



# POWER YOU CAN RELY ON

General catalogue



# POWERTRONIX LIGHTS UP RIO 2016 OLYMPIC GAMES



*Engenheiro Stadium, Olympic Games Rio de Janeiro 2016, power safety granted by Powertronix technology.*

# POWERTRONIX

## Not UPS only

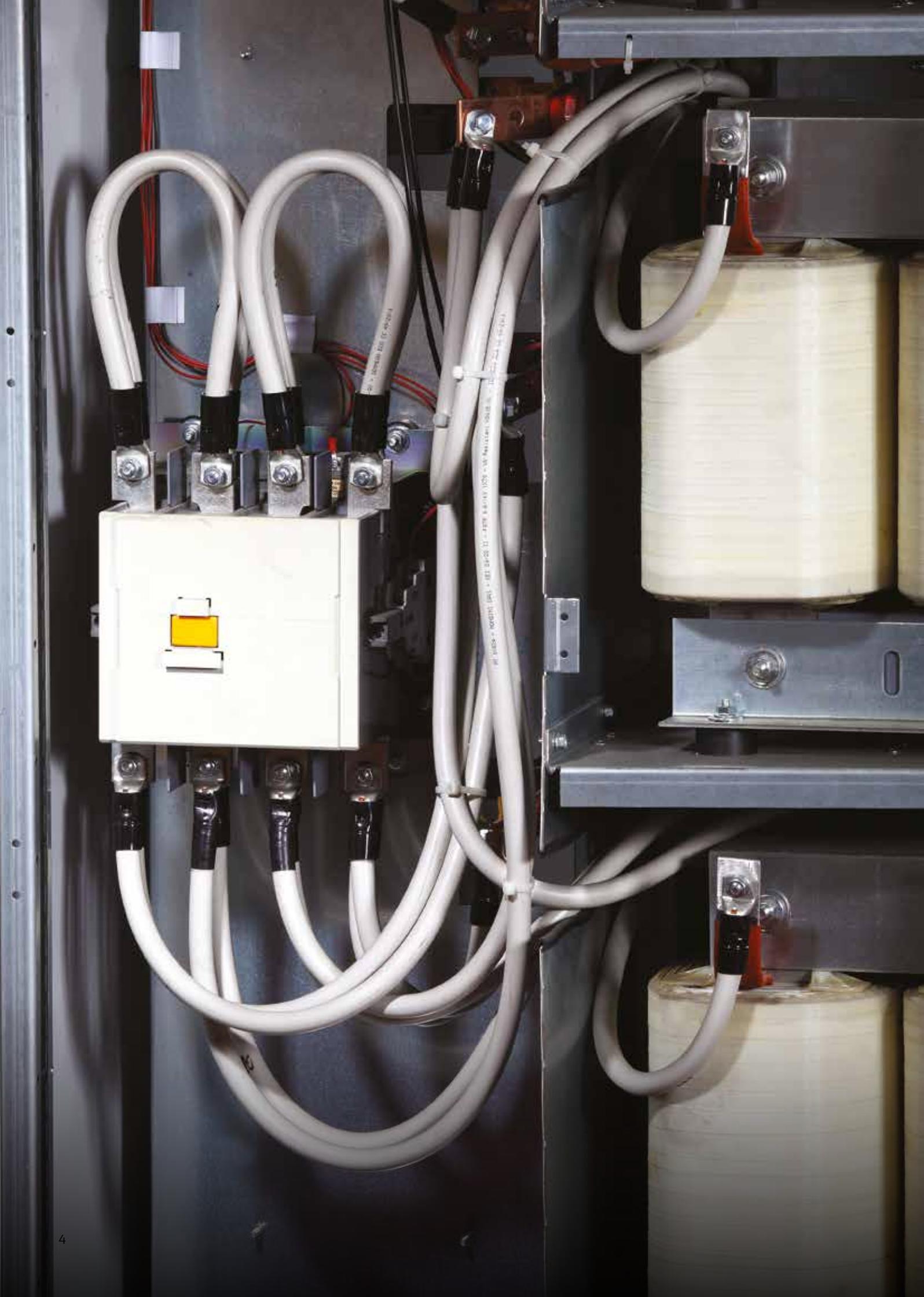


On the market since 1986, Powertronix is internationally known and appreciated, even before the proverbial reliability of its uninterruptible power supplies, for that spirit of constant research, development and innovation which hovers over its Grezzago headquarters, and which has made it a reference point of that Italian entrepreneurship which still knows how to represent a quality benchmark in the world.

The soul of Powertronix is still that of its founder Luigi Modenesi who designed the first transistor UPS in the late 70s, making what was on the market at the time seem suddenly obsolete.

Today we find the same desire to revolutionise through the same new and more efficient approach which drove the founder in the new tri-level UPS from the Hyperion series, characterised by performances above 97% and by Powertronix's interest in the topics of renewable energy and storage, an interest which has led to creating Enerclever, a line of smart products, capable, for example, of reducing generators' consumption by 60%. As you will have understood, Powertronix is and remains an advanced research and experimentation team with the ability to still produce equipment intended to make the history of power electronics with a passionate craftsmanship. After all, if the Olympic committee resorted to Powertronix technology in order to ensure a continuous power supply in stadiums throughout the Rio 2016 Olympic Games, there must be a reason.





## UNINTERRUPTIBLE POWER SUPPLIES THREE-PHASE

- SCR Serie from 50kVA to 300kVA
- IGBT Series from 10kVA to 200kVA
- Multilevel Series from 10kVA to 500kVA
- Modular Series from 20kVA to 850kVA
- Rack Independent Series from 10kVa to 200kVa



## UNINTERRUPTIBLE POWER SUPPLIES SINGLE-PHASE

- Tower - from 1kVA to 10kVA
- RackTower - from 1kVA to 10kVA



## ENERCLEVER

- BID/UPS from 50kVA to 300kVA
- Energy Station - custom designed to fit customer requirements



## VOLTAGE STABILIZER

- AVR Series



## DC SYSTEM

- CMP Series
- CMP-R Series



# THREE-PHASE UNINTERRUPTIBLE POWER SUPPLIES

For all three-phase installations, Powertronix offers Online Double Conversion Uninterruptible Power Supplies (classification according to IEC EN 62040-3 VFI SS 111 standards): a broad range of solutions entirely designed, produced and tested in Italy, at the Powertronix headquarters in Grezzago, according to ISO 9001 certified quality procedures.

Every Powertronix UPS is ideal for protecting all critical systems, such as computer networks, industrial processes, particularly in the health and pharmaceutical sector, telecommunications, transport, and all those contexts where the effective management of the quality of the energy supply is significantly important, in view of the key role played by electrical and electronic equipment.

The construction features of the various series on offer, ensure choosing the model suitable for every single and specific installation environment, with highly technological and innovative solutions that guarantee quality of energy and a continuous power supply for each user.

## SCR series

UPS characterised by SCR input section and high efficiency IGBT output inverter, without transformer.

Ideal for industrial plants, production lines, infrastructures and installations in remote areas.

It includes the UPS Vela - Atlas - Supernova products from 50kVA to 300kVA



## IGBT series

UPS characterised by PFC IGBT input section, with low distortion sine wave absorption, and by an output section with high efficiency IGBT inverter, without transformer. The perfect choice for any type of conventional load, common in various types of applications. It includes the Mizar - Alcor - Auriga - Auriga HP families with power ranges from 10kVA to 200kVA





## Multilevel Series

UPS designed to offer extremely high performance and unit power factor. Thanks to the IGBT-based design in multi-level topology. Ideal for installations in IT infrastructures, telecommunications, lighting systems. The Multilevel series develops power ranges from 10kVa to 500kVa.



## Modular series

Created to be integrated in computer centres, this UPS series features PFC IGBT input section, with low distortion sine wave absorption, and an output section with high efficiency IGBT inverter, without transformer and unit power factor. An almost obligatory choice for IT applications, it is also appreciated in areas where current loads are destined to grow in the near future. The series covers power ranges from 20kVa up to 300kVa in a single machine.

# SCR SERIES

The SCR series includes the Vela UPS, Atlas UPS and Supernova UPS products, characterised by a design that makes them suitable to be installed in remote areas with very unstable public networks. It has an input section with 6-pulse rectifier, with the possibility to upgrade to 12 pulses, with harmonic suppression filter, and an output section with high efficiency IGBT inverter, without transformer.

Thanks to the solutions adopted, the series guarantees maximum protection of power users and full compatibility with generators or separate sources, for all installations with three-phase power supply,

in the 50kVA - 60kVA - 80kVA - 100kVA - 120kVA - 160kVA - 200kVA - 250kVA - 300kVA power range. All models have an RS232 communication port, an "intelligent slot" for installing a network adapter (optional SNMP card), a voltage free contact board, and an EPO remote contact for UPS remote shut-down.

The proven reliability, in addition to the simplicity of installation and maintenance, ensure these UPS are ideal for the quality of the energy delivered and the safety of your systems.

ATLAS UPS 80÷120kVA



SUPERNOVA UPS 160÷300kVA



VELA UPS 50÷60kVA

Model	VL50	VL60	AT80	AT100	AT120	SN160	SN200	SN250	SN300	
<b>Input</b>										
Input nominal voltage	3Ph+N 380/400/415V									
Input nominal frequency	50 or 60 Hz									
Input frequency range	40 ÷ 70 Hz									
Power factor	0.99									
Soft start	0 ÷ 100% in 30 sec									
Backfeed protection	on request									
Input current distortion	THDi ≤5% (12 pulse vers. + filter)									
<b>Automatic Bypass</b>										
Bypass nominal voltage	3Ph 380/400/415 V									
Bypass nominal frequency	50 or 60 Hz									
<b>Output</b>										
Output nominal power KVA	50	60	80	100	120	160	200	250	300	
Output active power KW	40	48	64	80	96	128	160	200	240	
Output nominal voltage	3Ph+N 380/400/415V									
Output static voltage stability	± 1%									
Output dynamic voltage stability	± 5%									
Crest factor	3:1									
Output voltage distortion (linear load)	≤ 3%									
Output nominal frequency	50Hz or 60Hz									
Output frequency stability	0.01%									
<b>Battery</b>										
Battery type	VRLA AGM o VRLA GEL									
Max charging current	25				50					
Battery charging profile	DIN 41733 Temperature compensated									
<b>Communication</b>										
Remote signals	Remote EPO - External ByPass									
Communication interface	Serial RS232, Dry Contacts									
Options	Serial RS485 ModBus; IP Network SNMP/HTTP/MODBUS									
<b>Mechanical data</b>										
Protection	IP 20									
Dimensions mm	530x950xh1230		700x740xh1800			1240x800xh1800				
Weight Kg	182	192	350	390	430	570	600	683	693	
Noise at 1m dBA	62				64					
Storing temperature	-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)									
Working environment temperature	+20°C ÷ +40°C									
Relative humidity	95% non condensing									
Altitude	1000m slm (1% derating every 100m up to 2000m)									
Cooling	forced air regulated speed									
<b>General</b>										
UPS efficiency	94%									
Overload	125% 10 min; 150% 60 sec									
<b>Standards</b>	Direttives :LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFIS - 111 • RoHs compliant									

# IGBT SERIES

The IGBT series consists of the Mizar, Alcor, Auriga and Auriga HP families. Developed in Italy with today's most widespread technology, they meet the VFI-SS-111 CEI and EN62040 standards. Made wholly in Italy according to ISO9001 standards, the entire IGBT series represents the ideal solution for protecting IT infrastructures, industrial production lines, lighting and telecommunication systems, where the quality of the energy supplied is essential for the optimal operation of all the connected equipment.

