# RLP-2048BBSCLVD-MU

# Internet Ready Heavy Duty AC to DC Power Supply

# 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
- Smart Charger
- Monitor Voltages, Power Supply Current, Battery Current and Alarms
- Remote Shutdown of Each Power Supply Module
- Alarm IN and Alarm Out
- Battery backed up Real Time Clock to Timestamp Logged Information.
- Monitoring Samples can be Logged and Downloaded
- Input Voltage 100 to 240 VAC
- Analog Metering: Load Voltage / Each Power Supply Amperage
- Short Circuit / Overload / Over Voltage / Over Temperature Protection
- Manual Battery Disconnect Switch
- Designed for Negative Ground Applications Only
- 3 year warranty

## DESCRIPTION

The RLP-2048BBSCLVD-MU is a Heavy Duty AC to DC Power Supply with smart charger that 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 for each module, power supply current for each module, battery current, LVD status, external alarm status, as well as the ability to remotely control the state of each power supply module, all via the internet using any standard web browser. A mobile friendly version of the status page is included, and an alarm output is also provided.

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 RLP-2048BBSCLVD-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.

This power supply comes with power factor correction, and with front panel metering for voltage and current. All of the RLP series come with four layers of protection against overload, over voltage, over temperature, and short circuit protection. This model also comes with a manual battery disconnect.

The RLP-2048BBSCLVD-MU comes with the DuraComm three-year warranty.

# SPECIFICATIONS

Output Voltage ...................................................................................................................................55.5 VDC
Output Voltage Tolerance .......................................................................................................................+/- 1 %
Output Amperage.......................................................................................................................... 17 Amps cont.
Maximum Power, continuous ..................................................................................................... 1200 Watts
Maximum Ripple and Noise .................................................................................................200 mV p-p max
Input Voltage ...........................................................................................................................100 to 240 VAC
Input Frequency Range.............................................................................................................................47-63 Hz
Maximum AC Current............................................................................ 14 Amps/120 VAC; 7 Amps/240 VAC
Typical Efficiency ......................................................................................................................................88 %
Max Inrush Current, single cycle ......................................................... 20Amps / 120 VAC, 7 Amps / 240 VAC
Short Circuit Protection ....................................................................................................... Fold back Limiting
Overload Protection (operates) ...............................................................................................typical 110-120 %
Line Regulation ...................................................................................................................................50 mV
Load Regulation ...................................................................................................... 100 mV (20-100 % load)
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 ....................................................................... -4 F to +140 F (-20 C to +60 C)
Storage Temperature .................................................................................... -40 F to +185 F (-40 C to +85 C)
Withstand Voltage*.....................................................................1.5 KV @ 10 ma (I/P-O/P, I/P-FG)/1 min
        (Continued) .............................................................................500 V @ 10 ma (O/P-FG)/1 min
Dimensions .........................................................................................................3.5H x 19W x 13D inches
Weight .........................................................................................................................................15.8 lbs.

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# METER CIRCUITS

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

When set to the VOLT position, the full scale reading is 60 volts.

When set to the AMP position, the full scale reading is 30 amps.

The meter and associated circuitry accuracy is 10 percent of full scale deflection.  Since full scale is 30 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 #12 AWG negative return to the module as a meter   shunt.  The #12 AWG wire provides a nominal 50 mV drop at 30 amps

The meter sensitivity for voltage measurement is 1000 ohms per volt.

# SMART CHARGER

Maximum charge voltage.............................................................................................................................. 55.2 VDC
Maximum recharge rate .......................................................................................................2.2 Amp with auto sensing of charge current
Charger protection .................................................................................................Overload/voltage/temperature/reverse polarity protected
Dead battery protection............................................................................................ Short circuit protected with deep discharge start function
AC input ............................................................................................................... 90-130 / 180-260 VAC, 47-63 Hz, switch selected
Visual indication ................................................................................. Dual-state LED indication: Red = high rate charge, Green = Float charge

# BATTERY BACK UP

Maximum Power, continuous ........................................................................................................................... 1200 Watts
Auto-revert to Battery or Power Supply.................................................................provided by dual Shottky diode in OR configuration
Maximum Output Current in Battery Mode ...................................................................................40 Amps (limited by Shottky diode)

## LOW VOLTAGE DISCONNECT with RELAY

Maximum Interrupt Current / continuous current ........................................................................................40 Amps DC
Disconnect Voltage ...............................................................................................................................................42 VDC
Reconnect Voltage ................................................................................................................................................50 VDC
Disconnect Delay ...................................................................... 2 minutes @ less than preset disconnect voltage

