



**SUPERIOR**

Unrivalled power  
performance

# *MASTERYS IP+*

10 to 80 kVA



**socomec**  
Innovative Power Solutions

# OBJECTIVES

The aim of these specifications is to provide:

- the information required to choose the right 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 to the load(s) must be made 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 draw at full load.

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

We recommend fitting two metres of unanchored flexible cable between the UPS output terminals and the cable anchor (wall or cabinet). This makes it possible to move and service the UPS.

For detailed information, see the installation and operating manual.

# 1. ARCHITECTURE

## 1.1 RANGE

MASTERYS IP+ is a full range of high performing UPS designed to provide reliable power supply in harsh operating environments.

| Models            |    |    |    |    |    |    |    |
|-------------------|----|----|----|----|----|----|----|
| Rated power (kVA) | 10 | 15 | 20 | 30 | 40 | 60 | 80 |
| MASTERYS IP+ 3/1  | •  | •  | •  | •  | •  | •  | -  |
| MASTERYS IP+ 3/3  | •  | •  | •  | •  | •  | •  | •  |


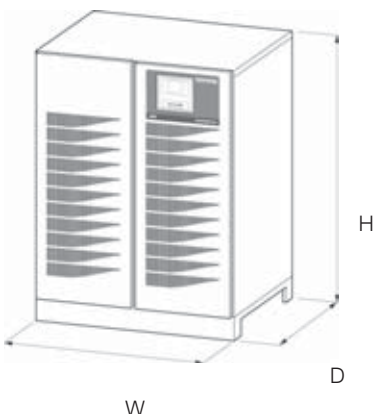
*Matrix table for model and kVA power rating*

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

## 2. FLEXIBILITY

### 2.1 POWER RATINGS FROM 10 TO 80 KVA

The entire range (13 basic products) are compatible with 2 cabinets.

| Dimensions                  |   |                   |                   |                    |
|-----------------------------|---|-------------------|-------------------|--------------------|
| Model                       | Cabinet type  | Width (W)<br>[mm] | Depth (D)<br>[mm] | Height (H)<br>[mm] |
| MASTERYS IP+ 10 kVA 3/1-3/3 |   | 600               | 800               | 1400               |
| MASTERYS IP+ 15 kVA 3/1-3/3 |   |                   |                   |                    |
| MASTERYS IP+ 20 kVA 3/1-3/3 |   |                   |                   |                    |
| MASTERYS IP+ 30 kVA 3/1-3/3 |   |                   |                   |                    |
| MASTERYS IP+ 40 kVA 3/3     |   |                   |                   |                    |
| MASTERYS IP+ 40 kVA 3/1     |  | 1000              | 835               | 1400               |
| MASTERYS IP+ 60 kVA 3/1-3/3 |   |                   |                   |                    |
| MASTERYS IP+ 80 kVA 3/1-3/3 |   |                   |                   |                    |

The equipment has been designed with a minimum direct and indirect footprint (the actual space occupied by the unit and the space required around it for maintenance, ventilation and access to the operating mechanisms and communication devices).

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




All of the control mechanisms and communication interfaces are located in the front part inside to metal door.

The air inlet is on the front, with outflow to the rear only; this means other equipment or external battery enclosures can be placed alongside the UPS unit.

## 2.2 FLEXIBLE BACK-UP TIME

Different extended back-up times are possible by using both UPS cabinet, both of which occupy minimum floor space.

For powers greater than or equal to 40 kVA, or long back-up power periods, an additional cabinet should be used, optionally with a supplementary battery charger.

