

AVAILABILITY SECURED

FOR POWER
GENERATION
TRANSMISSION
AND DISTRIBUTION

AEG
POWER SOLUTIONS

CUSTOM SOLUTIONS FOR CRITICAL OPERATIONAL NEEDS

AEG Power Solutions helps customers worldwide meet their power challenges with innovative, world-class power solutions. Backed by more than a century of innovation and customer service, AEG Power Solutions offers a full-range of reliable, cost-effective solutions, from power conversion modules and high reliability UPS systems to industrial chargers and DC systems.

AEG Power Solutions designs, manufactures, sells and services worldwide AC and DC power solutions for a wide variety of critical industrial and commercial applications.

The company's products, solutions and services are renowned for their reliability, especially in extremely challenging industrial and climatic environments.

Consolidating the portfolios previously sold under the AEG, Saft Power Systems and Harmer & Simmons brands, AEG Power Solutions delivers value to customers by protecting mission-critical assets, ensuring business continuity and protecting people's safety.

The company provides the power solutions of choice for such demanding applications as off-shore oil and gas platforms, non-stop industrial processes, nuclear power plants, renewable energy generation, rail transportation, telecoms and data centers.

Thanks to its distinctive expertise bridging both AC and DC power technologies and spanning the worlds of both conventional and renewable energy, the company also creates innovative advanced power systems contributing to energy storage or grid-stabilization.

Rely on AEG PS' power expertise

AEG PS' clients are able to grow their business, large or small, where availability is secured. They accomplish this without concern for electrical energy supply and they do not have to sacrifice their limited work space. Highly efficient, user-friendly power backup solutions with high power density and outstanding performance allow users to lower electricity, cooling,space and maintenance costs.

Since the creation of AEG in 1887, the company has established a continuous track record for serving customers with innovative, highly reliable systems and solutions.

In the area of power generation, transmission and distribution (PTD), AEG PS has been providing robust and rugged power in a wide variety of PTD applications for over 60 years. In this sector the company offers a comprehensive range of world-class AC and DC

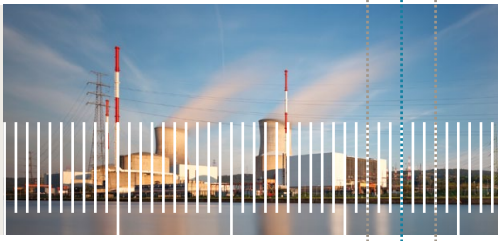
Foundation of AEG (Germany) **1887**

Foundation of SAFT (battery, France) **1918**

Creation of AEG plant in Warstein-Belecke, Germany **1945**

Acquisition of NIFE Group (Sweden) **1992**

Protect 3: First 100% digital UPS in the world **1995**







power protection and control products with more than a 20-year lifetime. AEG PS deliver industry-leading availability customers needing to protect their production processes, thus ensuring optimal uptime, maximum return on their investment and reduced lifetime costs. Whether you are a power company, an EPC, a project management consultant or an engineering and construction services provider, with AEG PS you partner with a power protection expert that is used to large international engineering projects and understands that safety, risk management, business continuity and operational excellence are the key elements of your business.

AEG Power Solutions

- Can offer stand-alone solutions and complete project solutions supported by experienced engineers who understand your engineering challenges
- Can offer the resources of an applications engineer or a complete dedicated project team to assist in large or complex solutions worldwide
- Have an extensive product portfolio that can be engineered to provide an efficient compact and reliable system, including optimum sizing of batteries by our battery specialists as well
- Invest heavily in technology to achieve high MTBF industrial systems that are designed to meet the most challenging operational conditions
- Provide new technology combined with design experience equating to a system that can be comfortably supported by a global service team for a minimum of 20 years
- Provide consistency in design, which minimizes spare parts requirement and operational simplicity supported by optional product training