## RMCU SPECIFICATIONS

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:  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 RLP-2048BBSCLVD-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 42 VDC. The battery reconnects once AC power is restored and voltage reaches 50 VDC.
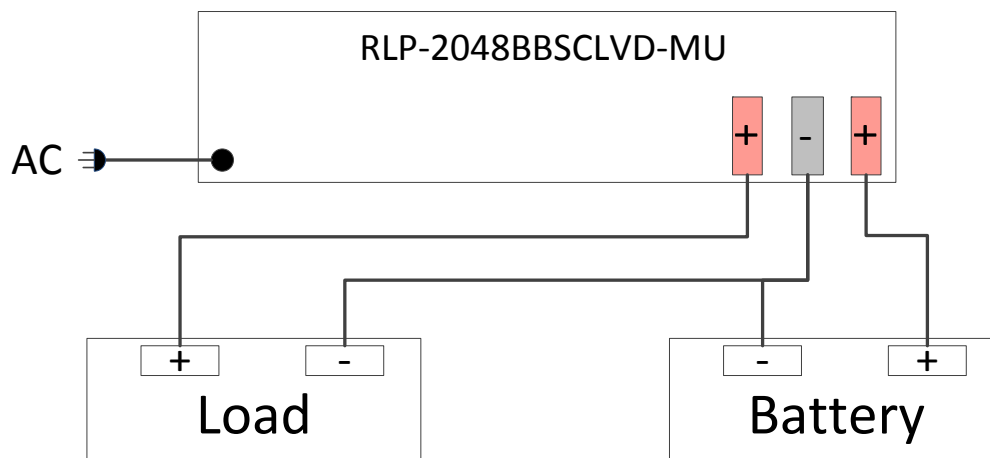


## Remote Monitoring and Alarm Wiring
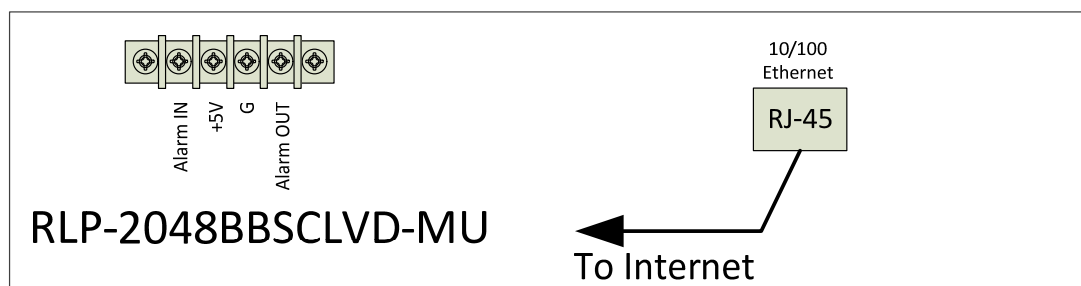


The Alarm input connections require normally closed contacts between Alarm IN and +5V for a typical setup. When the circuit opens, the Alarm Input will turn RED on the status page.

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 RLP-2048BBSCLVD-MU is not designed for Positive Ground applications.**

The RJ-45 connects the RLP-2048BBSCLVD-MU to your 10/100 Ethernet network.

## CONNECTING TO THE RLP-2048BBSCLVD-MU VIA THE INTERNET

## Prerequisites

System administrators must decide whether the RLP-2048BBSCLVD-MU will operate on the network with DHCP or a fixed IP address. The factory-set RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-MU

Power up the RLP-2048BBSCLVD-MU then connect the RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-MU, then proceed to the section in this manual named "**Open a Web Connection to the RLP-2048BBSCLVD-MU**".

## Using Static RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-MU"** to log in and enter the final network settings for the RLP-2048BBSCLVD-MU.

