



Powering Business Worldwide

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# Eaton's Telecommunications Power Solutions Business



## Our Business

Eaton is a power management company providing energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power. A global technology leader, Eaton serves the needs of customers located in over 175 countries. For more information, visit [www.eaton.com](http://www.eaton.com).

At Eaton, we're energized by the challenge of powering a world that demands more. With over 100 years experience in electrical power management, we have the expertise to see beyond today. From groundbreaking products to turnkey design and engineering services, critical industries around the globe count on Eaton.

We power businesses with reliable, efficient and safe electrical power management solutions. Combined with our personal service, support and bold thinking, we are

answering tomorrow's needs today. Follow the charge with Eaton. Visit [eaton.com/electrical](http://eaton.com/electrical).

## Environmental Standards

Eaton strives for the highest environmental standards across both our operations and products and our commitment goes beyond compliance with existing regulations. We wish to become recognized as an industry leader in creating safe workplaces and conserving world resources.

Eaton is committed to environmental stewardship and participates in a number of volunteer government partnership programs worldwide.

We were among the first diversified industrial companies to pursue global ISO 14001 certification - a rigorous standard for managing and improving environmental performance.

Today, virtually all of Eaton's

facilities worldwide have earned this designation.

Design for Environment (DfE) and Life Cycle Assessment are core parts of the Eaton product development process. They ensure that a product is safe, uses resources wisely, and fully sustainable over the whole life cycle.

## Unsurpassed Experience

Eaton has in excess of 40 years experience of working closely with customers to deliver tailored power management solutions for communications networks around the world.

## Customer led Solutions

Eaton's insight into customer needs is demonstrated through its products in terms of reliability, efficiency, smart energy features, power density, and ease of installation,

Intelligent monitoring and control capabilities add flexibility, precision, reliability, and automation - without added complexity.

## Comprehensive Range

Our telecom power solution range includes AC and DC power systems, power and ancillary equipment management software, cabinets and enclosures, and other products. Eaton also offers a wide range of DC services including design, installation and commissioning remote monitoring, turnkey integration and site support, to provide a seamless solution.

## Delivery

Eaton's global scale manufacturing and logistic capability means that products and services can be delivered with maximum cost-effectiveness and with the delivery speed and flexibility that you expect.

**We make what matters work<sup>\*</sup>**

# Eaton's Telecommunications Power Solutions Business



## Services Capability

Eaton's offers a wide range of DC secure power services including power quality evaluation, sizing, design consultancy, installation and commissioning, full project management and turnkey integration. Our individually tailored service contract plans can provide ongoing service maintenance, training, after-sales service, and repairs, Eaton's global presence ensures quick response times for all of our customers.

## World-Wide On-Site Services

Eaton's fully trained customer service engineers can carry out all installation tasks or supervise and assist local staff.

## Design Services

Skilled engineering staff can provide a full design service for DC power systems to specifically suit individual applications and sites.

## Integration Services

Our telecommunications integration services provide complete install, testing and integration services for any type of communications or other electronic equipment, to world leading standards of quality.

# Eaton's Telecommunications Power Solutions Business



## After-Sales Service and Repairs

Eaton DC Regional Repair Sites, staffed by fully trained technicians, are strategically located around the world to provide rapid turnaround times. Individually tailored service contracts are also

available so customers can choose the ongoing service package that best suits their requirements.

Options include extended warranty periods, out-of-warranty repairs, immediate replacement, on-site maintenance, and battery testing and conditioning.

Special terms and conditions apply to some DC services.

## Training

Eaton offers a comprehensive range of training courses designed to provide the right level of product knowledge

with practical demonstrations and hands-on opportunities. Courses can be arranged at an Eaton location or at a customer's site.

# 3G Enterprise Power Solutions - EPS2 Series



The **Eaton® 3G Enterprise Power Solutions** are the ideal solution for converged data networks and low power tele-communications applications requiring compact, efficient and flexible DC power supplies.

This EPS2 series is a 19" rack mounted system and is available with up to two of the Eaton 3G Enterprise or Access 48V rectifier modules providing a total output of up to 4000W.

The versatile SC200 system controller features a front access USB port for ease of system setup along with a RS232 rear port and a 10BaseT Ethernet port for remote networking and communications.

Communication features of the SC200 system controller include TCP/IP, SNMP and an onboard web server allowing access with standard web browsers. The SC200 also supports GSM cellular (including text messaging) and standard PSTN modems.

The Enterprise systems include an integral DC distribution panel with easy to fit push-in circuit breakers and low voltage disconnect contactor to prevent over discharging of the optional backup batteries.

Typical applications include providing secure power for customer premises equipment, roadside cabinets, converged VoIP/data networks, PoE, IP routers and small PABX's.

## Features

- 19" rack mounting
- High power density
- Intelligent system controls
- Pre-configured software
- Onboard secure web server
- Push-in easy to fit circuit breakers
- Low voltage disconnect
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Easy to use menu & full color display
- Optional batteries
- Compatible with Eaton's Energy Saver (ES) rectifier



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# Technical Specifications

## Input

AC Supply	Nominal: 120V, 240V Operating Range: 90V – 275V
Power Factor †	>0.99 (50 – 100% Output Current)
Efficiency †	>96% peak >95% (20% to 100% load, 230Vac)

## Output

DC Output Voltage Range	43 – 57.5V	
DC Output Power (maximum*) †	240V AC:	APR48-ES: 4.0kW APR48-3G: 3.6kW EPR48-3G: 1.8kW
	120V AC:	APR48-ES: 2.3kW APR48-3G: 2.2kW EPR48-3G: 1.1kW

\* Based on two rectifiers fitted, refer to rectifier data sheets.

## Environmental

Operating Temperature Range	Rated: -10°C to +50°C [-14°F to +122°F] Extended*: -40°C to +70°C [-40°F to +158°F]
	*Output current is derated above 50°C [122°F]

## Mechanical

Dimensions H,W,D	2U , 19" mounting, 14.1" [360mm]*
	* Additional clear depth space is required for exhaust air.

## System

System Controller	SC200
DC Distribution Module	12-way circuit breakers (2 x Battery, 10 x Load) Circuit breaker type: Magnetic/Hydraulic, push fit  Battery circuit breakers: Heinemann AC1R Series Typical ranges available: 30A, 40A, 50A, 60A, 70A  Load circuit Breakers: Heinemann JC1S Series Typical ranges available: 6A, 10A, 15A, 20A, 25A, 30A
Communication Features	USB direct 10BaseT Ethernet, TCP/IP, SNMP, Modbus-TCP, Modbus-RTU and on board web server RS232 to external PSTN or GSM modem (modem not included)
Rectifier Blank Panels	For unused rectifier positions

## Software

DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

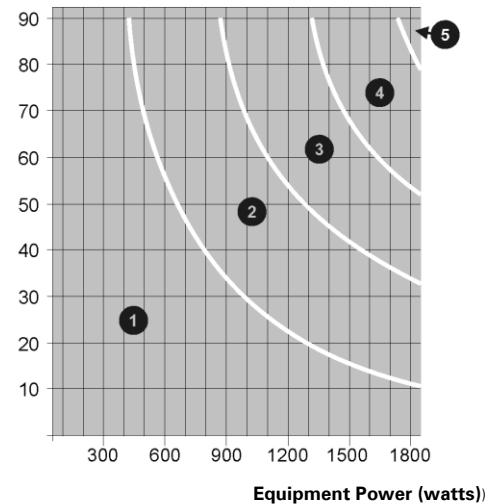
† Power factor, efficiency and DC output power are dependant on rectifier model fitted. Refer to the rectifier data sheet for further details.

## Options

Battery*	Eaton Extended Battery Module (EBM) 5PX version - 5PXEBM48RT (available globally) 5130 version - 103006587-6591 (EMEA only)Weight: 29.5kg [65lb] Dimensions (H,W,D*): 85mm (2U), 432mm (19" mounting), 487mm *Additional space is required at the rear for cables.
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Typical Run time values\* (see graph).

### Battery Run Time (minutes)



A = Required number of battery modules.

\*Battery times are approximate and vary depending on factors such as:  
- load configuration  
- battery charge  
- battery age and temperature.

\* Other battery options available - consult your local Eaton agent.

Battery Cables	CKBATT-02 Eaton EBM 5130 connection cable, 2000mm long or CKBATT-01 'other batteries' connection cable, 2000mm long
Equipment Cable	Customer Equipment Connection Cable CKLOAD-00 10-way connection loom, 1000mm long
EBM Rack Mounting Kit	Included with the EBM as standard

## Certifications

All products comply with International Standards.

North America	UL (Canada, USA), FCC Class B
Europe	CE
Australia and New Zealand	C-Tick

In the interests of continual product improvement all specifications are subject to change without notice.



# 3G Enterprise Power Solutions - EPS5 Series



The **Eaton® 3G Enterprise Power Solutions** are the ideal solution for converged data networks and low power tele-communications applications requiring compact, efficient and flexible DC power supplies.

The EPS5 series is a 19" rack mounted system and is available with up to five of the Eaton 48V 3G Enterprise power rectifier modules, providing a total output of up to 4500W. The modular design of the system allows users to simply add additional rectifiers and batteries as required to meet future growth of their network power demand, thus, better protecting the initial power system investment.

The versatile SC200 system controller features a front access USB port for ease of system setup along with a

RS232 rear port and a 10BaseT Ethernet port for remote networking and communications.

Communication features of the SC200 system controller include TCP/IP, SNMP and an onboard web server allowing access with standard web browsers.

The Enterprise systems include an integral DC distribution panel with easy to fit push-in circuit breakers and low voltage disconnect contactor to prevent over discharging of the optional backup batteries.

Typical applications include providing secure power for customer premises equipment, roadside cabinets, converged VoIP/data networks, PoE, IP routers and small PABX's.

## Features

- 19" rack mounting
- High power density
- Intelligent system controls
- Pre-configured software
- Onboard secure web server
- Push-in easy to fit circuit breakers
- Low voltage disconnect
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Easy to use menu & full color display
- Optional batteries



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# Technical Specifications

Input	
AC Supply	Nominal: 120V, 240V Operating range: 90V – 275V
Power Factor †	>0.99 (50 – 100% output current)
Efficiency †	91% (50 – 100% output current)

Output	
DC Output Voltage Range	43 – 57.5V
DC Output Power (maximum*) †	240V AC: 4.5kW 120V AC: 2.25kW
* Based on five rectifiers fitted, refer to EPR48-3G rectifier data sheets.	

Environmental	
Operating Temperature Range	Rated: -10°C to +50°C [-14°F to +122°F] Extended*: -40°C to +70°C [-40°F to +158°F]
*Output current is derated above 50°C [122°F]	

Mechanical	
Dimensions H,W,D	3U, 19" mounting, 13.2" [335mm]*
* Additional clear depth space is required for exhaust air.	

System	
System Controller	SC200
DC Distribution Module	12-way circuit breakers (2 x battery, 10 x load) Circuit breaker type: magnetic/hydraulic, push fit  Battery circuit breakers: Heinemann AC1R Series Typical ranges available: 30A, 40A, 50A, 60A, 70A  Load circuit breakers: Heinemann JC1S Series Typical ranges available: 6A, 10A, 15A, 20A, 25A, 30A
Communication Features	USB direct 10BaseT Ethernet, TCP/IP, SNMP, Modbus-TCP, Modbus-RTU and on board web server RS232 to external PSTN or GSM modem (modem not included)
Rectifier Blank Panels	For unused rectifier positions

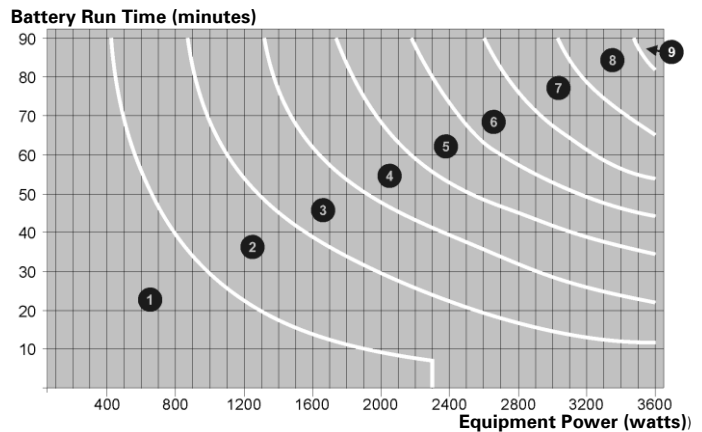
Software	
DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

† Power factor, efficiency and DC output power are dependant on rectifier model fitted. Refer to the rectifier data sheet for further details.

Options	
Battery*	Eaton Extended Battery Module (EBM) 5PX version - 5PXEBM48RT (available globally) 5130 version - 103006587-6591 (EMEA only)

Weight: 29.5kg [65lb]  
Dimensions (H,W,D\*): 85mm (2U), 432mm (19" mounting), 487mm  
\*Additional space is required at the rear for cables.

