HE1U-5012-BC-MU

High Efficiency 1U AC to DC Power Supply

Owners Guide

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

- Integrated Float Charge Circuit
- Integrated Low Voltage Disconnect
- Selectable Input Voltage 110 or 220 VAC
- Remote Monitoring of Power Supply Voltage and Current, Battery Voltage and Current, and an External Alarm.
- Remote control of power supply ON/OFF and External Alarm output ON/OFF via Web Interface
- Short Circuit / Overload / Over Voltage / Over Temperature Protection
- Manual Battery Disconnect Switch
- 3 year warranty

DESCRIPTION

The HE1U-5012-BC-MU is a Heavy Duty AC to DC 750 Watt Power Supply, a low voltage disconnect, and a float charge circuit in a 1U chassis. The HE1U-5012-BC-MU comes with power factor correction, and four layers of protection against overload, over voltage, over temperature, and short circuit. This model also comes with a manual battery disconnect switch, internal power supply ON/OFF remote control, and DC-OK. The HE1U-5012-BC-MU comes with a 3 year warranty.

The new internal Remote Monitoring and Control Unit (RMCU), provides the ability to remotely monitor the AC voltage, power supply current and voltage, battery voltage and current, and internal temperature, as well as the ability to remotely control the ON/OFF State of the power supply unit, 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. Alarm notifications can be configured by an administrator to send email and SNMP traps. 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 HE1U-5012-BC-MU comes with the DuraComm three-year warranty.

SPECIFICATIONS

Output Voltage	13.8 VDC
Output Voltage Tolerance	+/- 1 %
Output Amperage	50 Amps max.
Maximum Power, continuous	750 Watts
Maximum Ripple and Noise	150 mV p-p max
Input Voltage, Switch Selectable	110-or 220 VAC
Input Frequency Range	47-63 Hz
Maximum AC Current	8.2 Amps/115 VAC; 3.9 Amps/230 VAC
Typical Efficiency	89 %
Max Inrush Current, single cycle	25 Amps / 115 VAC, 40 Amps / 230VAC
Short Circuit Protection	Constant Current Limiting
Overload Protection (operates)	typical 105-125 %
Line Regulation	+/- 0.5 %
Load Regulation	+/- 0.5 %
Fan Control	Heat sink temp >140 F (60 C) = ON
Over Temperature	>195 F (90 C) auto output shutdown
Rise Time following ON	50 mS
Hold Time following OFF	10 mS
Working Temperature Range	-22 F to +158 F (-30 C to +70 C)
Storage Temperature	-40 F to +185 F (-40 C to +85 C)
Withstand Voltage	3 KVAC @ 10 ma (I/P-O/P)/1 min, 2 KVAC @ 10 ma (I/P-FG)/1 min, 500 V @ 10 ma (O/P-FG)/1 min
Dimensions	1.75” H x 19” W x 14” D
Weight	9.1 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, 60 VDC Max (REV 2 RMU Hardware), 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
5V Supply Maximum Current	300 mAmps

BATTERY BACK UP & CHARGER

Maximum Power, continuous	750 Watts
Auto-revert to battery or power supply	Provided by dual Shottky diode in OR configuration
Maximum output current in battery mode	75 amps (limited by Shottky diode)
Maximum charge voltage	13.8 VDC
Maximum recharge rate	2 amp

Note: The battery charger is a fixed resistance type that provides a tapering current output. A float charge current of 1-2 amps will be maintained after the battery is charged.

