DC-RMCU1

DC-Powered Remote Monitoring and Control Unit

Owners Guide

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

- Remote Monitoring and Control Unit
- Web Ready / Web GUI / Mobile Status Page
- 6 Isolated Voltage inputs with adjustable high and low alarm thresholds. (CH 1 set to measure current)
- 4 Digital Outputs(Open-Drain MOSFET)
- 4 Digital Inputs
- Configure emails for alarms with external email account
- SNMP Traps for Boot-up and Alarms
- SNMP Control of Digital Outputs
- Remote reboot
- 2 User Levels with different permissions
- Manual or NTP Time Setting
- Temp Sensor Input (Uses LM35)
- AC Voltage Monitor Input, 300 VAC
- Monitoring Samples can be Logged and Downloaded
- Battery backed up Real Time Clock to Timestamp Logged New Live Information
- Wide Input DC Supply Range, 9 to 60 VDC
- Accessory Kit Supplied
- 3 year warranty

DESCRIPTION

The new DC-RMCU1 DC-Powered Remote Monitoring and Control Unit, provides the ability to remotely monitor AC Line voltage up to 300 VAC, up to 6 DC Voltages and 1 temperature, monitor the status of up to 4 external alarms, as well as the ability to remotely control the state of 4 digital open-drain MOSFET outputs, all via the internet using any standard web browser. The Channel 1 DC voltage input is configured at the factory to measure current using the included 100 Amp/50mV shunt. Additional channels can be configured at the factory for current measurement. A mobile friendly version of the status page is also included. Alarms and email notifications can be configured for the 6 analog voltage channels (high and low voltage), and email notifications can be configured for the Alarm inputs. A high-temperature alarm threshold can be configured to send an email notification, as well as control one of the digital outputs internally. The DC-RMCU1 also sends SNMP Traps for alarm conditions. The DC-RMCU can also be set to log measurements to a 2 GB internal micro SD card, and the measurements are time-stamped with a real-time clock.

Guest users will see the status page that displays the AC Voltage, measured values and alarm condition of all active voltage channels, temperature value and alarm condition, as well as alarm input status, and control status.

Admin and Control Users will be able to configure all of the input and output settings, and set the state of the digital outputs. Admin and Control users can set device settings for logging, time, and Site Name. Admin users have exclusive control of network configuration, including manual time setting or NTP, soft reboot of the DC-RMCU1, factory reset of the entire configuration, and Control or Admin user passwords.

The DC-RMCU1 comes with the DuraComm three-year warranty.

TABLE OF CONTENTS

SPECIFICATIONS

Hardware Revision 2.0
Firmware Revision.. 2.16
DC Input Power .... 9 to 60 VDC @ 500 mA max
Internal +5VDC supply current (Source for external Logic) .... 300 mA Max
Voltage Input Channels (6 channels) – Max Voltage .... (Internally Isolated) +/-2 V with jumper, +/-100 V without jumper
Digital Alarm Input Channel Thresholds (4 channels) .... LED with 220 Ohm Series Resistor, 50 mA Max (per channel)
Digital Output (4 Channels) .... Open Collector, 60 VDC Max, 500 mA sink Max (per channel)
Network Connector... RJ-45 (10/100 Ethernet) with activity LEDs
Terminal Connector.. (factory diagnostics only)
Backup Battery (for Real Time Clock) CR2032
Memory Card .... 2GB min Micro SD
Voltage Measurement Range.. 0 VDC to 100 VDC
Current Measurement Range .... 0 Amps to 100 Amps
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
Temperature Measurement Range using LM35 connection (J8) .... +36 F to +300 F (+2 C to +150 C)
Working Temperature Range .... -22 F to +140 F (-30 C to +60 C)
Storage Temperature .... -40 F to +185 F (-40 C to +85 C)
Dimensions .... 8"H x 3.2"W x 5"D
Weight .... 1.7 lbs.

ACCESSORY KIT (INCLUDED)

Ethernet Cable .... 3 feet
Current Measurement Shunt .... 100 Amp / 50 mV
Temperature Sensor LM35
Rubber Feet 4
Wall Mounting Bracket .... 2 brackets and 4 sheet metal screws

INSTALLATION

Isolated Analog Inputs

DC-RMCU1 Input Power

Digital Outputs

+5V and Ground Connections for Digital Inputs and Outputs

Digital Inputs (Alarms)

