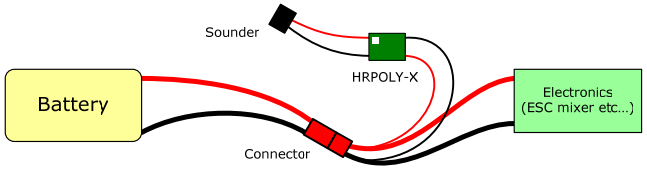
CUSTOM IDEA

HRPoly-X
Low-Voltage Warning Device

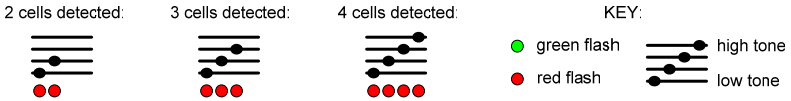
www.customidea.com Rev. 1.2

Overview: The HRPOLY-X is Custom Idea's second generation and most advanced microprocessor based low-voltage warning device, used to indicate lithium polymer battery voltage levels in RC models. All devices include an ultra-bright red/green LED, a super-loud sounder and additional new features including automatic cell number detection, support for four cell packs and digital level programming. Furthermore, the devices log the battery pack voltage for a period of up to 42 minutes during use, allowing voltage/time graphs to be shown on your computer, through the use of an optional cable.

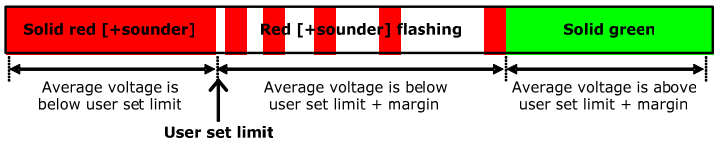
User installation: The device is connected to the battery the user wishes to monitor: the red wire should be connected to the positive supply and the black wire to the negative. The device should not be connected directly to the battery leads but instead after the connector as shown below. The device, wires and sounder should be fixed to the RC model (ideally with hot-melt glue) to prevent movements leading to the wires breaking. It is normal for the device to get warm during operation.



Cell number auto-detect: When the device is switched on, the green LED will appear dimmer for about ½ second - this is normal. About 1½ seconds later the device will indicate the number of cells it has detected. As shown below, the device will flash an appropriate number of times and a number of rising tones will be heard corresponding to the cell count:

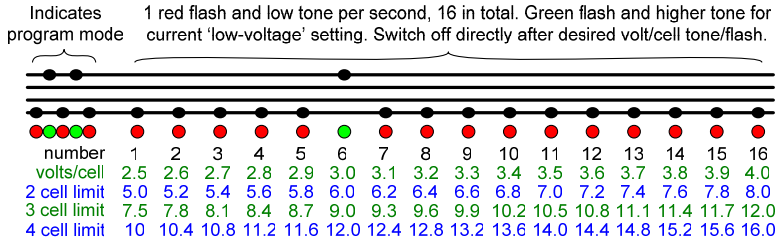


Normal operation: After the device has indicated the cell number, it enters normal operating mode. The green/red LED and sounder alerts the user when the battery voltage approaches and meets a user set 'low-voltage' limit. The device has three phases of operation: when the voltage is above the user set limit by more than a certain margin (0.2V for 2 cell, 0.3V for 3 cell and 0.4V for four cell) the LED is solid green, when the voltage is less than this value but higher than the user set limit the LED starts to flash red and the sounder beeps at an increasing rate until the voltage finally reaches the user set limit, when the LED becomes solid red and sounder constantly on:



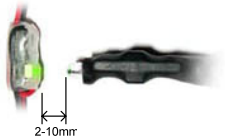
Setting the low-voltage limit: The user sets the 'low-voltage' limit as a volts/cell value from 2.5V to 4V in 0.1V steps. When the device auto-detects the number of cells it uses this volts/cell setting to set the correct absolute user set limit. For example, the devices come preset to 3.0V/cell, so if a user has a four cell lithium pack, the device will calculate the user set limit as 4×3.0V = 12.0V, and it will use a margin of 0.4V. During normal mode, the LED will therefore be green and sounder off until 12.0 + 0.4V = 12.4V when the red LED will start to flash, and sounder beep, faster and faster as the voltage reduces to the 12.0V limit when the red LED will become continuously lit and the sounder constantly on. The user can set the volts/cell value by following these step by step instructions:

1) Switch the device on and **during** the beeps/tones which indicate the cell number, switch it off.
2) Repeat step (1) a further two times (a total of three times in a row).
3) Switch on the device again (for the forth time), a rapid succession of high/low tones and red/green flashes indicates that program mode has been successfully entered.
4) After 1½ seconds, the device will emit a low tone/red flash every second, one for each of the 16 possible volts/cell settings detailed in the picture below. The current user volts/cell setting will be indicated by a higher tone and green flash. A new volts/cell value is programmed into the device by switching it off **directly after** the beep/flash which corresponds to the setting you would like.
5) Switch on the device to resume normal operation.
6) If you wish to check the new setting, follows steps (1) to (4) but do not switch off during step (4). The higher tone/green flash will indicate the new setting, and a few seconds after all 16 tones/flashes have passed, the device will automatically restart in normal mode. Do not switch off until normal mode starts, or you may run the risk of inadvertently setting the highest volts/cell value.



number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
volts/cell	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
2 cell limit	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0
3 cell limit	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9	10.2	10.5	10.8	11.1	11.4	11.7	12.0
4 cell limit	10	10.4	10.8	11.2	11.6	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0

Data logging feature: The device stores one voltage sample every 20 seconds, and has a maximum log-time of 42 minutes. The logging begins a little while after the device is switched on and stops when the device is switched off. Data from the previous flight is overwritten every time the device is switched on (after the device indicates the cell number). Data is transferred through the green LED within the first ½ second that the device is switched on - the green LED will be slightly dimmer during this period. The download cable (pictured right) has a detector to see the data being sent from the green LED on the device and transfers this to a computer's serial port. The cable will only successfully detect the entire data stream from the green LED if the detector on the end of the cable is positioned within 2-10mm from the green LED during the first ½ second the device is turned on. Free 'HRPolyPlotter' software can be downloaded from our website which allows the data to be viewed in the form of a voltage graph, and facilitates the communication with the cable. Full details of how to transfer the data and use the software are supplied upon purchase of a cable.



Technical Specifications: Cells supported: 2,3,4 cell; User limit range: 2.5V to 4.0V per cell; Pre-set limit: 3.0V/cell; Weight: 3.9g; Operating range: 2.5V to 18.0V; Current draw: 20mA (49mA sounder on); Cell auto-detect: two cell < 8.6V < three cell < 12.9V < four cell; Top level hystereses: 0.1V; Margin: 0.2V (2 cell) 0.3V (3 cell) 0.4V (4 cell); Voltage sample period: 20 seconds; Maximum samples: 126 (42 minutes).

Contact: If you have any problems or questions about this device, or are kind enough to give feedback, comments or suggestions then please do not hesitate to email: support@customidea.com.

WARNINGS:

The user is responsible for correctly connecting this device
The device is intended for indication purposes only
The device is not protected against reversal of polarity
The device should not be used by children under 14 years of age
Always follow lithium polymer battery safety guidelines
RC models should be flown at least 30m away from spectators