AEG

POWER
SOLUTIONS

POWER SECURED FOR OIL & GAS, & PETROCHEMICAL OPERATIONS

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.

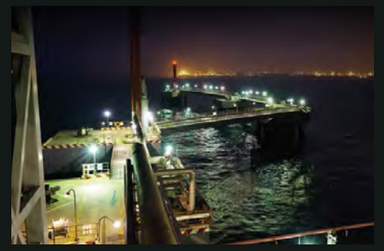
Backed by more than a century of innovation and customer service, AEG Power Solutions offers a full range of reliable, cost-effective solutions, from power conversion modules and high reliability UPS systems to industrial chargers and DC systems. Consolidating the portfolios previously sold under the 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 & 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 for hybrid energy storage solutions to support the growing integration of renewable energy sources 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 or complete project solutions supported by experienced engineers who understand your challenges
- Combines the resources of expert Application Engineers and a 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
- Provides systems compatible with all types of batteries: Nickel-Cadmium, lead-acid, Lithium-Ion as well as other alternatives
- Invests heavily in new technology to achieve high MTBF industrial systems that are designed to meet the most challenging operational conditions
- Offers sytems 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 seismic excitation to ensure our systems meet or surpass specified seismic characteristics

Rely on AEG PS power expertise
AEG Power Solutions has been securing power for critical applications in the up-, mid- and down-stream segments of the oil & gas and petrochemical industry for over 60 years. We strive to be innovative by offering state-of-the-art customized solutions, combined with a package of full project life-cycle services to ensure exceptional reliability, even in extremely harsh environments. In this sector the company offers a comprehensive range of world-class AC and DC power protection and control products with more than a 20 year lifetime, delivering the industry power availability required to safeguard personnel, prevent environmental risks, protect production processes, and ensure optimal uptime, maximum return on investment and reduced lifetime costs.

The expertise of the company spans the complete range of power supply technologies: thyristor, IGBT, switch mode, medium voltage materializing into a comprehensive offering of world-class AC and DC power protection and control products, adapted to any electric current from a few to thousands of amps and available in single- or three-phase input/output.

Our systems are designed to maximize the level of protection and prevent any type of dust generated by the process or the environment intruding into the inner parts of our products. Our range includes outdoor solutions which comply with stringent protection standards according to IEC 60529 (IP65). The usage of halogen-free cables limits smoke emissions, and our solutions can operate in a very wide range of temperatures, spanning -10 to 40 °C and above for outdoor applications. Our power protection systems meet or surpass specified seismic characteristics.

Numerous leading oil & gas, petrochemical and chemical industry players already rely on solutions from AEG PS, including Total, Saudi Aramco, Shell, BP, Wintershall (BASF), Gazprom, ExxonMobil and Qatar Petroleum.

AEG Power Solutions' systems are used in exploration and production rigs and platforms, FPSOs, marine transportation, pipelines, processing and storage facilities, GTL facilities, LNG facilities, refineries and chemical plants.

MINIMIZING RISKS, MAXIMIZING AVAILABILITY

Up-stream and Mid-stream

One of the multiple challenges faced in on- and off-shore production remains finding a suitable, sustainable and cost-effective power source and ensuring it is continuously and safely available on platforms (especially off-shore) for all applications which require it in up- and mid-stream operations.

Development of more advanced drilling and production systems in increasingly challenging environmental conditions makes it even more crucial and complex.

Continuous and safe operation is at stake. Downtime or malfunction can cost lives, damage the environment and have a lasting impact that costs millions of dollars per day. Power must be available 24/7 and protected from any supply disruption or malfunction resulting from frequency fluctuation or over-voltages caused by lightning strikes.

Facing the most severe conditions
To minimize the risks of downtimes and safety issues, the integration of an uninterruptible power supply system in the platform power network ensures the smooth continuity of operations; however, many other specific backups are also required to minimize risk and guarantee the availability of all security and emergency systems, including equipment in crew quarters. The offshore environment is harsh and remote; equipment must withstand the most severe conditions: storms, salt air intensifying corrosion, high heat or extreme cold, vibrations, dust and more while available space is also very limited. Maintenance is complex, comes at a high cost and should be as limited as possible.

