

A blurred high-speed train in motion, captured in a station setting. The train is moving from left to right, creating a sense of speed. The background shows the station's structure and tracks. Overlaid on the left side are several large, semi-transparent red arrows pointing right, suggesting forward movement or progress. The overall color palette is dark blue and red.

# Power Systems

# Reliability – Always feature number one

**Modularity and No Fans means the Lowest Total Cost of Ownership over 20 Year Life Time**



## MHE Rectifiers – Field proven reliability

- No Fan issues
- No Dust issues in electronics
- Efficiency 97%, low heat losses
- Field return rate < 0.2%
- Installation base > 15 000 modules
- Warranty 5 Years



**Over 40 years of experience in critical backup power systems – reliability always priority one**

# OPUS HE Systems product family summary



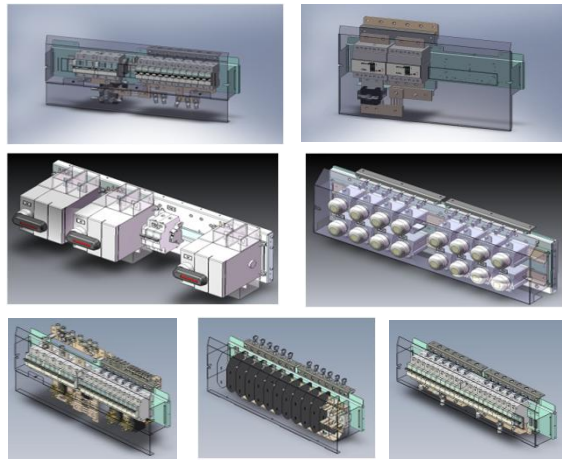
Wall Chargers



19" Rack Systems



Cabinet Systems



Electrical Options



Rectifiers



Inverters



DC/DC Converters



Controllers, Displays and aux Controllers



Modules for Systems



# MHE Rectifiers



Voltage	Rectifier
220	2.0 kW
125	2.0 kW
110	2.0 kW
60	2.0 kW
48	2.0 kW
24	1.5 kW

- Efficiency 97% @ 50% power, >96% 30%-70%
- Systems up to 70kW
- MTBF / Telcordia SR-332 > 1 800 000 h @ 25°C
- Front cabling – no backplanes
- Wide Input range: 85 – 300 VAC
- Wide Temp.range: -40°C...+70°C (see de-rating)

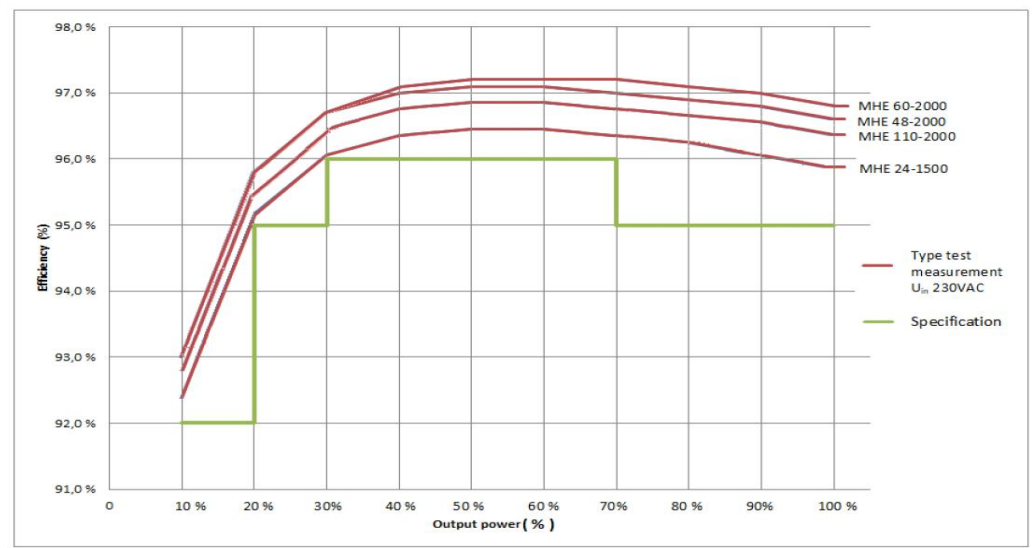
## RAIL CERTIFICATION

Harmonized EN Standards for Rail Track side Applications (MHE & VID12)

