



**SUPERIOR**

Unrivalled power  
performance

# MASTERYS GP4 RK

10 to 40 kVA/kW



**socomec**  
Innovative Power Solutions

# OBJECTIVES

The aim of these specifications is to provide:

- the information required to choose the correct uninterruptible power supply for a specific application.
- the information required to prepare the system and installation site.

The specifications are intended for:

- installation engineers.
- design engineers.
- engineering consultants.

# INSTALLATION REQUIREMENTS AND PROTECTION

Connection to the mains power supply and load(s) must be implemented using cables of suitable size, in accordance with current standards. If not already present, an electrical control station which can isolate the network upstream of the UPS must be installed. This electrical control station must be equipped with a circuit breaker (or two, if there is a separate bypass line) of an appropriate rating for the power drawn at full load.

If an external manual bypass is required, only the model supplied by the manufacturer must be installed.

For detailed information, see the installation and operating manual.

# 1. ARCHITECTURE

## 1.1 RANGE

MASTERYS GP4 is a full range of high performing UPS designed to:

- ensure 24/7/365 availability and business continuity for datacentre infrastructure,
- avoid data losses and downtime of company operations,
- reduce the electrical infrastructure's total cost of ownership,
- adopt a sustainable development approach.

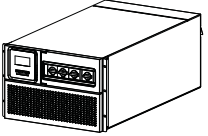
Models					
Rated power (kVA)	10	15	20	30	40
MASTERYS GP4 RK 3/1	•	•	•		
MASTERYS GP4 RK 3/3	•	•	•	•	•

*Matrix table for model and kVA power rating*

Each family has been specifically designed to meet the demands of loads in specific application contexts, in order to optimise product features and facilitate its integration within the system.

## 2. FLEXIBILITY

### 2.1 POWER RATINGS FROM 10 TO 40 kVA/kW

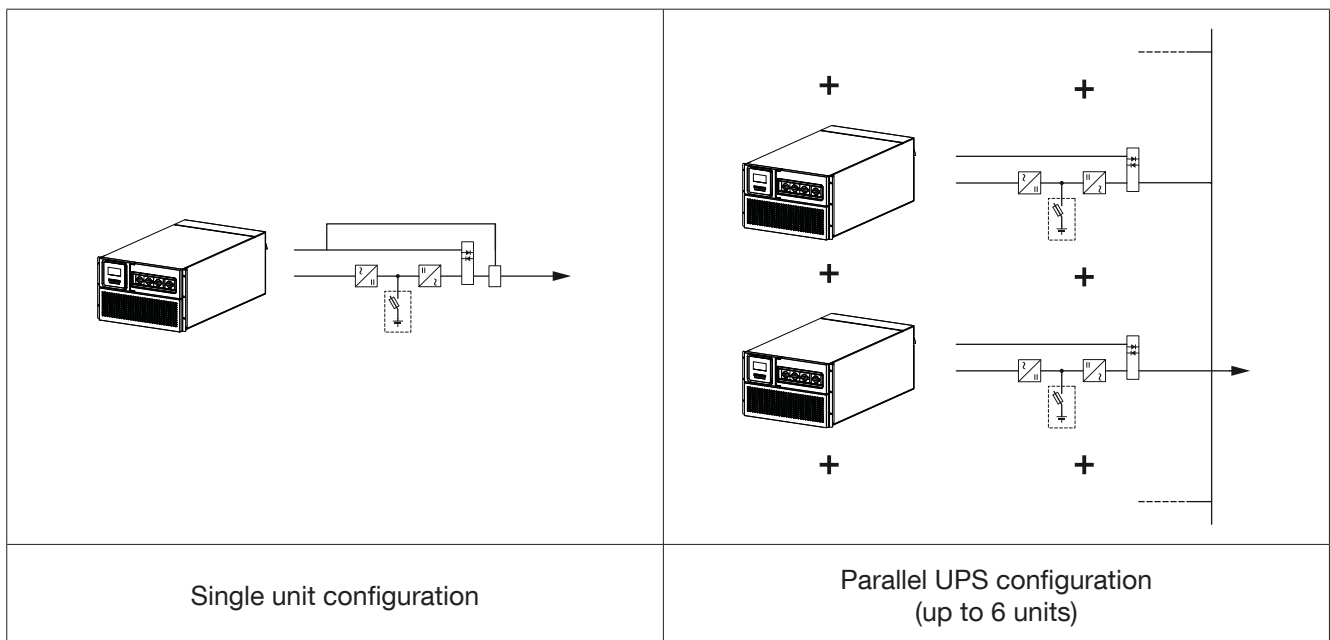
Dimensions				
Cabinet type		Width (W) [mm]	Depth (D) [mm]	Height (H) [mm]
	<b>RK</b>	442 (Suitable for 19" rack cabinet)	820	305 (7U)

All of the control mechanisms and communication interfaces are located in the upper front section.

