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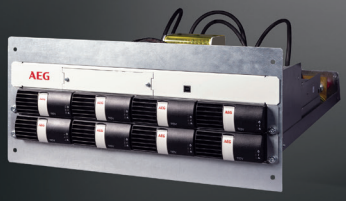
POWER
SOLUTIONS

PROTECT RCS MIPE

Modular switch-mode
industrial applications rectifier



State of the art switch mode technology, N+1 redundant Protect RCS MIPE rectifier system is designed to be scalable, simple to use and easy to maintain with hot swappable rectifier modules. It allows you to benefit from low electromagnetic pollution and high efficiency resulting in a cost effective system with reduced operating costs, short delivery time and prepared for possible future power expansion. The MIPe systems and racks are also available with DC/DC converter modules.

Typical applications

- Power generation
- T&D
- Oil & Gas
- Petrochemical and chemical
- Heavy industry
- Mining industry
- Transportation and signaling

FEATURES

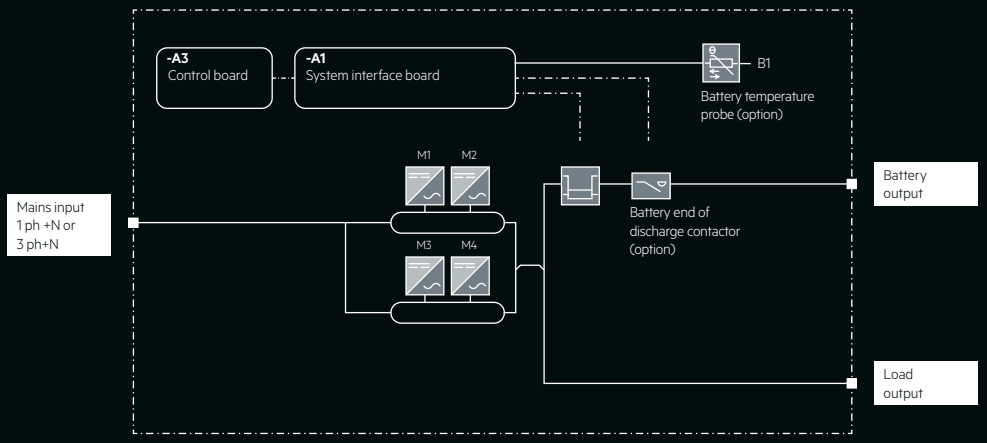
- Compact design and light weight
- High power density
- Low input current harmonics and high power factor, high efficiency
- High avaibility with N+1 redundancy of rectifier and converter modules
- Low MTTR due to modular design
- Low DC voltage ripple for an optimized battery life time
- Power increase possibility on site
- Digital processing and setting of all parameters
- Monitoring of all parameters via the front panel display
- Built-in intelligent battery management
- Temperature-compensated charge voltage regulation
- Manual or automatic high rate charge
- Alarm- and event logger, with a date and time-stamped event log memory
- Large communication facility options
- Inbuilt programable logic control to provide a wide range of interaction possibilities with external systems
- 19" battery charger subrack versions for integration inside cabinet as ready to use solution
- Compact 19" rectifier rack with integrated CoSSMIC Slot controller

BENEFITS

- Existing pre-defined configurations to permit reduced lead times
- Highly customizable with a fully comprehensive option list and fully flexible design
- Compatible with all industrial battery types including gas recombination and Li-Ion with easy parameter adjustment
- Reduces capital and operational expenses (CAPEX & OPEX)
- Ease of installation, start-up & maintenance, low Mean Time To Repair (MTTR)
- International service support

