



Marine and Offshore  
**Total Power Solutions**



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# Marine power from Eltek



# Powering marine and offshore operations

Our solutions are used within marine, oil and gas and wind farms. They power supervision, automation, data transmission, switchgear control, safety, emergency systems, dynamic positioning and ballast water treatment.





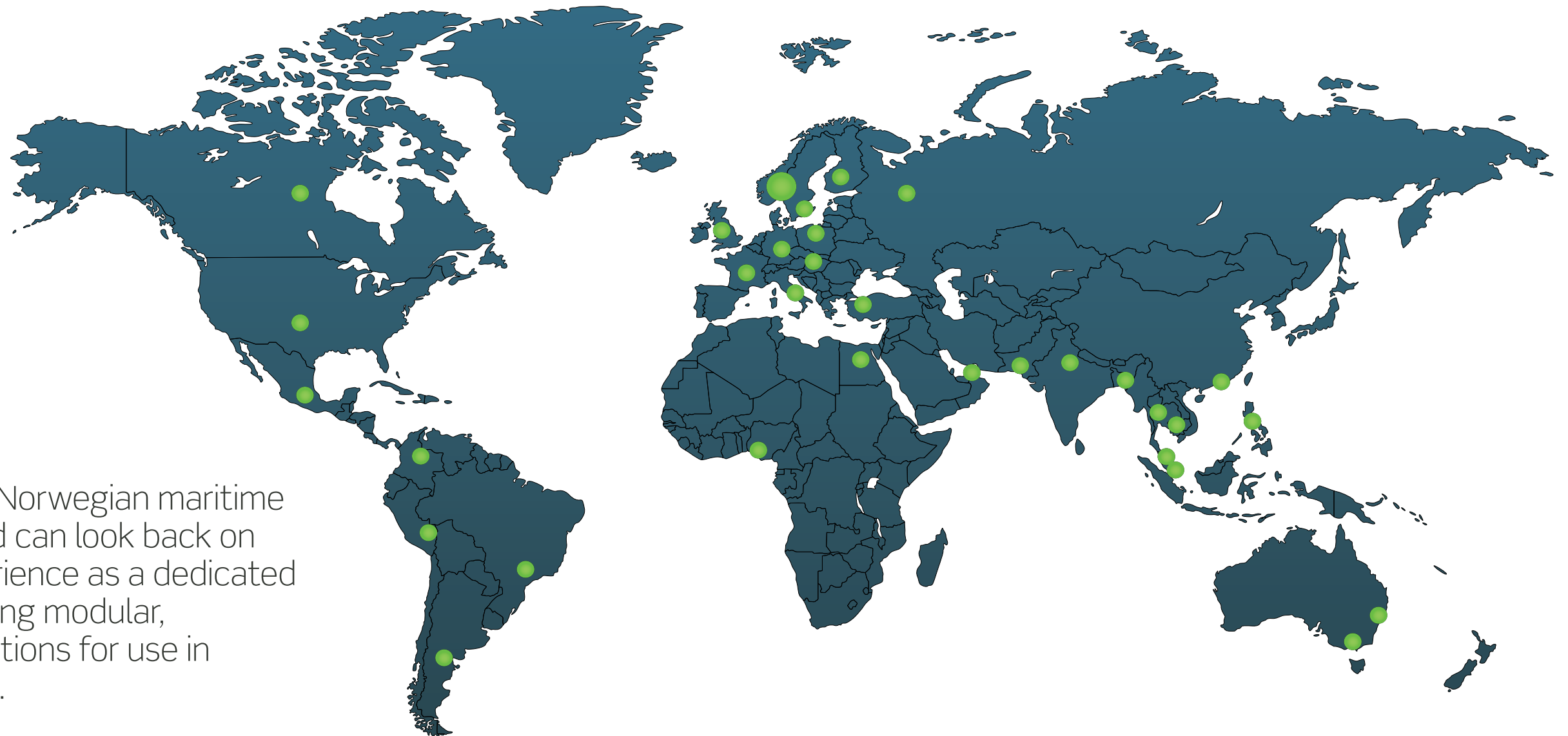


# Set course for lower cost of ownership

An Eltek Modular UPS, designed and certified for marine use, is the secure and safe way to improve the efficiency and flexibility of onboard power supplies. It will significantly reduce complexity, increase control and manageability, and provide the basis for a future-proof on board power infrastructure.

The bottom line is a significant reduction in total cost of ownership.





Eltek is part of the proud Norwegian maritime and offshore heritage and can look back on more than 40 years experience as a dedicated power specialist, developing modular, compact and reliable solutions for use in demanding environments.

### Modular, high-quality & future-proof power solutions

Based on switch-mode technology, our high quality solutions are:

- Scalable – expand as your load grows or add redundancy
- Serviceable – module replacement in seconds
- Designed to last – design life of 15 years
- Flexible – for all AC and DC needs
- Compact – save space
- Reliable – high MTBF

### Wide range of services

Our solutions are supplemented by a wide range of services:

- Installation
- Start-up and commissioning
- Preventive maintenance
- 24/7 emergency service
- Product repairs
- Training
- Battery testing
- Extended warranty

# The Rectiverter AC UPS - marine power redefined

The Rectiverter is a unique concept in power conversion. First and foremost, it is a very efficient and compact AC UPS for marine applications.

In addition, it combines the functionality of a rectifier, an inverter and a static transfer switch in one bidirectional power module. This opens up a new power flow architecture and a new way of designing power systems, meeting the needs for both AC and DC output in one modular system.

Visit [rectiverter.com](http://rectiverter.com)







A Rectifier UPS system multiplies the advantages of a modular power architecture



Hot swap modules

Up to 80 %  
reduced life  
time cost



6 kVA Rectifier building block



18 kVA Rectifier building block

With the same dimensions and mechanical design as Eltek's other modules, the Rectifier is the main building block in scalable systems for a wide range of marine applications.

The advantages of a modular systems are significant, when it comes to scalability, reliability and overall quality. In turn, this adds up to significant reductions in total cost of ownership over the system's life time.

**A case for reduced cost**

A Rectifier system fits into applications where commercial, monoblock UPS systems are used. Although monoblock solutions are modified to meet strict marine requirements, they are not designed to meet them, and consequently display relatively high fault rates and represent a very high service cost compared to the cost of the equipment.

By installing Rectifier UPS systems, designed for use on ships and offshore installations, and with components designed for a significantly longer lifetime, system fault rates will be significantly reduced. Add improved serviceability to the equation, and the reduction in service cost alone will cover the additional investment in equipment several times.

Despite a somewhat higher initial cost, the advantages of the Rectifier UPS add up to significant savings:

Up to 80 % reduced life time cost.



Marine Rectifier UPS 6 kVA

\* example on UPS, see page 40



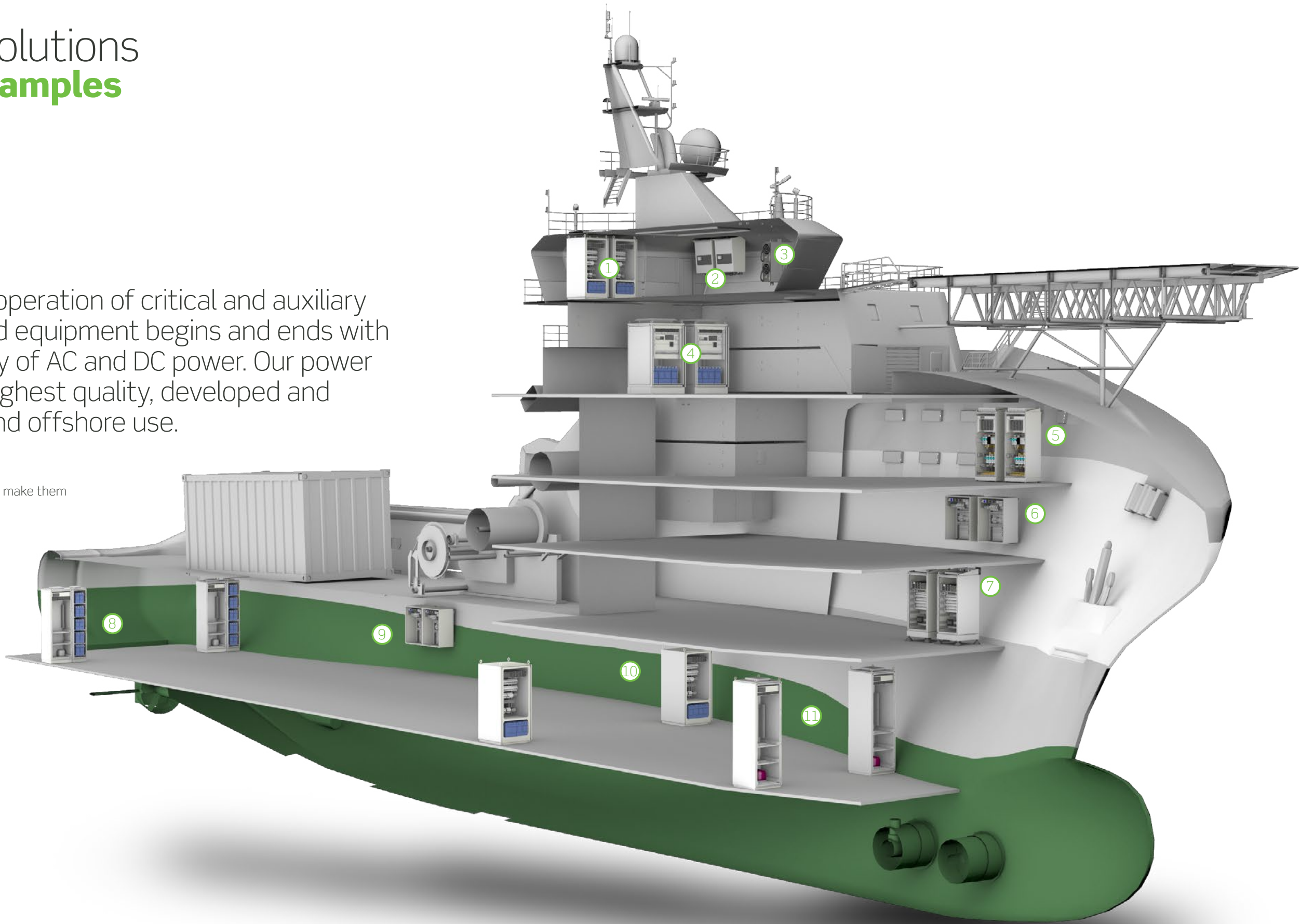
# Total Power Solutions

## Application examples

Continuous and safe operation of critical and auxiliary on-board systems and equipment begins and ends with stable and safe supply of AC and DC power. Our power solutions are of the highest quality, developed and certified for marine and offshore use.

Their scalability, compactness and efficiency make them ideal for most applications, including:

- Dynamic positioning
- Propulsion control
- Water tight doors
- Navigation
- Ship identification
- Ballast water treatment
- Drilling systems
- Data center
- Cranes
- Public address and alarm
- AC Substations
- Automation



### THE ILLUSTRATION SHOWS EXAMPLES OF APPLICATIONS AND SYSTEMS ON A VESSEL:

- |                             |                             |                      |
|-----------------------------|-----------------------------|----------------------|
| ① Control/automation DC UPS | ⑤ Emergency Lighting System | ⑨ Engine starter UPS |
| ② GMDSS & PA                | ⑥ Generator starter UPS     | ⑩ Engine room DC UPS |
| ③ Bridge power conversion   | ⑦ SAS DC UPS                | ⑪ Thruster DC UPS    |
| ④ Navigation & DP UPS       | ⑧ Propulsion DC UPS         |                      |

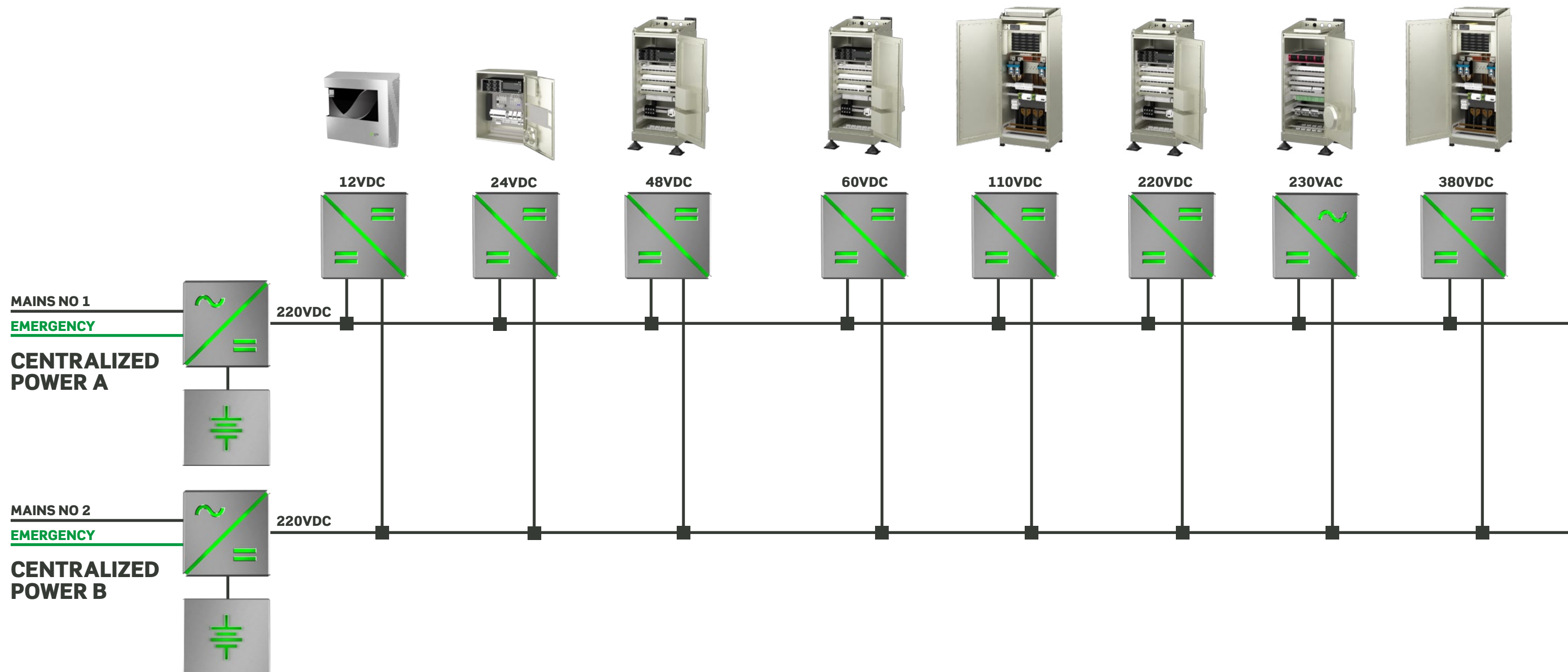




# Eltek Central Power System /CPS/

CPS is a high-end solution for ships and oil installations. In most cases, central power systems replace the AC-UPS and provide a closed and high-voltage DC bus that can convert to various voltages with a central battery back-up.

- Modular/scalable
- Fewer and global spares
- One management system
- Easily serviceable (short MTTR)
- Real battery management
- Fewer battery banks
- Full redundancy (all levels)
- Easy installation
- Standard solutions with DNV and ABS approval
- Low life time cost





CENTRAL POWER SYSTEM (CPS)

# Flatpack2 220VDC 48kW

The combination of high voltage for cost effective distribution and DC directly from redundant battery strings and redundant rectifiers, makes this system ideal for powering critical equipment in ships, larger buildings and factories.

The highly efficient Flatpack2 220V/2000W HE rectifiers makes sure that 95% of supplied energy from mains or generators are fed into the load and batteries. This allows huge savings in operational cost, and it can also have a significant environmental impact.



KEY FEATURES

- DNV / ABS approved (pending)
- Scalable
- Hot swappable modular rectifier units
- High efficiency
- Digital controllers
- Heat management
- Unique connection
- Ingress protection up to IP43

220VDC – A MORE RELIABLE UPS SOLUTION

Traditional UPS solutions have a DC to AC conversion step between the batteries holding the backup energy and the load distribution. A fault in this converter step will cause the connected equipment to go down.

The Flatpack2 220V/48kW system distributes 220V DC directly from the batteries and rectifiers. The system has 2 battery breakers supporting 2 external strings. The result is battery string and breaker redundancy, strengthening the reliability of the system.

Two output breakers allows for 2 redundant distribution branches that can feed equipment with dual feed input or redundant DC/DC converters.

220VDC – A MORE EFFICIENT UPS SOLUTION

Compared to traditional UPS, the removal of the DC to AC step contributes to increased end to end efficiency of the system. Combined with less energy wasted on cooling the power equipment and batteries, a significant operational cost reduction is achieved.



MODEL	FLATPACK 2 220VDC 48 KW
Part number	C22438.400
INPUT DATA	
Connection	2 x 3phase + PE terminals. Tension clamp (2.5 – 35mm2)
Voltage (phase to phase)	230Vac (Δ) nominal
Maximum current	100 ARMS per phase (at full load)
Input protection	3 Pole 100A MCCB, SPD
Input protection in each rectifier	Varistors for transient protection, mains fuse in both lines, disconnect above 300 V
OUTPUT DATA	
Voltage Adjustable	Default: 245.3 VDC (without controller) Range: 178.5 – 297 VDC (220 – 297 VDC with no load)
Pb (NiCd) Batteries	108-120 (170 – 180) cells
Output current	220 Amps at Vout ≤ 220 VDC and within nominal input
Output power	48 kW maximum within nominal input
Output protection in rectifiers	Overvoltage shutdown, OR-ing diode
Battery protection/Load protection	2 x 250A MCCB / 2 x 250A, M8 cable lug
CONTROL AND MONITORING	
Controller	Smartpack 2
Digital inputs	6 (Aux Sw: NO/NC)
Temperature	3 inputs (NTC probes) (optional)
Relay outputs	6 (Switching capacity max 2A/75V/60W)
Customer Connections	Tension clamp (0.5 – 1.5mm2)
ALL MODELS	
OTHER SPECIFICATIONS	
Efficiency	95%
Temperature	Operating: -40 to +45°C (-40 to +113°F) Storage: -40 to +85°C (-40 to +185°F)
Isolation	3.0 KVAC – input to output, 1.5 KVAC – input and output to earth
Dimensions (H x D)	1800 (+100)x 800 x 600 mm (WxDxH) (70.9 x 34.5 x 23.6")
Weight	Net weight: 306 kg, Gross weight: 341 kg
IP grade specification	IP43, Vibration absorbers are optional
DESIGN STANDARDS	
Electrical safety	IEC 60950-1 IEC 60945
EMC	ETSI EN 300 386 V.1.3.3, EN 61000-6, -1, -2, -3, -4
Environment	ETSI EN 300 019-2,-1 Class 1.2, -2 Class 2.3, -3 Class 3.2, RoHS
Marine	ABS (PENDING) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A
ORDERING INFORMATION	
C22438.400	FP2 220V 48kW 2x3PH230VAC CPS
241115.815M	Rectifier Flatpack2 220/2000 HE WOR
BE0138.000	Battery cabinet CPS 4sh 38U



CENTRAL POWER SYSTEM (CPS)

Flatpack2 24VDC 48kW

The combination of cost-effective design, power density and reliability makes the Flatpack2 24V 48 kW a product family that truly stands out and provides unparalleled availability. The versatility of the Flatpack2 rectifier means that it can be used in a wide variety of 24 VDC marine applications across the globe.



KEY FEATURES

- DNV / ABS approved (pending)
- Scalable
- Hot swappable modular rectifier units
- High efficiency
- Digital controllers
- Heat management
- Unique connection
- Ingress protection up to IP43

DESCRIPTION

The Flatpack2 24V 48kW has been specifically designed to meet the demand for higher density and more compact power solutions for marine applications worldwide. It is suitable for applications needing an expandable, easily serviceable and reliable power supply, fitting within a minimal space.

The modular concept of the Flatpack2 systems makes it easy to scale the Flatpack2 24V/48kW to fit specific power needs from 4 to 48kW. A system with unused rectifier positions can be expanded later simply by adding more rectifiers.

The power system is monitored by Smartpack 2 controller which has all the functionality required for present and future applications.

It contains 6U of PRs (power rack) which can house 24 Flatpack2 rectifier modules.

APPLICATIONS

- Offshore
- Ships
- Part of the Eltek Central Power System

MODEL		FLATPACK 2 24V <sub>DC</sub> 48KW						
Part number		C22438.401						
INPUT DATA								
Connection		2 x 3phase + PE terminals						
Nominal voltage		176VAC – 275VAC						
Maximum current (1 Module included)		Max. 13 Arms at 176Vrms input and full load (9,8 Arms at 230V)						
Input protection		3 Pole 100A MCCB						
Input protection in each rectifier		Varistors for transient protection, Mains fuse in both lines, Disconnect above 300 V						
OUTPUT DATA								
Maximum voltage		36 V <sub>DC</sub>						
Output current (1 Module included)		84 Amps at 24 VDC and nominal input						
Output power		48 kW maximum within nominal input						
Output protection in rectifiers		Overvoltage shutdown, OR-ing diode (241115.200M)						
Battery / Load protecti		2 x TPS 1200A / 2 x TPS 1200A						
CONTROL AND MONITORING								
Controller		Smartpack 2						
Digital inputs		6 (Aux Sw: NO/NC)						
Temperature		3 inputs (NTC probes) (optional)						
Relay outputs		6 (Switching capacity max 2A/75V/60W)						
Customer Connections		Tension clamp (0.5 – 1.5mm2)						
OTHER SPECIFICATIONS								
Temperature		Operating: -40 to +45°C (-40 to +113°F) Storage: -40 to +85°C (-40 to +185°F)						
Isolation		3.0 KVAC – input to output, 1.5 KVAC – input and output to earth						
Dimensions (H x D)		1800 x 800 x 600 mm (WxDxH) (70.9x34.5x23.6”) with plinth 100mm						
Weight		Net weight: 306 kg, Gross weight: 341 kg						
IP grade specification		IP43 outside cabinet, IP20 inside cabinet						
DESIGN STANDARDS								
Electrical safety		IEC 60950-1 IEC 60945						
EMC		ETSI EN 300 386 V.1.3.3, EN 61000-6-1, -2, -3,-4, EN 61000-3-2						
Environment		ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2, RoHS compliant						
Marine		ABS (Pending) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A						
ORDERING INFORMATION								
C22438.401		FP2 24V 48kW 2x3P220V						
AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	6 Module	12 Module	24 Module	
241115.205M	Flatpack 2 24V/1800W HE	21.7 – 28.8 V	>95% (30-65% load)	75 A	450 A	900 A	1800 A	Fuse
241115.200M	Flatpack 2 24V/2000W	21 – 29 V	>89% (25-100% load)	84 A	504 A	1008 A	2016 A	Blocking diode
241115.250M	Flatpack 2 24V/2000W WOR	21.5 – 36 V	>91% (25-85% load)	70 A	420 A	840 A	1680 A	Fuse

Errors and Omissions Excepted



ALL IN ONE

# Flatpack2 24VDC 8kW

Based on the successful Flatpack2 rectifier module, this system can provide up to 8KW 24VDC with comprehensive distributions, terminations, and battery room, all housed in a 1,4m high cabinet.



