

# ***Enterprise Power Solutions Installation and Operation Guide***

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**Refer to the separate SC200 or SC100 system controller handbook for full  
details of the system controller operation -  
[www.Powerware.com/DC\\_manuals](http://www.Powerware.com/DC_manuals).**

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## Scope

This guide covers installation, operation and maintenance of Enterprise Power Solutions.

Refer to the separate SC200 or SC100 system controller handbook for full details of the system controller operation - [www.Powerware.com/DC\\_manuals](http://www.Powerware.com/DC_manuals).

## Audience

This guide is intended for use by:

- Electronic equipment installers competent in:
  - installing and commissioning dc power systems
  - safe working practices for ac and dc powered equipment
  - the relevant local electrical safety regulations and wiring standards
- Electronic equipment operators and maintenance staff competent in:
  - operation of dc power systems
  - safe working practices for ac and dc powered equipment

## Related Information

- SC200 System Controller Operation Handbook - IPN 997-00012-50
- SC100 System Controller Operation Handbook - IPN 997-00012-63

## Reporting Problems with this Guide

Please use this email address to report any problems you find in this guide:

**Powerware dc Product Marketing Communications**

EMAIL: [DCMarketingNZ@eaton.com](mailto:DCMarketingNZ@eaton.com)

## For Further Information and Technical Assistance

For further information and technical assistance see Worldwide Support on page [73](#).



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# General Description

## Overview

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## Enterprise Power Solutions DC Power Systems

### Model Numbers

AC Supply Voltage (Nominal)	Maximum Output Power (48-58V)		System Controller	Model Numbers	
	EPR48-3G Rectifiers	APR48-3G Rectifiers		With AC cords	With IEC sockets
120V	1.1kW	2.2kW	SC200	EPS2-421-2000	EPS2-421-6000
208-240V	1.8kW	3.6kW	SC200	EPS2-421-3000	
120V	2.75kW	-	SC200	EPS5-421-2000	EPS5-421-6000
208-240V	4.5kW	-	SC200	EPS5-421-3000	
120V	1.1kW	2.2kW	SC100	EPS2-411-2000	EPS2-411-6000
208-240V	1.8kW	3.6kW	SC100	EPS2-411-3000	
120V	2.75kW	-	SC100	EPS5-411-2000	EPS5-411-6000
208-240V	4.5kW	-	SC100	EPS5-411-3000	

Enterprise Power Solutions provide 48V (nominal) for communications and data equipment in a compact 2U or 3U, 19-inch rack mount modules with optional battery backup.

Two models are available:

- EPS2 models accommodate one or two EPR48-3G or APR48-3G rectifier modules, an SC200 or SC100 system controller, and a circuit breaker distribution module.
- EPS5 models accommodate up to five EPR48-3G rectifier modules, an SC200 or SC100 system controller, and a circuit breaker distribution module.

Options include:

- Rectifier modules (see details on page [5](#)), either:
  - APR48-3G - 900W output at 120Vac, 1800W output at 208-240Vac, or
  - EPR48-3G - 550W output at 120Vac, 900W output at 208-240Vac
- SC200 or SC100 system controller (see details on page [5](#)).
- 18Ah rack mount battery modules (see details on page [7](#)).

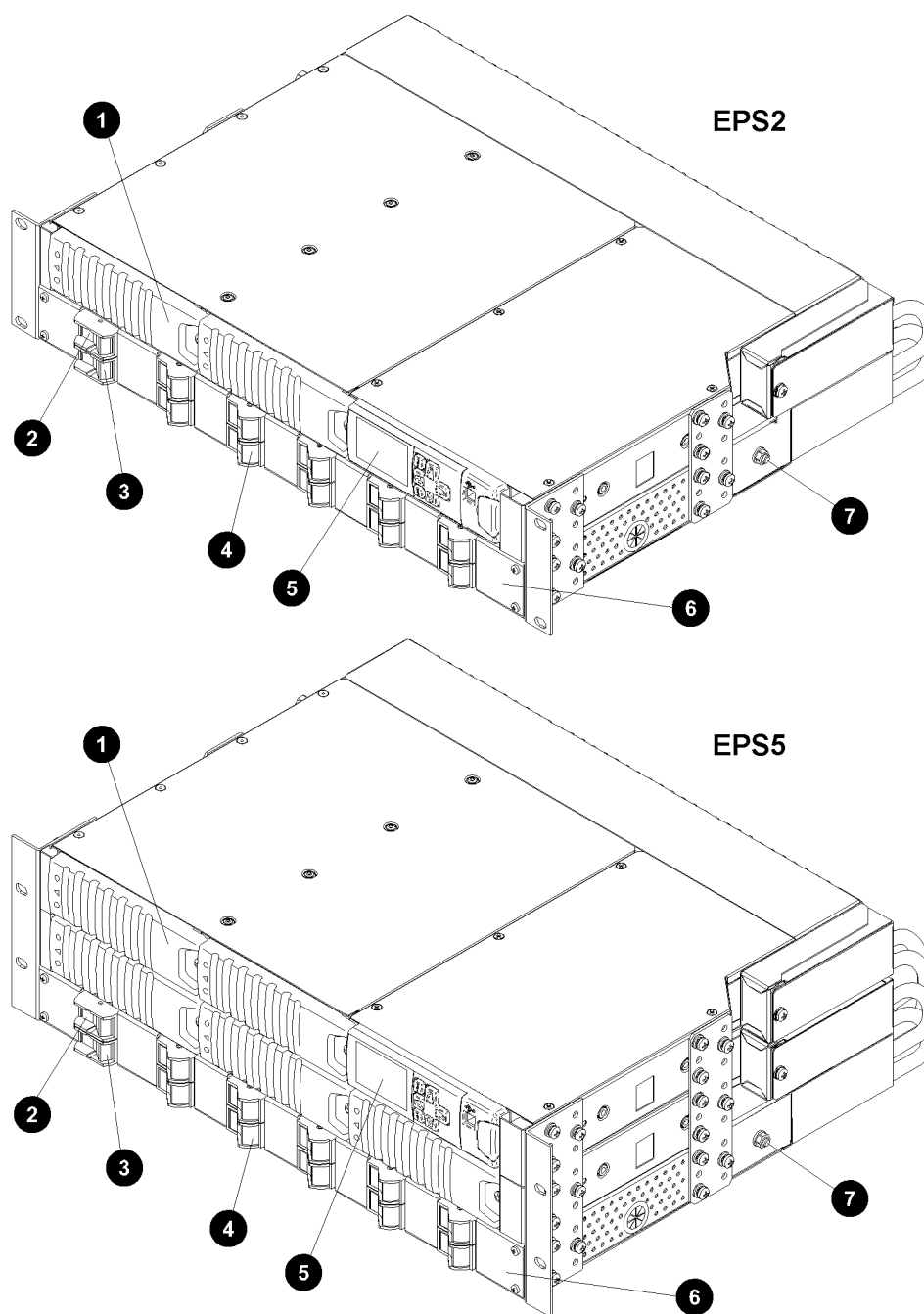
### System Sizing

For information on how select the correct system model, rectifier type and number of rectifiers for your application see System and Rectifier Selection on page [63](#).

For information on how to calculate the required number of optional Powerware 5125 EBM battery modules see Battery Module Selection on page [64](#).

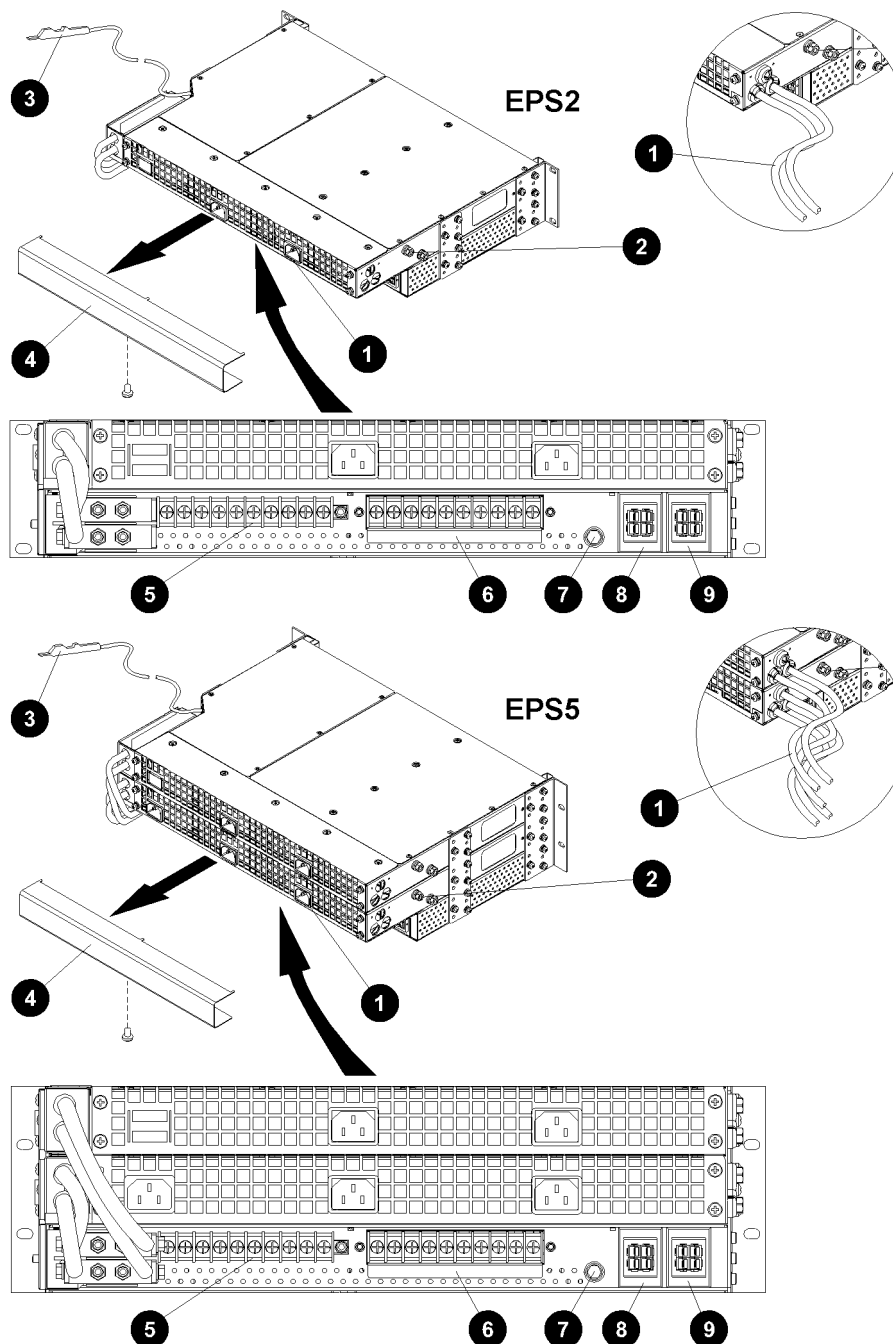


## Front Views



- ❶ Rectifier modules (see details on page [5](#)). 1 or 2 in EPS2 models, up to 5 in EPS5 models. (Use Rectifier blank panel RM3B-A01 to cover an un-used rectifier position)
- ❷ Battery circuit breaker 1 (connected to battery connector 1 on rear)
- ❸ Battery circuit breaker 2 (connected to battery connector 2 on rear)
- ❹ Load circuit breakers 1-10 (connected to load terminals 1-10 on rear)
- ❺ SC200 or SC100 system controller (see details on page [5](#))
- ❻ Circuit breaker cover
- ❼ Telecom ground terminal (M5). See details on page [18](#).


## Rear Views

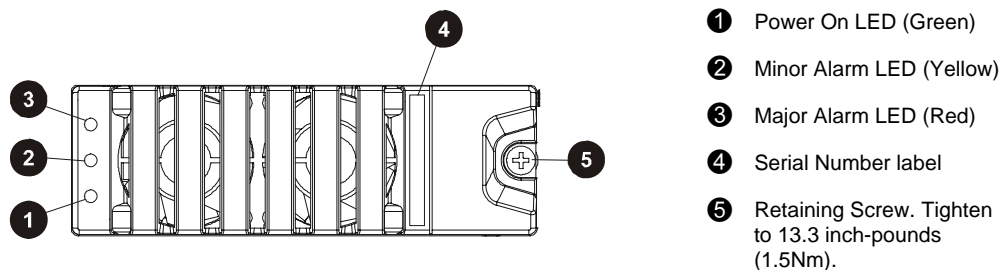


- |  |  |
|--|--|
| ① AC cord sockets to suit IEC plugs, or (see inset) ac cords fitted to some models (one per rectifier position). | ⑥ Positive (common) dc terminals 1-10  |
| ② Protective earthing terminal (M6). See details on page <a href="#">18</a> .                                    | ⑦ Output common-ground screw (see details on page <a href="#">18</a> )         |
| ③ Battery temperature sensor (for use with optional battery modules). See details on page <a href="#">26</a> .   | ⑧ Battery module connector 2 (connected to battery circuit breaker 2 on front) |
| ④ DC terminal cover  | ⑨ Battery module connector 1 (connected to battery circuit breaker 1 on front) |
| ⑤ Negative (live) dc terminals 1-10 (connected to load circuit breakers 1-10 on front)                           |  |

## Rectifier Modules (APR48-3G/EPR48-3G)

Powerware Enterprise Power Solutions are fitted with 48V rectifier modules, either APR48-3G or EPR48-3G type. The rectifiers are fan-cooled and hot-pluggable.

 See Specifications on page [59](#) for further information.



 See Troubleshooting on page [44](#) for details of rectifier alarms.

## System Controller

The SC200 or SC100 system controller provides control, communications and alarm functions.

The system controller is supplied pre-configured. Some configuration file changes can be made with the keypad, or all settings can be changed via a PC connected to the USB (SC200) or RS232 (SC100) interface.

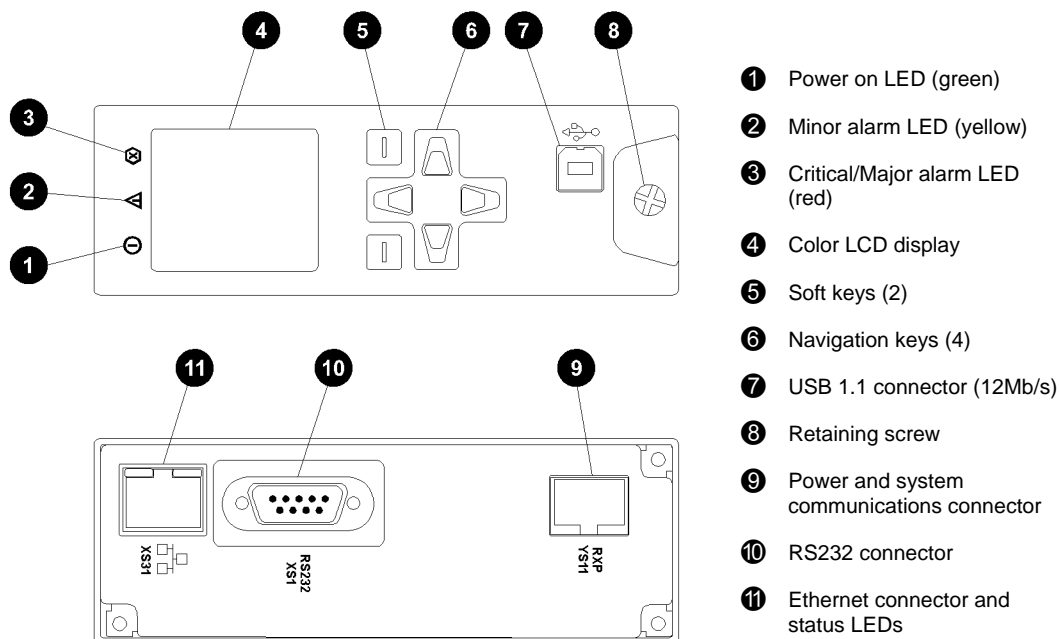
Basis operating information is available in System Controller on page [75](#). For further details refer to the System Controller Operation Handbook (see Related Information on page [i](#)).

See Troubleshooting on page [44](#) for details of system controller alarms.

