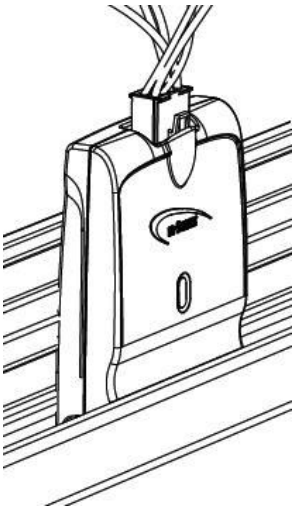
POWERSHIELD

m-Senzor Installation Manual

p/n 6300-080D

About this manual

This manual is intended for use with PowerShield m-Senzor battery sensor.



A battery is more commonly known as a monoblock or jar in the critical power industry and therefore these terms are used throughout this manual.

Part Number 6300-080
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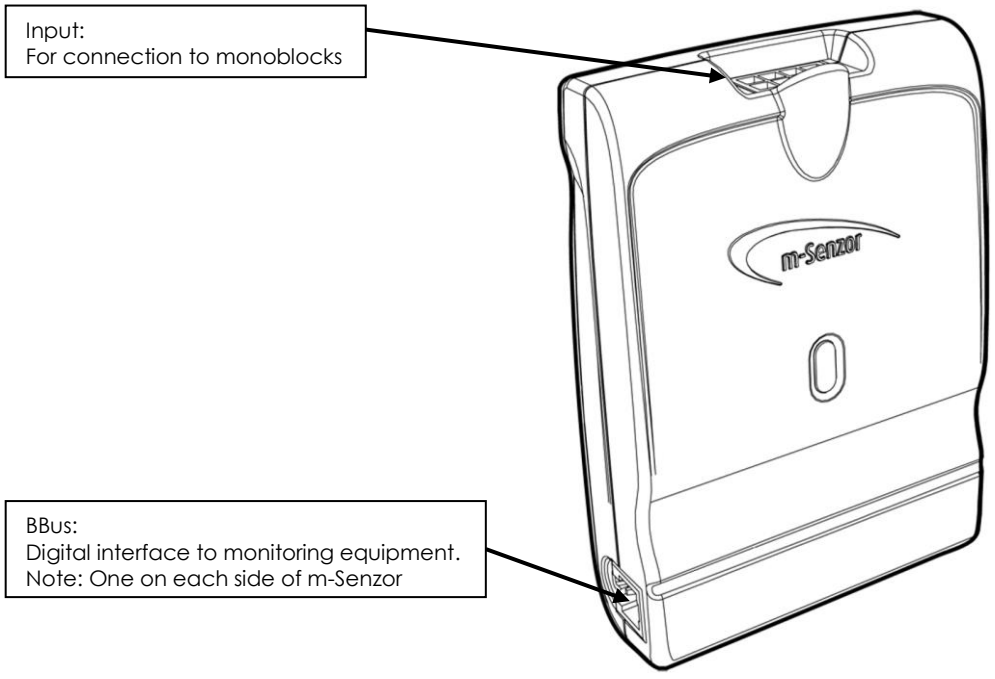
Contents

Safety Information

To ensure that the m-Senzor is installed and used in a safe manner, observe the following guidelines:

- Read this manual completely before installing the m-Senzor and follow all safety instructions.
- The m-Senzor must be correctly installed and configured in order to obtain accurate results. The installation must be carried out only by suitably trained personnel. Installation must be in an adequately ventilated environment or warranty may be invalidated.
- The m-Senzor may operate in a potentially hazardous environment making it imperative that all installation personnel have adequate training and experience. The m-Senzor must be installed in a Service Access area.
- The m-Senzor is intended for indoor use only.
- The m-Senzor is intended to be used in an environment with a maximum relative humidity of 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C.
- The m-Senzor is intended to be used in a Pollution Degree 2 environment.
- The m-Senzor is a Measurement Category I (CAT I) product. It should not be used for Measurement Categories II, III and IV.
- The m-Sensor is designed to withstand transient over-voltages up to 2500V.
- Maximum isolation voltage to Earth is 600Vdc.
- The m-Sensor is protected throughout by Double Insulation or Reinforced Insulation as indicated by this symbol 
- Consult the manual whenever you see this caution symbol 

Terminals



Operation

The m-Senzor is a battery sensor with a digital interface. The m-Senzor can measure battery temperature, voltage and ohmic value of the battery it is connected to.
The measurements and configuration of the m-Senzor need to be retrieved via the digital interface. The m-Senzor has 2 LED's to indicate status, the details of which are outlined in Appendix 1.