KEY FEATURES

- DNV / ABS approved (pending)
- Scalable
- Hot swappable modular rectifier units
- High efficiency
- Digital controllers
- Heat management
- Distribution section
- Battery compartment

DESCRIPTION

The Flatpack2 24V 8kW has been specifically designed to meet the demand for higher density and more compact power solutions for the marine application worldwide. It is suitable for applications needing an expandable, easily serviceable and reliable power supply, fitting within a minimal space.

The modular concept of the Flatpack2 systems makes it easy to scale the Flatpack2 24V/48kW to fit specific power needs up to 8kW. A system with unused rectifier positions can be expanded later simply by adding more rectifiers.

The power system is monitored by Smartpack 2 controller which has all the functionality required for present and future applications.

It contains 2U of PRs (power rack) which can house 4 Flatpack2 rectifier modules, and a battery compartment.

APPLICATIONS

- Control and protection
- SAS system
- Communication
- Emergency lighting

MODEL		FLATPACK 2 24V <sub>DC</sub> 8KW – ALL IN ONE						
Part number		CIE20425.401						
INPUT DATA								
Connection		2 x 3phase + PE terminals with Automatic Transfer Switch						
Nominal voltage		176V <sub>AC</sub> – 275V <sub>AC</sub>						
Maximum current (1 Module included)		Max. 13 A <sub>rms</sub> at 176V <sub>rms</sub> input and full load (9,8 A <sub>rms</sub> at 230V)						
Input protection		Marine AC filter (no protection device)						
Input protection in each rectifier		Varistors for transient protection,Mains fuse in both lines Disconnect above 300 V						
OUTPUT DATA								
Maximum voltage		36 V <sub>DC</sub>						
Output current (1 Module included)		84 Amps at 24 VDC and nominal input						
Output power		8 kW maximum within nominal input						
Output protection in rectifiers		Overvoltage shutdown and fuse, OR-ing diode (241115.200M)						
Battery protectio		1 x C120H D125A 2P 15kA MCB						
Load distribution		30 MCBs (1xB63A 2P, 14xB16A 2P, 15xB10A 2P, Ics=15kA)						
CONTROL AND MONITORING								
Controller		Smartpack 2						
Digital inputs		6 (Aux Sw: NO/NC)						
Temperature		3 inputs (NTC probes) (optional)						
Relay outputs		6 (Switching capacity max 2A/75V/60W)						
Customer Connections		Tension clamp (0.5 – 1.5mm2)						
OTHER SPECIFICATIONS								
Temperature		Operating: -40 to +45°C (-40 to +113°F) Storage: -40 to +85°C (-40 to +185°F)						
Isolation		3.0 KV <sub>AC</sub> – input to output, 1.5 KV <sub>AC</sub> – input and output to earth						
Dimensions (HxWxD)		1200 x 600 x 500 mm (47.2x23.6x19.6”) with plinth+100mm						
Battery compartment dimensions (HxWxD)		4x(340mm x 110mm x 395mm) Space for up to 4x100Ah VRLA battery						
Weight		Net weight: 130 kg, Gross weight: 140 kg (without batteries)						
IP grade specification		IP43 / IP44 outside cabinet, IP20 inside cabinet						
DESIGN STANDARDS								
Electrical safety		IEC 60950-1 IEC 60945						
EMC		ETSI EN 300 386 V.1.3.3,EN 61000-6-1, -2, -3, -4, EN 61000-3-2						
Environment		ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2, RoHS compliant						
Marine		ABS (Pending) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A						
ORDERING INFORMATION								
CIE20425.401		FP2 24V 8kW 2x2p230V BCE XP						
AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	2 Module	3 Module	4 Module	
241115.205M	Flatpack 2 24V/1800W HE	21.7 – 28.8 V	>95% (30-65% load)	75 A	150 A	225 A	300 A	Fuse
241115.200M	Flatpack 2 24V/2000W	21 – 29 V	>89% (25-100% load)	84 A	168 A	252 A	336 A	Blocking diode
241115.250M	Flatpack 2 24V/2000W WOR	21.5 – 36 V	>91% (25-85% load)	70 A	140 A	210 A	280 A	Fuse

CENTRAL POWER SYSTEM (CPS)

Flatpack S 8kW 24VDC

The combination of cost-effective design, power density and reliability makes the Flatpack S 24V 8 kW a product family that truly stands out and provides unparalleled availability. The versatility of the Flatpack S rectifier means that it can be used in a wide variety of 24V DC marine applications across the globe.



KEY FEATURES

- Powered from AC or DC
- Complete system
- Battery terminals
- Load distribution
- Hot pluggable rectifiers
- Hot pluggable controller
- Optional SIL 3 rectifiers

DESCRIPTION

The Flatpack S system is a 25U power system designed for use in 24VDC Marine applications. Marine filters are fitted on the input that makes this system meet the DNV requirement for marine applications. Flexible alarm and monitoring options are included in this modular design.



APPLICATIONS

- Ships
- SAS systems
- Part of the Eltek Central Power System



MODEL		FLATPACK S MARINE SYSTEM 8KW, 24V <sub>DC</sub>						
Part number		CS0825.000						
INPUT DATA								
Nominal voltage		185V <sub>AC/DC</sub> - 305V <sub>AC</sub> / 300V <sub>DC</sub>						
Voltage range (DC)		85V <sub>AC/DC</sub> - 305V <sub>AC</sub> / 300V <sub>DC</sub>						
Nominal current (at nominal input, full load)		37.6A <sub>RMS</sub>						
Input connection		10 mm <sup>2</sup> terminals						
Input protection		2 x C32A 2 pole MCB						
Marine filters		Optional						
OUTPUT DATA								
Nominal voltage		26.7 V <sub>DC</sub>						
Voltage range		21.5 - 28V <sub>DC</sub>						
Current		333.6A at 24VDC and full load						
Output power		8kW maximum (with 8 rectifiers)						
Load connection		20mm <sup>2</sup> terminals. Load MCB: 6x6A 2p, 14x10A 2p, 8x16A 2p +Alarm						
Protection on each rectifier		Blocking OR-ing FET, short circuit proof, high temperature protection						
Overvoltage protection on SIL 3 rectifier		Protection level: 30V, Proof test interval: 15 years, Handles dual component failure						
Battery connection		70mm <sup>2</sup>						
Alarm connection		2,5mm <sup>2</sup>						
CONTROL AND MONITORING								
Smartpack S		6 x Input/Output and Ethernet						
Alarm connections		Plug-in wire connectors rear access for 6 potential free relays 1.5mm <sup>2</sup>						
OTHER SPECIFICATIONS								
Isolation		3.0 kVAC – input to output; 1.5 kVAC – input to earth 0.5 kVAC – output to earth						
Operating temperature		-40 to +85°C (-40 to +185°F), humidity 5 - 95% RH non-condensing						
Storage temperature		-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing						
Dimensions		1200 x 600 x 600 mm (HxWxD) with plinth 100mm						
Weight		Net weight: 131 kg, Gross weight 173 kg						
DESIGN STANDARDS								
Cabinet		IP43 / 44						
EMC		ETSI EN 300 386 V.1.6.1, EN 61000-6, -1, -2-8, -3, -4						
Safety		IEC/EN 60 950-1 & IEC 60945						
Marine		ABS (Rectifiers) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A						
ORDERING INFORMATION								
CS0825.000		FPS 24V <sub>DC</sub> 8kW						
AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	2 Module	4 Module	8 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	83.4 A	166.8 A	333.6 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SIL	21.5 – 28 V	>92,5%	41.7 A	83.4 A	166.8 A	333.6 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28 V	>92,5%	19 A	38 A	76 A	152 A	Blocking diode



CENTRAL POWER SYSTEM (CPS)

Flatpack S 24VDC 8kW  
Wallbox

This compact DC system offers a flexible and expandable DC power solution. Due to its small size, high efficiency, reliability and wide range of applications, the Flatpack S System can grow to meet future needs.

The input voltage may be 230VAC or 220VDC. The Smartpack S controller has built-in Web and common earth fault monitoring. This DC system is designed to be wall mounted or placed on the top of a battery cabinet.





KEY FEATURES

- Powered from AC or DC
- Complete system
  - » Battery terminals
  - » Load distribution
  - » Hot pluggable rectifiers
  - » Hot pluggable controller
- Optional SIL 3 rectifiers
- Meets EN-60945 EMC (DNV class B) requirements with marine filters

DESCRIPTION

The Flatpack S system is a 17U power system designed to use in 24VDC Marine applications. Marine filters are fitted on the input that makes this system meet the DNV requirement for marine applications. Flexible alarm and monitoring options are included. Modular design.



APPLICATIONS

- Offshore
- Ships
- SAS systems
- Part of the Eltek Central Power System



MODEL	FLATPACK S MARINE SYSTEM 8KW, 24V <sub>DC</sub>
Part number	CS0816.000
INPUT DATA	
Nominal voltage	185V <sub>AC/DC</sub> - 305V <sub>AC</sub> / 300V <sub>DC</sub>
Voltage range (DC)	85V <sub>AC/DC</sub> - 305V <sub>AC</sub> / 300V <sub>DC</sub>
Nominal current (at nominal input, full load)	37.6A <sub>RMS</sub>
Input connection	10 mm <sup>2</sup> terminals
Input protection	2 x C32A 2 pole MCB
Marine filters	Optional

OUTPUT DATA	
Nominal voltage	26.7 V <sub>DC</sub>
Voltage range	21.5 - 28V <sub>DC</sub>
Current – one rectifier	333.6A at 24VDC and full load
Output power	8kW maximum (with 8 rectifiers)
Load connection	Load MCB: 2x10A 2p +Alarm, 3x10A 2p No Alarm
Protection on each rectifier	Blocking OR-ing FET, short circuit proof, high temperature protection
Overvoltage protection on SIL 3 rectifier	Protection level: 30V, Proof test interval: 15 years Handles dual component failure
Battery connection	35mm <sup>2</sup>
Alarm connection	2,5mm <sup>2</sup>

CONTROL AND MONITORING	
Smartpack S	6 x Input/Output and Ethernet
Alarm connections	Plug-in wire connectors rear access for 6 potential free relays 1.5mm <sup>2</sup>

OTHER SPECIFICATIONS	
Isolation	3.0 kVAC – input to output; 1.5 kVAC – input to earth 0.5 kVAC – output to earth
Operating temperature (derating above 45°C;113°F)	-40 to +85°C (-40 to +185°F), humidity 5 - 95% RH non-condensing
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing
Dimensions	760 x 600 x 350 mm (HxWxD)
Weight	Net weight: 80 kg, Gross weight: 95 kg

DESIGN STANDARDS	
Cabinet	IP44
EMC	ETSI EN 300 386 V.1.6.1EN 61000-6, -1, -2-8, -3, -4
Safety	IEC/EN 60 950-1 & IEC 60945
Marine	ABS (Rectifiers) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) Temperature Cl. A, Vibration Cl. A, Humidity Cl. A, Enclosure Cl. A

ORDERING INFORMATION	
CS0816.000	FPS 24VDC 8kW
BB0212.000	Battery cabinet 1 shelf 12U 4x62Ah

AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	2 Module	4 Module	8 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	83.4 A	166.8 A	333.6 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SIL	21.5 – 28 V	>92,5%	41.7 A	83.4 A	166.8 A	333.6 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28 V	>92,5%	19 A	38 A	76 A	152 A	Blocking diode

COMPACT WALL MOUNTED

Flatpack S 24VDC 2kW  
Wallbox

The Flatpack S Wallbox is built around our Flatpack S rectifier and its compact and simple installation makes it a powerful wall-mounted DC power supply package.

Its mechanical design and electrical connections are fully compatible with our previous SMPS 700 system, for retrofit of older systems.

Comprehensive monitoring, LVBD, load and battery fuses are included as standard parts. AC input filters assure compliance with DNV standards for marine applications.



KEY FEATURES

- 24VDC system
- AC or DC input
- AC input filters
- Hot pluggable rectifiers
- Modular architecture
- Up to 63 A DC output
- Retrofit for SMPS 700
- Easy removable cover
- Easy access for installation
- Protection class IP23
- Integrated LVBD
- Integrated load breaker
- Integrated battery breaker
- Graphical 2.2" TFT display
- Ethernet
- Web interface
- SNMP
- Modbus TCP/IP (RTU)
- Compact design

MODULAR ARCHITECTURE

The modular architecture, efficiency, compact design and comprehensive monitoring and control features provide significant benefits over the current industry standard.



Flatpack S rectifiers have intelligent self-protective features like reduced output power at high temperatures or low mains. The optional Flatpack S 24/1000 SIL 3 OVP is targeted at Safety and Automation Systems (SAS) where SIL 3 rated overvoltage protection is required.

APPLICATIONS

AC input filters assure compliance to DNV rules for high speed & light craft ship classifications, DNV offshore standards and other demanding applications.

Offshore and process industry

- Safety and Automation Systems (SAS)

Marine

- Communication systems onboard ships
- Certified to be located on the bridge: DNV 2.4 & EN 60945 (EMC cl.B)

MODEL			MARINE			
Part number			MFGS0208.002			
INPUT DATA						
Voltage (range)			85V <sub>AC/DC</sub> - 305V <sub>AC</sub> / 300 <sub>DC</sub> , (45-66Hz)			
Input protection			Individual fuse in rectifier modules			
Current (maximum) @ nominal input full load			2 x 5,9 A <sub>RMS</sub>			
Connection			Terminals 2,5 mm <sup>2</sup>			
OUTPUT DATA						
Voltage (nominal)			24V <sub>DC</sub>			
Power (maximum) @ nominal input			2000 W			
Current (maximum) @ nominal input			83,4 A @ 24 VDC output, (63 A load breaker output)			
Protected battery output			2 pole MCB, 63 A, D characteristics with fuse trip alarm			
Protected load outputs			2 pole MCB, 63 A, B characteristics			
LVBD (Low Voltage Battery Disconnection)			80 A			
Integrated battery shunt			100 A			
Load & Battery connection			Directly on MCB, max 25 mm <sup>2</sup>			
Output Protection in rectifiers			Blocking OR-ing FET or Diode , Short circuit proof & High temperature protection			
CONTROL AND MONITORING						
Monitoring Unit			Smartpack S Panel Mount			
Local Operation			Display and keys, WEB interface via standard browser			
Remote Operation			WEB Interface, SNMP protocol and email			
Alarm Relays (Connection: terminals ≤ 1.5 mm <sup>2</sup> )			3 x Potential free change over contacts (NO, NC, C) [Max 75V/2A/60W]			
Inputs (Connection: terminals ≤ 1.5 mm <sup>2</sup> )			3 x Configurable (digital, analog max 75V) and 1 temperature			
Currents displayed			Rectifier current, battery current and load current			
Alarms			Low & high output voltage alarms (Minor and major levels), Earth fault alarm, Temperature alarm, Mains outage alarm, Battery remaining capacity/low quality alarms, Battery breaker tripped alarm and much more			
OTHER SPECIFICATIONS						
Isolation			3.0 kV <sub>AC</sub> - input to output, 1.5 kV <sub>AC</sub> - input to earth 0.5 kV <sub>DC</sub> - output to earth			
Protection Class			IP 23			
Color			RAL 7035			
Operating temperature			-20 to +55°C (-4 to +131°F), humidity 5 - 95% RH non-condensing Output power de-rates at high temperature, see datasheet for applicable rectifier			
Storage temperature			-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing			
Dimensions[WxHxD]			273 x 371 x 211mm (10.75 x 14.61 x 8.31")			
DESIGN STANDARDS						
Electrical safety			EN 60945, EN 60950-1-3 <sup>rd</sup> edition			
EMC			ETSI EN 300 386 V.1.3.2 , EN 61000-6-1 / -2 / -3 / -4 / -5 FCC Part 15/109			
Mains Harmonics			EN 61000-3-2			
Marine			ABS DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) <ul style="list-style-type: none"><li>○ Temperature Cl. B</li><li>○ Humidity Cl. B</li><li>○ Vibration Cl. A</li><li>○ EMC Cl.B</li></ul>			
AVAILABLE 24V RECTIFIERS						
Part Number	Description	Voltage	Efficiency	Maximum current		Output Protection
		Range		1 Module	2 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	83.4 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SIL	21.5 – 28 V	>92,5%	41.7 A	83.4 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28V	>92,5%	19 A	38 A	Blocking diode





COMPACT WALL MOUNTED

# Flatpack2 and Micropack 24-220VDC Wallbox

The Flatpack2 Wallbox is built around the Flatpack2 rectifier and designed for applications such as switchgear, telecom, emergency lightning and alarm systems.



KEY FEATURES

- Compact design and simple installation
- Simple removable front, easy access for installation and connections
- 24-110 VDC systems
- Bulk feed output or 1 or 2 pole distribution
- Graphical 3.2" TFT high contrast, high resolution color display for easy navigation in user menu
- Ethernet for remote or local monitoring and control via web browser
- SNMP protocol with trap, set and get on Ethernet. Email of trap alarms
- 6 Digital programmable relay outputs
- 6 Programmable multipurpose inputs ("digital inputs" or analog signals).

DESCRIPTION

The Flatpack2 Wallbox's compact design and simple installation make it a powerful wall mounted DC power supply package.

The rectifier's wide DC output range makes it suitable for parallel operation with all types of stationary batteries, including lead acid, or nickel cadmium types.

APPLICATIONS

- Safety and Automation Systems (SAS)
- Control and protection
- Communication onboard ships



FLATPACK 2 WALLBOX - DC BULK FEED OUTPUT

Designed for 24, 30, 48, 60, 110 and 125 V<sub>DC</sub>

Wallbox with DC bulk feed output

-168 A DC Bulk feed output

- **CTO30210.100** FLATPACK 2 110-125V<sub>DC</sub> 4kW Wallbox  
Consist of: Smartpack2, I/O monitor type 2

FLATPACK2 AND MICROPACK WALLBOX -2 POLE DISTRIBUTION FLOATING SYSTEM

Designed for 24, 48, 110 and 220 V<sub>DC</sub>

Wallbox with 2 pole distribution

- **CIE20210.408** FLATPACK 2 24V<sub>DC</sub> 4kW Wallbox  
Consist of: Smartpack 2, Smartpack Basic Industrial, I/O monitor type 2. Mains input 25A 2P, Battery breaker: 2x63A 2P w AUX, Load breaker 2x10A 2P and 1x25A 2P, IP21
- **CIE20210.407** FLATPACK 2 48V<sub>DC</sub> 4kW Wallbox (Consist of: Same as above)
- **CIE20210.406** FLATPACK 2 110V<sub>DC</sub> 4kW Wallbox (Consist of: Same as above)
- **CIE20210.405** FLATPACK 2 220V<sub>DC</sub> 4kW Wallbox (Consist of: Same as above)
- **CIE20210.401** FLATPACK 2 24V<sub>DC</sub> 4kW Wallbox  
Consist of: Same as above but with 1xFP2 rectifier, without Smartpack Basic Industrial, Mains input 32A 2P, Load breaker 2x10A 2P and 1x32A 2P, IP21
- **CIEU0410.001** MICROPACK 24V<sub>DC</sub> 0,96kW + 2xBattery shelf  
Consist of: Compack, Mains input 10A 2P, Battery breaker: 1x25A 2P w AUX, Load breaker 2x10A 2P, 2xBattery shelves for 7Ah batteries, IP21

- COMMON FEATURES FOR ALL VERSIONS
- Houses up to two FP2 rectifiers

- Smartpack 2 DC System controller with 3.2" TFT color display,

- Included Ethernet and Web interface for remote monitoring.

- 6 Digital inputs for external alarm

- 6 Relay outputs NO, COM, NC for remote alarm

- Common feed AC-input (or options see below)

AVAILABLE 24V RECTIFIERS

Part Number	Description	Voltage	Efficiency	Maximum current		Output Protection
		Range		1 Module	2 Module	
241115.205M	Flatpack 2 24V/1800W HE	21.7 – 28.8 V	> 95% (30-65% load)	75 A	150 A	Fuse
241115.200M	Flatpack 2 24V/2000W	21 – 29 V	> 89% (25-100% load)	84 A	168 A	Blocking diode
241115.250M	Flatpack 2 24V/2000W WOR	21.5 – 36 V	> 91% (25-85% load)	70 A	140 A	Fuse

AVAILABLE 48V RECTIFIERS

Part Number	Description	Voltage	Efficiency	Maximum current		Output Protection
		Range		1 Module	2 Module	
241115.705M	Flatpack 2 48-60V/2000W HE	39.9 – 72 V	> 95.5% (25-75% load)	41.6 A	83.2 A	Fuse
241115.100	Flatpack 2 48V/2000W	43.2 – 57.6 V	> 91.5% (45-95% load)	41.6 A	83.2 A	Blocking diode
241115.105M	Flatpack 2 48V/2000W HE	43.5 – 57.6 V	> 96% (30-70% load)	41.6 A	83.2 A	Fuse

AVAILABLE 110V RECTIFIERS

Part Number	Description	Voltage	Efficiency	Maximum current		Output Protection
		Range		1 Module	2 Module	
241115.805B	Flatpack 2 110-125V/10A HE	89.2-171.6 V	> 94% (45-100% load)	10 A	20 A	Oring diode
241115.805M	Flatpack 2 110V/2000W HE	89.2-171.6 V	> 94% (30-70% load)	16.8 A	33.6A	Oring diode

AVAILABLE 220V RECTIFIER

Part Number	Description	Voltage	Efficiency	Maximum current		Output Protection
		Range		1 Module	2 Module	
241115.815M	Flatpack 2 220V/2000W HE WOR	178.5-297 V	> 95% (35-65% load)	9.16 A	18.32 A	Oring diode

Errors and Omissions Excepted



# Flatpack2 Wallbox

MODEL	BULK FEED 24-60V	BULK FEED 110V	2-POLE DIST. 24-110V
Part number	CTO30210.000	CTO30210.100	CIE20210.4xx
INPUT DATA			
Voltage (range)	85 - 300V <sub>AC</sub>		
Single AC feed	-	-	-
Single AC feed with SPD ( OVP Class 2)	-	-	-
Dual AC feed (individual pr rectifier)	-	-	-
Recommended input breaker	16A <sup>1)</sup> for 1 FP2 rectifier in system or 2 FP2 rectifiers with individual feed 25A <sup>1)</sup> for 2 FP2 rectifiers in system		
Protection	Individual fuse in rectifier modules		
Connection	Directly on input MCB, up to 25mm <sup>2</sup> PE screw terminal, max 10 mm <sup>2</sup> and M5 cable lug directly to chassis		
OUTPUT DATA			
Voltage (default)	24-60 V <sub>DC</sub>	110-125 V <sub>DC</sub>	24-110 V <sub>DC</sub>
NiCad, number of cells supported	18-40	85-104	18-88
Pb, number of cells supported	12-30	54-60	54
Power (maximum) @ nominal input	4000 W	4000 W	4000 W
Current (maximum) @ nominal input	See previous page or applicable Flatpack2 rectifier datasheet		
Unprotected bulk output	-	-	-
Protected battery outputs	-	-	-
Protected load outputs	-	-	-
Integrated battery shunt and discon.	-	-	-
Connection	Terminal 35mm2 M8 cable lug		Directly on input MCB, up to 25mm2
Output Protection in rectifiers	Blocking OR-ing FET or Diode or fuse, Short circuit proof & High temperature protection		
CONTROL AND MONITORING			
Monitoring Unit	Smartpack 2		
Local Operation	Display and keys, WEB interface via standard browser using WebPower		
Remote Operation	WebPower (WEB Interface, SNMP protocol and email)		
Alarm Relays (Conn.: clamp ≤ 1.5 mm <sup>2</sup> )	6 x Potential free change over contacts (NO, NC, C) [Max 75V/2A/60W]		
Inputs	6 x Configurable (digital, analog) and 3 temperature		
Current measurements	Rectifier current and if battery shunt is used; battery current and load current		
Alarms	Low & high output voltage alarms (Minor and major levels), Earth fault alarm, Temperature alarm, Mains outage alarm, Battery remaining capacity/low quality alarms, Battery/load breaker tripped alarm and much more		
OTHER SPECIFICATIONS			
Isolation	3.0 kV <sub>AC</sub> - input to output, 1.5 kV <sub>AC</sub> - input to earth, 0.5 kV <sub>DC</sub> - output to earth <sup>3)</sup>		
Operating temperature	-40 to +45°C (-40 to +113°F), humidity 5 - 95% RH non-condensing Output power de-rates at high temperature, see datasheet for applicable rectifier		
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing		
Dimensions[WxHxD] / Weight	452 x 450 x 200mm (17.8 x 17.7 x 7.9") / 13 kg (1 module) 15 kg (2 module)		
DESIGN STANDARDS			
Electrical safety	UL 60950-1-3 <sup>rd</sup> edition, EN 60950-1-3 <sup>rd</sup> edition		
EMC	ETSI EN 300 386 V.1.4.1 , EN 61000-6-1 / -2 / -3 / -4		
Environment	ETSI EN 300 019, ETSI EN 300 132 - 2		
Marine	ABS (PENDING) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (CTO30210.000 and Rectifiers) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A		

1) For 3kW Flatpack2 rectifiers 20A/50A / 2) Depending on AC Mains input configuration  
3) 1.5kVAC for Wallbox with 110V Flatpack2 rectifiers

Errors and Omissions Excepted





GENERATOR STARTER UPS

# Flatpack S 24VDC 3kW Generator Starter

Based on the successful Flatpack S rectifier module, this system is built to start diesel/emergency generators. Available as a wall-mounted cabinet with external battery box and as an integrated floor standing cabinet with built-in battery compartment.