Configured rectifier system specification

SYSTEM	24 V	48 V	110 / 120 V	220 V
INPUT				
Nominal input voltage	230 V single phase ±20 % (+20 % -60 % functional) or 400 V three phase with neutral +/-20% (+20% -60% functional)			
Frequency	50 Hz or 60 Hz, ±5 %			
Current consumption	Depends on configuration			
Inrush current	1.5 nominal peak current			
THDI	<5 %			
Power factor	0.99			
Overvoltage category	OVC III acc. to IEC62477-1			
Ground scheme	IT, TN, TT			
OUTPUT				
Output voltage	24 V	48 V	110 / 120 V	220 V
Maximum output current	1200 A	1200 A	1200 A	800 A
Voltage range	20 – 32.4 V	40 – 64.8 V	91 – 148.5 V	182 – 297 V
Commissioning voltage	33 V	66 V	166 V	308 V
System earth	Floating/positive or negative output connected to earth			
Static voltage regulation	<1 %			
Dynamic voltage regulation	Load change 10 – 90 %, 90 % – 10 % – deviation 5 %			
Current regulation	0 to +6 %			
Ripple voltage	Max. 0.2 % rms typical on rectifier output, battery not connected			
MANAGEMENT				
Common alarm connection	1 Form C relay contact – Rating 60 VAC @ 2 A, 24 VDC @ 2 A & 60 VDC @ 0.1 A			
Control panel	Multi-functional LCD with 2 LEDs indicate the system status			
PROTECTION				
Input/battery/load	Depending on configuration			
Soft start	Yes			
Protection	The rectifier has built-in protection functions against short circuit, over and under AC input voltage, over and under DC output voltage as well as high temperature			
Decoupling fuse	Yes – within rectifier			
MECHANICAL				
Degree of protection	Standard IP21, optional IP43 (other protection under request)			
Equipment color	RAL 7035, powder coated, textured paint (special colors as option)			
Dimensions (H x W x D) & weight	Output current ≤500 A: 2000 x 600 x 800 mm depending on DC voltage and options integrated Output current >500 A: 2000 x 1200 x 800 mm depending on DC voltage and options integrated weight depends on configuration			
Acoustic noise @ 1 m	≤65 dBA – depends on the system output power			
Connections	Bottom (top cable as option)			
ENVIRONMENTAL				
Type of cooling	Rectifier modules are forced air cooling with electronic speed control			
Operating temperature	-10 °C to +40 °C with a de-rating of 1.25 % / °C between 40 °C and 55 °C			
Storage temperature	-25 °C to +70 °C			
Operating humidity	10 % to 95 % R H non-condensing			
Installation height	0 to 1000 m – de-rating @ 1 % per 100 m above 1000 m up to 4000 m			
Pollution degree	Grade 2 acc. to IEC60664-1			
STANDARDS				
Safety	IEC62477-1			
EMC	EN 55022 Level B, EN 61000.6-1,2,3,4, EN 61000.3-2, EN 61000.3-3, EN21000, EN 50121-3-2/IEC 62236-3-2 - EN 50121-4/IEC 62236-4 - EN 50121-5/IEC 62236-5 IEC 60146-1-1 Class B 2kV			
Functional	EN/IEC62040-5-3			
Environment	ROHS WEEE			
Approvals & certification	CE			



19" battery charger subrack
typical single line drawing

19" battery charger subrack

SYSTEM		24 V	48 V	110 / 120 V	220 V
INPUT					
Nominal input voltage		230 V single phase ±20 % (+20 % -60 % functional) or 400 V three phase with neutral +/-20% (+20% -60% functional)			
Frequency		50 Hz or 60 Hz, ±5 %			
Current consumption	8 kW – 4 rectifier subrack 16 kW – 8 rectifier subrack 32kW - 16 rectifier subrack	37 A single phase mains – 24 A three phase with neutral – nominal mains voltage 74 A single phase mains – 36 A three phase with neutral – nominal mains voltage 72A three phase with neutral – nominal mains voltage			
Inrush current		1.5 nominal peak current			
THDI		<5 %			
Power factor		0.99			
Mains connections		Integrated mains terminal block compatible for single phase and three phase + neutral mains			
Overvoltage category		OVC III acc. to IEC62477-1			
Ground scheme		IT, TN, TT			
OUTPUT					
Maximum output current	8 kW – 4 rectifier subrack 16 kW – 8 rectifier subrack 32kW - 16 rectifier subrack	200 A 400 A 800 A	160 A 320 A 640 A	64 A 128 A 256 A	32 A 64 A 128 A
Voltage range		20 – 32.4 V	40 – 64.8 V	91 – 148.5 V	182 – 297 V
Commissioning voltage		33 V	66 V	166 V	308 V
System earth		Floating/positive or negative output connected to earth			
Static voltage regulation		<1 %			
Dynamic voltage regulation		Load change 10 – 90 %, 90 % – 10 % – deviation 5 %			
Current regulation		0 to +6 %			
Ripple voltage		Max. 0.2 % rms typical on rectifier output, battery not connected			
Output connections		Power connection to DC load and to battery through battery shunt 400 A max			
MANAGEMENT					
Alarm connection		3 Form C relay contact – Rating 60 VAC @ 2 A, 24 VDC @ 2 A & 60 VDC @ 0.1 A			
Control panel (option)		Optional multi-functional LCD with 2 LEDs indicate the system status (delivered loose with a 2m cable for cabinet front door installation)			
PROTECTION					
Input/battery/load		To be installed separately in the cabinet			
Soft start		Yes			
Protection		The rectifier has built-in protection functions against short circuit, over and under AC input voltage, over and under DC output voltage as well as high temperature			
Decoupling fuse		Yes – within rectifier			
MECHANICAL					
Degree of protection		Standard IP20 from front after integration inside cabinet			
Equipment color		RAL 7035, powder coated, textured paint (special colors as option)			
Dimensions (H x W x D) & weight		19" compatible width – Front face height : 4U (177.8 mm) for 8 kW rack / 5U (222.3 mm) for 16 kW rack / 7U (311.2mm) for 32kW rack 600mm or 480mm depth versions - weights with rectifiers 8kW=22kg/16kW=32kg/32kW=63kg			
Acoustic noise @ 1 m		≤65 dBA			
Connections		At the back of the rack			
ENVIRONMENTAL					
Type of cooling		Rectifier modules are forced air cooling with electronic speed control			
Operating temperature		-10 °C to +40 °C with a de-rating of 1.25 % / °C between 40 °C and 55 °C			
Storage temperature		-25 °C to +70 °C			
Operating humidity		10 % to 95 % R H non-condensing			
Installation height		0 to 1000 m – de-rating @ 1 % per 100 m above 1000 m up to 4000 m			
Pollution degree		Grade 2 acc. to IEC60664-1			
STANDARDS					
Safety		IEC62477-1			
EMC		EN 55022 Level B, EN 61000.6-1,2,3,4, EN 61000.3-2, EN 61000.3-3, EN21000, EN 50121-3-2/IEC 62236-3-2 - EN 50121-4/IEC 62236-4 - EN 50121-5/IEC 62236-5 - IEC 60146-1-1 Class B 2kV			
Environment		ROHS WEEE			
Approvals & certification		CE			

