

BMS-1000-12-MU

Internet Ready Battery Management System Owners Guide

(These instructions are intended for use by a technician familiar with electronic products)

- Built-in Active Power Factor Correction
- Universal Auto Selectable Input Voltage 90 - 264 VAC
- Analog Front-Panel Metering For Voltage / Amperage
- Microprocessor Controlled 1000 Watt Battery Charger For Lead-Acid Batteries
- Temperature Compensation Function
- Auto Fan Control (depends on charging current)
- Internal Remote Monitoring and Control Unit
- Web Ready / Web GUI
- Monitor Voltages, Currents, and Alarms
- Alarm Notifications by Email / SNMP
- Remote Shutdown of Charger
- Battery backed up Real Time Clock to Timestamp Logged Information.
- Monitoring Samples can be Logged and Downloaded
- Short Circuit/Overload/Over Voltage/Over Temperature Protection
- 3 year warranty



DESCRIPTION

The BMS-1000-12-MU is a rack-mount internet-ready battery management system. It includes an intelligent battery charger that comes with a built-in Active Power Factor Correction and is microprocessor controlled. The BMS-1000-12-MU also comes with three layers of protection for short circuit, over load, over voltage, and over temperature.

The new internal Remote Monitoring and Control Unit (RMCU), provides the ability to remotely monitor the AC voltage, internal temperature, power supply current, power supply voltage, charger current, and charger voltage, as well as the ability to remotely control the ON/OFF state of the charger and an external alarm output, all via the internet using any standard web browser. A mobile friendly version of the status page is also included.

Users that have access to the network can view the status of the power supply, control outputs, and the alarm conditions, as well as download a .CSV file of logged states. Administrative users can access the setup screens and change the control settings by logging into the RMCU via the browser. Alarm conditions are configurable, and can include over and under thresholds. Notifications via email can also be configured to notify an administrator. Setups are saved in non-volatile RAM, and a battery backed up real-time clock is provided to timestamp information logged to the internal SD card. Logging rate is user settable.

The BMS-1000-12-MU comes with the DuraComm three-year warranty.

SPECIFICATIONS

Output Voltage	13.8 V (14.4 Boost Charge)
Output Voltage Tolerance	+/- 1 %
Output amperage	60 A
Maximum Power.....	1000 watts
Recommended Battery Capacity.....	200 - 600 Ah
Input voltage; Auto Selectable.....	90-264 VAC
Input frequency range	47-63 Hz
Maximum AC current.....	12A / 115 VAC; 5.2A / 230 VAC
Typical Efficiency.....	85 %
Max inrush current, single cycle	25A / 115 VAC; 50A / 230 VAC
Short Circuit protection.....	Protected By Internal Circuit
Reverse Protection.....	Protected By Internal Circuit
Line Regulation	50 mV
Load Regulation	100 mV (20-100 % load)
Fan Control	<i>Dependent on Charging Current</i>
Over Temperature	>85 C Auto Output Shutdown/ Recovery
Working Temperature range	-4 F to +140 F (-20 to +60 C)
Storage Temperature	-40 F to +185 F (-40 to +85 C)
Withstand Voltage*	I/P-O/P: 3Kvac, I/P-FG: 1.5Kvac, O/P-FG: 0.5Kvac
Dimensions	3.5" H x 19" W x 14" D inches
Weight.....	16 lbs.

RMCU SPECIFICATIONS

Hardware Revision	2.0
Firmware Revision.....	2.7
Network Connector.....	RJ-45 (10/100 Ethernet) with activity LEDs
Backup Battery	CR2032
Memory Card	4GB Micro SD
Voltage Measurement Range.....	0 VDC to 100 VDC
Current Measurement Range.....	0 Amps to 100 Amps
Digital Alarm input	Normally Closed Contacts
Alarm Output	Open Collector, 20 VDC Max, 500 mA sink Max
Alarm Response Time.....	250ms
Alarm Notifications	Email and/or SNMP
Logging Rate.....	1 minute resolution, 1 minute to 1 hour
Log Download Format	Comma Separated Values (CSV) File
SNMP MIB File.....	Download from Device Setup Page

INSTALLER NOTES

NOTE: The outputs are **NOT** referenced to the chassis. The Modular System can be used either positive or negative ground.

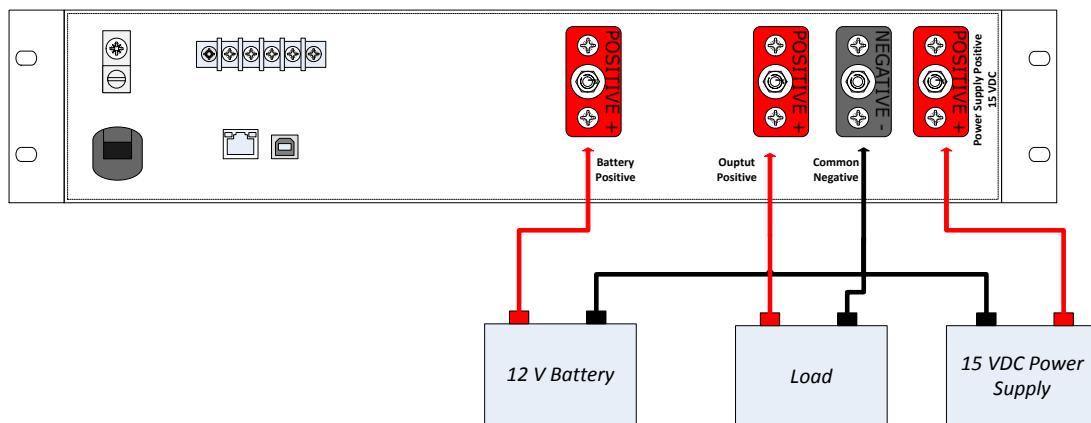
Suggested battery capacity for the BMS-1000-12-MU: **200-600 Amp Hours**