Acquisition of Harmer & Simmons by SAFT Power Systems
1995

Acquisition of AEG SVS Power Supply Systems by SAFT Power Systems
1998

Acquisition of SAFT Power Systems by Ripplewood from Alcatel
2005

First Chinese manufacturing facility in Beijing
2006

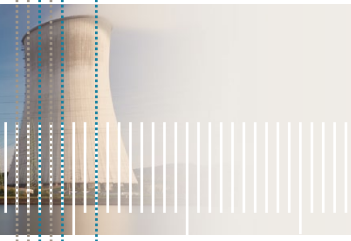
Protect RCS: Reliable rectifiers, chargers and DC systems, building on the success of its popular SPR/TPR range
2007

Protect MIP: Highly efficient and easily scalable rectifier system for the industrial market
2008

Rebranding: SAFT Power Systems to AEG Power Solutions
2008

Protect 8: First "customer-ized", modular UPS
2009

Protect MIP INV: Highly efficient and compact modular switch-mode inverter
2012



AC & DC
PREMIUM POWER
PROTECTION

SOLUTIONS FOR ALL APPLICATIONS

Power solutions designed to meet tough power generation, transmission and distribution industry needs:

- Continuity of business operations
- Safety of personnel
- Environmental protection
- Critical installations
- High availability systems and processes
- Easy maintenance and long service life
- Reduced footprint
- Black start
- Remote & Automated UPS operation
- 1E applications

Outlook on electrical energy

Rising urbanization in upcoming economies and its demand for transport and other utility services, the growing worldwide middle class, increasing automated production and further electrification of personal supplies are a few key contributors for the growing demand in electrical energy. In short: the production of electrical energy is a key task for the development and prosperity of any country. The reliability and availability of this energy determines the degree of possible technical progress. A growing motivation to win this energy from renewable sources, as geothermal, wind and solar will continue to grow. Nevertheless, and in the coming years, the majority of energy will still come from fossil fuels such as coal, gas and oil. These energy sources will be the backbone of our energy supply, not forgeting that nuclear energy is also being expanded as some countries continue to improve there CO_2 balance. The requirements for power plants have increased enormously in recent years.





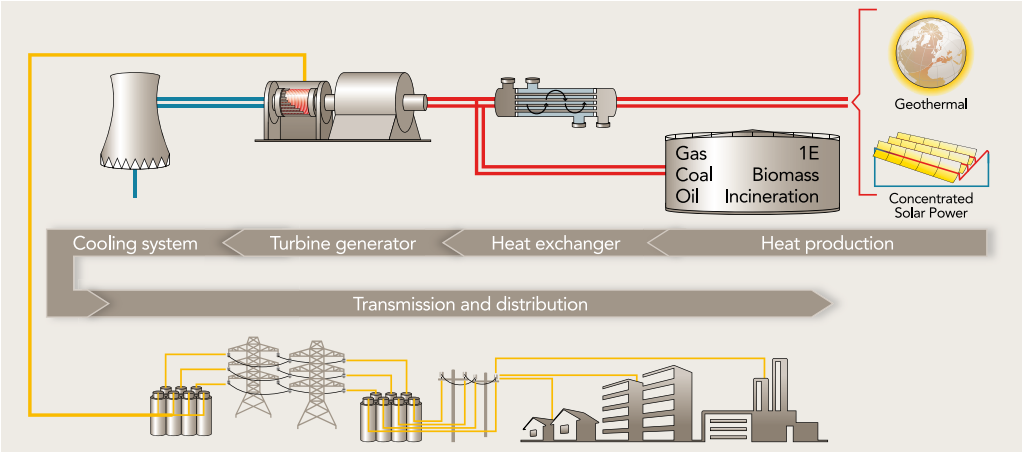
Whether it is:

- Flexibility in terms of safety
- Energy efficiency
- Improved running times
- Subsequent extraction of heat
- Preparing for CO_2 storage
- Reducing operating costs
- High durability
- Ease of use in service

these key points are important.

