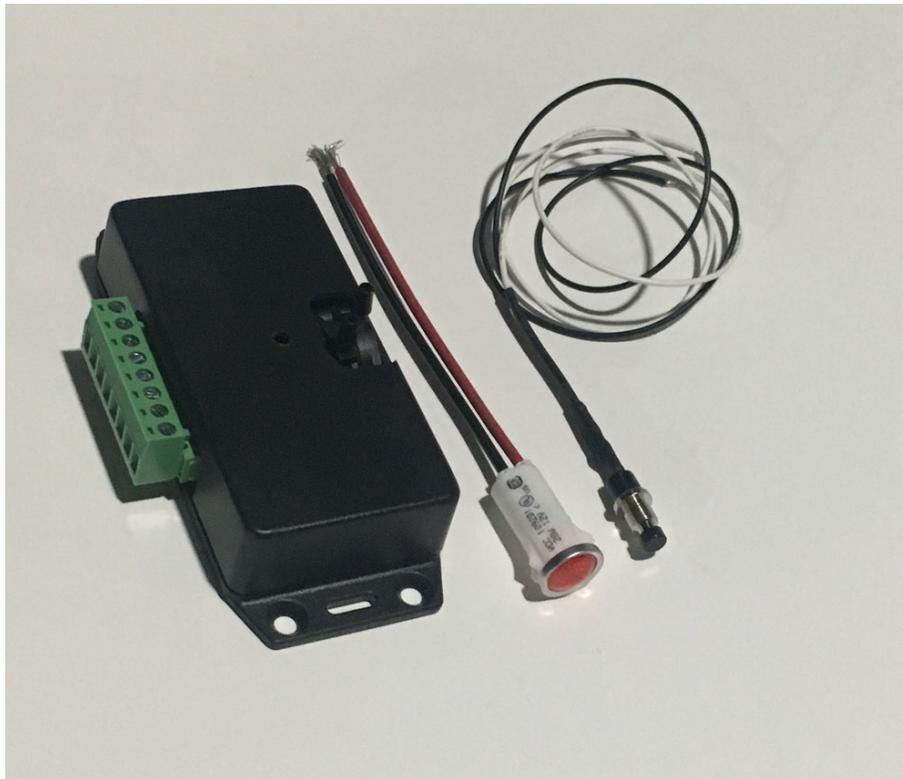


Landing Gear Safety Controller

Wiring & Setup Guide

HARDWARE



The Safety Controller is a Speed-Switch with Gear Auto-Extension feature (if enabled). The speed to allow the gear to go Up can be set during setup.

The default settings for the Speed-Switch is 75 kt. During setup; it can be changed to any desired value.

The Auto-Extension feature diverts power from the Gear-Up position to the Gear-Down position.

Operation

Landing Gear Safety Controller uses state-of-the-art Pressure Sensor with On-Chip Signal Conditioned, Temperature Compensated and Calibrated.

Pitot & Static ports are marked on the device. **Take extra care not to swap these connections.** Note that if Pitot/Static lines are leaking or blocked, this will affect the result of the Pressure Sensor output similar to any other device or instrument that require Pitot/Static connections.

Speed is detected using this pressure sensor and the controller allows +12V to pass from PIN 4 (Gear Up switch) to PIN 3 (Pump Switch/Controller) when the set speed is reached. Default settings is 75 kt.

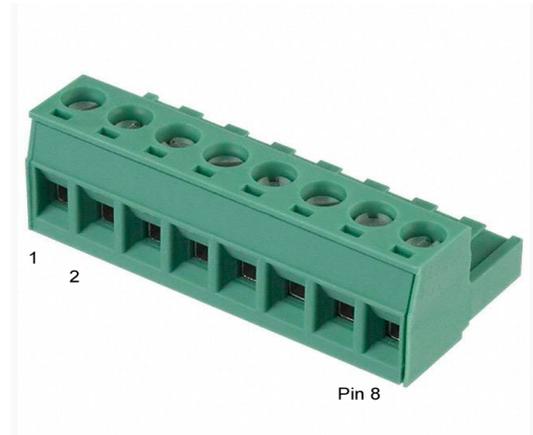
As an added safety feature; all internal switching is powered from PIN 4 (when the gear switch is in UP position).

If Auto-Extension is enabled (PIN 8 has +12V) and it was set during initial SETUP; once the speed reaches 120 kt; LED flashes once to indicate the system is armed. Speed must reach 120 kt every time to arm this feature.

When Speed is decreased to the set point for Auto-Extension; power is removed from PIN 3 and diverted to PIN 5 to lower the landing gear. Remember to place the gear switch to down position if Auto-Extension got engaged due to high pilot load or distraction. Speed needs to pass 120 kt again for this feature to be armed again.

