



EMERGENCY



E-MEDICAL



INDUSTRY



DATACENTRE



TRANSPORT

# Master HE



ONLINE



Tower



Service  
1st start



Flywheel  
compatible



Supercaps  
UPS



Lithium  
compatible



SmartGrid  
ready



**3:3** 100-800 kVA

## HIGHLIGHTS

- **High efficiency (up to 95.5% in ON LINE mode)**
- **kW=KVA (HE Models)**
- **Rectifier IGBT based technology**
- **Galvanic isolation**
- **High overload capacity**
- **LCD display**

The Master HE series from 100 to 800 kVA are the Riello UPS solution for installations requiring high energy efficiency and maximum power availability. Master HE Series provides maximum protection and power quality for data centres and industrial loads. The UPS has an IGBT-based rectifier, DSP (Digital Signal Processor) technology and provides true-line, double conversion power protection, (VFI SS 11 - Voltage and Frequency Independent in accordance with IEC EN 62040-3).

### MASTER HE - HIGH EFFICIENCY

Master HE series is available from 100 to 800 kVA. The UPS features a new ON LINE double-conversion technology utilising IGBT and DSP (Digital Signal Processor) control to

provide maximum protection, power quality and green energy for any type of application including data centres, disaster recover sites, telecoms rooms, industrial processes and security applications.

High efficiency stands for higher active power available if compared with legacy UPS thanks to output unitary power factor (up to +25% if compared unity with same UPS at p.f. 0.8). Nominal power is granted with no downgrading independently from operating temperature in the range 10-40 °C. Furthermore, control circuits and specifically designed firmware grant outstanding ON LINE double conversion efficiency up to 95.5%, comparable with the best transformer-free UPS available on the market.

## MAXIMISED COST SAVINGS

The Master HE has the ability to monitor the mains input quality and to select the best operating mode based on the interference present (Smart Active mode) or circular redundancy (Parallel Energy Saving mode), which allows the UPS to regulate available capacity based on the immediate demands of the load, automatically switching to standby in the event of excess capacity.

The Master HE also offers high levels of efficiency for partial loads, resulting in reduced operating costs.

## POWER CONTINUITY

For years, Riello UPS has developed and supplied solutions for dealing with the different requirements and problems that inevitably arise in critical applications. Riello UPS offers flexible, high-availability solutions that are able to adapt to different system structures and critical levels. Riello UPS creates UPS systems that can tolerate a number of components or subsystem failures, while continuing to operate normally, providing power without interruption. This is achieved by careful design, installing redundant elements, eliminating common failure points, scheduling maintenance activities and controlling and supervising the system operating parameters and environment. The TEC service team is ready to provide guidance and advice on projects.

## ZERO IMPACT SOURCE

The Master HE series features the added advantages of the Zero Impact Source formula offered by an IGBT-based rectifier assembly. This eliminates problems connected with installation in networks with limited power capacity, where the UPS is supplied by a generator set or anywhere there are compatibility problems with loads generate current harmonics. Master HE series UPS have zero impact on the power supply source, whether it is a mains grid or generator set:

- input current distortion <3%;
- input power factor 0.99;
- power walk-in function that ensures progressive rectifier start up;
- start up delay function, to restart the rectifiers when mains power is restored if there are several UPS in the system.

## BATTERY CARE SYSTEM

Master HE series UPS include a range of features designed to prolong battery life and reduce their usage such as different recharging methods, deep discharge protection, current limitation and voltage



compensation according with battery room temperature.

Thanks to the STEP-UP/STEP-DOWN converter, that provides to recharge and discharge the battery, the current ripple in the battery is extremely reduced; this arrangement enhance the battery reliability since it is no longer connected to UPS DC bus. in the battery is extremely reduced; this arrangement enhance the battery reliability since it is no longer connected to UPS DC bus.

## COMPLETE GALVANIC SEPARATION

Master HE UPS feature an output isolation transformer (delta zig/zag type) on the inverter as part of the inverter circuit inside the UPS cabinet, providing galvanic isolation between the load and the battery with improved versatility in system configuration, allowing:

- Complete UPS output galvanic isolation for critical infrastructures from the battery DC power source;
- two truly separated supply inputs (main and bypass), which can be taken from two different power sources (with different neutrals); this is particularly well suited to parallel systems in order to ensure selectivity between the two sources, thus improving the reliability of the entire installation;
- No neutral input connection is required at the UPS rectifier input stage; this method is particularly favourable in order to prevent the transmission of common neutral disturbances via the neutral conductor;
- No effects to the UPS output

performance or reduced impact of the inverter power components whilst supplying specific loads; in addition the inverter transformer minimizes the impact of third harmonic disturbances, prevents the effects of energy back-feed into the inverter when supplying industrial load applications and can supply unbalanced loads.