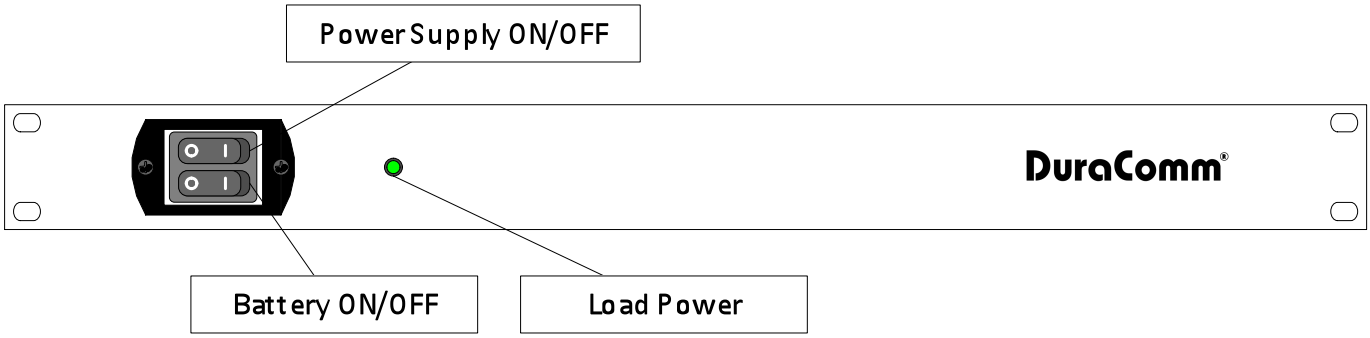
LOW VOLTAGE DISCONNECT with RELAY

Maximum Interrupt Current / continuous current .....75 Amps DC
Disconnect Voltage..... 10.5 VDC
Reconnect Voltage ..... 12.5 VDC
Disconnect Delay.....2 minutes @ less than preset disconnect voltage

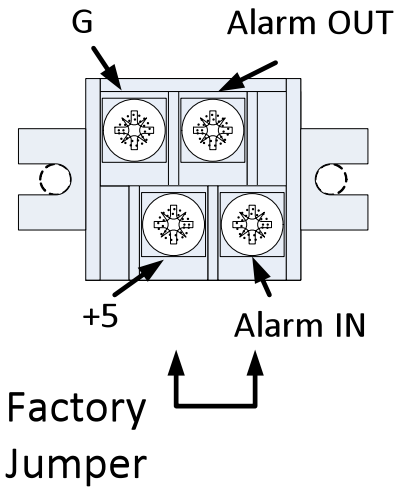
INSTALLER NOTES

NOTE: **DO NOT** block any of the cooling vents on the sides and top 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. **The Modular System can be used either positive or negative ground.**

FRONT PANEL LAYOUT



INSTALLATION BLOCK DIAGRAM



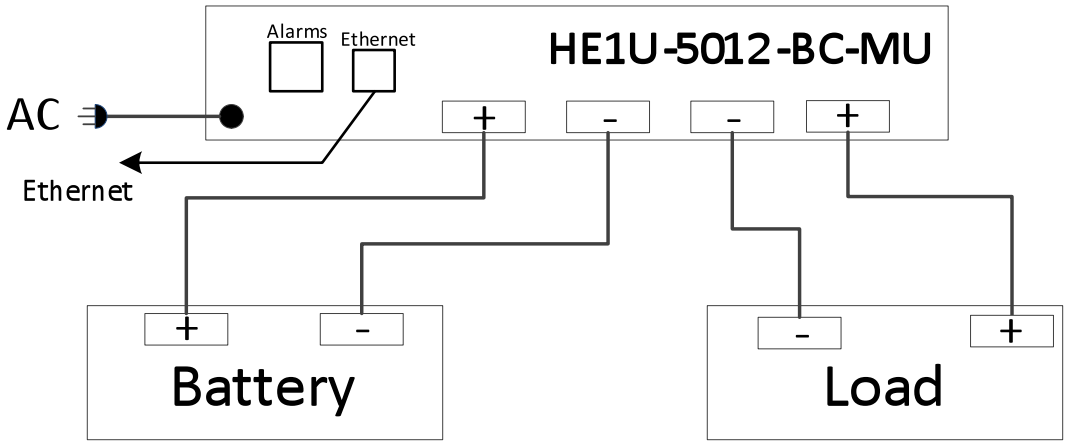
HE1U-5012-BC-MU Alarm Connector

Between +5V and Alarm In	Output Status
Switch Closed	Alarm Closed
Switch Open	Alarm Open

Between G and Alarm Out	Output Status
Open-Drain	500 mA max, 60 V max
Alarm ON/LOW	Shorted
Alarm OFF/HIGH	Open

HE1U-5012-BC-MU Wiring Layout

This system setup will provide continuous power to the load and maintain the battery bank with a float charge circuit 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 10.5 VDC. The battery reconnects once AC power is restored and voltage reaches 12.5 VDC.