Note:

1. Using battery capacity larger than the suggested value will not lead to damage of the battery. The main drawback is it may take longer to fully charge the battery.

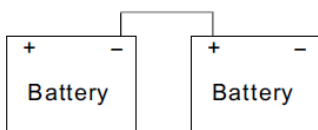
2. If you're unsure about max allowable charging current of your battery, please refer to the battery's technical specification or consult its manufacturer. This unit is designed for charging lead acid batteries and must be installed in a dry and well-ventilated area. It should not be exposed to rain or snow. The cables between charger and battery should be kept as short as possible to prevent excessive voltage drop. Too much voltage drop will lead to longer charging periods. Refrain from connecting new and old batteries in series. Charger should be in the OFF mode before making battery connection or disconnection.

BMS-1000-12-MU WIRING LAYOUT



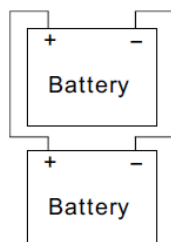
1. Batteries in series

Voltage can be doubled when 2 batteries are connected in series. However, the capacity (Ah) will remain the same. For example, 2 x 12V 100Ah batteries connected in series = 24V 100Ah.

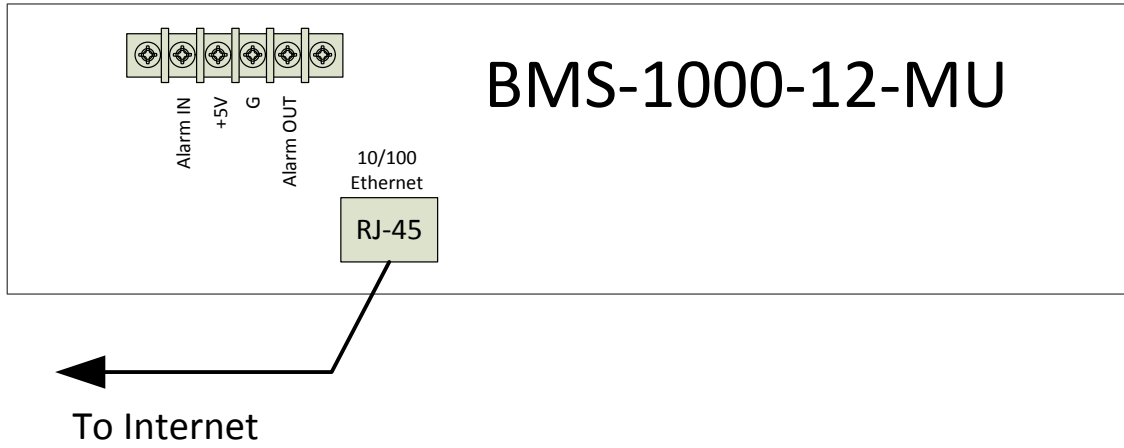


2. Batteries in parallel

When 2 batteries are connected in parallel, voltage remains the same and the capacity (Ah) doubles. For example, 2 x 12V 100Ah batteries connected in parallel = 12V 200Ah.



Network and Alarm Connections



METER CIRCUITS

The panel meter is switched to provide DC output voltage measurement and individual output load current measurement for the individual module.

When set to the VOLT position, the full scale reading is 30 volts.

