# RL-USB-5

## Counter, Event and State USB Data Logger

### FEATURES

- Functions as an event logger, state change logger and event counter
- Logging rate of up to five times per second for events, two times per second for state changes and 100 times per second when counting
- Stores up to 32,510 readings in event mode
- Stores up to 32,510 readings in state change mode
- Stores up to 32,510 timed intervals in event counter mode
- Accepts input voltages of up to 24V
- Volt free contacts option (normally open contact only)
- Rising and falling edge triggering
- LED flash on event / state change
- Connection via two screw terminals
- USB Interface for set-up and data download
- Supplied with replaceable internal lithium battery, Windows control software and measurement leads

### ORDERING INFORMATION

| | |
|---|---|
| Standard Data Logger (Data Logger, Software on CD, Battery) | RL-USB-5 |
| Replacement Battery | BAT 3V6 1/2AA |


This standalone data logger can record events (detecting an input and storing the time and date), record state changes (similar to an 'event' but also recording when the input reverts back to normal) and count events (count the number of events that happen during a timed interval). Up to 32,510 events or state changes can be recorded and up to 32,510 timed intervals in event counter mode (with 65,536 events in each interval).

Events and state changes can be triggered by either a rising edge (a voltage going from low to high) or falling edge (a voltage going from high to low). It is also possible to use volt free contacts. Instead of measuring an external voltage, the data logger applies a voltage across the screw terminals and detects when the input closes (i.e. a relay or microswitch).

Fast logging rates allow event capturing at speeds of up to two times per second and state changes at speeds of up to five times per second. Event counting can operate at speeds of up to 100 times per second (when the LEDs are turned off). The user can easily set up the logger, and download the stored data by plugging the data logger into a PC's USB port and running the purpose designed software under Windows 2000, XP, Vista & 7. Data can then be graphed, printed and exported to other applications.

The data logger is supplied complete with software, measurement leads terminated with crocodile clips and a long-life lithium battery which allows logging for up to 1 year. Functionality of the unit is indicated by flashing red and green LEDs, with an option to flash the red LED every time an event occurs.

| Specifications | Minimum | Typical | Maximum | Unit |
|---|---|---|---|---|
| Time between events | 200 | | | Milliseconds |
| Time between state changes | 500 | | | Milliseconds |
| Time between event counts | 10* | | | Milliseconds |
| Input voltage ** | 3 | | 28 | V d.c. |
| 'Volt free contacts' voltage *** | 2.75 | | 3.6 | V |
| 'Volt free contacts' current | | 35 | | µA |
| Timing accuracy † | | | ±3 | Seconds per 24 hours |
| Operating temperature range | -35 (-31) | | +80 (176) | °C (°F) |
| 1/2AA 3.6V Lithium Battery Life ‡ | | 1 | | Years |

* 10 milliseconds can only be achieved with the LEDs disabled. If the LEDs are enabled, the time between the event counts is reduced to 50 milliseconds
** see 'Voltage input range' section for details
*** Voltage will decrease as battery is discharged
† Per day at 20°C
‡ Assuming 1 event every 5 mins at 20°C in Voltage input mode

# RL-USB-5

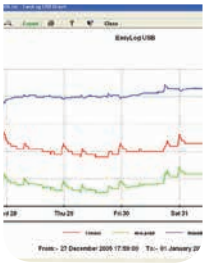
## Counter, Event and State USB Data Logger

### L-WIN-USB (CONTROL SOFTWARE)

Lr's EasyLog USB control software is supplied free of charge with each data logger. Easy to install and use, the control software runs under Windows 2000, XP, Vista & 7. The software is used to set-up the data logger as well as download, graph and export data to Excel.

The software allows the following parameters to be configured:

- Logger name
- Record events, record state changes or count events
- Triggering on rising of falling edges (see 'Edge Triggering' section)
- Voltage or Volt free contact triggering
- Flash LED on event/state change
- Voltage range
- Time period for event counting (i.e count the number of events every 10s). Maximum number of events per time period is limited to 65,000.


The latest version of the control software may be downloaded free of charge

### LED FLASHING MODES

RL-USB-5 features a red and a green LED to indicate the status of the data logger.


| | |
|---|---|
| **Green single flash (10 seconds)** Normal logging | |
| **Green single flash (20 seconds)** Low battery | |
| **Green double flash (20 seconds)** Data logger memory full | |
| **Red single flash** Event / State change / Count recorded | |

### VOLTAGE INPUT RANGE

The logger features a selectable voltage input range, which allows the logger to operate with a wide variety of system. Each input range has a different high and low 'trigger voltage' (i.e the voltage at which the logger considers a signal to be high or low).