| BACK-UP times in minutes (max @ 70% of load) |   |  |   |
|--|---|--|---|
|  |  |  |  |
|  | Masterys IP+ 10 to 40 kVA   | Masterys IP+ 40 to 80 kVA  | UPS with battery cabinet  |
| MASTERYS IP+ 10 3/1                          | 19  | -  | •   |
| MASTERYS IP+ 15 3/1                          | 11  | -  | •   |
| MASTERYS IP+ 20 3/1                          | 7   | -  | •   |
| MASTERYS IP+ 30 3/1                          | 4   | -  | •   |
| MASTERYS IP+ 40 3/1                          | -   | -  | •   |
| MASTERYS IP+ 60 3/1                          | -   | -  | •   |
| MASTERYS IP+ 10 3/3                          | 19  | -  | •   |
| MASTERYS IP+ 15 3/3                          | 11  | -  | •   |
| MASTERYS IP+ 20 3/3                          | 7   | -  | •   |
| MASTERYS IP+ 30 3/3                          | 4   | -  | •   |
| MASTERYS IP+ 40 3/3                          | -   | -  | •   |
| MASTERYS IP+ 60 3/3                          | -   | -  | •   |
| MASTERYS IP+ 80 3/3                          | -   | -  | •   |

Selection of the back-up time is flexible thanks to the wide range of DC bus voltages.

The batteries are organised internally into racks based on their relative sizes, so as to ensure a compact unit while still guaranteeing substantial back-up times.

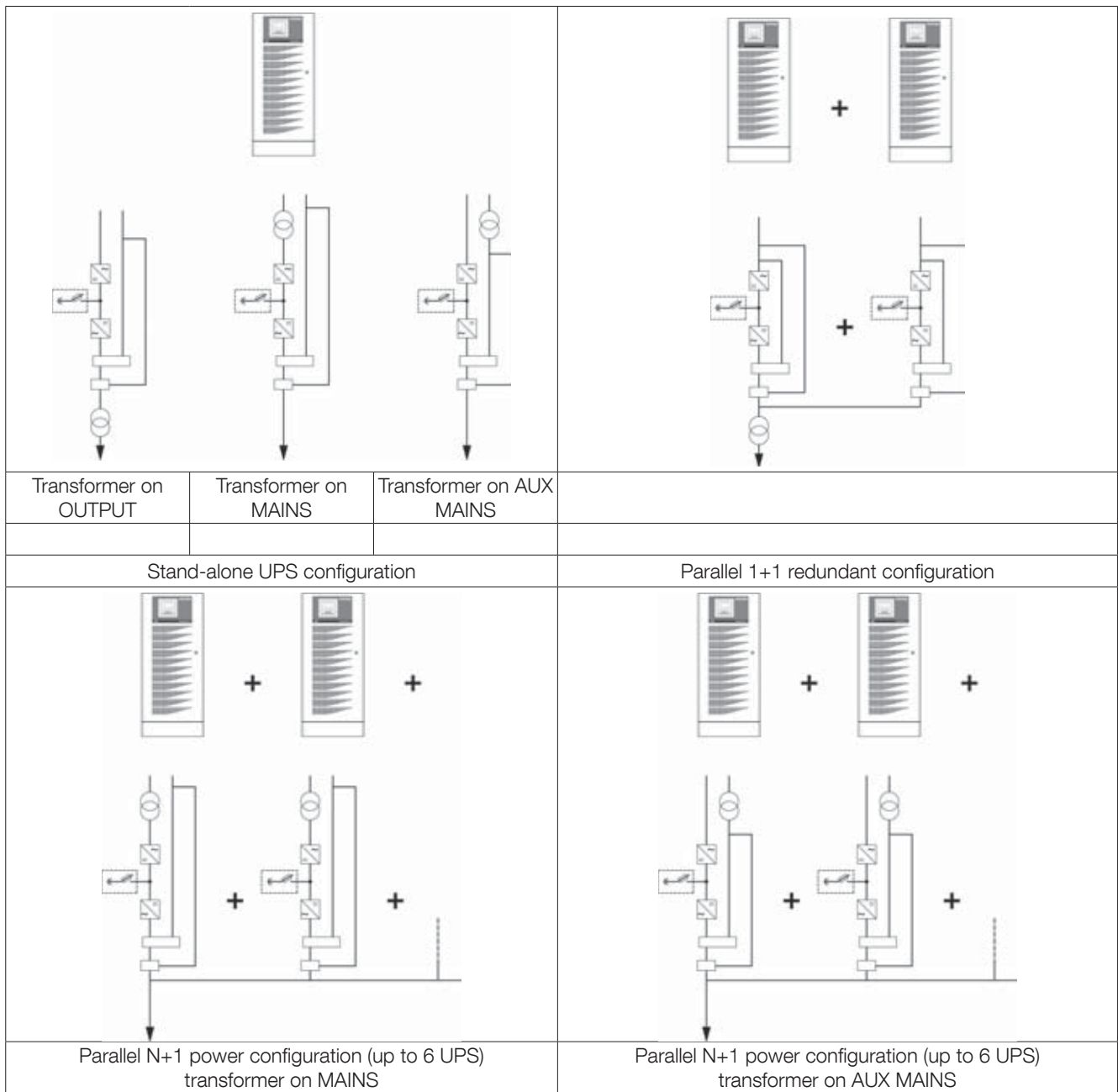
The UPS system's internal batteries consist of distinct strings of battery packs connected in series; each individual pack is connected using polarised connectors to facilitate battery configuration and maintenance.