CIES0325.002



CIES0316.000

KEY FEATURES

- Compact scalable system
- High charging capacity
- High short circuit level
- Distribution section
- Hot swappable modular rectifier units
- High efficiency
- Digital controllers
- Heat management
- Ip54/ip44

DESCRIPTION

The generator starter UPS has a rectifier section for a maximum of 3 Flatpack S rectifiers to maintain and recharge the starter batteries, along with starting switch and a load distribution part.

The battery compartment can be the part of the cabinet or can be located in an external box.

The rectifier section has enough power to recharge a battery bank up to 650Ah within 10 hours according to DNV requirement.

The maximum allowable starting current is up to 2500A for 5s which is sufficient for diesel generators up to 500-600kW.

The power system is monitored by the Smartpack S controller which has all the functionality and alarm signals required for present and future applications.

APPLICATIONS

- Marine & Offshore
  - » Diesel generator start
  - » Emergency generator start (dual system required)
  - » Shore generator start
  - » Fire pump system start

345183



MODEL	WALL CABINET		INTEGRATED CABINET				
Part number	CIES0316.000		CIES0325.002				
INPUT DATA							
Connection	2phase + PE (IT) terminals						
Nominal voltage	185V <sub>AC</sub> – 305V <sub>AC</sub>						
Maximum current	14.1A <sub>RMS</sub>						
Input protection	C-20A 2P MCB						
Input protection in each rectifier	Mains Fuse, Shutdown above 305 V						
OUTPUT DATA							
Maximum voltage	26.7 V <sub>DC</sub>						
Output current	125.1 A (@V <sub>OUT</sub> <24V <sub>DC</sub> )						
Output power	3 kW maximum within nominal input						
Output protection in rectifiers	Blocking Diode, Short circuit proof, Overvoltage and high temp. protection						
Battery protection	No protection (short circuit proof wiring)						
Load distribution	3 MCBs (1xC20A 2P, 2xC10A 2P) – No battery backup						
CONTROL AND MONITORING							
Controller	Smartpack S						
Local/Remote Operation	Display and keys, WEB interface via standard browser, SNMP, E-mail						
Inputs	3 x Configurable (digital, analog max 75V) and 1 temperature						
Alarms	6 (Switching capacity max 2A/75V/60W) Low & high output voltage alarms (Minor and major levels), Earth fault alarm, Temperature alarm, Mains outage alarm, Battery remaining capacity/low quality alarms, Battery breaker tripped alarm and much more						
OTHER SPECIFICATIONS							
Temperature derating above 45°C(113°F)	Operating: -40 to +85°C (-40 to +185°F), 5-95% RH non condensing Storage: -40 to +85°C (-40 to +185°F), 0 - 99% RH non-condensing						
Isolation	3.0 KV <sub>AC</sub> – input to output, 1.5 KV <sub>AC</sub> – input and output to earth						
Dimensions (HxWxD)	760 x 600 x 350 mm (29.9x23.6x13.7")		1200 x 600 x 505 mm (47.2x23.6x19.8")				
Battery compartment dimensions (HxWxD)	External - 345183 (Battery box SA-590x630x450)		Space for 2x142Ah VRLA battery 4x(287mm x 200mm x 395mm)				
Weight (Net)	58 kg		161 kg (~231kg with batteries)				
IP grade specification	IP54 (IP 20 inside cabinet)		IP44 (IP 20 inside cabinet)				
DESIGN STANDARDS							
Electrical safety	IEC/UL 60950-1						
EMC	ETSI EN 300 386 V.1.6.1, EN 61000-6-1, -2, -3, -4, -5, EN 61000-3-2						
Environment	ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2, RoHS compliant & 2008/98EC						
Marine	ABS (Rectifiers) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers) Temperature Cl. B, Vibration Cl. A, Humidity Cl. B, Enclosure Cl. A						
ORDERING INFORMATION							
CIES0316.000	FPS 24V 3kW 1x230V Generator Starter UPS Rittal – Wallbox						
CIES0325.002	FPS 24V 3kW 1x230V Generator Starter UPS Rittal - Integrated						
345183	Battery box SA-590x630x450mm						
AVAILABLE 24V RECTIFIERS							
Part Number	Description	Voltage	Efficiency	Maximum current			Output Protection
		Range		1 Module	2 Module	3 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	83.4 A	125.1 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SIL	21.5 – 28 V	>92,5%	41.7 A	83.4 A	125.1 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28V	>92,5%	19 A	38 A	57 A	Blocking diode

110VDC DP AND THRUSTER UPS

Flatpack2 110VDC 16kW

Proven solution for Thruster and Dynamic Positioning applications on Semi-Submersible drilling rigs.



CIE20438.411 CIE20838.403 CIE20838.402 BN0138.001

KEY FEATURES

- Compact scalable system
- High charging capacity
- Battery compartment
- Distribution section
- Hot swappable modular rectifier units
- High efficiency
- Digital controllers
- Heat management
- High IP grade

DESCRIPTION

Flatpack2 Integrated solutions have been specifically designed to meet the demand for higher density and more protected (higher IP) power solutions. It is suitable for applications needing an expandable, easily serviceable and reliable power supply that, fits within a minimal space.

The power system is monitored by Smartpack2 controller, which has all the functionality and alarm signals required for present and future applications in accordance with the DNV regulations.

It contains 2U or 1U of PRs (power rack) which can house 8 or 4 Flatpack2 rectifier modules.

APPLICATIONS

- Control voltage
- Dynamic positioning (DP)
- Thruster control



MODEL	8KW INTEGRATED	16KW INTEGRATED	16KW	BATTERY CABINET				
Part number	CIE20438.411	CIE20838.403	CIE20838.402	BN0138.001				
INPUT DATA								
Mains	3phase + PE (IT) 480V <sub>AC</sub>			-				
Maximum current (1 Module included)	Max. 5.95 A <sub>rms</sub> at 370V <sub>rms</sub> input and full load (4.7 A <sub>rms</sub> at 480V)			-				
Mains switch	63A 3P			-				
Input protection in each rectifier	Mains Fuse, Varistor, Shutdown above 305 V			-				
OUTPUT DATA								
Maximum voltage	122.5 V <sub>DC</sub>			-				
Output current (1 Module included)	16.89 A (@V <sub>OUT</sub> <110V <sub>DC</sub> )			-				
Output power	8 kW maximum	16 kW maximum						
Output protection in rectifiers	Blocking Diode, Short circuit proof, Overvoltage and high temp. protection			-				
Battery protection	160A MCCB			2xNH01 (250A)				
Load distribution	15 MCBs (1xC16A 2P, 14xB10A 2P)	30 MCBs (7xC16A 2P, 23xB10A 2P)		-				
CONTROL AND MONITORING								
Controller	Smartpack 2			-				
Local/Remote Operation	Display and keys, WEB interface via browser, SNMP, E-mail			-				
Inputs	3 x Configurable(digital, analog max 75V) and 1 temperature			-				
Alarms	6 (Switching capacity max 2A/75V/60W) Low & high output voltage alarms, Earth fault alarm, Temperature alarm, Mains outage alarm, Battery remaining capacity/low quality alarms, Battery breaker tripped alarm and much more			-				
OTHER SPECIFICATIONS								
Operating Temperature	-40 to +85°C (-40 to +185°F), 5-95% RH non condensing							
Storage Temperature	-40 to +85°C (-40 to +185°F), 0-99% RH non-condensing			-				
Isolation	3.0KV <sub>AC</sub> —input to output, 1.5KV <sub>A</sub> —input and output to earth			-				
Dimensions (HxWxD)	1960x605x605 mm (77.4x23.8x23.8")	1960x1006x605mm (77.4x39.6x23.8")	1960x605x605mm (77.4x23.8x23.8")	1960x806x605mm (77.4x31.7x23.8")				
Battery compartment dimensions (HxWxD)(mm)	9x38Ah VRLA 9x(184x97x280)	9x100Ah VRLA 9x(235x110x510)	External	18x190Ah VRLA 18x(316x125x561)				
Weight (without batteries)	Net weight: 252 kg,	Net weight: 405 kg,	Net weight: 305 kg	Net weight: 200 kg,				
IP grade specification	IP44	IP43	IP44	IP43				
DESIGN STANDARDS								
Electrical safety	IEC/UL 60950-1							
EMC	ETSI EN 300 386 V.1.4.1, EN 61000-6-1, -2, -3, -4, EN 61000-3-2							
Environment	ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2, RoHS compliant & WEEE2008/98EC							
Marine	DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers) Temperature Cl. B, Vibration Cl. A, Humidity Cl. B, Enclosure Cl. A							
ORDERING INFORMATION								
CIE20438.411	FP2 110V 8kW 3p480V with battery compartment without batteries (3xFP 2 included)							
CIE20838.403	FP2 110V 16kW 3p480V with battery compartment without batteries (6xFP 2 included)							
CIE20838.402	FP2 110V <sub>DC</sub> 16kW 3p480V (7xFP 2 included)							
BN0138.001	Batt. cabinet 4xSHELFS 18 places (Without batteries)							
AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	2 Module	4 Module	8 Module	
241115.805M	Flatpack 2 110V/2000W HE	89.2 – 171.6 V	>94% (30-70% load)	16.8 A	33.6 A	67.2	134.4	Oring diode



MODULAR AC-UPS

Rectifier UPS  
115/230VAC 6KVA

The Rectifier power module combines both AC and DC feed into one common unit. Simultaneously it provides AC backup power for 230 VAC or 115 VAC loads, and 48 VDC power for battery charging.

AC and DC output limits can be set according to the attached load, where the limitation for AC load is set to max 6 kVA with possibility to set recharge values for battery banks up to max 0,6kW



KEY FEATURES

- 230 or 115 VAC input/output
- Dual A & B AC feed
- Single phase input/output
- Max 6kVA AC output
- 2 pole AC distribution
- Ground fault alarm (RCR)
- Built-in manual bypass switch
- Built-in transfer technology
- 150% overload capability, 15S
- 600% quick trip current, 20MS
- Hot pluggable
- Smartpack 2 controller
- DNV & ABS approval
- Global compliance
- Patented HE technology

MODULAR ARCHITECTURE OF THE RECTIFIER MODULE

The 3 port converter simultaneously provides power to AC loads and battery charging. During mains outage the Rectifier 48/1200 HE feeds AC loads using energy stored in the battery.



The modular architecture, industry-leading efficiency, compact size, innovative design and comprehensive monitoring and control features provide significant benefits over the current industry standard.

APPLICATIONS

Marine

- Communication onboard ships
- Dynamic positioning
- Propulsion control
- Navigation
- Ship identification
- Drilling systems
- Computer room
- Public address and alarm

Offshore and process industry

- Safety and Automation Systems (SAS)



MODELS / ORDERING INFORMATION		6KVA, 230 V	3KVA, 115 V
Product family		CIER0418.002	CIER0418.001
AC OUTPUT DATA			
Voltage (default) / (adjustable range) <sup>1)</sup>		230V <sub>AC</sub> / 200 - 240V <sub>AC</sub>	115V <sub>AC</sub> / 100 - 127V <sub>AC</sub>
Frequency (default inverter mode)		50Hz, 60Hz or last synced 50/60Hz (adaptive)	
Frequency (set-able inverter mode)		50Hz, 60Hz or last synced 50/60Hz (adaptive)	
Power maximum (continuous / overload (<15s) )		4800 W (6000 VA) / 8000 VA	2400 W (3000 VA) / 4000 VA
Current maximum (continuous / overload (<15s) )		26A <sub>RMS</sub> / 34,8A <sub>RMS</sub>	
Current (maximum) Quick trip (20ms)		120A (6 x nominal)	
Hold up (Voltage dips) (before switching to battery)		>5ms @ 4800W load	> 5ms @ 2400W load
THD		<1.5 % at resistive load	
Output features		Fuse in L and N, Hot pluggable, AC Distribution: 12x6 A, C characteristics 2 pole breaker Ground fault alarm relay on AC output (Residual Current Relay)	
DC OUTPUT FOR BATTERY CHARGING			
Voltage (default) / (adjustable range)		53.5 V <sub>DC</sub> / 43 – 58 V <sub>DC</sub>	
Power (maximum @nominal input)		600 W	300 W
Current (maximum @V <sub>OUT</sub> 48 ≤ V <sub>DC</sub> )		12,5 A	6,25 A
Hold up time, maximum output power		>10ms; V <sub>OUT</sub> > 41V <sub>DC</sub>	
Output features		Short circuit proof, Over voltage Shutdown 1 x 125 A, C characteristics 2 pole battery breaker with 24V external ESD trip	
Extended battery kit PN: 350055		Additional 1*125 A, 2 pole battery breaker with battery looms	
INPUT DATA			
AC Mains Input Voltage (single phase)		185 – 275 V <sub>AC</sub>	95 – 140 V <sub>AC</sub>
AC Current (at nominal output voltage)		29 A <sub>RMS</sub> <sup>3)</sup>	
Frequency (default: sync range)		47-53 & 57-63 Hz	
Frequency ( set-able: sync range)		47-53 Hz, 57-63 Hz or both (adaptive)	
Power Factor / THD		>0.99 at 50% load or more / <3.5%	
DC Voltage nominal / extended range (no overload) <sup>2)</sup>		45 – 58 V <sub>DC</sub> / 40 - 45 V <sub>DC</sub>	
DC Current (maximum)		128 A / 180 A during overload(15s)	64 A / 90 A during overload (15s)
Input features		Fuse in L and N, Hot pluggable, Varistor, Hot pluggable Dual single phase input; A and B feed (changeover device controlled by feed A)	
OTHER SPECIFICATIONS			
Efficiency		>96% (mains mode (AC/AC and AC/DC) ), >94% (inverter mode (DC/AC) )	
Manual bypass switch		63 A (make before break)	
Colour		RAL 7035	
Protection Class		IP 33	
Battery backup time (at maximum AC power)		30-60 min	
Operating temperature		-10 to +45°C (+14 to +113°F), humidity 5 – 95% RH non-condensing	
Storage temperature		-40 to +85°C (-40 to +185°F), humidity 0 – 99% RH non-condensing	
Dimensions [WxDxH] / Weight		600 x 600 x 900mm (23,7 x 23,7 x 35,5") / 70 kg (155 lbs)	
DESIGN STANDARDS			
Electrical safety		EN 60950-1, EN 62040-1	
EMC		ETSI EN 300 386 V.1.6.1, FCC CFR 47 Part 15 EN 61000-6-1 /-2/-3/-4	
Environment		ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) RoHS (2011/65/EU) and WEEE (2002/96/EC) compliant	
Marine		DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) ○ Temperature Cl. B / Humidity Cl. B / Vibration Cl. A EMC Class A (pending approvals in next version EMC Class B & ABS)	

1) Output voltage ranges configured in factory and have individual keying in top chassis  
2) 40 - 45 VDC: reduced performance - no power boost and increased voltage THD on AC output.  
3) If DC voltage is pulled below 43V the input current may increase above this level

10KVA AC INVERTER SYSTEM 220VDC-230VAC

Inverter System  
230VAC 10KVA

This concept allows customers to build for the first time AC power systems without any possible “single point of failure” and with full scalability and high efficiency.

Based on one multifunctional module, the system leads to truly redundant parallel architectures. This Inverter System can be widely used in DC-AC marine applications across the globe. Each inverter module has built-in a static switch



**KEY FEATURES**

- DNV certificate
- No single point of failure
- Efficiency and selectivity
- Full scalability
- Clean output
- Transfer time reduced to zero

**DESCRIPTION**

The TSI “Twin Sine Inverter” is the very latest generation of power module that is creating a revolution in the DC/AC inverter marketplace.

The TSI design meets the golden rules of (TRS) principles that make this system an ideal solution to preserve critical loads and assets. The TSI concept is a modular “hot swappable” solution that eliminates all “single points of failure.”

The AC-to-AC conversion via the chain of batteries isolates the AC output from the AC input and features a double filtering function.

The TSI inverter is able to supply 10 times its normal output current in case of a downstream short-circuit in the AC distribution.

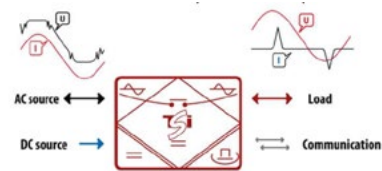
This short- circuit current is also controlled in magnitude to prevent tripping of the upstream breaker.

TSI is SAFE for your load and your operations.

- Efficiency up to 96%
- Reduction energy losses by 70%
- Positive carbon impact “Green solution”
- Elimination of external static switch and rectifier
- Expandable solution and modular architecture
- AC mains filtering
- Galvanic isolation from AC input when AC output is supplied from batteries

**APPLICATIONS**

- Offshore
- Ships
- Part of the Eltek Central Power System



MODEL		BRAVO 10KVA 220VDC-230VAC INVERTER
Part number		CINV0425.002
INPUT DATA (DC)		
Nominal voltage		2 x 220V DC
Voltage range (DC)		170V <sub>DC</sub> – 300V <sub>DC</sub>
Nominal current (at 220Vdc and 4 inverter modules)		39.2A ; max 59.6A for 15 second @< 200mV <sub>RMS</sub>
Input connection		10 mm <sup>2</sup> terminals
Input protection		2 x 2 x C16A 2 pole MCB
INPUT DATA (AC)		
Nominal voltage (AC)		230V L+N Note: N goes through to the AC output side
Voltage range (AC)		185-265V (full power)
Power factor		>99%
Frequency range (selectable)		50-60Hz
Input protection		C63A 2 pole MCB
OUTPUT DATA		
Nominal output power (VA / W)		10.000VA (4 x 2500VA) / 8000W (4 x 2000W)
Nominal voltage		230V; 2%
Voltage range (AC)		200 - 240V
Frequency		50-60Hz; 0.03%
Total harmonic distortion (THD)		<1.5%
Maximum current (4 inverter modules)		43.5A (4 x 10.87A)
Short circuit clear up capacity (AC mains available)		10 x I <sub>n</sub> for 20msec; 1.5 x I <sub>n</sub> after 15sec
Number of load MCBs / Size of connections		28 x C10A / 4 mm <sup>2</sup> terminals
CONNECTIONS		
Alarm connections		1.5 mm <sup>2</sup>
OTHER SPECIFICATIONS		
Temperature		Operating: -20 to +50°C (+4 to +122°F) Storage: -40 to +70°C (-40 to +158°F)
Relative humidity		95%, non-condensing
Dimensions (H x D)		1200 x 600 x 600 mm (HxWxD) (without plinth and vibration abs.)
Weight		Net weight: 129 kg, Gross weight: 169 kg
DESIGN STANDARDS		
Cabinet		IP44
EMC		ETSI EN 300-132-2 EN 55022 (Class B)
Safety		IEC/EN 60 950-1 & 62040-1 for inverter IEC/EN 62 040-1 for shelves
Marine		DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A
ORDERING INFORMATION		
CINV0425.002		INV 2x220V 10kVA 230V Bravo
241560.322		Bravo TSI 2.5kVA-220Vdc 230Vac EPC



230VAC MODULAR INVERTER & CHARGER

# Modular Inverter & Charger

## 400/230VAC 30kVA & 60kVA

This concept allows for the first time to build AC power systems by removing any possible “Single Point of Failure” with full scalability and high efficiency.

Based on the Flatpack 2 DC charging module and Bravo inverter module it leads to truly redundant parallel architectures. This modular UPS can be widely used in AC marine applications across the globe. Each inverter module has built in a static switch.



KEY FEATURES

- DNV certificate for the modules
- No single point of failure
- Efficiency and selectivity
- Full scalability
- Clean output
- Transfer time reduced to zero

- Offshore
- Ships
- Main AC UPS
- PA/PG
- Navigation
- Part of the Eltek Central Power System

DESCRIPTION

The TSI “Twin Sine Inverter” is the very latest generation of power modules that is creating a revolution on the DC/AC inverter marketplace.

The TSI design meets the golden rules of TRUE REDUDANT SYSTEMS (TRS) principles that make this system an ideal solution to preserve critical loads and assets. TSI concept is a modular “hot swap” solution that eliminates all “single points of failure”.

The AC to AC conversion features a double filtering function, thanks the double conversion AC-DC (to an internal DC buffer) and DC-AC.

The TSI inverter is able to supply 10 times its normal output current in

case on downstream short-circuit in the AC distribution. This short-circuit current is also controlled in magnitude to prevent tripping of the upstream breaker.

TSI is SAFE for your load and your operations.

