Power Systems

Enedo

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 > 6 000 rectifiers
- Warranty 5 Years

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

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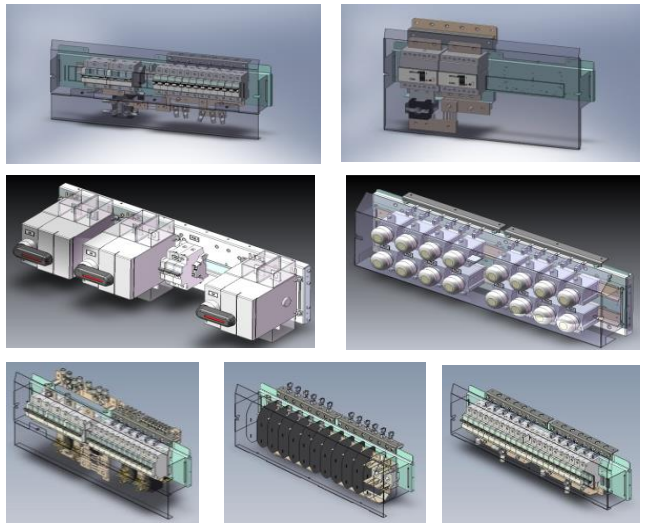
OPUS HE Systems product family summary

Wall Chargers

19” Rack Systems

Cabinet Systems



Electrical Options

Rectifiers

Inverters

DC/DC Converters

Controllers, Displays and aux Controllers

Modules for Systems

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MHE Rectifiers

NO FAN

5 YEAR WARRANTY

EFFICIENCY

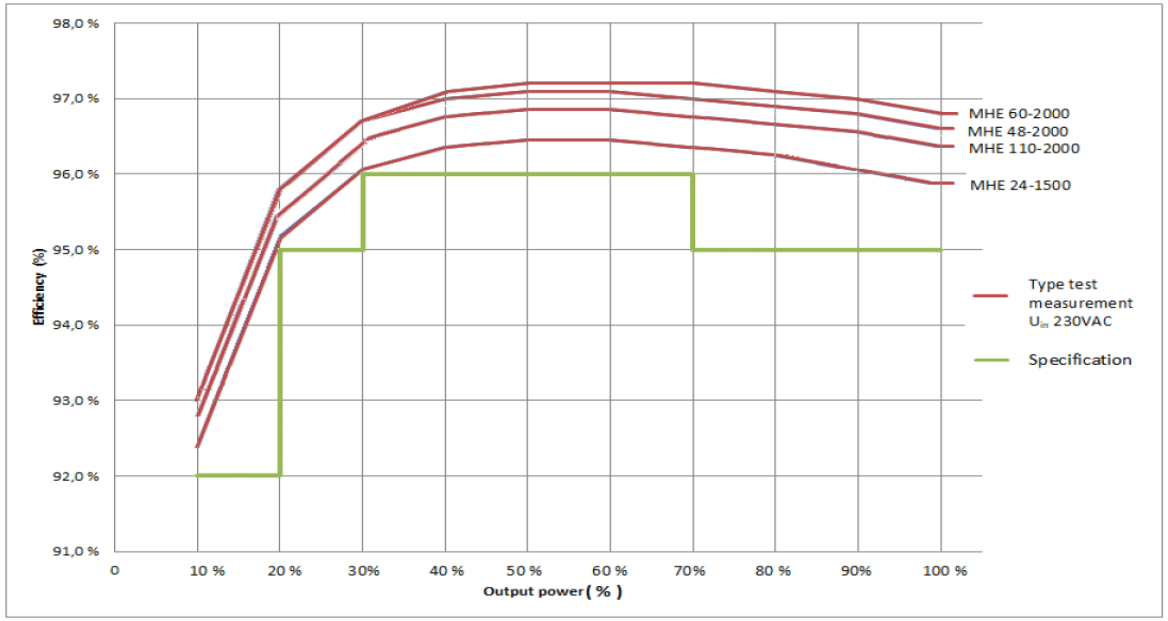
TCO

SGS C US 800930

CB CE

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 @ 25ºC
- Front cabling – no backplanes
- Wide Input range: 85 – 300 VAC
- Wide Temp.range: -40ºC...+70ºC (see de-rating)



