BATTERY CABINET
33 / 40 / 20 + 20 batteries

User's Manual

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Thank you for choosing our product.

The manufacturer is highly specialised in the development and production of UPS and UPS accessories. The equipment in this series are carefully designed and manufactured in order to ensure the highest levels of performance.

Symbols used in this manual

Graphic symbols drawing attention to the dangers of some operations are found in this manual:

	Possibility of serious injury or substantial damage to equipment if adequate precautionary countermeasures are not taken.
	This symbol indicates important information that should be read carefully.
	Part of the manual which is recommended reading

Personal Protective Equipment

During machine maintenance operations, operating without the Personal Protective Equipment (PPE) listed below is strictly forbidden.

Personnel responsible for equipment installation and maintenance must not wear clothing with wide sleeves or straps, belts, bracelets, or other parts that can cause danger, especially metal. Any long hair must be secured a precaution.

The following symbols summarise the protective equipment to be worn. Various devices are to be identified and sized according to the nature of the hazard (especially if electrical) that the equipment involves.

	**Safety footwear** Use: always		**Protective goggles** Use: always
	**Protective clothing** Use: always		**Helmet** Use: in the presence of overhead loads
	**Work gloves** Use: always		

Definition of "operator" and "skilled technician"

Operators are those professional persons authorised to access equipment for routine maintenance purposes.
This definition involves those persons who are familiar with equipment operation and maintenance and meet the following requirements:

1. Trained to operate in accordance with safety standards in relation to the presence of high voltages.
2. Trained to use appropriate Personal Protective Equipment and basic first aid measures.

Skilled technicians are those professional persons authorised to perform installation, start-up and any special maintenance.
This definition involves those persons that, in addition to the requirements of a generic operator, must also:

1 have been properly trained by the manufacturer or manufacturers representative.
2 be aware how to install, assemble, repair and service the equipment, and have a relevant technical qualification.
3 must have technical training or any specific training on procedures for safe equipment use and maintenance.

Emergency interventions

The following information is of a general nature.

First aid interventions

For any first aid interventions, follow local regulations and workplace procedures.

Fire-fighting measures

1 Do not use water for extinguishing fires but fire extinguishers suitable for electrical and electronic equipment.
2 When heated or on fire, some products can release toxic fumes into the atmosphere. Always use a respirator when extinguishing a fire.

GENERAL WARNINGS

This manual contains instructions on the installation and commissioning of battery cabinets. Reading this manual is of essential importance but cannot replace the expertise of technical personnel who must have received adequate training beforehand. This manual should be kept intact and in good condition throughout the life of the equipment.

This battery cabinet can only be connected to an uninterruptible power supply (UPS). The UPS shall have the same nominal voltage as the battery (see the data plate)

Follow instructions contained in the UPS user manual to switch on the UPS system +and battery cabinet.

Close the battery switch only when the UPS is turned on. Consult the UPS manual.

This equipment has been designed and built according to product standards, taking into account normal and reasonably foreseeable use. Use for pruposes other than those intended or in ways differing from those contained in this manual, is not permitted for any reason. The various operations should be performed in accordance to the criteria and order as described in this manual.

PRECAUTIONS AND SAFETY REGULATIONS

Consult the **"Safety and Compliance manual"** supplied with the battery cabinet (0MNA141_NE).

ENVIRONMENTAL PROTECTION

Our company dedicates several resources to analysing environmental aspects in the development of our products.
All our products pursue the objectives defined in the environmental management system developed by the company in compliance with applicable standards.
No hazardous materials such as CFCs, HCFCs or asbestos are used in this product.
When evaluating packaging, the choice of material has been made favouring recyclable materials.
For correct disposal, please separate and identify the type of material of which the packaging is made in the table below. Please dispose of all material in compliance with applicable local standards.

DESCRIPTION	*MATERIAL*
Box	Cardboard
Protective bag	Polyethylene
Accessories bag	Polyethylene
Pallet	Wood

DISPOSING OF THE PRODUCT

The battery cabinet contains batteries that are considered TOXIC WASTE and DANGEROUS. When the product reaches the end of its operating life, dispose of it in accordance with applicable local legislation.
Disposing of the product correctly contributes to respecting the environment and personal health.

CONTENTS

BATTERY CABINET STORAGE

The storage site must meet the following requirements:

- *Temperature*: 0°-40°C (32°-104°F)
- *Degree of relative humidity:* 95% max

If the batteries contained in the cabinet are not recharged, they become subject to self-discharge. Self-discharge happens faster in higher temperatures (e.g. 40°C) and slower in lower temperatures (e.g. 25°C).
Whenever the battery cabinet is stored and not installed immediately, take note of the date printed on the packing plate of the battery charger and recharge by that date.
To recharge batteries, simply plug the battery cabinet in to a NORMAL OPERATION UPS for at least 24 hours.
For longer storage periods, contact technical assistance.

