

# ThrottleSafe

\* these features can be adjusted via optional PC interface

- starting with radio off.
- Shuts throttle on normal radio turn off - inhibits engine
- Latched supply fault and signal loss indicators.
- Followed by engine cut for persistent signal loss \*
- Fail-safe in case of throttle signal loss with timed hold-at-idle
- LED voltage supply indicator\*
- second every 30 seconds.
- In-flight low voltage warning by throttling back to idle for 1 regulator failure)
- Throttle fail-safe even for total RC system power failure (e.g. regulator failure)

Regulated LiPo supplies provide a constant voltage supply to your RC system at low weight. However, they do run the risk of sudden regulator failure leaving you with no control and, with no servo power, defeating the receiver's fail-safe system. With IC models this means you can have the throttle stuck wherever it was when the regulator failed! ThrottleSafe protects against this eventually by shutting the throttle servo using its on-board reserve battery should the regulator supply drop too low or fail completely.

## Improving safety for IC powered models

# ThrottleSafe



### Ratings

Dimensions : 33mm x 33mm x 22mm  
 Weight: 30g including reserve back-up battery

Supply voltage range: 4.1 - 8.5v\*\*

\*\* Warning: Check your RC system voltage limits as these may be more restrictive.

**Manufactured in the UK by  
 CSM Design Consultancy Ltd**

For further information, see [www.rcmodels.org/csm](http://www.rcmodels.org/csm)

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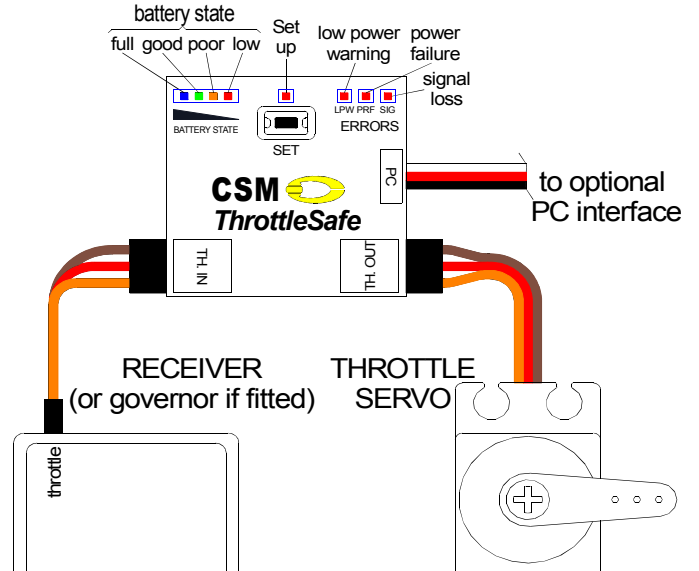


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## Installation

If you are likely to make adjustments to the internal parameters of ThrottleSafe after installation we suggest you fit the supplied 150mm black/red/white PC interface lead to the PC interface port on the ThrottleSafe unit prior to mounting.

Mount the unit using the double-sided adhesive pad provided. Pick a location where the ThrottleSafe LEDs will be visible .



If no RPM governor is used connect ThrottleSafe between the receiver and the throttle servo as shown in the diagram. Use the

supplied 300mm brown/red/orange lead to connect between receiver and ThrottleSafe. (Other lengths of lead are available.)

If an RPM governor is used connect ThrottleSafe between the output of the governor and the throttle servo as shown in the diagram. Use the supplied 300mm brown/red/orange lead to connect between the governor and ThrottleSafe.

Span the two RC connectors with one of the 8mm x 40mm self adhesive strips to secure the connections.

### Initial set-up

On first turn on the unit will require 'teaching' the throttle cut and throttle idle positions.

The battery state LEDs will ripple (indicating the need for set-up) until the SET switch is pressed and released.

The Set-Up LED will light to indicate set-up mode.

The LOW battery LED will light indicating stage 1 of the set-up.

Put the throttle to the engine cut position making sure the servo is not stalled and press the SET switch.

The LOW and POOR battery LEDs will light indicating stage 2 of the set-up.

Put the throttle to the engine idle position and press the SET switch.

The Set-up LED will go out and after about 1 second the unit will enter normal operation.

(NOTE: If you accidentally mix up the idle and cut positions during this set-up the unit will return to stage 1 of the set-up to be corrected)

## Re-entering the set-up mode

Should you need to re-do the initial set-up of the unit (for example after linkage changes have been made) you should hold down the SET button on ThrottleSafe while powering up the receiver. Continue to hold the button until the Set-up LED and the four battery state LEDs all light. Release the button and you are at stage 1 of the set-up sequence.