RAIL CERTIFICATION

TÜV SÜD Rail

Harmonized EN Standards for Rail Track side Applications (MHE & VIDI2)

EN50124-1 Safety / Insulation Coordination

EN50121-4 EMC, Signalling & communication equipment
EN50121-5 EMC, Rail Substation equipment

EN45545 Fire protection on railway vehicles

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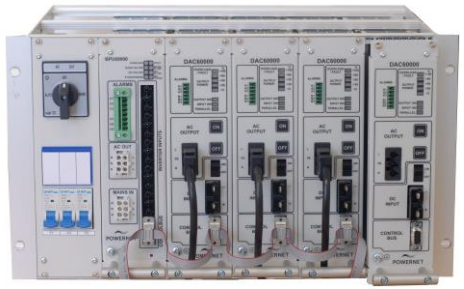
OPUS Inverters

NO FAN

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

TÜV SÜD
Rail

RAIL CERTIFICATION

Harmonized EN Standards for Rail Track side Applications

EN50124-1 Safety / Insulation Coordination

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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
EDC 48-60/12-500	40-87VDC	12VDC	0-36VDC / 400W
EDC 48-60/24-500	40-87VDC	24VDC	0-36VDC / 500W
EDC 48-60/36-500	40-87VDC	36VDC	0-54VDC / 500W
EDC 48-60/48-500	40-87VDC	48VDC	0-72VDC / 500W
EDC 48-60/60-500	40-87VDC	60VDC	0-108VDC / 500W
EDC 48-60/110-500	40-87VDC	110VDC	0-144VDC / 500W

- Modularity, n+1 redundancy, parallel connection 500W – 10kW
- Integration of the modules to OPUS cabinet

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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

