BMS-360-24-MU

Internet Ready 24 Volt Battery Management System

With Built-in Remote Monitoring and Control.

Owners Guide

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

- Internal Remote Monitoring and Control Unit
- Web Ready / Web GUI
- Monitor Voltages, Power Supply Current, and Alarms
- Alarm IN and Alarm Out
- Battery backed up Real Time Clock to Timestamp Logged Information.
- Alarm Notifications by Email / SNMP
- Remote Shutdown of Charger
- Monitoring Samples can be Logged and Downloaded
- Up to 75 Amps max load
- 2 rack units high (3.5")
- Suggested battery capacity: 60 to 125 AH
- Smart Charging and Low Voltage Disconnect
- Front Panel Meter for Battery Charger Voltage and Current
- 3 year warranty

DESCRIPTION

The Model BMS-360-24-MU is a complete battery management system for installations which already have a primary power supply but are lacking battery backup. The BMS-360-24-MU is web ready for remote monitoring and control. The new internal Remote Monitoring and Control Unit (RMCU), provides the ability to remotely monitor the AC voltage, battery voltage, power supply voltage, power supply current, battery current, external alarm status, as well as the ability to remotely control an external alarm, 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 output, 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 BMS-360-24-MU via the browser. Alarm conditions are configurable, and can include over and under thresholds and discreet logical inputs. 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.

Smart Charging and battery protecting Low Voltage Disconnect maintain and prevent battery failures caused by over-charging and excessively deep discharging. Dual Schottky diodes provide smooth transfer to battery power and auto-revert to AC mains power that is seamless and glitch less.

The Smart Charger is designed to auto-charge and maintains Gelled electrolyte (Gel-Cell) and liquid electrolyte lead-acid 24 volt batteries up to 125 Amp Hour. The charger is a constant current monitoring charger for the charging and maintenance of fixed location UPS, emergency lighting systems, and telecommunications battery backup systems.

The charger is protected against over loading by deep discharge start circuitry with auto shut down due to over-voltage, over-temperature, short circuit and reverse polarity.

August 4, 2016

The Model BMS-360-24-MU incorporates an automatic Low Voltage Disconnect that monitors battery voltage and disconnects the load when the battery voltage drops below 20 VDC. The LVD has been adjusted and calibrated at the factory for correct voltage disconnect and re-connect. No adjustment is required.

The LVD is pre-set to disconnect the load at 20 VDC. However, to prevent premature or false disconnect when the battery voltage drops below the 20 volt threshold a timer is started. If the battery recovers to above 20 volts, the timer resets and waits. The battery can and will recover if the system is a repeater or remote base station or similar equipment that has a varying demand that fluctuates from low to high current. The delay ensures the battery is not disconnected until necessary to prevent damage.

After the AC main power is restored and the battery is recharging, the LVD will reconnect the load when the battery voltage exceeds 25 volts.

SPECIFICATIONS

Operational DC Voltage.. 27.6 VDC, nominal
Maximum Current..75 Amps
Low Voltage Disconnect...20 VDC
Low Voltage RE-Connect ....25 VDC
Maximum Charger Output Current ....12.5 Amps
AC Input Voltage Range (switch selectable, Factory Set) ....100 to 130 VAC
Max Inrush Current, single cycle ....60 Amps
Input Frequency Range...47-63 Hz
Typical Efficiency... 86 %
Short Circuit Protection.. Fold back Limiting
Overload Protection (operates) ....typical 110 %
Over Temperature ....>195 F (90 C) auto output shutdown
Working Temperature Range ....-4F to 140 F (-20C to +60 C)
Storage Temperature ....-40F to 185 F (-40C to +85 C)
Size .... 3.5" in (Two rack units) h x 19" w x 14" d
Weight .... 12.2 lb

