AEG

POWER
SOLUTIONS

SECURED POWER FOR RAILWAY INFRASTRUCTURES

RELIABLE POWER FOR CRITICAL OPERATIONAL NEEDS

AEG Power Solutions helps its customers worldwide to secure power for their critical infrastructures and processes with innovative, world-class power solutions.

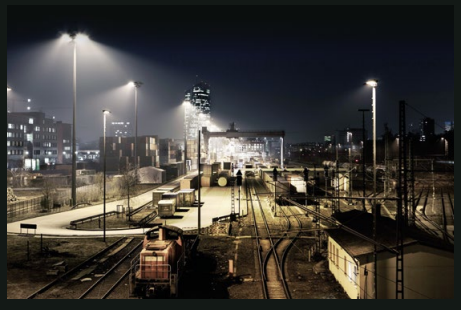
Backed by more than a century of innovation and customer service, AEG Power Solutions offers a full-range of reliable, cost-effective solutions, from power conversion modules and high reliability UPS systems to industrial chargers and DC systems. Consolidating the portfolios previously sold under the 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.

AEG PS 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.

Always innovating, AEG PS has also developed advanced power systems contributing to energy storage and a unique concept of hybrid energy storage solutions to support the growing integration of renewable sources of energy into the grid.

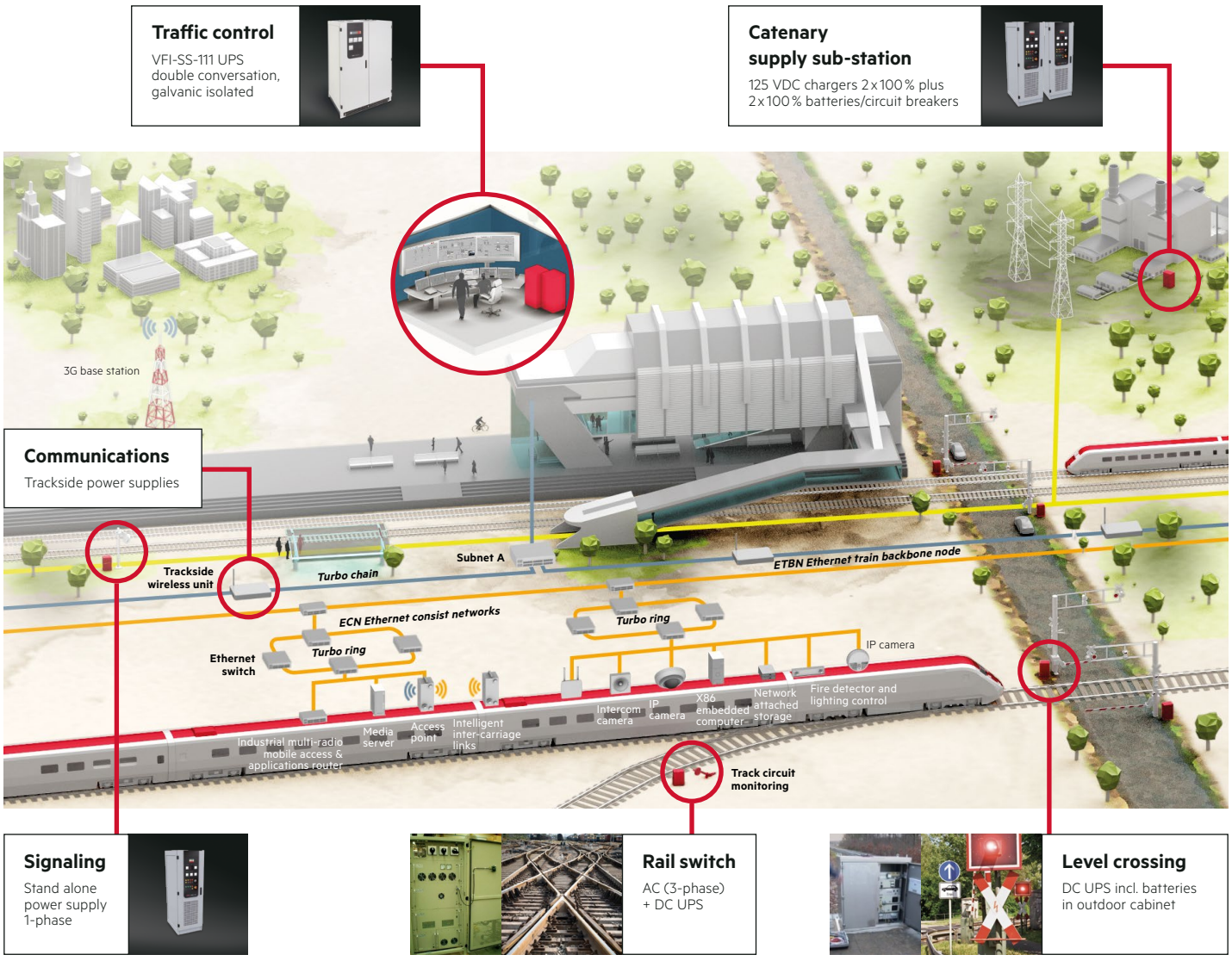
Our power solutions are recognized worldwide for their proven reliability in extremely challenging industrial and harsh climatic environments.