EN50124-1 Safety / Insulation Coordination

EN50121-4 EMC, Signalling & communication equipment

EN50121-5 EMC, Rail Substation equipment



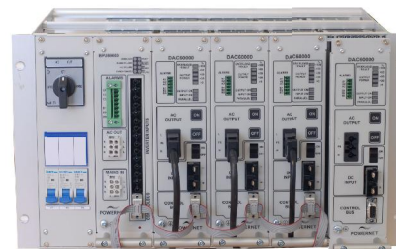
# OPUS DAC60000 Inverters



Modular Architecture & No Fans



- VIDI+ controlled full functional inverter system with static switch, manual bypass, AC distribution
- Natural convection cooled modules:
  - 24VDC / 230VAC 1000VA
  - 48-60VDC / 230VAC 1000VA
  - 110-125VDC / 230VAC 1000VA
  - 220VDC / 230VAC 1000VA
- Modularity, n+1 redundancy
- Power range 1kVA – 24kVA, parallel connection of 1-20 modules
- Integration of the modules to OPUS cabinet



Rail

## RAIL CERTIFICATION

Harmonized EN Standards for Rail Track side Applications

EN50124-1 Safety / Insulation Coordination

EN50121-4 EMC, Signalling & communication equipment

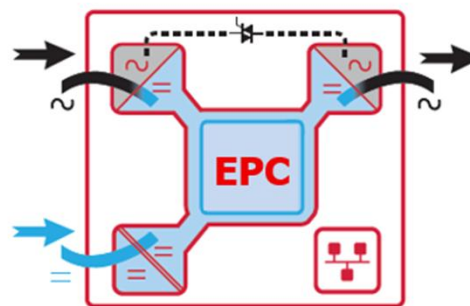
EN50121-5 EMC, Rail Substation equipment



# OPUS Bravo Inverters



- High power applications, 3kVA modules
- Configurable default supply AC (EPC) or DC
- DC input models 48VDC and 110/125VDC
- OPUS modular DC+AC UPS systems with internal battery backup up to 36kVA/30kW
- Inverter cabinets 1-p and 3-p up to 60kVA
- OPUS cabinet alternatives OC2066, OC1666, IC2066, IC1666, RC2066 Rittal VX25
- Configurable load distribution
- Options: A+B double DC input



***"Built-in Bypass"***  
Included in each  
inverter module



# OPUS DC/DC Converters

## Modular Architecture

Description	Input voltage range	Nominal output	Output setting & max power
EDC 110-220/12-750	65-300VDC	12VDC	0-36VDC / 750W
EDC 110-220/24-750	65-300VDC	24VDC	0-36VDC / 750W
EDC 110-220/36-750	65-300VDC	36VDC	0-54VDC / 750W
EDC 110-220/48-750	65-300VDC	48VDC	0-72VDC / 750W
EDC 110-220/60-750	65-300VDC	60VDC	0-108VDC / 750W
EDC 110-220/110-750	65-300VDC	110VDC	0-144VDC / 750W

- Modularity, n+1 redundancy, parallel connection 500W – 10kW



Rack mounting adapter  
Plug-in unit for OPUS racks



Converters installed to OPUS cabinet



19" converter rack up to 3,75kW



# VIDI+ & VIDI2 System Controllers

## Basic functionality

- Float charging, boost charging and temperature compensated charging
- 12 x configurable relay alarms
- 12 x configurable inputs (alarm, temp. control)
- Alarm and event logs
- Energy saving function
- Earth leakage monitoring
- Remote monitoring: Modbus, Ethernet, SNMP, IEC61850 SCADA, RS-232

## Extensive battery monitoring

- Battery current monitoring
- Charge current limitation
- Battery testing
- Battery Health Analysis & alarm
- Graphical battery test information
- Battery deep discharge protection
- Battery temperature measurement
- Battery midpoint and block voltage monitoring



VIDI+ / VIDI2 Controller & VIDI aux controllers



System measurements, diagnostics and parameter setting



UIF Display



UIF Touch Service Display



Control & Monitoring for Rectifiers and Inverters



# VIDI+ System Controller, Remote Access & Web Interface

The screenshot displays the VIDI+ web interface in a browser window. The address bar shows the URL <http://192.168.40.109/epos.cgi/>. The interface includes a navigation menu on the left with links for Status, Measurements, Actions, Event Log, Alarm Log, Battery Test Log, System Logs, Inventory, Parameters, Maintenance, Administration, Username: admin, and Logout.