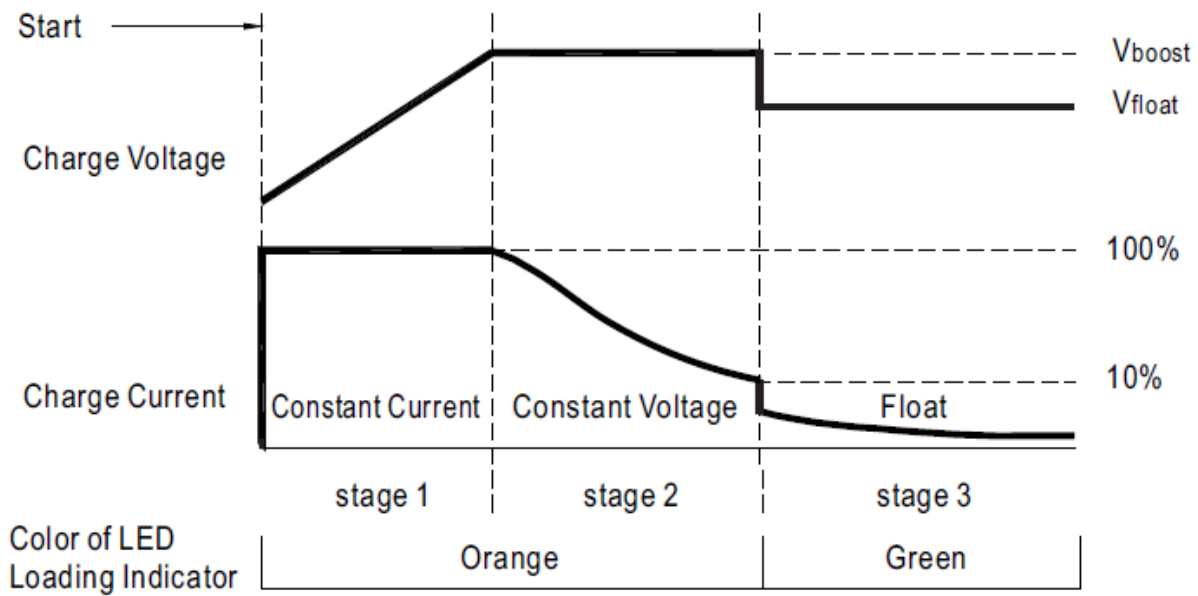
When set to the AMP position, the full scale reading is 60 amps.

The meter and associated circuitry accuracy is 10 percent of full scale deflection. Since full scale is 60 amps, a 20 amp current can vary from 18 to 22 amps indicated. To prevent unnecessary output voltage drops, the meter circuits use the voltage drop of the black negative return to the module as a meter shunt. The meter sensitivity for voltage measurement is 1000 ohms per volt.

CHARGER

The charging curve is for charging lead-acid batteries.

Contact DuraComm regarding other types of battery charging requirements



State	PB-1000-12	PB-1000-24	PB-1000-48
Constant Current	60A	34.7A	17.4A
V_{boost}	14.4V	28.8V	57.6V
V_{float}	13.8V	27.6V	55.2V

© Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).

NOTES:

The individual user should take care to determine, prior to use or installation, whether this device is suitable, adequate or safe for the use intended. Since individual applications are subject to great variation, DuraComm makes no representation or warranty as to the merchantability, suitability or fitness of these units for any specific application.

The precision regulated power supplies operate internally from voltages in excess of 300 volts. In rare cases, voltage spikes or transients on the AC power line, or overheating, may cause a component failure in the power supply. Overloading the output will cause the over current feature to operate. In either case, the cause must be determined and corrected. Failures require investigation as to cause and/or repair of the unit.

CONDUCTOR PRETREATMENT

All kinds of copper conductors can be clamped without treatment. DO NOT solder tin stranded conductors. The solder yields and fractures under high pressure. The result is increased contact resistance and excessive temperature rise. Additionally, corrosion has been observed due to the fluxes. Notch fractures at the transition from the rigid tinned part to the flexible conductors are also possible. Ferrules can be used as a protection when wiring stranded conductors. Copper ferrules prevent the current transfer from being influenced by dissimilar metals and remove the risk of corrosion. Always use the correct tool to crimp the ferrule.

CONNECTING TO THE BMS-1000-12-MU VIA THE INTERNET

Prerequisites

System administrators must decide whether the BMS-1000-12-MU will operate on the network with DHCP or a fixed IP address. The factory-set BMS-1000-12-MU will have these static addresses: **IP address: 192.168.100.220, gateway address: 192.168.100.1, netmask: 255.255.255.0, and DNS address: 192.168.100.1.**

If you configure it to use DHCP, the BMS-1000-12-MU will request an available IP address on your network. You will need to determine what address it has been given.

If DHCP is not used, system administrators must also choose an unused IP address, and other network settings to use in the Network Setup screen. System administrators will also need to choose an email service and address to use for notifications, if needed. These will be used in the Email Setup Screen.

DETERMINING THE IP ADDRESS OF THE BMS-1000-12-MU

Power up the BMS-1000-12-MU then connect the BMS-1000-12-MU to the network with an Ethernet cable.

Using DHCP

You will need to get the IP address in one of two ways. You can get the IP address from the DHCP server's client list, or you can use a PC on the same network to scan for the new IP address by using a software tool such as Angry IP Scanner. In Angry IP Scanner, you should add the MAC address "Fetcher" under "Tools > Fetchers". The DuraComm MAC addresses all start with a base address of **70-B3-D5-6B-3**. Write down the IP address of the BMS-1000-12-MU, then proceed to the section in this manual named "**Open a Web Connection to the BMS-1000-12-MU**".

