

Green Power 2.0

500 kVA

Installation manual 



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1. WARRANTY CERTIFICATE

The warranty terms and conditions are stipulated in the offer, by default the following clauses apply.

The SOCOMEC warranty is strictly limited to the product(s) and does not extend to equipment which may be integrated with this/these product(s), nor the performance of such equipment.

The manufacturer guarantees its products to be free from manufacturing faults and defects in design, material or workmanship, subject to the limits set forth below.

The manufacturer reserves the right to modify the delivery with a view to fulfilling these guarantees or to replace defective parts. The manufacturer's warranty does not apply in the following cases:

- fault or defect in the design of parts added or supplied by the customer
- fault due to unforeseen circumstances or force majeure
- replacement or repair resulting from normal wear and tear of the modules or machinery
- damage caused by negligence, lack of proper maintenance or misuse of the products
- repair, modification, adjustment or replacement of parts undertaken by unqualified third parties or personnel without the express consent of SOCOMEC.

The warranty period is twelve months commencing from the date of delivery of the product.

The repair, replacement or modification of the parts during the warranty period does not imply or justify any extension of the warranty beyond the original period.

In order to establish a valid warranty claim, the purchaser must notify the manufacturer in writing immediately after the discovery of any apparent material defects and provide any and all supporting evidence of the defects at the latest within eight days before the date of expiry of the warranty.

Defective parts which have been returned and replaced free of charge shall become the property of SOCOMEC.

The warranty is void if the purchaser has undertaken modifications or repairs on the devices on his or her own initiative and without the express consent of the manufacturer.

The manufacturer's responsibility is strictly limited to the obligations defined in this warranty (repair and replacement) excluding any other right to claim compensation or indemnity.

Any import tax, duty, fee or charge of any nature whatsoever imposed by European regulations or those of an importing country or of a transit country shall be paid by the purchaser.

2. SAFETY

2. 1. IMPORTANT

- This document provides important instructions for the safe use, movement and connection of the uninterruptible power system (UPS).
- SOCOMEC retains the full and exclusive ownership rights over this document. Only a personal right to utilize the document for the application indicated by SOCOMEC is granted to the recipient of such document. All reproduction, modification, dissemination of this document whether in part or whole and by any manner are expressly prohibited except upon Socomec's express prior written consent.
- This document is not a specification. SOCOMEC reserves the right to make any changes to data without prior notice.
- The unit must be installed and activated only by qualified technical personnel and authorised by SOCOMEC.



Green Power 2.0 MUST be handled with the utmost care by at least two people.

- The unit must remain in a vertical position in all circumstances.
- Connect the PE ground conductor first before you make any other connection.



The UPS mains power supplies (rectifier and bypass) must be protected from voltage transients with devices that are suited to the installation; the mains voltage transients must be limited to 2.5 kV. These devices must be sized to take into account all the installation parameters (geographical position, whether or not there is a lightning rod, whether or not there are other suppressors in the electrical installation, etc.).

- Do not expose UPS to rain or liquids in general. Do not introduce external bodies.
- If UPS is not equipped with automatic sectioning against back feed or if the switch is external to UPS, affix a label bearing the following words on all the external switches of UPS power supply:

Before working on this circuit

- isolate Uninterruptible Power System (UPS) Green Power 2.0
 - then check for Hazardous Voltage between all terminals including the protective earth

Risk of Voltage Backfeed



- Keep this manual handy for future consultation.
- If the unit fails, it must be repaired only by authorised technicians that have been specially trained for this purpose.
- This equipment conforms to the European Community directives for professional equipment and bears the approval mark: **CE**
- This equipment conforms to AS standards and bears the approval mark:



- Do not connect the output neutral to ground (except the TNC Option). Green Power 2.0 does not modify the neutral arrangements of the system; the use of an isolation transformer is required should it be necessary to modify the neutral arrangements downstream of the UPS (see § 4.5.1 "Connecting earth cables").
- If the UPS needs to be scrapped, it is essential to entrust the equipment solely and exclusively to specialist disposal companies. These are obliged to break up and dispose of the various components in accordance with the legal provisions in force nationally.
- Before connecting the external battery cabinet, check that this is fully compatible with the model of UPS.
- The use of external battery cabinets not supplied by the manufacturers is not recommended.
- Switch off and isolate UPS and then wait for 5 minutes before removing the protection panels in order to carry out work on parts under dangerous voltage.
- Danger of explosion if the batteries are replaced with others of the wrong type.
- The batteries are considered as toxic waste. If they are replaced, entrust the used batteries solely and exclusively to specialist disposal companies. As provided for by the local laws in force, batteries must not be disposed of with other industrial or domestic waste.



It is very dangerous to touch any part of the batteries as there is no isolation between the batteries and the mains power source.

The product you have chosen is designed for commercial and industrial use only. In order to be used for particular "critical applications" such as life support systems, medical applications, commercial transportation, nuclear facilities or any other application or systems where product failure is likely to cause substantial harms to person or property, the products may have to be adapted. For such uses we would advise you to contact SOCOMEC beforehand to confirm the ability of these products to meet the requested level of safety, performance, reliability and compliance with applicable laws, regulations and specifications.



This is a product for commercial and industrial application in the second environment – installation restrictions or additional measures may be needed to prevent disturbances.

2. 2. DESCRIPTION OF THE SYMBOLS USED ON THE LABELS APPLIED TO THE UNIT

All the precautions and the warnings on the labels and plates on the inside and outside of the equipment should be respected.



DANGER! HIGH VOLTAGE (BLACK/YELLOW)



GROUND TERMINAL



READ THE USER MANUAL BEFORE USING THE UNIT

F Attention ! Présence de tensions élevées.
Après mise hors tension, attendre 5 minutes avant de retirer les panneaux de protection.

GB Warning ! High voltage inside.
After complete shutdown, wait 5 minutes before removing the cover protection.

D Vorsicht ! Gefährliche Spannung.
Nach dem Ausschalten, warten Sie ca. 5 Minuten bevor Sie die Schutzplatten entfernen.

E Atención ! Presencia de tensiones peligrosas.
Después de la puesta sin tensión, esperar 5 minutos antes de quitar los paneles de protección.

I Attenzione ! Presenza di tensioni elevate.
Dopo aver tolto l'alimentazione, attendere 5 minuti prima di ritirare i pannelli di protezione.

E 223918 F

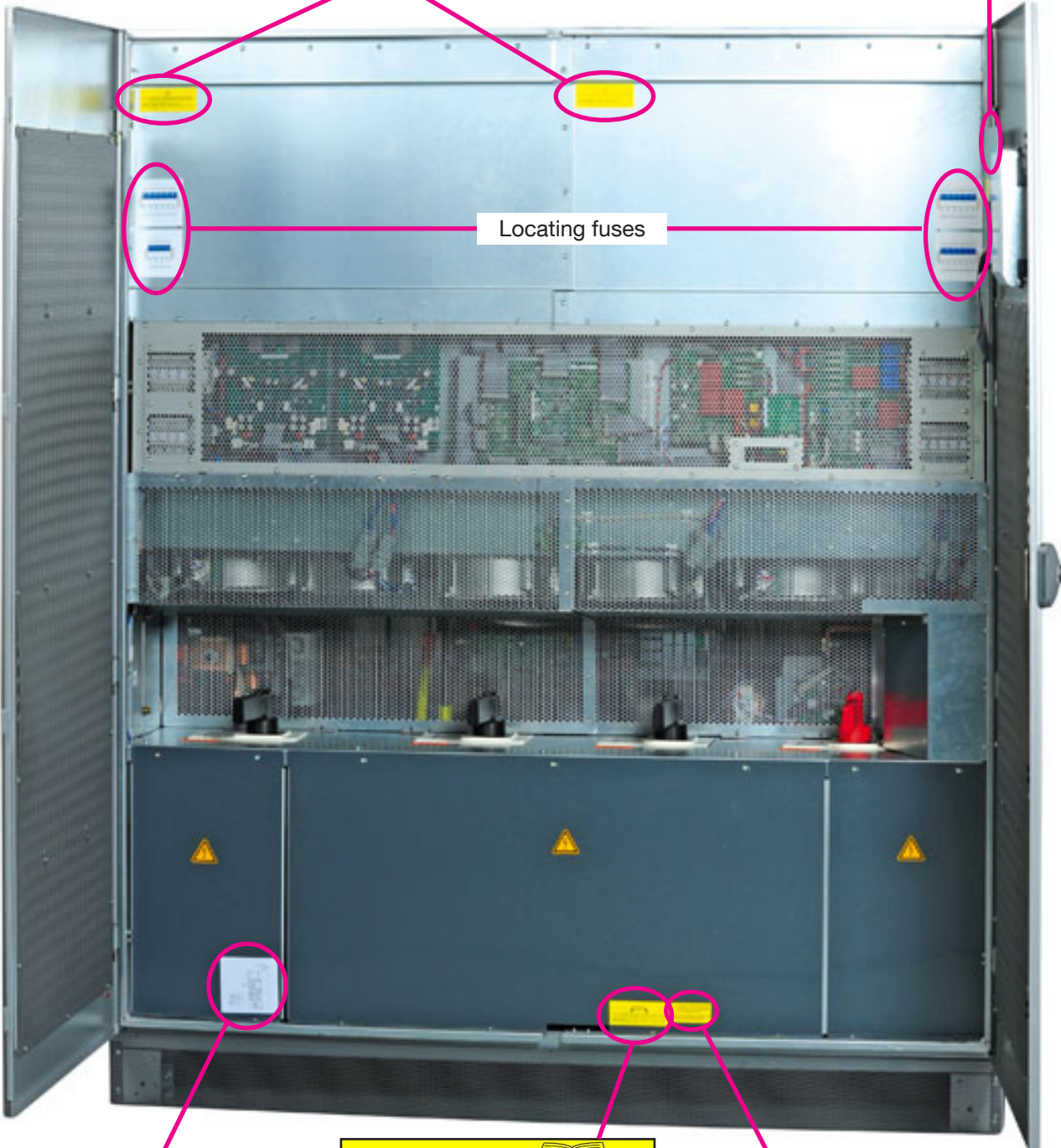
Nameplate

socomec 11 route de Strasbourg - BP 10058
92225 Fontenay-sous-Forest (FRANCE)
Tel. (09 33) 85 57 45 45 - Fax. (09 33) 30 38 74 87 59

DATE: _____ Year: 2009 Week: _____
SERIAL N°: _____

Input / Output	Max. Amb. Temp.: _____
Wires	
Voltage	
Frequency	
Switching	

CE



Locating fuses

Rack slots (see § 5.18)

F Attention !
Cet appareil peut avoir plusieurs sources d'alimentation.
Pour l'isoler, consulter le manuel d'exploitation.

GB Caution !
This system can have several power sources.
For the isolation, please refer to the operating manual.

D Vorsicht !
Das System kann mehrere Versorgungsquellen haben.
Zur Isolierung, siehe die Bedienungsanleitung.

E Atención !
El sistema puede tener varias fuentes de alimentación.
Para aislar el sistema, véase el manual de utilización.

I Attenzione !
Il sistema può avere diverse sorgenti di alimentazione.
Per isolare il sistema, consultare il manuale d'uso.

E 223928 B

FR EQUIPEMENT DESTINE A ETRE MONTE SUR UNE SURFACE EN BETON OU SUR TOUTE AUTRE SURFACE NON COMBUSTIBLE.

GB THIS EQUIPMENT SHOULD BE MOUNTED ON A CONCRETE SURFACE OR ANY OTHER NONCOMBUSTIBLE SURFACE.

3. FOREWORD

We thank you for the trust you have in SOCOMEC Uninterruptible Power Systems, Green Power 2.0.

This equipment is fitted with up to date technology with power semiconductors (IGBT) including a digital micro-controller.

Our equipment complies with standard IEC 62040-2 and IEC 62040-1.



This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances.

It is recommended that the ambient temperature and the humidity of UPS environment are maintained below the values specified by the manufacturer.

REGULATIONS CONCERNED WITH ENVIRONMENTAL ISSUES

Recycling of electrical products and equipment.

Provision is made in European countries to break up and recycle materials making up the system. The various components must be disposed of in accordance with the legal provisions in force in the country where the system is installed.

Battery wastes

Used batteries are considered as toxic wastes. It is therefore essential to entrust them solely and exclusively to firms specialised in their recycling. They can not be treated with other industrial or household wastes, as set out in local regulations in force.

4. REQUISITES

The packaging guarantees the stability of the UPS during shipping and physical transfer. Carry the packaged unit as close as possible to the installation site.



When moving the unit on even slightly sloping surfaces, use the blocking equipment and breaking devices to ensure that the unit does not fall over.

4. 1. STORING, SHIPPING AND MOVING

- if storing more than 6 month, please contact us
- Green Power 2.0 must remain in a vertical position during all shipping and moving operations.
- Ensure that the floor is strong enough to support the weight of the UPS and of the battery cabinet, if used.



Avoid moving the unit by putting pressure on the front door.



The UPS MUST be handled with the utmost care by at least two people.

CAUTION IF DAMAGED.



Packages, crushed, punctured, or torn such that contents are revealed must be set aside in an isolated area and inspected by a qualified person. If the package is deemed to be not shippable, the contents must be promptly collected, segregated, and either the consignor or consignee contacted.



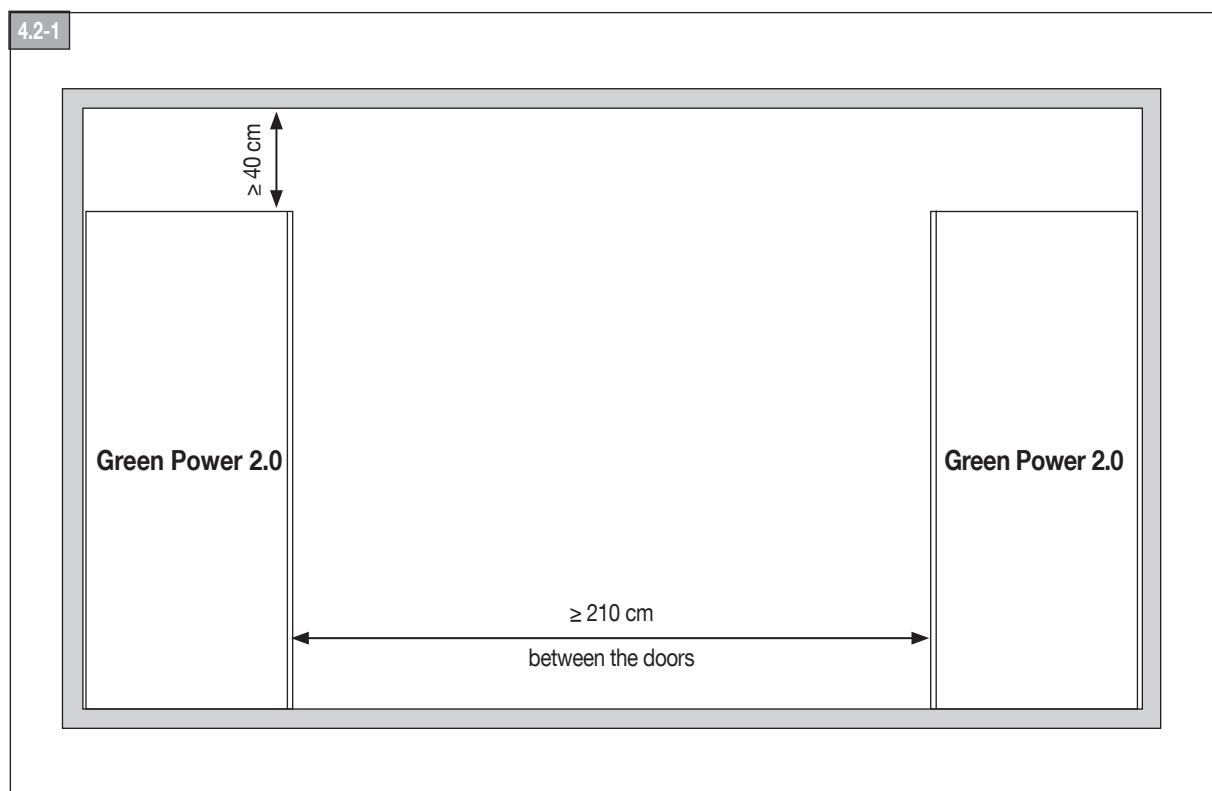
All packaging material must be recycled in compliance with the laws in force in the country where the system is installed.

4. 2. ENVIRONMENTAL REQUISITES

- Green Power 2.0 is not designed for outdoor use.
- Do not expose Green Power 2.0 to direct sunlight or to sources of excessive heat.
- The recommended operating temperature, humidity and altitude values are listed in the technical specifications table (see chapter 9). Cooling systems may be required to maintain these values.
- Green Power 2.0 must be installed in an environment without obstructions and which is dry, clean and dust-free.
- Avoid dusty environments or areas where there is dust from conductive or corrosive materials (e.g. metal dust or chemical solutions).
- Green Power 2.0 can be installed against a wall; the distance will depend on the cables present. The upper part of Green Power 2.0 must be positioned at least 40 cm away from the ceiling (figure 4.2-1).
- Green Power 2.0 switches are accessed from the front; however, a space of at least 1.5 metres should be left at the front of Green Power 2.0 for maintenance purposes.
- For UPSs arranged frontally, leave a minimum space of 210 cm between the two cabinets so as to allow a passageway when both doors are open (in accordance with the provisions of standard IEC 60364 - see figure 4.2-1).



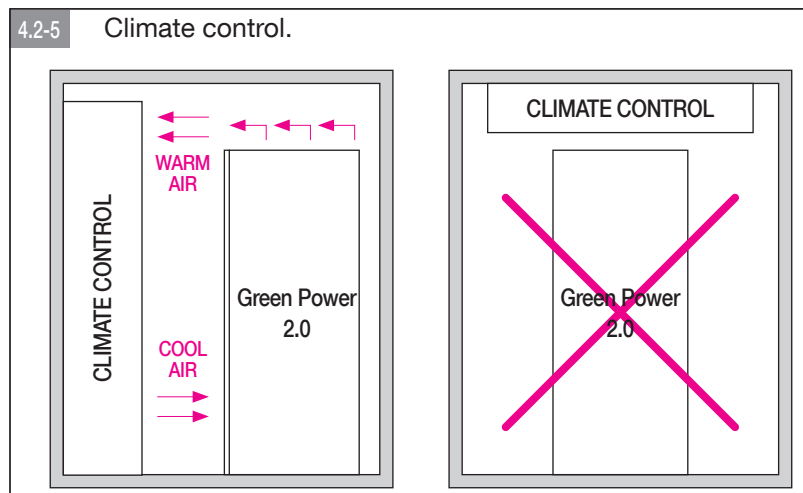
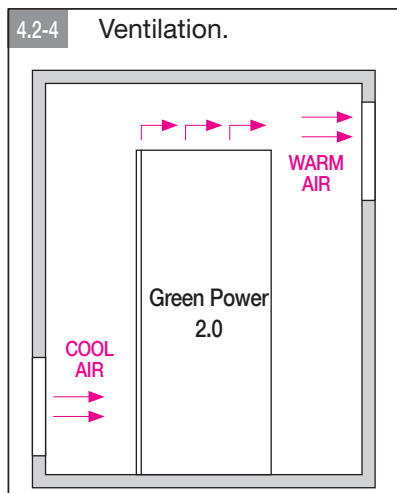
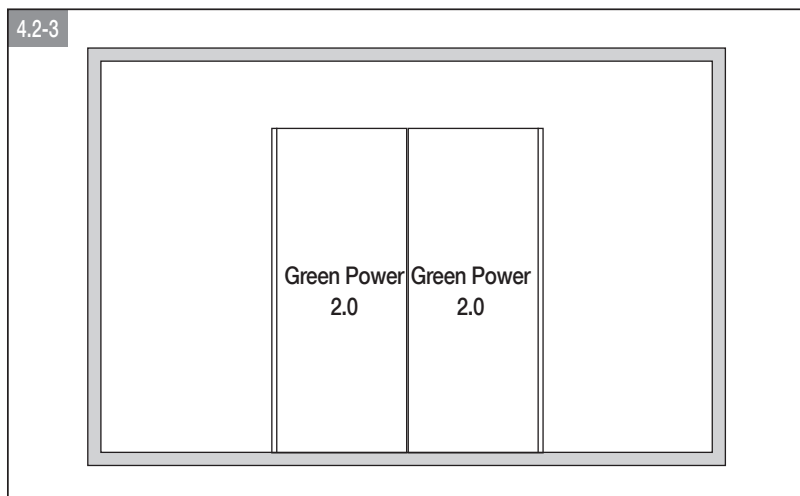
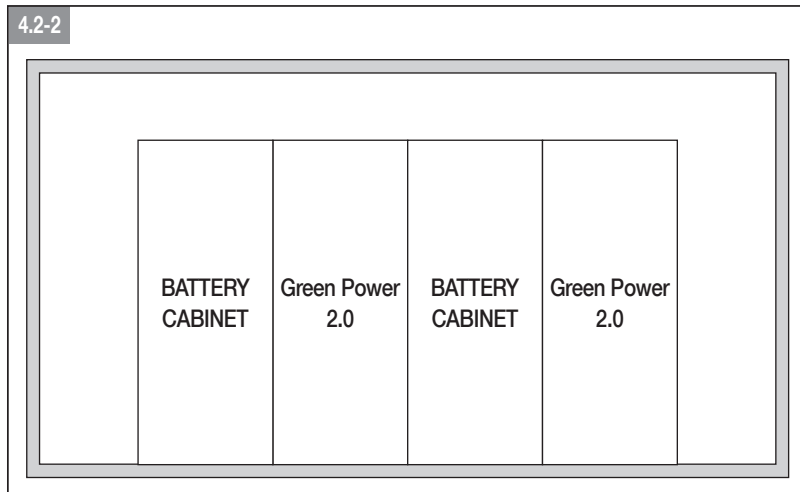
Green Power 2.0 should only be installed on a concrete surface or other non-combustible surface.



