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.
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 Rectivertter
AC UPS - marine power redefined

The Rectivertter 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 rectivertter.com
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.

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.

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

**Up to 80 % reduced life time cost**

Hot swap modules
A vessel or offshore installation is a complex environment

There may be dozens - if not hundreds - of functions and equipment and systems on board, from absolutely essential navigation and propulsion systems with backup power, to convenient "nice-to-haves", like onboard entertainment systems. Every one of these requires power, some AC and some DC, at different voltages, with or without backup. Typically, there are many different makes, from different suppliers, and with varying product life time expectations.

Complexity is expensive

It is obvious that complexity comes at a cost. It may be hard to see the full picture and be on top of things. There are many potential points of failure, and the cost of service or repair due to poor quality or short life expectancy may, in many cases, exceed the initial purchase cost.

Modularity is the key

There is an obvious case to be made for simplification. Fewer components and less equipment, the ability to oversee and manage several subsystems as one, shared backup batteries and one common management interface – these are things that will yield substantial benefits in terms of reliability and operational cost.

Where Eltek fits in

Eltek has decades of experience with modular power systems, and an equally long history as a supplier to the marine market. We have a wide range of products and solutions specifically developed or adapted for marine use, all with DNV and ABS certification. This enables us to provide the required power for most purposes.

There is more in it for customers

The benefits of adopting modularity go beyond those directly associated with the products and technology - including performance, compact form factor, flexibility and overall quality. By reducing the number of suppliers, life becomes easier. There will be less time and cost spent on surveys and approvals, and a reduction of the spare parts stock. In the rare event of a malfunctioning module, a new one can be easily hot-swapped without interfering with the running system. This also opens up the possibility for "smart logistics" - i.e. installing the modules and finalizing the system setup when the environmental conditions are favorable.

An additional - and important - benefit is that a customer can deal with the same company, no matter where in the world his ships are sailing. An Eltek representative and spare parts, assistance or additional products that may be required are never far away.

One step further with the Rectiverter AC UPS

The benefits really add up. We are confident that customers who embrace the modular approach will significantly reduce operating and maintenance cost, improved reliability and greater flexibility.

These benefits are further strengthened with the Rectiverter - the modular AC UPS. With its modularity, efficiency and dual output, it is the perfect building block for tomorrow's marine and offshore power solutions.

"Higher performance at a lower total cost of ownership"

Marine power expert Ingar Sørensen expands on the benefits of modern modular power in marine environments.

Meet Ingar Sørensen in this 2 minutes documentary

Scan the QR code or go to: www.eltek.com/marine
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
2. GMDSS & PA
3. Bridge power conversion
4. Navigation & DP UPS
5. Emergency Lighting System
6. Generator starter UPS
7. SAS DC UPS
8. Engine starter UPS
9. Engine room DC UPS
10. Propulsion DC UPS
11. Thruster DC UPS

**Total Power Solutions**

**Application examples**
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

![Diagram of Central Power Systems](image)
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.

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

OUTLET DATA
- Voltage
- Adjustable
- Pb (NiCd) Batteries
- Output current
- Output power
- Battery protection/Load protection

CONTROL AND MONITORING
- Controller
- Digital inputs
- Temperature
- Relay outputs
- Customer Connections

OTHER SPECIFICATIONS
- Efficiency
- Temperature
- Isolation
- Dimensions (H x D)
- Weight
- IP grade specification

DESIGN STANDARDS
- Electrical safety
- EMC
- Environment
- Marine

ORDERING INFORMATION
C22438.400
241115.815
BE0138.000

Specifications are subject to change without notice
Flatpack2 24VDC 48kW

The combination of cost-effective design, power density and reliability makes the Flatpack2 24V 48kW 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.

**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.

**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

**APPLICATIONS**

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

**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)
  - Temperature Cl. A
  - Vibration Cl. A
  - Humidity Cl. A
  - Endorse Cl. A

**ORDERING INFORMATION**

C22438.401

FP2 24V 48kW 2x3P220V

**AVAILABLE 24 RECTIFIERS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum Current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.200M</td>
<td>Flatpack 2 24V/1800W HE</td>
<td>21.7 – 28.8 V</td>
<td>&gt;95% (30-65% load)</td>
<td>75 A</td>
<td>450 A</td>
</tr>
<tr>
<td>241115.200M</td>
<td>Flatpack 2 24V/2000W</td>
<td>21 – 29 V</td>
<td>&gt;95% (25-100% load)</td>
<td>84 A</td>
<td>504 A</td>
</tr>
<tr>
<td>241115.250M</td>
<td>Flatpack 2 24V/2000W WOR</td>
<td>21.5 – 36 V</td>
<td>&gt;91% (25-85% load)</td>
<td>70 A</td>
<td>420 A</td>
</tr>
</tbody>
</table>
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.

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.

**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

**AVAILABLE 24V RECTIFIERS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage Range</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.205M</td>
<td>Flatpack 2 24V/1800W HE</td>
<td>21.7 – 28.8 V</td>
<td>&gt;95% (30-65% load)</td>
<td>75 A</td>
<td>150 A</td>
</tr>
<tr>
<td>241115.200M</td>
<td>Flatpack 2 24V/2000W diode</td>
<td>21 – 29 V</td>
<td>&gt;95% (25-100% load)</td>
<td>84 A</td>
<td>168 A</td>
</tr>
<tr>
<td>241115.250M</td>
<td>Flatpack 2 24V/2000W WOR</td>
<td>21.5 – 36 V</td>
<td>&gt;91% (25-85% load)</td>
<td>70 A</td>
<td>140 A</td>
</tr>
</tbody>
</table>
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

### PART NUMBER
CS0825.000

### INPUT DATA
- Nominal voltage: 185VAC/DC - 305VAC / 300VDC
- Voltage range (DC): 85VAC/DC - 305VAC / 300VDC
- Nominal current (at nominal input, full load): 37.6A
- Input connection: 10 mm² terminals
- Input protection: 2 x C32A 2 pole MCB
- Marine filters: Optional

### OUTPUT DATA
- Nominal voltage: 26.7 VDC
- Voltage range: 21.5 - 28VDC
- Current: 333.6A at 24VDC and full load
- Output power: 8kW maximum (with 8 rectifiers)
- Load connection: 20mm² 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: 70mm²
- Alarm connection: 2.5mm²

### CONTROL AND MONITORING
- Smartpack S: 6 x Input/Output and Ethernet
- Alarm connections: Plug in wire connectors rear access for 6 potential free relays 1.5mm²

### OTHER SPECIFICATIONS
- Isolation: 3.0 kVAC – input to output; 1.5 kVAC – input 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)
- Temperature Cl. A
- Vibration Cl. A
- Humidity Cl. A
- Enclosure Cl. A

### ORDERING INFORMATION
- CS0825.000

### AVAILABLE 24V RECTIFIERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage Range</th>
<th>Efficiency</th>
<th>Maximum Current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241122.205M</td>
<td>Flatpack S 24V/1000W HE</td>
<td>21.5 – 28 V</td>
<td>&gt;92.5%</td>
<td>41.7 A</td>
<td>1 Module 41.7 A, 2 Module 83.4 A, 4 Module 166.8 A, 8 Module 333.6 A Blocking diode</td>
</tr>
<tr>
<td>241122.290</td>
<td>Flatpack S 24V/1000W HE SIL</td>
<td>21.5 – 28 V</td>
<td>&gt;92.5%</td>
<td>41.7 A</td>
<td>1 Module 41.7 A, 2 Module 83.4 A, 4 Module 166.8 A, 8 Module 333.6 A SIL 3 / diode</td>
</tr>
<tr>
<td>241122.215M</td>
<td>Flatpack S 24V/500W HE</td>
<td>21.75 – 28 V</td>
<td>&gt;92.5%</td>
<td>19 A</td>
<td>38 A, 76 A, 152 A Blocking diode</td>
</tr>
</tbody>
</table>
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.

**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.

**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

**Applications**

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

**Ordering Information**

- Part number: CS0816.000
- FPS 24VDC 8kW
- BB0212.000 Battery cabinet 1 shelf 12U 4x62Ah

**Available 24V Rectifiers**

- Part Number: 241122.205M
  - Flatpack S 24V/1000W HE
  - Voltage: 21.5 – 28 V
  - Efficiency >92.5%
  - Module 1: 41.7 A
  - Maximum current: 166.8 A
  - Output: Blocking diode

- Part Number: 241122.290
  - Flatpack S 24V/1000W HE SIL
  - Voltage: 21.5 – 28 V
  - Efficiency >92.5%
  - Module 1: 41.7 A
  - Maximum current: 166.8 A
  - Module 8: 333.6 A
  - Output: SIL 3 / diode

- Part Number: 241122.215M
  - Flatpack S 24V/500W HE
  - Voltage: 21.75 – 28 V
  - Efficiency >92.5%
  - Module 1: 19 A
  - Maximum current: 76 A
  - Output: Blocking diode

**Specifications**

- Nominal voltage: 185VAC/DC - 305VAC / 300VDC
- Voltage range (DC): 85VAC/DC - 305VAC / 300VDC
- Nominal current (at nominal input, full load): 37.6A
- Input connection: 10 mm² terminals
- Input protection: 2 x C32A 2 pole MCB
- Marine filters: Optional

**Output Data**

- Nominal voltage: 26.7 VDC
- Voltage range: 21.5 – 28VDC
- 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: 35mm²
- Alarm connection: 2.5mm²

**Control and Monitoring**

- Smartpack S 6 x Input/Output and Ethernet
- Plug-in wire connectors rear access for 6 potential free relays 1.5mm²

**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.1.6.1, EN 61000-6, -1, -2-8, -3, -4
- Safety: IEC/EN 60950-1 & 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

Errors and Omissions Excepted
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 rules for high speed & light craft ship classifications, DNV offshore standards and other demanding applications.