- Efficiency up to 96%
- Reduction energy losses by 70%
- Positive carbon impact “Green solution”
- Elimination of external static switch and
- Expandable solution and modular architecture
- AC mains filtering
- Galvanic isolation is ensured between batteries and AC output

MODEL	BRAVO 30KVA 230V <sub>AC</sub>		BRAVO 60KVA 230V <sub>AC</sub>	
Part number	CIE20499A.4005		CIE20899A.1003	
INPUT DATA (DC)				
Nominal voltage	220V DC			
Voltage range (DC)	170V <sub>DC</sub> – 300V <sub>DC</sub>			
Nominal current (at 220Vdc and 12/24 modules)	117.6A		235.2A	
Input connection	35mm <sup>2</sup> terminals		95mm <sup>2</sup> terminals	
Input protection	12xC16A 2 pole MCB		24xC16A 2 pole MCB	
INPUT DATA (AC)				
Nominal voltage (AC)	400/230V <sub>AC</sub> , 3Ph+N (230V, 440V or 690V IT with built in transformer)		400/230V <sub>AC</sub> , 3Ph+N (230V, 440V or 690V IT with external transformer)	
Voltage range (AC)	185-265V (full power)			
Power factor	>99%			
Frequency range (selectable)	50-60Hz			
Input protection	C63A 3 pole MCB		-	
OUTPUT DATA				
Nominal output power (VA / W)	30.000VA (12x2500VA)		60.000VA (24x2500VA)	
Nominal voltage	230V			
Voltage range (AC)	200 - 240V			
Frequency	50-60Hz; 0.03%			
Total harmonic distortion (THD)	<1.5%			
Maximum current / phase (TN-S, 230V <sub>AC</sub> )	43.3A		87A	
Short circuit clear up capacity (AC mains available)	10 x In for 20msec; 1.5 x In after 15sec			
Number of load MCBs / Size of connections	Bulk(35mm <sup>2</sup> )+B50A 3P+C16A 3P		Bulk (35mm <sup>2</sup> )	
CONNECTIONS				
Alarm connections	1.5 mm2			
OTHER SPECIFICATIONS				
Temperature	Operating: -20 to +50°C Storage: -40 to +70°C			
Relative humidity	95%, non-condensing			
Dimensions (HxWxD)	1762 x 605 x 805 mm		2162 x 605 x 805 mm	
Input / Output transformers	Optional 230V/440V/690V		External	
DESIGN STANDARDS				
Cabinet	IP43			
EMC	ETSI EN 300-132-2, EN 55022 (Class B)			
Safety	IEC/EN 60 950-1 & 62040-1,-2 for inverter IEC/EN 62 040-1 for shelves			
Marine	DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Inverters and rectifiers) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A			
ORDERING INFORMATION				
CIE20499A.4005	400/230V 30kVA UPS & FP2 220V 8kW charger (without modules)			
CIE20499A.4002	3x230V 30kVA UPS & FP2 220V 8kW charger with 34kVA input and 30kVA 230V built in output Yan0 transformers (without modules)			
CIE20899A.1003	400/230V 60kVA UPS & FP2 220V 16kW charger (without modules)			
241115.815M	Flatpack2 220V <sub>DC</sub> /2000W HE Marine rectifier module			
241560.322	Bravo TSI 2.5kVA 220V <sub>DC</sub> , 230V <sub>AC</sub> inverter module			

CIE20xx99A.x00x - rev1

Specifications are subject to change without notice

Errors and Omissions Excepted

POWER SHELVES 24VDC, 48VDC, 110VDC

Flatpack2 19" 2U 8kW

The combination of cost-effective design, power density and reliability makes the Flatpack2 a product family that truly stands out and provides unparalleled system availability.

The versatility of the Flatpack2 rectifier means that it can be used in a wide variety of Marine & Offshore applications across the globe.



KEY FEATURES

- Highest efficiency in minimum space
- Scalable
- Full voltage range
- Digital controllers
- Heat management
- Unique connection
- Global approvals

DESCRIPTION

The Flatpack2 has been specifically designed to meet the demand for higher density and more compact power solutions. It is suitable for applications needing an expandable, easily serviceable and reliable power supply, fitting within a small space.

The power system is monitored by Smartpack 2 controller which has all the functionality required for present and future applications.

It contains 2U of PRs (power rack) which can house 4 Flatpack2 rectifier modules.

APPLICATIONS

- Control and Protection
- SAS System
- Communication
- Emergency lights
- Dynamic Positioning (DP)
- Thruster control
- HV switchgear control voltage
- LV switchgear control voltage
- Generator control voltage



MODEL	24-60V <sub>DC</sub>	110V <sub>DC</sub>
Part number	C20402.401	C20402.400
INPUT DATA		
Voltage (range)	85-300V <sub>AC/DC</sub> (Nominal 185-275V)	
Frequency	44 to 66Hz	
Protection	Varistors for transient protection, Mains fuse in both lines / Disconnect above 300V	
OUTPUT DATA		
Maximum voltage	36/72 V <sub>DC</sub>	122.5 V <sub>DC</sub>
Maximum current (4 modules)	300A@26.7V	67.2A
Output protection	See the rectifier's data below	
CONTROL AND MONITORING		
Master controller	Smartpack 2	
Local Operation	Display and keys or PC (PowerSuite)	
Remote operation	PowerSuite via modem or Monitoring via WebPower	
Inputs	6xdigital (for monitoring of external equipment)	
Current measurements	Rectifier current and if battery shunt is used battery current and load current	
Alarms	Load fuse alarm, Battery fuse alarm, LVD operated, Low output voltage alarms (2 individual alarm levels), High output voltage alarms, (2 individual alarm levels), Battery capacity, Temperature alarm, Symmetry alarm	

OTHER SPECIFICATIONS

Isolation	3.0 kV <sub>AC</sub> – input to output, 1.5 kV <sub>AC</sub> – input and output to earth
Operating temperature	-40 to 75°C (-40 to +167°F), Derating > 45°C/113°F
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0-99% RH non-condensing
Dimensions (H x D)	482x432x89mm (2U) (WxDxH) (19x17x3.5"), recommended cabinet depth is 500mm (19.6")
Weight	Approx. 5kg (11lbs) excl. rectifier

DESIGN STANDARDS

Electrical safety	EN/UL 60950-1-3 <sup>rd</sup> edition
EMC	ETSI EN 300 386 V.1.3.2 EN 61000-6-2 / -3
Environment	ETSI EN 300 019, ETS EN 300 132-2
Marine	ABS (Pending) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers)

AVAILABLE RECTIFIERS (24V<sub>DC</sub>, 48V<sub>DC</sub>, 110V<sub>DC</sub>)

Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	2 Module	3 Module	4 Module	
241115.205M	Flatpack 2 24V/1800W HE	21.7 – 28.8 V	>95% (30-65% load)	75 A	150 A	225 A	300 A	Fuse
241115.200M	Flatpack 2 24V/2000W	21 – 29 V	>89% (25-100% load)	84 A	168 A	252 A	336 A	Blocking diode
241115.250M	Flatpack 2 24V/2000W WOR	21.5 – 36 V	>91% (25-85% load)	70 A	140 A	210 A	280 A	Fuse
241115.705M	Flatpack 2 48-60V/2000W HE	39.9-72 V	>95.5% (25-75% load)	41.6 A	83.2 A	124.8 A	166.4 A	Fuse
241115.100M	Flatpack 2 48V/2000W	43.2-57.6 V	>91.5% (45-95% load)	41.6 A	83.2 A	124.8 A	166.4 A	Blocking diode
241115.105M	Flatpack 2 48V/2000W HE	43.2-57.6 V	>96% (30-70% load)	41.6 A	83.2 A	124.8 A	166.4 A	Fuse
241115.805M	Flatpack 2 110V/2000W HE	89.2-171.6 V	>94% (30-70% load)	16.8 A	33.6 A	50.4 A	67.2 A	Oring diode



POWER SHELVES 3X2KW 24V&48VDC, 8X1KW 24VDC

Flatpack S 19" 3U 8kW

The combination of innovative design, efficiency and reliability makes the Flatpack S a perfect choice for Marine & Offshore and Industrial applications.

With a system depth of only 250mm, the Flatpack S system will fit in most cabinets.

With its flexible alarm and monitoring options, combined with bulk output, this 3U system is a superb building block for various marine applications.



KEY FEATURES

- Compact and shallow
- High power density
- High efficiency
- 3 separate systems (3x2kW)
- Smartpack controllers
- SIL 3 rated output versions available
- Flexibility

FLATPACK S RECTIFIERS

The Flatpack S family will include models covering most applications in terms of output voltage and power, efficiency and special requirements. All rectifiers have intelligent self-protective features like reduced output power at high temperatures or low mains.

Models with increased output overvoltage protection are also available. The Flatpack S 24/1000 SIL 3 OVP, has SIL 3 on output voltage exceeding 30V. It is capable of handling double fail and has a proof test interval exceeding 15 years.

DC SYSTEM

The Flatpack S 19" 3U rack has 3 separate DC systems consisting of 2 redundant rectifiers and 1 controller or 1 common system with 8 rectifiers (8x1kW). For flexibility, two of these systems can be used in parallel to create a system with 4 rectifiers for greater power output or increased redundancy. All rectifiers have separate AC feeding (common for 8x1kW) allowing for redundant AC sources for each output.

A relay output DC okay signal is available for each pair of rectifiers. For increased monitoring and control one Smartpack S controller can be plugged in for each rectifier pair and output. In additions to more warning and alarm relay outputs, it provides setup, status and logs through the display or the Ethernet port.

GLOBAL COMPLIANCE

Eltek 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.



MODEL		FPS 3X2KW		FPS 8X1KW				
AC INPUT								
Individual feed		Single Phase for each rectifier		Common Single Phase				
Voltage		230 VAC/DC nominal, max 300 V <sub>AC/DC</sub> *						
Current		28.2 A <sub>RMS</sub>		37.6 A <sub>RMS</sub>				
Connection		2 x 2.5mm2 for each rectifier		2 x 16mm2				
DC OUTPUT								
Voltage		24V <sub>DC</sub> / 48V <sub>DC</sub> *						
Maximum Current		3 x 83 A / system*		333.6 A				
Connection		6 x 16/25mm2 (3 x VDC+ and 3 x VDC-) Can be paralleled by links		VDC+ and VDC- busbar with M6 cable lugs				
OTHER SPECIFICATIONS								
# rectifiers		2 position for each output (4 if paralleled)		8 positions				
# controller		1 position for each output		1 position				
Isolation		3.0 kVAC – input to output, 1.5 kVAC – input to earth 0.5 kVDC – output to earth						
Operating temp. /Storage temp.		-40 to +85°C (-40 to +185°F) * / -40 to +85°C (-40 to +185°F)						
Mounting		See the details below						
MTBF		> 500,000 hours Telcordia SR-332 Issue I, method III (a) (T <sub>ambient</sub> † : 45°C)						
IEC Prot. Cl.		IP20						
Dimensions		Height: 132.5 mm (3U) / Width: 482.6 mm (to fit into 19"mounting) Depth: 300 mm including rear mounting brackets, 252 mm without brackets. 300 mm depth required in enclosed cabinets for air flow						
CONTROL AND MONITORING								
Without controller		Series connected rectifier alarm for each rectifier pair <sup>(1)</sup>						
Connection		2 x 1.5mm2; COM, NC (To be loaded with maximum 30V and 100mA)						
With Smartpack S		Battery current sense <sup>(2)</sup> , Battery and load fuse sense <sup>(2)</sup> , 2 LVDs <sup>(2)</sup>						
Connection		10 x 1.5mm <sup>2</sup> Temp, input and alarm output, connections on controller <sup>(2)</sup>						
APPLICABLE STANDARDS								
Electrical safety		IEC/UL 60950-1/-3rd edition						
EMC		ETSI EN 300 386 V.1.4.1, EN 61000-6-1, -2, -3, -4, FCC Part 15 /109						
Mains Harmonics		EN 61000-3-2						
Marine		ABS DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) Temperature Cl. B / Humidity Cl. B / Vibration Cl. A EMC Cl. B with Marine filter 241120.930						
Environment		ETSI EN 300 019-2-1, -2, -3, ETSI EN 300 132-2, RoHS compliant						
ORDERING INFORMATION								
CA0603.000		Flatpack S 24V <sub>DC</sub> 3x2kW 3U 19" with EMC filter, Rear fixing, Front conn.						
CA0603.001		Flatpack S 24V <sub>DC</sub> 3x2kW 3U 19", Rear fixing, Front connection						
CA0603.002		Flatpack S 24V <sub>DC</sub> 3x2kW 3U 19", Front fixing, Front connection						
CA0603.003		Flatpack S 24V <sub>DC</sub> 3x2kW 3U 19", Front fixing, Rear connection						
CS0603.000		Flatpack S combined 24V&48V <sub>DC</sub> ,4x1kW 4x230V & 2x1kW 2x230V						
CS0803.001		Flatpack S 24V <sub>DC</sub> 8x1kW 3U 19", 2x230V, Including 1 FPS 1000W HE						
AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	3 Module	5 Module	6 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	125.1 A	208.5	250.2 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SILS 3	21.5 – 28 V	>92,5%	41.7 A	125.1 A	208.5	250.2 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28 V	>92,5%	19 A	38 A	76 A	152 A	Blocking diode
241122.105M	Flatpack S 48V/1000W HE	43,5 – 57,6 V	>95,5%	20.9 A	62.7 A	104.5 A	125.4 A	FET

POWER SHELVES 1U X 19" 48V / 24V - C+3R/C+5R/6R

Flatpack S 19" 1U



Flatpack S 1U Power Shelves are designed for integration into a power system. They can be used with all Flatpack S rectifiers and meet the market demand for flexible and expandable power solutions. The combination of power density, efficiency, and reliability makes the Flatpack S family a perfect choice for Marine & Offshore applications.

KEY FEATURES

- Compact and shallow
- High power density
- High efficiency
- Smartpack controllers
- SIL 3 rated output versions available
- Flexibility
- Advanced control and monitoring

DESCRIPTION

Flatpack S 24/48V combines High Efficiency and an extremely compact and short casing. With only 210 mm long modules the system fits into most applications in shallow cabinets.

Complete solutions are available in compact packages and there is flexibility to meet higher power demands in tight spaces.

The Flatpack S follows the strictest Marine & Offshore specifications, and offers 95,5% efficiency and reverse current protection.

Applications in these markets demand state of the art, reliable and safe DC power systems. The Flatpack S delivers an industry leading power density in its segment, many safety functions, wide operating temperature range and superb reliability in its small housing.

APPLICATIONS

- Control and protection
- SAS system
- Communication
- GMDSS
- Emergency lights



MODEL	FLATPACK S 1U/C+3R 24V	FLATPACK S 1U/C+5R 24V	FLATPACK S 1U/6R 24V
Part number	CMES0301.1000	CMES0501.1001	CMES0601.1000
INPUT DATA			
Voltage (nominal)	185V <sub>AC/DC</sub> - 305V <sub>AC</sub> / 300V <sub>DC</sub>		
Maximum current (per feed)	12A <sub>rms</sub>	21A <sub>rms</sub>	
Mains configuration	230VAC, 3 x 1 phase or 3 phase(Δ) / 230/400VAC, 3 phase (Y)		
Mains connection	7x4mm2 Terminal blocks, rear connection	Flying leads 2,5mm2 halogen free, 1.5 meter	
Frequency	45 – 66Hz		
OUTPUT DATA			
Maximum voltage	28V <sub>DC</sub>		
Maximum current	125.1A <sub>DC</sub>	187.5A <sub>DC</sub>	225A <sub>DC</sub>
Load connection (rear)	M6 cable lug	M6 cable lug	M6 cable lug
Battery connection (rear)	M6 cable lug Shunt in positive leg	-	-
LVBD (LV battery disconnecter)	In positive leg (150A latched)	-	-
CONTROLLER			
	Smartpack S <sup>1)</sup>		External <sup>2)</sup>
MECHANICAL DATA			
Dimensions (W/H/D)	19" / 1U / 270mm (recommended minimum cabinet depth, 300mm)		
Weight (without rectifiers / controller)	4.7 Kg [10.36 lbs]	2.8 Kg [6.17 lbs]	
OTHER SPECIFICATIONS			
Operating temperature <sup>3)</sup>	-40 to +85°C (-40 to +185°F)		
Coding	Coding to prevent insertion of incorrect power modules		
Mounting	Flush mount or mid mount		
DESIGN STANDARDS			
Electrical safety	UL 60950-1 2ed, EN 60950-1 2ed		
EMC	ETSI EN 300 386 V.1.6.1 / EN 61000-6-1, -2, -3, -4		
Environment	ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2		
Marine	ABS (Rectifiers) DNV GL-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers)		

1) See applicable datasheet for Smartpack S  
2) Can be used with Compact, Smartpack 2 and Smartpack S controllers  
3) See rectifier and controller datasheet for details



MODEL	FLATPACK S 1U/C+3R 48V	FLATPACK S 1U/C+5R 48V	FLATPACK S 1U/6R 48V
Part number	CMES0301.1001	CMES0501.1000	CMES0601.1001

INPUT DATA

Voltage (nominal)	85 - 305V <sub>AC/DC</sub>		
Maximum current (per feed)	12A <sub>rms</sub>	21A <sub>rms</sub>	
Mains configuration	230VAC, 3 x 1 phase or 3 phase(Δ) / 230/400VAC, 3 phase (Y)		
Mains connection	7x4mm2 Terminal blocks, rear connection	Flying leads 2,5mm2 halogen free, 1.5 meter	
Frequency	45 – 66Hz		

OUTPUT DATA

Maximum voltage	60V <sub>DC</sub>		
Maximum current	125.1A <sub>DC</sub>	187.5A <sub>DC</sub>	225A <sub>DC</sub>
Load connection (rear)	M6 cable lug	M6 insert nuts	M6 insert nuts
Battery connection (rear)	M6 cable lug Shunt in negative leg	-	-
LVBD (LV battery disconnecter)	In negative leg (150A latched)	-	-

CONTROLLER

	Smartpack S <sup>1)</sup>	External <sup>2)</sup>
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MECHANICAL DATA

Dimensions (W/H/D)	19" / 1U / 270mm (recommended minimum cabinet depth, 300mm)	
Weight (without rectifiers / controller)	4.7 Kg [10.36 lbs]	2.8 Kg [6.17 lbs]

OTHER SPECIFICATIONS

Operating temperature <sup>3)</sup>	-40 to +85°C (-40 to +185°F)
Coding	Coding to prevent insertion of incorrect power modules
Mounting	Flush mount or mid mount

DESIGN STANDARDS

Electrical safety	UL 60950-1 2ed, EN 60950-1 2ed
EMC	ETSI EN 300 386 V.1.6.1 / EN 61000-6-1, -2, -3, -4
Environment	ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2
Marine	ABS (Rectifiers) DNV GL-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers)

AVAILABLE 24V RECTIFIERS

Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	3 Module	5 Module	6 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	125.1 A	208.5	250.2 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SIL	21.5 – 28 V	>92,5%	41.7 A	125.1 A	208.6	250.2 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28 V	>92,5%	19 A	57 A	95 A	114 A	Blocking diode
241122.105M	Flatpack S 48V/1000W HE	43.5 – 57.6 V	>92,5%	20.9 A	62.7 A	104.5 A	125.4 A	FET

OPTIONAL CONTROLLERS FPS 1U/6R

		
COMPACT 242100.400	SMARTPACK S PANEL MOUNT 242100.415M	SMARTPACK2 242100.500M+242100501M

1) See applicable datasheet for Smartpack S / 2) Can be used with Compact, Smartpack 2 and Smartpack S controllers / 3) See rectifier and controller datasheet for details

Errors and Omissions Excepted





COMPACT HE STAND-ALONE POWER RACK

Flatpack S Stand-Alone  
24/48VDC 6kW

The Flatpack S Stand-Alone Power Rack is designed to be an easy to place, high efficiency DC power solution. It can house 2 Flatpack S rectifiers, and up to 3 units can easily be stacked together. Due to its small size, flexible mounting options and reliability, this unit is a key for future needs.



KEY FEATURES

- Compact and shallow
- High power density
- High efficiency
- Smartpack S controllers
- SIL 3 rated output versions available
- Flexibility
- Advanced control and monitoring

APPLICATIONS

- Control and protection
- SAS system
- Communication
- GMDSS
- Emergency lights

DESCRIPTION

Flatpack S 24/48V combines High Efficiency and an extremely compact and short casing. With modules that are only 210 mm long the system fits into most shallow cabinet applications.

Complete solutions are available in compact packages and there is flexibility to meet higher power demands in tight spaces.

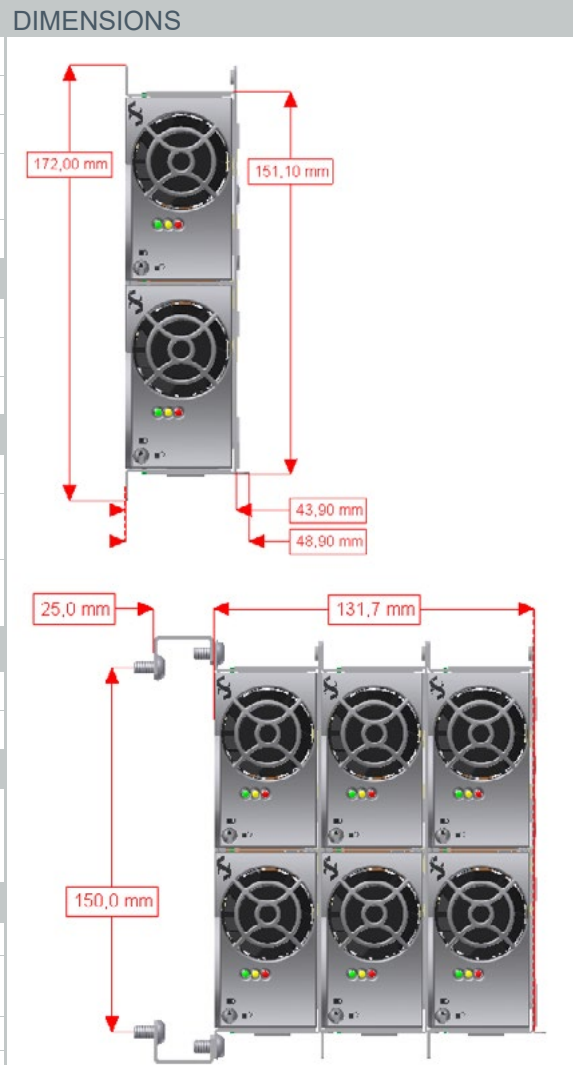
The Flatpack S follows the strictest Marine & Offshore specifications, and offer 95,5% efficiency and reverse current protection.

Applications in these markets demand state of the art, reliable and safe DC power systems. Flatpack S delivers an industry leading power density in its segment, with many safety functions, wide operating temperature range and superb reliability in its small housing.

The AC input filters assure compliance to DNV Rules for ships that are classified high speed & light craft and DNV offshore standards.



