GREEN CUBES
THE POWER TO PERFORM

GUARDIAN

GUARDIAN M44

6U/7U Integrated DC Power System -48VDC @ 60A to 700A

Overview

Guardian M44 is a 6RU or 7RU high 19" rack-mounted, integrated DC power systems providing an output of 48VDC. These systems can accommodate between eight (6U) and twelve (7U) Guardian family FMPe30.48J hot-swap rectifiers or FPV30.48G hot-swap solar converters. A load current of up to 700A is available with software controlled battery charge current subject to an overall 700A load plus charge. The rectifiers / solar converters are internally fan cooled with speed control which is a function of load and temperature, keeping acoustic noise to a minimum.

The DC output circuits can provide up to 23 loads which utilize circuit breakers with capacities from 4A to 150A plus up to six 100A to 300A breakers that provide battery protection. An optional programmable low voltage battery disconnect + shunt (LVBD) with 600A capacity is available for use with Lead Acid batteries; while an optional partial load disconnects (PLD), rated at 350A and also programmable, can provide non-critical load shedding when operating on batteries. When the LVBD option and battery breakers are not required the maximum number of available load breakers increases to 23.

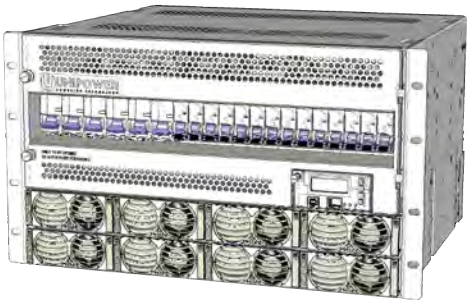
The GCC remote access controller monitors system parameters, controls rectifier / solar converter output, and provides alarms for system failures. It is also pluggable for easy field replacement in case of failure. There are 2 LED alarm indicators which indicate failures, (RED) Alarm and (YELLOW) Message. A third green LED indicates the controller is working properly. As standard four form-C relay outputs provide alarms for remote use, while an additional 6 can be included as an option. Two digital inputs and outputs are also provided as well as a microSD card slot that accepts an up to 32GB card which is sufficient for more than 20 years data logging.

The GCC controller supports Green Cubes Guardian GBU Lithium ion battery modules as well as Lead Acid batteries. When the system is deployed with these modules the LVBD, current shunt and battery breakers are not included by default.

The system can be programmed by means of a remote PC web page display or the free PowCom™ software which offers local and remote management through an advanced Windows GUI. Communication is by IPv4 or IPv6 Ethernet LAN with SNMP v2c and v3 including alarm trapping. It also has provision for temperature compensated charging of an external battery Lead Acid battery using a supplied TC probe. An LCD Display and Keypad are included for local metering, status, and setup.

Features

- Rectifiers or Solar Converters
- 60A to 700A Capacity
- Remote Monitoring & Control
- Field Replaceable Controller
- Ethernet Comm. with SNMPv3
- 4 or 10 Form-C Relay Alarms
- Up to 23 Load Breakers
- Up to 6 Battery Breakers
- LCD Display & Keypad
- Easy Installation



Safety Certification

CAN/CSA C22.2 No 62368-1:2014
UL 62368-1:2014
EN 62368-1:2014/A11:2017

System Specifications & Capability Guide

SYSTEM DESIGNATION - GUARDIAN M44 - M00044

Output

System Voltage	-48VDC nominal | 53.5VDC float	
Maximum Capacity @ 230/400VAC nominal	Load	600A with LVBD & Shunt 700A without LVBD & Shunt
	Battery	600A discharge with LVBD & Shunt 700A discharge without LVBD & Shunt s/w controlled charge
No. Rectifier / Solar Converter Slots	8 or 12 (see configuration guide on page 4)	

DC Distribution

Loads Circuits	up to 23 (4A to 150A - see configuration guide on page 4)
Battery Circuits	2, 4 or 6 x (100A, 125A, 200A, 250A or 300A)

Input

		Rectifiers	Solar Converters
Rating	1 input, 8 rectifiers 1 input, 12 rectifiers	230Vac/400Vac, 3W+N+PE, 42A, 50/60Hz 230Vac/400Vac, 3W+N+PE, 56A, 50/60Hz	Nominal MPPT: 160-300 V DC
Frequency		47-63Hz	
Maximum Input Current	1 input, 8 rectifiers 1 input, 12 rectifiers	52.5A per phase @ 185-276VAC 70A per phase @ 185-276VAC	17.6A, 1 input each module
Rectifier Power Factor		>0.98 (typical)	
Surge Protection		Optional (see configuration guide on page 5)	Not Available