CHARGER SPECIFICATIONS

Output Voltage, charger ....27.6 VDC
Maximum Charger Power, continuous .... 360 Watts
Maximum Charger Output Current .... 12.5 Amps
Max Inrush Current, single cycle ....60 Amps
AC Input Voltage Range (switch selectable) .... 90-130 or 180-260 VAC
Input Frequency Range...47-63 Hz
Typical Efficiency... 86 %
Short Circuit Protection.. Fold back Limiting
Overload Protection (operates) ....Typical 110%
Over Temperature Range...>195 F (90 C) auto output shutdown
Working Temperature Range ....-4F to 140 F (-20C to +60 C)
Storage Temperature ....-40F to 185 F (-40C to +85 C)

RMCU SPECIFICATIONS

Hardware Revision.. 2.0
Firmware Revision.. 2.16
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

August 4, 2016

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
Log Download Format ....Comma Separated Values (CSV) File
SNMP MIB File...Download from Device Setup Page

INSTALLATION WARNING

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.

DO NOT block any of the cooling vents on the sides and always allow adequate ventilation by not installing the unit inside tightly closed spaces. Physical mounting position is not critical but the cooling vents must not be blocked. Make certain the input voltage switch is set to the correct voltage BEFORE applying AC power.

The power supply output voltage measured at the rear panel terminals should be set to 28 to 28.2 VDC using an accurate voltmeter. This is to compensate for the 0.3 volt drop of the diodes. If this voltage is not correct, charger miss-operation will result.

Connect the battery positive to the red terminal labeled, "Battery Positive (+)".

Connect the load positive to the red terminal labeled, "Load Positive (+)".

Connect the power supply positive output to the red terminal labeled, "Power Supply Positive (+)" (Set to 28 to 28.2 VDC).

Connect the power supply, battery and load negative outputs to the black terminal labeled, "Battery, Load &Power Supply Negative (-)".

CAUTION: Under no circumstances should more than 30 VDC be applied to the battery input. Permanent damage to the LVD will result.

Make certain the unit is OFF. Double check the color coded leads from the battery, load and power supply. Select the proper AC input voltage, 110-120 VAC **or** 220-240 VAC, **prior** to plugging the unit into the AC mains.

L.E.D. STATUS INDICATORS - There is one LED type status light located on the BMS unit to indicate Power Supply input status.

When charging series connected batteries identical batteries must be used.

This completes the installation. Failures require investigation as to cause and/or repair of the unit.

THERE ARE NO USER SERVICEABLE PARTS INSIDE. SERVICE AND REPAIR MUST BE REFERRED TO QUALIFIED FACTORY PERSONNEL.

INSTALLER NOTES

NOTE: DO NOT block any of the cooling vents on the sides and always allow adequate ventilation by not installing the unit inside tightly closed spaces. Physical mounting position is not critical but the cooling vents must not be blocked.
NOTE: The outputs are **NOT** referenced to the chassis, however the **Alarms are referenced the power supply and battery ground**. **The BMS-360-24-MU is designed for negative ground application only.**