On-shore power challenges are also numerous, and often similar to that of off-shore operations. Up-stream and mid-stream oil or gas facilities have high power demands which can reach up to several hundred MW. Most of the processes involved, such as drilling operations, are conducted around-the-clock, and downtimes are not an option. Security is also at stake as most drilling and extraction equipment is explosive and hazard-classified, therefore emergency and firefighting systems are critical and require power backup.
Oil & gas on-shore sites are often remote and in climatically challenging locations. Sand and extreme temperatures associated with dusty environments or full outdoor operations demand truly rugged systems.

Rugged and reliable power solutions
AEG Power Solutions' engineering expertise and our in-depth knowledge of the specific challenges on an off-shore platform are leveraged to secure the continuous availability of power and safe operations for all types of critical applications in this extremely harsh environment with customized and rugged UPS and chargers. Our systems have an average life expectancy of 20 years and meet the most stringent international industrial standards, including IEC 62040-1, IEC 62040-2, IEC 62040-3 and CE marking.

Customized to needs
Our AC and DC UPS systems as well as our AC and DC power conversion systems are field-proven, highly reliable and customizable. Our rugged solutions are natively designed to operate in a very wide span of temperatures; resist maritime corrosion and overheating with minimized maintenance and are protected from seismic impacts up to 3G level.

Our portfolio can meet any typical oil & gas application requirement. Reduced footprint, explosion-proof, maximum IP rate and battery-optimized to face oil & gas operation requirements such as a flame-retardant container or shock-proof rack for offshore.

Power secured for all critical applications

Security
- Navigational aids
- Helideck lighting
- Emergency lighting
- Fire & Gas detection systems
- ESD systems
- Fire fighting
- Emergency shutdown
- Radio & Telecommunications
- Signaling

Continuity of operations
- Instrumentation & Process Control
- Gas turbine control
- Switchgear tripping
- Motor starting
- Lube-oil pump supply

Power Backup
- Power Generation, Transmission and Distribution

MINIMIZING RISKS, MAXIMIZING AVAILABILITY

Up-stream and Mid-stream

SAFETY

- Personnel safety
- Navaids
- Fire and gas detection
- Weather station
- Emergency shutdown (ESD)
- Helideck signalling
- Emergency lighting
- Telecomm system

PROCESS

- Control room SCADA
- Access control
- Instrumentation
- Motor soft starter
- Gas compression
- Water injection & lube oil pumps
- DCS
- HVAC