MODEL	FLATPACK S 2R
Part number	241122.902/241122.903*
INPUT DATA	
Maximum voltage	305V <sub>AC</sub> / 400V <sub>DC</sub> <sup>1)</sup>
Maximum current	12A <sub>rms</sub> per feed <sup>1)</sup>
Mains configuration	230V <sub>AC</sub> , 2 x single phase + PE
Mains connection	Flying leads 1.5 mm <sup>2</sup> / length 2 meter (* Halogen free)
Frequency	45 – 66Hz
OUTPUT DATA	
Maximum voltage	60V <sub>DC</sub>
Maximum current	85A
Connections	M6 cable lug
CONTROL AND MONITORING	
Controller options (external)	Compack, Smartpack S, Smartpack 2
Interface	RJ45 for paralleling units and connect controller
Alarm connection	3-pin, galvanic isolated, max 60V <sub>DC</sub> / 100mA
MECHANICAL DATA	
Dimensions	See figures for details
Weight	0,910kg
MOUNTING	
For wall mount or mounting plate. The unit can be mounted horizontally or vertically left or right. Additional brackets are used for 25 mm pitch and offset arrangements. Up to 3 Power Racks can be stacked.	
DESIGN STANDARDS	
Electrical safety	UL60950-1 2ed / IEC60950-1
EMC	ETSI EN 300 386 V.1.6.1 EN 61000-6-1, -2, -3, -4
Environment	ETSI EN 300 019-2-1, -2, -3
Marine	ABS / DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) Temperature Cl. B / Vibration Cl. A Humidity Cl. B / Enclosure Cl. A



AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage	Efficiency	Maximum current				Output Protection
		Range		1 Module	3 Module	5 Module	6 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41.7 A	125.1 A	208.5	250.2 A	Blocking diode
241122.290	Flatpack S 24V/1000W HE SIL3	21.5 – 28 V	>92,5%	41.7 A	125.1 A	208.6	250.2 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28 V	>92,5%	19 A	57 A	95 A	114 A	Blocking diode
241122.105M	Flatpack S 48V/1000W HE	43.5 – 57.6 V	>92,5%	20.9 A	62.7 A	104.5 A	125.4 A	FET

OPTIONAL CONTROLLERS FPS 1U/6R

COMPACK 242100.400

SMARTPACK S PANEL MOUNT  
242100.415M

SMARTPACK2  
242100.500M+242100501M

1) See applicable datasheet for selected rectifiers



COMPACT, ROBUST AND EASY TO HANDLE

# Portable Emergency Unit

## FP S 24VDC 6kW

The Portable Emergency Unit is designed to be used in situations when there is a main DC power failure, a system replacement, a battery replacement or maintenance. It's easy handling, durability and many configuration options make this unit a must to all service staff.



KEY FEATURES

- Easy to handle
- Dual voltage
- Robust
- Output power: 1kw to 4kw 24VDC + 1-3,6kw 48VDC
- Smartpack S controller
- Individual AC Input Feed
- Flexible

DESCRIPTION

The Portable Emergency Unit is configurable with up to four Flatpack S 24VDC, two 48VDC modules and three Smartpack S controllers. All housed in a hard case with removable lids in back and front for maximum protection during transport. By removing the lids you have easy access to connections, modules, and controllers.

The Flatpack S 19" 3U rack has 3 separate DC systems consisting of 2 redundant rectifiers and 1 controller. For flexibility two of these systems can be paralleled to create a system with 4 rectifiers for greater out power or increased redundancy. All rectifiers have separate AC feeding allowing for redundant AC sources for each output.



570X210X565mm (W/H/D)

APPLICATIONS

- Maintenance
- Replacing batteries or systems
- Failure on DC power

MODEL		FP S 24V <sub>DC</sub> . 48V <sub>DC</sub> 6KW
Part number		CIES06EP.1000
AC INPUT		
Individual feed		Single Phase for each rectifier
Voltage		230 V <sub>AC</sub> /DC nominal, max 300 V <sub>AC/DC</sub> <sup>1</sup>
Maximum Current		5.9 A <sub>RMS</sub> for each feed <sup>1</sup>
Connection		2 x 4mm <sup>2</sup> for each rectifier
DC OUTPUT		
Voltage		24 V <sub>DC</sub> & 48 V <sub>DC</sub>
Maximum Current		See the rectifier's data below <sup>1</sup>
Connection		24V <sub>DC</sub> +: 2x10mm <sup>2</sup> +2xC40A MCB 48V <sub>DC</sub> +: 1x10mm <sup>2</sup> +1xC40A MCB DC 0V(-): 3x10mm <sup>2</sup>

OTHER SPECIFICATIONS		
# rectifiers		2x2 positions for 24V <sub>DC</sub> and 2 positions for 48V <sub>DC</sub>
# controller		3x1 position
Isolation		3.0 kV <sub>AC</sub> – input to output, 1.5 kV <sub>AC</sub> – input to earth 0.5 kV <sub>DC</sub> – output to earth
Operating temp. /Storage temp.		-40 to +85°C (-40 to +185°F) * / -40 to +85°C (-40 to +185°F)
Dimensions		Height: 210 mm Width: 570 mm Depth: 565 mm

CONTROL AND MONITORING		
Rectifier alarm		Series connected rectifier alarm for each rectifier pair 2 2 x 1.5mm <sup>2</sup> ; COM, NC (To be loaded with maximum 30V and 100mA)

APPLICABLE STANDARDS		
Electrical safety		IEC/UL 60950-1/-3 <sup>rd</sup> edition
EMC		ETSI EN 300 386 V.1.4.1, EN 61000-6-1, -2, -3, -4, FCC Part 15 /109
Mains Harmonics		EN 61000-3-2
Environment		ETSI EN 300 019-2-1, -2, -3, ETSI EN 300 132-2, RoHS compliant
Marine		ABS (Rectifiers) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Rectifiers) Temperature Cl. B Humidity Cl. B Vibration Cl. A

PART NUMBERS		
CIES03EP.1000		FPS 24+48V 3x2kW 6x230V PORTABLE EMERGENCY UNIT

AVAILABLE 24V RECTIFIERS								
Part Number	Description	Voltage Range	Efficiency	Maximum current				Output Protection
				1 Module	3 Module	5 Module	6 Module	
241122.205M	Flatpack S 24V/1000W HE	21.5 – 28 V	>92,5%	41,7 A	125,1 A	208,5	250,2 A	Blocking diode
241122.290M	Flatpack S 24V/1000W HE SIL	21.5 – 28 V	>92,5%	41,7 A	125,1 A	208,5	250,2 A	SIL 3 / diode
241122.215M	Flatpack S 24V/500W HE	21.75 – 28 V	>92,5%	19 A	57 A	95 A	114 A	Blocking diode
241122.105M	Flatpack S 48V/1000W HE	43,5 – 57,6 V	>92,5%	20,9 A	62,7 A	104,5 A	125,4 A	FET
241122.125M	Flatpack S 48V/1800W HE	43,5 – 57,6 V	>95,8%	37,5 A	112,5 A	187,5 A	225 A	FET

(1) see rectifier datasheet for details, (2) see Smartpack S datasheet for details

HIGH EFFICIENCY AND RELIABLE RECTIFIERS

Flatpack2 Rectifiers

The combination of cost-effective design, power density and reliability makes the Flatpack2 a product family that truly stands outs and provides unparalleled network availability.

The Flatpack2 HE stands out. With efficiency up to 96.5%, power losses have been reduced by 50% compared to the current industry standard. WOR (wide output range) rectifiers have optimized output voltage windows for use with any type of batteries.

The versatility of the Flatpack2 rectifier means that it can be used in a wide variety of Marine & Offshore applications across the globe.



APPLICATIONS

- Control and protection
- SAS systems
- PA Systems
- Communication
- Emergency lights

DESCRIPTION

Since setting the new standard for rectifier efficiency, the Flatpack2 HE family is now available in a variety of voltages and power ratings, all with superior efficiency up to 96.5%.

With more than 4 billion in-field operating hours and a proven cumulative field MTBF of more than 1,9 million hours, Flatpack2 HE is the only HE (High Efficiency) rectifier with a proven track record.

KEY FEATURES

- Highest efficiency in minimum space
- Resonant topology makes the module efficiency industry leading and contributes to the rectifier's ultra compact dimensions.
- Digital controllers
- The number of components have been reduced by 40% - for highly reliable, long life, trouble free DC power systems.
- Heat management
- Front-to-back airflow with chassis-integrated heat sinks and no limitations in the scalability of the desired system solution.
- Unique connection
- Time - to- install and cost-reducing solution.
- Global approvals
- Flatpack2 WOR is CE and UL certified
- DNV and ABS(pending) certification



MODEL	24/2000	24/1800 HE	24/2000 WOR
Part number	241115.200M	241115.205M	241115.250M
INPUT DATA			
Voltage (nominal range)	175 VAC - 275 VAC	185 VAC/DC - 275 VAC/DC	185 VAC - 275 VAC
Voltage (operating range)	85 VAC - 290 VAC	85 VAC/DC - 300 VAC/DC	85 VAC - 300 VAC
Frequency (nominal / range)	44 to 66Hz	0 to 66Hz	44 to 66Hz
Maximum current	13 A <sub>RMS</sub>	11.25 A <sub>RMS</sub>	12,5 A <sub>RMS</sub>
Power Factor	> 0.99 at 50% load or more		
Protection	Varistors for transient protection, Mains fuse in both lines, Disconnect above 290 V <sub>AC</sub>	Varistors for transient protection, Mains fuse in both lines Disconnect above 300 V <sub>AC</sub>	
OUTPUT DATA			
Voltage (default)	26.7 V <sub>DC</sub>		
Voltage (adjustable range)	21 - 29 V <sub>DC</sub>	21.7 - 28.8 V <sub>DC</sub>	21.5 - 36 V <sub>DC</sub>
Max power, nominal input	2000 W	1800 W	2000 W
Max current	84 A (@V <sub>OUT</sub> < 24 VDC)	75 A (@V <sub>OUT</sub> = 24 V <sub>DC</sub> )	70 A (@V <sub>OUT</sub> = 29 V <sub>DC</sub> )
Current sharing	±5% of maximum current from 10 to 100% load		
Static voltage regulation (10-100% load)	±0.5%		
Dynamic voltage regulation	±5.0% for 10-90% or 90-10% load variation, regulation time < 50ms		
Hold up time	>20ms; output voltage > 21.5 V <sub>DC</sub>	>20ms; output voltage > 21 V <sub>DC</sub>	>20ms; output voltage > 21.5 V <sub>DC</sub>
Ripple	< 100 mV <sub>PP</sub> , 30 MHz bandwidth	< 250 mV <sub>PP</sub> , 30 MHz bandwidth	< 100 mV <sub>PP</sub> , 30 MHz bandwidth
Protection	Overvoltage shutdown, Blocking diode, Short circuit proof, High temperature protection	Overvoltage shutdown, Fuse on output, Short circuit proof, High temperature protection	
OTHER SPECIFICATIONS			
Peak Efficiency	91.0%	95.0%	91.0%
Isolation	3.0 kVAC – input and output, 1.5 kVAC – input earth, 0.5 kVDC – output earth		
Alarms (Red LED)	Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure		
Warnings (Yellow LED)	Low temperature shutdown, Rectifier (Converter) in power derate mode, Remote battery current limit activated, Input voltage out of range, flashing at overvoltage, Loss of CAN communicationwith control unit, Stand alone mode		
Normal (Green LED)	Input and output ok		
Cooling	2 fans (front to back airflow)	Single fan (front to back airflow)	2 fans (front to back airflow)
Fan Speed	Temperature and load regulated		
Acoustic Noise	< 65dBA at nominal input and 70% load (Tambient < 30°C)	at nominal input and full load < 40dBA (Tambient <= 25°C) < 58dBA (Tambient > 40°C)	< 65dBA at nominal input and 70% load (Tambient < 30°C)
MTBF (Telcordia SR-332 Iss.I method III (a))	> 200 000 (@ Tambient : 25 °C)	> 300 000 (@ Tambient : 25 °C)	> 200 000 (@ Tambient : 25 °C)
Operating temperature (5 - 95% RH non-cond.)	- 40 – 75°C (-40 – 167°F)		
Max output power de-rates above temp / to	45°C [+113°F] / 1400 W	45°C [+113°F] / 1200 W	45°C [+113°F] / 1400 W
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing		
Dimensions [WxHxD] / Weight	109 x 41.5 x 327mm (4.25 x 1.69 x 13") / < 1.9 kg (3.97 lbs)		
DESIGN STANDARDS			
Electrical safety	IEC 60950-1, UL 60950-1, CSA 22.2		
EMC	ETSI EN 300 386 V.1.3.2, EN 61000-6-1 / -2 / -3 / -4	ETSI EN 300 386 V.1.4.1, EN 61000-6-1 / -2 / -3 / -4	ETSI EN 300 386 V.1.3.2 , EN 61000-6-1 / -2 / -3 / -4
Mains Harmonics	EN 61000-3-2		
Environment	ETSI EN 300 019-2 ETSI EN 300 132-2 Telcordia NEBS GR63 CORE Zone 4 RoHS compliant	ETSI EN 300 019-2-1 Class 1.2, 2.3, 3.2 ETSI EN 300 132-2 RoHS compliant	ETSI EN 300 019-2 ETSI EN 300 132-2 Telcordia NEBS GR63 CORE Zone 4 RoHS compliant
Marine	ABS (Pending), DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4), Temperature Cl. A, Vibration Cl. A, Humidity Cl. A		

Errors and Omissions Excepted



MODEL	24/1350 HE DC/DC	48/1350 HE DC/DC	48/2000
Part number	241115.600	241115.602	241115.100
INPUT DATA			
Voltage (nominal range)	20 - 75 V <sub>DC</sub> (shutdown < 16.5VDC)		185 V <sub>AC</sub> - 275 V <sub>AC</sub>
Voltage (operating range)	-		85 V <sub>AC</sub> - 300 V <sub>AC</sub>
Frequency (nominal / range)	-		44 to 66Hz
Maximum current	70 A <sub>DC</sub> (85 A <sub>DC</sub> during boost)		12.5 A <sub>RMS</sub>
Power Factor	-		> 0.99 at 50% load or more
Protection	Fuse and reversed polarity protection		Varistors for transient protection, Mains fuse in both lines, Disconnect above 290 V <sub>AC</sub>
OUTPUT DATA			
Voltage (default)	26 VDC	53 VDC	53.5 VDC
Voltage (adjustable range)	24 - 28 VDC	48 - 58.5 VDC	43.5 - 57.6 VDC
Max power, nominal input	1350 W	1350 W	2000 W
Max current	56 A	28 A	41.7 A
Current sharing	-		±5% of maximum current from 10to100%load
Static voltage regulation (10-100% load)	±1% (0-100% load)	±0.5% (0-100% load)	±0.5%
Dynamic voltage regulation	±5.0% for 10-90% or 90-10% load variation, regulation time < 30ms		±5.0% for 10-90% or 90-10% load variation, regulation time < 50ms
Hold up time	-		>20ms; output voltage > 43.5 VDC
Ripple	< 200 mVPP , 20 MHz bandwidth		< 100 mVPP , 30 MHz bandwidth
Protection	Short circuit proof, OR-ing diode, High temperature protection, Hot plug-in inrush current limiting, Over voltage Shutdown		ORing diode, Short circuit proof High temperature protection, Overvoltage shutdown
OTHER SPECIFICATIONS			
Peak Efficiency	91,7 %	93,8 %	92.5%
Isolation	1.2 kVDC - input to chassis 1.9 kVDC - input to output 1.0 kVDC - output to chassis	1.9 kVDC - CAN to chassis 1.9 kVDC - CAN to input 1.9 kVDC - CAN to output	3.0 kVAC – input and output, 1.5 kVAC – input earth, 0.5 kVDC – output earth
Alarms (Red LED)	Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure		Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure
Warnings (Yellow LED)	Low temperature shutdown, Rectifier (Converter) in power derate mode, Remote battery current limit activated, Input voltage out of range,flashing at overvoltage, Loss of CAN communicationwith control unit, Stand alone mode		Low temperature shutdown, Rectifier (Converter) in power derate mode, Remote battery current limit activated, Input voltage out of range,flashing at overvoltage, Loss of CAN, communicationwith control unit, Stand alone mode
Normal (Green LED)	Input and output ok		
Cooling	Fan (front to back airflow)	2 fans (front to back airflow)	Fan (front to back airflow)
Fan Speed	Temperature and load regulated		
Acoustic Noise	< 65dBA		< 55dBA at nominal input and full load (Tambient < 30°C)
MTBF (Telcordia SR-332 Iss.I method III (a))	>315 000 (@ Tambient : 25 °C)		> 391 000 (@ Tambient : 25 °C)
Operating temp.(5 - 95% RH non-cond.)	- 40 – 75°C (-40 – 167°F)		
Max output power de-rates above temp/to	55°C [131°F] / 800W		45°C [+113°F] / 1350 W
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing		
Dimensions [WxHxD] / Weight	109 x 41.5 x 327mm (4.25 x 1.69 x 13") / < 1.9 kg (3.97 lbs)		109 x 41.5 x 327mm (4.25 x 1.69 x 13") / < 1.9 kg (3.97 lbs)
DESIGN STANDARDS			
Electrical safety	UL 60950-1, EN 60950-1		UL 60950-1:2007, IEC 60950-1:2005 + A1:2009 / EN 60950-1: 2006 + A11:2009 + A1:2010 + A12:2011
EMC	ETSI EN 300 386 V.1.4.1 , EN 61000-6-1 / -2 / -3 / -4		ETSI EN 300 386 V.1.6.1 , EN 61000-6-1 / -2 / -3 / -4, Telcordia NEBS GR1089 CORE
Mains Harmonics	-		-
Environment	ETSI EN 300 019: 2-1(Class 1.2), 2-2(Class 2.3) & 2-3(Class 3.2) / RoHS (2011/65/EU) and WEEE (2002/96/EC) compliant		ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2), ETSI EN 300 132-2 / Telcordia NEBS GR63 CORE Zone 4, OHScompliant
Marine	ABS (Pending) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Pending) Temperature Cl. A, Vibration Cl. A, Humidity Cl. A		ABS (Pending), DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4), Temperature Cl. A, Vibration Cl. A, Humidity Cl. A

MODEL	48/2000 HE	48/2000 HE WOR	110/2000 HE WOR	220/2000 HE WOR
Part number	241115.105M	241115.705M	241115.805M	241115.815M
INPUT DATA				
Voltage (nominal range)	185 V <sub>AC/DC</sub> - 275 V <sub>AC/DC</sub>	185 V <sub>AC</sub> - 275 V <sub>AC</sub>	185 V <sub>AC/DC</sub> - 275 V <sub>AC/DC</sub>	185 V <sub>AC</sub> - 275 V <sub>AC</sub>
Voltage (operating range)	85-300 V <sub>AC</sub> / 140-275 V <sub>DC</sub>	85 V <sub>AC</sub> - 300 V <sub>AC</sub>	85 V <sub>AC/DC</sub> - 300 V <sub>AC/DC</sub>	85 V <sub>AC</sub> - 300 V <sub>AC</sub>
Frequency (nominal / range)	45 to 66Hz / 0Hz	0 to 66Hz	0 to 66Hz	
Maximum current	11.6 A <sub>RMS</sub>	11.9 A <sub>RMS</sub>	11.9 A <sub>RMS</sub>	
Power Factor	> 0.99 at 50% load or more			
Protection	Fuse in both lines Varistor for transient protection, Disconnect above 300 V <sub>AC/DC</sub>	Fuse in both lines Varistor for transient protection, Disconnect above 300 V <sub>AC</sub>	Fuse in both lines, Varistor for transient protection Disconnect above 300 V	
OUTPUT DATA				
Voltage (default)	53.5 V <sub>DC</sub>	53.5 V <sub>DC</sub> (48V) 67 V <sub>DC</sub> (60V)	122.5 V <sub>DC</sub>	245.3 V <sub>DC</sub>
Voltage (adjustable range)	43.5 - 57.6 V <sub>DC</sub>	39.9 - 72 V <sub>DC</sub>	89.2 - 171.6 V <sub>DC</sub>	178.5 - 297 V <sub>DC</sub>
Max power, nominal input	2000 W			
Max current	41.7 A	41.6 A	16.7 A	9.16 A
Current sharing	±5% of maximum current from 10 to 100% load			
Static voltage regulation	(10-100% load) ±0.5%			
Dynamic voltage regulation	±5.0% for 10-90% or 90-10% load variation, regulation time < 50ms			
Hold up time	-	>20ms; output voltage > 53.5 V <sub>DC</sub>	-	-
Ripple	< 100 mV <sub>PP</sub> , 30 MHz bandwidth	< 150 mV <sub>PP</sub> , 30 MHz bandwidth	< 200 mV <sub>PP</sub> , 20 MHz bandwidth	
Protection	Fuse, Short circuit proof, High temperature protection, Hot plug-in inrush current limiting		Short circuit proof, OR-ing diode, High temperature protection, Hot plug-in inrush current limiting, Over voltage Shutdown	
OTHER SPECIFICATIONS				
Peak Efficiency	96.5%	96.0%	91,7 %	93,8 %
Isolation	3.0 kVAC – input and output, 1.5 kVAC – input earth, 0.5 kVDC – output earth		1.2 kVDC - input to chassis 1.9 kVDC - input to output 1.0 kVDC - output to chassis	1.9 kVDC - CAN to chassis 1.9 kVDC - CAN to input 1.9 kVDC - CAN to output
Alarms (Red LED)	Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure			
Warnings (Yellow LED)	Low temperature shutdown, Rectifier (Converter) in power derate mode, Remote battery current limit activated, Input voltage out of range,flashing at overvoltage, Loss of CAN communicationwith control unit, Stand alone mode			
Normal (Green LED)	Input and output ok			
Cooling	Fan (front to back airflow)		Fan (front to back airflow)	
Fan Speed	Temperature and load regulated			
Acoustic Noise	at nominal input and full load < 20dBA Tambient <= 25°C) < 56dBA (Tambient > 40°C)	< 52dBA at nominal input and full load (Tambient < 30°C)	at nominal input and full load < 40dBA (Tambient <= 25°C) < 58dBA (Tambient > 40°C)	
MTBF (Telcordia SR-332 Iss.I method III (a))	> 391 000 (@ Tambient : 25 °C)		>391 000 (@ Tambient : 25 °C)	
Operating temperature	- 40 – 75°C (-40 – 167°F) (5 - 95% RH non-cond.)			
Max output power de-rates above temp/to	45°C [+113°F] / 1200 W		55°C [131°F] / 1350W	
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing			
Dimensions [WxHxD] / Weight	109 x 41.5 x 327mm (4.25 x 1.69 x 13") / < 1.95 kg (3.97 lbs)			
DESIGN STANDARDS				
Electrical safety	IEC 60950-1, UL 60950-1, CSA 22.2		IEC 60950-1, UL 60950-1, CSA 22.2	
EMC	ETSI EN 300 386 V.1.4.1 , EN 61000-6-1 / -2 / -3 / -4, Telcordia NEBS GR1089 CORE	ETSI EN 300 386 V.1.3.2 , EN 61000-6-1 / -2 / -3 / -4, Telcordia NEBS GR1089 CORE	ETSI EN 300 386 V.1.4.1 (1.3.2) , EN 61000-6-1 / -2 / -3 / -4 / -5	
Mains Harmonics	EN 61000-3-2	-	EN 61000-3-2	
Environment	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2), ETSI EN 300 132-2 / Telcordia NEBS GR63 CORE Zone 4, OHS compliant		ETSI EN 300 019: 2-1(Class 1.2), 2-2(Class 2.3) & 2-3(Class 3.2), RoHS (2011/65/EU) and WEEE (2002/96/EC) compliant	
Marine	ABS (Pending), DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4), Temperature Cl. A, Vibration Cl. A, Humidity Cl. A			

500W & 1000W HE 24/48V

# Flatpack S Rectifiers

The Flatpack S rectifiers incorporate Marine specifications, high efficiency, ORing protection on output and high power in a small, 217 mm deep box.