PRELIMINARY OPERATIONS

CHECKING PACKAGING AND REMOVAL

Upon receipt of the battery cabinet, ensure that packaging has not been damaged during transport. In particular, check that none of the anti-shock devices set in the packaging have turned red. If any have turned red, please follow the instructions contained on the packaging

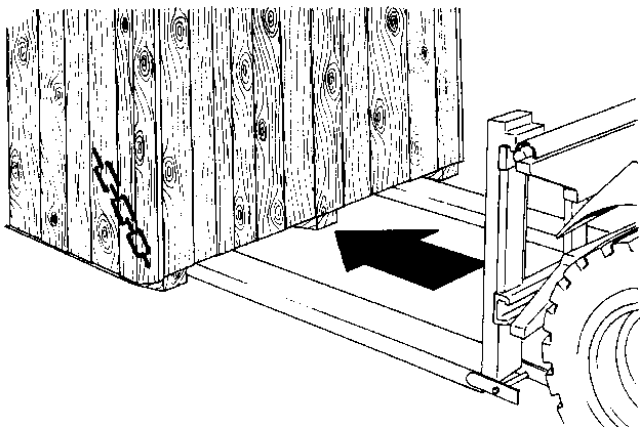
BATTERY CABINET HANDLING

The battery cabinet complete with batteries can only be handled with the side, front and rear panels bolted in place.

For mechanical dimensions of cabinets, refer to the ***"INSTALLATION DRAWING"*** supplied with the battery cabinet, if present. These drawings provide the following information:

- a view of the floor support for the sizing of any structures in order to raise the cabinet
- cable entry position
- connection cables section

Machine handling must be completed by suitably trained personnel. Unloading from the transport vehicle and placement in the installation location can be carried out lifting the crated or wooden platform to which the equipment is attached with a forklift. For final installation, use a transpallet or forklift according to the instructions provided below.



1 Insert the forks of the forklift at the bottom of the equipment from the front or back, making sure that they protrude about 30 cm on the opposite side. If you plan to use a transpallet, lift the equipment only if absolutely necessary.
2 Fasten the equipment to the transpallet or forklift and move.

Overturning hazard

To avoid the risk of overturning, make sure equipment is firmly anchored to the transpallet or forklift with suitable cables before moving.

During these operations, keep in mind that the cabinet should be handled with care. Any shocks or falls can cause damage. Once positioned, remove packaging carefully to avoid scratching equipment.
Remove the packaging as follows:

1 Cut straps
2 Carefully remove upwards from the cardboard packaging.
3 Remove the screws holding the cabinet to the wooden base.
4 Using a transpallet, remove equipment from the pallet and lay it on the floor, using the same precautions as seen in the Handling section.

INSTALLATION ENVIRONMENT

The battery cabinet has been designed for indoor installation. The following points must be considered when selecting the installation location:

5 Ensure that flooring is flat and able to sustain the weight of the battery cabinet
6 Avoid dusty environments
7 Avoid positioning in places which are exposed to direct sunlight or to hot air
8 Verify that the room temperature, with the UPS in operation, is maintained as follows:
minimum operating temperature: 0 °C
maximum temperature: + 40°C
9 Avoid environments that are too narrow which might prevent normal maintenance operations - leave a clear space of about 1m in front of the cabinet
10 A clear space of about 20 cm must be left behind the cabinet for proper ventilation
11 No objects should rest on the upper part of the cabinet

Battery life is tied to the operating temperature and the number of charging and discharging cycles undergone.
Capacity is not constant but increases after a few charging/discharging cycles and remains constant for several hundreds of cycles and then decreases permanently.
Battery preventive maintenance involves:

- maintaining operating temperature within the range of 20 - 25°C
- during the first month of use, perform two or three discharging and charging cycles
- after the first month of use, do this every six months.

AIR RENEWAL FOR THE BATTERY SITE

Air circulation must be provided in the area where the battery cabinet is positioned. This is in order to maintain the concentration of hydrogen emitted during battery charging below the danger limit.
Battery site air renewal must be ensured preferably via means of natural ventilation or with forced ventilation should this not be possible.
Standard EN 50272-2 for air renewal requires a minimum opening to satisfy the following formula:

$$\mathbf{A = 28 \times Q = 28 \times 0.05 \times n \times Igas \times C10\ (1/10^3)\ [cm^2]}$$

where:
- A = free surface of air inlet and air outlet
- Q = airflow to be remove [m^3/h]
- n = number of battery cells
- C10 = battery capacity in 10 hours [Ah]
- Igas = current producing gas [mA//Ah]

according to the standard: Igas = 1 VRLA (*) battery

(*) contact the battery manufacturer for open circuit or nickel batteries.

Applying the formula for 240 sealed lead elements (40 batteries):

$$\mathbf{A = 336 \times C10 / 10^3\ [cm^2]}$$

Using 120Ah batteries, the minimum opening must be approximately:

$$\mathbf{A = 41\ [cm^2]}$$

Air input and output must be positioned in such a way to create the best circulation, for example: - openings on opposite walls
- with a minimum distance of 2 m when they are on the same wall.

