



Pressure Guard

Pneumatic Retract Air System Monitor

Description

The Pressure Guard is designed to minimize the chance of pneumatic landing gear failure or a forced gear-up landing in an R/C aircraft due to insufficient air pressure. This can be the result of a leak in the system, failure to properly fill the air reservoir, or simply too many up/down cycles of the gear during flight. The failsafe is triggered by a system pressure below a user defined threshold. During normal operation, the circuit uses a flashing LED to indicate the actual pressure above the failsafe threshold in increments of 10psi. An optional digital display can be connected to provide a continuous pressure read out in steps of 1psi.

Installation

The Pressure Guard should be installed between the receiver gear channel and the landing gear servo. The landing gear signal from the receiver should be plugged into the rightmost header location, and the landing gear control servo should be plugged into the middle location. The ground wire on each plug (typically black or brown) should be oriented to be nearest the top edge of the circuit.

The air fitting on the Pressure Guard should be used to connect it to the landing gear pressure system on the aircraft. ***For most reliable operation, it should be installed as close to the pressure tank as possible.*** This reduces the risk of brief pressure drops during normal gear operation which can cause false triggers.

Programming

The Pressure Guard can be placed into programming mode by pressing and holding the programming button while powering up the receiver. Note that it is not necessary to remove the circuit during initial radio adjustments and landing gear set up. Simply place the Pressure Guard in programming mode and make any necessary adjustments to the gear control channel on the transmitter and the landing gear servo for both gear up and gear down positions. The servo will be directly controlled by the transmitter as if the Pressure Guard were not installed.

The step-by-step procedure for setting up and programming the Pressure Guard is as follows:

1. Press and hold the programming button on the Pressure Guard while powering up the receiver. Continue to hold the button for 2 seconds until the LED turns on (no flashing).
2. Release the button and the LED will begin to flash once, indicating the gear-down servo position programming mode.
3. Place the landing gear in the down position using the transmitter. Press and hold the programming button until the LED stops flashing. The servo gear-down position is now stored in permanent memory.
4. Release the button and the LED will flash twice, indicating the gear-up servo position programming mode.
5. Place the landing gear in the up position using the transmitter. Press and hold the programming button until the LED stops flashing. The servo gear-up position is now stored in permanent memory.

6. Release the button and the LED will begin to flash 3 times, indicating pressure threshold programming mode.
7. Fill the system to the air pressure that the failsafe should engage (lowest acceptable working pressure).
8. Press and hold the programming button until the LED stops flashing. The failsafe pressure is now stored in permanent memory.
9. Release the button and the LED will begin to flash 4 times.
10. Cycle the power to the receiver to start normal operation.

The following table summarizes the programming steps for the Pressure Guard circuit.

<i>Programming step</i>	<i>LED flashes</i>	<i>Action</i>
Gear-down	1	Set landing gear servo to the down position then press and hold button
Gear-up	2	Set landing gear servo to the up position then press and hold button
Minimum pressure	3	Set reservoir pressure to the minimum allowable pressure then press and hold button

System pressure protection

During normal operation, the LED flashes out the measured pressure above the failsafe threshold in steps of 10psi. For example, if the threshold is set at 70psi and the measured pressure is 100psi, the LED will repeatedly display 3 quick flashes (30psi difference). See table below. If the pressure falls below the failsafe value programmed in step 7 of the procedure above, the LED will come on continuously and the gear servo will automatically extend. Once the failsafe is engaged, landing gear control can only be restored by increasing the system pressure above the failsafe threshold (70psi for this example) and moving the transmitter gear switch to the down position.

The following table describes pressure indication using LED flashes during normal operation.

<i>Pressure above programmed failsafe (psi)</i>	<i>LED indication</i>
0-9	No flashing – LED off
10-19	1 flash
20-29	2 flashes
30-39	3 flashes
40-49	4 flashes
...	1 flash per 10 psi

As indicated in the table above, if the LED is off with no flashes, then the pressure is less than 10psi above the failsafe setting.

Gear motion protection during power-up

In order to prevent unexpected landing gear raising or lowering when the receiver is first powered up, the Pressure Guard remembers the landing gear position when the system was last powered down. When the receiver power is first applied, it keeps the gear at this position. The transmitter gear switch must be moved to match the actual gear position before full control is restored.

For example, if the aircraft was sitting on the ground with the landing gear extended when the receiver was last powered down, the gear will not retract, even if the transmitter is powered up with the gear switch in the raised position. In the same way, if the plane was on the workbench with the gear retracted, they will remain retracted when the system is repowered, regardless of the transmitter switch setting or if the pressure is below the fail safe value. Again, matching the transmitter switch to the actual gear position restores full gear position control.

Important: For best operation it is important that the transmitter always be powered up first for 2.4G radio control systems.

Lost signal protection

If a signal from the receiver is ever lost, the LED will turn on (no flashing), and the Pressure Guard will lower the landing gear.

**Robart Manufacturing, 625 N. 12th Street, St. Charles, IL 60174
Phone 630.584.7616 Website: www.robart.com**