



La Marche Manufacturing Company

www.lamarchemfg.com

DCPS

DC Power System



Installation and Operation Manual

Important Safety Instructions

Before using this equipment, read all manuals and other documents related to this unit and other equipment connected to this unit. Always have a copy of the unit's manual on file nearby in a safe place; if a replacement copy of a manual is needed, it can be found at www.lamarchemfg.com.

Electrical Safety



WARNING: Hazardous Voltages are present at the input of power systems. The output from rectifiers and from batteries may be low in voltage, but can have a very high current capacity that may cause severe or even fatal injury.

When working with any live battery or power system, follow these precautions:

- Never work alone on any live power system, someone should always be close enough to come to your aid
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.



WARNING: Lethal Voltages are present within the power system. Parts inside the unit may still be energized even when the unit has been disconnected from the AC input power. Check with a meter before proceeding. Do not touch any uninsulated parts.

- A licensed electrician should be used in the installation of any unit.
- Always disconnect the unit from the supply, batteries, and loads before performing maintenance or cleaning.
- If the unit is hot-swappable, simply remove it from the shelf for any maintenance or cleaning.
- Always assume that an electrical connection is live and check the connection relative to ground.
- Be sure that neither liquids nor any wet material come in contact with any internal components.
- Do not operate this unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

Mechanical Safety

- This unit or parts of the unit may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this unit. Incorrect re-assembly may result in a risk of electric shock or fire.

Battery Safety



WARNING: Follow all of the battery manufacturer's safety recommendations when working with or around battery systems. DO NOT smoke or introduce a spark or open flame in the vicinity of a battery. Some batteries generate explosive gases during normal battery operation.

- To reduce risk of arc, connect and disconnect the battery only when the unit is off.
- If it is necessary to remove battery connections, always remove the grounded terminal from the battery first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber lined vest/apron when working near a battery.
- Have plenty of fresh water and soap nearby in case the battery electrolyte contacts skin, clothing, or eyes.
- If the battery electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop metal on a battery. A spark or short-circuit could occur and could cause an explosion.

Unit Location

- Allow at least 6 inches of free air on all vented surfaces for proper cooling
- Allow sufficient clearance to open the front panel for servicing.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.
- Do not set any battery on top of this unit.
- Never allow battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Never place this unit directly above a standard flooded battery. Gases from the battery will corrode and damage equipment.
- A sealed maintenance free or valve regulated lead acid (VRLA) battery may be placed below this equipment.

Check for Damages

Prior to unpacking the product, note any damage to the shipping container and take pictures. Unpack the product and inspect the exterior and interior of product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the unit sent back for evaluation and repair.



CAUTION: Failure to properly file a claim for shipping damages, or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

Inspection Checklist

- Enclosure exterior and interior is not marred or dented.
- There are no visible damage components.
- All internal components are secure.
- Printed circuit boards are firmly seated.
- All hardware and connections are tight.
- All wire terminations are secure.
- All items on packing list have been included.

Handling

Equipment can be very heavy with uneven distribution of weight. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

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1 Overview

1.1 Introduction

The La Marche DCPS system utilizes high efficiency rectifiers, a highly intelligent system controller, I/O interface board for alarms/ sensors, and a load/battery distribution panel. This complete DC system offers battery management with low voltage disconnect, remote monitoring, remote configuration and configurable alarm contacts.

The compact design of the system reduces space requirements and installation cost. The system is configured with 48V/50A high efficiency rectifiers to provide a rated output current up to 200A. The DC distribution section is comprised of 16 pluggable load breakers and 2 battery breakers.

1.2 Model Number Description

DCPS stands for DC Power System

1.3 Features

The DCPS has the following features:

- Wide voltage range of 85VAC to 300VAC
- Comprehensive battery management
- Network application over a fast Ethernet (FE) port and an RS485/RS232 port
- Communication such as the Simple Network Management Protocol (SNMP) and Hypertext Transfer Protocol Secure (HTTPS) to enable remote management and unattended working
- Remote software upgrade
- Liquid crystal display (LCD) for display and operations
- Web user interface (Web UI) for display and operations
- Display in multiple optional languages
- Hot-swappable DCR rectifiers and DCSC controller
- Rectifier power factor up to 0.99

1.4 Work Principles

AC power enters rectifiers through the AC inputs of the DCD distribution panel. The rectifiers convert the AC input into -48VDC output, which is directed by the DC distribution to DC loads along different routes.

When the AC power is normal, rectifiers power DC loads and charge batteries. When the AC power is absent, rectifiers stop working and batteries start to power loads. After the AC power resumes, rectifiers power DC loads and charge batteries again.

The DCSC controller monitors the operating status of each component in the power system in real time and performs appropriate intelligent control. When detecting a fault, the DCSC generates an alarm.

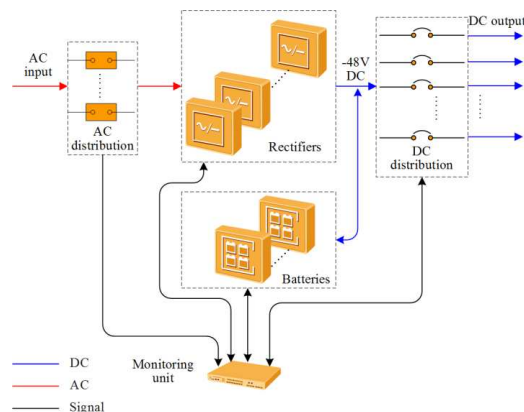


Figure 1 – Conceptual Diagram

1.5 Configurations

The subrack has 1U space for installing DCR rectifiers and 3U space for installing power distribution components (including 1U space for installing the DCSC controller).

2 Components

2.1 Appearance

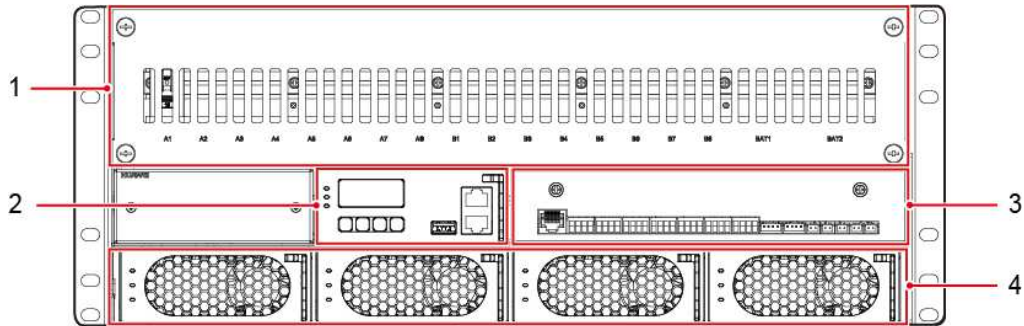


Figure 2 – DCPS Front View

- (1) DCD – DC Distribution Panel (2) DCSC – DC System Controller (3) DCU – DC User Interface Module
(4) DCR – DC Rectifiers

2.2 DCD – DC Distribution Panel

Figure 3 shows the DC section of the DC distribution panel (top view without the top cover) for the DCPS. Figure 4 shows the AC section of the DC distribution panel for the DCPS. Table 2 lists the power distribution specifications for the DCPS.

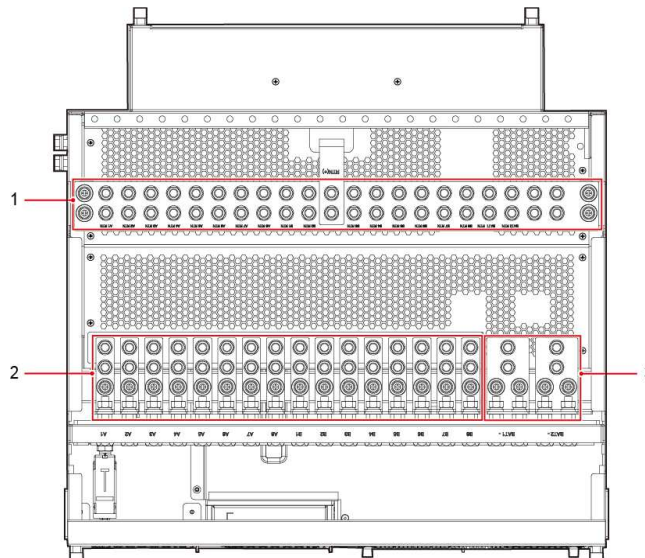


Figure 3 – DCPS Top View

- (1) RTN+ busbar (2) DC Output Terminals (3) Battery Terminals

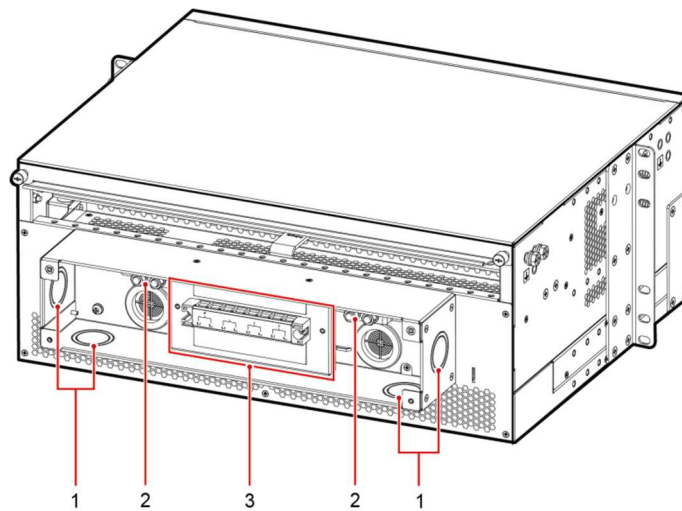


Figure 4 – DCPS Back View

(1) Cable Entry Holes

(2) AC Input Ground Terminals

(3) AC Input Terminals

Item	DCPS
Input System	110 VAC dual-live wire
AC Input	Four terminals (for one to four routes)
DC Output Circuit Breaker	16 BLVD circuit breakers (1A to 100A, depending on customer requirements) BLVD is short for Battery Low Voltage Disconnection.
DC Surge Protection	Differential Mode: 10 kA; Common Mode: 20 kA
Battery Circuit Breaker	Two circuit breakers (200A max, depending on customer requirements)

Table 1 – Power Distribution Specifications

2.3 DCR – Rectifier

Description

The DCR50 rectifier converts AC power to DC power and utilizes high performance features, such as high efficiency (>96%), high power density, walk-in start, complete protection and low noise. The output voltage of the rectifiers can be adjusted through the DCSC controller. The rectifier is hot swappable, providing easy installation and maintenance.