Helping our customers to face their challenges

Mission-critical applications in the power generation, transmission or distribution industry need 100% available highly reliable electrical power. The 'internal power supply' or 'power back-up' is redundant at least to the established n+1 criterion with self-monitoring devices that provide the plant manager with automatic messages when necessary. It is built independent of external energy feed and includes at least two independent emergency power generators, and at least two independent high-performance batteries. In case of power failure, the battery driven power back-up system is taken-over immediately and the generators are started accordingly. Once the generators have run through their start-up phase and deliver a stable voltage, they will take over overall power back-up supply. The main loads in a power plant are always connected to the DC safety rail and are normally supplied by the rectifier and the batteries in case of an emergency. The most important AC consumers are supplied indirectly via the inverter which in turn is supplied via the DC rail. Several DC voltages are realized by switching power supplies.



Comprehensive solutions

Benefit from a single source for all your power protection requirements. Get fully customized systems to meet your exact needs.

- AC & DC power supply systems:
  - UPS
  - Inverters
  - Rectifiers
  - Chargers and DC systems
  - Modular industrial power supplies
  - Switch mode power supplies
- Monitoring and control
- Batteries
  - Lead acid
  - Nickel cadmium
  - Lithium
- Power controllers
- Ancillary equipment
- Services

All of our products are designed and manufactured to meet the most stringent international safety and EMC standards.

Total system design

- Specification support
- Site surveys, with analysis of:
  - High and low voltage electrical distribution network
  - Load flow and load shedding
  - Failure and power quality
  - Short circuit and noise rejection
- Grounding/neutral networking
- Emergency and stand-by power requirements
- Battery configuration to meet load, environmental and aging requirements
- Seamless integration in existing electrical and mechanical environment
- Personal health and overall safety

AEG PS system principles

The rectifier is the core component of the emergency power supply, which is available in several implementations:

- Thyristor rectifier
- IGBT rectifier
- Switch mode power supplies

Depending on security requirements, these devices will be cooled naturally or via forced ventilation. Particular attention should be paid to the control here; there are variants, both software-based and analog. A rectifier in a power plant application must in all circumstances be rugged, durable and low maintenance. Robustness is required in two areas; first, mechanical (depending on application) for earthquake resistance and electromagnetic strength, and second, electrical resistance to voltage spikes or transients. In short the input transformer is one of the electrical components that contribute to a long lifetime.

To maximize lifetime the redundant rectifier is constructed so that each of the rectifiers is providing 50% capacity during normal operation. The rectifier must be capable of supplying the load and charging the battery. The inverter (with bypass) is one of the loads connected to the rectifier.

The inverter supplies the AC loads, ensuring that it will not suffer from a voltage drop. In the situation where the DC network fails or the inverter itself has a fault, it will switch after a synchronization check to the mains voltage, and will switch back when the error is removed again. Even when an output short circuit occurs, the inverter can automatically draw from the mains to help secure the power availability, but the device should provide this in any case by itself.

For small to medium loads, more and more switching power supplies are used in the power industry. With devices connected in parallel, the total required power is combined. The SMPS is used for charger applications as well as for DC to DC conversion, available in variations with or without fans, analog or digital (micro + software) control and optional earthquake resistance.

AC & DC PREMIUM POWER PROTECTION SOLUTIONS





Lifetime project management

- Engineering support in all stages including FEED
- Geographical customer teams
- Optimized technical advice
- Factory acceptance test and inspection
- Timely customization documentation
  - Engineering drawings
  - O&M manuals
- Technical training
- Installation
- Commissioning
- Maintenance
- Complete support for integrated solutions:
  - UPS, DC systems, batteries
  - Gensets, distribution, fire detection, control and monitoring
- Global service up to turnkey projects