The main content area is titled "Update" and "Status". It displays the following information:

- Local Time: 29.09.2019 13:00:43
- Voltage Version: 48 V
- Charge Mode: Float Charge
- System Voltage: 54.6 V
- Load Current: 0.9 A
- Rect. Current: 0.8 A
- Batt. Current: -0.2 A
- Batt. Discharge: 12.8 Ah
- Batt. State: In Stand-by
- Active Alarms: 0
- Non-acknowledged Alarms: 37
- System Location: Demo Hall, Efore Powernet Oy, Vantaa
- System Serial Number: AP218240002

Below the status information, there are three sections:

- Rectifiers:** A table showing the status of three rectifiers (G1, G2, G3).
- Inverters:** A section indicating "No inverter devices present".
- Bypass:** A section indicating "No bypass modules present".

On the right side, there is a "System Measurements" section with a "Start Auto-update" button. It displays the following data:

- Voltage version: 48 V
- Battery Status: In Stand-by
- System voltage: 54.6 V
- Rect. Current: 0.7 A
- Batt. Current: -0.2 A
- Load Current: 0.9 A
- Discharged: 12.8 Ah

Below this, there are sections for "Temperatures", "Battery Lifetime", and "Battery Measurements".

**Temperatures:**

- A1-pT16: System Temperature: 36.9 C
- A1-pDT3: Battery Temperature Tbl: 21.0 C

**Battery Lifetime:**

- Battery Temperature Lifetime Used Factor: 7.6 %
- Battery Temperature Lifetime Remaining: 4.6 years
- Battery Cycle Lifetime Used Factor: 100.0 %
- Battery Cycle Lifetime Remaining: 0 cycles
- Deepest Battery Discharge Depth: 99.5 %
- Measured Battery Temperature: 21.0 C
- Battery Configured Design Temperature: 20.0 C
- Battery Configured Design Lifetime: 5.0 years
- Battery Configured Base Cycles: 1000 cycles

**Battery Measurements:**

- A1-pI1: Battery Current Rb1: -0.2 A

**Battery String 1:**

- A5-pUb1: Battery Voltage B1: 54.78 V
- A5-pUb1: Block Voltage B1.1: 13.95 V
- A5-pUb2: Block Voltage B1.2: 13.40 V
- A5-pUb3: Block Voltage B1.3: 13.71 V
- A5-pUb4: Block Voltage B1.4: 13.50 V

- Ethernet (TCP/IP), Modbus TCP/IP, IEC61850 SCADA, SNMP, RS-232
- TCP/IP protocols: HTTP, HTTPS, telnet, SSH, SMTP, SNMP, NTP and DHCP
- Network Security

# OPUS HE, Configurable Cabinet Power Systems

## Footprint 600 x 600mm, 4.5kW – 24kW



- Dimensions:  
H 2000 x W 600 x D600 mm OR  
H 1600 x W 600 x D600 mm
- OPUS Cabinets IP20/IP21  
IC Cabinets IP20/21, IP31/31  
RC Rittal VX25 cabinets IP20/21, IP40/41
- Configurable features:
  - Qty of Rectifier Modules
  - Qty of Battery Shelves
  - Battery fuses, MCB/Fuse/MCCB
  - Load distribution
  - A+B double system
  - Battery test discharging KIT
  - Battery LVD, Load LVD
  - Blocking diodes, dropping diodes
- Inverter and DC/DC Converters options
- Cabling access from the top, bottom access option



# OPUS HE, Configurable Cabinet Power Systems

## Footprint 800 x 600mm, 12kW – 70kW



- IC 2086 cabinets:  
H 2000 x W 800 x D600 mm  
IP20/21, IP31/31, IP40/IP41
- Configurable features:
  - Qty of Rectifier Modules
  - Qty of Battery Shelves
  - Battery fuses, MCB/Fuse/MCCB
  - Load distribution
- Inverter and DC/DC Converters options
- Cabling access from the top, bottom access option

