DELPHYS GP

Green Power 2.0 range

160 to 800 kVA/kW

3 LEVEL TECHNOLOGY

96% EFFICIENCY

kW = kVA

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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.

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 GP is a full range of high performing Green Power 2.0 UPS designed to:

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

GREEN POWER 2.0								
Rated power (kVA)	160	200	250	320	400	500	600	800
DELPHYS GP 3/3	•	•	•	•	•	•	•	•

Matrix table for model and kVA power rating

DELPHYS GP 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 160 to 800 kVA/kW

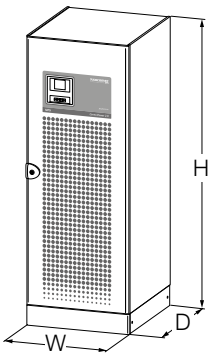
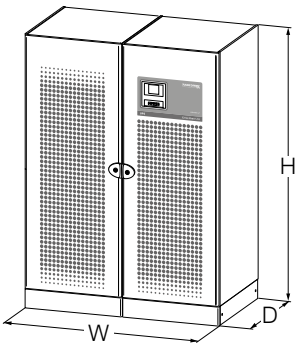
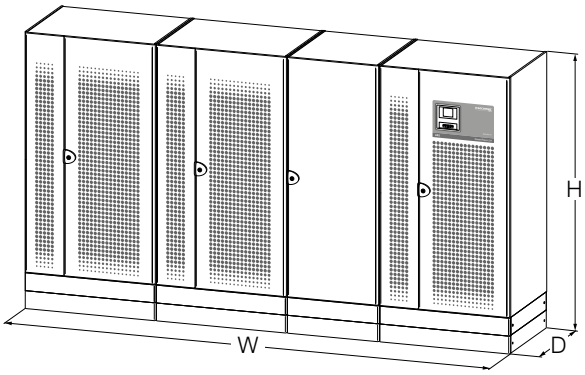
The equipment has been designed with a minimum direct and indirect footprint (the actual space occupied by the unit and the space required around it for maintenance, ventilation and access to the operating mechanisms and communication devices).

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

All of the control mechanisms and communication interfaces are located in the front side and can be accessed from a door provided with handle and lock.

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.

DELPHYS GP - Dimensions

		Width (W) [mm]	Depth (D) [mm]	Height (H) [mm]
	160 kVA/kW	700	800	1930
	200 kVA/kW			
	250 kVA/kW	1000	950	1930
	320 kVA/kW	1400	800	
	400 kVA/kW			
	500 kVA/kW	1600	950	
	600 kVA/kW	2800	950	2060
	800 kVA/kW	3700		

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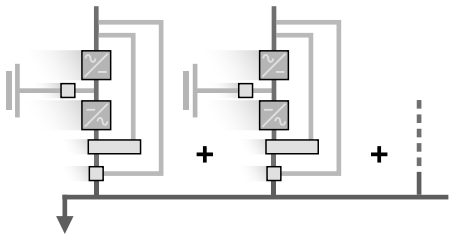
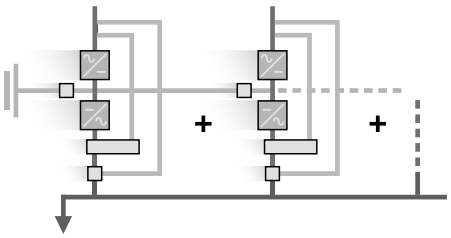
2.2. Battery management

Available with distributed batteries, DELPHYS GP allows to optimise the batteries size thanks to a shared battery operation. 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.

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

- EBS (Expert Battery System), smart battery charging management.
- Distributed or shared battery for energy storage optimization on parallel systems.
- Capability to discharge the battery at a programmable power (“BCR” option), without any load bank.

	
Distributed battery	Shared battery

2.3. UPS and system architectures

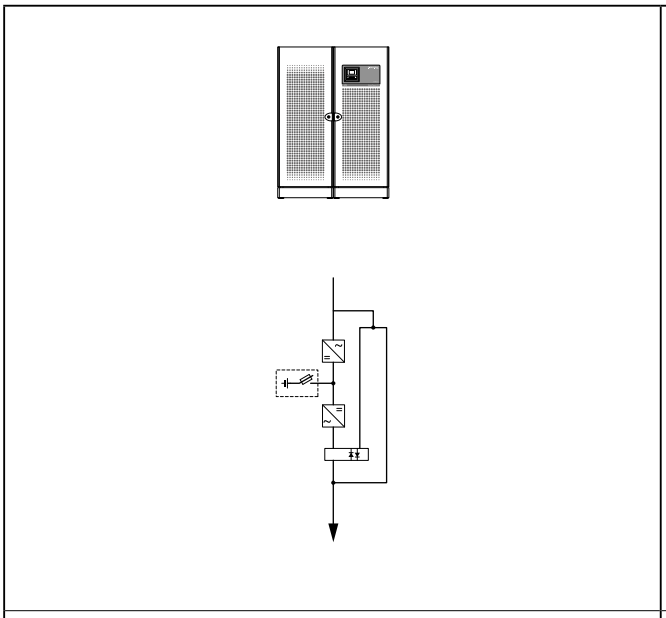
DELPHYS GP units (rectifier, battery, inverter and bypass) can be connected in parallel with distributed or central bypass:

- up to 8 units (160, 200, 250 and 500 kVA/kW)
- up to 6 units (320 and 400 kVA/kW)
- up to 4 units (600 and 800 kVA/kW)

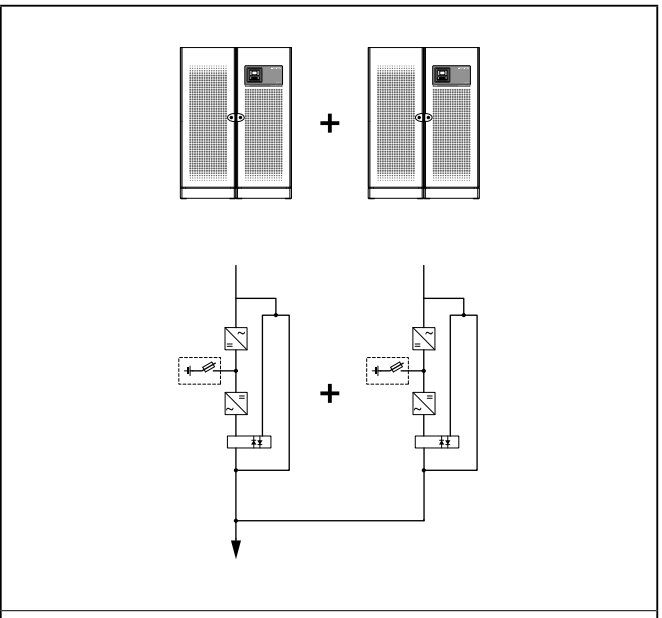
This solution, which is ideally suited for N+1 redundancy, offers flexible power upgrading and enables stand-alone UPS units to be expanded.

Each single UPS unit has a built-in maintenance bypass (single unit or 1+1 distributed bypass).

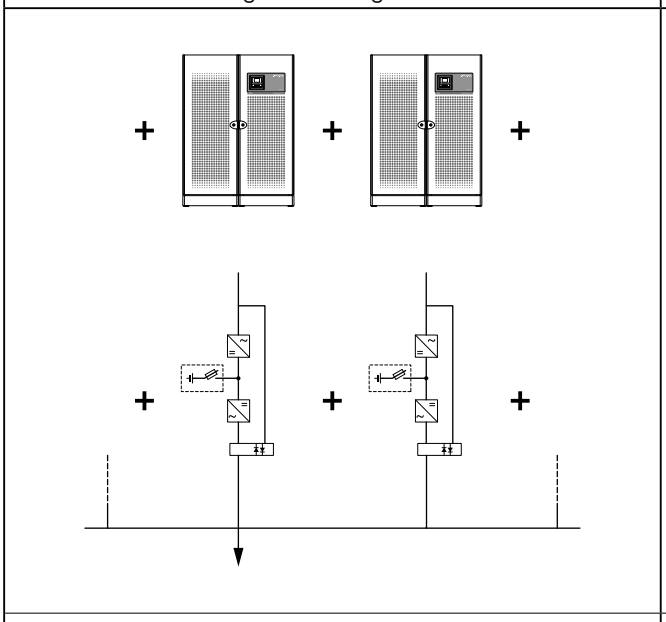
It is possible to add an external maintenance bypass, common to all of the UPS units, for maintenance access. A central bypass configuration has a common maintenance bypass for the complete system.