### SC200 System Controller

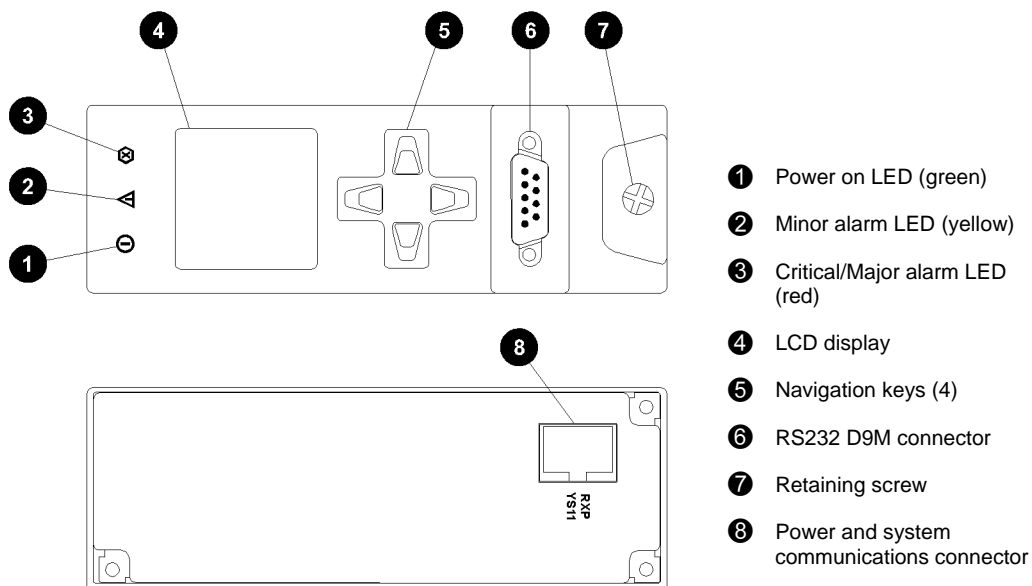
The SC200 system controller is an advanced control and monitoring solution which provides a full suite of communications options, including built-in Ethernet interface, Web server, and SNMP agent.

Alarm notifications may be by SNMP traps, SMS text messaging, dial-out to PowerManagerII remote monitoring software, or relay contact closures.



## SC100 System Controller

The SC100 system controller is a full-featured control and monitoring solution which provides alarm notifications via dial-out modem to PowerManagerII remote monitoring software, SMS text messaging, or by relay contact closures.



## External communications

Refer to the system controller handbook for information on these communications options.

Communications options	SC200	SC100
Communication with <i>DCTools</i> via USB	✓	-
Communication with <i>DCTools</i> or <i>PowerManagerII</i> via RS232	✓	✓
Communication with <i>DCTools</i> or <i>PowerManagerII</i> via an external PSTN or GSM modem (dial-in and dial-out on alarm)	✓	✓
Communication with <i>DCTools</i> or <i>PowerManagerII</i> via Ethernet	✓	-
Communication with any web browser software via an IP network	✓	-
Communication with a Network Management System (NMS) using SNMP	✓	-
Alarm and status messages to GSM Short Messaging Service (SMS) text capable cell phones	✓	✓
Communication with an alarm management system using voltage-free relay contacts (on an IOBGP I/O board)	✓	✓

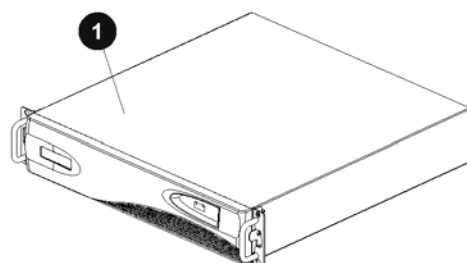
## Compatible Software

The following software is compatible with the SC200 or SC100 system controller:

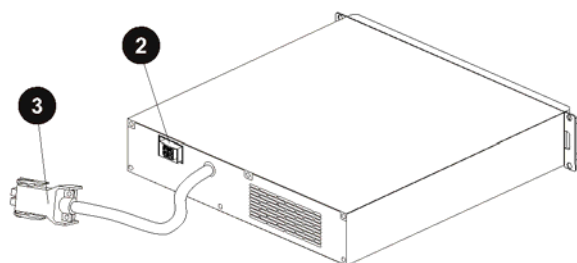
- *DCTools* Configuration Software. Latest version is available free from [www.powerware.com/downloads](http://www.powerware.com/downloads).
- *PowerManagerII* Remote Control and Monitoring Software. Contact your Eaton dc product supplier for further information (see Worldwide Support on page 73).

## Optional Battery Modules

Front View





Rear View



- ❶ 19-inch rack mount battery module with 48V, 18Ah battery
- ❷ Socket for connection to next battery module
- ❸ Connection cable to EPS2/EPS5 or previous battery module

Up to 10 optional battery modules (5 connected to each battery connector) can be connected to the EPS2/EPS5 to provide a dc source when the ac supply is not available.

The battery modules must be connected in series using the supplied plugs and cables.

-  *The battery modules will only operate when the one or both battery circuit breakers are fitted (see details on page [15](#)) and switched on.*
-  *The weight of the battery modules must be fully supported by either fixed side rails or battery shelves. These are not supplied with the battery modules.*

For specifications see details on page [60](#). For purchasing information see Spare Parts on page [66](#).

For information on how to calculate the required number of battery modules see Battery Module Selection on page [64](#).

## **Low Voltage Disconnect (option)**

If fitted, the Low Voltage Disconnect (LVD) will disconnect all battery modules at the end of the battery runtime. This is to prevent damage from deep discharge which may shorten the battery service life.

An audible click will be heard when the LVD operates or releases (whether or not battery modules are connected). This is normal.

For further information refer to Low Voltage Disconnect (LVD) in the System Controller Operation Handbook (see Related Information on page [i](#)).

# *Preparation*

## **Overview**

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Inspecting the Equipment and Reporting Damage	<a href="#"><u>12</u></a>

## Warnings

This section contains important warnings. Read these warnings before installing or operating a Powerware Enterprise Power Solutions dc power system.



### Electrical Safety

- The case of the Powerware Enterprise Power Solutions dc power system is a fire enclosure as specified in UL 60950-1. The system can be installed in an enclosed cabinet or an open relay rack.
- The dc power system may be powered from multiple ac sources. All power sources must be isolated before internally servicing the equipment.
- The dc power system must be connected to a suitable and readily accessible disconnect device(s). The ac plug may be suitable as the disconnect device. See details on page [14](#).
- The dc power system is not compatible with IT (Impedance Terra) ac supply. For advice see Worldwide Support on page [73](#).
- A registered electrician (or suitably qualified person) must check the integrity of the installed cabling, BEFORE the dc power system is powered up.
- Tasks must be performed in the sequence documented in this guide.



### Location and Environment

- The EPS2/EPS5 must be installed in a Restricted Access Location (dedicated equipment rooms, equipment closets, or similar) in accordance with the U.S. National Electric Code (NEC), ANSI/NFPA No. 70, and according to the applicable local codes.
- The EPS2/EPS5 is not suitable for use in a computer room as defined in the Standard for Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.  
*Ne peut être utilisé dans une salle d'ordinateurs telle que définie dans la norme ANSI/NFPA 75 Standard for Protection of Information Technology Equipment.*
- For ease of access and to maintain optimum system cooling observe the clearances stated on page [18](#).
- Ensure the ambient temperature and humidity are within the ranges in the Specifications.
- Dust build-up within the EPS2/EPS5 may cause premature failure. In dusty environments filter the ventilation air entering the equipment room. Ensure regular cleaning of the air filters.
- Do not allow water or any foreign object to enter the EPS2/EPS5. Do not place objects containing liquid on top of or near the unit.



### Hazardous Energy Levels

- Rectifiers and batteries contain hazardous energy levels. Only personnel trained and experienced in dc power systems are to service this equipment.
- Always use insulated tools.
- Do not short-circuit the live and common bus bars or cables.



### Rectifiers

- Do not install the rectifiers until the room has been cleaned and is dust free.
- To reduce the risk of electric shock and maintain optimum system cooling, always cover empty rectifier slots with blanking panels.
- To avoid electrical shock, do not place hands inside the rectifier magazine.
- Rectifier cases may exceed 100°C (212°F), especially after prolonged operation. Use suitable gloves when removing a rectifier from the magazine.
- Do not attempt to disassemble faulty rectifiers. Return them (in their original packaging) with a completed Equipment Incident Report on page [71](#).





### Servicing

- The dc power system contains hazardous voltages and hazardous energy levels. Do not attempt to disassemble or service the unit if you are not qualified.



### EMC Compliance

- This Powerware product ("the equipment") has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the Federal Communications Commission (FCC) Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
- The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this installation guide, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation.
- If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.
- Changes or modifications to the equipment not approved by Eaton Corporation could void the FCC authority to operate the equipment.



### Telecom Ground and dc Supply Bond to Chassis

- CAUTION: This equipment has a connection between the earthed conductor of the dc supply circuit and the earthing conductor.  
*Cet appareil comporte une connexion entre le conducteur relié à la terre du circuit d'alimentation c.c. et son conducteur de terre.*
- All of the following installation conditions must be met:
  - This equipment shall be connected directly to the dc supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the dc supply system earthing electrode conductor is connected.
  - This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same dc supply circuit and the earthing conductor, and also the point of earthing of the dc system. The dc system shall not be earthed elsewhere.
  - The dc supply source shall be located within the same premises as this equipment.
  - Switching or disconnecting devices shall not be in the earthed circuit conductor between the dc source and the point of the connection of the earthing electrode conductor.
- *Ce matériel doit être raccordé directement au conducteur de la prise de terre du circuit d'alimentation c.c. ou à une tresse de mise à la masse reliée à une barre omnibus de terre laquelle est raccordée à l'électrode de terre du circuit d'alimentation c.c. Les appareils dont les conducteurs de terre respectifs sont raccordés au conducteur de terre du même circuit d'alimentation c.c. doivent être installés à proximité les uns des autres (p.ex., dans des armoires adjacentes) et à proximité de la prise de terre du circuit d'alimentation c.c. Le circuit d'alimentation c.c. ne doit comporter aucune autre prise de terre. La source d'alimentation du circuit c.c. doit être située dans la même pièce que le matériel. Il ne doit y avoir aucun dispositif de commutation ou de sectionnement entre le point de raccordement au conducteur de la source d'alimentation c.c. et le point de raccordement à la prise de terre.*



#### **Batteries**

- Batteries can present a risk of electric shock or burns from high short-circuit current.
- Do not alter any battery module cables or connectors.
- Do not place any metal objects in or near the connectors.
- VRLA lead acid batteries can emit explosive gases and must be installed with adequate ventilation. Do not install batteries in a sealed room or cabinet.
- Do not attempt to disassemble battery modules. Return them (in their original packaging) with a completed Equipment Incident Report on page [71](#).
- Only dispose of battery modules according to Battery Disposal and Recycling on page [55](#).



- Check the battery recharge dates on the shipping carton labels. Do not use the batteries if the date has expired and the batteries were never recharged. Contact your battery supplier.
- Batteries are heavy. Two people may be required to lift a module.
- Batteries must be installed at the bottom of the rack.

## **Inspecting the Equipment and Reporting Damage**

Unpack the equipment and inspect it carefully for possible damage that may have occurred while in transit. Do not use any damaged equipment.

Report any damage immediately, using a completed Equipment Incident Report on page [71](#).



*Keep the original packaging and use it if any equipment needs to be returned for replacement or repair.*

**Overview**

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## Installation Tasks

Before starting the installation, review the following information:

- Required Equipment and Tools on page [65](#)
- Warnings and Cautions on page [10](#)
- Inspecting the Equipment and Reporting Damage on page [12](#)

Complete the Installation tasks in the following order:

Task	Description	Reference
1	Check the AC Supply	See details on page <a href="#">14</a>
2	Customize the EPS2/EPS5	See details on page <a href="#">15</a>
3	Mount the EPS2/EPS5 in the Rack	See details on page <a href="#">18</a>
4	Connect the Output Cables	See details on page <a href="#">21</a>
5	Install the Batteries Modules (if required)	See details on page <a href="#">23</a>
6	Mount the Battery Temperature Sensor (if required)	See details on page <a href="#">26</a>
7	Connect communications cable (if required)	See details on page <a href="#">26</a>
8	Connect to the AC Supply Point	See details on page <a href="#">28</a>

For details of external communications refer to Communications Options in the System Controller Operation Handbook (see Related Information on page [i](#)).

### Task 1 - Check the AC Supply

It is important that the ac supply for the Enterprise Power Solutions dc power system includes the correct levels of protection.

#### Step 1 - Check the type of ac supply



Check the type of ac supply. Only the types of ac supply listed in the Specifications on page [59](#) are suitable for the EPS2/EPS5.



*Only use an ac supply referenced to ground, or with a protection system so that the phase-ground voltage cannot exceed the rating of the rectifier.*

**Step 2 - Disconnect device and overcurrent protection**

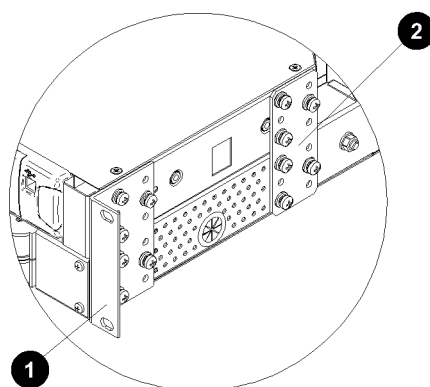
- 1 The socket outlet(s) shall be installed near to the EPS2/EPS5 and shall be readily accessible.
- 2 Each socket shall be protected by an overcurrent protection device (a circuit breaker suitable for Branch Circuits and rated 15A or less).
- 3 The external circuit breaker(s) must be two-pole type wired in each conductor, if:
  - the ac supply is 2W (see Specifications on page 59), or
  - the ac supply is 1W+N but the neutral is not clearly identified.

**Procedure complete**

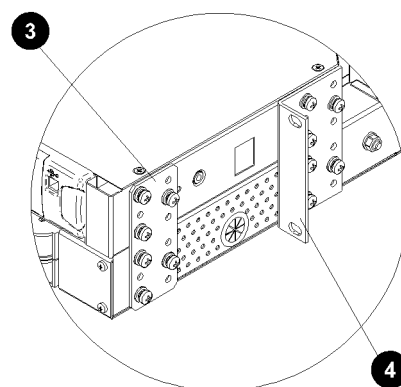
**Task 2 - Customize EPS2/EPS5****Step 1 - Check position of mounting brackets**

EPS2/EPS5s are pre-assembled with 19-inch rack-mounting brackets as shown in the following diagram. If required, the brackets can be moved to alternative positions to reduce the effective depth of the unit.

- 1 Remove top cover.
- 2 Undo the screws holding each bracket and the module connection plates.
- 3 Refit the brackets and plates at the required location. Tighten the screws.



- 1 Rack-mounting bracket
- 2 Module connection plate



- 3 Alternative position for module connection plate
- 4 Alternative position for rack bracket mounting

**Step 2 - Install battery circuit breaker(s) (if required)**




Ignore this task if:

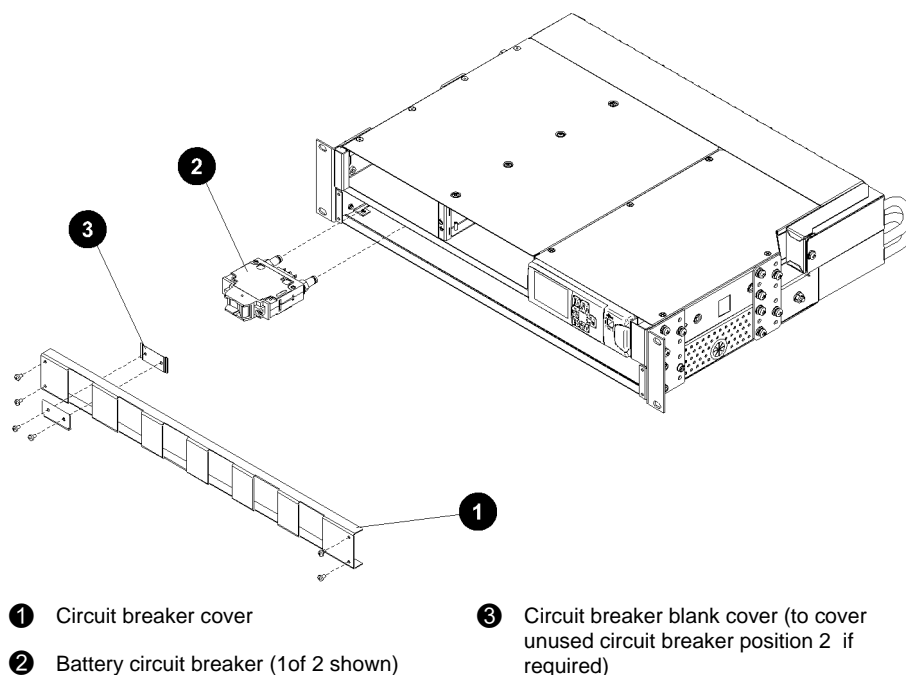
- The battery circuit breakers are already fitted, or
- No battery modules will be connected (see details on page 7).