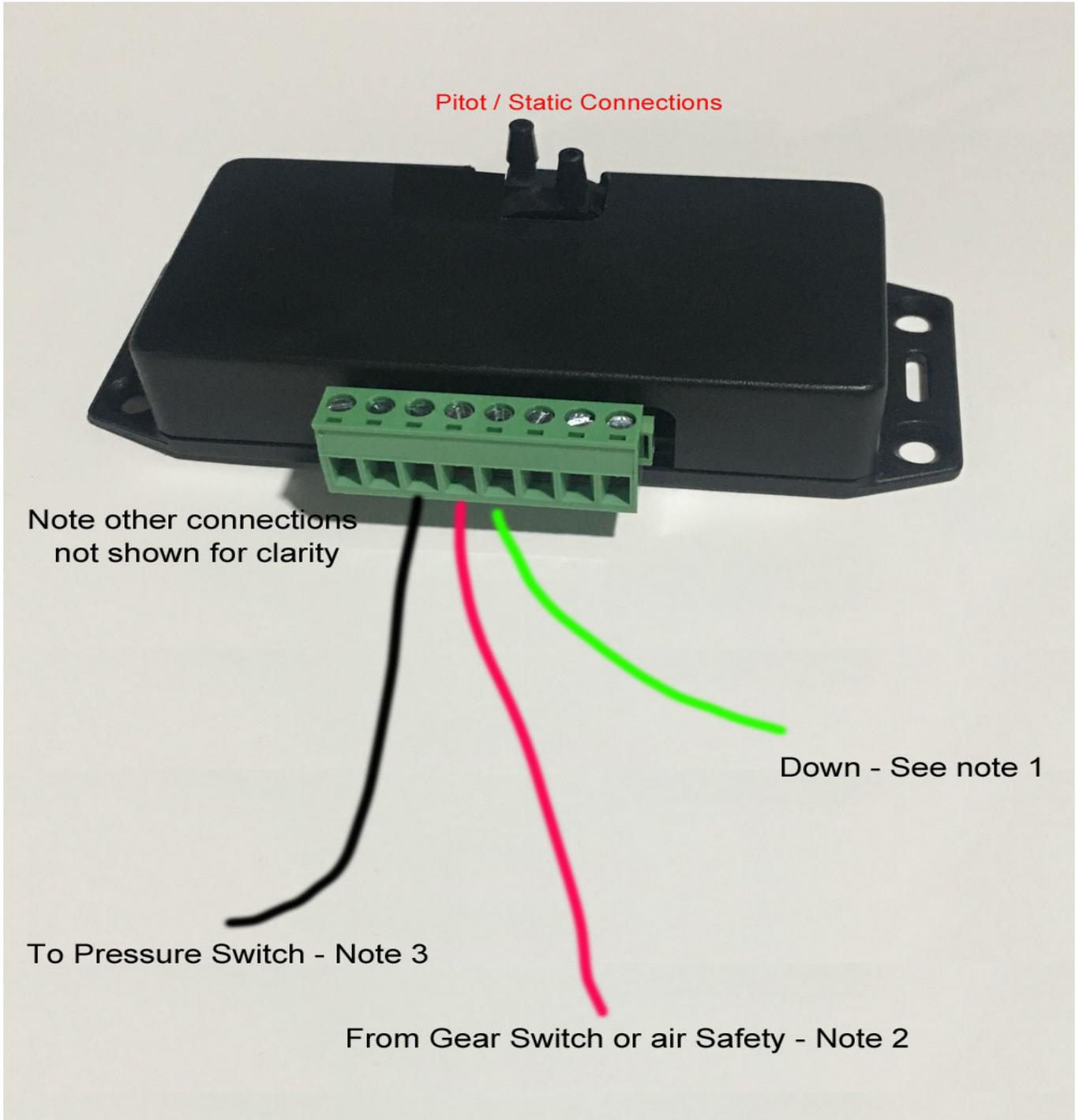
WIRING

Landing Gear Safety Controller comes with an 8-PIN Terminal Block.



PIN #	FUNCTION
1	(Input) +12Vdc. Power to the controller. Controller requires less than 40mA to operate. It includes built-in reverse-polarity & short circuit protection. Dedicating a circuit breaker is not required. You can share power from any non-inductive load or use an 1A inline-fuse or 1A circuit breaker if desired.
2	(Input) Ground (GND)
3	(output) To High-Side Pressure Switch. This is the Gear UP line that connects to the pump High-Side Pressure Switch or Gear UP Controller signal. <i>Do not connect this to the pump solenoid directly</i>
4	(Input) From Gear Switch (Up). This is the line coming from gear switch Up position. Or from any Gear Controller or Air Safety Switch.
5	(output) Copy of Gear Down Position Line. Attach in-parallel the line going out of Gear Switch in the Down position to the Low-Side Pressure Switch or Pressure Controller.
6	(Input) Setup Trigger. Attach supplied Push Button used for setup - See drawing for wiring
7	(Output) LED. Attach supplied LED used for Setup & notifications - See drawing for wiring
8	(Input) Optional Override Switch. Attach a switch or a circuit breaker to disable Auto-Extension if planning to slow-flight or stalls training. Connect permanently to +12V if Override switch option is not required.

