Let's talk!

Power Innovation
Stromversorgungstechnik GmbH

AC-DC Converter REC3200-230-48/60-K30

Modular Charging Rectifier for Telecom and Industry Applications

General description

Thanks to the variety of modules available, the REC3200 system offers the perfect solution for all areas of application requiring a power output of up to 3.2 kW.

Starting up from a minimum equipment for 800 watts, the system can be expanded with additional modules for higher performance or redundancy growing in line with the requirements of your application. With the easily integrable monitoring and remote control functions of the controller, the REC3200 system allows the design and setup of appropriate system solutions, e.g. for outdoor telecommunication systems.

Further features:

- 19" / 3U subrack, also suitable for installation in ETSI racks or cabinets
- Up to four redundant rectifier modules (800 W each), U_{OUT} = 48 V_{DC} or 60 V_{DC}
- Two redundant battery connection modules for UPS function
- Short-term UPS module based on SuperCap capacitors (on request)

Picture may differ from actual device

- Inverter module for a secured, uninterruptible supply of AC loads
- Solar converter module for feeding solar energy into 48 V systems
- Bidirectional, universal DCDC converter, 48 V ↔ 60 V (on request)
- Three-phase AC input and one unsecured DC output at the front
- Optional distribution module with additional electronically protected DC outputs (on request)
- Comprehensive controller functions such as alarm contacts, LAN ports, SNMP and a web interface

Electrical data – input

Mains voltage	U_N = 3 x 230 V_{AC}, 50/60 Hz
Voltage range	+/-20 % (184 – 276 V_{AC})
Frequency range	47 – 63 Hz, sine wave form
Mains connection	1 – 3 phase
Commercial power line	TT and TN grid acc. to VDE 0100
Active PFC (Power Factor Correction)	Acc. to EN 61000-3-2; > 0.98 at 100 % load > 0.95 at 60 % load

Electrical data – output

Output voltage	48 V_{DC} / 60 V_{DC}, potential-free
Output power	800 W – 3200 W, depending on expansion stage, without derating up to 60 °C ambient temperature
Output current	Max. 65 A (unsecured, for external distribution)
Output voltage tolerance	temperature-controlled battery charging characteristic
Output characteristic	UI characteristic
Output ripple	< 100 mVpp
Efficiency	> 93 % at nominal load

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Dipl.-Ing. Bernhard Böden

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Mechanical data

Design	Suitable for mounting in 19“ and ETSI racks (flanges for ETSI available)
Dimensions (W x D x H)	19“ x 240 mm x 3U
Weight	Subrack with connector panel and controller: approx. 4.3 kg Single rectifier module: approx. 1.7 kg Single battery module: approx. 0.8 kg

Cooling

Rectifier module	Forced ventilation with fan failure detection

Protective functions

DC output, overvoltage protection	repetitive trace function, tripping value: ≤ 60 V_{DC} (48 V system) ≤ 72 V_{DC} (60 V system)
DC output, short-circuit current	I_{sc} = 16 A (48 V system) I_{sc} = 13 A (60 V system) per rectifier module (without battery), short-circuit-proof
Leakage current	A fixed protective earth (PE) connection is obligatory

Connection technology

AC input	Phoenix HDFKV 4, 5-pole
DC output	Phoenix HDFK 16, 3-pole,
Signal connector (controller)	2 x Phoenix FK-MC 0,5/10-ST-2,5, each 10-pole
LAN (Ethernet)	2 x RJ45 connector
Battery	Phoenix HDFK 10, 2-pole
Battery signal connector	Phoenix MC1,5/6-G-3,5-RN

Signalling

Optical: controller module	LED green: OK LED red: collective alarm
Optical: rectifier module	LED green: AC OK LED green: DC OK
Electrical: controller module	3 external alarm inputs 3 programmable, potential-free relay contacts, each 3-pole led-out (COM-NC-NO), contact load max. 80 V_{DC}, 500 mA via signal connector 2 inputs for PT1000 sensors
Electrical: battery connection module	Inputs for PT1000 sensor and symmetry measuring