- High inverter short circuit current to clear faults which occur between phase and neutral on load side (up to three times nominal current).

Output transformer housed within the cabinet which allows for a significant reduction in the footprint and provides space saving.

## MAIN FEATURES

- High efficiency up to 99.4% (STANDBY ON Mode);
- Compact size: e.g.: only 0.85 m<sup>2</sup> for the Master HE 250 kVA;
- Reduced weight for tranformer based UPS;
- Double load protection, both electronic and galvanic, towards the battery.

The entire Master HE range is suitable for use in a wide range of applications. Thanks to the flexibility of configuration, available options and accessories, it is suitable for supplying any type of load, e.g. capacitive loads such as blade servers, rather than motor drivers or any other critical vertical application.

## SMART GRID READY

Being Smart Grid Ready, Master HE allows for the implementation of power accumulation solutions, and at

the same time ensures extremely high levels of efficiency. It is also able to independently select the most efficient operating method based on the status of the grid. Master HE UPS are also able to electronically interface with the energy manager using the smart grid communication network

## MAXIMUM RELIABILITY AND AVAILABILITY

- Distributed parallel configuration of up to 8 units per redundant (N+1) or power parallel system;
- Centralized parallel system up to 7 units with centralized bypass system (MSB);
- Dual bus configuration: allows two or more non-parallel UPS devices to remain synchronised even during mains power failure by adding the UGS device. The UGS also enables a Riello UPS to be synchronised with another power source that is independent and of a different power rating;
- Dynamic Dual bus configuration: allows two groups of UPS with the PSJ device to be connected in parallel whilst operating, in the event of maintenance (with no interruption to the output), using a power coupling switch. Should one of the UPS in one of the parallel groups fail, it is automatically excluded. The PSJ connects the remaining UPS, to the other parallel group via an external bypass, in order to continue to guarantee load redundancy. Allows two groups of UPS to be connected in parallel whilst operating, in the event of maintenance (with no interruption to the output), using a power coupling switch. Should one of the UPS in one of the parallel groups fail, it is automatically excluded. The PSJ connects the remaining UPS, to the other parallel group via an external bypass, in order to continue to guarantee load redundancy;
- Hot System Expansion (HSE): allows the addition of a further UPS into an existing system, without the need to switch off the existing UPS or transfer them to bypass mode. This guarantees maximum load protection, even during maintenance and system expansion;
- Maximum levels of availability, even in the event of an interruption to the parallel bus cable: the system is "FAULT TOLERANT". It is not affected by



Master Static Bypass

connection cable faults and continues powering the load without disruption, signalling an alarm condition;

- Efficiency Control System (ECS): a system to optimise the operating efficiency of parallel systems, according to the power required by the load. N+1 redundancy is guaranteed, with every UPS working in parallel at the best load level possible to achieve higher overall efficiency.

## CENTRALIZED BYPASS CABINET

The Riello UPS centralised bypass (named MSB) is available in four power ratings: 800, 1200, 2000 and 3000 kVA. Intermediate solutions within this range can be made, as well as solutions greater than 3000 kVA based on the requirements of the customer or application. The MSB centralised bypass can be integrated with the Master HE range; in fact it can be associated with up to 7 UPS modules in the range, obviously without static bypass and associated bypass line (named MHT/MHE NBP). Based on requirements thus ensuring complete flexibility aimed at satisfying all power and power supply requirements.

Riello UPS provides the same flexibility as the Master HP for the battery bus, so

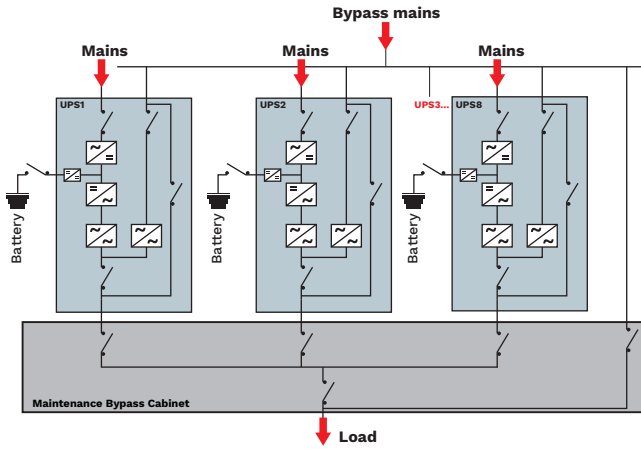
that the UPS units can operate with both shared or separate batteries.