CONNECTING TO THE HE1U-5012-BC-MU VIA THE INTERNET

Prerequisites

System administrators must decide whether the HE1U-5012-BC-MU will operate on the network with DHCP or a fixed IP address. The factory-set HE1U-5012-BC-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 HE1U-5012-BC-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 HE1U-5012-BC-MU

Power up the HE1U-5012-BC-MU then connect the HE1U-5012-BC-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 HE1U-5012-BC-MU, then proceed to the section in this manual named "**Open a Web Connection to the HE1U-5012-BC-MU**".

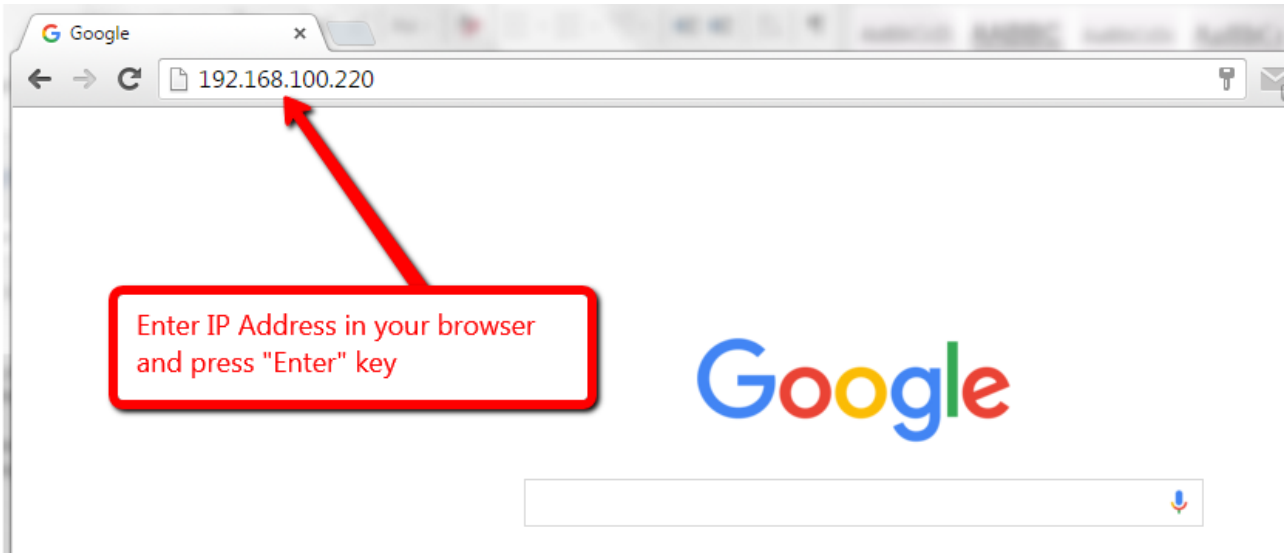
Using Static HE1U-5012-BC-MU IP and Network Configuration

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 HE1U-5012-BC-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 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 HE1U-5012-BC-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 HE1U-5012-BC-MU"** to log in and enter the final network settings for the HE1U-5012-BC-MU.

Open a Web Connection to the HE1U-5012-BC-MU

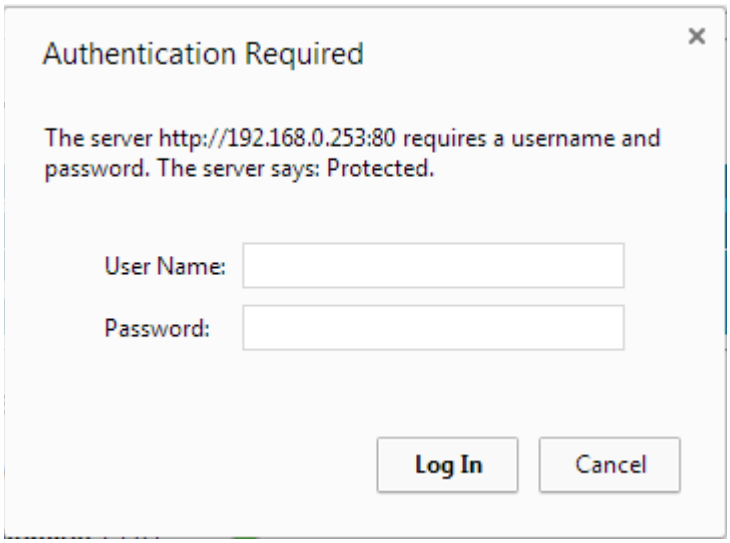
1. Connect the RJ-45 connector on the back of the HE1U-5012-BC-MU to your network
2. Use your favorite device and browser (Chrome, Firefox, internet Explorer, etc.), and enter the IP address of the power supply on your network into the URL box on the browser (see the screenshot below). If you are unable to connect to the device with the browser, you will need to use a terminal with a USB connection to access the device and configure the IP address. If the HE1U-5012-BC-MU responds with the “Status” screen, then skip to the User Login Section.