Applications in these markets demand state of the art, reliable and safe DC power systems. The Flatpack S delivers an industry leading power density in its segment, many safety functions, wide operating temperature range and superb reliability with low heat dissipation.

The Flatpack S 24/1000 SIL 3 OVP targets Safety and Automation Systems (SAS) in offshore and process industries requiring SIL 3 rated overvoltage protection on DC output.



### KEY FEATURES

- Small
- Short
- Power density - 47W/Inch 3
- High efficiency
- Oring protection on output
- Hot pluggable
- Voltage and power keying
- Accepts DC input (DC/DC converter)
- Alarm relay output - basic monitoring without controller
- SIL 3 rated output
- Overvoltage protection
- Meets DNV class B and IEC 60945

### DESCRIPTION

Flatpack S 24/48V combines High Efficiency and an extremely compact and short casing. With only 217 mm long modules it fits into most applications in the shallow cabinets.

Complete solutions are available in compact packages and there is flexibility to meet higher power demands in tight spaces.

Complete solutions are available in compact packages and there is flexibility to meet higher power demands in tight spaces.

The Flatpack S follows the strictest Marine & Offshore specifications, 95.5% efficiency and reverse current protection.

### APPLICATIONS

- Control and protection
- SAS systems
- PA Systems
- Communication
- GMDSS (24V modules are acc. to IEC 60945)
- Emergency lights

MODEL	24/500 HE	24/1000 HE	24/1000 HE SIL 3	48/1000 HE
Part number	241122.215M	241122.205M	241122.290	241122.105M
INPUT DATA				
Voltage (nominal range)	185 V <sub>AC/DC</sub> - 305 V <sub>AC</sub> / 300V <sub>DC</sub>			185 - 270 V <sub>AC</sub> / 185 - 250 V <sub>DC</sub> <sup>1)</sup>
Voltage (operating range)	85 V <sub>AC/DC</sub> - 305 V <sub>AC</sub> / 300V <sub>DC</sub>			85 - 300 V <sub>AC</sub> / 85 - 250 V <sub>DC</sub> <sup>1)</sup>
Frequency (nominal / range)	DC, 45 - 66 Hz / 0-66Hz			45 - 66 Hz / 0 Hz <sup>1)</sup>
Maximum current	3.2 A <sub>RMS</sub> <sup>1)</sup>		5.9 A <sub>RMS</sub>	
Power Factor	> 0.975 at 75% load or more		> 0.99 at 50% load or more	
Protection	Fuse / Shutdown above 305 VAC / VDC			Fuse in L & N, Varistor / Shutdown when input voltage is out of operating range

OUTPUT DATA				
Voltage (default)	26.7 V <sub>DC</sub>			53.5 V <sub>DC</sub>
Voltage (adjustable range)	21.75 - 28 V <sub>DC</sub>	21.5 - 28 V <sub>DC</sub>		43.5 - 57.6 V <sub>DC</sub>
Max power, nominal input	500 W	1000 W		
Max power, @ 85 V <sub>AC/DC</sub>	200 W	440 W		420 W
Max current	19 A (@V <sub>OUT</sub> <24 V <sub>DC</sub> )	41.7 A (@V <sub>OUT</sub> < 24 V <sub>DC</sub> )		20.9 A (@V <sub>OUT</sub> <48V <sub>DC</sub> )
Current sharing	±5% of maximum current from 10 to 100% load			
Static voltage regulation	(10-100%load) ±0.5%			
Dynamic voltage regulation	±5.0% for 10-90% or 90-10% load variation, regulation time < 50ms			
Hold up time	>20ms; output voltage > 21 V <sub>DC</sub>			>20ms;output voltage >41V <sub>DC</sub>
Ripple	< 160 mV <sub>PP</sub> , 30 MHz bandwidth	< 150 mV <sub>PP</sub> , 30 MHz bandwidth	< 200 mV <sub>PP</sub> , 30 MHz bandwidth	< 150 mV <sub>PP</sub> , 30 MHz bandwidth
Protection	Blocking OR-ing Diode, Short circuit proof, Over voltage protection and High temperature protection			ORing FET, Short circuit proof, High temperature protection, Over voltage Shutdown
Overvoltage protection, SIL3 parameters	-		Protection level: 30V Proof test interval: 15 years. Handles dual component failure	-

OTHER SPECIFICATIONS			
Peak Efficiency	92,5 %		95,5 %
Isolation	3.0 kVAC – input and output, 1.5 kVAC – input earth, 0.5 kVDC – output earth		3.0 kV <sub>AC</sub> – input and output, 1.5 kV <sub>AC</sub> – input earth, 710 V <sub>DC</sub> – output earth
Alarms (Red LED)	Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure		
Warnings (Yellow LED)	Rectifier in power de-rate mode, Remote battery current limit activated, Input voltage out of range, flashing at overvoltage		
Normal (Green LED)	Input and output ok		
Potential alarm relay	Opens on alarms and mains outage (normally closed)		
MTBF (Telcordia SR-332 Iss.I method III (a))	> 300 000 (@ Tambient : 25 °C)		> 315 000 (@ T <sub>ambient</sub> : 25 °C)
Operating temperature	(5 - 95% RH non-cond.) - 40 – 85°C [-40 – 185°F ]		
Max output power de-rates above temp / to	45°C [+113°F] / 260W	45°C [+113°F] / 400 W	45°C [113°F] / 600W
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing		
Dimensions [WxHxD] / Weight	72 x 41.5 x 217mm (2.83 x 1.63 x 8.54") / < 850 g (1.9 lbs)	72 x 41.5 x 217mm (2.83 x 1.63 x 8.54") / < 1 kg (2 lbs)	72 x 41.5 x 217mm (2.83 x 1.63 x 8.54") / < 850 g (1.9 lbs)

DESIGN STANDARDS				
Electrical safety	EN 60950- 1:2006+A11:2009 +A1:2010+A12:2011,UL 60950-1:2011		UL 60950-1, EN 60950-1, IEC 61508	UL 60950-1, EN 60950-1
EMC	EN 61000-6-1:2007, -6-2:2005, -6-3:2007 + A1:2011, -6-4: 2007 + A1:2011, TS 61000-6-5, EN 300 386-v1.6.1, FCC CFR 47 Part15:2013		ETSI EN 300 386 V.1.4.1 , EN 61000-6-1 / -2 / -3 / -4 / -5 ,FCC Part 15 Subpart 109	ETSI EN 300 386, EN 61000-6-1 / -2 / -3 / -4 TS 61000-6-5, FCC CFR 47 Part 15
Environment	ETSI EN300 019: 2-1(Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) 2011/ 65/EU(RoHS) &2008/98/EC(WEEE)	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) / RoHS (2011/65/EU)	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) / RoHS (2011/65/EU) and WEEE (2002/96/EC) compliant	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) RoHS (2011/65/EU) and WEEE (2002/96/EC) compliant
Marine	ABS, DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4), Temperature Cl. B / Vibration Cl. A / Humidity Cl. B			

1) DC input only allowed when up-stream breaker is rated for the applicable DC input voltage and has a maximum current rating of 32A / 2) For HW revisions 1 - 1.31, nominal range is 207 - 277 VAC / 207 - 250 VDC, maximum output power at 176 VAC/DC is 1180 W with further linear de-rating to 90W at 122 VAC/DC. Not to be used in applications with 110/120 VAC mains.





COMPACT, FULL-FEATURED DIN-RAIL POWER SYSTEM

# Micropack Rectifiers

## 12VDC/120W, 24-30VDC/240W & 48VDC/250W

The Micropack System is convection cooled, designed for less power hungry applications, but still with system functionality options to match any requirements. Use as stand alone or in a flexible off the shelf configurable system.



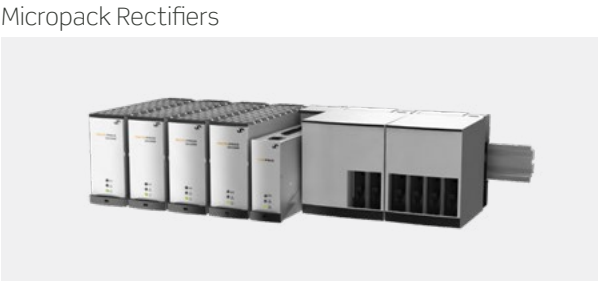
The Micropack Power System extends your network one step further. With load ranges typically between 120W and 1000W, and in 12, 24 and 48V options, the system is perfect for a great variety of applications.

### APPLICATIONS

- Telecom
  - » LTE/femto cells
  - » Small base stations / repeaters
  - » Fixed & mobile broadband
  - » FTTx
- Power utilities
  - » Control & protection
  - » Scada
  - » Communication
- Railway infrastructure
  - » Control & protection
  - » Signaling
- Various other applications in demanding industries like Marine, Oil & Gas, process etc.

### KEY FEATURES

- Convection cooled – inaudible
- Accepts 85 – 300 VAC/DC input
- 12, 24-30, 48 VDC output versions
- NiCad support for 12 and 24VDC
- Quick-trip pulse to help open load MCB
- Pot-meter voltage adjustment for standalone
- Module alarm relay contact for basic monitoring without controller
- Active current sharing
- Comprehensive monitoring and control when used with controller:
  - » Remote/local connection through Ethernet
  - » Webpages and SNMP support
  - » Monitoring of rectifier temperature, input voltage and output current
- Modular approach in DIN-rail mountable back planes
- Off-the-shelf delivery



MODEL	12V / 120W	24V / 240W	48V / 250W
Part number	241120.300	241120.200	241120.100
INPUT DATA			
Voltage range	85 - 300 V <sub>AC/DC</sub> <sup>1)</sup>		
Voltage range (nominal)	130 - 275 V <sub>AC/DC</sub>	185 - 275 V <sub>AC/DC</sub> <sup>1)</sup>	
Frequency	0 - 66 Hz <sup>1)</sup>		
Maximum current, 230V input / overall (boost)	0.6 A / 2.0 A	1.2 A / 2.0 A	1.2 A / 1.9 A
Maximum earth leakage current	2.0 mA (@ 250V <sub>AC</sub> /50Hz)		
Power Factor	0.97 (@ 70 - 100 % load)	0.98 (@ 55 - 100 % load)	0.98 (@ 50 - 100 % load)
THD (@ 230 VAC)	< 5 % (@ 80 - 100 % load)	< 5 % (@ 50 - 100 % load)	< 5 % (@ 50 - 100 % load)
Protection	Varistor for transient protection, fuse in both lines (2x 2.0 A), shutdown above 300 V <sub>AC/DC</sub>		
OUTPUT DATA			
Default voltage	13.6 V <sub>DC</sub>	27.2 V <sub>DC</sub>	53.5 V <sub>DC</sub>
Voltage range	10.7 - 18.0 V <sub>DC</sub>	21.5 - 36 V <sub>DC</sub>	43.5 - 57.6 V <sub>DC</sub>
Voltage range without controller	10.7 - 15.0 V <sub>DC</sub>	21.5 - 30 V <sub>DC</sub>	43.5 - 57.6 V <sub>DC</sub>
# Pb cell supported (1.8 - 2.4 V <sub>DC</sub> /cell)	6 - 7	12 - 15	24
# NiCad cell supported (1.05 - 1.65 V <sub>DC</sub> /cell)	10 - 11 <sup>2)</sup>	20 - 22 <sup>2)</sup>	-
Max power, nominal / 60s boost	120 W / 160 W	240 W / 315 W	250 W / -
Max current, @12/24/48V <sub>DC</sub> / boost / QT <sup>3)</sup>	10 A / 15 A / 55 A	10 A / 15 A / 55 A	5 A / - / -
Current sharing	±5% of maximum current from 10 to 100% load		
Static voltage regulation	±0.5% from 10% to 100% load and nominal input		
Dynamic voltage regulation	± 5 % < 10ms, load step 10% to 90% or opposite at nominal output voltage		
Hold-up time, default voltage and full power	20 ms, V <sub>OUT</sub> > 10.7 V <sub>DC</sub>	20 ms, V <sub>OUT</sub> > 21.5 V <sub>DC</sub>	20 ms, V <sub>OUT</sub> > 43 V <sub>DC</sub>
Rippel and noise, 30 MHz b.w. / psophometric	< 200 mV <sub>PP</sub> / 5 mV <sub>RMS</sub>	< 200 mV <sub>PP</sub> / 5 mV <sub>RMS</sub>	< 150 mV <sub>PP</sub> / 2 mV <sub>RMS</sub>
Protection	Overvoltage shutdown, short circuit proof, high temperature, hot plug-in inrush current limiting, fuse		
OTHER SPECIFICATIONS			
Efficiency @ nominal input/output, peak/range	89.5% / >88%, 50-100% load	93.0% / >92%, 50-100% load	93.6% / >93%, 50-100% load
Isolation	3.0 kV <sub>AC</sub> – input and output, 1.5 kV <sub>AC</sub> – input earth, 0.5 kV <sub>DC</sub> – output earth		
Alarms: Red LED 'on'	Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure		
Warnings: Yellow LED 'on'	Rectifier in power derate mode, Remote battery current limit activated, Input voltage out of range, flashing at overvoltage		
Normal (module running): Green LED 'on'			
Alarm output (isolated)	NO (+positive terminal), COM (-negative terminal). 60 V / 100 mA max		
MTBF (Telcordia SR-332 Issue I method III (a))	>480 000h (@T <sub>AMBIENT</sub> = 25°C)	>480 000h (@T <sub>AMBIENT</sub> = 25°C)	>500 000h (@T <sub>AMBIENT</sub> = 25°C)
Operating temperature (5 - 95% RH non-cond.)	-40 to +70°C [-40 — +158°F]	-40 to +60°C [-40 to +142°F]	-40 to +75°C [-40 to +167°F]
Output power de-rates above temp / to	+55°C / 50W @ +70°C	+45°C / 80W @ +60°C	+55°C / 140W @ +75°C
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing		
Dimensions[WxHxD] / Weight	39.0 x 88.5 x 149mm [1.54 x 3.48 x 5.87"] / 0.5 kg [1.1 lbs]		
DESIGN STANDARDS			
Electrical safety	UL 60950-1, EN 60950-1, CSA 22.2		
EMC	ETSI EN 300 386 V.1.3.2 EN 61000-6-1 / -2 / -3 / -4 / -5 <sup>4)</sup>		
Mains Harmonics	EN 61000-3-2		
Environment	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) ETSI EN 300 132-2 2002/95/EC (RoHS) & 2002/96/EC (WEEE)		
Marine compliance (EMC class B with AC filter)	DnV Rules for Classification of Ships, High Speed & Light Craft and DnV Offshore Standards		

1) DC support for 241120.200 with primary FW 404088.009 (from HW revision 1.2) and 241120.100 from HW revision 2  
2) 11/22 cells with max boost voltage 1.636 VDC/cell 3) Quick-Trip function, if VOUT = 5 VDC a 35 ms current pulse is generated to help trip fuse/MCB on short circuited branch 4) Only 12V and 24V

Errors and Omissions Excepted

MARINE FILTER

DIN Rail Marine filter  
(241120/930)



MICROPACK SYSTEM BUILDING BLOCKS - COMPABILITY MATRIX

Part number	Description	Output Voltage			Output grounding			Supports		
		12V	24V	48V	DC+	DC-	FLOAT	Rectifier	DC/DC	
241120.900	Powercore -1	✓	✓	✓	✓	✓	✓	✓	✗	
241120.901	Powercore -2	✓	✓	✓	✓	✓	✓	✓	✗	
241120.902	Powercore -4	✓	✓	✓	✓	✓	✓	✓	✗	
241120.905	Powercore -1	✓	✓	✓	✓	✓	✓	✗	✓	
241120.907	Powercore -4	✓	✓	✓	✓	✓	✓	✗	✓	
241120.910	Batt dist.	✗	✗	✓	✓	✗	✓ <sup>1)</sup>	✓	✓ <sup>3)</sup>	
241120.911	Bulk feed	✓	✓	✓	✓	✓	✓	✓	✓ <sup>4)</sup>	
241120.912	Bulk feed LVD 12	✓	✗	✗	✗	✓	✓	✓	✓	
241120.914	Bulk feed LVD 24/48	✗	✓	✓	✗	✓	✓	✓	✓	
241120.915	Batt dist. 24/48	✗	✓	✓	✓	✗	✓ <sup>1)</sup>	✓	✓	
241120.920	Load dist.	✓	✓	✓	✓	✗	✓ <sup>1)</sup>	✓	✓	
251875	Dummy Module	✓	✓	✓	✓	✓	✓	✓	✓	
241120.930	Marine filter <sup>2)</sup>	✓	✓	✓	✓	✓	✓	✓	✓	

RECTIFIER POWER CORES

A few quick steps.....

- Start with a DIN rail
- Clip on and lock the desired power core; 2 or 4 rectifier positions or stand alone
- Clip on and fasten either the bulk feed unit or battery distribution (for 2 or 4 pos power cores)
- Clip on and fasten the load distribution (if applicable)
- Do the wiring

- In marine applications, clip on the Marine Filter Unit and connect the AC feed through it.
- Plug in the battery and load breakers
- Plug in the rectifier modules and controller
- Install covers for the distributions, bulk feed and blind panel for any unused rectifier positions if applicableS

...and you'll have a complete DC system.

MODEL	BATTERY DIST.	BULK FEED	BULK FEED LVD	LOAD DIST.
Part number	241120.910 / .915	241120.911	241120.912 /.914	241120.920

OUTPUT DATA

System voltage support	-48 / -24 – -48 V <sub>DC</sub>	±12 – ±48 V <sub>DC</sub>	+12 / +24 – +48 V <sub>DC</sub>	-12 – -48 V <sub>DC</sub>
Unprotected bulk output connections	-	1 (Max 10 mm <sup>2</sup> )	1 (Max 10 mm <sup>2</sup> )	-
Protected load output connections (plug-able single pole MCB in negative)	-	-	-	4 x 2 - 15 A (Max 4 mm <sup>2</sup> )
Connection to Load dist (241120.920)	•	•	•	•
Unprotected battery output connections (shunt and LVBD in positive)	-	-	1 (Max 10 mm <sup>2</sup> )	-
Protected battery output connections (single pole MCB, shunt and LVBD in negative)	2 x max 30 A (Max 10 mm <sup>2</sup> )	-	-	-
Output Protection in rectifiers/converters	Blocking OR-ing FET or fuse, Short circuit proof and High temperature protection			

OTHER SPECIFICATIONS

Control system connection terminals	CAN (1 x RJ45)	CAN (1 x RJ45) 2 x LVD 2 x fuse fail 1 x current shunt	CAN (1 x RJ45) 1 x LVD 2x fuse fail 1 x earth fault	-
Extending width	66 mm [2.6"]	26 mm [1.0"]	66 mm [2.6"]	73 mm [2.9"]
Weight	270 g [0.6 lbs]	110g [0.24 lbs]	250 g [0.6 lbs]	165 g [0.3 lbs]

MODEL

FLATPACK S MARINE SYSTEM 8KW, 24V<sub>DC</sub>

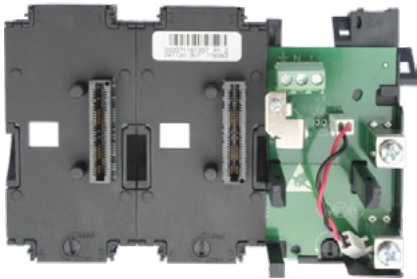
RECTIFIER POWER CORES

RECTIFIER POWER CORES

Standalone  
(241120.900)



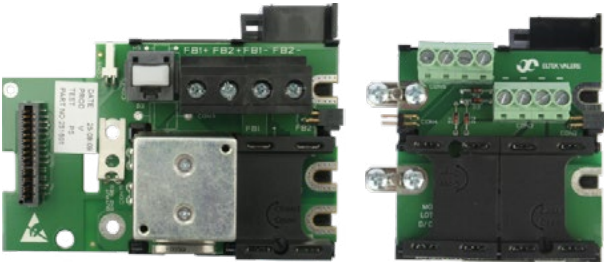
2-POS (241120.901)



4-positions (241120.902)

Battery distribution with shunt, LVBD and sockets for 2 breakers

(241120.910 for 48 VDC only)  
(241120.915 for 24 - 48 VDC)



Load distribution with sockets for 4 breakers  
(241120.920)



Plug-in battery and load breaker

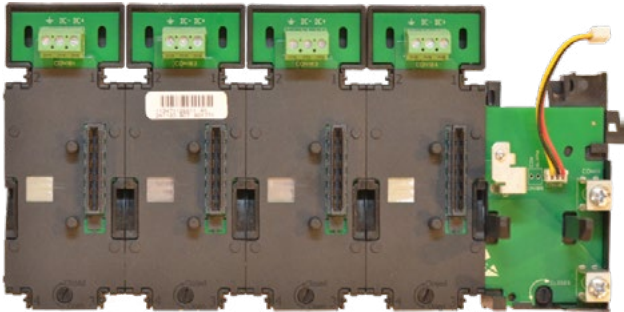
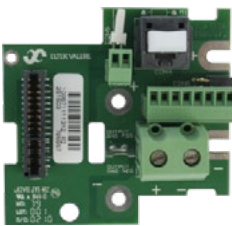
RECTIFIER POWER CORES

RECTIFIER POWER CORES

Standalone (241120.905)

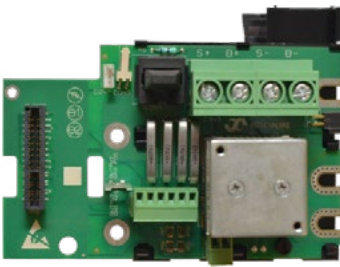


Bulk feed output (241120.911)



4-positions (241120.907)

Battery bulk feed with shunt and contactor in positive leg. (241120.912 – 12 VDC only) (241120.914 – 24 - 48 VDC)





## MARINE 24VDC POWER SUPPLIES

# CliQ M DIN Rail Power Supply 24V Output

Delta Electronics is introducing one of the slimmest DIN rail industrial power supplies in its class, the CliQ M DIN rail power supply series. The high power density product is designed according to major industrial and marine safety standards.



## KEY FEATURES

- Universal AC input voltage range
- High power density in corrosion resistant aluminium casing
- Power Boost of 150% for 5 seconds
- Advanced Power Boost (APB) - large reserve output current for fuse tripping
- Conforms to harmonic current IEC/EN 61000-3-2, Class A
- Built-in DC OK contact and LED indicator for DC OK/Over Load
- Conformal coating on PCBA's to protect against common dust and chemical pollutants

## DESCRIPTION

In addition to having Power Boost of 150% for 5 seconds, the CliQ M series is the first in the CliQ family to provide the Advanced Power Boost (APB) feature. With multiple loads connected in a system and due to one of fault load a large outrush current is drawn (demanded), this will be detected by APB. This APB will trip the circuit breaker (circuit breaker with appropriate rating base on the system load) on the current path of faulty load due to high current. This thus prevents the system from shutting down while the other connected current paths continue to operate without interruption.

## APPLICATIONS

- IT
- Industry
- Marine
- Renewable energy
- LED
- Oil & gas
- Semi-conductor
- General

As a Delta Group company, Eltek offers a wide range of Delta solutions and services.



