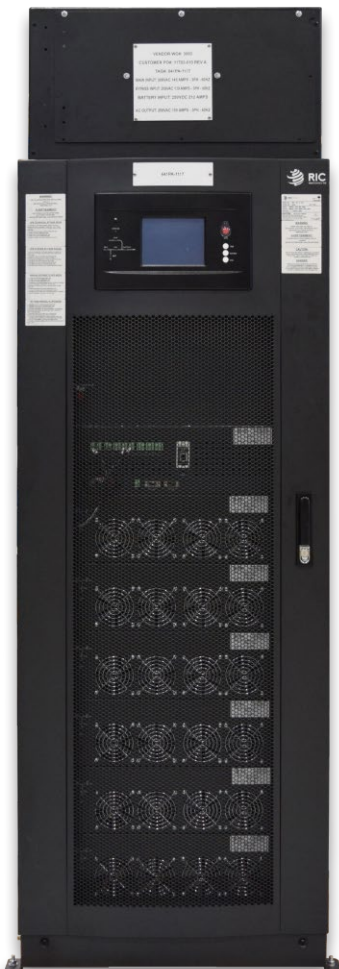




RIC | RECTIFIER
INVERTER
CONVERTER
electronics Ltd.

Product Catalogue





About RIC Electronics

RIC Electronics Ltd. manufactures industrial rectifiers, inverters and converters.

Since 1981 they have been manufacturing custom AC and DC UPS systems for oil & gas, utility & switchgear, telecom, defense, and mining as well as general industrial applications.

Products are robust, heavy-duty and built to withstand the harshest conditions.

Not limited to batch manufacturing, RIC Electronics can customize units to customer's specific applications.

They have experience using all types of technology including high frequency switch-mode rectifiers, silicon controlled rectifiers (SCRs), ferro-resonant and saturable reactors.

RIC Electronics is the go-to solution for primary and secondary power needs.

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Certified to CSA/UL Standards



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SB7

SCR Battery Charger





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Product Specifications

SB7

Description

The SB7 is RIC Electronics' premiere SCR battery charger/rectifier. The SB7 provides power to critical DC loads through a wide range of outputs and is engineered for maximum reliability and ease of maintenance.

A key component of the charger is usability, that's why they designed a responsive human-machine interface with built in LEDs and mimic screen. Providing a bright two line vacuum florescent display and central key pad, performing routine maintenance couldn't be easier.

Focusing on continual innovation has enabled their SB7 to provide mean time between failure, or MTBF to over 200,000 hours and reduce mean time to repair, or MTTR to less than 30 minutes.

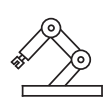
Offering fast lead times and customized solutions, RIC Electronics is your go-to for all industry applications.



Industries



Utility, Switchgear and Substation



Automation & Control Systems



Department of National Defense



Municipal & General Industry



Hospitals and Laboratories



Data Center & Telecom



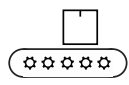
Mining



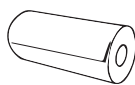
Oil and Gas



Solar and Wind



OEM



Pulp and Paper



Marine

Standard Features

- Output blocking diode
- Digital output voltage and current metering
- Battery test mode
- Temperature compensation (optional probe is required)
- Modbus TCP, RS-485 & RS-232 communications
- Molded case UL 489 AC and DC breakers
- Designed for parallel operation and loadsharing
- Automatic and manual equalize and float modes w/ configurable setpoints & alarming
- High temperature shutdown



Product Specifications

SB7

Alarming and Control

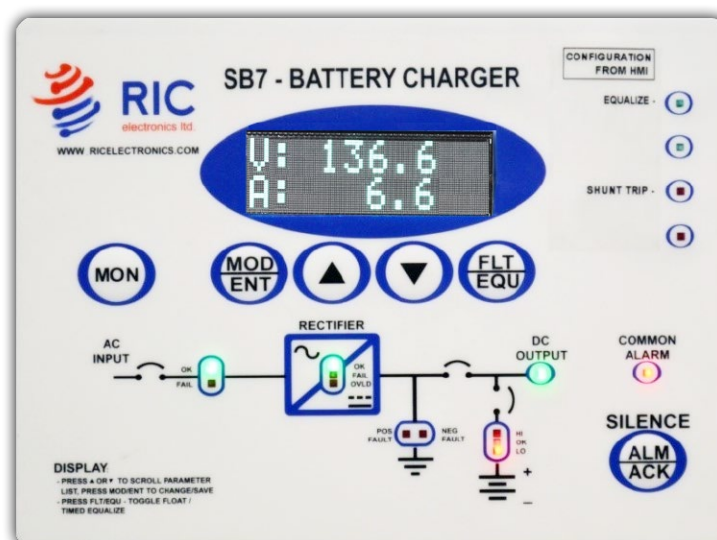
- Programmable common alarm
- Programmable Form C relays and digital inputs
- High DC voltage
- Low DC voltage/end of battery voltage
- AC failure/loss
- Rectifier failure
- Ground fault (+/-)
- Charger overload
- Control card temperature (high/low)
- High ripple alarm



Wall mount SB7 showing I/O and battery breaker

Human-Machine Interface (HMI)

- **Vacuum Fluorescent Display** - bright display panel, wide viewing angles, can withstand extremely high and low temperatures
- **Alarm Logging**
- **Password Protected Panel** - only authorized users can change settings
- **Mimic screen with LED test feature**
- **Audible Buzzer** – sounds alarm on common alarm
- **Additional LEDs** - customizable to any alarm



SB7 HMI providing mimic screen, control and metering control

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Available Options

SB7

Mechanical Options

- Enclosure options:
 - NEMA 2
 - NEMA 3R
 - NEMA 4/4X
 - NEMA 12
- Floor mount/wall mount
- Integrated battery rack
- High seismic rating as per IEEE 693
- Enclosure insulation
- Conformal coating
- Heater, air conditioner, fan c/w thermostat
- Redundant configuration
- Integrated load distribution breakers
- Breakers padlock provision/kirk-key
- Door mounted mushroom button E-stop



NEMA 4 marine type, fully insulated SB7 charger with a heater, air conditioning and an integrated battery rack.



NEMA 3R charger fitted with double doors and rain hoods over vents. Integrated battery rack w/ 20 yr. VRLA batteries.

Electrical Options

- 12 pulse rectifier
- Input/AC monitoring (voltage, current, frequency, kW, kVA & harmonics)
- Shunt trip (AC/DC, and/or battery breaker)
- High short circuit capacity (KA) breakers
- Communication:
 - DNP3: RS-485, RS-232, Ethernet
 - Fiberoptic
 - SNMP
- Relay card (2 form C contacts per alarm)
- Auxiliary alarm contact on breakers
- Dual input source option c/w breaker interlock
- Temperature probe (5, 10, 15m)



Available Options

SB7

Monitoring Solutions

When charging and providing backup power for critical devices, battery health is of the utmost importance. RIC Electronics provides two solutions for your monitoring needs: integrated monitoring on a string level or stand-alone monitoring on a single cell level.

Battery Sense Integrated Monitoring

Integrated monitoring offers battery string voltage, current and midpoint voltage measurements and alarming functionality. The additional temperature probe provides battery string temperature measurements as well as battery temperature compensation which automatically adjusts the battery charger voltage based on ambient temperature.

