DELPHYS XM

300 to 800 kVA/kW

SUPERIOR

Unrivalled power performance

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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.

For detailed information, see the installation and operating manual.

1. ARCHITECTURE

1.1 RANGE

DELPHYS XM is a full range of high performing UPS (Uninterruptible Power Supply) designed to secure highly critical applications and therefore to ensure business continuity by means of a fully resilient architecture. It has been specifically designed to meet the stringent demands of loads in particular application contexts, in order to optimize the features of the product and to facilitate its integration within the system.

The DELPHYS XM can deliver many more benefits than standard systems, packing into an overall space-saving design, providing:

- Fault tolerant architecture, and possibility to set N+1 internal redundancy,
- Minimize the footprint thanks to high power density,
- Easy and fast maintenance,
- Reduce the electrical infrastructure's total cost of ownership,
- Fast deployment time / Flexible installation.

Rated power (kVA)	300	400	500	600	800
DELPHYS XM	•	•	•	•	•

DELPHYS XM is designed by 100 kW power conversion modules combined with a common static bypass rated for permanent operation at the rated power of the UPS. The UPS is designed with mechanical and electrical segregation solution, so that any abnormal event will be contained to the related brick and not propagated to the rest of the unit.

To increase the system power, DELPHYS XM can be parallelized up to 6 units, for a maximum of 3,6 MW (6x600 kW). The 800 kW size can be parallelized up to 4 units, for a maximum of 3,2 MW.

1.2 INTRINSIC REDUNDANCY

The UPS is designed to provide intrinsic double conversion mode redundancy in case of a single power module is no longer available, to grant a minimum of capability to supply the connected load.

Any potential module fault should be isolated, keeping the critical load protected in double conversion mode thanks to the remaining power converters to maximize the Mean Time Between Critical Failure.

UPS rating		300	400	500	600	800
Number of 100kW modules		3	4	5	6	8
N configuration	Rated power kVA	300	400	500	600	800
	Intrinsic redundancy up to % of rated power	66%	75%	80%	83%	87%
N+1 configuration	Rated power kVA	200	300	400	500	700
	Intrinsic redundancy up to % of rated power	100%				

N+1 configuration setting available on HMI.

1.3 ENERGY EFFICIENCY

DELPHYS XM solution allow reducing energy consumption to minimize GHD emission and operation bill, thanks to:

- High efficiency in double conversion mode, under wide load rate range,
- Energy saver mode to maximize the online double conversion efficiency under low load condition, by switching automatically into hot-standby the modules which are not required to supply the load.
- Smart conversion mode allowing to automatically select the most optimized working mode : double conversion or line interactive mode according to the input network conditions. In this mode, a specific algorithm monitors in real time the network quality and selects the optimum working mode between Double Conversion (VFI) and Line Interactive (LI).

1.4 MAINTAINABILITY

The equipment is designed to minimize MTTR trough:

- Full front access to easier maintenance activities,
- Possibility for Socomec service engineers to extract online a power conversion module (conditioned by the load rate and redundancy level) in order to maintain the concerned modules without the need to move the load on maintenance bypass,
- Withdrawable static bypass subassembly to easier access and avoid cabling operation when required to maintain the bypass line static switch subassembly.
- UPS heat run test - without the need of dummy load bench - allowing to certify the commissioning and advanced maintenance operations.

1.5 MAINTAINABILITY

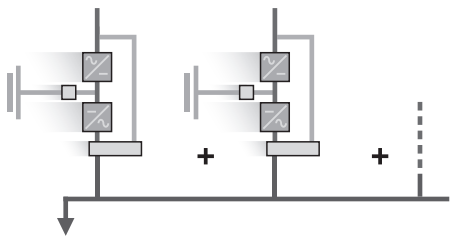
Rated power (kVA)	300	400	500	600	800
Number of 100kW modules	3	4	5	6	8
Input rectifier switch	•	•	•	•	- (1)
Input bypass switch	•	•	•	•	- (1)
Output switch	•	•	•	•	- (1)
Maintenance bypass switch	• (Single unit only)				- (2)

(1) Available only for bottom connection variant.

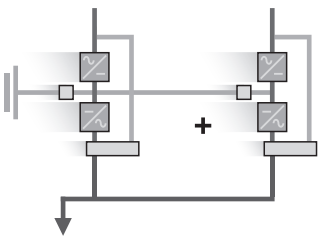
(2) Available only for bottom connection variant and single unit(not parallel version).

1.6 BATTERY MANAGEMENT

Available with distributed batteries when paralleling units, DELPHYS XM allows to optimize the batteries size thanks to a shared battery operation, this can be set by HMI up to 2 units. This reduces the overall system footprint, the weight of the required batteries, the battery monitoring system, the amount of wiring needed and the amount of lead.