The series, characterised by 0.9 PF, covers a broad power range, from 10KVA up to 200KVA in single units, but with the possibility of setting up parallel systems up to 8 units for a maximum power of 1.6MVA.

All models have, already in their standard configuration, an RS232 communication port, an RS485 interface with Modbus RTU protocol, an "intelligent slot" for installing the optional network adapter (TCP/IP, SNMP, HTTP, MODBUS and others), a voltage free contact board, an auxiliary contact input, an external manual by-pass, an EPO (Emergency Power Off) remote contact for the UPS remote shutdown.

AURIGA HP UPS 120÷200kVA



AURIGA UPS 60÷100kVA



MIZAR UPS 10÷15kVA

ALCOR UPS 20÷40kVA

## ON FIELD FLEXIBILITY.

- 3 phase to 3 phase.
- 3 phase to 1 phase.
- 1 phase to 1 phase.
- 1 phase to 3 phase.

Model	MZ10	MZ15	AL20	AL30	AL40	AU060	AU080	AU100	AU120	AU160	AU200	
<b>Input</b>												
Input nominal voltage	1Ph 220/230/240V or 3Ph+N 380/400/415V						3Ph+N 380/400/415V					
Input nominal frequency							50 or 60 Hz					
Input frequency range							40 ÷ 70 Hz					
Power factor							0.99					
Soft start							0 ÷ 100% in 30 sec					
Backfeed protection							on request					
Input current distortion							THDi ≤3%					
<b>Automatic Bypass</b>												
Bypass nominal voltage	1Ph 220/230/240V or 3Ph+N 380/400/415V						3Ph+N 380/400/415V					
Bypass nominal frequency							50 or 60 Hz					
<b>Output</b>												
Output nominal power KVA	10	15	20	30	40	60	80	100	120	160	200	
Output active power KW	9	13,5	18	27	36	54	72	90	108	144	180	
Output nominal voltage	1Ph 220/230/240V or 3Ph+N 380/400/415V						3Ph+N 380/400/415V					
Output static voltage stability							± 1%					
Output dynamic voltage stability							± 5%					
Crest factor							3:1					
Output voltage distortion (linear load)							≤ 1%					
Output nominal frequency							50Hz or 60Hz					
Output frequency stability							0.01%					
<b>Battery</b>												
Battery type							VRLA AGM o VRLA GEL					
Max charging current							25% nominal power					
Battery charging profile							DIN 41733 Temperature compensated					
<b>Communication</b>												
Remote signals							Remote EPO - External ByPass					
Communication interface							Serial RS232/RS485 Modbus, Dry contacts					
Options							IP network SNMP/HTTP/MODBUS					
<b>Mechanical data</b>												
Protection							IP 20					
Dimensions mm	390x900xh910						410x830xh1510			800x840xh1800		
Weight Kg	70	70	75	80	90	240	270	290	480	540	590	
Noise at 1m dBA	54		56		58		65			66		
Storing temperature							-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)					
Working environment temperature							+20°C ÷ +40°C					
Relative humidity							95% non condensing					
Altitude							1000m slm (1% derating every 100m up to 2000m)					
Cooling							forced air regulated speed					
<b>General</b>												
UPS efficiency							95,5%					
Overload							125% per 10 minuti; 150% per 60 secondi					
<b>Standards</b>	Direttives :LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHs compliant											

# MULTILEVEL SERIES

The Multilevel series is the latest born. Also fully designed and manufactured in Italy, it adopts the most advanced technology that can be found in the world of UPS. Composed of an inverter and a multilevel type PF controller, it guarantees a very high performance, 97%, and very low levels of harmonics injected into the network, thus saving money on the consumption deriving from the use of the UPS itself. This latest technology subjects the components to less electrical stresses, thus increasing the reliability of the equipment.

Designed according to the VFI-SS-111 (CEI and EN 62040) regulations in force and built according to ISO 9001 standards, the Multilevel series covers the power range from 100KW to 300KW, with PF 1.

As occurs for the entire Powertronix production, these UPS also feature, as standard design, an RS232 communication port, an RS485 interface with Modbus RTU protocol, an "intelligent slot" for installing the optional network adapter (TCP/IP, SNMP, HTTP, MODBUS and others), a voltage free contact board, an auxiliary contact input, an external manual by-pass, an EPO (Emergency Power Off) remote contact for the UPS remote shutdown.

VECTOR HP UPS  
10÷30kVA



HYPERION UPS  
100÷300kVA



CORAL UPS  
10÷160kVA



SIRIO UPS  
300÷500kVA



Model		VNVH 10	VNVH 20	VNVH 30
CAPACITY*		10 KVA/10 KW	20 KVA/20 KW	30 KVA/30 KW
<b>Input</b>				
Voltage Range	Low Line Loss	110 VAC(Ph-N) $\pm$ 3 % at 50% Load 176 VAC(Ph-N) $\pm$ 3 % at 100% Load		
	High Line Loss	300 VAC(L-N) $\pm$ 3 % at 50% Load 276 VAC(L-N) $\pm$ 3 % at 100% Load		
Frequency Range		46Hz ~ 54 Hz nel sistema 50Hz 56Hz ~ 64 Hz nel sistema 60Hz		
Phase		3 Phase with Neutral		
Power Factor		$\geq$ 0.99 at 100% Load		
<b>Output</b>				
Phase		3 Phase with Neutral		
Output voltage		360/380/400/415VAC (Ph-Ph) - 208*/220/230/240VAC (Ph-N)		
AC Voltage Regulation		$\pm$ 1%		
Frequency Range (Synchronized Range)		46Hz ~ 54 Hz @ 50Hz system - 56Hz ~ 64 Hz @ 60Hz system		
Frequency Range (Batt. Mode)		50 Hz $\pm$ 0.1 Hz or 60Hz $\pm$ 0.1 Hz		
Overload	AC mode	100%~110%: 60min; 110%~125%: 10min; 125%~150%:1min;>150% : immediately		
	Battery mode	100%~110%: 60min; 110%~125%: 10min; 125%~150%:1min;>150% : immediately		
Current Crest Ratio		3:1 max		
Harmonic Distortion		$\leq$ 2% al 100% di carico lineare $\leq$ 5% al 100% del carico non lineare		
Transfer Time	Line $\leftrightarrow$ Battery	0 ms		
	Inverter $\leftrightarrow$ Bypass	0 ms (When phase lock fails, <4ms interruption occurs from inverter to bypass)		
	Inverter $\leftrightarrow$ Eco	<10 ms		
Topology		multilevel		
<b>Efficiency</b>				
AC mode		96,5%		
Battery Mode		95,5%		
<b>Battery</b>				
Standard Model	Type	12 V/7 Ah	12 V/9 Ah	12 V/7 Ah
	Numbers	(10+10) pcs	(16+16) pcs x 2 strings	
	Recharge Time	9 hours recover to 90% capacity		
	Charging current(max.)	2.0 A $\pm$ 10% (Recommended) 1.0~12.0A (Adjustable)		
	Charging voltage	+/-136,5 V CC $\pm$ 1%	+/-218 V CC $\pm$ 1%	
Long-run Model	Type	Depending on applications		
	Numbers	20	32 ~ 40 (adjustable)	
	Charging current(max.)	1,0~12,0A $\pm$ 10% (adjustable)		
	Charging voltage	+/- 13,65 V CC * N $\pm$ 1% (N = 16~20)		
<b>Physical</b>				
Standard Model	Dimension, D x W x H (mm)	175	185	245
	Net Weight (kgs)	124/126	139/141	225/230
Long-run Model	Dimension, D x W x H (mm)	175	185	245
	Net Weight (kgs)	28/30	43/45	60/65
<b>Environment</b>				
Operation Temperature		0 ~ 40°C (the battery life will down when > 25°C)		
Operation Humidity		<95 % and non-condensing		
Operation Altitude**		<1000 m**		
Acoustic Noise Level		Less than 55dB @ 1 Meter	Less than 58dB @ 1 Meter	Less than 65dB @ 1 Meter
<b>Management</b>				
Smart RS-232 or USB		Supports Windows@ 2000/2003/XP/Vista/2008/7/8/10, Linux, Unix, and MAC		
Optional SNMP		Power management from SNMP manager and web browser		

\* Derate capacity to 90% when the output voltage is adjusted to 208VAC.

\*\* If the UPS is installed or used in a place where the altitude is above than 1000m, the output power must be derated 1% per 100m.

\*\*\*Product specifications are subject to change without further notice.