Typical run time values\* (see graph).



● = Required number of battery modules.

\*Battery times are approximate and vary depending on factors such as:  
- load configuration  
- battery charge  
- battery age and temperature.

\* Other battery options available - consult your local Eaton agent.

Battery Cables	CKBATT-02 Eaton EBM 5130 connection cable, 2000mm long. or CKBATT-01 'other batteries' connection cable, 2000mm long.
Equipment Cable	Customer equipment connection cable CKLOAD-00 10-way connection loom, 1000mm long
EBM Rack Mounting Kit	Included with the EBM as standard

**Certifications**  
All products comply with international standards.

North America	UL (Canada, USA), FCC Class B
Europe	CE
Australia and New Zealand	C-Tick

In the interests of continual product improvement all specifications are subject to change without notice.



# Enterprise Battery Module



*Eaton 5PX version pictured*

The **Eaton® 3G Enterprise Extended Battery Module (EBM)** is designed as an optional integrated backup power source to the 3G Enterprise Power Systems, providing secure power during AC grid failure for anything from orderly shutdowns through to extended runtimes for continuity of service.

Multiple battery modules can be connected together to achieve increased backup capacity for a given output demand.

This module is slim and rack mountable to suit the likely applications for these systems such as server room racks.

The battery modules use simple 'plug and play' cables for connecting the Enterprise Power Solution. No specialized tools are required, thus making installation very easy in an IT environment.

The scalability of the EBM ensures that your investment is protected into the future as the demands of your network increase. Simply add more EBM modules as your network grows.

EBM has an 18Ahr capacity and is service maintenance free for the life of the battery module. Battery function is monitored and controlled by the power system controller for complete battery protection.

## Features

- Easy to install
- Slimline 19" rack mounting
- Extended runtime -18Ahr capacity
- Modular and scaleable
- Service maintenance free VLRA batteries



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# Technical Specifications

## Output

DC Output Voltage	48V nominal
DC Output Capacity	18Ahr
	Maximum input/output current should not exceed 55Amps

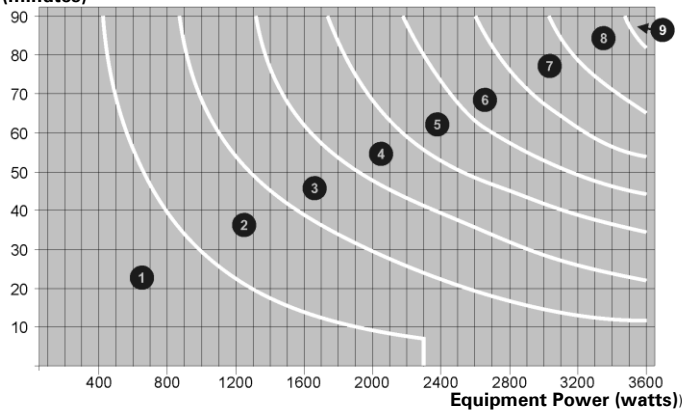
## Mechanical

Weight	29.5kg
Dimensions H,W,D	85mm (2U), 432mm (19" mounting), 487mm*
	* Additional space is required at the rear for cables.

## Battery

Typical Run Time Values\*

### Battery Run Time (minutes)



● = Required number of battery modules.

\*Battery times are approximate and vary depending on factors such as:  
 - load configuration  
 - battery charge  
 - battery age and temperature.

Order Number	Eaton Extended Battery Module (EBM) 5PX version - 5PXEBM48RT (available globally) 5130 version - 103006587-6591 (EMEA only)
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## Certifications

All products comply with international standards. Contact your local Eaton DC representative for details on the specific product versions available with these safety and EMC approvals:

North America	UL listed
Europe	CE

In the interests of continual product improvement all specifications are subject to change without notice.



# 3G Access Power Solutions - APS3 and APS6 Series



## Features

- 19" sub-rack
- Modular 3U and 6U options
- Up to 6 rectifier modules
- Pre-configured software
- High power density (24/48V: 300/250A, 6U, 19")
- Multiple AC option (1Ø, 3Ø, 2Ø)
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Priority and non priority options for DC distributions
- Compatible with Eaton Energy Saver (ES) Rectifiers



24V and 48V secure DC power up to 8.64kW and 12kW respectively.

The **Eaton® 3G Access Power Solutions** are ideal for low to medium power telecommunications applications, offering compact, efficient, flexible and reliable secure DC power supply.

These 19" rack mount systems are available with up to 3 or 6 of the Eaton 3G Access power rectifier modules as either 24V or 48V with output up to 280A. For superior operating efficiency to further reduce operating costs, these systems are also compatible with Eaton Energy Saver (ES) Access power rectifiers which provides operating efficiency in excess of 96%.

The systems include an integral DC distribution panel with a range of MCB and Low Voltage Disconnect (LVD) options available.

The SC200 series of system controller offers highly advanced control and monitoring features including Smart Alarms – a configurable logic for automated site energy control. The SC200 also offers a complete array of communications options with Ethernet, GSM cellular (including text messaging), standard modem and TCP/IP communications options. The slightly lower specification SC100 is also available.

Typical applications include providing secure power for customer premises equipment, roadside terminals, data networks and IP routers. The 3G Access Power Solutions are pre-configured and all system settings are fully adjustable in software and stored in transferable, configuration files for repeatable and quick one-step system set-up.

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# Technical Specifications

## Input

AC Supply†	100 – 240V, 50 – 60Hz (nominal) 175 – 275V full power output up to 50°C [122°F] 90 – 175V reduced power output
Power Factor†	>0.99 (50 – 100% Output Current)
Efficiency†	APR48-3G : 92% (50 – 100% Output Current) APR48-ES : >96% peak, >95% (20% to 100% load, 230Vac)

## Output

DC Output Voltage Range	21.5V – 32V / 43-57.5V	
DC Output Power (maximum)*	APS3-300	48V: 6.00kW 24V: 4.32kW
	APS6-300	48V: 8.90kW
	APS6-500	48V: 12.0kW 24V: 8.64kW

\* Ratings are stated without LVD's fitted. In some cases lower ratings may result when LVDs are used. Refer to installation guide for detailed load specs and MCB derating factors.

## Environmental

Operating Temperature Range*	-40°C to +70°C [-40°F to +158°F]
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\* Refer to rectifier data sheet for more information. Output current is derated above 50°C [122°F] and below -10°C [14°F]

## Mechanical

Dimensions H,W,D	APS3-300: 3U, 19" mounting, 315mm [12.4"]* APS6-300: 6U, 19" mounting, 335mm [13.2"]* APS6-500: 6U, 19" mounting, 335mm [13.2"]*
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\* Additional clear space is required for exhaust air.

## System

System Controller	SC200 or SC100	
DC Distribution Module	APS3-300:	12-way circuit breakers (2 x battery, 10 x load)
	APS6-300:	20-way circuit breakers (4 x battery, 16 x load)
	APS6-500:	20-way circuit breakers (4 x battery, 16 x load)
Communication Features	USB direct* 10BaseT Ethernet*, TCP/IP*, SNMP*, Modbus-TCP*, Modbus-RTU* and on board web server* RS232 to external PSTN or GSM modem (modem not included) *SC200 only	
Low Voltage Disconnect (LVD)	APS3-300:	optional battery LVD
	APS6-300:	optional 200A LVD's for battery or load, or both.
	APS6-500:	optional 400A LVD's for battery or load, or both.
Rectifier Blank Panels	For unused rectifier positions	
Options	External Surge Protection	

† Power factor, efficiency, AC voltage range and output power is dependant on rectifier module fitted. Refer to the rectifier data sheet for more information.

## Software

DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

## Certifications

All products comply with international standards.

In the interests of continual product improvement all specifications are subject to change without notice.



# 3G Access Power Solutions - APS6-600 Series



## Features

- 19" sub-rack
- Compact 6U system
- Up to 6 rectifier modules
- Pre-configured software
- High power density (48V: 360A, 6U, 19")
- Multiple AC option (1Ø, 3Ø, 2Ø)
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Priority and non priority options for DC distributions
- Compatible with Eaton's Network Energy Saver (ES) Rectifier

## 48V secure DC power up to 18kW.

The Eaton® 3G Access Power Solutions are ideal for low to medium power telecommunications applications, offering compact, efficient, flexible and reliable secure DC power supply.

This 19" rack mount system is available with up to 6 of the Eaton 3G, NPR48-ES Network power rectifier modules with a total output up to 360A. For superior operating efficiency to further reduce operating costs, this system is offered as standard with Eaton Energy Saver (ES) Network power rectifier which provides operating efficiency in excess of 96%.

The systems include an integral DC distribution panel with a range of MCB and Low Voltage Disconnect (LVD) options available.

The SC200 series of system controller offers highly advanced control and monitoring features including Smart Alarms – a configurable logic for automated site energy control. The SC200 also offers a complete array of communications options with Ethernet, GSM cellular (including text messaging), standard modem and TCP/IP communications options. The slightly lower specification SC100 is also available.

Typical applications include providing secure power for customer premises equipment, roadside terminals, data networks and IP routers. The 3G Access Power Solutions are pre-configured and all system settings are fully adjustable in software and stored in transferable configuration files for repeatable and quick one-step system set-up.



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# Technical Specifications

## Input

AC Supply†	100 – 240V, 50 – 60Hz (nominal) 185 – 275V full power output up to 50°C [122°F] 90 – 185V reduced power output
Power Factor†	>0.99 (50 – 100% Output Current)
Efficiency†	NPR48-ES : >96% peak, >95% (20% to 100% load, 230Vac)

## Output

DC Output	43.2-57.5V
Voltage Range	
DC Output Power (maximum)*	48V: 18kW  * Ratings are stated without LVDs fitted. In some cases lower ratings may result when LVDs are used. Refer to installation guide for detailed load specs and MCB derating factors.

## Environmental

Operating Temperature Range*	-40°C to +70°C [-40°F to +158°F]  * Refer to rectifier data sheet for more information. Output current is derated above 50°C [122°F] and below -10°C [14°F]
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## Mechanical

Dimensions H,W,D	6U, 19" mounting, 335mm [13.2"]*  * Additional clear space is required for exhaust air.
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## System

System Controller	SC200, Option for SC100
DC Distribution Module	20-way circuit breakers (4 x battery, 16 x load)
Communication Features	USB direct* 10BaseT Ethernet*, TCP/IP*, SNMP*, Modbus-TCP*, Modbus-RTU* and on board web server* RS232 to external PSTN or GSM modem (modem not included) *SC200 only
Low Voltage Disconnect (LVD)	Optional 400A LVDs for battery or load, or both.
Rectifier Blank Panels	For unused rectifier positions
Options	External Surge Protection

† Power factor, efficiency, AC voltage range and output power are dependent on the rectifier module. Refer to the rectifier data sheet for more information.

## Software

DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

## Certifications

CE

In the interests of continual product improvement all specifications are subject to change without notice.



# 3G Access Power Solutions - APS3-400 Series



## Features

- Compact and scalable 19" sub-rack solution
- High power density (6kW @ 48V/3U, 19")
- Easy plug-and-go rectifier set-up
- Fast on-line rectifier expansion (hot-plug)
- High efficiency and unity power factor
- Single AC input or individual rectifier feeds
- Intelligent system management features
- Remote access (TCP/IP, web browser, SNMP)
- Pre-configured software for quick & simple deployment
- Onboard energy management software optimizes operating efficiency for lower OPEX
- Compatible with Eaton Energy Saver (ES) Rectifiers

The **Eaton® 3G Access Power Solutions** are ideal for low to medium power telecommunications applications requiring compact, efficient and flexible DC power supplies with or without batteries.

This Eaton 3G Access Power Solution 400 series has UL and FCC standards certifications. A technician friendly user-interface includes a full color menu screen and is preconfigured for fast install and easy commissioning. All system settings are fully adjustable in software and stored in transferable configuration files for repeatable one-step system set-up.

With up to 6kW of power output, it features state-of-the-art 48V 3G or Energy Saver (ES) Access Power Rectifiers for superior operating efficiency (>96%). The DC distribution panel, simple to use hydraulic magnetic circuit breakers, and optional low voltage disconnect (LVD) modules are fully integrated.

The advanced SC200 system controller offers high-level communications capability for real time information. It also has built-in intelligence for optimizing system efficiency, and comprehensive alarm and system status notifications, which are all designed to minimize operational expenses.

A comprehensive range of other controller features ensures maximum battery life and optimum system performance under a wide range of environmental conditions.

The 19" rack mount system is ideal for rapid deployment into customer facilities or enclosures.

Typical applications include standby power for customer premises equipment, outdoor power plants, data networks and IP routers.