Each pack is sealed in an acid-proof container which is designed to prevent damage in the case of acid leakage.

To guarantee maximum back-up time availability and battery life, the Masterys series is equipped with EBS systems, depending on the model.

## 2.3 PARALLEL CONFIGURATION.

MASTERYS IP+ offers various configurations.



## 2.4 AVAILABILITY, REDUNDANCY AND EFFICIENCY

To increase the availability of the power supply, redundant parallel configurations are becoming increasingly common. Consequently, the overall efficiency of the UPS system risks being reduced due to the low load on each individual machine.

## 3. STANDARD AND OPTIONS

### 3.1 FOR INDUSTRIAL LOADS

- 100 % non-linear loads.
- 100 % unbalanced loads.
- 100 % “6-pulse” loads (motor speed drivers, welding equipment, power supplies...).
- Motors, lamps, capacitive loads.

### 3.2 STANDARD ELECTRICAL FEATURES

- Dual input mains.
- Internal maintenance bypass.
- Backfeed protection: detection circuit.
- EBS (Expert Battery System) for battery management.

### 3.3 ELECTRICAL OPTIONS.

- Long-life batteries.
- External battery cabinet (degree of protection up to IP32).
- External temperature sensor.
- Additional battery chargers.
- Additional transformer.
- Parallel kit.
- Cold start.
- ACS synchronization system.
- Neutral creation kit for mains without neutral.
- Tropicalization and anti-corrosion protection for electrical boards.

### 3.4 STANDARD COMMUNICATION FEATURES.

- Multilanguage graphic display.
- Dry contact interface.
- MODBUS RTU.
- Embedded LAN interface (web pages, email).
- 2 slots for communication options.

### 3.5 COMMUNICATION OPTIONS.

- Profibus.
- MODBUS TCP.
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.

### 3.6 REMOTE MONITORING SERVICE.

- LINK-UPS, remote monitoring service that connects your UPS to your Critical Power specialist 24/7.