To ensure the continuous operation of critical processes, AEG PS' experts support customers with comprehensive maintenance solutions by combining preventive and corrective maintenance with management services.



AEG Power Solutions

- Offers stand-alone solutions and also complete project solutions supported by experienced engineers who understand your engineering challenges
- Offers the resources of an Applications Engineer and a complete dedicated project team to assist in large and complex solutions worldwide
- Has 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
- Invests heavily in new technology to achieve high MTBF industrial systems that are designed to meet the most challenging operational conditions
- Provides 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
- Provides consistency in design, which minimizes spare part requirements and operational simplicity supported by product training options
- Runs in-house development and testing of all equipment behavior to control electromagnetic interference (EMI) and assurance of electromagnetic compatibility (EMC)



Rely on the power expertise from AEG PS
AEG Power Solution is uniquely positioned in the power supply industry for its ability to protect any critical load related to railway infrastructure. From tramway systems to high speed trains, AEG Power Solutions provides solutions to protect the integrity of assets and to guarantee the safety of staff and users.

This know-how relies on decades of experience materializing in a wide range of AC and DC solutions:

- Based on all types of technologies such as switch mode modules, thyristor-or transistor-based systems
- Adapted to any electric current from a few to thousands of amps
- Available in single or three phase input/output

AEG Power Solutions is the only power supply manufacturer running in-house electromagnetic tests in its own lab, to check its equipment compliance with the relevant standards and requirements of railway infrastructures when the system is exposed to electromagnetic disturbances.

Thanks to our expertise in supplying systems subject to harsh conditions in mining, Oil & Gas, power generation applications, we provide solutions with halogen free cables to limit smoke emission. AEG PS' systems are also designed to maximize the level of protection and to prevent dust generated by brakes intruding into the inner parts of our products. Additionally they can operate at 40 °C, common for underground substations.

AEG Power Solutions secures power for all types of processes as well as for the critical equipment of railway infrastructure:

- Signaling systems or level crossing with stand-alone UPS or 24 VDC systems
- Track side substation including catenary supply with DC chargers and batteries/ circuit breakers
- Tunnel lighting and ticketing systems' back-up with AC stand-alone or modular UPS

Our systems have been operating for over 60 years in most railway infrastructures throughout Europe as well as more recently, in the Middle East, Africa and Asia.

SIGNALING AND ELECTRICAL SUBSTATIONS

Securing the complete railway environment

Excellence across the line
We deliver competitive, cost-effective, customer driven solutions. Committed to excellence, our 250 engineers and project managers offer a wide range of R&D and application engineering skills and can assist you in creating optimum solutions to your technical challenges. In addition, we have registered more than 70 active patents in power conversion.

Combined AC and DC power solutions
AEG Power Solutions supports large railway EPC (engineering, procurement and construction) to design and manufacture complete and optimized back-up systems compliant with end customer specifications based on our broad and reliable range of AC and DC UPS systems.

UPS systems
With a range of UPS systems from 500 VA to 8 MVA, our standard or customized UPS solutions provide up to 99.99 % availability for mission critical equipment to meet challenging environmental conditions.

