MASTERYS GP4

From 60 to 160 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 distribution panel which can isolate the network upstream of the UPS must be installed. This electrical distribution panel must be equipped with a protection device (or two, if there is a separate bypass line) of an appropriate rating for the power drawn at full load.

For detailed information, see the installation and operating manual.

1. ARCHITECTURE

1.1 RANGE

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

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

MASTERYS GP4					
Rated power (kVA)	60	80	100	120	160
MASTERYS GP4 3/3	•	•	•	•	•
Matrix table for model and kVA power rating					

MASTERYS GP4 has been specifically designed to meet the demands of loads in specific application contexts, in order to optimise the features of the product and facilitate its integration within the system.

2. FLEXIBILITY

2.1 POWER RATINGS FROM 60 TO 160 KVA/KW

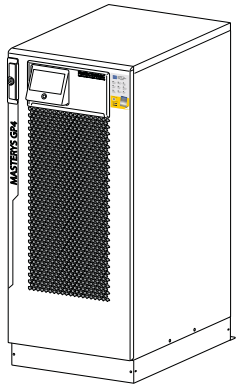
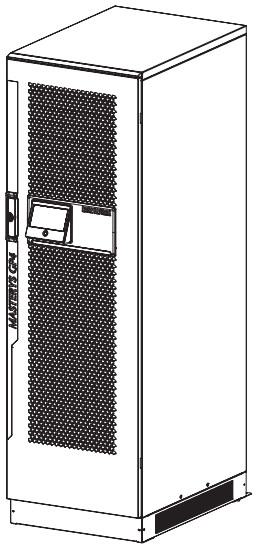
The equipment has been designed with a minimum direct and indirect footprint (the actual space occupied by the unit and the space required around it for maintenance, ventilation and access to the operating mechanisms and communication devices).

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

All of the control mechanisms are located on the front at the bottom and communication interfaces are on the inside of the door.

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

With specific cabinets it is possible to have solution with a top air outlet

Dimensions			
MASTERYS GP4	Width [mm]	Depth [mm]	Height [mm]
MASTERYS GP4 60 to 120 kVA/kW 	600	855	1400 (100/120 kVA 1930 as option)
MASTERYS GP4 160 kVA/kW 	600	855	1930

2.2 FLEXIBLE BACK-UP TIME

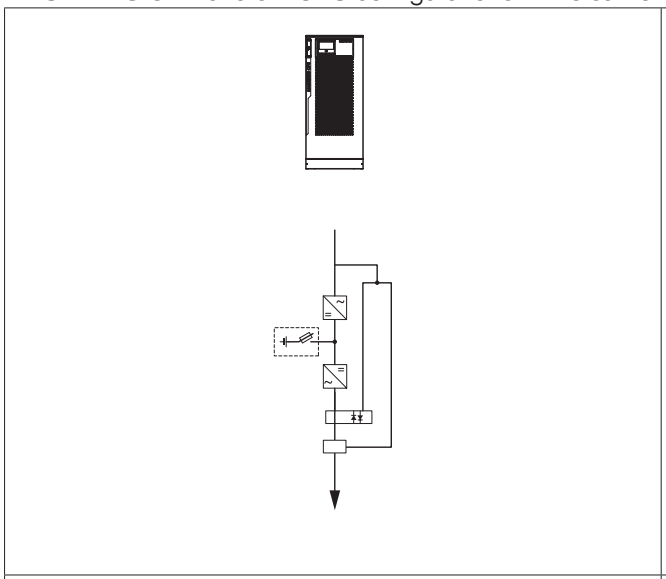
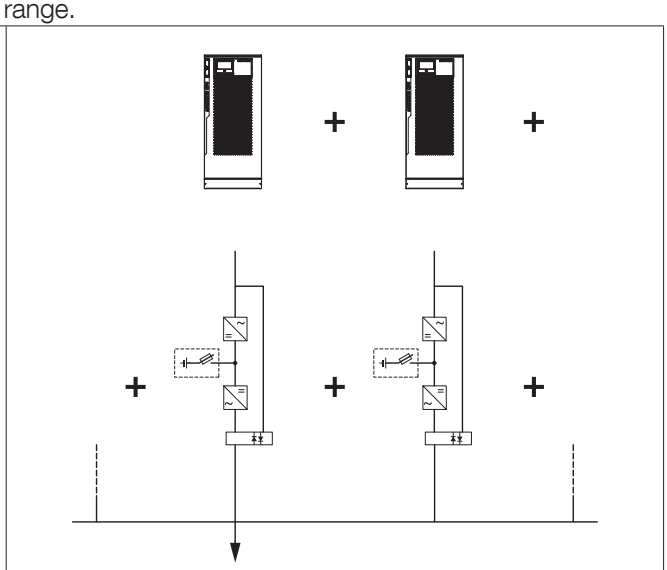
Different extended back-up times are possible by using external battery cabinets, optionally with a enhanced battery charger.