REMOTE MONITORING AND CONTROL (HE1U-5012-BC-MU) SETUP

All setup requires an administrative user to log into the HE1U-5012-BC-MU in your power supply. Click the 'Login' button in the top menu.

User Login



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 HE1U-5012-BC-MU. "Control" users can access all screens except the User Setup screen.

NETWORK SETUP

RMCU - SITE CENTRI© - HE1U-5012-BC-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:35:38

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.

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

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 RLP-812-MU. 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 HE1U-5012-BC-MU can be downloaded from the HE1U-5012-BC-MU after you connect to it with your browser. Go to the Device Setup page and log in to the HE1U-5012-BC-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.

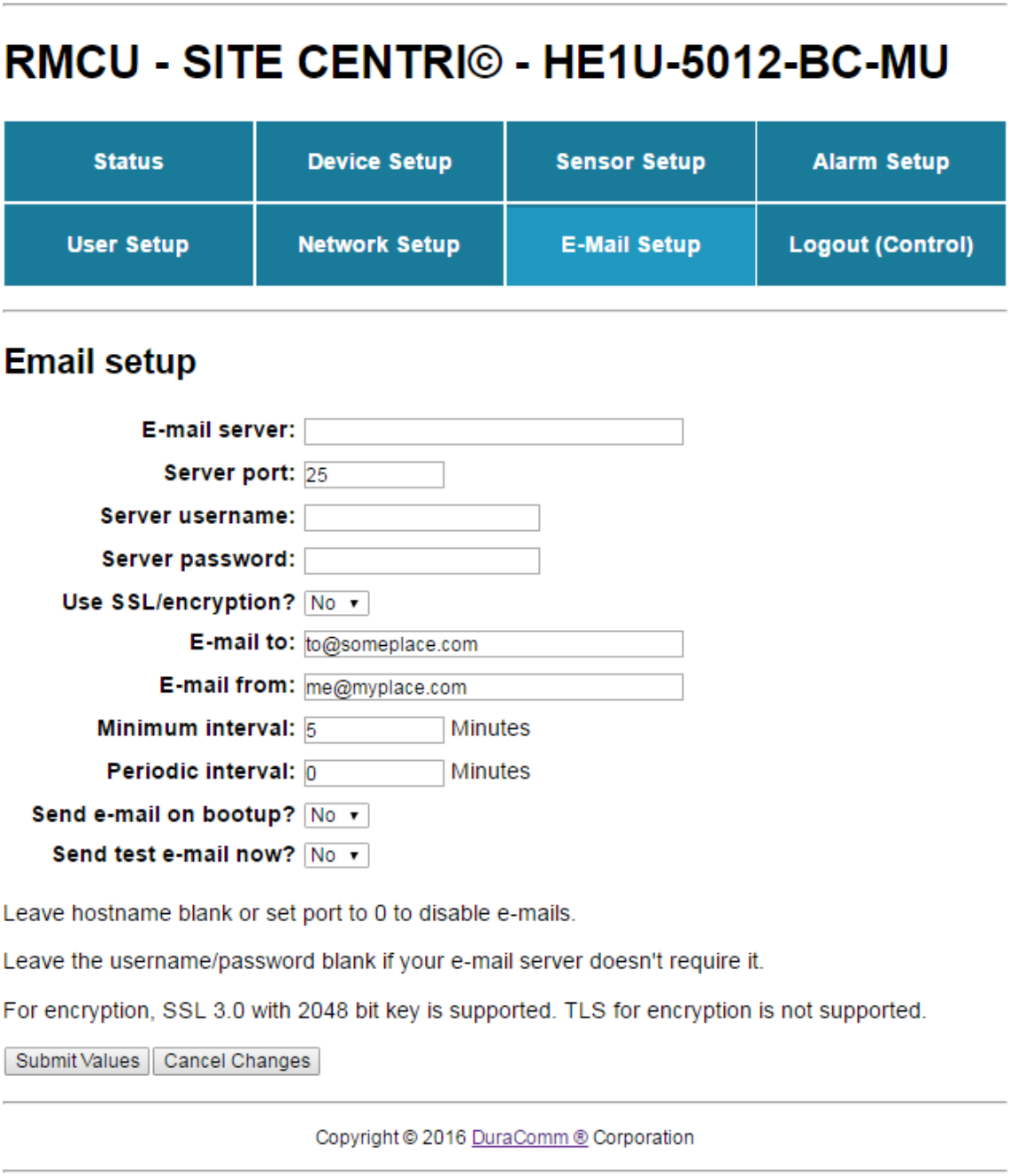
After download, import the MIB file into your MIB browser or Monitoring software to configure it for use with the HE1U-5012-BC-MU.