Installation – Preliminaries

Each m-Senzor is specific to the monoblock voltage to which it will be fitted – NiCad /2V/4V/6V/8V/12V/16V – but it is a dual device and is connected across a pair of these monoblocks. The pair of monoblocks must be located one after the other in series, within the same battery string. The most positive monoblock of the pair is V1, the most negative monoblock of the pair is V2. The m-Senzor measures each monoblock individually.

Each m-Senzor has a factory set ID number between 1 and 125. Any m-Senzor can be fitted to any 'in series' pair of monoblocks, regardless of ID number; however, each m-Senzor on a single digital interface must have a unique ID.

For installations containing strings with uneven numbers of monoblocks, or where layout makes pairs impossible, a one monoblock 'single' version of the m-Senzor is available. This is identical to and treated in the same manner as the dual version, but connected across a single block.

Bbus
m-Senzors communicate via the PowerShield Bbus digital interface. This connects m-Senzor to m-Senzor and m-Senzor to monitoring equipment in a chain. One Bbus is not limited to a single monoblock/jar string, or even consecutive monoblocks. If it is more practical, each Bbus may span between monoblock/jar strings.

It is advisable to keep the total length of the BBus interface to less than 150m. This is the total length of the Bbus to the furthest module, including the short connecting cables between each m-Senzor.

Installation

Installation must be carried out only by suitably trained personnel.

Installation must be in an adequately ventilated environment.

Step 1 - Monoblocks/Jars

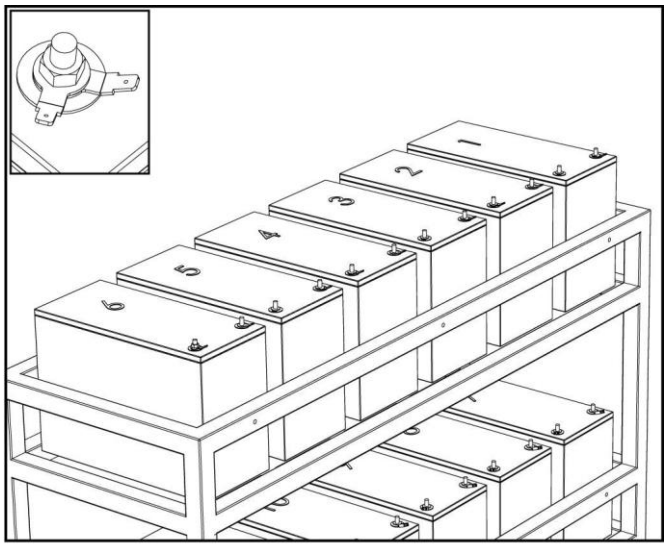
Each monoblock must be uniquely identified, preferably by number, to aid in mapping modules to monoblocks. It does not matter which numbers are allocated to which monoblock, although it is advisable that monoblocks in a single string are identified by a single consecutive sequence of numbers. Where there are multiple strings in a system, ensure every monoblock is uniquely identified, i.e. 1-24, 25-48, 49-72, NOT 1-24, 1-24, 1-24.

Ensure that all terminals have 6.3mm tabs available for m-Senzor connection as follows:

Where a dual m-Senzor is to be used – fit two tabs on the negative (-) terminal of the most negative monoblock and two tabs on the positive (+) terminal of the most positive monoblock. Fit one tab on each of the remaining terminals.

Where a single m-Senzor is to be used – two tabs are required on each monoblock terminal.