- 1 The EPS2/EPS5 has two battery connectors (with two battery circuits per connector). Fit a battery circuit breaker for each battery connector to be used.

 See Specifications on page 59 for the battery circuit current rating.

 See Spare Parts on page 66 for circuit breaker type and purchasing information. The current rating of the circuit breakers must be derated to 80%.

- 2 Remove the circuit breaker cover.
- 3 Remove the battery circuit breaker blank cover in position 1 and plug in the battery circuit breaker.
- 4 If required, repeat for position 2 or fit the circuit breaker blank cover.
- 5 Switch the circuit breaker(s) to the OFF (O) position.



**Step 3 - Install load circuit breakers (if required)**

Ignore this task if the load circuit breakers are already fitted.

Select the required load circuit breakers from the following list (see position restrictions in point 2):

Circuit breaker rating	Maximum load current
6A	4.8A
10A	8A
15A	12A
20A	16A
25A	20A
30A	24A

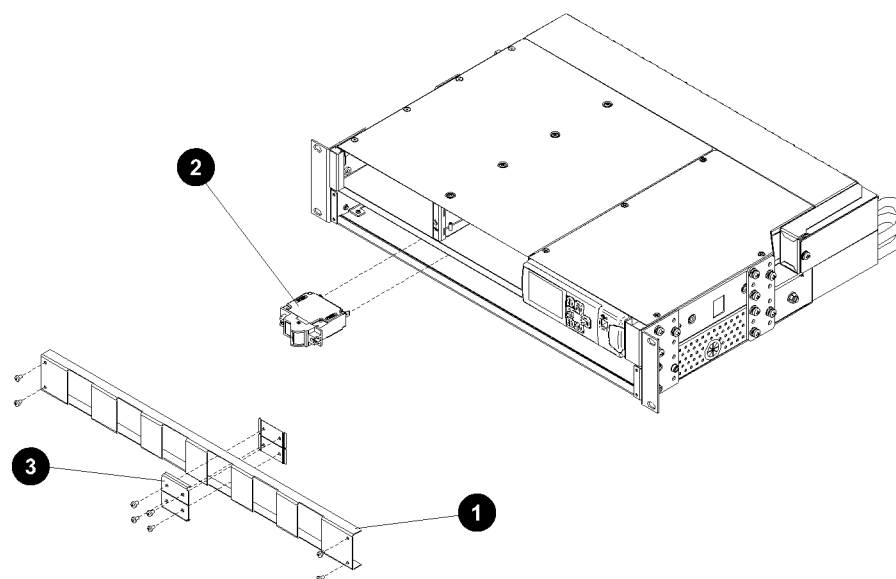


See Spare Parts on page 66 for circuit breaker types and purchasing information. The current rating of the circuit breakers must be derated to 80%.

- 1 Remove the circuit breaker cover.
- 2 Plug in the load circuit breakers according to following restrictions:

Top row (1-2):	6A, 10A or 15A only
Top row (3-5):	6A, 10A, 15A, or 20A only
Bottom row (6-7):	6A, 10A or 15A only
Bottom row (8-10):	any value (6-30A)

- 3 Fit circuit breaker blank covers in all unused positions.
- 4 Replace the circuit breaker cover.
- 5 Switch the circuit breakers to the OFF (O) position.



- ① Circuit breaker cover
- ② Load circuit breaker (1 of 10 shown)
- ③ Circuit breaker blank covers (to cover unused circuit breaker positions as required)

Procedure complete

### Task 3 - Mount the EPS2/EPS5 in the Rack

#### Step 1 - Check clearances



The EPS2/EPS5 requires the following clear space:

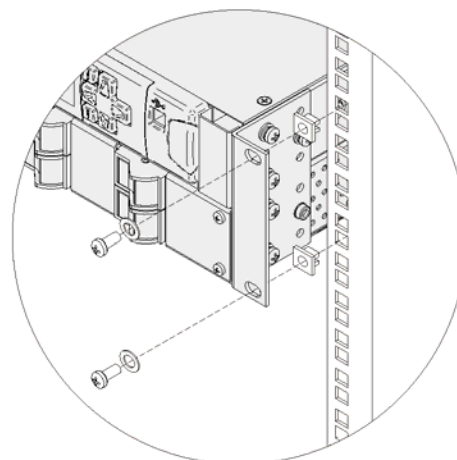
- Front:** adequate space for access and ventilation for rectifiers- 600mm (24") minimum recommended.
- Rear:** adequate space for ventilation and access to input and output terminals, and battery connectors
- Below:** adequate space for ventilation and to route wires connected to the output terminals (recommended 1U minimum).  
No heat source greater than 50°C below the EPS2/EPS5.
- Sides:** if required, adequate space for access to protective ground terminal and telecom ground terminal.



## Step 2 - Mount the EPS2/EPS5



- 1 Fit cage nuts to match the screw holes in the rack mounting brackets.
- 2 Attach the EPS2/EPS5 using the rack mounting screws as shown.
- 3 Tighten the screws.



## Step 3 - Protective earthing conductor



The building installation shall provide a means for connection to protective earth, and the EPS2/EPS5 is to be connected to that means:

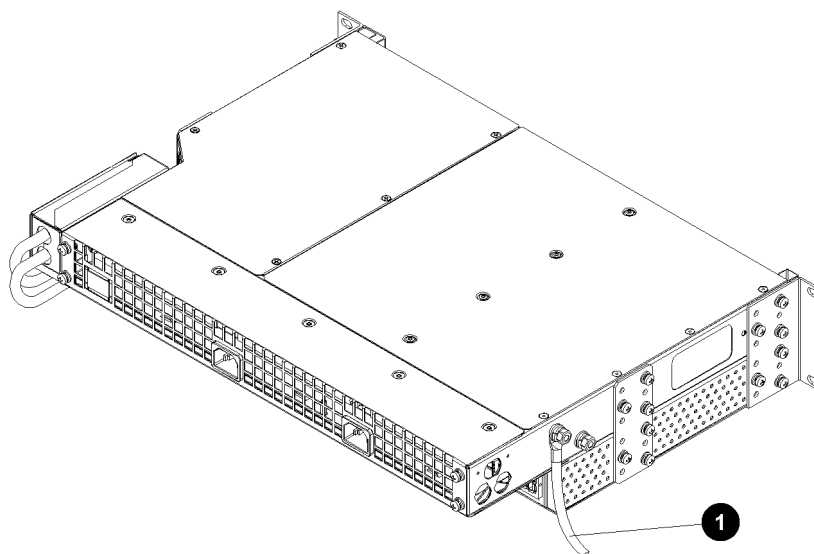
- 1 A Service Person shall check whether or not the socket-outlets from which the EPS2/EPS5 is to be powered provide a connection to the building protective earth.



*If this connection is provided then no further action is required.*

- 2 If not, the Service Person shall arrange for the installation of a Protective Earthing Conductor from the separate protective earthing terminal to the protective earth wire in the building:
  - Connect a Protective Earthing Conductor to the chassis of the EPS2/EPS5 as shown in the following diagram. Use:
 

Wire:	Multi-strand, copper conductor, 8 AWG with green/yellow insulation
Strip length:	½" (12mm)
Crimp lug:	FCI-Burndy type YAV8C-L3
Crimp tool:	FCI-Burndy type MY29-11
  - Tighten terminal to 36 in-lb (4Nm).
  - Terminate the Protective Earthing Conductor at a point connected to the protective earth wire in the building.



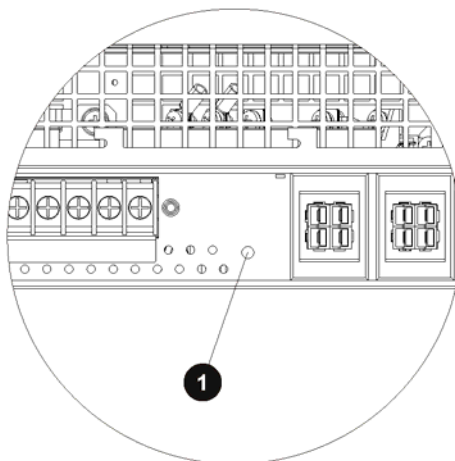
- 1** Protective earthing conductor to protective earth bar in building.

**Step 4 - Set Output to Floating if required (otherwise go to next Step)**




The EPS2/EP55 can be configured with either the output positive connected to ground (standard) or with a floating output (optional).

- 1** Check if the equipment to be powered requires a dc supply with output positive connected to ground or with a floating output.
- 2** If the equipment to be powered requires that the dc output of the EPS2/EP55 is "floating" (not bonded to ground), then remove the output-ground screw. No further action is required.



- 1** Output-ground screw removed for "floating" output.

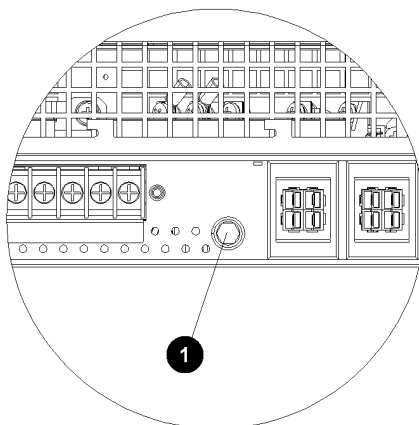
**Step 5 - Connect Output Positive to Ground**

 *Ignore this Step if the dc output of the EPS2/EPS5 is "floating" (see previous Step)*

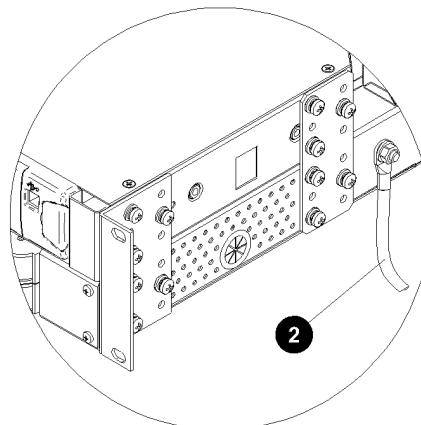
If the equipment to be powered requires that the dc output positive must be bonded to ground, then:

- 1** Leave the output-ground screw in place.
- 2** If the building is fitted with a telecom ground bar (usually only at telecom communications installations) then also:
  - Connect a telecom ground link cable from the telecom ground terminal to the telecom ground bar ( as shown in the following diagram).
  - Use:
 

Wire:	Multi-strand, copper conductor, 1 AWG with green/yellow insulation
Strip length:	5/8" (16mm)
Crimp lug:	FCI-Burndy type YAV1C-L1
Crimp tool:	FCI-Burndy type MY29-11 (Die index 42)
  - Tighten terminal to 20 in-lb (2.3Nm).



**1** Output-ground screw in place for output positive connected to ground.



**2** Telecom ground link cable to the telecom ground bar (if required).

**Procedure complete**

## **Task 4 - Connect the Output Cables**

### **Step 1 - Remove the dc terminal cover**



## Step 2 - Select cable size



Select the required dc output cable size from the following table, according to each circuit breaker rating:

Circuit breaker rating	Maximum load current	Cable size*
6A	4.8A	14AWG / 1.5mm <sup>2</sup>
10A	8A	
15A	12A	
20A	16A	12AWG / 2.5mm <sup>2</sup>
25A	20A	10AWG / 4mm <sup>2</sup>
30A	24A	

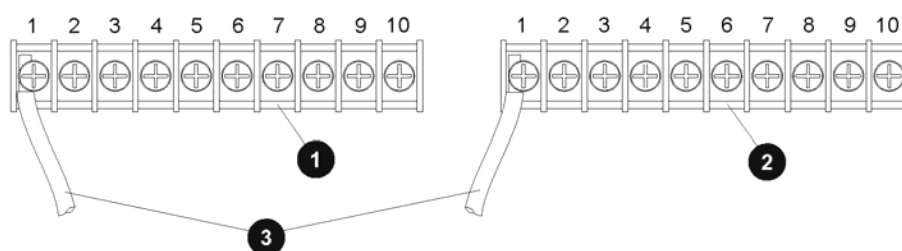


\* These cable sizes are calculated to limit the voltage drop to 1.0V or less at the maximum current for a distance of up to 12feet / 3.6m from the EPS2/EPS5 to the load equipment. For greater distances increase the cable size.

## Step 3 - Connect dc output cables



- 1 Route the cables to the rear of the EPS2/EPS5.
- 2 Connect the first positive cable to the LOAD COMMON terminal 1.
- 3 Connect the first negative cable to the LOAD -VE terminal 1 (connected to load circuit breaker 1).
- 4 Repeat for all other cables.
- 5 Tighten all terminals to 9 in-lb / 1Nm.



- 1 Negative (live) output terminals (terminal numbers correspond to the load circuit breaker numbers)
- 2 Positive (Common) output terminals
- 3 Positive and negative cables to load equipment

## Step 4 - Check terminations, secure cables and test insulation



- 1 Check all terminations are correct and are tightened.
- 2 Secure the cables with cable ties to ensure there will be no strain on the terminals.
- 3 Test the insulation resistance of the cables.

**Step 5 - Connect the cables at the equipment to be powered**



Follow the instructions provided by the equipment supplier/manufacturer.

**Step 6 - Replace dc terminal cover**



**Procedure complete**

## Task 5 - Install the Batteries Modules (if required)

Ignore this task if no battery modules will be connected.



### Batteries

- Batteries can present a risk of electric shock or burns from high short-circuit current.
- Do not alter any battery module cables or connectors.
- Do not place any metal objects in or near the connectors.
- VRLA lead acid batteries can emit explosive gases and must be installed with adequate ventilation. Do not install batteries in a sealed room or cabinet.
- Do not attempt to disassemble battery modules. Return them (in their original packaging) with a completed Equipment Incident Report on page [71](#).
- Only dispose of battery modules according to Battery Disposal and Recycling on page [55](#).



- Check the battery recharge dates on the shipping carton labels. Do not use the batteries if the date has expired and the batteries were never recharged. Contact your battery supplier.
- Batteries are heavy. Two people may be required to lift a module.
- Batteries must be installed at the bottom of the rack.

**Step 1 - Fit rack rails or battery shelves (if required)**



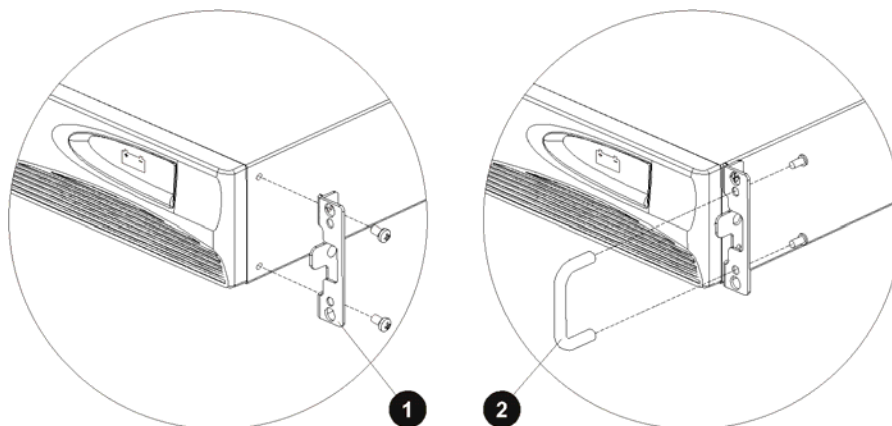
The weight of the battery modules must be fully supported by either fixed side rails or battery shelves.

If not already fitted, fit fixed rails or shelves (starting at the bottom of the rack) to suit the number of battery modules.



Refer to Spare Parts on page [66](#) for available fixed rails.