Industrial chargers and DC power systems
Ready to meet the toughest challenges in industrial environments, our robust range of thyristor and switch-mode DC chargers allow AEG PS to offer optimized solutions.

Features and benefits
- Heavy duty design
- Building block or modular design
- Flexibility of scalable power
- High availability
- Built-in protection
- High power density
- Batteries

With our considerable in-house knowledge of battery technologies, we provide expert advice on battery specification, selection, operation and testing. Our total system solutions include a wide range of products using lithium-ion, lead-acid and nickel-cadmium batteries in vented and gas-recombination technologies. Batteries can be supplied, installed, maintained and replaced by our global service teams. Our specialists will provide an optimum battery configuration meeting railway load, environmental and aging requirements.

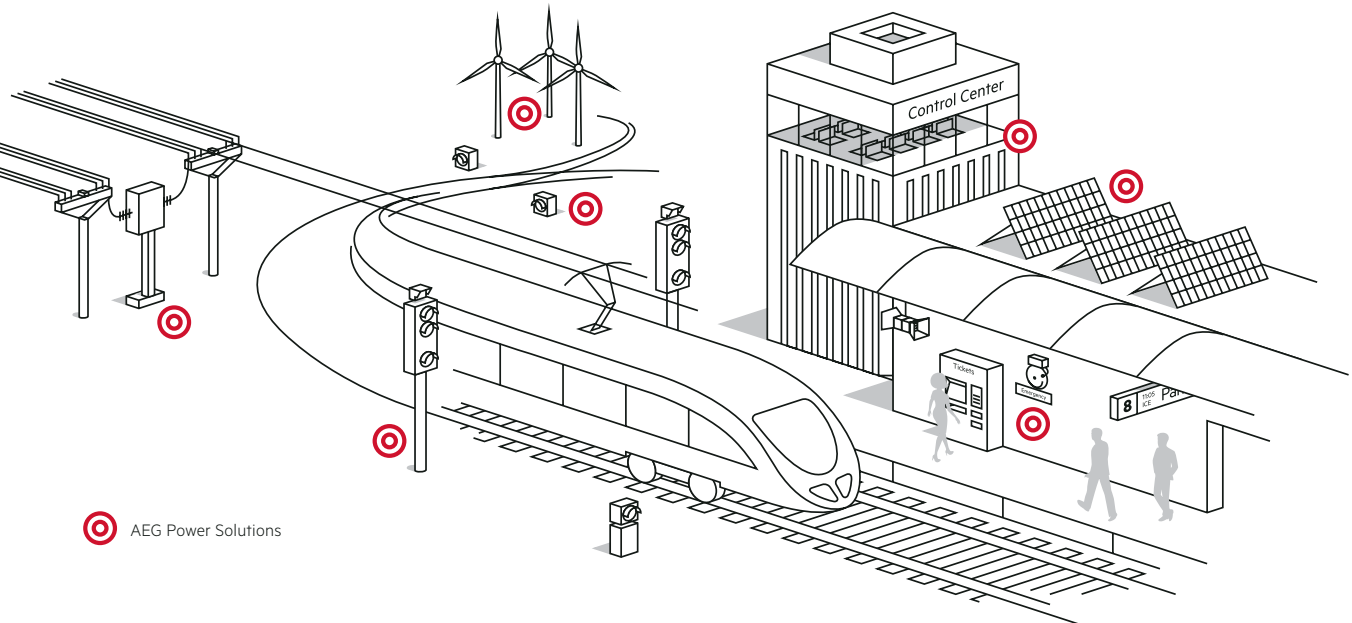
Built-in communications
We offer a wide range of communication interfaces including RS232, SNMP, J-Bus, Modbus, Profibus, CAN-bus, IEC 61850 and TCP/IP interfaces.

Turnkey power solutions
Our engineers design complete solutions including distribution cabinets, generator back-up systems and complete containerized solutions when required. The overall systems are stringently tested in our labs and include factory acceptance testing performed in the presence of customer representatives.

Overhead UPS
In situations when it is preferable to use a catenary supply, AEG PS is capable of providing a complete UPS and charger solution saving the use of a diesel generator by using the mains as a redundant power source. For more information see page 7.

