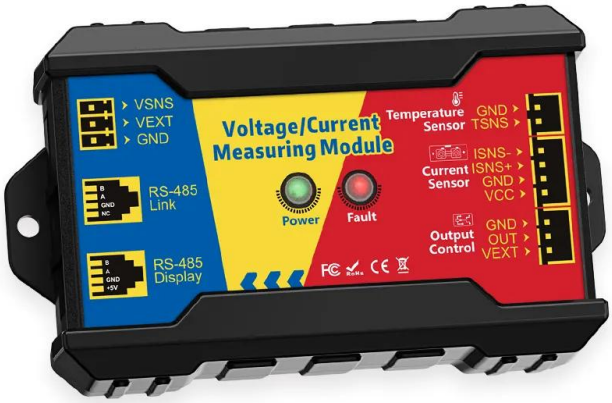
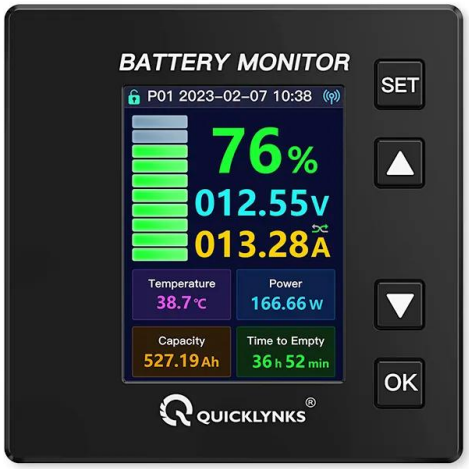
BATTERY NZ

BMQ-400 and 600A Battery Monitor

Installation Guide





General Safety Precautions

Read this manual carefully. It contains important instructions that must be followed during installation, operation and maintenance. Save these instructions for future reference on operation and maintenance

Battery Safety Warnings

Working in the vicinity of a lead acid battery is dangerous. Batteries can generate explosive gases during operation. Never smoke or allow a spark or flame in the vicinity of a battery. Provide sufficient ventilation around the battery. Wear eye and clothing protection. Avoid touching eyes while working near batteries. Wash your hands when done. If battery acid contacts skin or clothing, wash them immediately with soap and water. If acid enters an eye, immediately flood the eye with running cold water for at least 15 minutes and get medical attention immediately. Be careful when using metal tools in the vicinity of batteries. Dropping a metal tool onto a battery might cause a short circuit and possibly an explosion. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short circuit current high enough to melt objects such as rings, causing severe burns

The Battery Monitor

The BMQ-400 and the BMQ-600 Smart are battery monitors. They measure battery voltage and current. Based on these measurements, it calculates the battery's state of charge and the time to go. It also keeps track of historical data. All monitored battery parameters can be read out, and settings can be changed via the display and the four buttons or via the blue tooth phone app. The Pro BMS app can be used to read out all monitored battery parameters or to change settings. The included temperature probe can also be used for battery temperature monitoring.

Why should I monitor my battery?

Batteries are used in a wide variety of applications, mostly to store energy for later use. But how much energy is stored in the battery? No one can tell by just looking at it, especially in the case of lithium batteries. The service life of batteries depends on many factors. Battery life may be shortened by under-charging, over-charging, excessively deep discharges, excessive charge or discharge currents, and by high ambient temperature. Monitoring the battery with a battery monitor will give important feedback to the user so that remedial measures can be taken when necessary. Doing this will extend battery life and the battery monitor will quickly pay for itself.

Sizing

The battery monitor is available in two sizes; it is available with a 400A or 600A shunt.

How does the battery monitor work?

The main function of the battery monitor is to follow and indicate the state of charge of a battery, to be able to know how much charge the battery contains and to prevent an unexpected total discharge. The battery monitor continuously measures the current flow in and out of the battery. Integration of this current over time, if it was a fixed current, boils down to multiplying current and time and gives the net amount of Ah added or removed. For example, a discharge current of 10A for 2 hours will take 10 x 2 = 20Ah from the battery. To complicate matters, the effective capacity of a battery depends on the rate of discharge, the Peukert efficiency, and, to a lesser extent, the temperature. And to make things even more complicated: when charging a battery more energy (Ah) has to be 'pumped' into the battery than can be retrieved during the next discharge. In other words: the charge efficiency is less than 100%. The battery monitor takes all these factors into consideration when calculating the state of charge.

