BATTMASTER® 4.0

Advanced Wireless Battery Monitoring System

Datasheet

1 General description

BATTMASTER® is a wireless battery monitoring system that measures and logs the voltage, internal resistance, temperature and current of lead acid batteries (2, 6 or 12 V nominal voltage) as individual blocks or within a battery string. It can operate as a standalone.

The modular architecture of the system has the benefit to be easily customizable to log other parameters on request (i.e. pressure, humidity, etc.).

BATTMASTER® is composed of 4 components:

CU (Central Unit) • Collects stores and dispatch the measurements data and events. • Manages the communication with the PC • Sends SMS (using with the optional GSM module) and E-Mail notifications. • Permits the connection of an optional monitor through HDMI port. The monitor shows the actual status of the system.	 **Figure 1: CU**
BAM (Battery Acquisition Module) • Measures the voltage, temperature and internal resistance of the battery. • Stores the most significant data until the next reading by the CU. All data is time stamped.	 **Figure 2: BAM**

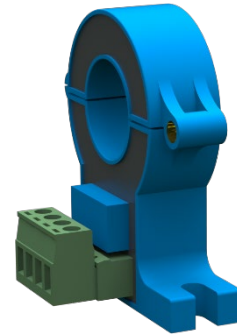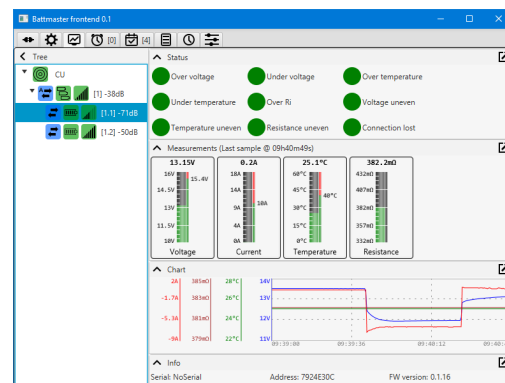|	
CAM (Current Acquisition Module) • Measures the current of a battery or a string of batteries, in conjunction with a Hall effect current clamp (factory provided). • Stores the most significant data until the next reading by the CU. All data is time stamped.	 **Figure 3: CAM** **Figure 4: Clamp**
BATTMASTER® Application Software • Used to configure the system. • System monitoring. • Automatically updated. • Data import and review. • Runs on Windows and Android	 **Figure 5: Application screen**

A typical system is composed by one CU, one CAM for each string of batteries and one BAM for each battery. A simple system composed of one single string of batteries is shown below. Each CU supports up to 1024 (50 for lite version) BAMs and 64 CAMs.
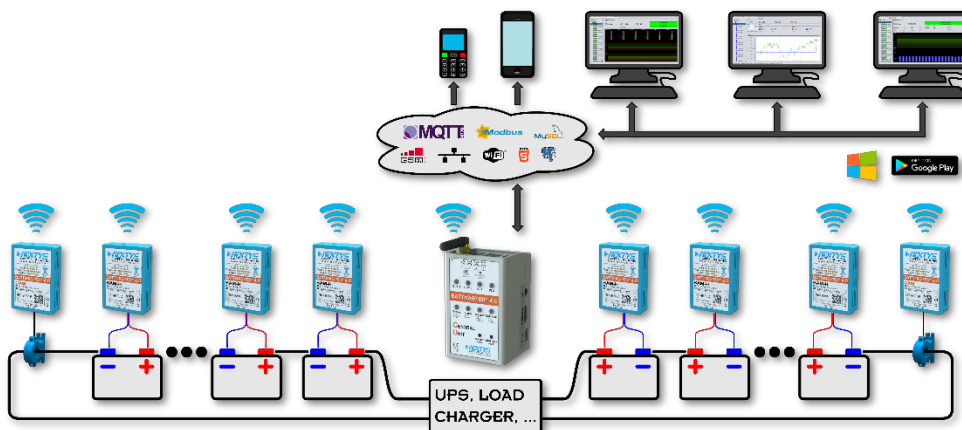

Figure 6: Typical configuration

2 Features and benefits

- Increased safety and reliability for critical application.
- Reduction of maintenance costs.
- Increased battery lifespan.
- Commodity (ease) of installation and operation.
- Possible integration with other systems.
- Ethernet and Modbus/TCP connectivity allows remote monitoring.
- Automatic SMS and E-Mail notifications.

3 Functional description

- Each BAM measures the voltage and temperature of the battery with a sampling rate of 1ms. All significant data (minimum, maximum, average voltage and temperature, last Ri measured value, discharge cycles and out of limit voltage, temperature alarms) are stored in the BAM memory and transmitted to the CU when required.

- The CAM measures the current of the battery (or string of batteries) and the discharge cycles. The CU downloads every xAM's (Acquisition Module) stored data with a user settable Acquisition Interval (AI) on the internal flash memory. After downloading the data, the BAMs memory is erased and a new set of data is built for the following request.

- The Acquisition Interval represents the time between 2 scans of the xAMs modules by the CU. The minimum AI value is limited automatically by the system in proportion with the number of batteries. The system guarantees that no significant data will be lost, independently of the AI value.

- Ri Sampling Interval represents the time between 2 Ri measures. Ri measures starts only if the specific battery is not in an alarm status.

- The user can configure the system to automatically send E-Mail and SMS notification in case of an alarm or event.