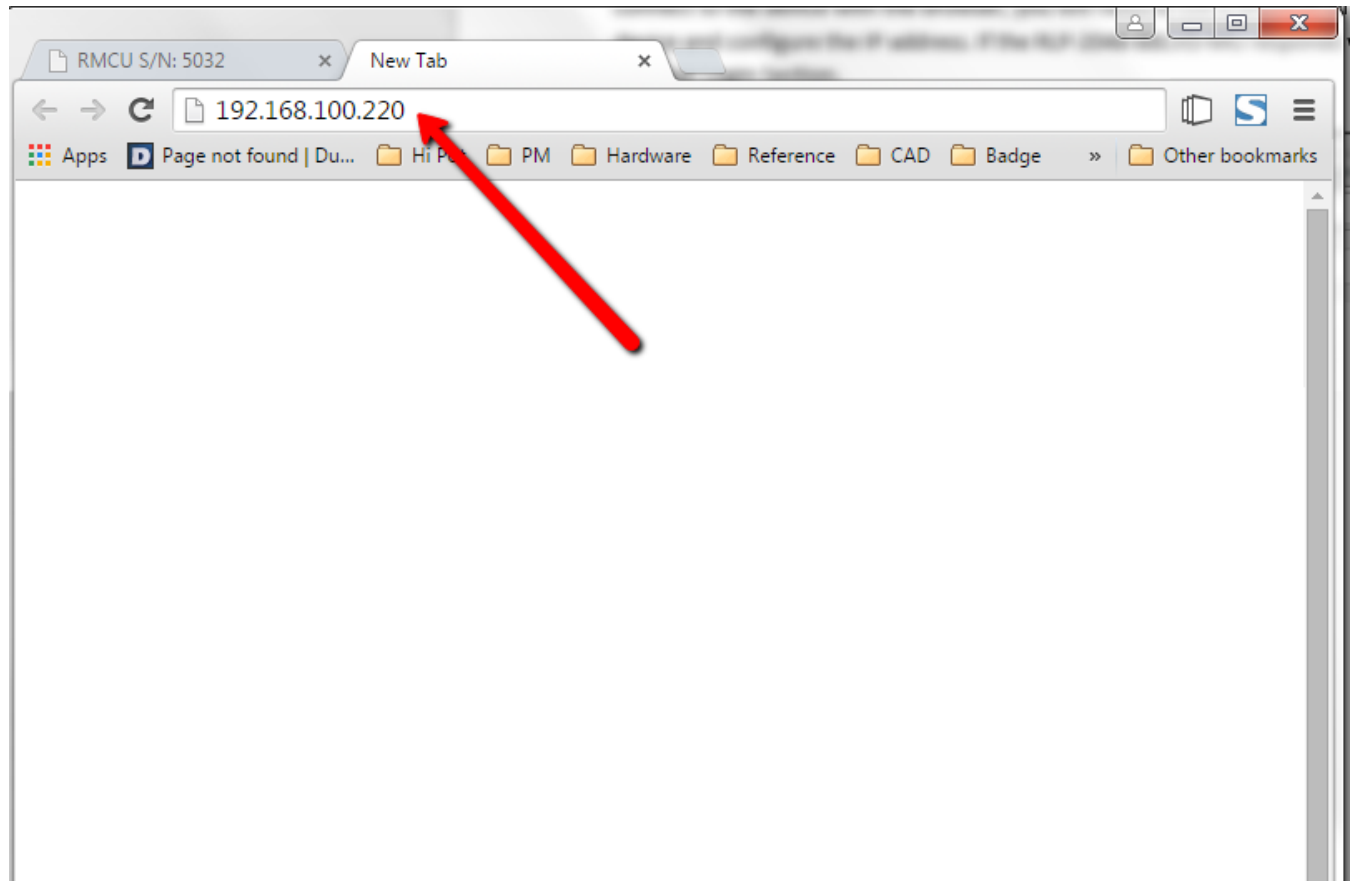
Using Static BMS-1000-12-MU IP and Network Configuration

If your network is not set up for DHCP, you will need to manually configure the settings to match the network it will be used on. Before you can do that, you will need to configure a computer to talk to the BMS-1000-12-MU at the default configuration settings shown above. We will use Windows 7 as an example. Other operating systems will vary, but the overall concept is the same.

1. Disconnect your PC from all networks.
2. Connect it directly to the BMS-1000-12-MU with an Ethernet cable (You may need to use an Ethernet crossover cable if the PC does not automatically detect this configuration).
3. Open the control panel on your PC and select "View Network Status and Tasks"
4. Click on "Change Adapter Settings" on the left side of the screen.
5. Right click on "Local Area Connection" and click on "Properties"
6. Click on "Internet Protocol Version 4 (TCP/IPv4)" to highlight it, then click the "Properties" button.
7. Before you make any changes, **record the existing settings**, so that you can change them back when you are finished setting up the BMS-1000-12-MU.
8. Enable "Use The Following IP Address"
9. Now enter 192.168.100.221 for the IP address.
10. Enter 255.255.255.0 Subnet mask
11. Click OK to save the network configuration.
12. Jump to the section in this owners guide named "**Open a Web Connection to the BMS-1000-12-MU**" to log in and enter the final network settings for the BMS-1000-12-MU.