When the MIB file has been loaded, complete the “SNMP Setup” section on the “Network Setup” page of the HE1U-5012-BC-MU to configure it for use with your monitoring solution.

The HE1U-5012-BC-MU will send traps for all configured alarm conditions including bootup, temperature, analog alarms, and digital alarms.

Digital Outputs can also be controlled by SNMP on the HE1U-5012-BC-MU.

EMAIL SETUP



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.

Firmware 2.7 adds the ability to configure a periodic status email that is independent of alarms.

DEVICE SETUP

RMCU - SITE CENTRI© - HE1U-5012-BC-MU

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

Device Setup

Device Info

Site Name: HE1U-5012-BC-MU
Model: RMCU
Serial Number: 5432
Version: HW: 2.0, FW: 2.7

Logging

Logging rate: 0 Minutes
Log start date: Thu, 14 Jan 2010 10:02:15
Last log date: Mon, 20 Jun 2016 10:52:38
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: Mon, 20 Jun 2016 13:41:41
NTP Server:
Leave blank to disable NTP
NTP sync now? No
NTP status: Disabled
Time Zone: -5 Hours
Manually set time? No
Date (MM/DD/YY): 06/20/16
Time (HH:MM:SS): 13:41:25

Miscellaneous

Signficant digits: 1
Temperature units: Fahrenheit

Submit Values | Cancel Changes

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 HE1U-5012-BC-MU will log all measurements and alarms to an SD card that is plugged into the HE1U-5012-BC-MU 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 HE1U-5012-BC-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 HE1U-5012-BC-MU.

For firmware 2.2, the log file will be automatically renamed and a new one started when the file size reaches 5MB. Download all log files before deleting them!

With REV 2.3 Firmware, the ability to log readings when an alarm occurs has been added. To turn off periodic logging, just enter 0 as the logging rate. You can set up logging to occur only on alarms, periodically, both or none.

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

With Firmware 2.0, you can set the number of significant digits for the Analog Voltage readouts on the Status page, as well as set the temperature units.

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SENSOR SETUP

RMCU - SITE CENTRI© - HE1U-5012-BC-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		
#2	Amps Battery Mode		
#3	Volts Power Supply		
#4	Volts Battery		
#5			
#6			

	Digital Inputs	Open color	
#1	Alarm In		
#2	DC-OK Power Supply		
#3			
#4			

	Digital Outputs	Inactive	Active	Pulse
#1	Alarm Out	Green/Right OFF/HIGH	Red/Left ON/LOW	No
#2	Power Supply ON/OFF	Green/Right ON	Red/Left OFF	No
#3		Green/Left Inactive	Red/Right Active	No
#4		Green/Left Inactive	Red/Right Active	No

Submit Values | Cancel Changes

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 HE1U-5012-BC-MU board are wired as shown on the Sensor Setup screen.

Analog alarms are set up in the “Alarm Setup” screen. See the “Alarm Setup” section for more information.

In the HE1U-5012-BC-MU the Digital Output 1 is an alarm output, and Digital Output 2 controls the ON/OFF state of the power supply. The user must be logged in as the admin or control user to control the digital outputs. The digital outputs can be controlled by the buttons on the status page, mobile page, or via SNMP on the HE1U-5012-BC-MU. Optionally, they can be automatically controlled by connecting them to an alarm on the “Alarms” screen.