Single Cell Stand-alone Monitoring

Stand-alone monitoring provides full single cell battery readings including: cell conductance, voltage, temperature, and strap resistance between cells. Single cell monitoring can save hours on monthly, quarterly and annual battery checks and maintenance and in turn, substantial monetary savings.

Measurement	Battery Sense (String Level)	Cell Monitoring (Single Cell Level)
Battery string voltage	✓	
Battery string current	✓	
Battery string midpoint voltage	✓	
Battery string temperature*	✓	
Single cell conductance		✓
Single cell voltage		✓
Single cell temperature		✓
Strap resistance (between cells)		✓

**Additional temperature probe may be required*



Technical Specifications

SB7

Input	
Input AC Voltage	1ph - 120, 208, 240, 480, 600V (other voltages optional) 3ph - 208, 480, 600V
Input Breaker Short Circuit Rating	240VAC – 65kAIC (standard) – up to 200 kAIC (optional) 480VAC – 35 kAIC (standard) – up to 200 kAIC (optional) 600VAC – 18 kAIC (standard) – up to 100 kAIC (optional)
Frequency	50 / 60 Hz
Power Factor Model Dependent	≤ 0.95
Input Voltage Tolerance	$\pm 10\%$
Frequency Tolerance	± 2 Hz
Short Circuit Protection	Auto shutdown at 250% of rated output (Auto Recovery)
Output	
Output DC Voltage	12, 24, 48, 120, 240VDC (others upon request)
Output DC Voltage Range	12VDC: 1-15, 24VDC: 1-30V, 48VDC: 1-60V, 120VDC: 1-150V, 240VDC: 1-300
Output Breaker Short Circuit Rating	240VDC – 10 kAIC (standard) – up to 30 kAIC (optional)
Output Current	5 to 1200A
Efficiency Model Dependent	$\leq 93\%$
Regulation	$< 0.5\%$ for input variation of 10%
Ripple	1% (150mV optional)
Technical Features	
Programmable Form C Relays	9
Programmable LEDs	4
Programmable Digital Inputs	3
Environmental	
Operating Temperature	-25 to 40°C
Storage Temperature	-40 to 55°C
Altitude Above Sea Level	1000m w/o derating
Method of Cooling	Convection
Noise Level (1 meter)	< 60 dBA
Humidity	0 to 95%, non-condensing
General Features	
Enclosure	NEMA 1 (optional: NEMA 2, 3R, 4/4X or 12)
Mounting Positions	Floor mount/wall mount
Enclosure Size Model Dependent	Size between: 24"H x 20"W x 16"D & 70.87"H x 47.24"W x 31.50"D
Certification	CSA 107.1/107.2/UL1012
Communication	Modbus: TCP, RS-485, RS-232 (optional: DNP3, Ethernet; Fiberoptic, SNMP)
Warranty	5 years from shipment

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HB5

Switch-Mode Battery Charger





Product Specifications

HB5

Description

The HB5 is their most durable, digitally controlled switchmode battery charger to date.

Built for industries that demand rugged and long-lasting equipment, HB5 boasts mean time between failure, or MTBF of 200,000 hours and mean time to repair, or MTTR of just 20 minutes.

HB5 provides flexible power output (12, 24, 32, 36 and 48VDC) and built in protection (AC/DC breakers) to meet varying industry needs.

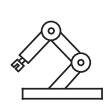
Including an LCD screen, customizable alarms, push button control, and Modbus RS-485 communication, HB5 is your solution for providing power to critical standby applications.



Industries



Utility, Switchgear and Substation



Automation & Control Systems



Department of National Defense



Municipal & General Industry



Hospitals and Laboratories



Data Center & Telecom



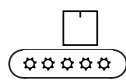
Mining



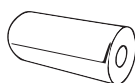
Oil and Gas



Solar and Wind



OEM



Pulp and Paper



Marine

Standard Features

- Wide range AC input (optional DC input)
- AC input and DC output breakers
- Filtered output for valve regulated batteries
- Back lit 2 line LCD display with 4 button user interface
- Modbus RS485 communications
- 4 mode equalize – manual, 30 day, start up and AC fail
- Temperature compensation (optional probe is required)
- Modify output voltage and current, alarm set points and equalize timer via keypad or communication protocol
- 6 form C alarm relays (configurable to any alarms)

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Alarming & Monitoring



Form C Contact Alarms

- Common alarm
- Low battery voltage
- High battery voltage
- Rectifier fail
- AC/DC fail
- Equalize

Communication Alarms

- Common alarm (configurable)
- Low battery voltage
- High battery voltage
- AC/DC fail
- Low temperature
- Equalize
- Shunt trip
- Rectifier fail
- +/- GND fault
- High temperature



Technical Specifications

Input	
Input AC Voltage	1PH 100-240VAC (3PH input on 100amp DC output units)
Input DC Voltage	Optional DC 18-32VDC
Frequency	45 – 65 Hz
Short Circuit Protection	Electronically current limited
Output	
Output DC Voltage	12, 24, 32, 36, 48VDC
Regulation	+/- 1%
Ripple	50mV
Environment	
Operation Temperature	-20° to 40° (Optional: Extended temperature -40° to 40°)
Storage Temperature	-40 to 50°C
Altitude Above Sea Level	1000m w/o derating
Method of Cooling	Natural Convection
Noise Level	<60 dBA
Humidity	0 to 95%, non-condensing
General Features	
Efficiency	>90%
Enclosure	NEMA 1 (optional: NEMA 2, 3R, 4, 4X and 12)
Soft Start	Electronic soft start
Certification	CSA 107.1/107.2/UL1012
Communication	Modbus: RS-485 (optional: DNP3: RS-485, RS-232, Ethernet; Fiberoptic; SNMP)
Form C Relays	6
Mounting Positions	Wall mount/floor mount
Warranty	18 mos. from shipment; 3 year w/startup; 5 year w/ service

Available Options



- Battery monitoring
- Enclosure options:
 - NEMA 2
 - NEMA 3R
 - NEMA 4/4X
 - NEMA 12
- Floor mount/wall mount
- Integrated battery rack
- Parallel operation (redundant configuration)
- 19" or 23" rack mountable
- Battery/load distribution breakers
- Din rail mount or special OEM package
- Temperature probe
- Extended temperature -40° to 40° C
- Conformal coating
- Blocking diode
- Communication:
 - DNP3: RS-485, RS-232, Ethernet
 - Fiberoptic
 - SNMP



80A charger w/ monitoring, integrated distribution on the door and internal battery shelves.

Battery Monitoring Option

HB5 battery monitoring module adds battery monitoring and low battery voltage disconnect capabilities. It protects the battery by disconnecting the load from the battery when the battery voltage is below a critical setpoint value (voltage setpoint fully adjustable). The following monitoring and alarming features are included in this option, in addition to the standard monitoring and alarming features standard in HB5.

Additional Monitoring:

- Load voltage
- Battery voltage
- Midpoint 1 voltage
- Midpoint 2 voltage
- Current
- Battery charge/discharge

Additional Alarming:

- Low battery voltage
- Midpoint 1 battery voltage imbalance
- Midpoint 2 battery voltage imbalance
- Battery fuse open



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MP7

Uninterruptible Power Supply





Product Specifications

MP7

Description

The industrial MP7 UPS provides your critical equipment with uninterruptible 3 phase AC power. Using high frequency dual conversion technology, MP7 protects your critical load and provides reliable power isolated from AC main distortion and fluctuation.