MODEL	3A 24VDC	5A 24VDC	10A 24VDC	20A 24VDC	40A 24VDC
Part number	DRM-24V80W1PN	DRM-24V120W1PN	DRM-24V240W1PN	DRM-24V480W1PN	DRM-24V960W1PN
<b>OUTPUT</b>					
Output Voltage	24V	24V	24V	24V	24V
Output Voltage Range	24-28V	24-28V	24-28V	24-28V	24-28V
Output Current	3.40-3.00A	5.00-4.50A	10.0-9.00A	20.0-17.0A	40A
Output Power	81.6W	120W	240W	480W	960W
Line Regulation	10mV (@ 85-264Vac input, 100% load)	20mV (@ 85-264Vac input, 100% load)	10mV (@ 85-276Vac input, 100% load)	< 10mV (@ 85-264Vac input, 100% load)	< 10mV (@ 85-264Vac input, 100% load)
Load Regulation	100mV (@ 85-276Vac input, 0-100% load); DRM-24V120W1PN: 100mV (@ 85-264Vac input, 0-100% load)				< 50mV (@ 85-264Vac input, 0-100% load)
PARD (20MHz)	< 50mVpp			< 100mVpp	< 100mVpp
Hold-up Time	> 41ms @ 120Vac, > 70ms @ 230Vac,	> 34ms @ 120Vac, > 65ms @ 230Vac,	> 28ms @ 120Vac & 230Vac	> 30ms @ 120Vac & 230Vac	> 23ms @ 120Vac & 230Vac (100% load)

INPUT						
Phase Input		Single Phase				
Input Voltage Range		85-276Vac(DC input range 88-375Vdc) <sup>1)</sup>	85-264Vac (DC input range 88-375Vdc) <sup>1)</sup>	85-276Vac (DC input range 88-375Vdc) <sup>1)</sup>	100-240Vac/ 90 -264Vac	
Input Frequency		47-63Hz				
Input Current		< 0.90A @ 120Vac, < 0.60A @ 230Vac	< 1.12A @ 120Vac, < 0.62A @ 230Vac	< 2.26A @ 120Vac, < 1.25A @ 230Vac	< 4.60A @ 120Vac, < 2.50A @ 230Vac	< 8.6A @ 120Vac, < 4.5A @ 230Vac (at 24V/40A)
Efficiency <sup>2)</sup> at 100% Load		> 90.1% @ 120Vac, > 90.0% @ 230Vac	> 91.6% @ 120Vac, > 92.7% @ 230Vac	> 92.6% @ 120Vac, > 93.5% @ 230Vac	> 92.4% @ 120Vac, > 93.4% @ 230Vac	93.6 % typ. @ 120Vac, 94.6% typ. @ 230Vac
Max Inrush Current (Cold start)		< 7A @ 120Vac, < 13A @ 230Vac	< 15A @ 120Vac & 230Vac	< 6A @ 120Vac, < 7A @ 230Vac	< 9A @ 120Vac, < 7A @ 230Vac	< 13A @ 120Vac & < 20A @ 230Vac
Power Factor		> 0.95 @ 120Vac, > 0.80 @ 230Vac	> 0.99 @ 120Vac, > 0.91 @ 230Vac	> 0.98 @ 120Vac, > 0.92 @ 230Vac	> 0.92 @ 120Vac, > 0.87 @ 230Vac	-
Leakage Current (264Vac, 50Hz)	TT/TN	< 0.36mA	< 0.45mA	< 0.74mA	< 0.80mA	-
	IT	< 0.95mA	< 1.08mA	< 1.29mA	< 2.00mA	

<b>MECHANICAL</b>					
Case Cover	Aluminium				
Dimensions (L x W x D)	124 x 32 x 102 mm (4.88" x 1.26" x 4.02")	124 x 40 x 117 mm (4.88" x 1.57" x 4.61")	124 x 60 x 117 mm (4.88" x 2.36" x 4.61")	124 x 82 x 127 mm (4.88" x 3.23" x 5.00")	125 x 124 x 132 mm (4.92" x 4.88" x 5.19")
Unit Weight	0.50 kg (1.10 lb)	0.63 kg (1.39 lb)	0.94 kg (2.07 lb)	1.40 kg (3.09 lb)	
Cooling System	Convection				
MTBF <sup>3)</sup>	> 2,000,000 hrs	> 1,800,000 hrs	> 1,400,000 hrs	> 778,800 hrs	> 480,000 hrs <sup>5)</sup>

<b>ENVIRONMENT</b>					
Operating Temperature	-25°C to +70°C (-13 to +158°F)				
Storage Temperature	-40°C to +85°C (-40 to +185°F)				
Power De-rating	> 60°C (2.5% / °C) (140°F)				> 60°C de-rate power by 2.5% / °C
Operating Humidity	5 to 95% RH (Non-Condensing)				
Operating Altitude	Industrial Application: 0 to 2,500 m (0 to 8,200 ft); ITE Application: 0 to 5,000 m (0 to 16,400 ft)				0 to 2000m for ICE, 0 to 5000m for ITE

<b>DESIGN STANDARDS</b>					
Hazardous Locations	ATEX and Class I, Div 2 (only DRP024V120W1BX, DRP024V240W1BX, DRP024V480W1BX)				
Marine	ABS - DRM-24V120W1PN / DNV - DRM-24V80W1PN, DRM-24V120W1PN, DRM-24V240W1PN, DRM-24V480W1PN Environmental category C, EMC2				

<b>ATEX CERTIFIED VERSIONS</b>					
DRP024120W1BA	CliQ II DIN rail Power Supply 24V 5A 1P (ATEX)				
DRP024240W1BA	CliQ II DIN rail Power Supply 24V 10A 1P (ATEX)				
DRP024480W1BA	CliQ II DIN rail Power Supply 24V 20A 1P (ATEX)				

1) All models are certified for DC Input.

2) At 25°C ambient temperature by vertical mounting orientation.

3) MTBF as per Telcordia SR-332 (Confidence level: 90%, I/P: 100Vac, O/P: 100% load) for vertical mounting orientation.

4) All parameters are specified at 25°C ambient temperature unless otherwise indicated.

5) MTBF as per Telcordia SR-332 I/P: 120Vac, O/P: 100% load, Ta: 25°C

DRM-24VxxxW1P

Specifications are subject to change without notice

RECTIFIER & INVERTER IN ONE BOX

# Rectiverter 48V 230/1500 48/1200 & 115/750 48/600

Built on HE technology from the Flatpack2 HE rectifier family the Rectiverter 230/1500 48/1200 provides backed up power for 230 VAC loads with minimum losses and footprint.

It is a 3 port device capable of charging the 48V battery and simultaneously provides power for the AC and DC loads. During mains outage the Rectiverter feeds AC loads using energy stored in the battery.



### APPLICATIONS

- Telecom
  - » LTE/4G/WiMAX
  - » Distributed antenna system
  - » Broadband
- Power utilities
  - » Switch tripping and SCADA
  - » Low & High voltage switchgear
  - » Transformer & SUB stations
  - » Power Generation & Distribution
  - » Control & protection
  - » SCADA system
- Railway & metro infrastructure
  - » Signaling and communications
  - » Control centers
- Marine
  - » Communication onboard ships

### KEY FEATURES

- Unique 3-in-1 operation....
  - » Inverter
  - » Rectifier
  - » Power source transfer ....In one box
- Modular design
- High efficiency
- Global compliance
- Patented technology
- Hot plug-able
- Ac & dc port voltage keying

Rectiverter 6kVA single phase power core



Rectiverter 18kVA 3-phase power core



MODEL	230/1500 48/1200	230/1500 48/150	230/1500 48/0	115/750 48/600	115/750 48/75	115/750 48/0
Part number	241123.100	241123.101	241123.102	241123.100L	241123.101L	241123.102L
AC OUTPUT DATA						
Voltage (default) / (adjustable range)	230 V <sub>AC</sub> / 200 - 240 V <sub>AC</sub>			115 V <sub>AC</sub> / 100 - 127 V <sub>AC</sub>		
Frequency (default inverter mode)	50 Hz (adaptive)			60 Hz (adaptive)		
Frequency (set-able inverter mode)	50Hz, 60Hz or last synced 50/60Hz (adaptive)					
Power maximum (continuous / overload (<15s))	1200 W (1500 VA) / 2000 VA			600 W (750 VA) / 1000 VA		
Load sharing	±5% of active power from 10 to 100% load					
Current maximum (continuous / overload (<15s))	6.5 A <sub>RMS</sub> / 8.7 A <sub>RMS</sub>					
Current (maximum) Quick trip (20ms)	32 A (6 x nominal)					
Hold up (Voltage dips) (before switching to battery)	5ms			5ms		
THD	< 1.5 % at resistive load					
Protection	Fuse in L and N, Hot pluggable					
DC OUTPUT DATA						
Voltage (default) / (adjustable range)	53.5 V <sub>DC</sub> / 43 - 58 V <sub>DC</sub>					
Power (max@nominal input)	1200 W <sup>1)</sup>	150 W	0 W	600 W <sup>1)</sup>	75 W	0 W
Current (max @V <sub>OUT</sub> ≤ 48 V <sub>DC</sub> )	25 A <sup>1)</sup>	3.13 A	-	12.5 A <sup>1)</sup>	1.56 A	-
Hold up time, maximum output power	>10ms; V <sub>OUT</sub> > 41 V <sub>DC</sub> (only in rectifier mode)					
Current sharing (10 - 100% load)	±5% of maximum current from 10 to 100% load					
Static Voltage regulation (10 - 100% load)	±0.5%					
Dynamic Voltage regulation	±5.0% for 10-90% or 90-10% load variation, regulation time < 50ms					
Ripple	< 200 mV <sub>PP</sub> , 30 MHz bandwidth					
Protection	Short circuit proof, Over voltage Shutdown, ORing FET and fuse					
INPUT DATA						
AC Mains Input Voltage (range / LV disconnect)	185 - 275 V <sub>AC</sub> / 170 V <sub>AC</sub>			95 - 140 V <sub>AC</sub> / 85 V <sub>AC</sub>		
AC Current (maximum)	11.5 A <sub>RMS</sub>	9.1 A <sub>RMS</sub> <sup>2)</sup>	8.2 A <sub>RMS</sub> <sup>2)</sup>	11.3 A <sub>RMS</sub>	10.1 A <sub>RMS</sub> <sup>2)</sup>	9.2 A <sub>RMS</sub> <sup>2)</sup>
Frequency (default: sync range)	47-53 & 57-63 Hz			47-53 & 57-63 Hz		
Frequency (set-able:sync range)	47-53 Hz, 57-63 Hz or both (adaptive)					
Power Factor / THD	> 0.985 at 50% load or more / < 3.5%					
AC Input Protection	Fuse in L and N, Hot pluggable, Varistor					
DC Voltage nominal / extended range <sup>3)</sup>	45 - 58 V <sub>DC</sub> / 40 - 45 V <sub>DC</sub>					
DC Current (maximum)	32 A / 45A during overload (15s)			16 A / 22.5A during overload (15s)		
OTHER SPECIFICATIONS						
Efficiency	>96% (mains mode), >94% (inverter mode)			>92% (mains mode), >91% (inverter mode)		
Isolation	3 kV <sub>DC</sub> - AC <sub>Ports</sub> to PE, 3.6 kV <sub>AC</sub> - AC <sub>Ports</sub> to DC <sub>Port</sub> , 710 V <sub>DC</sub> - DC <sub>Port</sub> to PE					
Alarms: Red LED Alarm relay [NO max 75 V <sub>DC</sub> / 100 mA] (AC output <b>OR</b> DC output alarms)	Low and high mains input voltage shutdown, High and low temperature shutdown, Rectiverter Failure, Overvoltage shutdown on output, Fan failure, Low output voltage alarm, CAN bus failure, Sync bus lost and Sync fail					
Warnings: Yellow LED	Rectiverter in power de-rate mode or in power or current limit mode on DC or AC port, Remote output current limit activated, Loss of CAN communication with controller					
Normal operation: Green LED	AC output and/or DC output on and ok					
MTBF (Telcordia SR-332 Iss.I method III (a))	260 000 hours (@ Tambient : 25 °C)					
Operating temperature	-40 to +75°C (-40 to +167°F), humidity 5 - 95% RH non-condensing					
Temperature de-rating above 55°C (131°F)	1200W to 480W @ 75°C (167°F) for each, AC and DC, outputs (total power 2000W to 800W)					
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing					
Dimensions[WxHxD] / Weight	109 x 41.5 x 327mm (4.25 x 1.69 x 13") / 1.95 kg (4.3 lbs)					
DESIGN STANDARDS						
Electrical safety	UL 60950-1, UL1778, EN 60950-1, EN 62040-1					
EMC	EN 61000-6-1 /-2/-3/-4 ETSI EN 300 386 V.1.6.1, FCC CFR 47 Part 15					
Environment	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) RoHS (2011/65/EU) and WEEE (2002/96/EC) compliant					

1) AC load has priority. Maximum available DC output power and current is dependent on instant AC load and AC input voltage; i.e maximum 800W/16.6A at full AC power and nominal input for 230VAC. 2) If DC port is overloaded pulling the voltage below 43V the input current may increase above this level 3) Reduced performance - no over load support, maximum output power de-rates to 970W (230 VAC) and 470 W (115 VAC) and increased voltage THD on AC output.

Errors and Omissions Excepted



EFFICIENT MODULAR INVERTER

# Bravo Inverter

## 2500VA 220VDC/230VAC

The TSI ‘Twin Sine Inverter’ Bravo is the very latest generation of hot swap inverter modules that brings Scalability, Availability, reduced Footprint and high Efficiency to provide SAFE operation of all AC powered equipment.

The EPC mode stabilizes AC output while providing unity power factor, mains filtering and reduced conversion losses.

Large modular UPS with record-breaking availability figures can be realized, allowing for building datacenters meeting future Tier “x” requirements. Long downtime and expensive repairs are replaced by a technician swapping faulty boxes on a live system.



### KEY FEATURES

- DNV approved
- No single point of failure
- Efficiency and selectivity
- Full scalability
- 15% Power boost for 15s
- 10xI<sub>N</sub> short circuit current for 20ms
- Clean output
- Transfer time reduced to zero

### DESCRIPTION

The TSI “Twin Sine Inverter” is the very latest generation of power modules that is creating a revolution on the DC/AC inverter marketplace.

The TSI design meets the golden rules of TRUE REDUDANT SYSTEMS (TRS) principles that make this system an ideal solution to preserve critical loads and assets. TSI concept is a modular “hot swap” solution that eliminates all “single points of failure”.

The AC to AC conversion features a double filtering function, thanks the double conversion AC-DC (to an internal DC buffer) and DC-AC.

The TSI inverter is able to supply 10 times its normal output current in case on downstream short-circuit in the AC distribution. This short- circuit current is also controlled in magnitude to prevent tripping of the upstream breaker.

TSI is SAFE for your load and your operations.

### APPLICATIONS

- Offshore
- Ships
- Main AC UPS
- PA/PG
- Navigation
- Part of the Eltek Central Power System

- Efficiency up to 96%
- Reduction energy losses by 70%
- Positive carbon impact “Green solution”
- Elimination of external static switch and
- Expandable solution and modular architecture
- AC mains filtering
- Galvanic isolation is ensured between batteries and AC output

MODEL	BRAVO 2,5KVA 220VDC-230VAC INVERTER
Part number	241560.322
INPUT DATA (DC)	
Nominal voltage	220V DC
Voltage range (DC)	170V <sub>DC</sub> – 300V <sub>DC</sub>
Nominal current	9.8A
Current, maximum (for 15 seconds)	14.9 A <sub>Peak</sub>
Input protection	12xC16A 2 pole MCB
INPUT DATA (AC)	
Nominal voltage (AC)	230V <sub>AC</sub>
Voltage range (AC)	185-265V (full power)
Power factor	>99%
Frequency range (selectable)	47-53Hz / 57-63Hz
OUTPUT DATA	
Nominal output power (VA / W)	2500 / 2000
Nominal voltage	230V
Voltage range (AC)	200 - 240V
Frequency	50-60Hz; 0.03%
Total harmonic distortion (THD)	<1.5%
Load impact recovery time	0.4ms
Crest factor	3 : 1
Nominal current	10.9A
Short circuit clear up capacity (AC mains available)	10 x I <sub>n</sub> for 20msec; 1.5 x I <sub>n</sub> after 15sec
Short circuit current after clear up capacity	2.1 I <sub>n</sub> during 15 s and 1.5 I <sub>n</sub> after 15 s
OTHER SPECIFICATIONS	
Efficiency	> 96.5% EPC mode > 92.5% DC mode
Temperature	Operating: -20 to +70°C,(derating 50°C to 70°C) Storage: -40 to +70°C
Relative humidity	95%, non-condensing
Dielectric strength DC/AC	4300 VDC
Signaling and supervision	LED; Dry contact alarm output; remote on/off
Cooling	Forced
Isolation	Double
MTBF	240,000 hrs
True redundant systems	3x disconnection levels on ACout & DCin power ports, 4 disconnection levels on ACin port
Dimensions (WxHxD)	102 x 89 x 435 mm / < 5 kg
DESIGN STANDARDS	
EMC	EN 61000-4-2,-3,-4,-5,-6,-8, EN 55022 (B)
Safety	EN62040-1
Marine	DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) <ul style="list-style-type: none"><li>o Temperature Cl. C</li><li>o Vibration Cl. A</li><li>o Humidity Cl. A</li></ul>
ORDERING INFORMATION	
241560.322	Bravo TSI 2.5kVA 220V <sub>DC</sub> , 230V <sub>AC</sub> inverter module

MONITORING AND CONTROL UNIT

# Smartpack 2 Controller

Smartpack just got smarter

- New and improved interface
- New and improved functionality
- Improved statistics
- Full hybrid support

Distributed control system for medium to large power systems.



NEW FEATURES AND LOOK ON A WELL-TESTED CONTROL PLATFORM

Smartpack2 is built on the proven software platform that is used in Smartpack, making it reliable and robust. Increased program memory and new hardware allows for more features and improved user interface. The new modular distributed control system simplifies connections.

Smartpack2 comes with advanced software to control power systems with multiple power sources. It handles solar energy and generators in combination with unstable grid. Smartpack2 is also prepared for wind power. It can be configured to automatically choose the smartest energy source at all times, and it can log the amount of energy produced by the various sources.

APPLICATIONS

Minimize fuel consumption for off grid sites. Sites that run only on power from a generator often keep it running at a low load where most generators have low efficiency. Adding cyclic batteries and a Smartpack2 controlled power system, the Smartpack2 will run the generator in cyclic operation at its maximum efficiency. This will typically give a 55% reduction in fuel consumption. The total OPEX will be further decreased as the generator service will be less frequent due to it not running 24hours a day.

SIMPLIFIES OPERATION IN LARGE MULTISITE SYSTEMS

Smartpack2 offers many offsite benefits if it is connected to the internet. View the system status, change parameters and receive alarms at a multisite management center. Use features such as battery lifetime estimations, fuel consumption through tank level measurement and generator runtime, to plan for site service. Use the energy logs to document the amount of renewable energy used, and to plan for site upgrades.



KEY FEATURES		
SMARTPACK2 ON-SITE – DISPLAY AND MENUS FOR EASY ACCESS TO STATUS AND COMPLETE CONFIGURATION. <b>NO PC TO HOOK ON TO THE CONTROLLER – NO PROBLEM!</b> <ul style="list-style-type: none"><li>• Key system status parameters displayed by default: alarms, battery voltage, rectifier current and load current.</li><li>• Single key-hit to display list of triggered alarms.</li><li>• All configurations and setup available from the menus.</li><li>• High resolution and contrast – excellent reading and able to show complex content.</li><li>• Multilanguage (changeable “on the fly”): English, Chinese Simp., Chinese Trad., Russian, Norwegian and pending languages: Finish, French, German, Greek, Italian, Polish, Portuguese, Spanish, Swedish and Turkish.</li><li>• Disable external alarms while servicing.</li><li>• Access control – pin code to change configuration</li></ul> <b>SETUP DATA AND LOGS – BRING YOUR SD CARD.</b> <ul style="list-style-type: none"><li>• Convenient storage – for backup and transportation.</li><li>• Easy and robust to roll out a set of systems with</li><li>• Identical setup.</li></ul>	Screen	Graphical TFT high contrast, high resolution color display for easy navigation in user menu
	LEDs for local visual alarms	(Major, Minor, Power ON)
	Ethernet	for remote or local monitoring and control via WEB Browser Ethernet port with HP Auto MDI/MDI-X for detection and correction for straight-through and crossover cables.
	SNMP protocol	with TRAP, SET and GET on Ethernet. Email of TRAP alarms
	6 programmable relay outputs	for “traditional” remote monitoring. Expandable with I/O Monitor CAN Nodes.
	6 programmable multipurpose inputs	(“digital inputs” or analog signals). Expandable with I/O Monitor CANNodes.
	Comprehensive logging	
	Backup of critical control features in Basic unit.	
	Automatic battery monitoring and test	
	Battery lifetime indication	
	Battery used and remaining capacity (Ah or %)	
	Monitoring	
	User defined alarm grouping (boolean logic for grouped alarms)	
	Uploading and Downloading of configuration files with SD Card or PowerSuite (Windows™ application).	

OUTPUT DATA

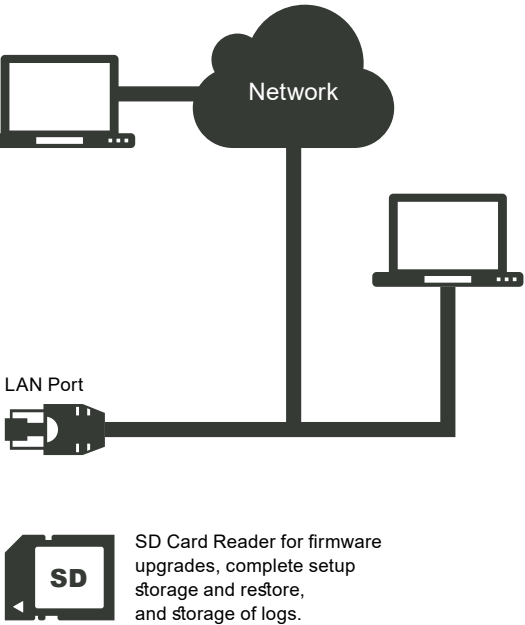
Event log: scroll through all events to get a quick overview of system history



System configuration: all parameters are editable from the menu



Main menu: easy task oriented layout and self explanatory navigation.