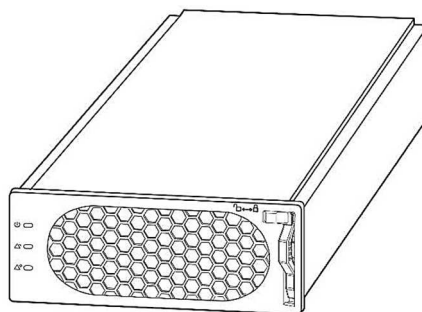


Figure 5 – DCR (Rectifier)

Panel

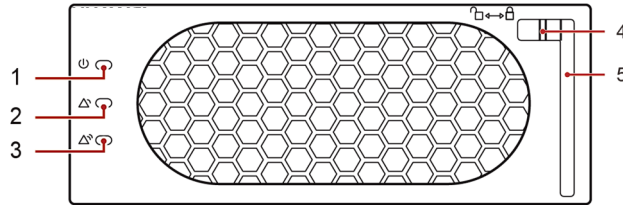


Figure 6 – DCR Panel

(1) Power Indicator
(4) Locking Latch

(2) Alarm Indicator
(5) Handle

(3) Fault Indicator

Indicators

Indicator	Color	Status	Description
Power Indicator	Green	Steady On	The rectifier has an AC power input.
		Off	The rectifier has no AC power input.
		Blinking at 0.5 Hz	The rectifier is being queried.
		Blinking at 4 Hz	The rectifier is loading an application program.
Alarm Indicator	Yellow	Off	No alarm is generated.
		Steady On	The rectifier generates an alarm for power limiting due to ambient overtemperature. The rectifier generates an alarm for shutdown due to ambient over-temperature or under-temperature.
			The rectifier protects against AC input overvoltage or under-voltage.
			The rectifier is hibernating.
	Blinking at 0.5 Hz	The communication between the rectifier and the DCSC is interrupted.	
Fault Indicator	Red	Off	The rectifier is running properly.
		Steady On	The rectifier locks out due to output overvoltage. The rectifier has no output due to an internal fault.

Table 2 – DCR Indicators

2.4 DCSC – System Controller

Description

The DC System Controller (DCSC) is an intelligent module that monitors and manages La Marche DC power systems. The controller provides the system with Battery Management, Energy Conservation, Rectifier Management, Intelligent Battery Hibernation Mode, Battery Testing, Battery Charging, and Current Limiting controls. System configuration settings and real-time parameters can be accessed either locally (through a two-line LCD display), or remotely (through a Web User Interface).

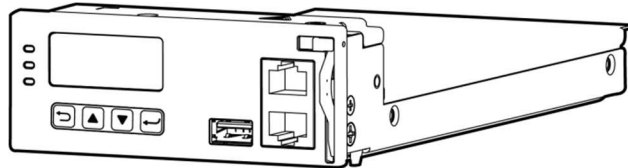


Figure 7 – DCSC (System Controller)

Panel

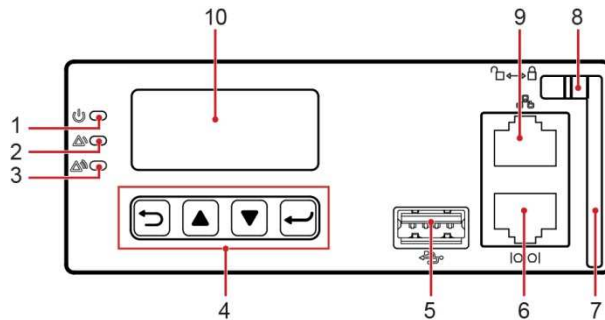


Figure 8 – DCSC Panel

- | | | | |
|-------------------------|---------------------------|---------------------------|-------------------|
| (1) Run Indicator | (2) Minor Alarm Indicator | (3) Major Alarm Indicator | (4) Buttons |
| (5) USB Port (Reserved) | (6) RS485/RS232 Port | (7) Handle | (8) Locking Latch |
| (9) FE Port | (10) LCD Screen | | |

Indicators

Name	Color	Status	Description
Run Indicator	Green	Off	The DCSC is faulty or has no DC input.
		Blinking at 0.5 Hz	The DCSC is running properly and communicating with the host properly.
		Blinking at 4 Hz	The DCSC is running properly but is not communicating with the host properly.
Minor Alarm Indicator	Yellow	Off	The DCSC does not generate any minor alarms.
		Steady On	The DCSC generates a minor alarm.
Major Alarm Indicator	Red	Off	No critical or major alarm is generated.
		Steady On	A critical or major alarm is generated.

Table 3 – DCSC Indicators

Buttons






Button	Name	Description
	Up	Scrolls up menus or sets parameter values.
	Down	Scrolls down menus or sets parameter values.
	Back	Returns to the previous menu without saving the settings.
	Enter	<ul style="list-style-type: none"> Enters the main menu from the standby screen. Enters a submenu from the main menu. Saves the menu settings.
 NOTE <ul style="list-style-type: none"> The LCD screen becomes dark if no button is pressed within 30 seconds. You need to log in again if no button is pressed within 1 minute. The preset password is 000001 (refer to section 5.6 for accessing the controller via internet browser) 		

Table 4 – DCSC Buttons

Communications Ports


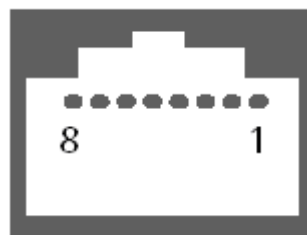
Communications Port	Communications Parameter	Communications Protocol
FE Port	10/100M Auto-Adaptation	HTTPS and SNMP
RS485/RS232 Port	Baud Rate: 9600 bit/s	Master/Slave Protocols
 NOTE All these ports are protected by a security mechanism.		

Table 5 – Communication Ports



RJ45 Female

Figure 9 – RS485/RS232 Port and FE Port Pinout

Pin	Signal	Description
1	TX+	Sends data over the FE.
2	TX-	
3	RX+	Receives data over the FE.
6	RX-	
4, 5, 7, and 8	Not defined	None

Table 6 – FE Port Pin Definitions

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Connects to the ground.
8	Not defined	None

Table 7 – RS485/RS232 Port Pin Definitions

2.5 DCU – User Interface Module

Description

Equipped with the I/O module (DCU), the controller supports configurable digital inputs, alarm dry-contacts and site sensor ports for environment management and alarms reporting. The DCU user interface module provides the ability to add multiple sensors for: ambient temperature, humidity, water, door status, smoke and battery temperature. The dry contact alarms are configurable and can be customized upon the DC system’s requirements. All alarms can be easily configured and monitored remotely through the WebUI (Web User Interface).

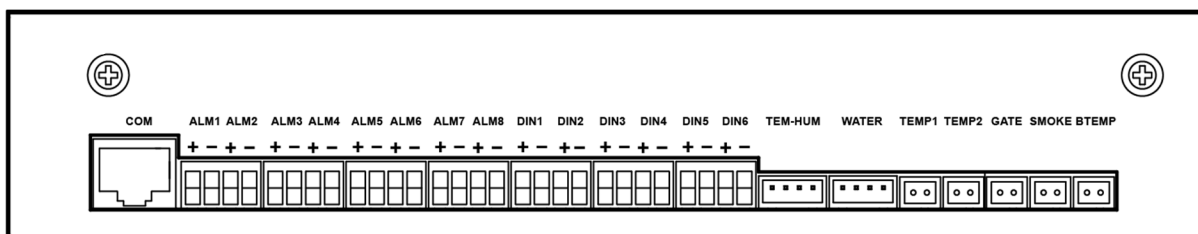


Figure 10 – DCU Panel

Ports




Port Type	Silk Screen	Description
Sensor Port	TEM-HUM	Temperature and Humidity Sensor
	WATER	Water Sensor
	TEMP1	Ambient Temperature Sensor 1
	TEMP2	Ambient Temperature Sensor 2
	GATE	Door Status Sensor
	SMOKE	Smoke Sensor  (Refer to Appendix E)
	BTEMP	Battery Temperature Sensor
Boolean Value Signal Port  NOTE For the associations between the Boolean value signal ports and alarms, see the appendix.	DIN1	Boolean Value Input 1
	DIN2	Boolean Value Input 2
	DIN3	Boolean Value Input 3
	DIN4	Boolean Value Input 4
	DIN5	Boolean Value Input 5
	DIN6	Boolean Value Input 6
Dry Contact  NOTE For the associations between the dry contacts and alarms, see the appendix.	ALM1	Dry Contact Output 1
	ALM2	Dry Contact Output 2
	ALM3	Dry Contact Output 3
	ALM4	Dry Contact Output 4
	ALM5	Dry Contact Output 5
	ALM6	Dry Contact Output 6
	ALM7	Dry Contact Output 7
	ALM8	Dry Contact Output 8
Communications Port	COM	RS485 Port