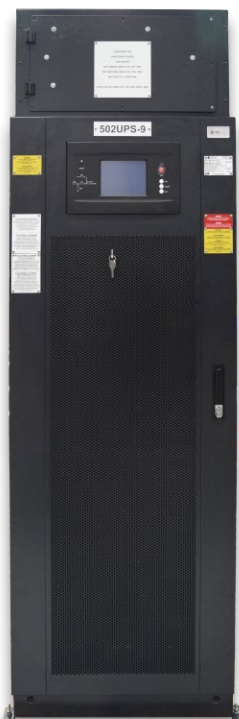
Using insulated gate bipolar transistors (IGBT), MP7 reduces total harmonic distortion and controls output voltage utilizing pulse width modulation (PWM).

The MP7 UPS is a fully modular and hot swappable system which also contains an internal maintenance bypass and static transfer switch through the bypass module. This enables easy expansion and maintenance, all without load interruption.

For mission-critical equipment, isolation and line maintenance is vital. MP7 comes standard with input, output and maintenance bypass breakers inside the main cabinet, or an external maintenance bypass panel option is available.



10 module, 100kVA MP7 with internal breakers, static transfer switch and front accessible top hat.



Standard Features

- Vienna rectifier
- Module capacity 10KVA @ 208V AC
- “Hot Swappable” modules
- Linear and nonlinear load capability
- IGBT modules in design for better regulations, efficiency and control
- Dedicated rectifier and inverter controllers in each module
- Static transfer switch (<1 ms transfer time)
- Input, output and maintenance bypass breakers
- Battery temperature compensation (optional probe required)
- Modbus RS232 & RS485 Port (optional Modbus TCP, SNMP)
- Conformal coating
- Fault isolation
- LCD Human-Machine Interface (HMI)
- Dust proof filter (front and rear)
- Top hat providing front access
- Certificates: CSA-C22.2 No.107.3, UL 1778, CE 73/23 & 93/68



Redundancy and Hot Swappable Modules

MP7

Scalable and flexible, each 208V MP7 can output 10 kVA and is available in 3, 6 and 10 module cabinets.

MP7 can be customized to meet a wide range of job specifications.

The modular design allows you to:

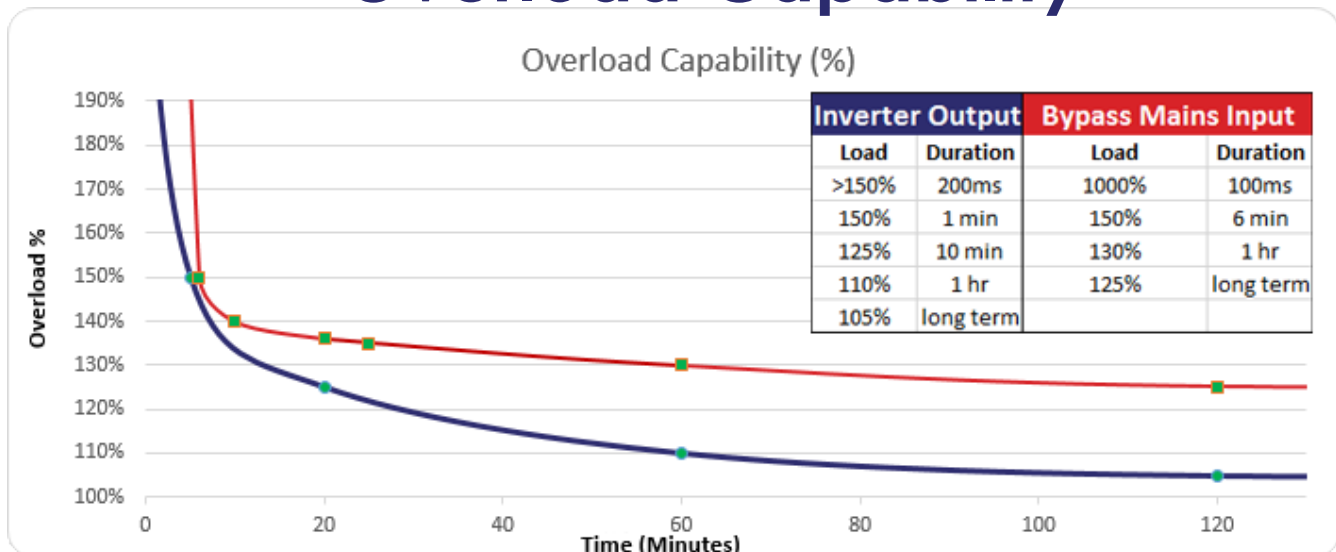
- Easily scale MP7 for growing power requirements
- “Hot Swap” by quickly adding/replacing modules
- Have redundant modules in case of failure
- Run cabinets in parallel
- Reduce maintenance by stocking standardized modules that fit all cabinet sizes

On the right hand side is a chart that shows you the versatility of the MP unit. N + 1 signifies a unit with one redundant module. N + 2 signifies a unit with two redundant modules. 2N signifies a secondary fully redundant cabinet. Lastly 2N + 1 signifies a fully redundant cabinet with 1 redundant module in each.

Redundancy Chart	
10 kVA Module	
3 Module Cabinet	

Possible Configurations	
10 kVA	
10 kVA N+1, 20 kVA N	
10 kVA N + 2, 20 kVA N + 1, 30 kVA N	
10 kVA 2N	
10 kVA 2N +1, 20 kVA 2N	

Overload Capability





Key Features

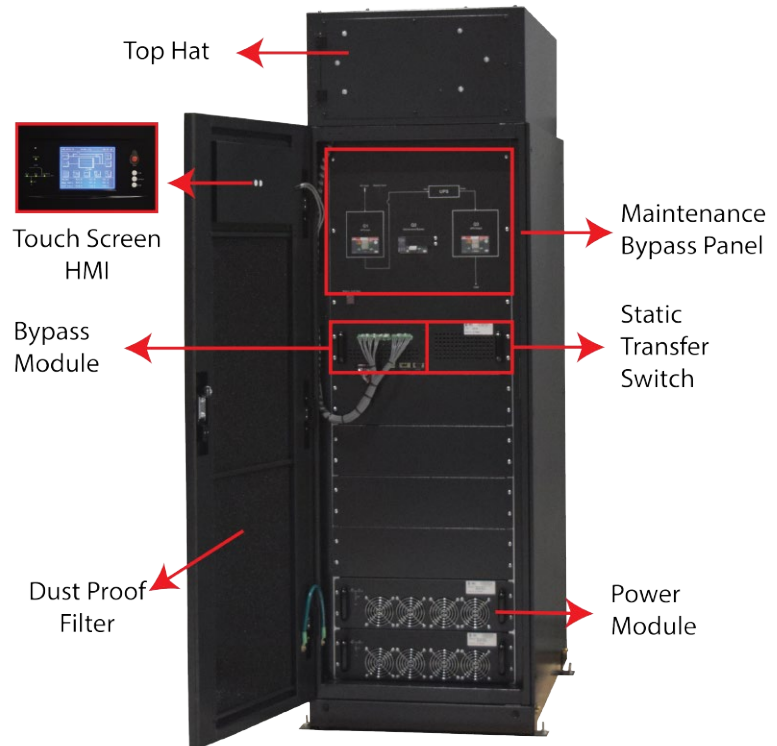
MP7

MP7 has mechanical features that make it suitable for a wide variety of applications. Some of the key mechanical features include:

Integrated MBP which provides input/output breakers and maintenance bypass breaker inside the main cabinet. Optionally, you can install protection breakers into an external maintenance bypass panel completely isolating AC power from the UPS.