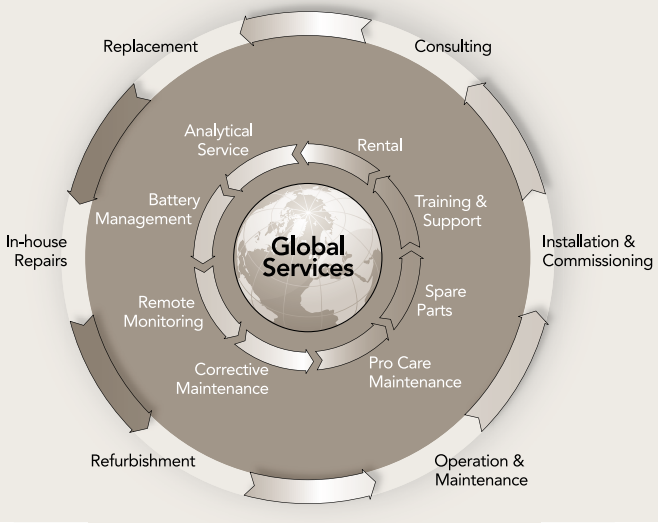
Global service

Our customers can rely on a global network of 20 service centers supported by over 150 field engineers and more than 100 certified service partners around the world, with both scheduled maintenance and 24/7 service to keep your business running and exceed HSE requirements. From system selection to commissioning our certified experts go beyond your expectations by offering service excellence that will ensure the lowest operational cost for your mission-critical equipment.

The reliability of your installed power solution is supported by a global service team renowned for its short response time and troubleshooting efficiency. Choosing one of the Pro Care™ maintenance programs gives you ultimate peace of mind providing reassurance of complete cost control, security and uninterrupted power supply in situations of the utmost criticality.

You can also benefit from a full range of professional services that will protect and ensure the durability of your investment and will take over when you need it most:

- Consulting
- Full range site servicing
- Installation and commissioning
- Operation and maintenance
  - Pro Care™ maintenance
  - Corrective maintenance
  - Remote monitoring
  - Battery management
  - Analytical services
  - Rental
  - Training and support
  - Spare parts
- Refurbishment
- In-house repairs
- Replacement



MEETING YOUR EXACT NEEDS





Sample customers

- CNPEC
- E-On
- Areva
- Cegelec
- ENBW

Unique design

Parallel operation for capacity and performance with proven long-term field experience.

Flexible Multi Master Technology and CAN bus communication enables up to 8 UPS' to be connected in parallel for increased power, redundancy or system upgrade. Parallel UPS' can be operated with a central battery. The three microprocessor control system is designed to provide trouble-free power, the microprocessors continuously monitor and control the rectifier, inverter and static switch units.

Complete with:

- N+1 fans
- Dual power sources for control boards
- Robust Industrial Chassis with easy access
- In-house PCB manufacture, not vulnerable to 3rd party obsolescence
- In-house software development essential in a 20-year design
- Applications chargers with SIL3
- Applications with analog control
- Battery monitoring

Unequalled flexibility and reliability

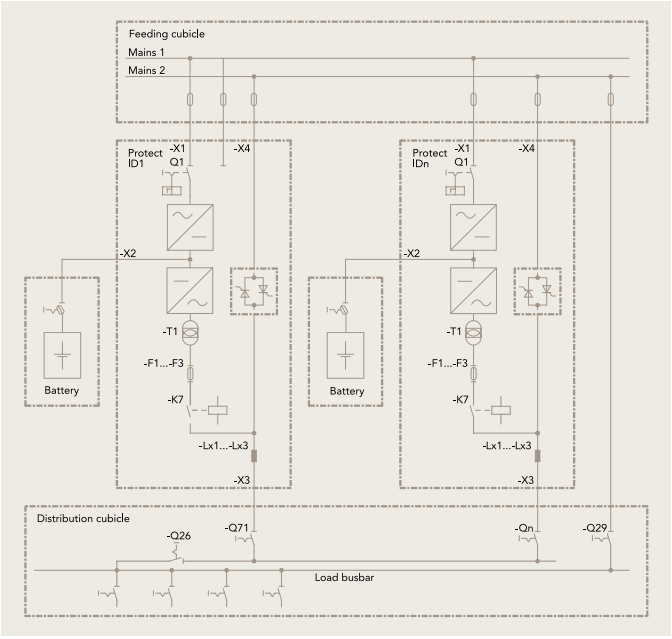
Complete solution combines ease of operation with numerous options.