Table 8 – DCU Ports

Pins

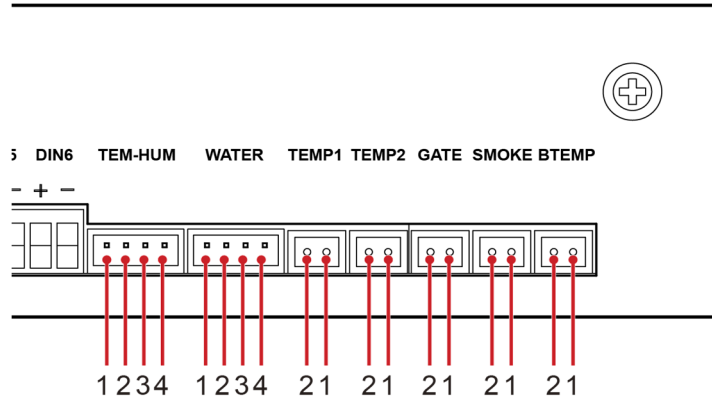


Figure 11 – DCU Pin Numbers

Silkscreen	No.	Pin Definition
TEM-HUM	1	12V
	2	ENV_TEMP
	3	12V
	4	ENV_HUM
WATER	1	12V
	2	WATER
	3	GND
	4	Not defined
TEMP1	1	TEMP1
	2	GND
TEMP2	1	TEMP2
	2	GND
GATE	1	DIN7+
	2	JTD7
SMOKE	1	12V
	2	SMOKE
BTEMP	1	BTEM1
	2	GND

Table 9 – Pin Definitions

3 Installation

3.1 Installation Preparations

3.1.1 Tools


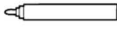










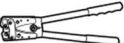


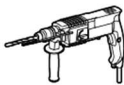

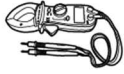







				
Paper knife	Marker	Rubber mallet	Phillips screwdriver	Flat-head screwdriver
				
Combination spanner	Adjustable spanner	Torque spanner	Socket spanner	Diagonal pliers
				
Wire clippers	Power cable cutter	Power cable crimping tool	Hydraulic pliers	Wire stripper
				
Hammer drill	Drill bit	Clamp meter	Heat gun	ESD wrist strap
				
Vacuum cleaner	Heat shrink tubing	ESD gloves	Protective gloves	Steel tape

Figure 12 – Installation Tools

3.1.2 Requirements for Cable Routing

- The bending semidiameter of power cables and ground cables should be greater than or equal to three times the diameter of the power cables and ground cables respectively.
- The bending semidiameter of signal cables should be greater than or equal to five times the diameter of the signal cables.
- Cables of the same type should be bound together. Cables of different types should keep a minimum distance of 30 mm from each other to avoid tangles.
- Cables that are bound together should be close to each other, neat, and free of damage.
- The protection ground cables must not be bound to or tangled with the signal cables. An appropriate distance should be left between them to minimize interruption.
- AC power cables, DC power cables, signal cables, and communications cables must be bound separately.
- Power cables must be routed straightly. No joint or weld can be found in a power cable. In case of insufficient cable length, use a longer cable.

3.1.3 Unpacking and Acceptance

Procedure

- Step 1** Unpack the subrack.
- Step 2** Check the total quantity of equipment against the packing list attached to each packing case. If the total quantity is inconsistent with the packing list, identify the cause and contact the La Marche office.
- Step 3** Check whether the packing case is intact. If no, identify the cause and contact the La Marche office.

3.2 Installing the Subrack

Rack Type	U-Shaped Slot Inward	U-Shaped Slot Outward
19-inch rack	Normal installation (three mounting holes)	Reverse installation (three mounting holes)
23-inch rack	Normal installation (three mounting holes)	Normal installation (three mounting holes)

Table 10 – Rules For Installing Mounting Brackets

3.2.1 Installing the Subrack into a 19-Inch Rack

Procedure

- Step 1** Install mounting brackets onto the subrack.

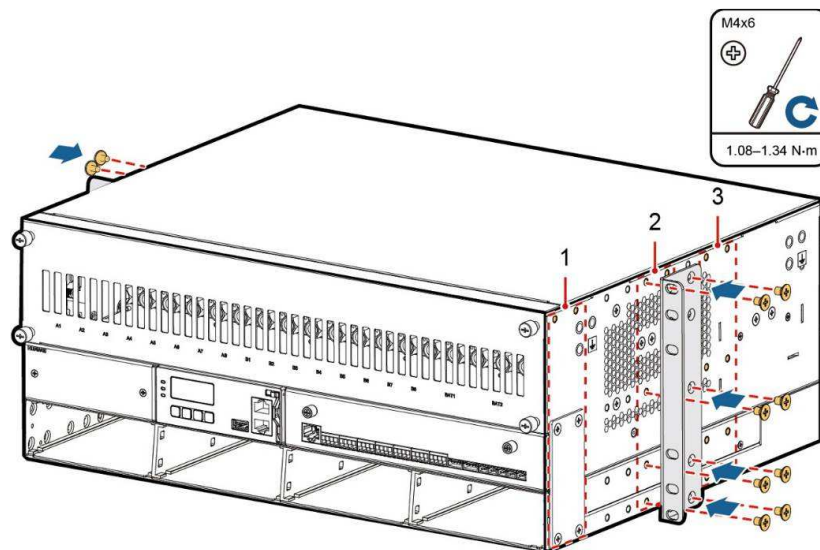


Figure 13 – Installing Mounting Brackets (Normal Installation)

(1) Mounting Hole 1
(Reserved)

(2) Mounting Hole 2
(Reserved, default)

(3) Mounting Hole 3
(Reserved)

- Step 2** Install the subrack into a 19-inch rack.

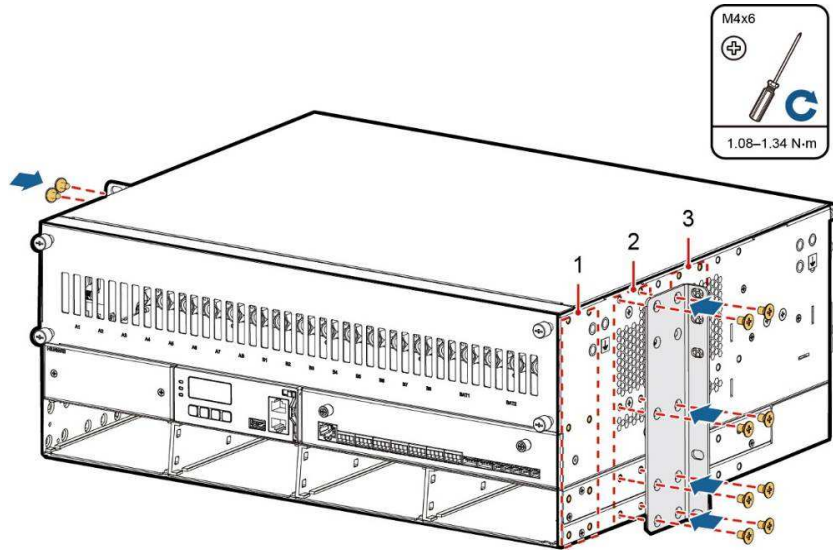


Figure 14 – Installing Mounting Brackets (Reverse Installation)

(1) Mounting Hole 1
(Reserved)

(2) Mounting Hole 2
(Reserved, default)

(3) Mounting Hole 3
(Reserved)

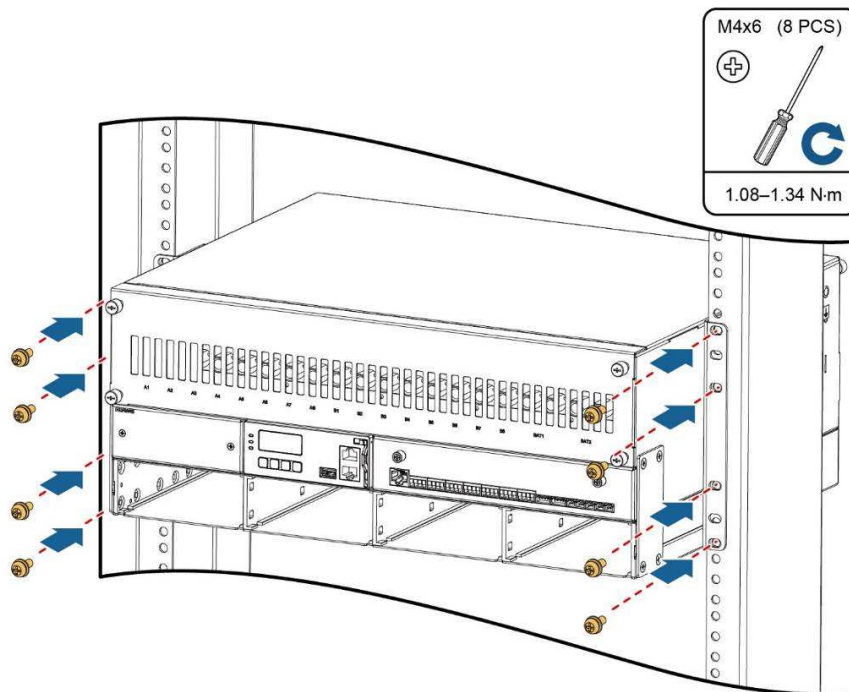


Figure 15 – Installing the Subrack

3.2.2 Installing Subrack into a 23-Inch Rack

For details about how to install the subrack into a 23-inch rack, see section 3.2.1.