**Step 2 - Fit the mounting brackets to the front of each battery module**



- ❶ Rack mounting bracket (two per module)    ❷ Mounting handle (two per module)

**Step 3 - Fit battery modules into rack**

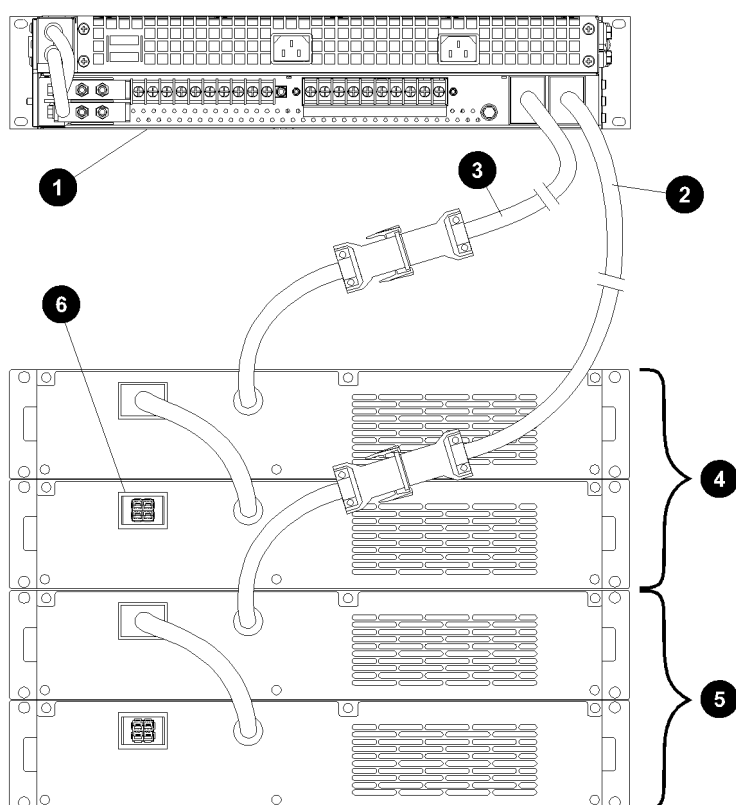


- 1 Slide the battery modules into the rack starting at the bottom.  
☐ *The battery modules are heavy (54.9kg/121 lb). A minimum of two people are required to lift a module into a rack.*
- 2 Secure the battery module to the front of the rack using the rack fixing screws provided.

**Step 4 - Connect cables**



- 1 Connect the battery modules together in series (in two groups if two battery circuit breakers are fitted).  
☐ *Maximum 5 battery modules to be connected to each battery circuit breaker in the EPS2/EPS5.*
- 2 Connect from battery connector 1 (BATT 1) on the EPS2/EPS5 to the cable plug on the first battery in group 1. Use the battery cable type CKBATT-00 (see Spare Parts on page [66](#)).
- 3 If required, connect from battery connector 2 (BATT 2) on the EPS2/EPS5 to the cable plug on the first battery in group 2.



- |   |  |
|---|--|
| ① EPS2 or EPS5  | ④ Group 2 battery modules (connected together)                                   |
| ② Battery cable connected from BATT1 to first battery module in group 1 | ⑤ Group 1 battery modules (connected together)                                   |
| ③ Battery cable connected from BATT2 to first battery module in group 2 | ⑥ Connector for next battery module, if required (maximum 5 per group, 10 total) |

#### Step 5 - Switch off the battery circuit breakers



#### Procedure complete

See Battery Care on page [55](#) for details of battery maintenance.

## Task 6 - Mount the Battery Temperature Sensor (if required)

The EPS2/EPS5 is supplied with a battery temperature sensor and standard 2m (6.5 feet) long cable, already connected to the IOBGP input/output (I/O) board to measure the ambient air temperature around the battery modules (if fitted). This is required for the temperature compensation control process.

If no battery modules will be connected leave the sensor cable coiled at the back of the EPS2/EPS5, and ignore the remainder of this task.

### Step 1 - Route cable



- 1 Undo the temperature sensor cable supplied.
- 2 Route the temperature sensor cable to near the middle battery module.  
☐ Do not run the sensor cable along ac supply cables. Interference may cause false readings.

### Step 2 - Fix sensor



- 1 Fix the sensor approximately above the middle battery module.
- 2 To avoid false readings:
  - Do not attach the sensor to a battery module case, or to the battery cables.
  - Do not expose the sensor to direct sunlight, air movements from air-conditioning systems, or open windows.

### Procedure Complete

## Task 7 - Connect communications cable (if required)

The following procedure is to connect an Ethernet and/or RS232 communications cable to the rear ports on an SC200 system controller only. Ignore this task if the system controller is an SC100 type (SC100 has a front connect RS232 connector only).



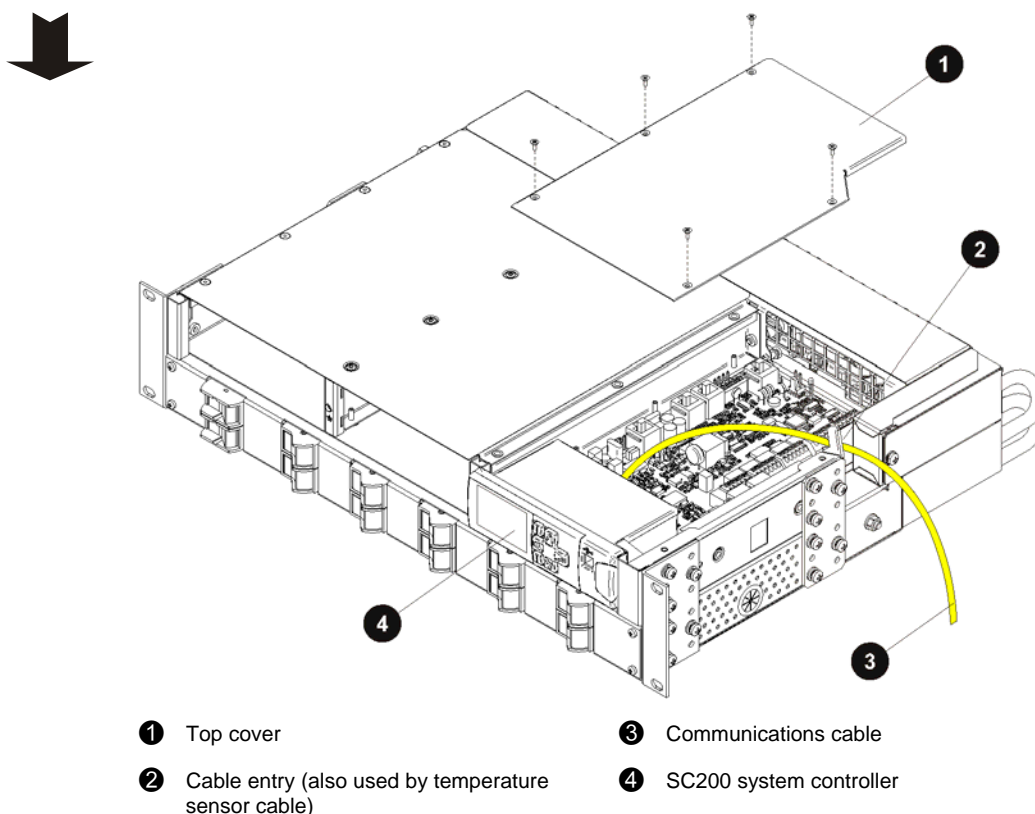
For further details see *External Communications* on page [7](#) and *Communications Options* in the *SC200 System Controller Operation Handbook* (see *Related Information* on page [i](#)).

### Step 1 - Remove top cover





**Step 2 - Route communications cable(s) to rear of SC200**



**Step 3 - Plug into Ethernet and/or RS232 port as required**

- 1 See the diagram on page 5 for position of Ethernet or RS232 port on rear of SC200.
- 2 Secure the cable(s) to prevent strain on the connector.

**Step 4 - Replace top cover**



**Procedure complete**

## Task 8 - Connect to the AC Supply Point

### Step 1 - EPS2/EPS5 systems with IEC cord sets



If the EPS2/EPS5 has permanently connected ac cords then go to Step 2.

Connect one of the cord sets provided to each IEC connector on the rear of the EPS2/EPS5.



*If the cord sets are missing or must be replaced then refer to Spare Parts on page [66](#) for replacement items.*

### Step 2 - Connect at the ac supply point



- 1** Check the ac supply point is isolated.
- 2** Connect the ac cords to the ac supply point.
- 3** Label the connection at the ac supply point.
- 4** Secure the cords to ensure there is no strain on the terminals.

### Procedure complete



*Do not switch on the ac supply at this stage.*

## Installation Completed

Installation of the EPS2/EPS5 is now complete. Follow the instructions in Start-Up on page [30](#) to make the system operational.

**Overview**

<b>Topic</b>	<b>Page</b>
Start-Up Tasks	<a href="#"><u>30</u></a>
Task 1 - Inserting the Rectifiers	<a href="#"><u>30</u></a>
Task 2 - Pre-Power-Up Checklist	<a href="#"><u>31</u></a>
Task 3 - Applying AC Power	<a href="#"><u>31</u></a>
Task 4 - Configuring the DC Power System	<a href="#"><u>32</u></a>
Task 5 - Applying DC Power to Battery and Load	<a href="#"><u>34</u></a>
Start-Up Completed	<a href="#"><u>34</u></a>

## Start-Up Tasks

Complete all the Installation tasks (see details on page [14](#)) before starting these Start-Up tasks.

Complete the Start-Up tasks in the following order:

Task	Description	Reference
1	Insert the Rectifiers	See details on page <a href="#">30</a>
2	Complete the Pre-Power-Up Checklist	See details
3	Apply AC Power	See details on page <a href="#">31</a>
4	Configure the dc power system	See details on page <a href="#">32</a>
5	Apply dc Power to Battery and Load	See details on page <a href="#">34</a>

### Task 1 - Inserting the Rectifiers



- Do NOT install the rectifiers until the room has been cleaned and is dust free.
- Do NOT switch on the ac supply at this stage.

#### Step 1 - Unpack the rectifiers



Unpack the rectifiers and inspect them carefully for possible transport damage. Report any damage immediately using a completed Equipment Incident Report on page [71](#).

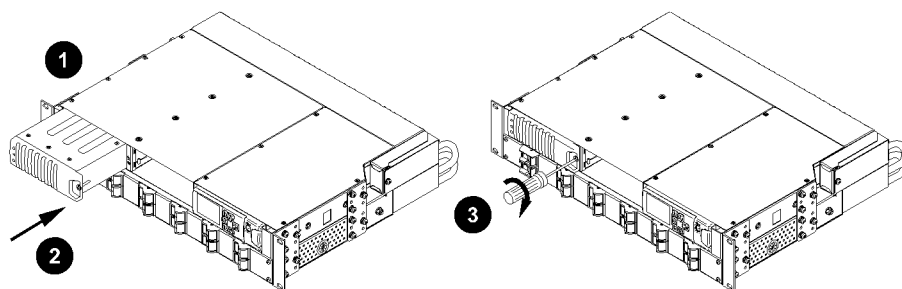


*Keep the original packaging to return a rectifier for replacement or repair, if required.*

#### Step 2 - Fit first rectifier



- 1 Align the rectifier with the left side of the shelf.
- 2 Push in the rectifier until the retaining screw contacts the shelf.
- 3 Tighten the retaining screw to 1.5Nm (13.3 inch-pounds). This will locate the rectifier in its rear connector.



### Step 3 - Repeat for other rectifiers or fit blank panels



If not already fitted, fit rectifier blank panels in any vacant rectifier positions.

### Procedure complete

## Task 2 - Pre-Power-Up Checklist

Complete the checklist to confirm initial work is complete before progressing further.

<input type="checkbox"/>	All cabling is installed, securely tied and correctly insulated
<input type="checkbox"/>	Ground bonding is correct (see details on page <a href="#">18</a> )
<input type="checkbox"/>	DC output cabling has the correct polarity
<input type="checkbox"/>	A registered electrician or other suitable approved person has checked the integrity of the installed cabling
<input type="checkbox"/>	All covers are in place and all empty rectifier slots are covered with blanking panels
<input type="checkbox"/>	DC-powered equipment is switched off
<input type="checkbox"/>	All circuit breakers are in the Off (O) position
<input type="checkbox"/>	EPS2/EPS5 is disconnected from the ac supply
<input type="checkbox"/>	The site is clean.

## Task 3 - Applying AC Power



- A registered electrician (or suitably qualified person) must check the integrity of the installed cabling, BEFORE the dc power system is powered up.

### 1 Switch on the AC supply.

- All rectifiers start up (after the startup delay).
- The rectifier alarm LEDs will turn on for a short time.
- The SC200 or SC100 system controller will turn on (green Power On LED is on) when the rectifiers start.
- During start-up of the system controller the rectifier yellow alarm LEDs will flash until the rectifiers are registered.

2 After start-up of the system controller:

- Press any key on the system controller to silence the alarm (SC200 only).



*Depending on the configuration file settings, one or both alarm LED(s) may be on and the system controller may display some system alarm messages. This is normal. For an explanation of alarm messages see Alarm Descriptions in the System Controller Operation Handbook.*

- The LCD display module shows the summary screen. See details on page [37](#).



*If no load or battery is connected the current will be 0A.*

- If fitted and enabled, the LVD(s) operate.

3 Check all rectifiers are running and only the rectifier green Power On LEDs are on (no alarm LEDs).

- On the system controller keypad select *Menu > Rectifiers*. See details on page [61](#). Check that all rectifiers are registered.



*If any problems see Troubleshooting on page [44](#).*



*After start-up of the system controller there will be a loud click when the battery disconnect LVD operates. This is normal operation.*

## Task 4 - Configuring the DC Power System

The operational settings of the dc power system are stored in a configuration file loaded into the SC200 or SC100 system controller. See details in the System Controller Operation Handbook (see Related Information) on page [i](#).

Make the following configuration changes, if required:

### Step 1 - Systems with batteries connected



*Ignore this Step if the EPS2/EPS5 system does not have batteries connected.*

- In the SC200 or SC100 configuration file, set the battery capacity according to the number of battery modules connected:
  - Either:  
On SC100 go to: *Menu > Configuration > System > Edit > Battery Capacity > Edit*, or  
On SC200 go to: *Battery > Battery > Battery Capacity*.
  - Set *Battery Capacity* to the number of battery modules x 18Ah.
- Go to Step 3.

## Step 2 - Systems without batteries connected



*Ignore this Step if the EPS2/EPS5 system has batteries connected.*

- 1 In the SC200 or SC100 configuration file, set the battery capacity to zero (to indicate no batteries are connected):
  - Either:  
On SC100 go to: Menu > Configuration > System > Edit > Battery Capacity > Edit, or  
On SC200 go to: Battery > Battery > Battery Capacity.
  - Set Battery Capacity to zero.
- 2 Disable the Temperature Compensation control process (this is only required when batteries are connected):
  - Either:  
On the SC100 go to: Menu > Configuration > Temp Compensation > Edit, or  
On SC200 go to: Control Processes > Temperature Compensation > Enabled.
  - Select *Disable*.
- 3 Change Float Voltage (dc output voltage) if required:
  - If required, the Float Voltage (dc output voltage) can be adjusted within the Output Voltage range in the Specifications on page [59](#).
  - Refer to the SC200 or SC100 system controller System Controller Operation Handbook for details on how to adjust the Float Voltage.
  - Also adjust the alarm voltage settings (Low Load, Low Float, High Float and High Load).

## Step 3 - Setup communications (if required)



*For an overview of communications options see External Communications on page [7](#).*

To configure the communications settings refer to Communications Options in the System Controller Operation Handbook (see Related Information on page [i](#)).

## Procedure complete

## Task 5 - Applying DC Power to Battery and Load

### Step 1 - Connect battery modules (if fitted)



Ignore this step if no battery modules are connected.

- 1 Switch on the battery circuit breaker(s).
- 2 Check the Battery Fuse Fail alarm clears.  
☐ *All battery circuit breakers (including any unused circuit breakers) must be switched ON (I) to clear the alarm.*
- 3 Check the battery current. The actual value depends on the state of charge of the batteries.  
☐ *It is recommended that the batteries charge for 24 hours after installation or long-term storage.*

### Step 2 - Connect load



- 1 Follow the equipment suppliers instructions for starting the equipment.
- 2 Switch on the load circuit breakers.
- 3 Check the equipment powers up.
- 4 Check the Load Fuse Fail alarm clears.  
☐ *Only load circuit breakers with equipment connected must be switched ON (I) to clear the alarm.*

### Step 3 - Check the rectifier currents



- 1 Check the rectifier currents.
- 2 Verify the load current is as expected for the load and battery size.

### Procedure complete

## Start-Up Completed

Start-Up of the EPS2/EPS5 is now complete and the system is operational.

For information on how to use the SC200 or SC100 system controller see SC200 or SC100 Operation in the System Controller Operation Handbook (see Related Information) on page [i](#).

For information on alarms, or operation problems see Maintenance on page [43](#).