- Several cabinets can be installed adjacent to each other (figure 4.2-2).
- Two Green Power 2.0 500 kVA can be installed back to back (figure 4.2-3).
- Observe the direction of the ventilation flows (figure 4.2-4) and heat dispersion flows (figure 4.2-5). See chapter 9 for the technical specifications relating to the required ventilation values.



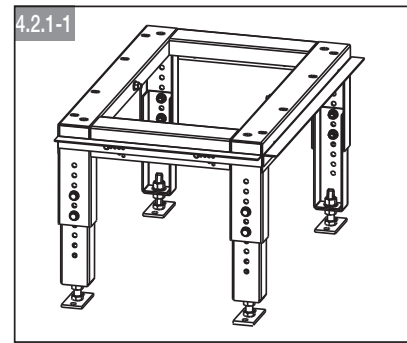
In order to profit from an optimal ventilation, the side panels must remain in place



For fixing on the floor, see § 5. 6 and § 10. 1 Plan 1

4. 2.1. Installation on raised flooring

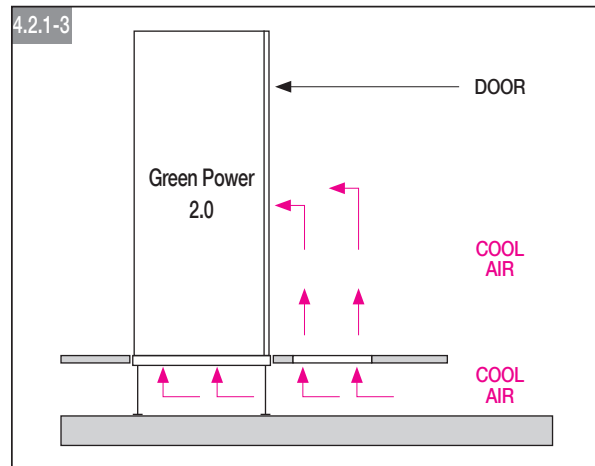
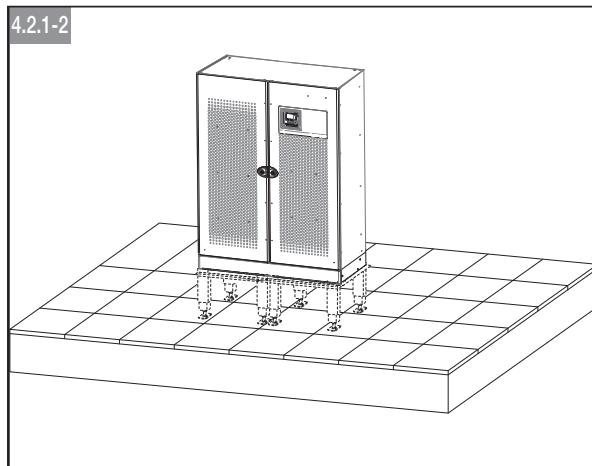
If Green Power 2.0 is to be installed on raised flooring, the SOCOMEC adjustable frame (figure 4.2.1-1) must be used to support the weight of the unit (figure 4.2.1-2).



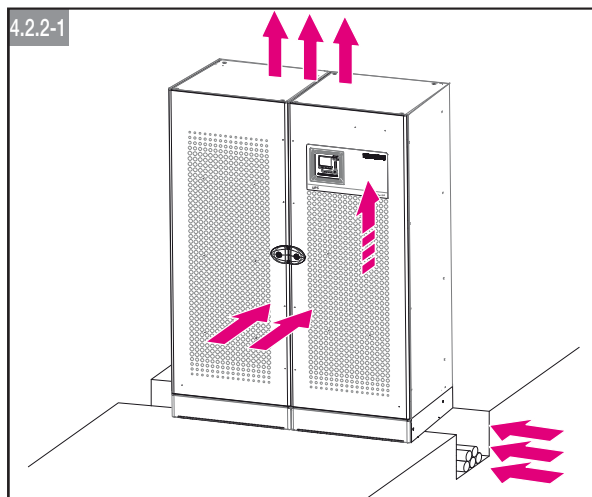
Refer to the relevant installation manual provided in the packaging for information on frame assembly operations.



Allow for small openings in the floor panels to ensure the air flow at the front (figure 4.2.1-3).



4. 2.2. Installation over a tunnel



4. 2.3. Heat loss and ventilation characteristics

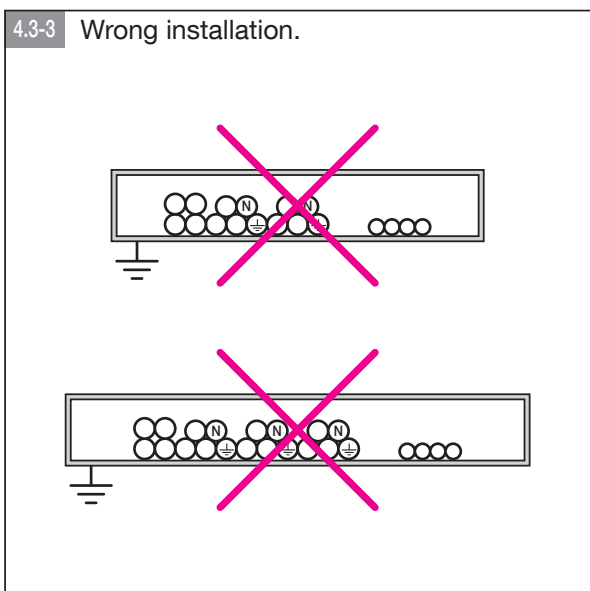
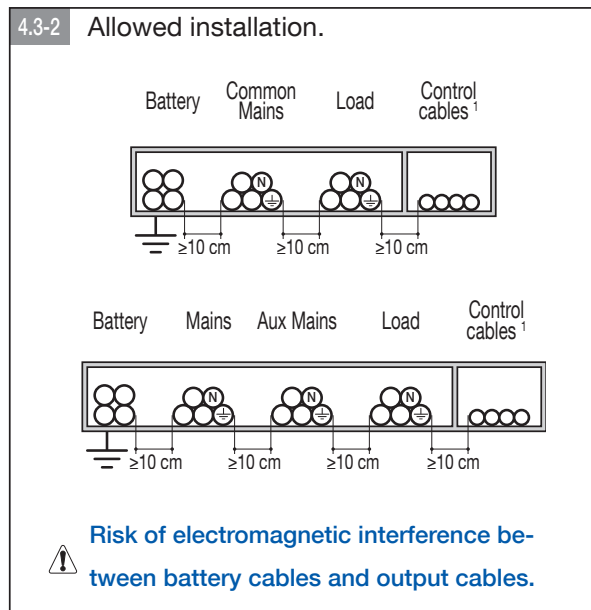
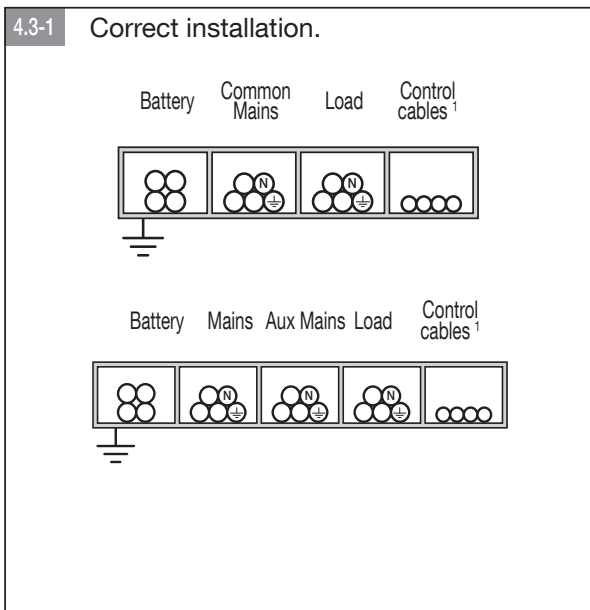
kVA	Air flow		Total air flow	Heat losses at full load MAX.	
	Bottom	Mid height		Nominal condition / worst conditions	
				W	BTU/h
UPS 500	45 % *	55 % *	5400 m3/h	24300 / 30000	82914 / 102364
Bypass 250/500	100% *	0 % *	1050 m3/h	2700	9331
Bypass 600/800			900 m3/h	3640	12459
Bypass 900/1200			2000 m3/h	5260	17973
Bypass 1500/2000			2200 m3/h	11600	36120
Bypass 2400			2200 m3/h	16700	50101

* of Total air flow


4. 3. GENERAL RULES FOR CABLE INSTALLATION ON TRAY

 The cables must be installed on trays when indicated in the following diagrams. The trays must be positioned near to Green Power 2.0.

 All metal and suspended ducts or those in raised flooring **MUST** be connected to earth and to the various cabinets.



¹Control cables: connections between the cabinets and each unit, alarm signals, remote mimic panel, connection to the BMS (Building Management System), emergency stop, connection to generator.

 Do not expose control and power UPS cables to other equipment sensitive to the electromagnetic field.

4. 4. ELECTRICAL REQUISITES

The installation and the system must comply with national plant regulations. The electrical distribution panel must have a protection and sectioning system installed for the input mains and the auxiliary mains. If a differential switch is installed on the mains power switch (optional), it must be inserted upstream from the distribution panel.

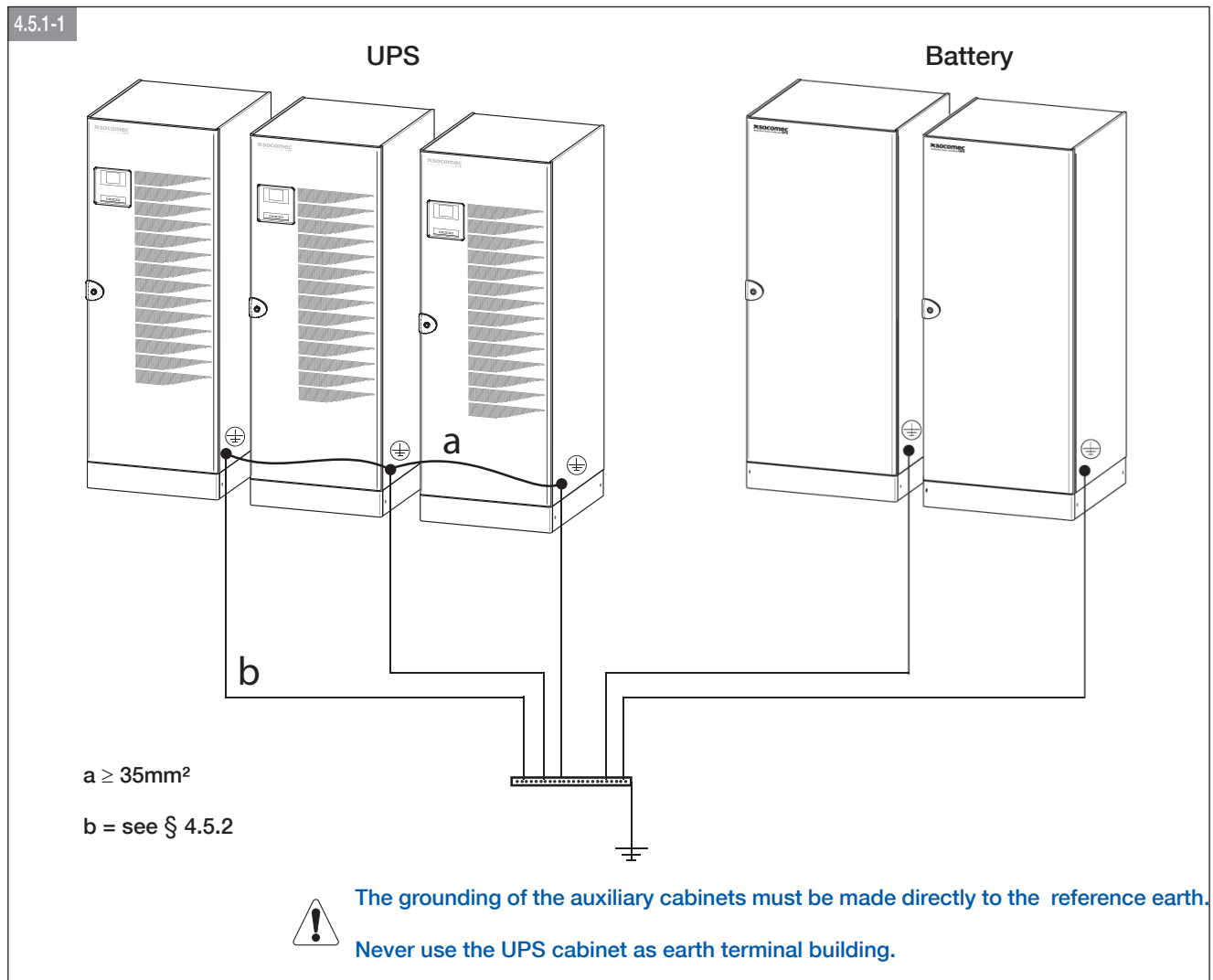
4. 5. EXTERNAL CONNECTIONS

4. 5.1. Connecting earth cables

IMPORTANT : due to EMI filters*, there are "HIGH LEAKAGE CURRENTS".

As a consequence, it is imperative to connect earth cables before mains cables.

* EMI filters = protection against electromagnetic disturbances.



4. 5.2. Earth cable cross-section

We recommend a section of ground wire at least half of the section of cable phases AND comply with standards of the country (for example NFC 15100 in France).

4. 5.3. Leakage current (rating of the earth leakage current device)

The minimum "off-delay relays" recommended is 3 A .

4. 5.4. Earthing systems and UPS (TT consult us)

In TNC: UPS output neutral must be grounded.

In TNS: when opening a 4 phases switch between UPS output and transformer upstream of the bypass, system grounding must be present to reference the neutral to ground.

4. 5.5. Neutral cable cross-section

It is necessary to check:

- the minimum cross-section of the neutral cable must equal one of the phase conductors.
- the balancing of the loads across the three phases,
- the values that will trip the protective devices.

4. 6. VALUES OF CURRENTS FOR CABLE SIZING

NOTE : these values are only indicative for standard systems.

4. 6.1. Input rectifier currents for Green Power 2.0

Operating conditions are as follows:

- Input/output power supply voltage 3 x 400V,
- Green Power 2.0 is operating at rated power and batteries are recharging.

POWER on UPS output	Max. rectifier input current (A)*
500 kVA/ 500 kW	850 A

* Regardless of the conditions (battery recharge, overload, voltage...)

4. 6.2. Mean current supplied by the battery when discharging

The mean current value is to be taken into account for sizing connecting cables between the battery and Green Power 2.0.

Green Power 2.0 Power	500 kVA/ 500 kW
Currents (A)	1100 A

4. 6.3. Bypass current (or output current to the load)

Operating conditions are as follows:

- Input/output power supply voltage 3 x 400V, for other voltages 380V or 415V, the current values must be multiplied by 1.05 and 0.96 respectively,
- Green Power 2.0 is operating at rated power.

	UPS	Bypass				
Power kVA	500	500	800	1200	2000	2400
Currents (A)	722	722	1155	1732	2887	3464

Note: sizing of cables and protections upstream of the bypass shall take into account:

- overloads caused by non-linear loads,
- possible overloads admitted by Green Power 2.0 i.e. 1,1In for 1h, 1,25In for 10min or 1,5In for 1min.

4. 7. SIZING OF CIRCUIT BREAKERS

4. 7.1. Rectifier input circuit breaker

Values are only indicative as per the following conditions:

- the rectifier and bypass input voltage is 3 x 400V overload 150 %
- the length of cabling between the circuit breaker and Green Power 2.0 is <10 metres.

Green Power 2.0 Power	500 kVA/ 500 kW
Sizing of circuit breaker	1000 A

Note: the sizing of circuit breakers takes into account a possible overload rate of 150%.

4. 7.2. Circuit breaker on bypass input

Values are only indicative as per the following conditions:

- the rectifier and bypass input voltage is 3 x 400V overload 150 %
- the length of cabling between the circuit breaker and Green Power 2.0 is <10 metres.

	UPS	Bypass				
Power kVA	500	500	800	1200	2000	2400
Sizing of circuit breaker	800 A	800 A	1200 A	2000 A	3000 A	4000 A

Note 1: the admissible input voltage tolerance is +/-10% - the sizing of circuit breakers has therefore to be adjusted accordingly.

Note 2: the protection on the bypass input is intended for cable protection and does not take into account the I²T of thyristors.

Nota 3: Ensure that the circuit breaker trigger curve takes into account a possible overload

4. 7.3. Circuit breaker on a common rectifier and bypass input (except C3)

Values are only indicative as per the following conditions:

- the rectifier and bypass input voltage is 3 x 400V,
- the length of cabling between the circuit breaker and Green Power 2.0 is <10 metres.

Green Power 2.0 Power	500 kVA/ 500 kW
Sizing of circuit breaker	1000 A

Note: the admissible input voltage tolerance is +/-10% - the sizing of circuit breakers has therefore to be adjusted accordingly.

4. 8. BACKFEED PROTECTION

Green Power 2.0 is preset for the installation of external protection devices against the backfeed of dangerous voltages on the auxiliary backup mains power supply line (AUX MAINS SUPPLY), the input power supply line (MAINS SUPPLY) is already equipped in internal.

In the event that the equipment does not have a voltage protection device, warning labels must be affixed on all mains power disconnectors installed away from Green Power 2.0 area, in order to remind support personnel that the circuit is connected to a UPS (see also § 2 "Safety" of this manual and paragraph 4.9.3 of standard IEC62040-1, 2008). The label is supplied with the equipment.

If, in certain anomaly states, or because of the installation upstream (e.g. undetected and protected earth fault, or high leakage in a phase, or with IT systems) there is a hazardous potential on neutral, a suitable isolating switch must be provided on the neutral as well, or else there must be a detection, signalling and protection system.

For the connections, see to § 5. 15.

4. 9. PROTECTION AND CROSS-SECTION OF BATTERY CABLES

Values are provided for a distance of 5 meters between Green Power 2.0 and the battery. (Battery mean current while discharging – Please see § 4.6.2). Use double insulated cables BN4-F.

CAUTION: The size of protections depends on the power and back up time of the system. Protections other than the ones defined below may cause electrical hazard or damage to the equipment.

Example of Ur fuse battery protection¹, block type 90 Ah: SWL2500, XP12V3000

Max Power UPS output	Backup time	branches Number	blocks Number ⁴	Ur Fuse Number	Size of Ur fuse	Icc mini batterie ⁵	Ferraz Code	Socomec Code	min. Cross- section ²
500 kVA 500 kW	5 min	3	43	4	550A T2	6300A	G320488C	E045628	2x240
	10 min	4	43	4	550A T2	6300A	G320488C	E045628	2x240
	16 min	5	43	4	630A T3	6500A	R320589A	E045548	2x240
	20 min	6	43	4	630A T3	6500A	R320589A	E045548	3x150
500 kVA 450 kW	10 min	4	40	4	630A T2	7400A	H320489C	E045568	2x240
	15 min	5	41	4	630A T3	6500A	R320589A	E045548	2x240

¹ not standard Fuse protection FUSOMAT Socomec, please contact us

² H07 RN-F cabling for a 5 meters distance between the UPS and the battery

⁴ see 5. 11.1

Circuit breaker Battery protection (≤ 39 blocs)

Definition for 36 to 39 blocs					
Green Power 2.0 Power	Backup time	Number of Contact in serie	Size of breaker	Magnetic adjustment Im = nxIn	ICC battery min. ⁵
500 kW	≤ 60 mn	2	NW20HDC -E	3300A B notch	3700A

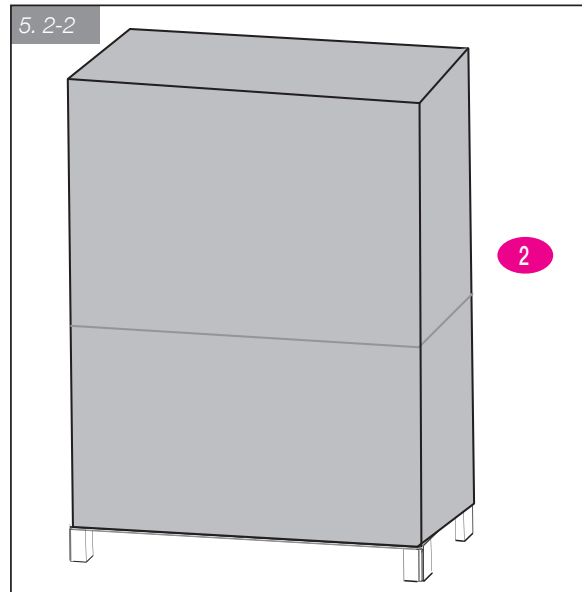
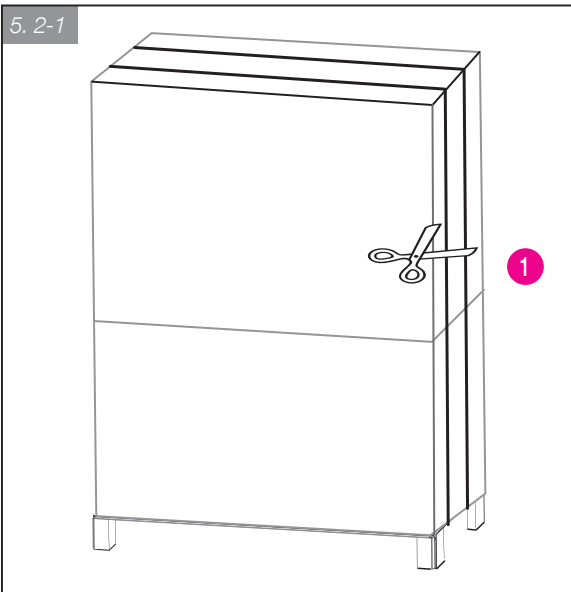
 ⁵ end of life

5. INSTALLATION

5. 1. DIMENSIONS AND WEIGHT (OVERALL)

kVA	UPS	Bypass				
	500	250-500	600-800	900-1200	1500-2000	2400
Height (mm)	1930	1930	1930	1950	1950	1950
Width (mm)	1603	810	1010	1210	2610	3010
Depth (mm)	995	845	845	845	1245	1245
Weight (kg)	1500	315	420	600	2000	2600

5. 2. UNPACKING PROCEDURE



5.2-3

Place Green Power 2.0 in the installation area.