3.3 Installing Components

3.3.1 Installing Rectifier

Prerequisites

- Rectifiers are found intact after unpacking and check. In case of any discrepancy, contact the La Marche office.
- The filler panels on the slot for installing the rectifiers have been removed from the cabinet.

Procedure

- Step 1** Push the locking latch towards the left.
- Step 2** Draw the handle downwards.
- Step 3** Gently push a rectifier into its slot along the guide rail.
- Step 4** Push the handle upwards.
- Step 5** Push the locking latch towards the right to secure the handle.

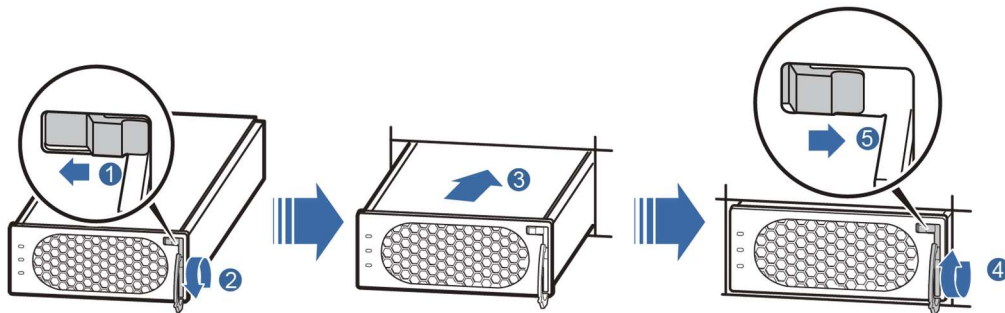


Figure 16 – Installing a Rectifier

3.3.2 Installing Circuit Breaker

Procedure

- Step 1** Remove the front panel from the DCPS, as shown in Figure 17

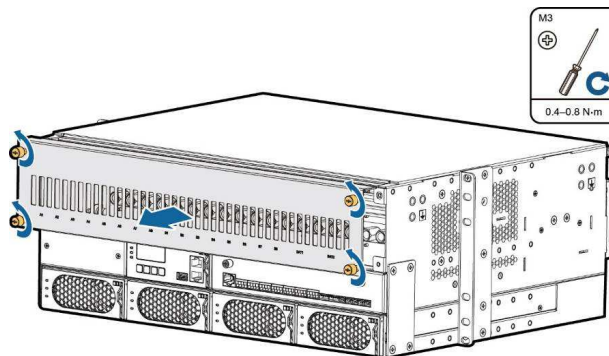


Figure 17 – Removing the Front Panel from the DCPS

- Step 2** Remove the top cover from the DCPS.
1. Loosen the captive screws on the top cover by using a Philips screw driver.
 2. Pull the top cover forward to the locking position.

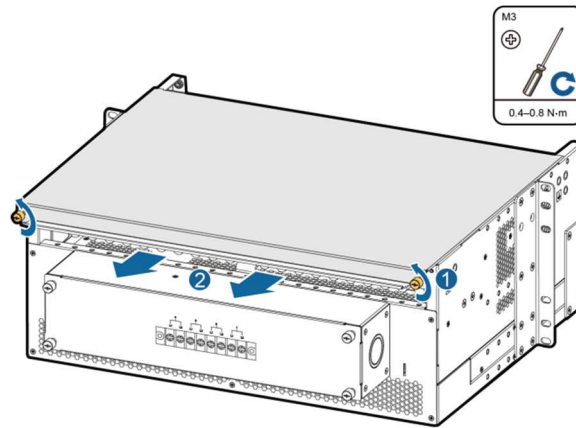


Figure 18 – Removing the Top Cover

Step 3 Lift the top cover and take it out.

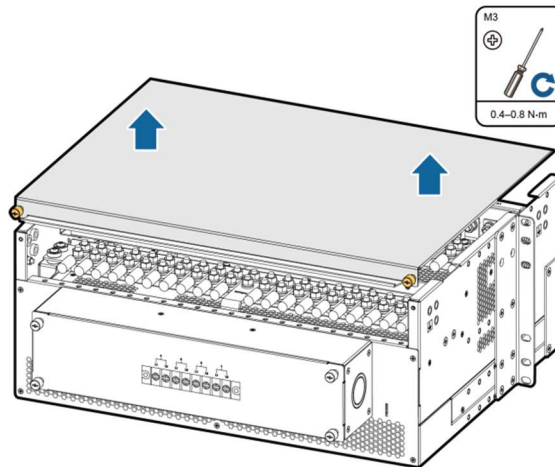


Figure 19 – Removing the Top Cover



CAUTION: When you remove the top cover, hold the top cover by hands to prevent it from falling into the subrack.

Step 4 Switch off the circuit breaker.

Step 5 Insert the circuit breaker into the mounting holes and push the circuit breaker forward until it is in position, as shown in Figure 20.

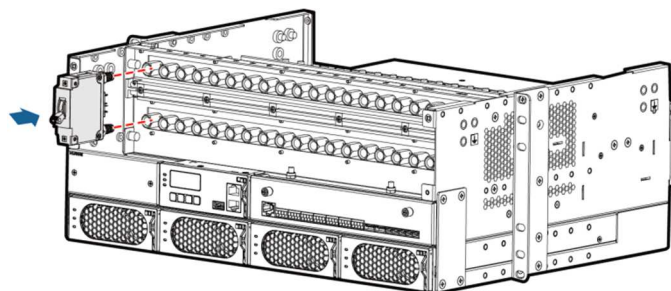


Figure 20 – Removing the Top Cover

Step 6 Reinstall the front panel for the DCPS.

3.4 Installing a Ground Cable

Install a subrack ground cable into the rack by using M6x16 screws. Figure 21 shows the subrack ground terminals.

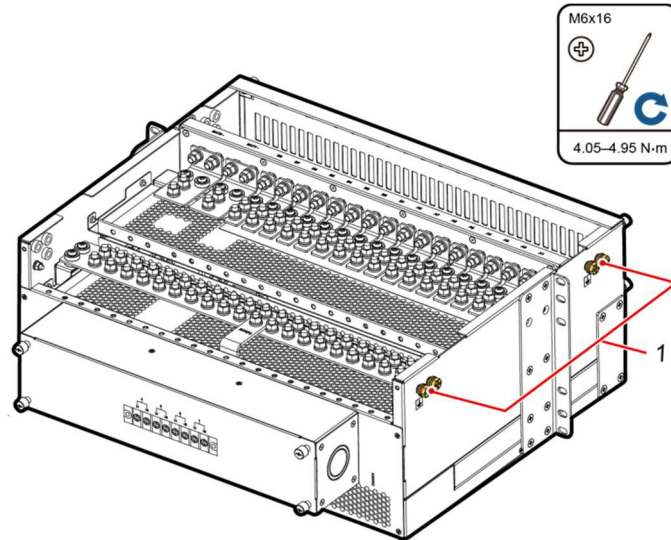


Figure 21 – Subrack Ground Terminals

(1) Subrack Ground Terminals

3.5 (Optional) Installing Dry Contact Signal Cables

Procedure

- Step 1** Press the contact plate using a flat-head screwdriver to flip the metal spring inside each dry contact.
- Step 2** Connect the signal cables to the corresponding dry contacts.
- Step 3** Put away the flat-head screwdriver and check that the signal cables are securely connected.

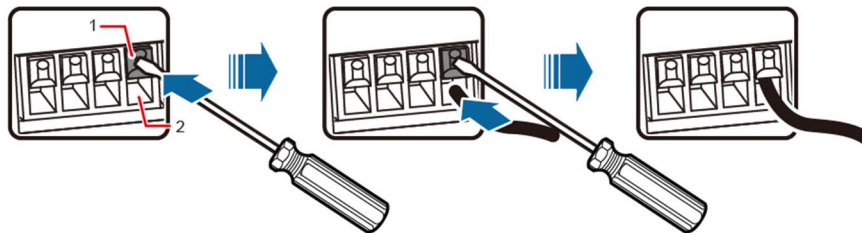


Figure 22 – Installing a Dry Contact Signal Cable

(1) Contact Plate

(2) Dry Contact

3.6 Installing Communication Cables

- If the power system connects to power and environmental monitoring equipment, connect the communications cables to the RS485/RS232 port on the DCSC.
- If the power system requires remote management over the WebUI or a third-party SNMP device, connect the communications cables to the FE port.