Touch Screen LCD provides easy navigation and enhanced control over MP7 parameters.

Small Footprint. MP7 provides the same physical dimensions (width and depth) for all cabinet options with only a variation in height. Depending on your backup time, batteries can either be inside the cabinet, or put in an external battery panel giving you more control over your space. Having a standardized module sizes across all cabinets reduces spare parts and maintenance costs.



Load Adaptability

MP7 provides 100% non-linear load capability, providing steady state voltage regulation of ± 1 and unbalanced load regulation of ± 1.5 .

Load adaptability can help simplify integration and prevent buying an oversized unit to handle an unbalanced load.

Low Total Harmonic Distortion

MP7 uses PWM and IGBT technology to reduce harmonics. Low harmonics can prevent unnecessary equipment degradation, and avoid problems like electrical energy loss, damage to capacitors and conductor losses when power is sent back to the grid.



Metering and Display

MP7

MP7 gives the operator full control over the UPS through the HMI. The operator can manually operate the static transfer switch and battery maintenance tests as well as monitor all measured parameters such as UPS and battery status and event and alarm logs.

MP7 and measures and displays the following:

- **Main Input, Output and Bypass**
 - Voltage (V) L-N
 - Current (A)
 - Frequency (Hz)
 - Power Factor (%)
- **UPS load per module**
 - S (KVA) (Apparent Power)
 - P (KW)
 - Q (KVAR)
 - Load (%)
- **Battery Data**
 - Battery temperature (° C)
 - Ambient temperature (° C)
 - Battery capacity (%)
 - Voltage (V)
 - Current (A)
 - Remaining backup time (min.)
 - Float charging
 - Equalized charging
- **Fault history**
- **Event log**
- **Real time alarm monitoring**
- **N# status code**

MP7 provides dedicated dry contacts for the following functions:

- **Input**
 - Remote EPO (Emergency Power Off) operation
 - Remote static transfer switch operation
- **Output**
 - Battery and environment temperature monitoring
 - Static switch feedback
 - Common alarm
 - Utility failure alarm



3-Module Cabinet



6-Module Cabinet



10-Module Cabinet



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Optional Features

MP7

Power Distribution Unit



One central power unit when two or more power supplies are utilized.

External Maintenance Bypass Panel



Completely isolate power to one central bypass cabinet.

NEMA Enclosures



Other NEMA ratings available upon request.

Battery Cabinet



- a) Internal (inside UPS)
- b) Internal (external cabinet)
- c) External (rack).
(depending on battery setup and ventilation)

Additional Options

- Single cell battery monitoring
- Isolation transformer
- Temperature probe
- Dual input
- Frequency converter configuration

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Technical Specifications



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Input			
Rated AC Input Voltage	200/208VAC (3 phase 4 wire , sharing neutral with the bypass input)		
Input Voltage Range	-20% to +25%		
Frequency	50/60 (range: 40Hz~70Hz)		
Power factor	>0.99 @ full load		
THDI	<3% @ 100% linear load		
Bypass & Static Transfer Switch			
Switch time (bypass & inverter)	Synchronized switch: ≤1ms		
Superior Protection Bypass Line	Thermal-magnetic breaker, the capacity is 125% of rated current output		
Synchronization-window	Rated ±3Hz (selectable from ±0.5Hz ~±5Hz)		
Inverter Output			
Rated AC Voltage	200/208VAC (3 phase 4 wire , sharing neutral with the bypass input)		
Inverter Voltage Range	±5%		
Frequency	50/60 Hz		
Fault Current	300% short current limitation for 200ms		
Steady State Voltage Stability	±1 (balanced load), ±1.5 (100% unbalanced load)		
THDu	<1.5% (linear load), <5% (non-linear load)		
Slew Rate	1%, selectable 0.1~5		
Efficiency			
Normal mode (dual conversion)	90%		
ECO mode	98%		
Battery mode	90%		
Battery			
Battery Bus Voltage	Nominal: 240 VDC, (±99V~±144V) 2 strings in series (120 Cells)		
Quantity of Lead-Acid Cells	20=[12V unit] , 120=[2V unit]		
Float/Equalize	264 – 294V		
Type of Battery	VRLA/Flooded Lead Acid/NiCd		
Communication			
Communication	RS-485, RS-232, (optional: Modbus TCP, SNMP card)		
Environmental Characteristics			
Acoustic Noise Level at 1 Meter	55.0 dB		
Operating Altitude	≤3280ft. (1000m) above sea level, de-rate power by 1% per 328ft between 3280ft and 6560ft		
Relative Humidity	0 to 95%, non-condensing		
Operating Temp.	0 to 40 °C		
UPS Storage Temp.	- 20 °C~70 °C		
Battery Storage Temp.	- 20 °C~30 °C (20°C for optimum battery storage)		
Mechanical Characteristics			
Cabinet Specification	3-module	6-module	10-module
Dimensions, H x W x D (inch)	44 x 23.6 x 35.4	63 x 23.6 x 35.4	78.7 x 23.6 x 35.4
Weight (lb)	190	381	472
Color	Black		
Protection Level, IEC(60529)	NEMA 1 (optional: NEMA 2, 3R or 12)		
Certification			
Certification	CSA-C22.2 No.107.3, UL 1778, CE 73/23 & 93/68		
Warranty			
Warranty	5 years from shipment		

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MX

Modular Inverter





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Product Specifications

MX

Description

When you need clean, efficient AC power, RIC Electronics offers its MX inverter. This modular, “hot swappable” inverter system can provide up to 20KW (1PH), 40KW (bi-phase) and 60KW (3PH, 208VAC).

Because of its modular design, MX is capable easily expandable and can provide N+1 redundancy to ensure an unforeseen failure does not take down the critical load.



Protection Circuitry

Over Voltage*: Shut off at maximum input voltage, per input conditions. Automatic reset upon fault correction

Under Voltage*: Shut off at minimum input voltage, per input conditions

Thermal*: 105°C internal temperature. Warning buzz 5° C before shut off

Output Short: Unit shuts off (manual reset)

*Automatically reset

Mechanical Specifications

Four case sizes are available; all are: 7” high X 15” deep.

- 19 inch Wide: (includes hardware for rack or shelf mounting)
- 23 inch Wide: (includes hardware for rack or shelf mounting)
- 9.97 inch Wide: (for 1 to 3KW applications: surface mounting only)
- 7 inch Wide: (for 1 or 2KW applications; surface mounting only)

Available in other sizes including metric.