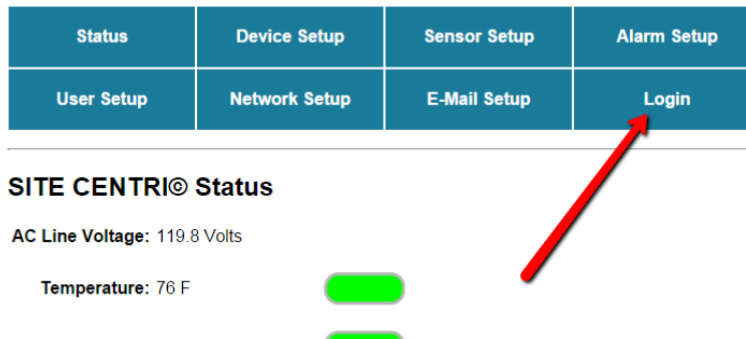
Open a Web Connection to the BMS-1000-12-MU

1. Connect the RJ-45 connector on the back of the BMS-1000-12-MU to your network
2. Use your favorite device and browser (Chrome, Firefox, internet Explorer, etc.), and enter the IP address of the power supply on your network into the URL box on the browser (see the screenshot below. The BMS-1000-12-MU should respond with the Status screen shown later in this document.



REMOTE MONITORING AND CONTROL (RMCU) SETUP

All setup requires an administrative user to log into the RMCU in your power supply. Click the 'Login' button in the top menu.



User Login

Authentication Required

The server http://192.168.0.253:80 requires a username and password. The server says: Protected.

User Name:

Password:

Log In Cancel

Enter the user name and password. Factory default username and password are as follows:

Admin Users have full control of the device.

Username: admin (cannot be changed)
Password: admin

Control users have limited control capability.

Username: control (cannot be changed)
Password: control

These two users are the only ones available in the RMCU. "Control" users can access all screens except the User Setup screen.

NETWORK SETUP

RMCU - SITE CENTRI© - BMS-1000-12-MU

Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Logout (Control)

TCPIP Setup

MAC Address: 70:B3:D5:6B:34:8C

Static IP Address:
Static IP address to use if DHCP client is disabled.

Static Gateway Address:
Static gateway address to use if DHCP client is disabled.

Static Netmask Address:
Static netmask address to use if DHCP client is disabled.

Static DNS Address:
Static DNS address to use if DHCP client is disabled.

DHCP Client:
If enabled, get IP configuration from DHCP server on the network.

SNMP Settings

Agent UDP port:
Set to 0 disable SNMP agent access

Public (read) community:

Private (write) community:

Trap community:

Trap UDP port:
Set to 0 to disable all traps

Trap Destination IP:

Leave blank to not send a trap

Send test trap now?

HTTP server

HTTP port

These parameters require a power-cycle or reboot.

Changing any of these values may affect your ability to access the RMCU

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Network Setup

A network administrator for your company must choose the settings for this page. The default HTTP port is **80**. If a different HTTP port is used, it will need to be added to the URL to access the V. For example: if the port is changed to **8080** then the address would be changed to <http://192.168.0.253:8080>

Revision 2.6 FW fixed a bug with saving the Static Netmask Address.

NOTE: You must reboot the device for changes in these settings to take effect.

SNMP TRAPS SETUP

This section is simplified, and meant for network administrators who already understand SNMP traps and how to configure capable equipment into their system. For those who want to understand the benefits of using SNMP traps, you can search for training material online under “SNMP Traps”, “MIB Browsers”, and “SNMP Monitoring”.

The MIB file for the BMS-1000-12-MU can be downloaded from the BMS-1000-12-MU after you connect to it with your browser. Go to the Device Setup page and log in to the BMS-1000-12-MU. Halfway down the page there is a link to the MIB file. Right click on the link and click “Save Link As” to download the file.

After download, import the MIB file into your MIB browser or Monitoring software to configure it for use with the BMS-1000-12-MU.

When the MIB file has been loaded, complete the “SNMP Setup” section on the “Network Setup” page of the BMS-1000-12-MU to configure it for use with your monitoring solution.

The BMS-1000-12-MU will send traps for all configured alarm conditions including bootup, temperature, analog alarms, and digital alarms.

With REV 2.2 Firmware, you can now control the state of the digital outputs via SNMP. Writing a 1 to the digital output will turn on the MOSFET.

Firmware 2.7 added traps for alarm recovery events.

EMAIL SETUP

RMCU - SITE CENTRI© - BMS-1000-12-MU

Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Logout (Control)

Email setup

E-mail server:

Server port:

Server username:

Server password:

Use SSL/encryption?

E-mail to:

E-mail from:

Minimum interval: Minutes

Periodic interval: Minutes

Send e-mail on bootup?

Send test e-mail now?

Leave hostname blank or set port to 0 to disable e-mails.

Leave the username/password blank if your e-mail server doesn't require it.

For encryption, SSL 3.0 with 2048 bit key is supported. TLS for encryption is not supported.

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Email Setup Notes

Enter the required email setup parameters given to you by your System Administrator. You can also send a test email from this screen.

Periodic Interval was added with Firmware 2.7 to provide a “heartbeat” or periodic status email, even if there are no alarms.