The intelligent design also provides easy access for maintenance and installation.

The air inlet is on the front, with outflow to the rear.

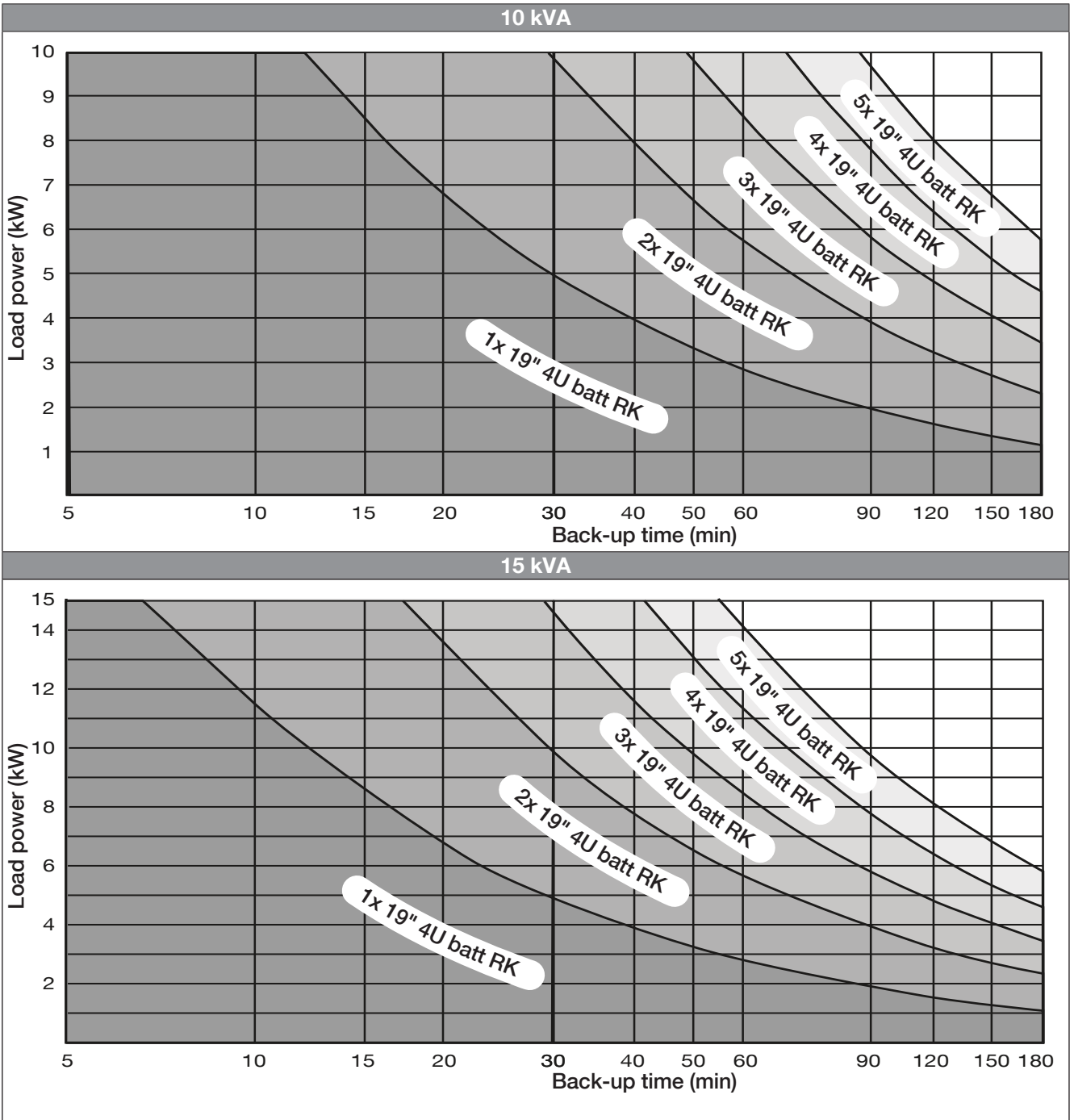
### 2.2 PARALLEL



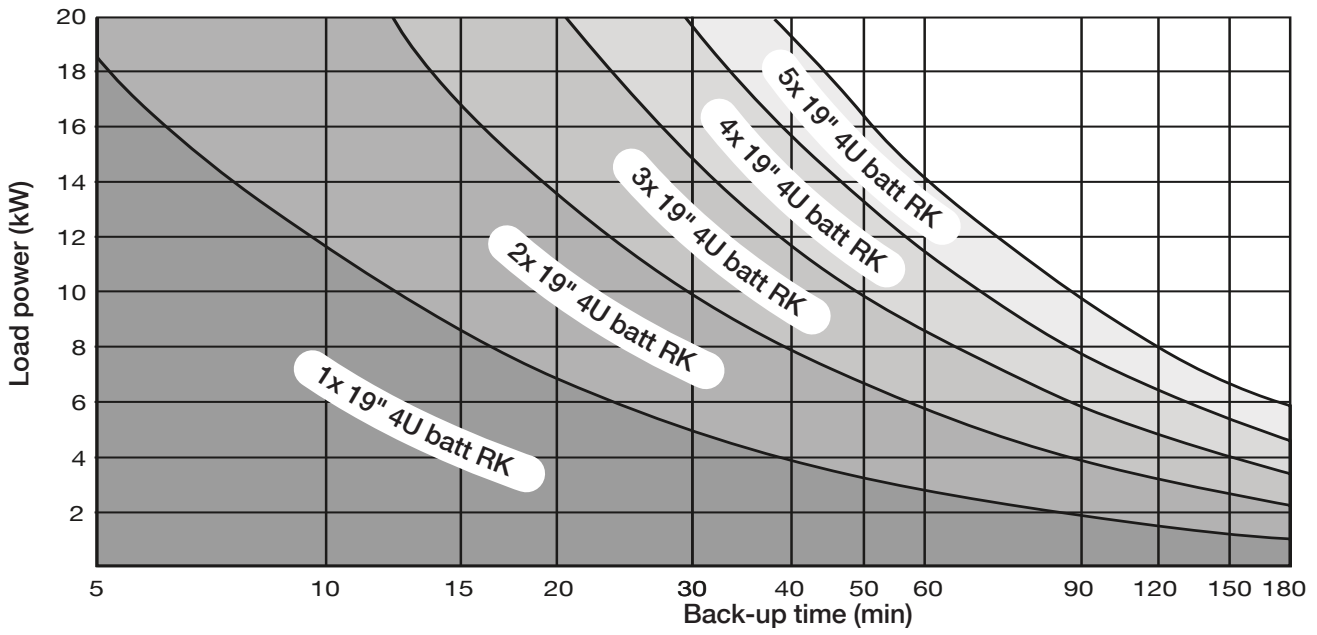
## 2.3 FLEXIBLE BACK-UP TIME

Different extended back-up times are possible by using the standard 19" battery rack or an external battery cabinet. Batteries are installed on acid-proof trays and connected by means of polarised connectors to facilitate their maintenance.

