Flatpack2 220/2000 HE WOR & Flatpack2 220/5A HE

220VDC Rectifier/Converter Modules

The most efficient power conversion module in the industry!

The combination of innovative design, efficiency and reliability makes the Flatpack2 HE stand out. With efficiency up to 95.3%, the losses have been reduced by 50% compared to the current industry standard. Compared to older technologies with even poorer efficiency an investment in a Flatpack2 HE system is repaid in a few years by the reduced operating cost.

In a global perspective, considering the high energy consumption in the industry, this technology breakthrough can also have a significant environmental impact.

Applications

Industry

High efficiency rectifier for DC power supply facilities with or without battery. The module also operates with DC input, making it a versatile DC/DC Converter for stepping down a DC supply or act as a buffer to isolate branches.

All in all this make the Flatpack2 HE modules Industrial Building Blocks (IBB) with superior flexibility. Combined with other IBBs systems can be created for:

- ✓ Low & High Voltage switchgear
- ✓ Transformer & SUB Stations
- ✓ Power Generation & Distribution
- ✓ Emergency lighting systems
- ✓ Rail applications; Telecom, signaling and power conversion
- ✓ Industrial control systems
- ✓ Process and Heavy industry

Small and large

Due to the high power density, cost competitive design and a highly flexible system communication interface, Flatpack2 HE rectifiers are used in system solutions from 2kW to 192kW.

Product Features and Advantages

Flexibility and reliability

The FP2 modular concept has a lot of benefits compared to traditional solutions in the industry:

- ✓ High efficiency; less power consumption and heat dissipation
- ✓ Overall Size and footprint of cabinet: 50% of Thyristor Controlled Size
- ✓ Modular Hot Plug-in Construction allows
  - ✓ Redundancy, n+1, n+2... configurations
  - ✓ easy to do repairing: MTTR < 5 minutes
- ✓ Very high MTBF > 350000 hours
- ✓ Wide input AC Voltage and Frequency range
- ✓ Possibility to build combined systems with rectifiers, DC/DC converters and inverters controlled by one controller

Global compliance

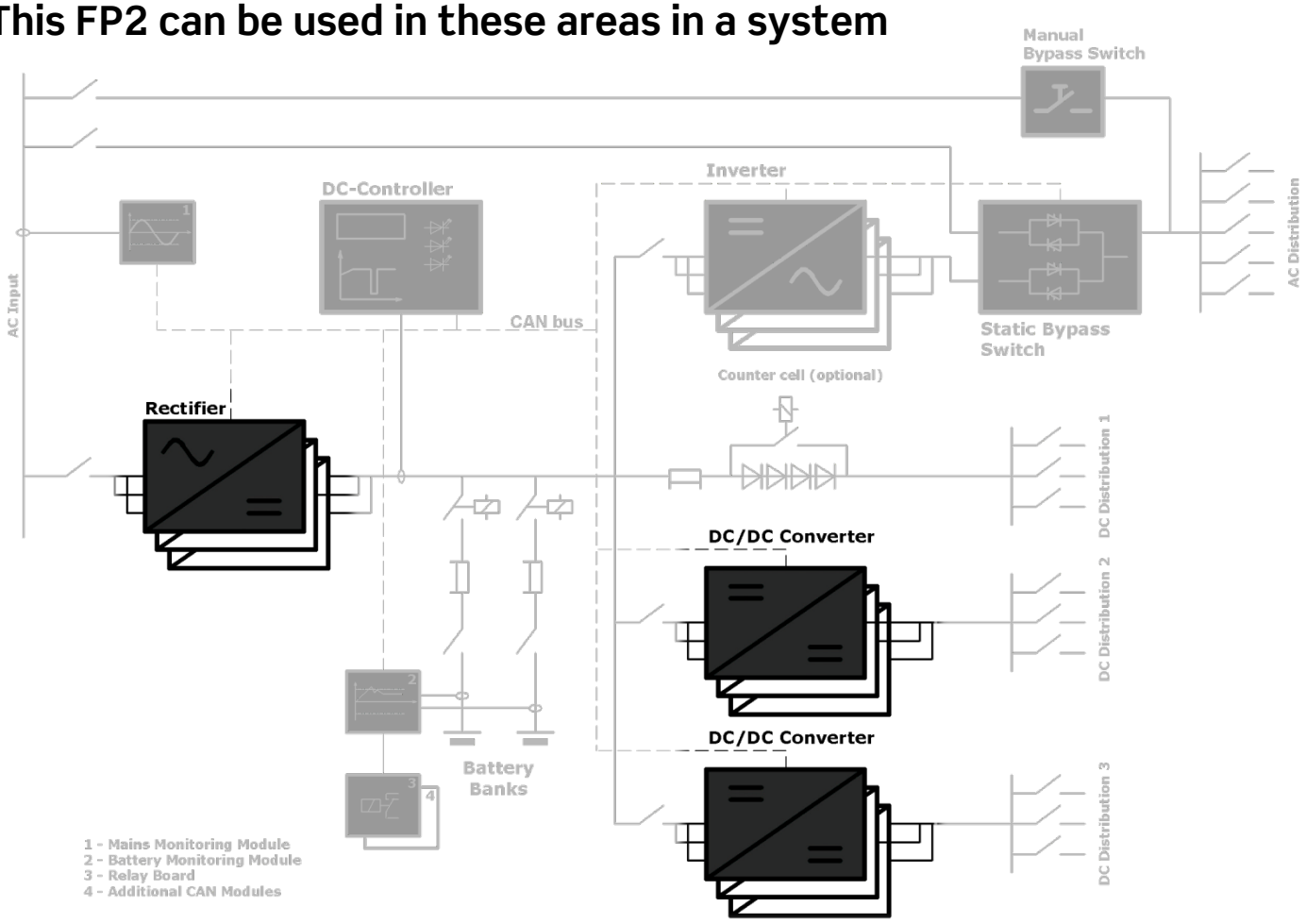
Eltek Valere is among the market leaders in all regions in the world, and designs the core products to be compliant to all relevant standards and customer requirements. All Flatpack2 rectifiers are CE marked and UL recognized.