In Revision 2.2 Firmware (see Device Setup screen) the user can enter text to change the user meaning of the digital output states, and there are 3 color options for the buttons. “Active means that the digital output MOSFET is conducting. Digital Output 1 can also be configured to output a 500mS pulse.

Additional settings for digital input alarms and emails have been added in Firmware 2.3.

ALARM SETUP

RMCU - SITE CENTRI© - HE1U-5012-BC-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

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

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

Digital Inputs

Alarm In:	Never alarm	Never e-mail
DC-OK Power Supply:	Never alarm	Never e-mail
:	Never alarm	Never e-mail
:	Never alarm	Never e-mail

Digital Outputs

Alarm Out:	Never alarm	Never e-mail
Power Supply 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

Alarm Setup

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 “Module #1 Amps” channel in the screen above. Firmware 2.0 includes additional settings for alarms.

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.

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

Firmware 2.3 added the ability to log alarms. The “Log Alarms” setting on the “Device Setup” Page, is the same as the “Global Settings”, “Log All Alarms” setting on this page.

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)”.

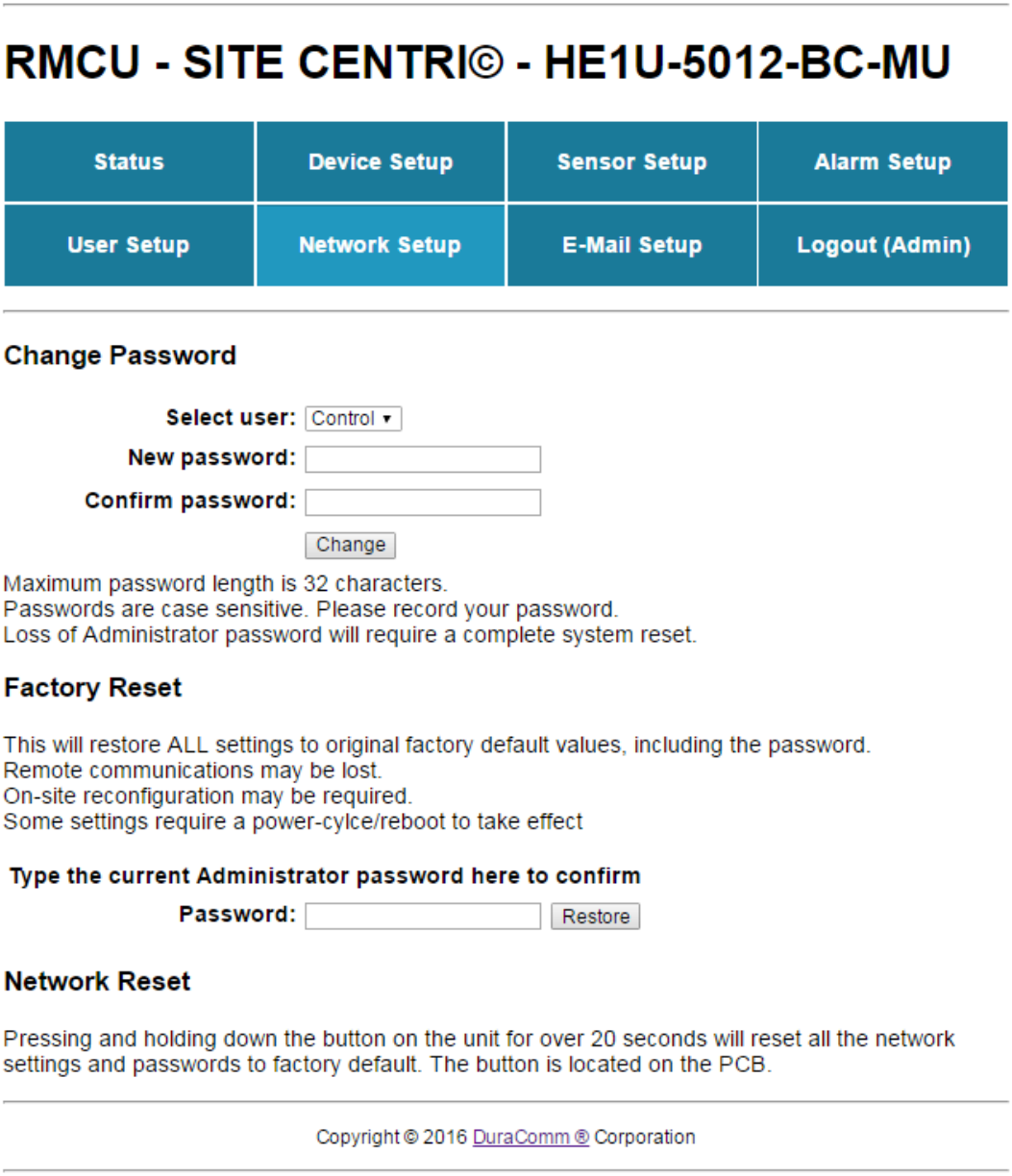
E-mail notifications can be set for each analog alarm threshold, as well as digital alarm conditions. Recovery thresholds do not send notifications.