Applications

- Safety and Automation Systems (SAS)
- Offshore and process industry
- Marine

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 24V/1000W 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.

COMPLIANCE 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 mm²):
  - 3 x Potential free change over contacts (NO, NC, C) [Max 75V/2A/60W]
- 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 kVAC - input to output, 1.5 kVAC - input to earth
  - 0.5 kVAC - 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
- Storage temperature:
  - -40 to +85°C (-40 to +185°F), 0 - 99% RH non-condensing
- Dimensions[WxHxD] (inches): 273 x 371 x 211 (10.75 x 14.61 x 8.31)
- INPUT DATA
- Power (maximum) @ nominal input:
  - 2400 W
- Current (maximum) @ nominal input:
  - 83.4 A
-缁切 Bernardino
  - 2 pole MCB, 63 A, B characteristics
- Protected battery output:
  - 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 mm²
- Output Protection in rectifiers:
  - Blocking OR-ing FET or Diode, Short circuit proof & High temperature protection
- COMPLIANCE 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 mm²):
  - 3 x Potential free change over contacts (NO, NC, C) [Max 75V/2A/60W]
- 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 kVAC - input to output, 1.5 kVAC - input to earth
  - 0.5 kVAC - 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
- Storage temperature:
  - -40 to +85°C (-40 to +185°F), 0 - 99% RH non-condensing
- Dimensions[WxHxD] (inches): 273 x 371 x 211 (10.75 x 14.61 x 8.31)
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  - 2 pole MCB, 63 A, B characteristics
- Protected battery output:
  - 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 mm²
- Output Protection in rectifiers:
  - Blocking OR-ing FET or Diode, Short circuit proof & High temperature protection

Other Specifications

- Isolation:
  - 3.0 kVAC - input to output, 1.5 kVAC - input to earth
  - 0.5 kVAC - 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
- Storage temperature:
  - -40 to +85°C (-40 to +185°F), 0 - 99% RH non-condensing
- Dimensions[WxHxD] (inches): 273 x 371 x 211 (10.75 x 14.61 x 8.31)
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 user menu
- RJ45 Ethernet. Email of trap alarms via web browser
- 6 Programmable multipurpose inputs (“digital inputs” or analog signals)
- 6 Digital programmable relay outputs
- 6 Digital inputs for external alarm
- 6 Relay outputs NO, COM, NC for remote alarm
- Common feed AC-input (or options see below)
- Included Ethernet and Web interface for remote monitoring.
- Smartpack 2 DC System controller with 3.2” TFT color display,
- Houses up to two FP2 rectifiers
- Smartpack 2 DC System controller with 3.2” TFT color display,
- Common features for ALL VERSIONS
- 6 Relay outputs NO, COM, NC for remote alarm
- Common feed AC-input (or options see below)
- Included Ethernet and Web interface for remote monitoring.

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

AVAILABLE 24V RECTIFIERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.020M</td>
<td>Flatpack 2 24V/1000W HE</td>
<td>21.7 – 28.8 V</td>
<td>&gt; 95% (65% load)</td>
<td>150 A</td>
<td>Fuse</td>
</tr>
<tr>
<td>241115.030M</td>
<td>Flatpack 2 24V/2000W HE</td>
<td>21 – 29 V</td>
<td>&gt; 95% (45% load)</td>
<td>168 A</td>
<td>Blocking diode</td>
</tr>
<tr>
<td>241115.040M</td>
<td>Flatpack 2 24V/2000W WOR</td>
<td>21.5 – 29 V</td>
<td>&gt; 95% (25% load)</td>
<td>140 A</td>
<td>Fuse</td>
</tr>
</tbody>
</table>

AVAILABLE 48V RECTIFIERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.070M</td>
<td>Flatpack 2 48-60V/2000W HE</td>
<td>39.9 – 72 V</td>
<td>&gt; 95% (25% load)</td>
<td>83.2 A</td>
<td>Fuse</td>
</tr>
<tr>
<td>241115.100M</td>
<td>Flatpack 2 48V/2000W HE</td>
<td>43.2 – 57.6 V</td>
<td>&gt; 91% (45% load)</td>
<td>83.2 A</td>
<td>Blocking diode</td>
</tr>
<tr>
<td>241115.105M</td>
<td>Flatpack 2 48V/2000W HE</td>
<td>43.5 – 57.6 V</td>
<td>&gt; 96% (30% load)</td>
<td>83.2 A</td>
<td>Fuse</td>
</tr>
</tbody>
</table>

AVAILABLE 110V RECTIFIERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.805M</td>
<td>Flatpack 2 110-125V/10A HE</td>
<td>89.2-171.6 V</td>
<td>&gt; 94% (45-100% load)</td>
<td>20 A</td>
<td>O ring diode</td>
</tr>
<tr>
<td>241115.805M</td>
<td>Flatpack 2 110V/2000W HE</td>
<td>89.2-171.6 V</td>
<td>&gt; 94% (50-70% load)</td>
<td>33.6A</td>
<td>O ring diode</td>
</tr>
</tbody>
</table>

AVAILABLE 220V RECTIFIER

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.815M</td>
<td>Flatpack 2 220V/2000W HE WOR</td>
<td>178.5-297 V</td>
<td>&gt; 95% (35-65% load)</td>
<td>18.32 A</td>
<td>O ring diode</td>
</tr>
</tbody>
</table>
# Flatpack2 Wallbox

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BULK FEED 24-60V</th>
<th>BULK FEED 110V</th>
<th>2-POLE DIST. 24-110V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>CTO30210.000</td>
<td>CTO30210.100</td>
<td>CIE20210.4xx</td>
</tr>
</tbody>
</table>

## INPUT DATA

<table>
<thead>
<tr>
<th>Voltage (range)</th>
<th>85 - 300VAC</th>
<th>85 - 104VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single AC feed</td>
<td>-</td>
<td>12-30</td>
</tr>
<tr>
<td>Single AC feed with SPD (GVP Class 2)</td>
<td>-</td>
<td>54</td>
</tr>
<tr>
<td>Dual AC feed (individual pr rectifier)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Recommended input breaker</td>
<td>16A(^1) for 1 FP2 rectifier in system or 2 FP2 rectifiers with individual feed</td>
<td>25A(^1) for 2 FP2 rectifiers in system</td>
</tr>
</tbody>
</table>

## OUTPUT DATA

<table>
<thead>
<tr>
<th>Voltage (default)</th>
<th>24-60 VDC</th>
<th>110-125 VDC</th>
<th>24-110 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiCd, number of cells supported</td>
<td>18-40</td>
<td>85-104</td>
<td></td>
</tr>
<tr>
<td>Pb, number of cells supported</td>
<td>12-30</td>
<td>54-60</td>
<td></td>
</tr>
<tr>
<td>Power (maximum) @ nominal input</td>
<td>4000 W</td>
<td>4000 W</td>
<td></td>
</tr>
</tbody>
</table>

## POWER (maximum) @ nominal input

- 4000 W for Single AC feed with SPD (OVP Class 2)
- See previous page or applicable Flatpack2 rectifier datasheet

## Connection

- PE screw terminal, max 10 mm\(^2\) and M5 cable lug directly to chassis
- Directly on input MCB, up to 25mm\(^2\)

## OUTPUT PROTECTION

- 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\(^2\)): 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\(_{AC}\) - input to output, 1.5 kV\(_{AC}\) - output to earth, 0.5 kV\(_{DC}\) - output to earth\(^2\)
- Operating temperature: -40 to +45°C, humidity 5 - 95% RH non-condensing
- Storage temperature: -40 to +85°C, 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\(^{rd}\) edition, EN 60950-1-3\(^{rd}\) edition
- EMC: ETSI EN 300 386 V.1.4.1, ETSI 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)
- Temperature Cl. A
- Vibration Cl. A
- Humidity Cl. A
- 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.