INSTALLATION BLOCK DIAGRAM

Output Power Wiring Layout

     This system setup will provide continuous power to the load and maintain battery bank with smart charger while AC power is on. There is a seamless transfer of the load to the battery when the AC power goes off. The LVD will disconnect the battery if the voltage drops below 20.0 VDC. The battery reconnects once AC power is restored and voltage reaches 25.0 VDC.
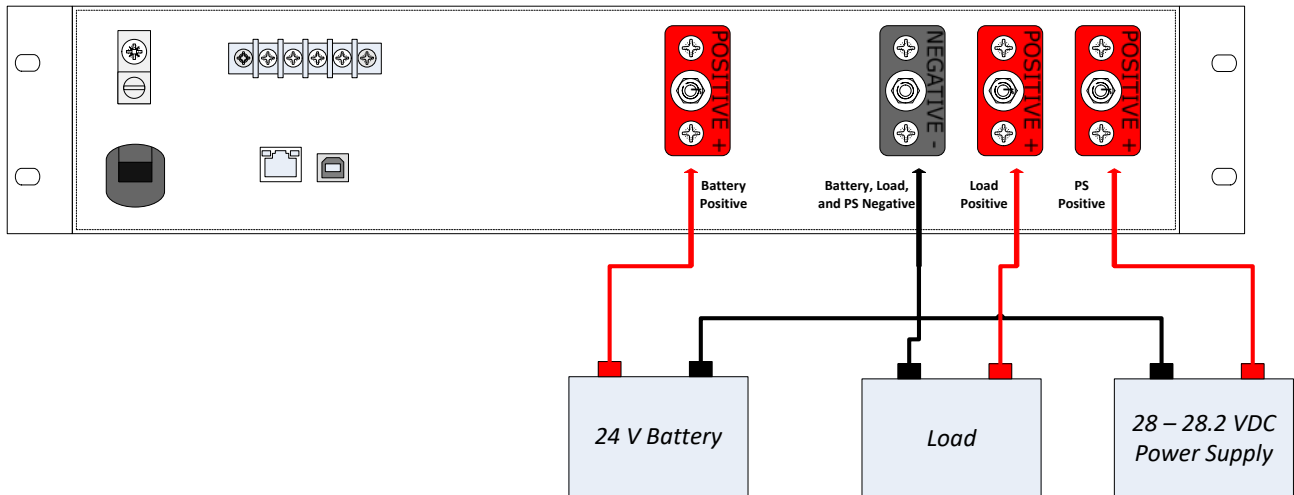
Remote Monitoring and Alarm Wiring

BMS-360-24-MU

To Internet
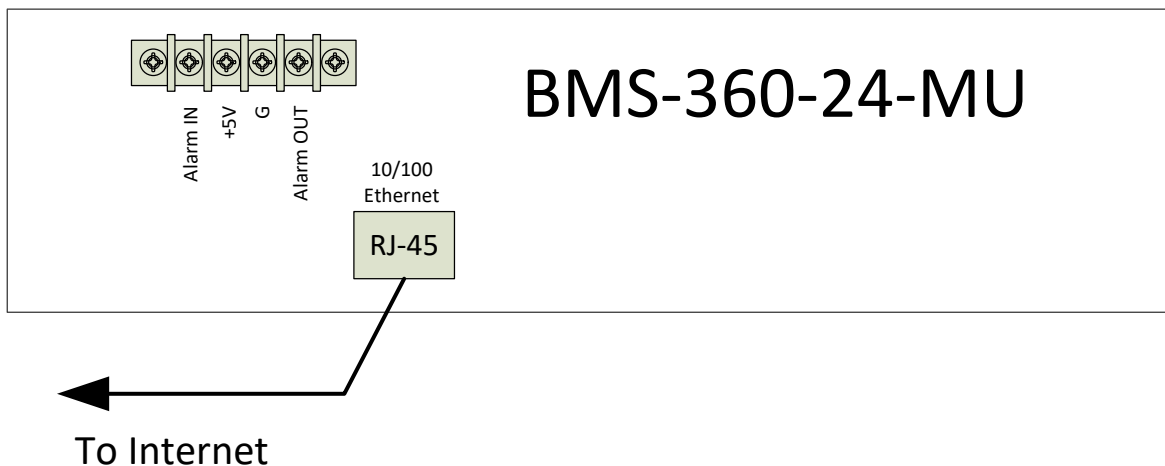
The Alarm input connections require normally closed contacts between Alarm IN and +5V for a typical setup. When the circuit opens, the Alarm Input will turn RED on the status page.

The Alarm output provides an open collector (Open MOSFET drain) form control of external equipment. A load may be connected to the +5V terminal and the Alarm OUT. Alternately, you may use up to a +20V external supply. The Alarm OUT pin will sink up to 500 mAmps Max when turned on.

NOTE: The 'G' connection on the alarm terminal strip is the same as Power Supply and Battery Negative, so the BMS-360-24-MU is not designed for Positive Ground applications.

The RJ-45 connects the BMS-360-24-MU to your 10/100 Ethernet network.