## Pre-flight testing

We suggest you conduct this test before the first flight of the day and after any adjustments to the model have been done that might affect the throttle operation (e.g. linkage changes).

Turn on the RC system as normal.

Open the throttle to full observing normal operation of the throttle servo.

Turn off the receiver.

Check that ThrottleSafe moves the throttle servo to the cut position and that the power failure LED (PRF) lights briefly before going out. In some systems the signal loss LED (SIG) will also light at this point.

Turn on the receiver again and check for the restoration of normal throttle control.

Press and hold down the SET switch. This switches the battery state display to indicate the state of ThrottleSafe's built-in reserve battery. This should show "full" (blue) or "good" (green) state of charge.

If the reserve battery is showing a lower state of charge simply leave the receiver supply on for a few minutes to allow ThrottleSafe to charge its battery to at least the "good" state.

This completes the ThrottleSafe checks.

## Features

During normal operation the unit will simply pass the throttle signal through to the throttle servo and the state of the main supply will be displayed on the four battery state LEDs. The unit will also charge the reserve back-up battery as needed. The default settings for the main supply display are:-

Blue LED on: Main supply above 5.1v

Red LED on: Main supply below 4.7v

Please note: when used with a regulated LiPo supply ThrottleSafe only displays the status of the output of the regulator and does not monitor the LiPo voltage.

### Reserve battery check.

If, during normal operation the Set-Up switch is pressed and held down the battery display will show the charge state of the ThrottleSafe's reserve battery. Should this indicate the reserve battery charge is poor or low then leave the radio on until ThrottleSafe has charged it to good or full status.

### Low voltage warnings

If the supply voltage drops sufficiently (default value 4.1V) then the unit will warn the pilot by briefly dropping the throttle to idle before restoring normal throttle control (default idle time is 1 second). The Low Power Warning LED (LPW) will light and latch on to indicate that a warning was issued. If the pilot continues to fly this warning will be repeated at intervals (default interval is 30 seconds).

### Power failure protection

If the supply voltage continues to fall a critical value (default 3.7V) will be reached at which the unit shuts the throttle to the cut position. This is achieved using the reserve battery which ensures sufficient power for the servo to respond. This feature also deals with sudden catastrophic loss of RC system power ensuring safe closure of the throttle independent of the main RC supply. If this feature is activated the Power Loss LED (PRF) will latch on.

Note: once the power failure feature has been triggered, normal servo operation is only resumed after the supply exceeds the 'low' status on the battery state display (default 4.7v).

### Signal Loss protection

If the throttle signal from the receiver is lost for more than 0.5 seconds for any reason the unit will initially lower the throttle to the idle point and hold this position for a period (default 2 seconds). If the throttle signal is not restored within this time the throttle will shut to the cut position.

Should the signal be restored at any time normal throttle servo operation will resume (but if the engine has cut it will not re-start it!)

If this feature is activated the Signal Loss LED (SIG) will latch on.

### Latch duration for Error warning LEDs

The warning LEDs will continue to display for a while after the RC system has been turned off. This period is adjustable via the PC interface (default value 60 seconds).

To allow for testing of ThrottleSafe before flight this latch time is reduced to 2 seconds for the first 30 seconds of operation so that the latched warnings will be cleared quickly after the pre-flight test.

## PC interface

Many of the parameters in ThrottleSafe can be adjusted to suit your requirements. To access these you will need a CSM USB adapter (part no. CSM 0049) and the ThrottleSafe interface software that is available from the CSM website ([rcmodels.org/csm](http://rcmodels.org/csm)) or from our CD.

Once the interface software has been installed connect the USB interface to your PC and install the necessary USB drivers as prompted by the Windows wizard.

Start the ThrottleSafe interface application on your PC, power up the ThrottleSafe and connect to the USB adapter observing the correct polarity of the 3 pin connector. Click on "Read from Unit" to see the current settings.

Make such changes as you require and save those back to the unit using "Write to Unit"

## Reserve battery considerations

ThrottleSafe uses a low self-discharge rate NiMh battery as the reserve supply. This should retain a substantial proportion of its charge during the winter storage of the model. However particular attention should be paid to the charge state of this reserve battery after any significant period of storage. Power up the radio system and after normal throttle control is obtained press and hold the SET switch to display the reserve battery charge status. If the amber or red LED illuminates then leave the radio powered up to allow ThrottleSafe to charge the reserve from the main supply.

We suggest that the unit be returned to CSM for the reserve battery to be replaced every 5 years.