Selection of the back-up time is flexible thanks to the wide range of battery string voltages.

MASTERYS GP4 is setup for Lithium Battery

2.3 HORIZONTAL PARALLEL

MASTERYS GP4 offers 2 UPS configurations in the same range.

	
Single unit configuration	Parallel UPS

2.4 RELIABILITY

Reliability is the most critical factor for any UPS solution designed to protect and manage the continuity of activities and services.

MASTERYS GP4 MTBF exceeds the market standard, and Socomec officially declares its MTBF data.

2.5 SEISMIC RESISTANT

The 4th generation MASTERYS units (with SEISMIC option installed) have successfully passed extensive tests to verify resistance to withstand seismic events.

Tests have been performed by accredited laboratories according to the standards covering zones with the highest level of seismic activity: Zone 4.

The test requires that the UPS system, working at full load and provided with floor fixing devices, must resist the stresses and accelerations defined by the test protocol. When the test has been completed, the UPS must be intact and working perfectly.

3. STANDARD AND OPTIONS

3.1 STANDARD ELECTRICAL FEATURES

- Dual input mains.
- Internal maintenance bypass.
- Backfeed protection: detection circuit and driver.
- EBS (Expert Battery System) for battery management.
- Distributed and shared battery
- Energy saving mode (applicable on parallel systems) to optimise efficiency according to load rate and enhance the UPS lifetime.
- Gen-set compatibility.
- Protection against incorrect cabling

3.2 ELECTRICAL OPTIONS

- Internal backfeed protection contactor.
- External maintenance bypass.
- External battery cabinet.
- Enhanced battery chargers.
- External temperature sensor
- Parallel kit.
- ACS synchronisation system, to synchronise the UPS to an external source.
- Redundant cooling fan for bypass
- Neutral kit for 3 wires (no neutral) input
- Ground Neutral connection for TNC system
- Connection kit for common mains
- Isolation transformer with isolation control device

3.3 STANDARD COMMUNICATION FEATURES

- User-friendly multilingual interface with 7" touch colour graphic display.
- 2 slots for communication options.

3.4 COMMUNICATION OPTIONS

- Dry-contact interface.
- PROFIBUS.
- BACnet/IP interface
- NET VISION: professional WEB/SNMP interface for UPS monitoring and shutdown management of several operating systems.
- EMD: Net vision Environment Temperature and Humidity sensor with 2 inputs

3.5 REMOTE MONITORING SERVICE

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

3.6 MECHANICAL OPTIONS

- Seismic kit
- IP21 protection degree
- Anti-vermin kit
- Top air exhaust module (only for 1930 mm cabinet)
- Top entry cable module (only for 1930 mm cabinet)