Contorol & Monitoring
for Rectifiers
and Inverters

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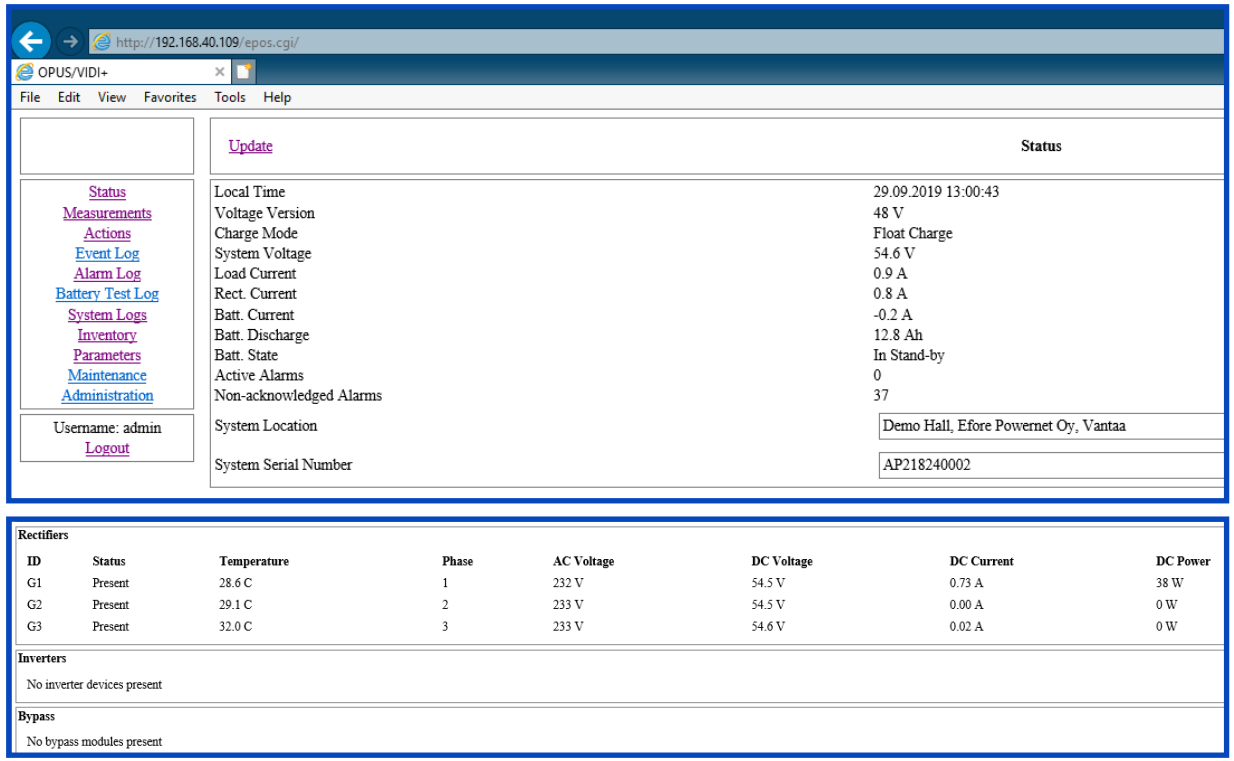
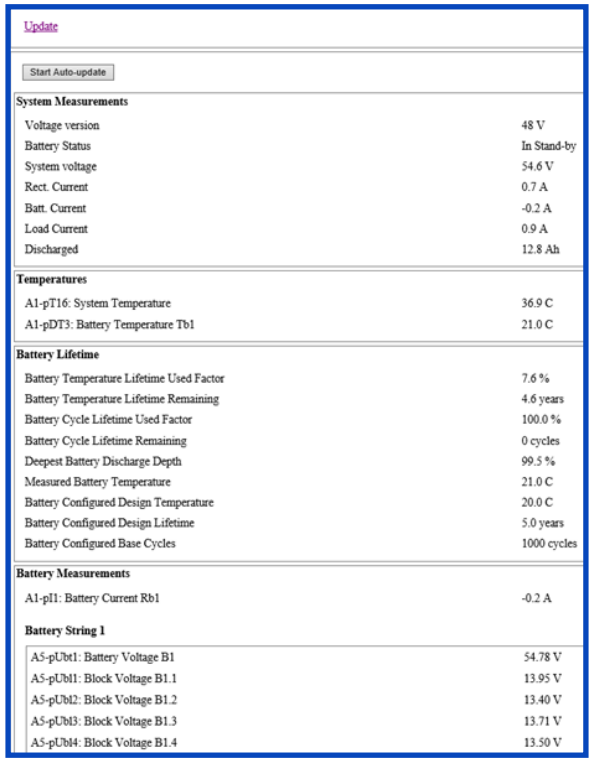
VIDI+ System Controller, Remote Access & Web Interface





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

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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,
  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 DC SYSTEMS

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OPUS HE, Configurable Cabinet Power Systems
Footprint 800 x 600mm, 12kW – 70kW

- IC 2086 cabients:
  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

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OPUS Inverter Systems

Configurable Cabinet AC Power Systems 1kVA – 16.8kVA

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

IC2086 Cabients:
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

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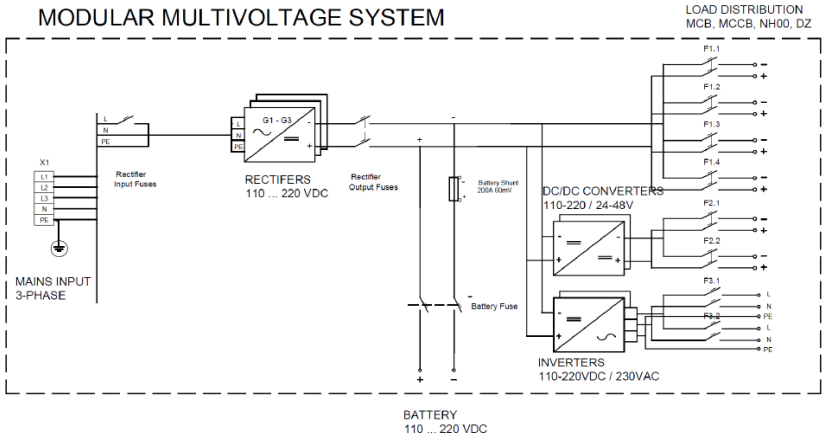
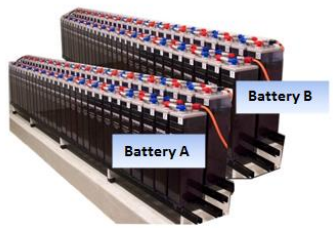
OPUS HE WMC Wall Charger Systems