## 4. SPECIFICATIONS

### 4.1 INSTALLATION PARAMETERS

| Installation parameters   |                          |                          |                          |                          |                   |                   |                   |                   |                   |                          |                           |                   |                    |       |
|---|--------------------------|--------------------------|--------------------------|--------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------------|---------------------------|-------------------|--------------------|-------|
| Rated power (kVA)   | 10                       | 15                       | 20                       | 30                       | 10                | 15                | 20                | 30                | 40                | 40                       | 60                        | 60                | 80                 |       |
| Phase in/out  | 3/1                      |                          |                          |                          | 3/3               |                   |                   |                   | 3/1               |                          | 3/3                       |                   |                    |       |
| Active power (kW)   | 9                        | 13.5                     | 18                       | 27                       | 9                 | 13.5              | 18                | 27                | 36                | 32                       | 48                        | 48                | 64                 |       |
| Rated/maximum rectifier input current (EN 62040-3) (A)                        | 14/<br>17 <sup>(1)</sup> | 21/<br>25 <sup>(1)</sup> | 28/<br>34 <sup>(1)</sup> | 42/<br>50 <sup>(1)</sup> | 14/<br>17         | 21/<br>25         | 28/<br>34         | 42/<br>50         | 56/<br>67         | 52/<br>70 <sup>(1)</sup> | 78/<br>100 <sup>(1)</sup> | 78/<br>100        | 106/<br>133        |       |
| Rated bypass input current (A)  | 44 <sup>(1)</sup>        | 65 <sup>(1)</sup>        | 87 <sup>(1)</sup>        | 131 <sup>(1)</sup>       | 15 <sup>(2)</sup> | 22 <sup>(2)</sup> | 29 <sup>(2)</sup> | 44 <sup>(2)</sup> | 58 <sup>(2)</sup> | 174 <sup>(1)</sup>       | 261 <sup>(1)</sup>        | 87 <sup>(2)</sup> | 116 <sup>(2)</sup> |       |
| Inverter output current @230 V (A) P/N  | 44                       | 65                       | 87                       | 131                      | 15                | 22                | 29                | 44                | 58                | 174                      | 261                       | 87                | 116                |       |
| Maximum air flow (m3/h)   | 440                      |                          |                          |                          |                   |                   |                   |                   |                   | 1810                     |                           |                   |                    |       |
| Sound level (dB)  | 50                       |                          |                          |                          |                   |                   | 55                |                   |                   | 62                       |                           |                   |                    |       |
| Dissipation at rated load (minimum mains power present and batteries charged) | (W)                      | 890                      | 1335                     | 1780                     | 2670              | 890               | 1335              | 1780              | 2670              | 3560                     | 4364                      | 5933              | 6100               | 8100  |
|   | (kcal/h)                 | 765                      | 1148                     | 1531                     | 2296              | 765               | 1148              | 1531              | 2296              | 3062                     | 3753                      | 5102              | 5250               | 6970  |
|   | (BTU/h)                  | 3035                     | 4553                     | 6071                     | 9106              | 3035              | 4553              | 6071              | 9106              | 12141                    | 14880                     | 20230             | 20820              | 27650 |
| Dimensions (with standard back-up time)                                       | W (mm)                   | 600                      |                          |                          |                   |                   |                   |                   |                   | 1000                     |                           |                   |                    |       |
|   | D (mm)                   | 800                      |                          |                          |                   |                   |                   |                   |                   | 830                      |                           |                   |                    |       |
|   | H (mm)                   | 1400                     |                          |                          |                   |                   |                   |                   |                   | 1400                     |                           |                   |                    |       |
| Weight (kg)   | 230                      | 250                      | 270                      | 330                      | 230               | 250               | 270               | 320               | 370               | 490                      | 540                       | 500               | 550                |       |

(1) Input current in bypass mode is single-phase. Consequently, the rated current of the neutral and of the phase common to the bypass is three times higher than the current drawn during normal operation by the rectifier.

(2) In the case of single-phase distorting loads downstream of the UPS, when the bypass is in operation the neutral current can be 1.5-2 times higher than the phase current; this is due to the harmonic current distortion produced by the load itself, which is no longer corrected by the UPS rectifier as occurs in normal operation.

### 4.2 ELECTRICAL CHARACTERISTICS

| Electrical characteristics - Input                  |   |    |    |    |     |    |    |    |     |   |     |    |    |
|---|---|----|----|----|-----|----|----|----|-----|---|-----|----|----|
| Rated power (kVA)                                   | 10  | 15 | 20 | 30 | 10  | 15 | 20 | 30 | 40  | 40  | 60  | 60 | 80 |
| Phase in/out  | 3/1   |    |    |    | 3/3 |    |    |    | 3/1 |   | 3/3 |    |    |
| Rated mains supply voltage                          | 400 V 3ph + N   |    |    |    |     |    |    |    |     |   |     |    |    |
| Voltage tolerance                                   | -15% to +20% (pf 0.9)<br>-20% to +20% (pf 0.8)<br>Up to -40% to 50% of rated power (pf 0.9) |    |    |    |     |    |    |    |     | -20% to +20% (pf 0.8)<br>-35% to +20% @ 70% of rated power (pf 0.8) |     |    |    |
| 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%  |    |    |    |     |    |    |    |     | < 7%  |     |    |    |
| Max inrush current at start-up                      | < I <sub>n</sub> (no overcurrent)   |    |    |    |     |    |    |    |     |   |     |    |    |