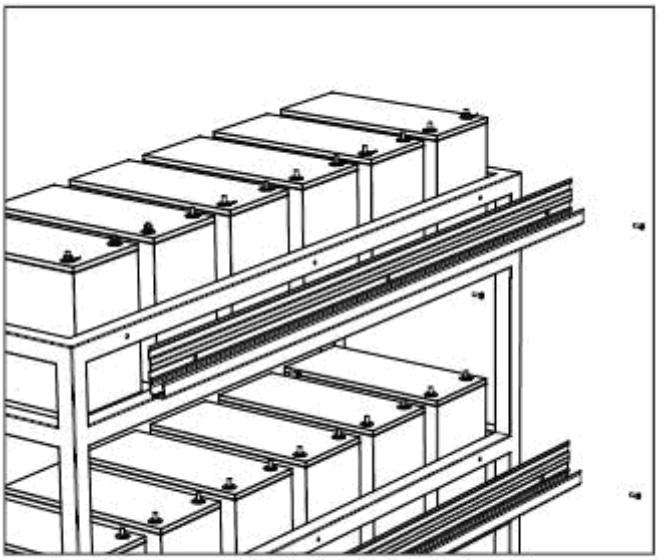
For simplicity, it may be easier and more efficient to fit two tabs to every terminal.



Number all monoblocks individually
1-1280 (eg.1-32, 33-64, 65-96, Not 1-32, 1-32, 1-32).
Fit 6.3mm QC terminal tags.

Step 2 – Mounting Rail for m-Senzors

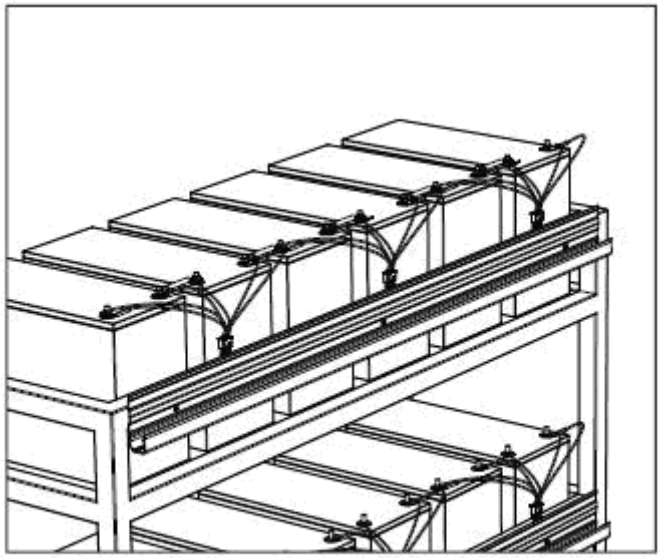
The m-Senzor mounting rail can be fitted in any orientation and can be used with both racks and cabinets.
Drill to suit and fasten with screws or cable ties.



Secure the mounting rail to suit battery layout.

Step 3 – m-Senzor Power Leads

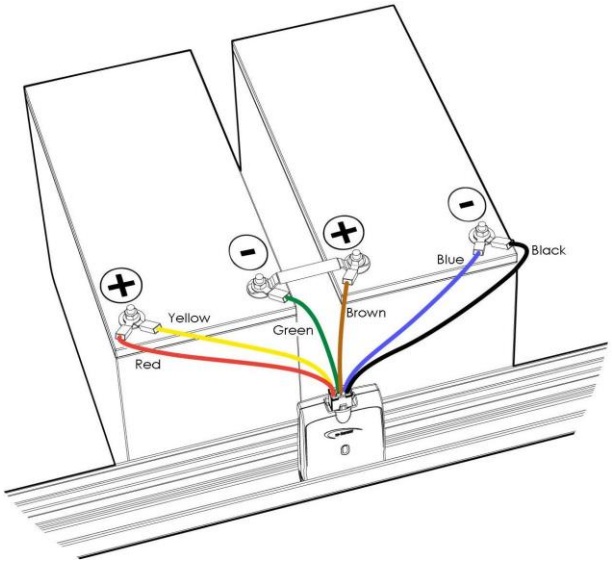
Fit the m-Senzor power leads to the monoblock/jar terminals. Ensure the dual power leads are connected across an 'in series' pair of monoblocks/jars. Refer Appendix 2 for connection details.