CONNECTING TO THE BMS-360-24-MU VIA THE INTERNET

Prerequisites
System administrators must decide whether the BMS-360-24-MU will operate on the network with DHCP or a fixed IP address. The factory-set BMS-360-24-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-360-24-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-360-24-MU

Power up the BMS-360-24-MU then connect the BMS-360-24-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-360-24-MU, then proceed to the section in this manual named "**Open a Web Connection to the BMS-360-24-MU**".

Using Static BMS-360-24-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-360-24-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-360-24-MU with an Ethernet cable (You may need to use an Ethernet <u>crossover</u> 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-360-24-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-360-24-MU"** to log in and enter the final network settings for the BMS-360-24-MU.

Open a Web Connection to the BMS-360-24-MU

1. Connect the RJ-45 connector on the back of the BMS-360-24-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-360-24-MU should respond with the Status screen shown later in this document.
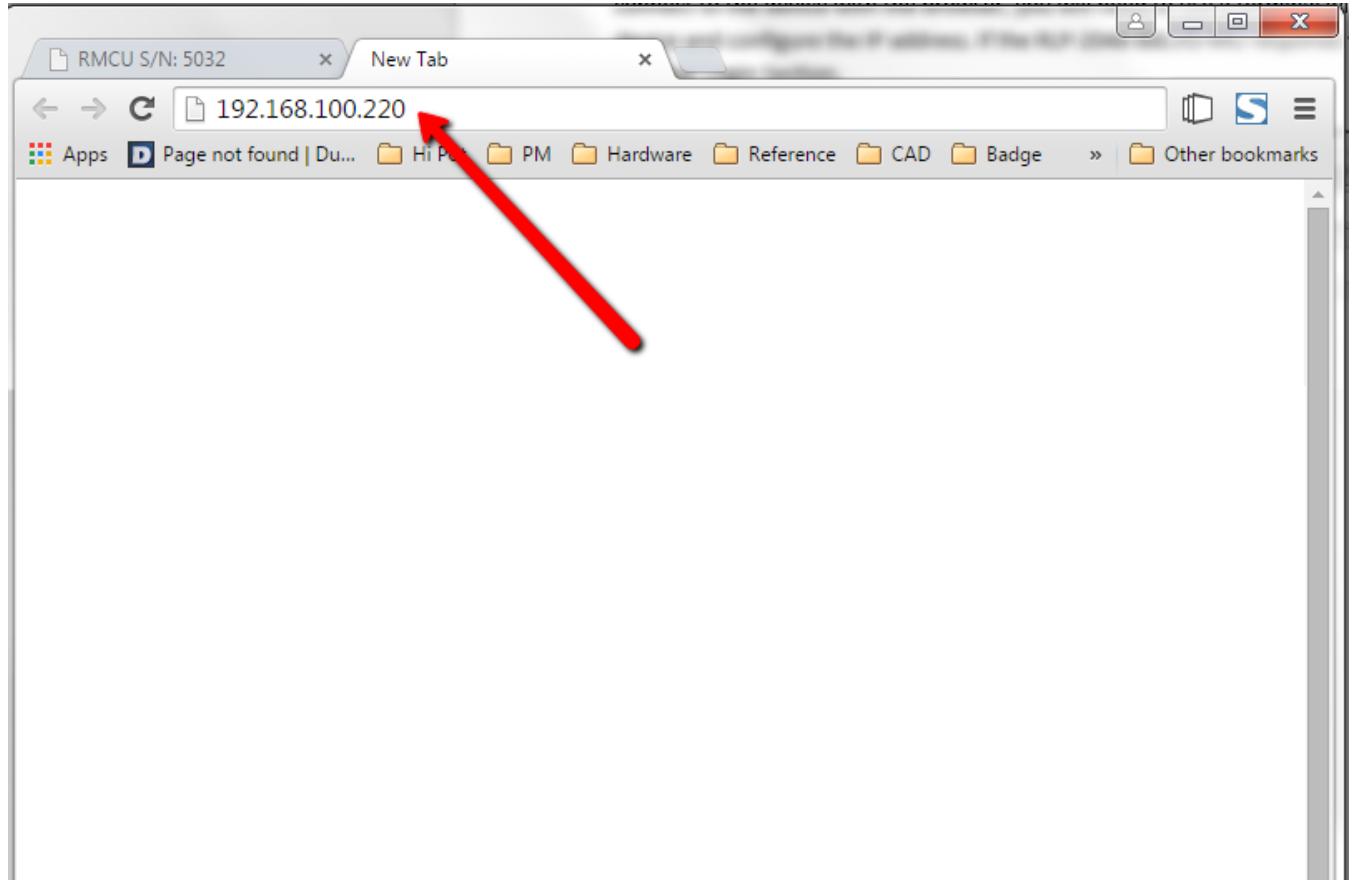
REMOTE MONITORING AND CONTROL (RMCU) SETUP