Firmware 2.7 adds the ability to configure Alarm recovery notifications.

Factory Default 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 From Battery	Amps	-1000	0	1000	0
Volts Power Supply	Volts	16	15	8	13
Volts Battery	Volts	15	14.8	12	13

USER SETUP

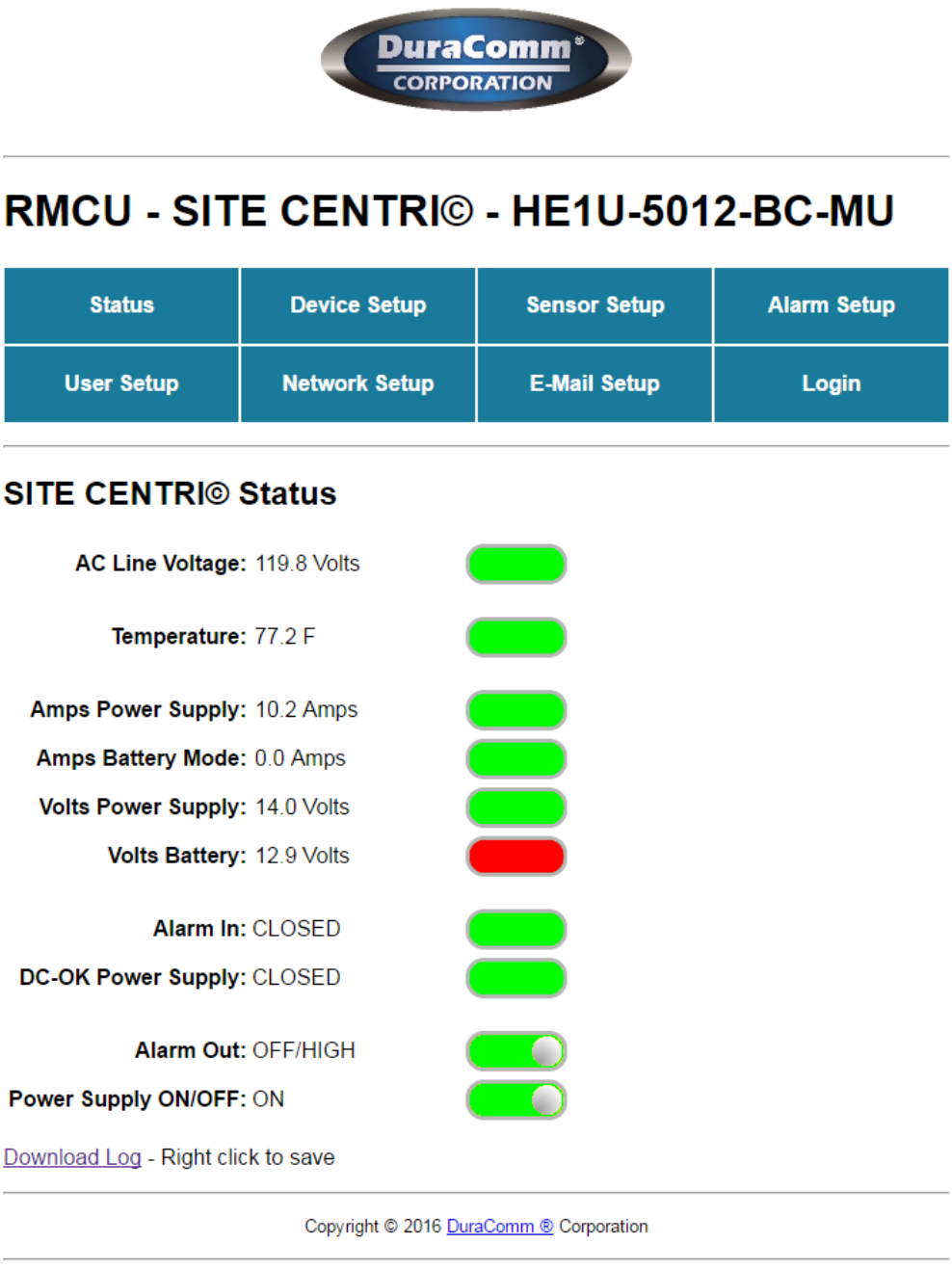


User Setup

Password changes and HE1U-5012-BC-MU 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 HE1U-5012-BC-MU PCB and hold it for more than 30 seconds. You will need to re-connect to the HE1U-5012-BC-MU through your web browser by entering the factory supplied IP address and HTTP port (see Network Setup).