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

MODEL WALL CABINET INTEGRATED CABINET
Part number CIES0316.000 CIES0325.002

INPUT DATA
- Connection 2phase + PE (IT) terminals
- Nominal voltage 185VAC – 305VAC
- Maximum current 14.1Amax
- Input protection C-20A 2P MCB
- Input protection in each rectifier Mains Fuse, Shutdown above 305 V

OUTPUT DATA
- Maximum voltage 26.7 VDC
- Output current 125.1 A (V<24VDC)
- 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)
- Isolation 3.0 kVAC – input to output, 1.5 kVDC – input and output to earth
- Battery compartment dimensions (HxWxD) External - 345183 (Battery box SA-590x630x450mm)
- Weight (Net) 58 kg
- IP grade specification IP54 (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 & 2008/98/EC
- 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 Generator Starter UPS Rittal – Wallbox
CIES0325.002 FPS 24V 3kW Generator Starter UPS Rittal - Integrated
345183 Battery box SA-590x630x450mm

AVAILABLE 24V RECTIFIERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241121.205M</td>
<td>Flatpack S 24V/1000W HE</td>
<td>21.5 – 28V</td>
<td>&gt;92.5%</td>
<td>41.7 A</td>
<td>Blocking diode</td>
</tr>
<tr>
<td>241121.290</td>
<td>Flatpack S 24V/1000W HE SIL</td>
<td>21.5 – 28V</td>
<td>&gt;92.5%</td>
<td>41.7 A</td>
<td>SIL 3 / diode</td>
</tr>
<tr>
<td>241122.215M</td>
<td>Flatpack S 24V/500W HE</td>
<td>21.75 – 28V</td>
<td>&gt;92.5%</td>
<td>19 A</td>
<td>Blocking diode</td>
</tr>
</tbody>
</table>

Errors and Omissions Excepted

Doc. CIES0316.000.DS3 - rev1 Specifications are subject to change without notice
110VDC DP AND THRUSTER UPS

Flatpack2 110VDC 16kW

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

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.

### DESCRIPTION
- **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

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

### OUTPUT DATA
- **Maximum voltage**: 122.5 V<sub>DC</sub>
- **Output current (1 Module included)**: 16.89 A (@V<sub>OUT</sub><110VDC)
- **Output current (1 Module included)**: 8 kW maximum
- **Output power**: 16 kW maximum
- **Output protection in rectifiers**: Blocking Diode, Short circuit proof, Overtension and high temp. protection
- **Battery protection**: 160A MCCB 2xNH01 (250A)
- **Load distribution**: 15 MCBs (1xC16A 2P, 14xB10A 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
- **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): 9x(184x97x280)
  - (HxWxD(mm): 9x(235x110x510)
- **Weight (without batteries)**
  - Net weight: 252 kg,
  - Net weight: 405 kg,
  - Net weight: 305 kg
- **IP grade specification**
  - 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)

### 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 110VDC 16kW (7xFP 2 included)
- **BN0138.001**: Batt. cabinet 4xSHELFS 18 places (Without batteries)

### AVAILABLE 24V RECTIFIERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage Range</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIE20438.411</td>
<td>Flatpack 2 110V/2000W HE</td>
<td>89.2 – 171.6 V</td>
<td>&gt;94% (30-70% load)</td>
<td>16.8 A</td>
<td>33.6 A</td>
</tr>
<tr>
<td>CIE20838.403</td>
<td>Flatpack 2 110V/3000W HE</td>
<td>89.2 – 171.6 V</td>
<td>&gt;94% (30-70% load)</td>
<td>33.6 A</td>
<td>67.2</td>
</tr>
<tr>
<td>CIE20838.402</td>
<td>Flatpack 2 110V/6000W HE</td>
<td>89.2 – 171.6 V</td>
<td>&gt;94% (30-70% load)</td>
<td>67.2</td>
<td>134.4</td>
</tr>
</tbody>
</table>

Errors and Omissions Excepted
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 (GFR)
- Built-in manual bypass switch
- Built-in transfer technology
- 150% overload capability, 15s
- 600% quick trip current, 20ms
- Ground fault alarm relay on AC output (Residual Current Relay)
- AC breakers: 185 – 275 VAC
- 6,25 A
- 120A (6 x nominal)
- Over voltage Shutdown
- Short circuit proof
- Protection Class
- Ground fault alarm relay on AC output (Residual Current Relay)

**MODULAR ARCHITECTURE OF THE RECTIVERTER MODULE**

The 3 port converter simultaneously provides power to AC loads and battery charging. During mains outage the Rectiverter 48/1200 HE feeds the 3 port converter simultaneously provides power to AC loads and backup power for 230 VAC or 115 VAC loads, and 48 VDC power for battery charging.

**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)
- Marine Environment
- Maritime
- Energy & Oil
- Power distribution & Management
- Safety and Security

**DESIGN STANDARDS**

- Electrical safety: EN 60950-1, EN 62040-1
- EMC: EN 301 489-17, EN 300 440-01
- Environment: EN 50121-4-2 (Class 2.2) & 2-3 (Class 2.3)
- RoHS (2002/95/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)

**MODELS / ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Product family</th>
<th>CIER0418.002</th>
<th>CIER0418.001</th>
</tr>
</thead>
</table>

**AC OUTPUT DATA**

| Voltage (default) / (adjustable range) | 230VAC / 200 - 240VAC | 115VAC / 100 - 127VAC |
| Frequency (default inverter mode) | 50Hz, 60Hz or last sync 50/60Hz (adaptive) | 50Hz, 60Hz or last sync 50/60Hz (adaptive) |
| Power maximum (continuous / overload) | 4000 W (6000 VA) / 8000 VA | 2400 W (3000 VA) / 4000 VA |
| Current maximum (continuous / overload) | 26Amps, 34.8Amps | 120A (6 x nominal) |
| Current (maximum) Quick trip (20ms) | <1.5 % at resistive load | >5ms @ 2400W load |
| Hold up (Voltage drops) 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, Ground fault alarm relay on AC output (Residual Current Relay) |

**DC OUTPUT FOR BATTERY CHARGING**

| Voltage (default) / (adjustable range) | 53.5VDC / 43 – 58 VDC |
| Power (maximum) @nominal input | 600 W | 300 W |
| Current (maximum) @VOUT 48 ≤ VDC | 12.5 A | 6,25 A |
| Hold up time, maximum output power | >10ms; VOUT > 41VDC |
| Output features | Short circuit proof, Over voltage Shutdown |
| 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 VAC | 95 – 140 VAC |
| AC Current (at nominal output voltage) | 29 Aamps | 3 Aamps |
| Frequency (default: sync range) | 47-53 & 57-63 Hz |
| Frequency (set-able: sync range) | 47-53 Hz, 57-63 Hz or both (adaptive) |

**OTHER SPECIFICATIONS**

- Efficiency: >94% (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)

**CIRCUIT FEATURES**
- Patented HE technology
- Global compliance
- DNV & ABS approval
- Smartpack 2 controller
- Hot pluggable
- 600% quick trip current,
- 150% overload capability,
- Built-in transfer technology
- Built-in manual bypass switch
- Ground fault alarm (GFR)
- AC Distribution: 12x6 A, C characteristics 2 pole breaker
- Dual A & B AC feed
- Single phase input/output
- Dual single phase input; A and B feed

**APPLICATIONS**

Marine
- Safety and Automation Systems (SAS)
- Public address and alarm
- Computer room
- Drilling systems
- Ship identification
- Navigation
- Dynamic positioning
- Drilling systems
- Computer room
- Propulsion control
- Navigation
- Ship identification
- Computer room
- Public address and alarm

Offshore and process industry
- Safety and Automation Systems (SAS)
- Marine Environment
- Maritime
- Energy & Oil
- Power distribution & Management
- Safety and Security
- Communication onboard ships
- Dynamic positioning
- Propulsion control
- Navigation
- Ship identification
- Drilling systems
- Computer room
- Public address and alarm
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.

### Description

**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

**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**

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

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

### Design Standards
- Cabinet: IP44
- EMC: ETSI EN 300-132-2
- Safety: IEC/EN 60 950-1 & 62040-1 for inverter
- Marine: DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4)
  - Temperature Cl. A
  - Vibration Cl. A
  - Humidity Cl. A
  - Enclosure Cl. A

### Ordering Information
- CINV0425.002
- INV 2x220V 10kVA 230V Bravo
- 241560.322
- Bravo TSI 2.5kVA-220Vdc 230Vac EPC

### Specifications
- Nominal voltage: 2 x 220V DC
- Voltage range (DC): 170VDC – 300Vdc
- Nominal current: 39.2A, max. 59.6A for 15 second @< 200mVrms
- Input connection: 10 mm² terminals
- Input protection: 2 x 2 x C16A 2 pole MCB
- 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: 50-60Hz
- Frequency range (selectable): 50-60Hz
- Total harmonic distortion (THD): <1.5%
- Maximum current: 43.5A (4 x 10.87A)
- Short circuit clear up capacity: 10 x In for 20msec; 1.5 x In after 15sec
- Number of load MCBs / Size of connections: 28 x C10A / 4 mm² terminals
- Alarm connections: 1.5 mm²

**Specifications are subject to change without notice.**
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

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 REDUNDANT 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 solution is ensured between batteries and AC output

MODEL
<table>
<thead>
<tr>
<th>BRAVO 30kVA 230VAC</th>
<th>BRAVO 60kVA 230VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>CIE20499A.4005</td>
</tr>
</tbody>
</table>

INPUT DATA (DC)
Nominal voltage: 220V DC
Voltage range (DC): 170Vdc – 300Vdc
Nominal current: 117.6A
Input connection: 12xC16A 2 pole MCB
Input protection: 63A 3 pole MCB

INPUT DATA (AC)
Nominal voltage: 400/230VAC, 3Ph+N (230V, 440V or 690V IT with built in transformer), 400/230VAC, 3Ph+N (230V, 440V or 690V IT with external transformer)
Voltage range: 185-265V (full power)
Power factor: >99%
Frequency range (selectable): 50-60Hz

OUTPUT DATA
Nominal output power: 30.000VA (12x2500VA)
Nominal voltage: 230V
Voltage range: 200 - 240V
Frequency: 50-60Hz; 0.03%
Total harmonic distortion (THD): <1.5%
Number of load MCBs / Size of connections: Bulk (35mm²)+B50A 3P+C16A 3P

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 (KWhxD): 1762 x 605 x 805 mm
Input / Output transformers: Optional 230V/440V/690V

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
Marine: DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4) (Inverters and rectifiers)
ORDERING INFORMATION
CIE20499A.4005: 400/230V 30kVA UPS & FP2 220V 8kW charger (without modules)
CIE20499A.4002: 3x30kV 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 220Vac/2000W HE Marine rectifier module
241560.322: Bravo TSI 2.5kVA 220Vac, 230VAC inverter module

Specifications are subject to change without notice
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.

