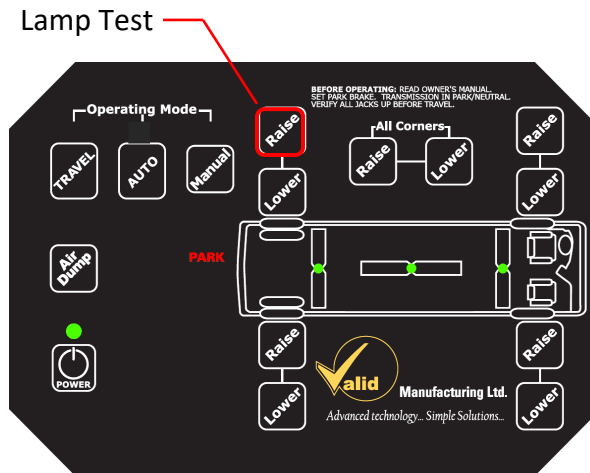


Figure 16

Output Test

Enter service mode and press the rear left **LOWER** button to initiate the Output Test. The system will then cycle the two GP (general purpose) outputs from the keypad for a few seconds. Electrically verify that each of the outputs activates.

Warning: Do not perform this function while the unit is being installed, since this will activate the GP outputs.

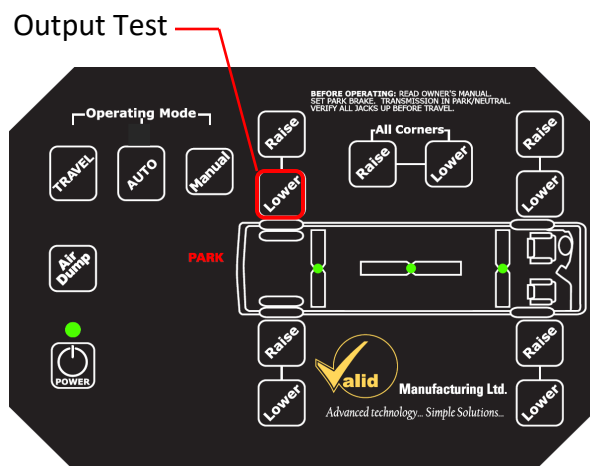


Figure 17

RESETTING THE SYSTEM

In rare cases, you may be required to perform a full reset of your leveling system. Note that this will not reset any forced valves. Please do not reset your system unless directed by qualified service personnel.

To reset the leveling system:

1. The coach must be stopped.
2. Press **POWER** to turn on the leveling controller.
3. Press and hold **POWER** until an alternating tone is heard. The system will turn itself off after this.

Resetting the system is the same as pulling and replacing all three fuses for the keypad, front and rear sensors; fault codes are cleared and the saved configuration values are read from the EEPROM.

Note: Resetting the system does **NOT** restore factory default configurations.

FAULT DIAGNOSTICS

Fault diagnostics provide information about problems detected in the leveling system; such as a loss of communication, or a short or open circuit.

If there is a fault in the system, the **FAULT** indicator will illuminate, along with one or more LEDs in the level indication displays.

The following table describes the various fault LED configurations and what they mean.

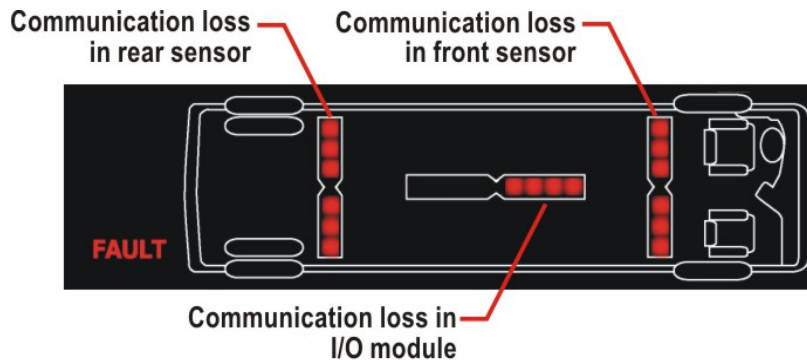
If you see:	The problem is:	See diagram	Diagnostic procedures
Fault indicator + front axle lit up (all red, not the green LED).	A loss of communication in the front sensor.	A	Communication Fault
Fault indicator + rear axle lit up (all red, not the green LED).	A loss of communication in the rear sensor.	A	Communication Fault
Fault indicator + front half of longitudinal bar lit up.	Loss of communication in the I/O module.	A	Communication Fault
Fault indicator + lowest LED on right/left side in front/rear axle. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the Travel valve for the right/left side on the front/rear axle.	B	See Page 40
Fault indicator + middle LED on right/left side in front/rear axle. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the Lower valve for the right/left side on the front/rear axle.	B	See Page 40
Fault indicator + upper LED on right/left side in front/rear axle. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the Raise valve for the right/left side on the front/rear axle.	B	See Page 40
Fault indicator + 2 nd LED from left on longitudinal bar. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the front curbside Hydraulic valve.	C	See Page 41
Fault indicator + 3 rd LED from left on longitudinal bar. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the front roadside Hydraulic valve.	C	See Page 41

If you see:	The problem is:	See diagram	Diagnostic procedures
Fault indicator + 4 th LED from left on longitudinal bar. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the rear curbside Hydraulic valve.	C	See Page 41
Fault indicator + 4 th LED from right on longitudinal bar. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the rear roadside Hydraulic valve.	C	See Page 41
Fault indicator + 3 rd LED from right on longitudinal bar. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the Pump solenoid.	C	See Page 41
Fault indicator + 2 nd LED from right on longitudinal bar. Flashing LED = open circuit Solid LED = short circuit	A short/open circuit in the Hydraulic Extend valve.	C	See Page 41
Fault indicator + 1 st LED on left on longitudinal bar.	Flashing LED = rear sensor accelerometer failure. The accelerometer is not producing output data. Solid LED = excess pressure switch transitions. The pressure switch cycled on and off more than 4 times within 60 seconds.	D	See Page 41
Fault indicator + 1 st LED on right on longitudinal bar.	Flashing LED = front sensor accelerometer failure. The accelerometer is not producing output data. Solid LED = hydraulic pump timeout. While in travel mode, the pump was operating for more than 90 seconds.	D	See Page 41
Fault indicator + no LED	No LED = tag lift fault.		See Page 71

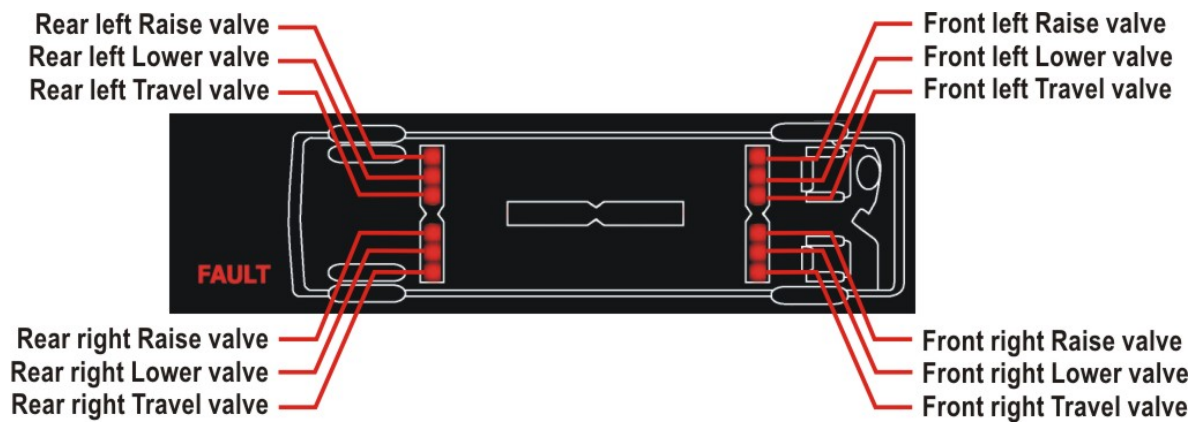
Note: If the FAULT light is flashing, press the right rear RAISE and LOWER buttons together once to display the fault.

Fault Diagrams

A. Communication loss:



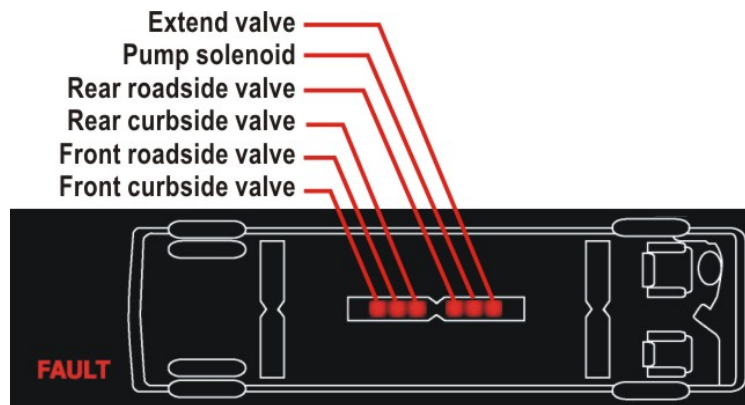
B. Short/open circuits in pneumatic valves (flashing = open circuit, solid = short circuit)



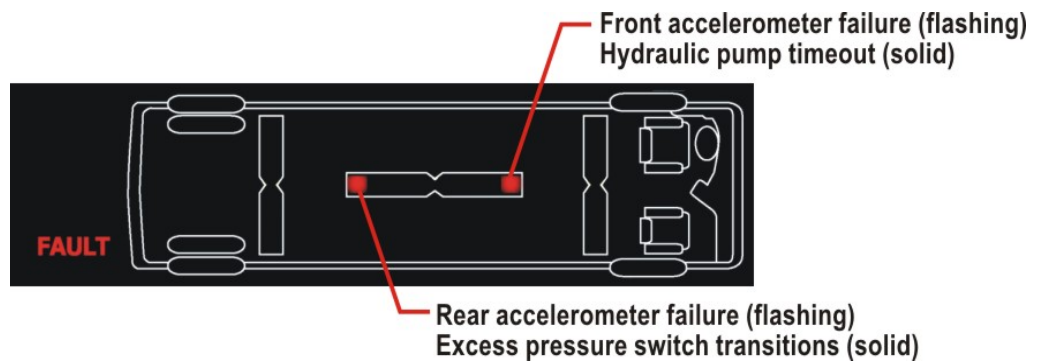
NO FAULT INDICATION SHOWN: On systems equipped with a TAG LIFT or TAG DUMP feature, be sure to test the valve coils on the 4 or 3 pack tag control manifold.

TRAVEL VALVE FAULTS: On systems equipped with a TAG LIFT or TAG DUMP feature, be sure to test the valve coils on the 4 or 3 pack tag control manifold as well.

C. Short/open circuits in hydraulic valves
(flashing = open circuit, solid = short circuit)



D. Accelerometer failure/misc.



Note: If the FAULT light is flashing, press the right rear RAISE and LOWER buttons together once to display the fault.

FORCING PNEUMATIC VALVES

In some systems, it is possible to put the leveling system into a 'forced' condition, where you can force one or more pneumatic valves on or off. When valves have been forced, you may not use the system in any other mode.

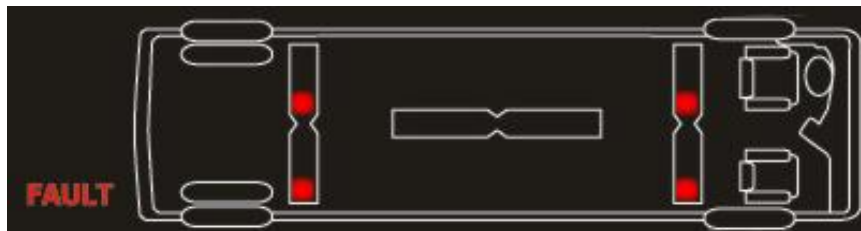
There are two valve manifolds in the vehicle – one at the front and one at the back, corresponding to the two mounted sensors. Within each manifold, there are two valves for raising, two for lowering, and two for Travel mode. Each valve within the pairs relates to one side of the vehicle. Thus, each manifold has a right raise valve, left raise valve, right lower valve, left lower valve, right travel valve, and left travel valve.

Any of these valves can be forced on using the procedure described below.

To go into forced mode and force a valve on:

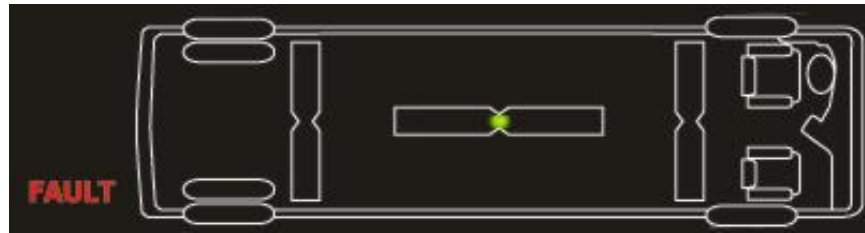
1. Press **POWER** to turn the leveling controller on.
 2. Press and hold **ALL CORNERS RAISE** and **ALL CORNERS LOWER** simultaneously for approximately 10 seconds until the **AUTO** and **MANUAL** indicators flash alternately and an alternating tone is sounded.
 3. Release **ALL CORNERS RAISE** and **ALL CORNERS LOWER**.
 4. Press the rear right **LOWER** button. The **FAULT** light will begin to flash.
 5. Press the **RAISE** or **LOWER** button for any corner that you wish to force the valve on. The LED corresponding to your choice will illuminate.
For example, to force on the rear right Lower valve, press the rear right LOWER button.
- OR**
- To force Travel mode, press the **TRAVEL** button. All four Travel LEDs will illuminate, as shown in the figure below.

Note: Once one valve has been forced on, all other valves are forced off. However, you may force on additional valves.



Forced travel mode

To force all valves to the off state, press the **ALL CORNERS RAISE** button. This will illuminate the green LED in the centre of the display.



All valves forced off

In forced mode, you may force valves on or off. If **at least one** valve is forced, the system is in forced mode. If **no** valves are forced, the system will exit forced mode.

To un-force valves while in the forced condition:

Press the appropriate **RAISE** or **LOWER** button to force off individual valves. Valves can be forced on and off by simply toggling the associated **RAISE** and **LOWER** buttons.

*For example: If you have forced on the front right Lower valve, press front right **LOWER** again to force off that valve. If that is the **only** valve that was forced on, turning it off will cause the system to exit the forced condition and return to its standard operating mode.*

Exiting Forced mode:

If you have forced on several valves and wish to 'un-force' them all and exit the forced condition:

1. 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.
2. Release **ALL CORNERS RAISE** and **ALL CORNERS LOWER**.
3. Press the rear right **LOWER** button. The **FAULT** light will begin to flash.
4. Press the **ALL CORNERS LOWER ONCE**
5. Press the **MANUAL** button once to save and exit.

Note: The leveling system cannot be used in any other mode until all forced valves have been unforced.

ELECTRICAL TESTING

When performing electrical testing on the Valid Trueline Leveling System, please adhere to the following guidelines:

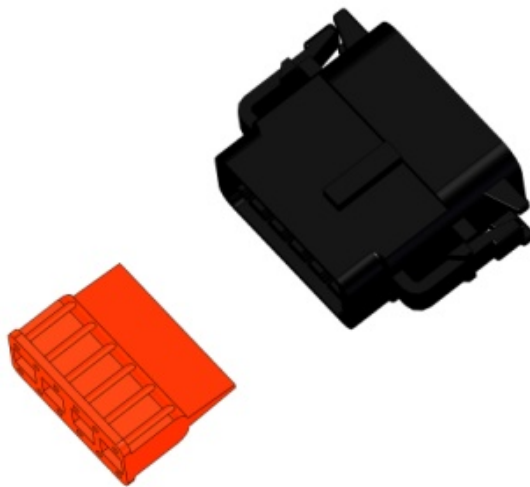
When testing for resistance or continuity, the system must be turned off, ignition turned off, and fuses for Trueline Leveling System removed.

When testing for voltage or outputs, ensure that the ignition is on, and the fuses are in place. It is not possible to test output voltage from the modules. There is a 'supervisory' current that will give false voltage readings.

When testing continuity to ground (example: some parking brake signals) ensure that you can get good contact with ground – a proper bare metal spot on the chassis – otherwise you may get false readings.