- 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





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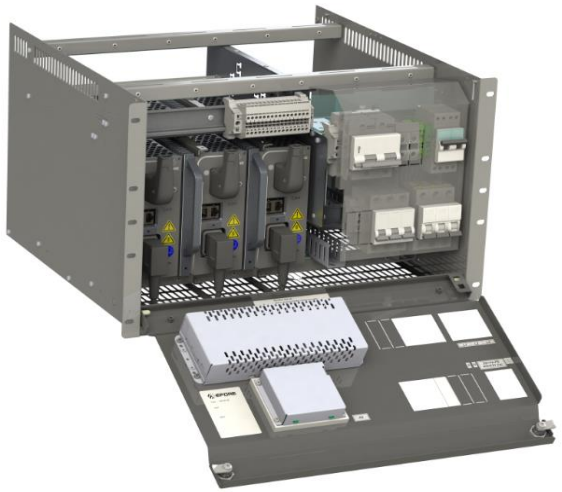
OPUS HE Rack System 7U



- 19" rack assembly or wall-mounted
- Common modular construction for all systems from 24 VDC to 220 VDC
- Maximum output power 6,0 kW
- Dimensions (h*w*d): 311*438*451 mm
- IP20, option IP21
- Place for 3 MHE-rectifiers
- Battery fuse
- Optional battery LVD

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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
- 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
- UPS Rack, rectifiers, inverters, bypass

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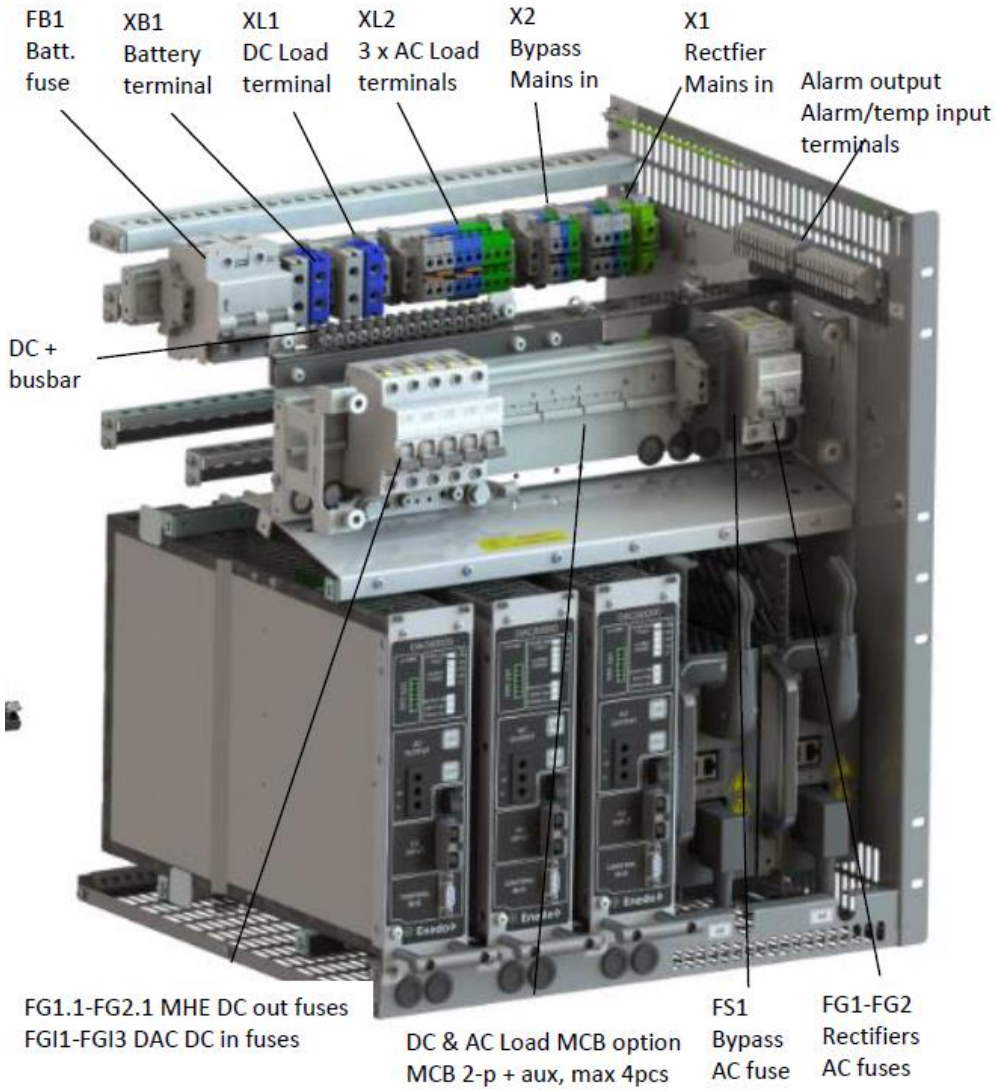
OPUS MVPS Modular UPS Rack System 19” 12U