4. SPECIFICATIONS

4.1 INSTALLATION PARAMETERS

Installation parameters							
Rated power (kVA)			60	80	100	120	160
Phase in/out			3/3				
Active power		kW	60	80	100	120	160
Rated/maximum rectifier input current (EN 62040-3)		A	93/110	123/146	154/183	185/219	245/292
Rated bypass input current (1)		A	96	128	160	191	255
Inverter output current @ 400 V Pn		A	87	116	145	174	252
Recommended air flow capacity		m^3/h	480	720	840	1080	1440
Acoustic Noise @ 70% Pn		dBA	53		55		57
Power dissipation in nominal conditions (2)		W	2880	3950	4800	5940	7850
		kcal/h	2476	3396	4127	5107	6784
		BTU/h	9833	13486	16388	20280	26922
Power dissipation (max) in the worst conditions (3)		W	3360	4630	5500	6560	8950
		kcal/h	2889	3981	4729	5641	7696
		BTU/h	11471	15807	18788	22397	30539
Dimensions	Width	mm	600				
	Depth	mm	855				
	Height	mm	1400		1400 (1930 optional)		1930
Weight		kg	174	186	228	240	350

1. *Considering nominal bypass current calculated @ 400 V, considering a continuos overload of 110%.*
2. *Considering nominal input current (400 V, battery charged) and rated output active power (PF1).*
3. *Considering maximum input current (low input voltage, battery charged) and rated output active power (PF1).*

4.2 ELECTRICAL CHARACTERISTICS

Electrical characteristics - Rectifier Input					
Rated power (kVA)	60	80	100	120	160
Rated mains supply voltage	400 V 3ph + N				
Voltage tolerance	340 to 480 V (-15 +20%)				
Voltage tolerance at derated load	up to 240 V @ 70% of nominal active load				
Rated frequency	50/60 Hz				
Frequency tolerance	±10%				
Power factor (at full load and rated voltage)	≥ 0.99				
Current Total harmonic distortion (THDi)	≤ 2%				
Max inrush current at start-up	<In				
Power walk-in (from battery to normal mode)	4 second (settable parameters)				

Electrical characteristics - Bypass							
Rated power (kVA)		60	80	100	120	160
Bypass frequency variation speed		1 Hz/s (settable up to 3 Hz/s)				
Bypass rated voltage		Nominal output voltage ±20% (selectable)				
Bypass rated frequency		50/60 Hz (selectable)				
Bypass frequency tolerance		±2% (configurable from ±1% to ±10%)				
Bypass current overload (A)	10 min	109	145	181	218	290
	1 min	130	174	217	261	348

Electrical characteristics - Inverter						
Rated power (kVA)		60	80	100	120	160
Rated output voltage (selectable)		380/400/415 V (selectable)				
Output voltage tolerance		Static: ±1% Dynamic: VFI-SS-111 (EN 62040-3 compliant)				
Rated output frequency (selectable)		50/60 Hz (selectable)				
Output frequency tolerance		±0.01% on mains power failure				
Load crest factor		≥ 2.7				
Voltage total harmonic distortion THDV		< 1% with linear load				
Inverter overload (kW) (1)	10 min	75	100	125	150	200
	5 min	79	106	132	158	211
	1 min	90	120	150	180	240
Short-circuit inverter current (A) (when AUX MAINS is not present)	0 to 40 ms	234	312	390	468	624
	40 to 100 ms	196	260	326	390	520

Electrical characteristics - Efficiency						
Rated power (kVA)	60	80	100	120	160
Double conversion efficiency	up to 96.3%				
EcoMode efficiency	99.4%				

Electrical characteristics - Environment						
Rated power (kVA)	60	80	100	120	160
Storage temperatures	-5 to +50 °C (23 to 122 °F) (15 to 25 °C for better battery life)				
Working temperature	0 to +40 (1) °C (32 to 104 °F) (15 to 25 °C for better battery life) *Up to 50 °C @70% Pn 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)				
Colour	RAL 7016				

1. *The system can supply the full rated load (kW = kVA / PF_out =1) whatever the input voltage within the "voltage tolerance" range and whatever the temperature within the "working temperature" range.*

4.3 RECOMMENDED PROTECTIONS

RECOMMENDED PROTECTION DEVICES - Rectifier [1]					
Rated power (kVA)	60	80	100	120	160
C curve circuit breaker (A)	125	160	250		315
gG fuse (A)	125	160	250		315