REMOTE MONITORING AND CONTROL STATUS PAGE

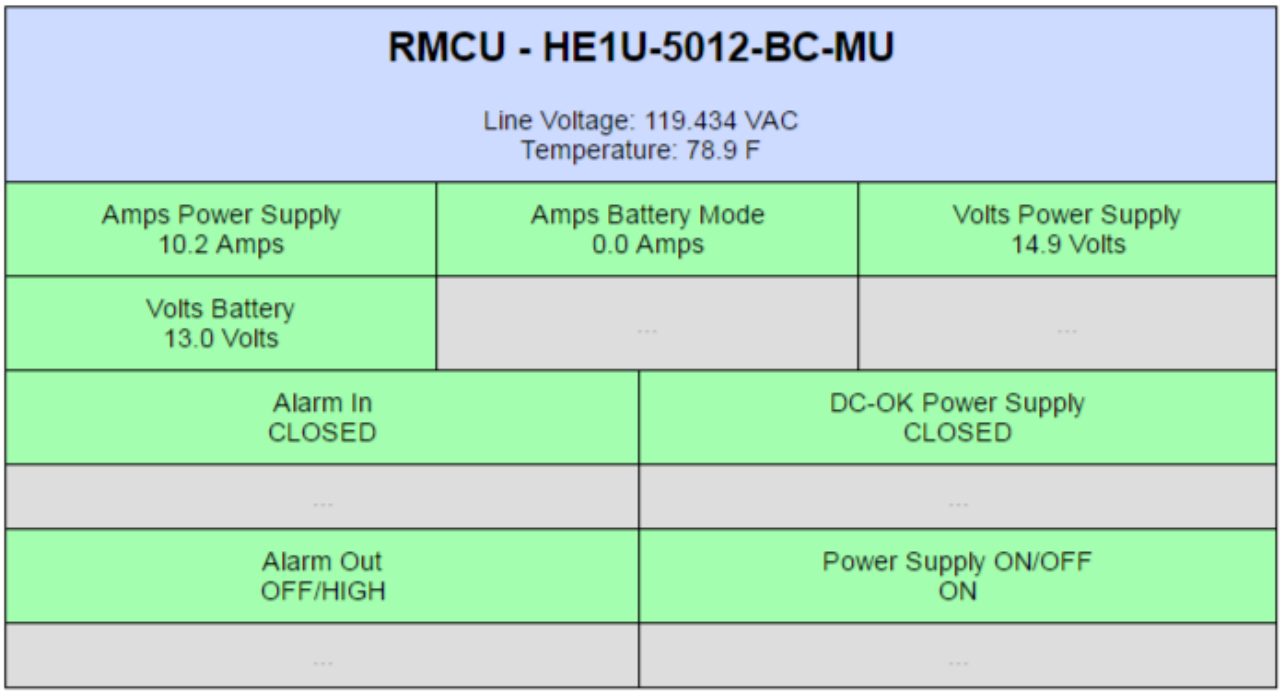


Status screen

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

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



HE1U-5012-BC-MU MAINTENANCE

Battery

The battery on the HE1U-5012-BC-MU 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)

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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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.

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