Fit Module power leads to terminal tags, confirming correct polarity

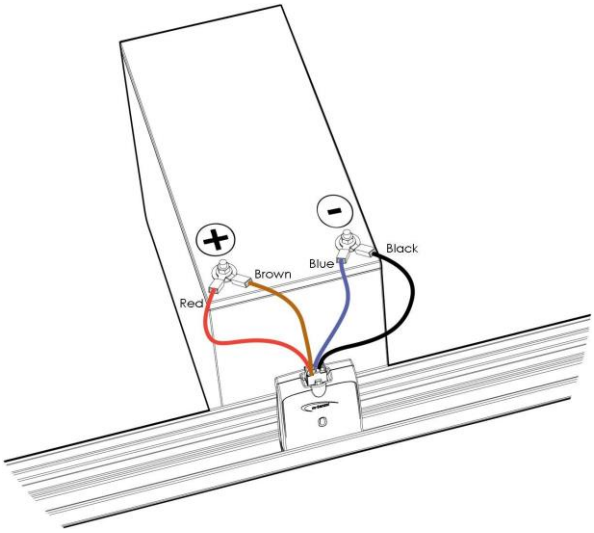
Dual m-Senzor

Dual m-Senzor Power Lead Connection Detail
(No Post Temperature)



Single m-Senzor

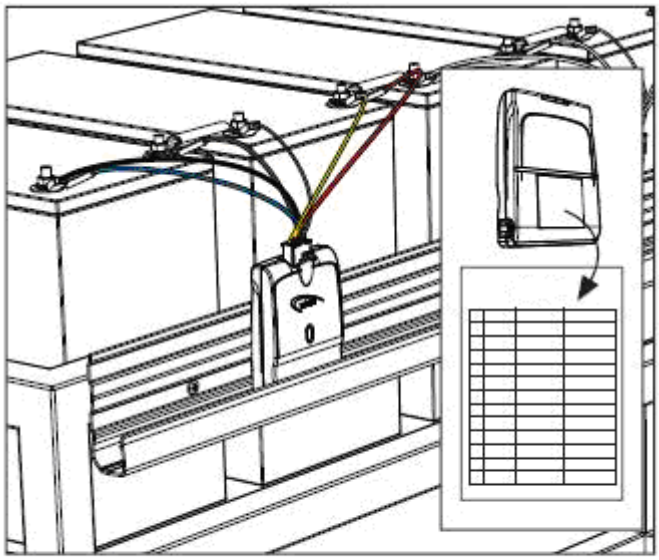
Single m-Senzor Power Lead Connection Detail
(No Post Temperature)



Step 4 – Connect m-Senzors

Connect the m-Senzors to the power leads and snap into mounting rail. Ensure the module ID and monoblock number are recorded. Without this information the monitoring system cannot be properly configured. The ID range is 1-125, however the m-Senzors can be installed in any arrangement. The only requirement is that when connected to the monitoring equipment each m-Senzor on a Bbus communication link has a different ID.

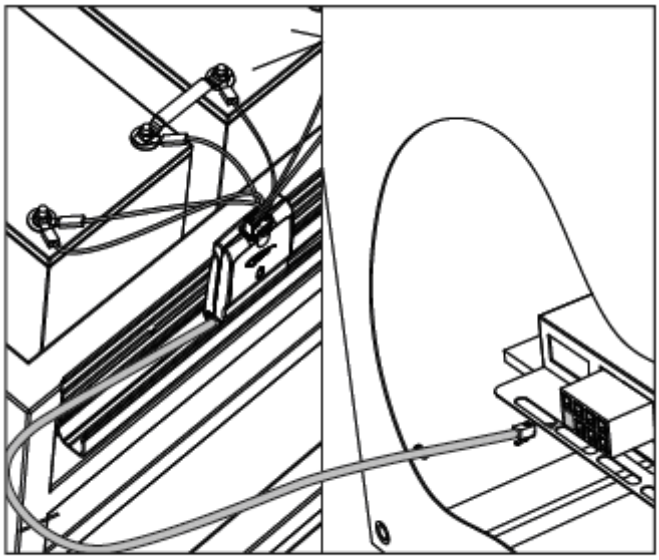
The LED should light solid green when the m-Senzor is powered correctly. If the LED lights red, check the connections of the power lead.
A full list of m-Senzor LED states is available in Appendix 1



Fit modules, connect power leads.
The LED should turn on green.
Record Module ID and battery number.