# System Controller

<b>Topic</b>	<b>Page</b>
Configuration File	<a href="#"><u>36</u></a>
Starting the SC200 or SC100	<a href="#"><u>37</u></a>
SC200 or SC100 Operation using the Keypad and Screen	<a href="#"><u>38</u></a>
SC200 or SC100 Operation Using a PC/Laptop	<a href="#"><u>39</u></a>
SC200 or SC100 Identity Information	<a href="#"><u>41</u></a>

## Configuration File

The operational settings of the dc power system are stored in a configuration file loaded into the SC200 or SC100 system controller.

The SC200 or SC100 is supplied pre-loaded with a configuration file. If this configuration file has been customized for the site then no further configuration changes will be necessary.

Otherwise, it is important that the settings of this configuration file are checked and changed as required for site-specific conditions. In particular, settings that may affect the performance and life expectancy of the battery must be checked and set according to the battery manufacturer's recommendations.

Some settings in the configuration file can be edited using the system controller's keypad (see details on page 38), or all settings can be edited using a PC/laptop with DCTools/Web (see details on page 39) or remotely, see Communications Options in the System Controller Operation Handbook.

## Backup and Restore

The configuration file settings in the SC200 or SC100 can be saved to (Backup) or loaded from (Restore) a PC/laptop using DCTools/Web.

Backup and Restore can be used to:

- Load a standard (master) configuration file into an SC200 or SC100 for customization.
- Copy a customized configuration file from one SC200 or SC100 to others (at similar sites).
- Save a copy of a customized configuration file. This is recommended in case the SC200 or SC100 has to be replaced.

### ► To use DCTools for Backup and Restore

- 1 Connect to the SC200 or SC100 with DCTools. See details on page 39 or see Communications Options in the System Controller Operation Handbook.
- 2 In DCTools go to *File > ICE Backup/Restore* and follow the prompts.



*The saved file does not include site specific settings including Site Identity, IP Address and S3P Address.*

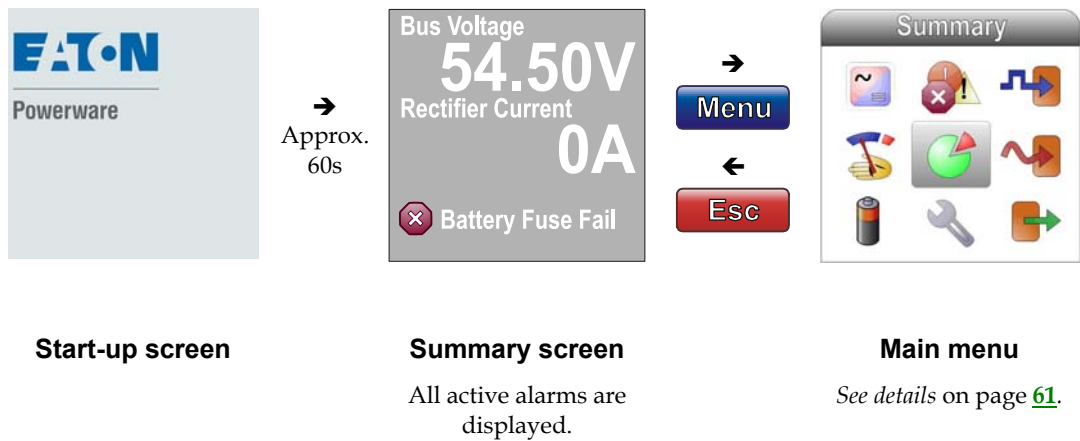
### ► To use a web browser for Backup and Restore (SC200 only)

- 1 Connect to the SC200 via a web browser. For details see Ethernet Communications in the System Controller Operation Handbook.
- 2 Go to *Tools*.
- 3 Select *Backup Tool* or *Restore Tool*.
- 4 Select *Configuration* (does not include site specific settings including Site Identity, IP Address and S3P Address) or *System Snapshot* (includes site specific settings).
- 5 Click *Proceed*.

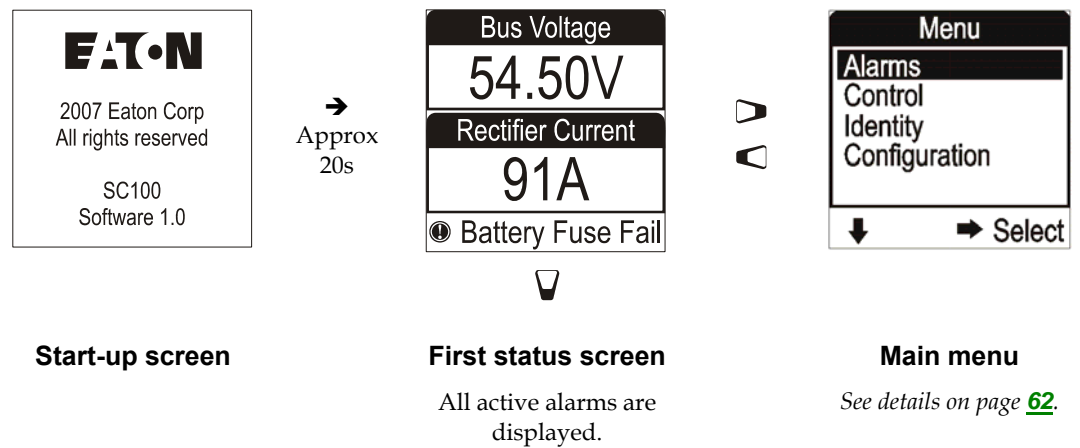
Starting the SC200 or SC100

When dc power is applied to the SC200 or SC100 (via the RXP connector YS11) the start-up sequence begins.

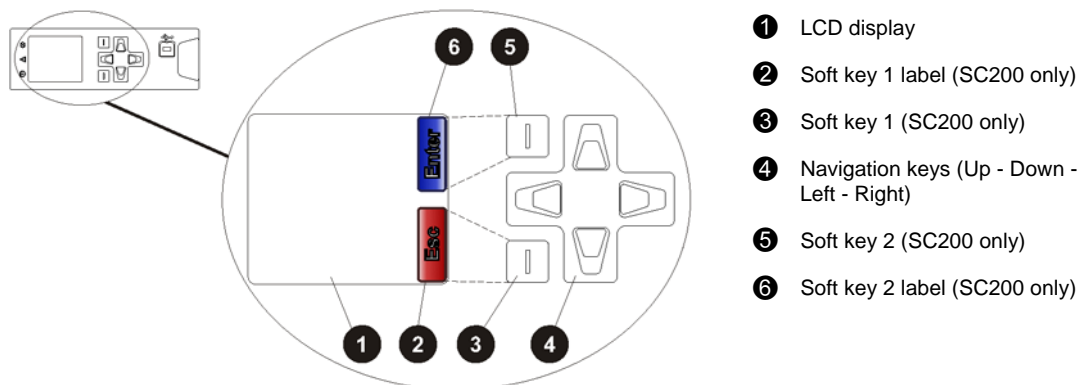
SC200



SC100



## SC200 or SC100 Operation using the Keypad and Screen



### Keypad Access Security

This feature prevents accidental or unauthorized changes to settings from the SC200 or SC100 keypad.



All access to change an SC200's settings will be lost if:

- All communications are disabled. See S3P Access and HTTP/HTTPS Access in the System Controller Operation Handbook, and
- Keypad access is PIN Protected, and
- The keypad access PIN is lost.

The SC200 will continue to function, but no configuration changes can be made. Contact your Powerware dc product supplier or Eaton for advice (see Worldwide Support on page 73).

#### ► To use DCTools/Web to enable/disable keypad access

- In DCTools/Web go to *Communications > Front Panel*.
- Set *Access* to:
  - *Unprotected* - keypad access is allowed, or
  - *Protected* - keypad access is denied (can be temporarily over-ridden, see below), or
  - *PIN Protected (SC200 only)* - keypad access is allowed when a 4-digit number is entered in the *Access PIN* field.

#### ► To temporarily enable keypad access when access is set to Protected

- Press *Up* and *Down* keys together for approximately 10 seconds.



*Keypad access is now temporarily enabled. Keypad access control reverts back to Protected mode after return to the Summary Screen (or after the display time-out period).*

#### ► To temporarily enable keypad access when access is set to PIN Protected (SC200 only)




- Press *Up* and *Down* keys together for approximately 10 seconds.
- Use the navigation keys to enter the correct 4-digit number.




*Keypad access is now temporarily enabled. Keypad access control reverts back to PIN Protected mode after return to the Summary Screen (or after the display time-out period).*

## Alarm Indicators


### Visual indicators

-  Power on LED (green)
-  Minor Alarm LED (yellow)
-  Critical/Major Alarm LED (red)
- ??? The system value cannot be displayed because of a failed, disconnected or unconfigured sensor.


### Audible indicator (SC200 only)

- One beep – indicates an invalid key press
- One beep every 2 seconds – Minor alarm is active
- Continuous sound – Critical/Major alarm is active
-  *Critical/Major alarms always override Minor alarms.*

#### ► To stop the audible indicator (when an alarm is active)

- Press any key
-  *The audible indicator will restart at the next active alarm.*

#### ► To enable/disable the audible alarm indicator


- Use the keypad to go to *Settings > Setup > Audible Alarms*.
-  *The audible indicator will still indicate an invalid key press.*

## SC200 or SC100 Operation Using a PC/Laptop

*DCTools* is configuration software for editing a system controller's configuration file (on-line) and monitoring the operation of Eaton's dc power systems. It is available free from [www.powerware.com/downloads](http://www.powerware.com/downloads).

### Using DCTools via USB (SC200 only)

*DCTools* can be run on a PC/laptop connected to the SC200's USB port.

-  *DCTools can also be run on a remote PC/laptop connected to the SC200's RS232 serial port (via a modem) or Ethernet port. For remote PC/laptop connection details see Communications Options in the System Controller Operation Handbook.*

Before you start you will need:

- The latest version of *DCTools* available from [www.powerware.com/downloads](http://www.powerware.com/downloads).
- A PC/laptop with USB port and USB A/B cable (RadioShack 55010997, Jaycar WC7700, or equivalent).

► **To connect a PC/laptop to the SC200:**

- 1 Download the latest version of *DCTools* from [www.powerware.com/downloads](http://www.powerware.com/downloads).
- 2 Install *DCTools* on the PC/laptop.
- 3 Connect a USB A/B cable from a USB port on the PC/laptop to the USB port on the SC200.  
☐ See the diagram on page [5](#) for location of the USB port.
- 4 *DCTools* will now connect to the SC200.  
☐ If connection is not successful refer to *DCTools* help (press F1) or Troubleshooting on page [44](#).
- 5 For details of the SC200 control and monitoring functions available via *DCTools* see System Operation in the System Controller Operation Handbook.  
☐ For help using *DCTools* press F1.

## Using DCTools via RS232

*DCTools* can be run on a PC/laptop connected to the SC200 or SC100's RS232 port.

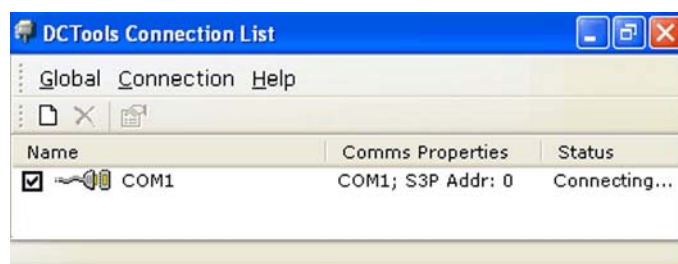
- ☐ For remote PC/laptop connection details see *Communications Options in the System Controller Operation Handbook*.



Before you start you will need:

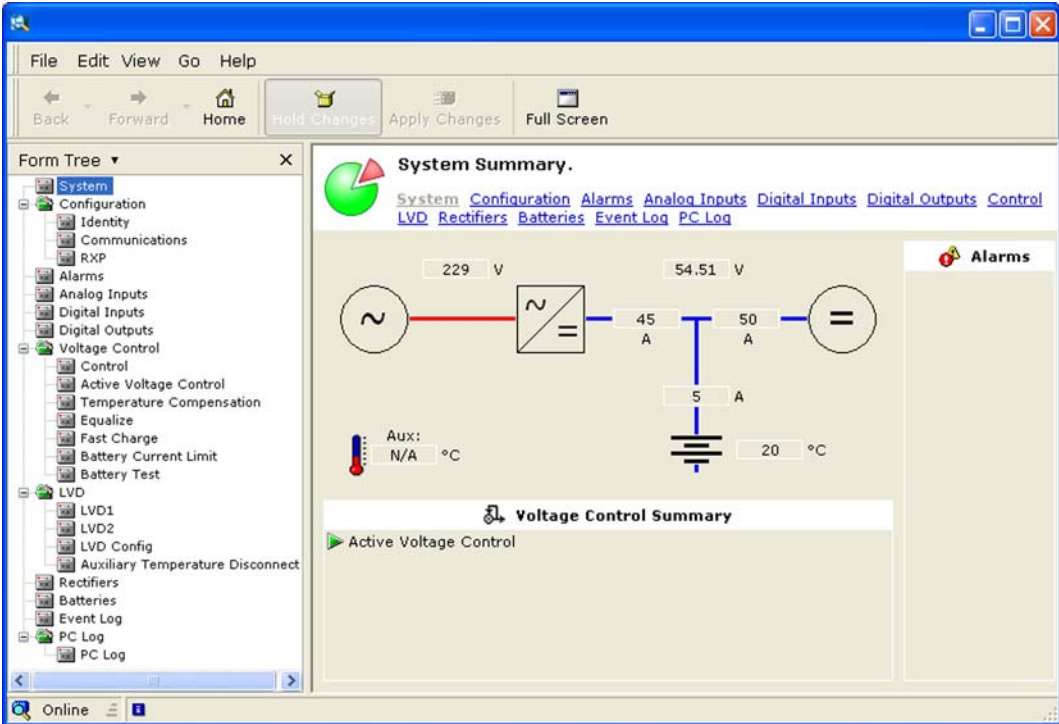
- The latest version of *DCTools* available from [www.powerware.com/downloads](http://www.powerware.com/downloads).
- A PC/laptop with a spare RS232 port.
- A null-modem cable (see Equipment and Tools on page [65](#)).

► **To connect a PC/laptop to the SC100:**

- 1 Download the latest version of *DCTools* from [www.powerware.com/downloads](http://www.powerware.com/downloads).
- 2 Install *DCTools* on the PC/laptop.
- 3 Connect a null-modem cable from the COM1 RS232 port on the PC/laptop to the RS232 connector on the SC100.  
☐ See the diagram on page [5](#) for location of the RS232 connector on the SC100. Ensure the cable is secured so that no force is applied to the RS232 plug on the SC100 as this may damage the connector.  
☐ If COM1 port is not available or for more details see *Direct RS232 Communications in the System Controller Operation Handbook*.
- 4 Start *DCTools* to open the Connection List. Check the box for the COM1 connection.



- 5 DCTools will now connect to the SC100.
-  If connection is not successful refer to DCTools help (press F1) or Troubleshooting on page [44](#).
- 6 For details of the SC100 control and monitoring functions available via DCTools see System Operation in the System Controller Operation Handbook.
-  For help using DCTools press F1.



## SC200 or SC100 Identity Information

The following identity information is stored in the SC200 or SC100.

Parameter	Description	Where to find:
Serial Number	The SC200 or SC100 serial number (factory set).	SC100: Menu > Identity > SC100 Identity
Software Version (App Version)	The version of the embedded software in the SC200 or SC100 (factory set).	SC200: Settings > Info DCTools/Web: Configuration > Identity

If required, the following site specific information can be stored in the SC200 or SC100 to assist site management.

Parameter	Description	Where to find:
System Manufacturer	The manufacturer of the dc power system.	DCTools/Web: Configuration > Identity
System Type	The EPS2/EPS5 model number.	
System Serial Number	The EPS2/EPS5 serial number.	
System Location	Location of EPS2/EPS5 at the site.	
Site Name	Name of the site.	
Site Address	Address of the site.	
Site Notes	Any notes relevant to site access, location or other matters.	
Contact	Contact name, phone number, etc.	
Configuration Name	Reference name of the configuration file in the SC200 or SC100.	



**Overview**

<b>Topic</b>	<b>Page</b>
Troubleshooting	<a href="#"><u>44</u></a>
Replacing or Adding a Rectifier	<a href="#"><u>47</u></a>
Replacing or Adding a Circuit Breaker	<a href="#"><u>48</u></a>
Replacing or Adding a Battery Module	<a href="#"><u>51</u></a>
Battery Care	<a href="#"><u>55</u></a>
Replacing the System Controller	<a href="#"><u>56</u></a>

## Troubleshooting

Use the table to troubleshoot minor installation and operational problems. For additional assistance see contact details on page [73](#). Return items for replacement or repair with a completed Equipment Incident Report on page [71](#).