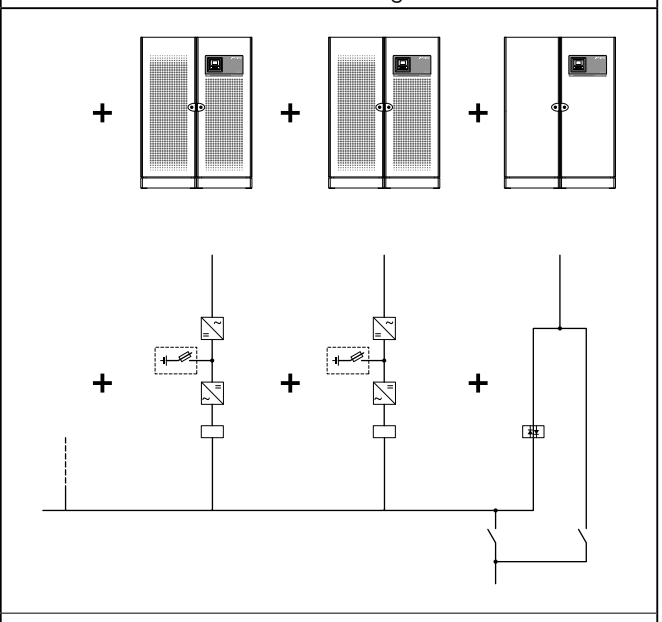
Single unit configuration



1+1 redundant configuration



Modular parallel UPS with distributed bypass



Modular parallel UPS with centralised bypass

3. STANDARD AND OPTIONS

3.1. Standard electrical features.

- Integrated maintenance bypass (single and 1+1 redundant units).
- Backfeed protection: detection circuit.
- EBS (Expert Battery System) for battery management.
- Redundant cooling.
- Battery temperature sensor.

3.2. Electrical options.

- Separated or common input mains.
- External maintenance bypass.
- Extended battery charger capability.
- Shared battery.
- Flywheel compatible.
- Galvanic isolation transformer.
- Backfeed isolation device.
- ACS synchronisation system.
- BCR (Battery Capacity Re-injection).
- FAST ECOMODE.

3.3. Standard communication features.

- User-friendly multilingual interface with graphic display.
- 2 slots for communication options.
- Ethernet connection (WEB/SNMP/email).
- USB port for event log access.

3.4. Communication options.

- Advanced server shutdown options for stand-alone and virtual servers.
- 4 additional slots for communication options.
- ADC interface (configurable voltage-free contacts).
- MODBUS TCP.
- MODBUS RTU.
- BACnet/IP interface.

3.5. 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 paramenters									
Rated power (kVA)		160	200	250	320	400	500	600	800
Phase in/out		3/3							
Active power (kW)		160	200	250	320	400	500	600	800
Rated/maximum rectifier input current (EN 62040-3) (A)		244/290	305/340	380/425	488/580	610/680	760/850	915/1020	1140/1275
Rated bypass input current (A)		231	289	361	462	578	722	866	1155
Inverter output current @ 230 V (A) P/N		231	289	361	462	578	722	866	1155
Maximum air flow (m^3/h)		2250		2700	4500		5400	6750	8100
Sound level (dBA)		≤ 65	≤ 67	≤ 70	≤ 68	≤ 70	≤ 72		≤ 74
Power dissipation in nominal conditions[1]	(W)	7900	10400	12800	17000	22000	24300	31800	45000
	(kcal/h)	6797	8948	11013	14627	18929	20908	27361	38718
	(BTU/h)	26956	35486	43675	58006	75066	82914	108505	153545
Power dissipation (max) in the worst conditions[2]	(W)	10000	13000	15000	20000	26000	30000	39000	48000
	(kcal/h)	8604	11185	12906	17208	22370	25812	33555	41300
	(BTU/h)	34121	44358	51182	68242	88716	102364	133074	163782
Dimensions	W (mm)	700		1000	1400		1600	2800	3700
	D (mm)	800		950	800		950	950	
	H (mm)	1930						2060	
Weight (kg)		470	490	850	980	1000	1500	2300	3400

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).

4.2. Electrical characteristics

Electrical characteristics - **Rectifier[1] Input**								
Rated power (kVA)	160	200	250	320	400	500	600	800
Rated mains supply voltage (V)	400 3ph							
Voltage tolerance	200 V to 480 V[2]							
Rated frequency	50/60 Hz							
Frequency tolerance	42 to 65 Hz							
Power factor	> 0.99							
Total harmonic distortion (THDi) (at full load and rated voltage)	< 2.5%[3]							
Max inrush current at start-up	< In (no overcurrent)							
Soft start	50 A/sec (settable)			100 A/sec (settable)			150 A/sec (settable)	

(1) IGBT rectifier. (2) Conditions apply. (3) With input THDV < 1%.