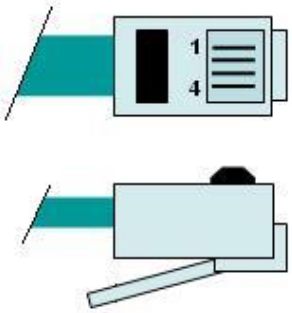
Step 5 – Connect the Bbus

The Bbus is the digital interface between m-Senzors and monitoring equipment and is single ended [not a loop]. The m-Senzors can be connected in any arrangement, so long as each m-Senzor on a single BBus has a different ID number.
Use the short Bbus interconnect cables from m-Senzor to m-Senzor, and the longer Bbus port cables from m-Senzor to monitoring equipment.



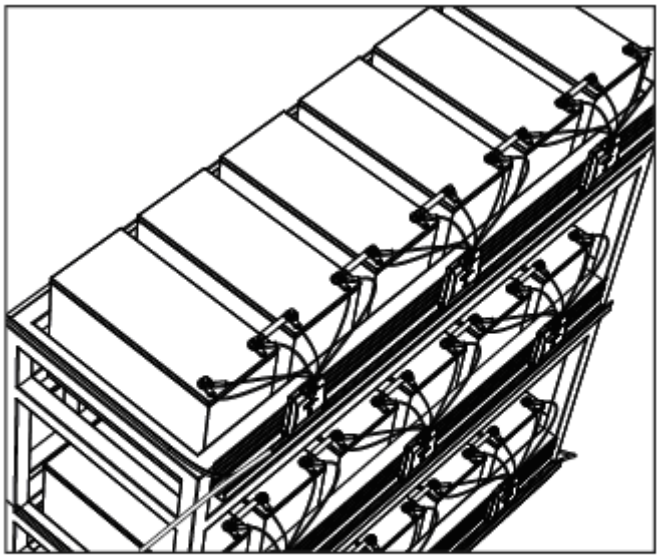
Connect Bbus Port cable from one end of the m-Senzor to monitoring equipment.

Bbus Cable Pin-Out Detail



Left		Right	
Pin #	Color	Pin #	Color
1	Yellow	1	Yellow
2	Green	2	Green
3	Red	3	Red
4	Black	4	Black

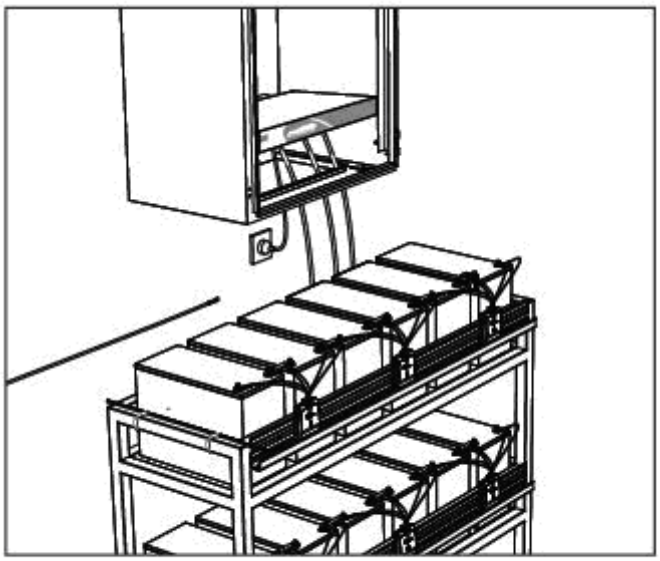
Once the Bbus is connected to powered monitoring equipment, the m-Senzor LEDs should flash green and red in unison.



Remember-each Module on the Bbus must have a different ID.
The LED should flash green and red in unison.

Step 6 – Confirmation

Check that all installed parts are performing as expected, and that the installation forms are complete. Secure all cables with appropriate strain relief.



Confirm all module LEDs are flashing.
Secure all cables tidily.

Your system is now ready for configuration.

Specifications

Mechanical

Width: 75mm / 2.95 inches
Depth: 26mm / 1.05 inch
Height: 105mm / 4.15 inches
Weight: 113g