DuraComm®
SITE CENTRI

Temperature Sensor Connection Block

AC Line monitoring Connection Block

Ethernet Connector
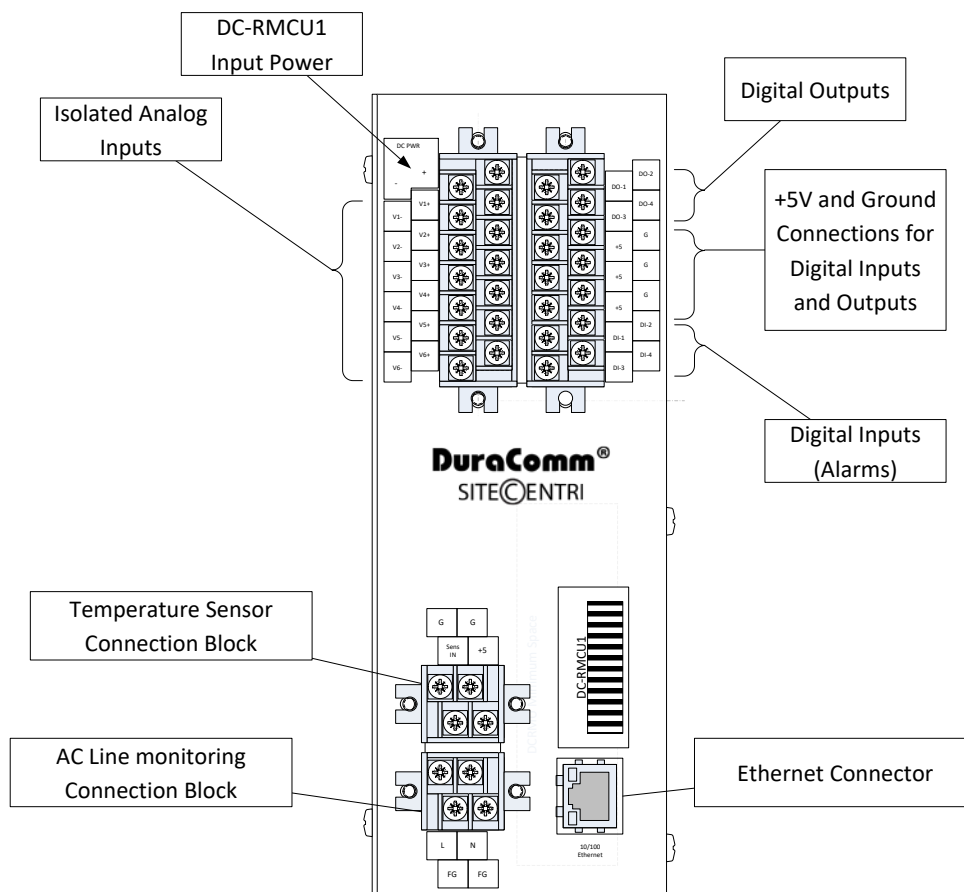
Input Power

The DC-RMCU1 DC PWR connections on the power strip. Please be sure to connect the positive terminal to the positive(+) supply lead, and the negative terminal to the negative(-) supply lead. The supply voltage may be 9 VDC to 60 VDC.

NOTE: The DC-RMCU1 is "ON" as soon as power is applied.

10/100 Ethernet

Connect the RJ-45 on the DC-RMCU1 to your network with an Ethernet patch cable. A short 3 foot cable is provided with the DC-RMCU1.

NOTE: The USB connector is for factory diagnostics only.

DCRMU Board Layout and Configuration

Analog Inputs
J3

AC Monitoring
J1

RMU DC Power Input
J10

Analog Channel Jumpers
Open = +/- 100 V Range
Shorted = +/- 2 V Range
P1 (left) thru P6

Digital Inputs and Outputs,
J2

Temp Sensor or Socket
J8

Micro SD Card Socket

Real Time Clock Backup Battery Socket for CR2032

Ethernet
J4

Factory Reset Button
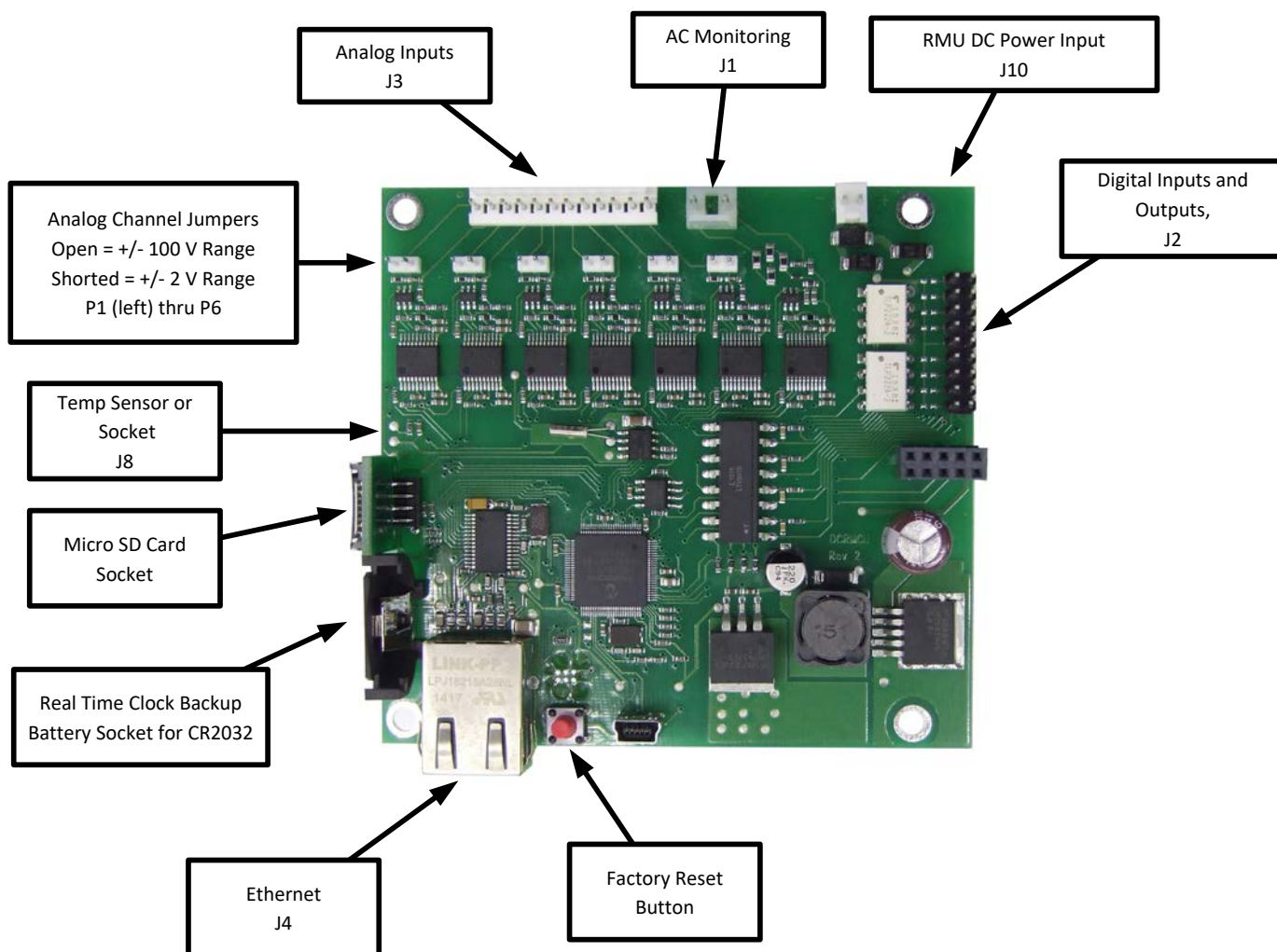
Figure 1: PCB Layout

The DC-RMCU1 comes with a jumper installed on P1 to configure analog channel 1 for +/- 2 V to measure current shunt voltage.

See the Sensor Setup Section for sensor wiring and configuration.