## Open a Web Connection to the RLP-2048BBSCLVD-MU
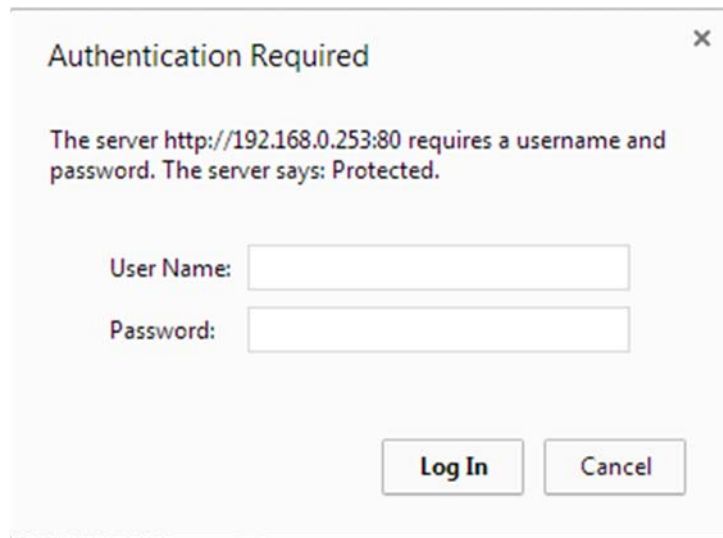
1. Connect the RJ-45 connector on the back of the RLP-2048BBSCLVD-MU to your network
2. Use your favorite device and browser (Chrome, Firefox, internet Explorer, etc.), and enter the IP address of the power supply on your network into the URL box on the browser (see the screenshot below). If you are 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 RLP-2048BBSCLVD-MU responds with the "Status" screen, then skip to the User Login Section.
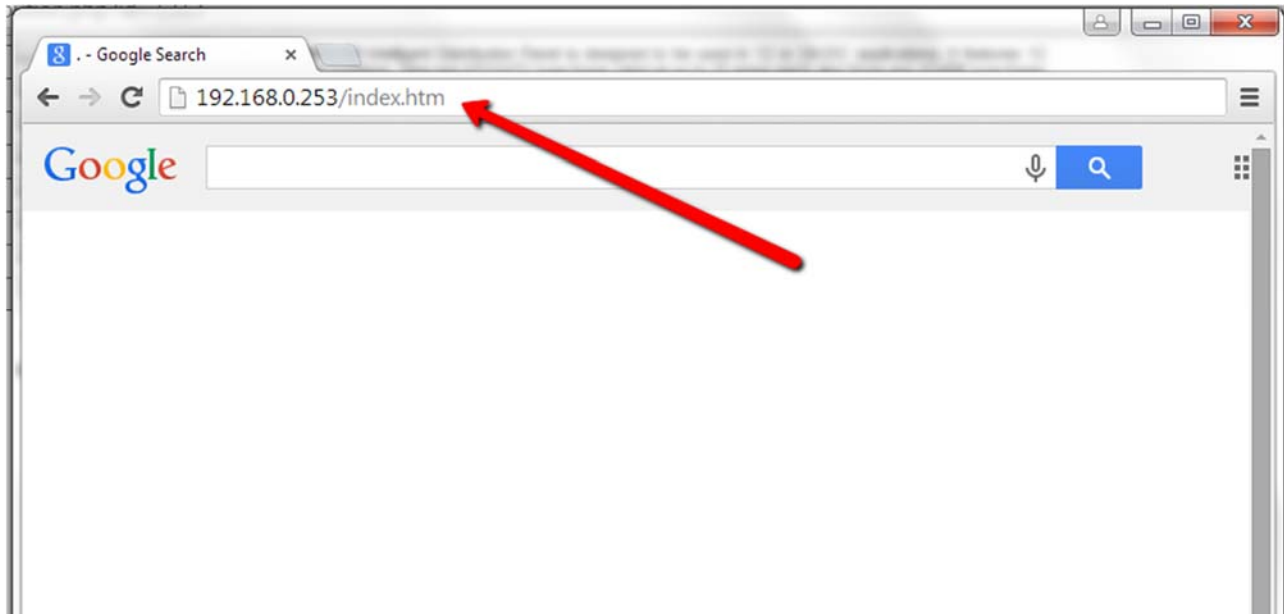
## REMOTE MONITORING AND CONTROL (RMCU) SETUP

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© - RLP-2048-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:34:50

**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

**Read community:** public

**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 ]

January 27, 2015

## 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 RLP-2048BBSCLVD-MU RLP-2048BBSCLVD-MUcan be downloaded from the RLP-2048BBSCLVD-MU after you connect to it with your browser. Go to the Device Setup page and log in to the RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-MU.

When the MIB file has been loaded, complete the "SNMP Setup" section on the "Network Setup" page of the RLP-2048BBSCLVD-MU to configure it for use with your monitoring solution.

The RLP-2048BBSCLVD-MU will send traps for all configured alarm conditions including bootup, temperature, analog alarms, and digital alarms.

## EMAIL SETUP

RLP-2048BBSCLVD-MU

## RMCU - SITE CENTRI© - RLP-2048-MU

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

## Email setup

| | |
|---|---|
| E-mail server: | smtp.gmail.com |
| Server port: | 465 |
| Server username: | 2014dcrmcu@gmail.com |
| Server password: | |
| Use SSL/encryption? | Yes ▾ |
| E-mail to: | 2014dcrmcu@gmail.com |
| E-mail from: | 2014dcrmcu@gmail.com |
| Minimum interval: | 5 Minutes |
| Send e-mail on bootup? | Yes ▾ |
| 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.

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

[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.