Patents

Flatpack2 HE is a result of intensive research over many years. Several unique technical solutions, protected by patent applications, are introduced,

See last page for specifications

This FP2 can be used in these areas in a system



Plug and play

Plug a new rectifier into the system, and it automatically logs on, gets an assigned ID, downloads the system set parameters from the control system and starts up with a minimum of installation time, and without interrupting the system or attached equipment.

The Flatpack2 HE family covers application with output voltages from 22 to 290VDC. It is capable of taking both AC and DC input voltages of from 85 to 300V. This makes the Flatpack2 family the perfect choice to build a platform suitable to a wide range of applications.

Wide Output Range (WOR)

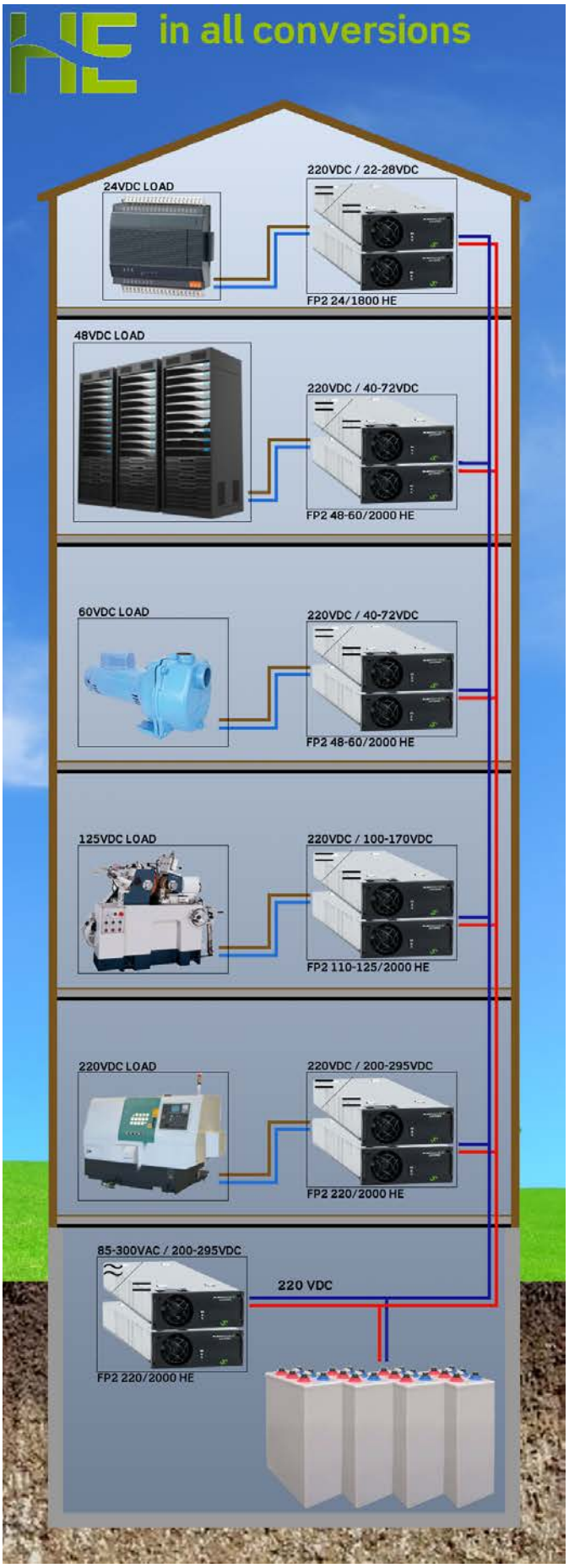
Wide DC output range to support battery banks of both NiCd and lead acid. For NiCd battery banks any number cells from 170 to 180 are fully supported.

