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## Instructions

### Battery Condition Meters

4QD's BCM is a small LED meter board.

LEDs (Light Emitting Diodes) are semiconductor lights.

For 24v (or 36v) battery systems 5 LEDs are used whilst the 12v version uses 3 LEDs.

For higher voltages (36, 48 or 60v), 7 LEDs are used.

A 36v version of the 5 LED board is also available.

By using LEDs they can tell you more about the battery that a moving coil meter will. This is because the LEDs do not suddenly switch on and off, but each LED fades over a range of voltages.

#### Operation

At full battery voltage all LEDs are on. As the voltage falls the LEDs fade one by one and go off, starting with the end green LED.

If the Green LEDs are all off when the motor is not in use, then the battery needs recharging. Red alone indicates there is a danger of over-discharging the battery: discharging a 24v battery below 21v (10.5v for 12v batteries) can permanently damage the cells.

The LEDs operate at approximately the voltages shown in the table overleaf.

The meter says nothing about the battery during charging: the voltage then is well over 24v (12v) and all LEDs will normally be on.

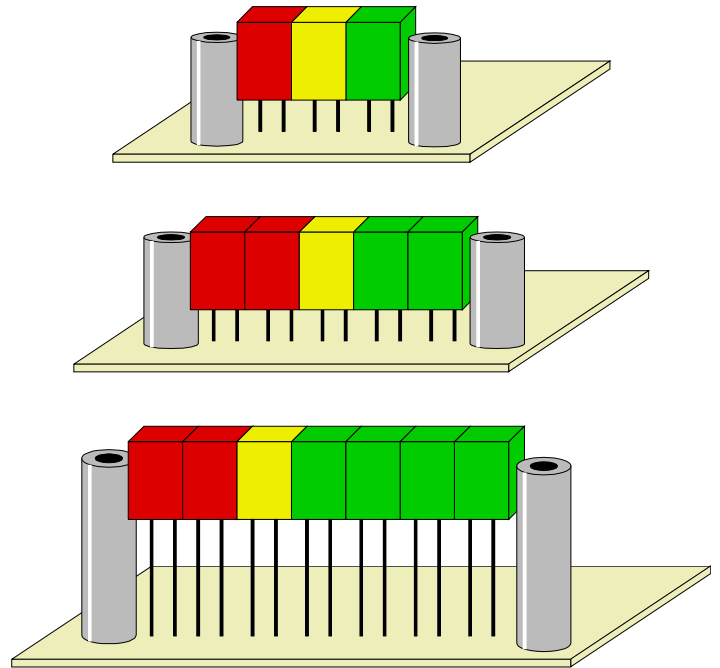
When the battery is under (heavy) load the voltage will be lower than when off load, so during heavy loading you can expect some of the LEDs to go out but if the battery charge is still OK they should come on again as soon as the heavy load is removed.

Once you have become familiar with the way a particular battery behaves you should be able to tell by the off load and on load LED indication exactly how the battery is ageing.

# Indicated Voltages.

	7 LED (48v)	5 LED (36v)	5 LED (24v)	3 LED (12v)
Green	49.7 — 49.2			
Green	47.9 — 47.4			
Green	46.1 — 45.6	37 — 36.5	25.1 — 24.6	12.3 — 11.8
Green	44.3 — 43.8	35 — 34.5	23.3 — 22.8	
Yellow	42.5 — 42.0	34 — 33.5	21.5 — 21.0	10.3 — 9.8
Red	40.7 — 40.2	33 — 32.5	20.7 — 19.2	
Red	38.9 — 38.4	32 — 31.5	18.9 — 17.4	9.0 — 8.5

The LEDs fade between the voltages indicated in the table above.

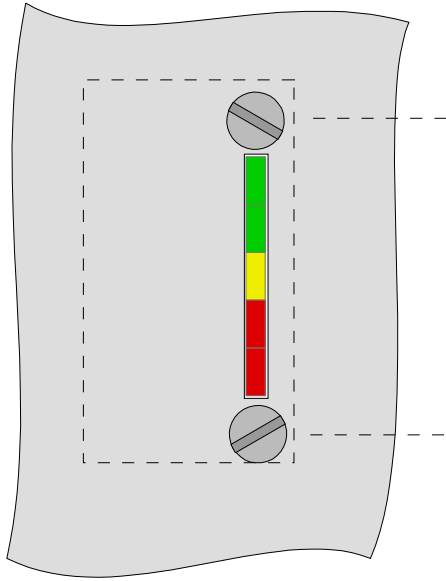


## Dimensions

All dimension in millimeters.

Board	Length	Width	Height
3 LED	29	21	20
5 LED	41	21	20
7 LED	51	21	33

## Mounting



panel detail

All boards require a 2.2mm wide slot, length as in the table. with two 3.5 mm fixing holes at centres indicated.

	<b>Slot</b>	<b>Hole spacing.</b>
<b>3 LED</b>	15.5	23
<b>5 LED</b>	25.5	33
<b>7 LED</b>	35.5	44.5

## Water resistance.

When mounting, make sure water cannot run down the leads onto the circuit board. This is not usually a problem as any water getting onto the panel will usually run off along the panel, either on the front or the rear, rather down the leads of the LEDs.

You should of course make sure the panel is not subjected to heavy rainfall or hosing!

## Connections

The BCM is supplied with wires attached.

The White or Red or Yellow wire is the positive connection.

The Green or Black or Blue wire is the negative connection.

The meter should connect directly across the battery, probably via the ignition switch.

# Service

The LED meters are very reliable and there is little to go wrong with them. Even reversing the battery connections will not usually damage them, though we can't guarantee this with the 36 and 48v versions!

This reliability of course means that it is uneconomical for us to offer any service facilities on them, so there is no 'standard' service charge: if the item is not under guarantee it makes better sense to replace it.