 Figures 2 and 3 Show connector wiring for the DC-RMCU1 inputs for troubleshooting purposes.

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Red — VM1+
Black — VM1-
Blue/White — VM2+
Blue — VM2-
Yellow — VM3+
Black — VM3-
Red — VM4+
Black — VM4-
Orange — VM5+
Black — VM5-
Yellow — VM6+
Black — VM6-

Grey — ACVML
White — ACVMN

Black
Red

J3

J3

J1

J1

Board Power
J10

Figure 2: J1 and J3 Wiring

Digital I/O
J2

Pin 18   Pin 17

Violet/White Tracer – 18 – (DO4 –)   (DO4 +) – 17 – Violet/White Tracer
Blue/White Tracer – 16 – (DO3 –)   (DO3 +) – 15 – Blue/White Tracer
Green/Yellow Tracer – 14 – (DO2 –)   (DO2 +) – 13 – Green/Yellow Tracer
Orange/White Tracer – 12 – (DO1 –)   (DO1 +) – 11 – Orange/White Tracer
White/Black Tracer – 10 – (GND)   (+5V) – 9 – Yellow
Violet – 8 – (DI4 –)   (DI4 +) – 7 – Violet
Blue – 6 – (DI3 –)   (DI3 +) – 5 – Blue
Green – 4 – (DI2 –)   (DI2 +) – 3 – Green
Orange – 2 – (DI1 –)   (DI1 +) – 1 – Orange

Pin 2   Pin 1

J2

PCB Interconnect
J9

Figure 3: J2 Wiring

CONNECTING TO THE DC-RMCU1 VIA THE INTERNET

Prerequisites

System administrators must decide whether the DC-RMCU1 will operate on the network with DHCP or a fixed IP address. The factory-set DC-RMCU1 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 DC-RMCU1 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 DC-RMCU1

Power up the DC-RMCU1 then connect the DC-RMCU1 to the network with an Ethernet cable. A 3 foot cable is provided.

Using DHCP

The DC-RMCU1 will attempt to connect to the network via DHCP when it is first connected, or when you perform a factory reset.

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 DC-RMCU1, then proceed to the section in this manual named "**Open a Web Connection to the DC-RMCU1**".

Using Static DC-RMCU1 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 DC-RMCU1 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 DC-RMCU1 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 DC-RMCU1.
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 DC-RMCU1"** to log in and enter the final network settings for the DC-RMCU1.
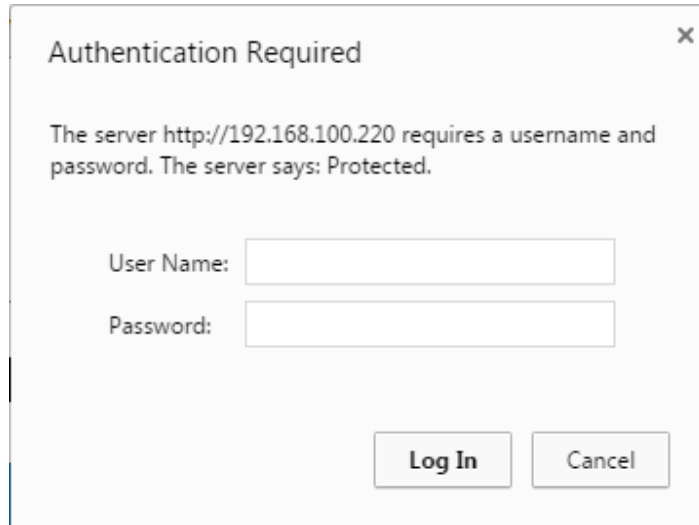
Open a Web Connection to the DC-RMCU1

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 DC-RMCU1 should respond with the "Status" screen.
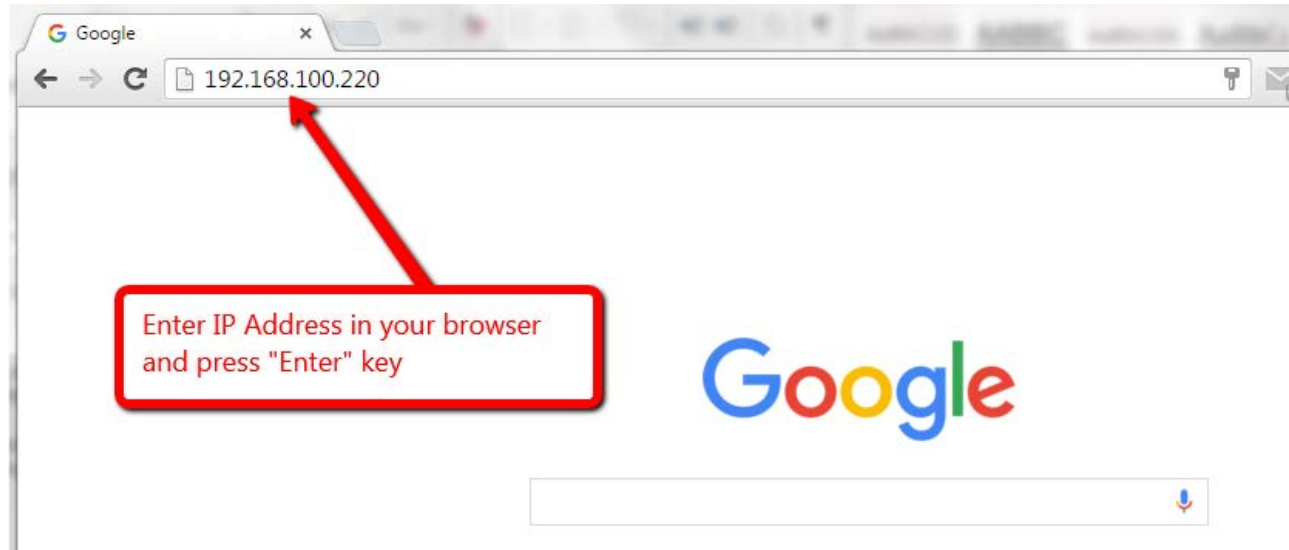
REMOTE MONITORING AND CONTROL SETUP

Click "Network Setup" in the menu at the top of the screen. All setup requires an administrative user to log into the DC-RMCU1. See default passwords below.

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 DC-RMCU. "Control" users can access all screens except the User Setup screen.