Refer to § 5. 3 if the equipment has to be moved from above.

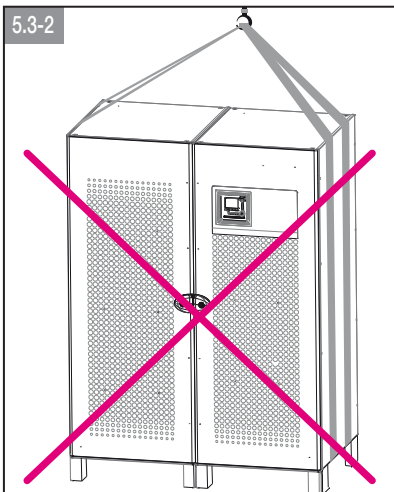
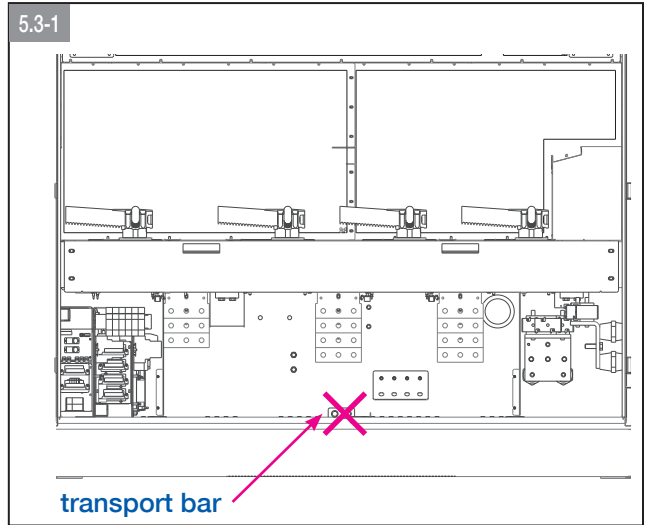


All packaging material must be recycled in compliance with the laws in force in the country where the system is installed.

5. 3. MOVING



When the cabinet is in place, the transport bar **MUST** be removed (figure 5.3-1)



When being moved, the cabinets must be kept in an upright position.



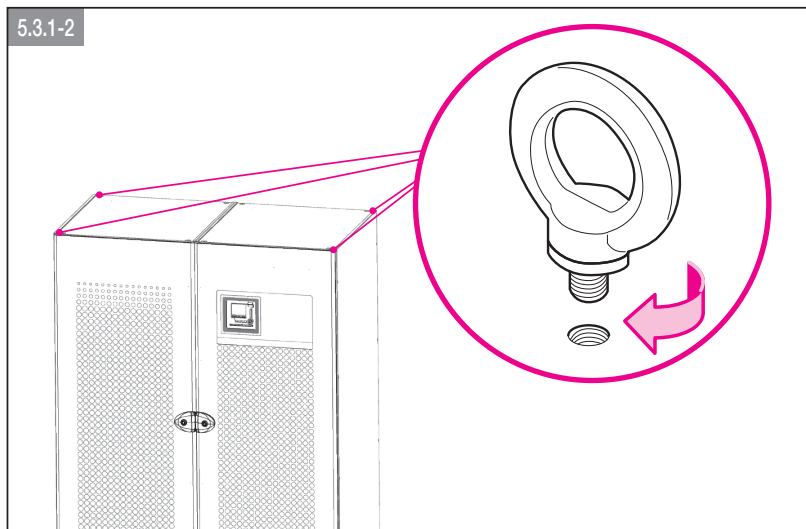
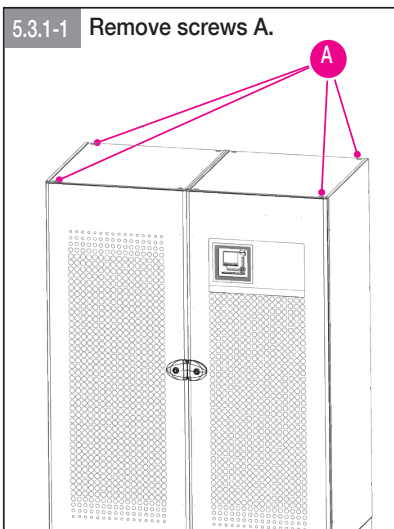
Never use harnesses!

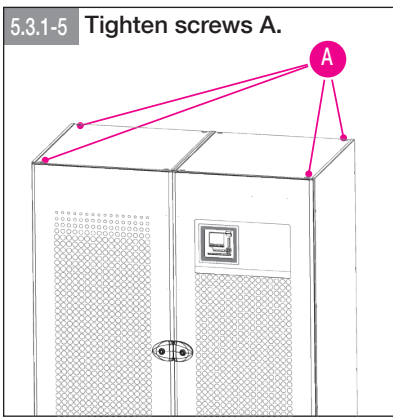
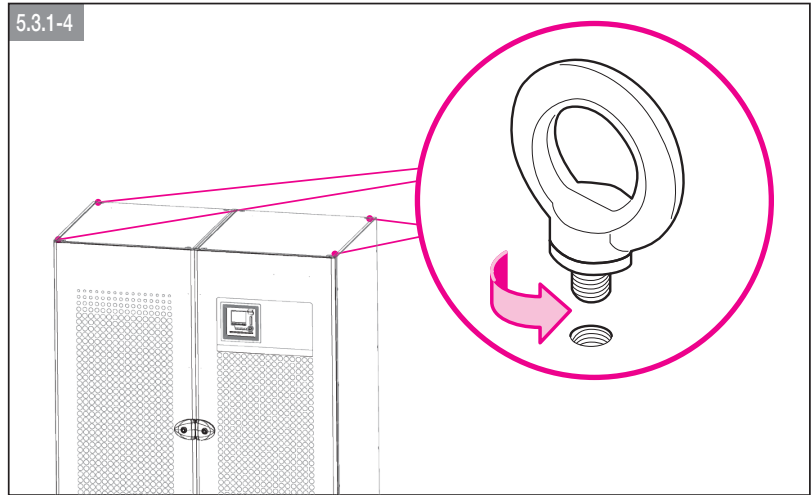
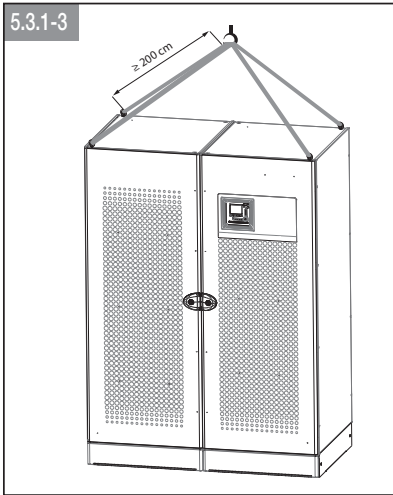
5. 3.1. Moving with belts

- Length of belts: ≥ 200 cm
- Lifting eyebolts (supplied on request): internal $\varnothing 30$ mm, thread M12.



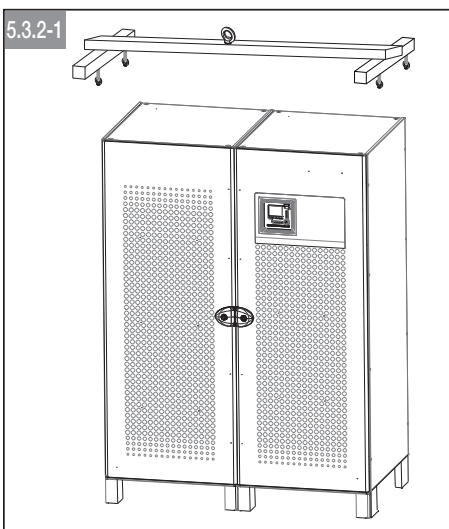
Lift and handle the cabinets with the utmost care and without jerking!





5. 3.2. Moving with lifting truss.

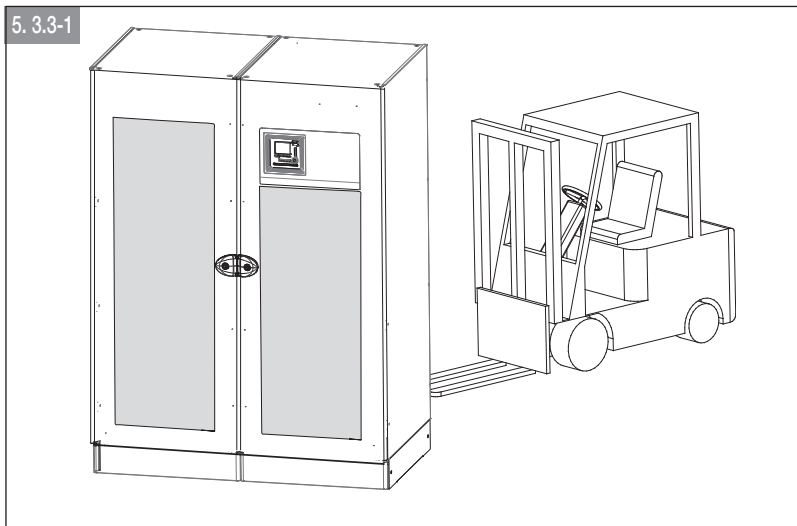
If the height of the ceiling does not allow the use of belts, Green Power 2.0 can be moved using lifting trusses.



5. 3.3. Handling from underneath

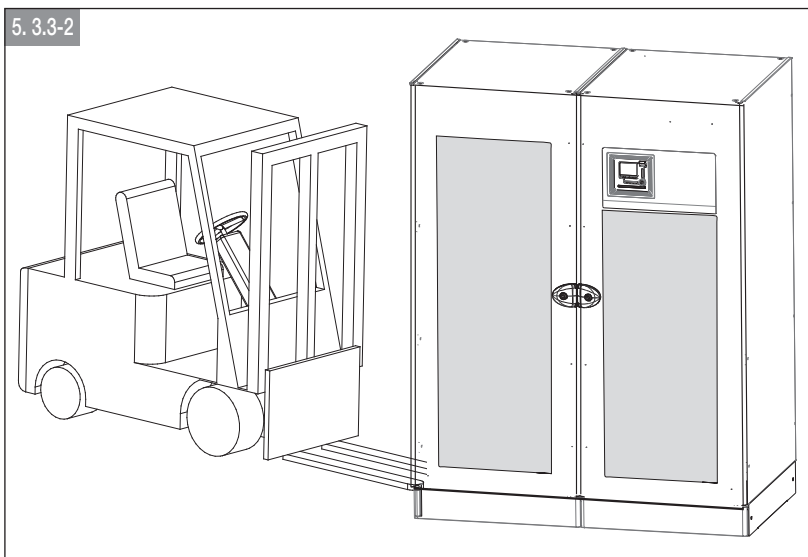
Remove the grilles on the front and rear of the cabinet and introduce the fork under the unit.

HANDLING FROM THE FRONT OR THE REAR



LATERAL HANDLING

Lateral handling is also possible, provided that the bottom side panels are removed.



Note : the fork should be at least 162 cm long



Given the cabinets are heavy, handling using a pallet truck on slopes or ramps –even only slightly inclined, is hazardous and can cause severe accidents.



Take all required precautions and use adapted means and tools.

5. 3.4. Handling of battery cabinet

Handling from underneath

Handling can be from the bottom using a lifting truck. Front, rear as well as side bottom panels are available on the top of the cabinet.

Handling from above


Handling can be by using 4 slings that are at least 1 meter long. The total weight shall not exceed 1500 kg, i.e. 375 kg per eye screw, so please adapt to the weight to be lifted accordingly.

5. 3.5. Dimensions and weights of the battery cabinet

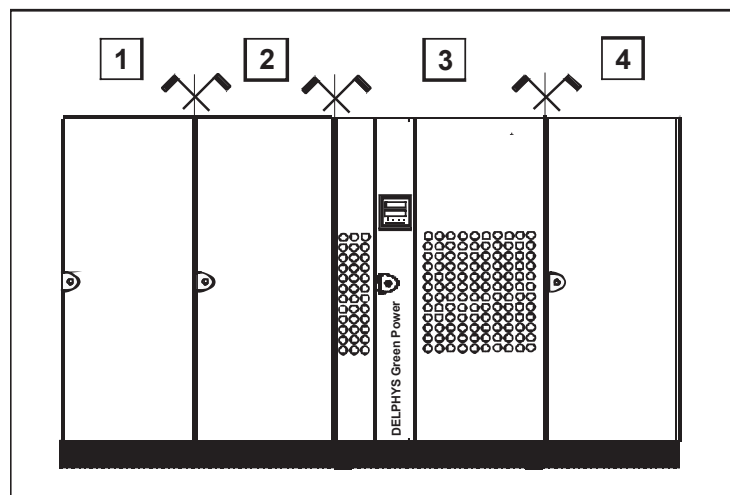
Cabinet	800	1000
Maximum weight for transport (kg)	1700	1800
Maximum weight of blocks (kg)	1450	1500
Maximum weight per shelf (kg)	350	380
WIDTH (mm)	800	1 000
DEPTH (mm)		
- floor requirement	815	
- Overall dimensions with door handle	830	
- door, handle and rear panel excluded	800	
HEIGHT (mm)	1925	

5. 4. CABINET POSITIONING

To make transport and handling easier, the system is separated into cabinets (or cabinet sets).

The  symbol on the front face indicates the separation points between the cabinets.

The individual cabinet position should correspond with sequence / numbers indicated on the front view of the system.



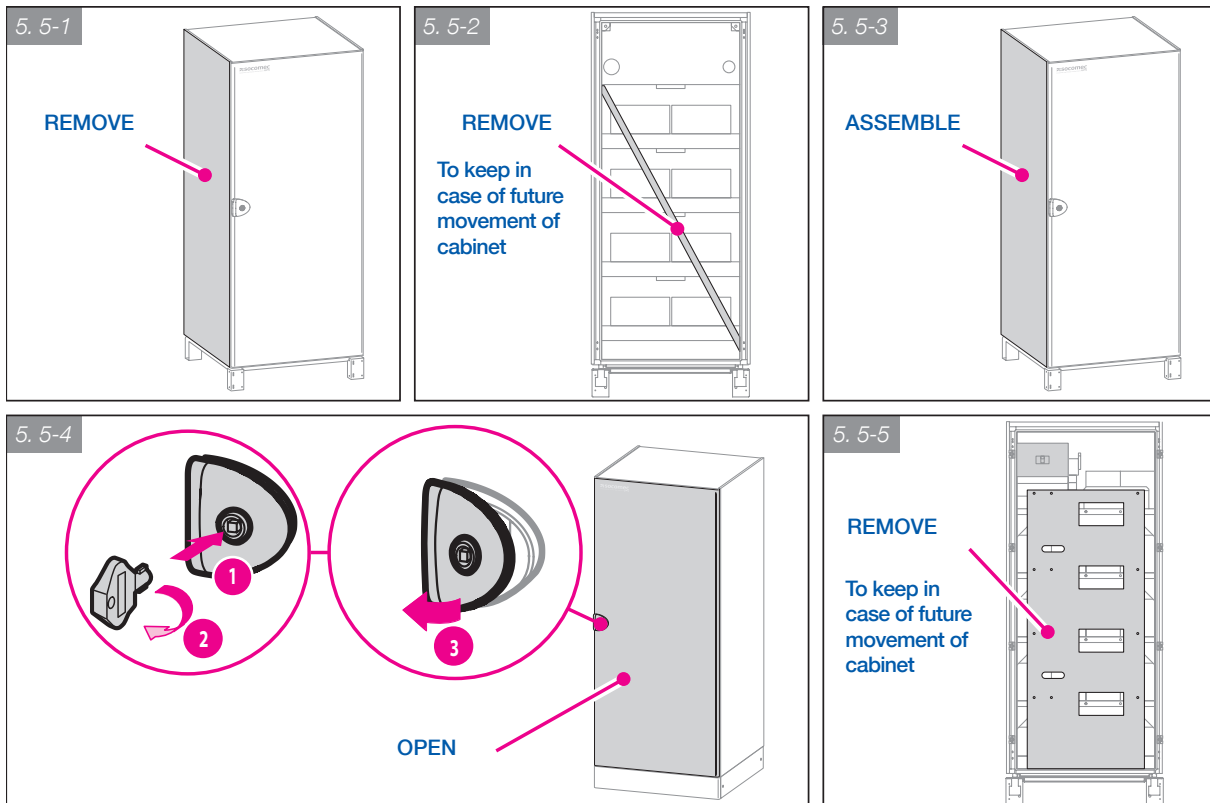
(The number of each cabinet is indicated on the right top corner on the inside of the door).

Note : reference should be made to the technical details in the drawing file.

5. 5. BATTERY CABINET INSTALLATION

Each battery cabinet has two side reinforcement bars. After unloading, they must be removed to ensure proper ventilation of battery blocks. If the cabinet is provided with side panels, they shall be removed first.

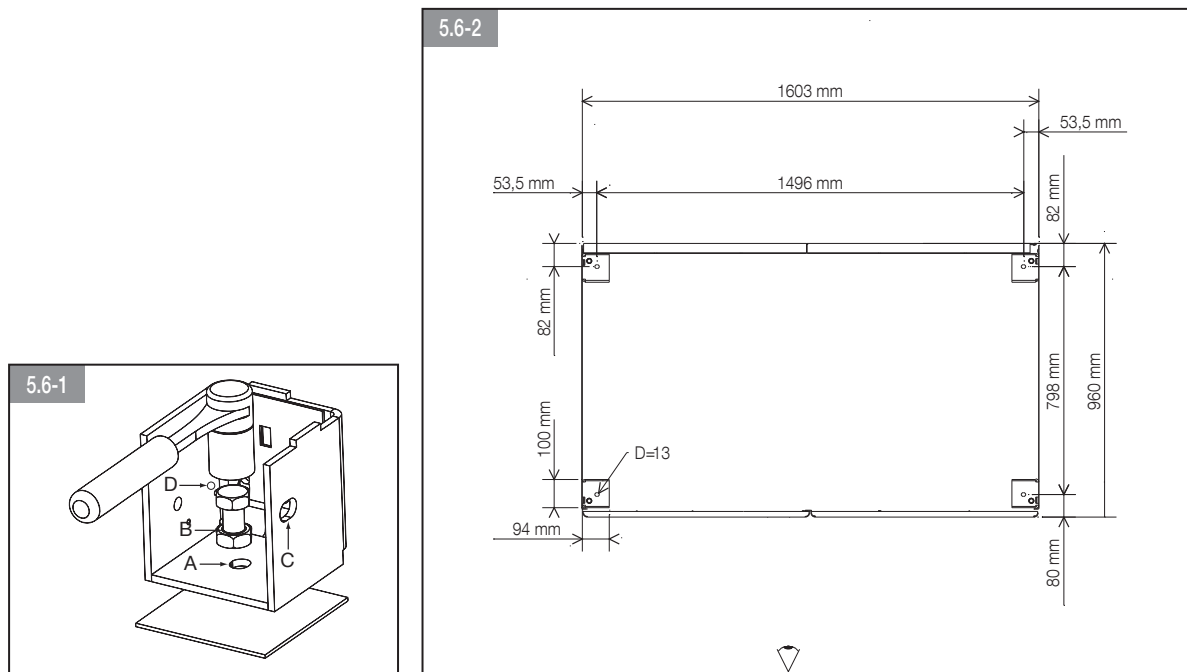
For advice regarding safety, fixing to the floor of the cabinets and adjusting of fastening rods, please see § 5. 7.



5. 6. FIXING TO THE FLOOR (A RAISED FLOOR OR DIRECTLY TO THE FLOOR)

Each foot of the cabinet needs to be linked up to the metallic mesh network (if the cabinet is on a raised floor) or to have direct earth bonding (if the cabinet is directly positioned on the floor) by using short links with a cross-section $\geq 35 \text{ mm}^2$.

Use braidings to connect all the metallic feet of the raised floor and guarantee equipotential cabling.



Each foot has a floor fixing hole (labelled A : $\varnothing 13$) and welded nut for level adjusting (labelled B : screw THM 12 not supplied).

5. 7. BATTERY CABINETS FIXING

! For batteries on racks or in cabinets, the cabinet must be fixed to the floor to prevent it from falling over. Each cabinet is fitted with pre-drilled feet - See dimensions § 5.6.1.