# RMCU - SITE CENTRI© - RLP-2048-MU

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

## Device Setup

### Device Info

|  |  |
|--|--|
| Site Name: | RLP-2048-MU |
| Model: | RMCU |
| Serial Number: | 5200 |
| Version: | SW=1.5 HW=1 |

### Logging

|  |  |
|--|--|
| Logging rate: | 0  Minutes |
| Log start date: | Fri, 16 Oct 2015 07:49:16 |
| Last log date: | Fri, 16 Oct 2015 07:50:16 |
| Clear Log? | No ▾ |
| Append Now? | No ▾ |
| 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, 20 Oct 2015 12:14:06 |
| 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): | 10/20/15 |
| Time (HH:MM:SS): | 12:13:59 |

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 RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-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 RLP-2048BBSCLVD-MU.

## 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.**

.

# RMCU - SITE CENTRI© - RLP-2048-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 Module # 1 | ● red ○ green |
| #2 | Amps Module # 2 | ● red ○ green |
| #3 | Amps From Battery | ● red ○ green |
| #4 | Volts Module # 1 | ● red ○ green |
| #5 | Volts Module # 2 | ● red ○ green |
| #6 | Battery Voltage | ● red ○ green |

| | Digital Inputs | Open color | Email |
|---|---|---|---|
| #1 | Alarm Input | ● red ○ green | Never email ▼ |
| #2 | Module # 1 DC OK | ○ red ● green | Never email ▼ |
| #3 | Module # 2 DC OK | ○ red ● green | Never email ▼ |
| #4 | | ● red ○ green | Never email ▼ |

| | Digital Outputs | On color |
|---|---|---|
| #1 | Alarm Output | ● yellow ○ green |
| #2 | Module # 1 On/Off + | ● yellow ○ green |
| #3 | Module # 2 On/Off + | ● yellow ○ green |
| #4 | | ○ yellow ● green |

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 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.

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

## ALARM SETUP

## RMCU - SITE CENTRI© - RLP-2048-MU

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

### Alarm Setup

| Analogs | Amps Module # 1 ▾ |
|---|---|

**Under-voltage alarm**

Threshold: < -1000

Recovery: > 0

Send e-mail: No ▾

Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

**Over-voltage alarm**

Threshold: > 1000

Send e-mail: No ▾

Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

**Temperature**

Threshold: > 200 F

Recovery: < 180 F

Send e-mail: No ▾

Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Submit Values | Cancel Changes

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## 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 Currrent" 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. In the RLP-2048BBSCLVD-MU, the alarm that is tied to the rear panel barrier strip is **Alarm #1.**

## RMCU - SITE CENTRI© - RLP-2048-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: [_____]

[Change]

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-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).

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# RMCU - SITE CENTRI© - RLP-2048-MU

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

## SITE CENTRI© Status

**AC Line Voltage:** 116.5 Volts

**Temperature:** 86.5 F

**Amps Module # 1:** 2.6 Amps

**Amps Module # 2 :** 1.9 Amps

**Amps From Battery :** 0.0 Amps

**Volts Module # 1:** 56.4 Volts

**Volts Module # 2:** 56.7 Volts

**Battery Voltage:** 55.5 Volts

**Alarm Input:** CLOSED

**Module # 1 DC OK:** OPEN

**Module # 2 DC OK:** OPEN

**Alarm Output:** OFF/HI

**Module # 1 On/Off +:** ON/HI

**Module # 2 On/Off +:** ON/HI

Download Log - Right click to save

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January 27, 2015

## 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 - RLP-2048-MU | | |
|---|---|---|
| Line Voltage: 116.2 VAC Temperature: 89.4 F | | |
| Amps Module # 1 2.6 Amps | Amps Module # 2 1.9 Amps | Amps From Battery 0.0 Amps |
| Volts Module # 1 56.4 Volts | Volts Module # 2 56.7 Volts | Battery Voltage 55.5 Volts |
| Alarm Input CLOSED | | Module # 1 DC OK OPEN |
| Module # 2 DC OK OPEN | | ... |
| Alarm Output OFF | | Module # 1 On/Off + ON |
| Module # 2 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.

## 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<br>18 AWG Up to 10 feet |
| 14  AMPERES | 18 AWG Up to 5 feet<br>16 AWG Up to 10 feet |
| 20  AMPERES | 16 AWG Up to 5 feet<br>14 AWG Up to 10 feet |
| 30  AMPERES | 14 AWG Up to 5 feet<br>12 AWG Up to 10 feet |
| 40  AMPERES | 12 AWG Up to 5 feet<br>10 AWG Up to 10 feet |
| 50  AMPERES | 10 AWG Up to 5 feet<br>8  AWG Up to 10 feet |
| 70  AMPERES | 8 AWG Up to 5 feet<br>6 AWG Up to 10 feet |
| 100 AMPERES | 6 AWG Up to 5 feet<br>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.*

*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.*

## DuraComm® Corporation

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