

## LipoGuard G4

### Overview:

Thank you for purchasing our LipoGuard G4 advanced battery monitor. The G4 is mainly targeted at the battery powered model aircraft market providing an early warning to the pilot of impending battery exhaustion. Although compact in size, G4 utilises the latest micro-controller technology to achieve precision voltage measurements via digital signal processing techniques and offer fully configurable operation. It's simple yet clear visual indication can be easily seen on the brightest of days.

### Warning:

- **Never reverse polarity.** The G4 is not protected against reverse polarity on the (+) and (-) terminals. Connecting the G4 with reverse polarity will almost certainly cause irreparable damage.

### Installation:

The G4 should be installed in a location where it can be easily seen in flight. Its narrow profile makes it ideal for installation under a helicopters tail boom or between the skids. Use a small piece of double sided adhesive foam tape for mounting G4 in place. If removal of G4 is required at a later time, use a knife to slice the tape. Do not try to pull G4 away as this can cause the circuit board to flex causing damage.

### Connecting:

Ensure that the battery is disconnected before proceeding with the electrical connections. The G4 should ideally be connected in parallel with the ESC (Electronic Speed Controller), directly to the (+)RED and (-)BLACK terminals of the ESC. This ensures correct voltage measurement and that G4 is powered off when the battery is disconnected at the end of the flight.

### Operation:

- When G4 is powered, the alarm LED will glow once to indicate that the G4 is operating in normal battery monitoring mode. This is a distinct glow where the intensity of the LED will progressively increase to full brightness and then similarly fade out.
- Whilst in use, the G4 will flash once every 8 seconds to indicate that it is functioning.
- When a low voltage condition is detected G4 will constantly flash for a minimum of 1 second or until the critical low voltage condition is no longer present.

**Note:** Due to the internal resistance of the battery it is common for battery voltage to slightly drop whilst the battery is under heavy load. For example when hard maneuvers are performed with a model helicopter or full power is demanded. When approaching battery exhaustion this could cause the battery voltage to temporarily drop below the alarm voltage setting. G4 will detect this condition and will flash several times. This will be a minimum of 1 second or until the critical low voltage condition is no longer present.

**NiCD/NiMH packs:** The recommended alarm voltage for NiCD and NiMH batteries is 1.05V per cell which is not the factory default value.

**Li-Poly packs:** Great care must be taken with Li-Polymer packs that rapidly overheat when the voltage drops below 3V/cell. In most cases it is safe to run the pack below 3V/cell for short periods of time (a few seconds) however please consult your battery pack manufacturer. In a real life scenario it is possible that G4 will occasionally indicate a low voltage condition when full throttle is demanded. However, if the low voltage alarm remains for more than just a few seconds the pilot should abort any hard maneuver and fly in a milder style that clears the low voltage alarm. At this point he should proceed to landing as soon as it is safe to do so.

### Configuration:

The G4 can be configured to work with various types of battery packs. The number of cells and alarm voltage (V/cell) can be configured via a simple user interface. Configuration is performed via the use of a miniature push-button switch and the alarm LED. **Note:** The alarm LED operates at reduced intensity in configuration mode.

#### Accessing the battery type and cell count configuration mode:

- Power on G4 while holding the pushbutton pressed. The alarm LED will illuminate at reduced intensity.
- Release the push-button. The LED will flash a number of times to indicate the current battery type. This will be followed by a short pause before the flashing sequence repeats.
- Press and release the pushbutton until the desired pack type is reached. The number of flashes will increment for every press of the pushbutton until the last pack type is reached then roll back to 1. **Note:** You may quickly jump back to 1 by holding down the push-button. After a few seconds the LED will remain constantly lit. You may now release the push-button.