3.7 Installing DC Output Power Cables

Prerequisites



DANGER:

Switch off all circuit breakers before installing power cables.

Procedure

- Step 1** Route DC output power cables through a cable hole on the rear of the subrack.
- Step 2** Connect the negative DC output power cable to the corresponding DC output terminal based on the actual load power.
- Step 3** Connect the positive DC output power cable to the corresponding screw on the RTN+ busbar.

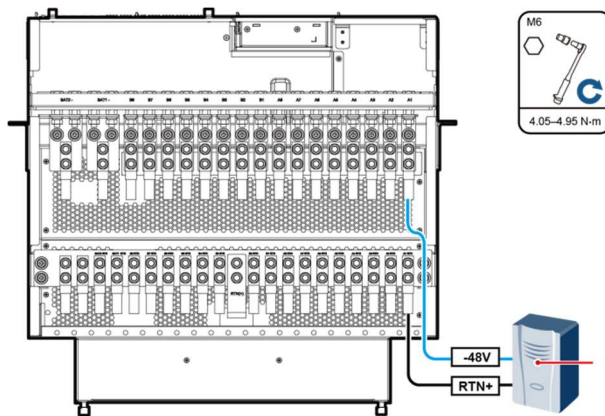


Figure 23 – Installing DC Power Output Cables

(1) Load

3.8 Installing Battery Cables

Prerequisites



CAUTION:

Switch off all circuit breakers before installing power cables.

Procedure

- Step 1** Route battery cables from a cable hole on the rear of the subrack.
- Step 2** Connect the negative battery cable to the battery wiring terminal.
- Step 3** Connect the positive battery cable to the RTN+ busbar.

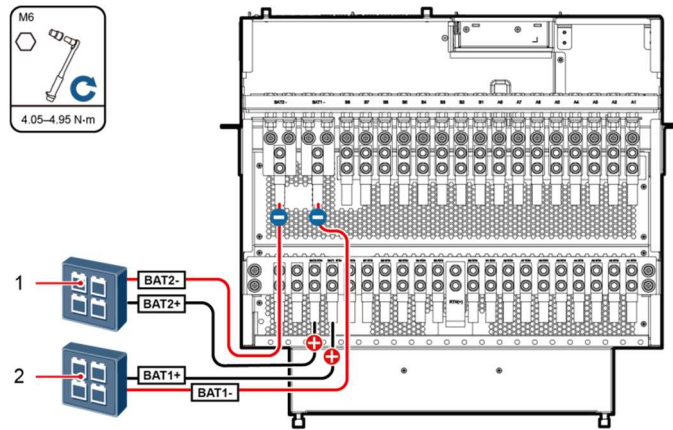


Figure 24 – Installing Battery Cables

(1) Battery String 2

(2) Battery String 1

Step 4 Reinstall the top cover for the subrack.

3.9 Reinstalling AC Dual-Live Wire Input Power Cables

Prerequisites



CAUTION:

The upper-level circuitry breaker required for the DCPS must have a capacity greater than the maximum input current of the DCPS and must be switched off.

3.9.1 Installing AC Input Ground Cable

Step 1 Remove the rear cover from the DCPS, as shown in Figure 25.

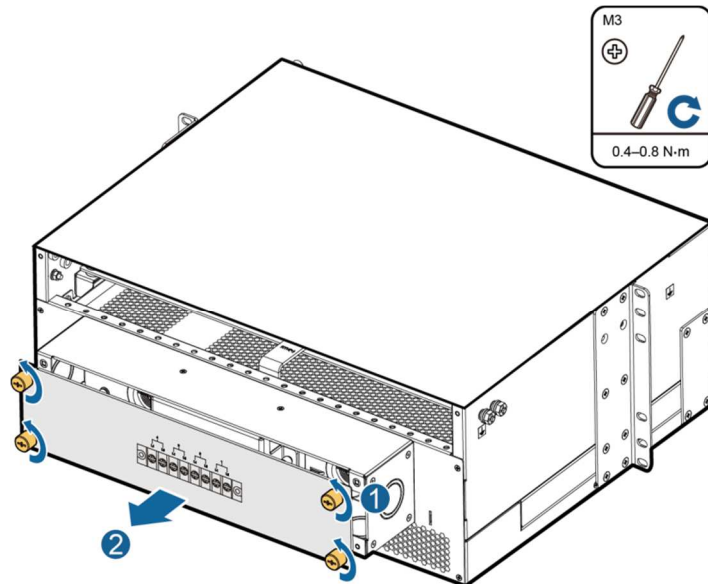


Figure 25 – Removing the Rear Cover from the DCPS

Step 2 Remove the AC input protective cover, as shown in Figure 26.

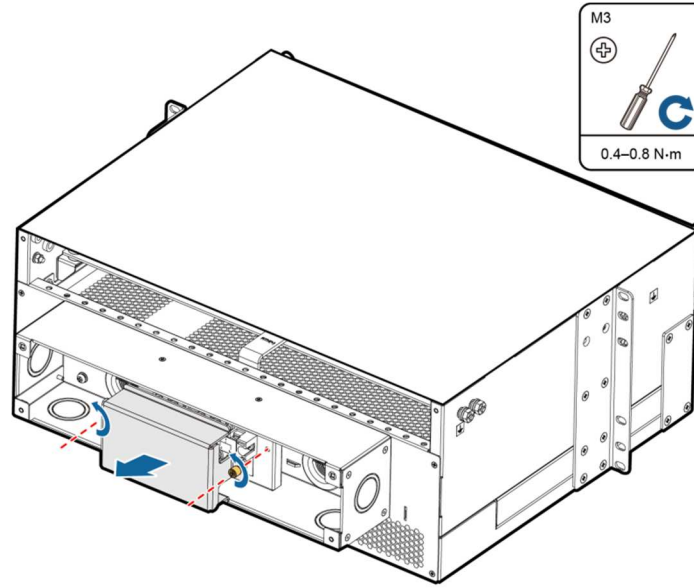


Figure 26 – Removing the AC Protective Cover

Step 3 Route the AC input ground cable through an appropriate cable hole on the rear of the subrack.

Step 4 Secure the AC input ground cable to the corresponding AC input ground terminal by using M6X16 bolts, spring washers, and flat washers. Figure 27 shows an AC input ground terminal

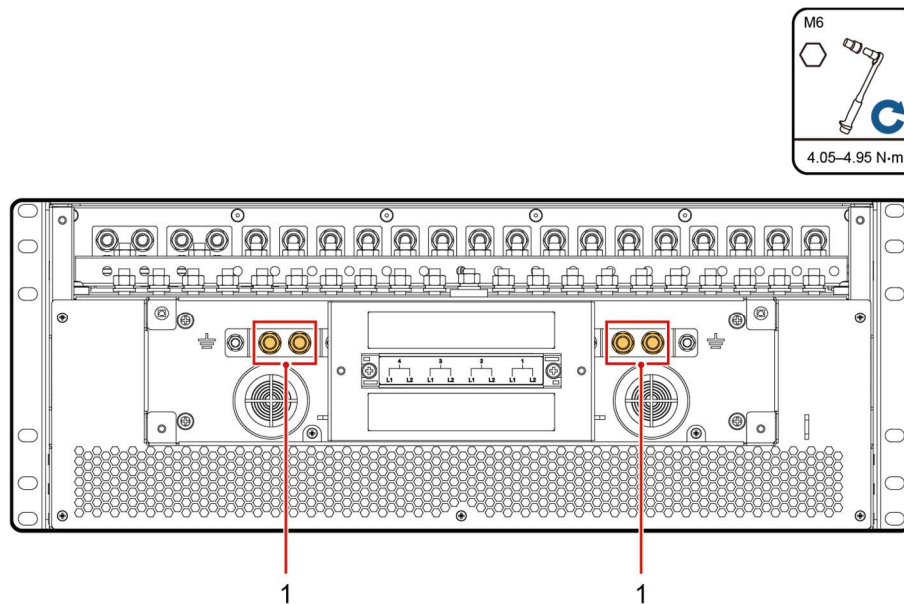


Figure 27 – AC Input Ground Terminals (Straight Rear View)

(1) AC Input Ground Terminals

3.9.2 Installing AC Input Power Cable

The DCPS supports one to four AC dual-live wire inputs.

(Optional) Installing Power Cables for Four AC Dual-Live Wire Inputs

- Step 1 Route AC input cables through an appropriate cable hole on the rear of the subrack.
- Step 2 Secure the AC input cables to the AC input wiring terminals, as shown in Figure 28

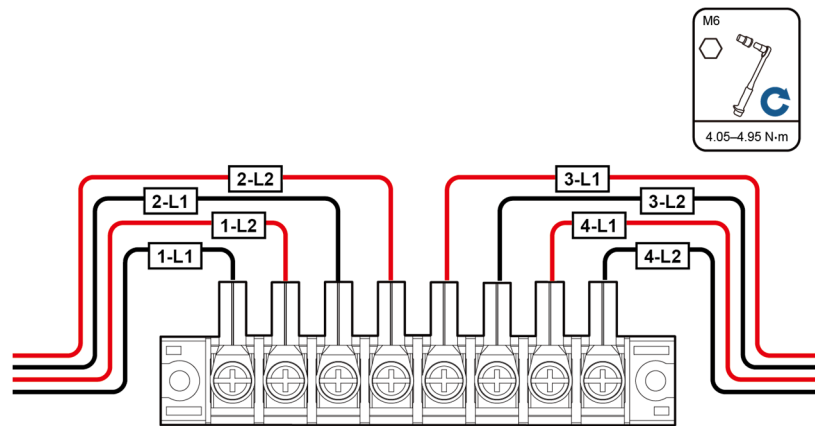


Figure 28 – Installing Power Cables for four AC dual-live Wire Inputs

- Step 3 Reinstall the AC input protective cover.
- Step 4 Reinstall the rear cover for the DCPS.