Options

- Maintenance bypass switch
- Static transfer switch (<4 ms)
- Communication options
 - Modbus TCP
 - SNMP



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Technical Specifications

Output Power

Continuous Power	Surge Power (3 Seconds)	No Load Power	Output Voltage	Output Current	Weight (LBS)
1000 Watt	2200 Watts	20 Watts	230 +/- 6%	4.3	7.5
1000 Watt	2200 Watts	20 Watts	117 +/- 6%	8.6	7.5
1000 Watt	2200 Watts	20 Watts	100 +/- 6%	10.0	7.5

*10W with X2 option

**Remote switchable

Input Power

Model Voltage	Minimum (Typical)**	System (Typical)	Maximum (Typical)**	Typical Efficiency @ Full Power	Peak Efficiency @ 1/3 Power
12Vdc	10.4/10.6Vdc*	13.8Vdc	17Vdc	85%	87%
24Vdc	19/21Vdc*	27.6Vdc	34Vdc	87%	89%
32Vdc	26.5/28Vdc*	36.8Vdc	45Vdc	87%	89%
48Vdc	41.5/42.5Vdc*	55.2Vdc	62Vdc	87%	89%
66Vdc	57.5/58.5Vdc*	75.9Vdc	94Vdc	88%	90%
108Vdc	94/ 95Vdc*	124Vdc	149Vdc	88%	90%

*Indicates typical cut-off voltage/warning buzzer voltage

** +/- 3%

General Specifications

Conditions	Minimum	Typical	Maximum
Waveform	-	Sinusoidal	-
Line Regulation	-	0.1%	0.5%
Load Regulation	-	0.5%	1%
Distortion	-	1.5%	2%
Frequency*	-0.1%	Nominal	+0.1%

*50, 60, 400Hz nominal

Environmental Characteristics	
Audible Noise	<45.0 dBA
Humidity	0 to 95%, non-condensing
Temperature	-25° to 40° C full power derated above 40° C. Derate 20% per 10° C
Altitude	-200 to 10k feet full power, derated above 10k ft
Cooling	Thermo-statically controlled forced air
Finish	Painted aluminum
Certification	
Certification	CSA C22.2 NO. 107.1-01 (R2011), UL 1778: 2014 (Ed. 5)
Warranty	
Warranty	18 mos. from shipment; 3 year w/startup; 5 year w/ service



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CP8

Single Phase Clean Power UPS





Product Overview

CP8

Description

The CP8 Single Phase Clean Power UPS keeps your mission-critical power equipment well protected against common power anomalies such as: power sags and brownouts, harmonic distortions, voltage surges/spikes, input noise, and frequency fluctuations at all times. It provides clean, uninterrupted power with precise voltage regulation which guarantees a true sinewave output.

CP8 has high efficiency which helps reduce electrical cost. Further, the UPS is conformally coated which helps protect from degradation, making it a viable solution for a variety of applications such as telecom, data centers, server rooms and others.

The CP8 models are available in wide range of power ratings including, 1000, 1500, 2000, 3000, 6000, 10000VA. Up to three modules can be connected in parallel for added capacity on 6 and 10kVA models.

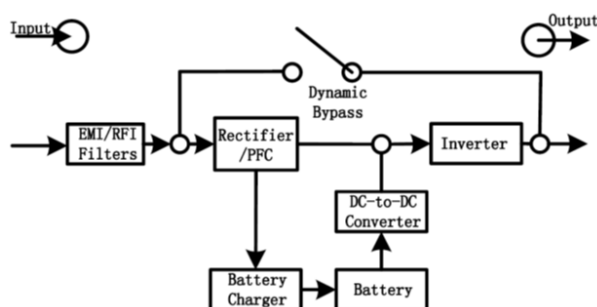


1kVA UPS with accessories included

Technology

Double Conversion technology utilized in every CP8 model allows the equipment to be isolated from raw utility power. This is accomplished by first converting utility input to DC then DC through a booster which is inverted back to AC. In addition, CP8 boasts zero transfer time between the AC mode to battery mode. CP8 also incorporates automatic re-transfer in the event utility is restored while the system is in battery mode.

Furthermore, the UPS is equipped with an internal static bypass switch such that if a fault occurs at the rectifier or the inverter, or if the overload rating is exceed, the system will automatically transfer to bypass mode, safely isolating your essential loads from any potential hazards.



UPS topology






Features

CP8

All Models (1-10kVA)

- Output power factor: > 0.9
- Exceptional output voltage regulation of $\pm 1\%$
- Active input power factor correction 0.99
- Outstanding overload capability
- High efficiency up to 91%
- 50Hz/60Hz frequency converter mode
- 4 programmable power management outlets (1-3kVA only)
- Emergency power off function (EPO)
- Hot swappable battery design
- ECO mode energy saving
- Input EMI filter for surge protection
- USB/RS-232 communications
- Low input THDi
- Optional: SNMP/Modbus RS485/Alarm card/Wifi card/External Maintenance Bypass (6/10kVA only for bypass)

INPUT CORD TYPE		
1/1.5kVA	NEMA 5-15R (15A)	
2kVA	NEMA 5-20R (20A)	
3kVA	NEMA L5-30R (30A)	
6/10kVA	Terminal Blocks	



6kVA UPS and external battery pack in rack mount configuration



1kVA UPS in tower configuration

6/10kVA

- State-of-Art DSP technology guarantees increase in reliability and noise immunity
- Wide input voltage range (110-300 VAC)
- Generator compatible
- Adjustable battery numbers
- Optional N+1 redundancy up to 3
- Optional isolation transformer for 120VAC nominal output

BRC-CAT1-21-07-27

Additional Features



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Rear Layout 6kVA



*Shown above is the rear view of the 6/10kVA UPS unit.
To the right is the 3kVA unit. Other UPS models may vary.

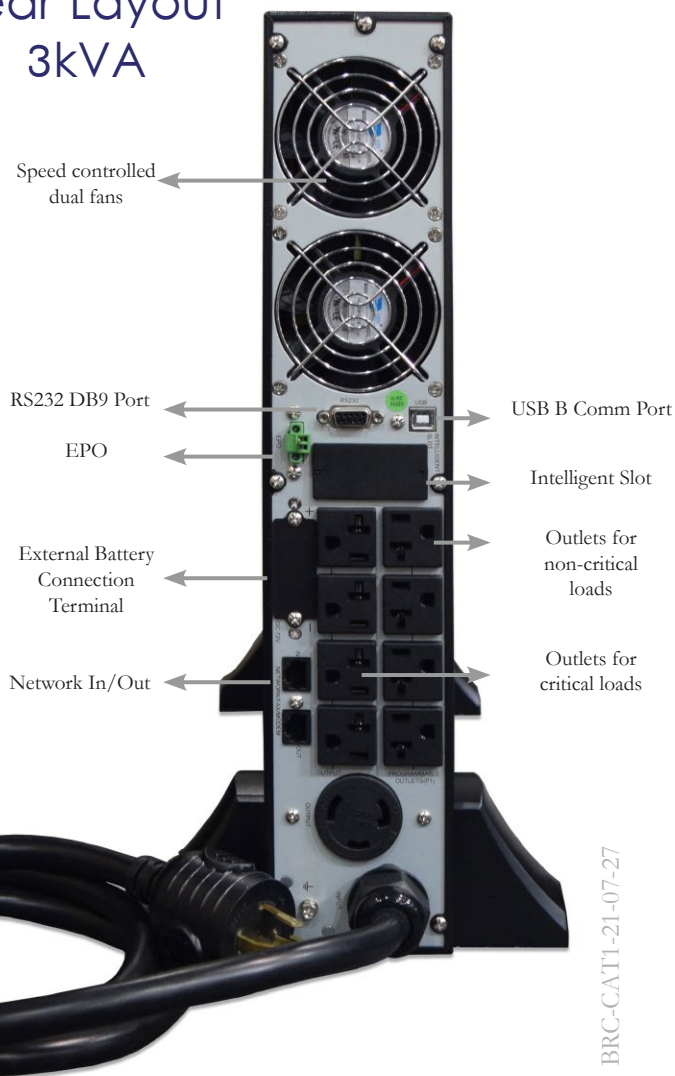
Custom Integration

For harsh environments, an appropriately rated NEMA enclosure can be easily integrated with rails, back panel, sliding drawers, ground lugs, fans, heaters, and A/C to maximize efficiency and reliability.