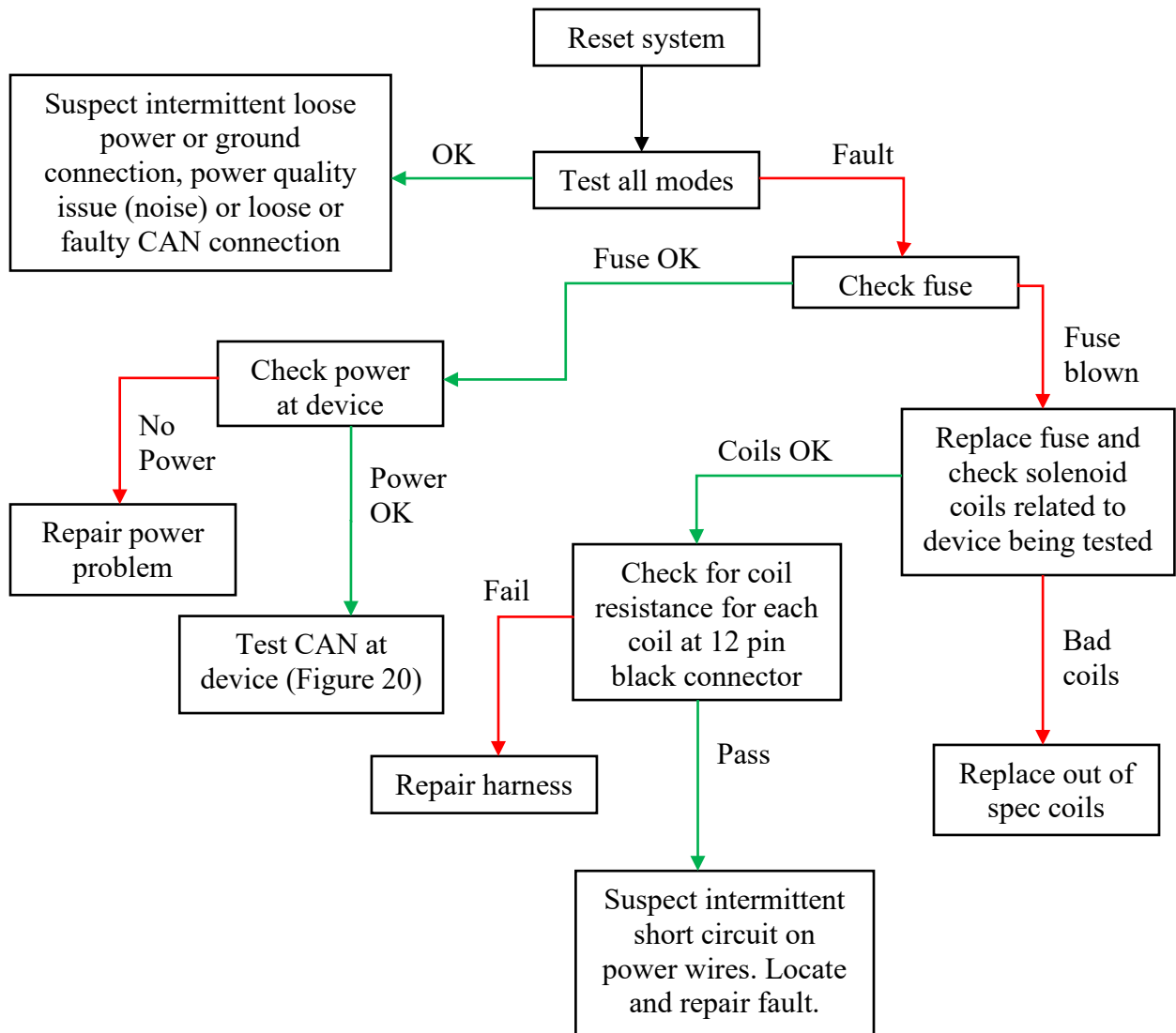
To test for blown fuses, set your meter to the continuity setting, or the ohms (omega Ω symbol) setting, and place one meter lead on each side of the fuse, with the fuse removed from the coach. If your meter shows an open circuit, the fuse is bad - replace it.

For any testing at the Deutsch style connectors which plug in to the sensors, the orange wedge lock inserts must be removed from the connector. Use needle nose pliers to pull the wedge lock straight out from the end of the connector. When replacing a wedge lock insert, make sure the pins are properly seated in the correct location.



DIAGNOSTIC PROCEDURES

Communication faults



Resetting the System – See page 37

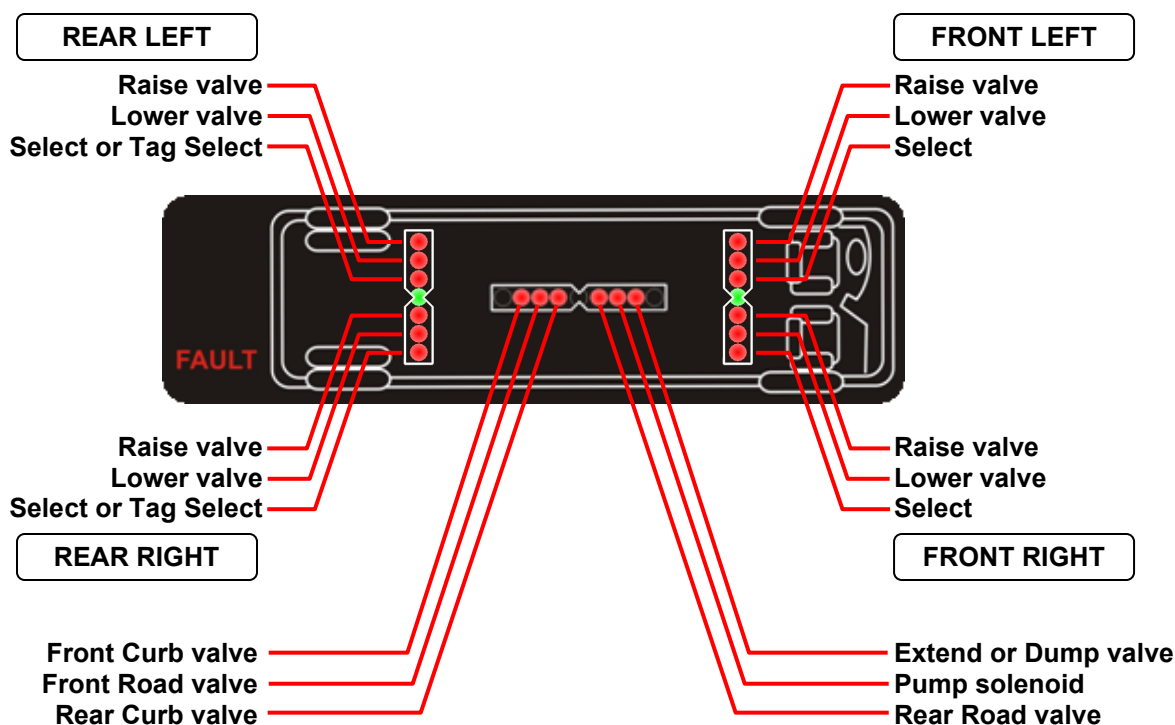
Testing Valve Coils – See page 46

Testing Grey Module Connector – See page 55

Testing Black Module Connector – Starting on page 58

Output (valve) faults

Identify which valve(s) the fault indicates.



Identify if the fault is open circuit (valve indicator flashing) or short circuit (valve indicator solid).

Identify wire colour from chart for affected valve(s).

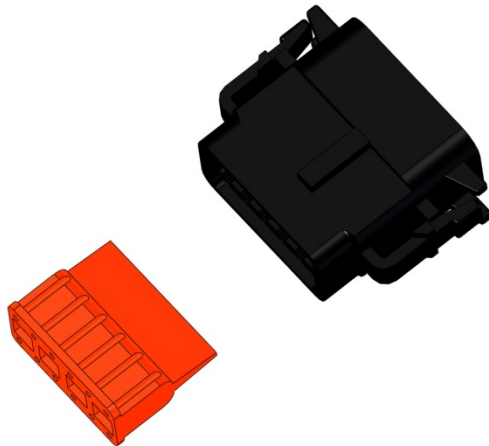
Function	Wire Colour		Function	Wire Colour
Left Raise	Red	Pneumatic Valves	Right Raise	Yellow
Left Lower	White		Right lower	Brown
Left Select	Green		Right Select	Blue
Left Tag Select	Violet		Right Tag Select	Pink
Tag Lift*	Orange		Tag Dump*	Tan
Front Curb	Red	Hydraulic Valves	Extend / Dump	Green
Front Road	Violet		Pump Solenoid	Blue
Rear Curb	Orange		Rear Road	Yellow

* 'Tag Lift' and 'Tag Dump' valves are not represented by any indicators on the keypad in the event of a valve fault. If a fault is shown on the keypad with no corresponding valve indicated, test these two valves for faults.

Locate associated control module (Front sensor, Rear Sensor, I/O Module).

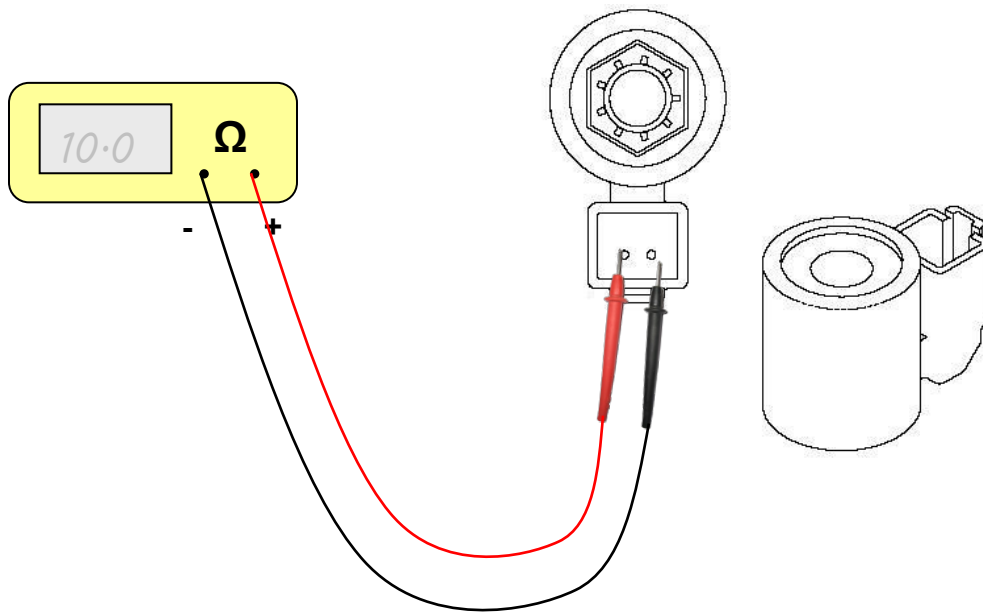


Unplug black connector and extract orange wedge lock.



Test determined wire colour(s) from above with associated black wire for continuity and record result.

Locate associated valve coil on manifold.



Unplug harness from coil and test continuity of coil.

The continuity should be close to the continuity measured through the wire. If it is not, there may be an **open** or **short circuit** in the harness between the valve and sensor.

Valve coils should be tested at room temperature, and reference specifications are given based on an approximate temperature of 20° C (~70° F). Warmer coils will tend to have higher than spec resistance; cold coils will tend to have less resistance.

A coil measured at room temperature with a deviation of more than ±10% from the published specification should be replaced.

	Part Number	Normal
Pneumatic Valve	4301512	10 Ω
Hydraulic Valve	Power Gear	8.5 Ω
Pump Run Solenoid	Power Gear	16 Ω

Warning: Continued use of low impedance coils (less than approximately 5ohms) will result in damage to the output circuit of the controlling module.

CAN Network Testing

The communication network in the Trueline Leveling System is a J1939 style **Controller Area Network** bus. The system consists of a main trunk with terminating resistors at each end, and nodes that tee off to the various components (Keypad, Sensor or I/O module). For normal operation, both terminating resistors must be installed, one at each end of the main harness trunk.

- 1) Test network with ignition off or all fuses removed.
- 2) Disconnect connector from the keypad and all modules.
- 3) Use an ohm meter to measure resistance between CAN H and CAN L at all connection points.

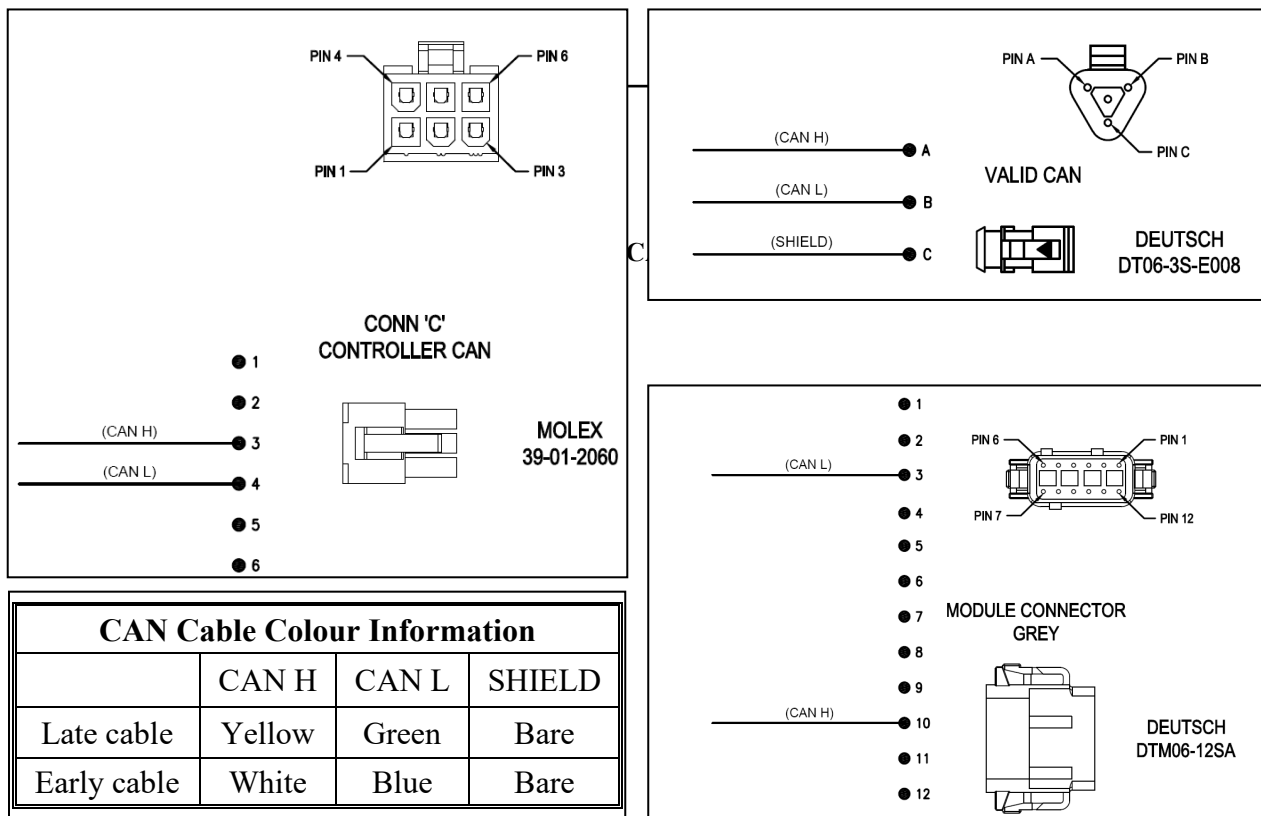


Figure 18 - Typical CAN Connectors

In the case where there is a communication fault being shown on the keypad, perform the following tests at the device indicated by the keypad as having the failure. In the case of a double communication fault, perform these tests at the keypad.

Note: A double communication fault would show the fault light and all of the red LEDs lit over the front and rear axle at the same time.