NETWORK SETUP

RMCU - SITE CENTRI© - RMCU

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.

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 Notes

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 RMCU. For example: if the port is changed to **8080** then the address would be changed to **http://192.168.0.253:8080**.   Rev 2.6 Firmware fixed an issue with saving the Static Netmask Address. Firmware 2.16 added the ability to configure an Alternate DNS Address.

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

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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 DC-RMCU1 can be downloaded from the DC-RMCU1 after you connect to it with your browser. Go to the Device Setup page and log in to the DC-RMCU1. 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 DC-RMCU1.

When the MIB file has been loaded, complete the "SNMP Setup" section on the "Network Setup" page of the DC-RMCU1 to configure it for use with your monitoring solution.

The DC-RMCU1 will send traps for all configured alarm conditions including bootup, temperature, analog alarms, and digital alarms.

Firmware 2.7 adds the ability to send SNMP traps for alarm recovery.

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.

EMAIL SETUP

RMCU - SITE CENTRI© - RMCU

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

Email setup

E-mail server: `mail.smtp2go.com`
Server port: `2525`
Server username: [   ] ← smtp2go email address
Server password: `••••••••`
Use SSL/encryption? `No ▾`
E-mail to: `your_email@your_company.com`
E-mail from: [   ]
Minimum interval: `5` Minutes
Periodic interval: `1440` 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 Notes

Enter the required email setup parameters given to you by your System Administrator. You can also send a test email from this screen. The example shows how to set up an smtp2go.com email relay account connection. An email relay service may be needed if you have difficulty setting up your SSL mail connection, as with Gmail. There may additional requirements, since email security changes rapidly.

Firmware 2.16 added the ability to send periodic "Heartbeat" emails to get status notifications even when there is no alarm condition by selecting from a drop-down list of 1, 6, 12, or 24 hour intervals.

DEVICE SETUP

RMCU - SITE CENTRI© - RMCU

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

Device Setup

Device Info

Site Name:	RMCU
Model:	RMCU
Serial Number:	5432
Version:	HW: 2.0, FW: 2.16

Logging

Logging rate:	0 Minutes
Log start date:	Tue, 16 May 2017 09:48:26
Last log date:	Tue, 16 May 2017 09:48:26
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:	Tue, 16 May 2017 10:09:00
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):	05/16/17
Time (HH:MM:SS):	10:08:54

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

TheDC-RMCU1will log all measurements and alarms to an SD card that is plugged into theDC-RMCU1board. 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. You can also examine the log file using a terminal connection through the USB port. If the SD card fills up, the oldest sample is discarded when a new one is stored. TheDC-RMCU1custom device name is stored with the logged data, so that the source of the card can be identified after it removed from the RMCU.

A DC-RMCU1 connected to a battery backup power system can monitor and log information about AC mains power outages, as well as all the other measurements for as long as the battery backup lasts.