DEVICE SETUP

RMCU - SITE CENTRI© - BMS-1000-12-MU




Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Logout (Control)

Device Setup

Device Info

Site Name:
Model: RMCU
Serial Number: 5260
Version: HW: 2.0, FW: 2.7



Logging

Logging rate: Minutes
Log start date: Mon, 09 May 2016 15:58:16
Last log date: Mon, 09 May 2016 15:58:16
Clear Log? 
Append Now? 
Log Alarms? 
Logging status: Never used
Download log: [RMCU.CSV](#)
Right click to save


SNMP MIB File Download

Download MIB File: [SNMP MIB File](#) - Right click to save

Date and time settings

Current system time: Tue, 10 May 2016 15:45:39
NTP Server:
Leave blank to disable NTP
NTP sync now? 
NTP status: Disabled
Time Zone: Hours
Manually set time? 
Date (MM/DD/YY):
Time (HH:MM:SS):

Miscellaneous

Significant digits:
Temperature units: 

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Device Info

A custom site name can be entered here, and the model number, serial number, software version, and hardware version are shown here.

Logging

The BMS-1000-12-MU will log all measurements and alarms to an SD card that is plugged into the RMCU board. Users can set the rate here, as well as clear the card, or append new measurements. The CSV log file can be downloaded here, as well as the Status page. If the SD card fills up, the oldest sample is discarded when a new one is stored. The BMS-1000-12-MU custom device name is stored with the logged data, so that the source of the card can be identified after it removed from the BMS-1000-12-MU.

When a log file reaches 5 MB, it is renamed, and a new one is started. **Download all log files before clearing the log.**

With REV 2.4 Firmware, the DC-RMCU1 has the ability to save log entries when an alarm occurs by choosing “Log Alarms” > “Yes”. You can log alarms, log periodically by setting the “Logging Rate” minutes, log both, or log none by choosing “Log Alarms”>”No” and setting the “Logging Rate” to “0”. The Alarm log entry is identified with label entry before the data entry, as in this example:

```
Jan 20 14:53:44 2016, ALARM, Digital output #1 inactive
Jan 20 14:53:44 2016, RMCU, Temp, 70.2 F, AC Line, 120.160 Volts, Ammeter #1, 100.0 Amps,
Voltmeter #1, 0.0 Volts, Voltmeter #2, 0.0 Volts, Voltmeter #3, 0.0 Volts, Voltmeter #4, 0.0
Volts, Voltmeter #5, 0.0 Volts, Alarm contact #1, Open, Alarm contact #2, Open, Alarm contact #3,
Open, Alarm contact #4, Open, Output #1, OFF/HIGH, Output #2, OFF/HIGH, Output #3, OFF/HIGH,
Output #4, OFF/HIGH
```

SNMP MIB File Download

The SNMP MIB File can be downloaded from this page.

Date and Time Settings

Configuration for all date and time settings. Date and time is battery backed up on the card, and the values are saved in the logged samples. The real-time-clock can synchronize it's time to the network through an NTP server, or it can be set manually if a network is not available.

The NIST NTP servers can be used by entering **time.nist.gov** or **pool.ntp.org**, or another NTP server address into the **NTP Server box**.

Miscellaneous Settings

The number of significant digits to the right of the decimal for the analog channels can be configured here as well as the temperature units.

SENSOR SETUP

RMCU - SITE CENTRI© - BMS-1000-12-MU

Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Logout (Control)

Sensor Setup

Analog Inputs		Alarm color	
#1	Amps Power Supply	<input type="radio"/>	<input checked="" type="radio"/>
#2	Amps Battery Charger	<input type="radio"/>	<input checked="" type="radio"/>
#3	Volts Power Supply	<input type="radio"/>	<input checked="" type="radio"/>
#4	Volts (Battery, Charger)	<input type="radio"/>	<input checked="" type="radio"/>
#5	Volts Output to Load	<input type="radio"/>	<input checked="" type="radio"/>
#6		<input type="radio"/>	<input checked="" type="radio"/>

Digital Inputs		Open color	
#1	Alarm Input	<input type="radio"/>	<input checked="" type="radio"/>
#2		<input type="radio"/>	<input checked="" type="radio"/>
#3		<input type="radio"/>	<input checked="" type="radio"/>
#4		<input type="radio"/>	<input checked="" type="radio"/>

Digital Outputs		Inactive	Active	Pulse
#1	Alarm Output	Red/Left OFF/HIGH	Green/Right ON/LOW	No
#2	Battery Charger ON/OFF	Red/Left OFF	Green/Right ON	No
#3		Green/Left Inactive	Red/Right Active	No
#4		Green/Left Inactive	Red/Right Active	No

Submit Values Cancel Changes

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Sensor Setup Notes

The admin user can set custom names for each input or output. Factory set names will be supplied, but they can be re-written to be more descriptive, or to manage larger systems. Alarm colors can be set here to represent the proper logical state for your system. Digital Inputs are not used on the BMS-1000-12-MU. If any of the name fields on the left are left blank, the channel will be hidden on the status screen. Inputs and outputs of the RMCU board are wired as shown on the Sensor Setup screen.

With the REV2.2 firmware, the “+” signs have been removed from the digital output names. This was used to reverse the logic of the Digital Outputs in the older firmware. There are now more settings for the button color and direction, as well as a user-name for the state of each digital output.