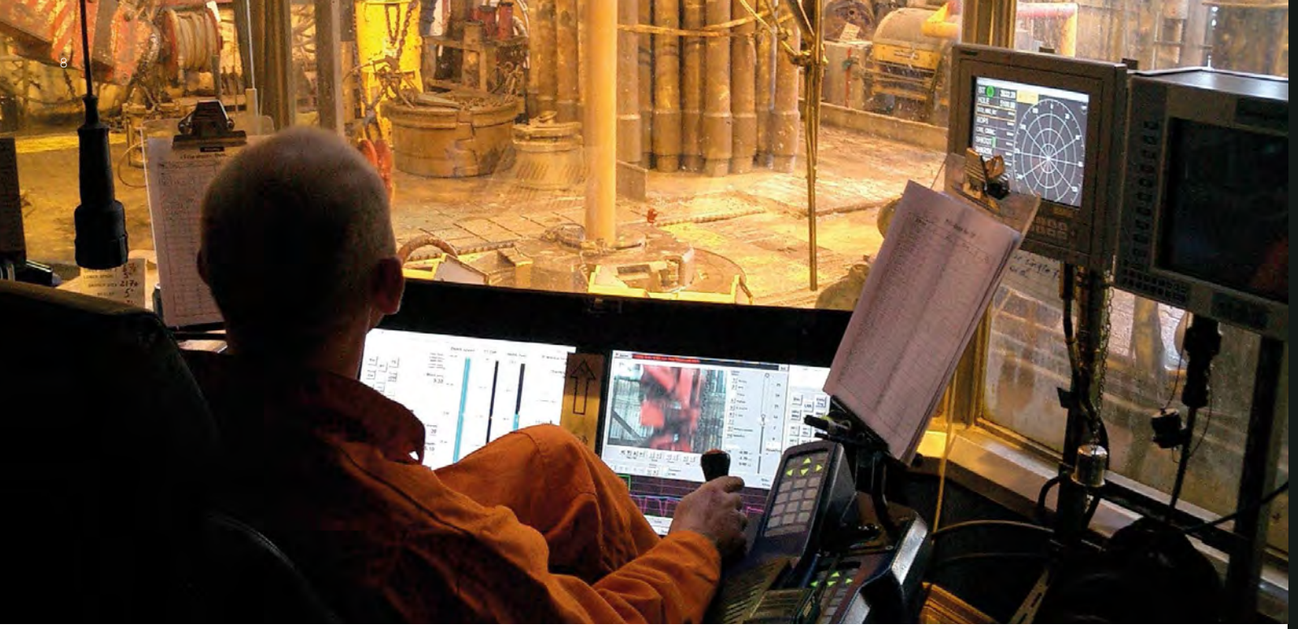
POWER

- Turbine process
- HV – MV switchgear

Up-stream

Mid-stream

Down-stream



COST-EFFECTIVE & RELIABLE POWER BACKUP

Down-stream applications

Down-stream oil & gas, plastics and down-stream chemical processing require a continuous and reliable power supply to avoid annual losses of significant amounts of wasted resources and materials, and safety risks or environmental issues.

Modern refineries and processing plants are integrating distributed control systems (DCS), programmable logic controllers (PLC), industrial computer systems or connected processes which are crucial to daily operations. Safety systems and pressure-relief systems are particularly at risk and have to be protected by uninterruptible power supplies according to the industry-specific requirements.

To avoid costly downtimes and damaged equipment, as well as protect the teams involved and the environment, it is essential to ensure reliable and high-quality power supply.

AEG Power Solutions offers robust power backup solutions to guarantee seamless operation processes and protect critical loads all along the down-stream oil & gas chain.

Our range of power supplies and services secure and power critical applications in petrochemical plants, such as a control system of partial air pressure and a transformer substation for recycled water. Our rugged and cost-effective AC and DC systems have proven track records in many existing petrochemical facilities. Compliant with the toughest industry standards, our systems can be easily maintained and upgraded when refineries or plants are refurbished as industrial processes evolve.

GLOBAL EXPERTISE

End-to-End project management and service

AEG PS is a power protection expert with experience in large international engineering projects and has a true understanding of your business challenges: safety, risk management, business continuity and operational excellence.

Our engineering support is available at all stages, including FEED, and our experts can help in specifying the optimized solution. In a site survey, an analysis is conducted on the high and low voltage electrical distribution network, load flow and load shedding, power quality and failures, short-circuit and noise rejection. The full system design includes:

- 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 environments
- On-site safety

Full life-cycle services
Our offer spans from stand-alone systems to a complete, dedicated project team tasked with assisting in the provision of large or complex power supply solutions, from custom design to installation. Our extensive product portfolio can be engineered to provide an efficient, compact and reliable system, including:

- Optimum sizing of batteries by our battery specialists
- Factory acceptance test and inspection
- Customized documentation, engineering drawings, O&M manuals
- Technical training
- Installation & commissioning

AEG Power Solutions is committed to the reliability of your power supply and the safe continuity of your operations. As your service partner, our portfolio for power protection is designed to increase your investment return and keep equipment operating at the highest efficiency and availability level throughout its entire life-cycle. The reliability of your installed power solution is supported by a Global Service Team renowned for its short response time and troubleshooting efficiency.

Pro Care™ Maintenance
Choosing one of the Pro Care™ Preventive 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. 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.

REFERENCES

Technical excellence for the Total oilfield in Tempa Rossa

AEG Power Solutions chosen by Maire Tecnimont Group for UPS at the Total oilfield
Tecnimont S.p.A., the main subsidiary of Maire Tecnimont Group, an industrial leader in the hydrocarbon industry, chose AEG Power Solutions to provide 25 UPS systems for the Tempa Rossa (www.it.total.com) on-shore oilfield in Italy, consisting of 4 DC UPS systems, 15 AC UPS systems and 6 AC and DC combined systems.

Tecnimont selected a combination of AEG PS Protect 8 UPS, its Protect 8 inverter and the Protect RCS battery charger.

AEG PS' battery expertise made a major difference, allowing the final customer to save money on battery costs and maintenance. The choice of AEG PS was motivated by, among other things, its technical excellence and experience and outstanding product range.