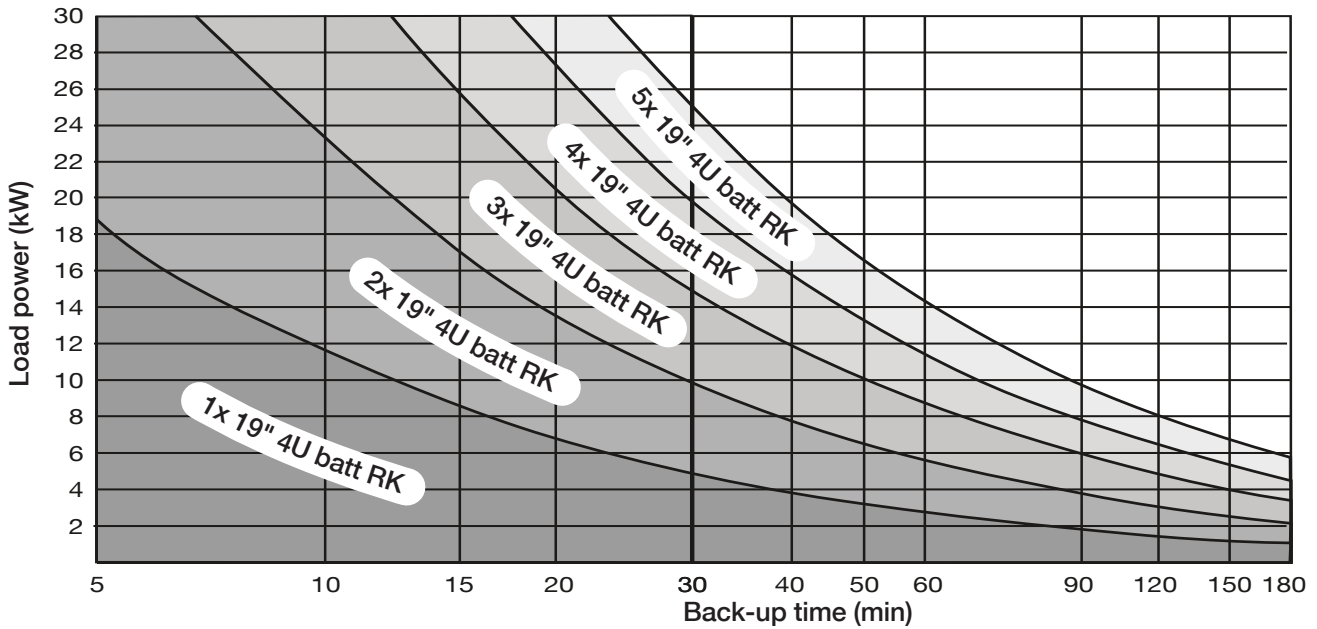
To guarantee maximum back-up time availability and battery life, the MASTERYS GP4 series is equipped with an EBS (Expert Battery System).