A pulse option has also been added to the firmware, which outputs a single pulse when the button is clicked.

ALARM SETUP

RMCU - SITE CENTRI© - BMS-1000-12-MU

Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Logout (Control)

Alarm Setup

Analogs Amps Power Supply ▾

Under alarm

Threshold: < Amps

Recovery: > Amps

Send e-mail: ▾

Alarm contacts: #1 #2 #3 #4

Over alarm

Threshold: > Amps

Recover: <

Send e-mail: ▾

Alarm contacts: #1 #2 #3 #4

Temperature

Under alarm

Threshold: < F

Recovery: > F

Send e-mail: ▾

Alarm contacts: #1 #2 #3 #4

Over alarm

Threshold: > F

Recovery: < F

Send e-mail: ▾

Alarm contacts: #1 #2 #3 #4

Line AC

Under alarm

Threshold: < Volts

Recovery: > Volts

Send e-mail: ▾

Alarm contacts: #1 #2 #3 #4

Over alarm

Threshold: > Volts

Recovery: < Volts

Send e-mail: ▾

Alarm contacts: #1 #2 #3 #4

Digital Inputs

Alarm Input: ▾ ▾

: ▾ ▾

: ▾ ▾

: ▾ ▾

Digital Outputs

Alarm Output: ▾ ▾

Battery Charger ON/OFF: ▾ ▾

: ▾ ▾

: ▾ ▾

Global settings

Log all alarms: ▾

Alarm Setup Notes

To set up analog alarms, first you must select the alarm channel to set. This is accomplished by selecting the custom name of the channel in the dropdown box next to the “Analog” label. For example, we are looking at the settings for the “Amps Power Supply” channel in the screen above.

This screen is where thresholds are set to define alarm conditions for the analog channels. You can choose to set an email notification when the alarm conditions are met, and you can assign the alarm to one of four alarm contacts.

Note: The maximum temperature of the temperature sensor is +300 F. The low range of the sensor is about +36 F.

Digital alarms for inputs and outputs as well as the email notifications for them are also configured in this screen. Digital input alarm conditions should be set to “Never alarm”. Digital output alarm conditions can be set to “Never Alarm”, “Alarm on <user name for inactive state>”, “Alarm on <user name for active state>”, “Alarm on (both states)”.

E-mail notifications can be set for each analog alarm threshold, as well as digital alarm conditions.

Global Settings” “Log all alarms” is the same as “Log Alarms” on the “device Setup” screen.

The Alarm Contacts are the same as the digital outputs. These digital outputs are being used to control the ON/OFF states of the power supply modules in the BMS-1000-12-MU. Be careful with these settings.

Firmware 2.7 added the ability to configure emails for alarm recovery events.

Factory Default Analog Alarm Settings

<u>MEASUREMENT</u>	<u>UNITS</u>	<u>OVER ALARM</u>	<u>OVER ALARM RECOVER</u>	<u>UNDER ALARM</u>	<u>UNDER ALARM RECOVER</u>
AC Line Voltage	Volts	140	135	100	107
Temperature	Fahrenheit	150	145	40	45
Amps Power Supply	Amps	1000	0	-1000	0
Amps Battery	Amps	1000	0	-1000	0
Volts Power Supply	Volts	16	15	8	13
Volts (Battery, Charger)	Volts	15	14.8	12	13
Volts Output to Load	Volts	15	14.8	12	13

USER SETUP

RMCU - SITE CENTRI© - BMS-1000-12-MU

Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Logout (Admin)

Change Password

Select user:

New password:

Confirm password:

Maximum password length is 32 characters.
Passwords are case sensitive. Please record your password.
Loss of Administrator password will require a complete system reset.

Factory Reset

This will restore ALL settings to original factory default values, including the password.
Remote communications may be lost.
On-site reconfiguration may be required.
Some settings require a power-cycle/reboot to take effect

Type the current Administrator password here to confirm

Password:

Network Reset

Pressing and holding down the button on the unit for over 20 seconds will reset all the network settings and passwords to factory default. The button is located on the PCB.

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User Setup Notes

Password changes and RMCU hard resets are performed by using this page. Care should be taken when changing any of these settings.

NOTE: To hard reset your device back to factory settings, press the red button on the RMCU PCB and hold it for more than 20 seconds. You will need to re-connect to the RMCU through your web browser by entering the factory supplied IP address and HTTP port (see Network Setup).

REMOTE MONITORING AND CONTROL STATUS PAGE



RMCU - SITE CENTRI© - BMS-1000-12-MU

Status	Device Setup	Sensor Setup	Alarm Setup
User Setup	Network Setup	E-Mail Setup	Login

SITE CENTRI© Status

AC Line Voltage: 117.9 Volts	<input checked="" type="checkbox"/>
Temperature: 85.3 F	<input checked="" type="checkbox"/>
Amps Power Supply: 14.000 Amps	<input checked="" type="checkbox"/>
Amps Battery Charger: 1.000 Amps	<input checked="" type="checkbox"/>
Volts Power Supply: 14.652 Volts	<input checked="" type="checkbox"/>
Volts (Battery, Charger): 13.767 Volts	<input checked="" type="checkbox"/>
Volts Output to Load: 14.112 Volts	<input checked="" type="checkbox"/>
Alarm Input: CLOSED	<input checked="" type="checkbox"/>
Alarm Output: ON/LOW	<input checked="" type="checkbox"/>
Battery Charger ON/OFF: ON	<input checked="" type="checkbox"/>

[Download Log](#) - Right click to save

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Status screen Notes

This screen shows the status of all analog and digital inputs, as well as digital outputs. A user can also download the Log file from this page. AC Voltage is approximate.