Custom distribution panel, terminal layout, lifting provisions, over-current protection and transformer configurations can all be utilized as required to provide the perfect solution for your application.

Conveniently, the CP8 UPS can be mounted either on standard 19" racks or freestanding with a tower base.

Rear Layout 3kVA



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Additional Features

CP8

Metering and Setup

- **Input AC**
 - Voltage
 - Frequency
 - Current
- **Battery DC**
 - Voltage
 - Current*
 - Load %*
 - Back-up Time
- **Output AC**
 - Voltage
 - Frequency
 - Load Current
 - Load %
- **Mode of Operation**
 - Normal
 - Battery
 - Bypass
 - ECO
 - Frequency Converter
- **Warning/Alarms/Fault Code**
 - Overload
 - Low / High Voltage
 - Abnormal Frequency
 - Batt EOD
 - Over charge
 - EPO
 - High Temperature
 - Rectifier/Inverter/Battery Fail
 - Input Connection Fail
- **Ambient Temperature**

* 1-3kVA models only



HMI showing key UPS parameters

Setup Parameters

- **Configurable Parameters**
 - Output voltage / frequency
 - ECO mode
 - Frequency converter mode
 - Bypass voltage / frequency limit
 - Input AC Voltage
 - Programmable Outlet*
 - Battery AH (Capacity)*
 - Battery Boost / Float Voltage*
 - Max charging current
 - EPO logic
 - Output voltage calibration**

* 1-3kVA models only

**6/10kVA models only



Optional Features

CP8



CP8-SNMP-CARD

The Simple Network Management Protocol (SNMP) allows you to monitor the status of the CP8 UPS using any user-preferred web browser. The card should be inserted in the Intelligent Slot from the rear.



CP8-MODBUS-CARD

The dual Modbus RTU RS485 ports provides you with flexibility for networking with multiple devices. An external Modbus RTU to TCP converter can be installed if desired.



CP8-COMM-CARD

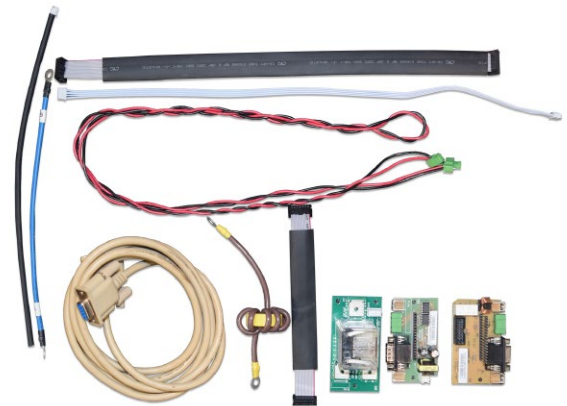
The optional alarm card provides the following status relays for your monitoring needs:

- UPS ON status
- UPS alarm
- Utility failure
- Low battery
- UPS failure
- Bypass Status
- UPS audible alarm



CP8-MBP-10K-RT

A external maintenance bypass panel can be integrated to ensure a complete UPS isolation when maintenance or removal of the UPS is required without dropping power to the load.



CP8-B-PARA-KIT

The factory installed, plug and play parallel kit enables the 6 and the 10kVA UPS models to be connected in parallel up to three units for an added capacity and N+1 redundancy with load sharing.

*Each UPS unit must have its own separate battery bank for proper operation.

Product Selection



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MODEL	Capacity (VA)	Power (W)	In (Vac)	Out (Vac)	Battery (Vdc)	Battery Backup Time				Dimensions H x W x D (in)	Wt (lbs)
						25% Load (min)	50% Load (min)	75% Load (min)	100% Load (min)		
CP8-A-1K-RT	1000	1000**	120	120	36	38.63	16.77	9.46	5.9	(2U) 3.5 x 17.2 x 16.1	31.1
CP8-A-1.5K-RT	1500	1300**	120	120	36	20.2	10.3	5.27	2.96	(2U) 3.5 x 17.2 x 16.1	32.1
CP8-A-2K-RT	2000	1850**	120	120	72	40.59	17.01	9.62	5.96	(2U) 3.5 x 17.2 x 24.8	51.4
CP8-A-3K-RT	3000	2739**	120	120	72	24.33	9.79	4.88	2.64	(2U) 3.5 x 17.2 x 24.8	60.6
CP8-B-6KB-RT*	6000	6000	240	240	240	42.89	18.09	10.3	6.57	(5U) 8.8 x 17.2 x 27	172.1
CP8-B-10KB-RT*	10000	10000	240	240	240	22.88	8.78	4.59	3.06	(5U) 8.8 x 17.2 x 28	178.7

* Includes one external battery bank - part number: CP8-EBB-240-6K/10K-RT

** Based on 120V input/output nominal

MODEL	Use with (VA)	Battery (Vdc)	Battery Qty (#)	Battery Cap (AH)	Total String	Additional External Battery Backup				Dimensions H x W x D (in)	Wt (lbs)
						25% Load (min)	50% Load (min)	75% Load (min)	100% Load (min)		
CP8-EBB-36-1.5K-RT	1500	36	6	18	2	147.45	66.50	39.61	27.31	(2U) 3.5 x 17.2 x 16.75	47.3
	1500	36	6	18	2	55.73	24.34	14.58	9.29		
CP8-EBB-72L-2K/3K-RT	2000	72	12	18	2	96.98	41.46	24.68	16.88	(2U) 3.5 x 17.2 x 28.5	90.8
	3000	72	12	18	2	58.93	25.04	14.54	9.46		
CP8-EBB-240-6K/10K-RT	6000	240	20	9	1	42.89	18.09	10.3	6.57	(3U) 5.3 x 17.2 x 24.75	139
	10000	240	20	9	1	22.88	8.78	4.59	3.06		

Options

ISOLATION TRANSFORMER	Capacity (VA)	Power (W)	In (Vac)	Out (Vac)	Battery (Vdc)	Dimensions H x W x D (in)	Wt (lbs)
CP8-6K-ISO	6000	6000	240	240/120	240	(3U) 5.3 x 17.2 x 26.75	134.5
CP8-10K-ISO	10000	10000	240	240/120	240	(3U) 5.3 x 17.2 x 31	198.4

*Backup time is affected with use of isolation transformers.