Problem	Possible Cause	Required Action
SC200 or SC100 displays a dc power system alarm message.		See Alarm Descriptions in the System Controller Operation Handbook.
All rectifiers are off (no LEDs on) and system controller display is blank.	AC supply to the system is off and batteries (if used) are not connected or are fully discharged.	Restore ac supply.
Green LED of one or more rectifiers is off.	AC supply to rectifier(s) off or one or more phases are off.	Restore ac supply.
	Rectifier(s) not fully inserted.	Insert rectifier and tighten retaining screw.
	Internal rectifier fault.	Remove the rectifier and insert another one in the same slot. If second rectifier fails to start then there is a fault with the rectifier position. Check ac connections.  If the second rectifier operates normally, the first rectifier is faulty and must be returned for service.
All rectifier LEDs flash.	The rectifier <i>Identify</i> function.	Normal operation. See details in the System Controller Operation Handbook.
Rectifier yellow LED flashes	The system controller is starting.	Wait for system controller to complete start-up.
	Rectifier has not registered with the system controller.	Remove then re-insert the rectifier.  Replace the rectifier with another rectifier. If second rectifier fails to register then there is a fault with the rectifier position. Check rectifier comms bus wiring.  If second rectifier registers then first rectifier is faulty and must be returned for service.

Problem	Possible Cause	Required Action
Rectifier yellow LED on.	Rectifier power limit or current limit is active.	Power system is charging the batteries.
	Load current exceeds the total rectifier capacity.	Install additional rectifiers.
	Rectifier temperature turndown is active due to low ac supply voltage or high ambient temperature.	Power system will return to normal operation when the ac supply voltage and/or ambient temperature are within the specified ranges. See Specifications on page <a href="#">59</a> .
Rectifier yellow LED on and rectifier clicks every 5-15 seconds.	Rectifier has been shut down.	Normal operation. See details in the System Controller Operation Handbook.
		If required, restart the rectifier.
Rectifier red LED on.	Very high or low ac voltage, or ac supply failed.	Rectifier will return to normal operation when the ac supply voltage is within the specified range. See Specifications on page <a href="#">59</a> .
	DC overvoltage	Remove and re-insert rectifier(s) or shut down and restart using <i>DCTools/Web</i> .
	Rectifier failed	Replace the rectifier.
Low system output voltage (rectifiers not in current limit).	Rectifiers off.	Restore the ac supply.
	Temperature Compensation is active.	This is normal if batteries are connected and the battery temperature is above the reference temperature.  Disable Temperature Compensation if no batteries are connected.
	Battery Test is active.	Disable Battery Test if not required.
	Incorrect float voltage setting at system controller.	Correct the float voltage setting of the system controller.  Record new setting.
Low system output voltage and rectifier yellow LEDs are on (rectifiers are in current limit).	Load is too high for rectifier capacity.	Install additional rectifiers. See System and Rectifier Selection on page <a href="#">63</a> .
	Battery is recharging after ac supply failure.	Check battery has recharged within expected time.

<b>Problem</b>	<b>Possible Cause</b>	<b>Required Action</b>
High system output voltage.	Temperature Compensation is active	This is normal if batteries are connected and the battery temperature is below the reference temperature.  Disable Temperature Compensation if no batteries are connected.
	.Equalize or Fast Charge is active.	Disable active control process in system controller if not required.
	Incorrect float voltage setting at system controller.	Correct the float voltage setting of the system controller.  Record new setting.
	Faulty rectifier.	Locate the rectifier with the highest output current and remove this one first.  If the first rectifier removed is not faulty, remove each of the remaining rectifier modules one at a time, until the faulty rectifier is found. (The output voltage returns to normal when faulty rectifier is removed.)  Replace faulty rectifier with one that is working.  Return the faulty rectifier for service.
System has no dc output (rectifiers are on).	Load circuit breaker open.	Switch on the required load circuit breaker(s).
System has no battery input	Battery module cable(s) disconnected.	Connect all battery module cables.
	Battery circuit breaker(s) in off (O) position.	Switch on (I) the required battery circuit breaker(s).
	LVD has disconnected the battery (because ac supply is off and the battery is fully discharged).	None, this is normal operation. The battery will be automatically reconnected when the ac supply is restored.
Battery runtime is too short	Battery capacity is too low for the connected load.	Connect additional battery module(s). See Battery Module Selection on page <a href="#">64</a> .
	Battery requires recharge.	Charge for 24 hours.
	Battery service life has expired.	Check service life of battery (see details on page <a href="#">55</a> ).
	A battery module has an internal fault.	Disconnect the input and output cables from each battery module in turn and check its dc output voltage (nominal 48V). Any module with zero output voltage must be returned for service.

## Replacing or Adding a Rectifier

Rectifiers can be replaced without switching off the dc power system and disconnecting the equipment it powers.



- To reduce the risk of electric shock and maintain optimum system cooling, always cover empty rectifier slots with blanking panels.
- To avoid electric shock do not place hands inside the rectifier shelf.
- Do not attempt to disassemble faulty rectifiers. Return them (in their original packaging) with a completed Equipment Incident Report on page [71](#).

### Removing a Rectifier

#### Step 1 - Undo the rectifier retaining screw

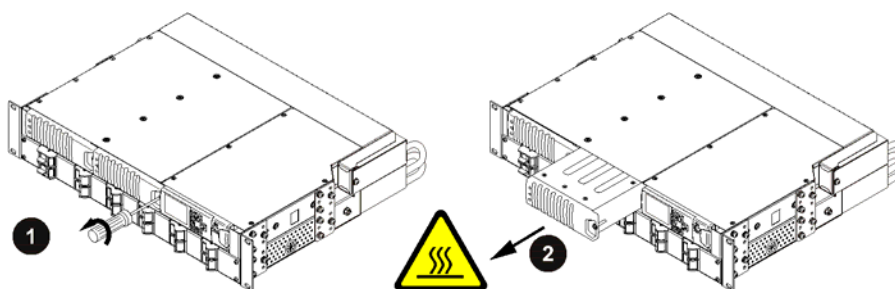


This will release the rectifier from its rear connector.

#### Step 2 - Pull out the rectifier



- The rectifier may be hot, especially after prolonged operation. Use suitable gloves.
- To avoid damage do not rest the rectifier on its connector.



#### Step 3 - Replace rectifier or fit blank panel



Insert a replacement rectifier into the empty slot (see details in following section), or fit a blank panel.

#### Procedure complete

### Installing a Replacement Rectifier

#### Step 1 - Remove rectifier blank panel (if fitted)



**Step 2 - Align the rectifier with the guides**



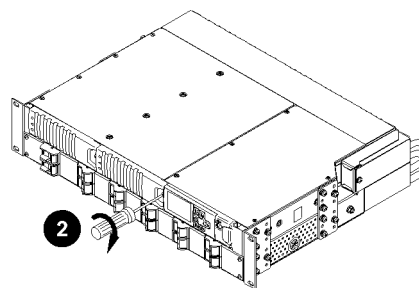
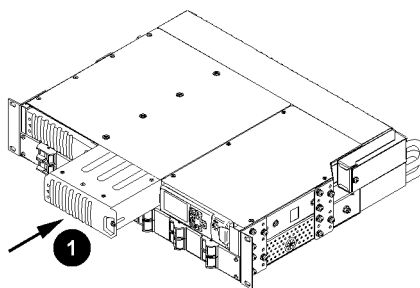
**Step 3 - Push in the rectifier**



- 1 Push in the rectifier until the retaining screw contacts the shelf.
- 2 Tighten the retaining screw to 1.5Nm (13.3 inch-pounds). This will locate the rectifier in its rear connector.
- 3 Check that the rectifier's Power On LED turns on (after the startup delay) and the alarm LEDs turn off.



*The rectifier will automatically register with the system controller and download its operating parameters. No adjustments are required.*



**Procedure complete**




## Replacing or Adding a Circuit Breaker

Circuit breakers can be replaced without switching off the dc power system.

### Removing a Circuit Breaker

**Step 1 - Disconnect the load or battery module(s)**



- If removing a load circuit breaker:
  - Switch off the equipment (if any) connected to the load circuit breaker.
  -  *Refer to the equipment supplier's instructions on switching off equipment.*
  - Switch OFF (O) the load circuit breaker
  -  *A Load Fuse fail alarm will appear if any equipment is connected to the circuit breaker.*
- If removing a battery circuit breaker:
  - Switch OFF (O) the battery circuit breaker.
  -  *A Battery Fuse Fail alarm will appear.*
- Unplug the battery cable (if any) connected to the circuit breaker.

**Step 2 - Remove circuit breaker cover****Step 3 - Pull out the circuit breaker**

*Any Fuse Fail alarm will clear.*

**Step 4 - Plug in new circuit breaker or replace cover**

Either:

- See instructions in following section for installing a new circuit breaker, or
- Fit a circuit breaker blank cover and replace the circuit breaker cover.

**Procedure complete****Installing a Circuit Breaker****Step 1 - Disconnect the load or battery module(s) (if required)**

- If installing a load circuit breaker then switch off the equipment (if any) connected to the circuit breaker.



*Refer to the equipment supplier's instructions on switching off equipment.*

- If installing a battery circuit breaker then unplug the battery module(s) (if any) connected to the circuit breaker.

**Step 2 - Remove circuit breaker cover****Step 3 - Plug in the circuit breaker**

- For a battery circuit breaker a *Battery Fuse Fail* alarm will occur at the system controller.
- For a load circuit breaker a *Load Fuse Fail* alarm will occur at the system controller if equipment is connected to the circuit breaker.

**Step 4 - Replace circuit breaker cover**



**Step 5 - Connect load or battery module (if required)**



- 1** Switch the circuit breaker to the OFF (O) position.
- 2** Connect the load equipment or battery (if required):
  - For a load circuit breaker, connect the cables to the load equipment (see details on page [21](#)), or
  - For a battery circuit breaker, plug in the battery module cable (see details on page [51](#)).

**Step 6 - Switch on circuit breaker**



- For a load circuit breaker:
  - Switch the load circuit breaker to the ON (I) position.
  - Follow the equipment suppliers instructions for starting the equipment.
  - Check the *Load Fuse Fail* alarm clears.
  - ☐ *Only load circuit breakers with equipment connected must be switched ON (I) to clear the alarm.*
- For a battery circuit breaker:
  - Switch the battery circuit breaker to the ON (I) position.
  - Check the *Battery Fuse Fail* alarm clears.
  - ☐ *All battery circuit breakers (including any unused circuit breakers) must be switched ON (I) to clear the alarm.*
  - The battery module(s) will begin to charge.
  - ☐ *The batteries will charge to 90% capacity in approximately 3 hours. However, it is recommended that they are charged for 24 hours after long-term storage.*

**Procedure complete**



## Replacing or Adding a Battery Module

Battery modules can be replaced without switching off the dc power system and disconnecting the equipment it powers.



### Batteries

- Batteries can present a risk of electric shock or burns from high short-circuit current.
- Do not alter any battery module cables or connectors.
- Do not place any metal objects in or near the connectors.
- VRLA lead acid batteries can emit explosive gases and must be installed with adequate ventilation. Do not install batteries in a sealed room or cabinet.
- Do not attempt to disassemble battery modules. Return them (in their original packaging) with a completed Equipment Incident Report on page [71](#).
- Only dispose of battery modules according to Battery Disposal and Recycling on page [55](#).



- Check the battery recharge dates on the shipping carton labels. Do not use the batteries if the date has expired and the batteries were never recharged. Contact your battery supplier.
- Batteries are heavy. Two people may be required to lift a module.
- Batteries must be installed at the bottom of the rack.

### Removing a Battery Module

#### Step 1 - Switch off battery circuit breaker



#### Step 2 - Disconnect cables



Disconnect the battery module cable(s).

#### Step 3 - Undo rack screws



#### Step 4 - Pull out the battery module



- The battery modules are heavy (54.9kg/121 lb). A minimum of two people are required to lift a module.

#### Step 5 - Replace battery module or reconnect cables



Either:

- Insert a replacement battery module into the empty position (see details in following section), or
- Reconnect the cables and switch on the battery circuit breaker.

**Step 6 - Adjust battery capacity in configuration file (if required)**



- In the SC200 or SC100 configuration file, set the battery capacity according to the number of battery modules connected:
  - Either:
    - On SC100 go to: *Menu > Configuration > System > Edit > Battery Capacity > Edit*, or
    - On SC200 go to: *Battery > Battery > Battery Capacity*.
  - Set *Battery Capacity* to the number of battery modules x 18Ah.

**Procedure complete**

**Installing a Battery Module**

**Step 1 - Fit rack rails or battery shelves (if required)**



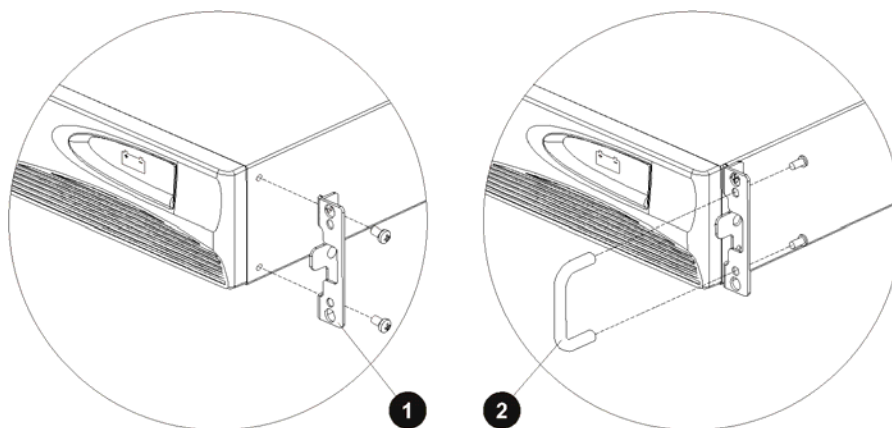
The weight of the battery modules must be fully supported by either fixed side rails or battery shelves.

If not already fitted, fit fixed rails or shelves (starting at the bottom of the rack) to suit the number of battery modules.




Refer to *Spare Parts* on page [66](#) for available fixed rails.

**Step 2 - Fit the mounting brackets to the front of each battery module**




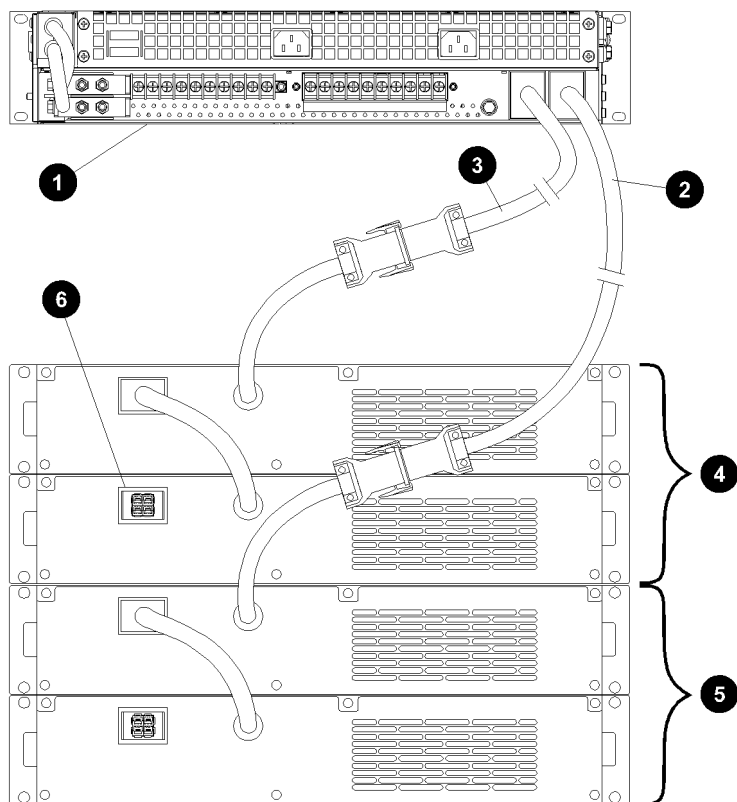
- ① Rack mounting bracket (two per module)    ② Mounting handle (two per module)

**Step 3 - Fit battery modules into rack**

- 1** Slide the battery modules into the rack starting at the bottom.  
 *The battery modules are heavy (54.9kg/121 lb). A minimum of two people are required to lift a module into a rack.*
- 2** Secure the battery module to the front of the rack using the rack fixing screws provided.