NOTE: Pins 3 & 5 do not power the Hydraulic pump directly. These lines connect to Pressure Switches or equivalent.



Note 1:

This is the line that is connected to the Gear Down Position Switch or Controller and it connects to the Low-Side Pressure Switch. This activates the gear extension. This is just a 'copy' so it's 'teed' to the line and the line is still connected to the Pressure Switch directly from the Gear Switch. Safety Controller diverts power to this line when Auto-Extension is required.

Note 2:

This is the line normally coming out of the Gear Switch Up position or an air-safety switch, a squat switch, or any other controller.

This Safety controller sits between the pump Pressure Switches and any system or switches you may have for gear operation.

This could be either :

1 - Mechanical Gear Switch

This line connects to the Gear Up position pin on this switch. It prevents power from reaching the Pump Pressure switch until safety parameters achieved.

2 - An air-safety switch or squat switch

This can be removed if desired to save space or weight, or kept in place and take the line output of that switch connected to the pump Pressure Switch, to this controller first then to the Pressure Switch again.

3 - Another Controller which acts as Air-Safety switch

As above, take the output of the installed controller to this controller first then to the Pressure Switch. If this controller also measures the airspeed to determine when to activate this output for Gear Up position, then this Controller can also be set to the same speed or a little higher to act as another line of defense.

(See additional notes below)

Note 3:

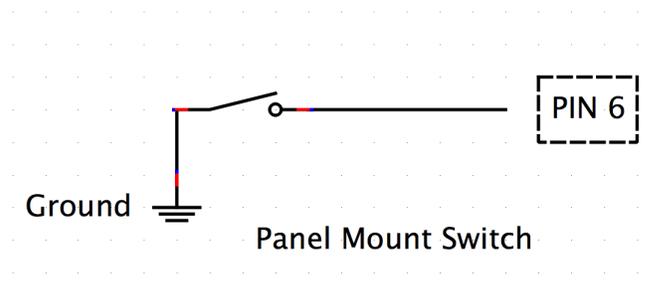
This is pin that connects to the Gear Up Pressure Switch as explained in Note 2. This line will only be active if the set speed is reached or passed. Power will be removed from this line and diverted to the Down line (Note 1) if Auto-Extension is needed.

Additional Notes:

- To identify and make it easier for wiring; find the wire that is connected to the High-Side Pressure Switch (or to the Landing Gear Pressure Controller if installed), and cut that line then connect the first end to PIN # 4. This is the end that is coming from your existing Speed-switch if installed or directly from the Gear Switch Up position if no speed-switch installed. Connect the other end to PIN #3. This is the end which is continuing to the Pressure Switch.
- If you have a speed switch already installed; you can either remove it or connect the Safety controller after that switch.
- To be able to operate the gear while on the ground for maintenance and testing; the lines between PIN 3 & 4 need to be manually bypassed. On existing installations, the same by-pass can be used if the controller is installed prior to the bypass wiring. Otherwise, attach a bypass switch so power can reach the High-Side pressure switch or Pump Controller for ground testing. Remember to remove the bypass.

Push-Button Switch

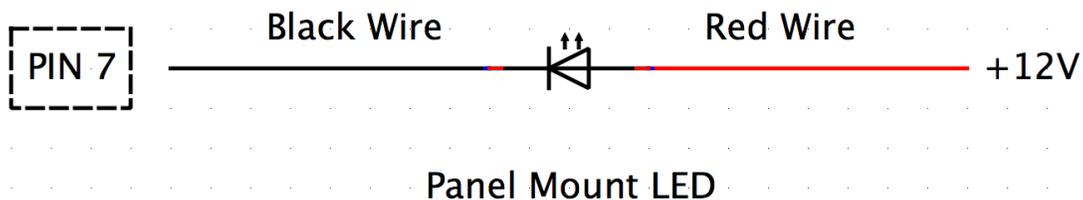
The supplied button is. Install on the panel. Any momentary contact push button can be used if desired. One button wire goes to PIN 6. The other wire to the airplane ground (GND). Do not connect this to +12V supply.



Panel mount LED

The supplied LED is required. Install on the panel. Any +12V LED can be used; the controller sinks up to 30mA of current for the LED.

RED wire of the LED goes to +12V. Black wire connect to PIN 7.



