

DELPHYS MX

250 to 900 kVA



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

DELPHYS MX is a high performing transformer based UPS designed to secure power supply to critical industrial applications up to 5.4 MVA.

The isolation transformer installed on the inverter output ensures complete galvanic isolation between DC circuit and load output.

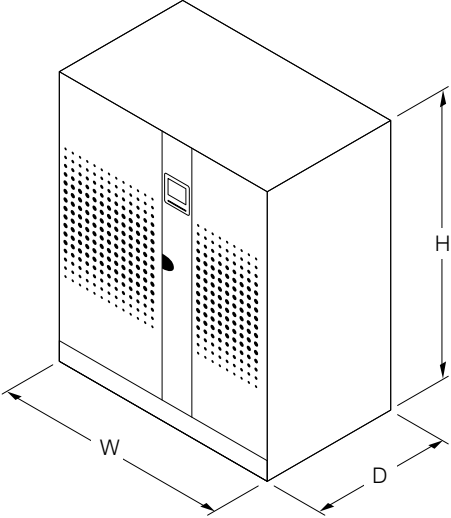
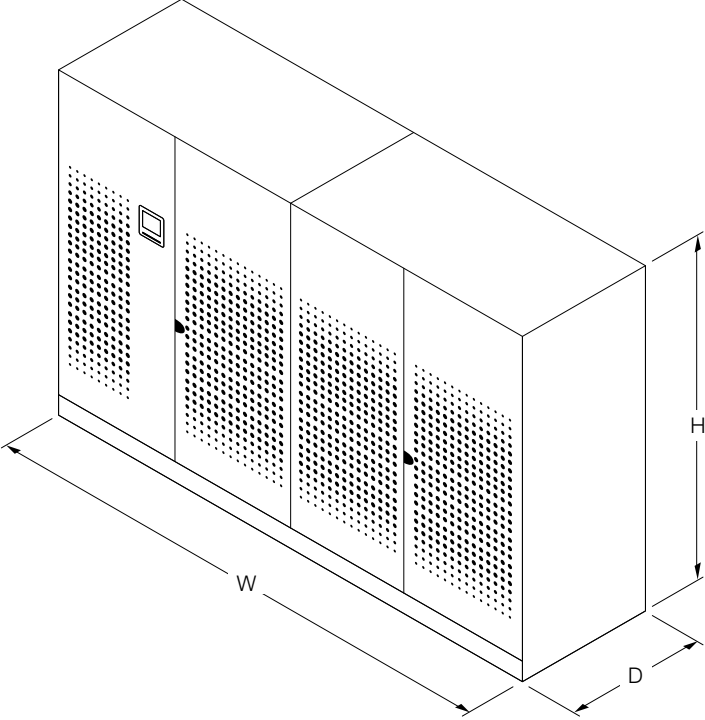
Models						
Rated power (kVA)	250	300	400	500	800	900
DELPHYS MX 3/3	•	•	•	•	•	•

Matrix table for model and kVA power rating

DELPHYS MX 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 250 to 900 kVA

Dimensions			
	Width (W) [mm]	Depth (D) [mm]	Height (H) [mm]
 <p>DELPHYS MX 250 to 500 kVA</p>	1600	995	1930
 <p>DELPHYS MX 800 and 900 kVA</p>	3200	995	2210

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 and can be accessed in the front part,
- the air inlet is on the front, with outflow from the upper side; this means other equipment or external battery enclosures can be placed alongside the UPS unit.

2.2. Flexible backup time

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 backup times.