# OPUS Inverter Systems

## Configurable Cabinet AC Power Systems 1kVA - 16.8kVA



OC2066 Cabinets:  
 H 2000 x W 600 x D 600 mm  
 1-5 x inverters, 1kVA - 6kVA  
 1-14 x inverters, 1kVA - 16.8kVA



IC2086 Cabinets:  
 H 2000 x W 800 x D 600 mm  
 1-9 x inverters, 1kVA - 10.8kVA

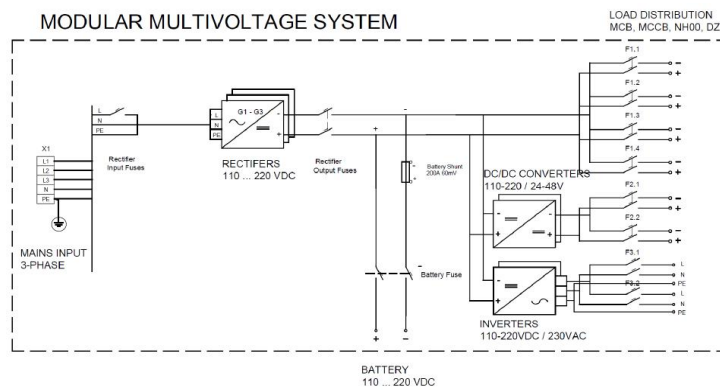


OC0864 Wall Cabinets:  
 H 800 x W 600 x D 490 mm  
 1-5 x inverters, 1kVA - 6kVA

# OPUS HE WMC Wall Charger Systems

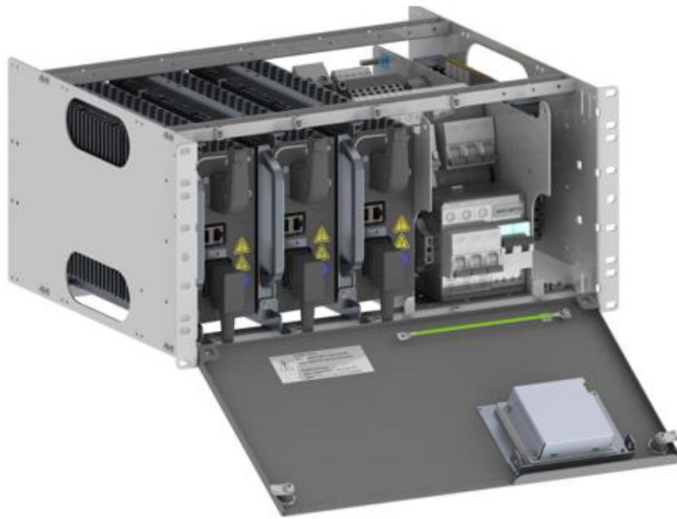


- Dimensions:  
H 800 x W 600 x D400 mm
- OPUS Cabinets IP20/IP21
- Configurable features:
  - Qty of Rectifier Modules
  - Battery fuses, Switch fuse / NH00
  - Load distribution
- Inverter and DC/DC Converters options
- Cabling access from the top and bottom
- A+B double Systems



# OPUS HE Rack System 5U

- 19" rack assembly or wall-mounted
- Common modular construction for all systems from 24 VDC to 220 VDC
- VID12 system controller based
- Flexible UIF installation
- Maximum output power 6,0 kW
- Dimensions (h\*w\*d): 223\*482\*380 mm
- IP20 class protection
- Place for 3 MHE-rectifiers
- Battery fuse, optional battery LVD
- Optional Rack flat pack shipment



19" Load distribution panels

# OPUS HE Rack System 12U



- 19" rack assembly or wall-mounted
- Common modular construction for all systems from 24 VDC to 220 VDC
- Maximum output power 10,0 kW
- VID12 system controller based
- Dimensions (h\*w\*d): 533\*438\*370 mm
- IP20, Option IP21, Option wall mounting
- Load distribution: 1-10 x 1-pole MCB + aux or 1-6 pcs x 2-pole MCB + aux
- Battery connection MCB