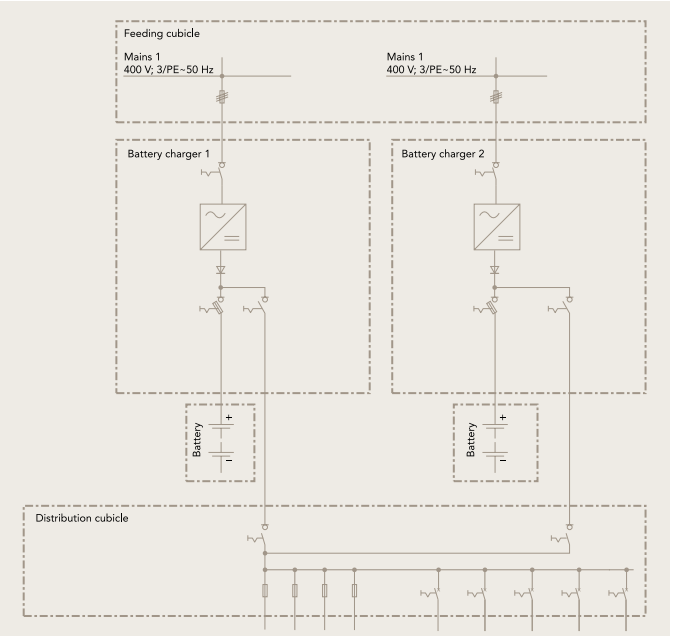
The communications system monitors and controls user defined parameters locally or remotely while customers enjoy a choice of battery types as well as battery testing operation and simplified maintenance.

Optimum electrical distribution

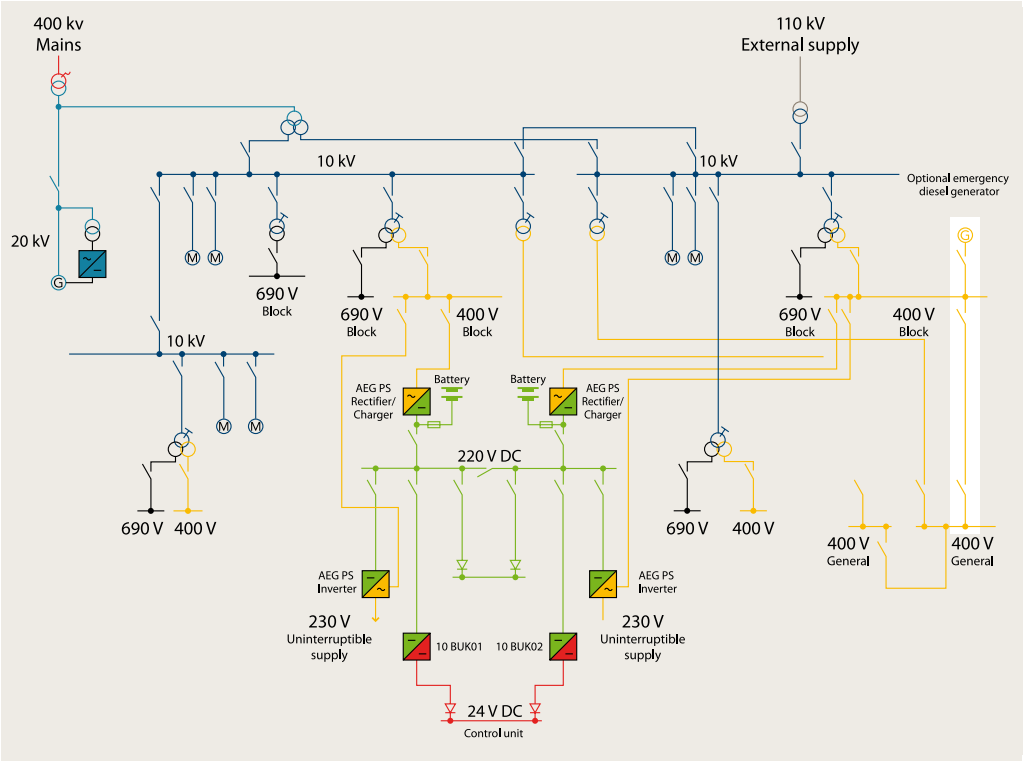
In-house expertise to define and design all kinds of distribution panels.