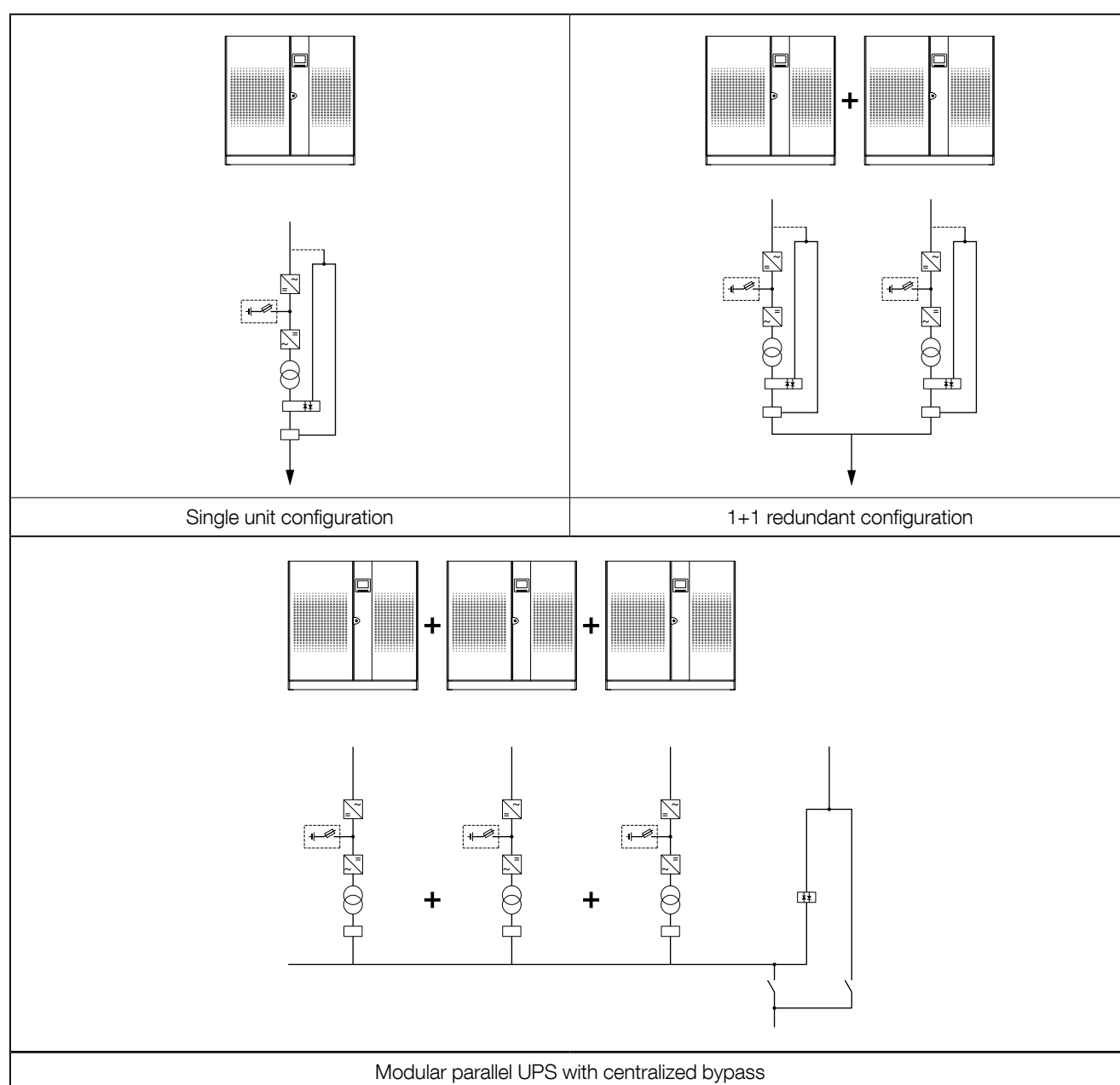
To guarantee maximum back-up time availability and battery life, the DELPHYS MX includes:

- EBS (Expert Battery System), smart battery charging management.

2.3. Parallel

DELPHYS MX UPS units (rectifier, battery, inverter and bypass) can be connected in parallel (up to 6 units) with distributed or central bypass. This solution, which is ideally suited for 1+1 redundancy, offers flexible power upgrading and enables stand-alone UPS units to be expanded. Each single UPS unit has a built-in maintenance bypass (single unit or distributed bypass).