Readout overview

The head unit display displays an overview of the most important parameters.

These are:

State of charge

Battery voltage

Battery current

Power

State of charge: This is the actual state of charge of the battery in a percentage and is compensated for both the Peukert efficiency and charge efficiency. The state of charge is the best way to monitor the battery.

Estimated Full Time: This is the estimated time remain before the battery is depleted

Remaining Capacity: This is the amount of energy remaining in the battery in Ah

A fully charged battery will be indicated by a value of 100.0%. A fully discharged battery will be indicated by a value of 0.0%.

Voltage: This is the terminal voltage of the battery.

Current: This is the actual current flowing in or out of the battery. A negative current indicates that current is taken from the battery. This is the current needed for DC loads. A positive current means that current is going into the battery. This is current coming from charge sources. Keep in mind that the battery monitor will always indicate the total battery current, being the current traveling into the battery minus the current traveling out of the battery.

Temperature: This is the current temperature of the temperature probe.

Power: The power drawn from or received by the battery.

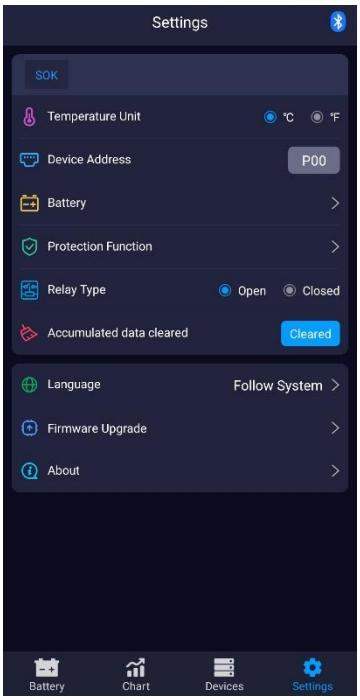
Cumulative Charge: The battery monitor keeps track of the Amp-hours added to the battery compensated for the efficiency. Example: If a current of 12A is drawn from a fully charged battery for a period of 2 hours, the readout will show -24.0Ah (-12 x 2 = -24).

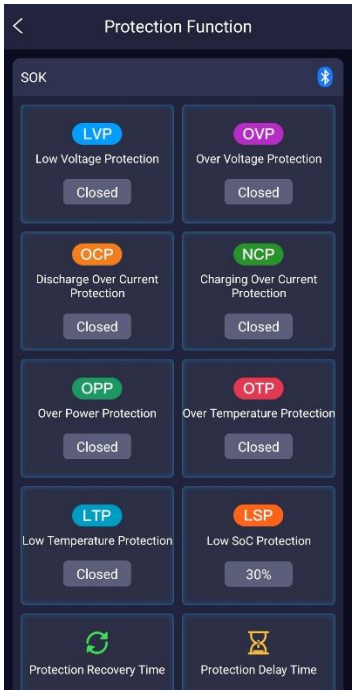
Cumulative Discharge: The battery monitor keeps track of the Amp-hours removed from the battery compensated for the efficiency. Example: If a current of 12A is drawn from a fully charged battery for a period of 2 hours, the readout will show -24.0Ah (-12 x 2 = -24).

The Pro BMS APP

The pro BMS app can be used to monitor and configure the battery monitor. There are additional settings that can only be set by the app such as the low SOC alarm.

The app is available on IOS or Android. Search for Pro BMS





What is included in the box

Temperature Probe

RJ-45 Wire

Shielded Wire

Mounting the shunt

The shunt is not waterproof and has to be mounted in a dry location. The shunt has two holes for mounting purposes; these are located in the base of the shunt. The holes can be used to screw or bolt the shunt onto a hard surface.