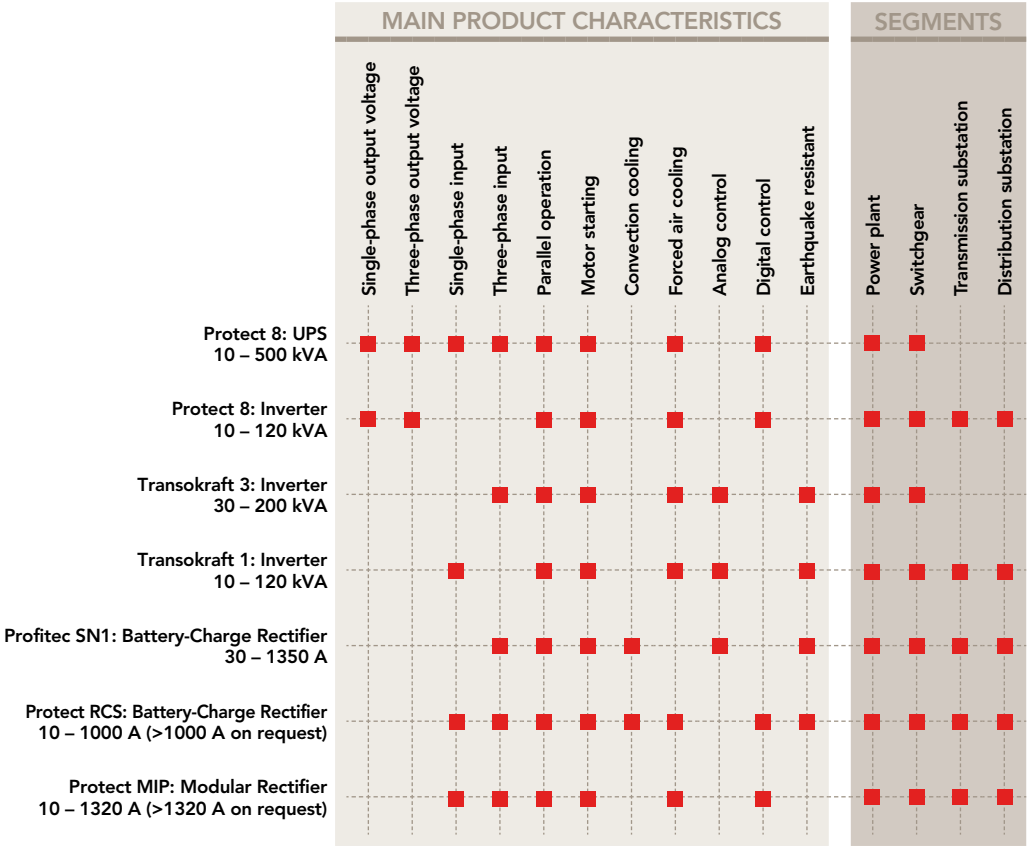
The panels ensure selectivity and clearance capacity for all load events; possibility of full customization meeting the various requirements in oil and gas applications.