**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.

**KEY FEATURES**

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

**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

**INPUT DATA**

- **Voltage (range):** 85-300VAC (Nominal 185-275V)
- **Frequency:** 44 to 66Hz
- **Protection:** Variants for transient protection, Mains fuse in both lines / Disconnect above 300V

**OUTPUT DATA**

- **Maximum voltage:** 36/72 VDC
- **Maximum current (4 modules):** 300A@26.7V
- **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 kVAC – input to output, 1.5 kVAC – 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
- **Weight:** Approx. 5kg (11lbs) excl. rectifier

**AVAILAble RECTIFIERS (24VDC, 48VDC, 110VDC)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage Range</th>
<th>Efficiency</th>
<th>Maximum Current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241115.205</td>
<td>Flatpack 2 24V/1800W HE</td>
<td>21.7 – 28.8 V</td>
<td>&gt;95% (30-60% load)</td>
<td>75 A</td>
<td>150 A</td>
</tr>
<tr>
<td>241115.200</td>
<td>Flatpack 2 24V/2000W</td>
<td>21 – 29 V</td>
<td>&gt;85% (25-100% load)</td>
<td>84 A</td>
<td>168 A</td>
</tr>
<tr>
<td>241115.250</td>
<td>Flatpack 2 24V/2000W WOR</td>
<td>21.5 – 36 V</td>
<td>&gt;91% (25-85% load)</td>
<td>70 A</td>
<td>140 A</td>
</tr>
<tr>
<td>241115.705</td>
<td>Flatpack 2 48-60V/2000W HE</td>
<td>39.9-72 V</td>
<td>&gt;95.5% (25-70% load)</td>
<td>41.6 A</td>
<td>83.2 A</td>
</tr>
<tr>
<td>241115.100</td>
<td>Flatpack 2 48V/2000W</td>
<td>43.2-67.6 V</td>
<td>&gt;91.5% (49-95% load)</td>
<td>41.6 A</td>
<td>83.2 A</td>
</tr>
<tr>
<td>241115.105</td>
<td>Flatpack 2 48V/2000W HE</td>
<td>43.2-67.6 V</td>
<td>&gt;96% (30-70% load)</td>
<td>41.6 A</td>
<td>83.2 A</td>
</tr>
<tr>
<td>241115.805</td>
<td>Flatpack 2 110V/2000W HE</td>
<td>89.2-171.6 V</td>
<td>&gt;94% (30-70% load)</td>
<td>16.8 A</td>
<td>33.6 A</td>
</tr>
</tbody>
</table>

Specifications are subject to change without notice
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
- SL 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 DVP, 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 2 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 addition to more warning and alarm relay outputs, it provides setup, status and logs through 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.

**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

**OTHER SPECIFICATIONS**
- 2 position for each output (4 if paralleled)
- 8 positions
- 1 position
- Series connected rectifier alarm for each rectifier pair
- 2 x 1.5mm2; COM, NC (To be loaded with maximum 30V and 100mA)
- Battery current sense (2) Battery and load fuse sense (2)
- 10 x 1.5mm²
- Temp, input and alarm output, connections on controller

**APPLICABLE STANDARDS**
- Electrical safety IEC61499 1-13rd edition
- EMC EN 300 386 V.1.1, 2009-12
- Mains Harmonics EN 61000-3-2
- Marine ABS
- DNV-OS-D202, Ch.2 Sec.4 (DNV 2.4)
- EMC Cl. B with Marine filter 241120.930
- Environment EN 60068-2-3
- RoHS compliant

**CONTROL AND MONITORING**
Without controller
Series connected rectifier alarm for each rectifier pair
Connection
2 x 1.5mm²; COM, NC (To be loaded with maximum 30V and 100mA)
With Smartpack S
Battery current sense (2) Battery and load fuse sense (2)
Connection
10 x 1.5mm²
Temp, input and alarm output, connections on controller

**ORDERING INFORMATION**
- Flatpack S 24V, 3x2kW 3U 19” with EMC filter, Rear fixing, Front conn.
- Flatpack S 24V, 3x2kW 3U 19”, Rear fixing, Front connection
- Flatpack S 24V, 3x2kW 3U 19”, Front fixing, Front connection
- Flatpack S combined 24V&48Vdc 4x1kW 4x230V & 2x1kW 2x230V
- Flatpack S 24V 8x1kW 3U 19”, 2x230V, Including 1 FPS 1000W HE

**AVAILABLE 24V RECTIFIERS**
- Flatpack S 24V/1000W HE
- Flatpack S 24V/1000W HE SILS 3
- Flatpack S 24V/500W HE
- Flatpack S 24V 4800W HE

**Specifications are subject to change without notice**
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
- SL 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

---

### POWER SHELVES 1U X 19” 48V / 24V – C+3R/C+5R/6R

**FLATPACK S 1U/C+3R 24V**
- Voltage: 185VAC/DC - 305VAC / 300VDC
- Maximum current: 12Arms
- Mains configuration: 230VAC, 3 x 1 phase or 3 phase (Δ) / 230/400VAC, 3 phase (Y)
- Mains connection: 7x4mm² Terminal blocks, rear connection
- Frequency: 45 – 66Hz

**FLATPACK S 1U/C+5R 24V**
- Voltage: 185VAC/DC - 305VAC / 300VDC
- Maximum current: 21Arms
- Mains configuration: 230VAC, 3 x 1 phase or 3 phase (Δ) / 230/400VAC, 3 phase (Y)
- Mains connection: 7x4mm² Terminal blocks, rear connection
- Frequency: 45 – 66Hz

**FLATPACK S 1U/6R 24V**
- Voltage: 185VAC/DC - 305VAC / 300VDC
- Maximum current: 30Arms
- Mains configuration: 230VAC, 3 x 1 phase or 3 phase (Δ) / 230/400VAC, 3 phase (Y)
- Mains connection: 7x4mm² Terminal blocks, rear connection
- Frequency: 45 – 66Hz

**INPUT DATA**
- Voltage (nominal): 185VAC/DC - 305VAC / 300VDC
- Maximum current (per feed): 12Arms
- Mains configuration: 230VAC, 3 x 1 phase or 3 phase (Δ) / 230/400VAC, 3 phase (Y)
- Mains connection: 7x4mm² Terminal blocks, rear connection
- Frequency: 45 – 66Hz

**OUTPUT DATA**
- Voltage: 28VDC
- Maximum current: 125.1ADC
- Battery connection (rear): M6 cable lug
- LVBD (LV battery disconnector): In positive leg (150A latched)

**MODEL**
- FLATPACK S 1U/C+3R 24V
- FLATPACK S 1U/C+5R 24V
- FLATPACK S 1U/6R 24V

**CONTROLLER**
- Smartpack S

**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]

**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 V.2.1.1, -2, -3, -4
- 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 Compack, Smartpack 2 and Smartpack S controllers
3) See rectifier and controller datasheet for details

Specifications are subject to change without notice.
### Model Specifications

#### Part number
<table>
<thead>
<tr>
<th>Model</th>
<th>FLATPACK S 1U/C+3R 48V</th>
<th>FLATPACK S 1U/C+5R 48V</th>
<th>FLATPACK S 1U/6R 48V</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMES0301.1001</td>
<td>CMES0501.1000</td>
<td>CMES0601.1001</td>
<td></td>
</tr>
</tbody>
</table>

#### Input Data
- **Voltage (nominal):** 85 - 305VAC/DC
- **Maximum current (per feed):** 12Amax, 21Amax
- **Mains configuration:** 230VAC, 3 x 1 phase or 3 phase(5) / 230/400VAC, 3 phase (Y)
- **Mains connection:** 7x4mm² Terminal blocks, rear connection
- **Frequency:** 45 – 66Hz

#### Output Data
- **Maximum voltage:** 60VDC
- **Maximum current:** 125.1A, 187.5A, 225A
- **Load connection (rear):** M6 cable lug, M6 insert nuts
- **Battery connection (rear):** M6 cable lug, Shunt in negative leg
- **LVBD (LV battery disconnector):** In negative leg (150A latched)