**Step 4 - Switch off battery circuit breaker****Step 5 - Connect cables**

- 1** Connect the battery modules together in series (in two groups if two battery circuit breakers are fitted).  
 *Maximum 5 battery modules to be connected to each battery circuit breaker in the EPS2/EPS5.*
- 2** Connect from battery connector 1 (BATT 1) on the EPS2/EPS5 to the cable plug on the first battery in group 1. Use the battery cable type CKBATT-00 (see Spare Parts on page [66](#)).
- 3** If required, connect from battery connector 2 (BATT 2) on the EPS2/EPS5 to the cable plug on the first battery in group 2.



- |   |  |
|---|--|
| ① EPS2 or EPS5  | ④ Group 2 battery modules (connected together)                                   |
| ② Battery cable connected from BATT1 to first battery module in group 1 | ⑤ Group 1 battery modules (connected together)                                   |
| ③ Battery cable connected from BATT2 to first battery module in group 2 | ⑥ Connector for next battery module, if required (maximum 5 per group, 10 total) |

#### Step 6 - Switch on battery circuit breaker



*The batteries will charge to 90% capacity in approximately 3 hours. However, it is recommended that they are charged for 24 hours after long-term storage.*

#### Step 7 - Adjust battery capacity in configuration file (if required)



- In the SC200 or SC100 configuration file, set the battery capacity according to the number of battery modules connected:
  - Either:
    - On SC100 go to: *Menu > Configuration > System > Edit > Battery Capacity > Edit*, or
    - On SC200 go to: *Battery > Battery > Battery Capacity*.
  - Set *Battery Capacity* to the number of battery modules x 18Ah.

#### Procedure Complete

## Battery Care


### Battery Temperature

- For full battery life, keep the ambient temperature around the battery modules to 25°C/77°F.

### Battery Service Life

- The batteries in the battery modules have a 3-5 year service life. The length of service life varies, depending on the frequency of usage and ambient temperature.
- Batteries used beyond expected service life will often have severely reduced runtimes.
- Replace battery modules at least every 5 years to maintain runtimes.

### Storing Battery Modules

- If battery modules are stored then ensure they are recharged every 6 months by plugging them into a EPS2/EPS5.  
 *The batteries will charge to 90% capacity in approximately 3 hours. However, it is recommended that they are charged for 24 hours after long-term storage.*
- Check the battery recharge date on the shipping carton label. Do not use the batteries if the date has expired and the batteries were never recharged. Contact your Eaton dc product representative for advice.

### Battery Disposal and Recycling

Follow Environmental Protection Agency (EPA) guidelines or the equivalent local regulations to dispose of all batteries. Please remember that the owner is responsible and liable to ensure those EPA guidelines or equivalent local regulations are followed.

For assistance contact your local hazardous waste center or Worldwide Support on page [73](#).

## Replacing the System Controller

The SC200 or SC100 system controller can be replaced without switching off the dc power system and disconnecting the equipment it powers.

### Before you start, you need

- A PC/laptop with the latest version of DCTools software installed and a connection cable.
    - ☐ See *Communications Options in the System Controller Operation Handbook*.
  - A replacement SC200 or SC100 system controller.
    - ☐ A new system controller is factory loaded with a 48V (nominal) default configuration file.
  - A copy of the appropriate configuration file, either:
    - use the configuration file saved from the existing system controller, or
    - contact your Eaton dc power system supplier to obtain a master configuration file to suit the dc power system. This file will have to be customized for the site.
- ☐ DCTools can be used to modify the configuration file already loaded in a system controller. However, a system controller configured for a particular nominal system voltage (48V or 24V) can only be converted to the other nominal system voltage by loading a new configuration file.

### Step 1 - Backup the configuration file of the old SC200 or SC100 if possible



If the old system controller is still operational use DCTools/Web to backup its configuration file.

☐ See *Backup and Restore* on page [36](#).

### Step 2 - Remove the system controller



- 1 Undo the system controller retaining screw. See the diagram on page [5](#).
- 2 Partly withdraw the system controller.
- 3 Label then disconnect the cable(s) from the rear connectors.

☐ When the system controller stops communicating the rectifier output voltage will be unchanged for 2 minutes. After 2 minutes the rectifier output voltage will change to the Float Voltage and the rectifier yellow LEDs will flash.

### Step 3 - Insert the new system controller





- 1 Connect the cable(s) to the rear connectors.

☐ The system controller will start. See *Starting the SC200 or SC100* on page [37](#). Various alarms may appear because of incorrect configuration file settings. Press any key to silence the alarm (SC200 only).

- 2 Insert the system controller and tighten the retaining screw.

**Step 4 - Download the configuration file**


- 1 Connect to the system controller with *DCTools*. See details on page [39](#).
- 2 If a copy of the old configuration file, or a master configuration file is available, then use *DCTools* to restore (download) it to the new system controller.
  -  See *Backup and Restore* on page [36](#).
  -  If you receive an error message about the MIB file version, please contact your Eaton dc product supplier for advice.
- 3 If a copy of the old configuration file, or a master configuration file is not available, then use the keypad or *DCTools/Web* to change the configuration settings to the correct values (provided the system controller is set for the correct nominal system voltage).

**Step 5 - Check the system controller operation**

- 1 Map the I/O board (SC200 only):
  - In *DCTools/Web* go to: *I/O Board > I/O Board to Serial Number Mapping*.
  - Copy the I/O board serial number(s) from the *RXP Bus Slaves* table to the *I/O Board to Serial Number Mapping* table to map an *IOB Number* to each I/O board (overwrite an existing serial number if required).
- 2 Check that the system controller has registered all rectifiers.
- 3 Check all control processes, alarms and current measurement(s).
- 4 Check the power system identification parameters and communications settings.
- 5 Change the configuration file as required to ensure that the system controller operates as intended.
- 6 Check the system controller time (SC200 only). See details in system controller handbook.


**Step 6 - LVD Characterization Alarm**




 *If there is no LVD Characterization alarm then ignore this step.*

If the SC200 or SC100 indicates an *LVD Characterization Error* alarm then:

- 1** On the SC200 go to: Battery > LVDs > LVD1 > Options, or on the SC100 go to: Menu > Configuration > Low Volts Disconnect
- 2** If available, select *Characterize With IOB Values*. Press *Enter*. No further action is needed.
- 3** If *Characterize With IOB Values* is not available, the LVD must be characterized. This will cause the LVD contactor to disconnect the battery for a few seconds.

 *The load equipment will be powered by the rectifiers.*

- On the SC200 go to: Battery > LVDs > LVD1 > Options, or on the SC100 go to: Menu > Configuration > Low Volts Disconnect
- Select *Characterize*. Press *Enter*.

 *The LVD contactor will disconnect and connect. When the characterization is complete the LVD Characterization Error alarm will clear.*

**Procedure complete**

Return the faulty SC200 or SC100 with a completed Equipment Incident Report on page [71](#).



# Specifications

## System Input

Input Voltage	120V, 208-240V (nominal)		
Input Current Rating			
EPS2 models:	1W + N + PE (120V nom.):	2 x 10A	
	2W + PE (208-240V nom.):	2 x 10A/ph	
EPS5 models:	1W + N + PE (120V nom.):	5 x 6A	
	2W + PE (208-240V nom.):	5 x 6A/ph	
Frequency	50-60Hz		
Maximum Ground Leakage Current	1.3mA per rectifier		
Rectifier Input Fuses (internal)	APR48-3G:	16A, 250V	
	EPR48-3G:	8A, 250V	

## System Output

Output Voltage (nominal)		48V	
Output Voltage			
With battery	Factory preset:	54.5V ± 0.1V	
	Range:	43 - 55V	
Without battery	Adjustable:	48 - 57.5V	
Connectable Equipment Power (maximum)			
		APR48-3G Rectifiers	EPR48-3G Rectifiers
EPS2 models with batteries*:	120V ac:	1100W	550W
	208-240V ac:	1800W	900W
EPS2 models without batteries:	120V ac:	2200W	1100W
	208-240V ac:	3600W	1800W
EPS5 models with batteries*:	120V ac:	-	2200W
	208-240V ac:	-	3600W
EPS5 models without batteries:	120V ac:	-	2750W
	208-240V ac:	-	4500W

*\*In systems with batteries one rectifier module is redundant and provides battery recharge.*

## Environment

Ambient Temperature Range	-40°C to 50°C [-40°F to 122°F]
Relative Humidity ( <i>operating and storage</i> )	<95% (non condensing)

## Dimensions H, W, D

EPS2 models	2U, 19-inch mounting, 335 mm [13.2"]*
EPS5 models	3U, 19-inch mounting, 335 mm [13.2"]*

\* Additional clear air space is required at rear for rectifier exhaust air venting. See details on page [18](#).

## Weight

EPS2 models	10.4kg [23 lb]*
EPS5 models	14.2kg [31.3 lb]*
Rectifier (APR48-3G or EPR48-3G)	1.7kg [3.7 lb]

\* Excluding rectifiers and battery modules

## Communications

USB (SC200 only)	Version:	1.1
	Speed:	Full Speed (12Mbits/s)
	Connector:	USB B (female)
RS232	Interface:	RS232 (DTE)
	Connector:	DB9M
Ethernet (SC200 only)	Interface:	10baseT
	Connector:	RJ45
	Protocols:	TCP/IP, SNMP, S3P over IP, http (Web), https (secure Web), SNTF
External modem options	Type:	PSTN or GSM
	Operation:	Dial in/Dial out on alarm*

\* Can operate as a backup for Ethernet communications (SC200 only).

## Optional Battery Modules

Model	Powerware 5125 EBM
Battery	48V, 18Ah total (2 strings), VRLA
Dimensions (H, W, D)	2U (85mm/3.4"), 19" rack mount, 495mm (19.5") <i>Excluding connection cable.</i>
Weight	54.9kg [121 lb]

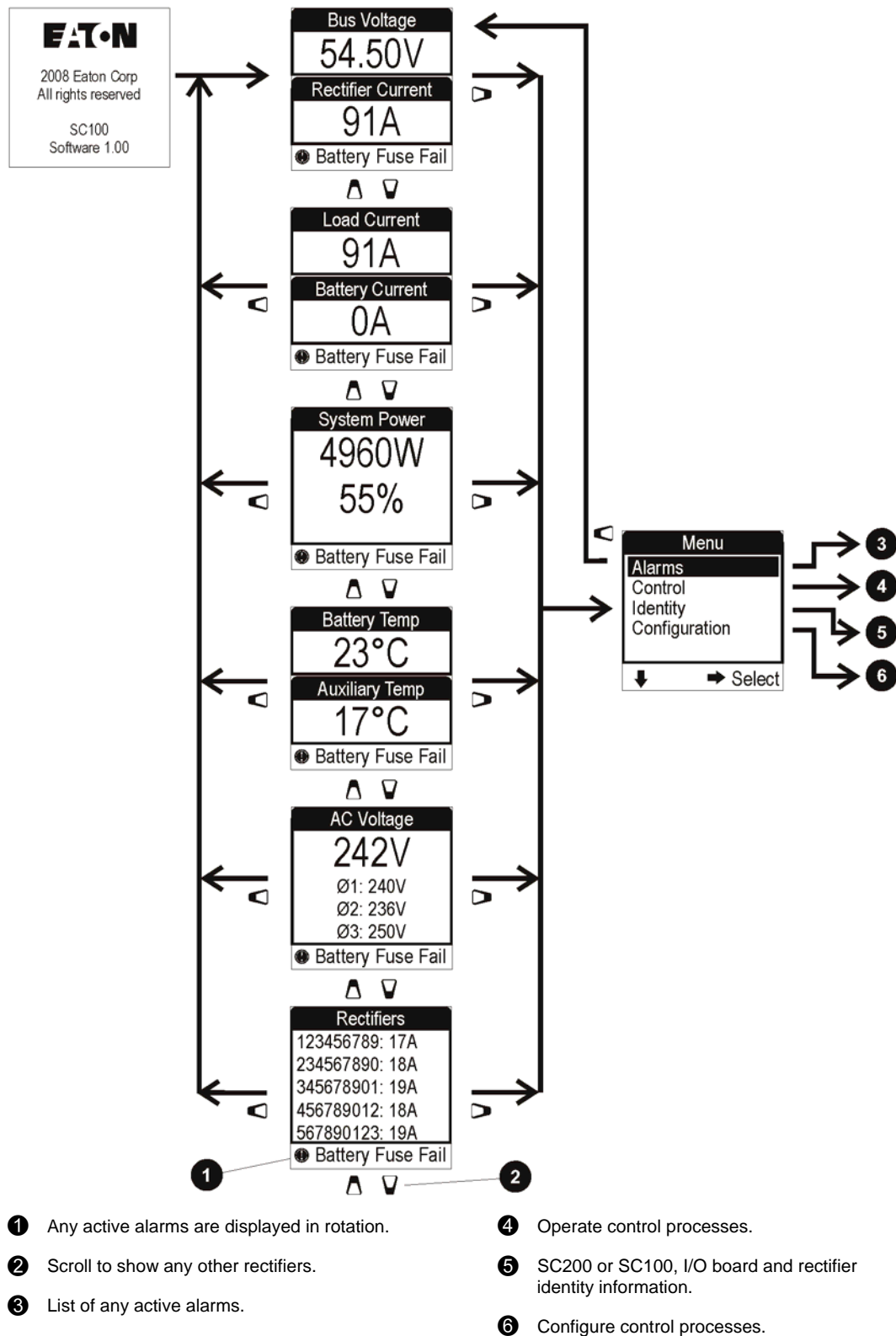
# Controller Menus

## SC200 Menu



## SC100 Menu

The following diagram shows the Status Screens and main navigation.



# System Sizing

## System and Rectifier Selection

Follow these steps to select the correct system model, rectifier type and number of rectifiers for your application:

- 1 What is the nominal ac supply voltage (120V or 208-240V)?
- 2 What is the total power requirement of the equipment to be connected to the EPS2/EPS5?
  - Add up the power ratings of all equipment that will be powered from the EPS2/EPS5. Look at the rating labels on the back of the routers, servers and other equipment. Or refer to the equipment manufacturer's specifications. The power is given in watts (W).
  - If you plan to add more equipment later then you may want to size the EPS2/EPS5 so that it can also supply this future requirement.
  - Up to 10 dc circuits can be connected to each EPS2/EPS5.
- 3 Select the EPS2/EPS5 system and rectifier type to suit your needs.
  - Use one of the selection charts below to select the correct system and rectifier type.
  - The number of rectifier modules shown in the charts includes one redundant rectifier. This is an additional (hot-spare) rectifier for added security.

### Supply Voltage: 120V ac

Connectable Equipment Power (W):	550	1100	1100	1650	2200
System model:	EPS2	EPS2	EPS5	EPS5	EPS5
Rectifier type:	EPR48-3G	APR48-3G	EPR48-3G	EPR48-3G	EPR48-3G
Number of rectifiers:	2	2	3	4	5

### Supply Voltage: 208-240V ac

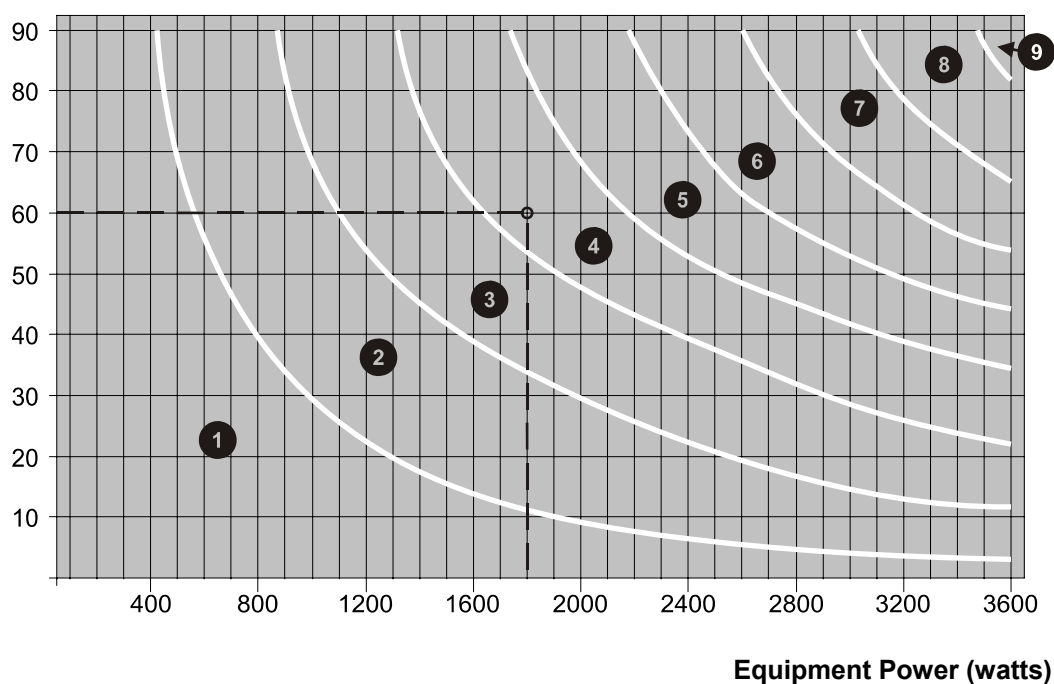
Connectable Equipment Power (W):	900	1800	1800	2700	3600
System model:	EPS2	EPS2	EPS5	EPS5	EPS5
Rectifier type:	EPR48-3G	APR48-3G	EPR48-3G	EPR48-3G	EPR48-3G
Number of rectifiers:	2	2	3	4	5

## Battery Module Selection (optional)

To calculate the required number of optional Powerware 5125 EBM battery modules:

- 1 Plot the total Equipment Power (watts) and the required battery run-time (minutes) on the following graph.
- 2 The number shown in each zone of the graph is the number of battery modules required.
- 3 Connect the modules as shown on page 24. Connect up to five modules to each battery connector.