(Optional) Installing Power Cables for Three AC Dual-Live Wire Inputs

- Step 1 Install short-circuit copper bars. Connect AC input terminals 3-L1 and 4-L1 by using short-circuit copper bar 1. Connect AC input terminals 3-L2 and 4-L2 by using short-circuit copper bar 2. Then secure the copper bars by using screws.
- Step 2 Route AC input power cables through an appropriate cable hole on the rear of the subrack.
- Step 3 Secure the AC input OT terminals to the corresponding short-circuit copper bars and AC input wiring terminals, as shown in Figure 29.

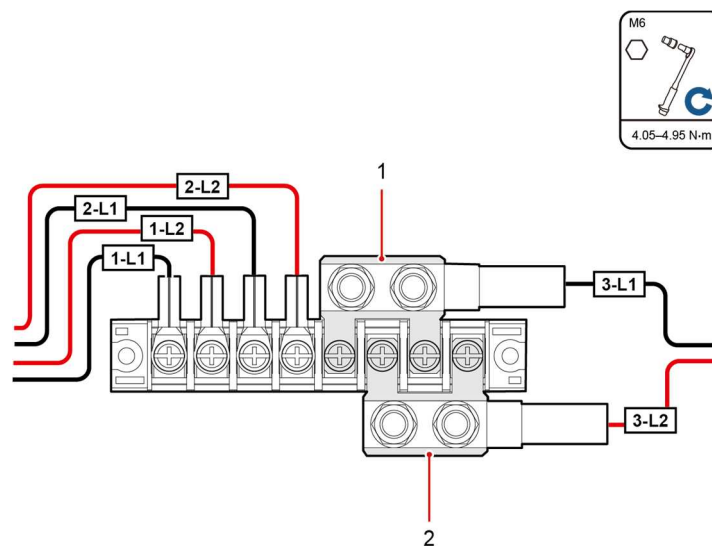


Figure 29 – Installing Power Cables for three AC dual-live Wire Inputs

(1) Short-Circuit Copper Bar 1

(2) Short-Circuit Copper Bar 2

Step 4 Reinstall the AC input protective cover.

Step 5 Reinstall the rear cover for the DCPS.

(Optional) Installing Power Cables for Two AC Dual-Live Wire Inputs

Step 1 Install short-circuit copper bars. Connect AC input terminals 1-L1 and 2-L1 by using short-circuit copper bar 1. Connect 1-L2 and 2-L2 by using short-circuit copper bar 2. Connect 3-L1 and 4-L1 by using short-circuit copper bar 3. Connect 3-L2 and 4-L2 by using short-circuit copper bar 4. Then secure the four copper bars by using screws.

Step 2 Route AC input power cables through an appropriate cable hole on the rear of the subrack.

Step 3 Secure the AC input OT terminals to the corresponding short-circuit copper bars, as shown in Figure 30.

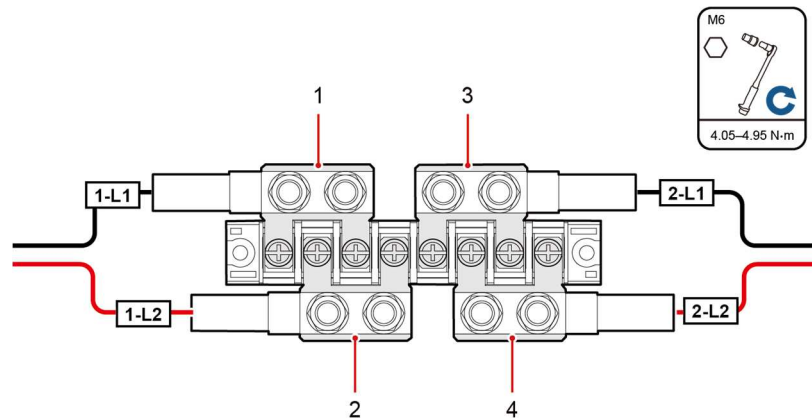


Figure 30 – Installing Power Cables for two AC dual-live Wire Inputs

- (1) Short-Circuit Copper Bar 1 (2) Short-Circuit Copper Bar 2 (3) Short-Circuit Copper Bar 3
(4) Short-Circuit Copper Bar 4

Step 4 Reinstall the AC input protective cover.

Step 5 Reinstall the rear cover for the DCPS.

(Optional) Installing Power Cables for One AC Dual-Live Wire Input

Step 1 Install short-circuit copper bars. Connect AC input terminals 1-L1, 2-L1, 3-L1, and 4-L1 by using short-circuit copper bar 1. Connect AC input terminals 1-L2, 2-L2, 3-L2, and 4-L2 by using short-circuit copper bar 2. Then, secure the copper bars by using screws.

Step 2 Route AC input cables through an appropriate cable hole on the rear of the subrack.

Step 3 Secure the AC input OT terminals to the corresponding short-circuit copper bars, as shown in Figure 31.

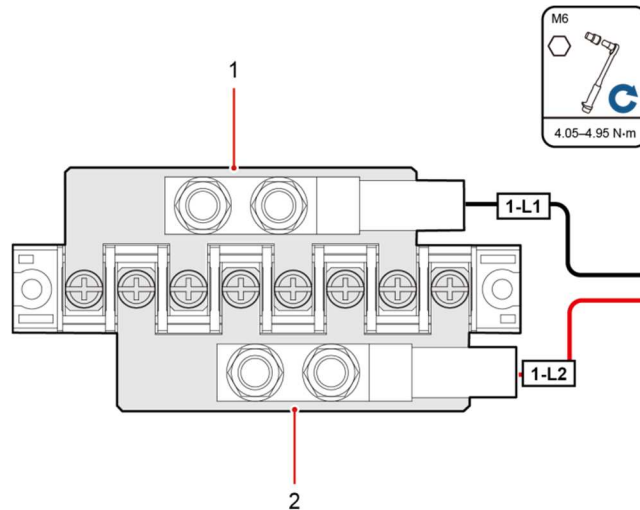


Figure 31 – Installing Power Cables for one AC dual-live Wire Inputs

(1) Short-Circuit Copper Bar 1

(2) Short-Circuit Copper Bar 2

Step 4 Reinstall the AC input protective cover.

Step 5 Reinstall the rear cover for the DCPS.

4 Verifying the Installation

4.1 Checking Hardware Installation

- Check that all screws, especially those used for electrical connections, are secured. Check that flat washers and spring washers are installed properly.
- Check that rectifiers are completely inserted into their respective slots and properly locked.

4.2 Checking Electrical Connections

- Check that all circuit breakers are switched off.
- Check that flat washers and spring washers are securely installed for all the OT terminals and that all the OT terminals are intact and properly connected.
- Check that batteries are correctly installed and that battery cables are correctly connected without being short circuited.
- Check that input and output power cables and ground cables are correctly connected without being short circuited.

4.3 Checking Cable Installation

- Check that all cables are securely connected.
- Check that all cables are arranged neatly and bound properly to their nearest cable ties without being distorted or excessively bent.
- Check that cable labels are properly and securely attached in the same direction.

5 Commissioning

5.1 Connecting the AC Power Supply

Procedure

- Step 1** Measure the input voltage on the AC input circuit breaker. The value should range from 85VAC to 300VAC.
- Step 2** Switch on the AC input circuit breaker and measure the output voltage on the AC input circuit breaker. The value should range from 85VAC to 300VAC.
- Step 3** Check that the indicators on the rectifiers are steady on.
- Step 4** Measure the voltage between the -48V busbar and the RTN+ busbar. The value should range from 42VDC to 58VDC.

5.2 Setting the Display Language

After powering on the DCSC, select English by pressing  or  on the LCD, and then press  to enter the standby screen.

5.3 Setting the Date and Time

Set the date and time as required.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Setting Wizard	Date and Time	Data and Time	No default value	Set to the local date and time.
		Time Zone	UTC -6:00 Central Standard Time	Set to the local time zone.

Table 11 – Setting the Date and Time

5.4 Setting Battery Parameters

Set battery string quantity, battery rated capacity, and battery installation time as required.

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting Value
Parameters Settings	Battery	Basic Parameters	Battery1 Connected	Yes	Yes/No Note: If one battery string is connected, set to Yes . If no battery string is connected, set to No .
			Battery2 Connected	Yes	Yes/No Note: If two battery strings are connected, set to Yes . If only one battery string is connected, set to No .
			Rated	150 Ah	Capacity of one battery string

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting Value
			Capacity		
		Other Parameters	Installation Time	2010-01-01	Set to the current date

Table 12 – Setting Battery Parameters

5.5 (Optional) Setting the Hibernation Parameter



CAUTION:

Before hibernating rectifiers, ensure that the upper-level circuit breaker can endure a current greater than the maximum input of the power system.