#### Controller
- **Smartpack S**
- **External**

#### 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:** -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:** 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage Range</th>
<th>Efficiency</th>
<th>Maximum current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Module 3 Module 5 Module 6 Module</td>
<td></td>
</tr>
<tr>
<td>241122.205M</td>
<td>Flatpack S 24V/1000W HE</td>
<td>21.5 – 28 V  &gt;92.5%</td>
<td>41.7 A 125.1 A</td>
<td>208.5 250.2 A</td>
<td>Blocking diode</td>
</tr>
<tr>
<td>241122.290</td>
<td>Flatpack S 24V/1000W HE SIL</td>
<td>21.5 – 28 V  &gt;92.5%</td>
<td>41.7 A 125.1 A</td>
<td>208.6 250.2 A</td>
<td>SIL 3 / diode</td>
</tr>
<tr>
<td>241122.215M</td>
<td>Flatpack S 24V/500W HE</td>
<td>21.75 – 28 V &gt;92.5%</td>
<td>19 A 57 A</td>
<td>95 A 114 A</td>
<td>Blocking diode</td>
</tr>
<tr>
<td>241122.105M</td>
<td>Flatpack S 48V/1000W HE</td>
<td>43.5 – 57.6 V &gt;92.5%</td>
<td>20.9 A 62.7 A</td>
<td>104.5 A 125.4 A</td>
<td>FET</td>
</tr>
</tbody>
</table>

#### Optional Controllers FPS 1U/6R
- **COMPACT 242100.400**
- **SMARTPACK S PANEL MOUNT 242100.415M**
- **SMARTPACK2 242100.500M+242100501M**

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

**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.

**AVAILABLE 24V RECTIFIERS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Voltage</th>
<th>Efficiency</th>
<th>Maximum Current</th>
<th>Output Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>241122.205M</td>
<td>Flatpack S 24/1000W HE</td>
<td>21.5 – 28 V</td>
<td>&gt;92.5%</td>
<td>47.1 A</td>
<td>125.1 A</td>
</tr>
<tr>
<td>241122.200</td>
<td>Flatpack S 24/1000W HE Sil3</td>
<td>21.5 – 28 V</td>
<td>&gt;92.5%</td>
<td>47.1 A</td>
<td>125.1 A</td>
</tr>
<tr>
<td>241122.215M</td>
<td>Flatpack S 24/500W HE</td>
<td>21.7 – 28 V</td>
<td>&gt;92.5%</td>
<td>19 A</td>
<td>57 A</td>
</tr>
<tr>
<td>241122.105M</td>
<td>Flatpack S 48V/1000W HE</td>
<td>43.5 – 57.6 V</td>
<td>&gt;92.5%</td>
<td>20.9 A</td>
<td>62.7 A</td>
</tr>
</tbody>
</table>

**APPLICATIONS**

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

**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 output power or increased redundancy. All rectifiers have separate AC feeding allowing for redundant AC sources for each output.

**APPLICATIONS**

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

**KEY FEATURES**

- Easy to handle
- Robust
- Output power: 1kw to 4kw 24VDC + 1-3.6kw 48VDC
- Smartpack S controller
- Individual AC input feed
- Flexible

---

**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.
**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 out 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-saving solution.
- Global approvals
- Flatpack2 WOR is CE and UL certified
- DNV and ABS(pending) certification

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**Model Specifications**

**Flatpack2 Rectifiers**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>241115.200M</td>
<td>241115.205M</td>
<td>241115.250M</td>
</tr>
<tr>
<td><strong>Input Data</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage (nominal range)</td>
<td>175 VAC - 275 VAC</td>
<td>185 VAC/DC - 275 VAC/DC</td>
<td>185 VAC - 275 VAC</td>
</tr>
<tr>
<td>Voltage (operating range)</td>
<td>85 VAC - 200 VAC</td>
<td>85 VAC/DC - 300 VAC/DC</td>
<td>85 VAC - 300 VAC</td>
</tr>
<tr>
<td>Frequency (nominal / range)</td>
<td>44 to 66Hz</td>
<td>0 to 66Hz</td>
<td>44 to 66Hz</td>
</tr>
<tr>
<td>Maximum current</td>
<td>&gt; 0.95 at 50% load or more</td>
<td>&gt; 0.95 at 50% load or more</td>
<td>&gt; 0.95 at 50% load or more</td>
</tr>
<tr>
<td>Power Factor</td>
<td>&gt; 0.95 at 50% load or more</td>
<td>&gt; 0.95 at 50% load or more</td>
<td>&gt; 0.95 at 50% load or more</td>
</tr>
<tr>
<td>Protection</td>
<td>Variants for transient protection, Mains fuse in both lines, Disconnect above 200 VAC</td>
<td>Variants for transient protection, Mains fuse in both lines, Disconnect above 300 VAC</td>
<td>Variants for transient protection, Mains fuse in both lines, Disconnect above 300 VAC</td>
</tr>
</tbody>
</table>

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**Output Data**

- Voltage (default): 26.7 VAC
- Voltage (adjustable range): 21 - 29 VAC
- Max power, nominal input: 2000 W
- Max current: 84 A (VOUT < 24 VDC) 75 A (VOUT > 24 VDC)
- Current sharing: ±5% of maximum current from 10 to 100% load
- Static voltage regulation: ±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 VAC
- Output ripple: < 100 mVpp, 30 MHz bandwidth
- Protection: Overvoltage shutdown, Overvoltage shutdown on output, Fuse on output, Short circuit proof, High temperature protection

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**Other Specifications**

- Peak Efficiency: 90.9%
- Isolation: 3.0 kVAC – input and output, 1.5 kVAC – input earth, 0.9 kVAC – output earth
- MTBF (Telcordia SR-332 Iss.1 method III (a)): > 200 000 @ Tambient : 25°C
- Operating temperature (5% - 95% RH non-cond.): 40°C (40°F) – 167°F (75°C)
- Max output power de-rates above temp / lo: 45°C (+113°F) / 1400 W
- Storage temperature: -45°C to +85°C (-40°F to +185°F), humidity 0% – 95% RH non-condensing
- Dimensions (HxWxL): 109 x 41.5 x 327mm (4.25 x 1.69 x 13")
- Weight: < 1.9 kg (3.97 lbs)

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**Design Standards**

- Electrical Safety: IEC 60950-1, UL 60950-1, CSA 22.2
- EMC: EN 301 285 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
- Marine: ABB, DNV-OS-D202, Ch.2 Sec. 4 (DNV 2.4), Temperature Cl. A, Vibration Cl. A, Humidity Cl. A

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**Specifications are subject to change without notice**
### INPUT DATA

<table>
<thead>
<tr>
<th>Voltage (nominal range)</th>
<th>20 - 75 VDC (shUTDOWN + 15 VDC)</th>
<th>185 Vac - 275 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (operating range)</td>
<td>-</td>
<td>85 Vac - 300 Vac</td>
</tr>
<tr>
<td>Frequency (nominal / range)</td>
<td>-</td>
<td>44 to 66Hz</td>
</tr>
<tr>
<td>Maximum current</td>
<td>70 A (85 A during boost)</td>
<td>12.5 A</td>
</tr>
<tr>
<td>Power Factor</td>
<td>-</td>
<td>&gt; 0.99 at 50% load or more</td>
</tr>
<tr>
<td>Protection</td>
<td>Fuse and reversed polarity protection</td>
<td>Variants for transient protection, Mains fuse in both lines, Disconnect above 290 Vac</td>
</tr>
</tbody>
</table>

### OUTPUT DATA

<table>
<thead>
<tr>
<th>Voltage (default)</th>
<th>26 VDC</th>
<th>53 VDC</th>
<th>53.5 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (adjustable range)</td>
<td>24 - 28 VDC</td>
<td>48 - 58.5 VDC</td>
<td>43.5 - 57.6 VDC</td>
</tr>
<tr>
<td>Max power, nominal input</td>
<td>1350 W</td>
<td>1350 W</td>
<td>2000 W</td>
</tr>
<tr>
<td>Max current</td>
<td>56 A</td>
<td>28 A</td>
<td>41.7 A</td>
</tr>
<tr>
<td>Current sharing</td>
<td>-</td>
<td>±5% of maximum current from 10% to 100% load</td>
<td></td>
</tr>
<tr>
<td>Static voltage regulation (10-100% load)</td>
<td>±1% (0-100% load)</td>
<td>±0.5% (0-100% load)</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Dynamic voltage regulation</td>
<td>±0.5% for 10-90% or 90-10% load variation, regulation time &lt; 30ms</td>
<td>±0.5% for 10-90% or 90-10% load variation, regulation time &lt; 50ms</td>
<td>-</td>
</tr>
<tr>
<td>Hold up time</td>
<td>-</td>
<td>&lt; 20ms; output voltage &gt; 43.5 VDC</td>
<td></td>
</tr>
<tr>
<td>Ripple</td>
<td>-</td>
<td>&lt; 100 mV/PP, 30 MHz bandwidth</td>
<td>-</td>
</tr>
<tr>
<td>Protection</td>
<td>Short circuit proof, OR-ing diode, High temperature protection, Hot plug-in inrush current limiting, Over voltage Shutdown</td>
<td>OR-ing Diode, Short circuit proof, High temperature protection, Overvoltage shutdown</td>
<td></td>
</tr>
</tbody>
</table>