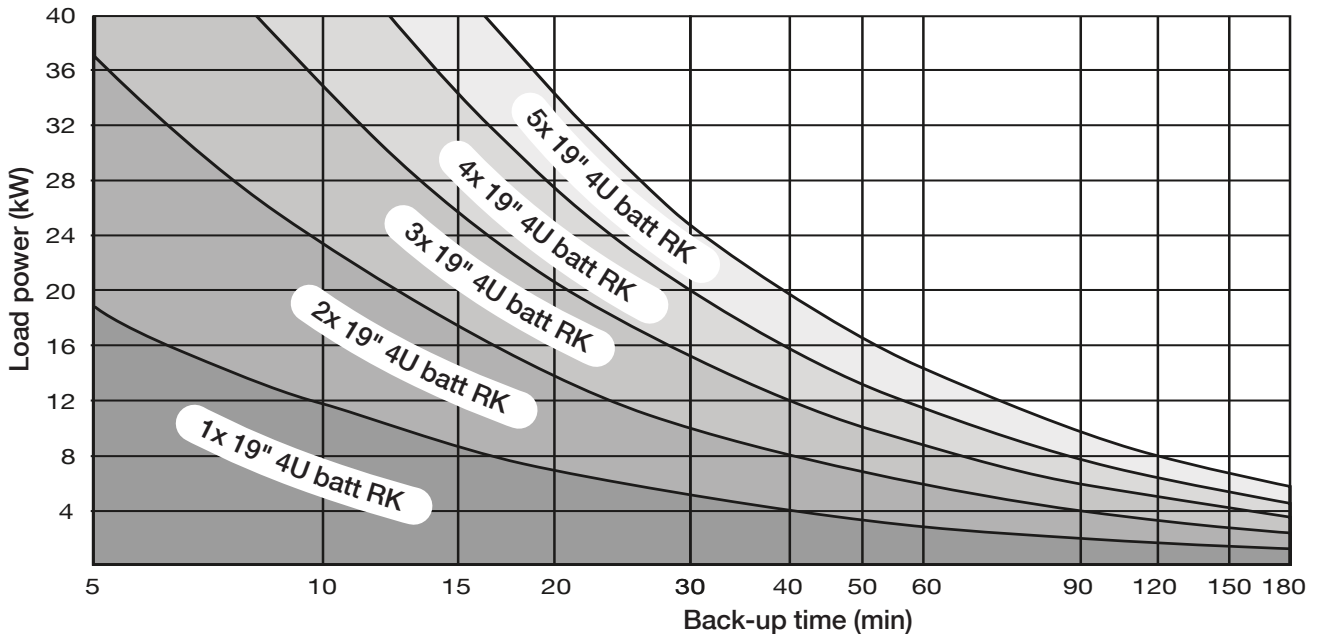
20 kVA



30 kVA



40 kVA



### 3. STANDARD FEATURES AND OPTIONS

Availability	
●	Factory-installed option
○	On site installed option

Features	MASTERYS GP4 RACK		Notes	
	10-15-20 kVA	30-40 kVA		
<b>Battery Option</b>				
Additional charger	●○	●○		
19" 4U Battery Rack	○	○		
<b>Communication Option</b>				
ACS card <i>(Automatic Cross Synchronisation)</i>	●○	●○		
ADC+SL card <i>(Advanced Dry Contact + Serial Link)</i>	○	○		
External temperature sensor	○	○	⚠	! "ADC+SL card"
Remote touchscreen display	○	○	⚠	! "ADC+SL card"
BACnet/IP interface card	○	○		
Modbus TCP interface card	○	○		
Net Vision card <i>(professional WEB/SNMP interface for UPS monitoring)</i>	○	○		
EMD <i>(Environmental Monitoring Device: temperature, humidity, 2 dry contacts)</i>	○	○	⚠	! "Net Vision card"
<b>Electrical Option</b>				
19" 2U External Maintenance Bypass	○	○		
Parallel card	●○	●○		
Kit for TN-C / Neutral-Ground connection	○	○		
Internal Backfeed isolation device	●	●		
Kit For Common Mains	○ (3/3)	○		
Redundant Bypass Ventilation	●	●		
Cold Start	●	●		

! Required option

## 4. SPECIFICATIONS - MASTERYS GP4 RK

### 4.1 INSTALLATION PARAMETERS

Installation parameters									
Rated power (kVA)		10	15	20	10	15	20	30	40
Phase in/out		3/1			3/3				
Active power	kW	10	15	20	10	15	20	30	40
Rated/maximum rectifier input current (EN 62040-3)	A	15/22	23/30	31/39	15/22	23/30	31/39	46/55	62/73
Rated bypass input current	A	48	72	96	16	24	32	48	64
Inverter output current @ 230 V	A	43	65	87	14	22	29	43	58
Maximum air flow	m <sup>3</sup> /h	240							360
Sound level	dB(A)	< 50							< 58
Power dissipation in nominal conditions <sup>(1)</sup>	W	440	665	905	440	665	905	1485	2090
	kcal/h	378	572	778	378	572	778	1277	1797
	BTU/h	1501	2269	3088	1501	2269	3088	5067	7131
Power dissipation (max) in the worst conditions <sup>(2)</sup>	W	490	750	1050	490	750	1050	1550	2445
	kcal/h	421	645	903	421	645	903	1333	2102
	BTU/h	1672	2559	3582	1672	2559	3582	5288	8342
Dimensions (with standard back-up time)	Width	mm	442						
	Depth	mm	820						
	Height	mm	305						
Weight without batteries	kg	72							78

1) Considering nominal input current (400 V, battery charged) and rated output active power (PF1).

2) Considering maximum input current (low input voltage) and rated output active power (PF1).

### 4.2 ELECTRICAL CHARACTERISTICS

Electrical characteristics - Rectifier Input									
Rated power (kVA)		10	15	20	10	15	20	30	40
Phase in/out		3/1			3/3				
Rated mains supply voltage		400 V 3ph + N							
Voltage tolerance		480V to 340 V (up to 240 V with load linear decrease from 100% Pn to 70% Pn)							
Rated frequency		50/60 Hz (selectable)							
Frequency tolerance		±10%							
Power factor (input at full load and rated voltage)		≥ 0.99							
Total harmonic distortion (THDi)		< 3%	< 2.5%	< 3%	< 2.5%	< 3%	< 2.5%	< 3%	< 2%
Max inrush current at start-up		< I <sub>n</sub> (no overcurrent)							
Power walk-in (from battery to normal mode)		4 seconds (settable parameters)							



Electrical characteristics - Bypass									
Rated power (kVA)	10	15	20	10	15	20	30	40	
Phase in/out	3/1			3/3					
Bypass frequency variation speed	1 Hz/s (settable up to 3 Hz/s)								
Bypass rated voltage	Nominal output voltage $\pm 15\%$								
Bypass rated frequency	50/60 Hz (selectable)								
Bypass frequency tolerance	$\pm 2\%$ (configurable from 1% to 10%)								