OPTIONS	Description
CP8-MBP-10K-RT	Maintenance Bypass panel [3.39"x17.2"x8.27"-HxWxD] - [6.6 lbs]
CP8-SNMP-CARD	SNMP network card
CP8-MODBUS-CARD	Modbus RTU RS-485 (2 ports)
CP8-COMM-CARD	Alarm relays/dry contact
CP8-B-PARA-KIT	Parallel Kit (only for 6-10k models)*
CP8-RAIL-KIT-2U	Rail mounting kit (pair) for 2U high
CP8-RAIL-KIT-3U	Rail mounting kit (pair) for 3U high
CP8-WIFI-CARD	Wifi network card

RIC Electronics Ltd. guarantees this product to be free from defects in material and/or workmanship for a period of 24 months (2 years) from date of manufacture. Some exclusions may apply.

* Derate the capacity to 90% in parallel operation or when the output voltage is adjusted to 208VAC.

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Technical Specifications (1-3kVA)

Model		CP8-1K-RT	CP8-1.5K-RT	CP8-2K-RT	CP8-A-3K-RT
Capacity*		1000VA/1000W	1500VA/1300W	2000VA/1850W	3000VA/2740W
Input					
Voltage Range	Low Line Transfer	80VAC/70VAC/60VAC/55VAC ± 5 % (based on load percentage 100% - 80 % / 80 % - 70 % / 70 - 60 % / 60 % - 0)			
	Low Line Comeback	87VAC/77VAC/67VAC/62VAC ± 5 %			
	High Line Transfer	150 VAC ± 5 %			
	High Line Comeback	145 VAC ± 5 %			
Frequency Range		40Hz ~ 70 Hz			
Phase		Single phase with ground			
Power Factor		≥ 0.99 @ full load			
THDi		≤ 5% @ 100~130VAC THDU < 1.6% @ input and full linear load condition			
Output					
Output voltage		100/110/115/120/127VAC			
AC Voltage Regulation		± 1% (Batt. Mode)			
Frequency Range (Sync)		47 ~ 53 Hz or 57 ~ 63 Hz			
Frequency Range (Batt. Mode)		50 Hz ± 0.1 Hz or 60Hz ± 0.1 Hz			
Overload	AC Mode	100%~ 110% warning only, 110%~130%: 5min,130%~140%: 30sec,140%: 1.5sec			
	Battery Mode	100%~ 110% warning only, 110%~130%: 2min,130%~140%: 10sec,140%: 1.5sec			
Current Crest Ratio		3:1 max			
Harmonic Distortion		≤ 2 % @ 100% Linear Load ; 4 % @ 100% Non-linear Load			
Transfer Time	Line to Battery	0 ms			
	Inverter to Bypass	< 4 ms			
Efficiency					
AC Mode		≥ 89% @ full charged battery			≥ 91% @ full charged battery
ECO Mode		≥ 96% @ full charged battery			
Battery Mode		≥ 88%			≥ 90%
Battery (Internal)					
Battery Type		12V/9AH	12V/9AH	12V/9AH	12V/9AH
Numbers		3	3	6	6
Autonomy (mins)		5.9 @ 100% load	2.94 @ 100% load	5.96 @ 100% load	2.96 @ 100% load
Charger					
Charging Current		Selectable: 1/2/4/6/8A			
Float Charging Voltage		Range: 2.20V to 2.33V/cell (Default 2.28V/cell)			
Boost Charging Voltage		Range: 2.25V to 2.40V/cell (Default 2.36V/cell)			
Dimensions - UPS inc. Internal Battery					
Dimension, HxWxD in {mm}		(2U) 3.5 x 17.2 x 16.1 in {89 x 437 x 409mm}	(2U) 3.5 x 17.2 x 16.1 in {89 x 437 x 409mm}	(2U) 3.5 x 17.2 x 24.8 in {89 x 437 x 630mm}	
Net Weight Lbs {Kg}		31.1lbs {14.1kg}	33.3lbs {15.1kg}	51.4lbs {23.3kg}	60.6lbs {27.5.1kg}
Environment					
Operation Humidity**		20-95 % RH @ 0- 40°C (non-condensing)			
Noise Level		Less than 50dBA @ 1 Meter (With fan speed control)			
Management					
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			
Certification					
Approvals		cTUVus (UL1778:2014, CSA C22.2 No. 107.3-14)			

*Output power capacity is based on a 120VAC input voltage. The power rating will vary depending on the input voltage.
 ** If the Ups is installed or used in a place where the altitude is above 1000m, the output power must be derated 1% for every 100m.
 Product specifications are subject to change without further notice.

Technical Specifications (6/10kVA)

Model		CP8-B-6K-RT	CP8-B-10K-RT
Capacity*		6000VA/6000 W	10000VA/10000W
Input			
Voltage Range	Low Line Loss	110 VAC(L-N) ± 3 % at 0-60% Load 176 VAC(L-N) ± 3 % at 60%-100% Load	
	Low Line Comeback	Low Line Loss Voltage + 10V	
	High Line Loss	300 VAC(L-N) ± 3 %	
	High Line Comeback	Low Line Loss Voltage - 10V	
Frequency Range		46Hz ~ 54 Hz @ 50Hz system 56Hz ~ 64 Hz @ 60Hz system	
Phase		Single phase with ground	
Power Factor		≥ 0.99 at 100% Load	
Output			
Output voltage		208/220/230/240VAC	
AC Voltage Regulation		± 1%	
Frequency Range (Synchronized Range)		46Hz ~ 54 Hz @ 50Hz system 56Hz ~ 64 Hz @ 60Hz system	
Frequency Range (Batt. Mode)		50 Hz ± 0.1 Hz or 60Hz ± 0.1 Hz	
Overload	AC Mode	100%~110%: 10min ; 110%~130%: 1min ; >130% : 1sec	
	Battery Mode	100%~110%: 30sec ; 110%~130%: 10sec ; >130% : 1sec	
Current Crest Ratio		3:1 max	
Harmonic Distortion		≤ 1 % @ 100% Linear Load; ≤ 4 % @ 100% Non-linear Load	
Transfer Time	Line <--> Battery	0 ms	
	Inverter <--> Bypass	0 ms	
	Inverter <--> ECO	<10 ms (Typical)	
Efficiency**			
AC mode		> 94%	
Battery Mode		> 92%	
Battery (External)			
CP8 Battery Module CP8-EBB-240-6K/10K-RT		240VDC/n*9Ah where n= # of strings	
External battery banks		240VDC custom battery solution	
Number of 12V jars in a bank		20	
Charger			
Charging Current		Adjustable from 1A to 4A	
Charging Voltage		(Battery number*13.65 V) ± 1%	
Dimensions - UPS inc. External Battery			
Dimension, HxWxD in {mm}		(5U) 8.8 x 17.2 x 27 {223.5 x 436.9 x 685.8mm}	(5U) 8.8 x 17.2 x 28 {223.5 x 436.9 x 711.2mm}
Net Weight Lbs {Kg}		33.1lbs {15kg}	39.7lbs {18kg}
Environment			
Operation Humidity		<95 % RH @ 0 - 40°C (non-condensing)	
Operation Altitude***		<1000m	
Acoustic Noise Level		Less than 55dB @ 1 Meter	Less than 58dB @ 1 Meter
Management			
Smart RS-232 or USB		Supports Windows® 2000/2003/XP/Vista/2008/7/8, Linux, Unix, and MAC	
Optional SNMP		Power management from SNMP manager and web browser	
Certification			
Approvals		cTUVus (UL1778:2014, CSA C22.2 No. 107.3-14)	

* Denote the capacity to 60% in Frequency Converter mode. * Denote the capacity to 90% in parallel operation or when the output voltage is adjusted to 208VAC.