EMC, safety

EMC emission	EN 61000-6-3
EMC immunity	EN 61000-6-2 (industrial areas)
Electrical safety	EN 62368
Protection class	1
Isolation group	Pollution degree 2

Environmental conditions

Ambient temperature during operation	-25 °C to +60 °C
Minimum ambient temperature	cold start at -40 °C, adherence of tolerances from -25 °C
Maximum ambient temperature	+70 °C, from +60 °C derating of 2.5 % per 1K
Relative air humidity	Up to 100 %, start-up after drying
Ingress protection class	IP 20

Warranty **24 months**

Order code **REC3200-230-48-z-K30**
REC3200-230-60-z-K30
(z = number of rectifier modules included)

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800 W Rectifier Module for the REC3200

General description

The rectifier modules for installation in the REC3200 subrack are available in the voltage classes 48 V and 60 V. The modules are hot pluggable, i.e. they can be mounted in the subrack or extracted during operation.

The DC bus of the charging rectifier is decoupled via a diode function (MOSFET transistors) for redundant module operation. In conjunction with the active load sharing among the modules, this creates a system that is characterised by very high availability.

Picture may differ from actual device

Electrical data – output

Nominal voltage	40 – 60 V_{DC} (48 V module) 50 – 72 V_{DC} (60 V module) CAN bus controlled
Max. output power	800 W
Max. output current	16 A (48 V module) 13 A (60 V module)
Efficiency	> 93 % at nominal load (48 V system)
Output characteristic	UI characteristic
Output ripple	< 100 mVpp
Parallel operation	Redundant decoupling of the modules via diode function
Load sharing	Active, accuracy ±10 %

Signalling

LED green	AC OK
LED green	DC OK

Order code	**MREC800-230-48-K30-HE** **MREC800-230-60-K30**

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AC-DC Converter REC3200-230-48/60-K30

Controller Module for the REC3200

General description

The controller module is used for controlling and monitoring the REC3200 system via the internal CAN bus. The module provides two RJ45 Ethernet connectors (LAN) for connection with a local PC or network. A clear and easy-to-operate user interface facilitates control, programming and monitoring of all relevant system parameters.

Further features:

- Hot plug capability
- No AC/DC power supply interruption in case of a controller failure
- Output voltage control via temperature dependent charging characteristic
- External alarm inputs
- Freely programmable alarm relays
- PCBs protected against humidity
- Web interface and SNMP function integrated
- Slot for Anybus module M30

Picture may differ from actual device

Signals

External alarm inputs	3 x (e.g. door contacts, relays of other devices)
Alarm outputs	3 x (potential-free, freely programmable)
External temperature monitoring	2 x PT1000

Connection technology

Signal connector	2 x Phoenix FK-MC 0,5/10-ST-2,5, each 10-pole
LAN (Ethernet)	2 x RJ45 connector

Optical signalling

LED green	OK
LED red	Alarm/collective alarm

LAN interfaces

Specifications	IEEE 802.3™ compatible Ethernet Controller, 10/100Base-T Port
Supported network protocols	IPv4, HTTP, SNMPv1 and v2c, DHCP, NTP, ICMP

Order code	**MCON-48-60-K30**

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Battery Connection Module for the REC3200

General description

The battery connection module enables the implementation of a UPS function by connecting a battery to the rectifier system.

The module includes the battery connector, battery fuse and LVD relay as well as the connectors for symmetry measuring lines and temperature monitoring (PT1000 sensor). The integrated control electronics for battery management enables functions such as symmetry monitoring, current measurement and temperature-controlled charging characteristics.