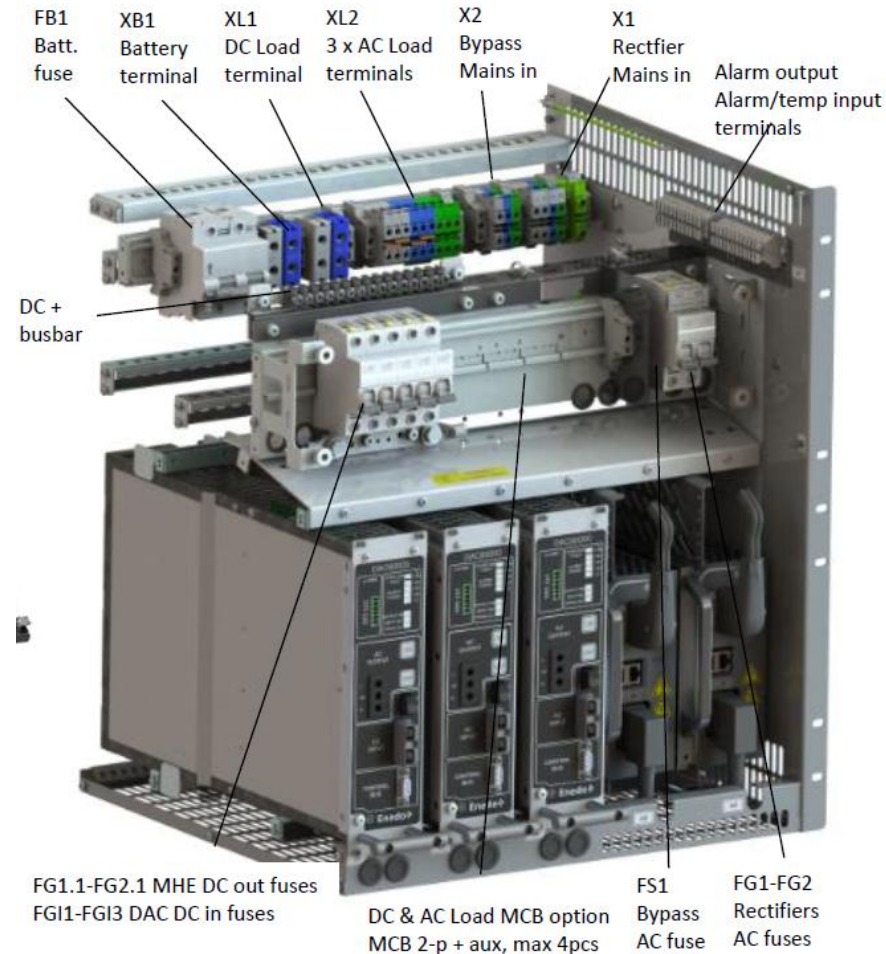


# OPUS MVPS Modular UPS Rack System 19" 12U

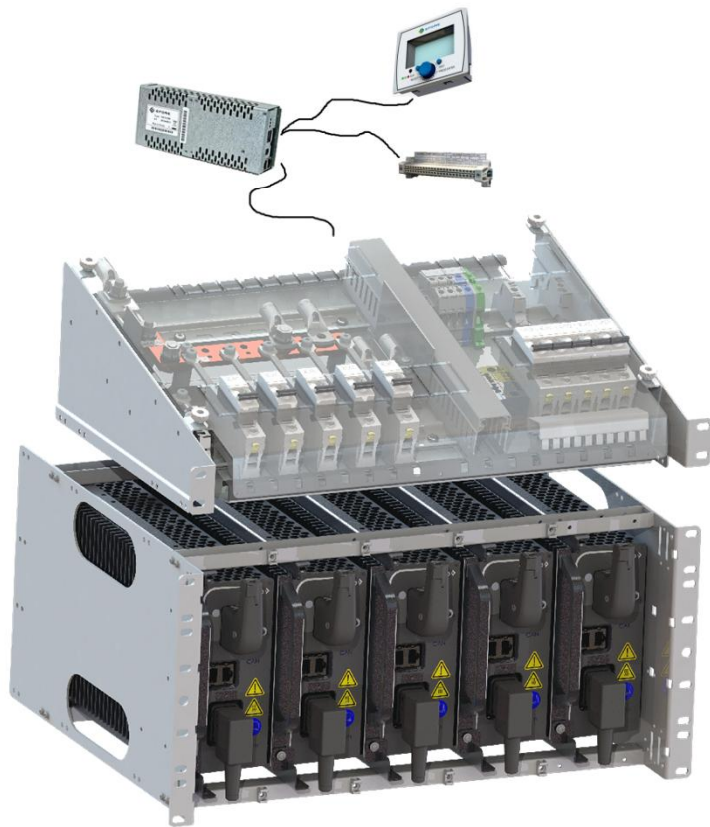


**DC 24V-220V max 4kW**  
**AC 208-240V max 3.6kVA**

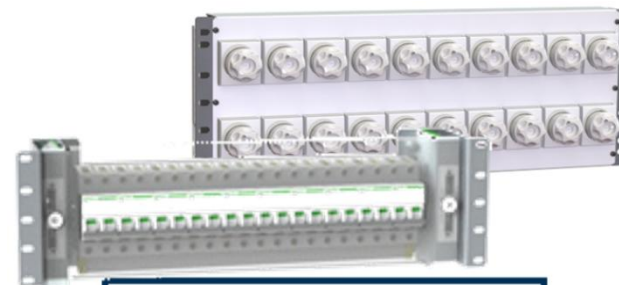
- Compact DC & AC power Rack module
- Backup by professional station main battery bank, e.g. OPzV 20 year batteries
- Replacement for unreliable UPS devices