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



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OPUS HE Bulk Rack 9U Building Block for System Building Partners

- Building Block Rack for integration partners
- Readymade rectifier shelf block
- Battery fuses,display/controller, load distribution and local variations buildt by integration partner
- Common modular construction for all systems from 24 VDC to 220 VDC
- Maximum output power 12,0 kW
- Master-Slave up to 24kW

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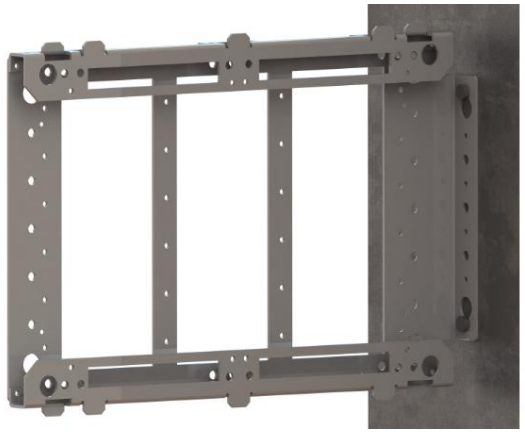
Building Block Modules for System Building Partners



- 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

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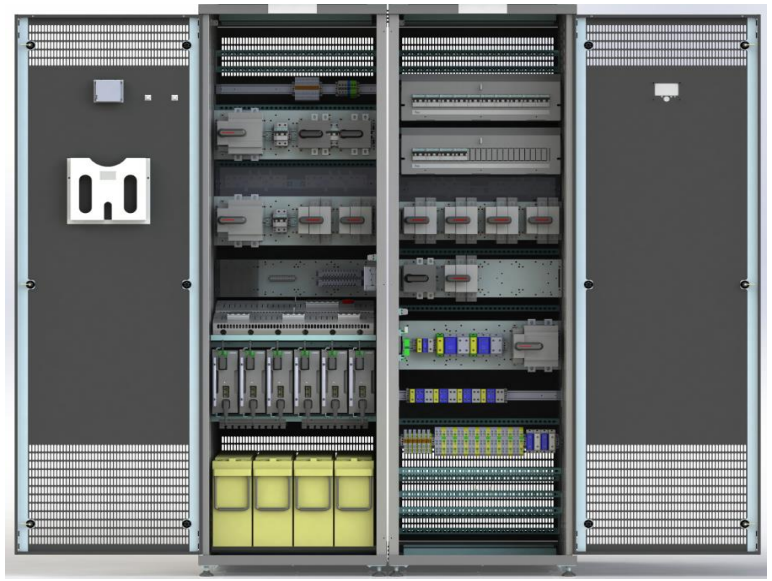
System engineering - industrial projects

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



OPUS DC SYSTEMS

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Technical support and System Engineering

Services offering

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

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Amps with passion.

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