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# Technical Specifications

## Input

AC Supply†	Nominal:	120V, 208-240V
	Operating Range:	90V – 275V*
	* <i>Output power derates below 175V AC.</i>	
Power Factor†	>0.99 (50 – 100% Output Current)	
Efficiency†	APR48-3G : 92% (50 – 100% Output Current) APR48-ES : >96% peak, >95% (20% to 100% load, 230Vac)	
Total Harmonic Distortion	<5% THD from 50% to 100% at load.	

## Output

DC Output Voltage Range	43 – 57.5V	
DC Output Power (maximum)†	APR48-3G : 120V AC:	3.3kW @ 48V
	208-240V AC:	5.4kW @ 48V
	APR48-ES : 120V AC:	3.45kW @ 48V
	208-240V AC:	6kW @ 48V

## Environmental

Temperature Range*	Rated:	-10°C – +50°C [14°F – +122°F]
	Extended:	-40°C – +65°C [-40°F – 149°F]
	* <i>Output current is derated above 50°C [122°F]</i>	

## Mechanical

Dimensions H,W,D	3U [5.25", 133mm], 19" [483mm] mounting, 14" [356mm]*	
	* <i>Additional clear space is required for exhaust air. Rear access is required for cable terminations.</i>	

## System

System Controller	SC200 as standard. SC100 optional.	
DC Distribution Module	10-way circuit breakers (2 x Battery, 8 x Load). Load circuit breakers: Heinemann AMIR Series 5A, 10A, 20A, 30A, 40A, 50A, 70A, 80A, 100A. Battery circuit breakers: Heinemann AMIR 100A or AMIP 120A.	
Communication Features	USB direct* 10BaseT Ethernet*, TCP/IP*, SNMP*, Modbus-TCP*, Modbus-RTU* and on board web server* RS232 to external PSTN or GSM modem (modem not included) *SC200 only	
Low Voltage Disconnect (LVD)	Battery disconnect: 200A internal.	
Rectifier Blank Panels	For unused rectifier positions.	
Options	Relay Rack Batteries.	

† Power factor, efficiency, AC voltage range and output power is dependant on rectifier module fitted. Refer to the rectifier data sheet for more information.

## Software

DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

## Certifications

All products comply with International Standards including UL (US and Canada) and FCC (Class B) Verification.

In the interests of continual product improvement all specifications are subject to change without notice.



# 3G Access Power Solutions - APS6-400 Series



## Features

- High power density (12kW @ 48V/6U, 19")
- Suitable for both 19" relay rack or enclosed cabinet
- High efficiency and unity power factor
- Easy fit plug-in hydraulic/magnetic circuit breakers.
- 20-way load and 6-way battery distributions
- Single or dual low voltage disconnect (LVD) options
- SC200 or SC100 intelligent system controller
- Onboard energy management software optimizes operating efficiency for lower OPEX
- Pre-configured software for quick & simple deployment
- Remote access (TCP/IP, web browser, SNMP)
- Easy plug-and-go rectifier set-up
- Fast on-line rectifier expansion (hot-plug)



The **Eaton® 3G Access Power Solutions** are ideal for low to medium power telecommunications applications requiring compact, efficient and flexible DC power supplies with or without batteries. Typical applications include standby DC power for customer premises equipment, outdoor power plants, data networks and IP routers.

A technician friendly user-interface includes a full color menu screen and is preconfigured for fast install and easy commissioning.

The 19" rack mount system is ideal for rapid deployment into customer facilities or enclosures.

All system settings are fully adjustable in software and stored in transferable configuration files for repeatable one-step system set-up.

The APS6-400 series has up to 12kW of power output, it features state-of-the-art 48 volt 3G Access Power Rectifiers, an integral DC distribution panel, easy to fit plug-in hydraulic magnetic circuit breakers, and optional low voltage disconnect (LVD) modules for battery and non priority loads.

The advanced system controller offers high-level communications capability for real time information. It also has built-in intelligence for optimizing system efficiency, and comprehensive alarm and system status notifications, which are all designed to minimize operational expenses.

Other features include temperature compensated voltage output, automated equalize charging, and integrated battery testing, for maximum battery life under a wide range of environmental conditions.

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# Technical Specifications

## Input

AC Supply†	Nominal: 120V, 208-240V Operating Range: 90V – 275V*
	* <i>Output power derates below 175V AC.</i>
Power Factor†	>0.99 (50 – 100% Output Current)
Efficiency†	By system rectifier type: APR48-ES: >95% (20 - 100% output current) APR48-3G: 92% (50 - 100% output current)
Total Harmonic Distortion	<5% THD from 50% to 100% at load.

## Output

DC Output Voltage Range	43 – 57.5V		
DC Output Power (maximum)	Rectifier type:	<b>APR48-3G</b>	<b>APR48-ES</b>
	110/120V AC:	6.6kW @ 48V	6.9kW @ 48V
	208-240V AC:	10.8kW @ 48V	12kW @ 48V

## Environmental

Temperature Range	Rated: -10°C to +45°C [14°F to +122°F]
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## Mechanical

Dimensions H,W,D	6U [10.5", 267mm], 19" [483mm] mounting, 15.3" [390mm]*
	* <i>Additional clear space is required for exhaust air. Rear access is required for cable terminations.</i>

## System

System Controller	SC200 as standard. SC100 optional.
DC Distribution Module	26-way circuit breakers (6 x Battery, 20 x Load). Load circuit breakers: Heinemann AMIR Series 5A, 10A, 20A, 30A, 40A, 50A, 70A, 80A, 100A, 120A (2-pole). Battery circuit breakers: 6 x Heinemann AMIR 80A, 100A or 3 x Heinemann AMIP 120A, 150A, 200A.
Communication Features of SC200	USB direct. 10BaseT Ethernet, TCP/IP, SNMP, On board web server. RS232 to external PSTN or GSM modem (modem not included).
Low Voltage Disconnect (LVD) (Optional)	Battery disconnect: 400A internal. Non priority load: 200A internal.
Rectifier Blank Panels	For unused rectifier positions.
Options	Relay Rack Batteries.

† Power factor, efficiency, AC voltage range and output power is dependant on rectifier module fitted. Refer to the rectifier data sheet for more information.

## Software

DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

## Certifications

North America:	UL listed 1801, cUL, FCC
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In the interests of continual product improvement all specifications are subject to change without notice.



# 3G Access Power Solutions - APS12 Series



## 48V secure power up to 17.2kW

The **Eaton® 3G Access Power Solutions** are ideal for low to medium power telecommunications applications, offering compact, efficient, flexible and reliably secure DC power supply.

This 19" rack mount system has an integrated distribution panel and is available with up to 12 of the 48V Eaton 3G Access Power Rectifier modules or, for superior operating efficiency, with Energy Saver (ES) Rectifier modules with output up to 360A.

The advanced SC200 system controller offers high-level communications capability for real time information. It also has built-in intelligence for

optimizing system efficiency, and comprehensive alarm and system status notifications, which are all designed to minimize operational expenses.

A comprehensive range of other controller features ensures maximum battery life and optimum system performance under a wide range of environmental conditions.

The 3G Access Power Solutions are pre-configured and all system settings are fully adjustable in software and stored in transferable, configuration files for repeatable and quick one-step system set-up.

Typical applications include providing secure power for cellular base stations, roadside terminals, data networks and IP routers.

## Features

- Compact 9U, 19" sub-rack
- Up to 12 rectifier modules
- Compatible with Eaton Energy Saver (ES) Rectifiers
- Pre-configured software
- High power density (400A/9U)
- Dual AC input
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Priority and non priority options for DC distributions



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# Technical Specifications

## Input

AC Supply†	100 – 240V, 50 – 60Hz (nominal) 175 – 275V full power output up to 50°C [122°F] 90 – 175V reduced power output Dual AC input - 1Ø, 2Ø or 3Ø (one supply feed per 6-rectifier shelf)
Power Factor†	>0.99 (50 – 100% Output Current)
Efficiency†	APR48-3G : 92% (50 – 100% Output Current) APR48-ES : >96% peak >95% (20% to 100% load, 230Vac)

## Output

DC Output Voltage Range	43 – 57.5V
DC Output Power (maximum) *	APR48-3G : 17.2kW @ 48V APR48-ES : 17.2kW @ 48V * Ratings are stated without LVD's fitted. In some cases lower ratings may result when LVDs are used. Refer to installation guide for detailed load specs and MCB de-rating factors.

## Environmental

Operating Temperature Range	-40°C to +70°C [-40°F to +158°F] Output current is derated above 40°C [104°F] and below -10°C [14°F]
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## Mechanical

Dimensions H,W,D	9U, 19" mounting, 335mm [12.4"]* * Additional clear space is required for exhaust air.
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## System

System Controller	SC200 or SC100
DC Distribution Module	20-way circuit breakers (4 x Battery, 16 x Load)
Communication Features	USB direct* 10BaseT Ethernet*, TCP/IP*, SNMP*, Modbus-TCP*, Modbus-RTU* and on board web server* RS232 to external PSTN or GSM modem (modem not included) *SC200 only
Low Voltage Disconnect (LVD) Panels	Optional battery LVD, or non priority LVD, or battery and non priority LVD's. (Contactors 400A rated)
Rectifier Blank Panels	For unused rectifier positions
Options	External Surge Protection

† Power factor, efficiency, AC voltage range and output power is dependant on rectifier module fitted. Refer to the rectifier data sheet for more information.

## Software

DCTools	Configuration software. Free download from: <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>
PowerManagerII	Remote control and monitoring software

## Certifications

All products comply with international standards. Contact your local Eaton DC representative for details on the specific product versions available with these safety and EMC approvals:

Europe	CE
Australia / New Zealand	C-tick

In the interests of continual product improvement all specifications are subject to change without notice.



# Maxi Access 3G - Power Solutions



## 48V integrated systems of up to 20 or 40kW

The Eaton® Maxi Access 3G Power Solutions range of DC power systems is designed for communication applications requiring compact, efficient, reliable and secure DC power.

System configurations include single cabinets offering up to 20kW, or two cabinets suited together to permit up to 40kW of output power.

The core building block of the system is the APR48-3G rectifier module or, for superior operating efficiency, the APR48-ES "Energy Saver" module.

Each cabinet can accommodate either three or four 48V strings of high capacity VRLA batteries. Integral AC and DC distributions are offered with flexible combinations of load and battery MCBs, and an SC200 system controller as standard. Low Voltage Disconnect (LVD) is included as standard.

The advanced SC200 system controller offers high-level communications capability for real time information. It also has built-in intelligence for optimizing system efficiency, and comprehensive alarm and system status notifications,

which are all designed to minimize operational expenses.

A comprehensive range of other controller features ensures maximum battery life and optimum system performance under a wide range of environmental conditions.

Systems are pre-configured for fast installation and set-up and fully adjustable and transferable for repeatable one-step system set-up.

Typical applications are providing secure power for cellular base transceiver stations, WiMAX nodes, base station controllers, long-distance transmission systems, local office switches and other telecommunication switch installations requiring distributed power.

## Typical Applications:

- Wireless BTS sites (3G/4G/5G)
- Transmission terminals
- Access nodes
- Local and central office switching



## Features

- Single systems, or two-cabinet suited options
- Intelligent system management features
- Pre-configured software
- High power density
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Flexible DC distribution configurations
- Integrated batteries and battery condition monitoring
- Wide AC input voltage range
- Remote monitoring and control
- Full length security door (optional)
- Compatible with Eaton Energy Saver Rectifiers



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# Technical Specification

## Input

AC Supply†	3P+N+PE, 1P+N+PE 50/60Hz (nominal)
Power Factor†	>0.99 (20 – 100% Maximum System Current)
Efficiency†	>96% peak >95% (20% to 100% load, 230Vac)

## Output

DC Output Voltage Range	40 – 57.5V
Typical DC Output Power per cabinet†	APR48-3G : 18 kW (375A @ 48V) or APR48-ES : 20kW (416A @ 48V)

## Environmental

Operating Temperature Range	-25°C to +50°C Output current is derated above 50°C [122°F] Refer to rectifier data sheet for more information.
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## Mechanical

Dimensions H,W,D*	2187mm [86"], 600mm [23.6"], 600mm [23.6"] or, 2009mm [79"], 600mm [23.6"], 600mm [23.6"]
Weight*	870kg [1914lb]* Typical maximum with 10 rectifier modules and 3 or 4 x 48V/100Ah battery strings.

## System

Rectifiers	APR48-3G APR48-ES
System Controller	SC200
Communications Features	USB direct, 10BaseT Ethernet, TCP/IP, SNMP, Modbus-TCP, Modbus-RTU and on board web server, RS232 to external PSTN or GSM modem (modem not included)
Batteries	Typically up to 3 or 4 strings @ 48V, 330-440Ah total capacity*. Other battery configurations available.

† Power factor, efficiency, AC voltage range and output power is dependant on rectifier module fitted. Refer to the rectifier data sheet for more information.

\* Cabinet weights are dependent on system configuration, cabinet height, and how many batteries are fitted.