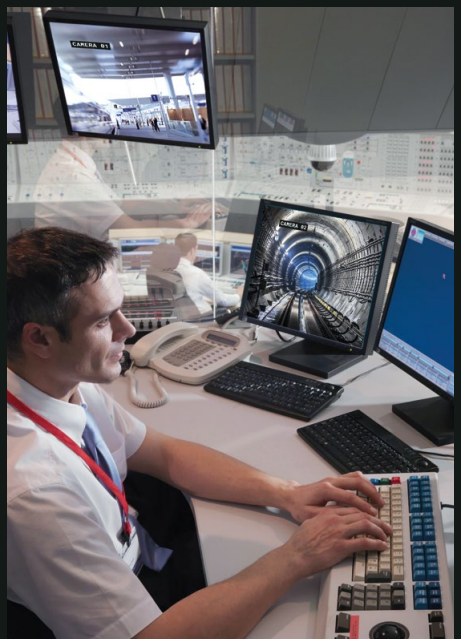
AEG Power Solutions offers a complete range of AC & DC power systems and solutions to help customers worldwide secure and protect their railway environment.

Building on a track record for quality and reliability established over more than a century, AEG Power Solutions is firmly committed to delivering unsurpassed knowledge and technical expertise.



AEG Power Solutions


F
01A
209
04



INFRASTRUCTURE

AEG Power Solutions has a long history of providing power supply solutions for the critical equipment and the intricate processes of rail infrastructure. This knowledge and expertise has resulted in improved reliability, safety and efficiency to the demanding nature of rail environments throughout the world.

Data management back-up
Railway operators manage a large volume of critical data within their ticketing systems and data centers. In addition to its renown industrial UPS range, AEG PS offers an extensive range of commercial UPS system full IGBT and transformer less that combine high AC/AC efficiency values with a compact footprint and a flexible and scalable architecture to match power back-up requirements to secure data operations. Systems available have a modular or stand-alone architecture.

Emergency lighting
Emergency lighting is a critical component of underground rail infrastructures and tunnels. To secure their power supply, AEG PS offers the perfect match with its rugged range of single or three phase solutions with halogen free cables, IP protections against metallic dust, suitable for different types of lamps (Sodium, LED, ...) and compliant with the latest EMC standards.

48 VDC Telecommunication
We have been supplying DC fixed telecom lines and more recently, GSM-R networks, to the world's railways for over 60 years. We rank among the principal suppliers to most European railway operators. Our power systems are designed with a modular approach, offering flexibility for users while enabling us to better meet individual customer needs. AEG PS offers a complete range of rectifiers from 270 W to 18,000 W.

Features
- Front access
- Hot swappable modules
- Standard or customized
- Configured distribution modules
- 12, 24, 48 and 60 V configurations
- Stand alone or expandable system rectifiers with long MTBF, wide input voltage range
- Redundancy with N+1 configuration

TRACTION SUPPLY

Up to 25 kV UPS system

AEG Power Solutions has developed uninterruptible power supplies that take their input from both the local 400 VAC supply and the 25 kV overhead line (OLE) supply at the same time. The UPS provides redundancy and increases the overall safety of the installation. This avoids the use of generators, which require regular maintenance and refueling, an expensive and time-consuming process. The two supplies are combined within the UPS and are used to charge the standby battery and power the inverter. The inverter supplies pure, uninterrupted power to the critical load.

It needs both the local mains supply and the 25 kV OLE to both fail before the batteries begin to discharge. Using two independent sources of power meets railway requirements for independent back-up supplies for critical equipment without resorting to generators.