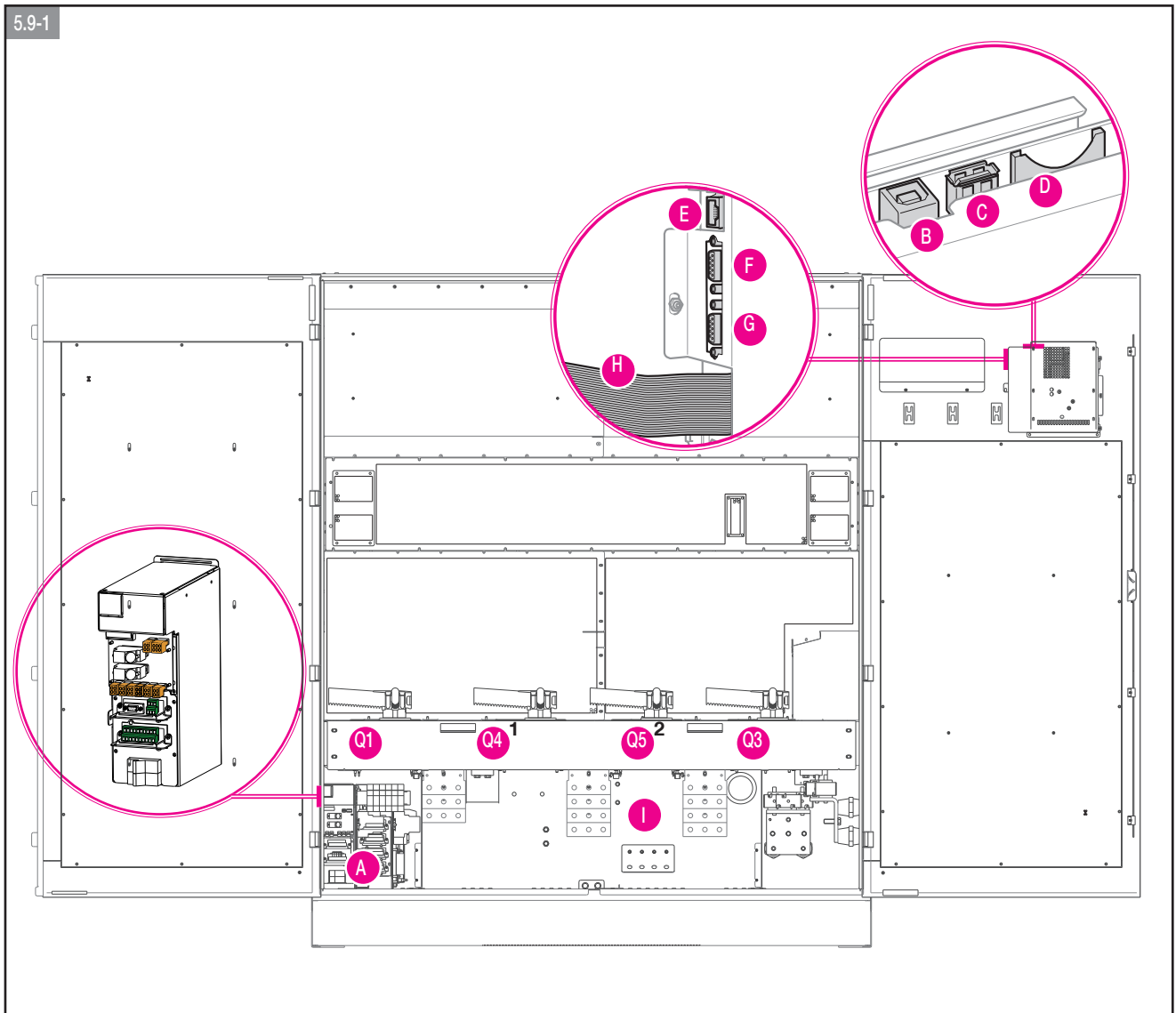
feet of battery cabinet: same as Green Power 2.0 feet. (see § "10. 7. Plan 7: Battery Floor fixing")

! When the battery cabinet is installed, cut and remove the plastic fastening of battery cells in order to release the safety valve

5. 8. SEPARATED CABINETS

! See § 5.4.

5. 9. IDENTIFYING SWITCHING AND CONNECTION ORGANS



¹ does not exist on C3

² does not exist on C3 nor C7

Legend.

A Slot for optional communication cards.

B USB port.

C USB port.

D Slot for memory card.

E LAN RJ45 connector for Ethernet.

F Serial RS232 connector for CIM.

G Serial RS232 connector for Modem.

H Cable for power supply and communication signals

I Power connections.

Q1 Input switch (MAINS).

Q3 Output switch.

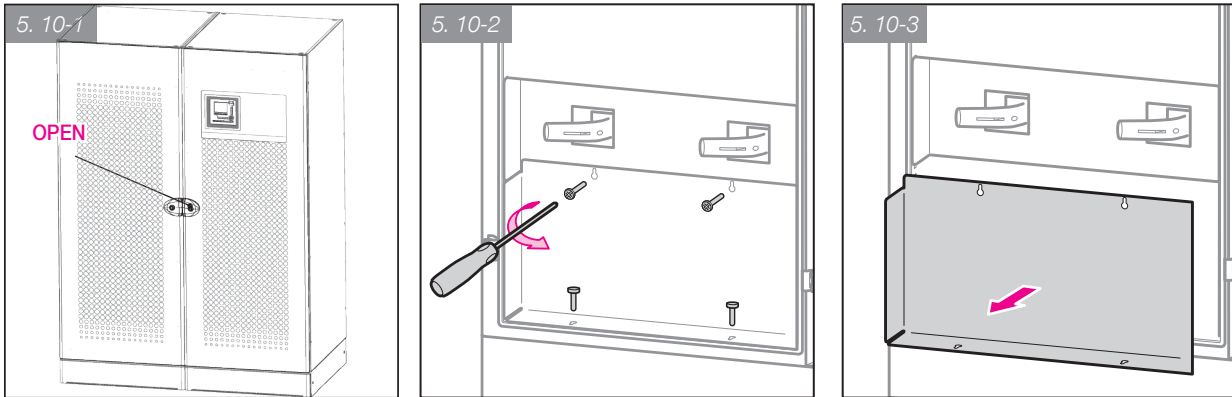
Q4 Auxiliary mains Input switch (AUX MAINS).¹

Q5 Output manual maintenance bypass switch.²

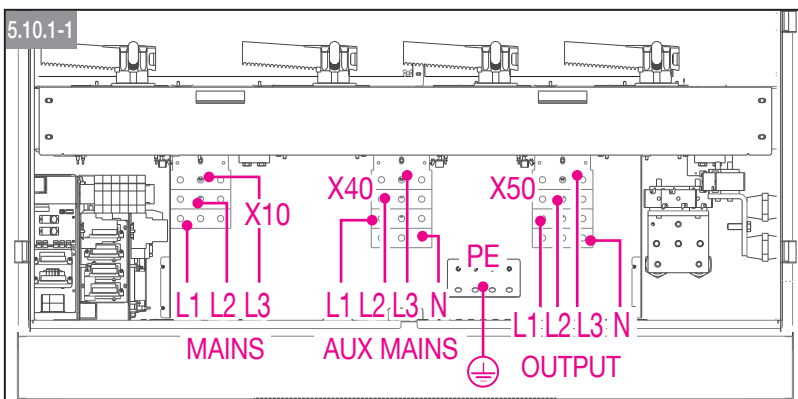
5. 10. INSTALLATION PROCEDURES AND INSTRUCTIONS



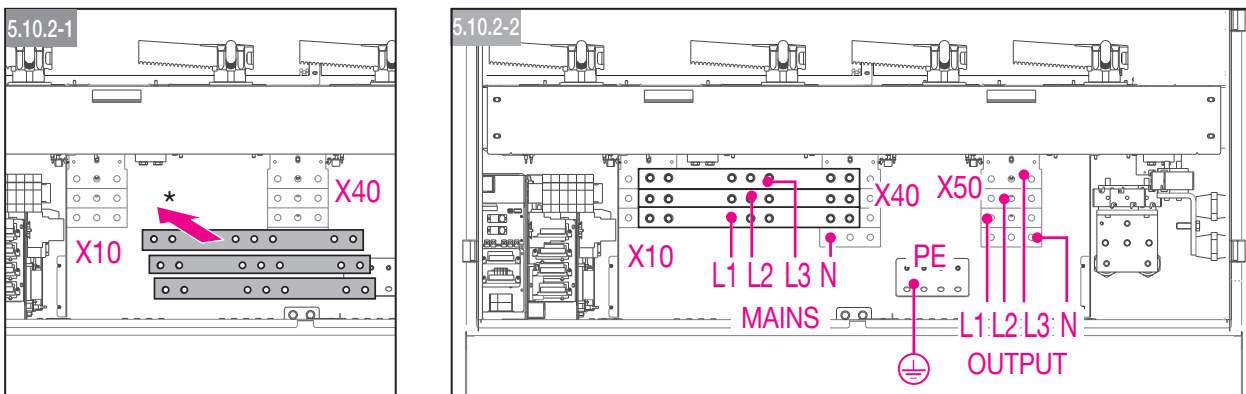
Before carrying out work on the terminal board or on UPS internal parts, ensure that Green Power 2.0 is switched off, remove the power supply, open the external battery cabinet disconnectors, isolate the system and wait 5 minutes.



5. 10.1. Connections if the MAINS and AUX MAINS are connected SEPARATELY

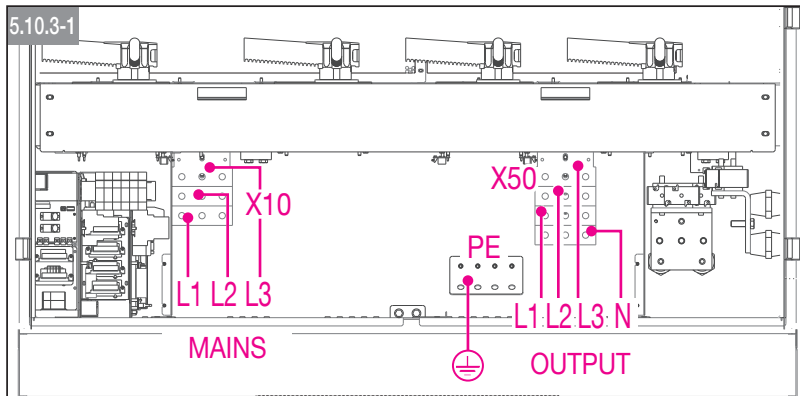


5. 10.2. Connections if the MAINS and AUX MAINS are connected IN COMMON



* Optional

5. 10.3. Unit connection in C3



5. 10.4. Connection input from above

In order to be able to connect using a cable from above, we offer a arrival from the top cabinet.



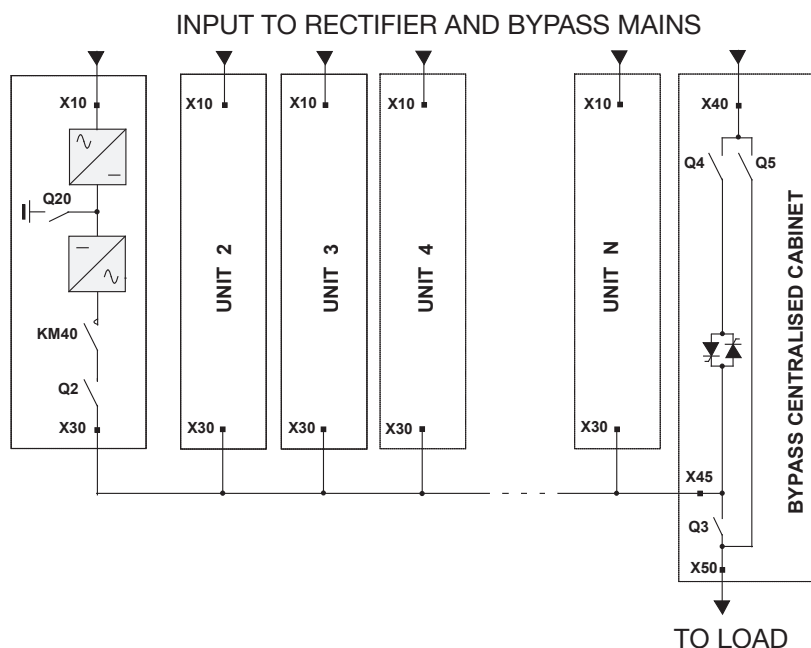
It must be positioned to the right of Green Power 2.0.

To ensure the required ventilation, all cabinet should be fitted with support feet (optional)

5. 10.5. Centralised Bypass connection in C3

PkVA	Name	Designation	Copper termination	∅ hole	Screw	Max cross section	Coupling torque
200 à 800	X45/L	Unit input	100 x 5 mm	3 x 13	M12	2x 3 x 240 mm ²	70 Nm
	X45/N		185 x 5 mm	5 x 13	M12	5 x 240 mm ²	70 Nm
	X40	Mains input	185 x 5 mm	4 x 13	M12	4 x 240 mm ²	70 Nm
	X50	Load output	185 x 5 mm	4 x 13	M12	4 x 240 mm ²	70 Nm
	PE	Protective conductor	50 x 5 mm	6 x 13	M12	6 x 150 mm ²	70 Nm
900 à 1200	X45/L	Unit input	100 x 10 mm	3 x 13	M12	2x 3 x 240 mm ²	70 Nm
	X45/N		100 x 10 mm	10 x 13	M12	2x 10 x 240 mm ²	70 Nm
	X40	Mains input	100 x 10 mm	4 x 15	M14	2x 4 x 240 mm ²	110 Nm
	X50	Load output	100 x 10 mm*	4 x 15	M14	2x 4 x 240 mm ²	110 Nm
	PE	Protective conductor	50 x 5 mm*	6 x 13	M12	6 x 240 mm ²	70 Nm

*Copper extension terminals (100x10, 7 holes *13) are to be moved from X40 to X50 if cable input is from the top.



5. 10.6. External battery cabinet connection



Before carrying out any operation, ensure that:

- the battery fuses located inside the battery cabinet are open;
- Green Power 2.0 is not live and all mains or battery switches are open;
- the switches upstream of Green Power 2.0 are open.



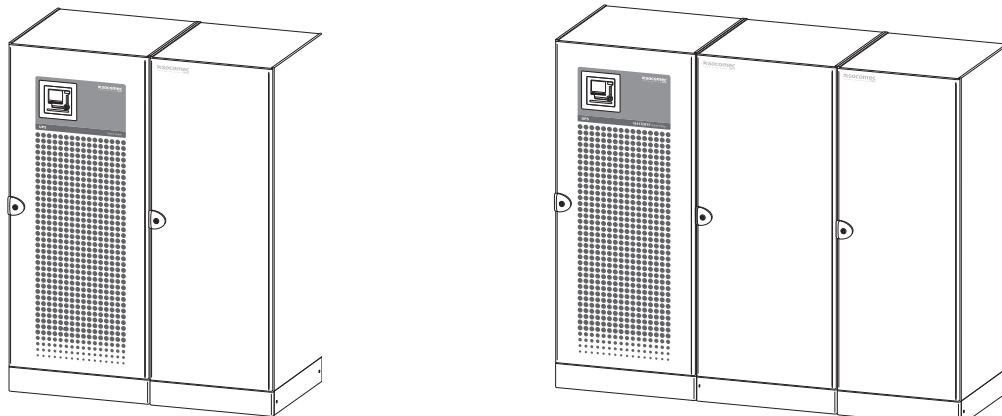
Use double insulated cables or the cables supplied with the unit to connect Green Power 2.0 to the Battery cabinet.



Cabling errors with inversion of the battery polarity may cause permanent damage to the equipment.

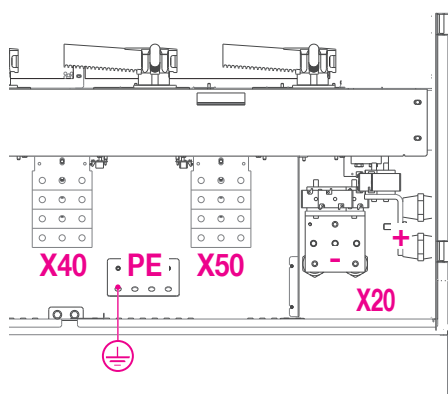
If using cabinets not supplied by the manufacturers of Green Power 2.0, it is the installer's responsibility to check the electrical compatibility and the presence of appropriate protection devices between Green Power 2.0 and the battery cabinet (fuses and switches of sufficient capacity to protect the cables from Green Power 2.0 to the battery cabinet). As soon as Green Power 2.0 is switched on (before closing the battery switches) the battery parameters must be verified accordingly (voltage, capacity, number of elements, ...) on the mimic panel menu.

5.10.6-1



5.10.6-2

BATTERY STRING



For safety reasons during transports and handling, batteries are disconnected at the level of each rack (or by sections not exceeding 150 V).

Take all necessary precautions when reconnecting the cables.



Connection must be performed by authorised staff, which have been previously trained. Connections to be performed are :

- grounding of battery cabinet,
- polarities + and - to the inverter,
- between battery sections and/or between shelves.

IMPORTANT:

Before closing the battery protection, be sure that the rectifier is started !

See the pictogram  : the bar must be green.

5. 10.7. Replacement of batteries

When replacing the batteries, please use the same type and number of battery blocks.



Do not dispose of into a fire due to risk of explosion. Do not try to open or break up batteries. The electrolyte is toxic and may cause acid projections or injuries.

For this operation, we recommend that you contact a SOCOMEC servicing technician.

5. 11. BATTERY CHARACTERISTICS

5. 11.1. Technical specifications

Dimensions (WxDxH):	800x830x1925	1000x830x1925
Weight (with packaging):	< 1550 kg	
Protection level:	IP 20	
Operating temperature:	0÷40 °C (15÷25 °C recommended for longer battery life)	
Storage and transport temperature ¹ :	-5 °C ÷ +40 °C max (recommended 25 °C)	
Relative humidity (condensation-free):	up to 95%	
Battery recharging:		
Tambient ≤ 25 °C:	every 6 months	
25 °C ≤ Tambient ≤ 30 °C:	every 4 months	
30 °C ≤ Tambient ≤ 35 °C:	every 3 months	
35 °C ≤ Tambient ≤ 40 °C:	every 2 months	
Tambient > 40 °C:	not recommended	
UPS output Power kW:	Battery block number:	
360 < P ≤ 400	43	
320 < P ≤ 360	from 39 to 43	
P ≤ 320	from 36 to 43	

¹ General indication for the application of lead batteries. For further details, see the battery manufacturer's indications.

5. 11.2. Reliability

Conforms to Standards:	IEC 50272-2, IEC 62040-1-1
------------------------	----------------------------

5. 11.3. Storage

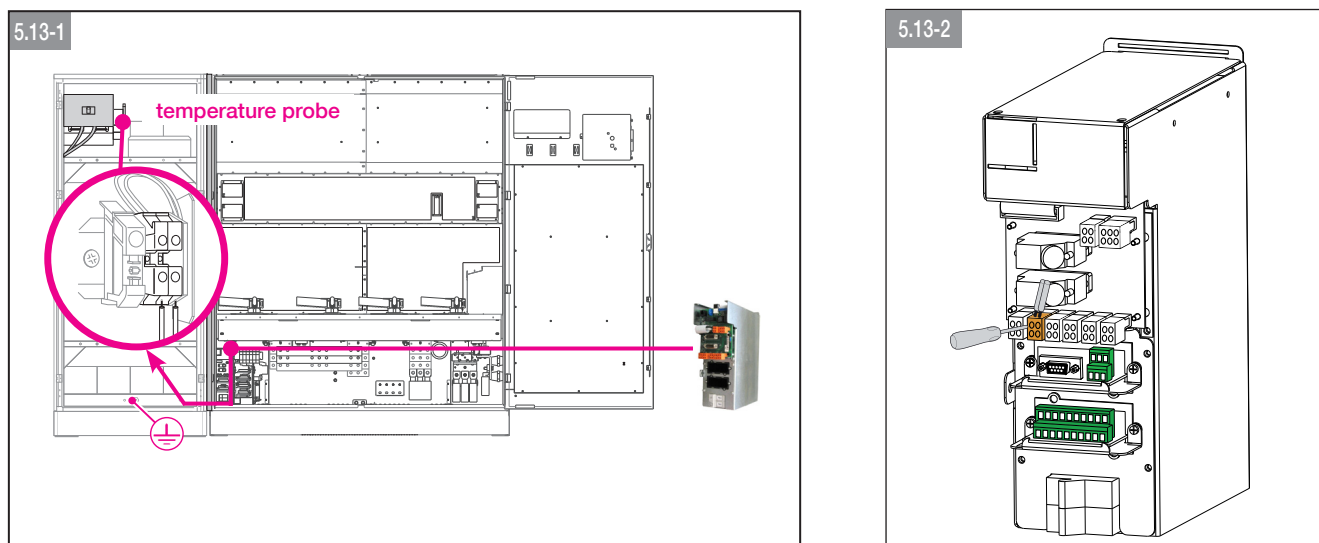
The duration of storage batteries must not exceed 6 months in appropriate storage conditions. The batteries should be stored away from bad weather in space whose average temperature is between 30 °C and -5 °C, with a maximum temperature below 40 °C. A battery is Rechargeable considered without significant decrease in reliability, while his last refill does not date from more than 6 months.

5. 12. TERMINAL CONNECTIONS CHARACTERISTICS

	Designation	∅ hole	Screw	Pitch	Max cross section	Torque Nm
PE	PE	4 x 13	M12	41.5	4 x 300 mm ²	70 Nm
X10	Rectifier input	3 x 13	M12	41.5	3 x 300 mm ²	70 Nm
X20	Battery input	3 x 13	M12	41.5	2 x 300 mm ²	70 Nm
X40*	Bypass input	3 x 13	M12	41.5	3 x 300 mm ²	70 Nm
X50	Load output	3 x 13	M12	41.5	3 x 300 mm ²	70 Nm

*not available on C3

5. 13. CONNECTING THE BATTERY CABINET TEMPERATURE PROBE



see § 5.18 Rack Slot.