| Electrical characteristics - Bypass |   |    |    |    |     |    |    |    |     |    |     |    |    |
|-------------------------------------|---|----|----|----|-----|----|----|----|-----|----|-----|----|----|
| Rated power (kVA)                   | 10  | 15 | 20 | 30 | 10  | 15 | 20 | 30 | 40  | 40 | 60  | 60 | 80 |
| Phase in/out                        | 3/1   |    |    |    | 3/3 |    |    |    | 3/1 |    | 3/3 |    |    |
| Bypass frequency variation speed    | 1 Hz/s - 3 Hz/s   |    |    |    |     |    |    |    |     |    |     |    |    |
| Bypass rated voltage                | Nominal output voltage $\pm 15\%$                                       |    |    |    |     |    |    |    |     |    |     |    |    |
| Bypass rated frequency (selectable) | 50/60 Hz  |    |    |    |     |    |    |    |     |    |     |    |    |
| Bypass frequency tolerance          | $\pm 2\%$ (from $\pm 1\%$ to $\pm 8\%$ (operation with generator unit)) |    |    |    |     |    |    |    |     |    |     |    |    |

| Electrical characteristics - Inverter             |  |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rated power (kVA)                                 | 10   | 15    | 20    | 30    | 10    | 15    | 20    | 30    | 40    | 40    | 60    | 60    | 80    |       |
| Phase in/out                                      | 3/1  |       |       |       | 3/3   |       |       |       | 3/1   |       | 3/3   |       |       |       |
| Rated output voltage (selectable)                 | 208 <sup>(1)</sup> /220/230/240 V (1ph)<br>380/400/415 V (3ph) |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Output voltage tolerance                          | Static: $\pm 1\%$  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Rated output frequency (selectable)               | 50/60 Hz   |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Output frequency tolerance                        | $\pm 0.01\%$ (on mains power failure)                          |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Load crest factor                                 | 3:1  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Voltage harmonic distortion                       | < 1% with linear load  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Overload tolerated by the inverter <sup>(2)</sup> | 10 min   | 10 kW | 15 kW | 20 kW | 30 kW | 10 kW | 15 kW | 20 kW | 30 kW | 40 kW | 40 kW | 60 kW | 60 kW | 80 kW |
|   | 1 min  | 12 kW | 18 kW | 24 kW | 36 kW | 12 kW | 18 kW | 24 kW | 36 kW | 48 kW | 48 kW | 72 kW | 72 kW | 96 kW |

(1) @ 208 V  $P_{out} = 90\% P_{nom}$ , (2) @ pf 0.9 (10 to 30 kVA 3/1, 10 to 40 kVA 3/3), @ pf 0.8 (40 and 60 kVA 3/1, 60 and 80 kVA 3/3)

| Electrical characteristics - Efficiency                                       |     |    |    |    |     |    |    |    |     |    |     |    |    |
|---|-----|----|----|----|-----|----|----|----|-----|----|-----|----|----|
| Rated power (kVA)   | 10  | 15 | 20 | 30 | 10  | 15 | 20 | 30 | 40  | 40 | 60  | 60 | 80 |
| Phase in/out  | 3/1 |    |    |    | 3/3 |    |    |    | 3/1 |    | 3/3 |    |    |
| Double conversion efficiency (normal mode) at rated load, trafo on the output | 91% |    |    |    | 91% |    |    |    | 89% |    | 89% |    |    |
| Double conversion efficiency (normal mode) at rated load, trafo on bypass     | 95% |    |    |    | 94% |    |    |    | 93% |    | 92% |    |    |