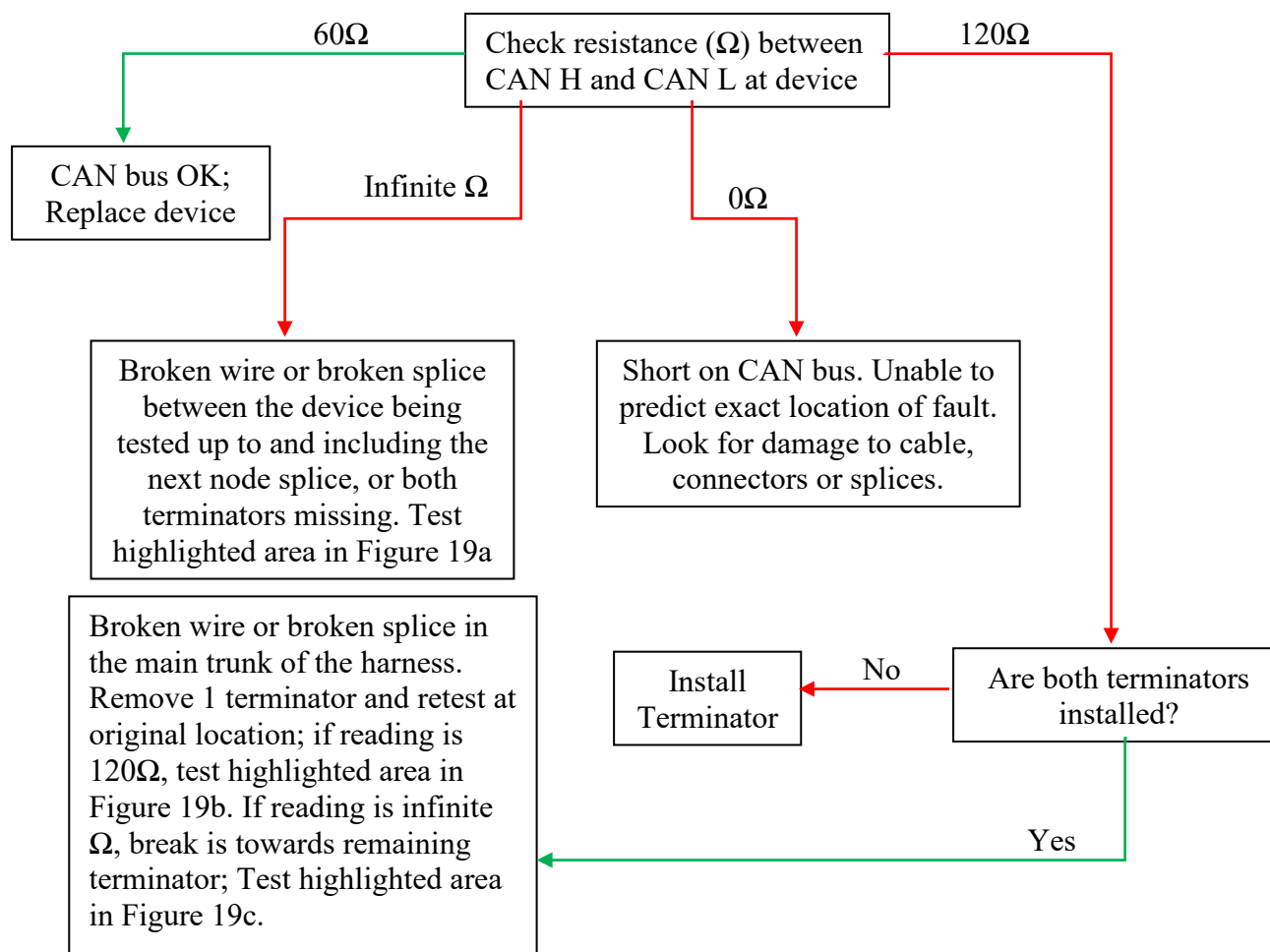


Figure 20, CAN Testing Flow Chart

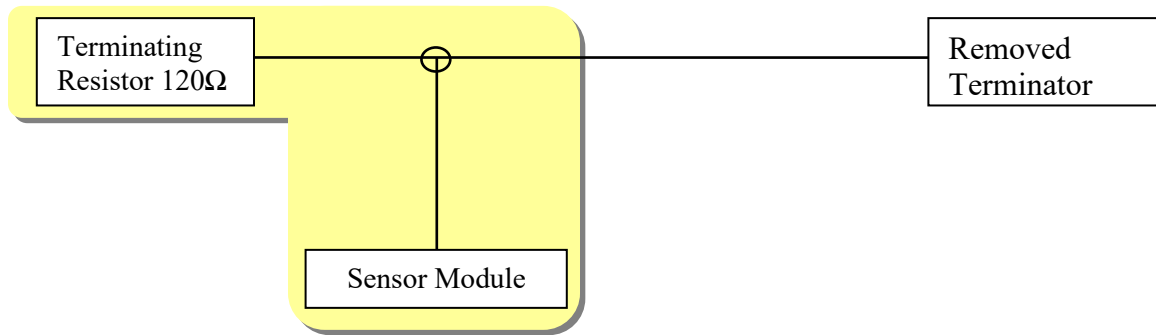


Figure 19a

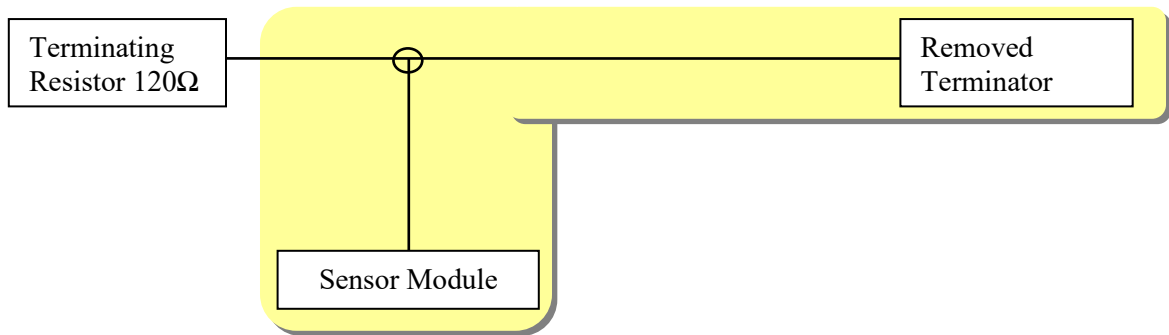


Figure 19b

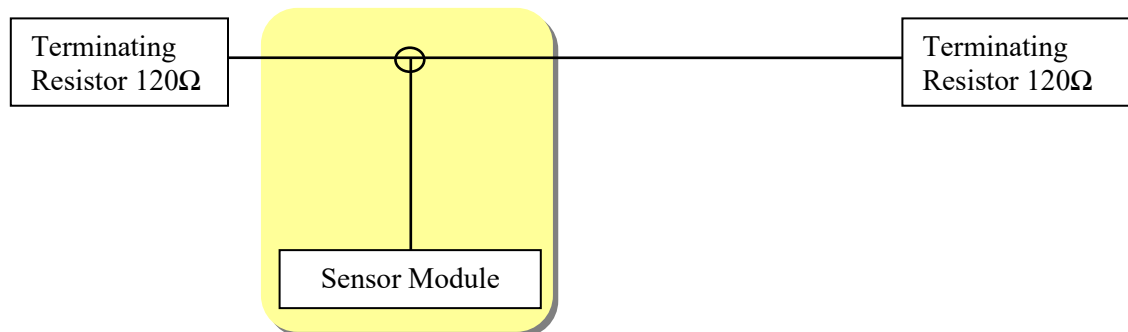


Figure 19c

CONNECTOR PIN-OUTS

Vehicle interface connector layout

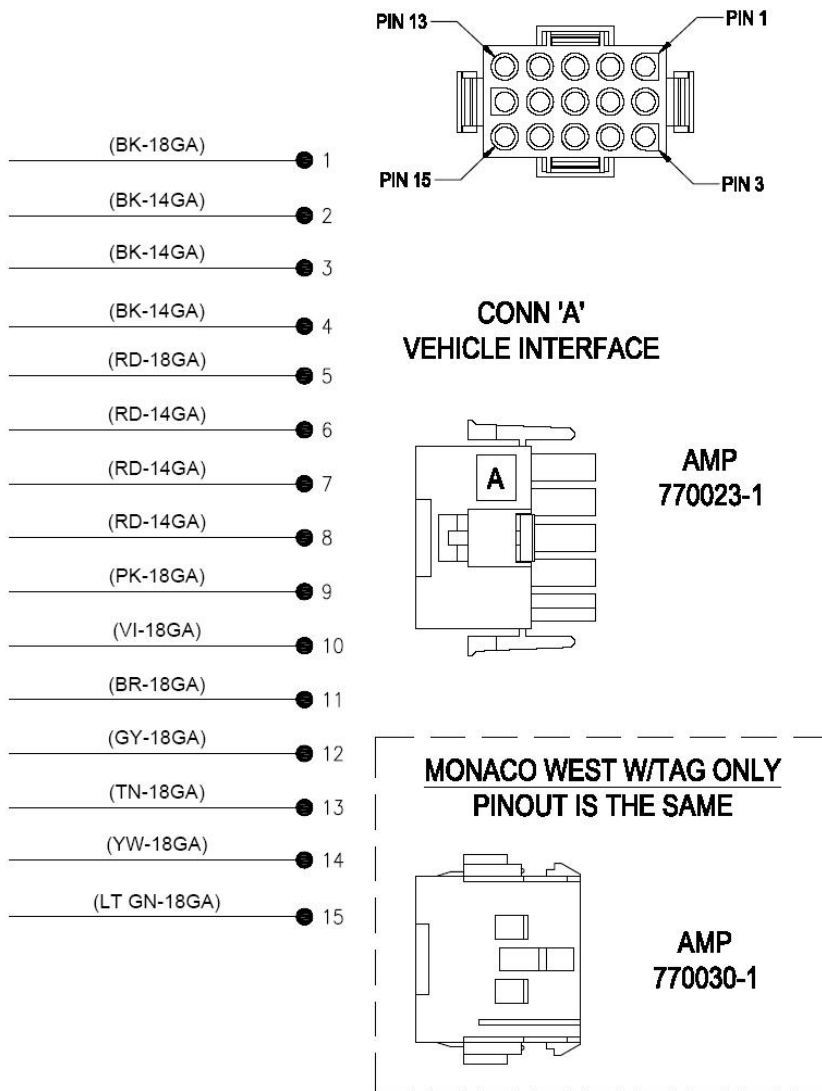


Figure 21

Vehicle connector interface pin-out

PIN	COLOUR	DESCRIPTION	SIGNAL
1	BLACK	CONTROLLER COMMON	BATTERY NEGATIVE
2	BLACK	MODULE COMMON	BATTERY NEGATIVE
3	BLACK	MODULE COMMON	BATTERY NEGATIVE
4	BLACK	MODULE COMMON	BATTERY NEGATIVE
5	RED	CONTROLLER POWER	BATTERY POSITIVE, +12VDC
6	RED	MODULE POWER	BATTERY POSITIVE, +12VDC
7	RED	MODULE POWER	BATTERY POSITIVE, +12VDC
8	RED	MODULE POWER	BATTERY POSITIVE, +12VDC
9	PINK	IGNITION INPUT	TRANSITION 0 TO +12VDC
10	VIOLET	PARK BRAKE INPUT	SEE NOTE 1
11	BROWN	SPEED SIGNAL	+12VDC SQUARE WAVE
12	GREY	SPEED SIGNAL COMMON	SPEED SIGNAL COMMON
13	TAN	NEUTRAL OR IN GEAR INPUT	SEE NOTE 2
14	YELLOW	GENERAL PURPOSE OUT 1	12VDC OUTPUT, 1 AMP MAX
15	LIGHT GREEN	GENERAL PURPOSE OUT 2	12VDC OUTPUT, 1 AMP MAX

Note 1 – Park Brake Input

In most cases this input expects to see +12VDC when the ignition is on and the park brake is applied.

Monaco West (Oregon factory) – The system is configured to expect a ground signal (continuity with ground) when the ignition is on and the park brake is applied.

Fleetwood – The system expects to see +12VDC when the park brake is OFF.
On Rev. C devices, this option is selectable by a jumper setting on the keypad.

Note 2 – Neutral or In Gear Input

This signal comes from the transmission ECU and transitions from 0VDC to +12VDC only when the ignition is on.

Fleetwood – The system expects +12VDC when the transmission is in GEAR.

Monaco – The system expects +12VDC when the transmission is in NEUTRAL.

Controller Power Connector

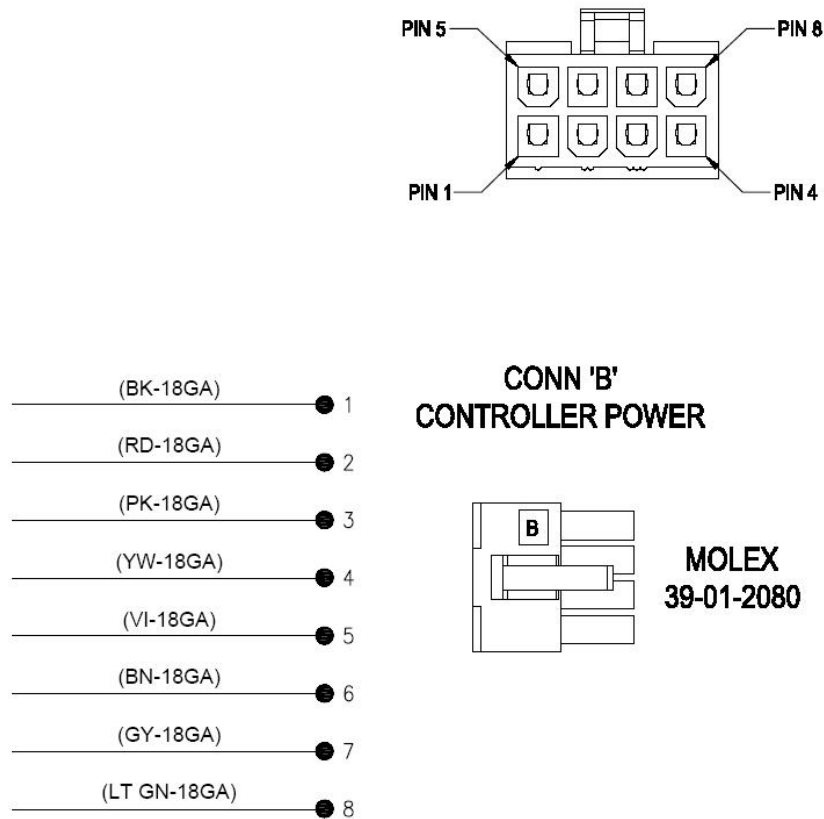


Figure 22

Controller Power Connector Pin-out

PIN	COLOUR	DESCRIPTION	SIGNAL
1	BLACK	CONTROLLER COM	BATTERY NEGATIVE
2	RED	CONTROLLER POWER	BATTERY POSITIVE +12VDC
3	PINK	IGNITION	TRANSITION FROM 0 TO +12VDC
4	YELLOW	GENERAL PURPOSE OUT 1	12VDC OUTPUT, 1 AMP MAX
5	VIOLET	PARK BRAKE	SEE NOTE 1
6	BROWN	SPEED SIGNAL	+12VDC SQUARE WAVE
7	GREY	SPEED SIGNAL COM	SPEED SIGNAL COMMON
8	LIGHT GREEN	GENERAL PURPOSE OUT 2	12VDC OUTPUT, 1 AMP MAX

Fleetwood Only

GP1 Air Fill (Spartan dump/fill valve)

GP2 Air Dump (Spartan dump/fill valve)

Note 1 – Park Brake Input

In most cases this input expects to see +12VDC when the ignition is on and the park brake is applied.

Monaco West (Oregon factory) – The system is configured to expect a ground signal (continuity with ground) when the ignition is on and the park brake is applied.

Fleetwood – The system expects to see +12VDC when the park brake is OFF.

On Rev. 'C' devices, this option is selectable by a jumper setting on the keypad.

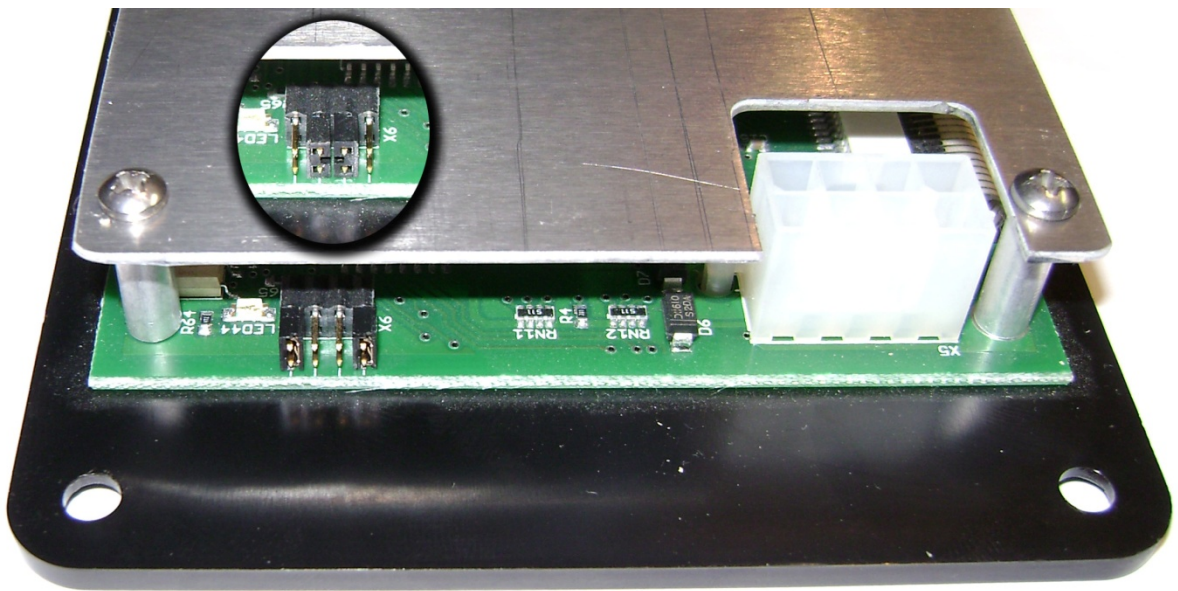


Figure 23

Monaco West (Inset), Park Brake transitions between open circuit and ground. (Jumpers in inner positions)

All others transition between open circuit and +12VDC. (Jumpers in outer positions)

Sensor Module Connector – Grey

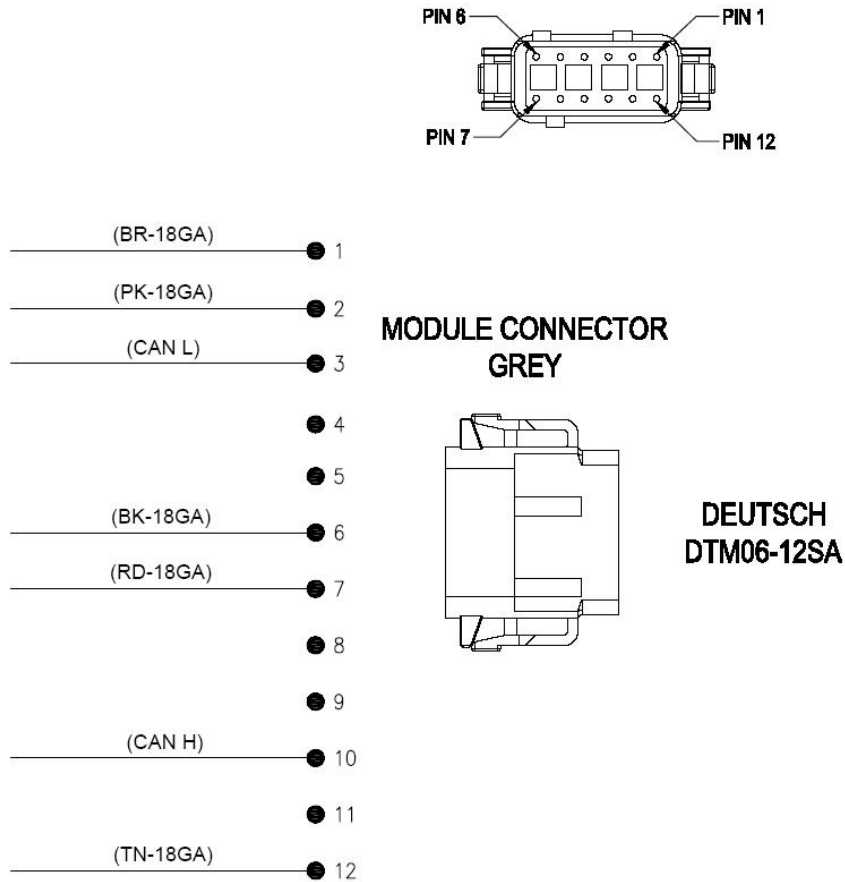


Figure 24

Grey Module Connector

PIN	COLOUR	DESCRIPTION	SIGNAL
1	BROWN	PRESSURE SWITCH	SEE NOTE 1
2	PINK	IGNITION	TRANSITION FROM 0 TO +12VDC
3	SEE CHART	CAN H	CAN H
4	NC	NC	NC
5	NC	NC	NC
6	BLACK	MODULE NEGATIVE	BATTERY NEGATIVE
7	RED	MODULE POSITIVE	BATTERY POSITIVE, +12VDC
8	NC	NC	NC
9	NC	NC	NC
10	SEE CHART	CAN L	CAN L
11	NC	NC	NC
12	TAN	IN GEAR/NEUTRAL	SEE NOTE 2

Note 1 – Fleetwood – Pressure Switch

This is a 1400 PSI switch that detects when the hydraulic jacks are fully retracted. Applies to Fleetwood only, and the 1400 PSI is expected to be maintained the entire time the coach is in Travel mode.