The rack can be also equipped with DC/DC converters of the MIPe range

19” rectifier rack with integrated CoSSMIC Slot controller (*)

SYSTEM		24 V	48 V	110 / 120 V	220 V
INPUT					
Nominal input voltage		230 V single phase ±20 % (+20 % -60 % functional) or 400 V three phase with neutral +/-20% (+20% -60% functional)			
Frequency		50 Hz or 60 Hz, ±5 %			
Current consumption	Max. 9A per rectifier module	Max. 12A per rectifier module			
Inrush current		1.5 nominal peak current			
THDI		<5 %			
Power factor		0.99			
Mains connections		Compatible for single phase and three phase + neutral mains			
Overvoltage category		OVC III acc. to IEC62477-1			
Ground scheme		IT, TN, TT			
OUTPUT					
Maximum output current	6kW rack equipped with 3 rectifier modules	150A	120 A	48 A	24 A
Voltage range		20 – 32.4 V	40 – 64.8 V	91 – 148.5 V	182 – 297 V
Commissioning voltage		33 V	66 V	166 V	308 V
System earth		Floating/positive or negative output connected to earth			
Static voltage regulation		<1 %			
Dynamic voltage regulation		Load change 10 – 90 %, 90 % – 10 % – deviation 5 % - recovery time <10ms			
Current regulation		0 to +6 %			
Ripple voltage		Max. 0.2 % rms typical on rectifier output			
Output connections		Power connection to DC load			
MANAGEMENT					
Common alarm connection		1 Form C relay contact – Rating 60 VAC @ 2 A, 24 VDC @ 2 A & 60 VDC @ 0.1 A			
Control panel (option)		Multi-functional LCD with 2 LEDs indicate the system status			
PROTECTION					
Input/battery/load		To be installed separately in the cabinet			
Soft start		Yes			
Protection		The rectifier has built-in protection functions against short circuit, over and under AC input voltage, over and under DC output voltage as well as high temperature			
Decoupling fuse		Yes – within rectifier			
MECHANICAL					
Degree of protection		Standard IP20 from front after integration inside cabinet, IP20 with optional cover.			
Equipment color		Black			
Dimensions & weight		19” compatible width - front face height 1U (44.45mm) - depth 461,8mm - weight with 3 rectifiers : 12kg			
Acoustic noise @ 1 m		≤65 dBA			
Connections		At the back of the rack			
ENVIRONMENTAL					
Type of cooling		Rectifier modules are forced air cooling with electronic speed control			
Operating temperature		-10 °C to +40 °C with a de-rating of 1.25 % / °C between 40 °C and 55 °C			
Storage temperature		-25 °C to +70 °C			
Operating humidity		10 % to 95 % R H non-condensing			
Installation height		0 to 1000 m – de-rating @ 1 % per 100 m above 1000 m up to 4000 m			
Pollution degree		Grade 2 acc. to IEC60664-1			
STANDARDS					
Safety		IEC62477-1			
EMC		EN 55022 Level B, EN 61000.6-1,2,3,4, EN 61000.3-2, EN 61000.3-3, EN21000, EN 50121-3-2/IEC 62236-3-2 - EN 50121-4/IEC 62236-4 - EN 50121-5/IEC 62236-5 IEC 60146-1-1 Class B 2kV			
Environment		ROHS WEEE			
Approvals & certification		CE			

(*): the rack can be also equipped with DC/DC converters of the MIP range refer to DC/DC converter operation manual for module technical data

Protect RCS MIPE configured system

STANDARD SYSTEM

The Protect RCS MIPE system has been pre-configured with a number of the most commonly requested features built-in as standard. These systems are available "off-the-shelf" with standard drawings and standard user documentation.

