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REC-2400-230

Rectifier System

Description

This compact 2.4kW rectifier system has been designed to work with -24 -48 -60 and -84Vdc battery supported Telecom Systems. Measuring only 19" x 3U x 240mm (WxDxH) the unit incorporates 4 x 600W plug-in rectifiers and an internal output distribution system that provides three separate MCB output terminals. With full load efficiencies of >90% the full system weighs less than 18kgs. With three separate AC input connectors allowing the unit to be powered by three separate phases the output can be assured in the event of a single phase being lost. The DC input is protected by a 80A 2 Pole MCB and the battery is protected against deep discharge with an integrated low voltage disconnect relay The system can be configured for a -60Vdc battery system by a simple jumper change in the power modules, which will then provide 54Vdc output.



- Internal DC distribution 3 MCB O/P's
- Battery deep discharge protected
- Redundant DC Output
- Redundant AC Input
- Hot swap modules

Selection Table

Part Number	Maximum Power	Voltage (per Module)	Number Of Modules	Weight
REC-2400-230-24-4	2400W	24VDC	4	12kgs
REC-2400-230-24-3	1800W	24VDC	3	12kgs
REC-2400-230-24-2	1200W	24VDC	2	12kgs
REC-2400-230-24-1	600W	24VDC	1	12kgs
REC-2400-230-48-4	2400W	48VDC	4	12kgs
REC-2400-230-48-3	1800W	48VDC	3	12kgs
REC-2400-230-48-2	1200W	48VDC	2	12kgs
REC-2400-230-48-1	600W	48VDC	1	12kgs
REC-2400-230-60-4	2400W	60VDC	4	12kgs
REC-2400-230-60-3	1800W	60VDC	3	12kgs
REC-2400-230-60-2	1200W	60VDC	2	12kgs
REC-2400-230-60-1	600W	60VDC	1	12kgs
REC-2400-230-85-4	2400W	85VDC	4	12kgs
REC-2400-230-85-3	1800W	85VDC	3	12kgs
REC-2400-230-85-2	1200W	85VDC	2	12kgs
REC-2400-230-85-1	600W	85VDC	1	12kgs



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Technical Data

General

Electrical Safety	EN 60950, UL 94
Protection Class	1
Pollution Degree	2
Isolation	Primary - secondary 3.75kVDC
PFC	According to EN 61000-3-2, >0.98 at 100% load; >0.95 at 60% load
Hot Plug-in	Modules can be replaced during operation
Ventilation	Forced ventilation, electronically monitored fans
MTBF	140,000h
Dimensions	19" x 3U x 240mm

Input

Mains Voltage	230VAC
Voltage Range	±20% (184 - 276VAC)
Frequency Range	45 - 66Hz (sinewave)
Mains Connection	1 - 3 Phase
Commercial Power Line	TT & TN-Net according to EN60950

Mechanical Data

Construction	For mounting in ETSI and 19" racks (flange can be changed)
Dimensions	19" x 3U x 240mm (W x H x D)
Weight	Approx. 12kg (Including module rack, controller & fuse panel)
Single Rectifier	Approx. 1.5kg

Output

Output Voltage	-48VDC, positive pin is connected to chassis/protective earth
Output Voltage Tolerance	Temperature controlled battery loading characteristic
Output Power	From 600 - 2400W, module size = 600W, without derating up to 60° C ambient temperature
Output Characteristics	UPI characteristic, transition from P to I at -33VDC
Output Ripple	<100ms mVpp
Efficiency	>90% at nominal load
Parallel Operation	Redundant de-coupling of the 600W modules with diode function
Load Sharing	Active, accuracy ±10%

Environmental Conditions

Operation	ETS 300 019-1-3 class 3.3, extended to +60° C ambient temperature
Transport	ETS 300 019-1-2 class 2.3
Storage	ETS 300 019-1-1 class 1.2
Isolation Group	According to EN60950
Ambient Temp. During Operation	-25° C to 60° C
Cold Start	-40° C, adherence of tolerances from -25° C
Maximum Ambient Temperature	+70° C, from +60° C to derating = 2.5% per 1° C
Rel. Humidity	0% to 100%, start-up after drying
Maximum Operation Altitude	3000 metres
Protection	IP20

EMC

Emission	EN 55022, class B, ETS 300 386 V1.3.1
Immunity	EN 55024, EN 61000-6-2 (Industrial Areas)

Options Table Overleaf



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Technical Data (continued)

Signals

Alarm Contacts	4 programmable, potential free alarm contacts, max. 125VDC, 500mA
Visual: Controller	LED 1 (green) = DC ok, LED 2 (green) = AC ok, LED 3 (red) = Failure
Visual: Rectifier	LED 1 (green) = DC ok, LED 2 (green) = AC ok
RS232	Interface for data reading & parameter adjustment

Battery Management

Symmetry Control	3 Monitoring Inputs
LVD	Integrated low voltage disconnect relay
Battery Test	Adjustable via RS232 interface in combination with monitoring software
Temperature Monitoring	PT1000 sensor input at the controller

Protection Functions

AC Input	Overvoltage according to EN61000-4-1 (VDE 0160): 750VAC 0.1/1.3ms
DC Output	Overvoltage, repetitive trace function, tripping value =60VDC
Leakage Current	A fixed protective earth (PE) connection must be setup

Connection Terminals

AC Input	Screw clamps (1 - 3phase) inside module rack, for sheathed cable (5-pol: 5x 1.5mm ² or 3pol: 3x 2.5mm ²)
DC Input	Screw clamps, type HDFKV, 16mm ²
Signal	Male connector, type Phoenix MC1.5/17-G3.5 1.5mm ²
RS232	Female connector, 9 pole
DC Output 1	Screw clamps, type HDFKV, 16mm ²
DC Output 2	Screw clamps, type HDFKV, 16mm ²
DC Output 3	Screw clamps, type HDFKV, 16mm ²

Distribution/Fuse Panel

DC Input	Circuit Breaker, magneto-hydraulic, 80A, 2 pole
DC Output 1	Circuit Breaker, magneto-hydraulic, 63A, 1 pole
DC Output 2	Circuit Breaker, magneto-hydraulic, 63A, 1 pole
DC Output 3	Circuit Breaker, magneto-hydraulic, 10A, 1 pole

Options Table

Code	Description
Replace xx in the part number with:	
/CC.....	Conformal coating
/BGM2400.....	1REC 2400 sub rack
/CONM2400-230-xx.....	Control module
/ENT00-043.....	3U cover plate
/VX-ZME10.....	Mounting kit
/EKA50 588.....	Battery symmetry test lead
/EKA50 596.....	Battery temperature test lead