

Rack Mounting Uninterruptible Power Supply Systems and Inverters

This is an introduction to our rack mounting, industrial, heavy duty, active-on-line Uninterruptible Power Supply Systems. These UPS systems feature fully controlled rectifiers and transistor or IGBT Pulse Width Modulated inverters which deliver continuous conditioned power with high stability regulated frequency and precise voltage for all types of computer, telecoms, non-linear and linear critical loads.

This product range is available in 500 VA to 12 kVA with single phase output and from 5 kVA to 12 kVA with three phase output. Telecoms class inverters are available in these sizes suitable for connection to 48 V DC station batteries, the inverter outputs are available in 50 Hz, 60 Hz and 400 Hz. The smaller sizes can be delivered in 2 modules as UPS System and bypass for assembly into customers' equipment racks. The larger systems are supplied in 3 sections - rectifier, inverter and bypass assembled into custom engineered rack enclosures. We offer this product in single module or multi-module redundant configuration complete with metering, status indication display mimic and battery autonomy to customers' specified needs.

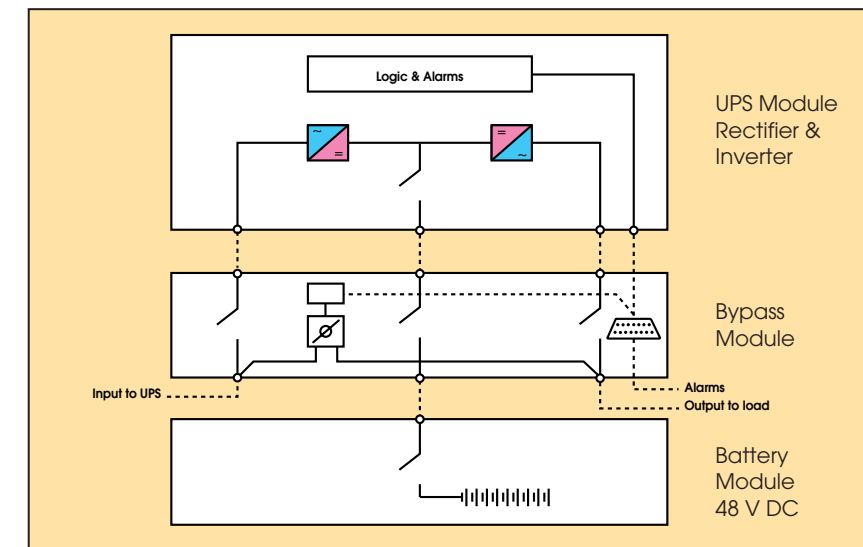


Miniverter 4

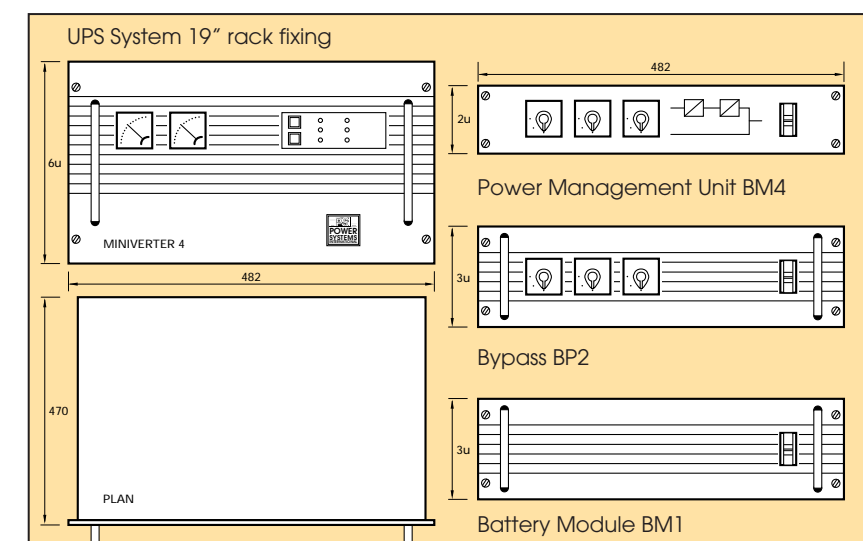
General: The Miniverter 230 V mains input must be protected by a fuse or circuit breaker of 6 A for 500 VA or 10 A for 800 VA and 13 A for 1100 VA. 'Klippon' type terminal blocks are used for cable termination in the power management and bypass module, fuses and circuit breakers should be sized to accept inrush current 'slow' characteristic. Maintenance free gas recombination monobloc batteries are supplied as optional items and the recharge float voltage is set at 54.48 V DC (nominal 48 V DC), the minimum autonomy battery is supplied within the bypass module.