Electrical

	NiCad (1V)	2V	4V	6V	8V	12V	16V	
Part Number Single Model	9100-094[1]	9100-096	9100-098	9100-100	9100-102	9100-104	9100-106	
Part Number Dual Model	9100-095	9100-097	9100-099	9100-101	9100-103	9100-105	9100-107	
Voltage Measurement Range[2]	0.8 - 1.9	1.6 - 2.6	3.2 - 5.2	4.8 - 7.8	6.4 - 10.4	9.6 - 15.6	12.8 - 20.8	Vdc
Typical Voltage Accuracy[6]	±0.3			±0.2				%
Voltage Resolution	1		5					mVdc
Ohmic Value Range	0.15 – 5			0.5 - 20		1 - 40		mΩ
Typical Ohmic Value Accuracy	±15 ±2.5%			±25 ±2.5%				µΩ
Ohmic Value Resolution	1							µΩ
Post Temperature Range	-10 to 70							°C
Post Temperature Accuracy	±1[3]							°C
Post Temperature Resolution	0.1							°C
Max Normal Current Consumption[4]	77	57	36	18			20	mA
Max Current[5]	2.5	2.8		2.0	1.4	1.0	0.6	Arms
Protected Maximum Voltage Unintended Applications	±5	±6	±16	±25	±65			Vdc

1. NiCad Single module cannot perform ohmic measurements.
2. Per monoblock.
3. Over the range 0 - 50°C.
4. Applies at minimum monoblock voltage.
5. Applies only during ohmic measurements.
6. Accuracy is ±0.3% for a temperature range of 0 - 50°C.

Connectors

Input	8 way AMP Mini UMNL p/n 0-0770579-1
BBus Interface	4 way modular jack p/n Tyco 5-641334-3

Other

Max. Isolation Voltage to Earth	600V DC
Storage temperature	0-70°C / 32-158°F
Operating temperature	0-50°C / 32-122°F

Powered from monoblock(s) being monitored
BBus Digital Interface maximum link length is 150m/492ft

Appendix 1 – LED Behaviour

The m-Senzor has a bi-colour [red and green] LED. It will exhibit varying behavior as described below:

Green [Continuous]
m-Senzor connected to the wiring harness & monoblock/jar with no problems detected.

Green & Red [Flashing]
m-Senzor is connected to monoblock/jar and an active Bbus but has not yet been detected.

Green [Flashing]
Normal operation. m-Senzor is connected to monoblock/jar and an active Bbus and has been detected.

Red [Continuous]
m-Senzor has detected a problem with the wiring harness or monoblock/jar.

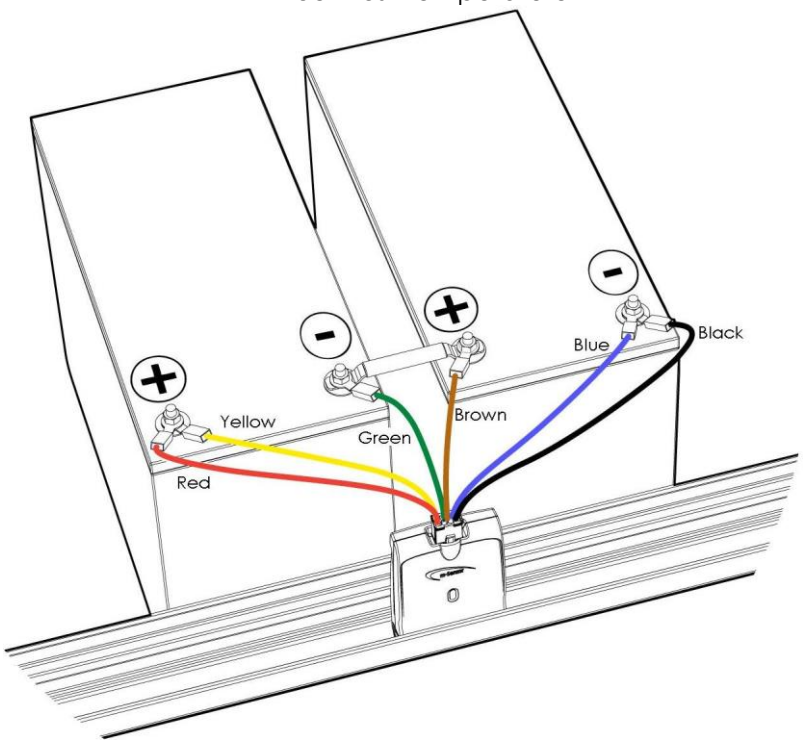
Red [Flashing]
m-Senzor is highlighting an alarm as directed by the m-Senzor monitoring equipment.