It is possible to add an external maintenance bypass, common to all of the UPS units, for maintenance access.



3. STANDARD AND OPTIONS

3.1. Standard electrical features.

- Backfeed protection: detection circuit.
- Standard interface:
 - 3 inputs (emergency stop, generating set, battery protection),
 - 4 outputs (general alarm, back-up, bypass, preventative maintenance needs).
- EBS (Expert Battery System).

3.2. Electrical options.

- EBS (Expert Battery System).
- FLYWHEEL compatible.
- ACS synchronisation system.
- Redundant electronic power supplies.

3.3. Mechanical options.

- Reinforced IP protection degree.
- Ventilation filters.
- Redundant ventilation with failure detection.
- Top entry connection.

3.4. Standard communication features.

- Multilanguage graphic display.
- Embedded dry contacts.

3.5. Communication options.

- GTS (Graphic Touch Screen).
- ADC interface (configurable voltage-free contacts).
- MODBUS RTU.
- MODBUS TCP.
- PROFIBUS/PROFINET.
- BACnet/IP interface.
- 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)		250	300	400	500	800	900
Phase in/out		3/3					
Active power (kW)		225	270	360	450	720	800
Rated/maximum rectifier input current (EN 62040-3) (A)		374/478	453/543	598/705	780/889	1273/1547	1428/1611
Rated bypass input current (A)		362	433	580	722	1155	1300
Inverter output current @230V (A) P/N		361	433	577	722	1155	1300
Maximum air flow (m³/h)		6140				14600	
Sound level (dBA)		≤ 70			≤ 72	≤ 75	
Dissipation at rated load (minimum mains power present and batteries charged)	W	17200	20630	27300	34000	48000	53000
	kcal/h	14800	17730	23250	29260	41310	45610
	BTU/h	58730	70357	92262	116111	163928	180992
Dimensions (with standard back-up time)	W (mm)	1600				3200	
	D (mm)	995				995	
	H (mm)	1930				2210	
Weight (kg)		2500		2800	3300	5900	

4.2. Electrical characteristics

Electrical characteristics - Input						
Rated power (kVA)	250	300	400	500	800	900
Phase in/out	3/3					
Rated mains supply voltage	380/400/415 V					
Voltage tolerance (ensuring battery recharge)	340 to 460 V				360 to 460 V	
Rated frequency	50/60 Hz					
Frequency tolerance	± 5%					
Power factor (input at full load and rated voltage)	0.93				0.94	
Total harmonic distortion (THDi)	< 4.5%				< 5%	
Max inrush current at start-up	<In (no overcurrent)					
Soft start	50 A/sec (settable)					

Electrical characteristics - Bypass							
Rated power (kVA)		250	300	400	500	800	900
Bypass frequency variation speed		2 Hz/s settable					
Bypass rated voltage		Rated output voltage ±10%					
Bypass rated frequency		50/60 Hz selectable					
Bypass frequency tolerance		±2 Hz (from 0.2 to 4 Hz settable (operation with generator unit))					

Electrical characteristics - Inverter						
Rated power (kVA)	250	300	400	500	800	900
Rated output voltage (selectable)	380/400/415 V					
Output voltage tolerance	Static: < 1% Dynamic: (0-100% Pn) ±2%					
Rated output frequency	50/60 Hz (selectable)					
Output frequency tolerance	0.02 on mains power failure					
Load crest factor (according IEC 62040-3)	3:1					
Voltage harmonic distortion (ThdU)	< 2% on linear load < 4% on distorting load (Ph/N)				< 2% on linear load < 2.5% on distorting load (Ph/N)	
Overload tolerated by the inverter (with mains power present)	125% x 10 min 150% x 1 min					

Electrical characteristics - Efficiency						
Rated power (kVA)	250	300	400	500	800	900
Double conversion efficiency (normal mode)	93.5% at full load					
Efficiency in Eco Mode	98%					

Electrical characteristics - Environment						
Rated power (kVA)	250	300	400	500	800	900
Storage temperatures	-20 to +70 °C (-4 to 158 °F) (15 to 25 °C for better battery life)					
Working temperature	0 to +35 °C (32 to 95 °F) (15 to 25 °C for better battery life)				0 to +35 °C (32 to 95 °F) ⁽¹⁾ (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	IP20 (up to IP52 optional)					
Portability	EN 60068-2					
Colour	RAL 9006 (Grey Toyo)					

(1) Conditions apply.