Monitoring & Control

Alarm Relays	10 standard, option for 4 only
Local Interface	4 x 20 LCD, 4-key menu keypad, USB / RS232, microSD card slot (32GB max,) for data logging
Remote Interface	Ethernet / Modem using PowCom™ software package Ethernet port allows monitoring and control over a IPv4 or IPv6 TCP/IP network. Web browser support + SNMP v2c and v3
LED Indications	Green - System ON; Yellow - Message(s); Red LED - Alarm(s)
External Digital I/O	2 x Inputs, 2 x Outputs (Open Collector)

Battery Management

Symmetry Inputs	6 or 12 (can be redefined as analog inputs up to 100VDC)
Low Voltage Battery Disconnect (LVBD)	1 x 600A Programmable (Optional)
Partial Load Disconnect (PLD)	1 x 350A Programmable (Optional)
Temperature Compensated Charging	Programmable

Compliance

EMC	EN 300 386 ; EN61000-6-3 (Emission) ; EN61000-6-2 (Immunity)
Safety	CAN/CSA C22.2 No 62368-1:2014 | UL 62368-1:2014 | EN 62368-1:2014/A11:2017

Environmental

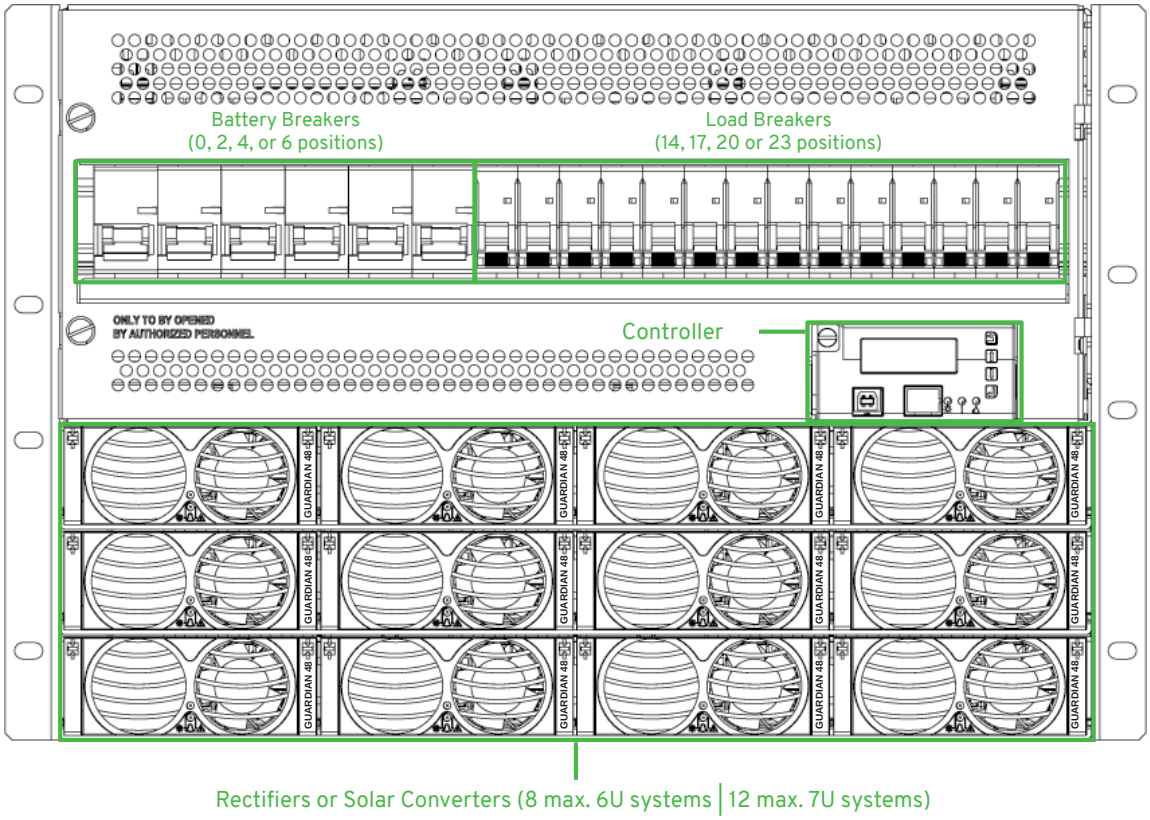
Operating Temperature	-40ºC to +55ºC
Storage Temperature	-40ºC to +85ºC