Set **Hibernation enable** to **Enable** if you need to use the intelligent hibernation function of the rectifiers.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Parameters Settings	Energy Saving	Hibernation Enable	No	No/Yes

Table 13 – Setting the Hibernation Parameter

5.6 Setting Communication Parameters

5.6.1 Setting Parameters before Using the SNMP Management

Procedure

Step 1 Apply to the site or equipment room network administrator for a fixed IP address.

Step 2 Set the IP address, subnet mask, and gateway on the LCD of the DCSC, as described in the table below.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Setting Wizard	Network Parameters	IP Address	192.168.0.10	Set this parameter based on the address assigned by the network administrator.
		Subnet Mask	255.255.255.0	Set this parameter based on the address assigned by the network administrator.
		Default Gateway	192.168.0.1	Set this parameter based on the address assigned by the network administrator.

Table 14 – IP Parameters

Step 3 Connect the network port on your laptop to the FE port on the DCSC by using a network cable.



CAUTION:

There is only one FE port on the DCSC. Before performing step 3, disconnect the original cable from the FE port and then reconnect it after performing the following steps.

Step 4 Set the laptop IP address in the same network segment as the DCSC IP address preset in step 2.

For example, if the DCSC has an IP address of 192.168.0.10 and a subnet mask of 255.255.255.0, set the IP address to **192.168.0.11** and subnet mask to **255.255.255.0** on the laptop.

Step 5 Enter "https://", followed by the DCSC IP address in the address box on the laptop. Log in to the Web UI on the login page shown in Figure 32



NOTE

The preset user name is **admin** and the preset password is **Changeme**.

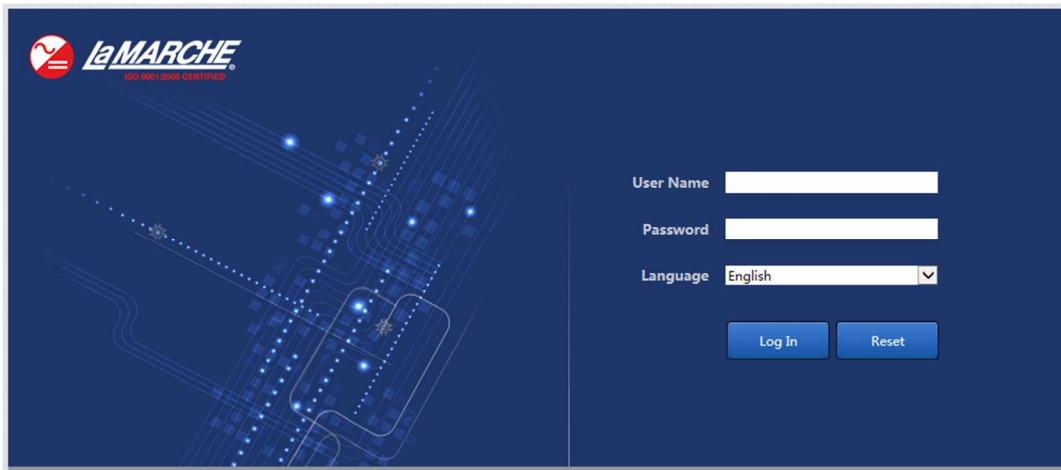


Figure 32 – Login Page

Step 6 On the **System Settings** tab page, select **SNMP**.

1. If the SNMP version is **SNMPv1** or **SNMPv2c**, set **SNMP Port Number**, **Read Community Name**, and **Write Community Name** as shown in Figure 33.

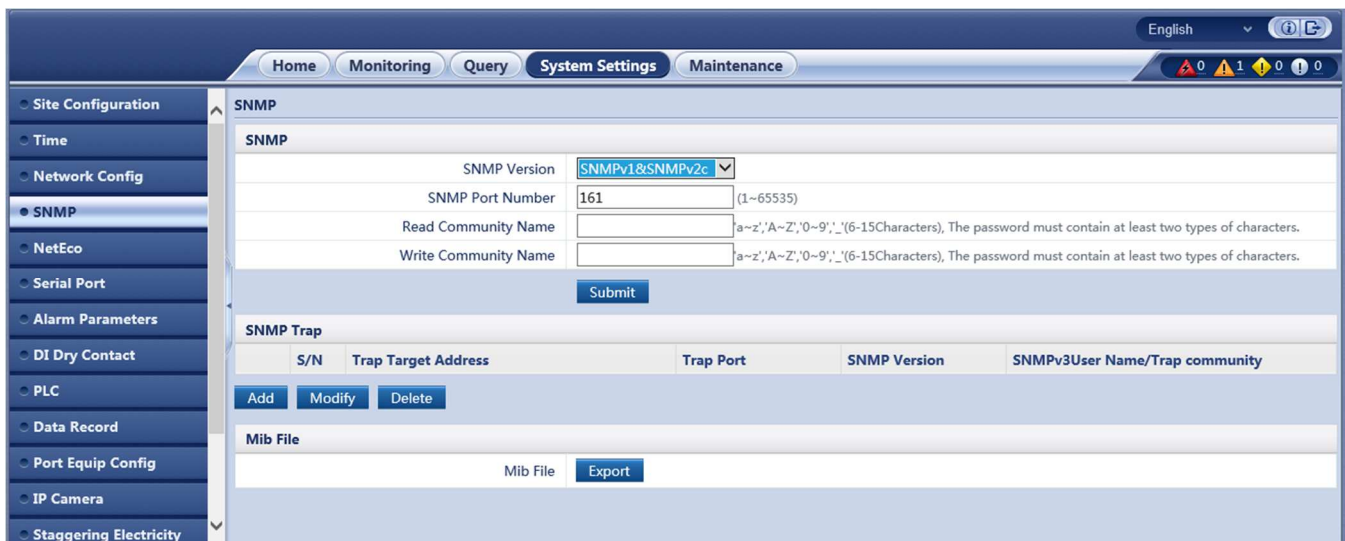


Figure 33 – Setting SNMPv1 and SNMPv2c Parameters

2. If the SNMP version is **SNMPv3**, set **User Name**, **MD5 Password**, and **DES Password**, as shown in Figure 34.

The screenshot shows the 'System Settings' page for SNMP configuration. The left sidebar contains a navigation menu with options like Site Configuration, Time, Network Config, SNMP, NetEco, Serial Port, Alarm Parameters, DI Dry Contact, PLC, Data Record, Port Equip Config, IP Camera, Staggering Electricity, and Scene Config. The main content area is titled 'SNMP' and includes the following sections:

- SNMP**: Fields for 'SNMP Version' (set to 'SNMPv3') and 'SNMP Port Number' (set to '161', with a range of 1-65535). A 'Submit' button is below.
- SNMPv3**: A table with columns 'S/N', 'User Name', 'Authentication Protocol', and 'Proprietary Protocol'. Below the table are 'Add', 'Modify', and 'Delete' buttons.
- SNMP Trap**: A table with columns 'S/N', 'Trap Target Address', 'Trap Port', 'SNMP Version', and 'SNMPv3User Name/Trap community'. Below the table are 'Add', 'Modify', and 'Delete' buttons.
- Mib File**: A field for 'Mib File' and an 'Export' button.

Figure 34 – Setting SNMPv3 Parameters

Step 7 Set the Trap Target Address and Trap Port.

Step 8 Export the MIB file and import it to the EMS.

5.7 Connecting the Battery Supply

Prerequisites



CAUTION:

To avoid damage to batteries, switch on the battery circuit breaker only after you correctly set the battery parameters.

Procedure

- Step 1** Switch off the upper-level circuit breaker.
- Step 2** Switch on the battery circuit breaker.
- Step 3** Switch on the upper-level circuit breaker.
- Step 4** Switch all the circuit breakers to appropriate status based on site requirements.
- Step 5** Observe the DCPS for 15 minutes. If no alarm is generated on the LCD of the DCSC during this period of time, the voltages and currents for batteries and loads are normal.

6 Maintenance

6.1 Performing Routine Maintenance

In order for the DCPS to continue to operate properly, it must undergo routine maintenance. The recommended maintenance schedule is listed below.

Yearly

1. Confirm air vents are open. Remove dust and debris from interior of charger.
2. Verify all connections are tight.
3. Perform a visual inspection on all external components.
4. Check front panel meters for accuracy and LED operation

6.2 Troubleshooting Procedure

Troubleshooting should be performed only by trained service personnel or experienced electricians. Before setting up any complicated testing or jumping to any conclusions, give the unit a general inspection.

Check the following:

1. Check DC output cables, connections, battery type, and number of cells against the unit's rating.
2. Check unit specifications against customer order.
3. Check input connections, input voltage and breaker size.
4. Check for shipping damage, loose connections, broken wires, etc.
5. Certain failures can be caused by defective batteries and customer loads; make sure batteries and loads are free from defects.

NOTE: *If the problem is found to be located in the printed circuit boards, the board should be replaced. No attempt should be made to repair circuit boards in the field.*

When calling in for a service inquiry or for troubleshooting assistance, be sure to have all of the following information on hand:

1. Equipment model number and serial number.
2. The measured AC input voltage.
3. The measured DC output voltage with and without the battery.
4. Result of the check of the AC and DC breakers.
5. The actual DC output current and voltage, measured with battery and load connected to charger.

