

# ***DELPHYS MX***

From 250 to 900 kVA





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# PURPOSE

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.

# 1. ARCHITECTURE

## 1.1. Range

**Delphys MX** integrates the latest and most powerful generation of Insulate Gate Bipolar Transistors (IGBTs). The use of microproces-  
sors increases the number of functions for more secure operation.

The implementation of cutting-edge technology such as Surface Mounted Technology (SMT) has reduced the number and size of  
the circuit boards. This reduction in the number of components enhances the reliability of **Delphys MX** by increasing its resistance  
to electromagnetic disturbances.

Models							
		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.

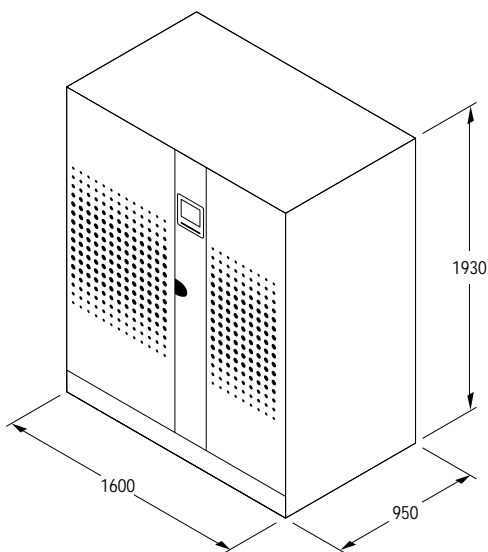
## 2. FLEXIBILITY

### 2.1. Power ratings from 250 to 900 kVA

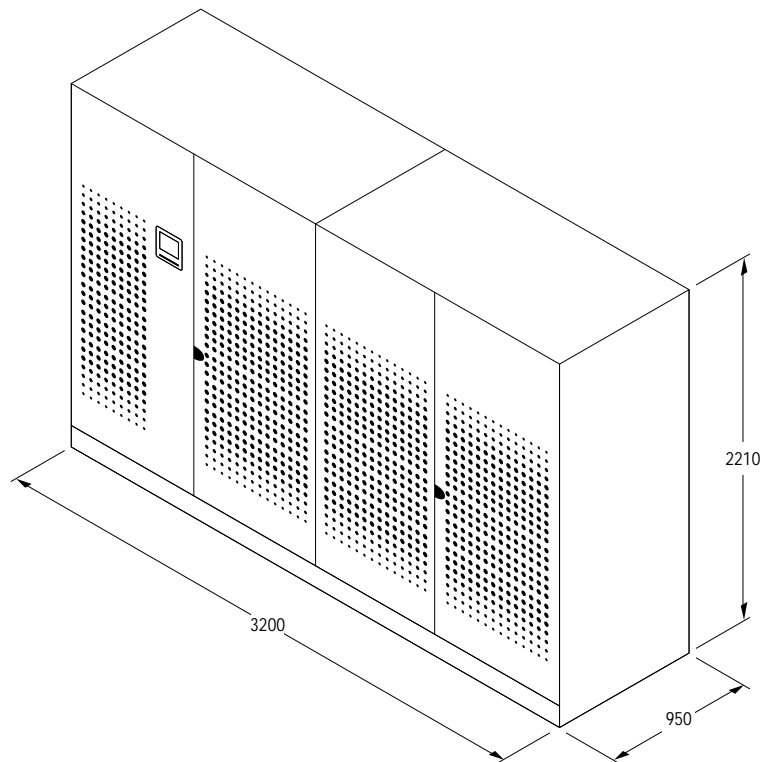
The equipment has been designed with a minimum direct and indirect footprint (the actual space occupied by the unit and the space required around it for maintenance, ventilation and access to the operating mechanisms and communication devices). The careful design also provides easy access for maintenance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

All of the control mechanisms and communication interfaces are located in the upper front part and can be accessed from the 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.

Dimensions			
Cabinet type	Width (W)	Depth (D)	Height (H)
Delphys MX 250-500 kVA [mm]	1600	950	1930
Delphys MX 800-900 kVA [mm]	3200	950	2210