- Single system
- Input voltage configuration 1 or 3 phase +N
- Internal rectifier input switch Q1
- 19" sub-rack with up to 100 hot swappable rectifier modules
- Digital control card
- Multi-functional LCD display with 2 LEDs indicate the system status
- Tropicalized control electronics boards
- Common fault remote alarm
- Floor mounted cabinet with protection IP21
- Cabinet color RAL 7035
- Power and control cable marking
- Detailed 3-D layout and component marking presented on rear side of front door
- 180 degrees swing door with three points key lock
- Bottom cable entry
- Input/battery/output terminals
- Standard labeling/nameplate
- Low smoke – halogen free wires and cables

OPTIONS

The standard system can be enhanced by additional options. The system specific drawing packages and user documentation will be automatically generated to reflect the actual option configuration.

To provide exact solutions for each application, we offer a wide range of inverters and converters for AC and DC outputs

Protections
- AC Input – switch, fuses, breakers
- Input contactor with external door switch
- DC Load – switch, fuses or breakers, including AC and DC distribution panels/cabinets
- AC and DC surge arrestors

Alarms/Signaling/Measurement
- Relay card (8 free contacts each), LED Box
- Alarms on protection devices
- Analog meters for AC and DC measurements
- Remote commands via analog and digital inputs, eg. boost charge, battery room fan, remote shutdown
- High rate interlock (automatic and manual)
- Battery cell fault alarm
- Independant protection system to limit hydrogen emission (NFC15-100)

Communication
- RS232/RS485 interface
- RS232/RS485 Modbus protocol
- TCP/IP interface
- Protocol converters (Profibus DP, J-bus DNP3, IEC 61850)
- Monitoring and management software

Battery options
- Battery protection – switch, fuses, breakers
- Low Voltage Disconnect (LVD)
- Battery shunt or hall effect sensor for battery measurement
- Matching battery cabinets
- Battery temperature probe

Mechanical options
- IP43 protection cabinet
- Anti-condensation heater
- Interior light
- Special color
- Special markings

Additional options are available upon request.

Protect RCS MIPE 19” racks

STANDARD SYSTEM

The Protect RCS MIPE 19” racks have been pre-configured with a number of the most commonly requested features built-in as standard. These racks are available “off-the-shelf” with standard drawings and standard user documentation.

- Single system
- Input voltage configuration 1 or 3 phase +N
- 19” battery charger subrack with up to 16 hot swappable rectifier or DC/DC converter modules.
- 19” rectifier subrack with CoSSMICSLOT controller with up to 3 hot swappable rectifier or DC/DC converter modules, and integrated HMI.
- 19” charger rack or 19” rectifier rack with CoSSMICSlot controller can be associated with additional 1U power rack to bring additional features (e.g 110V battery charger + 110V/24V DC/DC converter)
- Digital control card
- Tropicalized control electronic boards
- Common fault remote alarm
- Power and control cable marking
- Input/battery/output terminals
- Standard labeling/nameplate
- Low smoke – halogen free wires and cables

OPTIONS

The standard rack can be enhanced by additional options.

Alarms/Signaling/Measurement
- Relay card (8 free contacts each), LED Box
- Multi-functional LCD display with 2 LEDs indicate the system status
- Remote commands via analog and digital inputs, eg. boost charge, battery room fan, remote shutdown
- Battery cell fault alarm
- Project specific parameter uploaded at factory for a ready to use product.

Communication
- RS232/RS485 interface
- RS232/RS485 Modbus protocol
- TCP/IP interface
- Protocol converters (Profibus DP, J-bus DNP3, IEC 61850)
- Monitoring and management software

Battery options
- Low Voltage Disconnect (LVD)
- Battery temperature probe

Mechanical options
- IP20 protection cover
- Rectifier or converter module blanking plate

Example of 19” charger rack and additional DC/DC converter 1U rack

AEG Power Solutions
Approach your local AEG Power Solutions representative for further support. Contact details can be found on: www.aegps.com