- Options:**
- Psophometric filtering to meet CCITT requirements.
 - RFI suppression filters.
 - Interconnecting plugs and sockets between UPS module and bypass module.
 - Battery module with maintenance free lead acid or NiCad batteries to give autonomy up to 8 hours.
 - External station battery connection facilities with blocking diode and protection.
 - CEGB approval options pack for NGC, National Power, Powergen, Scottish Nuclear and Nuclear Electric.
 - Miniverter 2, special seismic qualified construction with external station battery connection for Nuclear power stations and military applications with integral automatic bypass.
 - Miniverter CCITT special inverter available for connection to Telecoms 48 V DC station battery.

Typical Scheme



Dimensions



Miniverter 4

The Miniverter 4 series of rugged, industrial class of Uninterruptible Power Supply Systems are designed to provide high security power for process engineering, data logging, military, instrumentation, public utility and telecoms applications.

Miniverters are active-on-line UPS Systems which provide galvanic separation between mains and DC and between the critical load and the mains. A full capacity rectifier provides continuous power for the inverter and simultaneously charges the battery module. This series of rack mounting UPS Systems are of a modular construction with rectifier, inverter, bypass and battery available as separated items. Metering, status indication with remote signalling features and distribution modules are available as popular options with this product.

The inverter is a PWM - Pulse Width Modulation type using the latest in high frequency transistor switching technology producing a precisely regulated AC Sine Wave output with an exceptional performance to handle switch mode and other non-linear loads.

In the event of commercial mains failure, the inverter draws its power from the battery module or the station battery and will continue to supply the critical load without any disturbance until the battery low level is reached or when power has been restored to the rectifier.

Where abnormal overload conditions or over temperature conditions impact the continued operation of the inverter the automatic bypass switch will operate. The bypass switch module enables the critical load to be transferred to the bypass circuit automatically, then returns the load back to the inverter without disturbing the critical load security. A manual maintenance bypass is also provided.

Specification (500 VA, 800 VA and 1100 VA)

Rectifier	Input Voltage, Single phase & Neutral Input Frequency Power Factor (mean value) Battery Charging characteristic Input Transformer	110/220/230/240 V (+/- 15%)* 50 (60 Hz) +/- 5% 0.8 IU (DIN 41773) Double wound isolation with galvanic separation
Inverter	Input Voltage Nominal output power cos phi 0.8 lag Nominal output power at 1.0 cos phi Crest factor of load Nominal output voltage, single phase+neutral Inverter Output transformer Output filter Output waveform Output voltage regulation: static at load step with 100 % load change output distortion at linear load Output frequency Output frequency regulation: free running, from internal oscillator with mains synchronisation Overload capability Short-circuit characteristic	48 V DC nominal 500 VA 800 VA 1100 VA 400 W 640 W 800 W 2.25:1 110/220/230/240 V * High frequency transistor with pulse width modulation (PWM), over temperature protection. Double wound isolation with galvanic separation LC - circuit Sine-wave +/- 1% +/- 3% <3% 50(60) Hz +/- 0.1% Up to +/-4%, normally +/-1% 110% for 10 minutes 150% for 30 seconds 200% for 10 seconds Electronic short-circuit protection
Bypass separate 19" rack module	Electronic automatic Maintenance bypass Input and output	Load transfer to mains and automatically back to inverter Automatic or switch selectable by rotary switch on front panel By 2 switches on front panel

* Supplied for single voltage single frequency operation

Miniverter Series RT

Our Industrial Miniverter Rugged Transistor (RT) series of rack construction Uninterruptible Power Supply Systems are designed to provide a high security power source for computer based process control, data logging, SCADA, military, telecommunications, rail signalling and Public Utilities applications especially Nuclear Power Stations. This product range has an active-on-line system topology comprising full capacity rectifier, transistor PWM inverter, static bypass and manual maintenance bypass.

During normal mains operation, the rectifier produces DC for charging the battery and power for the inverter load. The inverter uses the latest in transistor PWM switching technology and converts the DC into a precisely regulated AC sinusoidal output waveform low in harmonic content with excellent dynamic performance ideally suitable for handling high crest factor non-linear loads. In the event of input power failure, the Miniverter RT draws power from the battery and will continue to supply the critical load with AC power until the battery 'low' threshold is reached or until input power has been restored to the rectifier.

Where abnormal overload conditions or over temperature or current limit is reached in the inverter, the static bypass switch will be activated to transfer the critical load from the inverter to the bypass power source without interruption. The static bypass features an automatic return of the critical load from the bypass line to the inverter also without interrupting power supply to the load, a manual maintenance bypass is also provided as a standard feature.

Miniverter RTC series UPS Systems and inverters are available in a compact, integrated execution fitted with a full height front door, safety interior screen, EMC shield, mimic status and alarm panel and basic metering, a full metering option is available.