The 800 kVA MSB is supplied with a comprehensive cabinet including bypass line input switch (SWBY), system output switch (SWOUT) and manual bypass (SWMB). The 1200 kVA model is supplied as standard without any switches but can be equipped with the same, suitably proportioned, switches provided for the 800 kVA model (SWBY, SWOUT, SWMB). The more powerful models are supplied with no switches; the bulky sizes of disconnection devices at these power levels are such as to favour tailor-made engineering solutions as an additional part of the system attestation and distribution cabinets where the centralised bypass and MHE NBP modules are fitted.

## PARALLEL CONFIGURATION OF UP TO 8 UPS UNITS WITH DISTRIBUTED BYPASS

Parallel architecture to ensure redundancy of the power source.

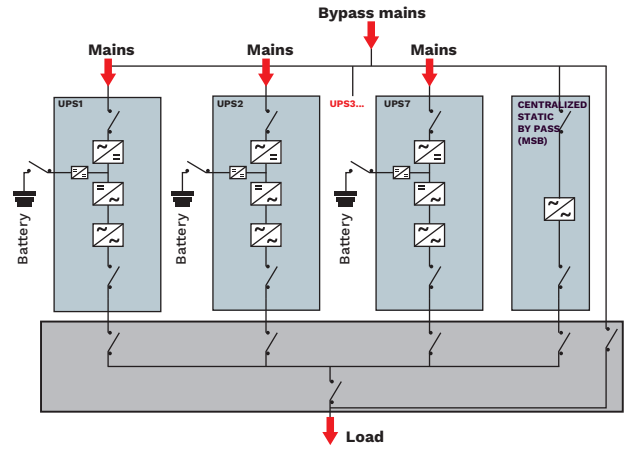
**+ Flexibility and modularity and no single point of failure.**



## PARALLEL CONFIGURATION OF UP TO 7 UNITS WITH CENTRALISED BYPASS

Parallel architecture to ensure redundancy of the power source, with autonomous bypass management.

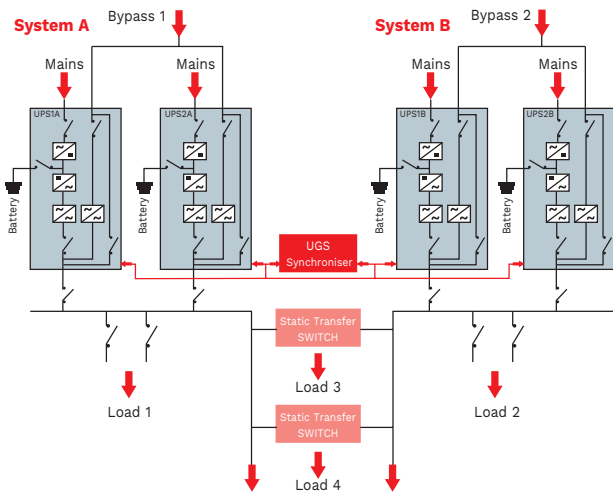
**+ Selectivity of downstream faults in bypass mode**



## DUAL BUS CONFIGURATION

Solution to ensure redundancy up to the distribution of the power supply to the loads and improved STS operation.

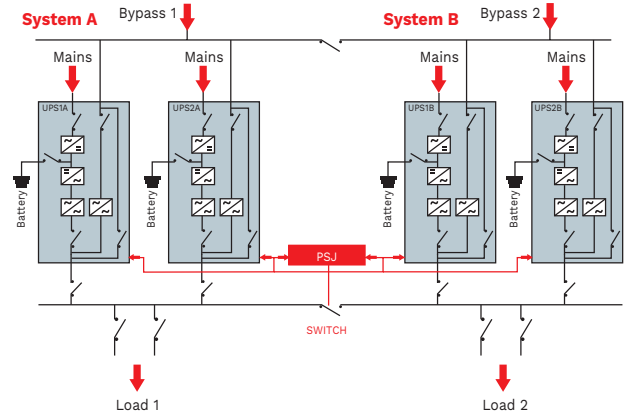
**+ Downstream fault discrimination**



## DYNAMIC DUAL BUS CONFIGURATION

Solution to ensure redundancy of the power supply even during maintenance.