Electrical characteristics - Inverter										
Rated power (kVA)	10	15	20	10	15	20	30	40		
Phase in/out	3/1			3/3						
Rated output voltage phase neutral (selectable)	220/230/240 V 208 V (@ 95% Pn)									
Output voltage tolerance	Static: $\pm 1\%$ Dynamic: VFI-SS-111 (EN62040-3) compliant									
Rated output frequency	50/60 Hz (selectable)									
Output frequency tolerance	$\pm 0.01\%$									
Load crest factor	$\geq 2.7$									
Voltage harmonic distortion	$\pm 1\%$ with linear load									
Overload tolerated by the inverter	10 min	kW	12.5	18.75	25.0	12.5	18.75	25.0	37.5	50.0
	1 min	kW	15	22.5	30	15	22.5	30	45	60

Electrical characteristics - Efficiency									
Rated power (kVA)	10	15	20	10	15	20	30	40	
Phase in/out	3/1			3/3					
Double conversion efficiency (normal mode - @ full load)	up to 96.2%								
Efficiency in EcoMode	up to 99.3%								

Electrical characteristics - Environment									
Rated power (kVA)	10	15	20	10	15	20	30	40	
Phase in/out	3/1			3/3					
Storage temperatures	-5 to +50 °C (15 to 25 °C for better battery life)								
Working temperature	0 to +40 °C (15 to 25 °C for better battery life) Max +50°C @ 70% Sn for a limited time								
Maximum relative humidity (non-condensing)	95%								
Maximum altitude without derating	1000 m (3300 ft)								
Degree of protection	IP20 (IP21 as option)								
Portability	ASTM D999-08, ASTM D-880, AFNOR NF H 00-042								
Colour	RAL 7016								

Electrical characteristics - Battery									
Rated power (kVA)	10	15	20	10	15	20	30	40	
Phase in/out	3/1			3/3					
Maximum recharge current	A	5							
Battery connection (UPS in parallel)	Distributed or shared battery								

## 4.3 RECOMMENDED PROTECTION

RECOMMENDED PROTECTION DEVICES - Rectifier <sup>(1)</sup>								
Rated power (kVA)	10	15	20	10	15	20	30	40
Phase in/out	3/1			3/3				
C curve circuit breaker (A)	25	32	40	25	32	40	63	80
gG fuse (A)	25	32	40	25	32	40	63	80

RECOMMENDED PROTECTION DEVICES - General bypass <sup>(1)</sup>								
Rated power (kVA)	10	15	20	10	15	20	30	40
Phase in/out	3/1			3/3				
Maximum I <sup>2</sup> t supported by the bypass (A <sup>2</sup> s)	16000			8000			15000	
Max I <sub>pk</sub> supported by the Bypass (A)	2400			1200			1700	
C curve circuit breaker (A)	63	100	125	25	32	40	63	80
gG fuse (A)	63	100	125	25	32	40	63	80

RECOMMENDED PROTECTION DEVICES - Input residual current circuit breaker <sup>(2)</sup>								
Rated power (kVA)	10	15	20	10	15	20	30	40
Phase in/out	3/1			3/3				
Input residual current circuit breaker	0.5 A Selective							

RECOMMENDED PROTECTION DEVICES - Output <sup>(3)</sup>									
Model	10	15	20	10	15	20	30	40	
Phase in/out	3/1			3/3					
Short-circuit inverter current (A) (when AUX MAINS is not present)	0 to 40 ms	120	177	237	40	59	79	117	156
	40 to 100 ms	99	147	198	33	49	66	98	130
C curve circuit breaker <sup>(3)</sup> (A)	≤ 10	≤ 16	≤ 20	≤ 4	≤ 4	≤ 6	≤ 10	≤ 13	
B curve circuit breaker <sup>(3)</sup> (A)	≤ 20	≤ 32	≤ 40	≤ 6	≤ 10	≤ 16	≤ 20	≤ 25	

CABLES - Maximum cable section								
Model	10	15	20	10	15	20	30	40
Phase in/out	3/1			3/3				
Rectifier terminals (flexible cable)/(rigid cable) mm <sup>2</sup>	25			50				
Bypass terminals (flexible cable)/(rigid cable) mm <sup>2</sup>	50			25			50	
Battery terminals (flexible cable)/(rigid cable) mm <sup>2</sup>	25			50				
Output terminals (flexible cable)/(rigid cable) mm <sup>2</sup>	50			25			50	

(1) Rectifier protection should only be considered in the event of separate inputs. The bypass protection is given by recommendation. When the bypass and rectifier inputs are combined (common input), the general input protection rating must be whichever is the highest (bypass or rectifier).