The admin or Control user must be logged in to control the digital outputs.

Mobile Status Screen

A simplified version of the status page is available for mobile devices. Just use the same IP address and add '/m'. for example 192.168.100.220/m

RMCU - BMS-1000-12-MU		
Line Voltage: 117.876 VAC Temperature: 85.3 F		
Amps Power Supply 14.000 Amps	Amps Battery Charger 1.000 Amps	Volts Power Supply 14.652 Volts
Volts (Battery, Charger) 13.767 Volts	Volts Output to Load 14.112 Volts	---
Alarm Input CLOSED	---	
---	---	
Alarm Output ON/LOW	Battery Charger ON/OFF ON	
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RMCU MAINTENANCE

Battery

The battery on the RMCU is used to back up the real time clock for logging purposes. Logged in users can see the current system time on the Device Setup page under Date and Time settings.

CONDUCTOR PRETREATMENT

All kinds of copper conductors can be clamped without treatment. DO NOT solder tin stranded conductors. The solder yields and fractures under high pressure. The result is increased contact resistance and excessive temperature rise. Additionally, corrosion has been observed due to the fluxes. Notch fractures at the transition from the rigid tinned part to the flexible conductors are also possible. Ferrules can be used as a protection when wiring stranded conductors. Copper ferrules prevent the current transfer from being influenced by dissimilar metals and remove the risk of corrosion. Always use the correct tool to crimp the ferrule.

RECOMMENDED COPPER WIRE SIZE FOR CURRENT CAPACITY

(Insulated Wire, Single Conductor in free air)

<u>Current Level in Amperes</u>	<u>Wire Size</u>
<7 AMPERES	20 AWG Up to 5 feet 18 AWG Up to 10 feet
14 AMPERES	18 AWG Up to 5 feet 16 AWG Up to 10 feet
20 AMPERES	16 AWG Up to 5 feet 14 AWG Up to 10 feet
30 AMPERES	14 AWG Up to 5 feet 12 AWG Up to 10 feet
40 AMPERES	12 AWG Up to 5 feet 10 AWG Up to 10 feet
50 AMPERES	10 AWG Up to 5 feet 8 AWG Up to 10 feet
70 AMPERES	8 AWG Up to 5 feet 6 AWG Up to 10 feet
100 AMPERES	6 AWG Up to 5 feet 4 AWG Up to 10 feet

LIMITED WARRANTY

DuraComm warrants to the initial end user, each power supply manufactured by DuraComm to be free from defects in material and workmanship, when in normal use and service for a period of three years from the date of purchase, from an authorized DuraComm dealer.

Should a product manufactured by DuraComm fail or malfunction due to manufacturing defect, or faulty component, DuraComm, at its option, will repair or replace the faulty product or parts thereof, which, after examination by DuraComm, prove to be defective or not operational according to specifications in effect at the time of sale to the initial end user. The product that is replaced or repaired under the provisions of this warranty, will be warranted for the remainder of the original warranty period, only, and will not extend into a new three year warranty period.

The limited warranty does not extend to any DuraComm product which has been subject to misuse, accidental damage, neglect, incorrect wiring not associated with manufacture, improper charging voltages, or any product which has had the serial number removed, altered, defaced, or changed in any way.

DuraComm reserves the right to change, alter, or improve the specifications of its products at any time, and by so doing, incurs no obligation to install or retrofit any such changes or improvements in or on products manufactured prior to inclusion of such changes.

DuraComm requires any product needing in or out of warranty service to be returned to DuraComm. All requests for warranty service must be accompanied by proof of purchase, such as bill of sale with purchase date identified. DuraComm is not responsible for any expenses or payments incurred for the removal of the product from its place of use, transportation or shipping expenses to the place of repair, or return expenses of a repaired or replacement product to its place of use.

The implied warranties which the law imposes on the sale of this product are expressly LIMITED, in duration, to the three (3) year time period specified herein. DuraComm will not be liable for damages, consequential or otherwise, resulting from the use and operation of this product, or from the breach of this LIMITED WARRANTY.

Some states do not allow limitations on the duration of the implied warranty or exclusions or limitations of incidental or consequential damages, so said limitations or exclusions may not apply to you. This warranty gives you specific legal rights which vary from state to state.

This warranty is given in lieu of all other warranties, whether expressed, implied, or by law. All other warranties, including WITHOUT LIMITATION, warranties of merchantability and fitness or suitability for a particular purpose, are specifically excluded. DuraComm reserves the right to change or modify its warranty and service programs without prior notice.

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