**Battery Run Time  
(minutes)**



① = the required number of battery modules.



Run Times are approximate and can vary due to battery age and condition.  
Run Times are based on an end voltage of 43.2V (1.8V per cell).

**Example:** (as shown on the graph) for a total Equipment Power of 1800 watts and a battery run-time of 60 minutes, connect four battery modules.

# Equipment and Tools

## Safety Equipment

Use approved safety equipment as required by local health and safety regulations including (but not restricted to):

- Safety glasses
- Safety gloves
- Safety footwear
- Appropriate handling equipment for batteries and other heavy items
- Appropriate platform(s) and access for working at height (if required)

## Essential Tools

Standard electrical toolkit with insulated tools, plus:

- Torque wrench
- Torque screwdriver with insulated handle
- Digital multimeter
- Insulation tester

## Recommended Tools

- Laptop with:
  - USB port and USB A/B cable (see Spare Parts on page [66](#)) - for EPS2/EPS5 systems with SC200 system controller, or
  - RS232 port and null-modem cable (see Spare Parts on page [66](#)) - for EPS2/EPS5 systems with SC100 system controller.
- DCTools software (download from [www.powerware.com/downloads](http://www.powerware.com/downloads)).
- Labeling tool and labels

## Spare Parts

Item	Description	Part Number
1	48V, 1800W rectifier (used in EPS2 models only) See replacement procedure on page <a href="#">47</a> .	Eaton APR48-3G
2	48V, 900W rectifier See replacement procedure on page <a href="#">47</a> .	Eaton EPR48-3G
3	Rectifier blank panel (to cover un-used rectifier positions)	Eaton RM3B-A01
4	System controller See replacement procedure on page <a href="#">56</a> .	Eaton SC100-00 or SC200-00
5	Battery circuit breakers (60A, 80V dc)	Heinemann ACG1R-B39-AJB-20-D-AU-52-60-251
6	Load circuit breakers (80V dc) <i>Maximum five 25A and 30A circuit breakers per system.</i>	6A:     Heinemann JC1S-B3-AI-05-D-DU-6-2 10A:    Heinemann JC1S-B3-AI-05-D-DU-10-2 15A:    Heinemann JC1S-B3-AI-05-D-DU-15-2 20A:    Heinemann JC1S-B3-AI-05-D-DU-20-2 25A:    Heinemann JC1S-B3-AI-05-D-DU-25-2 30A:    Heinemann JC1S-B3-AI-05-D-DU-30-2
7	Optional battery module	Eaton Powerware-5125-EBM
8	Battery module 4-post Fixed Rail Kit	Eaton Powerware RAILKIT2U
9	Battery connection cable, 10AWG, 4-core, Powerpole to Powerpole, 2m (78") long	Eaton CKBATT-00
10	AC cord sets, 120V supply	Conductors:   16AWG x 3 Rated:        15A, 125V, 105°C Jacket type:   SJT Connector 1:   North America: NEMA 5-15P Other countries: 10A min. rating Connector 2:   IEC type C-15
11	AC cord sets, 208 - 240V supply	Conductors:   16AWG x 3 Rated:        15A, 250V, 105°C Jacket type:   SJT Connector 1:   North America: NEMA L6-15 Other countries: 10A min. rating Connector 2:   IEC type C-15
12	USB A/B cable - for use with SC200 system controller	RadioShack 55010997, Jaycar WC7700, or equivalent.
13	RS232 DB9 F/F Null-modem cable - for use with SC100 system controller	RadioShack 55010600, Jaycar WC7513, or equivalent. (Cross-over connections: 5-5, 2-3, 3-2)

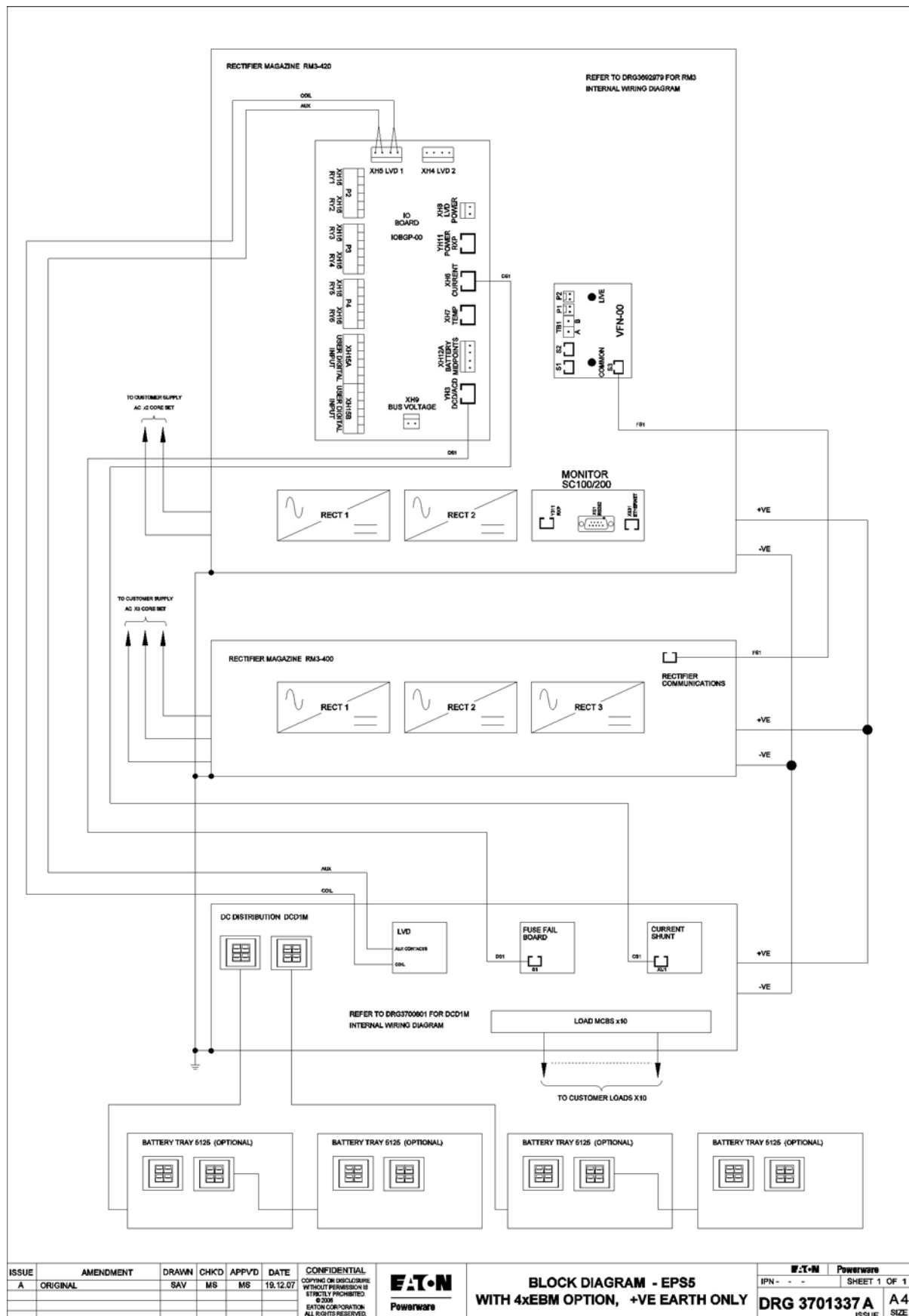
## Purchasing Information

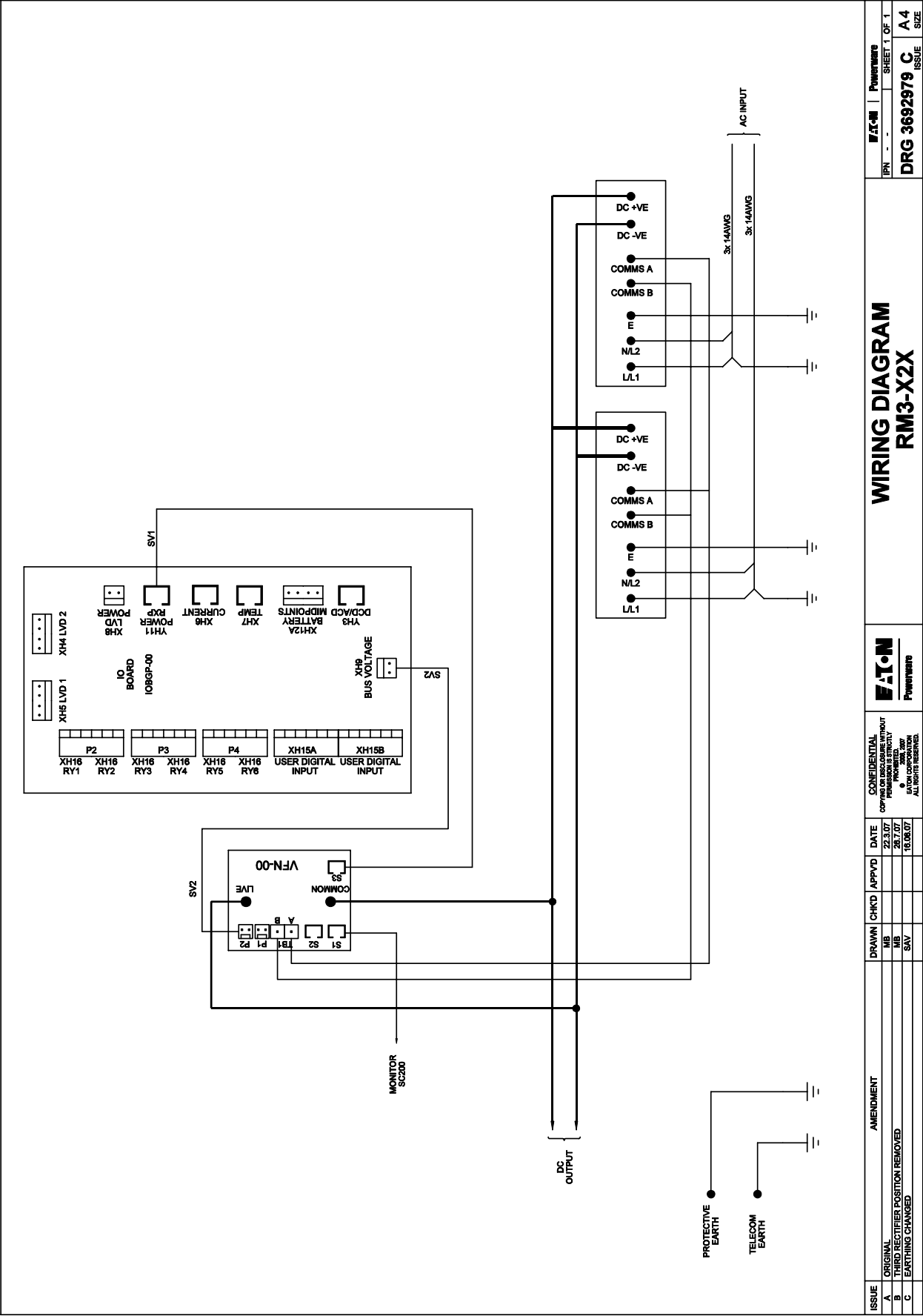
<b>Eaton</b>	See contact details on page <a href="#">73</a> .
<b>Heinemann</b>	Your local electrical trade supplier or see contact details on page <a href="#">73</a> .
<b>RadioShack</b>	<a href="http://www.radioshack.com">www.radioshack.com</a>
<b>Jaycar</b>	<a href="http://www.jaycar.com">www.jaycar.com</a>



# Circuit Diagrams

Drawing Number	Issue	Title
3701337	A	Block Diagram - EPS5 with 4 x Option, +ve Earth Only
3692979	C	WIRING DIAGRAM RM3-X2X (applies to RM3-420 models)
3700801	A	Wiring Diagram DCD1M +ve Earth







# Eaton | Powerware EQUIPMENT INCIDENT REPORT

Please enter as much information as you can. Send the completed form, together with the item for repair to your nearest authorized service agent. NOTE: Only one fault to be recorded per form.

For further information contact your Powerware dc product supplier or Eaton Corporation, Telecommunications Solutions Division. See contact details on page 73. Or email: CustomerServiceNZ@eaton.com

Date: \_\_\_\_\_

## Customer Information

Company: \_\_\_\_\_

Postal Address: \_\_\_\_\_

Return Address: \_\_\_\_\_  
(Not PO Box)

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Contact Name: \_\_\_\_\_

## Location of Failure

Product code: \_\_\_\_\_ Serial number: \_\_\_\_\_ Document number: \_\_\_\_\_

System type installed in: \_\_\_\_\_ Serial number: \_\_\_\_\_

Site name or location: \_\_\_\_\_

**Fault discovered** ☐ Delivery ☐ Unpacking ☐ Installation  
☐ Initial test ☐ Operation after \_\_\_\_\_ years ☐ Other \_\_\_\_\_

**Failure source** ☐ Design ☐ Manufacturing ☐ Documentation  
☐ Transportation ☐ Installation ☐ Handling  
☐ \_\_\_\_\_

**Effect on system operation** ☐ None ☐ Minor ☐ Major ☐ \_\_\_\_\_

## INFORMATION (fault details, circumstances, consequences, actions)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Internal use only.

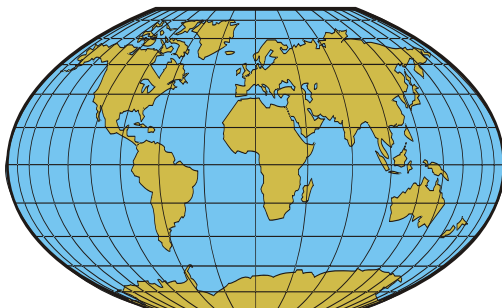
Reference No: \_\_\_\_\_ RMA: \_\_\_\_\_ NCR: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings present.

SG/03 ISS04

For product information and a complete listing of worldwide sales offices, visit Eaton's Powerware website at: **[www.powerware.com](http://www.powerware.com)** or email: **[DCinfo@eaton.com](mailto:DCinfo@eaton.com)**

For technical support contact either your local Powerware dc product representative, the closest office from the following list, telephone **(+64) 3 343-7448**, or email **[CustomerServiceNZ@eaton.com](mailto:CustomerServiceNZ@eaton.com)**



<b>Australia</b>	Tel. 1300 877 359
<b>Canada</b>	Tel. 1-800-461-9166
<b>Central America</b>	Tel. +52 55 9000 5252
<b>China</b>	Tel. +86-571-8848-0166
<b>Europe / Middle East / Africa</b>	Tel. +44-1243-810-500
<b>Hong Kong / Korea / Taiwan</b>	Tel. +852-7221-5305
<b>India</b>	Tel. +91-11-2649-9414 to 18
<b>New Zealand / Pacific</b>	Tel: 0800 dc Power (327-693) Tel. +64-3-343-7448
<b>Singapore / South East Asia</b>	Tel. +65 6825 1668
<b>South America</b>	Tel. +55-11-3616-8500 Tel: +54 11-4308-0778
<b>United States of America (Toll Free)</b>	Tel. 1-800-843-9433





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