Override Switch Input

If Auto-Extension feature is not required; keep PIN 8 open (not connected). This PIN must have +12V for the Auto-Extension to operate.

If an Override Switch is required, either connect a normal switch (not supplied) between +12V and PIN 8 so it can be turned On/Off, or use an existing non-essential circuit breaker as the switch. When the circuit breaker is in (enabled) then +12V is being supplied to this PIN. When you pull the circuit breaker off, then Auto-Extension is disabled.

Generally, installing a switch or a breaker to override the Auto-Extension is useful if the airplane will be doing frequent stalls and slow-flight training requiring the speed to reach slow without lowering the landing gear.

If this is not the case or such maneuvering are not frequently required; connect +12V line permanently into PIN 8.

For installations without Override switch installed and during extreme cases of emergencies where the Landing gear must not be lowered; disconnect power to the entire controller.

Also, for normal installations without Override switch installed and its desired for a speed to be low without lowering the gear; watch for the LED flashing notification that the gear is going down; once the pump starts; lower the gear switch and quickly put it back up; this will stop the gear from extending and will disable the Auto-Extension until speed is high to 120 kts.

SETUP

Even though SETUP can be done in-flight, it is recommended to perform the setup on the ground with the airplane on jacks.

Same procedures apply on ground or for in-flight setup.

There is no need to bypass the speed switch for the gear operation on the ground.

Use your preferred method to increase the airplane air-speed while the airplane is on jacks.

One method is to use a clear tube or similar connected to Pitot port of the airplane and carefully blow into the tube. Take care not to blow hard.

The Best method is to bend the tube two or three times in your hand and squeeze/push on the tube then slowly blow in the tube while watching the airspeed-indicator.

This method allows gauging/determining the required pressure to blow to get the speed up without damaging any sensitive pressure sensors you have installed. Squeeze more on the bends or block the tube if you want the speed to stop. Relax your hand slowly for the speed to decrease.



AIRPLANE MUST BE ON JACKS BEFORE SETUP OR BEFORE BLOWING INTO THE TUBE

- After completing all wiring; **(airplane on jacks)**; Speed is 0; place gear switch to UP. At this point; nothing should happen; gear pump should not start as no power is reaching the pump switch/Controller.
- Increase air-speed and when it reaches around 75 kt; gear will start to go up as power is now applied to the pump switch. Keep the switch at UP position and the gear UP during this setup.
- With the speed above 75 kt; press and hold the push button switch for 5 seconds till the LED starts to flash; release the button; the LED stays ON. Controller is now in setup mode (First Parameter)
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- First, we need to set the Gear-Up Speed; Decide on the speed you want for the Gear to go up and increase the air-speed to twice that speed. For example; if you want to set the speed to 80 kt; increase speed to 160 kt. To set the Gear-Up speed to 90 kt, increase air-speed to 180 kt. This is to allow for in-flight setup so slowing down the airplane to such low speeds are not required.

Once the speed reached 2X the required speed; press the push button once, LED flashes and then goes back ON again; now the setup mode is on the (2nd parameter). If the LED did not flash, try to press firmly once.

If the LED goes off and does not stay on after flashing, it means the push button was pressed more than one time. Start over by holding the button for 5 seconds and releasing it when the LED starts to flash.

Now Controller is waiting to set the Auto-Extension speed. Note that this procedure is still required even if Auto-Extension is not enabled or will not be used; as this is the method to permanently save these settings. Both parameters must be set even if Auto-Extension is not enabled.

- Decrease the speed till you reach the Auto-Extension desired speed. For example 95 kt. Or 100 kt. Press the button. LED should flash and then turns off. Now the controller is out of setup mode.
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- Start increasing the air-speed till it passes 120 kt. LED flashes once when air-speed passed 120 kt to indicate Auto-Extension is armed. If Auto-Extension is not enabled (no +12V line on PIN 8) LED will not flash.
- If enabled, once the system is armed and the gear is still in UP position; decrease speed slowly until it reaches the Auto-Extension speed. LED starts to flash for 5 second to warn that the gear is going down; if you increase speed at this point; gear will not be lowered and Auto-Extension is not engaged. If the speed is still at or below the Auto-Extension speed; the gear will be lowered.
- Decrease the speed to just below the Auto-Extension speed to test this feature.
- Place the gear switch to down position. Increase speed so it passes 120 kt; LED flashes once to indicate the feature is armed again. Start from Zero to test the new

Same procedure apply if setup is to be done in-flight. At safe altitude with gear is UP; press and hold push button for 5 sec and release when the LED starts to flash and follow the instructions above. Do not slow the airplane down to test Gear-Up Speed. For safety reasons, only test Auto-Extension in-flight and any Gear-Up speed-switch testing to be done on ground with airplane on jacks.