Application example - Power up the riser

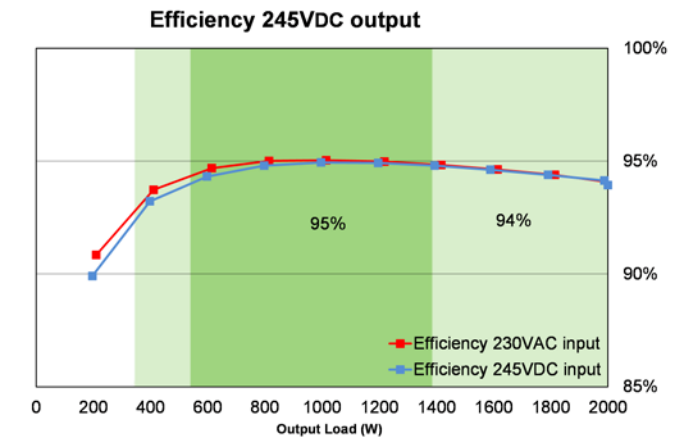
In areas with regular earthquakes it is regarded less likely that the batteries would fall over in the basement than in the upper floors. Distributing 24V or 48V from the basement and up requires large copper cables, and hence a solution is to distribute battery backed up 220VDC. As can be seen in the illustration next page, the Flatpack2 HE family is ideal for this application, because of its high efficiency, operates with both AC and DC input and also its wide output voltage range. (12VDC could also be provided with the use of Eltek Valere Micropack 12/120 WOR.)

Flexibility and reliability

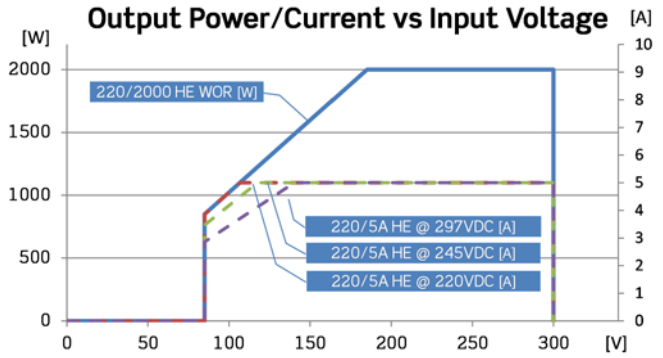
Use of digital controllers in the Flatpack2 provides intelligent self-protective features like reduced output power at high temperatures and low mains. Flatpack2 rectifiers are also designed to have the highest possible immunity level and fulfill the IEC61000-6-5 (immunity, power station and substation) which is unique in the Industry.

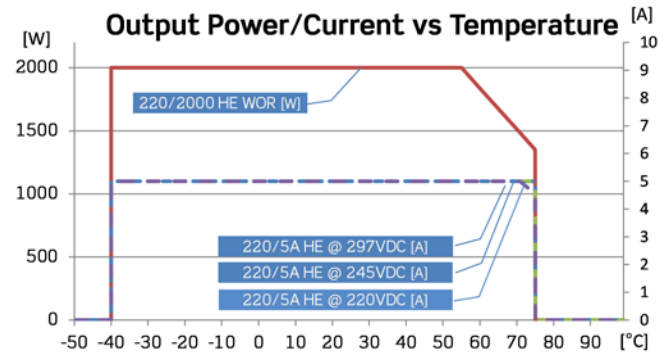


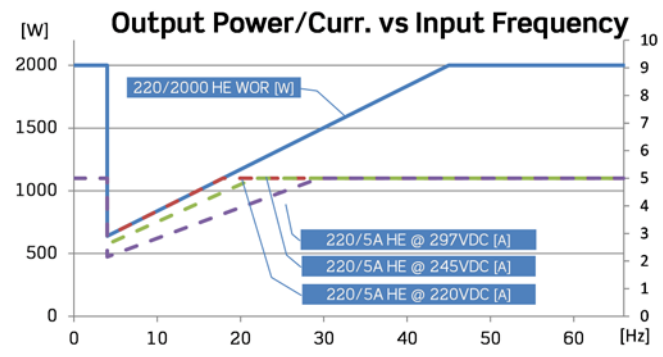
Efficiency



Temperature, input voltage and frequency derating







Curves shows power derating for Flatpack2 220/2000 HE and current derating for the Flatpack2 220/5A HE

