

# Dawnmist Throttle Minder 200 Instruction Manual

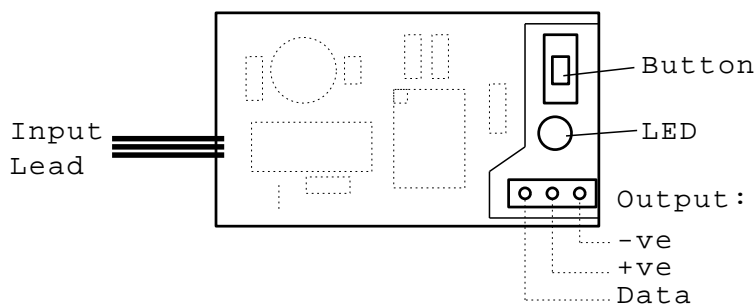
*Radio Control System Failsafe with Battery Monitor*

Revision 1.0: May 2004

## Introduction

The **Throttle Minder 200** from Dawnmist Studio is an economical, simple-to-use failsafe system for radio controlled models such as boats and cars. It is based upon the very sophisticated technology of Dawnmist Studio's successful UltiMix 5000 microcomputer R/C upgrade unit, but trimmed down to just a single-channel failsafe, and with an added battery-monitoring function. Throttle Minder 200 is available for a fraction of the price of the full UltiMix and is only marginally more expensive than the basic Throttle Minder 100 model, which lacks the battery monitor function.

In operation, Throttle Minder 200 connects between the receiver (Rx) and the throttle servo (or electronic speed controller, for an electric model). It passes the signal coming from the Rx to the servo, while continuously checking that it is free from glitches, interference or signal loss, and also checking that the receiver power supply (from the battery or 'Battery Eliminator Circuit' (BEC)) is intact. As soon as signal or power integrity is lost, the Throttle Minder takes direct control of the servo and moves it to a user-selected 'failsafe' position. This is usually set to be the 'stop' position, and puts the model quickly into a known, safe state. If the stop was due to signal loss, and a valid signal later returns, the Throttle Minder simply passes it through to the servo again. Power faults, on the other hand, are 'sticky'; in other words once a power fault is detected, the model stays in failsafe mode until the receiver power is switched off and on again (e.g. with a fresh battery). Although this is a fairly simple, single-channel failsafe, it is quite sufficient to ensure the safety of most non-flying models, and the voltage monitor provides an additional safeguard against low battery conditions and BEC problems.



*Fig. 1: Layout of Throttle Minder*

## Connecting Up

Please refer to Fig. 1 to find your way around the Throttle Minder unit.

You will see that the unit provides a single input cable and a single output connector similar to those on a receiver. Connection is very simple: the input cable plugs into the throttle output of the receiver, and the servo (or speed controller) plugs into the output of the Throttle Minder. No other connections are required; the unit obtains the very small amount of operating power it requires from the receiver.

In order to ensure compatibility of connectors with all makes of R/C equipment, the connectors used on the Throttle Minder are non-polarized. Therefore it is necessary to observe the correct polarity when connecting up — accidental reversal of a plug is unlikely to cause any damage, however.

Looking at the Rx's battery socket, you will see that the centre pin is positive (usually red), and one of the side pins is negative (usually black), the remaining pin being unconnected on the battery pack — this becomes the 'data out' pin on a servo socket. Plug the input lead of the Throttle Minder in to the Rx such that the black lead corresponds to battery negative and the white lead to 'data out'.

In a similar way, the servo (or speed controller) is plugged in to the male connector on the Throttle Minder. This connector is oriented such that the negative pin is towards the edge of the board and the 'data out' pin towards the black microchip visible on the board. Fig. 1 illustrates this.

## Normal Operation

When first powered-up, the unit flashes its LED on and then off to indicate that it is operating. From that point onwards, any valid signal is passed to the servo, with the LED off, and a corrupted or absent signal causes the LED to light and the servo to adopt its 'failsafe' position. The failsafe position is initially factory-set to mid-travel but can easily be reconfigured as described next.

Similarly, if a power failure is detected (defined as the supply voltage dropping below a pre-set level for at least 5 seconds continuously), the model is placed in failsafe mode, just as if the signal had been lost. In this case the LED flashes twice per second to indicate power failsafe mode, and the unit will only revert to normal operation by switching the Rx power off and back on. The trip-point of the voltage monitor is factory-set to 4.25 volts, which is suitable for most R/C systems, but this is easily reconfigurable for other trip-points.

## Configuring Throttle Minder 200

This is quite straightforward as the unit has only two configurable parameters, being respectively the 'failsafe' position that the servo adopts when signal is lost, and the voltage monitor's trip-point.

To adjust the failsafe position, it is necessary to have the Transmitter (Tx) switched on and transmitting a valid signal. Then all that is required is to move the throttle stick on the Tx to the desired failsafe position (which will be confirmed by the servo moving to that position), then pressing (and releasing) the button on the unit. The LED will flicker rapidly to confirm that the new position has been memorized. The memorized position is remembered indefinitely, even in the absence of power, by a special memory circuit — but can be changed as often as desired simply by clicking the button again.

Adjustment of the voltage trip-point is similar, but in this case the button must be held down *during power-up* of the Rx, and the power supply must be at the lowest tolerable voltage level (i.e. an almost-flat battery). In this case, the LED flashes four times per second while the button is being held, to indicate that a voltage is about to be learned. Then, when the button is released, the unit makes a voltage measurement, stores it in the non-volatile memory as the threshold, and flickers the LED (more slowly than when learning the position) to confirm that the new voltage has been learned. After this learning process is complete, a second press of the button will now store the servo position in the usual way, so that the entire setup can be done on a single power-up.

We anticipate that few modellers will ever need to alter the voltage trip point from its factory-set value of 4.25V, but this mechanism allows it to be adjusted again and again, just as with the failsafe position — thus guaranteeing total versatility.

## Technical Specifications

Product Title:	Dawnmist Throttle Minder 200
Dimensions:	36×20×12 mm
Weight:	8 gram (including cables/connectors)
Power:	4.5–6V at less than 25mA (LED on)
Input:	1 channel from Rx
Output:	1 servo or speed controller
Memory type:	Non-volatile FLASH memory
Memory life:	40 years typical
Button:	Single, multifunctional button
LED:	Daylight-visible Red
Failsafe:	Configurable position, 1 channel
Voltage Monitor:	5 second time-out, configurable trip point
Processor:	20MHz RISC
Approvals:	Meets relevant CE specifications

## Warranty and Support

The Throttle Minder comes with a limited warranty against defects in parts and workmanship for a period of one year after purchase. This does not cover damage caused by overload, misuse, impact or unauthorised modification, and is limited to the repair or replacement of the defective unit. Consequential losses of any sort are not covered, and it is stressed that it is the purchaser's responsibility to ensure that this product is used safely and properly. This does not affect your statutory rights.

Dawnmist products are engineered to a high standard, and we want you to get the best out of them. If you have any difficulties, please email [tech@dawnmist.demon.co.uk](mailto:tech@dawnmist.demon.co.uk).

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