| Electrical characteristics - Efficiency    |   |    |    |    |      |    |    |    |      |    |      |    |    |
|--|---|----|----|----|------|----|----|----|------|----|------|----|----|
| Rated power (kVA)                          | 10  | 15 | 20 | 30 | 10   | 15 | 20 | 30 | 40   | 40 | 60   | 60 | 80 |
| Phase in/out                               | 3/1   |    |    |    | 3/3  |    |    |    | 3/1  |    | 3/3  |    |    |
| Storage temperatures                       | -5 to +45 °C (23 to 113 °F) (15 to 25 °C for better battery life)               |    |    |    |      |    |    |    |      |    |      |    |    |
| Working temperature                        | 0 to +50 <sup>(1)</sup> °C (32 to 122 °F) (15 to 25 °C for better battery life) |    |    |    |      |    |    |    |      |    |      |    |    |
| Maximum relative humidity (non-condensing) | 95%   |    |    |    |      |    |    |    |      |    |      |    |    |
| Maximum altitude without derating          | 1000 m (3300 ft)  |    |    |    |      |    |    |    |      |    |      |    |    |
| Degree of protection                       | IP31 and IP52   |    |    |    | IP31 |    |    |    | IP31 |    | IP31 |    |    |
| Portability                                | ASTM D999-08, ASTM D-880, AFNOR NF H 00-042                                     |    |    |    |      |    |    |    |      |    |      |    |    |
| Colour                                     | RAL 7012  |    |    |    |      |    |    |    |      |    |      |    |    |

(1) Conditions apply.

## 4.3 RECOMMENDED PROTECTION DEVICES

| RECOMMENDED PROTECTION DEVICES - Rectifier <sup>(1)</sup> |     |    |    |    |     |    |    |    |     |     |     |     |     |
|---|-----|----|----|----|-----|----|----|----|-----|-----|-----|-----|-----|
| Model IP+   | 10  | 15 | 20 | 30 | 10  | 15 | 20 | 30 | 40  | 40  | 60  | 60  | 80  |
| Phase in/out  | 3/1 |    |    |    | 3/3 |    |    |    | 3/1 |     | 3/3 |     |     |
| D curve circuit breaker (A)                               | 32  |    | 40 | 63 | 32  |    | 40 | 63 | 80  | 80  | 125 | 125 | 160 |
| gG fuse (A)   | 32  |    | 40 | 63 | 32  |    | 40 | 63 | 80  | 125 | 160 | 125 | 160 |

| RECOMMENDED PROTECTION DEVICES - General bypass <sup>(1)</sup>      |       |    |    |        |      |    |    |       |        |        |       |        |    |
|---|-------|----|----|--------|------|----|----|-------|--------|--------|-------|--------|----|
| Model IP+   | 10    | 15 | 20 | 30     | 10   | 15 | 20 | 30    | 40     | 40     | 60    | 60     | 80 |
| Phase in/out  | 3/1   |    |    |        | 3/3  |    |    |       | 3/1    |        | 3/3   |        |    |
| Maximum I <sup>2</sup> t supported by the bypass (A <sup>2</sup> s) | 80000 |    |    | 125000 | 8000 |    |    | 15000 | 320000 | 500000 | 80000 | 125000 |    |
| I <sub>cc</sub> max (A)   | 4000  |    |    | 5000   | 1200 |    |    | 1700  | 8000   | 10000  | 4000  | 4000   |    |

| RECOMMENDED PROTECTION DEVICES - Input residual current circuit breaker <sup>(2)</sup> |                   |     |     |     |     |     |     |     |     |     |     |     |     |
|--|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Model IP+  | 10                | 15  | 20  | 30  | 10  | 15  | 20  | 30  | 40  | 40  | 60  | 60  | 80  |
| Phase in/out   | 3/1               | 3/1 | 3/1 | 3/1 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/1 | 3/1 | 3/3 | 3/3 |
| Input residual current circuit breaker   | > 0.5 A Selective |     |     |     |     |     |     |     |     |     |     |     |     |

| RECOMMENDED PROTECTION DEVICES - Output    |      |      |      |      |     |      |      |      |      |       |      |      |    |
|--|------|------|------|------|-----|------|------|------|------|-------|------|------|----|
| Model IP+                                  | 10   | 15   | 20   | 30   | 10  | 15   | 20   | 30   | 40   | 40    | 60   | 60   | 80 |
| Phase in/out                               | 3/1  |      |      |      | 3/3 |      |      |      | 3/1  |       | 3/3  |      |    |
| C curve circuit breaker <sup>(3)</sup> (A) | < 10 | < 16 | < 20 | < 32 | < 4 | < 6  | < 10 | < 13 | < 32 | < 50  | < 20 | < 40 |    |
| B curve circuit breaker <sup>(3)</sup> (A) | < 20 | < 32 | < 40 | < 63 | < 8 | < 12 | < 20 | < 25 | < 63 | < 100 | -    | -    |    |
| High-speed fuse <sup>(3)</sup> (A)         | < 12 | < 18 | < 24 | < 36 | < 6 | < 10 | < 12 | < 16 | < 40 | < 63  | < 32 | < 25 |    |