Note 2 – Neutral or In Gear Input

This signal comes from the transmission ECU and transitions from 0VDC to +12VDC only when the ignition is on.

Fleetwood – The system expects +12VDC when the transmission is in GEAR.

Monaco – The system expects +12VDC when the transmission is in NEUTRAL.

CAN Cable Information			
	CAN H	CAN L	SHIELD
Late	YELLOW	GREEN	BARE
Early	WHITE	BLUE	BARE

Black Sensor Module Connector, 6 Output for Hydraulics

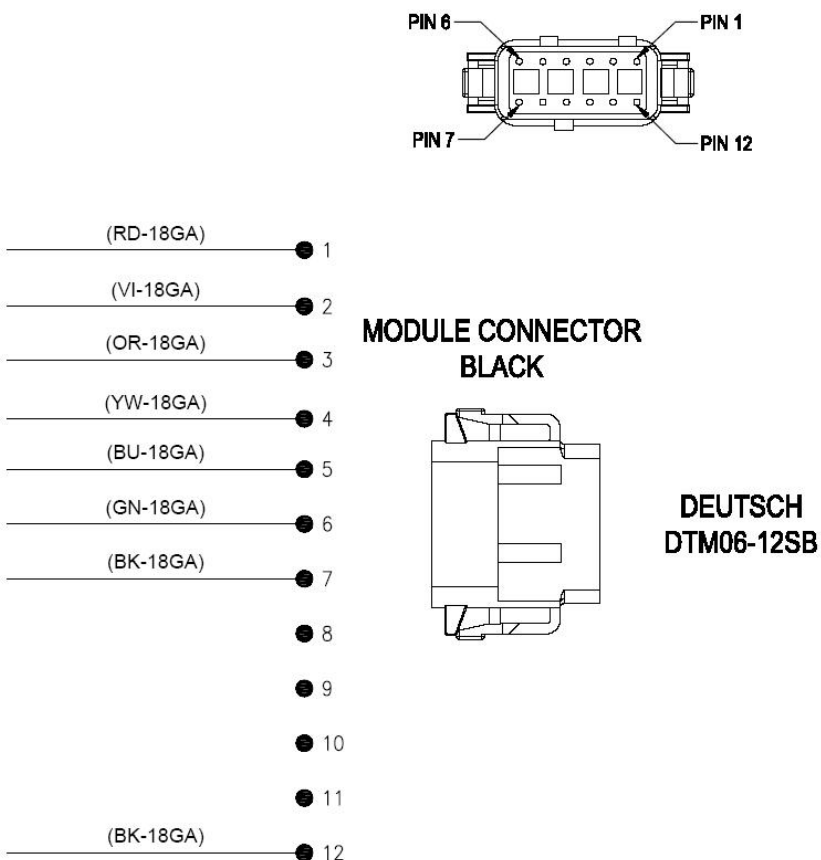


Figure 25

Black Sensor Module Connector, 6 Output, Hydraulic

PIN	COLOUR	DESCRIPTION	SIGNAL
1	RED	CURB FRONT VALVE	12VDC OUTPUT, 1 AMP MAX
2	VIOLET	ROAD FRONT VALVE	12VDC OUTPUT, 1 AMP MAX
3	ORANGE	CURB REAR VALVE	12VDC OUTPUT, 1 AMP MAX
4	YELLOW	ROAD REAR VALVE	12VDC OUTPUT, 1 AMP MAX
5	BLUE	PUMP SOLENOID	12VDC OUTPUT, 1 AMP MAX
6	GREEN	EXTEND VALVE	12VDC OUTPUT, 1 AMP MAX
7	BLACK	OUTPUT COMMON	OUTPUT COMMON
8	NC	NC	NC
9	NC	NC	NC
10	NC	NC	NC
11	NC	NC	NC
12	BLACK	OUTPUT COMMON	OUTPUT COMMON

Black Module Connector, 10 Output for Air Leveling with Tag Lift

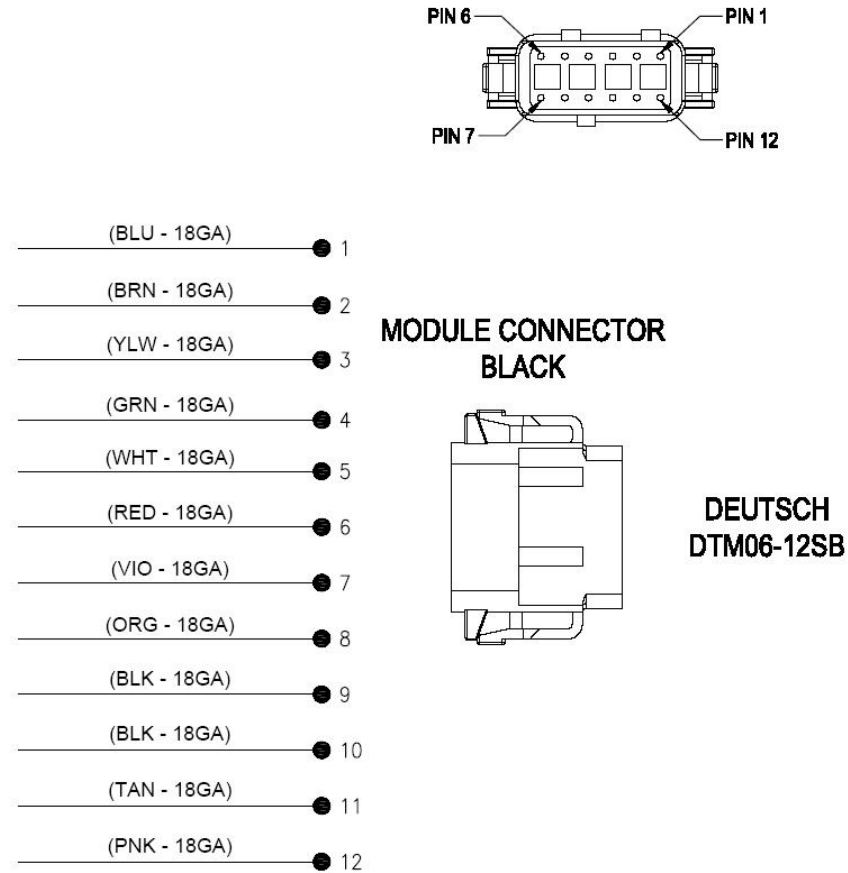


Figure 26

Black Module Connector, 10 Output with Tag Lift Option, Air

PIN	COLOUR	DESCRIPTION	SIGNAL
1	BLUE	RIGHT SELECT	12VDC OUTPUT, 1 AMP MAX
2	BROWN	RIGHT LOWER	12VDC OUTPUT, 1 AMP MAX
3	YELLOW	RIGHT RAISE	12VDC OUTPUT, 1 AMP MAX
4	GREEN	LEFT SELECT	12VDC OUTPUT, 1 AMP MAX
5	WHITE	LEFT LOWER	12VDC OUTPUT, 1 AMP MAX
6	RED	LEFT RAISE	12VDC OUTPUT, 1 AMP MAX
7	VIOLET	LEFT TAG	12VDC OUTPUT, 1 AMP MAX
8	ORANGE	TAG LIFT	12VDC OUTPUT, 1 AMP MAX
9	BLACK	OUTPUT COMMON	BATTERY GROUND
10	BLACK	OUTPUT COMMON	BATTERY GROUND
11	TAN	TAG DUMP	12VDC OUTPUT, 1 AMP MAX
12	PINK	RIGHT TAG	12VDC OUTPUT, 1 AMP MAX

Black Module Connector, 6 Output for Air Leveling

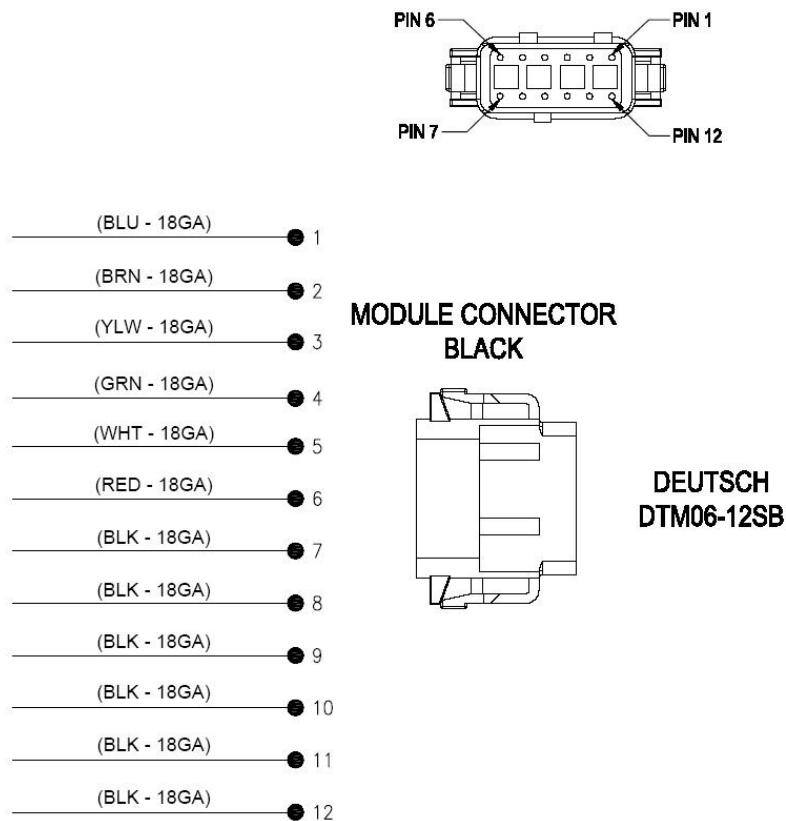


Figure 27

Black Module Connector, 6 Output, Air

PIN	COLOUR	DESCRIPTION	SIGNAL
1	BLUE	RIGHT SELECT	12VDC OUTPUT, 1 AMP MAX
2	BROWN	RIGHT LOWER	12VDC OUTPUT, 1 AMP MAX
3	YELLOW	RIGHT RAISE	12VDC OUTPUT, 1 AMP MAX
4	GREEN	LEFT SELECT	12VDC OUTPUT, 1 AMP MAX
5	WHITE	LEFT LOWER	12VDC OUTPUT, 1 AMP MAX
6	RED	LEFT RAISE	12VDC OUTPUT, 1 AMP MAX
7	BLACK	COMMON	BATTERY GROUND
8	BLACK	COMMON	BATTERY GROUND
9	BLACK	COMMON	BATTERY GROUND
10	BLACK	COMMON	BATTERY GROUND
11	BLACK	COMMON	BATTERY GROUND
12	BLACK	COMMON	BATTERY GROUND

Hydraulic Interface Connector

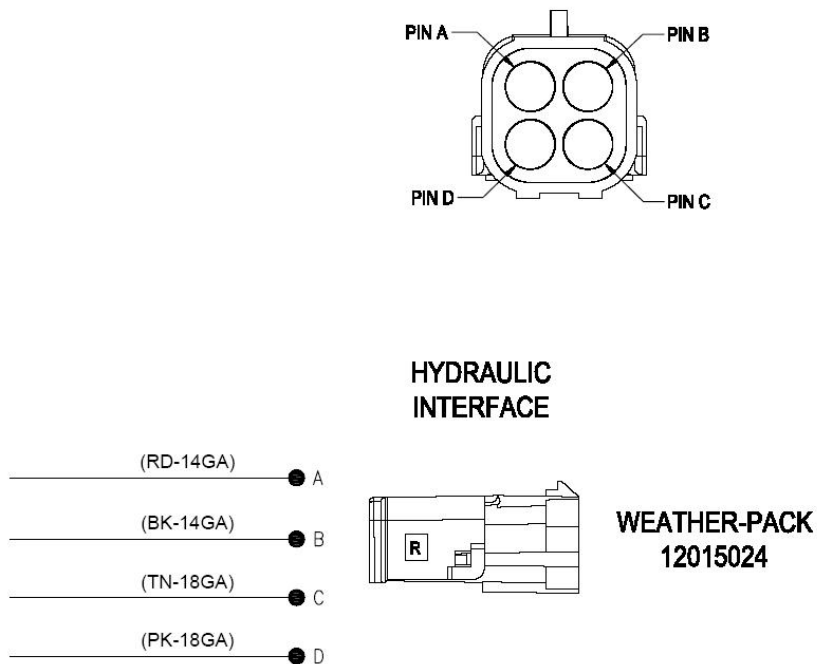


Figure 28

Hydraulic Interface Connector

PIN	COLOUR	DESCRIPTION	SIGNAL
A	RED	FRONT HYDRAULIC POWER	BATTERY POSITIVE
B	BLACK	MODULE COMMON	BATTERY NEGATIVE
C	TAN	NEUTRAL	SEE NOTE 1
D	PINK	IGNITION	TRANSITION FROM 0 TO +12VDC

Note 1 – Neutral or In Gear Input

This signal comes from the transmission ECU and transitions from 0VDC to +12VDC only when the ignition is on.

Monaco – The system expects +12VDC when the transmission is in GEAR.

Fleetwood – The system expects +12VDC when the transmission is in NEUTRAL.

Hydraulic Output – Fleetwood

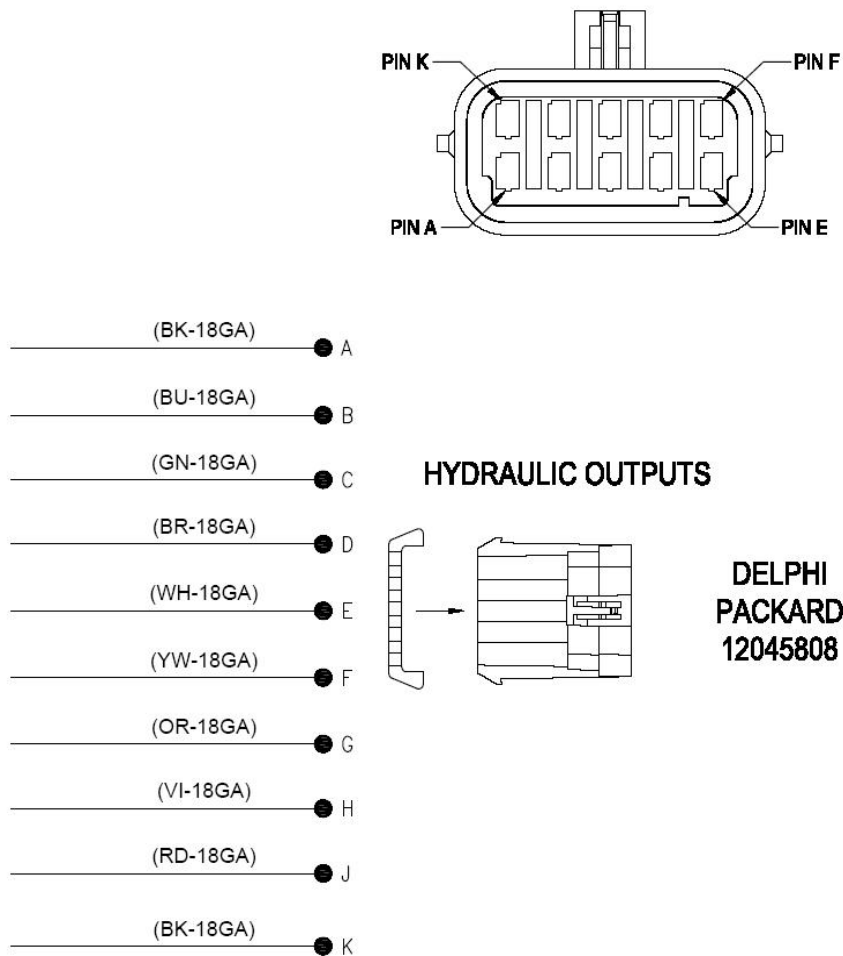


Figure 29

Hydraulic Output – Fleetwood

PIN	COLOUR	DESCRIPTION	SIGNAL
A	BLACK	I/O COMMON	BATTERY NEGATIVE
B	BLUE	PUMP SOLENOID	12VDC OUTPUT, 1 AMP MAX
C	GREEN	EXTEND VALVE	12VDC OUTPUT, 1 AMP MAX
D	BROWN	PRESSURE SWITCH SIGNAL	12VDC WHEN JACKS RETRACTED
E	WHITE	PRES SWITCH POWER	BATTERY POSITIVE, +12VDC
F	YELLOW	ROADSIDE REAR	12VDC OUTPUT, 1 AMP MAX
G	ORANGE	CURBSIDE READ	12VDC OUTPUT, 1 AMP MAX
H	VIOLET	ROADSIDE FRONT	12VDC OUTPUT, 1 AMP MAX
J	RED	CURBSIDE FRONT	12VDC OUTPUT, 1 AMP MAX
K	BLACK	I/O COMMON	BATTERY NEGATIVE