POWER GENERATION PROTECTED BY OUR END-TO-END SOLUTIONS









Environmentally responsible

AEG Power Solutions is committed to respecting the environment across all of its business activities, from operations to product design to the use of technology. For example, to comply with RoHS and WEEE European directives, hazardous substances are being eliminated from all components, products and manufacturing processes.

Registrations

As an established supplier to the oil and gas industry, AEG Power Solutions is an active participant in such industry groups as the Engineering Industry Council and the FPAL.

Member of EIC

GOST R certificate

RoK certificate

AEG Power Solutions is fully ISO accredited, with ISO certified suppliers and manufacturing locations worldwide.

AEG Power Solutions: your partner in each phase of the project

Being a power plant owner, a grid owner, an EPC, a project management consultant, a specifier, or an engineering and construction services provider, you should talk to a power protection company that is experienced and used to executing large international engineering projects and understands that safety, risk management, business continuity and operational excellence are the key elements of your business.

In short, world-class:

- Front end engineering & design (FEED)
- Detailed engineering
- Logistics and planning
- Execution
- Service

Is our promise to you!

INDUSTRIAL AC UPS SYSTEMS AND INVERTERS





PROTECT 8 UPS SINGLE & THREE PHASE OUTPUT

Nominal rating (at cos φ 0.8 lag) in kVA	10, 20, 30, 40, 60, 80, 100, 120, 160, 220, 330, 400 and 500
RECTIFIER UNIT	
Input nominal voltage (V)	3 x 380 / 400 / 415 / 480 (other voltages on request)
INVERTER UNIT	
DC input (V)	110 / 125 / 220 / 384
Nominal AC voltage (V)	1 x 120 / 220 / 230 / 240 and 3 x 208 / 380 / 400 / 415 / 480
OPTIONS	
To provide the perfect solution for each application, AEG Power Solutions offers a wide range of options:	
Alarms / signaling	Programmable relay contacts, battery monitoring, remote display, analog meters in front panel
Communication	RS232 / RS485 interface, Modbus, Profibus, SNMP-adapter, monitoring & management software
Mechanical	Up to IP43, special color, tropicalization, cabinet heater, special markings
Other	Bypass transformer, voltage stabilizer, maintenance bypass cabinet, AC distribution panels battery cabinet, battery fuse boxes, exd enclosures

PROTECT 8 INVERTER SINGLE & THREE PHASE OUTPUT

Nominal rating (at cos φ 0.8 lag) in kVA	10, 20, 30, 40, 60, 80, 100 and 120
INVERTER UNIT	
DC input (V)	110 / 125 / 220
Nominal AC voltage (V)	1 x 120 / 220 / 230 / 240 and 3 x 208 / 380 / 400 / 415 / 480
OPTIONS	
To provide the perfect solution for each application, AEG Power Solutions offers a wide range of options:	
Alarms / signaling	Programmable relay contacts, battery monitoring, remote display, analog meters in front panel
Communication	RS232 / RS485 interface, Modbus, Profibus, SNMP-adapter, monitoring & management software
Mechanical	Up to IP43, special color, tropicalization, cabinet heater, special markings
Other	Bypass transformer, voltage stabilizer, maintenance bypass cabinet, AC distribution panels battery cabinet, battery fuse boxes, exd enclosures

For further details please refer to individual product publications

TRANSOKRAFT 3 & TRANSOKRAFT 1

	Transokraft 3						**Transokraft 1**						
Nominal rating in kVA	30	50	80	120	170	200	10	20	40	60	80	100	120
Input voltages (VDC)	220 V +20 % / -15 % 30 – 200 kVA optional 110 V +20 % / -15 % 30 – 80 kVA						220 V +20 % / -15 % 10 – 120 kVA optional 110 V +20 % / -15 % 10 – 60 kVA						
Output voltage (VAC)	400 VAC (adjustable 380 – 415)						230 VAC (adjustable 220 – 240), other voltages on request						
Frequency, no mains synchronization	50 Hz ±0.1 % (60 on request)												
Synchronization range	49.5 – 50.5 Hz ±1 % optional 2 %, 3 % (other on request)												
Nominal current (A)	43 / 72 / 116 / 173 / 245 / 289 / 317						43 / 87 / 174 / 261 / 348 / 435 / 522						