## Options

AC Distribution	AC isolator per rectifier shelf
DC Distribution	24-way DC load distribution unit comprised of: 24 x 18mm Load MCBs (1-63A) 1 x 27mm Battery MCB per battery string Custom options available on request.
Low Voltage Disconnect (LVD)	Single LVD configured as battery disconnect.
Rectifier Blank Panels	For unused rectifier positions
SiteSure	Input/output modules to monitor and control external equipment (optional)
CellSure	Comprehensive battery monitoring and fault diagnosis system with patented state-of-health algorithms (optional)

## Software

PowerManagerII	Remote control and monitoring software
DCTools	Configuration Software. Free download from <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>

## Certifications

All products comply with International Standards. Contact your local Eaton DC representative for details on the specific product versions available with these safety and EMC approvals:

Europe	CE
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In the interests of continual product improvement all specifications are subject to change without notice.



# Maxi Network 3G - Power Solution



## 48V integrated systems up to 250kW

The Eaton® Maxi Network 3G Power Solutions range of DC power systems is designed for communications applications requiring high powered, efficient, flexible, and secure DC power.

Complete systems can be created from a suite of cabinets including rectifier cabinets, distribution cabinets, battery cabinets, or combinations of each.

The core building block of the system is the APR48-3G rectifier module or, for superior operating efficiency, the APR48-ES "Energy Saver" module.

Each cabinet can include integral AC and DC distribution with flexible combinations of fuses and MCBs. Low voltage disconnect (LVD) options are also available. DC distribution cabinets can be connected in parallel where additional distribution space is required. Systems of up to 5000A can be configured using internal horizontal busbars.

The SC200 system controller offers a broad range of intelligent system management features including: battery temperature compensation, fast charge, battery current

## Features

- Intelligent system management features
- Pre-configured software
- High power density
- Fast on-line expansion of rectifiers (hot-swap)
- High efficiency and unity power factor
- Range of DC distribution configurations
- Battery condition monitoring
- Wide AC input voltage range
- Remote monitoring and control
- Full length security door (optional)
- Remote monitoring and control

limit, automatic equalize charging and automatic battery condition monitoring.

Typical applications include provision of 48V standby power for centralised architecture such as local and central office switches and other large switch installations, wireless switching centres, long-distance transmission systems and data centres.

Eaton Maxi Network 3G Power Solutions are pre-configured for fast installation and set-up. All system settings are fully adjustable in software and stored in transferable configuration files for repeatable one-step system set-up.

## Typical Applications

- Wireless sites (3G 4G/5G)
- Local and central office switching
- Point of presence (POP) sites
- Data centres



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# Technical Specifications

## Input

Nominal AC	3P+N+PE, Y 230/400VAC
Supply †	50/60Hz
Power Factor †	>0.99 (20 – 100% Maximum System Current)
Efficiency †	>96% peak >95% (20% to 100% load, 230VAC)

## Output

DC Output	40 – 58V
Voltage Range	
Typical DC	66kW - 250kW
Output Power †	

## Environmental

Operating Temperature Range	-25°C to +50°C Output current is derated above 50°C [122°F] Refer to rectifier data sheet for more information.
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## Mechanical

Dimensions H,W,D*	2184mm [86"], 600mm [23.6"], 600mm [23.6"]
Weight*	300kg [664lb] Typical rectifier cabinet configuration with 20 rectifier modules.

## System

System Controller	SC200
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† Power factor, efficiency, AC voltage range and output power are dependent on rectifier module fitted. Refer to the rectifier data sheet for more information.

\* Cabinet weights are dependent on system configuration, cabinet height, and whether batteries are fitted.

\* System output power will vary depending on rectifiers and batteries selected.

## Options

AC Distribution	AC Isolator per rectifier shelf
DC Distribution	A wide range of DC distribution elements are available including: 24 x 18mm MCBs (1-63A) 16 x 27mm MCBs (63-125A) 6 x NH3 type HRC fuses (400-630A) 3 x NH4 type HRC fuses (800-1200A)

Open frame distributions:  
4 x NH4 type HRC fuses (800-1200A)  
4 x NS250 type MCCB  
3 x NS400 type MCCB  
2 x NS630 type MCCB

Low Voltage Disconnect (LVD)	SW1500A dual LVD, configured as battery disconnect fitted into open frame distribution.
Rectifier Blank Panels	For unused rectifier positions
SiteSure	Input/output modules to monitor and control external equipment (optional)
CellSure	Comprehensive battery monitoring and fault diagnosis system with patented state-of-health algorithms (optional)

## Software

PowerManagerII	Remote control and monitoring software
DCTools	Configuration Software. Free download from <a href="http://www.powerware.com/downloads">www.powerware.com/downloads</a>

## Certifications

All products comply with International Standards. Contact your local Eaton DC representative for details on the specific product versions available with these safety and EMC approvals:

Europe	CE
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In the interests of continual product improvement all specifications are subject to change without notice.



# Matrix™ Modular Inverter Solution



The **Eaton® Matrix™ Modular Inverter Solution** is an integrated inverter power system designed for applications where a very high reliability AC supply is required.

The Matrix modular design ensures maximum flexibility to configure solutions to customers' requirements. Modules include inverters, Static Transfer Switch, controller, interface module and Maintenance Bypass Module. With its versatile "building block" design and n+x redundant configuration, the Matrix ensures reliable telecommunication and industrial AC power.

The Matrix Static Transfer Switch provides automatic and instantaneous load transfer between mains power and inverter power and back again, to ensure uninterrupted AC supply to sensitive electronic equipment.

The Matrix solution uses digital microprocessor control. The monitoring controller gives real-time system status through comprehensive LCD /LED displays, and allows program settings through the display panel.

With the Matrix communication interface module installed, you can control and monitor the system remotely.

## Features

- Ultimate high power density reducing space demand
- Hot-pluggable connection allows module addition or removal without interruption to AC supply
- Versatile modular design allows a variety of configurations for different power needs
- Capacity up to 18kVA
- n+x redundancy
- Single phase 120Vac or 230Vac output options
- High efficiency, >89%
- Comprehensive LCD/LED display provides system status, and user-friendly panel eases program settings
- Optional maintenance bypass switch with integrated AC distribution
- Optional USB/RS232/RS485 communication for local and remote management



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# Technical Specifications

## DC Input

Nominal Voltage	48Vdc
Operating Range	40.5Vdc ~ 58Vdc
Surge Protection	Telcordia GR-1089 CORD, ANSI C62.41-IEEE, STD 587-1980
Input Protection	Reverse polarity protection

## AC Output

Output	Pure sine wave
Waveform	
Output power	18kVA (max)
Power factor	0.8
Nominal Output	110/115/120Vac 208/220/230/240Vac
Frequency	50/60Hz ±0.5%
Crest factor	3:1
THD	<3%, linear load <5%, non-linear load
Efficiency	Min 88% at rated load
Overload	1.5*Inom >20s 1.25*Inom temperature controlled

## Compliance

Conducted (AC)	EN55022 (Class A)
Conducted (DC)	EN300386
Radiated	EN55022 (Class A)

## Modules

Inverter	INV-4810E: 1000VA/800W inverter module INV-4810: 1000VA/800W inverter module INV-4815E: 1500VA/1200W inverter module INV-4815: 1500VA/1200W inverter module
Static Transfer Switch	INV-STSS-050: 50A static transfer switch INV-STSS-100: 100A static transfer switch
Controller	INV-MC-1000: Controller module INV-IFC-1000: RS232/USB/RS485 interface module
Shelf	INV-SS-2-1U: Chassis for two inverters (1U) INV-STSS-1U: Chassis for controller/STS-050 (1U) INV-STSS-2U: Chassis for controller/STS-100 (2U) INV-MBSDU-50: 50A maintenance bypass, power distribution module (2U) INV-MBSDU-100: 100A maintenance bypass module (2U)

## Mechanical

Inverter Shelf	INV-SS-2-1U: (HxWxD) 1U x 19" x 330mm (1.75"x19"x13") Weight 2.7kg (6lb)
50A STS Shelf	INV-STSS-1U: (HxWxD) 1U x 19" x 330mm (1.75"x19"x 13") Weight 2.7kg (6 lb)
50A MBS/DU	INV-MBSDU-50: (HxWxD) 2U x 19" x 330mm (3.5"x19"x13") Weight 7.0kg (15.4lb)
100A STS Shelf	INV-STSS-2U: (HxWxD) 2U x 19" x 330mm (3.5"x19"x13") Weight 3kg (6.6 lb)
100A MBS	INV-MBS-100: ' (HxWxD) 2U x 19" x 330mm (3.5"x19"x13") Weight 7.0kg (15.4lb)

### Maximum Number of Inverter Modules for Parallel Operation (Max Power)

Model	Without STS	With STS-050	With STS-100
INV-4810	12 (12kVA)	6 (6kVA)	12 (12kVA)
INV-4810E	12 (12kVA)	12 (12kVA)	12 (12kVA)
INV-4815	12 (18kVA)	4 (6kVA)	8 (12kVA)
INV-4815E	12 (18kVA)	8 (12kVA)	12 (18kVA)

## Certifications

All products comply with international standards including CE and UL.

In the interests of continual product improvement all specifications are subject to change without notice.



# Matrix™ 2000 Standalone Inverter



## Features

- Designed for telecom applications
- Pure sine wave output
- Unity power factor (full 2000 watt output power)
- Significant overload capability, 120% continuously, 200% for 5 seconds
- High efficiency, >91%
- High power density
- Built in Static Transfer Switch (STS)
- DSP design for improved reliability and performance
- Single phase 120Vac or 230Vac output options
- Comprehensive LCD/LED with keypad
- Wide selection of configurable parameters.
- International certifications

The **Eaton® Matrix™ 2000 Standalone Inverter** is designed for use in telecommunications applications where a very reliable AC supply is required. The high efficiency and compact size makes the Matrix 2000 Inverter an outstanding solution for powering all types of critical AC equipment.

The Matrix 2000 Standalone Inverter provides 2000W of reliable AC power in a 1U x 19" rack mount package that includes a built-in Static Transfer Switch (STS). The STS automatically and instantaneously switches the AC output, from the DC inverter to an alternative source such as AC mains (and back again), providing extra security of the AC supply to the load equipment.

The Matrix 2000 solution uses digital microprocessor control to provide maximum performance under all operating conditions. The built-in controller gives real-time system status through comprehensive LCD/LED displays, and allows program setting through a keypad panel.



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# Technical Specifications

## DC Input

Operating Range	48V: 40Vdc ~ 60Vdc
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## AC Input (to Transfer Switch)

Voltage Range: (50/60Hz)	INV-4820SA: 89Vac to 138Vac
	INV-4820ESA: 176Vac to 276Vac
Transfer Time	<10ms

## AC Output

Power Output	2000VA / 2000W
Wave Form	Pure sine wave
Power Factor	1.0
Nominal Output Voltage (selectable)	INV-4820SA: 110/115/120Vac
	INV-4820ESA: 208/220/230/240Vac
Output Frequency	50,60Hz
Efficiency	>91 % at rated load
Over Load Protection	2*Inom, 5sec max
	1.5*Inom, 10sec max
	1.25*Inom, temperature controlled

## Environmental Requirements

Operating Temperature Range	-20°C to 60°C (-4°F to 140°F)
	-20°C to 50 °C (-4°F to 122°F), full performance
Cooling	Fan Cooled

## Certifications

All products comply with international standards.

Safety	EN60950-1 / UL60950-1
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Europe	CE
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In the interests of continual product improvement all specifications are subject to change without notice.



# Telecom Inverter Solution



The **Eaton Telecom Inverter** is an innovative dual input inverter solution designed for applications where very high reliability of your AC supply is required. By incorporating a 230Vac input, as well as the 48Vdc input, Eaton has developed a solution that closes the gap between the traditional UPS and conventional inverter solutions.

The innovative architecture allows users to provide clean, regulated and continuous AC power to critical loads with the same n+x reliability as traditional DC power systems. The design of the inverter ensures a seamless transfer between the AC and DC inputs, giving zero transfer time and eliminating the need for a Static Transfer Switch.

Users can select between "Line Mode" and "Battery Mode". In Line Mode, the inverter operates similar to a double conversion UPS, drawing power from the AC mains, and delivering

smoothed and isolated AC power to the load. In "Battery Mode", the inverter draws power from the DC input. When power to the preferred input is interrupted; the Inverters seamlessly switch to the alternative input with no interruption of power to your critical AC loads.

The Eaton Telecom Inverter solutions can be configured with an optional controller module and/or Maintenance Bypass Switch. The monitoring controller gives real-time system status through comprehensive LCD /LED displays, and allows system parameter setting through the keypad panel. The communication interface allows users to monitor and control the system remotely.

An optional Maintenance Bypass Switch lets users manually switch the loads between inverter power and AC mains, allowing for complete shutdown of the inverter system while still maintaining mains power to the loads.