Hydraulic Output – Monaco

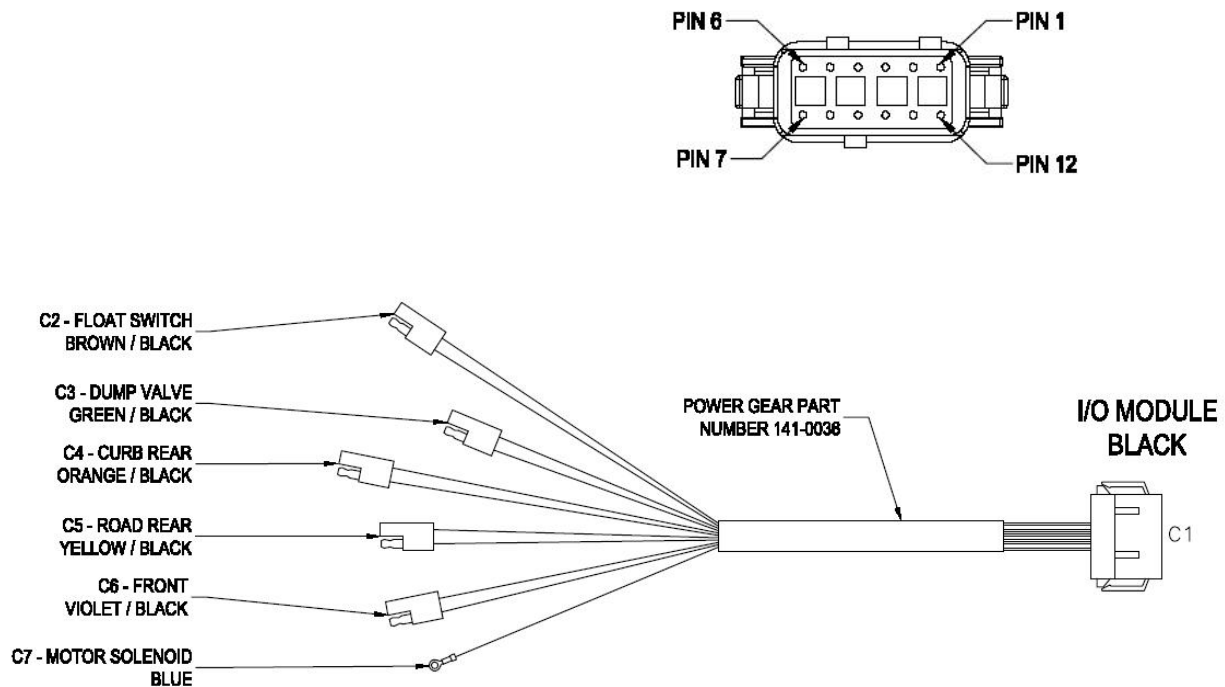


Figure 30

Hydraulic Output – Monaco

PIN	COLOUR	DESCRIPTION	SIGNAL	DESCRIPTION
1	BROWN	FLOAT SWITCH	SEE NOTE 1	C2
2	VIOLET	FRONT	12VDC OUTPUT, 1 AMP MAX	C6
3	ORANGE	RIGHT CURB REAR	12VDC OUTPUT, 1 AMP MAX	C4
4	YELLOW	RIGHT ROAD REAR	12VDC OUTPUT, 1 AMP MAX	C5
5	BLUE	MOTOR SOLENOID	12VDC OUTPUT, 1 AMP MAX	C7
6	GREEN	DUMP VALVE	12VDC OUTPUT, 1 AMP MAX	C3
7	BLACK	GROUND	BATTERY NEGATIVE	GROUND
8	NC	NC	NC	NC
9	BLACK	GROUND	BATTERY NEGATIVE	GROUND
10	BLACK	GROUND	BATTERY NEGATIVE	GROUND
11	BLACK	GROUND	BATTERY NEGATIVE	GROUND
12	BLACK	GROUND	BATTERY NEGATIVE	GROUND

SPEED SIGNAL REQUIREMENTS

The Valid Trueline Leveling System requires a standard square wave signal representing the vehicle speed. The signal must have a peak-to-peak voltage between 8 and 30 volts and a maximum frequency of 2 kHz. The Trueline Leveling System is pre-calibrated for a speed signal input of 30,000 pulses per mile (500 Hz at 60 MPH).

Typically, this signal will originate from the vehicle's transmission. However, to determine an appropriate source for this signal you should contact your dealer.

For most vehicles which incorporate the Allison World-Series Transmission, Wire 157 in the transmission harness is the speed signal and is typically available in both of the vehicle interface module (VIM) connectors (if equipped), at pin B2 on the 18-pin connector (if equipped), or pin H2 on the 30 pin connector (see example diagram below). The wire color is commonly violet or tan and will be labeled '157'. Connect the Violet wire (labeled 'Speed H' on the Level Controller Harness) to this wire (157). Connect the Grey wire (labeled 'Speed L' on the Level Controller Harness) to the transmission ECU ground (typically labeled '143C'). On some vehicles this signal may already be available in the dash/cab harness, which could simplify installation, contact your dealer to determine if this is the case.

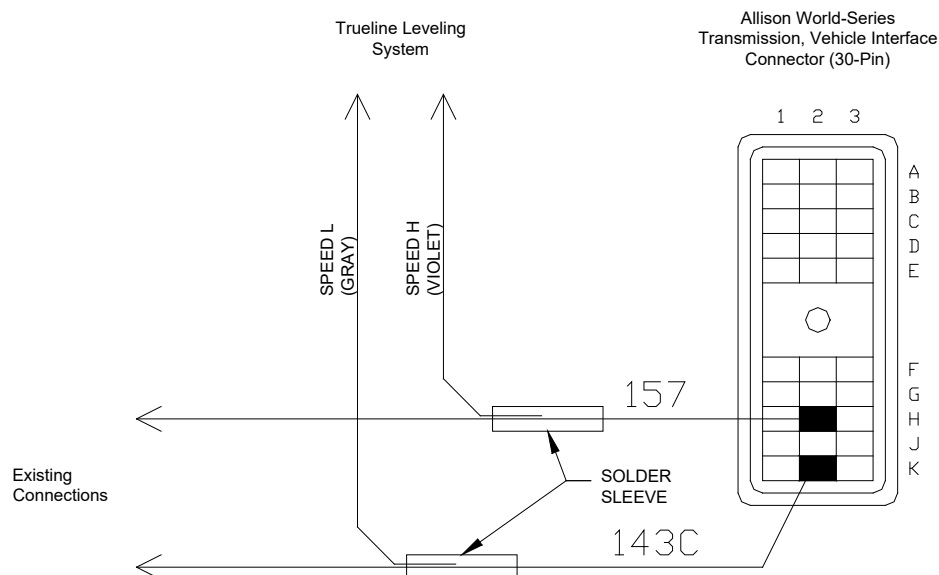


Figure 31

AIR MANIFOLD ASSEMBLY

Single and dual ride height manifold subcomponents:

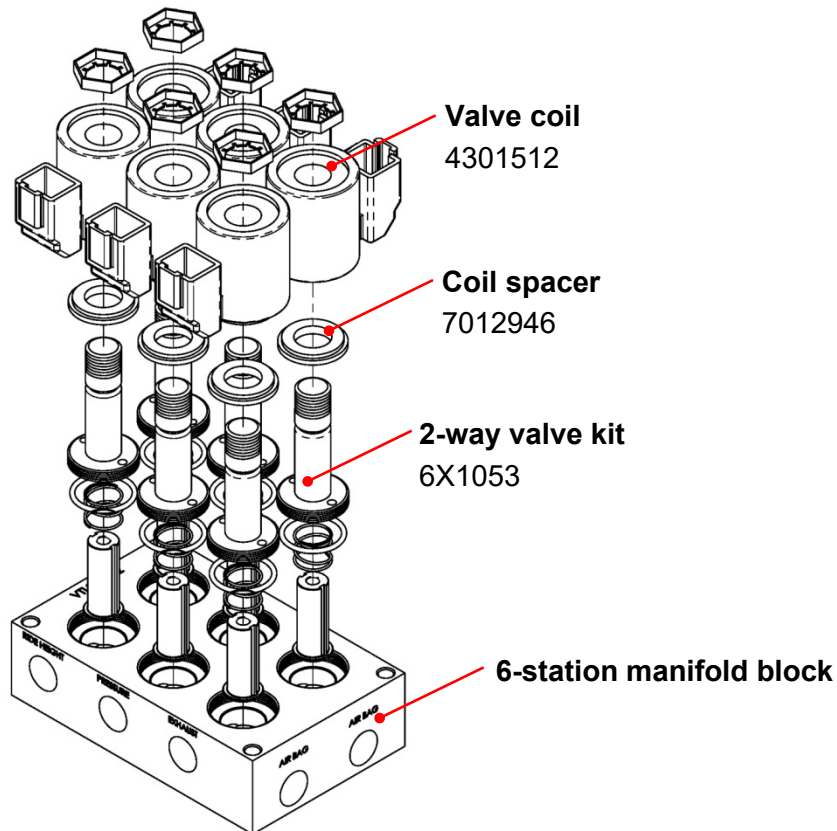
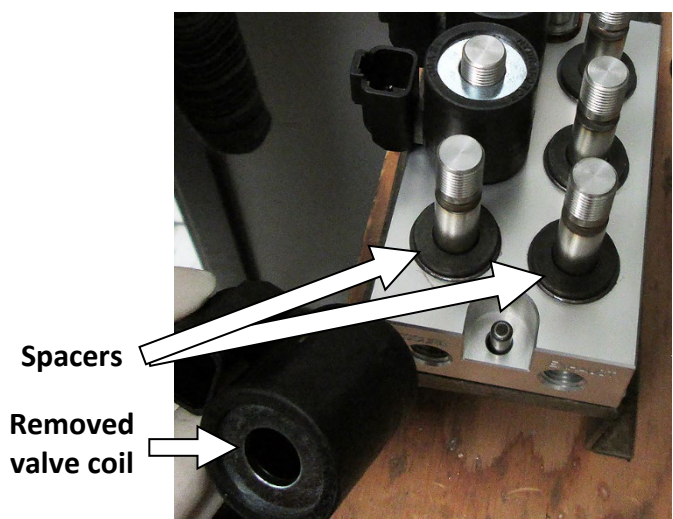


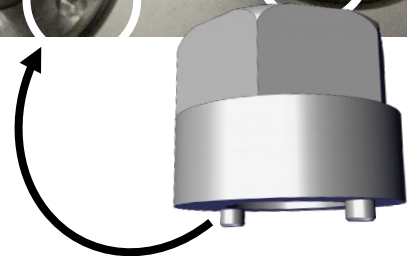
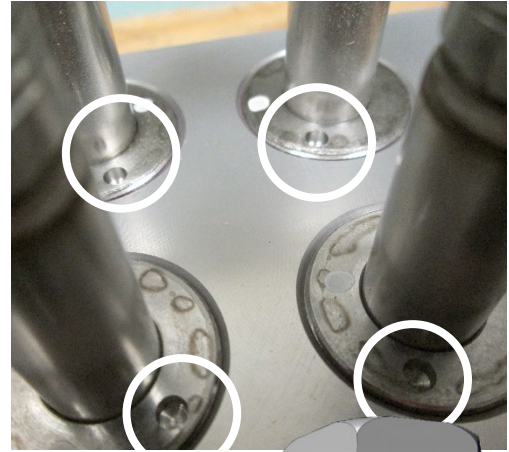
Figure 32

To disassemble the valve manifold:

1. Remove the black valve coil (part # 4301512) by loosening and removing the nut with a 3/4-inch wrench.
2. Remove the spacer (part # 7012946) at the base of the valve stem.
3. Remove the valve with the valve manifold tool (part # VTL01T001) and a 7/8-inch socket wrench.



The valve manifold tool has two protrusions which fit into counterbored holes at the base of the valve, allowing the valve to be loosened or tightened.



Manifold Valve Tool
Part# VTL01T001

GENERIC AIR SCHEMATIC

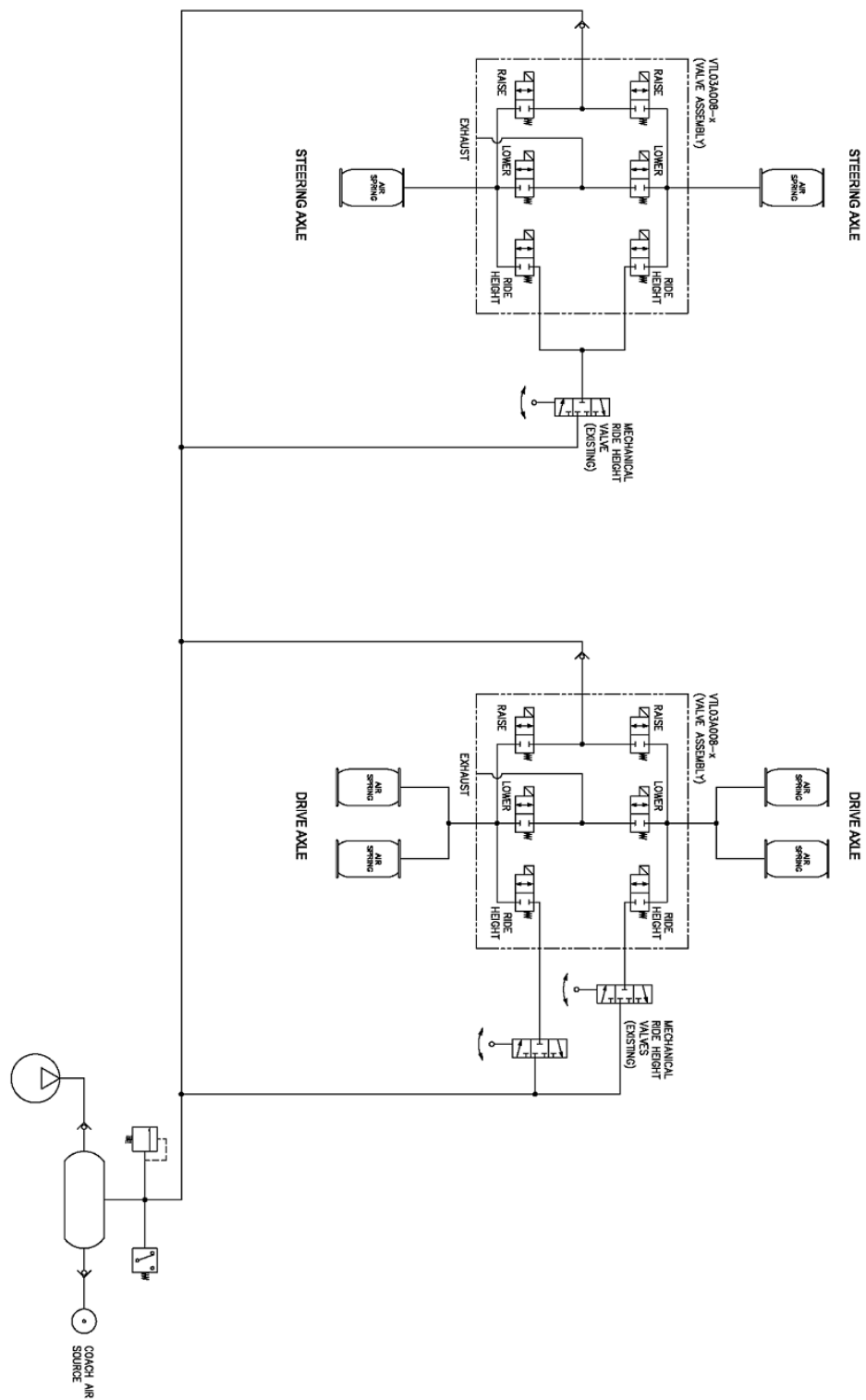


Figure 33

TAG LIFT

Tag Axle

On dual axles, there is a driven axle and a non-driven axle. When located behind the drive axle this free-rotating axle is called a tag axle.

Depending on the coach manufacturer, the tag axle may or may not have a lift capability. A tag axle will always have air bags. Even if there is no tag lift, these air bags can be exhausted so the tag axle is not supporting the coach; this is often done when put in reverse gear or by selecting a switch on the dash.

A dedicated pressure regulator may be used to set the 'down' pressure of a tag axle.

Lifting a tag axle will allow the coach to be more maneuverable, such as when parking or navigating through a tight space. It also provides increased traction on the remaining wheels which can be useful in slippery road conditions.

Tag Lift Feature

To support a lifting tag axle, Valid Manufacturing Ltd. has integrated a Tag Lift feature into some versions of the air-only and air/hydraulic leveling systems.

An optional trailer detector module will prevent the tag axle from lifting anytime a trailer is connected.

The tag axle is down during leveling. On each side of the coach, the drive and tag axle air bags are connected together so both axles are used to raise and lower the rear of the coach.

The Tag Lift feature is not available within the first 2-minutes after turning on the ignition. This is to ensure that there is sufficient air supply.

The Tag Lift feature is only available when in Travel mode.

TAG LIFT OPERATION

To operate Tag Lift when stopped or parked:

1. Start the engine. The controller will automatically turn on.

2. Press and release **TRAVEL**



3. Wait until the Tag Lift indicator stops slow-flashing (once per second) and turns off.



Tag Lift is disabled for the first 2-minutes after turning on the ignition. This allows the coach air pressure to build up.