### OTHER SPECIFICATIONS

<table>
<thead>
<tr>
<th>Peak Efficiency</th>
<th>91.7 %</th>
<th>93.8 %</th>
<th>92.8 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation</td>
<td>1.2 kVDC - input to chassis</td>
<td>1.9 kVDC - CAN to chassis</td>
<td>0.0 kVDC - CAN to input</td>
</tr>
<tr>
<td>Alarms (Red LED)</td>
<td>Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warnings (Yellow LED)</td>
<td>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 communication with control unit, Stand alone mode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MODEL

<table>
<thead>
<tr>
<th>48/1350 HE DC/DC</th>
<th>48/1350 HE DC/DC</th>
<th>48/2000 HE DC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>241115.600</td>
<td>241115.602</td>
</tr>
<tr>
<td>Voltage (default)</td>
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<td>-</td>
</tr>
<tr>
<td>Voltage (adjustable range)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Max power, nominal input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Max current</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Current sharing</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Static voltage regulation (10-100% load)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dynamic voltage regulation</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hold up time</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ripple</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Protection</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### OUTPUT DATA

<table>
<thead>
<tr>
<th>Voltage (default)</th>
<th>53.5 V</th>
<th>53.5 V</th>
<th>53.5 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (adjustable range)</td>
<td>43.5 - 57.6 V</td>
<td>39.5 - 72 V</td>
<td>89.2 - 171.6 V</td>
</tr>
<tr>
<td>Max power, nominal input</td>
<td>2000 W</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Max current</td>
<td>41.7 A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Current sharing</td>
<td>±5% of maximum current from 10% to 100% load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Static voltage regulation (10-100% load)</td>
<td>±0.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic voltage regulation</td>
<td>±0.5% for 10-90% or 90-10% load variation, regulation time &lt; 50ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hold up time</td>
<td>-</td>
<td>&lt; 20ms; output voltage &gt; 53.5 V</td>
<td></td>
</tr>
<tr>
<td>Ripple</td>
<td>-</td>
<td>&lt; 100 mV/PP, 30 MHz bandwidth</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Fuse, OR-ing diode, High temperature protection, Hot plug-in inrush current limiting, Over voltage Shutdown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OTHER SPECIFICATIONS

<table>
<thead>
<tr>
<th>Peak Efficiency</th>
<th>96.5%</th>
<th>96.0%</th>
<th>91.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation</td>
<td>3.0 kVAC - input and output, 1.5 kVAC - input earth, 0.5 kVDC - output earth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarms (Red LED)</td>
<td>Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warnings (Yellow LED)</td>
<td>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 communication with control unit, Stand alone mode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MODEL

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>241115.105M</td>
<td>241115.805M</td>
<td>241115.815M</td>
</tr>
<tr>
<td>Voltage (default)</td>
<td>185 Vac - 275 Vac</td>
<td>185 Vac - 275 Vac</td>
<td>185 Vac - 275 Vac</td>
</tr>
<tr>
<td>Voltage (adjustable range)</td>
<td>85-300 Vac - 140/275 Vac</td>
<td>85 Vac - 300 Vac</td>
<td>85 Vac - 300 Vac</td>
</tr>
<tr>
<td>Frequency (nominal / range)</td>
<td>45 to 66Hz / 0Hz</td>
<td>0 to 66Hz</td>
<td>0 to 66Hz</td>
</tr>
<tr>
<td>Maximum current</td>
<td>11.6 A</td>
<td>11.9 A</td>
<td>11.9 A</td>
</tr>
<tr>
<td>Power Factor</td>
<td>&gt; 0.99 at 50% load or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Fuse in both lines, Variator for transient protection, Disconnect above 300 Vac</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OUTPUT DATA

<table>
<thead>
<tr>
<th>Voltage (default)</th>
<th>53.5 V</th>
<th>53.5 V</th>
<th>53.5 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (adjustable range)</td>
<td>43.5 - 57.6 V</td>
<td>39.5 - 72 V</td>
<td>89.2 - 171.6 V</td>
</tr>
<tr>
<td>Max power, nominal input</td>
<td>2000 W</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Max current</td>
<td>41.7 A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Current sharing</td>
<td>±5% of maximum current from 10% to 100% load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Static voltage regulation (10-100% load)</td>
<td>±0.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic voltage regulation</td>
<td>±0.5% for 10-90% or 90-10% load variation, regulation time &lt; 50ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hold up time</td>
<td>-</td>
<td>&lt; 20ms; output voltage &gt; 53.5 V</td>
<td></td>
</tr>
<tr>
<td>Ripple</td>
<td>-</td>
<td>&lt; 100 mV/PP, 30 MHz bandwidth</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Fuse, OR-ing diode, High temperature protection, Hot plug-in inrush current limiting, Over voltage Shutdown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OTHER SPECIFICATIONS

<table>
<thead>
<tr>
<th>Peak Efficiency</th>
<th>96.5%</th>
<th>96.0%</th>
<th>91.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation</td>
<td>3.0 kVAC - input and output, 1.5 kVAC - input earth, 0.5 kVDC - output earth</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warnings (Yellow LED)</td>
<td>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 communication with control unit, Stand alone mode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Design Standards

**Electrical safety**


**EMC**

| EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, Electrolux NEBS GR1098 CORE |

**Mains Harmonics**

- |

**Environment**

| EN 300 019: 2-1 (Class 1.2, 2.2 (Class 2.3) & 2-3 (Class 2.3)) R<td>2011/65/EU) and WEEE (2002/96/EC) compliant |

**Marine**

| ABS (Pending), DNV-OS-DO2.02, Ch.2 Sec. 4, (DNV 2.4) Temperature Cl. A, Vibration Cl. A, Humidity Cl. A |

### Design Specifications

**Electrical safety**

| IEC 60950-1, UL 60950-1, CSA 22.2 |

**EMC**

| EN 60950-1, UL 60950-1, CSA 22.2 |

| EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, Electrolux NEBS GR1098 CORE |

**Environment**

| IEC 60950-1, UL 60950-1, CSA 22.2 |

| EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, Electrolux NEBS GR1098 CORE |

**Marine**

| ABS (Pending), DNV-OS-DO2.02, Ch.2 Sec. 4, (DNV 2.4) Temperature Cl. A, Vibration Cl. A, Humidity Cl. A |
500W & 1000W HE 24/48 V

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.

The 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.

The Flatpack S follows the strictest Marine & Offshore specifications.

Flatpack S Rectifiers

500W & 1000W HE 24/48V

Key Features

- Meets DNV class B
- Alarm relay output - (DC/DC converter)
- Accepts DC input
- High efficiency
- Power density - 47W/Inch 3
- Short
- Small
- Overvoltage protection
- Meets DIN 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.

The Flatpack S follows the strictest Marine & Offshore specifications.

Specifications

**APPLICATIONS**

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

**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.

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

**DESIGN STANDARDS**

- Electrical safety
- EMC
- Environment
- Marine

**INPUT DATA**

- Voltage (nominal range)
- Voltage (operating range)
- Frequency (nominal / range)
- Maximum current
- Power Factor
- Protection

**OUTPUT DATA**

- Voltage (default)
- Voltage (adjustable range)
- Max power, nominal input
- Max power, @ 85%Vdc
- Max current
- Current sharing
- Static voltage regulation
- Dynamic voltage regulation
- Hold up time
- Ripple
- Protection
- Overvoltage protection, SIL3 parameters

**OTHER SPECIFICATIONS**

- Peak Efficiency
- Isolation
- Operating temperature
- Max power output de-rates above temp / to
- Storage temperature
- Dimensions (Weight / Weight)

**NOTES**

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.

Errors and Omissions Excepted
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/RoF cells
- Small base stations / repeaters
- Fixed & mobile broadband
- FTtx
- Power utilities
- Control & protection
- Scalability
- 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 - 300VAC/DC input
- 12, 24-30, 48V DC output versions
- NC/AC 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

Rectifiers

Micropack Rectifiers
Compacpack Controller

Micropack Rectifiers Compack Controller
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Micropack Rectifiers Compack Controller
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APPLICATIONS
- Telecom
- LTE/RoF cells
- Small base stations / repeaters
- Fixed & mobile broadband
- FTtx
- Power utilities
- Control & protection
- Scalability
- 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 - 300VAC/DC input
- 12, 24-30, 48V DC output versions
- NC/AC 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