## Features

- Pure sine wave output
- AC and DC inputs
- High efficiency, >94% in line mode
- Up to 28kVA single phase output
- 120% overload capacity @ 30°C
- Modular n+x design
- No single point of failure
- Zero transfer time
- Hot-plug connection of modules
- Optional Maintenance Bypass Switch
- Optional LCD display + keypad with USB/RS232/RS485 interface
- ROHS compliance



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# Brief Technical Specification

## DC Input

Operating Range	48V: 40Vdc ~ 60Vdc
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## AC Input

Voltage Range: (50/60Hz)	185Vac - 265Vac
Transfer Time	zero

## AC Output

Power Output (inverter module)	3500VA / 2800W
Maximum	28kVA / 22.4kW
System Power Output (8 Inverters)	
Wave Form	Pure sine wave
Power Factor	0.8
Nominal Output Voltage (selectable)	208/220/230/240Vac
Output Frequency	50/60Hz
Efficiency	>94% AC Input >91% DC Input
Over Load Protection	1.5*Inom, 10sec max 1.2*Inom, temperature controlled

## Environmental Requirements

Operating Temperature Range	-20°C to 60°C (-4°F to 140°F)
Temperature Range	-20°C to 50 °C (-4°F to 122°F), full performance
Cooling	Fan Cooled

## Certifications

All products comply with international standards.

Safety Europe	EN60950-1 / UL60950-1 CE
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In the interests of continual product improvement all specifications are subject to change without notice.



## Part Numbers

INV-4835E	Eaton, Dual Input Inverter module. 48Vdc input, 230Vac Input, 230Vac output. 3.5kVA
INV-SS-8	Inverter Shelf for 8 x INV-4835E. 8U x 19"
INV-MC-2000	Controller for Dual Input Inverter systems (requires controller shelf)
INV-MCSS-1U	Controller Shelf for Dual Input Inverter systems. 1U x 19"
INV-MBS-125	125A Maintenance Bypass Switch for Dual Input Inverter systems. 3U x 19"

# Matrix Network Management Card



The **Eaton® Network Management Card for Matrix** is an advanced networking card for Matrix inverter system.

The Network Management Card (NMC) provides a full suite of advanced communications options, including built-in Ethernet interface, Web server, and SNMP agent.

In addition to information available directly from the Matrix controllers, the NMC card enables alarm notifications via SNMP traps, email, or web page.

Automatic email notifications can be sent out to up to four email addresses or groups, based on events or as daily status notifications.

SNMP based traps can be sent out to up to eight NMS terminals, triggered by three alarm thresholds.

The web interface provides users with a clear view of the status of the Matrix system, including information about the Inverters, Static Transfer Switch (STS), and Controller. This includes status information as well as configuration information.

Using the web interface the user can also change settings for the inverters, STS, and controller from any location, providing a web connection is available.

Full data logs for the Inverters, STS and Controller can be accessed and download remotely as well as Event and System logs.

The NMC provides new or existing installations of Matrix inverter systems the possibility to implement advance remote communications. Furthermore integration into popular NMS systems is possible through the use of SNMP traps and the available MIB file.

## Typical Applications:

- Wireless cell sites & switches
- Transmission terminals
- Local & central office switching
- Network Management Centres

## Features

- Ethernet interface built-in
- SNMP agent V1, V2, V3
- Email alarm messages
- Remote Parameter Configuration
- Setup via web
- Event and Data logs



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# Technical Specification

## Operation

Compatibility	Matrix Controller firmware v0.08 required (i.e. controllers manufactured from November 2009 onwards)
Operating Range	Standard: -10 to +40°C [14 to 105 °F]

## Communications

### Interfaces

Physical	Ethernet
Software	IP, http, SMTP (email), SNMP v1/v2/v3, Telnet
Addressing	Static IP and DHCP options

## User Interface

Display	None
Language	English (web page)

## Information

Status	Inverters, STS, Controller
Alarms	Current alarms
Basic	Inverters, STS, Controller
Parameter	Inverters and STS
Configuration	

## Datalogging

Event Log	200 records (web), 1000 records (extract)
Data Log	200 records, 1000 records (extract)
System Log	200 records, 1000 records (extract)
Inverter/STS/Controller	200 records, 1000 records (extract)

## Mechanical

Dimensions H,W,D	33mm, 67mm, 130mm
Mounting	INV-MC-1000 Controller based systems: fits within the Interface Module INV-MC-2000 Controller based systems: requires the updated controller shelf (INV-MCSS-1U) 730-36044-02

## Part Numbers

NMC Card	730-55016-00
INV-MC-2000 Controller shelf	730-36044-02

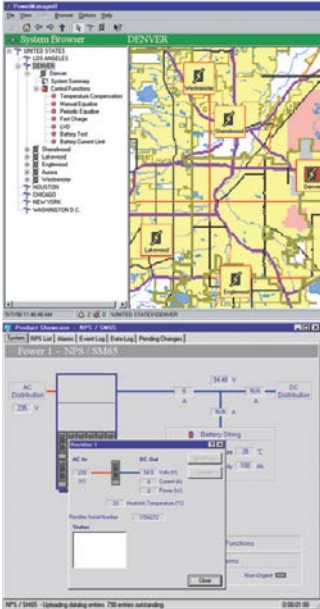
## Certifications

Europe	CE
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In the interests of continual product improvement all specifications are subject to change without notice.



# PowerManagerII™ Control and Monitoring Software



## Features

- Windows® based graphical user interface
- Real-time monitoring
- Automatic alarm indication
- Alarm and activity logging
- On-line access to system control functions
- Reduces the need for site visits
- International language options
- User configurable navigation maps
- Remote battery testing

The Eaton® PowerManagerII software provides effective remote management for Eaton DC power systems. The intuitive, Windows® - based graphical user interface enables you to quickly 'zoom in' and view concise summary information, or specific control functions, key operational data, or alarm details.

PowerManagerII is cost-effective. Remote management can reduce operating and maintenance costs. The latest power system information is available where and when you want it, greatly reducing the need for site visits. Alarms are highlighted and detailed, to help you analyze faults and produce maintenance histories and schedules.

PowerManagerII is comprehensive. You can connect as many power systems as you like, and all necessary data is clearly presented. PowerManagerII is flexible. You can set up area map views of urban areas and wider regions, to help you visually navigate to any site - the choices are yours. And it's simple to add new maps and site locations.

## Remote Control and Monitoring

PowerManagerII can control and monitor power equipment at multiple sites from one central location. It provides real-time graphical displays of system operating conditions, and monitors all system functions including individual rectifier modules.

## Event Logs and Data Logs

PowerManagerII lists data from each site. This includes all alarms, with activation details. Historical data can be recorded for fault analysis and preparation of maintenance schedules. The information can be filtered, sorted or exported to other applications.

## Customization

PowerManagerII is designed for easy customization. Maps and locations of the sites can be added to the PowerManagerII interface.

In addition to Eaton DC Power Systems, air-conditioning equipment and intruder alarms and other plant connected to the system Supervisory Module I/O connections, can also be monitored.

With the SiteManager option, PowerManagerII can monitor a wide range of inputs using SiteSure modules.



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# Technical Specifications

## Control Functions

PowerManagerII includes graphical displays of all system control processes. All parameters are displayed together with real-time displays of the system operating conditions:

System schematic	Displays operating conditions and system status.
Individual rectifier	PowerManagerII monitors individual rectifier performance.
System summary	Graphical real-time display of system status.
System control functions	Display of output voltage control systems.
Temperature Compensation	Set temperature compensation parameters for optimum battery charging.
Manual Equalize	Initiate battery equalize charge.
Periodic Equalize	Set the duration and level of auto battery equalize charges.
Fast Charge	Set-up fast battery recharge parameters for optimum system recovery after AC outage.
Low Voltage Disconnect	Set the operational parameters of the low voltage disconnect module.
Battery Current Limit	Set the maximum battery recharge current.
Battery Test	Conduct on-line battery tests to determine battery condition.
Discharge Test	Calibrates the Battery Capacity remaining algorithm.

## Data Networks

The Eaton Customer Services Team offers a complete installation and software customization service, and can provide advice on integration of PowerManagerII into existing data networks.

## Computer Minimum Requirements

Operating System	Windows XP, Windows 7, Windows 8, Windows 10 or Windows Server 2008
RAM	2GB

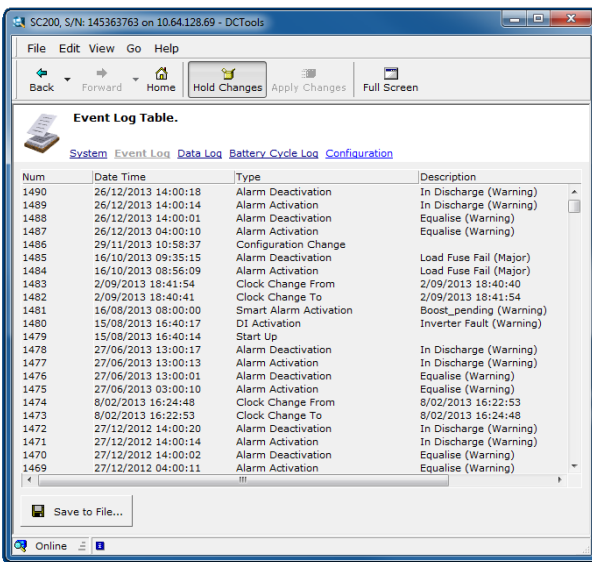
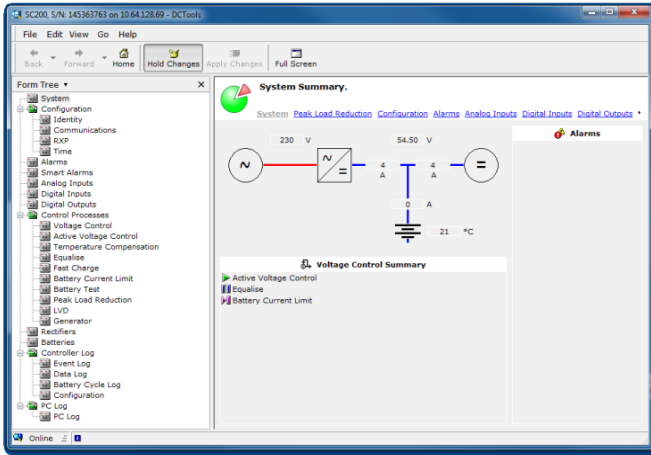
Protocols	SNMP (Can emit traps) S3P three layer protocol
Interfaces	RS232, RS485, Ethernet, TCP/IP, modem

## User Configurable Graphics

Format	Windows bitmap format (.BMP), or Windows Metafile (.WMF) file formats supported
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In the interests of continual product improvement all specifications are subject to change without notice.

# DCTools™ Configuration Software



Eaton® DCTools is configuration software for field technicians installing and maintaining Eaton DC power systems. It is supplied at no charge by download from the Internet and simplifies the setup and operation of all Eaton DC power systems.

Frontline staff will find DCTools is a major benefit during the installation, troubleshooting and support of any Eaton DC power system, CellSure battery monitoring systems and SiteSure ancillary monitoring and control systems.

For added flexibility DCTools can connect to an Eaton DC power system in several ways; directly through a USB connection to an SC200 Controller, Ethernet LAN/WAN, RS232 serial connection; or through a dialup or cellular modem.

DCTools is the ideal setup and diagnostic tool for field technicians. It provides a very easy way for them to configure an Eaton DC product, and view status and alarm conditions.

Among the advantages of using DCTools are reduced installation times, lower fault response times, less need to visit sites and better access to operating data for fault analysis and operating conditions such as load growth.

These make the processes of power system installation and operation more efficient with the potential for real operating cost savings.

DCTools is available for download at <http://dcpower.eaton.com/dc-products.asp>

## Features

- DC power system configuration software
- Windows® compatible
- Easy to use graphical display
- Operates with all Eaton DC power systems, CellSure™ and SiteSure™
- Local (USB, RS232 serial) or remote (or Ethernet or dialup modem) connection
- Downloadable from the Internet at no charge



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# Technical Specifications

## Computer

### Minimum

#### Requirements

Operating System	Windows XP, Window 7, Windows 8, Windows 10 <i>Windows 8 and Windows 10 may require special installation procedure – refer Application Note AN0143.</i>
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RAM	1GB
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Internet connection	Required for download only
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## Interfaces

Communications interfaces supported	Ethernet, USB, RS232, or modem
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## Availability

Free download	<a href="http://dcpower.eaton.com/dc-products.asp">http://dcpower.eaton.com/dc-products.asp</a>
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In the interests of continual product improvement all specifications are subject to change without notice.

# EPR48-3G Rectifier Module



The **Eaton® EPR48-3G Enterprise Power Rectifiers** are designed specifically for enterprise applications such as PoE and VoIP converged data networks, customer premises equipment and also tele-communications roadside cabinet installations.