CAN BUS FOR POWER AND INTERNAL COMMUNICATION



CONTROL FEATURES

CONTROL SYSTEM	BATTERY	RECTIFIER	GENERATOR
<ul style="list-style-type: none"><li>Output Voltage Measurement</li><li>Load Current Calculation</li><li>Energy Calculation</li><li>Load/Battery Disconnect</li><li>Real Time Clock with Battery Backup</li><li>Stored Site Text/ID and Messages</li><li>Position (long/lat) for auto placement</li><li>Test of Relay Outputs</li><li>Alarm grouping of events for relay outputs</li></ul>	<ul style="list-style-type: none"><li>Battery Current Measurement</li><li>Battery Temperature Measurement</li><li>Battery Testing (acc. to discharge table or set time limit)</li><li>Setup of Battery Data/Table</li><li>Battery Capacity Indication</li><li>Battery Boost Charging -Auto – Ah discharge or voltage threshold -Interval or Manual</li><li>Temperature Compensated Charging</li><li>Charge Current Limitation</li><li>Battery Low Voltage Disconnect -Temperature dependent (optional) -Mains independent (optional)</li></ul>	<ul style="list-style-type: none"><li>Available information about each rectifier, e.g. serial number, version, internal temperature</li><li>Individual Rectifier Current Measurement</li><li>Individual Rectifier Input Voltage</li><li>Efficiency Management</li><li>Emergency Voltage</li><li>Startup delay</li><li>Detailed internal alarms summary</li></ul>	<ul style="list-style-type: none"><li>On/Off control for cyclic charging and fuel reduction</li><li>Start-up delay of power system</li><li>Fuel consumption logging and alarming based on tank level measurement</li><li>Discharge cycle counter/Generator run hour logging</li><li>DoD [%] logging w/time stamp</li></ul>

**ALARMS/EVENTS AVAILABLE**  
Alarms can be set up with monitoring of minor and major levels. Hysteresis and time delay is user configurable. All average and peak levels on analogue values are auto logged in Event log

POWER & CONTROL SYSTEM	LOAD	BATTERY	RECTIFIER
<ul style="list-style-type: none"><li>AC Mains Low (2-level)</li><li>AC Phase Voltage x3 (2-level)</li><li>“Digital” Inputs (programmable descriptions)</li><li>Events trigger by inputs</li></ul> <p>Service mode (block relays), Generator running, Lower charge current limit, Battery test, Boost inhibit, Emergency low voltage , Clear manual reset alarms.</p>	<ul style="list-style-type: none"><li>Load Disconnect -Voltage or Timer (from mains failure) based -Mains independent (optional)</li><li>Load Fuse</li><li>Load Current</li></ul>	<ul style="list-style-type: none"><li>Battery Voltage (4-level, optional 8-level)</li><li>Battery Temperature (2-level)</li><li>Battery Used Capacity (2-level) [Ah or %]</li><li>Battery Remaining Capacity (2-level) [Ah or %]</li><li>Battery Fuse</li><li>Symmetry Failure (2-level) -Only with BM Can Node</li><li>Battery Quality after test (2-level)</li><li>Battery Current (4-level)</li><li>Battery Life Time (2-level) [from temperature log]</li></ul>	<ul style="list-style-type: none"><li>Rectifier Failure (2-level)</li><li>Rectifier Capacity (2-level)</li><li>Rectifier Current (2-level)</li><li>Rectifier Avg. Temperature (2-level)</li><li>Rectifier Current Share (2-level)</li></ul>

SPECIFICATIONS - MASTER	
Power Consumption	Max 4.5W
MTBF	> 1 300 000 hours Telcordia SR-332 Issue I, method III (a)(T <sub>ambient</sub> : 25°C)
Display	32k colour TFT – QVGA (320x240)
Ethernet Port	10/100 BASE-T / HP Auto MDI/MDI-X
Removable media	SD Card
SNMP	v1, v2c, v3 (pending) GET, SET & TRAP
Web	Webpower; XHTML 1, java script, SSL
Networking	SMTP Client and NTP Client.
Event log	10 500 time stamped events
Data log	10 000 time stamped values of 10 user defined monitoring points
Dimensions (WxHxD)	156 x 72 x 38mm 6,4 x 3 x 1,6”

SPECIFICATIONS - BASIC	
Input Voltage	20-172 VDC (20 -75 VDC***) Shutdown: < 18 VDC
Power Consumption	Max 1.5A Max 4.5A (3x LVD max loaded)
Contactor Outputs	3 x LVD control outputs
Configurable Inputs	3x NO/NC/Temperature: NTC probe
System Connections	
Voltage Sense	24V, 48V, 60V & 110V** systems
Current Sense	0-20mV and 0-60mV range shunts
Battery Fuse*	Battery fuse sense, Open/Closed
Load Fuse*	Load fuse sense, Open/Closed, Pull- Up/Down, Diode Matrix
Ground fault	Simple bridge circuit detection
Max Basic nodes	8 units on a single CAN-bus
Dimensions (WxHxD)	155 x 35 x 80mm 6.4 x 1.4 x 3.3”

SPECIFICATIONS – I/O MONITOR ( TYPE 2 )	
Configurable Inputs	6x NO/NC/Analog Voltage [0-75V]
Alarm Outputs	6x Relay–Dry/Form C [Max 75V/2A/60W]
Max I/O Monitors	14 units on a single CAN-bus
Power Consumption	Max 3.6W
Dimensions (WxHxD)	135.1 x 23.5 x 59mm 5.3 x 0.9 x 2.3”

GENERAL SPECIFICATIONS – ALL UNITS	
Temperature Range	-40 to +65°C (-40 to 140°F)
DESIGN STANDARDS	
Electrical safety	UL 60950-1, EN 60950-1, CSA 22.2
EMC	ETSI EN 300 386 V.1.3.2 EN 61000-6-1 / -2 / -3 / -4 / -5
Mains Harmonics	EN 61000-3-2
Environment	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) ETSI EN 300 132-2 2011/65/EU (RoHS) & 2008/98/EC (WEEE)
Marine compliance (EMC class B with AC filter)	ABS (PENDING) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) o Temperature Cl. A o Vibration Cl. A o Humidity Cl. A o Enclosure Cl. A

OPTIONAL CONTROL DEVICES / CANNODES	
Part No.	Description
242100.300	Battery Monitor
242100.301	Load Monitor
242100.304	I/O Monitor (Outdoor)
242100.306	I/O Monitor Type 3
242100.200	Smartnode RS232/485
242100.500M	Smartpack2 Master
242100.501M	Smartpack2 Basic
242100.601M	Industrial Basic
242100.502	I/O Monitor – Type 2

\*Only Open/Closed for 110V \*\*Basic ver. U1.3 \*\*\*Basic ver. 1.0 - 1.2

COMPACT, RICH-FEATURED, HOT SWAPPABLE, ALL-IN-ONE CONTROLLER

# Smartpack S Controller

The Smartpack S covers all control and monitoring needs of small to medium telecom and industrial DC power systems. Status and configuration is fully available through the display locally, or through the Ethernet port both remotely or locally.

Designed for the Flatpack S system platform, the Smartpack S finds its way into many space-restricted applications. Used in the 1U high, 265mm deep power racks, Smartpack S offers comprehensive monitoring and control of a 2kW-3kW system occupying less than 6 liters.



APPLICATIONS

- Dynamic Positioning (DP)
- GMDSS
- SAS systems
- Thruster control
- HV switchgear control voltage
- LV switchgear control voltage
- Generator control voltage



KEY FEATURES

- Graphical 2.2" TFT high contrast, high resolution color display for easy navigation in user menu
- Ethernet for remote or local monitoring and control via web browser
- SNMP protocol with trap, set and get on Ethernet. Email of trap alarms
- 6 Programmable relay outputs
- 6 Programmable multi-purpose inputs ("digital inputs" or analog signals).
- Comprehensive logging
- Automatic battery monitoring and test
- Battery quality indication (based on test results)

MODEL		SMARTPACK S	
Part number	242100.410M	242100.415M (Panel mount)	
INPUT DATA			
Nominal voltage	10-75V <sub>DC</sub>		
Power Consumption, max - no relays energized	3,1W (display sleep)		
max - all relays energized	5,5W (display on)		
SYSTEM CONNECTIONS - SYSTEM MONITORS			
Voltage sense, system voltage support	12 V <sub>DC</sub> , 24V <sub>DC</sub> , 48V <sub>DC</sub> & 60V <sub>DC</sub>		
Current sense, shunt support	0 - 20mV and 0 - 60mV		
Battery fuse monitoring	Auxiliary switch NO/NC, Pull up/down		
Load fuse monitoring	Auxiliary switch NO/NC, Diode Matrix Pull up/down		
Ground fault detection	Simple bridge circuit detection		
Fan speed monitoring	Tacho sense 0-65000 rpm (input max. 15V)		
SYSTEM CONNECTIONS - LVD CONTROL			
Battery disconnect	1 (latched or non-latched supported)		
Load disconnect	1 (latched or non-latched supported)		
INPUTS AND OUTPUTS			
Digital configurations, Inputs #1-6	Auxiliary switch: NO/NC		
Analog configurations, Inputs #1-4	Analog Voltage[±0 - 10V] ±4-20mA current measurement (through external 470kΩ resistor) Temperature (for NTC probe)		
Analog configurations, Inputs #5-6	Analog Voltage[0-75V] Symmetry measurement		
Output configurations, Outputs #1-6 (alarms)	6x Relay–Dry/Form C Configurable Normally Open/Closed [Max capacity 75V/2A/60W]		
Fan control	Analog Voltage (0-10V) Output Current 0-20mA (Fan input impedance minimum 10kΩ)		
USER INTERFACE			
Local	2.2" TFT 65k Colour display, QVGA resolution, 4 keys		
Ethernet port	10/100 BASE-T , HP Auto MDI/MDI-X IP protocols: HTTP / SSL, SNMP v3, MODBUS TCP and pComm UDP (PowerSuite)		
Serial port	RS-232 and RS-485 on RJ11 connector Serial protocols: MODBUS RTU, Modem Call-Back/SMS reporting (PSTN or GSM), COMLI, CSCP and pComm (PowerSuite)		
GENERAL SPECIFICATIONS			
Dimensions (WxHxD)	72.2 x 43.0 x 220.7mm (2.8 x 1.7 x 8.7")	232.2 x 76.2 x 33.0 (9.1 x 3 x 1.3")	
Temperature Range	Operating -20 to +60°C (-40 to 140°F)		
DESIGN STANDARDS			
Electrical safety	UL 60950-1-3rd edition, EN 60950-1-3rd edition		
EMC	ETSI EN 300 386 V.1.4.1 , EN 61000-6-1 / -2 / -3 / -4 , FCC Part 15 Subpart 109		
Marine	ABS DNV- OS-D202, Ch.2 Sev.4 (DNV 2.4) Temperature Cl. B, Humidity Cl. B, Vibration Cl. A		
Environment	ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) ROHS compliant		

Doc 242100.41x.DS3 - v3M

Specifications are subject to change without notice



MONITORING AND CONTROL UNIT

# Compack Controller

Small with all.  
“All-in-one” plug-in controller. Comprehensive functionality in a small box designed for small range power systems.



APPLICATIONS

- Telecom
  - » Chameleon
  - » Micropack 48V
  - » Minipack 1U
  - » Flatpack2 DC/DC in interface kit
- Industrial
  - » Micropack 12V & 24V
  - » Compack interface kit

KEY FEATURES

- Remote monitoring via ethernet
- SNMP (V3,V2C,V1)
- Web pages
- Email of logs and alarms
- 3 Configurable relays
- 3 Multipurpose inputs
- Temperature
- Symmetry
- Digital input
- 2 LVD controllrs (LVBD+LVLD)
- 12V,24V,30V,48V & 60V supported
- Battery monitoring
- Auto/periodic test
- Capacity/quality estimation
- Eltek software supported
- Eltek network utility
- Multisite monitor
- Power suite

Micropack 1000W Convection Cooled System



Compack in Interface Kit



MODEL		COMPACK	COMPACK INTERFACE KIT
Part number		242100.400	242100.900
ELECTRICAL SPECIFICATIONS			
Input Voltage	9 - 75 V <sub>DC</sub> , shutdown < 8.5 V <sub>DC</sub> *		
Temperature Range	Nominal: -20 to +60 C (-4 to 140 F) Reduced accuracy: -40 to +70 C		
Power Consumption	3W		
MTBF	> 550, 000 hours Telcordia SR-332 Issue I, method III (a) (Tambient : 25°C)		
Ethernet port	10/100 BASE-T HP Auto MDI/MDI-X		
Relay Outputs (1,5 mm2)	Form-C (dry contact NO-C-NC), Max 75V/2A/60W breaking capacity		
Configurable Inputs (1,5 mm2)	Temperature: External NTC, "Digital": open/closed, Analog: 0-75V, Battery Symmetry: 0-75V		
CONTROL FEATURES			
Control system	<ul style="list-style-type: none"><li>o Output Voltage Measurement</li><li>o Load Current Calculation</li><li>o Energy Calculation</li><li>o Load/Battery Disconnect</li><li>o Real Time Clock with Battery Backup</li><li>o Stored Site Text/ID and Messages</li></ul>	<ul style="list-style-type: none"><li>o Output Voltage Measurement to Position (long/lat) for auto placement</li><li>o Generator start/stop control setup</li><li>o Test of Relay Outputs</li><li>o Alarm grouping of events for relay outputs</li><li>o Boolean AND of alarm groups</li></ul>	
Battery	<ul style="list-style-type: none"><li>o Battery Current Measurement</li><li>o Battery Temperature Measurement</li><li>o Battery Testing (acc. to discharge table or set time limit)</li><li>o Battery Boost Charging<ul style="list-style-type: none"><li>- Auto – Ah discharge or voltage threshold</li><li>- Interval or Manual</li></ul></li></ul>	<ul style="list-style-type: none"><li>o Setup of Battery Data/Table</li><li>o Battery Capacity Indication</li><li>o Temperature Compensated Charging</li><li>o Charge Current Limitation</li><li>o Battery Low Voltage Disconnect<ul style="list-style-type: none"><li>- Temperature dependent (optional)</li><li>- Mains independent (optional)</li></ul></li></ul>	
Rectifier	<ul style="list-style-type: none"><li>o Available information about each rectifier, e.g. serial number, version, internal temperature</li><li>o Individual Rectifier Current Measurement</li><li>o Individual Rectifier Input Voltage</li></ul>	<ul style="list-style-type: none"><li>o Energy calculation</li><li>o Efficiency Management</li><li>o Emergency Voltage</li><li>o Startup delay</li><li>o Detailed internal alarms summary</li></ul>	
ALARMS / EVENTS			
Alarms can be set up with monitoring of minor and major levels. Hysteresis and time delay is user configurable. All average and peak levels on analogue values are auto logged.			
Power & Control System	<ul style="list-style-type: none"><li>o AC Mains Low (2-level)</li><li>o AC Phase Voltage x3 (2-level)</li><li>o "Digital" Inputs (programmable descriptions)</li><li>o Events trigger by inputs</li></ul>	<ul style="list-style-type: none"><li>o Service mode (block relays), Generator running, Lower charge current limit, Battery test, Boost Inhibit, Emergency low voltage, Clear manual reset alarms.</li></ul>	
Load	<ul style="list-style-type: none"><li>o Load Disconnect<ul style="list-style-type: none"><li>- Voltage or Timer (from mains failure) based</li><li>- Mains independent (optional)</li></ul></li></ul>	<ul style="list-style-type: none"><li>o Load Fuse</li><li>o Load Current</li></ul>	
Battery	<ul style="list-style-type: none"><li>o Battery Voltage (4-level, optional 8-level)</li><li>o Battery Temperature (2-level)</li><li>o Battery Used Capacity (2-level) [Ah or %]</li><li>o Battery Remaining Capacity (2-level) [Ah or %]</li><li>o Battery Fuse</li></ul>	<ul style="list-style-type: none"><li>o Symmetry Failure (2-level)</li><li>o Battery Quality after test (2-level)</li><li>o Battery Current (4-level)</li><li>o Battery Life Time (2-level) [from temperature log]</li></ul>	
Rectifier / Converter	<ul style="list-style-type: none"><li>o Rectifier Failure (2-level)</li><li>o Rectifier Capacity (2-level)</li><li>o Rectifier Current (2-level)</li></ul>	<ul style="list-style-type: none"><li>o Rectifier Avg. Temperature (2-level)</li><li>o Rectifier Current Share (2-level)</li></ul>	
DATA LOGGING			
Control System	Event log, Data log (configurable up to 20 monitors), Configuration Change log, Account Access log		
Energy	Energy delivered from Rectifiers, Solar Charger and Battery, and consumed energy by the load for the last 52 hours, 52 days and 52 weeks		
Battery	10 last battery tests detailed, number of battery cycles for the last 52 hours, 52 days and 52 weeks		
Generator	Run time in minutes and fuel consumption for the last 52 hours, 52 days and 52 weeks		
GENERAL SPECIFICATIONS			
Dimensions (WxHxD)	75 x 30 x 115mm / 2.95 x 1.2 x 4.52"	107.6 x 41.4 x 175.5mm / 2.24 x 1.63 x 6.91"	
Weight	240g / 0.53 lbs	380g / 0.84 lbs	

\* 12V support from HW rev. HW1.3. HW version 1.0 - 1.2 input voltage range: 17 - 75 VDC

COMPACT, RICH-FEATURED, HOT SWAPPABLE, ALL-IN-ONE CONTROLLER

# Battery Cabinets

The battery cabinets are designed for tough conditions and are rated to have Ingress Protection 43/44 (IP 43/44). Moreover, the cabinet is equipped with vibration dampers in order to prevent the effect of vibrations on components.

Horizontal stabilizers that protect batteries from moving around inside the large cabinet can be added.



BE0138.000



BB0299.1000



BB0212.000

APPLICATIONS

- 38U (1800mm)
  - » Central Power System (CPS)
  - » Offshore
  - » Ships
  - » 12U (600mm)
  - » Control and protection
  - » SAS system
  - » Communication
  - » GMDSS
  - » Emergency lights

MARINE STANDARDS

- ABS (Pending)
- DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4)
  - » Temperature Cl. A
  - » Vibration Cl. A
  - » Humidity Cl. A
  - » Enclosure Cl. A

KEY FEATURES

- IP43
- Vibration dampers
- Battery stabilizers
- Up to 18X12V (4X12V) batteries
- Battery capacity up to 170AH (62AH)
- Battery protection



MODEL	BATTERY CABINET 220VDC 38U
Part number	BE0138.000
PRODUCT DATA	
Maximum battery capacity	18 x 12V/155-190Ah (front terminal batteries)
Battery protection connection	2 x NH1 / 250A fuse switch 1 pole with 250A fuse-link
Number of battery shelves	4 shelves 8U
Enclosure	Rittal, IP43
Dimensions	(HxWxD) 1800x800x600mm without absorbers
Weight (netto)	262kg without batteries

ORDERING INFORMATION	
BE0138.000	Battery cabinet 18x190Ah

MODEL	BATTERY CABINET 220VDC 25U
Part number	BB0299.1000
PRODUCT DATA	
Maximum battery capacity	21 x 12V/30-62Ah (front terminal batteries)
Battery protection connection	NH00 / 160A 2poles fuse switch with 160A fuse-link
Number of battery shelves	3 shelves
Enclosure	Rittal, IP54
Dimensions	(HxWxD) 1200x600x600mm without absorbers
Weight (netto)	110kg without batteries

ORDERING INFORMATION	
BB0299.1000	Battery cabinet 21x62Ah

MODEL	BATTERY CABINET 24/48VDC 12U
Part number	BB0212.000
PRODUCT DATA	
Maximum battery capacity	4 x 12V/30-62Ah (front terminal batteries)
Battery protection connection	2 x D125A 2P MCB with auxiliary switch
Number of battery shelves	1 shelf
Enclosure	Rittal, IP44
Dimensions	(HxWxD) 600x600x350mm without absorbers
Weight (netto)	92kg without batteries

ORDERING INFORMATION	
BB0212.000	Battery cabinet 4x62Ah

DESIGN STANDARDS	
Electrical safety	IEC 60950-1 IEC 60945
Environment	ETSI EN 300 019-2,-1 Class 1.2, -2 Class 2.3, -3 Class 3.2, RoHS
Marine	ABS (PENDING) DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) <ul style="list-style-type: none"><li>o Temperature Cl. A</li><li>o Vibration Cl. A</li><li>o Humidity Cl. A</li><li>o Enclosure Cl. A</li></ul>



LEAD ACID, NI-CD, LI-ION

# Batteries

Batteries are a very important part of a UPS system. Finding the most ideal battery type and number of batteries is a key element of a well working and efficient system.



## LEAD ACID BATTERIES

AGM technology with Front Terminal range of valve regulated lead acid batteries has been designed specifically for use in applications that demand the highest levels of security and reliability.

The AGM Monoblocs are designed for installation in cabinets or on stands, close to the point of use.

- Competitive price
- Design life 3-12 years
- Needs stable temperature around 20°C to sustain life time, high temperature rapidly reduces life
- Separate battery room is not necessary
- Maintenance free: no water addition required.

## NI-CD BATTERIES

NiCad batteries are maintenance free valve regulated particularly suited for extreme temperatures from -40°C to +70 °C. Operational lifetime: 12 years at + 40°C and 20 years plus at + 20°C.

- More expensive than regular lead acid batteries
- Operating in a wider temperature range
- Need higher voltage to recharge
- Low level of gas emission

## LITHIUM-ION BATTERIES

Lithium-Ion batteries provide more energy for their weight and volume: they are 2x smaller than and 4x lighter than lead acid for the same power level. Lithium-Ion batteries are ideal for cyclic operation. Fast recharge: up to 95% in 3 hr. Wide temperature range: from -40°C to + 75°C

- Latest technology
- Environmentally friendly
- Built-in electronics that control the batteries
- High cyclic numbers
- Wide temperature operating range
- Space saving

KEY FEATURES

- Wide range of products
- Compact
- Extended design life
- Latest technologies
- Secure and reliable

Model	VRLA	Ni-Cd	Li-ion
GENERAL SPECIFICATIONS			
Cell voltage (nominal)	2V	1.2V	3.6V
Recommended float charge (V)	2.28V	1.43V	4.2V
Typical recharge time (h)	10-12h	10-15h	3.5
Operational life	10+years @+20°C	20 years @+20°C 12 years @+40°C	20 years
Life cycle (80% DOD; +20°C)	100-200 cycles	2000 cycles	3000 cycles
Operating temperature	-30 to +55°C (-22 to +131°F)	-40 to +70°C (-40 to +158°F)	-40 to +65°C (-40 to +149°F)
Storage Duration	6 months 20°C	Up to 24 months	12 months +15 to +35°C (+59 to +95°F)
Maintenance	Low maintenance No water addition required	Low maintenance	Low maintenance
DESIGN STANDARDS			
Electrical safety	UL 60950, UL 1642(cell)	EN 50272-2	UL 60950, UL 1642(cell) ETSI EN 300 386 GR 3108 class 3
EMC		ETSI EN 300 386 GR 3108 class 3	
Environment		ETSI EN 300 019	

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## EXPERIENCE THE POWER.

At Eltek, we are power experts with a sharp focus; to develop and provide our customers all over the world with the greatest power solutions available for applications used in an industrial context - where stable, safe and efficient supply of power is crucial.

This has been our passion and motivation for more than 40 years: to innovate and lead the way in power conversion and control. Today, we help our customers optimize and safeguard the operation of business-critical equipment, reduce their carbon footprint, while, at the same time, reduce their total cost of ownership of power supply equipment.

Nordic by birth, we have grown to service all countries and cultures, offering the best global technology and solutions matched to local requirements.

The combination of superior expertise, advanced solutions, responsive support and service, makes it possible for our more than 2500 passionate and proactive power experts worldwide to provide our customers with a unique, powerful experience.

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