**DELPHYS MX 250-500 kVA**



**DELPHYS MX 800-900 kVA**

## 2.2. Flexible backup time

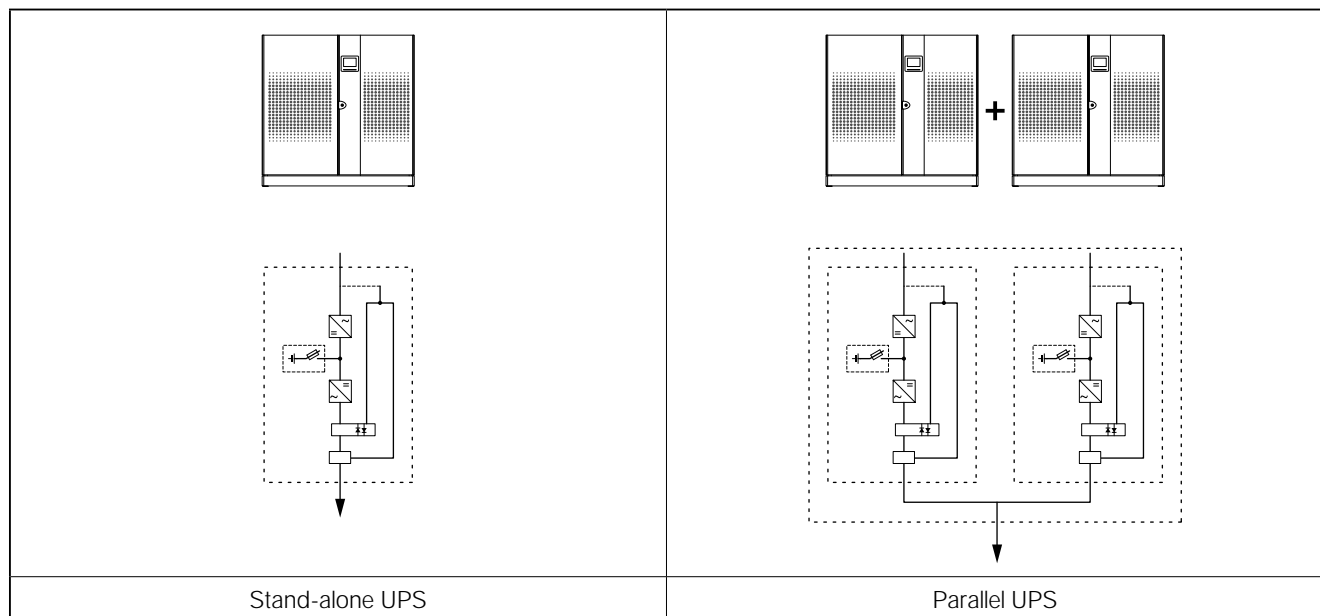
Selection of the back-up time is flexible thanks to the wide range of **DC bus** voltages. The batteries are organised internally into racks based on their relative sizes, so as to ensure a compact unit while still guaranteeing substantial backup times. To guarantee maximum back-up time availability and battery life, the **Delphys MX** includes **Expert Battery System (EBS)**, smart battery charging management and **BHC Universal** (Battery Health Check) to optimise the battery lifetime (available on request).

## 2.3. Parallel

**Delphys MX** consists of modular UPS units (rectifier, battery, inverter and bypass) connected in parallel (up to 6 UPS units). This solution, which is ideally suited for 1+1 redundancy, offers flexible power upgrading and enables stand-alone UPS units to be expanded, even if this was not planned in the original design of the system.

Each UPS unit has a built-in maintenance bypass.

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



## 3. ACCESSORIES

### 3.1. Communication interfaces

**Delphys MX** can manage various different serial, contact and Ethernet communication channels at the same time:

The various cards and signalling accessories can be housed in the communication slots mounted as standard on all models. This provides **Delphys MX** UPS systems with a highly flexible interface for the purposes of integration at a later stage after installation, also in terms of hot switching and with no need for specialist personnel.

Models	40x8 LCD display	GTS graphic display	1-7 slots						UniVision Pro and JNC	T.Service	EMD combined with NetVision	Remote mimic panel
			Serial 232/485	Dry contact card	Second serial 232	ADC	Modem	NetVision card and JNC				
Delphys MX	•	○	•	•	○	○	○	○	○	○	○	○
<ul style="list-style-type: none"> <li>• Standard</li> <li>○ Option</li> <li>- Not available</li> </ul> <p>For a description of the options, see glossary</p>												

### 3.2. Hardware Equipment

Models	Separate mains	Built-in manual bypass	External manual bypass	Input/output Transformer	Insulation monitoring device	Battery charger	Auxiliary battery charger	Back feed control system	Integrated Back feed protection	IP52	BHC	Redundant power supply	ACS	Parallel kit
Delphys MX	•	•	○	○	○	•	○	•	○	○	○	○	○	○
<ul style="list-style-type: none"> <li>• Standard</li> <li>○ Option</li> <li>- Not available</li> </ul> <p>For a description of the options, see glossary</p>														



## 4. 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, and a residual current circuit breaker.

Current flowing to earth varies depending on the size of the UPS, therefore installation engineers must install a residual current circuit breaker of an appropriate rating upstream of the UPS using a selective model (not sensitive to transitory currents).

Potential dispersion of current from utilities downstream of the UPS should be added to that discharged from the UPS, and it should also be noted that current peaks are also reached, albeit very briefly, during transitory phases. It is recommended to isolate the residual current circuit breaker by adding 30mA protection downstream of the UPS on power lines to utilities.

We also recommend checking first for any earth leakage current with an uninterruptible power supply installed and running at the final load to prevent any untimely tripping of the breakers.

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

See the relevant table for the data on the cable size and safety devices required.

For detailed information, see the installation and operating manual.