The EPR48-3G is a telecom network grade rectifier with 900W output. It is designed for operation at up to 70°C (158°F) and under a wide range of AC power conditions.

The EPR48-3G rectifier is microprocessor controlled and includes intelligent features such as automatic set up during installation, temperature dependant variable speed fans for lowest audible noise and automatic self protection over wide ranging environmental conditions.

The EPR48-3G also has power factor correction and is up to 91% efficient, with optimum performance available at typical load currents. Together these give the EPR48-3G some of the lowest running costs for any DC power system of its type available.

The EPR48-3G rectifier module will provide years of costeffective, and trouble free service for your 48V enterprise access equipment.

## Typical Applications:

- PoE equipment
- VoIP/IP converged data networks
- PABX for any business network
- Telecom roadside cabinets

## Features

- Fast on-line expansion of rectifiers (hot-swap)
- Automatic set-up from system controller
- Intelligent microprocessor controlled
- High efficiency and unity power factor
- Universal AC supply input
- Wide output voltage ranges
- Constant power output
- Compliance with international standards



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# Technical Specifications

## Input

AC Supply	Nominal: 220/240V, 50/60Hz Extended Operating Range: 90V – 275V
Power Factor	>0.98 (50 – 100% Output Current)
Efficiency	91% (50 – 100% Output Current)

## Output

DC Output Voltage Range	48V: 43 – 57.5V
DC Output (maximum)	900W (240V AC nominal) 550W (120V AC nominal)

## Environmental

Operating Temperature Range	-40°C – +70°C [-40°F – +158°F] Output current is derated above 50°C [122°F]
Cooling	Temperature controlled, variable speed, high reliability fans

## Mechanical

Dimensions	3U: 133mm [5.25"], 42mm [1.65"], H,W,D
Weight	266mm [10.45"] overall 1.7kg [3.7 lb]

## Certifications

North America	UL, FCC Verification
Europe	CE
Australia / New Zealand	C-tick, Telepermit

In the interests of continual product improvement all specifications are subject to change without notice. Performance ratings are valid with all other variables at Nominal. Specifications guaranteed over rated operating range.



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# APR24-3G Rectifier Module



The **Eaton® APR24-3G Access Power Rectifier** is the 24V series of rectifier modules designed specifically for telecom access networks and light industrial applications such as cellular base stations, radio trunk networks and SCADA systems. The APR24-3G is also suitable for NiCad battery applications.

The new generation 3G architecture is reliable, power dense and compact. The high power density allows as little as 1U of rack space to be occupied by power, therefore, maximizing space available for telecom equipment.

The APR24-3G rectifier incorporates a combination of leading-edge high frequency switch mode technology for a flexible and efficient DC power source, with high reliability fan cooling which further contributes to its high overall reliability.

Designed for operation at up to 70°C (158°F) and under a wide range of AC power conditions, the APR24-3G is perfectly suited to the demanding environments found in network access applications.

With up to 90% efficiency, optimum performance at typical load currents, and power factor correction the APR24-3G has some of the lowest running costs for any 24V DC power system of its type available.

The APR24-3G is designed to operate with the Eaton SC100 and SC200 system controllers in any of the versatile Access Power Solutions and provide years of cost-effective and trouble-free service for your network access equipment.

## Features

- Fast on-line expansion of rectifiers (hot-swap)
- Automatic set-up from system controller
- Intelligent microprocessor controlled
- High power density
- High efficiency and unity power factor
- Wide AC supply conditions
- Wide output voltage ranges
- Constant current output
- NiCad battery compatible
- Compliance with international standards



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# Technical Specifications

## Input

AC Supply	220/240V, 50/60Hz (nominal) 175-275V full output power up to 50°C [122°F]
Power Factor	>0.98 (50 – 100% Output Current)
Efficiency	89% (50 – 100% Output Current)

## Output

DC Output	24V: 20 – 32V
Voltage Range	
DC Output (maximum)	Constant power 1440W, 28.8 - 32V Constant current 50A, 20 - 28.8V

## Environmental

Operating Temperature Range	-40°C – +70°C [-40°F – +158°F]
Output current	Output current is derated above 50°C [122°F] and below -10°C [14°F]
Cooling	Temperature controlled, high reliability fans

## Mechanical

Dimensions	3U: 133mm [5.25"], 42mm [1.65"], H,W,D
Weight	266mm [10.45"] overall 1.7kg [3.7 lb]

## Certifications

North America	UL, FCC Verification, CSA, IC
Europe	CE
Australia / New Zealand	C-tick, Telepermit

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# APR48-3G Rectifier Module



The **Eaton® APR48-3G Access Power Rectifiers** are designed specifically for network access applications such as cellular base stations, customer premises equipment and roadside cabinet installations.

The new generation 3G architecture is reliable, power dense and compact. The high power density allows as little as 1U of rack space to be occupied by power, therefore, maximizing space available for telco equipment.

The APR48-3G rectifier incorporates a combination of leading-edge high frequency switch mode technology for a flexible and efficient DC power source, with high reliability fan cooling which further contributes to its high overall reliability.

The APR48-3G is a high powered rectifier with 1800W output. It is designed for operation at up to 70°C (158°F) and under a wide range of AC power conditions.

These features make the APR48-3G perfectly suited to the wide variety of equipment and demanding environmental conditions found in network access applications.

The APR48-3G also has power factor correction and is up to 92% efficient, with optimum performance available at typical load currents. Together these give the APR48-3G some of the lowest running costs for any DC powersystem of its type available.

Operating with the Eaton SC100 or SC200 system controller, the APR48-3G rectifier modules will provide years of cost-effective, and trouble free service for your 48V network access equipment.

## Features

- Fast on-line expansion of rectifiers (hot-swap)
- Automatic set-up from system controller
- Intelligent microprocessor controlled
- Industry leading power density
- High efficiency and unity power factor
- Wide AC supply conditions
- Wide output voltage ranges
- Constant power output
- Compliance with international standards



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# Technical Specifications

## Input

AC Supply	220/240V, 50/60Hz (nominal) 175-275V full output power up to 50°C [122°F]
Power Factor	>0.99 (50 – 100% Output Current)
Efficiency	92% (50 – 100% Output Current)

## Output

DC Output	48V: 43 – 57.5V
Voltage Range	
DC Output (maximum)	1800W @ 48V

## Environmental

Operating Temperature Range	-40°C – +70°C [-40°F – +158°F]
Output current is derated above 50°C [122°F] and below -10°C [14°F]	
Cooling	Temperature controlled, high reliability fans

## Mechanical

Dimensions	3U: 133mm [5.25"], 42mm [1.65"], H,W,D
Weight	266mm [10.45"] overall 1.7kg [3.7 lb]

## Certifications

North America	UL, FCC Verification, CSA, IC
Europe	CE
Australia / New Zealand	C-tick, Telepermit

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# APR48-ES Energy Saver Rectifier



The **Eaton® APR48-ES Energy Saver Rectifier** is designed for communications network operators who are striving to cut energy costs across the network, and/or to meet aggressive carbon footprint reduction targets.

Operating with well over 96% efficiency, it produces at least 50% less waste energy than most other modern rectifiers, and with potentially greater savings over older infrastructure.

The 2kW Energy Saver Rectifier is the ideal module size for powering access applications within a telecom network such as cellular base stations, ADSL equipment, and fibre nodes.

This rectifier features intelligent digital signal processing for enhanced control, producing peak efficiency in excess of 96% for typical operating loads, while also maintaining a very high minimum operating efficiency of 95 to 96%, over a very wide range of loads (from 30% to 100% of the 2kW capacity).

The high power density, short depth and flexible mounting options makes the Energy Saver Rectifier well suited to limited space applications such as ETSI and road side cabinets.

The Energy Saver Rectifier is fully compatible with existing Eaton 3G systems and it is one of the easiest rectifiers to use, with a simple plug-and-go insertion. It operates under a wide range of AC power conditions and in temperatures at up to 70°C (158°F).

## Features

- 2000W output power
- Energy saving efficiency greater than 96%
- Wide efficiency curve
- Industry leading power density
- Fast on-line expansion of rectifiers (hot-swap)
- Simple 'plug and go' insert
- Unity power factor
- Digital signal processing for enhanced control
- Wide AC supply conditions
- Wide output voltage range
- Constant power output
- Compliance with international standards

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**An Eaton Green Product**

# Technical Specifications

## Input

AC Supply	120V/208-240V, 50/60Hz (nominal) 185-275V full output power up to 50°C [122°F] 90-185V reduced output power
Power Factor	>0.99 (50 – 100% output current)
Efficiency	>96% peak >95% (20 – 100% output power)

## Output

DC Output	
Voltage Range	43 – 57.5V
DC Output (maximum)	2000W @ 48V

## Environmental

Operating Temperature	-40°C – +70°C [-40°F – +158°F]
Range	Output power derates above 50°C [122°F]
Cooling	Temperature controlled, variable speed, high reliability fan <50dBA ambient temperature 25°C

## Mechanical

Dimensions	3U: 133mm [5.25"], 42mm [1.65"], H,W,D
	266mm [10.45"] overall
Weight	1.7kg [3.7 lb]

## Certifications

North America	UL, FCC Verification, CSA, IC
Europe	CE

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# NPR48-ES Energy Saver Rectifier



The **Eaton® NPR48-ES Energy Saver Rectifier** is designed for communications network operators who are striving to cut energy costs across the network, and/or to meet aggressive carbon footprint reduction targets.

Operating with well over 96% efficiency, it produces at least 50% less waste energy than most other modern rectifiers, and with potentially greater savings over older infrastructure.

The NPR48-ES Energy Saver Rectifier harnesses the technology of the APR48-ES 2kW rectifier to offer a powerful 3kW of output power.

This rectifier features intelligent digital signal processing for enhanced control, producing peak efficiency in excess of 96% for typical operating loads, while also maintaining a very high minimum operating efficiency of 95 to 96%, over a very wide range of loads.

The high power density, short depth and flexible mounting options makes the Energy Saver Rectifier well suited to limited space applications such as ETSI and road side cabinets.

The Energy Saver Rectifier is fully compatible with the existing Eaton SC200 system controller and it is one of the easiest rectifiers to use, with a simple plug-and-go insertion. It operates under a wide range of AC power conditions and in temperatures up to 70°C (158°F).

## Features

- 3000W output power
- Energy saving efficiency greater than 96%
- Wide efficiency curve
- Industry leading power density
- Fast on-line expansion of rectifiers (hot-swap)
- Simple 'plug and go' insert
- Unity power factor
- Digital signal processing for enhanced control
- Wide AC supply conditions
- Wide output voltage range
- Constant power output
- Compliance with international standards

# Technical Specifications

## Input

AC Supply	120V/208-240V, 50/60Hz (nominal) 185-275V full output power up to 50°C [122°F] 90-185V reduced output power
Power Factor	>0.99 (50 – 100% output current)
Efficiency	>96% peak >95% (20 – 100% output power)

## Output

DC Output	
Voltage Range	43.2 – 57.5V
DC Output (maximum)	3000W, 60Amp at 50V

## Environmental

Operating Temperature	-40°C – +70°C [-40°F – +158°F]
Range	Output power derates above 50°C [122°F]
Cooling	Temperature controlled, variable speed, high reliability fan <50dBA ambient temperature 25°C

## Mechanical

Dimensions	3U: 130mm [5.1"], 63mm [2.5"], H,W,D
Weight	266mm [10.5"] overall 2.3kg [5.1 lb]

## Certifications

Europe	CE
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# CR48-3G Rectifier Module



The **Eaton® CR48-3G Core Network Rectifiers** are designed specifically for core network applications such as central office and data centres.

The new generation 3G architecture of the CR48-3G rectifier has improved space utilisation so rack space can be maximised for use with telco equipment and not power equipment.

The combination of industry leading power density and high frequency switch mode technology with high reliability fan cooling makes the CR48-3G a flexible, efficient, and very highly reliable DC power source.

The CR48-3G is a very high powered rectifier with 5800W output, it is designed for operation at up to 70°C (158°F) and under a wide range of AC power conditions.

The CR48-3G also has power factor correction and is up to 92% efficient, with optimum performance available at typical load currents. Together these give the CR48-3G some of the lowest running costs for any DC power system of its type available.

These features make the CR48-3G ideally suited to central office and data center applications that require the highest level of performance and reliability from the DC power system.

Operating with the Eaton SC200 system controller, the CR48-3G rectifier modules will provide years of cost-effective, and trouble free service for your core 48V network equipment.