**+ High availability and redundancy**



## OPTIONS

### SOFTWARE

PowerShield<sup>3</sup>  
PowerNetGuard

### ACCESSORIES

NETMAN 204  
MULTICOM 302  
MULTICOM 352  
MULTI I/O  
MULTIPANEL

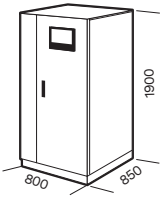
### PRODUCT ACCESSORIES

Isolation transformer  
Parallel kit  
Synchronisation device (UGS):  
*see Master MPS*  
Hot connection device (PSJ):  
*see Master MPS*  
Battery cabinets empty or for extended runtimes  
Top Cable Entry cabinets  
IP rating IP31/IP41/IP42  
Battery temperature sensor  
Cold start Kit

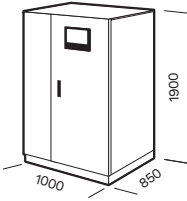


## DIMENSIONS

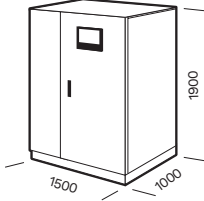
**MHE 100  
MHE 120**



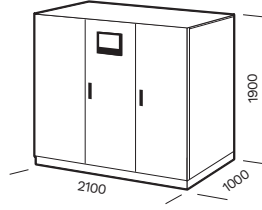
**MHE 160  
MHE 200  
MHE 250**



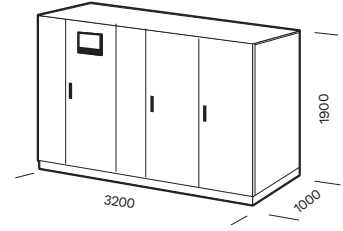
**MHE 300  
MHE 400**



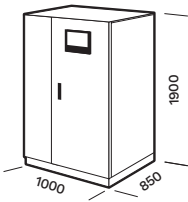
**MHE 500  
MHE 600**



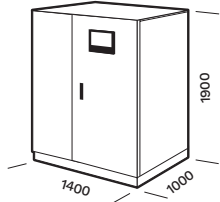
**MHE 800**



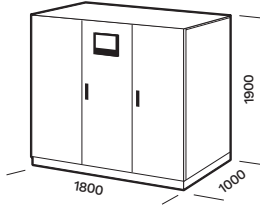
**MSB 800**



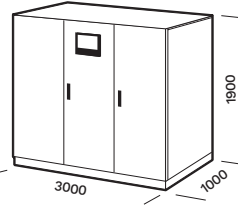
**MSB 1200**



**MSB 1600 / MSB 2000**



**MSB 3000**



## BATTERY CABINET

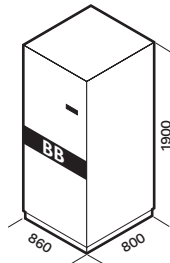
### MODELS

UPS MODELS

**BB 1900 480-V6 / BB 1900 480-V7  
BB 1900 480-V8 / BB 1900 480-V9**

MHE 100-800

Dimensions  
[mm]



## CABINETS WITH TOP ACCESS FOR CABLES

### MODELS

UPS MODELS

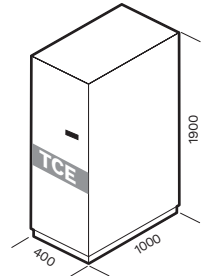
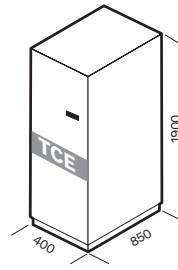
**TCE MHT 100-250**

MHE 100-250

**TCE MHT 300-600**

MHE 300-600

Dimensions  
[mm]



## THREE-PHASE ISOLATION TRANSFORMERS

### MODELS

UPS MODELS

**TBX 100 T - TBX 160 T**

MHE 100-160

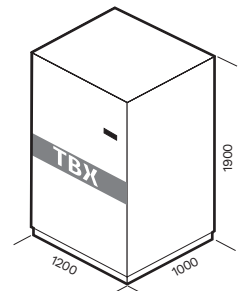
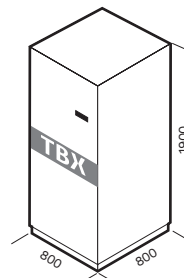
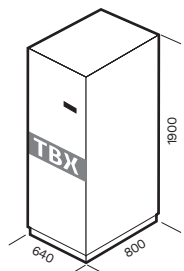
**TBX 200 T - TBX 250 T**

MHE 200-250

**TBX 300 T - TBX 600 T**

MHE 300-600

Dimensions  
[mm]