Rectifiers

Micropack Rectifiers
Compacpack Controller
### MARINE FILTER

**DIN Rail Marine filter**
(241120/930)

### MICROPACK SYSTEM BUILDING BLOCKS - COMPATIBILITY MATRIX

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Output Voltage</th>
<th>Output grounding</th>
<th>Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>241120.900</td>
<td>Powercore -1</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>Rectifier, DCC1</td>
</tr>
<tr>
<td>241120.901</td>
<td>Powercore -2</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.902</td>
<td>Powercore -3</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.903</td>
<td>Powercore -4</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.904</td>
<td>Powercore -5</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.905</td>
<td>Powercore -6</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.906</td>
<td>Powercore -7</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.907</td>
<td>Powercore -8</td>
<td>12V / 24V / 48V</td>
<td>DC+ / DC- / FLO</td>
<td>x</td>
</tr>
<tr>
<td>241120.910</td>
<td>Batt dist.</td>
<td>x x x x x x x x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>241120.911</td>
<td>Bulk feed</td>
<td>x x x x x</td>
<td>x x x x x x x x x</td>
<td>x</td>
</tr>
<tr>
<td>241120.912</td>
<td>Bulk feed LVD</td>
<td>x x x x x</td>
<td>x x x x x x x x x</td>
<td>x</td>
</tr>
<tr>
<td>241120.913</td>
<td>Dummy Module</td>
<td>x x x x x</td>
<td>x x x x x x x x x</td>
<td>x</td>
</tr>
<tr>
<td>241120.914</td>
<td>Bulk feed LVD</td>
<td>24/48</td>
<td>x x x x x</td>
<td>x</td>
</tr>
<tr>
<td>241120.915</td>
<td>Batt dist.</td>
<td>24/48</td>
<td>x x x x x</td>
<td>x</td>
</tr>
<tr>
<td>241120.920</td>
<td>Load dist.</td>
<td>x x x x x</td>
<td>x x x x x x x x x</td>
<td>x</td>
</tr>
<tr>
<td>251875</td>
<td>Module</td>
<td>x x x x x x x x</td>
<td>x x x x x x x x x</td>
<td>x</td>
</tr>
</tbody>
</table>

### 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 applicable

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

### OUTPUT DATA

<table>
<thead>
<tr>
<th>Model</th>
<th>Battery Dist.</th>
<th>Bulk Feed</th>
<th>Bulk Feed LVD</th>
<th>Load Dist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>241120.900</td>
<td>241120.910 / 915</td>
<td>241120.911</td>
<td>241120.912 / 914</td>
<td>241120.920</td>
</tr>
</tbody>
</table>

#### System voltage support

- 48 / -24 – -48 VDC
- Unprotected bulk output connections
- Protcted load output connections (plug-able single pole MCB in negative)
- Connection to Load dist (241120.920)
- Unprotected battery output connections (shunt and LVBD in positive)
- Protcted battery output connections (single pole MCB, shunt and LVBD in negative)
- Output Protection in rectifiers/converters

#### Control system connection terminals

- CAN (1 x RJ45)
- CAN (1 x RJ45)
- CAN (1 x RJ45)
- CAN (1 x RJ45)
- CAN (1 x RJ45)
- 1 x LVD
- 2x fuse fall
- 1 x current shunt
- 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]

Specifications are subject to change without notice
**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 aluminum 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 PCBAs to protect against common dust and chemical pollutants

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

**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 transitory 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.

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

**Rectifiers**

**Model Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>3A 24VDC</th>
<th>5A 24VDC</th>
<th>10A 24VDC</th>
<th>20A 24VDC</th>
<th>40A 24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>DRM-24V30W1PN</td>
<td>DRM-24V120W1PN</td>
<td>DRM-24V240W1PN</td>
<td>DRM-24V480W1PN</td>
<td>DRM-24V960W1PN</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>24V</td>
<td>24V</td>
<td>24V</td>
<td>24V</td>
<td>24V</td>
</tr>
<tr>
<td><strong>Output Voltage Range</strong></td>
<td>24-28V</td>
<td>24-28V</td>
<td>24-28V</td>
<td>24-28V</td>
<td>24-28V</td>
</tr>
<tr>
<td><strong>Output Current</strong></td>
<td>3.40-3.00A</td>
<td>5.00-4.50A</td>
<td>10.0-9.00A</td>
<td>20.0-17.0A</td>
<td>40A</td>
</tr>
<tr>
<td><strong>Output Power</strong></td>
<td>81.6W</td>
<td>120W</td>
<td>240W</td>
<td>480W</td>
<td>960W</td>
</tr>
<tr>
<td><strong>Line Regulation</strong></td>
<td>20mV (at 24V input, 100% load)</td>
<td>20mV (at 24V input, 100% load)</td>
<td>10mV (at 24V input, 100% load)</td>
<td>&lt; 10mV (at 24V input, 100% load)</td>
<td>&lt; 50V (at 24V input, 100% load)</td>
</tr>
<tr>
<td><strong>Load Regulation</strong></td>
<td>100mV (at 24V input, 100% load)</td>
<td>100mV (at 24V input, 100% load)</td>
<td>100mV (at 24V input, 100% load)</td>
<td>&lt; 100mV (at 24V input, 100% load)</td>
<td>&lt; 100mV (at 24V input, 100% load)</td>
</tr>
<tr>
<td><strong>FAD (20MHz)</strong></td>
<td>&lt; 50mVpp</td>
<td>&lt; 100mVpp</td>
<td>&lt; 100mVpp</td>
<td>&lt; 100mVpp</td>
<td>&lt; 100mVpp</td>
</tr>
<tr>
<td><strong>Hold-up Time</strong></td>
<td>&gt; 28ms @ 120Vac &amp; 230Vac</td>
<td>&gt; 28ms @ 120Vac &amp; 230Vac</td>
<td>&gt; 30ms @ 120Vac &amp; 230Vac</td>
<td>&gt; 23ms @ 120Vac &amp; 230Vac (100% load)</td>
<td></td>
</tr>
</tbody>
</table>

**INPUT**

| **Phase Input** | Single Phase |
| **Input Voltage Range** | 5.00-4.50A |
| **Input Frequency** | 47-63Hz |
| **Input Current** | < 0.90A @ 24Vac, < 0.60A @ 230Vac, < 1.12A @ 24Vac, < 0.62A @ 230Vac |
| **Efficiency** | > 90% at 120Vac, > 90.1% at 120Vac, > 91.6% at 120Vac, > 92.7% at 230Vac |
| **Max Input Current (Cold start)** | < 7A @ 120Vac, < 7.1A @ 230Vac, < 15A @ 120Vac & 230Vac |
| **Power Factor** | > 0.95 @ 120Vac, > 0.80 @ 230Vac, > 0.99 @ 120Vac, > 0.91 @ 230Vac |
| **Leakage Current** | < 0.36mA |
| **Environmental Category** | Class B, IEC/EN 61010-032, Class II |

**MECHANICAL**

| **Case Cover** | Aluminium |
| **Dimensions (L x W x H)** | 124 x 32 x 102 mm (4.88" x 1.26" x 4.02") |
| **Unit Weight** | 0.50 kg (1.10 lb) |
| **Cooling System** | Convection |
| **MTBF** | > 2,000,000 hrs |

**ENVIRONMENT**

| **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) |
| **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) |

**DESIGN STANDARDS**

| **Hazardous Locations** | ATEX and Class I, Div 2 |
| **Marine** | ABS - DRM-24V120W1PN / DNV - DRM-24V480W1PN, DRM-24V960W1PN |

**ATEX Certified Versions**

| **Model** | **KQ** II DIN rail Power Supply 24V 5A 1P (ATEX) |
| **Model** | **KQ** II DIN rail Power Supply 24V 10A 1P (ATEX) |
| **Model** | **KQ** 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 (P: 120Vac, O: 100% load, Ta: 25°C).
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/WMAX
- 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
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.

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.

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 REDUNDANT 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 of 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.

KEY FEATURES

• DNV approved
• No single point of failure
• Efficiency and selectivity
• Full scalability
• 15% Power boost for 15s
• 10xIₚ short circuit current for 20ms
• Clean output
• Transfer time reduced to zero

APPLICATIONS

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

EFFICIENCY

• Efficiency up to 96%
• Reduction energy losses by 70%
• Positive carbon impact “Green solution”
• Elimination of external static switch and

KEY FEATURES

• Expandable solution and modular architecture
• AC mains filtering
• Galvanic isolation is ensured between batteries and AC output

MODEL

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BRAVO 2.5kVA 220VDC-230VAC INVERTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>241560.322</td>
</tr>
</tbody>
</table>

INPUT DATA (DC)

| Nominal voltage | 220V DC |
| Voltage range (DC) | 170Vdc – 300Vdc |
| Nominal current | 9.8A |
| Current, maximum (for 15 seconds) | 14.9 APeak |
| Input protection | 12xC16A 2 pole MCB |

INPUT DATA (AC)

| Nominal voltage (AC) | 230Vac |
| 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 |
| Voltage range (AC) | 200 - 240V |
| Frequency | 50-60Hz; 0.03% |
| Crest factor | 3 : 1 |
| Nominal current | 10.9A |
| Short circuit clear up capacity (AC mains available) | 10 x In for 20ms; 1.5 x In after 15sec |
| Short circuit current after clear up capacity | 2.1 In during 15 s and 1.5 In after 15 s |

OTHER SPECIFICATIONS

| Efficiency | > 96.5% EPC mode |
| Temperature | Operating: -20 to +70°C; derating 50°C to 70°C |
| Relative humidity | 95%, non-condensing |
| Driectric strength DC/AC | 4300 VDC |
| Signalizing and supervision | LED; Dry contact alarm output; remote on/off |
| Cooling | Forced |
| 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) |
| o Temperature Cl. C |
| o Vibration Cl. A |
| o Humidity Cl. A |

ORDERING INFORMATION

| 241560.322 | Bravo TSI 2.5kVA 220VDC, 230VAC inverter module |

Specifications are subject to change without notice.
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.