## Features

- Fast on-line expansion of rectifiers (hot-swap)
- Automatic set-up from system controller
- Intelligent microprocessor controlled
- Industry leading power density
- High efficiency and unity power factor
- 3Ø AC supply
- Wide AC supply conditions
- Wide output voltage ranges
- Constant power output
- Compliance with international standards



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# Technical Specifications

## Input

AC Supply	208V, 50/60Hz (nominal) 3-phase Δ 400V, 50/60Hz (nominal) 3-phase Y 323-510V full output power up to 50°C [122°F]
Power Factor	>0.99 (50 – 100% Output Current)
Efficiency	92% (50 – 100% Output Current)

## Output

DC Output	43 – 58V
Voltage Range	
DC Output (maximum)	5800W @ 48V

## Environmental

Operating Temperature Range	-40°C – +70°C [-40°F – +158°F]
Temperature Range	Output current is derated above 50°C [122°F] and below -10°C [14°F]
Cooling	Temperature controlled, high reliability fan

## Mechanical

Dimensions	3U: 130mm [5.25"], 121mm [4.8"], H,W,D
Weight	321mm [12.6"] overall 4.4kg [9.7 lb]

## Certifications

North America	UL, FCC Verification, CSA, IC
Europe	CE
Australia / New Zealand	C-tick, Telepermit

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# ASC48-ES Solar Charger



The **Eaton® ASC48-ES Solar Charger** is designed for communications network operators who are striving to cut energy costs across the network, and/or to meet aggressive carbon footprint reduction targets.

It includes a high-performance Maximum Power Point Tracking (MPPT) function to extract the maximum available power from the solar panels.

Combined with efficiency of above 96%, it ensures that the maximum power is available to charge batteries and run load under all conditions.

An ASC48-ES may be connected to one or more strings of parallel solar panels.

Several ASC48-ES chargers, each with its own solar panels, may be operated in parallel.

This solar charger features intelligent digital signal processing for enhanced control, producing peak efficiency in excess of 96% for typical operating loads, while also maintaining a very high minimum operating efficiency of 95 to 96%, over a very wide range of loads (from 30% to 100% of the 2kW capacity).

The ASC48-ES combines with the Eaton SC200 controller to provide a fully managed solution.

Full monitoring includes energy metering and logging on input and output.

The ASC48-ES is fully compatible with existing Eaton 3G systems, such as the APS3 and APS6 systems. The output may be paralleled with one or more APR48-ES rectifiers to produce a versatile power solution for both AC or generator power and solar power.

This makes it an ideal solution for a fully integrated solar / diesel hybrid solution, or an AC powered system with solar added to reduce energy consumption.

Intelligent control in the SC200 allows optimal balance of solar energy and backup fuel.

The solar charger is protected against input over-voltage, surges and over-temperature. It is rated for operation in temperatures at up to 70°C (158°F).

## Features

- 2000W output power
- MPPT extracts maximum available energy
- Energy saving efficiency greater than 96%
- Wide efficiency curve
- Industry leading power density
- Fast on-line expansion of rectifiers (hot-swap)
- Simple 'plug and go' insert
- Digital signal processing for enhanced control
- Wide input voltage range
- Wide output voltage range
- Compliant with international standards



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# Technical Specifications

## Input

Input voltage range	100 V DC to 300V DC nominal Maximum open circuit voltage 350 V DC Absolute maximum input voltage 350V DC
Optimisation	Maximum power point tracking
Efficiency	>96% peak >95% (30 – 100% output power)

## Output

DC Output Voltage Range	43 – 57.5V
DC Output (maximum)	2000W @ 48V / 185V to 300V input 1150W at 120V input

## Parallel operation

Output	Multiple chargers may be connected in parallel to the DC bus
Input	Not supported (each ASC48-ES must be connected to separate string(s) of solar panels)

## Environmental

Operating Temperature Range	-40°C – +70°C [-40°F – +158°F] Output power derates above 50°C [122°F]
Cooling	Temperature controlled, variable speed, high reliability fan

## Mechanical

Dimensions H,W,D	3U: 133mm [5.25"], 42mm [1.65"], 266mm [10.45"] overall
Weight	1.7kg [3.7 lb]

## Certifications

Europe	CE
Australia / New Zealand	RCM

In the interests of continual product improvement all specifications are subject to change without notice. Performance ratings are valid with all other variables at Nominal.



# Solar Combiner Boxes



The **Eaton® Telecom Solar Combiner boxes** are specifically developed for communication network operators who are investing in photovoltaic (PV) solutions to support their telecom installations.

Due to the distributed nature of small to medium sized telecom PV installations, system protection can sometimes be overlooked. Adequate protection of these DC circuits in these small renewable installations is just as critical as in much larger systems.

These small and medium telecom PV installations are typically made up of one or two strings of eight modules, with high voltage DC cables run throughout the site. Here it is critical to protect people and property from fault and fire in the event of accidental damage or system failure. Eaton's Solar Combiner Boxes can provide this essential protection.

Additionally a small number of PV strings may be combined before being connected into a solar charger, as is particularly the case for thin-film module based systems.

Eaton offers a two string combiner box including: gPV string fuses, DC, isolation, and surge protection devices as an all in one solution. The combiner box can be offered in a "two string in, with one output" configuration or "two string in, with two outputs" configuration. Other configurations are of course possible.

Integrated within the combiner box is a DC surge protection device (SPD), protecting against damaging voltage surges typically caused by indirect or direct lightning strikes.

The Eaton Bussmann range of photovoltaic fuse links are also included and are specifically designed to provide high quality protection and isolation for photovoltaic installations at string level.

Eaton's telecom Solar Combiner Boxes help to complete the balance of system components necessary to complete your solar-based renewable installation and to provide the level of protection to ensure safe and reliable operation.

## Features

- Combiner box
- Surge Protection Device (SPD)
- Inline fuse holder
- Isolator
- Compliant with international standards



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# Technical Specifications

<b>Model</b>	CB02-15ACB00194
<b>Input</b>	
Number of string connections	Two
Protection	2 x 2 15A fuses, 600VDC, Positive and Negative side Protection (PVM-15)
<b>Surge</b>	
SPD	PV Surge protection device (SPD) Class II without remote indication (SPPVT2-06-2-PE)
<b>Output</b>	
Isolator	DC Switch disconnect 40A@1000VDC with Direct handle (external) and protection screens
<b>Environmental</b>	
IP Rating	IP65
Glands	<ul style="list-style-type: none"> <li>2 x 2 x M16 [IP65] Standard Glands for PV Input Strings. One set on the left side and one set on the right side</li> <li>1 x M16 [IP65] Gland for General Ground, bottom of the box</li> <li>1 x M16 [IP65] Gland for PV Earth, bottom of the box</li> <li>1 x M20 [IP65] Standard Gland for PV Output Strings on the bottom of the box</li> </ul>
<b>Mechanical</b>	
Enclosure	GRP Enclosure with Transparent lid – [IP65 with breather/vent plug], entry glands on the sides and bottom
Dimensions H,W,D	300mm, 300mm, 132mm overall
<b>Certifications</b>	
Combiner	IEC 61439-1 IEC 61439-2 IEC 60364-7-712
Components	PV fuse holder - IEC 60269-1 PV fuse link - IEC 60269-6 Enclosures - IEC 60529, IP65

<b>Model</b>	CB02-15ACB00195
<b>Input</b>	
Number of string connections	Two – each independently wired throughout
Protection	2 x 2 15A fuses, 600VDC, Positive and Negative side Protection (PVM-15)
<b>Surge</b>	
SPD	PV Surge protection device (SPD) Class II without remote indication <ul style="list-style-type: none"> <li>SPD on each string</li> <li>2 x SPD (SPPVT2-06-2-PE)</li> </ul>
<b>Output</b>	
Isolator	DC Switch disconnect with direct handle (external) and protection screens <ul style="list-style-type: none"> <li>Switch on each string</li> <li>2 x 25A@1000VDC</li> </ul>
<b>Environmental</b>	
IP Rating	IP65
Glands	<ul style="list-style-type: none"> <li>2 x 2 x M16 [IP65] Standard Glands for PV Input Strings. One set on the left side and one set on the right side</li> <li>1 x M16 [IP65] Gland for General Ground, bottom of the box</li> <li>1 x M16 [IP65] Gland for PV Earth, bottom of the box</li> <li>2 x M20 [IP65] Standard Gland for PV Output Strings on the bottom of the box</li> </ul>
<b>Mechanical</b>	
Enclosure	GRP Enclosure with Transparent lid – [IP65 with breather/vent plug], entry glands on the sides and bottom
Dimensions H,W,D	300mm, 300mm, 132mm overall
<b>Certifications</b>	
Combiner	IEC 61439-1 IEC 61439-2 IEC 60364-7-712
Components	PV fuse holder - IEC 60269-1 PV fuse link - IEC 60269-6 Enclosures - IEC 60529, IP65

In the interests of continual product improvement all specifications are subject to change without notice. Performance ratings are valid with all other variables at Nominal.



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# SC200 System Controller



The **Eaton® SC200 System Controller** is an advanced control and monitoring solution for Eaton Enterprise, Access, Metro and Core Power Solutions.

It provides a full suite of advanced communications options, including built-in Ethernet interface, Web server, and SNMP agent.

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

An intelligent "Smart Alarms" feature provides highly configurable control and alarms to automated site management and improve performance – e.g. disconnect loads during peak AC grid loading, run outdoor cabinets in low noise mode at night, manage cooling, or customise site alarms to network requirements.

The SC200 provides full generator control and fuel metering capability for off-grid, hybrid generator, battery, solar and wind applications.

The SC200 is supplied preconfigured with a default configuration file, or factory customized for a particular

application, ensuring fast and problem free installation. On-site changes are easily made from the front panel or with a Windows PC using DCTools configuration software.

The high-resolution color LCD display is easy to read and has an easy to use menu structure. All system values and alarms can be displayed, with easy keypad access to check or edit settings.

The SC200 works with separate system I/O boards for powerful and user-friendly interfacing. Easy, low cost I/O expansion is possible by adding additional I/O boards.

## Typical Applications:

- 24V & 48V power systems
- Wireless cell sites & switches
- Transmission terminals
- Local & central office switching

## Options:

- External GSM or PSTN modem
- Additional I/O boards for system expansion
- SiteSure-3G modules for site management

## Features

- Ethernet interface built-in
- SNMP agent V1, V2c, V3
- Battery mid-point monitoring & discharge time remaining
- Generator control & fuel metering
- Alternative energy input metering
- SMS & email alarm messages (with GSM modem)
- Comprehensive system control functions
- Complies with international standards
- Setup via web, keypad or DCTools configuration software
- Language options
- Optional extra I/O boards or SiteSure-3G modules for expansion
- Smart alarms
- Modbus



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# Technical Specification

## Operation

Supply Voltage Range	18 to 60Vdc
Operating Range	Standard: -10 to +50°C [14 to 122 °F] Extended: -25 to 70°C [-13 to 158 °F]

## Input/Output Standard

Analog inputs	Current sensor (3), Bus voltage (1), Temperature (2)
Digital inputs	4 Internal (pre-defined), 6 external (user-defined)
LVD contactor outputs	2 with one IOBGP module
Relay outputs	Up to 16 with additional IOBGP modules
Relay outputs	6 Voltage free, NO-C-NC, 0.1A @ 60VDC Screwless terminal block, 0.5mm <sup>2</sup> - 2.0mm <sup>2</sup> conductors

## Communications

### Interfaces

Physical	Ethernet, USB and RS232
Software	IP, http, https (secure web), S3P, Modbus, SMTP (email)
Management software	DCTools configuration / local management software. PowerManagerII remote management software. SNMP version V1, V2c or V3. Supports standard Network Management System software including HP OpenView Network Node Manager.

## User Interface

Display	Back-lit color dot matrix LCD 160 x 128 pixel Adjustable viewing angle
Keypad	6 keys
Language	English: Standard
Options	Spanish, German and Chinese available on request. Other language software upgrades by arrangement.
Indicators	Power on, Critical/Major alarm, Minor alarm

## Mechanical

Dimensions	SC200: 133.5mm (3U), 44.5mm, 70mm
H,W,D	IOBGP: 106mm, 175mm, 18mm
Mounting	SC200: rectifier slot or flush panel mount Orientation: vertical or horizontal IOBGP: panel mount

## Datalogging

Event Log	10,000 records
Data Log	10,000 records

## Options

Input/Output	With IOBSS module (SiteSure-3G): Analog inputs: 48 Digital inputs: 108 Digital outputs: 32
Modem communications	PSTN or GSM. Requires external modem.

## Certifications

China	MII
North America	UL, FCC Verification, IC
Europe	CE
Australia / New Zealand	C-tick

In the interests of continual product improvement all specifications are subject to change without notice.



# SC100 System Controller



The **Eaton® SC100 System Controller** is a control and monitoring solution for the Eaton 3G power solutions.

It provides a full suite of system control functions including Temperature Compensation, Equalize and Fast Charge.

A comprehensive range of alarms and alarm notification options are available, including SMS, relay contacts and modem dial out to PowerManagerII.

The SC100 is supplied preconfigured with either a default configuration file, or with one factory customized for a particular application. This ensures fast and problem free installation.