All setup requires an administrative user to log into the RMCU in your BMS-360-24-MU. Click the 'Login' button in the top menu.

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

SITE CENTRI© Status

AC Line Voltage: 118.5 Volts

Temperature: 75.5 F

Power Supply Current: 19.6 Amps

Charging Current: 3.5 Amps

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.

August 4, 2016

NETWORK SETUP

RMCU - SITE CENTRI© - BMS-360-24-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:37:E2

Static IP Address: 192.168.100.220
Static IP address to use if DHCP client is disabled.

Static Gateway Address: 192.168.100.1
Static gateway address to use if DHCP client is disabled.

Static Netmask Address: 255.255.255.0
Static netmask address to use if DHCP client is disabled.

Static DNS Address: 192.168.100.1
Static DNS address to use if DHCP client is disabled.

Alternate DNS Address:
Alternate DNS address is used regardless if DHCP client is enabled or disabled.

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

SNMP Settings

Agent UDP port: 161
Set to 0 disable SNMP agent access

Public (read) community: public

Private (write) community: private

Trap community:

Trap UDP port: 162
Set to 0 to disable all traps

Trap Destination IP:

Leave blank to not send a trap

Send test trap now? No ▾

HTTP server

HTTP port 80

These parameters require a power-cycle or reboot.

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

[Submit Values] [Cancel Changes] [Reboot Device]

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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**

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-360-24-MU can be downloaded from the BMS-360-24-MU after you connect to it with your browser. Go to the Device Setup page and log in to the BMS-360-24-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-360-24-MU.

When the MIB file has been loaded, complete the "SNMP Setup" section on the "Network Setup" page of the BMS-360-24-MU to configure it for use with your monitoring solution.

The BMS-360-24-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.

The Firmware 2.16 MIB file is not compatible with previous versions of firmware. Please make sure you are using the MIB file downloaded from the "Device Setup" page in this firmware, if you are using SNMP monitoring.

REV 2.16 Firmware also adds the ability to specify a second DNS server.

EMAIL SETUP

RMCU - SITE CENTRI© - BMS-360-24-MU

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

Email setup

E-mail server:	
Server port:	25
Server username:	
Server password:	
E-mail to:	to@someplace.com
E-mail from:	me@myplace.com
Minimum interval:	5 Minutes

Device won't attempt to send e-mails faster than this, any alarms that happen will be queued and sent when this duration has expired.

Periodic interval:	Never ▼
Send e-mail on bootup?	No ▼
Send test e-mail now?	No ▼

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.

[Submit Values] [Cancel Changes]

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Email Setup

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-360-24-MU

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

Device Setup

Device Info

Site Name: BMS-360-24-MU
Model: RMCU
Serial Number: 6114
Version: HW: 2.0, FW: 2.16

Logging

Logging rate: 0 Minutes
Log start date: Thu, 22 Jun 2017 13:40:39
Last log date: Thu, 22 Jun 2017 13:40:39
Clear Log? No ▾
Append Now? No ▾
Log Alarms? No ▾
Logging status: Success
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: Thu, 22 Jun 2017 13:47:01
NTP Servers:

Leave blank to disable NTP
NTP sync now? No ▾
NTP status: Disabled
Time Zone: -5 Hours
Manually set time? No ▾
Date (MM/DD/YY): 06/22/17
Time (HH:MM:SS): 13:46:53

Miscellaneous

Signficant digits: 1
Temperature units: Fahrenheit ▾

[Submit Values] [Cancel Changes]

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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-360-24-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-360-24-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-360-24-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.**

Firmware 2.16 added the ability to configure a second NTP server.