## 5. SPECIFICATIONS

### 5.1. Delphys MX

#### 5.1.1. Installation parameters

Installation parameters							
Model		MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Phase in/out		3/3	3/3	3/3	3/3	3/3	3/3
Rated power (kVA)		250	300	400	500	800	900
Active power (kW)		225	270	360	450	720	800
Rated/maximum rectifier input current (EN 62040-3) (A)		550 / 605	633 / 690	822 / 880	864 / 950	1273/1547	1428/1611
Rated/maximum bypass input current (EN 62040-3) (A)		362	433	580	722	1155	1300
Inverter output current @230V (A) P/N		361	433	577	722	1155	1300
Maximum air flow (m <sup>3</sup> /h)		6140				14600	
Sound level (dBA)		70	70	70	72	76	
Dissipation at rated load (minimum mains power present and batteries charging)	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)	950				995	
	H (mm)	1930				2210	
Weight (kg)		2300		2650	3000	5900	

#### 5.1.2. Electrical characteristics

Electrical characteristics - <b>Input</b>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Phase in/out	3/3	3/3	3/3	3/3	3/3	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 - <b>Bypass</b>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Bypass frequency variation speed	2 Hz/s settable					
Bypass rated voltage	Rated output voltage $\pm 10\%$					
Bypass rated frequency	50/60 Hz selectable					
Bypass frequency tolerance	$\pm 2$ Hz (from 0.2 to 4 Hz settable (operation with generator unit))					

Electrical characteristics - <b>Inverter</b>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 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	3:1					
Voltage harmonic distortion	< 2% on linear load < 4% on distorting load (Ph/N)				< 2% on linear load < 3% on distorting load (Ph/N)	
Overload tolerated by the inverter (with mains power present)	125% x 10 min 150% x 1 min					

Electrical characteristics - <b>Efficiency</b>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Double conversion efficiency (normal mode)	93.5% at full load				93.5% at full load	
Efficiency in Eco Mode	98%					

Electrical characteristics - <b>Environment</b>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Storage temperatures	-20 +70 °C (-4-158 °F) (15-25 °C for best battery life)					
Working temperature	10 °C to +35 °C (50-95 °F) (15-25 °C for best battery life)					10 °C to +35 °C (50-95 °F) <sup>(1)</sup>
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) Condition apply.

## 5.1.3. Recommended protection devices

RECOMMENDED PROTECTION DEVICES - Rectifier <sup>(2)</sup>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
D curve circuit breaker <sup>(1)</sup> (A)	630	630	860	1000	1600	1600

RECOMMENDED PROTECTION DEVICES - General bypass <sup>(2)</sup>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Maximum I <sup>2</sup> t supported by the bypass (A <sup>2</sup> s)	2250000				5120000	
I <sub>cc</sub> max (A)	10600				24700	
D curve circuit breaker <sup>(1)</sup> (A)	630	630	800	800	1250	1600

RECOMMENDED PROTECTION DEVICES - Input residual current circuit breaker <sup>(3)</sup>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Input residual current circuit breaker	300 mA					

RECOMMENDED PROTECTION DEVICES - Output <sup>(3)</sup>						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Maximum inverter I <sup>2</sup> t at 100 ms (short-circuit in battery mode) (A <sup>2</sup> s)	256000	256000	400000	841000	1600000	
C curve circuit breaker <sup>(4)</sup> (A)	160	160	200	250	400	
High-speed fuse <sup>(4)</sup> (A)	400	400	500	700	800	

RECOMMENDED PROTECTION DEVICES - Terminals and cable section						
Model	MX 250	MX 300	MX 400	MX 500	MX 800	MX 900
Rectifier terminals (maximum cable section)	Copper bar (3x300 mm <sup>2</sup> )				Copper bar (4x300 mm <sup>2</sup> )	
Bypass terminals (maximum cable section)	Copper bar (3x300 mm <sup>2</sup> )				Copper bar (4x300 mm <sup>2</sup> )	
Battery terminals (maximum cable section)	Copper bar (3x300 mm <sup>2</sup> )				Copper bar (4x300 mm <sup>2</sup> )	
Output terminals (maximum cable section)	Copper bar (3x300 mm <sup>2</sup> )				Copper bar (4x300 mm <sup>2</sup> )	

(1) For parallel topologies, cables must be selected 1.5 times larger than the recommended size.

(2) Rectifier protection alone should only be considered in the event of separate inputs; if the bypass and rectifier inputs are combined, the general input protection rating (bypass + rectifier) must reflect the recommended bypass or general protection rating.

(3) 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.

(4) Selectivity of distribution after the UPS with inverter short-circuit current (short-circuit in battery mode). The rating of the protection can be increased by "n" times for series-parallel machines, with "n" equal to the number of parallel machines.

## 6. REFERENCE STANDARDS AND DIRECTIVES

### 6.1. 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.

### 6.2. Standards

#### 6.2.1. 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.

#### 6.2.2. 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

#### 6.2.3. 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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### 6.3. System and installation guidelines

Once installed in a system, the UPS will not alter the neutral conditions; this is because the neutral input terminal "N" is connected directly to output terminal "N1" inside the equipment. If the neutral condition of the system downstream of the UPS needs modification, it will be necessary to install the IP version or to use the isolation transformer option.

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