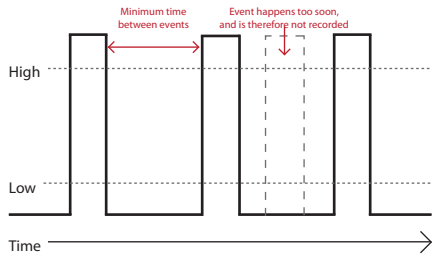
| Voltage range | Low trigger voltage | High trigger voltage |
|---|---|---|
| 0 - 3V | 0.8V | 2V |
| 0 - 5V | 1.3V | 3.4V |
| 0 - 12V | 3.2V | 8V |
| 0 - 24V | 6.4V | 16V |

# RL-USB-5

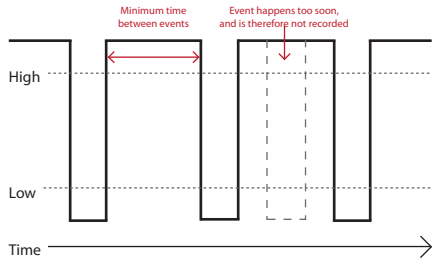
## Counter, Event and State USB Data Logger

### EDGE TRIGGERING

If the user selects 'rising edge' triggering, then an event is recorded at the point a signal goes from low to high. This is the default setting.




If the user selects 'falling edge' triggering, then an event is recorded at the point a signal goes from high to low.




### BATTERY REPLACEMENT

We recommend that you replace the battery every 12 months, or prior to logging critical data.

The RL-USB-5 does not lose its stored readings when the battery is discharged or when the battery is replaced; however, the data logging process will be stopped and cannot be re-started until the battery has been replaced and the logged data has been downloaded to PC.

Only use 3.6V 1/2AA lithum batteries. Check with your supplier that the battery you are ordering is 'press fit' and is not fitted with solder tags. Before replacing the battery, remove the RL-USB-5 from the PC.

**Note:**
Leaving the RL-USB-5 plugged into the USB port for longer than necessary will cause some of the battery capacity to be lost.

### WARNING

Handle lithium batteries carefully, observe warnings on battery casing. Dispose of in accordance with local regulations.

# RL-USB-5

## Counter, Event and State USB Data Logger

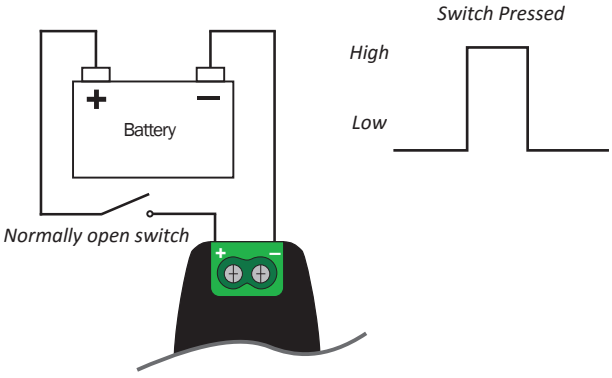
### THE EASYLOG USB RANGE

Each RL-USB data logger features the direct-to-USB connection and easy-to-use functionality that the range is known for. The range comprises 14 data loggers as detailed in the following table:

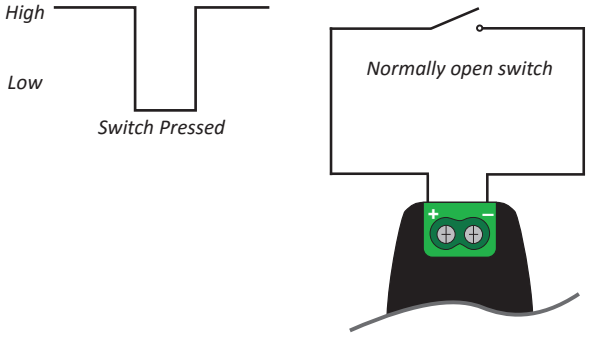
| Part No | Function | Range | Accuracy (overall error) | | Readings | Battery | Battery Life* |
|---|---|---|---|---|---|---|---|
| | | | Typ. | Max. | | | |
| RL-USB-1 | Temperature | -35 to +80°C (-31 to +176°F) | ±1°C (±2°F) | | 16,382 | 3.6V ½AA | 1 Year |
| RL-USB-1-PRO | High Temperature | -40 to +125°C (-40 to +257°F) | ±0.2°C (±0.4°F) | ±0.5°C (±1°F) | 32,510 | 3.6V ½AA | 3 years |
| RL-USB-1-RCG | Temperature with rechargeable battery | -20 to +60°C (-4 to +140°F) | ±1°C (±2°F) | | 32,510 | Lithium Ion | 1 month (rechargeable) |
| RL-USB-2 | Temperature, humidity & dew point | -35 to +80°C (-31 to +176°F)<br>0 to 100%RH | ±0.5°C (±1°F)<br>±3%RH | ±2°C (±4°F)<br>±6.0%RH | 16,382 | 3.6V ½AA | 1 year |
| RL-USB-2+ | Increased accuracy temperature, humidity & dew point | -35 to +80°C (-31 to +176°F)<br>0 to 100%RH | ±0.3°C (±0.6°F)<br>±2.0%RH | ±1.5°C (±3°F)<br>±4.0%RH | 16,382 | 3.6V ½AA | 1 year |
| RL-USB-2-LCD | Temperature, humidity & dew point with LCD | -35 to +80°C (-31 to +176°F)<br>0 to 100%RH | ±0.5°C (±1°F)<br>±3.0%RH | ±2°C (±4°F)<br>±6.0%RH | 16,379 | 3.6V ½AA | 1 year |
| RL-USB-2-LCD+ | Increased accuracy temperature, humidity & dew point with LCD | -35 to +80°C (-31 to +176°F)<br>0 to 100%RH | ±0.3°C (±0.6°F)<br>±2.0%RH | ±1.5°C (±3°F)<br>±4.0%RH | 16,379 | 3.6V ½AA | 1 year |
| RL-USB-3 | Voltage | 0 to 30V d.c. | ±1% | | 32,510 | 3.6V ½AA | 1 year |
| RL-USB-4 | Current loop | 4 to 20mA | ±1% | | 32,510 | 3.6V ½AA | 1 year |
| RL-USB-5 | Counter, Event & State | N/A | | ±3 secs/24 hrs | 32,510 | 3.6V ½AA | 1 year |
| RL-USB-TC | Thermocouple (J, K and T-type) K-type probe included | -200 to +1350°C (-328 to +2462°F) (K-type)<br>-200 to +1190°C (-328 to +2174°F) (J-type)<br>-200 to +390°C (-328 to +734°F) (T-type) | ±1°C (±2°F) | | 32,510 | 3.6V ½AA | 6 months |
| RL-USB-TC-LCD | Thermocouple with LCD (J, K and T-type) K-type probe included | -200 to +1350°C (-328 to +2462°F) (K-type)<br>-200 to +1190°C (-328 to +2174°F) (J-type)<br>-200 to +390°C (-328 to +734°F) (T-type) | ±1°C (±2°F) | | 32,510 | 3.6V ½AA | 6 months |
| RL-USB-CO | Carbon monoxide | 0 to 1000ppm **NOT A LIFE SAVING DEVICE** | ±6ppm | | 32,510 | 3.6V ½AA | 3 months |
| RL-USB-CO300 | Carbon monoxide | 0 to 300ppm **NOT A LIFE SAVING DEVICE** | ±4ppm | | 32,510 | 3.6V ½AA | 3 months |
| RL-USB-LITE | Low cost temperature | -10°C to +50°C (+14 to +122°F) | ±1°C (±2°F) | | 4,080 | CR1620 Lithium coin cell | 1 month |
| RL-USB-RT | Real-time temperature & humidity monitor | -20 to +70°C (-4 to +158°F) | ±1.5°C (±3°F)<br>±4.5%RH | | 7 days | N/A | N/A |

*Depending on logging rate, ambient temperature, and use of alarm LED

## CONNECTION & APPLICATIONS




*Event recording in 'voltage triggering' mode, using a battery and switch.*




*Event recording in 'volt free contacts' mode, using a switch only.*

## BATTERY INFORMATION

**Replacement**

We recommend that you replace the battery annually, or prior to logging critical data. Only use 3.6V ½AA lithium metal batteries. The data logger does not lose its stored readings when the battery is discharged or replaced; however, the data logging process will stop and will not resume until the battery is replaced and the logger restarted by EasyLog software.

Before replacing the battery, remove the data logger from the PC. Please note that leaving the data logger plugged into the USB port for extended periods will cause some of the battery capacity to be lost.

**Passivation**

If left unused for extended periods of time, lithium metal batteries including those used in the EasyLog range of data loggers naturally form a non-conductive internal layer, preventing them from self-discharge and effectively increasing their shelf life. When first installed in the data logger, this may cause a momentary drop in the battery voltage (the Transient Minimum Voltage) as the internal layer is broken down, resulting in the data logger resetting. Inserting the batteries in the data logger and leaving it connected to a PC for about 30 seconds will remove this layer. After this, remove and re-install the batteries to reset the data logger. Overall battery life will not be affected.

## WARNING

Handle lithium metal batteries carefully, observe warnings on battery casing. Dispose of in accordance with local regulations.