Flatpack2 220/2000 HE WOR & 220/5A HE

Additional Technical Specifications

AC Input

Voltage	85-300 VAC/DC (Nominal 185 – 275 V)
Frequency	0 to 66Hz*)
Maximum Current	11.9 A_{rms} maximum at nominal input and full load
Power Factor	> 0.99 at 1000W load or more
THD	< 5 % at nominal input and 2000W load < 9 % at nominal input and 1000W load
Input Protection	o Varistors for transient protection o Mains fuse in both lines o Disconnect above 300 V

*)(see previous page for frequency response)

DC Output (floating)

Voltage Adjustable	Default: 245.3 VDC (without controller) Range: 178.5-297 VDC (220 – 297 VDC with no load)
NiCd batteries	Float charge: 1,40 – 1.45 VDC/cell Boost charge: 1.45 – 1.70 VDC/cell Standby/Test: 1.05 – 1.2 VDC/cell No of cells configurable in controller Min: 170 / Max: 180
Output Power (241115.815)	2000 W at nominal input Constant Power > 220V > Constant Current
Output Power (241115.815B)	1100-1485W at 220 - 297 VDC and nominal input Constant current 0 – 297 VDC
Maximum Current (241115.815)	9.16 Amps at 220 VDC and nominal input
Maximum Current (241115.815B)	5 A at 0-297 VDC and nominal input
Current Sharing	±5% of maximum current from 10 to 100% load
Static voltage regulation	±0.5% from 10% to 100% load
Dynamic voltage regulation	±5.0% for 10-80% or 80-10% load variation, regulation time < 50ms
Hold up time	> 20ms; output voltage > 178 VDC at 1500W load
Ripple and Noise	< 1000 mV peak to peak, 30 MHz bandwidth
Output Protection	o Overvoltage shutdown o Hot plug-in o OR-ing diode o Short circuit proof o High temperature protection

Specifications are subject to change without notice

241115.815.DS3 - v3

Part numbers

Part no.	Description
241115.815	Flatpack2 220/2000 HE WOR
241115.815B	Flatpack2 220/5A HE

Optional clip-on fronts

Part no.	Description
277679	Optional grey front for 241115.815
275888	Optional black front for 241115.815B

Other Specifications

Efficiency	>95% at 35-65% load (241115.815) >95% at 45-95% load (241115.815B)
Isolation	3.0 KVAC – input to output 1.5 KVAC – input to earth 1.5 KVDC – output to earth 3.0 KVAC – CAN to primary 3.0 KVAC – CAN to secondary
Alarms:	o Low mains shutdown o High temperature shutdown o Rectifier Failure o Overvoltage shutdown on output o Fan failure o Low voltage alarm o CAN bus failure
Warnings:	o Low temperature shutdown o Rectifier in power derate mode o Remote battery current limit activated o Input voltage out of range, flashing at overvoltage o Loss of CAN communication with control unit, standalone mode
Visual indications	o Green LED: ON, no faults o Red LED: rectifier failure o Yellow LED : rectifier warning
Operating temp	-40 to +75°C (-40 to +167°F), derating above +55°C (+131°F) to 1350W at +75°C (+167°F)
Storage temp	-40 to +85°C (-40 to +185°F)
Cooling	Fan (front to back airflow)
Fan Speed	Temperature and load regulated
MTBF	> 459, 000 hours Telcordia SR-332 Issue I, method III (a) ($T_{ambient}$: 25°C)
Acoustic Noise	< 40dBA at nominal input and full load ($T_{ambient}$ <= 25°C) < 58dBA at nominal input and full load ($T_{ambient}$ > 40°C)
Humidity	Operating: 5% to 95% RH non-condensing Storage: 0% to 99% RH non-condensing
Dimensions	109 x 41.5 x 327mm (wxhxd) (4.25 x 1.69 x 13")
Weight	1.950 kg (4.3lbs)

Applicable Standards

Electrical safety	IEC 60950-1 /UL 60950-1 / CSA 22.2
EMC	ETSI EN 300 386 V.1.4.1 EN 61000-6-1 (immunity, light industry) EN 61000-6-2 (immunity, industry) EN 61000-6-3 (emission, light industry) EN 61000-6-4 (emission, industry) EN 61000-6-5 (immunity, power station and substation)
Mains Harmonics	EN 61000-3-2
Marine	DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) o Temperature Cl. B o Humidity Cl. B o Vibration Cl. A o EMC Cl. B *)
Environment	ETSI EN 300 019-2-1 Class 1.2 ETSI EN 300 019-2-2 Class 2.3 ETSI EN 300 019-2-3 Class 3.2 ETSI EN 300 132-2 RoHS compliant

*) Requires PR with filter: Fp2 PS 4 rect 4xAC HC Marine, pn: 233070

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