

# International Level Auto Leveler System Overview

## Summary:

The International Level Auto Leveler is designed to automatically level motorized recreational vehicles. The system contains the following:

- Controller unit
- Touch Panel unit
- 4 DC jack motors, installed near 4 corners of vehicle

The system requires the following electrical connections:

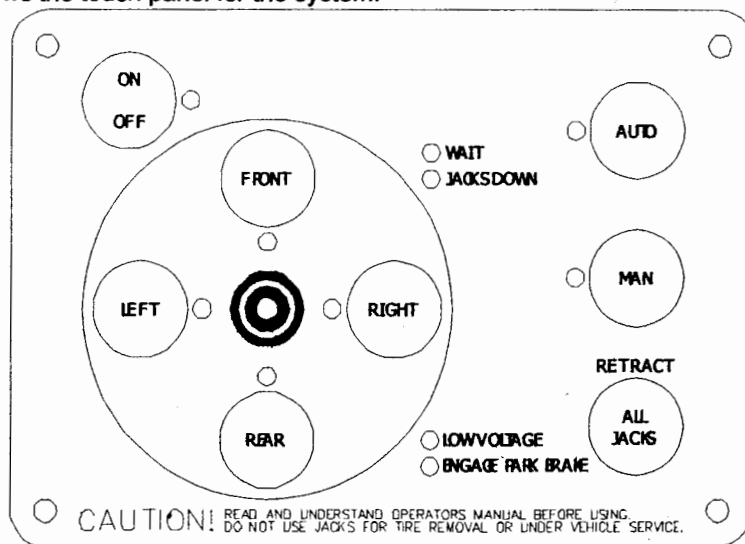
- battery power (heavy gauge)
- battery ground (heavy gauge)
- logic power (switched via ignition)
- park brake signal (open = park brake disengaged, GND = park brake engaged)
- 4-wire harness connecting Controller to Touch Panel

The system is designed to provide the following features:

- Automatic extension of jacks from full retract position (with automatic ground detection)
- Automatic leveling of jacks (once all jacks are on the ground)
- Manual leveling of jacks (if all jacks are on the ground)
- Automatic retraction of jacks (with automatic full retract detection)
- Air features (configurable on/off)
- Jack Load Sharing
- User alarm mode (jacks not retracted and park brake is disengaged)
- Automatic jack error detection, and error mode
- Configuration mode for Air features
- Configuration mode for Leveling Zero Point

## Touch Panel:

The following diagram shows the touch panel for the system.



The switches on the touch panel provide the following features:

- On/Off Turns the panel on/off

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- Auto Activates auto extend and auto level mode
- Manual Activates auto extend and manual level mode
- Retract All Activates auto retract mode and is a momentary jack retract in manual mode
- Front/Left/Right/Rear Controls the jacks in manual mode

The LEDs on the touch panel show the following status:

- On Alerts user that the system is on
- Auto Alerts user that the system is operating in auto mode (auto extend or auto level)
- Manual Alerts user that the system is operating in manual mode (auto extend or manual level)
- Wait Alerts user that Air features are active, or Auto Level sequence is active
- Jacks Down Alerts user that at least one jack is not fully retracted
- Low Voltage Alerts user that a low voltage condition has been detected.
- Enable Park Brake Alerts user that park brake is disengaged and should be enabled.
- Front/Left/Right/Rear Alerts user that that the corresponding vehicle axis is out of level

## **Manual Leveling:**

The following is a brief description of a (normal) Manual Leveling cycle.

- Verify that park brake is engaged, and that a low voltage condition does not exist
- Verify that all jacks are fully retracted, or that all jacks are on the ground. Manual leveling cycle cannot start unless one of these conditions is true
- Switch the panel on by hitting the On/Off switch (On/Off LED turns on)
- Hit that Manual switch (Manual LED turns on)
- If jacks are fully retracted, the jacks will begin automatically extending. Jacks will stop when the ground is hit. Wait LED will blink while the jacks are automatically extending.
- After the jacks are on the ground, manual features are available
- The Front/Left/Right/Rear LEDs show the axis that need to be leveled
- The Front/Left/Right/Rear switch extends that jacks pair while the switch is held (momentary operation)
- The Retract All switch retracts all jacks while the switch is held (momentary operation)
- Hit the Manual switch when done with manual mode (Manual LED turns back off)

## **Automatic Leveling:**

The following is a brief description of an Auto Leveling cycle.