- By using the **BATTMASTER**® software it is possible to view the actual system status/measures as well as retrieve the data collected on the internal flash memory for further analysis.

- Modbus/TCP communication allows integration with other systems.

- Various zoom/pan operations and user settable graphical parameters are possible.

- Exporting the data in various graphical or spreadsheet formats is possible.
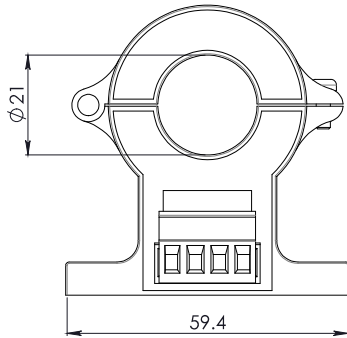
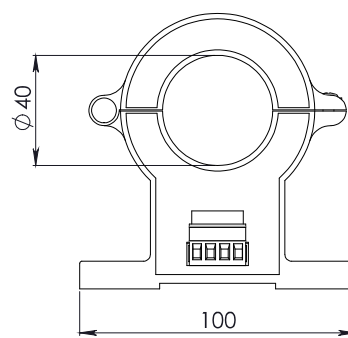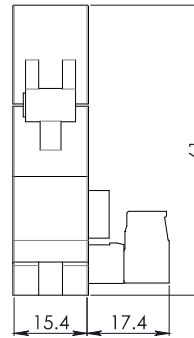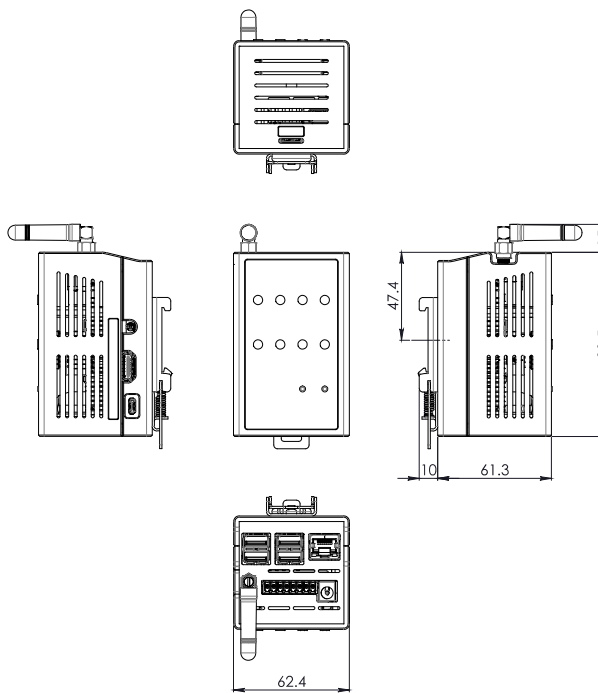## 4   Dimensions

Figure 7: 21mm current clamp

Figure 8: 40mm current clamp

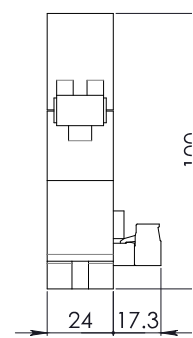**Figure 9: CU enclosure**

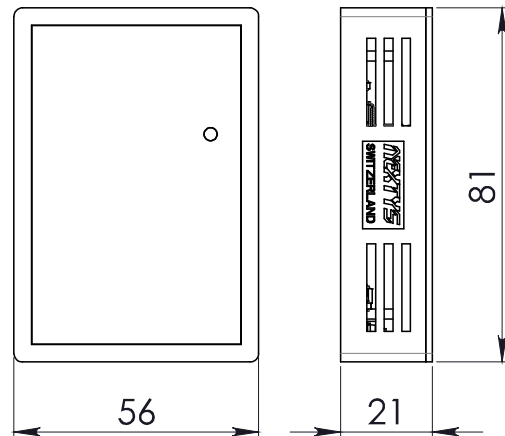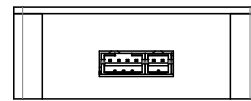**Figure 10: CAM – BAM enclosure**

5 Central Unit characteristics

CU		
Supply input	4.5…5.5Vdc / 3A by external power	
Weight	350g	
Plug-in AC adapter	- Input: 100..240Vac / 1A, 50..60Hz - Output: 5Vdc / 3A	
Backup power	1 x RCR123 Li-Ion rechargeable battery (about 0.5h of backup)	
Digital inputs	- 2 x opto isolated, 5…30Vdc, 10mA - Input 1: when active Real Time Logging enables - Input 2: available for future use	
Dry contact outputs	- 2 x relays, 30Vdc 3A max - Output 1: closed if no alarm is ongoing, open otherwise - Output 2: available for future expansion	
Data storage	-Primary: internal eMCC 16GB, shared with operating system. -Secondary: mirroring on micro SD card and/or USB stick	
Max. number of devices	Full version	64 CAM, 1024 BAM
	Lite version	64 CAM, 50 BAM
Connectivity	**Ethernet**	- 1Gb - Used for remote configuration and monitoring - HTTP server - SMTP client
	Modbus/TCP	- Remote Monitoring - Real Time Logging enable
	MQTT	- Online uploading to cloud server
	GSM	- Optional USB GSM modem - Quad-Band 850/900/1800/1900MHz - SMS alarms
	RF	- 868.00-868.60MHz, Max EIRP 4mW, 3 channels user settable - Up to 100 meters outdoor, up to 30 meters indoor