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
```

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© - RMCU

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

Sensor Setup

	Analog Inputs	Alarm color	Averaging
#1	Amp Meter #1	🔴 🟢	3 samples ▼
#2	Voltmeter #1	🔴 🟢	3 samples ▼
#3	Voltmeter #2	🔴 🟢	None ▼
#4	Voltmeter #3	🔴 🟢	None ▼
#5	Voltmeter #4	🔴 🟢	None ▼
#6	Voltmeter #5	🔴 🟢	None ▼

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

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

	AC Inputs	Averaging
#1	Line AC	None ▼

	Other Inputs	Averaging
#1	External Temperature	3 samples ▼

SENSOR SETUP (CONTINUED – SCHEDULING)

Scheduled Outputs

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

#2	Output #1 ▾	ON/LOW ▾
	Disabled ▾	00:00 to 00:00
	☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday

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

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

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

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

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

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

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

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

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

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

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

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

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

#16	Output #1 ▾	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]

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. If any of the name fields on the left are left blank, the channel will be hidden on the status screen. REV 2.10 firmware added the ability to change the name of the AC and Temperature channels.

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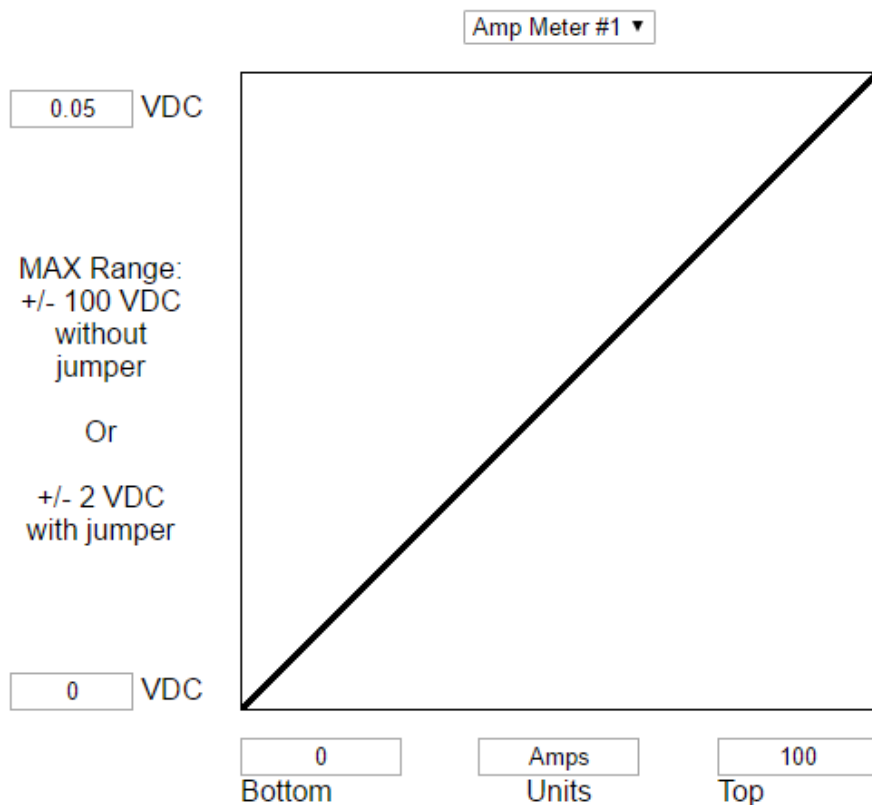
In Firmware 2.16, the Sensor Setup page has some grayed-out settings. Digital Input "Type" and "Averaging", as well as Digital Output "PWM" are not functional, and are under development for future release.

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.

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SENSOR CALIBRATION

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

Calibration

Amp Meter #1 ▼

0.05   VDC

MAX Range:
+/- 100 VDC
without
jumper

Or

+/- 2 VDC
with jumper

0   VDC

0	Amps	100
Bottom	Units	Top

Jumpered: Yes ▼

Submit Values   Cancel Changes

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Sensor Calibration Notes

The calibration page is not accessible via the page menus to protect measurement integrity from accidental changes. The access the calibration page you need to log in as the proper user (see User Setup Notes). Then you need to type the following URL into the browser <dc-rmcu-ip-address>/calib.html