Model	HY100	HY120	HY160	HY200	HY250	HY300
<b>Input</b>						
Input nominal voltage	3Ph+N 380/400/415V					
Input nominal frequency	50 or 60 Hz					
Input frequency range	40 ÷ 70 Hz					
Power factor	0.99					
Soft start	0 ÷ 100% in 30 sec					
Backfeed protection	standard for Plus version					
Input current distortion	THDi ≤2,5%					
<b>Automatic Bypass</b>						
Bypass nominal voltage	3Ph 380/400/415 V					
Bypass nominal frequency	50 or 60 Hz					
<b>Output</b>						
Output nominal power KVA	100	120	160	200	250	300
Output active power KW	100	120	160	200	250	300
Output nominal voltage	3Ph+N 380/400/415V					
Output static voltage stability	± 1%					
Output dynamic voltage stability	± 5%					
Crest factor	3:1					
Output voltage distortion (linear load)	≤ 1%					
Output voltage distortion (non linear load)	≤ 5%					
Output nominal frequency	50Hz or 60Hz					
Output frequency stability	0.005%					
<b>Battery</b>						
Battery type	VRLA AGM or VRLA GEL					
Max charging current	25% nominal power					
Battery charging profile	DIN 41733 Temperature compensated					
<b>Communication</b>						
Remote signals	EPO remoto - ByPass esterno					
Communication interface	Serial RS232/RS485 Modbus, Dry contacts					
Options	IP network SNMP/HTTP/MODBUS					
<b>Mechanical data</b>						
Protection	IP 20					
Dimensions mm	558x838xh1804		800x838xh1804		1035x838xh1804	
Weight Kg	490	520	690	740	870	950
Noise at 1m dBA	62		63		64	
Storing temperature	-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)					
Working environment temperature	+20°C ÷ +40°C					
Relative humidity	95% non condensing					
Altitude	1000m slm (1% derating every 100m up to 2000m)					
Cooling	forced air controlled speed					
<b>General</b>						
UPS efficiency	97% on-line; 99,5% eco-mode					
Overload	125% 15 min; 150% 60 sec					

**Standards**

Direttive: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive  
Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHs compliant

Model	SR300	SR400	SR500
<b>Input</b>			
Nominal voltage	380/400/415 VAC 3 P+N		
Nominal frequency	50 or 60 Hz		
Frequency range	±10% (Selectable)		
Power factor	>0.99		
Soft start	0 ÷ 100% in 30 sec		
Backfeed protection	Optional		
Current distortion	<3%		
Automatic bypass	Without interruption		
Bypass nominal voltage	3Ph 380x/400/415 V		
Bypass nominal frequency	50 or 60 Hz		
<b>Output</b>			
Nominal power KVA	300	400	500
Active power KW	300	400	500
Nominal voltage	380/400/415 VAC 3 P+N		
Static voltage stability	± 1%		
Dynamic voltage stability	±3%		
Crest factor	3:1		
Voltage distortion (linear load)	<1%		
Voltage distortion (non linear load)	<3%		
Nominal frequency	50Hz o 60Hz		
Frequency stability	0.005%		
<b>Battery</b>			
Battery type	VRLA/GEL		
Max charging current	25% nominal power		
Battery charging profile	DIN 41733 Temperature compensated		
<b>Communication</b>			
Remote signals	Remote EPO - External bypass		
Communication interface	RS232 Serial and RS485 Ports - 2 Communication Slots		
Options	Dry Contact - SNMP, ModBUS RTU / ModBUS TCP, ProfiBUS, Remote Emergency Power Off, Remote Display Panel		
<b>Mechanical data</b>			
Protection	IP 20		
Dimensions mm	1200x825xh1854	1200x825xh1854	1200x825xh1854
Weight kg	830	840	850
Noise at 1m dBA	<74dBA		
Storing temperature	-20°C ÷ +70°C (UPS) • +20°C ÷ +30°C (Batteries)		
Working environment temperature	-5°C ÷ +70°C (UPS) • +20°C ÷ +30°C (Batteries, with derating)		
Relative humidity	95% non condensing		
Altitude	1000m asl (1% derating every 100m up to 2000m)		
Cooling	Forced air controlled speed		
<b>General</b>			
UPS efficiency	96%		
Overload	At 125% Load 10 min, At 150% Load 1min		

Standards

Directive: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive  
Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHS compliant

Model	CR010	CR020	CR030
<b>Input</b>			
Input nominal voltage		1Ph+N 220/230/240V 3Ph+N 380/400/415V	
Input nominal frequency		50 or 60 Hz	
Input frequency range		40 ÷ 70 Hz	
Power factor		0.99	
Soft start		0 ÷ 100% in 30 sec	
Backfeed protection		on request	
Input current distortion		THDi ≤3%	
<b>Automatic Bypass</b>			
Bypass nominal voltage		1Ph+N 220/230/240V 3Ph+N 380/400/415V	
Bypass nominal frequency		50 or 60 Hz	
<b>Output</b>			
Output nominal power KVA	10	20	30
Output active power KW	10	20	30
Output nominal voltage		1Ph+N 220/230/240V 3Ph+N 380/400/415V	
Output static voltage stability		± 1%	
Output dynamic voltage stability		± 5%	
Crest factor		3:1	
Output voltage distortion (linear load)		≤ 1%	
Output nominal frequency		50Hz o 60Hz	
Output frequency stability		0.01%	
<b>Battery</b>			
Battery type		VRLA AGM o VRLA GEL	
Max charging current		25% nominal power	
Battery charging profile		DIN 41733 Temperature compensated	
<b>Communication</b>			
Remote signals		Remote EPO - External Bypass	
Communication interface		Serial RS232/RS485 Modbus, Dry contacts	
Options		IP network SNMP/HTTP/MODBUS	
<b>Mechanical data</b>			
Protection		IP 20	
Dimensions mm		390x900xh910	
Weight kg	70	80	90
Noise at 1m dBA	54	56	58
Storing temperature		-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)	
Working environment temperature		+20°C ÷ +40°C	
Relative humidity		95% non condensing	
Altitude		1000m slm (1% derating every 100m up to 2.000m slm)	
Cooling		forced air regulated speed	
<b>General</b>			
UPS efficiency		96%	
Overload		At 125% Load 10 min, At 150% Load 1min	
<b>Standards</b>	Directive: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFIS - 111 • RoHS compliant		

Model	CR050	CR060	CR080	CR100	CR130	CR160
<b>Input</b>						
Input nominal voltage	3Ph+N 380/400/415V					
Input nominal frequency	50 o 60 Hz					
Input frequency range	40 ÷ 70 Hz					
Power factor	0.99					
Soft start	0 ÷ 100% in 30 sec					
Backfeed protection	on request					
Input current distortion	THDi ≤3%					
<b>Automatic Bypass</b>						
Bypass nominal voltage	3Ph+N 380/400/415V					
Bypass nominal frequency	50 or 60 Hz					
<b>Output</b>						
Output nominal power KVA	50	60	80	100	130	160
Output active power KW	50	60	80	100	130	160
Output nominal voltage	3Ph+N 380/400/415V					
Output static voltage stability	±1%					
Output dynamic voltage stability	±5%					
Crest factor	3:1					
Output voltage distortion (linear load)	≤1%					
Output nominal frequency	50Hz o 60Hz					
Output frequency stability	0.01%					
<b>Battery</b>						
Battery type	VRLA AGM o VRLA GEL					
Max charging current	25% nominal power					
Battery charging profile	DIN 41733 Temperature compensated					
<b>Communication</b>						
Remote signals	Remote EPO - External Bypass					
Communication interface	Serial RS232/RS485 Modbus, Dry contacts					
Options	IP network SNMP/HTTP/MODBUS					
<b>Mechanical data</b>						
Protection	IP20					
Dimensions mm	410x830xh1510			800x840xh1800		
Weight kg	240	270	290	480	540	590
Noise at 1m dBA	65			66		
Storing temperature	+20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)					
Working environment temperature	+20°C ÷ 40°C					
Relative humidity	95% non condensing					
Altitude	1000m slm (1% derating every 100m up to 2.000m slm)					
Cooling	forced air regulated speed					
<b>General</b>						
UPS efficiency	96%					
Overload	At 125% Load 10 min, At 150% Load 1min					
<b>Standards</b>	Direttive: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHS compliant					

# MODULAR MV SERIES

The modular series, designed in Italy with today's most widespread technology, also complies with the VFI-55-111 CEI and EN62040 standards. Built according to ISO9001 standards, the entire modular series represents the ideal solution for protecting IT infrastructures, where the quality of the energy supplied is essential for the optimal operation of all the connected equipment.

The series, characterised by PF 1, covers a broad power range, from 20KW up to 300KW as a single unit, but with the possibility of composing 2-rack systems in parallel for a maximum power of 420KW.

All models have, as standard design, an RS232 communication port, an RS485 interface with Modbus RTU protocol, an "intelligent slot" for installing the optional network adapter (TCP/IP, SNMP, HTTP, MODBUS and others), a voltage free contact board, an auxiliary contact input, an external manual bypass, an EPO (Emergency Power Off) remote contact for the UPS remote shutdown.

## AURIGA MV FAMILY 20÷300kVA



Model	AUVM80	AUVM120	AUVM200	AUVM90	AUVM120	AUVM180	AUVM210	AUVM300	AUVM60E	AUVM90E
Fitting power modules (KVA)	20	20	20	30	30	30	30	30	20	30
Max power modules number	4	6	10	3	4	6	7+1	10	3	3
<b>Input</b>										
Input nominal voltage	3Ph+N 380/400/415V									
Input voltage range	305 ÷ 478 VAC at 100% load; 208 ÷ 304VAC at <70% load									
Input frequency nominal/range	50 or 60 Hz / 45 ÷ 66 Hz									
Power factor	0.99									
Backfeed protection	on request									
Input current distorsion	THDi ≤3%									
<b>Automatic Bypass</b>										
Bypass nominal voltage	3Ph 380/400/415 V									
Bypass nominal frequency	50 or 60 Hz									
<b>Output</b>										
Output nominal power KVA	80	120	200	90	120	180	210	300	60	90
Output active power KW	80	120	200	90	120	180	210	300	60	90
Output nominal voltage	3Ph+N 380/400/415V									
Output voltage stability	Static ± 1% / Dynamic ± 5%									
Output voltage distorsion (linear load)	≤ 1%									
Output nominal frequency	50Hz o 60Hz									
Output frequency stability	0.01%									
<b>Battery</b>										
Battery type	VRLA AGM o VRLA GEL									
Max charging current	6A each 20KVA power module / 8A each 30KVA power module									
Battery charging profile	DIN 41733 Temperature compensated									
<b>Communication</b>										
Remote signals	Remote EPO - Extenal ByPass									
Communication interface	Serial RS232/RS485 Modbus, Dry Contacts									
Options	IP Network SNMP/HTTP/MODBUS									
<b>Mechanical data</b>										
Protection	IP 20									
Dimensions rack mm 1100x600xh...	1475mm 30U		2010mm 42U		1475mm 30U		2010mm 42U		1000x514xh763mm 15U	
Rack weight Kg	175	185	245	180	185	240	255	275	195	195
Power module weight and dimensions	650x440xh132(3U) / 34Kg									
Noise at 1m dBA	58 ÷ 62 dBA									
Working environment temperature	+20°C ÷ +40°C / 95% non condensing									
Altitude	1000m slm (1% derating every 100m up to 2000m)									
<b>General</b>										
Cooling	Forced air									
UPS efficiency	95,5%									
Overload	110% 1 hr, 120% 10 min, 150% 1 min, >150% 200ms									
Standards	Direttives: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHs compliant									

# AURIGA MS MODULAR UPS (450-900KVA)

Auriga MS modular UPS, special used to IDC data center, is a high-end product launched to market by Powertronix adopting "Energy saving, green, environmental protection" concept. It delivers the best combination of rectifier, filter, charger, inverter and intelligent power protection. Applying innovative current sharing rectifier control, master-slave synchronization in sequence control, multi-level decentralized control and 3-level sine wave modulation technology, it features great efficiency, flexibility and reliability; reduces the maintenance cost.