Distributed battery
(1 battery set per UPS unit)



Shared battery
(1 battery set for 2 units)

1.7 FLEXIBILITY

The equipment has been designed with the aim to reach the best power density to reduce at minimum the 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.

For maximum flexibility, the UPS can adapted to be installed against a wall or back to back, without impacting its performance. All of the control mechanisms and communication interfaces are located in the front side and can be accessed from a door provided with handle.

DELPHYS XM – DIMENSIONS AND WEIGHT

UPS rating [kVA/kW]	Number of 100 kW modules	UPS Weight [kg]	Width [mm]	Depth [mm]	Height [mm]
300	3	550	800	1000	2000
400	4	600			
500	5	650			
600	6	750			
800	8	900			

2. STANDARD AND OPTIONS

2.1 STANDARD ELECTRICAL FEATURES

- Separated or common input mains
- Top entry connection
- Compatible with VRLA and Li-Ion energy storage technologies
- Inputs and output switches for single and parallel units (300-600kVA and 800kW bottom version)
- Maintenance bypass switch for single unit (300-600kVA and 800kW bottom version)
- High battery charging capacity
- TNS grounding system
- Backfeed protection: detection circuit
- Hot-swappable modules
- Withdrawable static bypass
- Smart conversion Mode
- Energy saver mode
- Cold start
- Heat-run System mode to allow UPS testing at rated power - without dummy load
- Tropicalized PCBs

2.2 ELECTRICAL OPTIONS

- Bottom entry connection (side cabinet)
- Kit for top air outlet(300-600kW)
- PEN kit for TN-C grounding system
- ACS synchronization between two DELPHYS XM systems
- Battery temperature sensor for lead batteries
- Galvanic isolation transformer.

2.3 ELECTRICAL OPTIONS

- IP degree adaptation
- Up to IP3X.

2.4 STANDARD COMMUNICATION FEATURES

- User-friendly 10” touch-screen multilingual color graphic display
- 3 Com-Slots for communication optional card
- Ethernet port for service purpose.

2.5 COMMUNICATION OPTIONS

- Com-slots extension (ready for 3 additional plug-in card)
- Dry-contact interface (configurable voltage-free contacts)
- MODBUS RTU RS485 or TCP
- NET VISION: professional WEB/SNMP Ethernet interface for secure UPS monitoring and remote automatic shut- down
- NET VISION EMD: Environment Temperature and Humidity sensor with 2 inputs
- Remote View Pro supervision software.

2.6 REMOTE MONITORING AND CLOUD SERVICES

- SoLive [(1)]: Real-time cloud monitoring app to supervise any Socomec UPS via smartphone
- SoLink [(1)]: 24/7 cloud remote surveillance service by manufacturer specialists for any Socomec UPS
- Remote operations [(1)]: on-demand remote connection by Socomec experts to perform diagnosis and troubleshooting directly on UPS.

(1) Please check the service availability in your Country.

2.7 ELECTRICAL OPTIONS.

Rated power (kVA)		300	400	500	600	800
Phase in/out		3/3				
Active power (kW) – N configuration		300	400	500	600	800
Rated / maximum rectifier input current (A)		451/ 594	601 / 791	752 / 989	902 / 1187	1202 / 1583
Rated bypass input current (A)		433	578	722	866	1155
Inverter output current @ 400V (A)		433	578	722	866	1155
Maximum air flow (m3/h)		4084	5445	6806	8168	10890
Sound level (dBA)		≤75 dBA				
Power dissipation in nominal conditions [1]	W	12000	16000	20000	24000	32000
	kcal/h	10318	13757	17196	20635	27514
	BTU/h	40944	54592	68240	81888	109184
Power dissipation (max) in the worst conditions [2]	W	13200	17600	22000	26400	35200
	kcal/h	11349	15132	18916	22699	30265
	BTU/h	45038	60051	75064	90077	120102
Dimensions	W (mm)	800				
	D (mm)	1000				
	H (mm)	2000				

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

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

2.8 ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS – RECTIFIER INPUT					
Rated power (kVA)	300	400	500	600	800
Rated mains supply voltage (V)	380/400/415 V (3ph + N)				
Voltage tolerance a full load	304 V to 485 V				
Voltage tolerance with power derating [1]	240 V to 485 V				
Rated frequency	50/60 Hz				
Frequency tolerance	40 to 70 Hz				
Power factor	> 0.99				
Total harmonic distortion (THDi) [2]	≤ 3%				
Max inrush current at start-up	< In (no overcurrent)				
Soft start (rectifier power walk-in)	Yes (fixed ramp time)				

(1) Conditions apply.