Sensor calibrations is provided to convert the native voltage measurements of the DC-RMCU1 into other units for linear transducers. For example, the current transducer provided with the DC-RMCU1 will have 50mv across it when 100 Amps is flowing through it. The conversion factor is entered on this page.

Channels that only measure voltage do not need a conversion factor, and the entries can be left at 0. When a physical jumper is placed on channel 1, it is changed from a +/-100 Volt max range to a +/-2V max range to gain resolution for smaller voltages. The "Jumpered" drop-down must be set to "Yes" for a channel with a jumper so that it is scaled properly. Since a current shunt is designed for a typical voltage drop of 50mv at full scale, Channel 1 is configured with a physical jumper, the "Jumpered" dropdown is set to "Yes", and calibration factors are entered. Since 0 v will be equal to 0 Amps, we don't need to change the lower left calibration factors. We change the vertical maximum to 0.05 VDC (50mv) and the horizontal maximum to 100. We then type "Amps" as the user units.

By defining 2 points on the linear graph, we can calibrate any linear transducer, within the voltage measurement range of the DC-RMCU1. This will allow you to use a broad range of existing transducers to measure many different things like pressure, temperature, force, etc. Even 4-20ma transducers can be used by measuring the voltage across a resistor placed in series with the transducer. These transducers require that both the lower-left and upper right calibration points be configured on the graph.

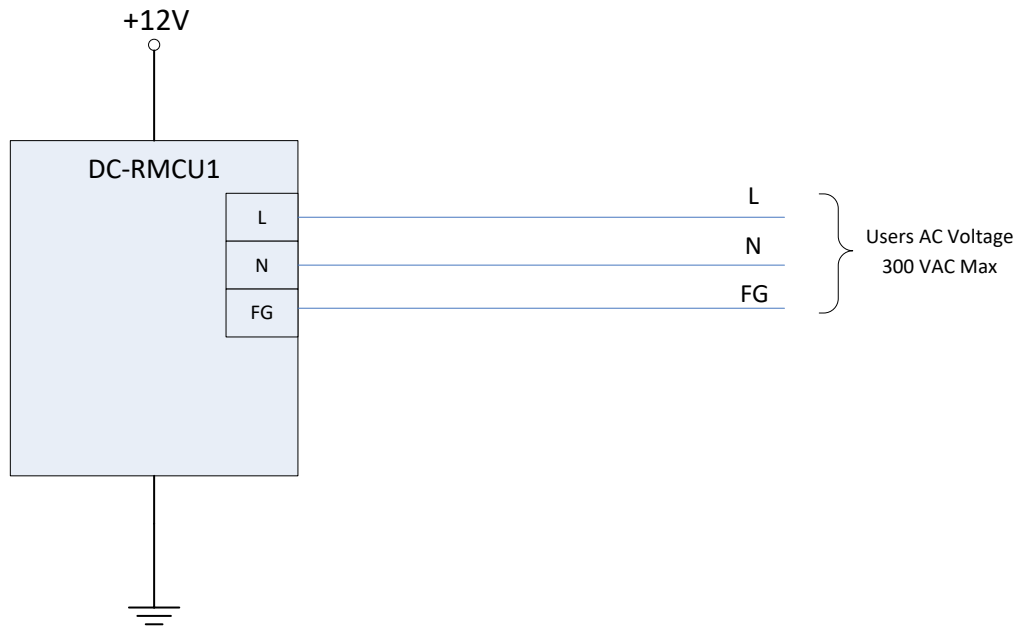# ANALOG AND DIGITAL WIRING

AC Line Voltage Measurement

+12V

DC-RMCU1

| L |
| N |
| FG |

L

N

FG

Users AC Voltage
300 VAC Max

Figure 4

Analog Channels: DC Voltage Measurement

+12V

- Inatall a jumper on the channel if you want 2 VDC Max Range. Otherwise it is +/- 100 V Max Range
- Each Analog input is isolated from ground

DC-RMCU1

Isolated Analog
Input #1

| V2+ |
| V2- |

Power Supply

Vout
Positive

Vout
Negative

Figure 5

May 25, 2017
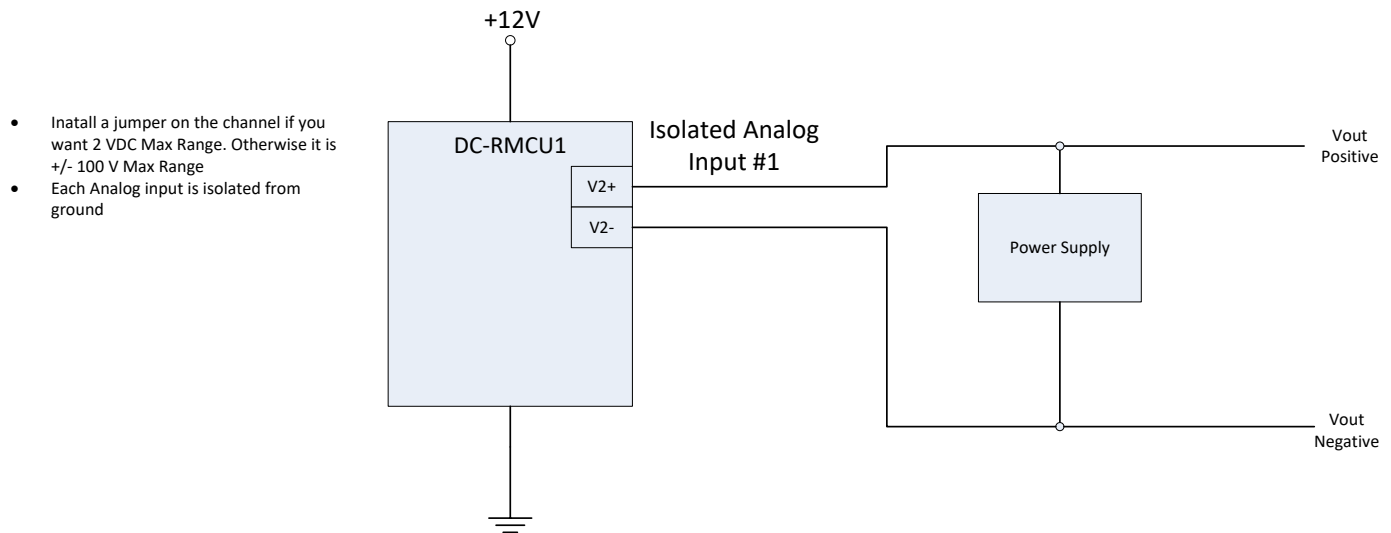
Analog Channels: DC Amperage Measurement

The DC-RMCU1 comes pre-configured from the factory to measure amperage on channel 1. A jumper is installed on the board in the channel 1 circuit to configure it to measure +/-2 V max instead of +/- 100 V max to measure the low voltage associated with the meter shunt. DC-RMCU1 Channel 1 is calibrated to use the 100 Amp / 50mV shunt supplied with the DC-RMCU1.

- Internal hardware configuration jumper comes installed on channel 1 (2 VDC Max Range) to measure Amperage.
- The DC-RMCU1 is factory configured to use the meter shunt supplied with the DC-RMCU1.

+12V

DC-RMCU1

Isolated Analog
Input #1

V1+

V1-

Power Supply

Vout
Positive

R1
(Meter Shunt)
50 mV @ 100
Amps

Vout
Negative
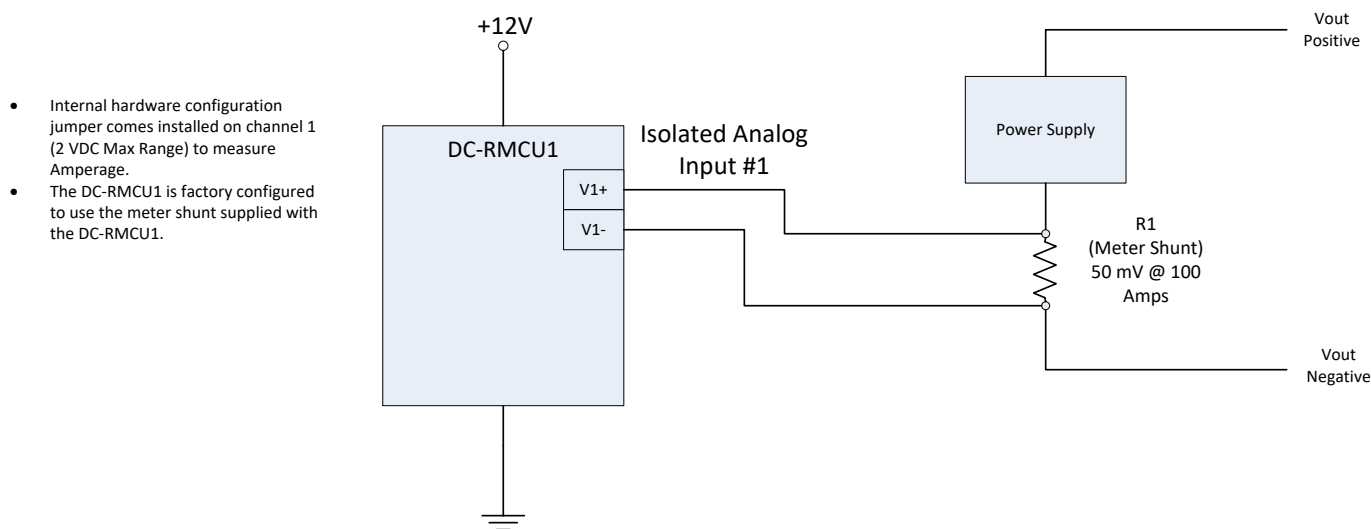
To measure lower amperage ranges, please contact DuraComm technical support.

Figure 6

Temperature Measurement
Connect the LM35 Temperature sensor to the DC-RMCU1 Temperature connector as shown.

