riello ups

DATACENTRE E-MEDICAL INDUSTRY

TRANSPORT EMERGENCY

Sentryum

VFI TYPE ONLINE

Tower

6 ECO LEVEL

sentryum

1:1 3:1 10-20 kVA/kW

3:3 10-20 kVA/kW

USB plug

SmartGrid ready

Supercaps UPS

Energy share

Service 1st start

HIGHLIGHTS

- Extensive range of solutions
- Compactness
- Efficiency up to 96.5%
- High power availability
- Smart Battery Management
- Maximum reliability
- Flexibility of use
- Graphic touch screen display

The rapid evolution of IT technologies, augmented focus on environmental matters and complexity of critical applications are demanding more flexible, efficient, secure and interconnected power protection solutions.
The Sentryum 10 - 20 kVA/kW offers the best combination of power availability, energy efficiency and global performance ensuring installation and running cost savings.
It is the very latest Riello UPS development resulting in a third-generation transformer-free UPS, originally introduced into the market over twenty years ago.
This ultimate solution is rated at output power factor 1 and defined as ON LINE double conversion technology in accordance with VFI-SS-111 classification (as set out in standard IEC EN 62040-3).
The Sentryum series is a transformer-free UPS available in 10-15-20 kVA/kW models with three-phase/single-phase input and single-phase output, and 10-15-20 kVA/kW models with three-phase input and output.
Sentryum is designed and built using state-of-the-art technology and components. It applies the advanced technologies such as DSP (Digital Signal Processor), dual core microprocessor, three-level inverter circuits and resonant control to provide maximum protection to the critical loads with no impact on downstream systems, whilst maintaining optimised energy savings. With a unique control system, it makes it possible to reduce the inverter output harmonic voltage distortion (<1% at resistive load and <1.5% at non linear load) and provide rapid response to all load variations, ensuring an outstanding sinewave form during all conditions.
Furthermore, Riello's technological advances in digital control and power components

contribute to minimise the impact on the grid. Sentryum provides the solution to installation problems in systems where the power supply has limited power available, when the UPS is supported by a generator or where there are compatibility problems with loads that generate harmonic currents.

Extensive range of solutions

Sentryum has been conceived to optimise the specific requirements by enhancing the installation flexibility.
Riello UPS offers Sentryum in three different frame solutions to satisfy any critical power demand and application:
The three different frame types available are: **Compact, Active** and **Xtend.**
Compact (CPT): this cabinet frame is specifically devised to offer a compact but efficient solution for tailored applications; thanks to the ultimate technologies applied, this solution offers unmatched power (up to 20 kVA @ pf1) and autonomy (12 minutes of backup time at typical load) in an extremely reduced space.
Active (ACT): this solution offers an optimised degree of flexibility to meet different power requirements and battery autonomy. Whilst, the solution offered is extremely compact but exceptionally powerful, with the possibility to deliver up to 20 kVA (@pf 1) and internally build one or two levels of battery backup time.
Xtend (XTD): this version is the most flexible solution available to meet installation requirements and power demand. In an extremely small footprint, it is possible to build up to three levels of battery backup time. In addition, the mechanical design makes it possible to install an isolation transformer or easily change the degree of protection from IP 20 to IP 21 or even IP 31.

Compactness

Modern guidelines and sustainable best practices direct us to conceive and design UPS with particular focus on the entire product life cycle, therefore applying ultimate but resilient technologies, recyclable materials and miniaturisation of assemblies whilst ensuring the systems global reliability, which is pivotal for any UPS. The internal card layout has been optimised to reduce the number of components, to reduce the number of interconnections and to reduce the space required, whilst at the same time increase global reliability and Mean Time Between Failures (MTBF) and to minimise operational expenditure such as service operations and maintenance costs.
The result is an outstanding range of three different solutions providing powerful but compact designs as follows:
Compact: less than 0.25 square meters and only 0.17 cubic meters of volume.
Active: less than 0.35 square meters and only 0.33 cubic meters of volume.
Xtend: less than 0.4 square meters and less than 0.5 cubic meters of volume.

Rear view Sentryum Compact.