(2) At full load and rated input voltage (THDV < 1%).

ELECTRICAL CHARACTERISTICS – BATTERY					
Rated power (kVA)	300	400	500	600	800
Number of poles	2 wires (+ / -)				
Min/Max number of battery lead battery cells with load PF=1	240/300				
Min/Max number of battery lead battery cells with load PF ≤ 0,9	216/300				
Min/Max number of battery lead battery cells with load PF ≤ 0,8	192/300				
Recharging current at 100% load	Up to 90 A	Up to 120 A	Up to 150 A	Up to 180 A	Up to 240 A
Recharging current at 50% load	Up to 300 A	Up to 400A	Up to 500 A	Up to 600 A	Up to 800 A

ELECTRICAL CHARACTERISTICS - BYPASS						
Rated power (kVA)		300	400	500	600	800
Bypass rated voltage		380/400/415 V configurable / (3ph + N)				
Bypass voltage tolerance		Nominal output voltage ±10% (settable up to ±20%)				
Bypass frequency variation speed		1.5 Hz/s settable from 1 to 3 Hz/s				
Bypass rated frequency		50/60 Hz (selectable)				
Bypass frequency tolerance		±10% fixed				
Bypass line overload	Permanent	110%				
	10 min	125%				
Semiconductors characteristics	I^2t (A^2 s)	1 361 000	1 361 000	2 205 000	3 075 000	4 740 000
	Is/c (A peak)	16 500	16 500	21 000	24 800	30 600

ELECTRICAL CHARACTERISTICS - INVERTER						
Rated power (kVA)		300	400	500	600	800
Rated output voltage (selectable) (V)		380/400/415 V configurable / (3ph + N)				
Output voltage tolerance		Static load ±1%, dynamic load VFI-SS-11 compliant				
Rated output frequency (Hz)		50/60 Hz (selectable)				
Autonomous frequency tolerance		±0.02 Hz on mains power failure				
Load crest factor		< 2.7%				
Harmonic voltage distortion		ThdU ≤ 1,5% with rated linear load				
Overload tolerated by the inverter [kVA/kW] (1)	10 min	375	500	625	750	1000
	1 min	450	600	750	900	1200

(1) The tolerated output overload corresponds to the inverter capability under defined conditions. The output overload performance is incremented by the static bypass capability (when available).

ELECTRICAL CHARACTERISTICS - EFFICIENCY						
Rated power (kVA)		300	400	500	600	800
Double conversion efficiency		Up to 97.1%				
Smart conversion mode (Line interactive)		Up to 99%				

ENVIRONMENTAL CHARACTERISTICS						
Rated power (kVA)		300	400	500	600	800
Storage temperatures		-25 to +55 °C				
Start-up and working temperature		0 to +40 °C				
Maximum relative humidity		≤95% (non-condensing)				
Cooling air inlet		Frontal				
Cooling air flow	Standard	Rear outlet - requires 500 mm rear space at 40 °C or 300 mm rear space at 35 °C				
	Optional	Top air extraction (without impacting the footprint - no rear space)				
Maximum altitude without derating		1000 m				
Degree of protection - Standard		IP20				
Color		RAL 7016				

2.9 RECOMMENDED PROTECTIONS

RECOMMENDED PROTECTION DEVICES - INPUTS					
Rated power (kVA)	300	400	500	600	800
Rectifier input mains (A) (1)	630	800	1000	1250	1600
Bypass input mains fuse (A) (1)	500	630	800	1000	1250

RECOMMENDED PROTECTION DEVICES - OUTPUT					
Rated power (kVA)	300	400	500	600	800
Inverter Short-circuit Current limitation (2)	200% of the rated current				
Circuit breaker (A)	≤ 80	≤ 100	≤ 125	≤ 160	≤ 200

CABLES CONNECTION - MAXIMUM CAPABILITY PER POLE					
Rated power (kVA)	300	400	500	600	800
Rectifier terminals (mm^2)	185x2	240x2	185x3	240x3	240x4
Bypass terminals (mm^2)	150x2	185x2	240x2	185x3	240x3
Battery terminals (mm^2)	185x2	240x2	240x3	240x4	240x5
Output terminals (mm^2)	150x2	185x2	240x2	185x3	240x3

(1) Rectifier protection should only be considered in case 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) 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. Ik1: phase to neutral, Ik2: phase to phase, Ik3: three-phase to neutral.

3. REFERENCE STANDARDS AND DIRECTIVES

3.1 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 harmonization legislation:

LVD 2014 / 35 / EU

DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014, on the harmonization 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 harmonization 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.

3.2 STANDARDS

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.

ELECTROMAGNETIC COMPATIBILITY

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

ENVIRONMENTAL

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

3.3 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.