+12V

DC-RMCU1

+5

Sens

G

Vs

Vout

GND

LM35
Temperature
Sensor
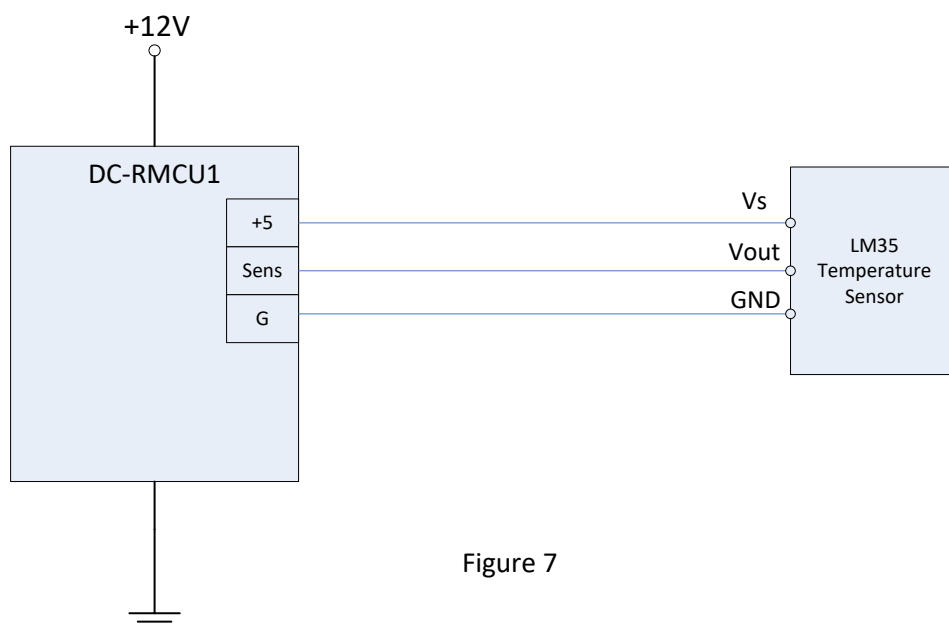
Figure 7

Sensor Setup – Digital Inputs (Alarms)

+12V

DC PWR +

+5

Dry Contact
Example

- NOTE: Digital ground is the same as the DC-RMCU1 Ground

220 Ohm
Each Chan

Opto-
Isolated
Digital
Input
Channel 1

DI-1

G

DC-RMCU1

DC PWR -

Add External Resistor if using higher voltage, to limit current to less than 50 ma

Figure 8

May 25, 2017
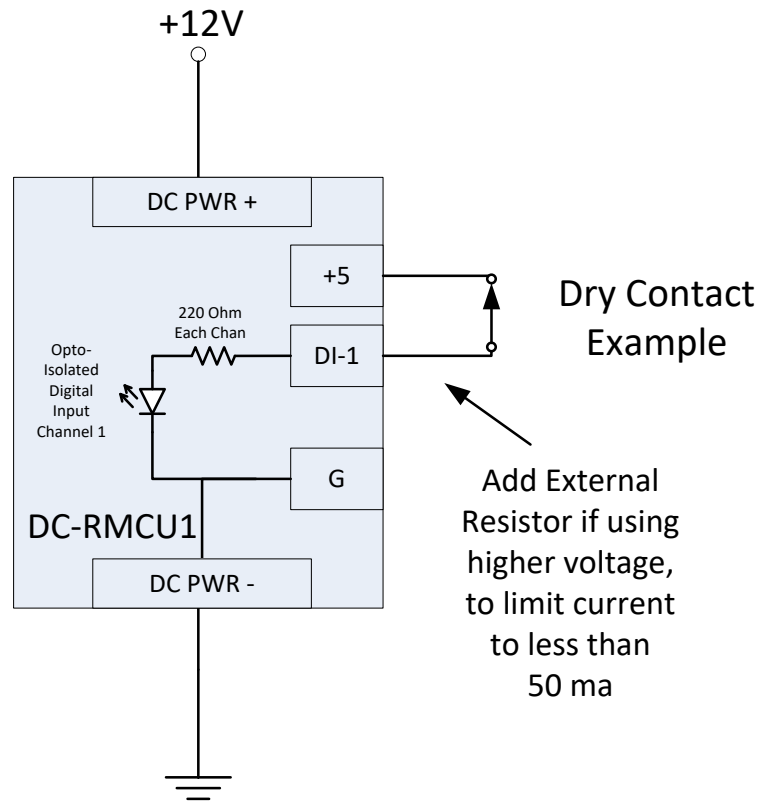
Sensor Setup – Digital Open-Drain Outputs

Digital outputs can be configured for the application. Here are a couple of examples. The color (green, red , or yellow) and left/right state of the control button can be set by the user, along with a custom label that makes sense to the user. "active" means that the MOSFET is conducting.

Configured output name for DO-1:
"FAN 1"

Logic:
Output Status "ON/LO" = Logic Low

+12V

12 VDC
Form "C"
Relay

DC-RMCU1

DO-1

115 VAC -Line

115 VAC
FAN

115 VAC -Neutral

MOSFET ON
Relay ON
FAN ON
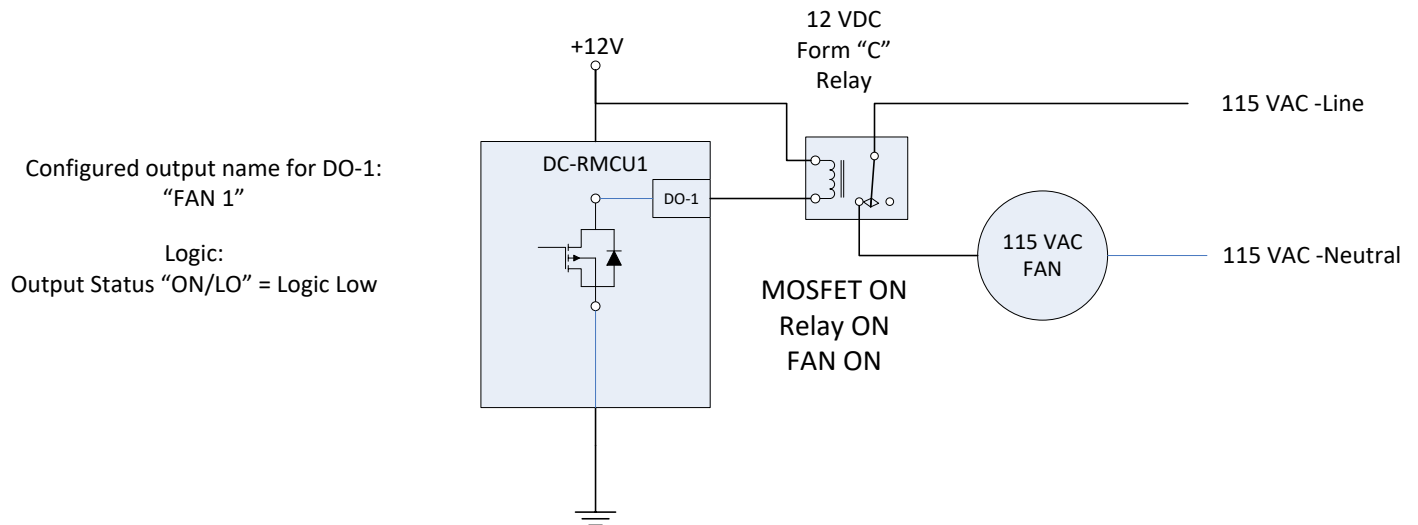
Figure 9: Normal Digital Output Configuration

Configured output name for DO-1:
"FAN 1"

Logic:
Output Status "ON/HI" = Logic HI

+12V

12 VDC
Form "C"
Relay

DC-RMCU1

DO-1

115 VAC -Line

115 VAC
FAN

115 VAC -Neutral

MOSFET OFF
Relay OFF
FAN ON
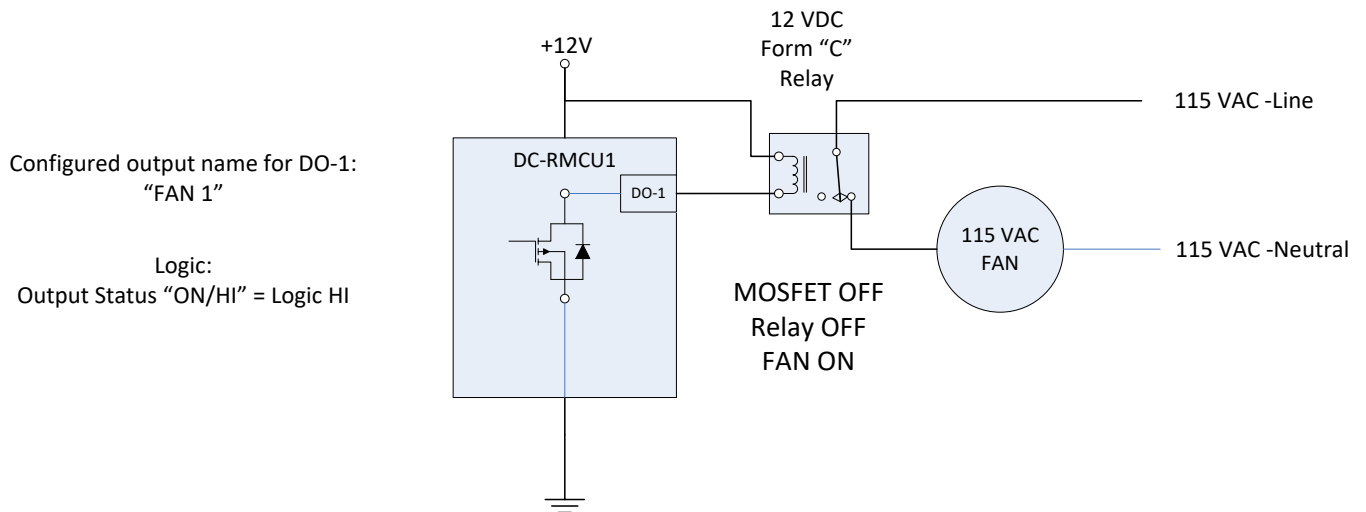
Figure 10: Reversed Logic Digital Output Configuration

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ALARM SETUP

RMCU - SITE CENTRI© - RMCU

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

Alarm Setup

Analogs	Amp Meter #1 ▾

Under alarm

Threshold: < `-10` Amps
Recovery: > `-1` Amps
Send e-mail: `No`
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Over alarm

Threshold: > `105` Amps
Recover: < `100`
Send e-mail: `No`
Alarm contacts: #1 ☐ #2 ☐ #3 ☐ #4 ☐

Alarm duration

Duration required: `0.5 seconds`

External Temperature

Under alarm

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

Over alarm

Threshold: > `120` F
Recovery: < `110` 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 contact #1 ▾

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

Digital Outputs

Output #1: `Never alarm` `Never e-mail`
Output #2: `Never alarm` `Never e-mail`
Output #3: `Never alarm` `Never e-mail`
Output #4: `Never alarm` `Never e-mail`

Global settings

Log all alarms: `No`

[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 "Ammeter #1" channel in the screen above. "Ammeter #1" is the name given to this channel in the Sensor Setup screen.

Note: The maximum temperature of the temperature sensor is +300 F. The low range of the sensor is about +36 F. The operating temperature range of the DC-RMCU1 is -22 F to + 140 F

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.

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	120	110	40	45
Ammeter #1	Amps	105	100	-10	-1
Voltmeter #1	Volts	100	95	-10	-1
Voltmeter #2	Volts	100	95	-10	-1
Voltmeter #3	Volts	100	95	-10	-1