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 24 hours 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.

NO PC TO HOOK ON TO THE CONTROLLER – NO PROBLEM!

- Key system status parameters displayed by default: alarms, battery voltage, rectifier current and load current.
- Single key-hit to display list of triggered alarms.
- All configurations and setup available from the menus.
- High resolution and contrast – excellent reading and able to show complex content.
- 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.
- Disable external alarms while servicing.
- Access control – pin code to change configuration.

SETUP DATA AND LOGS – BRING YOUR SD CARD.

- Convenient storage – for backup and transportation.
- Easy and robust to roll out a set of systems with identical setup.

OUTPUT DATA

Controllers

Spesifications are subject to change without notice
**CONTROL FEATURES**

**POWER & CONTROL SYSTEM**
- AC Mains Low (2-level)
- AC Phase Voltage x3 (2-level)
- "Digital" Inputs (programmable descriptions)
- Events trigger by inputs

**LOAD**
- Load Disconnect
- Voltage or Timer (from mains failure)
- "Mains independent"
- Load Fuse
- Load Current

**BATTERY**
- Battery Voltage (4-level, optional 8-level)
- Battery Temperature (2-level)
- Battery Used Capacity (2-level) [Ah or %]
- Battery Remaining Capacity (2-level) [Ah or %]
- Battery Fuse
- Symmetry Failure (2-level)
- Only with BM Can Node
- Battery Quality after test (2-level)
- Battery Current (4-level)
- Battery Life Time (2-level) [from temperature log]

**RECTIFIER**
- Rectifier Voltage (4-level, optional 8-level)
- Rectifier Temperature (2-level)
- Rectifier Used Capacity (2-level)
- Rectifier Current (2-level)
- Rectifier Current (4-level)
- Rectifier Life Time (2-level) [from temperature log]

**GENERATOR**
- Rectifier Failure (2-level)
- Rectifier Capacity (2-level)
- Rectifier Avg. Temperature (2-level)
- Rectifier Current Share (2-level)

**ALARMS/EVENTS AVAILABLE**
- On/Off control for cyclic charging and fuel reduction
- Start-up delay of power system
- Fuel consumption logging and alarming based on tank level measurement
- Discharge cycle counter/Generator run hour logging
- DoD [%] logging with time stamp

**SPECIFICATIONS**

**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/Analog Temperature: NTC probe
- **System Connections**
  - Voltage Sense
  - Current Sense
  - Battery Fuse*
  - Load Fuse*
- **Environment**
  - Temperature Range: -40 to +65°C (-40 to 140°F)
- **Electrical safety**
  - UL 60950-1, EN 60950-1, CSA 22.2
  - EMC
  - ETSI EN 300 386 V.1.3.2
  - All units

**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

**SPECIFICATIONS – I/O MONITOR (TYPE 2)**

- **Configurable Inputs**
  - 6x NO/NC/Analog Voltage [0-75V]
- **Alarm Outputs**
  - 6x Relay Dry/Form C
- **Max I/O Monitors**
  - 14 units on a single CAN-bus
- **Power Consumption**
  - Max 3.6W
- **Dimensions (WxHxD)**
  - 155 x 35 x 80mm
  - 5.3 x 0.9 x 3.2"

**GENERAL SPECIFICATIONS – ALL UNITS**

**Environment**
- Enclosure Cl. A
- Humidity Cl. A
- Vibration Cl. A

**Electrical safety**
- UL 60950-1, EN 60950-1, CSA 22.2
- EMC
- ETSI EN 300 386 V.1.3.2

**Electrical Harmonics**
- Mains independent
- Temperature dependent
- Optional

**Battery**
- 6x Relay–Dry/Form C
- Industrial Basic
- > 1300000 hours Telcordia SR-332 Issue I, method III (Tambient: 25°C)
- Load Monitor

**Controller**
- Smartnode RS232/485
- 10/100 BASE-T / HP Auto MDI/MDI-X
- ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2)
- ETSI EN 300 386 V.1.3.2

**Battery Monitor**
- 10000 time stamped values of 10 user defined monitoring points
- Max 4.5W
- Battery Monitor
- SMTP Client and NTP Client.

**Specifications are subject to change without notice**
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 port
- Fan speed monitoring
- Automatic battery monitoring and test
- Battery quality indication (based on test results)

MODEL

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SMARTPACK S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>242100.410M</td>
</tr>
<tr>
<td>242100.415M (Panel mount)</td>
<td></td>
</tr>
</tbody>
</table>

INPUT DATA

<table>
<thead>
<tr>
<th>Nominal voltage</th>
<th>10-75VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption, max - no relays energized</td>
<td>3,1W (display sleep)</td>
</tr>
<tr>
<td>max - all relays energized</td>
<td>5,5W (display on)</td>
</tr>
</tbody>
</table>

SYSTEM CONNECTIONS - SYSTEM MONITORS

| Voltage sense, system voltage support | 12 VDC, 24VDC, 48VDC & 60VDC |
| Current sense, shunt support | 0 - 20mA and 0 - 60mA |
| 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[±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”) |
| 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 |
| Environment | ETSI EN 300 019: 2-1 (Class 1.2), 2-2 (Class 2.3) & 2-3 (Class 3.2) |

Specifications are subject to change without notice
COMPACK INTERFACE KIT

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
- Industrial
- Micropack 12V & 24V
- Compack interface kit

Micropack 1000W Convection Cooled System
Compack Interface Kit

Key Features
- Remote monitoring via ethernet
- SNMP (v1/3/C/V1)
- Web pages
- Email of logs and alarms
- 3 Configurable relays
- 3 Multipurpose inputs
- Temperature
- Symmetry
- Digital input
- 2 LVD controls (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

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.

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): 76 x 30 x 115mm / 2.95 x 1.2 x 4.52”
- Weight: 240g / 0.53 lbs
- 12V support from HW rev. HW1.3. HW version 1.0 – 1.2 input voltage range: 17 – 75 VDC

MODEL
<table>
<thead>
<tr>
<th>COMPACK</th>
<th>COMPACK INTERFACE KIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>242100.400</td>
</tr>
</tbody>
</table>

Electrical Specifications
- Input Voltage: 9 - 75 VDC, shutdown < 8.5 VDC*
- Temperature Range: Nominal: -20 to +60 C (4 to 140 F) Reduced accuracy: -40 to +70 C
- Power Consumption: 107.6 x 41.4 x 175.5mm / 2.24 x 1.63 x 6.91”
- Weight: 107.6 x 41.4 x 175.5mm / 2.24 x 1.63 x 6.91”
- Energy Calculation
- Efficiency Management
- Emergency Voltage
- Battery test, BoostInhibit, Emergency low voltage, Clear manual reset alarms.

Power & Control System
- Load: Mains independent (optional)
- Battery: Battery Voltage (4-Level, optional 8-Level), Battery Temperature (2-Level), Battery Used Capacity (2-Level) [Ah or %], Battery Remaining Capacity (2-Level) [Ah or %], Battery Fuse, Battery Life Time (2-Level) (from temperature log)
- Rectifier / Converter: Rectifier Failure (2-Level), Rectifier Capacity (2-Level), Rectifier Current (2-Level), Rectifier Avg. Temperature (2-Level), Rectifier Current Share (2-Level)

Controller 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

Specifications are subject to change without notice
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.
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

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.

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

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

GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>VRLA</th>
<th>Ni-CD</th>
<th>Li-ion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell voltage (nominal)</td>
<td>2V</td>
<td>1.2V</td>
<td>3.6V</td>
</tr>
<tr>
<td>Recommended float charge (V)</td>
<td>2.28V</td>
<td>1.43V</td>
<td>4.2V</td>
</tr>
<tr>
<td>Typical recharge time (hr)</td>
<td>10-12h</td>
<td>10-15h</td>
<td>3.5</td>
</tr>
<tr>
<td>Operational life</td>
<td>10 years @ +20°C</td>
<td>20 years @ +20°C</td>
<td>20 years</td>
</tr>
<tr>
<td>Life cycle (80% DOD; +20°C)</td>
<td>100-200 cycles</td>
<td>2000 cycles</td>
<td>3000 cycles</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-30 to +55°C (-22 to +131°F)</td>
<td>-40 to +70°C (40 to +149°F)</td>
<td>-40 to +65°C (-40 to +149°F)</td>
</tr>
<tr>
<td>Storage Duration</td>
<td>6 months</td>
<td>Up to 24 months</td>
<td>+10 to +35°C (+50 to +95°F)</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Low maintenance</td>
<td>Low maintenance</td>
<td>Low maintenance</td>
</tr>
</tbody>
</table>

DESIGN STANDARDS

- Electrical safety: UL 60950, UL 1642(cell) | EN 50272-2 | UL 60950, UL 1642(cell) | ETSI EN 300 386 |
- EMC: ETSI EN 300 386 | GR 3108 class 3 | ETSI EN 300 386 | GR 3108 class 3 |
- Environment: ETSI EN 300 019

Specifications are subject to change without notice.
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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marine@eltek.com

EXPERIENCE THE POWER.