Auriga MS series is a new type modular UPS, which integrated digital technology and new semiconductor technology, can completely eliminate the impact of various grid problems on key loads. Adopting 75KVA power modules, it features high

## FEATURES

- Adopting modular structure, composed of monitor module, bypass module, control module and power module in parallel, power module N+X redundancy, hot swappable;
- Parallel-capable up to 4sets UPS, meet N+1, 2N, 2N requirements;
- In/out mode: 1/1, 1/3, 3/1, 3/3;
- All power modules share the batteries;
- Perfect battery management function: battery self-discharge function, auto-transfer between floating and equal charging, temperature compensation;
- Any module has balanced distribution function for input, output and charging power;
- Overall efficiency >96% (AC-AC), inverter efficiency>98% (DC-AC);
- Input THDI<3%;
- Input PF>0.99;
- Continuous current mode (CCM) is adopted for AC input to reduce interference to power grid (RFI/EMI);
- Appearance in accordance with industry specifications. Can meet the load-bearing requirements of ordinary buildings with small size and weight;
- Standard configuration with manual maintenance breaker, RS232, RS484/RS422 communication ports and remote monitor software. Option SNMP, SPD and input&output breaker;

AURIGA MS 450÷900kVA



power density, reliable, high efficiency and intelligence, provides ideal power supply protection for customers' large and medium places.

- Multiple work mode: online, ECO, iECO mode;
- System has energy storage function.

## LITHIUM BATTERY

- Battery core selection: square aluminum shell lithium iron phosphate battery, safety control starts from battery core selection;
- Module insulation design: cell gap is greater than 7mm, insulation ability complies with GB/T 16935.1 and IEC60664-1 standards, eliminating the risk of cell failure diffusion;
- Three-level safety protection design: fuses, circuit breakers and contactors to protect DC;
- BMS equalization technology: using energy transfer type passive (active is optional for special request) equalization control technology;
- BMS adopts three-level management system: module level, rack level, system level, providing perfect monitoring and protection functions;
- Small area covering and more space for servers;
- Large discharge rate, suitable for 5-15 minutes short-term backup of data center;
- Wide temperature range, reducing operating costs;
- Ampia gamma di temperature, ridurre i costi di manutenzione;
- Long life cycle, 4,500 cycles in 10 years.

Model	MS 240-450/75	MS 240-600/75	MS 240-900/75
Cabinet maximum power	450kVA	600kVA	900kVA
Accepted power module	DN75D		
<b>Mains input</b>			
Input mode	3PH+N+PE 1PH+N+PE		
Input voltage	380V/220V - 400V/230V - 415V/240V		
Input frequency	50Hz±5% 60Hz±5%		
<b>Battery charging</b>			
Charging profile	DIN 41733 temperature compensated		
Charging ability	8 hours to 90% capacity		
<b>AC output</b>			
UPS power factor	1		
Output voltage	380V/220V - 400V/230V - 415V/240V		
Output frequency	50Hz±0,01%(battery supply),60Hz±0,01(battery supply)		
Output voltage stability	±1%		
Voltage recovering	<20ms (load 0% to 100% change)		
Overload capability	10mins @125%, 60sec @150%		
Commutation bypass-inverter	0 time		
Peak factor	03:01		
Overall efficiency	≥96.5%		
Load share precision	97%		
<b>Operation environment</b>			
Ambient temperature	- 25°C ~ 60°C		
Operating temperature	- 5°C ~ 40°C		
Operation altitude	≤5000m, derating if altitude is more than 1000m		
Relative humidity	≤95% No condensation		
Protection degree	IP20		
Cooling	Cooling by Fans		
Safety standards	EN62040-1 / EN62040-2 / IEC60950		
Acoustic noise	≤68dB		
Width (mm)	800x1000x2000	1200x1000x2000	1800x1000x2000
Weight (kg)	320	480	730

<b>Module technical specifications</b>	
Power	75KVA
Input/Output Mode	3/3,3/1,1/1
THDI (%)	≤3%
Overload capacity	10mins @125%, 60sec @150%
Dimensions (HxWxD) mm	172x482x628
Peso (kg)	47.5

# RACK INDEPENDENT SERIES

VECTOR RI UPS 10÷100kVA



Vector RI UPS is market most flexible, complete and scalable power protection solutions delivering premium VFI online double conversion for IT and electrical infrastructures in corporate, medical, banking and industrial applications. Vector RI UPS provides flexible form factor allowing standardization across multiple applications.

High power internal chargers allow virtually unlimited additional matching battery packs to comply with aggressive runtime demands of business-critical systems. Adopting PFC input IGBT based, separate battery charger, transformer-less inverter design Vector RI UPS offers high availability, flexibility and minimum total cost of ownership, delivering on-line double conversion protection in a versatile rack/tower format.

Based on rack independent concept design and modular capability feature, Vector RI UPS allows to provide the customer with a tailor made power solution up to 100kW and to enhance the multi UPS architecture management and monitoring as per single UPS system, via additional PTX multiUPS rack controller and LCD screen panel. To ease installation and maintenance procedures, UPS provides hot swappable terminal block, to remove from rack cabinet the power module only, without disconnecting UPS input/output wiring.

Model	3/3-10K	3/1-10K	1/1-10K
Phase	3 phase in / 3 phase out	3 phase in / 1 phase out	1 phase in / 1 phase out
Capacity	10000 VA/ 10000 W		
Cabinet capacity	100KVA/100KW		
One power module capacity	10KVA/10KW		
Max power module no.	10		
Max battery set no.	10		
<b>Input</b>			
Nominal voltage	3x 360VAC/380VAC/400VAC/415 VAC (3Ph+N+PE)		208VAC/220 VAC/230VAC/ 240VAC (1Ph+N+PE)
Voltage range	190-520 VAC (3-phase) @ 50% load 305-478 VAC (3-phase) @ 100% load		110-300 VAC @ 50% load 176-276 VAC @ 100% load
Frequency range	40~70Hz		
Power factor	≥ 0.99 @ 100% load		
<b>Output</b>			
Output voltage	360VAC/380V AC/400VAC/41 5VAC (3Ph+N)	208*/220/230/240VAC (L+N)	
Regolazione della tensione CA	± 1%		
Frequency Range (Synchronized Range)	46~54Hz or 56~64Hz		
Frequency Range (Batt. Mode)	50 Hz ± 0.1 Hz o 60 Hz ± 0.1 Hz		
Current Crest Ratio	3:1 (max.)		
Harmonic Distortion	≤ 2 % THD (Linear Load); ≤ 4 % THD (Non-linear Load)		≤3% (Linear Load); ≤5% (Non-linear Load)
Transfer time	AC Mode to Batt. Mode	zero	
	Inverter to bypass	zero	
<b>Efficiency</b>			
AC Mode	94%		93.5%
ECO Mode	97%		
Battery Mode	93.5%	93%	92.5%
<b>Battery/charger</b>			
Battery Numbers	16 ~ 20 pcs (adjustable) x 2		
Nominal Voltage	+/-192V (12V x 32 pcs)		
Maximum Voltage	+/- 240V (12V x 40 pcs)		
Minimum Voltage	+/-192V (12V x 32 pcs)		
Typical Recharging Time	9 hours recover to 90% capacity		
Charging Current	+/- 4A		
<b>Indicators</b>			
LCD/LED Display	UPS status, Load level, Battery level, Input/Output voltage, Discharge timer, and Fault conditions		
<b>Physical</b>			
Dimension, D X W X H (mm)	678 X 418 X 132		
Net Weight (kgs)	20.5		
<b>Environment</b>			
Operation Humidity	172x482x628		
Noise Level	Less than 55dB @ 1 Meter		
<b>Management</b>			
Smart USB	Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7/8, Linux and MAC		
Optional SNMP	Power management from SNMP manager and web browser		

\*Derate capacity to 90% of capacity when the output voltage is adjusted to 208VAC..

\*\*Product specifications are subject to change without further notice.

# SINGLE-PHASE UNINTERRUPTIBLE POWER SUPPLIES

The Antares PRO series is the Powertronix's single phase UPS family available in power ranges from 1kVA to 10KVA. With single-phase input and output it can be configured with different reserve capacities arranged in cabinets with measures similar to those of the UPS. It is possible to have them in a 19-inch tower or rack version.

It is suitable for powering IT loads or process controllers, as well as for storage systems, telephony equipment, both VoIP and traditional, and medical devices. The Antares Pro UPSs have been designed to meet the requirements of the CEI-016 standard, so they are the ideal solution for use in medium-voltage substations to power auxiliary loads.

The newly developed inverter is certainly one of the best energy conversion systems on the market, thanks to the high output power factor and the 94% efficiency in On Line operation.

In business continuity applications that require long battery running times, the autonomy can be extended to several hours using versions with a high-performance battery charger.

Powertronix has always been sensitive to energy saving and has introduced the possibility of programming the UPS switching on and off times to the Antares Pro series, in order to reduce consumption to zero during periods of prolonged inactivity.

It is possible to interface the unit to a computer, through a free software, or through an external SNMP agent (optional) for a complete monitoring via the internal network or internet.

The functions can be programmed via software or manually set via the screen, making this range of UPS very flexible and easy to use. Antares Pro offers maximum flexibility for integration with any communication system and for all operating systems and network environments. The supervision software and shut-down ViewPower, already included with the UPS, allows managing varied operating systems such as Windows 7, 2008, Vista, 2003, XP, Linux, Mac OS X, Sun Solaris, VMware ESX and other Unix releases. Each UPS is equipped with a serial port, a USB port and a slot for communication boards such as Modbus/Jbus, TCP/IP, SNMP and relay contacts.

The main features that identify the family are:

- Rack or tower installation
- Adjustable LCD
- Double conversion
- PFC input
- DSP Digital control
- Economic mode (ECO)
- Wide input voltage window
- Battery ignition
- USB and RS232 ports
- Optional ports: SNMP, Free Contacts, Modbus

# Antares Pro Tower

## From 1 to 10kVA



The Antares Pro line in tower configuration, available in the sizes 1.000, 2000, 3000, 6000 and 10.000VA, is characterised by an online double conversion technology which allows the inverter to be supplied with constant power, with a perfectly sinusoidal wave, thus guaranteeing maximum reliability.