# OPUS HE Bulk Rack 5U+3U Building Block for System Building Partners, 19" 10kW and 23" 12kW

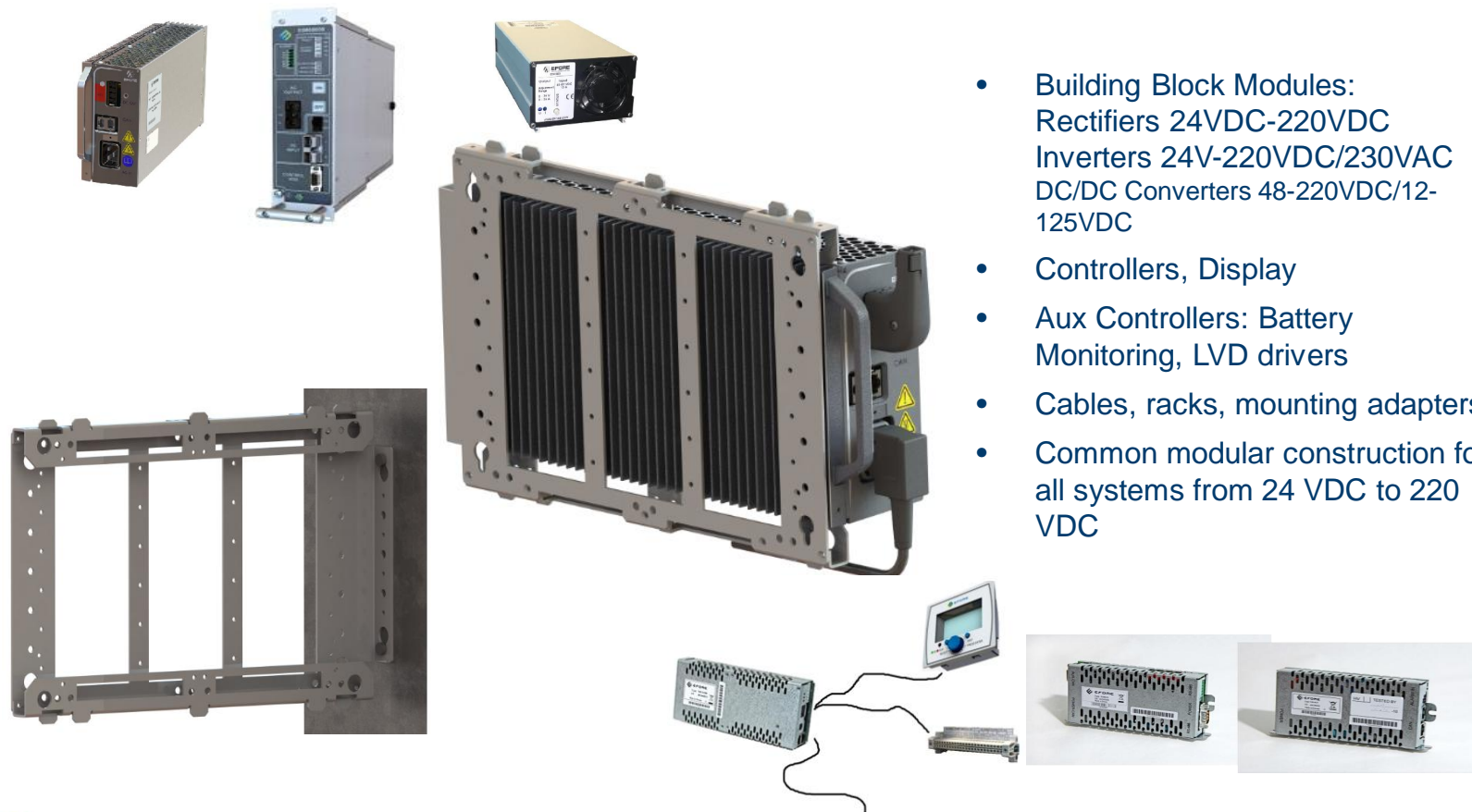


- Building Block Rack for integration partners
- Readymade rectifier shelf block
- Battery fuses, display/controller, load distribution and local variations built by integration partner
- Common modular construction for all systems from 24 VDC to 220 VDC
- Maximum output power per rack 19"/10,0 kW, 23"/12kW
- Master-Slave up to 20/24kW, multi cabinets up to 80kW



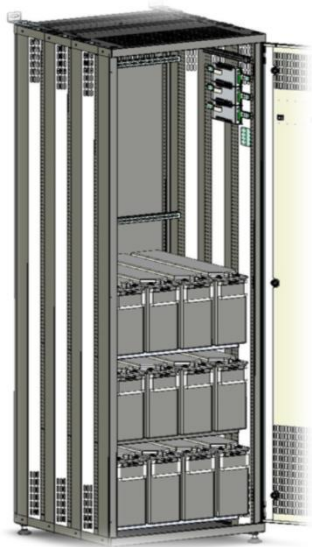
19" Load distribution panels

# Building Block Modules for System Building Partners

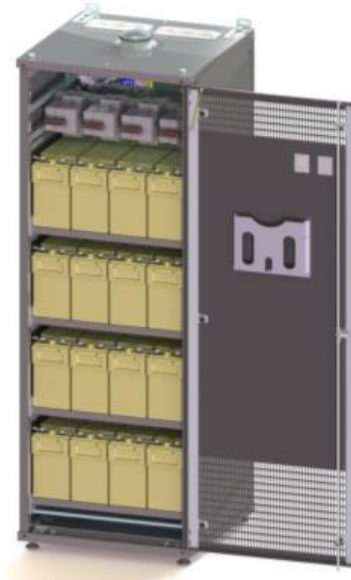


- Building Block Modules:  
Rectifiers 24VDC-220VDC  
Inverters 24V-220VDC/230VAC  
DC/DC Converters 48-220VDC/12-125VDC
- Controllers, Display
- Aux Controllers: Battery Monitoring, LVD drivers
- Cables, racks, mounting adapters
- Common modular construction for all systems from 24 VDC to 220 VDC

# Battery cabinets



**OC2066 OPUS Battery cabinet**  
IP20/IP21 600 x 600 x 2000 mm  
Same OPUS style as chargers  
4 battery shelves



**IC2066 Industrial Battery cabinet**  
IP20/IP21 600 x 600 x 2000 mm  
Switch fuse protection 4 x 125A  
4 battery shelves



**Battery cabinets for open batteries**  
IP20/IP21 800 x 600 x 2000 mm  
Custom models available

# System engineering - industrial projects

- System engineering for industrial/energy projects
- Commissioning and installation
- Documentation, training
- 1 cabinet and multi cabinet solutions
- Internal and external batteries



# Technical support and System Engineering

## Services offering

- Consultation for specification
- Engineering of new systems
- Training
- Installation and commissioning
- Customer support
- Maintenance, spare parts
- Upgrade





Amps with passion.