High efficiency

Sentryum is a true ON LINE double-conversion UPS system providing the very highest levels of power availability, flexibility and unrivalled energy efficiency with superior performance for any small Data Centre and mission critical applications.
With a full power rating (kVA=kW unity pf), the Sentryum provides the maximum available power without any de-rating.
Thanks to the three-level IGBT inverter topology (constructed using modules rather than discrete components) and innovative digital control, the Sentryum provides up to 96.5% overall efficiency, whilst maintaining a reduced number of components, connections and ribbon cables, which increases the overall system reliability, thanks to a higher MTBF.
Riello's advanced average current mode digital PFC control and State-of-the-art three-level NPC inverters working at high frequency (18 kHz), contributes to minimise the UPS's impact on the grid and hence reducing the overall operational costs and energy bills.

- Start-up delay function, to sequentially restart the rectifiers once the mains power supply is restored if there are several UPS within the overall system
- In addition, Sentryum provides a filtering and power factor correction function within the power network upstream of the UPS,

Graphic touch screen display

MECHANICAL CHARACTERISTICS	SENTRYUM COMPACT-CPT	SENTRYUM ACTIVE-ACT	SENTRYUM XTEND-XTD
Cabinet layout description	Free standing type with wheels and terminals/switches on rear	Free standing type with wheels and terminals/switches on front	Free standing type with wheels and terminals/switches on front
Range [kVA/kW]	10-15-20 (1 Ph) 10-15-20 (3 Ph)	10-15-20 (1 Ph) 10-15-20 (3 Ph)	10-15-20 (1 Ph) 10-15-20 (3 Ph)
Battery	Space for: 40 blocks	Space for: 2 x 40 blocks	Space for: 3 x 40 blocks
Ventilation	Forced, front to rear	Forced, front to rear	Forced, front to rear (Air filter door as option)
Cabinet IP rating	IP20 finger proof (either with cabinet doors open or closed)	IP20 finger proof (either with cabinet doors open or closed)	IP20 finger proof (either with cabinet doors open or closed) IP21/31 as option
Cable input	Bottom (rear)	Bottom (front)	Bottom (front)

thus eliminating harmonic components and reactive power generated by the power utilities.

Sentryum applies a zero impact onto its power source, whether this is from the mains power supply or a generator, this results in:

- very low input current distortion <3%
- near unity input power factor 0.99
- power walk-in function that ensures progressive rectifier start up
- start-up delay function, to sequentially restart the rectifiers once the mains power supply is restored if there are several UPS within the overall system
- in addition, Sentryum provides a filtering and power factor correction function within the power network upstream of the UPS, thus eliminating harmonic components and reactive power generated by the power utilities.

High power availability

Sentryum's fully rated design delivers full power (kVA=kW) regardless of the load power factor or operating temperature (full rated power is available up to 40 °C).

Furthermore, Sentryum's advanced digital control makes it possible to deliver up 250% inverter current for 200 msec and 150% for 300 msec. The high overcurrent availability enables the system to deal with sudden peak loads (without static bypass intervention) and provide the short circuit current if required during operation on battery.

The innovative input stage design provides extremely high battery recharging current, whilst at the same time an energy efficient conversion process during battery operation to reduce the power wasted and to increase the autonomy time compared to legacy DC/AC converters.

Smart Battery Management

Proper battery care is critical to ensure the correct operation of the UPS during emergency conditions. The Riello UPS Smart Battery Management consists of a series of features and capabilities to optimise battery management and obtain the best performance and operating life possible.

Battery recharging: Sentryum is suitable for use with conventional hermetically sealed lead-acid (VRLA), AGM and GEL batteries, Open Vent and Nickel Cadmium batteries. Sentryum is also compatible with ultimate alternative backup power sources such as Li-Ion batteries and Supercapacitors.

Superior battery charging current availability, ie up to 20 Amperes for the 20 kVA/kW power range, meaning that the Sentryum can be utilised within any extended battery autonomy application.

Depending on the battery type, different charging methods are available:

- One-level voltage recharge, typically used for widely available VRLA AGM batteries
- Two-level voltage recharge according to IU specification
- Cyclical recharge system to reduce electrolyte consumption and lengthen the life of VRLA batteries.

Recharge voltage compensation based on ambient temperature to prevent excessive battery charging or overheating.

Battery tests to diagnose in advance any reduction in performance or problems with the batteries.

Deep discharge protection: during extended low-load discharges, the end-of-discharge voltage is increased - as recommended by battery manufacturers - to prevent damage or reduced battery performance.