Antares Pro can guarantee a high quality of the output voltage even with distorting loads and allows a high short circuit current on bypass and a 150% overload capacity.

# Antares Pro Rack/Tower

## From 1 to 10kVA



The Rack/Tower Antares line, available in the same sizes as the tower version, is the ideal solution for protecting servers and network devices. Antares Pro Rack can be installed free-standing on the floor in tower configuration or in 19" rack cabinets simply by extracting and turning the screen. It allows a high short circuit current on bypass and a 150% overload capacity.

Model	1K	2K	3K	6K	10K
<b>Input</b>					
Input nominal voltage	200/208/220/230/240Vac				
Input voltage range	145 VAC ± 5 % o 300 VAC ± 5 %				
Input frequency	Nominal: 50 or 60 Hz / Range: 40 ÷ 70 Hz				
Power factor	0.99				
Backfeed protection	on request				
Input current distorsion	≤ 3 % THD (linear load); ≤ 6 % THD (non linear load)				
<b>Automatic Bypass</b>					
Bypass nominal voltage	200/208/220/230/240VAC				
Bypass nominal frequency	50 or 60 Hz				
<b>Output</b>					
Output nominal power KVA	1	2	3	6	10
Output active power KW	0,9	1,8	2,7	5,4	9
Output nominal voltage	200/208/220/230/240Vac				
Output static voltage stability	± 1%				
Output dynamic voltage stability	± 5%				
Crest factor	3:1				
Output voltage distorsion (linear load)	≤ 3%				
Output nominal frequency	50Hz or 60Hz				
Output frequency stability	0.01%				
<b>Battery</b>					
Battery type	VRLA AGM o VRLA GEL				
Max charging current	1A	1A	1A	1 / 4A	
Battery charging profile	DIN 41733 Temperature compensated				
<b>Communication</b>					
Remote signals	Remote EPO				
Communication interface	Serial RS232				
Options	RS485 ModBus; SNMP/HTTP/MODBUS; AS-400				
<b>Mechanical data</b>					
Protection	IP 20				
Dimensions mm	282x145x220	397x145x220	421x190x318	369x190x668	442x190x668
Weight Kg	10	17	27	52	57
Noise at 1m dBA	<50dBA				
Storing temperature	-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)				
Working environment temperature	+20°C ÷ +40°C				
Relative humidity	95% non condensing				
Altitude	1000m slm (1% derating every 100m up to 2000m)				
<b>General</b>					
UPS efficiency	94%				
Overload	110% 10 min; 130% 1 min; >130% 30 sec				
Standards	Direttives: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFI -SS - 111 • RoHs compliant				

Model	1K	2K	3K	6K	10K
<b>Input</b>					
Input nominal voltage	200/208/220/230/240Vac				
Input voltage range	145 VAC $\pm$ 5 % or 300 VAC $\pm$ 5 %				
Input frequency	Nominal: 50 or 60 Hz / Range: 40 ÷ 70 Hz				
Power factor	0.99				
Backfeed protection	on request				
Input current distortion	$\leq$ 3 % THD (linear load); $\leq$ 6 % THD (non linear load)				
<b>Automatic Bypass</b>					
Bypass nominal voltage	200/208/220/230/240VAC				
Bypass nominal frequency	50 or 60 Hz				
<b>Output</b>					
Output nominal power KVA	1	2	3	6	10
Output active power KW	0,9	1,8	2,7	5,4	9
Output nominal voltage	200/208/220/230/240Vac				
Output static voltage stability	$\pm$ 1%				
Output dynamic voltage stability	$\pm$ 5%				
Crest factor	3:1				
Output voltage distortion (linear load)	$\leq$ 3%				
Output nominal frequency	50Hz o 60Hz				
Output frequency stability	0.01%				
<b>Battery</b>					
Battery type	VRLA AGM o VRLA GEL				
Max charging current	1A	1A	1A	1 / 4A	
Battery charging profile	DIN 41733 Temperature compensated				
<b>Communication</b>					
Remote signals	Remote EPO				
Communication interface	Serial RS232				
Options	RS485 ModBus; SNMP/HTTP/MODBUS; A5-400				
<b>Mechanical data</b>					
Protection	IP 20				
Dimensions mm	310x438x2U	410x438x2U	630x438x2U	530x438x3U	580x438x3U
Weight Kg	4	8	8	15	20
Noise at 1m dBA	<50dBA				
Storing temperature	-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)				
Working environment temperature	+20°C ÷ +40°C				
Relative humidity	95% non condensing				
Altitude	1000m slm (1% derating every 100m up to 2000m)				
<b>General</b>					
UPS efficiency	94%				
Overload	110% per 10 minuti; 130% per 1 minuto; >130% per 30 secondi				
<b>Standards</b>	Direttives: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHs compliant				

# ENERCLEVER BEYOND STORAGE.

## **Enter the world of intelligent source management.**

Energclever is a family of products which is highly customisable according to the specific needs of the individual user, born with the intent of providing a practical response to the growing need to reduce management costs, even up to 60%, by optimising energy flows.

## **What it looks like**

It consists of an adequately sized battery pack and a UPS that we can define as intelligent, which, according to the indications, can be mono or bidirectional. Should there be a solar system present, Energclever is flanked by an SBC (Solar Battery Charger) able to oversee the battery charge, coordinating the various sources in sync with the UPS.

## **Main fields of use**

- In support of generators, it performs a peak levelling function by recovering and storing the excess energy in the battery pack and then delivering it appropriately during peak load requests.
- In order to manage the load by integrating and optimising the various sources of energy, favouring in each instance those at a lower cost. It allows the sun to be used as the primary source when available, to charge the batteries with the mains during off-peak hours when the cost is lower and in the absence of sun, and to use the energy stored during the hours when the network would be more expensive, thus resorting to activating one or more generators only for emergencies.
- To manage loads exceeding the mains availability. In many cases, it is therefore possible to avoid the need to install medium voltage substations by users with peaks above 100kW.



## BID and UPS

Powertronix offers this family of products designed with the best technology available on the market, offering an efficiency of 98% to customers who wish to optimise their systems. By integrating one or more machines into the power supply system of one's organisation, it is possible to intelligently manage the energy required by the loads, always drawing it from the most convenient source at that moment, including the electricity grid, renewable sources or storage system.



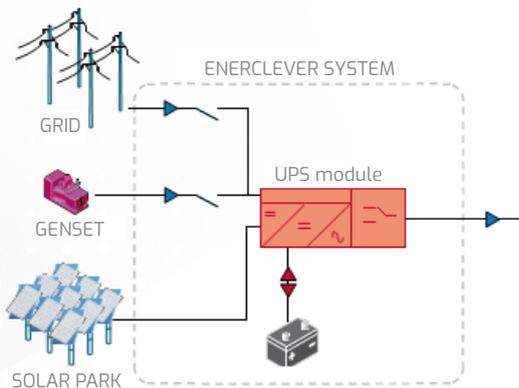
## Energy Station

When an integrated solution for supplying energy to a remote location is required, or even to quickly solve the intelligent coordination of one's energy sources, Powertronix offers ready-to-use ad hoc solutions, built in IP54 containers.

# BID and UPS

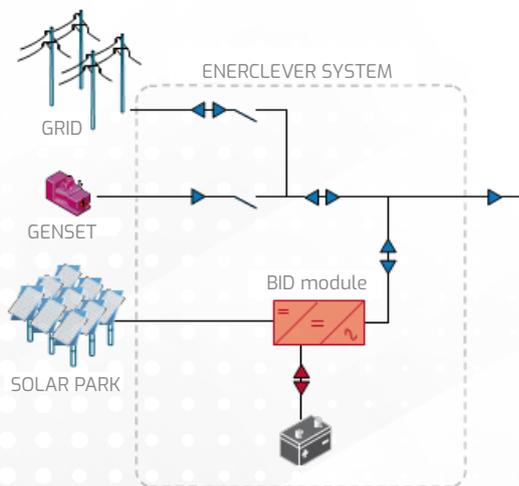
POWERTRONIX ENERCLEVER is the hybrid system that allows access to a continuous, less expensive and cleaner source of energy. The use of diesel generators is significantly reduced and when a renewable source is integrated, the savings become extraordinary. ENERCLEVER perfects pre-existing diesel generator installations, elevating the system to its highest levels of efficiency and savings.

There are two different configurations of the ENERCLEVER system which allow you to optimise or build systems for all needs:



### System based on ENERCLEVER BID

- Batteries charged from renewable sources or from the mains
- Energy stored to save fuel or to obviate mains failures
- Optimisation of diesel system efficiency (reduced consumption and operating costs)
- Uninterrupted power supply
- Load balancing
- Island operation



### System based on ENERCLEVER BID

- Improvement of network quality
- Power Factor Correction
- Reduction in harmonic content
- Island operation in the absence of a network
- Peak Levelling function
- Load Shaving function
- Dynamic management of diesel generators for cost optimisation

### A broad power range up to 300KW per unit

ENERCLEVER solutions are available in power sizes from 50KW up to 300KW.

Model	ECBID050 ECUPS050	ECBID100 ECUPS100	ECBID150 ECUPS150	ECBID200 ECUPS200	ECBID250 ECUPS250	ECBID300 ECUPS300
<b>AC values (Grid connected)</b>						
Nominal voltage	3Ph+N 380/400/415V					
Nominal frequency	50 or 60 Hz					
Frequency range	40 ÷ 70 Hz					
Max slew rate	±1Hz/s					
Nominal power KVA	50	100	150	200	250	300
Power factor correction	0,6 ÷ 1					
<b>AC values (Stand alone)</b>						
Nominal power KVA	50	100	150	200	250	300
Active power KW	50	100	150	200	250	300
Nominal voltage	3Ph+N 380/400/415V					
Voltage static stability	± 1%					
Voltage dynamic stability	± 5%					
Crest factor	3:1					
Voltage distorsion (linear load)	≤ 1%					
Nominal frequency	50Hz o 60Hz					
Overload	125% 10 min					
<b>Automatic Bypass (UPS)</b>						
Nominal voltage	3Ph 380/400/415 V					
Nominal frequency	50 or 60 Hz					
<b>DC values (solar panels)</b>						
Configuration	External module IP65					
Power	30KW					
MPPT number	6					
<b>DC values (battery)</b>						
Battery type	VRLA AGM / VRLA GEL					
<b>Communication</b>						
Remote signals	Remote EPO - External ByPass					
Communication interface	Serial RS485 Modbus, Dry Contacts, Current signal					
<b>Mechanical data</b>						
Protection grade	IP 20					
Noice level 1 m	<62dBA			<64dBA		
Storing temperature	-20°C ÷ +70°C (UPS) +20°C ÷ +30°C (Battery)					
Working environment temperature	+20°C ÷ +40°C					
Relatice humidity	95% non condensing					
Altitude	1000m slm (1% derating every 100m up to 2000m)					
Cooling	forced air controlled speed					
<b>General</b>						
Topology	Multilevel bidirectional inverter					
Inverter	High frequency IGBT inverter transformerless					
Statich switch	Statich Switch SCR and contactor					
Cooling	forced air					
Efficiency	97,5%					

Standards: LV 2014/35/UE Low Voltage Directive • EMC 2014/30/UE Electromagnetic Compatibility Directive  
Standards: Safety IEC EN 62040-1 • EMC IEC EN 62040-2 • IEC 62040-3 VFISS - 111 • RoHs compliant

# Energy Station

Off-grid energy station for intelligent energy management.