Robust rectifiers

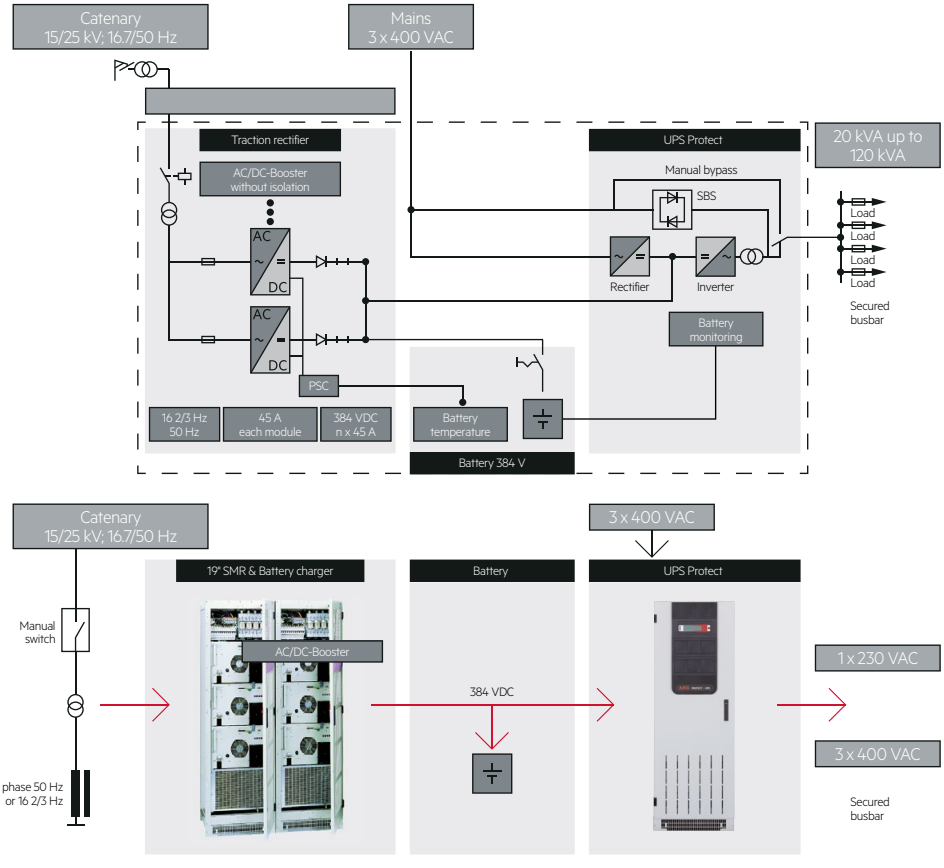
The 25 kV OLE could generate spikes, sags and surges caused by the current draw of locomotives. These are likely to damage the input stages of a conventional UPS. AEG PS' solution was both innovative and simple.

AEG PS was able to build robust rectifiers to meet the demanding nature of the railway environment. The system shown is typical of those installed on the UK's West Coast Main Line consisting of a 220 kVA UPS of the Protect range UPS coupled to 25 kV traction rectifiers supplying 650 V single phase power via a 400 A static transfer switch.

The complete system is supported by VRLA batteries giving ten minutes autonomy in the unlikely event that both main and overhead line supplies fail.

Features and benefits

- Two power sources: catenary and public mains
- Output isolation transformer
- Replacement of diesel generator
- Full range 10 – 120 kVA
- Modular traction rectifier, with MTTR <20 minutes
- Parallel operation for N+1 redundant systems



SERVICE AND FULL SUPPORT

Make the most of our expertise

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

Global service
We serve you with our extensive power expertise to ensure the smooth continuity of your business. 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.

From the system selection to your process installation and commissioning, our service offering spans the full lifetime of your equipment including simple repair of switch mode modules to complex on-site intervention:

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

Scheduled, recurring, preventive maintenance performed by accredited service experts is the most cost-effective way to secure the full performance of your power solution. Fast corrective repair actions are key to the increased availability of clean power and the continuity of your business.

Choosing one of the Pro Care™ maintenance programs gives you ultimate peace of mind providing

- Increased reliability of the UPS
- Faster emergency remedy actions
- Prolonged lifetime of the system
- Improved maintenance budget management

AEG Power Solutions has built a leading position on a worldwide expertise, providing robust and rugged power supplies in a wide variety of on-track, wayside and rail infrastructure applications for over 60 years. Two examples of our proven track records:

CROSSRAIL

AEG Power Solutions was awarded in 2015 by Crossrail Ltd, the frame contract to supply and install all the UPS systems for the Crossrail Project in London. This prestigious contract was rolled out over more than 2 years, and is followed by many years of service support during the systems 20+ year operational life.