| CABLES - Maximum cable section |  |    |    |    |  |    |    |    |   |    |  |    |    |
|--------------------------------|--|----|----|----|--|----|----|----|---|----|--|----|----|
| Model IP+                      | 10   | 15 | 20 | 30 | 10   | 15 | 20 | 30 | 40  | 40 | 60   | 60 | 80 |
| Phase in/out                   | 3/1  |    |    |    | 3/3  |    |    |    | 3/1   |    | 3/3  |    |    |
| Rectifier terminals            | 4x CBD 35<br>35 mm <sup>2</sup> (flexible cable)<br>50 mm <sup>2</sup> (rigid cable)   |    |    |    | 4x CBD 35<br>35 mm <sup>2</sup> (flexible cable)<br>50 mm <sup>2</sup> (rigid cable) |    |    |    | 4x CBD 50<br>50 mm <sup>2</sup> (flexible cable)<br>70 mm <sup>2</sup> (rigid cable)          |    |  |    |    |
| Bypass terminals               | 2x CBD 35<br>35 mm <sup>2</sup> (flexible cable)<br>50 mm <sup>2</sup> (rigid cable)<br>2x CBD 50<br>50 mm <sup>2</sup> (flexible cable)<br>70 mm <sup>2</sup> (rigid cable) |    |    |    |  |    |    |    | 2x ACB 120<br>120 mm <sup>2</sup><br>(flexible cable)<br>185 mm <sup>2</sup><br>(rigid cable) |    | 4x CBD 50<br>50 mm <sup>2</sup><br>(flexible cable)<br>70 mm <sup>2</sup><br>(rigid cable) |    |    |
| Battery terminals              | 4x CBD 35<br>35 mm <sup>2</sup> (flexible cable)<br>50 mm <sup>2</sup> (rigid cable)   |    |    |    |  |    |    |    | 4x CBD 70<br>70 mm <sup>2</sup> (flexible cable)<br>95 mm <sup>2</sup> (rigid cable)          |    |  |    |    |
| Output terminals               | 2x CBD 50<br>50 mm <sup>2</sup> (flexible cable)<br>70 mm <sup>2</sup> (rigid cable)   |    |    |    |  |    |    |    | 2x ACB 120<br>120 mm <sup>2</sup><br>(flexible cable)<br>185 mm <sup>2</sup><br>(rigid cable) |    | 4x CBD 50<br>50 mm <sup>2</sup><br>(flexible cable)<br>70 mm <sup>2</sup><br>(rigid cable) |    |    |

(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 the highest of both (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, 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) Selectivity of distribution after the UPS with inverter short-circuit current (with AUX MAINS not present).

## 5. REFERENCE STANDARDS AND DIRECTIVES

### 5.1 OVERVIEW

The equipment, installed, used and serviced in accordance with its intended use, its regulations and standards, its manufacturer instructions and rules, is in compliance with the relevant Union harmonisation legislation:

#### LVD 2014 / 35 / EU

DIRECTIVE 2014/35/EU 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 2014/30/EU 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 (certified by TÜV SÜD)  
IEC 62040-1 Uninterruptible Power System (UPS) - Part 1: Safety requirements

#### 5.2.2 ELECTROMAGNETIC COMPATIBILITY

EN 62040-2 Uninterruptible Power System (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements (C3 category)  
IEC 62040-2 Uninterruptible Power System (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements

#### 5.2.3 TEST AND PERFORMANCE

EN 62040-3 Uninterruptible power systems (UPS). Methods of specifying the performance and test requirements

#### 5.2.4 DEGREES OF PROTECTION

EN 60529 Degrees of protection provided by enclosures

### 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.