Mounting the head unit

Using a small flat head screwdriver prise the faceplate off the head unit

Drill a 50mm diameter hole in the desired location, connect the cable if it is not accessible from the rear and mount the head with two screws. Replace the bezel.

For the electrical connections, please follow the guide on the diagrams below

Electrical connections

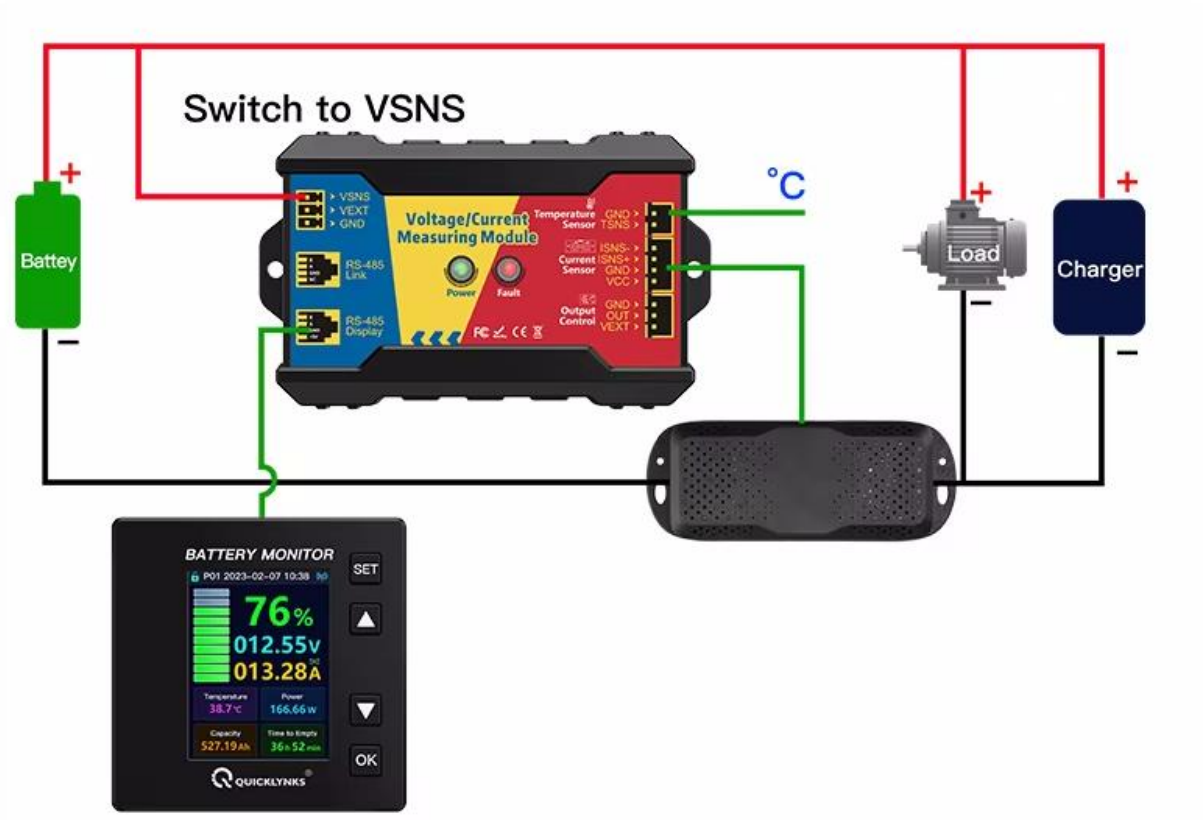
Make the connections according to your requirements. Please ensure that all circuits are fused. A 3A fuse is recommended the the +ve input.

Please note the different options available.