4.3. Recommended protection devices

RECOMMENDED PROTECTION DEVICES - Rectifier ⁽¹⁾						
Rated power (kVA)	250	300	400	500	800	900
D curve circuit breaker (A)	630		860	1000	1600	

RECOMMENDED PROTECTION DEVICES - General bypass ⁽¹⁾						
Rated power (kVA)	250	300	400	500	800	900
Maximum I ² t supported by the bypass (A ² s)	2250000				5120000	
I _{cc} max (A)	10600				24700	
D curve circuit breaker (A)	630		800		1250	1600

RECOMMENDED PROTECTION DEVICES - Input residual current circuit breaker ⁽²⁾						
Rated power (kVA)	250	300	400	500	800	900
Input residual current circuit breaker	300 mA					

RECOMMENDED PROTECTION DEVICES - Output ⁽²⁾						
Rated power (kVA)	250	300	400	500	800	900
Short-circuit inverter current (A) - (0 to 100 ms) (when AUX MAINS is not present)	256000	256000	400000	841000	1600000	
C curve circuit breaker ⁽³⁾ (A)	160		200	250	400	
High-speed fuse ⁽³⁾ (A)	400		500	700	800	

CABLES - Maximum cable section						
Rated power (kVA)	250	300	400	500	800	900
Rectifier terminals	Copper bar (3x300 mm ²)				Copper bar (4x300 mm ²)	
Bypass terminals						
Battery terminals						
Output terminals						

- (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.

5. REFERENCE STANDARDS AND DIRECTIVES

5.1. Overview

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

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

2006/95/EC	Council Directive 2006/95/EC, dated 16 February 2007, on the reconciliation of legislation within Member States regarding electrical material for use within specific voltage ranges.
2004/108/EC	Council Directive 2004/108/EEC, dated 15 December 2004, on the harmonisation of legislation within Member States regarding electromagnetic compatibility, in abrogation of directive 89/336/EEC.

5.2. Standards

5.2.1. Electromagnetic compatibility

Electromagnetic Compatibility Provisions (EMC)

EN 62040-2.	Electromagnetic compatibility (class C3 standard - C2 optional)
EN 61000-2-2	Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems
EN 61000-4-2	Electrostatic discharge immunity test,
EN 61000-4-3	Radiated radio-frequency electromagnetic field immunity test,
EN 61000-4-4	Electrical fast transient/burst immunity test,
EN 61000-4-5	Surge immunity test,
EN 61000-4-6	Immunity to conducted disturbances, induced by radio-frequency fields.
EN 55011 class A	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.

5.2.2. Safety

General and safety requirements for UPS used in operator access areas

EN 60950-1	General and safety requirements for equipment used in operator access areas
EN 62040-1	General and safety requirements for UPS used in restricted access locations
EN 60439-1	Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies,
EN 50272-2	Safety requirements for secondary batteries and battery installations
EN 60896-1	Stationary lead-acid batteries. General requirements and methods of test. Part 1: Vented types
EN 60896-2	Stationary lead-acid batteries. General requirements and methods of test. Part 1: Valve-regulated types
EN 60146	Semiconductor convertors
EN 60529	Degrees of protection provided by enclosures

5.2.3. Type and performances

Performance requirements and methods of test

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

The regulations refer to the unit (UPS) to which the manufacturer must comply with. The UPS engineer adhere's to current legislation for the specific electrical system (e.g. EN 60364).