Rectifier / Solar Converter Modules vs. System Capacity

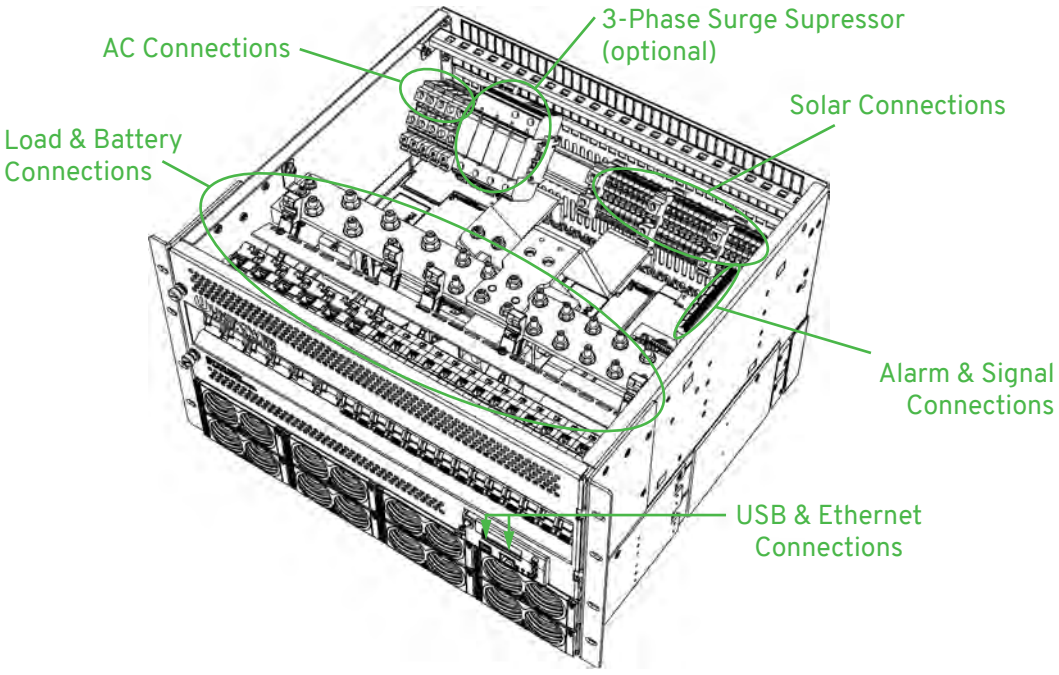
Rectifier / Solar Converter Modules						System Capacity @ Float [4,5]			
Model Number	Efficiency [1]	Input Voltage [2]	Input Current [3]	Output Power	Output Current 48V / 53.5V	Max. Load Current 6RU		Max. Load Current 7RU	
						Total	7+1	Total	10+1
FMPe30.48J	>95.0%	185-275VAC	18.5A	3000W	62.5A / 56.1A	448.8A	392.7A	600A	600A
FPV30.48G	95% peak	180-300VDC	17.6A	2900W	60.0A / 54.2A	433.6A	379.4A	600A	600A

Notes:
1. When operating at peak 230VAC.
2. Derated output available below 185VAC or 180VDC respectively. See individual datasheets for details.
3. Input currents shown are expected maximums at 185VAC or 180VDC respectively.
4. Factory set to 53.5V. Adjustable via system controller.
5. Maximum load current of 700A available when LVDB not included, subject to total rectifier or solar converter capacity.

Front Panel Description



Perspective Front View



Configuration Guide

PLEASE COMPLETE THE BELOW TABLE AND SUBMIT TO GREEN CUBES FOR VERIFICATION AND CONFIGURATION NO. ALLOCATION
(This form is fully interactive and may be completed electronically OR it can be printed and complete by hand)

STEP 1 - CUSTOMER DETAILS

Company: _____	Contact Name: _____
Address: _____	Email Address: _____
_____	Telephone: _____
Zip Code: _____ Country: _____	Quantity for quotation: _____

STEP 2 - CHASSIS TYPE - Choose one version [the system will be supplied configured for EITHER rectifiers OR solar converters]

8 Rectifier Positions (6RU)	1 x 3-Phase 400V ☐
OR 12 Rectifier Positions (7RU)	OR 1 x 3-Phase 400V ☐
OR 8 Solar Converter Positions (6RU)	OR 8 Solar Converters ☐
OR 12 Solar Converter Positions (7RU)	OR 12 Solar Converters ☐

STEP 3 - RECTIFIER / SOLAR CONVERTER MODULES - Enter quantity between 1 and 8 or 1 and 12 - dummies will be inserted into unused slots