Ripple current: recharge ripple current (residual AC component at low frequency) is one of the main causes of reduced reliability and battery life. Using a high frequency battery charger, Sentryum reduces this value to negligible levels, prolonging battery life and maintaining high performance over a long period of time.

Wide voltage range: the rectifier is designed to operate within a wide input voltage range (up to -40% at half load), reducing the need for battery discharge and thus helping to extend battery life.

Sentryum Active with open door

Maximum reliability and availability

Distributed parallel configuration of up to 8 units per redundant (N+1) or power parallel system grants exceptional expandability.

The UPS continue to operate in parallel even if the connection cable is interrupted (Closed Loop).

Advanced technology and use of high performance components, allows Sentryum to provide exceptional performances and utmost reliability:

- the smallest overall footprint is only 0.35 sqm for Sentryum 20 kVA/kW with two strings of 40 battery blocks
- the input power stage (IGBT rectifier) ensures an input power factor close to 1 with extremely low current distortion, avoiding the need for bulky and expensive filters
- unity output power factor Sentryum makes it suitable to any data centre application ensuring full power availability without

downgrading no matter what the load power factor range (typically from 0.9 lagging to 0.9 leading)
- extremely low output THDV under any circumstances provides a perfect sinewave and therefore a reliable power supply for the load preventing and disturbances from affecting the network users.
- more active power than a traditional UPS, guaranteeing a greater margin when sizing UPS for potential future load increases.
- more energy to face sudden load increase or clear output short circuits due to appliance failures downstream.
- smart ventilation principle, Sentryum manages the fan speed and airflow in accordance with the room temperature and load level. This preserves the lifespan of the fans, whilst at the same time reduces noise levels and the overall power consumption due to unnecessary UPS ventilation. Furthermore, the overall UPS high efficiency reduces the losses and therefore the need for high levels of ventilation compared to older legacy UPS. In addition, this results in a decrease in the overall noise level at the nominal load and a reduction in the number of fans required, which significantly benefits the operating and maintenance costs.

Sentryum Xtend with open door

Flexibility

With its flexible range of three solutions, configuration, performance, accessories and options, Sentryum is suitable for use in a wide range of applications:

- suitable for powering capacitive loads, such as blade servers, without any reduction in active power from 0.9 lead to 0.9 lag
- ON LINE, ECO, SMART ACTIVE and STANDBY Off operating Modes - compatible with centralised power systems (CSS) applications.
- Frequency Converter Mode
- Cold Start to switch on the UPS even when there is no mains power present
- S3T 20 XTEND version: cabinet (440 x 850 x 1320 mm WxDxH) for optimised solutions when medium to long-term runtimes are required (up to one hour back up time for a 20 kVA/kW at typical load rate)
- parallel configuration up to 8 units for three phase version
- optional temperature sensor for external battery cabinets, to assist recharge voltage compensation
- high power battery chargers to optimise charge time in the event of long runtimes
- dual input mains power supply (not applicable on Compact, optional for Active, standard on Xtend version)
- isolation transformers for modifying the neutral earthing (separate power sources), or for galvanic isolation between the input and output (optional inside Xtend, external for Compact or Active versions)
- mechanical fitting for a higher rating of IP protection either IP21 or IP31 on Xtend version
- Air filter on Xtend version door to protect UPS placed in dusty environment
- compatibility with alternative backup energy sources rather than lead batteries (NiCd or Li-ion batteries or supercapacitors)
- different sized battery cabinets and capacities, for extended runtimes

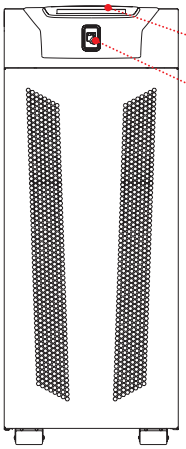
Advanced communications

Sentryum is equipped with a coloured graphic touch screen display providing UPS information, measurements, operating states and alarms in different languages.
The default screen displays the UPS status, graphical indication of the energy path through the UPS and the operational condition of the various assemblies (rectifier, batteries, inverter, bypass) within the UPS. Furthermore, the user interface includes a UPS status led bar which delivers immediate and clear information regarding the overall status of the UPS by changing the colour (might be light blue, dark blue, orange and red) according with the operating mode and condition.