Battery cabinets on rack:

- Use the specific kit available with the UPS.
- Fix the probe in the battery room or inside the battery cabinet.
- Connect the temperature probe as shown in figure 5.13-1 without cabling distance limits and without the need to observe polarity, by using a 2x1 mm² double isolation cable, XB5 1-2.
- In the event of a single UPS with several battery cabinets, use a single temperature sensor.
- In the event of parallel UPSs, connect the battery cabinet temperature sensors to the cards installed in the related UPSs.

5. 14. FLYWHEEL CONNECTIONS

5. 14.1. Power cables

Flywheel is connected at X20. Maximum cross section 185 mm²

5. 14.2. Control cables

Control cables of the flywheel (230V AC) are to be connected to fuses F113 and F114 of Green Power 2.0 (F114 corresponding to phase L1 and F113 to the neutral).

Note: adding a flywheel to a UPS that has already been installed requires a specific configuration, hence the visit of a servicing technician.

5. 15. BACKFEED PROTECTION (UPS C1, MODULE C6, C7 AND BYPASS C3)

STANDARD:

The backfeed protection is compliant with standard IEC 62040-1.

PURPOSE:

The backfeed protection is for ensuring personnel safety against any risks of accidental energy return to the input circuit. the backfeed protection imposes the automatic opening of an switching device in case of a malfunctioning of the static switch.

Principle:

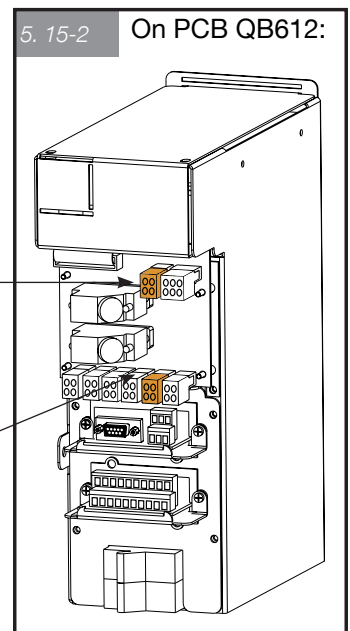
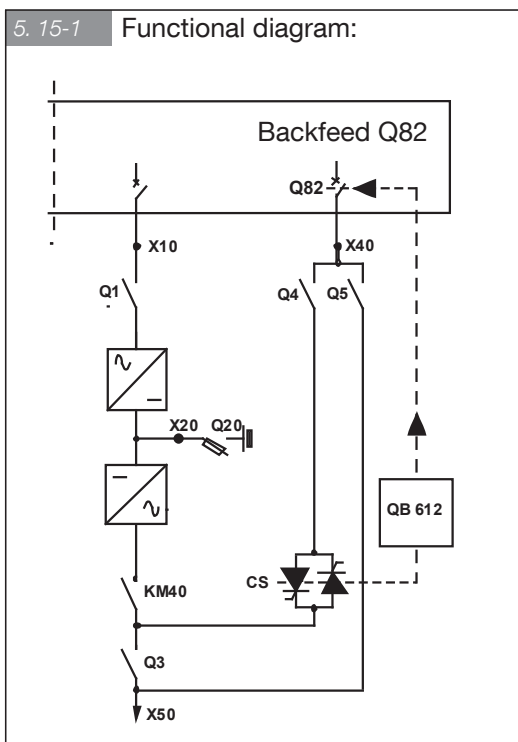
The backfeed protection consists of an electronic detection PCB internal to Green Power 2.0 and an external electromechanical device for isolation from the power circuit. optionally, the backfeed protection device may be built into the system. for further details about the size of the protective device, please see § 4. 7.

LABEL:

A safety label bearing the following advice is available in the equipment:

«ISOLATE Green Power 2.0 BEFORE WORKING ON THIS CIRCUIT»

the operator shall stick the label on the electromechanical device for isolation from the power circuit.



XB2 terminals 1-2:
connection of the trip coil
220V-240V of the power iso-
lating device.

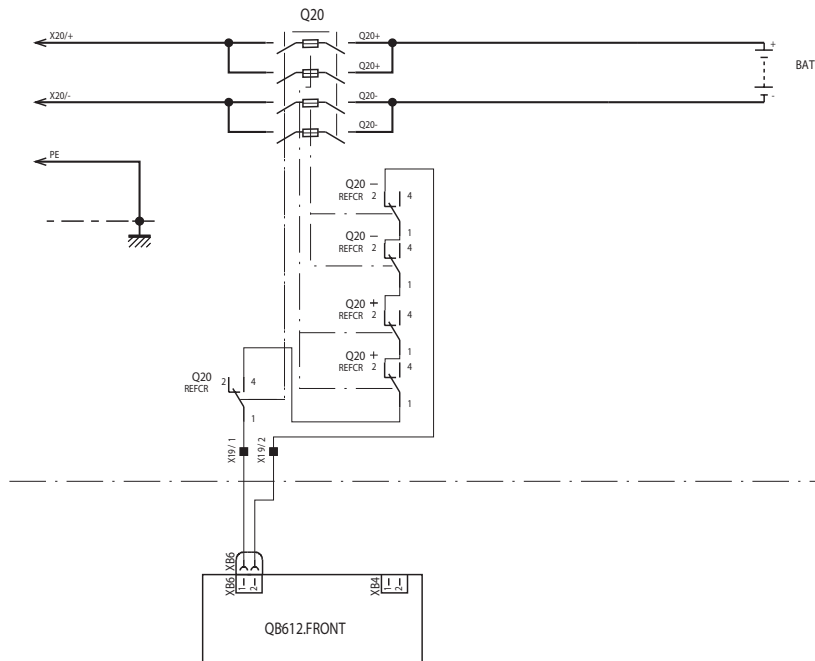
XB7 terminals 1-2:
connection of the auxiliary
contact indicating the status
of the power isolating device.



**If contact 1-2 on XB7 is open, you will have an alarm,
according to the Standard**

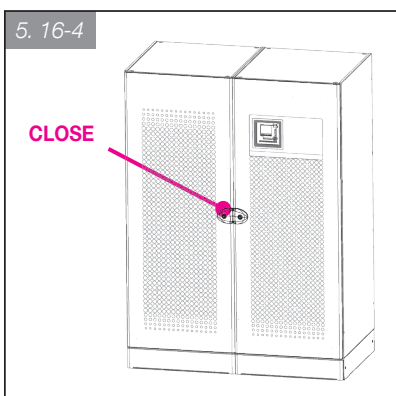
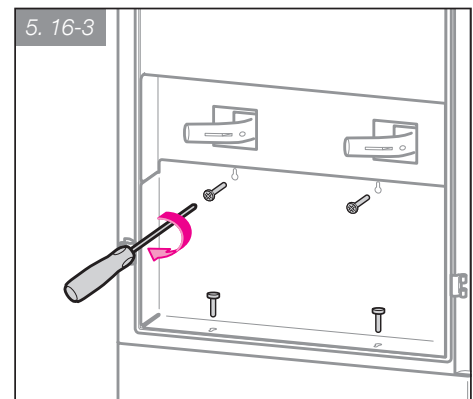
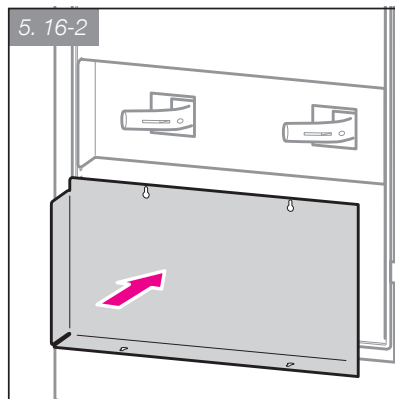
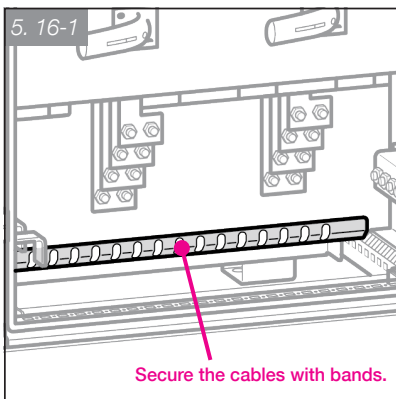
5. 16. AUTOMATIC OPENING OF BATTERY PROTECTION Q20

The position "opening / closing" of Q20 is reported in XB6 in the rack slot (see § 5.18).



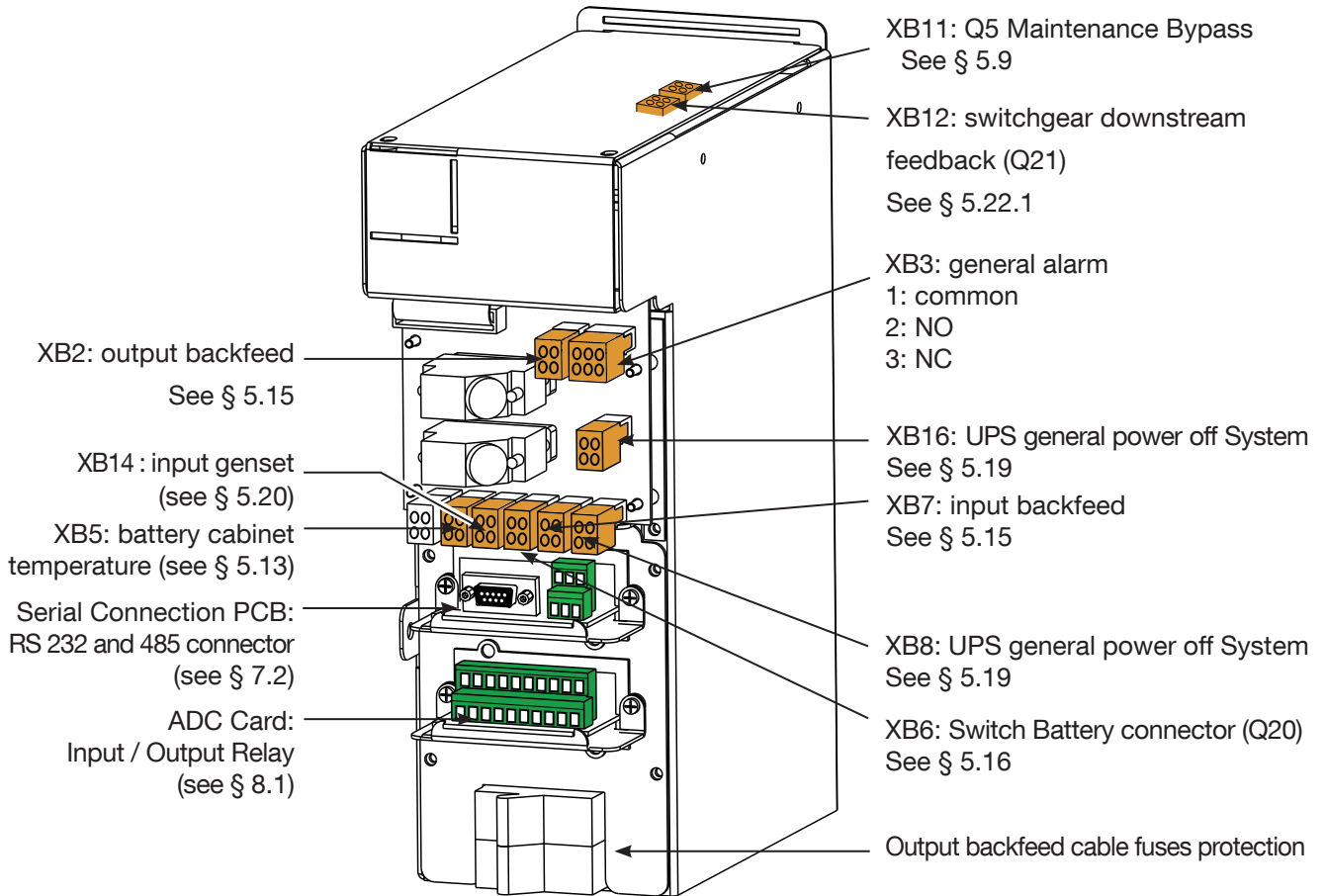
This option enables Q20 to be opened following an emergency shutdown or a slow discharge.

5. 17. COMPLETION OF THE INSTALLATION



Do not forget to put back protective screens.

5. 18. RACK SLOT



Connectors used depending on the UPS configuration:

Configuration (see 10.8)	C1	C6	C7	C3 / C4	Centralised bypass
	Connectors				
XB2: output backfeed	X	X	X	-	X
XB14: input genset	X	X	X	Stop battery recharge	desynchroni- zation
XB5: battery cabinet temperature	X	X	X	X	-
XB6: Switch Battery connector (Q20)	X	X	X	X	-
XB3: general alarm	X	X	X	X	X
XB7: input backfeed	X	X	X	-	X
XB8/16: UPS general power off System	X	X	X	X	X

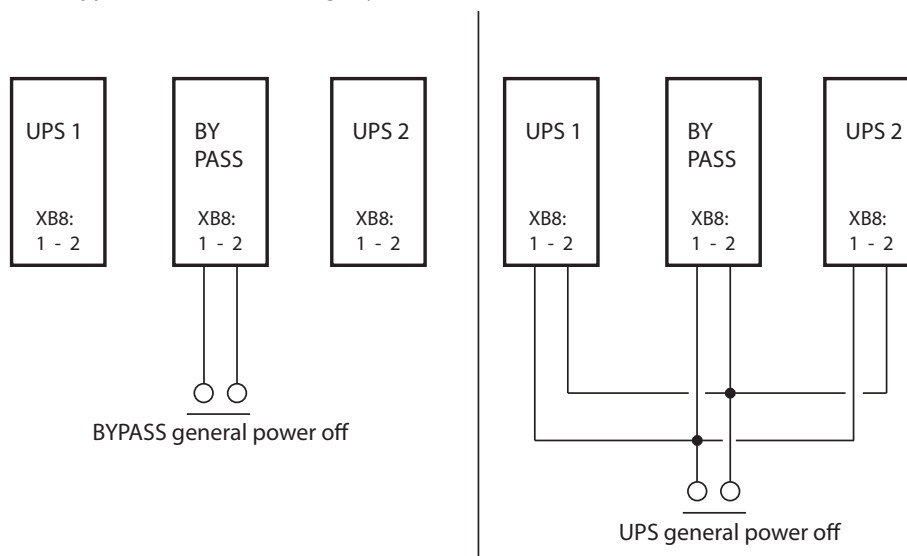
5. 19. UPS GENERAL POWER OFF CONNECTION

UPS general power off system can be installed on the QB612 card (see § 5.18).

The UPS general power off causes:

- the load to be shutdown
- the rectifier, the inverter and the automatic bypass are shutdown but the **battery remains connected**.

In such a case, emergency switching conditions are not complied with. If required, an option provides for a trip coil, directly controlled by the UPS general power off which can be used to trip the battery protection device. Connect a normally open, dry-switch contact to terminals XB8 (and/or XB16) 1 and 2 on QB612 card **of each cabinet** (module and bypass, could be bridged).



5. 20. CONNECTION OF THE GENERATOR (WHERE THERE IS THE BY-PASS)

A so-called GENERATOR SET information allows Green Power 2.0 to operate according to genset conditions.

The manufacturer can set some conditions for generator set operation, that is:

- Stop the battery charger. In such a case, the corresponding input is on terminations XB14 1-2 on PCB QB612
- Locked the bypass. The output frequency is come from internal clock. Transfer to the bypass automatic by pass isn't possible
- Case of a modular system : each unit has to be connected to terminations XB14 1-2 on PCB QB612
- Function a) and function b) through contact combination.



Without a specific request, the factory standard setting implies there is no action on Green Power 2.0 when the generator set is operating. Configurations mentioned above can be set at commissioning

5. 21. ISOLATION TRANSFORMER

If an external isolation transformer cabinet is required, the following instructions should be followed:

- Refer to § 5.3 and 5.4 of this manual for indications on moving and installing the cabinet.
- The protection cable marked with the ground symbol is connected directly to the distribution panel.
- The transformer can either be connected to Green Power 2.0 input or output.



If the neutral is not present on the input, please contact us

For details of the connections, refer to the transformer terminal board diagram on the UPS door.

5. 22. UPS PARALLEL CONFIGURATION

- Parallel connection enhances UPS system reliability, performance and power.
- Operating UPSs are connected to each other by a signal cable B (Fig. 5.22.1-1) which provides 25m distance between UPSs and enables the external battery cabinet to be inserted next to each UPS. They are configured differently depending on the position they are assigned; for this reason the units have a position label: the “INTERNAL” label (used only on systems with three UPS) means that this unit must be positioned between the two other cabinets.
- The power supply of each UPS must be equipped with a protection device as shown in the table in § 4.7.
- The cross section and length of the input and output cables must be identical for all the units.
- The phase rotation must be the same for each unit connected in parallel and also on any external manual maintenance bypass line.
- Cables of the same length and cross section must be used for the connection between the general power switch A, the switches C and the respective UPS units. The length of the cables from A to each UPS module must not exceed 25 meters (see Fig. 5.22.1-1).
- The cables from Green Power 2.0 module to circuit breaker D must be of the same length.
- If a differential switch is installed on the mains power switch, it must be inserted upstream from the distribution panel; it must be a selective type and the trigger value must be 3A tempo by the number of UPS connected in parallel.



If other switchgear, switch or circuit breaker, are present downstream of the UPS module (see Fig. 5.22.1-1 point D), you must bring his contact position (Q21) on the UPS in the rack slot XB12 (see § 5.18)



The opening and closing of the switch D should only be done only after stopping the unit UPS Green Power 2.0 upstream of this switch.

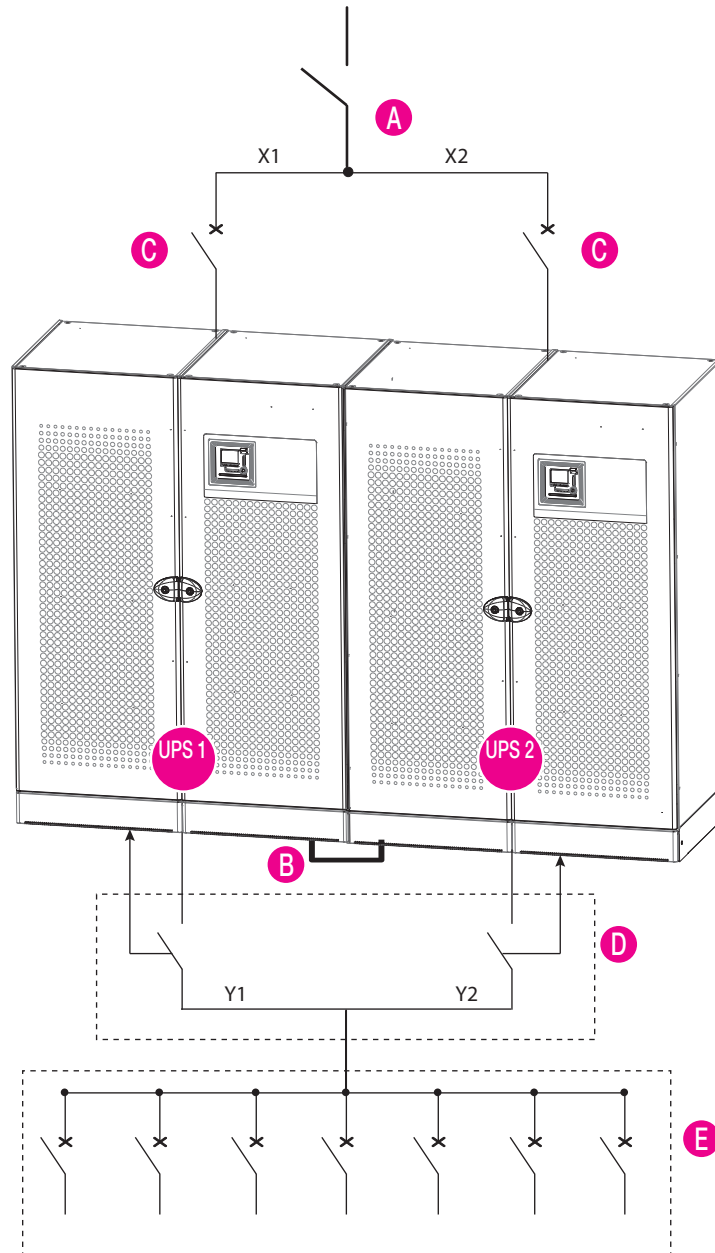
- In order for units connected in a parallel configuration to operate correctly, control cables are required to exchange data between both UPS units making up the parallel system. The cables in question are supplied with Green Power 2.0 in case of standard parallel setting or are attached to the parallel kit in case of later upgrading of the system.



Parallel configuration must only be activated by SOCOMEC qualified personnel.