Specification (2.5 kVA, 3.3 kVA, 5 kVA, 8 kVA, 10 kVA and 12 kVA)

UPS system size	2.5	3.3	5.0	8.0	10.0	12.0	
Rectifier	Input Voltage ⁽¹⁾ Frequency ⁽²⁾ Phases	230 Volts +/- 15% 50 Hz +/- 5% Single + neutral + earth	400 Volts +/- 15% ⁽³⁾ 50 Hz +/- 5% 3 phases + neutral + earth	400 Volts +/- 15% ⁽³⁾ 50 Hz +/- 5% 3 phases + neutral + earth	400 Volts +/- 15% 50 Hz +/- 5% 3 phases + neutral + earth	400 Volts +/- 15% 50 Hz +/- 5% 3 phases + neutral + earth	
Inverter	Rated Capacity kVA/kW Output Voltage: - Single Phase ⁽¹⁾ - Three Phases ⁽¹⁾ Voltage Regulation: - Normal - Dynamic Frequency ⁽²⁾ Phases: - Single Phase - Three Phases ⁽²⁾ Load Power Factor Harmonic Distortion Overload Capacity Audible noise at 1 metre	2.5/2 230 - +/- 1% +/-3% 50 Hz Yes No 0.7 lagging to unity within kW capacity <3% THD linear load 150% for 30 secs <57 dBA	3.3/2.7 230 - +/- 1% +/-3% 50 Hz Yes No 0.7 lagging to unity within kW capacity <3% THD linear load 150% for 30 secs <58 dBA	5.0/4 230 400 +/- 1% +/-4% 50 Hz Yes Yes 0.7 lagging to unity within kW capacity <3% THD linear load 150% for 30 secs <58 dBA	8.0/6.4 230 400 +/- 1% +/-5% 50 Hz Yes Yes 0.7 lagging to unity within kW capacity <3% THD linear load 150% for 30 secs 58 dBA	10.0/8 230 400 +/- 1% +/-8% 50 Hz Yes Yes 0.7 lagging to unity within kW capacity <3% THD linear load 120% for 10 mins <59 dBA	12.0/9.6 230 400 +/- 1% +/-8% 50 Hz Yes Yes 0.7 lagging to unity within kW capacity <3% THD linear load 120% for 10 mins <59 dBA
Bypass	Automatic synchronised static transfer switch with separate manual bypass circuit breaker for maintenance. A bypass isolation transformer and voltage regulating transformer are available as optional items.						
Notes	1. Other voltages and frequencies available. 2. Frequency stability is +/- 1% when synchronised to mains and +/- 0.01% when free running.						



Miniverter Series RT

General: Ambient operating temperature to 40°C in relative humidity of 97% non condensing, at 1000 m above sea level is permitted without de-rating, conditions must be dust and damp free, and well ventilated.

RFI suppression level is in accordance with VDE 0875N.

Psophometric filtering for CCITT is available on inverters requested for Telecoms applications as an optional feature.

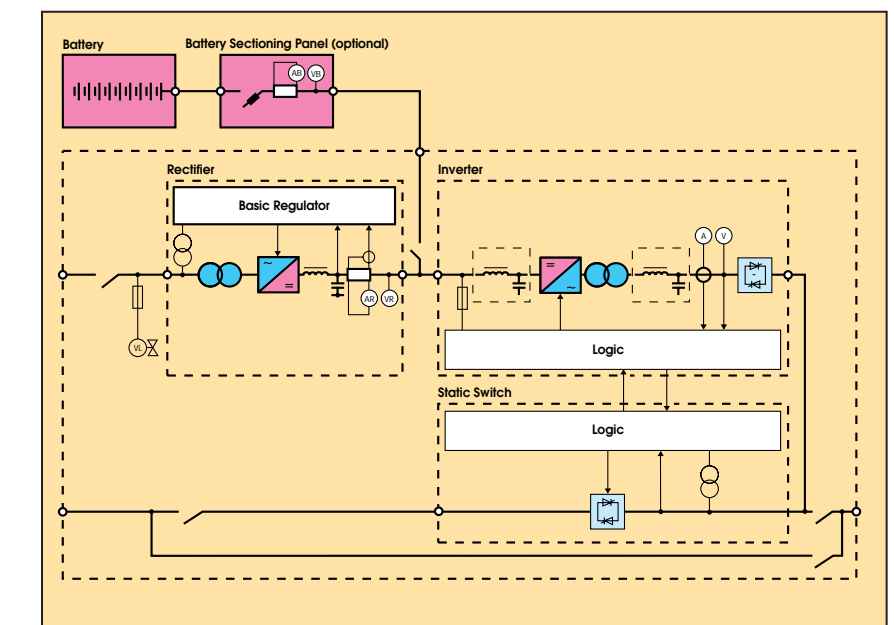
Colour: Colour is RAL 7032 with textured finish.