Green & Red [Alternate Flash]
m-Senzor locate function

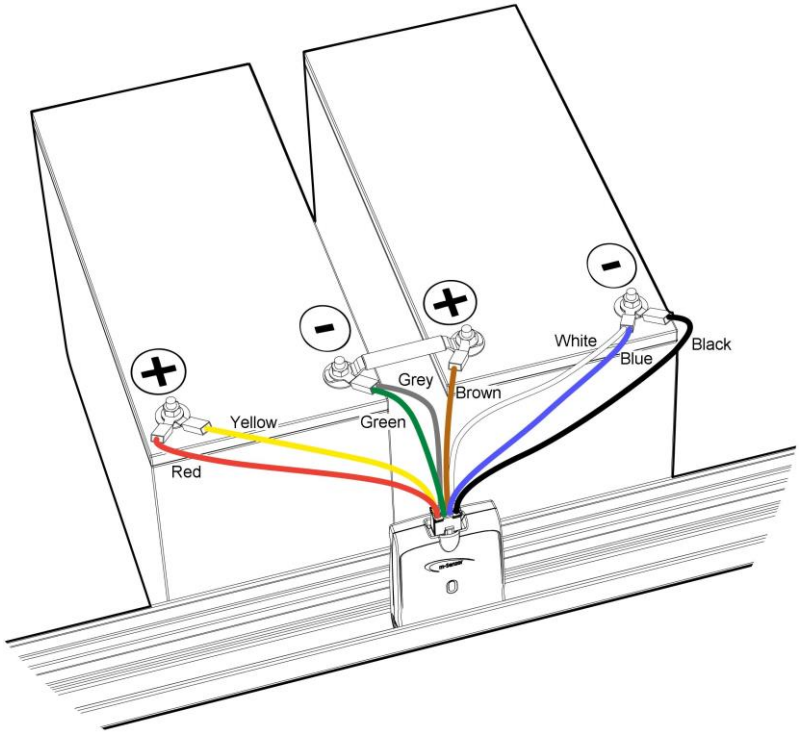
Appendix 2 – m-Senzor Connections

Dual m-Senzor

Without Post Temperature

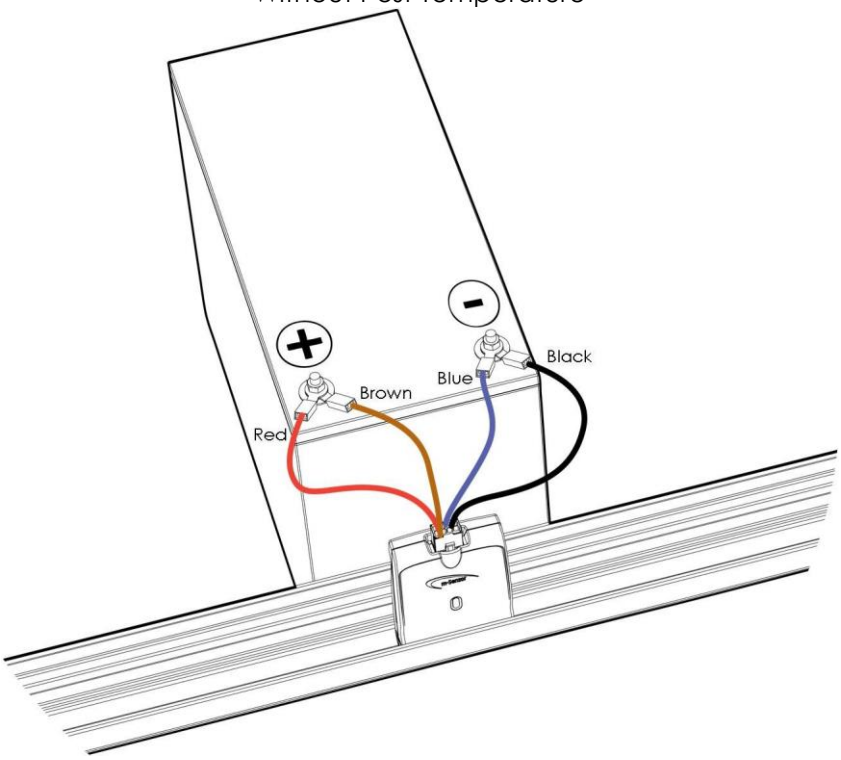


With Post Temperature



Single m-Senzor

Without Post Temperature



With Post Temperature