NOTE: *When ordering replacement parts, drawings, or schematics, always give model number, serial number and AC input voltage.*

A Technical Specifications

Category	Item	Specifications
Environment	Operating Temperature	-40°C to +65°C
	Transportation Temperature	-40°C to +70°C
	Storage Temperature	-40°C to +70°C
	Operating Humidity	5% – 95% RH
	Storage Humidity	5% – 95% RH
	Altitude	0 – 4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1°C for each additional 200 m.
AC Input	Input System	110 VAC dual-live wire
	Input Frequency	45–66 Hz (Rated Frequency: 50 Hz or 60 Hz)
	Power Factor (PF)	≥ 0.99 (Rated input, with loads)
	Total Harmonic Distortion (THD)	Rated input voltage and 100% output load: THD (I) ≤ 10%
DC Output	Output Voltage Range	42 VDC to 58 VDC
	Default Output Voltage	53.5 VDC
	Output Power	Maximum Output Power = Output power of a single rectifier x Number of rectifiers
	Regulated Voltage Precision	≤ ±1% (With 50% load, the output voltage is within -53.5±0.1 V.)
	Peak-to-Peak Noise Voltage	≤ 200 mV (under the rated input voltage and load range)
	Noise Weighting	≤ 2 mV (300–340 Hz, input voltage ≤ 264 VAC)
	Unbalance of Load Sharing	≤ ±5% (with 50% to 100% load)
AC Input Protection	AC Input Overvoltage Protection Threshold	> 300 VAC
	AC Input Overvoltage Recovery Threshold	When the voltage is restored to 290 VAC, the output resumes.
	AC Input Under-Voltage Protection Threshold	< 85 VAC
	AC Input Under-Voltage Recovery Threshold	When the voltage is restored to 90 VAC, the output resumes.

Category	Item	Specifications
DC Output Protection	DC Output Overvoltage Protection Threshold	58.5 VDC to 60.5 VDC
Rectifier	Efficiency	R4850G2: ≥ 96% (Peak Point) ≥ 95% (230 VAC, 30–100% Load)
	Output Power	R4850G2: 3000 W (input voltage: 176–290 VAC) 1250 W (The power linearly derates when the voltage ranges from 85 VAC to 175 VAC.)
	Overvoltage Protection	58.5 V DC to 60.5 V DC If overvoltage occurs inside a rectifier due to a fault, the rectifier experiences a deadlock. If the external voltage is greater than 63 VDC for more than 500 ms, the rectifier experiences a deadlock.
Electromagnetic Compatibility (EMC) Specifications	Conducted Emission (CE)	Input Port: CISPR 22/EN 55022 Class B
		Output Port: CISPR 22/EN 55022 Class A
	Radiated Interference	CISPR 22/EN 55022 Class B
	Harmonic Current	IEC 61000-3-12
	Voltage Fluctuation and Flicker	IEC 61000-3-11/12
	Electrostatic Discharge (ESD)	Shell port: contact discharge of 6 kV and air discharge of 8 kV Signal Port: Contact discharge of 2 kV
	Electrical Fast Transient (EFT)	Signal Port: 1 kV; Power Port: 2 kV
	Radiated Susceptibility (RS)	IEC61000-4-3 Field strength: 10 V/m
	Conducted Susceptibility (CS)	IEC61000-4-3 Signal Port: 3 V; Power Port: 10 V
	Surge Immunity	AC and DC Power Ports: Differential Mode: 2 kV (8/20 μs) Common mode: 4 kV (8/20 μs)
Voltage Dips Immunity (DIP)	IEC 61000-4-11	
Others	Surge Protection	The AC input can bear at least 5 kA (8/20 us) impulse current waveform five times respectively in the positive and negative directions at an interval of 1 minute.

Category	Item	Specifications
	Safety Design	IEC/EN60950-1 and GB4943 CE certifications
	Mean Time Between Failures (MTBF)	200,000 hours (25°C)
Structure	Power System	4 U x 19 inch x 17.7 inch (H x W x D)
	Weight	≤ 50.71 lb (23 kg) (without rectifiers and DCSCs)
	Protection Level	IP20
	Installation Mode	Installed in a 19-inch or 23-inch rack
	Cable Routing	Routed in and out from the rear
	Maintenance Mode	Maintained from the front
	Heat Dissipation	Natural heat dissipation

Table 15 – Technical Specifications

B Electrical Conceptual Diagram

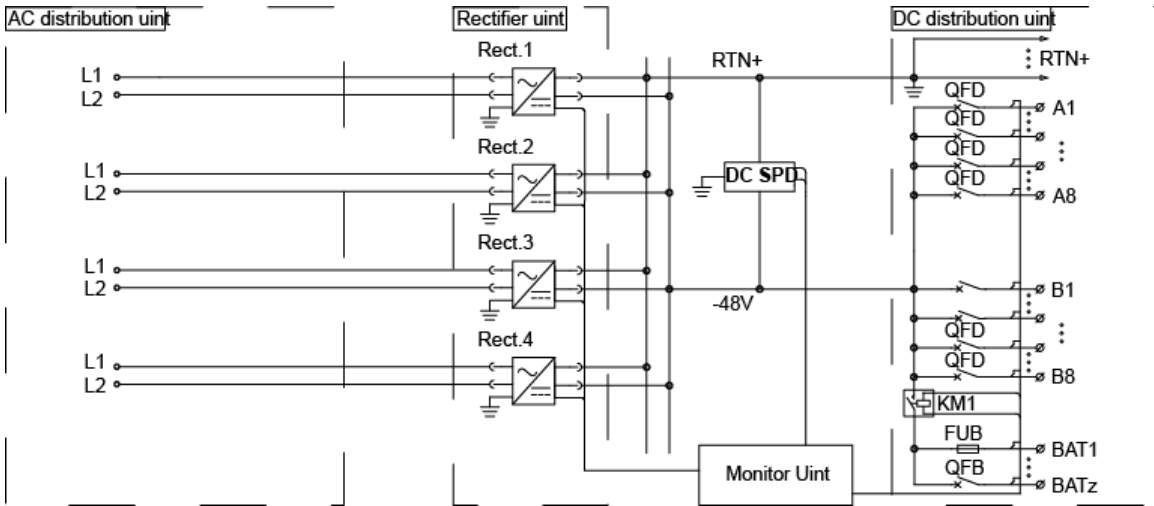


Figure 35 – DCPS Electrical Conceptual Diagram

C Associations Between Alarms and Dry Contacts on the DCU


Port Type	Silk Screen	Description
Boolean Value Port	DIN1	Reserved
	DIN2	Reserved
	DIN3	Reserved
	DIN4	Reserved
	DIN5	Reserved
	DIN6	Reserved
Dry Contact  NOTE The default setting can be changed.	ALM1	Reports alarms for AC power failures. (Closed: Alarm; Open: Normal)
	ALM2	Reports alarms for DC overvoltage or under-voltage. (Closed: Alarm; Open: Normal)
	ALM3	Reports alarms for rectifier faults. (Closed: Alarm; Open: Normal)
	ALM4	Reports alarms for DC surge protective device (SPD) faults. (Closed: Alarm; Open: Normal)
	ALM5	Reports alarms for battery fuse blown or breaker trip. (Closed: Alarm; Open: Normal)
	ALM6	Reports alarms for abnormal ambient or battery temperatures. (Closed: Alarm; Open: Normal)
	ALM7	Major
	ALM8	Minor

Table 16 – Associations Between Alarms and Dry Contacts

D Acronyms and Abbreviations

ASIC	Application-Specific Integrated Circuit
BLVD	Battery Low Voltage Disconnection
CS	Conducted Susceptibility
EFT	Electrical Fast Transient
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
FE	Fast Ethernet
HTTPS	Hypertext Transfer Protocol Secure
IEC	International Electro-Technical Commission
IP	Internet Protocol
LCD	Liquid Crystal Display
LLVD	Load Low Voltage Disconnection
LSI	Large-Scale Integrated
MTBF	Mean Time Between Failures
PCB	Printed Circuit Board
DCD	DC Distribution Panel
PF	Power Factor
RS	Radiated Susceptibility
SELV	Safety Extra-Low voltage
DCSC	DC System Controller
SNMP	Simple Network Management Protocol
SPD	Surge Protective Device
THD	Total Harmonic Distortion
TNV	Telecommunication Network Voltage
Web UI	Web User Interface

E Smoke Sensor Accessory Safety Notification
(S8-DCPS-SMS-1)

Ref. Part Number(s):

#135373 (*S8-DCPS-SMS-1 Smoke Sensor, with 1.7m Signal Cable*)

#135824 (*Label for P24SMS-HUA-1 Smoke Sensor*)

This is to declare that the smoke sensor – #135373 (which is used as an accessory to the *DCPS-4RU* Power Systems) cannot be used as a primary Fire Alarm Equipment. This sensor is to be used just as a reference for the DC power system for the monitoring purpose only.

Installing this accessory (#135735) does not fulfil the requirement to have a standard monitoring equipment for smoke or fire detection at the site.

All National and Local site safety codes, guidelines, rules, and regulations must be followed.

Manufacturer's Warranty

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within two year from date of purchase.

Should a piece of equipment require major component replacement or repair during the first year of the warranty period, these can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. Transportation charges or duties shall be borne by purchaser.
2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard LaMarche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes and is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

Document Control and Revision History

Part Number: 133202
Instruction Number: P25-LDCPS-1
Issue ECN: 21023 12/15

22133 – 03/19	21357-1 – 02/18	21357 - 02/17	21144 - 04/16
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