Miscellaneous Settings

The number of significant digits to the right of the decimal point for the analog channels can be configured here. Note: Best resolution is about 1 in 1000.

Temperature can be configured to read in Fahrenheit or Celsius.

SENSOR SETUP

RMCU - SITE CENTRI© - BMS-360-24-MU

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

Sensor Setup

	Analog Inputs	Alarm color	Averaging
#1	Amps Power Supply	● 🔴 ○ 🟢	None ▼
#2	Amps Battery Charger	● 🔴 ○ 🟢	None ▼
#3	Volts Power Supply	● 🔴 ○ 🟢	None ▼
#4	Volts (Battery, Charger)	● 🔴 ○ 🟢	None ▼
#5	Volts Output to Load	● 🔴 ○ 🟢	None ▼
#6		● 🔴 ○ 🟢	None ▼

	Digital Inputs	Alarm / Open	Type	Averaging
#1	Alarm Input	● 🔴 ○ 🟢	GPIO ▼	None ▼
#2		● 🔴 ○ 🟢	GPIO ▼	None ▼
#3		● 🔴 ○ 🟢	GPIO ▼	None ▼
#4		● 🔴 ○ 🟢	GPIO ▼	None ▼

	Digital Outputs	Inactive	Active	Pulse	PWM
#1	Alarm Output	Red/Left ▼ / OFF/HIGH	Green/Right ▼ / ON/LOW	No ▼ / 0.5 seconds ▼	Disabled ▼
#2	Battery Charger ON/OFF	Green/Right ▼ / ON	Red/Left ▼ / OFF	No ▼ / 0.5 seconds ▼	Disabled ▼
#3		Green/Left ▼ / Inactive	Red/Right ▼ / Active	No ▼ / 0.5 seconds ▼	Disabled ▼
#4		Green/Left ▼ / Inactive	Red/Right ▼ / Active	No ▼ / 0.5 seconds ▼	Disabled ▼

	AC Inputs	Averaging
#1	Line AC	None ▼

	Other Inputs	Averaging
#1	External Temperature	None ▼

August 4, 2016

SENSOR SETUP (CONTINUED)

Scheduled Outputs

#1	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#2	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#3	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#4	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#5	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#6	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#7	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#8	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#9	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#10	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#11	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#12	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#13	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#14	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#15	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

#16	Alarm Output ▼	OFF/HIGH ▼
	Disabled ▼	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday	

Logging schedule

Disabled ▼ 00:00 to 00:00

☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday

If set to **Disabled**, then the unit will always log sensor values and check for new alarms. If set to **Enabled**, then specified time is the only time it will log sensor values, log alarms, transmit alarms (SNMP or e-mail) or set digital outputs because of alarms. Regardless of this setting or schedule, alarms will always be cleared when the alarm condition has passed.

Submit Values   Cancel Changes

August 4, 2016

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 can also be set here to send notification emails to the email address configured in the Email Setup screen. 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.

Revision 2.10 firmware also added the ability to apply a running average to any of the analog channels, including the AC voltage and Temperature monitors. The number of averages is selected from a dropdown list for each channel. This can be used to quiet any noise or false alarms due to transients.

Digital Outputs can be user-configured to match your circuit. "Active" refers to the output MOSFET being "ON" or conducting. You may configure each output to provide a positive or negative pulse with a duration between 0.5 second and 60 seconds. Pulse width value is chosen from a dropdown list. Button colors and orientation are also selectable. A user-name for Active and Inactive states can also be configured.

Analog and digital alarms are set up in the "Alarm Setup" screen. See the "Alarm Setup" section for more information.