5.22.1. Recommended 1+1 parallel configuration

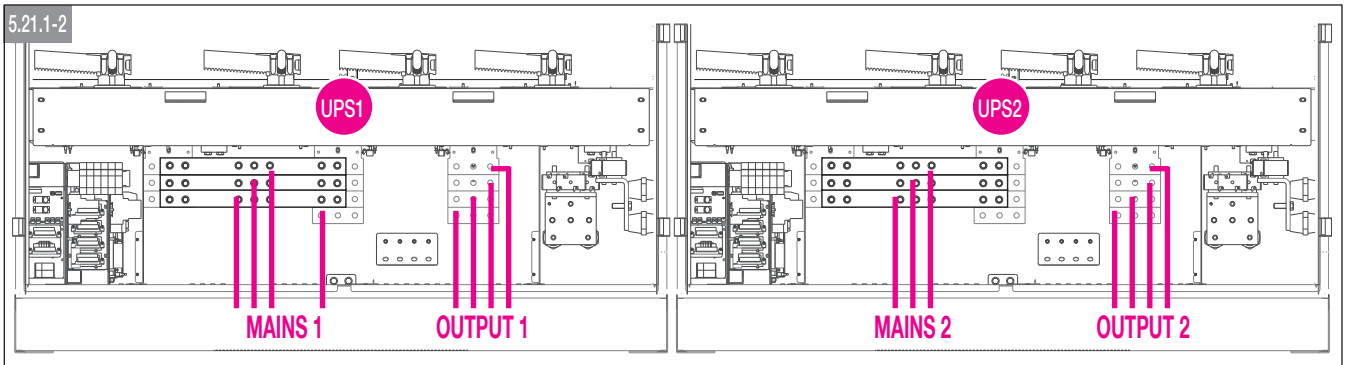
5.22.1-1

**Legend.**

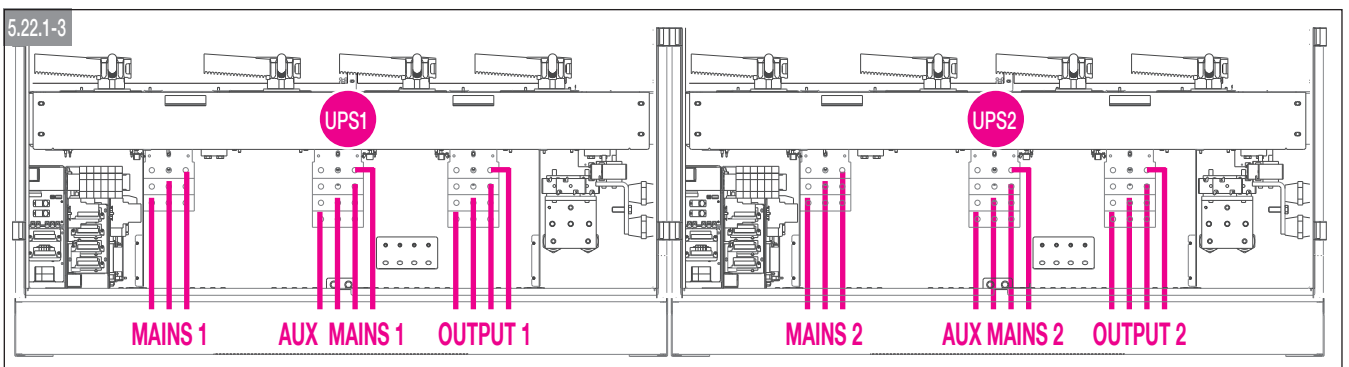
- A Selective general differential magneto thermal switch.
- B "Parallel bus" cable.
- C Single UPS magneto-thermal switch (if a separate auxiliary power source is used, add a magneto-thermal switch for each UPS).
- D Additional disconnectors on the distribution panel (Q21, see § 5.22).
- E Distribution.

$$X1 = X2 \quad Y1 = Y2 \leq 25\text{m}$$

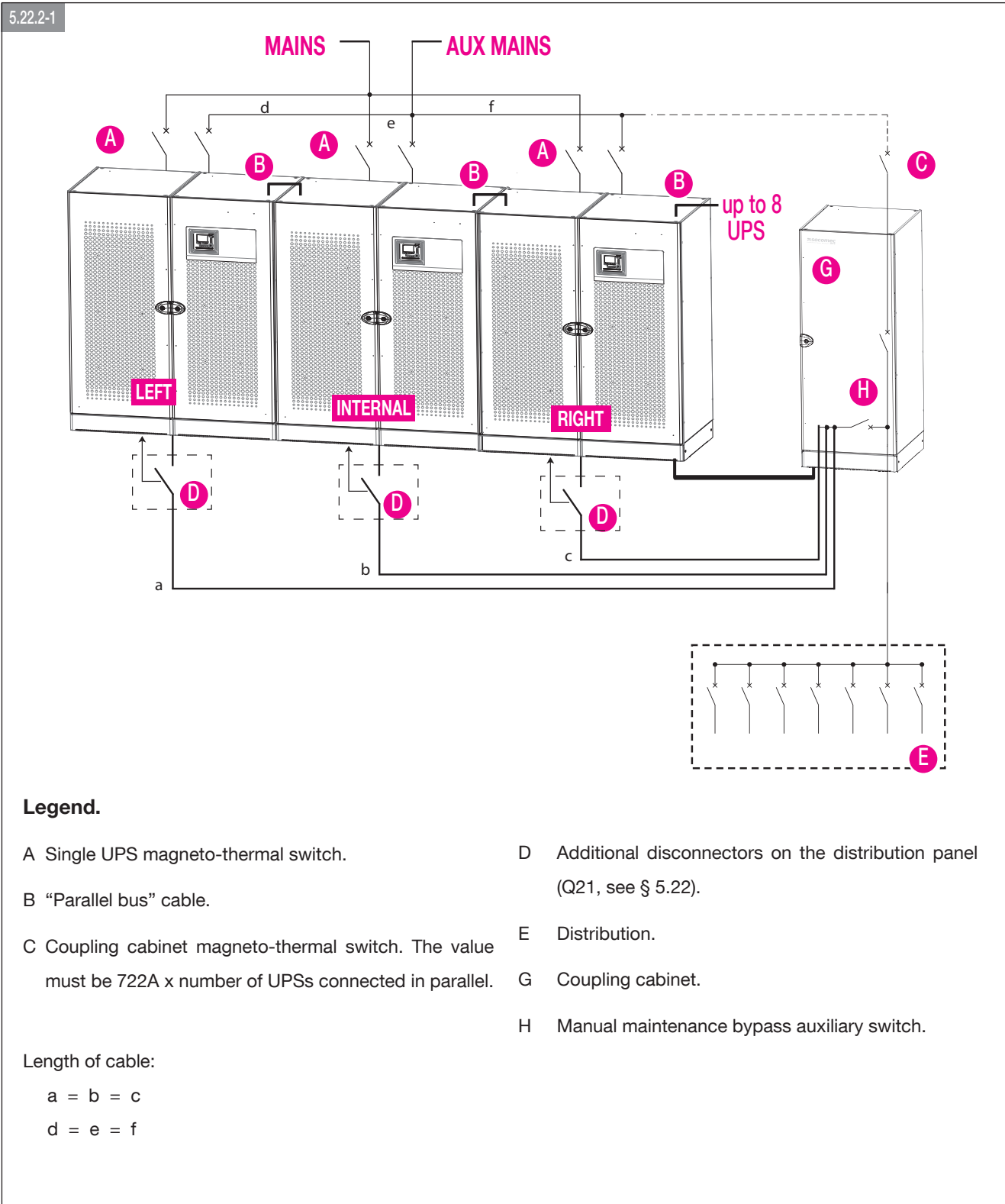
1+1 Parallel configuration - Common Mains.



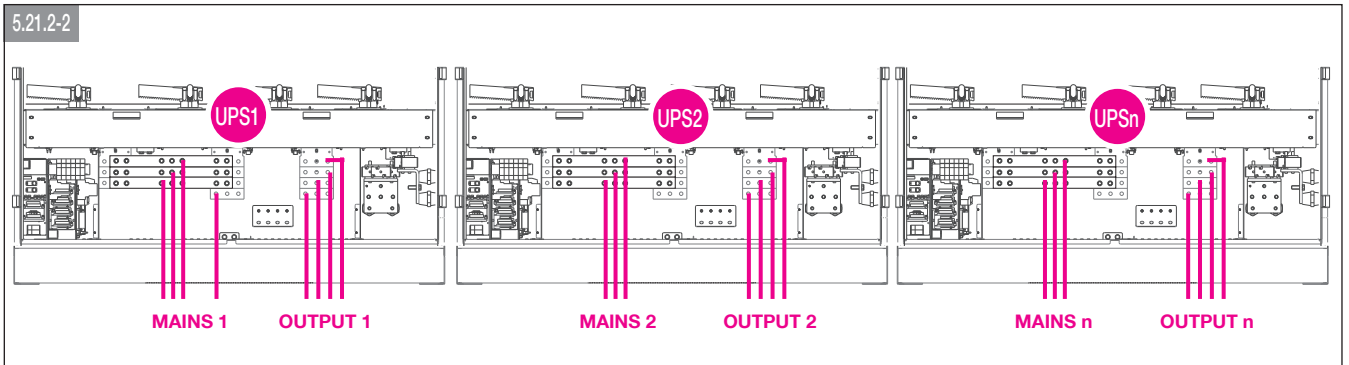
1+1 Parallel configuration - Separate Mains.



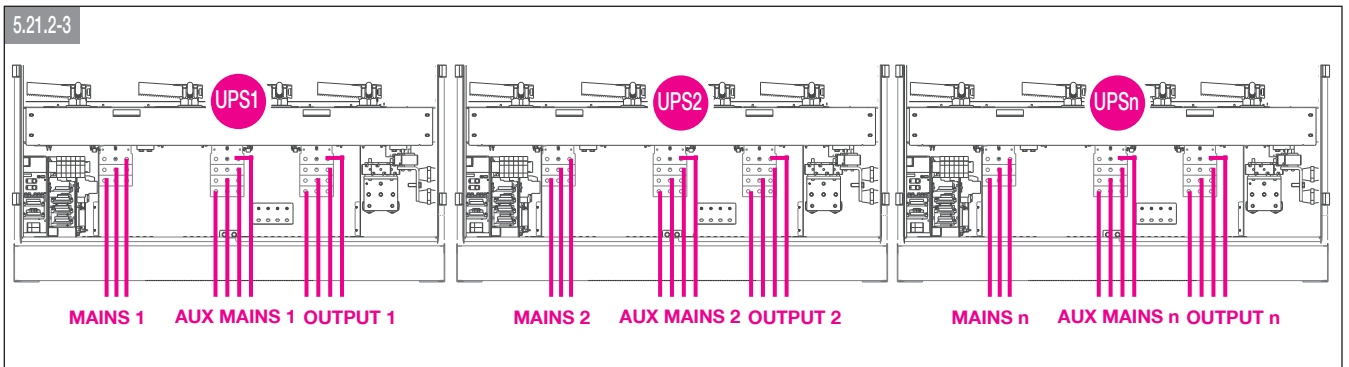
5. 22.2. Recommended N+1 parallel configuration



N+1 Parallel configuration - Common Mains.

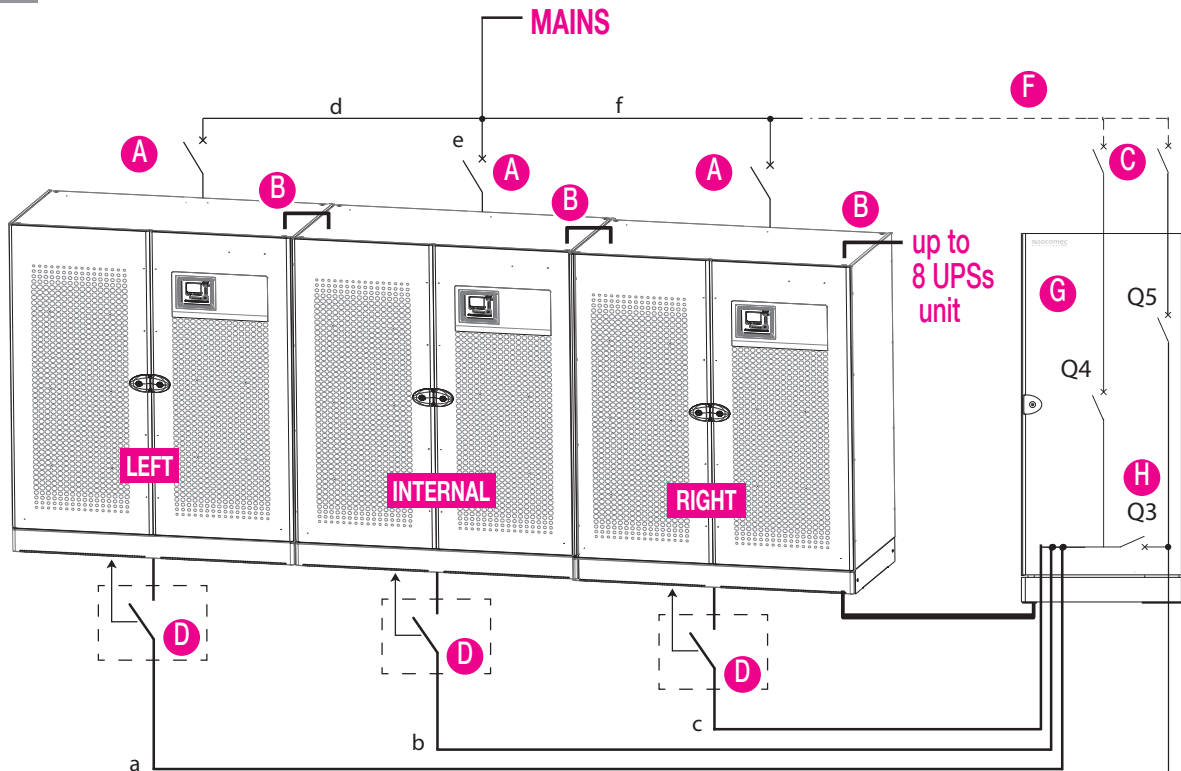


N+1 Parallel configuration - Separate Mains.



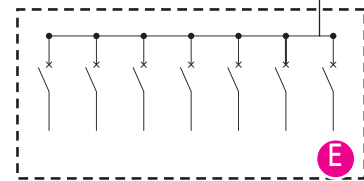
5. 22.3. Recommended parallel C3 system configuration

5.22.3-1

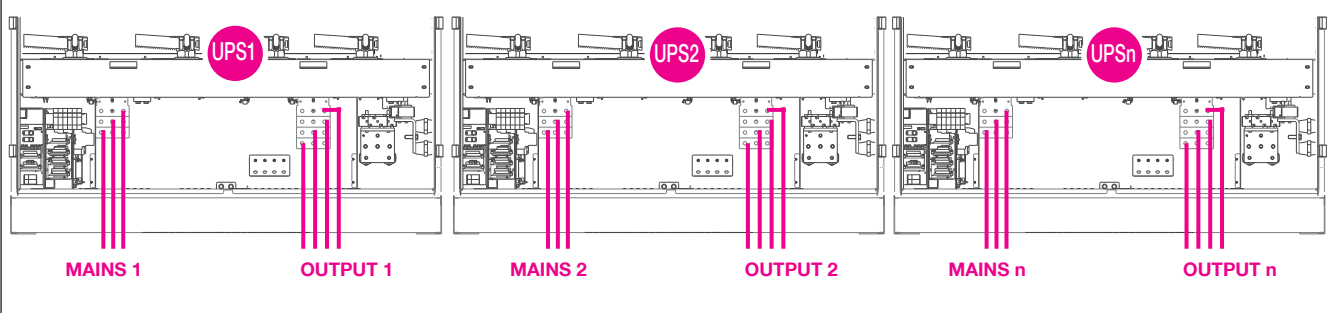


Legend.

- A Single UPS unit magneto-thermal switch.
- B "Parallel bus" cable.
- C Coupling cabinet magneto-thermal switch. The value must be 722 A x number of UPSs unit connected in parallel.
- D Additional disconnectors on the distribution panel (Q21, see § 5.22).
- E Distribution.
- F Adapted to the power of the bypass
- G Bypass cabinet.
- H Output switch.



5.21.3-2



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6. PREVENTIVE MAINTENANCE



All operations on the equipment must be carried out solely by SOCOMEC personnel or by authorised service personnel.

Maintenance requires accurate functionality checks of the various electronic and mechanical parts and, if necessary, the replacement of parts subject to wear and tear (batteries, fans and condensers). It is recommended to carry out periodic specialised maintenance (annually), in order to keep the equipment at the maximum level of efficiency and to avoid the installation being out of service with possible damage/risks. Moreover, attention should be paid to any requests for preventive maintenance that the equipment may automatically display with alarm/warning message.

6. 1. BATTERIES

The state of the battery is fundamental to UPS operation.

Thanks to the Expert Battery System, the information relating to the state and the conditions of use of the battery are processed in real time and the recharging and discharging procedures are selected automatically in order to optimise battery life expectancy and offer maximum performance.

Furthermore, during the operating life of the battery, Green Power 2.0™ stores statistics on the conditions of use of the battery for analysis.

Since the expected life of the batteries is very much dependent on operating conditions (number of charging and discharging cycles, load rate, temperature), a periodic check by authorised personnel is recommended.



When replacing the batteries, use the same type and configuration by placing them in the appropriate containers so as to avoid the risk of acid leakage.

The replaced batteries must be disposed of at authorised recycling and disposal centres.

Do not open the plastic cover of the batteries as they contain harmful substances.

6. 2. FANS

The life of the fans used to cool the power parts is dependent on the using and environmental conditions (temperature, dust).

Preventive replacement by an authorised technician is recommended within 4 years (in normal operating conditions).



When needed, fans must be replaced as per specifications by SOCOMEC.

6. 3. CAPACITORS.

The equipment houses electrolytic capacitors (used in the rectifier and inverter section) and filtering capacitors (used in the output section), whose life is dependent on using and environmental conditions.

The average expected life of these components is shown below:

- Electrolytic capacitors: 5 years;
- Filtering capacitors: 5 years.

In any case the effective state of the components is verified during preventive maintenance.

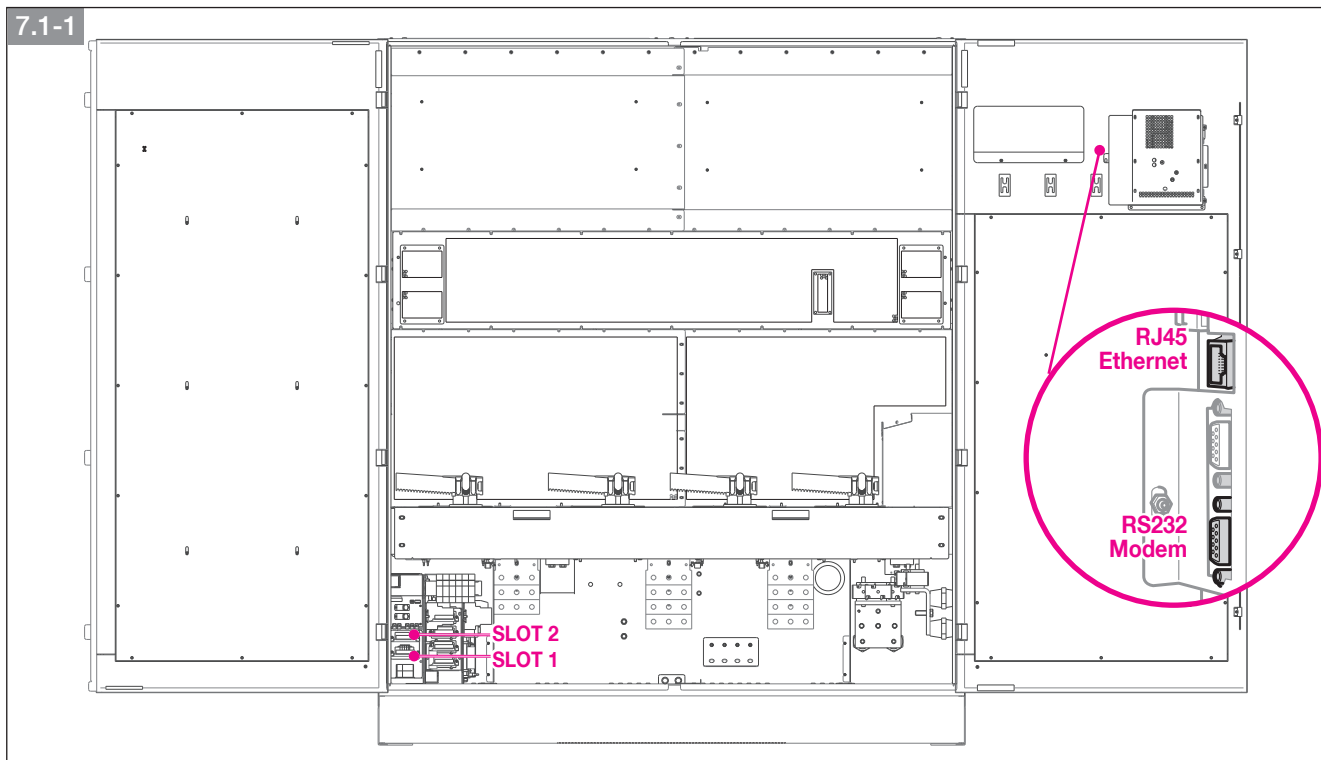
7. COMMUNICATION

7.1. MULTILEVEL COMMUNICATION

Green Power 2.0 can manage various serial, contact and Ethernet communication channels at the same time. The 2 communication slots available allow the use of signalling accessories and cards. Each communication channel is independent; simultaneous connections can thus be made to have various levels of remote signalling and monitoring (see the § 8 for a detailed evaluation of the functionality of the cards that can be installed in the slots). The table below shows the possible connections between Green Power 2.0 communication channels and the external devices.

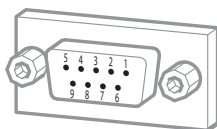
Communication levels			Optional		
	SLOT 1	SLOT 2	SLOT 3	SLOT 4	SLOT 5
ADC card	•	•	•	•	•
Serial port*		COM2	COM3	COM2	
BHC interactive		•			
NetVision		•			
Modbus TCP		•			

* It is possible to use one isolated serial PCB only.