Enclosure: Enclosure class IP30 to IEC 529 for RTC product and IP 20 for RT.

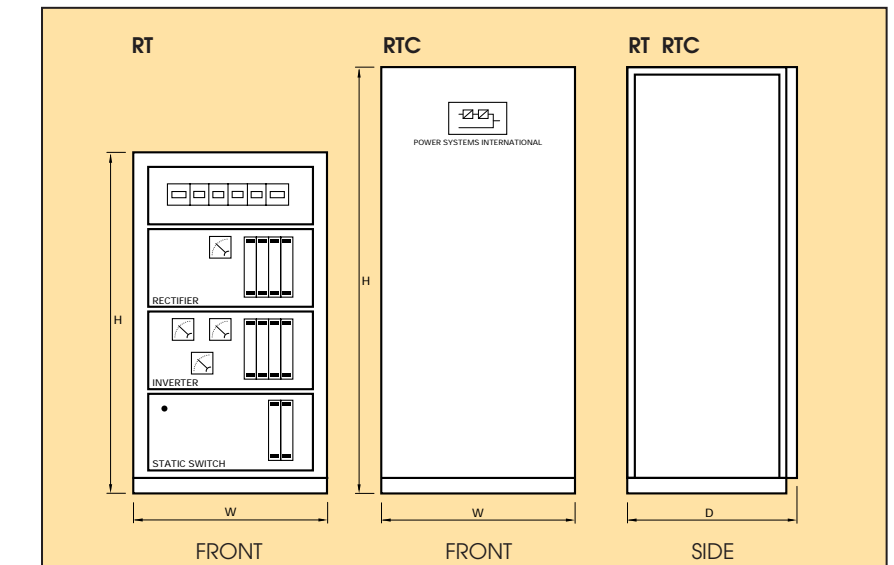
- Options:**
- Alternative enclosure class to IP 54
 - Custom colours
 - Digital metering
 - Customers requested features

- Notes:**
- Single phase means one phase + neutral and earth
 - Three phase means three phase lines + neutral and earth
 - The RTC version of this product is provided with a full height door and inner safety screen with EMC shield

Typical Scheme



Typical construction and dimensions



NEW

Miniverter WM Series rugged, heavy duty inverter for mobile and fixed station telecoms application
 24V, 48V and 120V DC input with 230V 50Hz output
 500VA and 1000VA



Selection Data

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UPS Module	6U high x 482 wide x 470 deep (mm) excluding handles Weights: 500 VA 23 kg 800 VA 45 kg 1100VA 53 kg
Inverter only	5U high x 482 wide x 470 deep (mm) excluding handles Weights: 500 VA 20 kg 800 VA 33 kg 1100 VA 39 kg
Bypass BP1	3U high x 482 wide x 375 deep (mm) excluding handles Weight with internal battery approx 10 min autonomy 500 VA 16 kg 800 VA 19 kg 1100 VA 24 kg
Power management BM4	2U high x 482 wide x 375 deep (mm) no handles Input, output, bypass and battery isolation with mimic status feature - weight 11 kg
Battery Module BM1	3U high x 482 wide x 375 deep (mm) excluding handles Weight with internal battery approx 10 min autonomy 500 VA 15 kg 800 VA 18 kg 1100 VA 23 kg
Battery Module BM2	6U high x 482 wide x 375 deep (mm) excluding handles weight 5 kg without batteries

Miniverter RT/RTC

kVA	Phases		Battery Autonomy		Dimensions (mm)			Weight (Kg)	
	Input	Output	volts	Minutes	H	W	D	UPS	Battery
2.5	1	1	48	15	1080	600	600	165	44
	1	1	48	60	1400	600	600	165	95
3.5	1	1	72	15	1080	600	600	180	67
	1	1	72	30	1400	600	600	195	104
5	3	1	120 ⁽²⁾	0 ⁽⁴⁾	1080	600	600	210	- ⁽³⁾
	3	1 ⁽¹⁾	120	30	1600	600	600	240	110
8	3	1 ⁽¹⁾	120 ⁽²⁾	0 ⁽⁴⁾	1080	650	700	300	- ⁽³⁾
	3	1	120 ⁽²⁾	15	1600	650	700	380	132
	3	1	120 ⁽²⁾	30	1800	650	700	390	235
12	3	1	120 ⁽²⁾	0 ⁽⁴⁾	1400	700	750	390	- ⁽³⁾
	3	1	120 ⁽²⁾	15	1800	700	750	410	174
	3	3	120 ⁽²⁾	0 ⁽⁴⁾	1400	700	750	395	- ⁽³⁾
	3	3	120 ⁽²⁾	15	1800	700	750	420	174

(1) 3 Phase available as option (3) No built in battery
 (2) 48 V DC input inverter available for telecoms (4) RTC models have provision for battery
 RT models have no provision for batteries



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