In Firmware 2.16, the Sensor Setup page has some grayed-out settings. Digital Input "Type" and "Averaging", as well as Digital Output "PWM" are not functional, and are under development for future release.

Firmware 2.16 also added "Scheduled Outputs" based on the built-in Real Time Clock. This allows the user to change Digital Outputs based on a schedule. You can configure them to change once, or set them to a given state between the specified start and stop times.

ALARM SETUP

RMCU - SITE CENTRI© - BMS-360-24-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: < -1000   Amps
Recovery: > 0   Amps
Send e-mail: No ▾
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Over alarm

Threshold: > 1000   Amps
Recover: < 0
Send e-mail: No ▾
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Alarm duration

Duration required: Instant (0 seconds) ▾

External Temperature

Under alarm

Threshold: < 40   F
Recovery: > 45   F
Send e-mail: No ▾
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Over alarm

Threshold: > 150   F
Recovery: < 145   F
Send e-mail: No ▾
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Alarm duration

Duration required: Instant (0 seconds) ▾

Line AC

Under alarm

Threshold: < 100   Volts
Recovery: > 107   Volts
Send e-mail: No ▾
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Over alarm

Threshold: > 140   Volts
Recovery: < 135   Volts
Send e-mail: No ▾
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Alarm duration

Duration required: Instant (0 seconds) ▾

Digital Inputs   Alarm Input ▾

Alarm Condition: Never Alarm ▾
Email: No ▾
Duration required: Instant (0 seconds) ▾

Digital Outputs

Alarm Output: Never alarm ▾   Never e-mail ▾
Battery Charger ON/OFF: Never alarm ▾   Never e-mail ▾
: Never alarm ▾   Never e-mail ▾
: Never alarm ▾   Never e-mail ▾

Global settings

Log all alarms: No ▾

[Submit Values] [Cancel Changes]

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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 "Analogs" 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. A digital output are being used to control the ON/OFF state of the charger in the BMS-BMS-24-MU. Be careful with these settings.

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

Factory Default Analog Alarm Settings

MEASUREMENT	UNITS	OVER ALARM	OVER ALARM RECOVER	UNDER ALARM	UNDER ALARM RECOVER
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	30	28	20	24
Volts (Battery, Charger)	Volts	30	28	22	24
Volts Output to Load	Volts	30	28	22	24

Revision 2.10 of the firmware added the ability to set a duration for the analog and digital input alarms. Selecting a duration from the dropdown list means that the alarm condition must be sustained for this length of time before the alarm is triggered. This applies to alarms shown on the status screen, email notifications, and traps when the alarm is set, and when it is cleared.

August 4, 2016

USER SETUP

RMCU - SITE CENTRI© - BMS-360-24-MU

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

Change Password

Select user: [Control ▼]

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.

[Update Users] [Cancel Changes]

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-cylce/reboot to take effect

Type the current Administrator password here to confirm

Password: [   ] [Restore]

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

Password changes and RMCU hard resets are perform 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-360-24-MU

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

SITE CENTRI© Status

AC Line Voltage: 118.7 Volts

Amps Power Supply: 9.9 Amps

Amps Battery Charger: 0.6 Amps

Volts Power Supply: 28.0 Volts

Volts (Battery, Charger): 26.0 Volts

Volts Output to Load: 27.5 Volts

Alarm Input: CLOSED

Alarm Output: ON/LOW

Battery Charger ON/OFF: ON

External Temperature: 81.3 F

Download Log - Right click to save

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Status screen

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-360-24-MU		
Line Voltage: 118.389 VAC Temperature: 81.8 F		
Amps Power Supply 9.9 Amps	Amps Battery Charger 0.0 Amps	Volts Power Supply 28.0 Volts
Volts (Battery, Charger) 26.0 Volts	Volts Output to Load 27.5 Volts	...
Alarm Input CLOSED		...
...		...
Alarm Output ON/LOW		Battery Charger ON/OFF ON
...		...

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.

August 4, 2016

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)

Current Level in Amperes	Wire Size
<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

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August 4, 2016

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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