Solar energy and a generator unit optimised by a storage system. In a single solution, this product implements all the possible sources of energy which can be put in place to meet the typical needs of remote areas, not reached by public mains. The system integrates distribution panels on both the continuous and the alternating power sides, thus reducing time and costs for on-site implementation. It consists of independent modules which can be positioned and connected to form the system according to requirements.

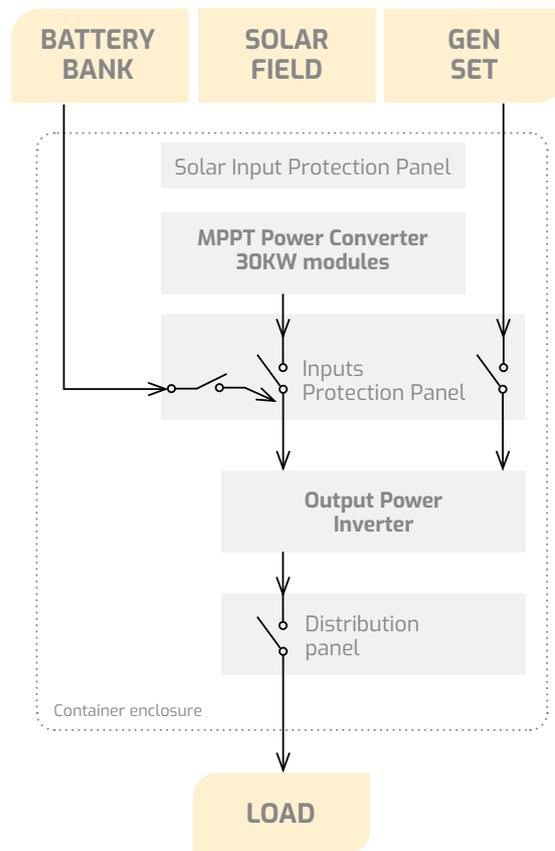
### Key features:

#### Advantages:

- Integrated technologies
- Reliability
- Easy installation
- IP54 container for outdoor use
- High performance IGBT power equipment
- A broad DC input range for high flexibility of the photovoltaic field
- Optimised MPPT algorithm
- Advanced thermal design for harsh environments
- Compliance with international standards

#### Protections:

- DC disconnecting switch
- AC disconnecting switch
- AC/DC power surge protection
- AC/DC over voltage protection
- Real-time management of the load
- Over-temperature protection
- Protection against ventilation malfunction



Model	ES270100	ES480100	ES330160	ES780200
<b>Solar Input (DC)</b>				
Max. DC power	270 KWp	480 KWp	330 KWp	780 KWp
Max. input voltage	900 V			
Min. operating voltage	400 V			
Max operating voltage	850 V			
Max. input current	600A	1070 A	733 A	1733 A
MPPT voltage range	500 ~ 850 V			
Number of DC cabinet input terminals	54 x2	96 x2	66 x2	156 x2
<b>Genset Input (AC)</b>				
Max. AC power	160 KW		200 KW	
Max. input voltage	900 V			
Min. operating voltage	400 V			
Max operating voltage	850 V			
Max. input current	600 A	1070 A	733 A	1733 A
MPPT voltage range	500 ~ 850 V			
Number of DC cabinet input terminals	54 x2	96 x2	66 x2	156 x2
<b>Output (AC)</b>				
Rated power	100 KW		160 KW	
Max. AC output power	160 KW		200 KW	
Max. output current	240 A		290 A	
Accepted inverter overload	125% for 10 minutes			
Current distortion	< 1%			
Rated voltage	380/400/415 V			
Static output voltage stability	±1%			
Dynamic output voltage stability	±5%			
Rated frequency	50 Hz / 60 Hz (settable)			
Frequency accuracy	0,005 Hz			
Isolation transformer	Optional			
<b>Efficiency</b>				
Max. conversion efficiency (DC to AC)	96.4%			
Max. conversion efficiency (AC to AC)	97.5%			
<b>Others</b>				
Communications	RS485, DryContacts			
Altitude	3000 m (> 1000 m derating)			
Cooling	Temperature control forced-air cooling			
IP rating	IP 54			
Relative humidity	0 ~ 95% non-condensing			
Ambient temperature	-25°C ~ +55°C			
Dimensions	20 feet container	40 feet container	40 feet container	40 feet container

# AVR SERIES

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The AVR voltage stabilizers series is realized on the specific needs of the customer in the powers of 10KVA - 20KVA - 30KVA,

VR Static Voltage Stabilizers work automatically because they regulate the voltage without any intervention from the user.

The system guarantees a continuous and stable supply of mains voltage even in situations where the electrical infrastructure is unstable. This solution allows to achieve a stable voltage without interruption.

Electronic voltage stabilizers are devices used for voltage control and protection of users, through a digital control logic in FPGA technology which operates a semi-conductor system.

They generate a suitable voltage for sensitive industrial devices and are designed to meet their continuous safe and correct energy needs.

AVR Static Voltage Stabilizers can work with different and wide input voltage ranges for places where there are strong fluctuations. This device keeps the output voltage constant even with input variations of up to -30% or +30% with 100% of the load supplied.

In this way, the stabilizer allows the system to work with optimum efficiency and high operational reliability.



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## FEATURES

- New maintenance-free technology with digital control
- Constant generation of output
- IGBT units digitally controlled by FPGA
- Protection against over load, over temperature, high voltage, low voltage etc
- Switch manual by-pass (standard) for network operation, in cases where a malfunction occurs or during maintenance
- High efficiency
- Safe use for all electrical devices
- Compact structure with high quality material.

Modello	VR10	VR20	VR30
Nominal Power	10KVA	20KVA	30KVA
Active Power	10KW	20KW	30KW
Power Factor	1		
Technology	completely electronic		
Dimension mm	390x900xh910		
Weight kg	70	75	80
<b>Input</b>			
Number of phases	3F+N		
Nominal voltage	380/400/415Vac (selectable)		
Input voltage range	±30%		
Nominal frequency	50/60 Hz		
Phase imbalance	100%		
<b>Output</b>			
Number of phases	3F+N		
Nominal voltage	380/400/415Vac (selectable)		
Voltage stability	±1%		
Voltage regulation	0 mSec		
Performance	>97%		
Load variation	Da 0% a 100%		
Overload	125% 10 min; 150% 60 sec		
Nominal frequency	50/60 Hz		
<b>Environmental specification</b>			
Working temperature	Da 0 a 40°C		
Humidity	< 95% without condensation		
Maximum altitude	3000m con derating		
IP protection	IP20		
Certifications	CE		

# Single branch SCR

## MAIN FEATURES

- Power device: SCR
- Control type: control phase
- Incoming isolation transformer at mains frequency
- Electrostatic shield
- Microprocessor supervision
- LCD with backlit alphanumeric display and led status
- Charging curve for each battery type
- High efficiency
- High reliability
- Easy maintenance with access from the front
- Low output ripple
- Extended frequency input range
- Automatic and manual battery test
- Earthed polarity sensor with differentiated LED
- Output overload indication
- Acknowledgeable audible alarm

## LED STATUS

- AC/DC ok
- Boost charge (optional)
- Manual charge (optional)
- Maximum output voltage
- Negative pole to earth
- Positive pole to earth
- Output overload
- Battery test failed
- Power supply via batteries
- Low battery voltage
- End battery autonomy
- System maintenance request

## ELECTRICAL MEASUREMENTS ON LCD

- Output voltage
- Output current
- Current battery recharge (optional)
- Countdown (seconds) to the end of battery test

## MULTIFUNCTION PUSH-BUTTON

- Acknowledgeable audible alarm
- Alarms reset
- Led test
- Manual battery test

## SPECIAL FUNCTIONS ON BOARD

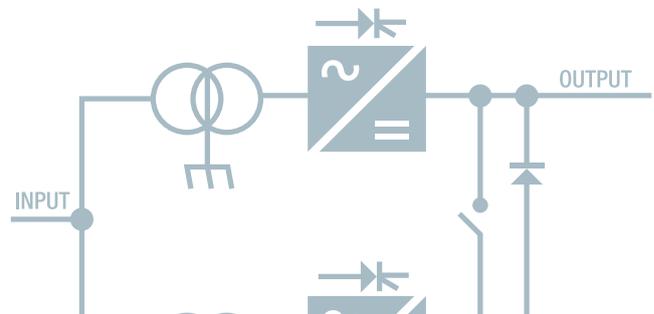
- Manual and automatic battery
- DC earth with +/- polarity leds
- Overload detection

## APPLICATION FIELDS

- Oil & Gas
- Energy management and production
- Process control
- Transport
- Security

## OPTIONS

- Input, output and battery automatic switch
- uP card for boost and manual charge functions
- uP card for temperature compensation function
- End battery discharge power contactor
- Temperature probe
- Coil circuit breaker tripping
- Auxiliary circuit breaker contact
- Field Bus Interface (only state, no measures)
- Battery reverse control (BRPCU)
- E.P.O (Emergency Power Off) device
- LCD kit in order to measure battery recharge current



Model	CMP1R024S	CMP1R048S	CMP1R110S	CMP1R220S
<b>Output</b>				
Nominal voltage	24	48	110	220
Current range	60 ÷ 500A		60 ÷ 250A	
Max power (W)	12000	24000	55000	55000
Ripple noise (RMS)	≤ 1% Vn			
Adj. output voltage range	+/- 5%			
Stability	+/- 1%			
Adj. following Vin change	+/- 1%			
Adj. following load change	+/- 1%			
Start-up time	10 sec			
<b>Input</b>				
Nominal voltage	400 +/-10%			
Current curve	50 ÷ 60 +/-5%			
Efficiency (Typ.)	≥ 90 %			
Isolation I/O	4kV with transformer			
<b>Protections</b>				
Sequence sense	Shut down. Automatic restart after phase correction			
Incoming low voltage	Shut down. Restart down if Vin<325VAC Vin>330VAC			
Overvoltage	+10%Vn			
Undervoltage	- 50% Vn			
Overtemperature	Shutdown. Automatic restart after temperature normalization			
<b>Alarms</b>				
Contacts (8Amp/250VAC)	AC/DC operating General fault Battery test failed Low battery voltage DC earth			
<b>Environment</b>				
Operating temperature	-10+40°C			
Operating humidity	20-90% (NO COND.)			
Storage temperature	-20+50°C			
<b>Standards</b>				
Marking	CE			
Protection degree	IEC 60529			
EMC	EN 61000-6-2 EN 61000-6-4			
Static converter	EN 60146-1-2			
Protection degree (front panel closed)	IP 30			
Color	RAL 7035			