** Specifications vary when output isolation transformer is installed with the system. If the Ups is installed or used in a place where the altitude is above 1000m, the output power must be derated 1% for every 100m.

Product specifications are subject to change without further notice.



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AC & DC

Custom UPS



Product Specifications



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Description

RIC Electronics designs and manufactures AC and DC UPS solutions to fit demanding industrial needs. Whether it be single or dual input, redundant rectification, AC and/or DC output, they will create a custom system that meets or exceeds the required technical specifications.

Not being constrained to one size of cabinet or type of system, they can utilize SCR or high frequency switch-mode rectification based on the requirements.

Backup time can be provided internally or externally depending on the amount of time needed.

Contact the sales team at RIC Electronics for more information on custom AC/DC solutions.



System providing 3KW AC and DC 6.25KW DC

Features

- SCR or high frequency switch mode rectifier
- AC/AC, AC/DC, DC/AC, DC/DC
- AC single phase/three phase
- Voltage: 2-600V (input or output)
- Power: 120 Watts – 200kW
- Backup time: 5 minutes – multiple days (optional redundancy)
- Single or dual (multiple source) input
- NEMA 1 enclosure (NEMA 2, 3R, 4/4X and 12 available)
- Redundant chargers

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High Frequency System

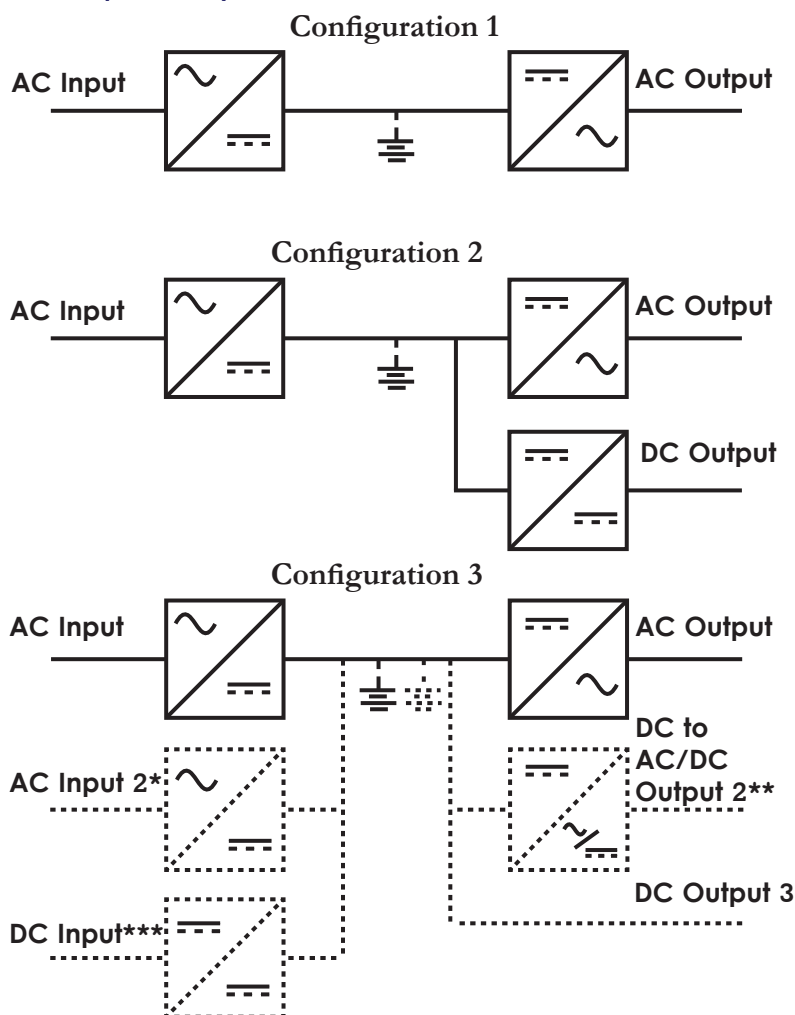


The sample system on the right hand side is comprised of an IGBT battery charger that outputs 48VDC/40A and 120VAC (650 Watts). The backup time for this system is 24 hours.

This system provides both midpoint and string voltage readings with 500VDC input and DC output breakers.



Sample Systems



Not shown are transfer and bypass switch options which can be added to any system.

Number of battery strings dependant on backup time. Inverters and converters can be added for redundancy.

*Dual AC input with redundant rectifier available.

** DC to AC inverter and/or DC outputs.

***DC input capability

Customer List



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Overview

RIC Electronics has been manufacturing quality power products for oil and gas, utility and heavy industry since 1981.

Their business is based on repeat business from satisfied customers due to the reliability of their products, after sales service and prolonged support for mature products.

Here are a few customers in different sectors.



Industrial

- Barrick Gold
- Cerro Verde Mine
- Department of National Defense
- Finning
- Rio Tinto Alcan
- Seaspans
- Teck Resources

Utility

- ATCO Electric
- BC Hydro
- Hydro One
- Hydro Quebec
- Manitoba Hydro
- New Brunswick Power
- Nova Scotia Power
- Saskpower



Oil and Gas

- Access Pipeline
- BP
- Canadian Natural Resources Limited
- Enbridge Pipeline
- ExxonMobil
- Fortis BC
- Imperial Oil
- Pembina Gas & Pipeline
- Petro Canada
- Shell
- Suncor
- Syncrude
- Trans Canada Pipeline





Case Study

CASE STUDY

Sea-span Esquimalt shipyards needed a regulated high voltage DC power supply for the modernization efforts of the Victoria class submarines. This innovative system would ultimately provide shore power to submarines while docked. Later named as “Gizmo”, the power system needed to charge the submarine batteries and provide full submarine DC and AC power needs. A variety of important specifications needed to be met:

The Challenge

- 2MW power supply converting 480VAC three phase to a regulated and adjustable 0-720VDC (0-2600Amps).
- The AC power to be supplied by paralleling four diesel 750kW Diesel Generators. The generators to be functioning in parallel and in sync with the power demands of the submarine.
- Secondary 225kW 480VAC three phase for submarine use.
- Regulated DC load bank capable of discharging up to 720VDC (0-2600Amps). The load bank will be used for trial testing the submarine machinery and discharging the batteries.
- Portable and fully integrated package including the diesel generators, AC paralleling switchgear, DC power supply and DC load banks.
- Portable and rugged design package in standard sea-cans.

The Solution

RIC Electronics designed and manufactured a fully integrated 1.5MW power supply, 1.5MW adjustable load bank and AC paralleling switch gear. The solution integrated four 750kW diesel generators for AC power supply. All the power modules and sections were fully controlled and monitored by a central PLC system. The operator has full control of the functionality of the system and individual power sections through a touchscreen HMI. The system included all secondary distribution systems; protections and high amperage bus-work.



Gizmo
2 MW Submarine
Battery Charger



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RIC ELECTRONICS

Unit 1 – 5628 Riverbend Dr.
Burnaby BC, V3N 0C1
P: (604) 549-9350 F: (604) 549-9335
ricelectronics.com