Pack Type (cells)		Pack Type (cells)		Pack Type (cells)		Pack Type (cells)	
1	Li-Poly (3S)	13	NiCD/NiMH (7)	25	NiCD/NiMH (19)	37	NiCD/NiMH (31)
2	Li-Poly (4S)	14	NiCD/NiMH (8)	26	NiCD/NiMH (20)	38	NiCD/NiMH (32)
3	Li-Poly (5S)	15	NiCD/NiMH (9)	27	NiCD/NiMH (21)	39	NiCD/NiMH (33)
4	Li-Poly (6S)	16	NiCD/NiMH (10)	28	NiCD/NiMH (22)	40	NiCD/NiMH (34)
5	Li-Poly (7S)	17	NiCD/NiMH (11)	29	NiCD/NiMH (23)	41	NiCD/NiMH (35)
6	Li-Poly (8S)	18	NiCD/NiMH (12)	30	NiCD/NiMH (24)	42	NiCD/NiMH (36)
7	Li-Poly (9S)	19	NiCD/NiMH (13)	31	NiCD/NiMH (25)	43	NiCD/NiMH (37)
8	Li-Poly (10S)	20	NiCD/NiMH (14)	32	NiCD/NiMH (26)	44	NiCD/NiMH (38)
9	Li-Poly (11S)	21	NiCD/NiMH (15)	33	NiCD/NiMH (27)	45	NiCD/NiMH (39)
10	Li-Poly (12S)	22	NiCD/NiMH (16)	34	NiCD/NiMH (28)	46	NiCD/NiMH (40)
11	Li-Poly (13S)	23	NiCD/NiMH (17)	35	NiCD/NiMH (29)		
12	Li-Poly (14S)	24	NiCD/NiMH (18)	36	NiCD/NiMH (30)		

Factory default configuration is shown with **bold** font.

#### Accessing the V/cell configuration mode:

- Power on G4 while holding the pushbutton pressed. The alarm LED will illuminate at reduced intensity.
  - Continue holding the push-button pressed until the LED is turned off.
  - Release the push-button. The LED will flash a number of times to indicate the current V/cell. This will be followed by a short pause before the flashing sequence repeats.
  - Press and release the pushbutton until the desired V/cell is reached. The number of flashes will increment for every press of the pushbutton until the last V/cell is reached then roll back to 1. **Note:** You may quickly jump pack to 1 by holding down the push-button. After a few seconds the LED will remain constantly lit. You may now release the push-button.
- |    |                  |                   |
|----|------------------|-------------------|
| 1  | Li-Poly          | NiCD/NiMH         |
| 2  | 2.5V/cell        | 0.70V/cell        |
| 3  | 2.6V/cell        | 0.75V/cell        |
| 4  | 2.7V/cell        | 0.80/cell         |
| 5  | 2.8V/cell        | 0.85V/cell        |
| 6  | 2.9V/cell        | 0.90V/cell        |
| 7  | <b>3.0V/cell</b> | <b>0.95V/cell</b> |
| 8  | 3.1V/cell        | 1.00V/cell        |
| 9  | 3.2V/cell        | 1.05V/cell        |
| 10 | 3.3V/cell        | 1.10V/cell        |
| 11 | 3.4V/cell        | 1.15V/cell        |
|    | 3.5V/cell        | 1.20V/cell        |

### Specifications:

Operating voltage: 6.5 - 60 Volts, current draw <10mA at idle state.

Li-Poly packs: 3S to 14S (alarm voltage adjustable from 2.5V/cell to 3.5V/cell in 0.1V steps)

NiCD/NiMH packs: 7 cell to 40 cells (alarm voltage adjustable from 0.7V/cell to 1.2V/cell in 0.05V steps)

Accuracy: 0.05% or better, automatic calibration.

Visual indicator: 1Watt LED, 44 lumens (approx. 12000mcd), Viewing angle: >140°

Size: 42mm x 22mm x 8mm

Weight: 6 grams without power leads

Operating conditions: 0 to 50 deg C, 32 to 122 deg F, 20 to 85 % humidity not condensing.

Storage: -20 to 70 deg C, -68 to 158 deg F, 20 to 90 % humidity not condensing.

### Disclaimer:

Because SpartanRC and their distributors have no control over the installation and use of this product, no liability may be assumed nor will any liability be accepted for any damages resulting from the use of this product. Under no circumstances will the buyer be entitled to consequential or incidental damages. By act of installing this product, the buyer accepts all resulting liability.