Crossrail is Europe's largest rail infrastructure project under construction and is building the Elizabeth line – a new railway for London and the South East, running from Reading and Heathrow in the west, through 42 km of new tunnels under London to Shenfield and Abbey Wood. All projects launched by Crossrail should be operational in 2019. The target for this major investment by the UK Government is to provide major additional transport capacity and improved connectivity and will increase the number of people who are able to access employment destinations throughout London.

The complete project will include 21 km of new twin bore rail tunnels through London and the upgrading of 28 existing surface stations over the planned 90 km surface route..

The choice of AEG PS' UPS, acknowledged the company's capacity to engineer and provide custom power for the most challenging of applications where safety and reliability are crucial.

POWERTRONICS

Powertronics has selected Protect MIP DC rectifier/chargers to secure power supply to the new automatic control systems it provides to Egyptian National Railways. The current contract was signed for a first wave of over 300 systems.

The Egyptian Ministry of Transportation has launched a major transformation program of its national operator, Egypt National Railways, which includes upgrades to its rolling equipment and rail infrastructure to improve user safety and service. To reach international technical standards, Egyptian railway level crossing control systems is shifting from manual / semi-automatic control to fully automatic control.

AEG Power Solutions' Protect MIP 24 V – 50 A battery chargers have been selected to supply the DC load to control and automatically open and close the barriers.

When it comes to this type of application, security is highly at stake, and reliability of the system was the first concern of Powertronics when they selected AEG PS. The Protect MIP rectifier/charger has state of the art switch mode technology and high reliability with N+1 redundancy. It is designed to be scalable, simple to use and with hot swappable rectifier modules, assures easy maintenance making it the solution of choice when reliability and reduced operational costs are at stake.


Protect 8


Protect RCS


ProtectFLEX


Protect MIP

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

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

For further details please refer to individual product publications

Industrial chargers, DC systems and modular industrial power

PROTECT RCS 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	50 Hz or 60 Hz ±6 %
Output voltage (VDC)	12, 24, 32, 48, 60, 110, 125, 220, 250
Rectifier output current (A)	10 – 1200 (>1000 upon request)

CABINETS

Wall mounted and floor standing cabinets available, depending on system rating and options specified. Weights and dimensions upon 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, among 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 – 900 (higher current ratings upon 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, IEC 61850, 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 upon request

PROTECTFLEX INDUSTRIAL-GRADE MODULAR UPS

From 20 to 40 kVA depending on system rating and options specified. Weights and dimensions upon request

INPUT	
Rectifier type	IGBT based, Vienna bridge
Nominal voltage	(3 phase+N+G) 380 / 400 / 415 I Only with 10 kVA/kW Power Module: (1 phase+N+G) 220 / 230 / 240
Voltage range (V)	304 to 478 V (at full load) I 228 to 304 V (with load decreasing linearly)
OUTPUT	
Inverter type	3-level IGBT based
Voltage (V)	(3 phase) 380 / 400 / 415 I Only with 10 kVA/kW Power Module: (1 phase+N+G) 220 / 230 / 240
ENVIRONMENTAL	
Operating temperature (°C)	0 to 40
Storage temperature (°C)	-40 to 70
Relative humidity	0 to 95 %
Altitude	Up to 1000 m (without derating), up to 2000 m (load derated 1 % every 100 m)
STANDARDS AND CERTIFICATIONS	
Safety	IEC EN 62040-1
EMC	IEC EN 62040-2, EN 50121-5
Test and Performance	IEC EN 62040-3

SWITCH MODE POWER SUPPLY MODULES AND 19" INVERTERS

	DC / DC CONVERTERS	AC / DC POWER SUPPLIES	19" INVERTERS
Input voltage	24 / 48 / 110 / 220 VDC	230 / 3 x 400 VAC	24 – 220 VDC
Output voltage	8 – 60 VDC	24 – 220 VDC	230 VAC
Output current	3 – 100 A	7.5 – 250 A	1500 – 3000 VA

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

www.linkedin.com/company/aeg-power-solutions

www.facebook.com/aegpowersolutions

twitter.com/AEGPS