RECOMMENDED PROTECTION DEVICES - General bypass [2]					
Rated power (kVA)	60	80	100	120	160
Max I^2t supported by the bypass (A^2s)	120000		400000		400000
Max Ipk supported by the Bypass(A)	5000		9000		9000
Conditional short circuit current rating (Icc)	10 kA				
C curve circuit breaker (A)	160	200	250		400
gG fuse (A)	160	200	250		400

RECOMMENDED PROTECTION DEVICES - Input residual current circuit breaker[3]					
Rated power (kVA)	60	80	100	120	160
Input residual current circuit breaker	0.5 A Selective type B				

RECOMMENDED PROTECTION DEVICES - Output [4]					
Rated power (kVA)	60	80	100	120	160
C curve circuit breaker [3] (A)	≤ 20	≤ 25	≤ 32	≤ 40	≤ 50
B curve circuit breaker [3] (A)	≤ 40	≤ 50	≤ 63	≤ 80	≤ 100

CABLES - Maximum cable section [5]					
Rated power (kVA)	60	80	100	120	160
Rectifier terminals (4x)	bus bar with holes ø 8 mm 70 mm^2 (flexible cable and rigid cable)		bus bar with holes ø 10 mm 2x120 mm^2 (flexible cable and rigid cable)		bus bar with holes ø 10 mm 2x150 mm^2 (flexible cable and rigid cable)
Bypass terminals (4x)					
Battery terminals (3x)					
Output terminals (4x)					

1. *Rectifier protection should only be considered in the event of separate inputs. Recommended values to avoid unwanted tripping with UPS at full power. When the bypass and rectifier inputs are combined (common input), the general input protection rating must be the highest of the two (bypass or rectifier).*
2. *Recommended values to avoid unwanted tripping with UPS at full power. A current limiting device has to be used in case of maximum i^2t and Ipk of the SCR by-pass is exceeded. When the bypass and rectifier inputs are combined (common input), the general input protection rating must be the highest of the two (bypass or rectifier).*
3. *RCD is not necessary when the UPS is installed in a TN-S system. RCD is not permitted on TN-C systems. If a RCD is required a B-type should be used. RCD must be coordinate 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.*
4. *Protection tripping downstream of the UPS with inverter short circuit current (Worst case = AUX MAINS not present). In the Normal case, with AUX MAINS present, fault clearing is determined by the Mains short-circuit capability. The rating of the protection can be increased "n" times downstream of a parallel UPS system, with "n" equal to the number of parallel UPS units.*
5. *Use cable with tin-plated eyelets for the connection*

5. REFERENCE STANDARDS AND DIRECTIVES

5.1 OVERVIEW

The production of the equipment and the choice of materials and components are in accordance with currently applicable Laws, Decrees, Directives and Standards.

In particular, the equipment is in compliance with all European directives on CE marking.

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.

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.

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 ELECTROMAGNETIC COMPATIBILITY

“Electromagnetic Compatibility Provisions (EMC)”

EN 62040-2 Electromagnetic compatibility (C3 category) (tested and verified by third party)

5.2.2 SAFETY

“General and safety requirements for UPSs used in operator access areas”

EN 62040-1 General and safety requirements for UPSs used in restricted access locations (certified by TÜV SÜD)

5.2.3 TYPE AND PERFORMANCE

“Performance requirements and test methods”

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

5.2.4 RESTRICTION OF USE OF HAZARDOUS SUBSTANCES (RoHS)

EN 50081 technical documentation for assessment of electrical and electronic products with respect to the restriction of hazardous substances.

5.2.5 SYSTEM AND INSTALLATION GUIDELINES

Once installed in a system, the UPS will not alter the neutral conditions; this is because the neutral input terminal is connected directly to the output terminal inside the equipment. If the neutral condition of the system downstream of the UPS needs to be modified, it will be necessary to use the isolation transformer option.

The manufacturer must comply with the unit (UPS) regulations. UPS engineers comply with current legislation for the specific electrical system (e.g.EN 60364).