The challenging environment of the Yamal LNG project

AEG Power Solutions secures power for the Yamal LNG project
AEG PS provided equipment ensuring uninterrupted power supply for the Yamal LNG Project (Yamal-Nenets Autonomous Area, Russia). Protect 8 uninterrupted power supply systems were selected as they met all of the stringent technical requirements that Yamal LNG set for the equipment to be operated in the challenging conditions faced by this gas field in the Arctic.

The Yamal LNG plant needed more than 50 Protect 8 three-phase UPS units (in/out: 400 VAC, battery: 384 VDC). The Protect 8 UPS employs cutting-edge technology and is based on double conversion topology. This technology is a robust and commercially beneficial solution to ensure safe operation of high-performance equipment in demanding climate conditions. The Protect 8 UPS system has a proven track record of operation in the most challenging environments.

Providing back-up power to Sadara's chemical complex

AEG Power Solutions meets the back-up power challenge at Sadara's petrochemical site
AEG Power Solutions provided a large series of AC and DC UPS systems as part of the world-class Sadara Chemical Company complex. Sadara Project is the world´s largest integrated chemical facility ever built in a single phase. Inaugurated in 2017 in Jubail Industrial City II on Saudi Arabia´s Gulf coast, Sadara is a joint-venture between the Saudi Arabian Oil Company and the Dow Chemical Company.

Adapted to the project specifications, the modular architecture of the Protect 8 UPS line enabled AEG PS to rapidly customize each Protect 8 UPS to the unique requirements of each application within the Sadara project, so that each EPC could create their own solution, using the same basic Protect 8 building blocks.

To enable the first Sadara production units to come online as scheduled during the second half of 2015, AEG Power Solutions began commissioning its first power back-up systems during the final quarter of 2013 and continued through 2014. Now complete, the Sadara chemical complex can produce over three million metric tons of high-value-added chemical products and performance plastics annually.

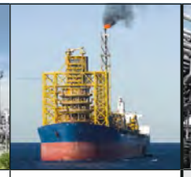
Relying on AEG PS power back-up solutions:
- Total
- Shell
- BP
- GDF
- Bayer
- Wintershall (BASF)
- ExxonMobil
- Repsol
- Agip
- ADNOC
- Saudi Aramco
- KNPC
- PDO Oman
- ONGC
- Thaioil
- Gazprom
- Qatar Petroleum
- DOW
- SABIC
- Sadara

SOLUTIONS

for all types of applications

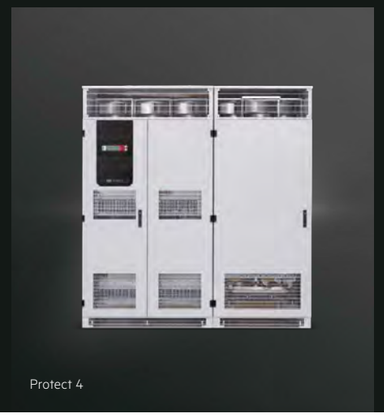







			LNG train	Grassroot refinery	Offshore platform (gathering)	LNG terminal	Petrochemical plant (feedstock)	FPSO	Refinery refurbishment	Pipe line station	Onshore field	Tank farms	Chemical plant
	MW process		300 – 700	200 – 500	5 – 20	5 – 10	50 – 100	20 – 70	200 – 500	5 – 10	5 – 20	<5	<5
SAFETY	Personnel evacuation	AC			Protect 8 S10 Protect 4			Protect 8 S10 Protect 4					
	Fire and gas detection	AC	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 8 S14 Protect 4
	Emergency shutdown (ESD)	DC/AC	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV				
	Emergency/safety lighting	AC	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4				Protect 8 S10 Protect 4
	Navaids	AC						Protect 8 S10 Protect 4					
	Dynamic positioning	AC						Protect 8 S10 Protect 4					
	Helideck signalling	DC			Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R		Protect RCS TPR Protect 8R					
	Facility management/CCTV	AC	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 8 S14 Protect 4
PROCESS	Telecom system/ satellite communication	DC/AC	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV		Protect 8 INV	Protect 8 INV	Protect 8 INV
	Internet of Things	DC											
	Control room SCADA, Data centers	AC	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300						Protect 8 S10 Protect 4			
	Instrumentation/PLC/ valves and actuator	DC	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect RCS TPR Outdoor Protect 8R	Protect RCS TPR Protect RCS TPR Outdoor Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR
	Remote tele-control	DC								Protect RCS TPR Protect RCS TPR Outdoor Protect 8R			
	Gas compression	AC								Protect 8 S10 Protect 4			
	DCS/ECS	AC	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300		Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 8 S14 Protect 4
	Access control	AC											
	AC or DC motor	DC/AC	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV	Protect 8 INV		Protect 8 INV		Protect 8 INV
	Liquid pump	AC											
	Water injection & lube oil pumps	DC/AC			Protect 8 INV						Protect 8 INV		
	HVAC control cabinet	AC	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4 Protect PLUS M400 Protect PLUS M600 Protect PLUS S300	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 4	Protect 8 S10 Protect 8 S14 Protect 4
POWER	Turbine process	DC	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R		Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect RCS TPR Outdoor Protect 8R			
	Electrolysis												Thyrobox DC3
	Heavy Drive (>1 MW) control	AC	Protect 8 S10 Protect 4							Protect 8 S10 Protect 4			
	HV, MV/LV switchgear (tripping)	DC	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect RCS TPR Outdoor Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R	Protect RCS TPR Protect 8R