7.2. SERIAL CONNECTION PCB

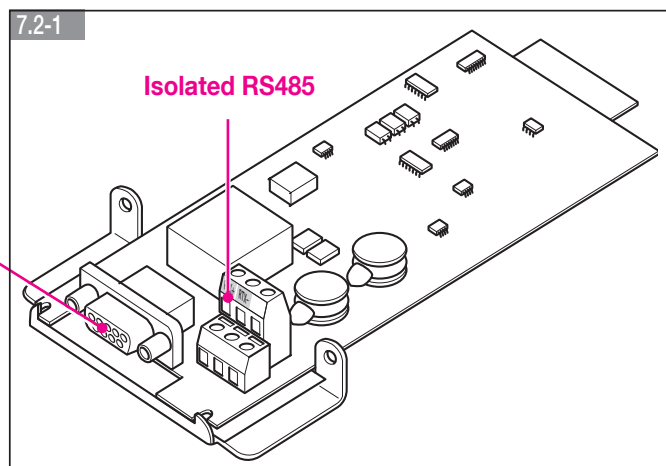
A serial RS232 connector DB9 and an isolated RS485 connector are available on the card (RTX+ and RTX-).



RS232 DB9

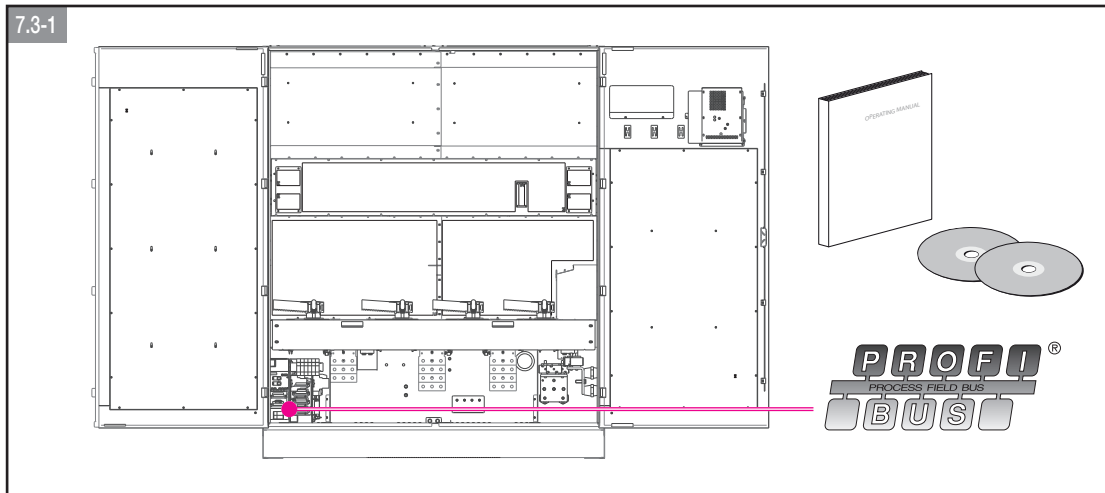
Legend pin RS232 DB9

1 Reserved	4 Reserved	7 Reserved
2 RX for RS232	5 GND for RS232	8 Reserved
3 TX for RS232	6 Reserved	9 Reserved



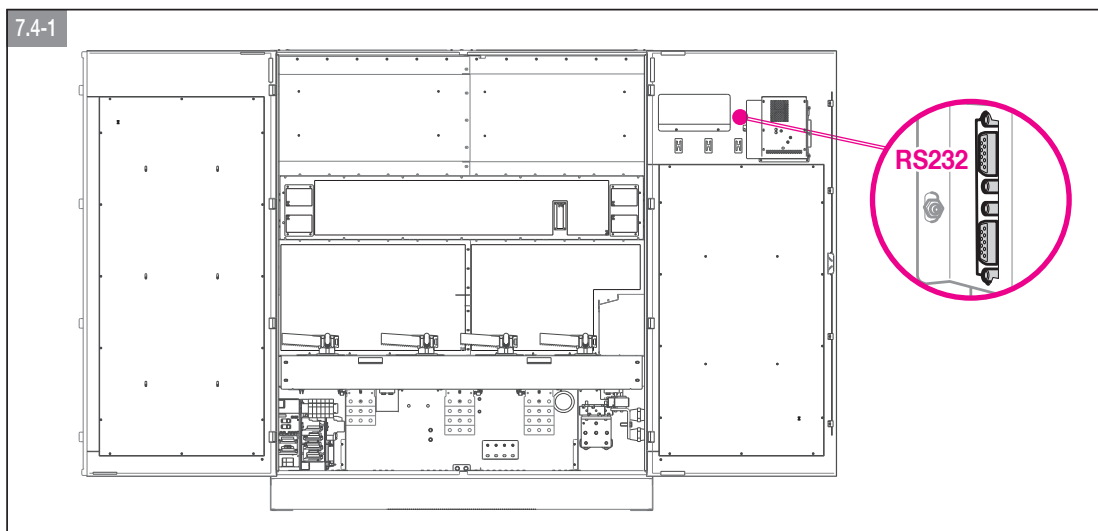
7. 3. PROFIBUS

On request, Green Power 2.0 can be provided with a Profibus protocol converter, installation software, configuration software and user manuals.



7. 4. GSM MODEM

Enables sending of SMS messages regarding the equipment's operating status.



7. 5. REMOTE MONITORING VIA WEB SERVER

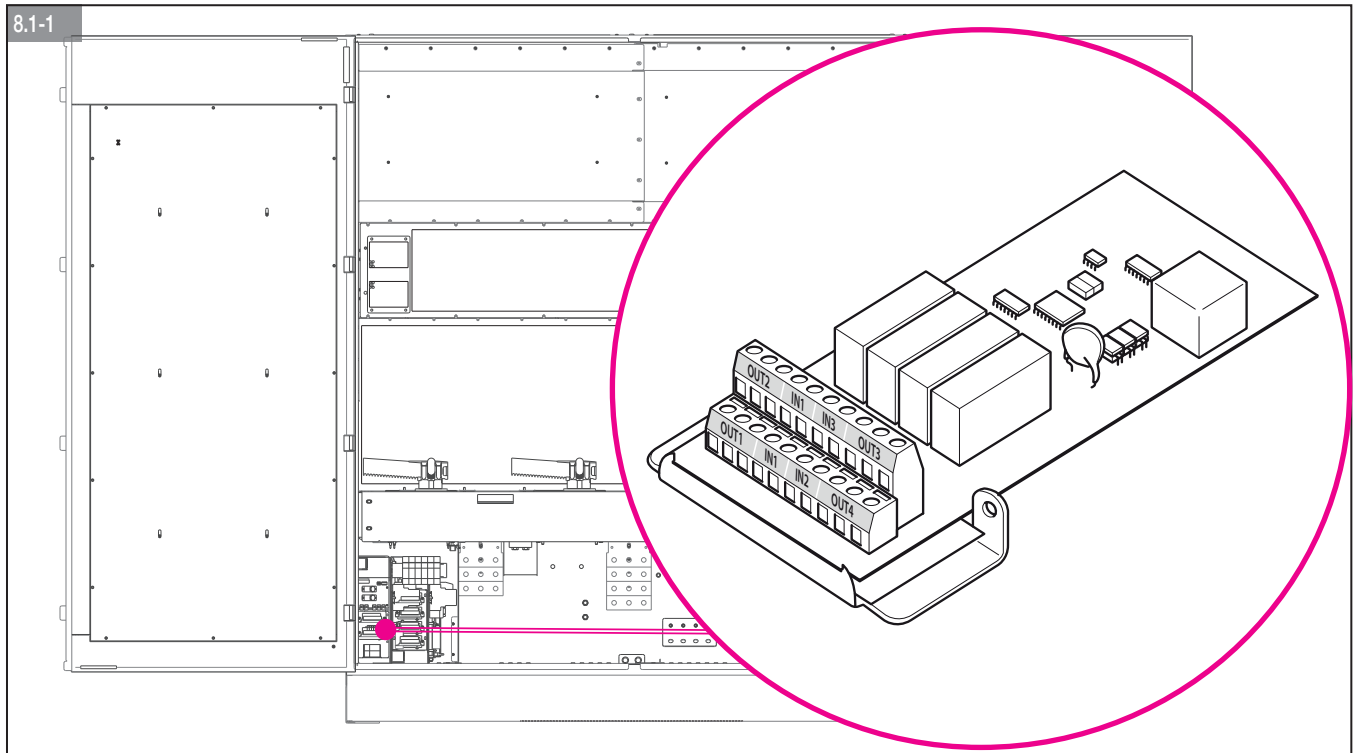
By connecting Green Power 2.0 to an Ethernet network, the operating status of Green Power 2.0 can be monitored from any PC connected to the network through an html page.

1. Connect the network cable to the RJ45 port.
2. Configure the network IP address via the mimic panel.
3. Open your favourite web browser.
4. Type the IP address of Green Power 2.0 to display its synoptic.

8. OPTIONS

8. 1. ADC CARD

This card can be configured to control up to four outputs that are normally closed or normally open and up to three digital inputs. A maximum of two cards can be installed on each unit.



8. 2. ISOLATION CONTROLLER

This device continually checks the transformer isolation, displaying an alarm message on the mimic panel.

8. 3. EXTERNAL MANUAL MAINTENANCE BYPASS

This device will electrically exclude and isolate Green Power 2.0 (e.g. for maintenance operations) without interrupting the power supplied to the load.



8. 4. ACS PCB

Synchronises Green Power 2.0 output with an external power source (another UPS, even of a different brand, generator or transformer).

8. 5. TEMPERATURE SENSOR

This allows control of the temperature in the battery room or inside the battery cabinet.

9. TECHNICAL SPECIFICATIONS

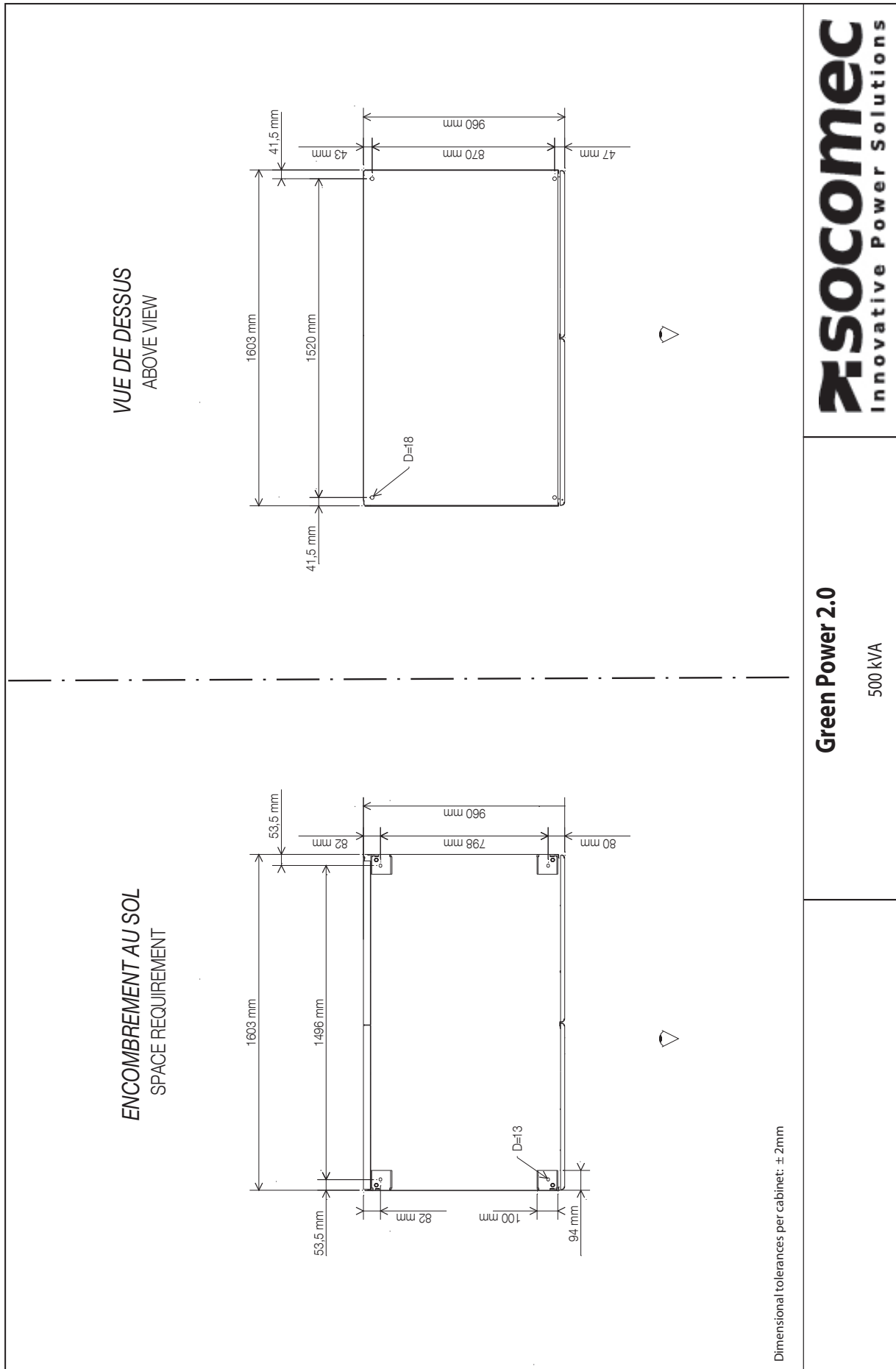
Green Power 2.0	500 kVA
Electrical specifications - Rectifier Input	
Mains voltage with nominal power ($\cos \varphi = 1$)	3P Un= 380 - 415 VAC
Input frequency	42 - 65 Hz
Input power factor	0,99
THDI (with THDV < 1%)	$\leq 2,5\%$
Electrical specifications - Bypass Input	
Mains voltage with nominal power ($\cos \varphi = 1$)	3P+N Un $\pm 15\%$
Input frequency	50-60 Hz
Electrical specifications - Output	
Output voltage	3P+N 380 / 400 / 415 VAC
Frequency	50-60 Hz $\pm 0.02\%$
Automatic bypass	400 V $\pm 15\%$ (Selectable from 10% to 20% if generator is used)
Nominal power	500 kW
Overload (at $t^\circ \leq 25^\circ\text{C}$, as per IEC 62040-3):	
• 10 minutes	560 kW
• 1 minute	625 kW
Crest factor	3:1
Voltage distortion	< 1,5% with linear load; < 4% with non-linear load
Inverter short-circuit capacity	1800A
Rated short-time withstand current I_{cw}	15,2 kA
Bypass	
Manual maintenance bypass	Built-in
Maximum overload capacity admitted	110% 60 min, 125% 10 min, 150% 1 min ($\leq 25^\circ\text{C}$, 400V/50Hz)
Bypass short-circuit capacity (peak 20ms)	14500 A
Environment	
Operating temperature (permanent)	10 \div 35 $^\circ\text{C}$ (25 $^\circ\text{C}$ recommended)
Storage temperature	-20 \div 70 $^\circ\text{C}$
Relative humidity (condensation-free)	up to 95%
Max. altitude	1000 m
Acoustic noise	< 72 dBA
Air flow	5400 m ³ /h
Dissipated power max at Pn nominal condition	24300 W 82914 BTU/h
Dissipated power max at Pn worst condition	30000 W 102364 BTU/h
Standards	
Safety (TÜV certified)	IEC 62040-1, IEC 60950-1-1
Type and performance	IEC 62040-3 (VFI-SS-111)
EMC	IEC 62040-2
Product certification	 
Protection level	IP20 (compliant with IEC 60529) *

* IP 32 on request

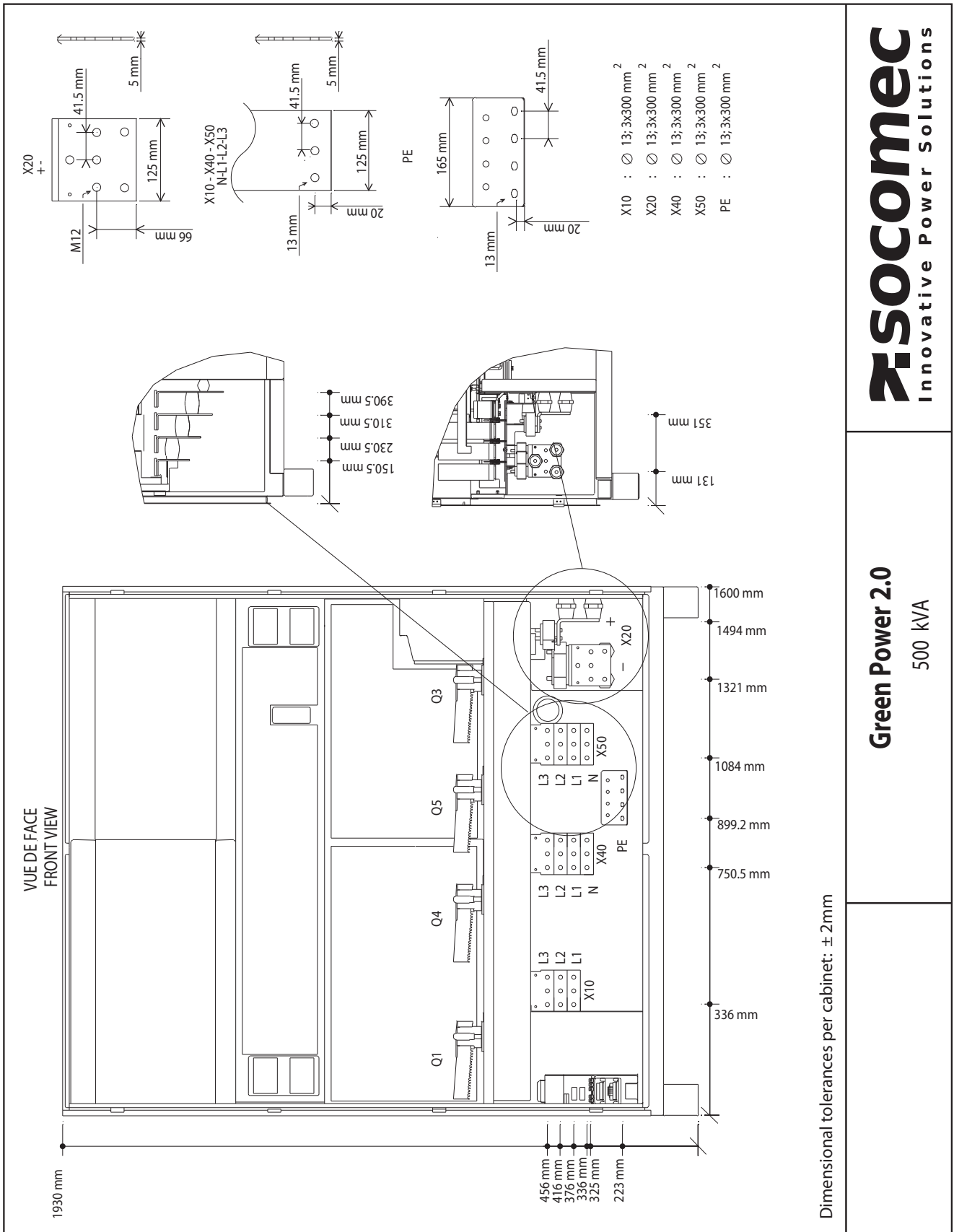
These performances are given for information at rated load (resistive)