If on-site changes are needed then these can be easily made from the front panel or with a Windows PC using DCTools configuration software.

The front panel incorporates a high-resolution back-lit LCD display with easy to read characters and easy to use menu system.

All system values and alarms can be displayed and the keypad provides easy access to check or edit settings.

The SC100 works with a separate system I/O board for powerful and user-friendly interfacing.

## Typical Applications:

- 24V and 48V power systems
- Wireless cell sites and switches
- Transmission terminals

## Options:

- External GSM or PSTN modem

## Features

- Comprehensive system control functions
- Supports PSTN and GSM external modems
- User-friendly menus
- Pre-loaded customized configuration file
- Complies with international standards
- Setup via DCTools configuration software
- Language options
- Low cost



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# Technical Specifications

## Operation

Supply Voltage Range	19 to 60Vdc
Operating Range	-10 to +70 °C [14 to 158 °F]

## Input/Output with IOBGP-00

Analog inputs	Current sensor (3), Bus voltage (1), Temperature (2)
Digital inputs	4 Internal (pre-defined), 6 external (user-defined)
LVD contactor outputs	2
Relay outputs	6 Voltage free, NO-C-NC, 0.5A @ 100VDC Screw terminal block, 0.5mm <sup>2</sup> - 2.0mm <sup>2</sup> conductors

## Communications

### Interfaces

Physical	RS232
Software	S3P, MII
Management software	DCTools configuration / local management software. PowerManagerII remote management software.

### User Interface

Display	Back-lit dot matrix LCD 128 x 128 pixel Adjustable viewing angle
Keypad	4 keys
Language	English: Standard
Options	Other languages by arrangement.
Indicators	Power on, Critical/major alarm, Minor alarm

### Mechanical

Dimensions H,W,D	SC100: 133.5mm (3U), 44.5mm, 60mm IOBGP: 106mm, 175mm, 18mm
Mounting	SC100: rectifier slot or flush panel mount Orientation: vertical or horizontal IOBGP: panel mount

### Datalogging

Event Log	100 records
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## Options

Modem communications	PSTN or GSM. Requires external modem.
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## Certifications

China	MII
North America	FCC Verification, IC
Europe	CE
Australia / New Zealand	C-tick

In the interests of continual product improvement all specifications are subject to change without notice.



# SiteSure-3G™



The **Eaton® SiteSure-3G** adds on to the SC200 Controller to provide control and monitoring of a wide range of external devices. It uses the communications capability of an Eaton DC power system to monitor and control security, air conditioning, engine alternators and other building services, or sense DC currents for load metering.

SiteSure-3G modules can be remotely controlled and configured using the PowerManagerII remote control and monitoring software or with DCTools local craft terminal.

SiteSure-3G is also compatible with Network Management Systems using SNMP.

Additional SiteSure-3G modules can be added as required to provide the number of inputs and outputs needed for a particular application.

## Features

- Remote control and monitoring
- Expandable
- Modular
- Real time data collection
- Compliance with international standards



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# Technical Specifications

## Operation

Supply Voltage Range	19 to 60V
Rated Operating Range	-10°C to +80°C [+14°F to +176°F]

## Input/Output

Bus voltage input	Number:	1
	Range:	-60V to +60V
Current inputs	Number:	3
	Range:	-50mV to +50mV
Temperature inputs	Number:	2
	Range:	2.53V to 3.23V (-20°C to +70°C with TS02 temperature sensor)
Digital inputs	Number:	10
General purpose analog inputs	Number:	4
	Range:	0V to +10V
Digital Outputs (Relays)	Number:	6
	Type:	Voltage free, NO-C-NC 0.3A @ 60VDC / 1A @ 30VDC

## Certifications

All products comply with international standards. Contact your local Eaton DC representative for details on the specific product versions available with these safety and EMC approvals:

North America	UL, FCC Verification, IC
Europe	CE
Australia / New Zealand	C-tick

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# SheltR Outdoor Enclosure



The **Eaton® SheltR Outdoor Enclosure** is designed to provide a secure and clean environment for equipment in harsh or outdoor environments. Typical applications may include communication and telecommunication installations, the housing of data and control equipment, or the support of industrial and process equipment. The SheltR enclosure can accommodate the application equipment, DC or AC backup power, and batteries.

The enclosure is designed to resist harsh environments by employing a combination of extruded aluminium framework, together with power-coated steel panels and aluminium cowlings. The performance is assured by internal insulation to reduce the heating effects from solar gain.

Cooling of the upper equipment compartment is provided by a sealed air-to-air heat exchanger (HEX) to ensure that moisture, pollutants and vermin are kept away from the equipment to be protected, something that cannot generally be achieved by inferior free-air cooled solutions. The electronically controlled HEX fans are DC powered to ensure that the cooling can be maintained during a power outage\*. The internal environment of the enclosure is further protected during sub-zero temperatures by the standard inclusion of a 240VAC heater.

The lower battery compartment is

*(\* requires a DC backup power solution)*

thermally isolated from the hot equipment compartment.

For temperate climates battery cooling is provided by ventilation to the ambient, thereby benefitting from the average ambient temperature. For hotter climates, or where precision cooling is needed, an optional active cooling module is available that utilises a Peltier cooling element.

The SheltR enclosure can be preconfigured at the factory with any combination of DC system including: rectifiers, DC distribution, AC distribution, inverters, battery configuration, and control.

For sites that are off grid or connected to an unreliable AC network the enclosure can be preconfigured with a DC system, solar converters, and hybrid control in order to harness energy from sun all-the-while managing the run time of a generator.

Finally remote communications and alarming can be achieved using Eaton's advanced SC200 system controller providing: volt-free contact alarms, Modbus RTU/TCP, SNMP v1/v2/v3, and web access.

## Typical Applications:

- Solar based installations
- Wireless cell sites & switches
- Transmission terminals
- Data and Control
- Transportation

## Features

- Aluminium frame, roof, and HEX/Peltier covers
- Steel sandwich panel construction
- Attractive powder coat finish
- Polyurethane insulation
- Vandal resistant 3 point locking
- Galvanised steel base
- 48V DC Heat Exchanger for heat removal
- Filtered air inlet/outlet for battery compartment (standard)
- 240V AC Heater
- Accommodates up to 400-450Ah (48V) of battery



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# Technical Specification

<b>Environment: Power Compartment</b>	
Protection	IP55
Cooling	HEX-based system
Cooling Capacity	80W/K equipment compartment
Operating temperature	+9°C above ambient at 800Watt internal heat load
Cooling Fans	RG175. 48V radial, speed controlled (1x external, 1x internal)
Heater	1000watt, 230VAC

<b>Environment: Battery Compartment</b>	
Protection	IP55 (when fitted with the optional Peltier cooling)
Cooling – standard	Filtered ventilation to the ambient
Cooling – option	Optional Peltier-based precision cooling system
Cooling Capacity	22W/K equipment compartment (option)
Operating temperature (option)	+5°C above ambient at 100Watt internal heat load

<b>Input</b>	
AC Supply	187 – 276V, 50 – 60Hz (nominal)

<b>Security</b>	
Locking	3 point lock mechanism, key locked handle with security panel and padlock clasp.
Hinges	Concealed
Cable Glands	12 cables glands accepting cables of 15mm, as standard

<b>Equipment Space</b>	
Power Compartment	21U, 19" (450mm), 548mm
Battery Compartment	340mm, 745mm, 620mm, per shelf.
H,W,D	Two shelves.
Batteries	Space for 48V, 400-450Ah (2 shelves, 6 x 12V 100-150Ah front terminal blocks)

<b>Mechanical</b>	
Dimensions	2100mm, 905mm, 997mm
H,W,D	
Weight	225kg (excluding DC power and batteries or customer equipment)
Finish	Powder coating
Base	Hot dipped galvanised (200mm height)

<b>Part Numbers</b>	
SheltR-FC	SheltR enclosure with HEX cooling, and ambient cooling for the battery compartment
SheltR-TEC	SheltR enclosure with HEX cooling, and Peltier cooling for the battery compartment

<b>Options</b>	
TEC200	Peltier based cooling module for battery compartment – 200Watt cooling capacity (nominal). Factory fit.

<b>Certifications</b>	
Europe	CE

In the interests of continual product improvement all specifications are subject to change without notice.



# SheltR-AIR Outdoor Enclosure



The **Eaton® SheltR Outdoor Enclosure** is designed to provide a secure and clean environment for equipment in harsh or outdoor environments. Typical applications may include communication and telecommunication installations, the housing of data and control equipment, or the support of industrial and process equipment. The SheltR enclosure can accommodate the application equipment, DC or AC backup power, and batteries.

The enclosure is designed to resist harsh environments by employing a combination of extruded aluminium framework, together with power-coated steel panels and aluminium cowlings. The performance is assured by internal insulation to reduce the heating effects from solar gain.

Cooling of the upper equipment compartment is provided by air-conditioning (aircon) units to ensure that moisture, pollutants and vermin are kept away from the equipment to be protected, something that cannot generally be achieved by inferior free-air cooled solutions. The electronically controlled aircon fans and compressor are DC powered to ensure that the cooling can be maintained during a power outage\*.

The lower battery compartment shares the same cooling space as the equipment compartment, to ensure batteries

are maintained at a reliable temperature.

The air-conditioned version of the SheltR enclosure is intended for hotter climates where active cooling is essential to protect the installed equipment and batteries from high ambient temperatures.

The SheltR enclosure can be preconfigured at the factory with any combination of DC system including: rectifiers, DC distribution, AC distribution, inverters, battery configuration, and control.

For sites that are off grid or connected to an unreliable AC network the enclosure can be preconfigured with a DC system, solar converters, and hybrid control in order to harness energy from sun all-the-while managing the run time of a generator.

Finally remote communications and alarming can be achieved using Eaton's advanced SC200 system controller providing: volt-free contact alarms, Modbus RTU/TCP, SNMP v1/v2/v3, and web access.

## Typical Applications:

- Solar based installations
- Wireless cell sites & switches
- Transmission terminals
- Data and Control
- Transportation

*(\* requires a DC backup power solution)*

## Features

- Aluminium frame, roof, and air-conditioning unit cover
- Steel sandwich panel construction
- Attractive powder coat finish
- Polyurethane insulation
- Vandal resistant 3 point locking
- Galvanised steel base
- 48V DC Air-conditioning unit for heat removal
- Accommodates up to 400-450Ah (48V) of battery



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# Technical Specification

Environment:	Compartment
Protection	IP55
Cooling	DC powered air-conditioner
Cooling Capacity	CE: 500Watt, 1500Watt (pending) Non-CE: 1000, 2000, 3000Watt
	$T_{Ambient} = 35^{\circ}C$ , $T_{Internal} = 35^{\circ}C$
Operating temperature	-15°C to +55°C
Cooling Fans	48V speed controlled (1x external, 1x internal)
Refrigerant	R134a
Noise Level	60-65dB(A)

## Input - Aircon

DC Supply	44 to 58VDC, 48VDC nominal
DC Current	500Watt (3.34Amp), 1500Watt (9Amps), 1000Watt (6.90Amp), 2000Watt (12.0Amps), 3000Watt (18Amps), 48VDC

## Security

Locking	3 point lock mechanism, key locked handle with security panel and padlock clasp.
Hinges	Concealed
Cable Glands	12 cables glands accepting cables of 15mm, as standard

## Equipment Space

Power	21U, 19" (450mm), 548mm
Compartment	
Battery	340mm, 745mm, 620mm, per shelf.
Compartment H,W,D	Two shelves.
Batteries	Space for 48V, 400-450Ah (2 shelves, 6 x 12V 100-150Ah front terminal blocks)

## Mechanical

Dimensions H,W,D	2100mm, 905mm, 1040mm
Weight	225kg (excluding DC power and batteries or customer equipment)
Finish	Powder coating
Base	Hot dipped galvanised (200mm height)

## Part Numbers

Sheltr-AIR-A05CE	Sheltr-AIR enclosure with Air-conditioning-based cooling (500Watt) for power and battery compartment. CE compliant DC-powered aircon unit. Not included: DC power, batteries, AC and DC distribution, or cabling.
Sheltr-AIR-A15CE	As per Sheltr-AIR-A05CE, but with 1500Watt CE compliant air-conditioning-based cooling
Sheltr-AIR-A10	Sheltr-AIR enclosure with Air-conditioning-based cooling (1000Watt) for power and battery compartment. DC-powered aircon unit. Not included: DC power, batteries, AC and DC distribution, or cabling.
Sheltr-AIR-A20	As per Sheltr-AIR-A10, but with 2000Watt Air-conditioning-based cooling.
Sheltr-AIR-A30	As per Sheltr-AIR-A10, but with 3000Watt Air-conditioning-based cooling

## Options

Smoke Detector	Optical smoke detector
Door Switch	Switch for door alarm

## Certifications

Europe	CE
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