Voltmeter #4	Volts	100	95	-10	-1
Voltmeter #5	Volts	100	95	-10	-1

Digital alarms for inputs and outputs as well as the email notifications for them are also configured in this screen. Digital input alarm conditions can be set to "Never alarm", "Alarm on close", Alarm on open", or "Alarm on open or close". 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.

Firmware 2.7 added the ability to send notifications for alarm recovery events.

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.

USER SETUP

RMCU - SITE CENTRI© - RMCU

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]

Miscellaneous

Calibration access: Admin User ▾

[Submit Values] [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 Notes

Password changes and DC-RMCU1 hard resets are perform by using this page. Care should be taken when changing any of these settings.

Admin users of the DC-RMCU1 with Revision 2.2 Firmware have access to a new calibration page. This page allows the user to calibrate a relationship between voltage measured and user units, such as Amperage. See the calibration page for more detail. The Admin user can also allow the Control user to perform this function by selecting Control User in the Calibration Access Dropdown list, and clicking Submit Values.

NOTE: To hard reset your device back to factory settings, press the red button on theDC-RMCU1PCB and hold it for more than 20 seconds. You will need to re-connect to theDC-RMCU1through your web browser by entering the factory supplied IP address and HTTP port (see Network Setup). Using the factory reset here or using the red button to reset will change the network settings back to the factory reset/default values shown in this manual on the network configuration page, even if your unit was custom set at the factory to a user IP address. If your unit was set to a custom IP address, it will be labeled underneath the product label on the side of the DC-RMCU1.

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. This example shows the factory settings. The temperature will show abnormally high readings if no LM35 temperature sensor is connected, because the input will float high.

MOBILE STATUS SCREEN

The following examples show a configured DC-RMCU1 that is reading various voltages and currents. Any unused channels (configured with a blank name) are hidden in the desktop browser view, and grayed out in the mobile browser view.

RMCU - RMCU		
Line Voltage: 118.714 VAC Temperature: 68.7 F		
Amp Meter #1 0.0 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 ON/LOW	Output #2 ON/LOW	
Output #3 ON/LOW	Output #4 ON/LOW	

RMCU MAINTENANCE

Battery

The battery on theDC-RMCU1is 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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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.

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DuraComm® Corporation

6655 Troost Avenue

Kansas City, MO 64131

Phone (816) 472-5544   Fax (816) 472-0959

www.duracomm.com