FMPe30.48J - 3000W / 62.5A OR FMV30.48G - 2900W / 60A	Quantity ____

STEP 4 - ALARM INTERFACE - Select desired alarm interface

Alarm Interface - 4 Relays or 10 Relays	4 Relays ☐ OR 10 Relays ☐

STEP 5 - LOW VOLTAGE BATTERY DISCONNECT (LVBD) - Select none, 2, 4 or 6 battery breaker positions

No LVBD or battery breakers (23 load breaker positions available)	None ☐ [Select when using Lithium Ion GBUs]
2 battery breaker positions (20 load breaker positions available)	OR 2 positions ◉
4 battery breaker positions (17 load breaker positions available)	OR 4 positions ☐
6 battery breaker positions (14 load breaker positions available)	OR 6 positions ☐

STEP 6 - BATTERY BREAKERS - Choose rating and quantity based on step 5 choice (Breakers MUST be identical rating)

100A (1 pole) - 2, 4 or 6 max.	Qty 1 ☐ OR Qty 2 ☐ OR Qty 3 ☐ OR Qty 4 ☐ OR Qty 5 ☐ OR Qty 6 ☐
OR 125A (1 pole) - 2, 4 or 6 max.	OR Qty 1 ☐ OR Qty 2 ☐ OR Qty 3 ☐ OR Qty 4 ☐ OR Qty 5 ☐ OR Qty 6 ☐
OR 200A (2-pole) - 1, 2 or 3 max.	OR Qty 1 ☐ OR Qty 2 ☐ OR Qty 3 ☐
OR 250A (2-pole) - 1, 2 or 3 max.	OR Qty 1 ☐ OR Qty 2 ☐ OR Qty 3 ☐

STEP 7 - PARTIAL LOAD DISCONNECT (PLD) - Select YES or NO

350A (non-critical load / load shed disconnect)	Yes ☐ OR No ☐

STEP 8 - LOAD BREAKERS - Choose quantity for desired ratings, total 23, 20, 17 or 14 positions based on step 5 selection. When the PLD option is not selected populate only the LVBD 'critical' circuits column. When the PLD option is selected the maximum number of 'critical' circuits is reduced to 12, 9, 6 or 3 respectively. The maximum allowed PLD breakers is always 7. [Configuration will be checked by Green Cubes]

Two and three pole options are configured to support a single load at the load capacity indicated.	LVBD CIRCUITS (Critical)	PLD CIRCUITS (non-Critical)
4A single pole (1 position) [load capacity 4A]	Quantity ____	Quantity ____
6A single pole (1 position) [load capacity 6A]	Quantity ____	Quantity ____
10A single pole (1 position) [load capacity 10A]	Quantity ____	Quantity ____
16A single pole (1 position) [load capacity 16A]	Quantity ____	Quantity ____
20A single pole (1 position) [load capacity 20A]	Quantity ____	Quantity ____
25A single pole (1 position) [load capacity 25A]	Quantity ____	Quantity ____
32A single pole (1 position) [load capacity 32A]	Quantity ____	Quantity ____
40A single pole (1 position) [load capacity 40A]	Quantity ____	Quantity ____
50A single pole (1 position) [load capacity 50A]	Quantity ____	Quantity ____
63A single pole (1 position) [load capacity 63A]	Quantity ____	Quantity ____
50A two pole (2 positions) [load capacity 80A]	Quantity ____	Quantity ____
63A two pole (2 positions) [load capacity 100A]	Quantity ____	Quantity ____
50A three pole (3 positions) [load capacity 120A]	Quantity ____	Quantity ____
63A three pole (3 positions) [load capacity 150A]	Quantity ____	Quantity ____

STEP 9 - TEMPERATURE SENSOR - available for battery and ambient temperature measurement

None	NONE ☐
OR 3.0m (~10ft) [Preferred]	OR Qty 1 ☐ OR Qty 2 ☐
OR 6.0m (~20ft)	OR Qty 1 ☐ OR Qty 2 ☐

STEP 10 - SYMMETRY CABLES - choose none or type and length as desired. Quantity will be matched to battery breakers installed.