Electrical characteristics - **Battery**								
Rated power (kVA)	160	200	250	320	400	500	600	800
Min/Max number of battery cells with load PF=1	216/258	258/258	252/258	216/258	258/258	252/258	258/258	258/258
Min/Max number of battery cells with load PF ≤ 0,9	216/258	234/258	234/258	216/258	234/258	234/258	234/258	246/258
Min/Max number of battery cells with load PF ≤ 0,8	216/258	216/258	216/258	216/258	216/258	216/258	216/258	234/258
Battery AC ripple current	< 3% C10							
Battery AC ripple voltage	< 1% on the battery bloc							

Electrical characteristics - **Bypass**								
Rated power (kVA)	160	200	250	320	400	500	600	800
Bypass frequency variation speed	1.5 Hz/s settable from 1 to 3 Hz/s							
Bypass rated voltage	Nominal output voltage ±15% (settable)							
Bypass rated frequency	50/60 Hz (selectable)							
Bypass frequency tolerance	±2% (from ±1% to ±8% (operation with generator unit))							

Electrical characteristics - **Inverter**									
Rated power (kVA)		160	200	250	320	400	500	600	800
Rated output voltage (selectable) (V)		400 3ph + N (380/415 configurable)							
Output voltage tolerance		static load ±1%, dynamic load VF-SS-111 compliant							
Rated output frequency (Hz)		50/60 Hz (selectable)							
Autonomous frequency tolerance		±0.02% on mains power failure							
Load crest factor (according IEC 62040-3)		3:1							
Harmonic voltage distortion		ThdU ≤ 1,5 % with rated linear load							
Overload tolerated by the inverter - 25 °C	10 min	200 kW	225 kW	280 kW	400 kW	450 kW	560 kW	675 kW	840 kW
	1 min	240 kW	270 kW	312 kW	480 kW	540 kW	625 kW	810 kW	935 kW

Electrical characteristics - **Efficiency**								
Rated power (kVA)	160	200	250	320	400	500	600	800
Double conversion efficiency (normal mode - VFI)	up to 96%							
Fast EcoMode	up to 99%							

Electrical characteristics - **Environment**								
Rated power (kVA)	160	200	250	320	400	500	600	800
Storage temperatures	-20 to +70 °C (-4 to +158 °F) (15 to 25 °C for better battery life)							
Start-up and working temperature	+10 to +40 °C(1) (+50 to +104 °F) (15 to 25 °C for better battery life)							
Maximum relative humidity (non-condensing)	95%							
Maximum altitude without derating	1000 m (3,300 ft)							
Degree of protection	IP 20 (other IP as option)							
Portability	EN 60068-2							
Colour	cabinet: RAL 7012, door: silver grey							

(1) Conditions apply.

4.3. Recommended protections

RECOMMENDED PROTECTION DEVICES - **Rectifier**[1]								
Rated power (kVA)	160	200	250	320	400	500	600	800
Circuit breaker (A)	315	400	630		800	1000	1250	1600
gG fuse (A)	315	400	630		800	1000	1250	1600

RECOMMENDED PROTECTION DEVICES - **General bypass** [1]								
Rated power (kVA)	160	200	250	320	400	500	600	800
Maximum I^2t supported by the bypass (A^2s)	320000			780000		1050000	1843000	
$I_{s/c}$ max (A peak)	8000			12500		14500	19200	
Circuit breaker (A)	400		630		800		1000	1250

RECOMMENDED PROTECTION DEVICES - **Input residual current circuit breaker** [2]								
Rated power (kVA)	160	200	250	320	400	500	600	800
Phase in/out	3/3							
Input residual current circuit breaker	3 A							

RECOMMENDED PROTECTION DEVICES - **Output** [3]								
Rated power (kVA)	160	200	250	320	400	500	600	800
Short-circuit inverter current Ik1=Ik2=Ik3[4] (A) - (0 to 100 ms) (when AUX MAINS is not present)	800		900	1600		1800	2200	2500
C curve circuit breaker (A)	≤ 80			≤ 160			≤ 200	≤ 250
B curve circuit breaker (A)	≤ 125		-					

CABLES CONNECTION - **Maximum capability per pole**								
Rated power (kVA)	160	200	250	320	400	500	600	800
Rectifier terminals (mm^2)	2 x 150		2 x 150	3 x 300			4 x 300	
Bypass terminals (mm^2)	2 x 150		2 x 150	3 x 300			4 x 300	
Battery terminals (mm^2)	2 x 240		2 x 240	2 x 300		3 x 300	4 x 300	
Output terminals (mm^2)	2 x 150		2 x 150	3 x 300			4 x 300	

(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) Ik1: phase to neutral, Ik2: phase to phase, Ik3: three-phase.

5. REFERENCE STANDARDS AND DIRECTIVES

5.1. Overview

The construction of the equipment and choice of materials and components comply with all 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

On the approximation of the laws of the Member States relating to electromagnetic compatibility

5.2. Standards

5.2.1. Electromagnetic compatibility

"Electromagnetic Compatibility Provisions (EMC)"

EN 62040-2 Electromagnetic compatibility (C3 category)

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 50272-2	Safety requirements for secondary batteries and battery installations
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

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).