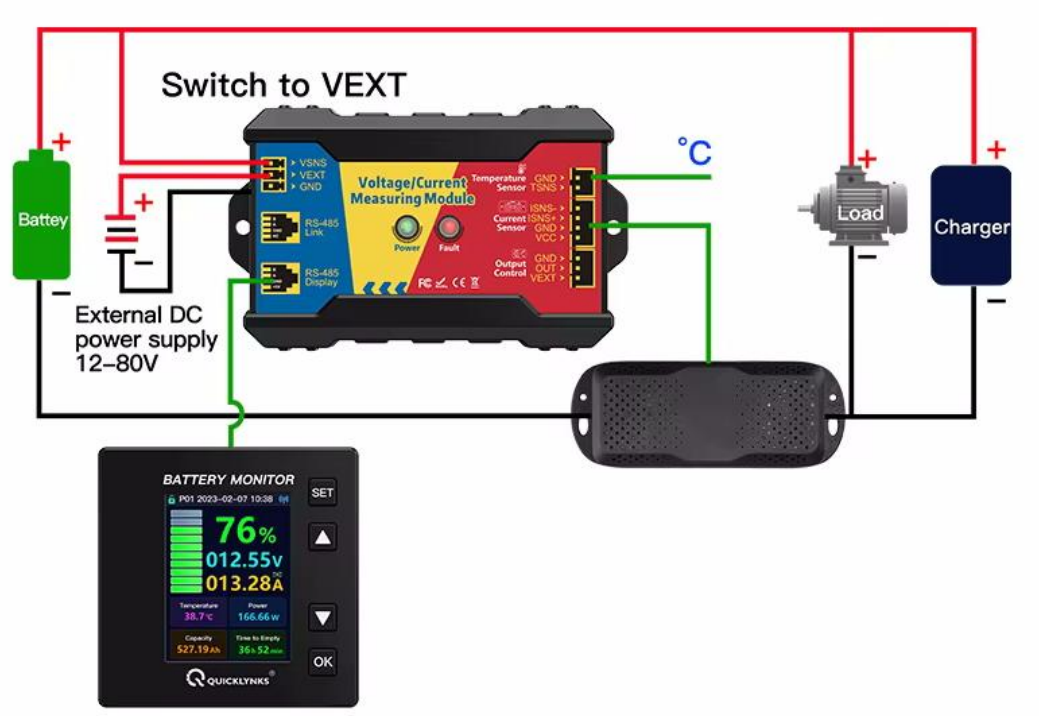
1. Internal Power
2. External Power
3. Utilising the relay output

Internal Power

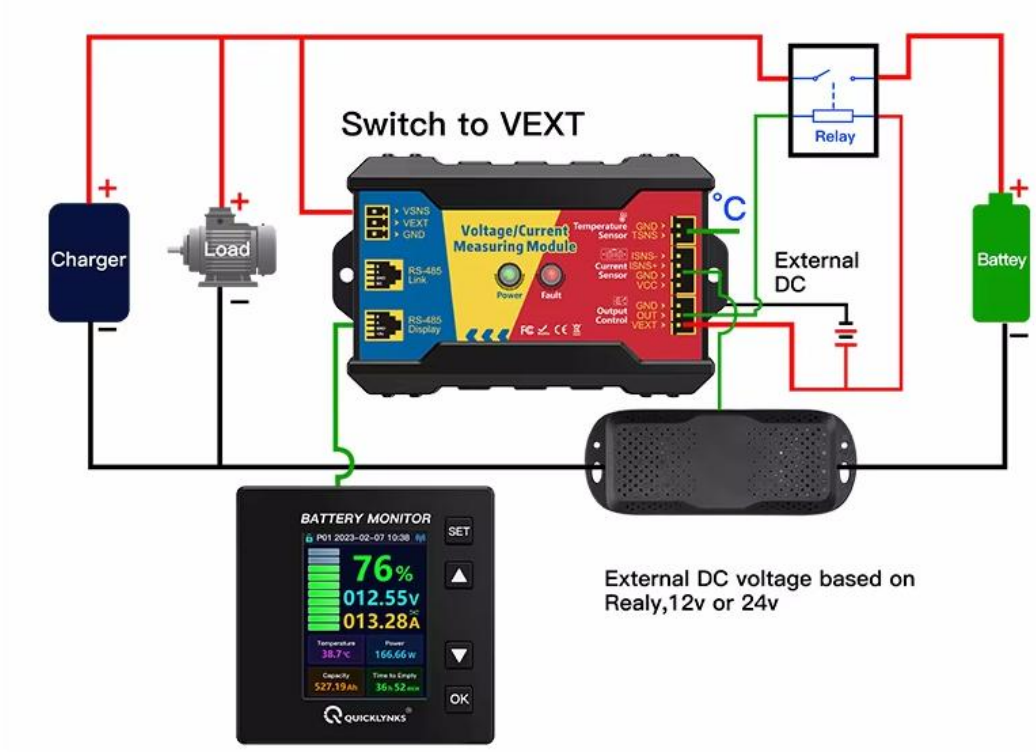
Ensure that the switch on the rear of the unit is set to VSNS