- Verify that park brake is engaged, and that a low voltage condition does not exist
- Verify that all jacks are fully retracted. Auto leveling cycle cannot start if jacks are not fully retracted.
- Switch the panel on by hitting the On/Off switch (On/Off LED turns on)
- Hit that Auto switch (Auto LED turns on)
- Wait LED blinks while auto leveling
- At this point, the jacks should be automatically extending to ground.
- After the jacks are on the ground, auto leveling begins. Wait LED will blink.
- The Front/Left/Right/Rear jacks will automatically extend as necessary until system is optimally leveled. The Front/Left/Right/Rear LEDs show the axis being leveled.
- Auto LED will turn off when system has been leveled

**NOTE:** User should limit their movements in the vehicle while the system is auto leveling. This helps the system ensure that the level sensor is not seeing movement.

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## **Jack Retraction:**

Jacks must be retracted prior to moving the vehicle. Jacks should also be retracted before starting an auto leveling sequence. The following is a brief description of the jack retraction sequence

- Verify that park brake is engaged, and that a low voltage condition does not exist
- Switch the panel on by hitting the On/Off switch (On/Off LED turns on)
- Hit that Retract All switch
- The jacks will automatically retract until the full retract position is detected
- Wait LED will blink while the jacks are automatically retracting

## **Air Features:**

The system has the option to control external Air features.

When enabled, the feature works according to the following logic:

- Bags are automatically dumped when starting an auto extend sequence (jacks leave the all-retract position, level sequence starting)
- Bags are automatically filled when starting an auto retract sequence.
- Bags are automatically filled if jacks ever become "fully retracted"

The Wait LED will blink for the first 45 seconds of an air fill operation. This alerts the user that they should wait until the bags have filled.

## **User Alarm Mode:**

If the system detects that the park brake has been disengaged while at least one jack is not fully retracted, then the panel will signal this error to the user.

When in alarm mode, most LEDs will flash and the buzzer will beep. The Status LEDs will show the system status.

In this mode the user has two options:

- Engage the park brake
- Attempt to fully retract the jacks by hitting the Retract All switch

No other features are available in this mode.

## **Level Zero Point Configuration:**

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

To set the zero point (controller module must be fully secured in production intent location), first run a manual leveling sequence to get the vehicle at the desired level point. Then activate the level zero point configuration mode.

This mode is enabled by performing the following sequence:

- Turn the panel off
- Within 20 seconds, perform the following:
  - Press the Front switch 5 times
  - Press the Rear switch 5 times
- At this point all LED outputs will blink, and the buzzer will be off. You are now in zero mode.



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- Left Rear jack has an error      Left LED blinking  
   Rear LED blinking
- Right Rear jack has an error      Right LED blinking  
   Rear LED blinking

All normal features are disabled in Error mode. The intent of this mode is to allow the user or service technician to individually drive the jacks, in order to isolate the error. Please note that all additional error detection is disabled in this mode. The user actuates the jacks at their own risk.

To extend or retract and individual jacks, three buttons must be held down.

- The Auto or Manual switch determines extend or retract operation (respectively)
  - To extend an individual jack, the AUTO switch must be held down.
  - To retract an individual jack, the MANUAL switch must be held down.
- Two direction switches must be held to determine which jack to move.
  - Left + Front switches control the Left Front jack
  - Right + Front switches control the Right Front jack
  - Left + Rear switches control the Left Rear jack
  - Right + Rear switches control the Right Rear jack

When the user/technician is confident that the error has been removed, they can attempt to exit Error mode by hitting the Retract All switch and performing a Jack Retract sequence. If the error has been eliminated, the jacks will retract to the home position and the panel will return to normal operation. If the error persists, the system will return to error mode.

## **Miscellaneous:**

- The system will automatically shut down after 5 minutes of no operation
- Auto leveling cycle cannot be started until all jacks are fully retracted. Make sure jacks are retracted before attempting to auto level.
- Manual Leveling cycle can only be started if all jacks are on the ground, or if all jacks are retracted. Make sure one of these two conditions is true before attempting to manually level.
- System will refuse any operation when a low voltage condition is present
- System will automatically alarm if park brake is disengaged and jacks are not retracted. In alarm mode, the only available feature is to retract all jacks.
- Please note the Wait LED shows the status of Air features.
- Please note that the LEDs blink differently when in special controller modes (error, alarm, and configuration). Learning how to recognize these modes is important.
- In manual mode, the system refuses to allow momentary jack retract until at least one pair of jacks has been extended.
- If an Auto Level cycle is attempted without having set the Leveling Zero Point, the system will automatically enter Level Zero Point Configuration mode