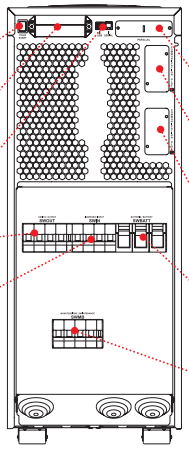
- Advanced multi-platform communications for all operating systems and network environments: PowerShield[3] monitoring and shutdown software included for Windows operating systems 10, 8, 7, Hyper-V, 2019, 2016, 2012, and previous versions, Mac OS X, Linux, VMWare ESXi, Citrix XenServer and other Unix operating systems
- Compatible with RIELLO CONNECT (remote monitoring service)
- RS232 serial on RJ10 connector and USB ports
- 2 slots for the installation of optional communications accessories such as network adaptors and volt free contacts etc
- Embedded contact interface which includes 5 programmable inputs and 4 programmable outputs
- REPO Remote Emergency Power Off for switching off the UPS via a remote emergency button
- Graphic display panel for remote connection.

DETAILS

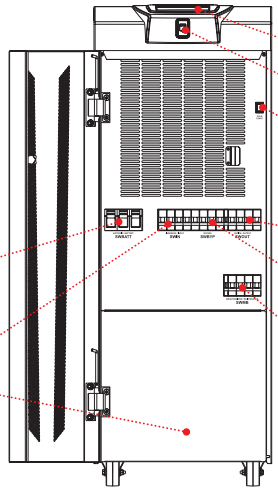
COMPACT (front)



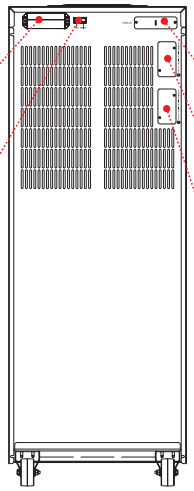
COMPACT (rear)



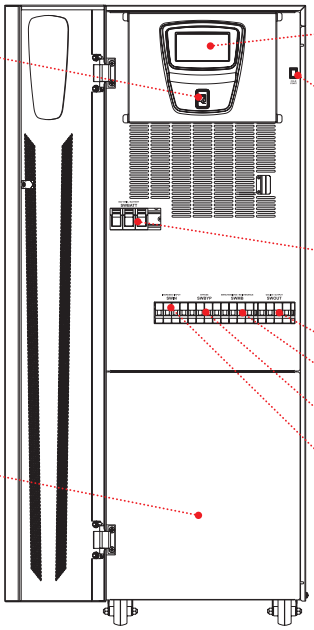
ACTIVE (front)



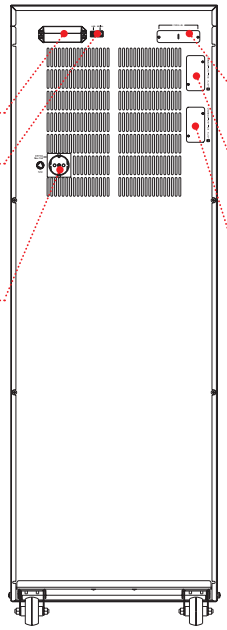
ACTIVE (rear)



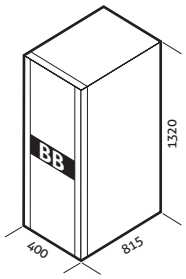
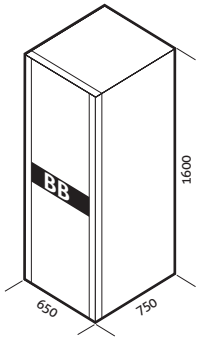
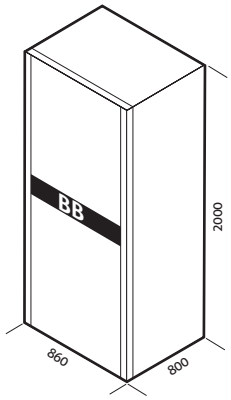
XTEND (front)



XTEND (rear)



BATTERY CABINET

MODELS	BB 1320 480-T4 / BB 1320 480-T5 BB 1320 480-T2 / AB 1320 480-T5	BB 1600 480-S5 / AB 1600 480-S5	BB 1900 480-V6 / BB 1900 480-V7 BB 1900 480-V8 / BB 1900 480-V9 AB 1900 480-V9
UPS MODELS	S3M/S3T 10-20 kVA/kW (According with battery cabinet fuse kit associated)		
Dimensions (mm)			