Protect 4

Protect 8

Protect RCS

Protect RCS Outdoor

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
RECTIFIER UNIT	
Input nominal voltage (V)	3 x 380 / 400 / 415 (other voltages upon request)
INVERTER UNIT	
DC input (V)	108 / 216 / 384
Nominal AC voltage (V)	1 x 120 / 220 / 230 / 240 and 3 x 208 / 380 / 400 / 415

PROTECT 8 INVERTER SINGLE & THREE PHASE OUTPUT	
Nominal rating (at cos φ 0.8 lag) in kVA	10, 20, 30, 40, 60, 80, 100, 120
INVERTER UNIT	
DC input (V)	108 / 216
Nominal AC voltage (V)	1 x 120 / 220 / 230 / 240 and 3 x 380 / 400 / 415 (other voltages upon request)

PROTECT 4 UPS THREE PHASE OUTPUT	
Nominal rating (at cos φ 0.8 lag) in kVA	160, 220, 300, 400, 500, 600
RECTIFIER UNIT	
Input nominal voltage (V)	3 x 380 / 400 / 415
INVERTER UNIT	
DC input (V)	384 V ± 20 %
Nominal AC voltage (V)	3 x 380 / 400 / 415 (other voltages upon request)

PROTECT 8, PROTECT 4	
GENERAL DATA	
Efficiency depending on rating	Up to 94 % / >95 % with ECO Mode
Degree of protection	IP20 (option up to IP43; other upon request)
Noise level depending on rating	>60 dB (A)
Color	RAL 7035
Maximum altitude without derating	1,000 m
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
STANDARDS	
Safety	IEC 62040 - 1
EMC immunity and emission	IEC 62040 - 2
Performance	IEC 62040 - 3
CE marking	Yes

For further details, please refer to individual product publications

Industrial chargers, Rectifiers and DC scystems

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 optionally
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 a single cabinet
- Battery integrated in the 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	Cabinet IP protection: up to IP43 and IP55 on request
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 battery protection

For further details, please refer to individual product publications

PROTECT RCS OUTDOOR STANDARD CONFIGURATION	
INPUT	
Nominal input voltage	Three-phase 400 / 480 V ±10 % (+15 % – 20 % functional)
Frequency	50 Hz or 60 Hz, ±6 %
OUTPUT	
Voltage (UDC)	24 VDC
MECHANICAL	
Degree of protection	IP65 according to IEC 60529
Cabinet material	316 L stainless steel, natural color, sanded finish
ENVIRONMENTAL	
Type of cooling	Natural convection
Operating temperature	0 °C to +40 °C and higher temperatures up to 56 °C with de-rating
Operating humidity	10 % to 100 % R H non-condensing
Installation height	0 to 1,000 m – de-rating @ 1 % per 100 m above 1,000 m up to 3,000 m
STANDARDS	
Safety	IEC/EN 62040-1 / EN 50178
EMC	IEC/EN 61000-6-2,- 4 / IEC 62040 - 2
Approvals & certification	CE-Label, NFC 58-311