10. APPENDIX

10. 1. PLAN 1: FLOOR FIXING

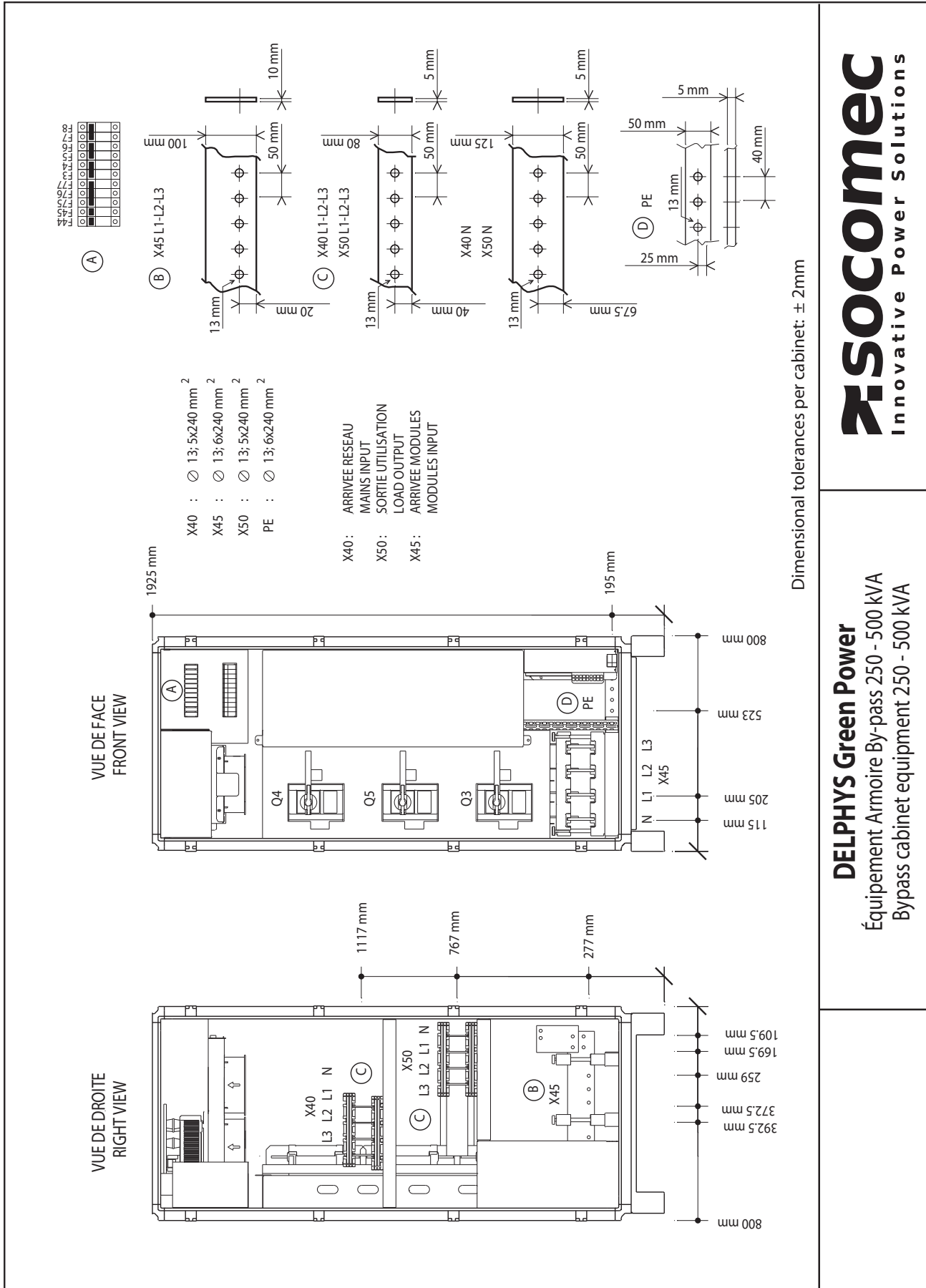


10. 2. PLAN 2: DIMENSIONS



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10. 3. PLAN 3: BYPASS CENTRALISED CABINET DIMENSIONS 250/500 kVA



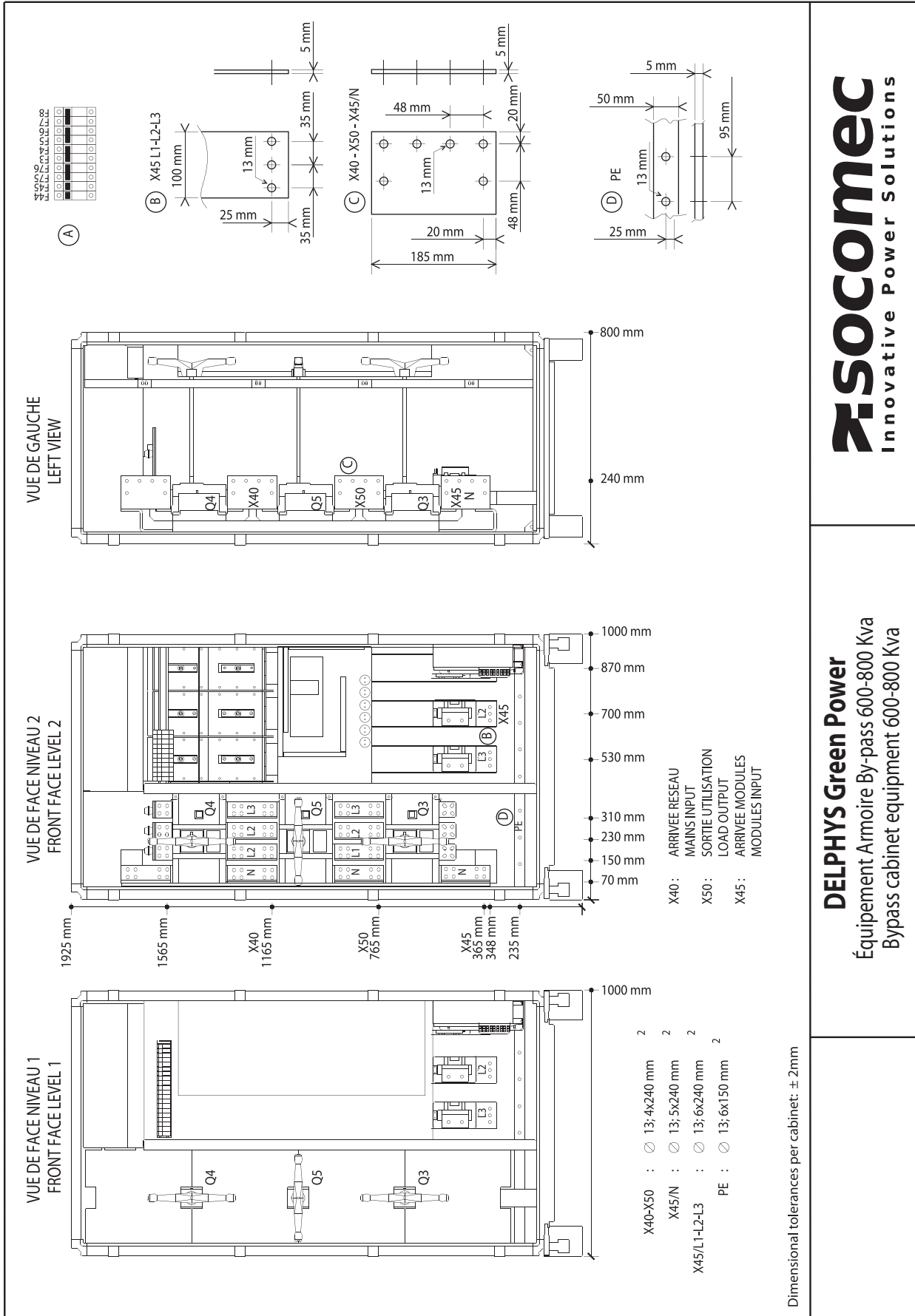
Dimensional tolerances per cabinet: ± 2mm

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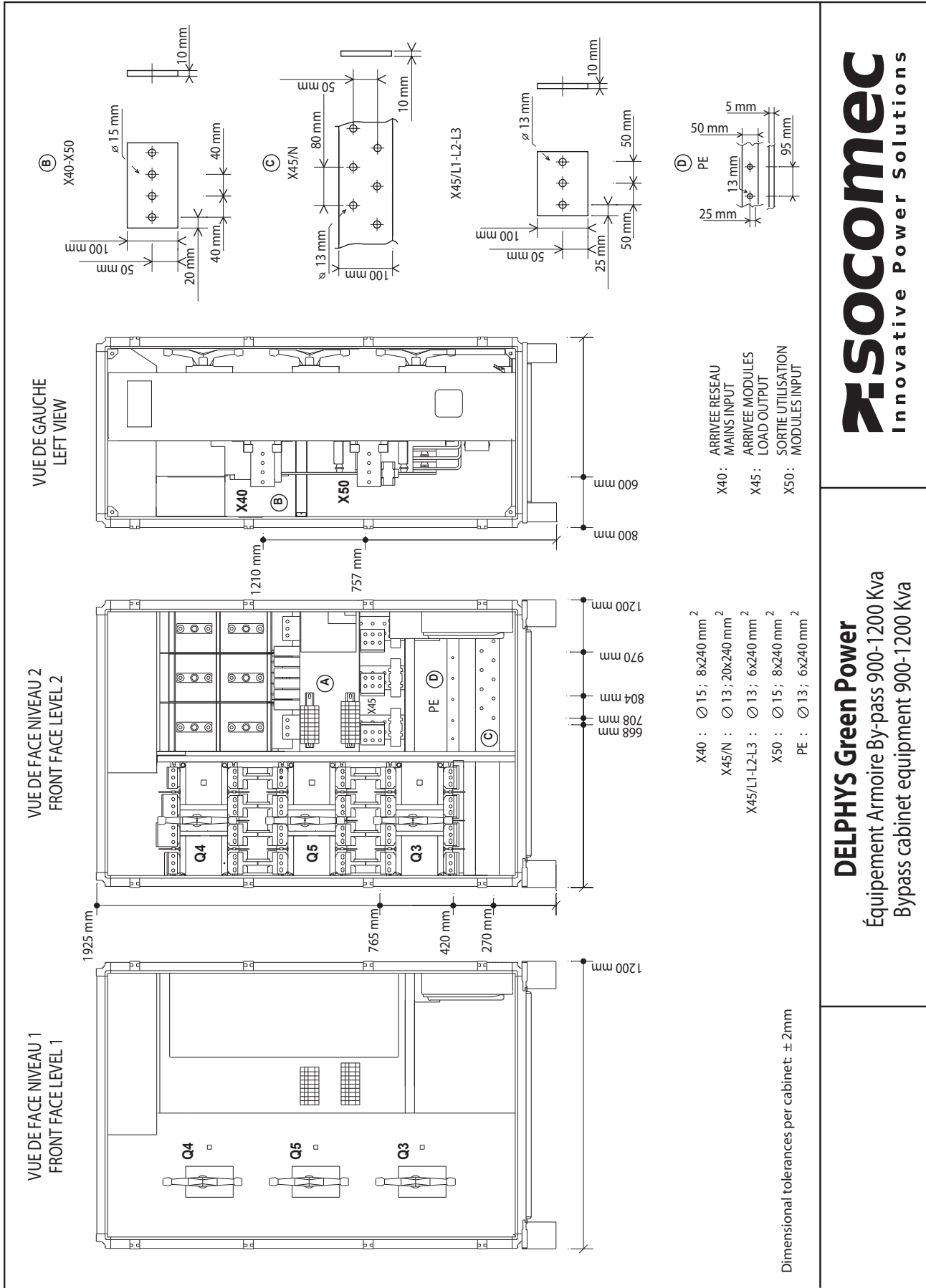
DELPHYS Green Power
Équipement Armoire By-pass 250 - 500 kVA
Bypass cabinet equipment 250 - 500 kVA

ENGLISH

10. 4. PLAN 4: BYPASS CENTRALISED CABINET DIMENSIONS 600/800 kVA

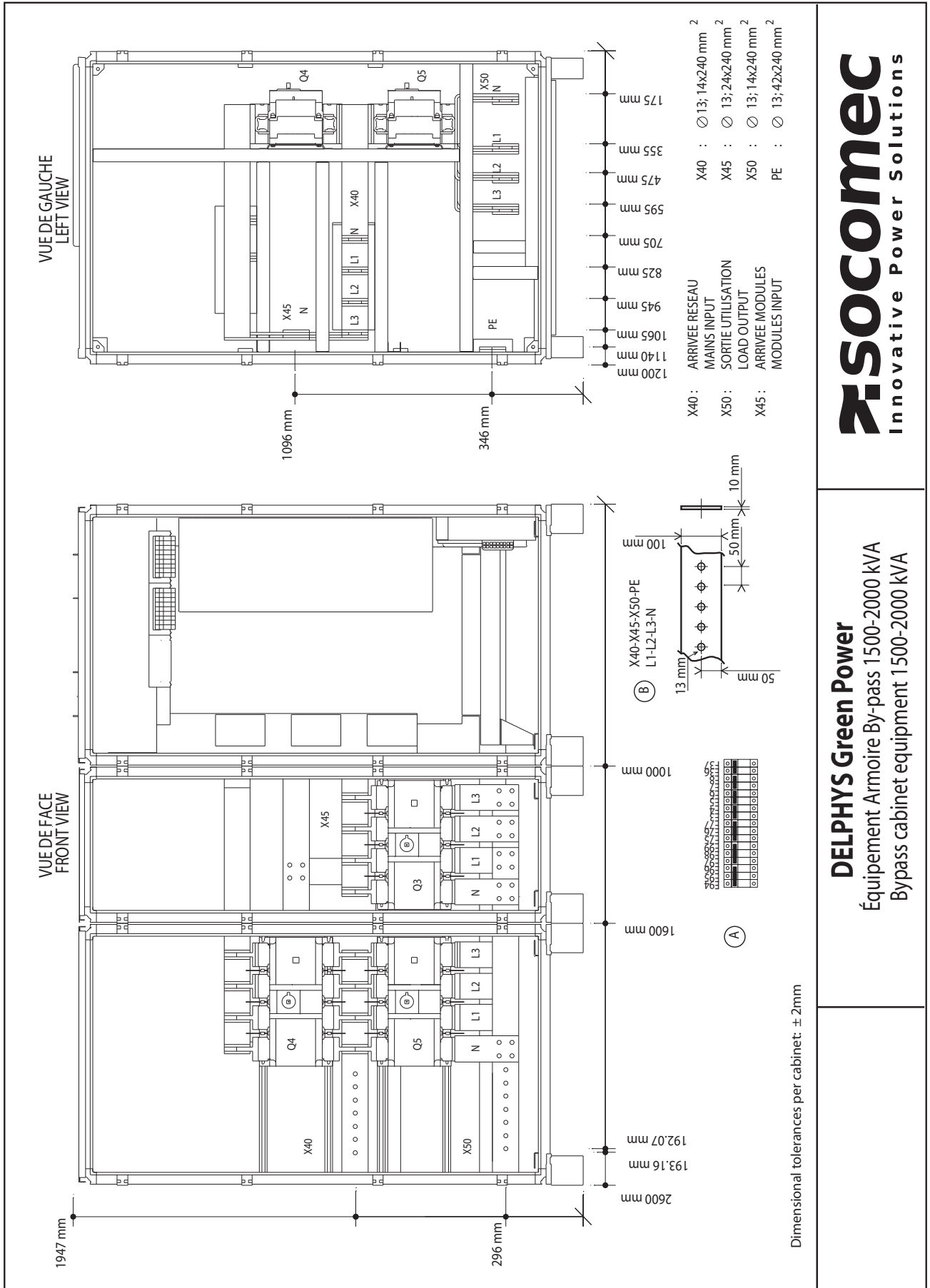


10. 5. PLAN 5: BYPASS CENTRALISED CABINET DIMENSIONS 900/1200 kVA

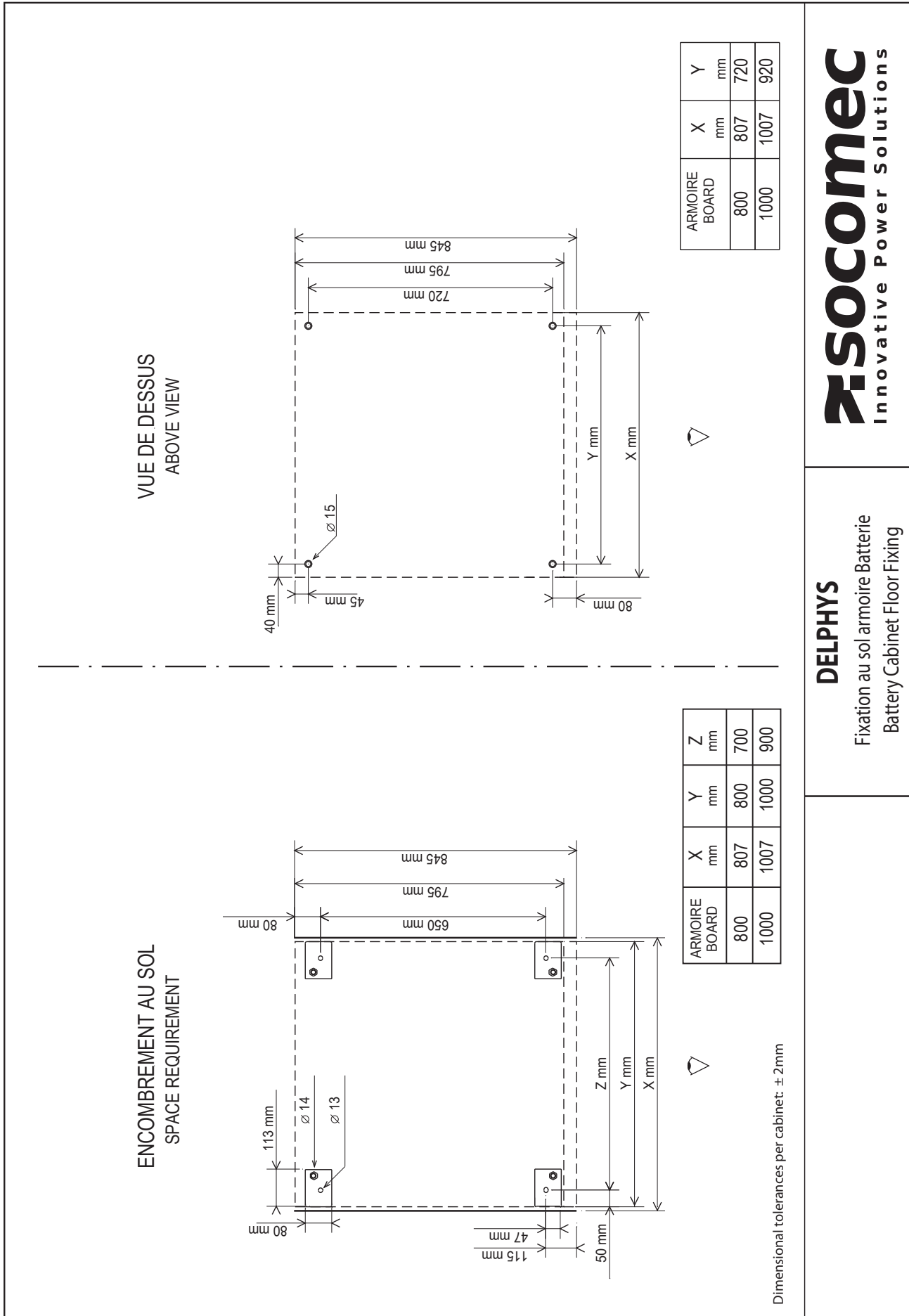


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10. 6. PLAN 6: BYPASS CENTRALISED CABINET DIMENSIONS 1500/2000 kVA



10. 7. PLAN 7: BATTERY FLOOR FIXING

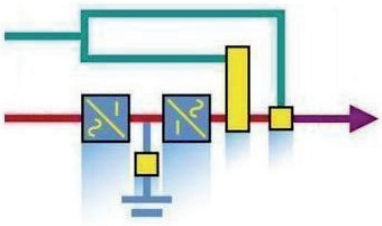
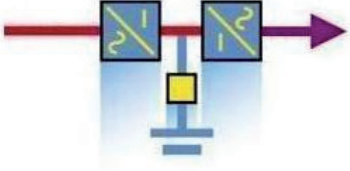
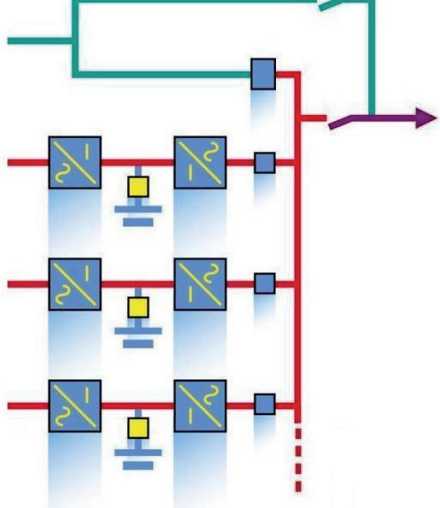
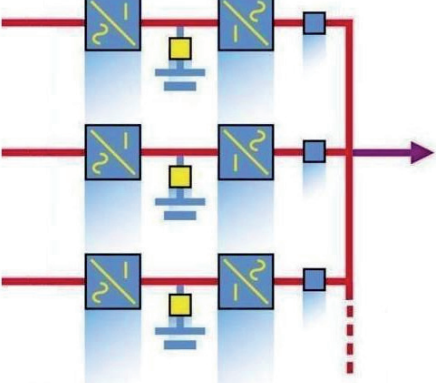
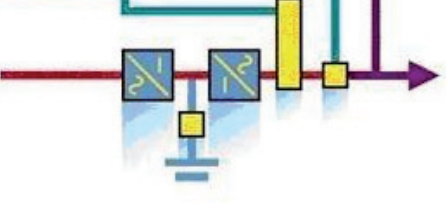
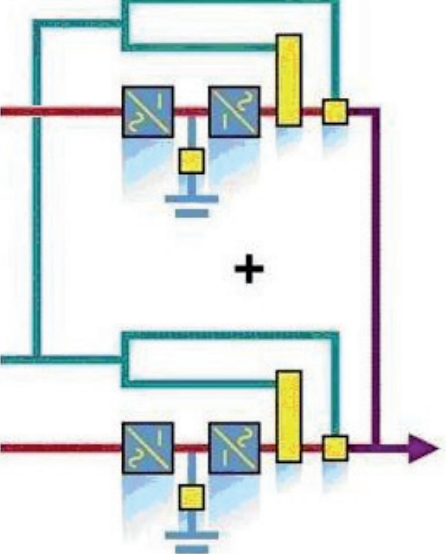



DELPHYS

Fixation au sol armoire Batterie
Battery Cabinet Floor Fixing

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10. 8. PLAN 8: UPS CONFIGURATIONS

<p>C1 : UNITAIRE AVEC BY-PASS C1 : SINGLE UNIT WITH BY-PASS</p> 	<p>C2 : UNITAIRE SANS BY-PASS C2 : SINGLE UNIT WITHOUT BY-PASS</p> 	<p>C3 : PARALLELE AVEC BY-PASS CENTRALISE C3 : PARALLEL WITH CENTRALISED BY-PASS</p> 
<p>C4 : PARALLELE SANS BY-PASS C4 : PARALLEL UNIT WITHOUT BY-PASS</p> 	<p>C6 : PARALLELE MODULAIRE REDONDANT C6 : PARALLEL WITH MODULAR BY-PASS</p> 	<p>C7 : PARALLELE MODULAIRE NON REDONDANT C7 : PARALLEL WITH NON REDONDANT BY-PASS</p> 
<p>CONFIGURATION Delphys Green Power EXPLICATIF CONFIGURATION Delphys Green Power CONFIGURATION EXPLANATION Delphys Green Power</p>		

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