(2) Must be selective with residual current circuit breakers downstream of the UPS connected to the UPS output. If the bypass network is separate from the rectifier circuit, or in the event of parallel UPS configurations, use a single residual current circuit breaker upstream of the UPS.

(3) Selectivity of distribution after the UPS with inverter short-circuit current (short-circuit with AUX MAINS not present). The rating of the protection can be increased by "n" times downstream a parallel UPS system, with "n" equal to the number of parallel modules.

## 4.4 AVAILABILITY

The primary goal of every UPS system is to ensure power availability. Availability is defined for all repairable systems as

$$\text{Availability} = 1 - \text{MTTR} / \text{MTBF}$$

To achieve maximum system availability, it is necessary to deliver high reliability (high MTBF) and reduce repair times (short MTTR) as much as possible.

MTBF (Mean Time Between Failure) is a measure of UPS Reliability being the reciprocal of Failure Rate:

$$\text{MTBF} = 1 / \text{Failure Rate}$$

Reliability is the most critical factor in the design and manufacture of any UPS.

The end result is a combination of know-how, quality material, and a design created with expertise throughout the production process.

The higher the MTBF, the lower the failure rate, making the UPS more reliable.

Mean Time Between Failure		
MTBF <sub>VFI</sub> <sup>(1)</sup>	> 500,000 h	Failure inside the UPS, but application still supplied in Bypass Mode
MTBF <sub>UPS</sub>	> 12,000,000 h	Critical failure inside the UPS, causing a load cut

*(1) VFI (Voltage and Frequency Independent) also called Normal Mode or Double Conversion Mode is the only UPS working-mode that ensures total load protection against all possible mains quality problems.*

Even though high reliability limits the likelihood of failure, it is essential to respond quickly to unforeseen events in order to guarantee continuity and minimise the risk of downtime.

MTTR is the Mean Time To Restore the UPS after a failure i.e. the sum of Intervention Time and Repair Time:

$$\text{MTTR} = \text{Intervention Time} + \text{Repair Time}$$

The proximity of a service technician is vital to ensure rapid repair.

Furthermore, both UPS design and construction are critical success factors when it comes to serviceability and performance.

MASTERYS GP4 RK has been specifically engineered for safe and fast maintenance by front access advanced brick replacement – with on-site repair time 5x faster than standard UPS systems and an enhanced First Time Fix Rate.

# 5. REFERENCE STANDARDS AND DIRECTIVES

## 5.1 OVERVIEW

The construction of the equipment and choice of materials and components comply with all laws, decrees, directives and standards currently in force.

In particular, the equipment is fully compliant with all European Directives concerning CE marking.

### LVD 2014/35/EU

Directive of the European Parliament and of the council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

### EMC 2014/30/EU

Directive of the European Parliament and of the council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

### RoHS 2011/65/EU

Directive 2011/65 of the European parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

## 5.2 STANDARDS

### 5.2.1 SAFETY

EN 62040-1 Uninterruptible Power System (UPS) - Part 1: General and safety requirements

IEC 62040-1 Uninterruptible Power System (UPS) - Part 1: Safety requirements (CB scheme by TÜV)

### 5.2.2 ELECTROMAGNETIC COMPATIBILITY

EN 62040-2 Uninterruptible Power System (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements (tested and verified by third party)

IEC 62040-2 Uninterruptible Power System (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements

### 5.2.3 TEST AND PERFORMANCE

EN 62040-3 Uninterruptible Power System (UPS) - Part 3: Method of specifying the performance and test requirements

### 5.2.4 ENVIRONMENTAL

IEC 62040-4 Uninterruptible Power System (UPS) - Part 4: Environmental aspects - Requirements and reporting

## 5.3 SYSTEM AND INSTALLATION GUIDELINES

When carrying out electrical installation, all the above standards must be observed. All national and international standards ( e.g IEC60364 ) applicable to the specific electrical installation including batteries must be observed. For further information refer to 'Technical specifications' chapter in the user manual.