4. Press and release **TAG LIFT**



5. The Tag Lift indicator will fast-flash (3 times a second). This indicates the Tag axle Lift actuators are active.



The drive axle air bags will automatically inflate for 10 seconds when activating the tag lift actuators. This is to compensate for the extra load being put on the drive axle

Warning: If the ignition is turned off while the tag axle is lifted, it will remain up. Battery drain will occur because all tag valves will be energized. Turn on the ignition and press **TRAVEL** to lower the tag axle then turn off the ignition.

Driving with Tag Lift active

1. As soon as the speed of the coach reaches 2 mph the buzzer will start to beep once per second. It will continue to beep until the speed reaches 10 mph. The **TAG LIFT** indicator will continue to fast-flash.

Fast Flash



2. Once the speed exceeds 10 mph, the tag axle will **automatically lower**, the **TAG LIFT** indicator will be on solid and beeping will cease.

Solid ON



3. As soon as the speed is reduced below 10mph, the tag axle will **automatically lift** and the **TAG LIFT** indicator will begin to fast-flash. The buzzer will start to beep once per second while the speed remains between 2 mph and 10 mph.

Fast Flash



4. Once the speed of the coach falls below 2 mph, the beeping will cease and the **TAG LIFT** indicator will continue to fast-flash. The tag axle remains lifted.

Fast Flash



TAG LIFT can be pressed at any time to turn off the indicator. If the tag axle is already lifted, it will be lowered. The tag axle will now remain lowered at all speeds.

TAG LIFT TROUBLESHOOTING

If a tag manifold valve is detected to be open circuit or short circuit, the **FAULT** indicator will illuminate.

Unlike other faults which illuminate one or more indicators in the Level Displays, a tag valve fault only illuminates the fault indicator.

The fault may be one or more of the following parts:

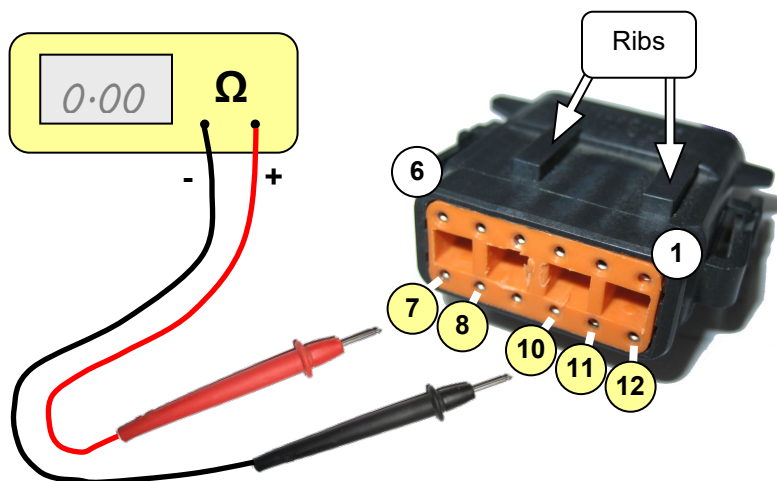
- Valve
- Harness
- Rear sensor

Test Harness and manifold valve coils for continuity:

1. Locate the rear sensor and disconnect the **black** Deutsch connector (The other connector is grey).



2. Inspect to confirm that there are no bent or damaged pins on the sensor module and the cable end sockets are correctly seated within the connector.



3. Use a multi-meter to test the resistance between the following pins. A good valve coil should measure around $10\ \Omega$, $\pm 10\%$.

Pins to test	Valve Description
10 & 7	Left Tag
10 & 8	Tag Lift
10 & 11	Tag Dump
10 & 12	Right Tag

4. If the resistance is OK then it is likely to be a faulty connection to the rear sensor or a faulty rear sensor.

Note: The system will detect a short circuit if the current exceeds 5-Amps, or less than $\sim 3\ \Omega$
The system will detect an open circuit if the resistance is greater than $\sim 27\text{K}\Omega$

5. If the resistance is too low or too high, locate the tag manifold and measure the resistance between each of the two coil connector pins. They should be around $10\ \Omega$, $\pm 10\%$.

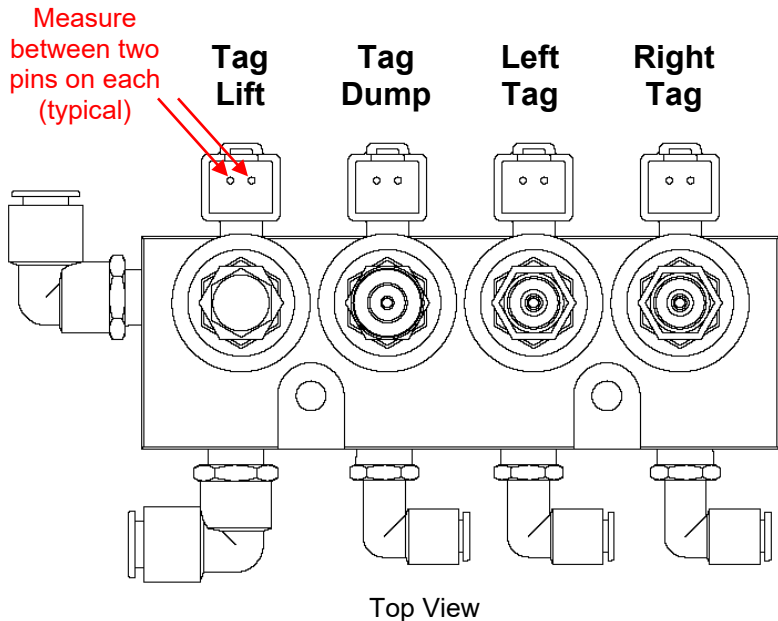


Figure 34

6. If the coil resistance is OK then it is likely the harness connection to the manifold, or the harness itself that is faulty.

TAG MANIFOLD

A tag manifold consists of four 3-way air valves.

Valve	Energized	De-energized
TAG LIFT	Tag axle lift actuators connected to coach air pressure to raise tag axle	Tag axle lift actuators connected to exhaust
TAG DUMP	Left and Right tag axle air bag valves connected to exhaust	Left and Right tag axle air bag valves connected to regulated air supply
LEFT TAG	Connects left tag axle air bag to tag dump valve	Connects left tag axle air bag to left drive axle air bags
RIGHT TAG	Connects right tag axle air bag to tag dump valve	Connects right tag axle air bag to right drive axle air bags

The Tag Lift valve is directly connected to the tag axle lift actuators

The Tag Dump valve works in conjunction with Left Tag and Right Tag valves

MODE	CONDITION	TAG BUTTON LIGHT	BUZZER	Tag manifold valve activation				TAG AXLE
				TAG LIFT	TAG DUMP	LEFT TAG	RIGHT TAG	
-	Ignition turned off with tag axle down	-	-	✗	✗	✗	✗	DOWN connected to drive axle pressure
	Ignition turned off with tag axle up	-	-	✓	✓	✓	✓	UP (Will go down when ignition is turned on and Travel is pressed)
Travel	For 2 minutes after Ignition turned on to allow air pressure to build up	SLOW FLASH	If press TAG button	✗	✗	✓	✓	DOWN connected to regulated pressure
	Less than 10mph	FAST FLASH  OFF	Beeps between 2 and 10 mph	✓	✓	✓	✓	UP Inflates drive axle air bags for first 10 seconds while lifting tag axle
		 OFF	-	✗	✗	✓	✓	DOWN connected to regulated pressure
	Greater than 10mph	ON (solid)  OFF	-	✗	✗	✓	✓	DOWN connected to regulated pressure
				✗	✗	✓	✓	DOWN Connected to regulated pressure. Will automatically lift when speed falls below 10 mph
Auto or manual for both air and hydraulic	-	OFF	If press TAG button	✗	✗	✗	✗	DOWN connected to drive axle pressure

Tag lift manifold subcomponents

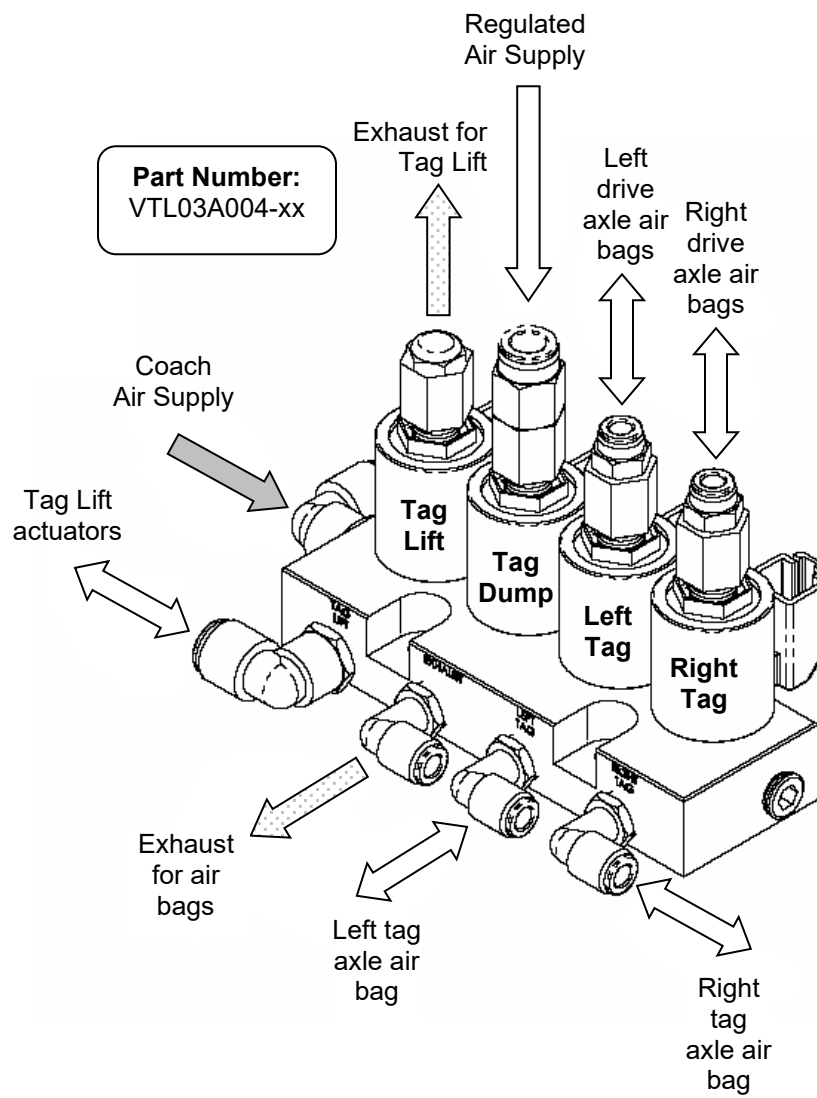


Figure 35

Tag Axle Air Manifold Connections

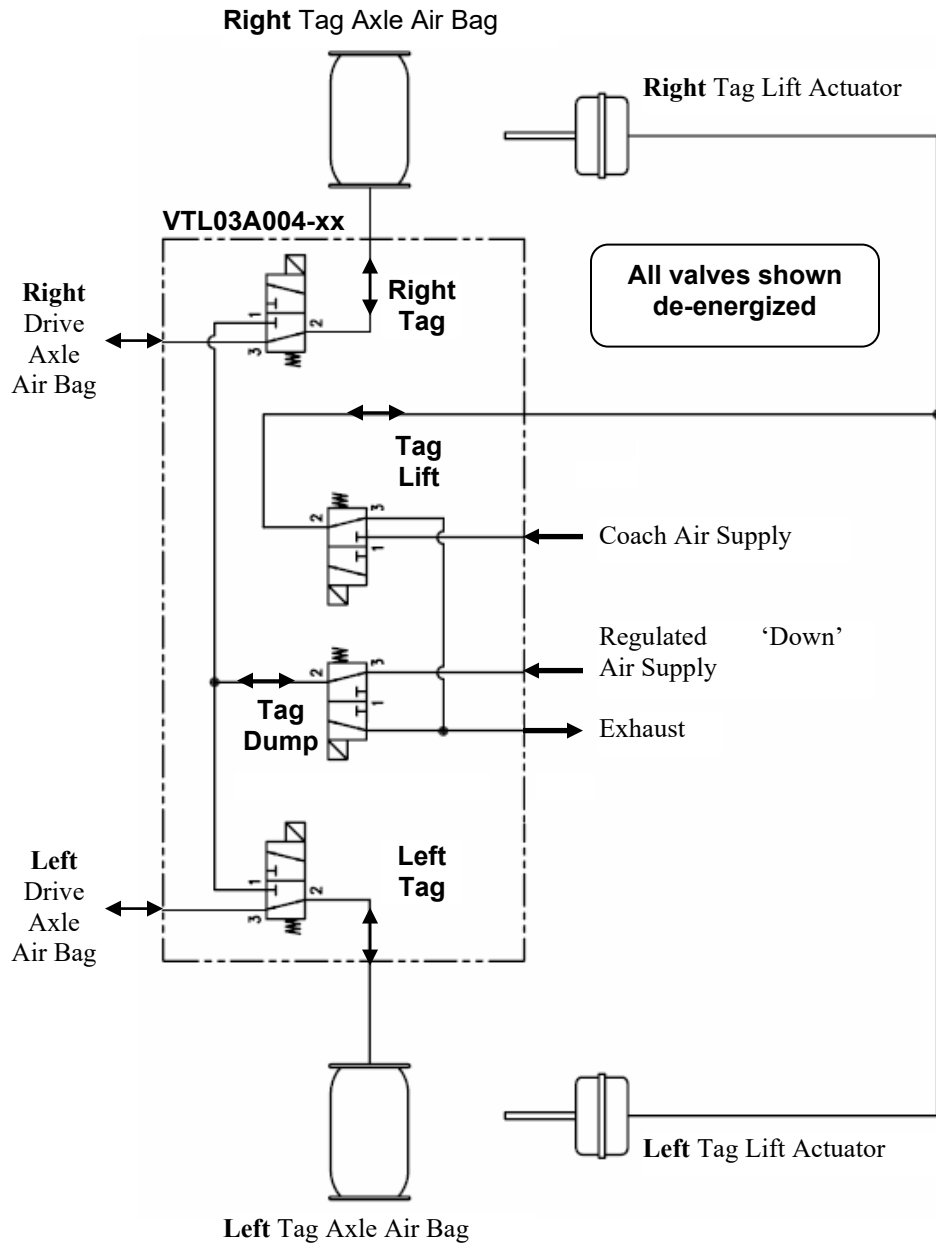


Figure 36

TRAILER DETECTION MODULE

The optional trailer detection module will prevent the tag axle from lifting anytime a trailer is connected to the coach.

Description of operation

Trailer detection is defined as having a current draw through the TAIL OUT wire (Trailer Lights illuminated) and/or having a load attached to the TAIL OUT (Trailer lights not illuminated).

- If a trailer is detected, the Tag Lift function will be disabled: If the **TAG LIFT** button is pressed, the controller will sound a short alarm and flash the 'Tag Lift' button light for 1 second.
- If the tag axle is already lifted and a trailer is detected, the tag axle will lower automatically. The tag axle will not automatically re-lift when the trailer is no longer detected.
- There is a configuration value in the controller which will disable the trailer detection module to allow the tag axle to be lifted normally.

Remove or disable the trailer detector module

If the trailer detector module is malfunctioning or you wish to disable or remove it, refer to the following Controller Setup instructions. Once the configuration is set to disable, the controller completely ignores the trailer detector module.

TRAILER DETECT CONFIGURATION

Before the system can function properly the controller must be configured correctly.

Air Only with Tag Lift

Config Item	Item Description	Desired Setting
Air 1	Twist Limit	2
Air 2	Air Leveling Mode	5
Air 3	Manual Mode Speed Limit	1
Air 4	Low-Voltage Threshold	3
Air 5	Leveling Tolerance	2
Air 6	Air Bag Deflate Time	4
Air 7	Re-level Interval	4
Air 8	Brake Input Source	2
Air 9	Travel Mode Accel Display	3
Air 10	Diagnostic Mode	2
Air 11	Leveling Action Timeout	3
Air 12	Excess Slope Limit	4
Air 13	Trailer Detection Enable	2

Air/Hydraulic with Tag Lift

Config Item	Item Description	Desired Setting
Air 1	Twist Limit	2
Air 2	Air Leveling Mode	5
Air 3	Manual Mode Speed Limit	1
Air 4	Low-Voltage Threshold	3
Air 5	Leveling Tolerance	2
Air 6	Air Bag Deflate Time	2
Air 7	Re-level Interval	4
Air 8	Brake Input Source	2
Air 9	Travel Mode Accel Display	3
Air 10	Diagnostic Mode	2
Air 11	Leveling Action Timeout	3
Air 12	Excess Slope Limit	4
Air 13	Hydraulic Enable	2
Air 14	Trailer Detection Enable	2
Hyd 1	Longitudinal Extend Front	5
Hyd 2	Longitudinal Retract Front	7
Hyd 3	Lateral Extend Rear	3
Hyd 4	Lateral Retract Rear	7
Hyd 5	Longitudinal Extend Rear	7
Hyd 6	Longitudinal Retract Rear	7
Hyd 7	Air Bad Deflate Time	7
Hyd 8	Actuator Timeout	7
Hyd 9	Acceleration Filter	4
Hyd 10	Air Bag Pre-inflate Time	2
Hyd 11	Front Actuator Retract Time	4
Hyd 12	Settle Time	5
Hyd 13	Extend Over Limit	2

Remove/Disable Detection Module

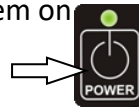
If detection module is malfunctioning or you wish to disable or remove the trailer detection module read the following:

All that is needed is to set the very last air configuration item to the lowest position (disabled, LED #1). This tells the controller to completely ignore the detection module. Therefore you do not have to remove the module from the vehicle if you do not wish to. One thing here to note is that on Air/Hydraulic w/ TAG systems it is important to be in the AIR configuration settings (because the hydraulic button acts as a toggle and it really depends on how long the button has been held down for). This should be the settings in which the hydraulic LED is NOT blinking.