# Single branch IGBT

## MAIN FEATURES

- Power device: IGBT
- Control type: high frequency PWM
- Incoming isolation transformer at mains frequency
- Electrostatic shield
- Microprocessor supervision
- LCD with backlit alphanumeric display and led status
- Charging curve for each battery type
- High efficiency
- High reliability
- Easy maintenance with access from the front
- Low output ripple
- Extended frequency input range
- Automatic and manual battery test
- Earthed polarity sensor with differentiated LED
- Output overload indication
- Acknowledgeable audible alarm

## LED STATUS

- AC/DC ok
- Boost charge (optional)
- Manual charge (optional)
- Maximum output voltage
- Negative pole to earth
- Positive pole to earth
- Output overload
- Battery test failed
- Power supply via batteries
- Low battery voltage
- End battery autonomy
- System maintenance request

## ELECTRICAL MEASUREMENTS ON LCD

- Output voltage
- Output current
- Current battery recharge (optional)
- Countdown (seconds) to the end of battery test

## MULTIFUNCTION PUSH-BUTTON

- Acknowledgeable audible alarm
- Alarms reset
- Led test
- Manual battery test

## SPECIAL FUNCTIONS ON BOARD

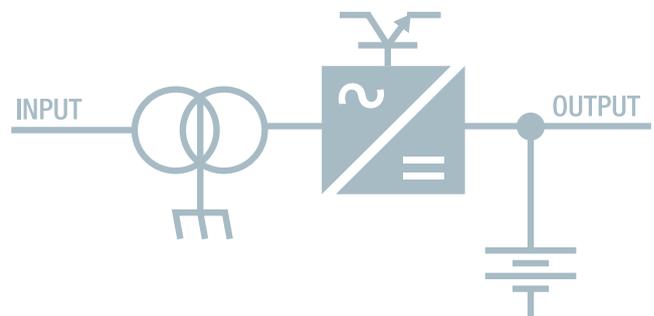
- Manual and automatic battery
- DC earth with +/- polarity leds
- Overload detection

## APPLICATION FIELDS

- Oil & Gas
- Energy management and production
- Process control
- Transport
- Security

## OPTIONS

- Input, output and battery automatic switch
- uP card for boost and manual charge functions
- uP card for temperature compensation function
- End battery discharge power contactor
- Temperature probe
- Coil circuit breaker tripping
- Auxiliary circuit breaker contact
- Field Bus Interface (only state, no measures)
- Battery reverse control (BRPCU)
- E.P.O (Emergency Power Off) device
- LCD kit in order to measure battery recharge current



Model	CMP1R024I	CMP1R048I	CMP1R110
<b>Output</b>			
Nominal voltage	24	48	110
Current range with 1Ph supply		10 ÷ 60A	
Current range with 3Ph supply		10 ÷ 100A	
Ripple noise (RMS)		≤ 0.5% Vn	
Adj. output voltage range		+/- 5%	
Stability		+/- 1%	
Adj. following Vin change		+/- 1%	
Adj. following load change		+/- 1%	
Start-up time		2 secs	
<b>Input</b>			
Nominal voltage		230 +/- 10%	400 +/- 10%
Current curve		constant	
Efficiency (Typ.)		≥ 90 %	
Isolation I/O		4kV with transformer	
<b>Protections</b>			
Overload		2In x 5mS shut down for 250mS – automatic restart	
Current type		constant	
Overvoltage		+10%Vn	
Undervoltage		- 50% Vn	
Overtemperature		Shut down. Automatic restart after temperature normalization	
<b>Alarms</b>			
Contacts (8Amp/250VAC)		AC/DC operating General fault Battery test failed Low battery voltage DC earth	
<b>Environment</b>			
Operating temperature		-10+40°C	
Operating humidity		20-90% (NO COND.)	
Storage temperature		-20+50°C	
<b>Standards</b>			
Marking		CE	
Protection degree		IEC 60529	
EMC		EN 61000-6-2 EN 61000-6-4	
Static converter		EN 60146-1-2	
Protection degree (front panel closed)		IP 30	
Color		RAL 7035	

# Double branch SCR

## MAIN FEATURES

- Power device: SCR
- Control type: control of phase
- Incoming isolation transformer at mains frequency
- Electrostatic shield
- Microprocessor supervision
- LCD with backlit alphanumeric display and led status
- Charging curve for each battery type
- High efficiency
- High reliability
- Easy maintenance with access from the front
- Low output ripple
- Extended frequency input range
- Automatic and manual battery test
- Earthed polarity sensor with differentiated LED
- Output overload indication
- Acknowledgeable audible alarm

## LED STATUS

- Mains status
- Rect. SB operating
- Rect BC operating
- Boost charge activated (optional)
- Manual charge activated (optional)
- Minimum and maximum SB voltage
- Minimum and maximum BC voltage
- Overload
- DC earth
- Battery mode
- Low battery voltage
- End battery autonomy
- System maintenance request

## ELECTRICAL MEASUREMENTS ON DISPLAY

- SB output voltage
- SB output current
- BC batteries charging voltage
- BC batteries charging current

## MULTIFUNCTION BUTTON

- Acknowledgeable audible alarm
- Alarms reset
- Test LED activation

## SPECIAL FUNCTIONS ON BOARD

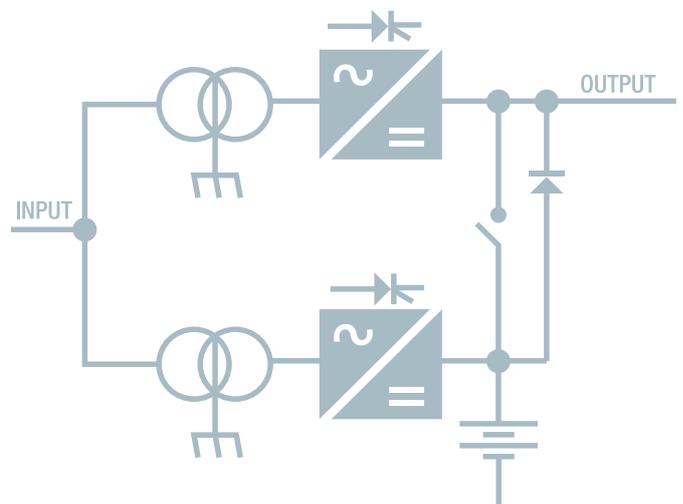
- DC earth device with +/- polarity LEDs
- Overloading detection

## APPLICATION FIELDS

- Oil & Gas
- Energy management and production
- Process control
- Transport
- Security

## OPTIONS

- Input, output and battery automatic switch
- uP card for boost and manual charge functions
- uP card for temperature compensation function
- End battery discharge power contactor
- Temperature probe
- Coil circuit breaker tripping
- Auxiliary circuit breaker contact
- Field Bus Interface (only state, no measures)
- Battery reverse control (BRPCU)
- E.P.O (Emergency Power Off) device
- LCD kit in order to measure battery recharge current



Model	CMP2R024S	CMP2R048S	CMP2R110S	CMP2R220S
<b>Output</b>				
Nominal voltage	24	48	110	220
Current range	60 ÷ 500A			60 ÷ 250A
Maximum power (W)	12000	24000	55000	55000
Ripple noise (RMS)	≤ 0.5% Vn			
Adj. output voltage range	+/- 5%			
Stability	+/- 1%			
Adj. following Vin change	+/- 1%			
Adj. following load change	+/- 1%			
Start-up time	10 secs			
<b>Input</b>				
Voltage range	400 +/- 10%			
Current curve	50 ÷ 60 +/- 5%			
Efficiency (Typ.)	≥ 90 %			
Isolation I/O	4kV with transformer			
<b>Protections</b>				
Sequence sense	Shut down. Automatic restart after phase correction			
Incoming low voltage	Shut down. Restart down if Vin < 325VAC Automatic restart if Vin > 330VAC			
Overvoltage	+10%Vn			
Undervoltage	- 50% Vn			
Overtemperature	Shut down. Automatic restart after temperature normalization			
<b>Alarms</b>				
Contacts (8Amp/250VAC)	AC/DC operating General fault Battery test failed Low battery voltage DC earth			
<b>Environment</b>				
Operating temperature	-10+40°C			
Operating humidity	20-90% (NO COND.)			
Storage temperature	-20+50°C			
<b>Standards</b>				
Marking	CE			
Protection degree	IEC 60529			
EMC	EN 61000-6-2 EN 61000-6-4			
Static converter	EN 60146-1-2			
Protection degree (front panel closed)	IP 30			
Color	RAL 7035			

# Double branch IGBT

## MAIN FEATURES

- Power device conversion: IGBT
- Control type: high frequency PWM
- Incoming isolation transformer at mains frequency
- Electrostatic shield
- Microprocessor supervision
- LCD with backlit alphanumeric display and led status
- Charging curve for each battery type
- High efficiency
- High reliability
- Easy maintenance with access from the front
- Low output ripple
- Extended frequency input range
- Earthed polarity sensor with differentiated LED
- Output overload indication
- Acknowledgeable audible alarm

## LED STATUS

- Mains status
- Rect. SB operating
- Rect BC operating
- Boost charge activated (optional)
- Manual charge activated (optional)
- Minimum and maximum SB voltage
- Minimum and maximum BC voltage
- Overload
- DC earth
- Battery mode
- Low battery voltage
- End battery autonomy
- System maintenance request

## ELECTRICAL MEASUREMENTS ON DISPLAY

- SB output voltage
- SB output current
- BC batteries charging voltage
- BC batteries charging current