PROFITEC SN1

Input	Three Phase
Input voltages (VAC)	3 x 400 ±10 % (+15 % – 20 % functional)
Frequency	50Hz with N connector
Power factor	0.72 – 0.78
Output voltages (VDC)	24 / 60 / 110 / 220
Output current	30 –1350 A (higher curent ratings on request)
Voltage ripple	5 % SS wihtout parallel battery

INDUSTRIAL CHARGERS, DC SYSTEM AND MODULAR INDUSTRIAL POWER





PROTECT RCS/SPRE/TPRE: INDUSTRIAL CHARGERS, RECTIFIERS AND DC SYSTEMS

Input	Single and Three Phase
Input voltages (VAC)	1 x 120 / 220 / 230 / 240 and 3 x 380 / 400 / 415 / 480 other voltages available as option
Exceptional variations	+15 / -20 % (functional)
Frequency (Hz)	50 or 60 ±6 %
Output Voltage (VDC)	12, 24, 32, 48, 60, 110, 125, 220, 250
Rectifier Output Current (A)	10 – 1000 (>1000 on request)

CABINETS

Wall mounted and floor standing cabinets available, depending on system rating and options specified. Weights and dimensions on request. Also available:

- Dual system in single cabinet
- Battery integrated in system cabinet
- Matching battery cabinets

OPTIONS

To provide exact solutions for each application, AEG Power Solutions offers a wide range of options, amongst others:

Analog meters in front panel	Cabinet heater	Outdoor cabinet: up to IP65
Special treatment (tropicalization, relative humidity up to 95 %, etc)	Low smoke wiring (halogen-free)	Special markings
Customized cabinets (paints, etc.)	Blocking diode for parallel redundancy	Diode dropper
Battery temperature compensation	Battery fuse box	Exd enclosures

For further details please refer to individual product publications

PROTECT MIP: MODULAR INDUSTRIAL POWER

Input	Single and Three Phase
Input voltages	230 V ±20 % (+20 % -60 % functional) or 400 V ±10 % (+15 % -20 % functional)
Frequency	50 Hz or 60 Hz ±5%
THDI	<5 %
Power factor float	0.99
Output voltage (VDC)	24 / 48 / 110 / 125 / 220
Output Current (A)	9–1320 (higher current ratings on request)

OPTIONS

Alarms / signaling	Relay boards, battery monitoring, low electrolyte level alarm, high ripple voltage alarm, LED indicator
Communications	RS232 / RS485 Interface, Modbus, Profibus DP, J-bus protocol, TCP/IP interface, monitoring & management software
Input / battery / load options	DC distribution, integrated inverters, diode droppers, load or battery MCBs / fuses / switches
Mechanical	Wall mounted or standalone cabinets, up to IP54, special color

Additional options are available or request

SWITCH MODE POWER SUPPLY MODULES AND 19" INVERTERS

DC / DC Converters		
	Input voltage (VDC)	110 / 220
	Output voltage (VDC)	24 – 60
	Output current (A)	15 – 100
AC / DC Power Supplies		
	Input voltage (VAC)	230 / 3 x 400
	Output voltage (VDC)	24 – 220
	Output current (A)	7.5 – 250
19" Inverters		
	Input voltage (VDC)	24 – 220
	Output voltage (VAC)	230
	Output current (VA)	1500 – 3000



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AEG Power Solutions

Approach your local AEG Power Solutions representative for further support.
Contact details can be found on:

www.aegps.com

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POWER SOLUTIONS