Controller Setup – Trailer Detection Module

A new configuration item has been added to enable or disable the trailer detector module. The **Air Only** controller has a different configuration item than the **Air/Hydraulic**.

- Ensure the system is powered off (ignition must be off).
- Press and release **POWER** to turn the system on



- Enter service mode by pressing and holding **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.



AIR ONLY	AIR / HYDRAULIC
Press TAG LIFT to enter the configuration mode. 	Press HYD to enter the configuration mode. 

Note: If you do not press either **TAG LIFT** or **HYD** within 5 seconds after the tone is heard, the system will exit service mode.

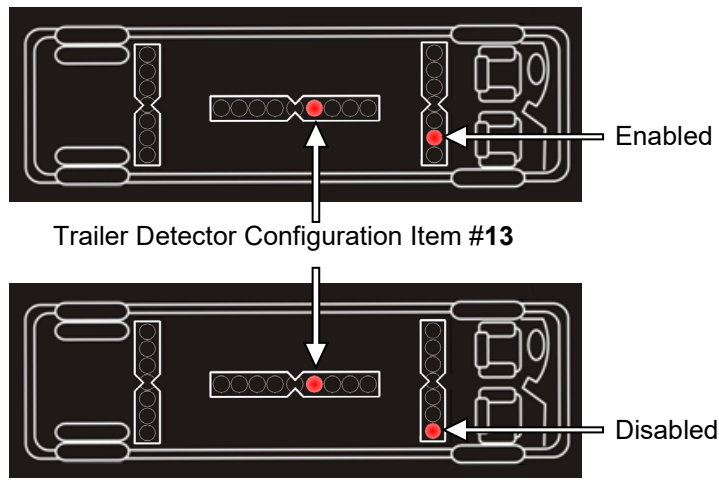
-
- If equipped with hydraulic leveling, ensure that the AIR configuration mode is selected; **HYD** indicator must be **off**. If it is flashing, press **HYD** to turn off the indicator.
 - Press rear right **RAISE** to advance to the desired configuration **item**. (Press rear right **LOWER** to go to the previous **item**).
 - Press front right **RAISE** to increase the **setting** or press front right **LOWER** to decrease the **setting**.

Note: If you do not select an **item** or **setting** within 30 seconds the system will exit service mode.

- Press **MANUAL** to save your configuration settings to permanent memory (EEPROM).

Note: If you change any values without saving them, they will be used temporarily until the system is reset (press **POWER** button for 10 seconds) or the battery is disconnected. Then the system will re-load the saved values from EEPROM memory.

Configuration - Air Only



Configuration – Air/Hydraulic

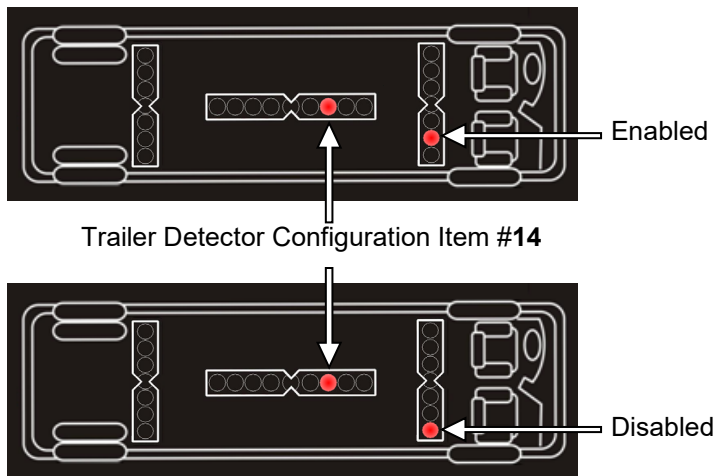
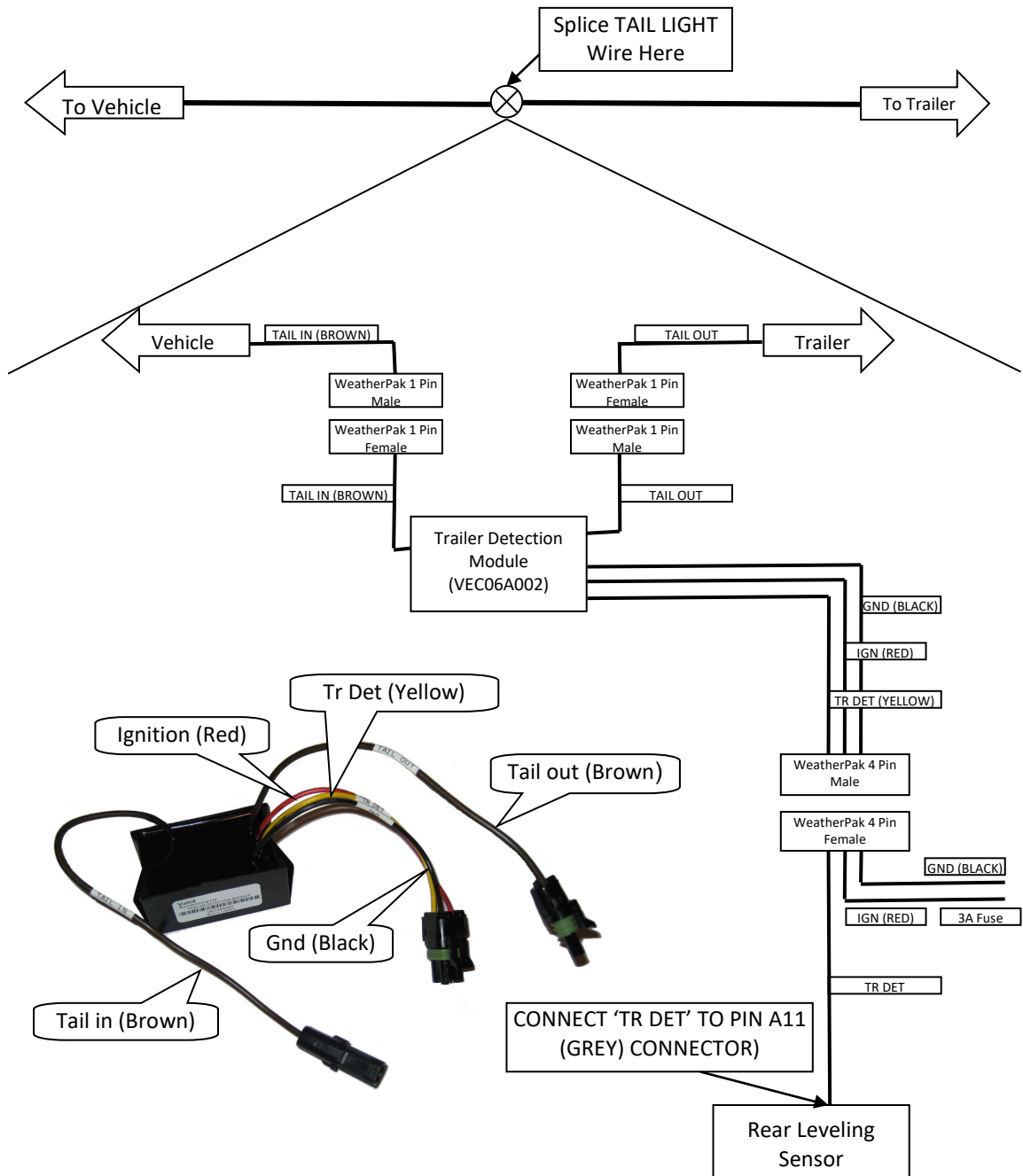


Figure 37 Trailer Detection Module Installation Diagram



GENERAL TROUBLESHOOTING

Here we have provided a number of common troubles and their solutions. If you do not see your particular concern addressed here, please contact Valid Manufacturing Ltd. (See page 95 for contact information.)

For DC voltage checks, refer to page 44. For resistance checks refer to page 46.

Trouble Shooting Charts (Air/Hydraulic)

Trouble with selecting leveling functions

Unable to enter 'air auto level' mode	• Check that vehicle is stopped and park brake is on • Check that ignition is on • Check that hydraulic jacks are fully stored
Unable to enter 'hydraulic auto level' mode	• Check that vehicle is stopped and park brake is on • Check that ignition is on and vehicle is in neutral (or park) • Check that hydraulic jacks are fully stored
Unable to enter 'air manual level' mode	• Check that vehicle is traveling slower than 10 mph
Unable to enter 'hydraulic manual level' mode	• Check that vehicle is stopped and park brake is on • Check that ignition is on and vehicle is in neutral (or park)

Diagnosing Fault Codes

Loss of communication with sensor or I/O module	• Check fuse for sensor or I/O module • Check power to sensor or I/O module (refer to schematic) • Check integrity of harness to sensor or I/O module • Check condition of sensor or I/O module
Failure of valve (open circuit)	• Check for low battery voltage • Check valve solenoid for open circuit • Check integrity of harness to sensor or I/O module controlling valve • Check condition of sensor or I/O module

Failure of valve (short circuit)	• Check for low battery voltage • Check valve solenoid for short circuit • Check integrity of harness to sensor or I/O module controlling valve • Check condition of sensor or I/O module
Accelerometer Fault	• Reset system. If problem persists, replace sensor

Trouble Shooting Chart (Hydraulic Only)

Trouble with selecting leveling functions

Unable to enter 'hydraulic auto level' mode	• Check that vehicle is stopped and park brake is on • Check that ignition is on and vehicle is in neutral (or park) • Check that hydraulic jacks are fully stored
Unable to enter 'hydraulic manual level' mode	• Check that vehicle is stopped and park brake is on • Check that ignition is on and vehicle is in neutral (or park)

Diagnosing Fault Codes

Loss of communication with sensor	• Check fuse for sensor • Check power to sensor (refer to schematic) • Check integrity of harness to sensor • Check condition of sensor
Failure of valve (open circuit)	• Check for low battery voltage • Check valve solenoid for open circuit • Check power to sensor (refer to schematic) • Check integrity of harness to sensor controlling valve • Check condition of sensor
Failure of valve (short circuit)	• Check for low battery voltage • Check valve solenoid for short circuit • Check integrity of harness to sensor controlling valve • Check condition of sensor
Accelerometer Fault	• Reset system. If problem persists, replace sensor

Trouble Shooting Chart (Air Only)

Trouble with selecting leveling functions

Unable to enter 'air auto level' mode	• Check that vehicle is stopped and park brake is on • Check that ignition is on
Unable to enter 'air manual level' mode	• Check that vehicle is traveling slower than 10 mph

Diagnosing Fault Codes

Loss of communication with sensor	• Check fuse for sensor • Check power to sensor (refer to schematic) • Check integrity of harness to sensor • Check condition of sensor
Failure of valve (open circuit)	• Check for low battery voltage • Check valve solenoid for open circuit • Check integrity of harness to sensor controlling valve • Check condition of sensor
Failure of valve (short circuit)	• Check for low battery voltage • Check valve solenoid for short circuit • Check integrity of harness to sensor controlling valve • Check condition of sensor
Accelerometer Fault	• Reset system. If problem persists, replace sensor

Frequently Asked Questions (FAQ)

	QUESTION	ANSWER
1	I am unable to enter auto level mode; they keypad beeps when I press the button.	Ensure the ignition is ON (power light lit solid) and the park brake is set ("PARK" illuminated on the keypad)
2	I am unable to level my coach in manual mode and my keypad says "TWIST"	You have reached the twist limit as detected by the keypad. Any movement in a direction that would increase the amount of twist will be disallowed by the keypad.
3	The fault light is on, but no faults are showing.	Check for 'tag lift' or 'tag dump' valve faults. See page 46.
4	I'm testing the outputs for voltage, and get strange readings.	Output voltage cannot be tested due to supervisory signals. See page 44.
5	I can hear valves clicking, but the coach does not move.	Ensure that you have adequate air pressure to lift the coach.
6	My coach is leveled, but the entry height is too (high / low).	After auto leveling, use the All Corners RAISE and LOWER buttons to adjust your entry height while maintaining level.
7	My coach goes out of level between leveling cycles.	Check for leaks in your air system. Factory configuration is set to re-level every 2 hours. If the coach changes height before this time, it is probably an air leak, a stuck valve, or a leaking valve.

FIRMWARE VERSION

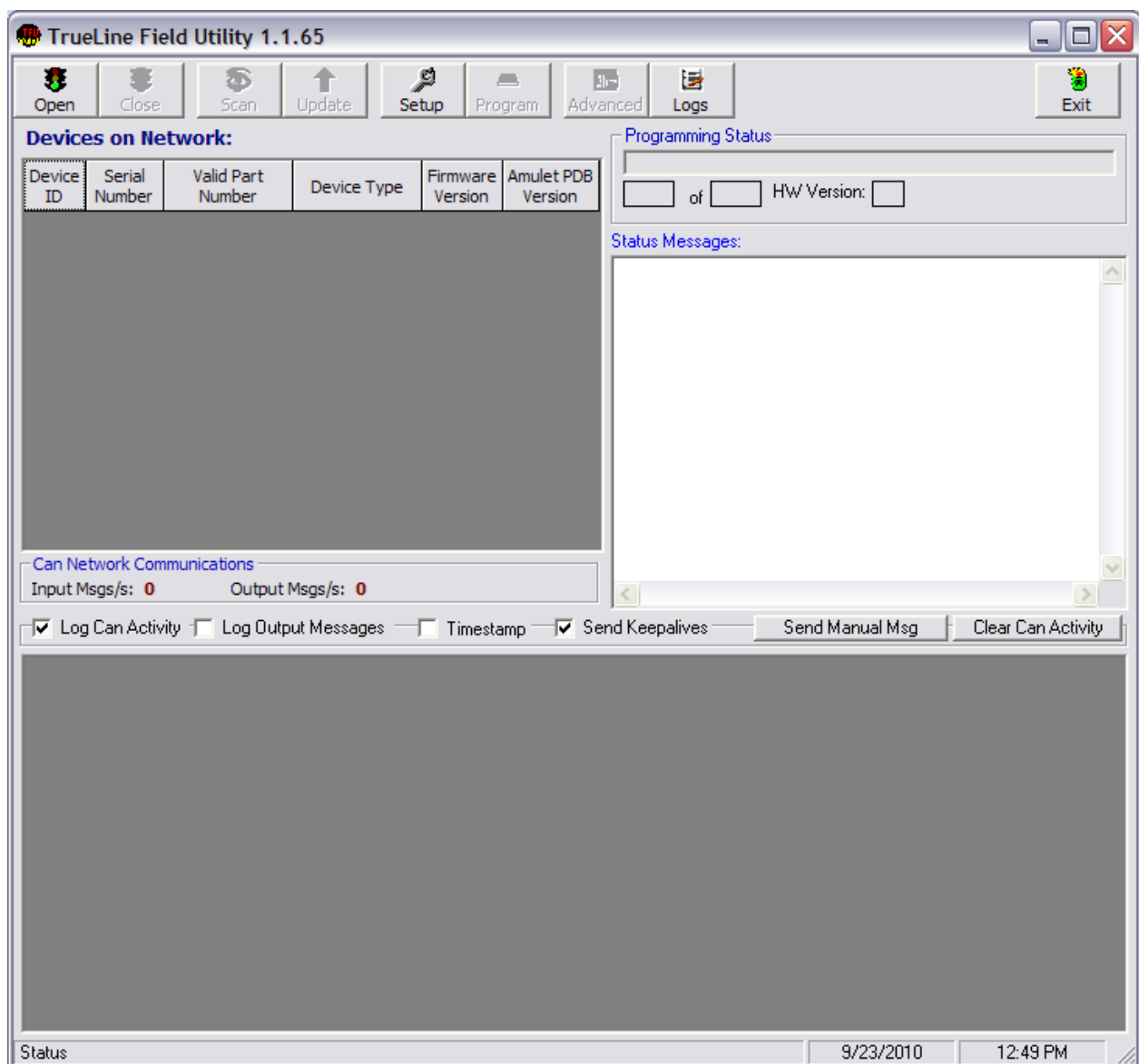
Firmware versions can be determined by submitting the serial number and part number of the device in question to Valid Manufacturing, but the records held there will only indicate what version the device shipped with and not indicate any possible updates that may have been done in the field. Actual installed firmware versions can only be determined by reading the device with the *Trueline Field Utility*.