OPTIONS

SOFTWARE
PowerShield³
PowerNetGuard

ACCESSORIES
NETMAN 204
MULTICOM 302
MULTICOM 352
MULTICOM 384
MULTICOM 411
MULTI I/O
MULTIPANEL
MBB 100 A (2 pole)
MBB 125 A (4 pole)

PRODUCT ACCESSORIES
Battery temperature sensor
ER battery charger
MULTICOM 392
UPS with internal isolation transformers (XTEND version)
IP rating IP21/IP31/IP42 (XTEND version)
Dual Input Kit (ACT version)
Front door air filter (XTD version)

MODELS	S3M CPT-ACT-XTD 10 BAT	S3M CPT-ACT-XTD 15 BAT	S3M CPT-ACT-XTD 20 BAT	S3T CPT-ACT-XTD 10 BAT	S3T CPT-ACT-XTD 15 BAT	S3T CPT-ACT-XTD 20 BAT
INPUT						
Rated Voltage [V]	380 / 400 / 415 three-phase + N 220 / 230 / 240 single-phase + N			380 / 400 / 415 three-phase + N		
Rated frequency [Hz]	400 / 230 +20% -40%[1]			400 +20% -40%[1]		
Voltage tolerance [V]	240 to 480[1]					
Frequency tolerance [Hz]	0.99					
Power factor @ full load	0.99					
Current distortion	THDI ≤ 3%					
BYPASS						
Rated Voltage [V]	220 / 230 / 240 single-phase + N			380 / 400 / 415 three phase + N		
Number of phases	1 + N			3 + N		
Voltage tolerance (Ph-N) [V]	from 180 (adjustable 180-200) to 264 (adjustable 250-264) referring to neutral					
Rated frequency [Hz]	50 or 60 (selectable)					
Frequency tolerance	±5% (selectable)					
Bypass overload	110% infinite, 125% for 60 min, 150% for 10 min					
OUTPUT						
Nominal power [kVA]	10	15	20	10	15	20
Active power [kW]	10	15	20	10	15	20
Power factor	1 up to 40 °C					
Number of phases	1 + N			3 + N		
Rated Voltage [V]	220[1] / 230 / 240 single-phase + N (selectable)			380[1] / 400 / 415 three-phase + N (selectable)		
Rated Frequency [Hz]	50 or 60					
Frequency stability on battery operation	0.01%					
Voltage stability	± 1%					
Dynamic stability	EN 62040-3 class performance 1 distorting load					
Voltage distortion	< 1% with linear load / ≤ 1.5% with non-linear load					
BATTERIES						
Type	VRLA AGM/GEL/NiCd/Li-ion/Supercaps					
Recharging method	One level, Two level, Cyclic recharge (selectable)					
OVERALL SPECIFICATIONS						
Weight without batteries [kg] CPT - ACT - XTD	48-72-103	50-74-105	52-76-107	48-72-103	50-74-105	52-76-107
Dimensions CTP (WxDxH) [mm]	Compact: 280x840x700					
Dimensions ACT (WxDxH) [mm]	Active: 380x850x1025					
Dimensions XTD (WxDxH) [mm]	Xtend: 440x840x1320					
Communications	UPS status led bar - Graphic touch screen diplay - 2 slots for communications interface USB - RS232 - Contact interface with 5x opto insulated Input and 4x Output relays					
Operating temperature	0 °C / +40 °C					
Range of relative humidity	5-95% non-condensing					
Colour	RAL 7016 Anthracite grey					
Noise level at 1 m [dBA ±2] Smart Active	< 40					
IP rating	IP20					
Smart Active efficiency	up to 99%					
Standards	European directives: L V 2014/35/EU low voltage Directive EMC 2014/30/EU electromagnetic compatibility Directive Standards: Safety IEC EN 62040-1; EMC IEC EN 62040-2; RoHS compliant Classification in accordance with IEC 62040-3 (Voltage frequency Indioendent) VFI - SS - 111					
Moving the UPS	Castors / Pallet Jack					

[1] *Conditions applied.*

[BAT] Also available with internal batteries

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