## MULTIFUNCTION BUTTON

- Acknowledgeable audible alarm
- Alarms reset
- Test LED activation

## SPECIAL FUNCTIONS ON BOARD

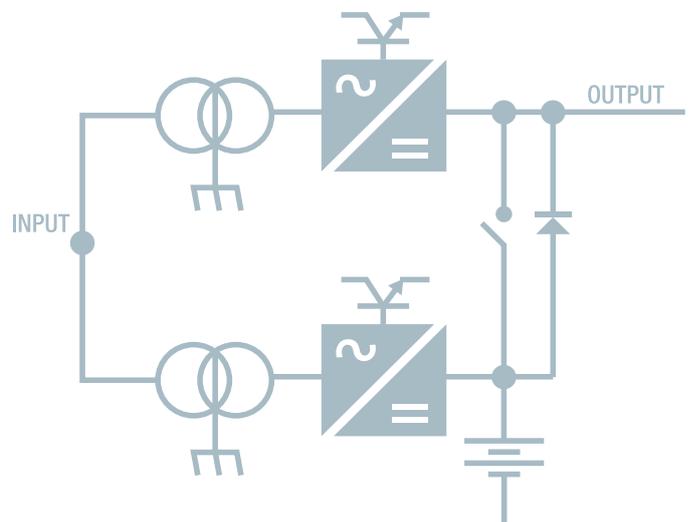
- DC earth device with +/- polarity LEDs
- Overloading detection

## APPLICATION FIELDS

- Oil & Gas
- Energy management and production
- Process control
- Transport
- Security

## OPTIONS

- Input, output and battery automatic switch
- uP card for boost and manual charge functions
- uP card for temperature compensation function
- End battery discharge power contactor
- Temperature probe
- Coil circuit breaker tripping
- Auxiliary circuit breaker contact
- Field Bus Interface (only state, no measures)
- Battery reverse control (BRPCU)
- E.P.O (Emergency Power Off) device
- LCD kit in order to measure battery recharge current



Model	CMP2R024I	CMP1R048I	CMP1R110
<b>Output</b>			
Nominal voltage	24	48	110
Current range with 1Ph supply		10 ÷ 60A	
Current range with 3Ph supply		10 ÷ 100A	
Ripple noise (RMS)		≤ 0.5% Vn	
Adj. output voltage range		+/- 5%	
Stability		+/- 1%	
Adj. following Vin change		+/- 1%	
Adj. following load change		+/- 1%	
Start-up time		2 secs	
<b>Input</b>			
Nominal voltage	230 +/- 10%		400 +/- 10%
Current curve		50 ÷ 60 +/-7%	
Efficiency (Typ.)		≥ 90 %	
Isolation I/O		4kV with transformer	
<b>Protections</b>			
Overload		2In x 5mS shut down for 250mS – automatic restart	
Current type		constant	
Overvoltage		+10%Vn	
Undervoltage		- 50% Vn	
Overtemperature		Shut down. Automatic restart after temperature normalization	
<b>Alarms</b>			
Contacts (8Amp/250VAC)		AC/DC operating General fault Battery test failed Low battery voltage DC earth	
<b>Environment</b>			
Operating temperature		-10+40°C	
Operating humidity		20-90% (NO COND.)	
Storage temperature		-20+50°C	
<b>Standards</b>			
Marking		CE	
Protection degree		IEC 60529	
EMC		EN 61000-6-2 EN 61000-6-4	
Static converter		EN 60146-1-2	
Protection degree (front panel closed)		IP 30	
Color		RAL 7035	

# CMP-R series



The CMP-R series represents the ideal solution for powering direct current loads while keeping the battery in buffer charge. The AC input can be single-phase or three-phase (optional). They are 1 branch current rectifiers (full buffer), switching technology in N + 1 configuration, for VRLA hermetic batteries.

Rated output voltage 24, 48, 110Vdc up to 20kW

For industrial applications

- Transformer station
- Substations
- Telecommunications
- LV and MV switchboards
- Automation

## TECHNICAL FEATURES

- Switching technology
- N + 1 configuration
- Electronic stabilization of the output voltage, regardless of the supplied current to the load, or of the voltage and frequency of the mains
- Max current control both towards the loads and the battery (double current limitation)
- Hot swappable modules
- P.F. up to 0.99%
- Protection against overloads and short circuits

Model	CMR2U024	CMR4U024	CMR2U048	CMR4U048	CMR2U110	CMR4U110
<b>AC Input</b>						
Connections	1PH + N + PE (opcional 3PH+N+PE)					
Nominal Voltage	230Vac (opcional 400Vac)					
Accepted voltage range at full load (PH-N)	75 - 300 VAC					
Frequency	50-60Hz +/-5%					
Internal protection	In case of input voltage out of range, alarm triggers and rectifier turns off. In case of overcurrent, alarm triggers and internal fuse trips.					
Main terminal blocks	10 mm <sup>2</sup>					
Nominal current (for each module)	7,3A		10,5A		9,6A	
Maximum current (for each module)	18A		18A		18A	
Inrush current (for each module)	18A		18A		18A	
<b>DC Output</b>						
Nominal Voltage	24Vdc		48Vdc		110Vdc	
Voltage range	21 -31Vdc		42 - 58Vdc		97 - 132Vdc	
Voltage stability	< 1%					
Ripple	< 0,1%					
Maximum current for each module	70A		50A		20A	
Maximum power for each module	1680W		2400W		2200W	
Number of rectifiers	Max 3	Max 7	Max 3	Max 7	Max 3	Max 7
Maximum current for each rack	210A	490A	150A	350A	60A	140A
Maximum power for each rack	5040W	11760W	7200W	16800W	6600W	15400W
Power with redundancy	3360W	10080W	4800W	14400W	4400W	13200W
<b>Battery</b>						
Number of independent batteries	1	2	1	2	1	2
Charge profile	DIN 41773					
Technology	VRLA					
<b>Load distribution panel</b>						
panel 19" 4U	optional max 20 poles 63A					
<b>User interface</b>						
Operator	LCD					
BMS	free contacts (mains failure, summary alarm)					
<b>General</b>						
Isolation	input/output and output/ground					
Cooling	Forced ventilation					
Protection	IP 20					
User interface	LCD					
Color	RAL 7024					
Dimensions	19" x 2U x 400mm	19" x 4U x 400mm	19" x 2U x 400mm	19" x 4U x 400mm	19" x 2U x 400mm	19" x 4U x 400mm
Operating temperature	-10/+45°C					
Maximum humidity	97% relative humidity, non-condensing					
Maximum altitude	1000m msl without derating					
Safety	IEC/EN 60950-1					
Standards of electromagnetic compatibility	Emissions: IEC/EN 61000-6-4 Immunity: IEC/EN 61000-6-2 Harmonic currents IEC/EN 61000-3-2 Voltage fluctuation & flicker: IEC/EN 61000-3-3					
Options	SNMP Detachment of the load for minimum battery voltage Execution in cabinet					

# POWERTRONIX

## REFERENCES

### HEALTHCARE

- France

Polyclinique du Grand Sud - Nimes

Hopital de la Grave - Toulouse

Bicetre Hospital - Paris

- United Kingdom

Saint Mary's Hospital - London

Rampton Secure Hospital - Nottinghamshire

NHS Trust - Nottingham

- Bangladesh

Metropolitan Medical Center

- Spain

Sanatorio Vallés

Hospital de la Santa Creu i Sant Pau

- U.A.E.

Oasis Hospital

Mafraq Hospital - Abu Dhabi

- Ghana

Family Heal Hospital

- Equatorial Guinea

La Paz Medical Center - Malabo

Centro Medico La Paz

- Pakistan

IHS Children Hospital - Islamabad

- Singapore

SGH Singapore General Hospital

### INDUSTRY

- Bulgaria

Odessa Shiprepair Yard

- Czech Republic

DHL Logistic Park

- Germany

Basf AG - Ludwigshafen

- Romania

Omco Romania - Iasi

Dico Service - Craiova

Dacia - Mioveni

- Poland

Philips Polska Sp - Warsaw

Solbika Sp Glass Factory - Skaryszew

- Russia

K-Flex Thermal and Acoustic Insulation - Moscow

- Bangladesh

Rose Sweaters Ltd - Joydebpur

Shovon Group - Dhaka

Madinaple Fashion Craft

Transcom Digital Ltd - Bogra

- Tunisia

Tunicotex - Tunisi

- Libia

TCF - Tripoli

- Iran

KTT Logisitcs - Teheran

- Egypt

Al-Ahram Establishment - El Cairo

- Jordan

Amman Sugar Factory - Amman

### GOVERNMENT & EDUCATION

- Germany

BBAW Academy - Berlin

- Czech Republic

Ministry of Finance - Praha

- Russia

Domodedovo Custom Office - Moscow

- United Kingdom

University of Lancaster - Lancaster

Queen Mary University - London

- Oman

Royal Opera House - Muscat

Bayan College - Barka

- Qatar

Foreign Information Agency - Doha

ADLQ Anti Doping Lab - Doha

- Singapore

Canadian International School

- Hong Kong

HK Science Technology Park

- Pakistan

Government of Punjab - Agriculture Dept.

- Ghana

NIIT College - Accra

## ENERGY

- Czech Republic  
Setto CZ - Praha
- Romania  
RADET - Bucarest
- Pakistan  
Atomic Energy Minerals Centre - Lahore
- Sudan  
SUDAPET - Khartoum

## SPORT & LEISURE

- Germany  
Olympiahalle - Munchen
- Romania  
Romania
- Serbia  
Omladinski Stadium - Beograd
- Algeria  
1er Novembre Stadium - Tizi Ouzou
- Qatar  
Al Shahaniya Camel Racetrack - Doha

## RETAILS & HOTEL

- Albania  
ABA Business Center - Tirana
- Poland  
City Solei Boutique Hotel - Poznan
- Czech Republic  
TESCO
- Russia  
Nautilus - Moscow
- U.A.E.  
Al Mas Tower - Dubai  
Al Waha Mall - Al Ain
- Ghana  
Movenpick Hotel - Accra

## BANKS & INSURANCES

- Albania  
Bank of Albania - Tirana  
Alpha Bank - Tirana
- Bulgaria  
Allianz Bank Bulgaria - Sofia
- Luxemburg  
Bank of Tokyo  
DEKA Bank
- Switzerland  
Eidgenossische Material Verwaltung - Bern
- Romania

- Raiffeisen Bank - Timisoara
- OTP Bank Romania - Bucharest
- U.A.E.  
Arabia Insurance Co. - Dubai  
OTP Bank  
Nasco Dubai
- Oman  
Dofar Insurance Co. - Muscat
- Venezuela  
ABN Ambro - Caracas  
Banco de Venezuela - Caracas
- Chile  
Banco de Chile - Santiago
- Brasil  
Receita Federal do Brasil
- Indonesia  
Stock Exchange - Jakarta
- Sudan  
Bank of Sudan - Karthoum
- Ghana  
Barclays Bank GH Ltd - Accra



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Rev. 4.4

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