None	NONE ☐ [Select when using Li Ion battery units]
OR - End Measure (3-wire 4 block) 3.0m (~ 10ft) [Preferred]	OR End Measure 3.0m ☐
OR - End Measure (3-wire 4 block) 6.0m (~20ft)	OR End Measure 6.0m ☐
OR - Mid Measure (1-wire 2 block) 3.1m (~ 10ft) [Preferred]	OR Mid Measure 3.1m ☐
OR - Mid Measure (1-wire 2 block) 6.0m (~ 20ft)	OR Mid Measure 6.0m ☐

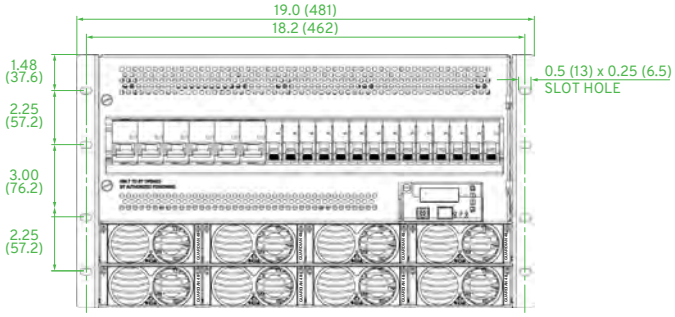
STEP 11 - AC SURGE PROTECTION - choose none or type desired. [Not available with solar configured chassis types (step 2)]

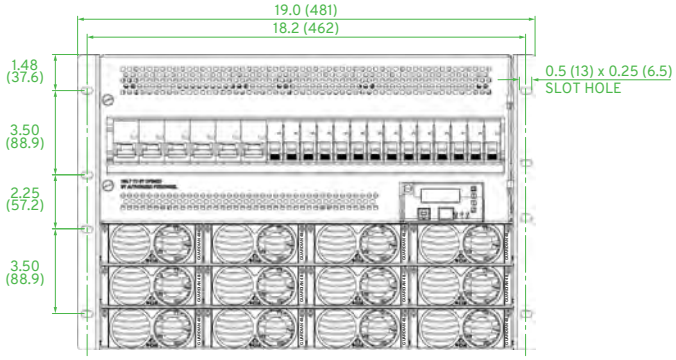
None OR 1-phase OR 3-phase	NONE ☐ OR 1-phase ☐ OR 3-phase ☐

STEP 12 - SUBMIT COMPLETED FORM TO Green Cubes FOR CHECKING AND ALLOCATION OF CONFIGURATION PART NUMBER

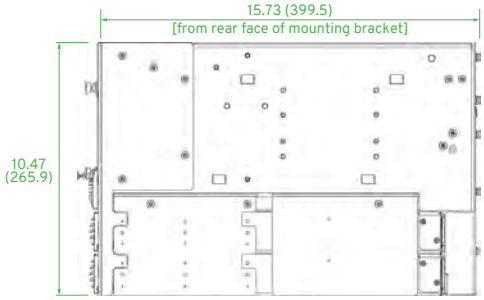
Configuration Part Number: M00044G_____ (leave blank for completion by Green Cubes)

Detailed Dimensions

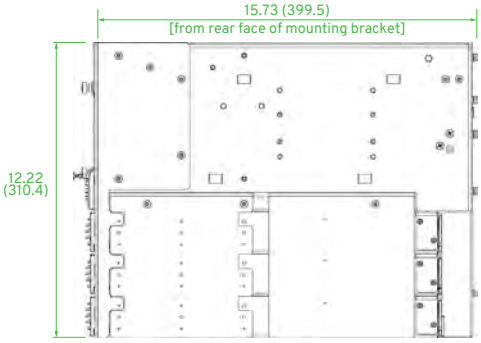




6RU CONFIGURATION



7RU CONFIGURATION



Weights & Dimensions

UNIT TYPE	UNIT				PACKAGED				
	Width	Height	Depth	Weight	Width	Height	Depth	Weight	# in box
System Unit	18.9 (481)	6RU 7RU	16.0 (406)	73 lbs (33 kg) max.	23.4 (595)	17.9 (455)	1.91 (485)	77 lbs (35 kg) max.	1
Rectifier Module	4.2 (107)	1.6 (41)	14.0 (355)	4.6 lbs (2.1 kg)	15.5 (394)	2.3 (58)	8.2 (208)	4.8 lbs (2.2 kg)	1

Dimensions in inches (mm)

ABOUT GREEN CUBES TECHNOLOGY

Green Cubes Technology harnesses over 30 years of industry experience to ensure we design, develop and deliver solutions for the most challenging energy needs. We offer battery technology innovation, application design and performance management to drive productivity, scalability and sustainability.

Green Cubes provides complete power systems to the stationary power industry. With the addition of the Guardian and Aspiro Product lines offered under the UNIPOWER brand, these industry proven DC plant systems serve critical applications all around the world. Green Cubes offers complete power solutions including energy storage, power conversion, and seamless integration.

For more information, email **contact@greencubes.com** or visit **greencubes.com**

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