<b>MODELS</b>	<b>MHE 100</b>	<b>MHE 120</b>	<b>MHE 160</b>	<b>MHE 200</b>	<b>MHE 250</b>	<b>MHE 300</b>	<b>MHE 400</b>	<b>MHE 500</b>	<b>MHE 600</b>	<b>MHE 800</b>
<b>INPUT</b>										
Rated voltage [V]	380 / 400 / 415 3-phase									
Voltage tolerance [V]	400 ±20% @ full load <sup>1</sup>									
Frequency [Hz]	45 - 65									
Power factor	>0.99									
Harmonic current distortion [THDi]	<3%									
Soft start	0 - 100% in 120 sec. (selectable)									
Frequency tolerance	±2% (selectable from ±1% to ±5% from front panel)									
Standard equipment	Back Feed protection; separable bypass line									
<b>BYPASS</b>										
Rated voltage [V]	380 / 400 / 415 3-phase + N									
Frequency [Hz]	50 or 60 selectable									
<b>OUTPUT</b>										
Nominal power [kVA]	100	120	160	200	250	300	400	500	600	800
Active power [kW]	100	120	160	200	250	300	400	500	600	800
Number of phases	3 + N									
Rated voltage [V]	380 / 400 / 415 3-phase + N (selectable)									
Static stability	±1%									
Dynamic stability	±5% in 10 msec.									
Voltage distortion	<1% with linear load / <3% with non-linear load									
Crest factor [l <sub>peak</sub> /l <sub>rms</sub> ]	3:1									
Frequency stability on battery	0.05%									
Frequency [Hz]	50 or 60 (selectable)									
Overload	110% for 60 min.; 125% for 10 min.; 150% for 1 min.									
<b>BATTERIES</b>										
Type	VRLA AGM / GEL; NiCd; Supercaps; Li-ion; Flywheels									
Ripple current	Zero									
Recharge voltage compensation	-0.11% x V x °C									
<b>OVERALL SPECIFICATIONS</b>										
Weight [kg]	850	850	1015	1070	1300	1680	2050	3026	3080	4004
Dimensions (WxDxH) [mm]	800x850x1900		1000x850x1900			1500x1000x1900		2100x1000x1900		3200x1000x1900
Remote signals	volt-free contacts (configurable)									
Remote controls	ESD and bypass (configurable)									
Communication	Double RS232 + remote contacts + 2 slots for communications interface									
Ambient temperature for the UPS	0 °C - +40 °C									
Recommended temperature for battery life	+20 °C - +25 °C									
Range of relative humidity	5-95% non-condensing									
Colour	Dark grey RAL 7016									
Noise level (@ 1 m) [dBA]	63 - 68					70 - 72				
Protection level	IP20 (others upon request)									
SMART ACTIVE Efficiency	>99%									
Double Conversion Efficiency	up to 95.5%									
Regulations	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 Independent) VFI - SS - 111									
Classification according to IEC 62040-3	(Voltage Frequency Independent) VFI - SS - 111									

<sup>1</sup> For wider tolerance conditions apply.

MODELS	MSB 800	MSB 1200	MSB 1600	MSB 2000	MSB 2400	MSB 3000
<b>OPERATING SPECIFICATIONS</b>						
Nominal power [kVA]	800	1200	1600	2000	2400	3000
Rated voltage [V]	380 / 400 / 415 three-phase + N					
Voltage tolerance	±15% (selectable from ± 10% to ±25% from front panel)					
Frequency [Hz]	50 / 60					
Frequency tolerance	±2% (selectable from ±1% to ±6% from front panel)					
Standard equipment provided	Back Feed protection					
Permitted overload*	110% for 60 min.; 125% for 10 min.; 150% for 1 min.					
<b>ENVIRONMENTAL SPECIFICATIONS</b>						
Noise at 1 m from front (from 0 to full load) [dBA]	<65					
Storage temperature	-10 °C up to +50 °C					
Ambient temperature for the UPS	0 °C - +40 °C					
Recommended temperature for battery life	+20 °C - +25 °C					
Range of relative humidity	5-95% non-condensing					
Reference standard	EN 62040-1 general safety requirements; IEC 62040-2 electromagnetic compatibility					
<b>OVERALL SPECIFICATIONS</b>						
Weight [kg]	570	800	1000	1200	2000	2400
Dimensions (WxDxH) [mm]	1000x850 x1900	** 1400x1000 x1900	*** 1800x1000 x1900	1800x1000 x1900	3000x1000 x1900	3000x1000 x1900
Communications	Double RS232 + dry contacts + 2 slots for communications interface					
Colour	Dark grey RAL 7016					
IP rating	IP20 (others on request)					
Moving the UPS	Pallet jack					

\* under certain conditions \*\* 1800 mm version with switches \*\*\* with switches

The information in this document is subject to change without notice. Riello UPS assumes no responsibility for any errors that may appear in this document. DATMHEF3Y2IGREN