TRUELINE FIELD UTILITY

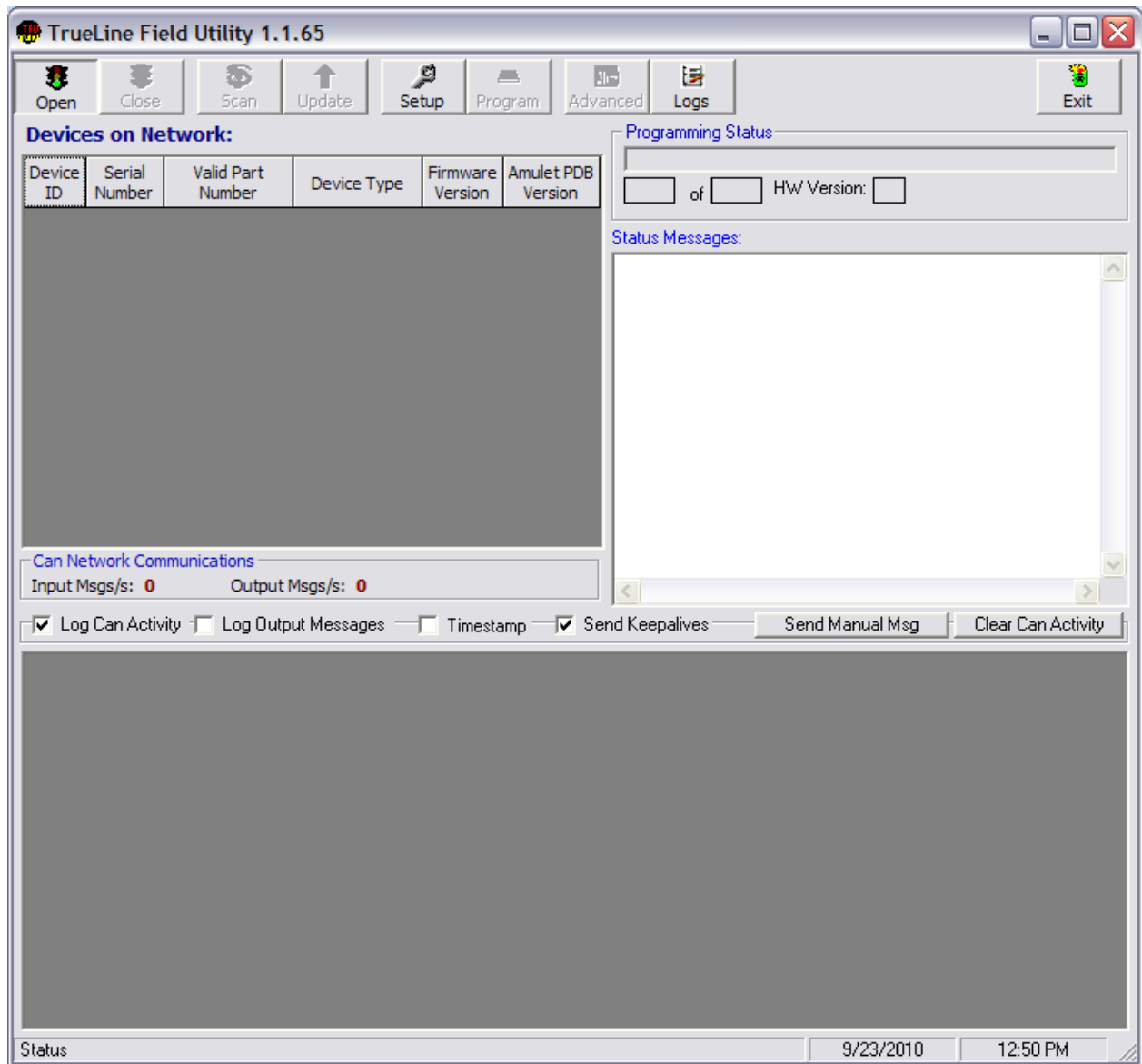
The Valid Trueline Field Utility (TFU) is software designed to update the firmware on the Valid Trueline Leveling Systems. It has the capability to check the currently installed firmware in sensor modules and keypads, and update it to the newest firmware available. Using a computer and a USB to CAN interface, the TFU will read the current firmware on the sensors and keypad, and then update it.

See the documentation included with the interface kit for connection information.

When you first start the program, the following screen will be displayed.

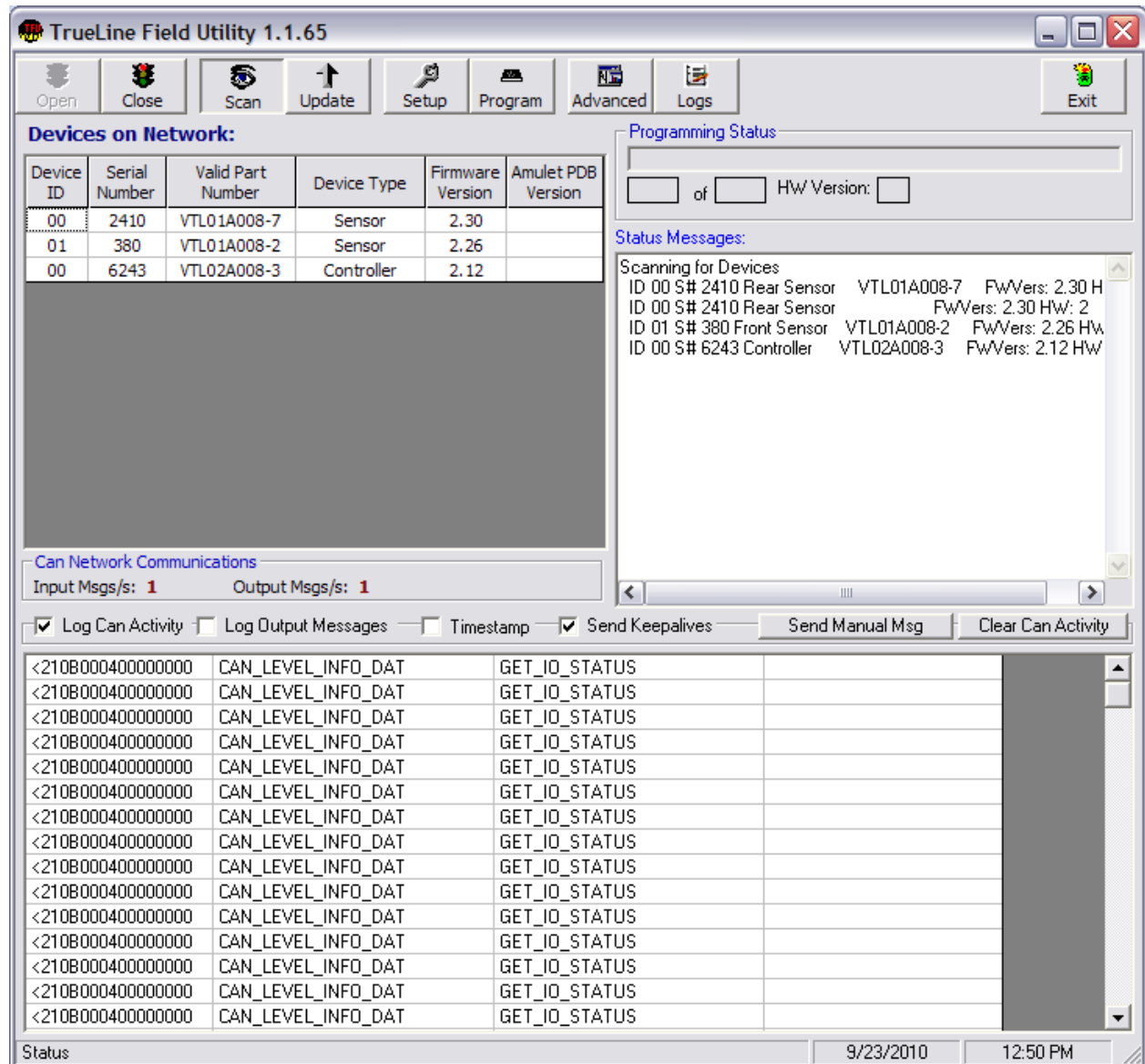


With the CAN adapter connected to the computer and leveling system, press **OPEN**.

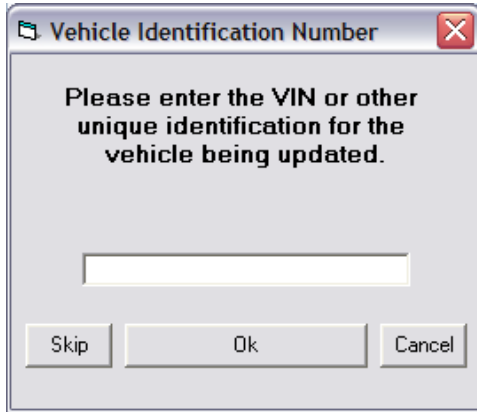


Next press **SCAN**. This will find all of the devices currently in use in the Valid Trueline Leveling System. Note that the controller (keypad) must be powered on to be discovered by the utility.

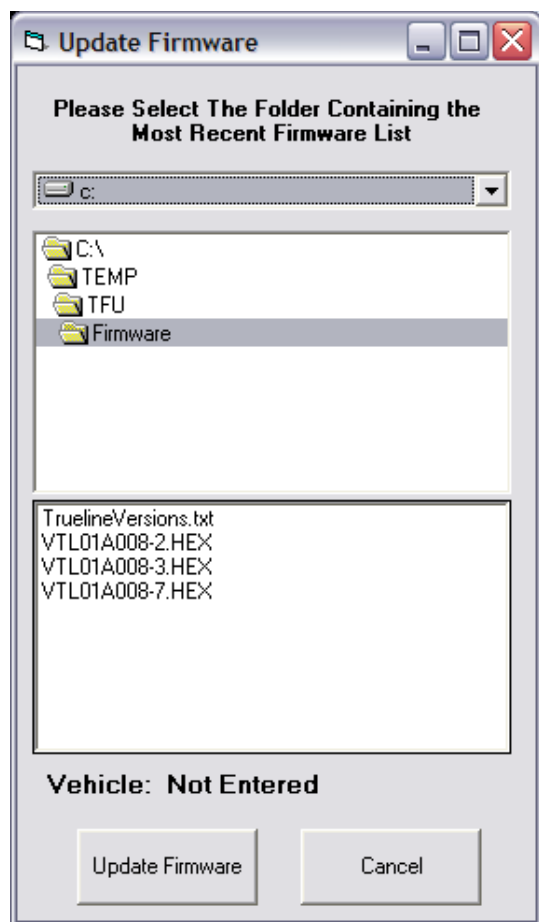
In combination (air/hydraulic) systems, there should be 4 (four) devices appearing on the screen, in all other systems there should only be 3 (three).



Press the **UPDATE** button, and the following screen will pop up. You may enter a unique identifier, and then press **OK**.



The following screen should appear. The folder you choose will be the one where the firmware files have been stored on your computer.



Press **UPDATE FIRMWARE**. The program will now update the devices in your coach.

TrueLine Field Utility 1.1.65

Open Close Scan Update Setup Program Advanced Logs Exit

Devices on Network:

Device ID	Serial Number	Valid Part Number	Device Type	Firmware Version	Amulet PDB Version
00	4192	VTLO1A008-7	Sensor	2.13	
01	380	VTLO1A008-2	Sensor	2.26	
00	6243	VTLO2A008-3	Controller	2.12	

Programming Status

of HW Version:

Status Messages:

Scanning for Devices
 ID 00 S# 4192 Rear Sensor VTLO1A008-7 FwVers: 2.13 H
 ID 01 S# 380 Front Sensor VTLO1A008-2 FwVers: 2.26 HW
 ID 00 S# 6243 Controller VTLO2A008-3 FwVers: 2.12 HW
 Checking for out-of-date device firmware
 Device 00 VTLO1A008-7 is up to date
 Device 01 VTLO1A008-2 is up to date
 Device 00 VTLO2A008-3 is up to date
 Finished Updating Device Firmware
 Scanning for Devices
 ID 00 S# 4192 Rear Sensor VTLO1A008-7 FwVers: 2.13 H
 ID 01 S# 380 Front Sensor VTLO1A008-2 FwVers: 2.26 HW
 ID 00 S# 6243 Controller VTLO2A008-3 FwVers: 2.12 HW

Can Network Communications

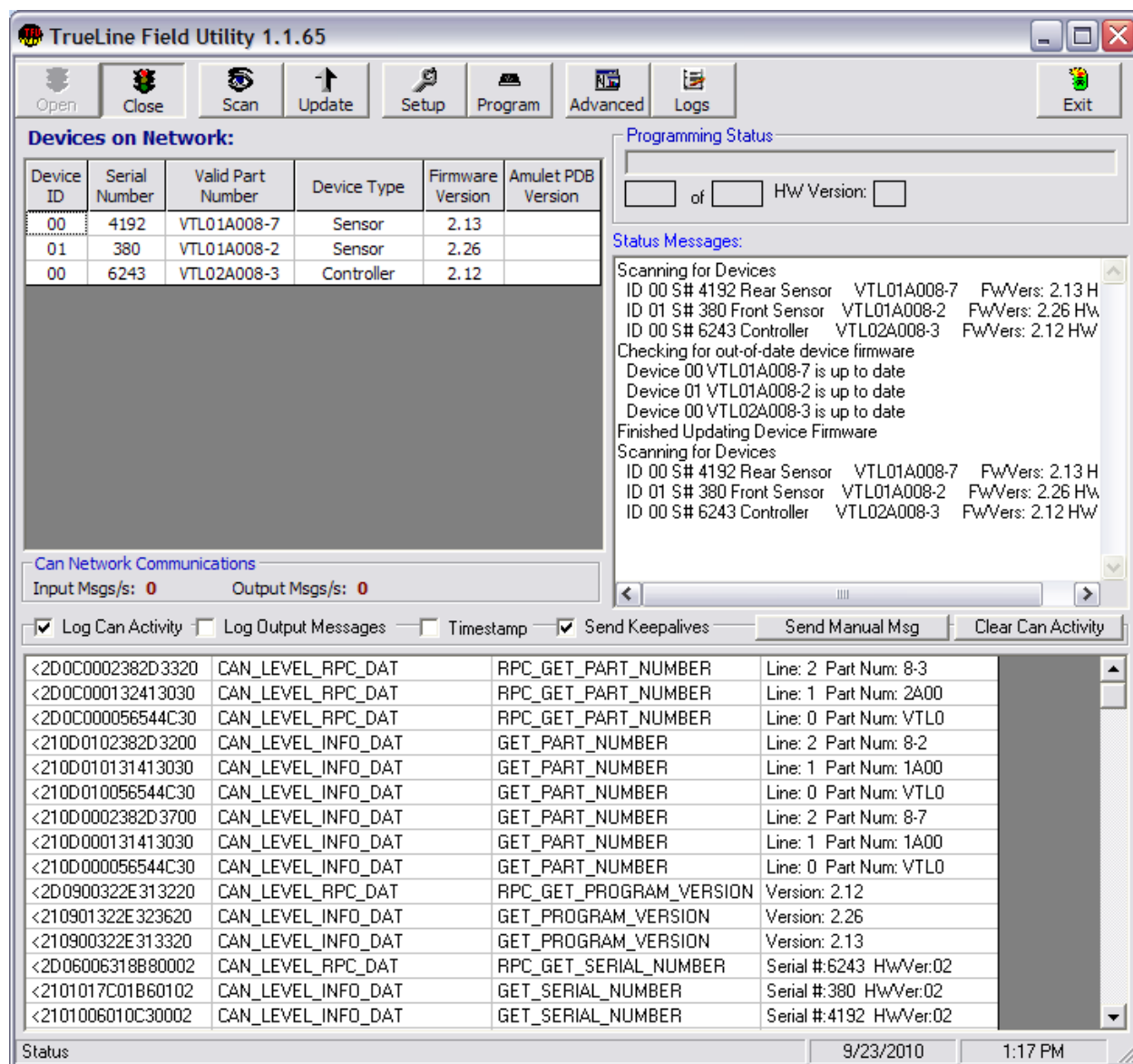
Input Msgs/s: 0 Output Msgs/s: 0

☒ Log Can Activity ☐ Log Output Messages ☐ Timestamp ☒ Send Keepalives

<2D0C0002382D3320	CAN_LEVEL_RPC_DAT	RPC_GET_PART_NUMBER	Line: 2 Part Num: 8-3
<2D0C000132413030	CAN_LEVEL_RPC_DAT	RPC_GET_PART_NUMBER	Line: 1 Part Num: 2A00
<2D0C000056544C30	CAN_LEVEL_RPC_DAT	RPC_GET_PART_NUMBER	Line: 0 Part Num: VTLO
<210D0102382D3200	CAN_LEVEL_INFO_DAT	GET_PART_NUMBER	Line: 2 Part Num: 8-2
<210D010131413030	CAN_LEVEL_INFO_DAT	GET_PART_NUMBER	Line: 1 Part Num: 1A00
<210D010056544C30	CAN_LEVEL_INFO_DAT	GET_PART_NUMBER	Line: 0 Part Num: VTLO
<210D0002382D3700	CAN_LEVEL_INFO_DAT	GET_PART_NUMBER	Line: 2 Part Num: 8-7
<210D000131413030	CAN_LEVEL_INFO_DAT	GET_PART_NUMBER	Line: 1 Part Num: 1A00
<210D000056544C30	CAN_LEVEL_INFO_DAT	GET_PART_NUMBER	Line: 0 Part Num: VTLO
<2D0900322E313220	CAN_LEVEL_RPC_DAT	RPC_GET_PROGRAM_VERSION	Version: 2.12
<210901322E323620	CAN_LEVEL_INFO_DAT	GET_PROGRAM_VERSION	Version: 2.26
<210900322E313320	CAN_LEVEL_INFO_DAT	GET_PROGRAM_VERSION	Version: 2.13
<2D06006318880002	CAN_LEVEL_RPC_DAT	RPC_GET_SERIAL_NUMBER	Serial #:6243 HwVer:02
<2101017C01860102	CAN_LEVEL_INFO_DAT	GET_SERIAL_NUMBER	Serial #:380 HwVer:02
<2101006010C30002	CAN_LEVEL_INFO_DAT	GET_SERIAL_NUMBER	Serial #:4192 HwVer:02

Status 9/23/2010 1:17 PM

Once TFU displays “Finished Updating Device Firmware” in the status message box it has finished updating the firmware on the modules. Press **CLOSE** to stop the computer from communicating with the Valid Trueline Leveling System.



The devices in the leveling system are now updated, and you may exit the program. Unhook the USB to CAN adapter, and reinstall the terminator.

WARRANTY & SERVICE

Warranty

Please refer to your operation guide or OEM supplier for warranty information.

Service

For information or service on your Trueline Leveling System, contact your coach manufacturer or Valid Manufacturing Ltd.

Valid Manufacturing Ltd.

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Salmon Arm, B.C.
Canada
V1E 1X2

Phone: 250-832-6477

Fax: 250-832-7746

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