Further features:

- CAN bus controlled
- Programmable charging characteristics
- Programmable LVD relay
- Battery temperature detection
- Automatic battery tests

Picture may differ from actual device

Battery connection

Nominal voltage	48 V_{DC} / 60 V_{DC}
Max. battery current	50 A
Fuse	2-pole, magneto-hydraulic
Max. battery power	2400 W / 3000 W
Deep discharge protection	Via LVD relay
Temperature sensor	PT1000
Recommended power reserve for battery charging	500 W

Connection technology

Battery	Phoenix HDFK10
Battery signal (symmetry/temperature)	Phoenix MC1,5/6-G-3,5-RN (10 kΩ required in the symmetry measuring lines)

Signalling

LED green	OK
LED red	Failure

Order code **MBATT3200-48-K30**

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AC-DC Converter REC3200-230-48/60-K30

Inverter Module for the REC3200

General description

Inverter module for a secure and uninterrupted supply of AC loads. The plug-in module provides a 230V_{AC} / 50Hz sine wave output signal supplied by the DC bus system. It can be used in a 48 V system as well as in a 60 V system. The load connection is located at the module's front panel.

Further features:

- CAN bus controlled
- Hot-plug capability
- Temperature range -25 °C to +70 °C
- Controlled and monitored fan
- PCBs protected against humidity
- Real sine wave output
- Short-circuit protected

Picture may differ from actual device

Electrical data – output

Output voltage	230 V_{AC}
Frequency	50 Hz, sine wave processor-controlled
Output power	500 VA / 400 W
Power factor	0.8
Crest factor	> 2.5
Harmonic distortion	< 2.5 %
Load range	0 % – 100 %
Overload range	101 % – 150 %, tolerated for 30 s to 3 s
Efficiency	> 88 % at nominal load

Connection technology

Output	Phoenix MC1,5/3-GF-5,08

Signalling

LED green	Output OK
LED yellow	Warning (overload within tolerance range, overtemperature, fan failure)
LED red	Alarm, output switched off (overload, short-circuit, overtemperature, AC UVP/OVP)

Order code **MINV500-48-230-K30**

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AC-DC Converter REC3200-230-48/60-K30

DCDC Module for the REC3200

General description

The bidirectional DCDC converter is powered by the DC bus system. It provides a 48 V or 60 V output voltage at its front panel. Thus, a 60 V load can be supplied by a 48 V system and a 48 V load can be supplied by a 60 V system. Alternatively, an external voltage (38 – 72 V_{DC}) can be fed into the system via the converter.

Further features:

- CAN bus controlled
- Hot-plug capability
- High efficiency of 97 %
- Controlled and monitored fan
- Output voltage adjustable
- Operation mode „feeding-in“ with U_{IN} = 38 – 72 V_{DC}

MDCDC1500-48-60-K30

(in development)

Electrical data – output

Output voltage	20 – 68 V_{DC}
Max. output current	30 A
Output power	1500 W
Efficiency	> 97 % at nominal load

Connection technology

Output	Phoenix PC5/2-GF-7,62

Signalling

LED green	Output OK
LED yellow	Warning, overload within the range of tolerance
LED red	Alarm, output switched off

Order code **MDCDC1500-48-60-K30**

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Solar Converter Module for feeding solar energy into the REC3200 system

General description

The solar converter module is equipped with three inputs, each of them feeding the energy from a pair of series-connected solar panels into a 48 V system. Each input has a separate control, so that different irradiation or even partial shade do not have any significant impact on the overall system. An effective MPP tracking ensures optimal efficiency in every situation. The evaluation of the power supplied by the solar panels can be done via the controller of the REC3200 system.

Picture may differ from actual device

Electrical data – input

Input voltage	$U_N = 2 \times U_{solar\ panel}$
Voltage range	55 – 95 V_{DC}
Max. power	3 x 2 x 240 W_{pp}

Electrical data – output

Output voltage	U_N = 48 V_{DC} (system voltage) adjustable via controller MCON-48-60-K30
Current	max. 26 A

Order code **MDCDC1500-80-48-K30**

Connection technology

Input 1 – 3	Phoenix CCDN 2,5/6 (2 x 3 pole, pitch 5 mm)

Signalling

LED green	operation
LED red	error

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