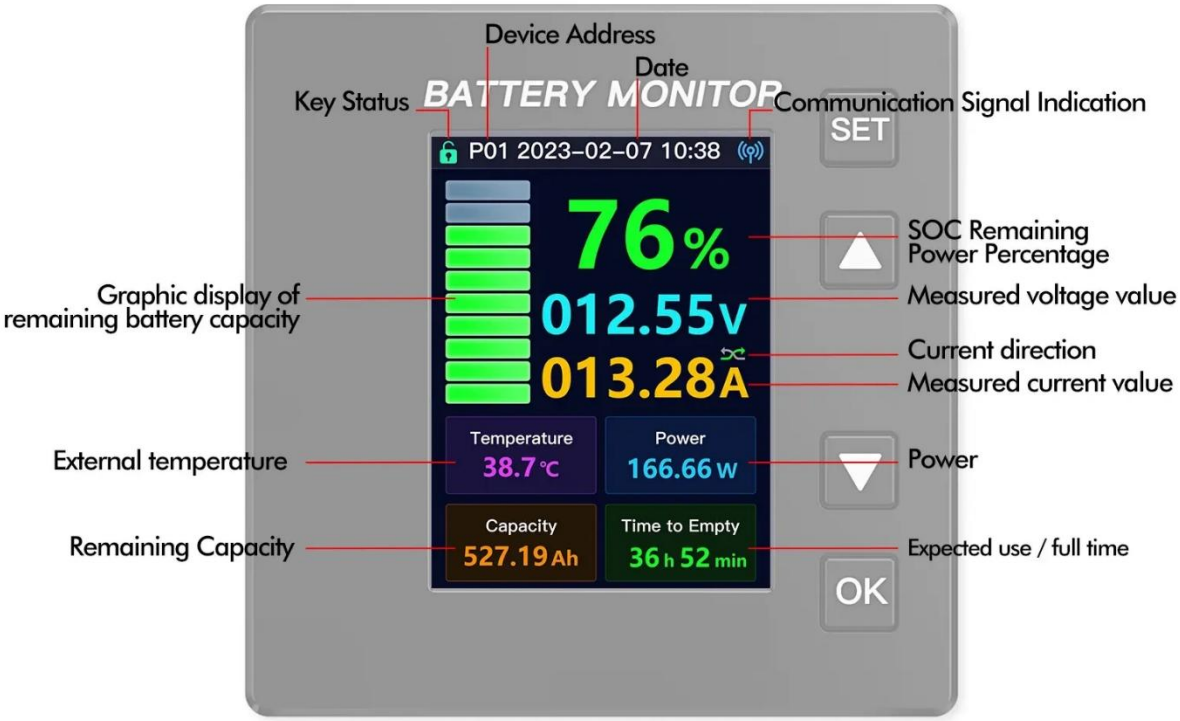
External Power



Utilising External Replay Output



Display



To enter the setup menu, press set.

Select from the options:

Language > Change the language

System Setting > to zero and clear data

Time > Set the time

Graphic Monitor > View the volts and current in a graph

Temp Unit > Set C or F

Buzzer > Set button beep and alarm beep

Lighting Power > set brightness

Blanking time > Set when the screen sleeps

Version > View Firmware information

Additional configuration such as low SOC Alarms and Low Voltage Alarms is possible via the Pro BMS app.