INSTALLATION AND BATTERY CONNECTION

Operations described in this chapter should be performed only by a ***skilled technician*** wearing appropriate protective equipment.

For battery cabinets complete with battery, follow instructions contained in "INSTALLATION INSTRUCTIONS."

For empty battery cabinets, first follow instructions contained in "SINGLE UNIT CONNECTION", then in "INSTALLATION INSTRUCTIONS."

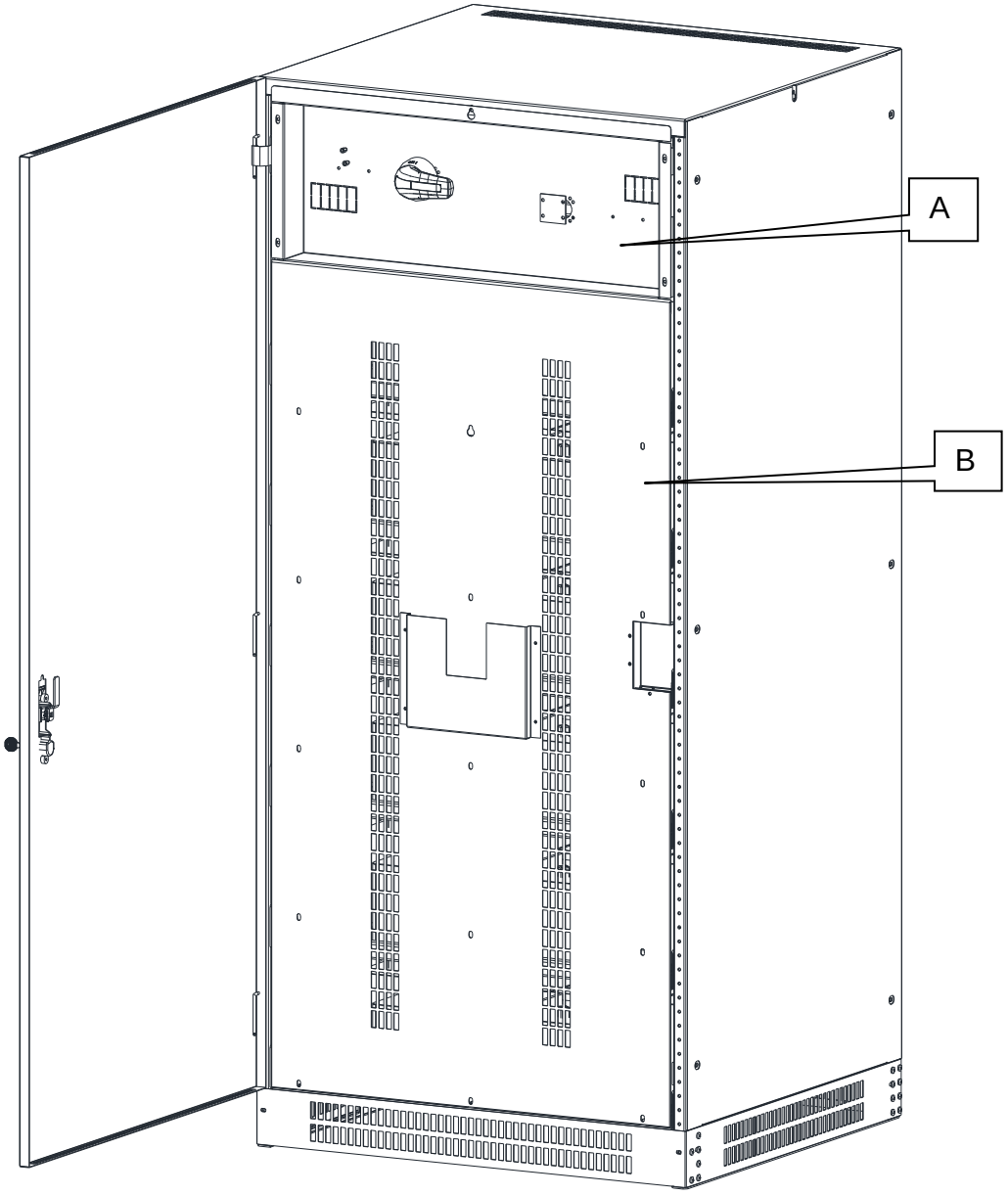


Fig.1

BATTERY CONNECTION

To assemble batteries/single units:

- Open and remove the front door to facilitate handling
- Remove the two internal "A" and "B" panels, see Fig.1.
- Remove the left and right side panels to make it easier to install and connect the battery.
-

THE REAR PANEL OF THE BATTERY CABINET MUST NEVER BE REMOVED.

- Position the batteries, starting from the bottom upwards, as indicated in Fig.2, blocking them to the right with the bracket supplied.
- The supplied 10 cm adhesive sponge must be put on the batteries, as indicated in Fig.2, before batteries can be positioned.
- Connect the batteries and switch with the supplied cables as per Fig. 3, relative to the two types of connection:
  - cabinet with 20+20 / 40 batteries
  - cabinet with 33 batteries
- Comply with cable numbering.

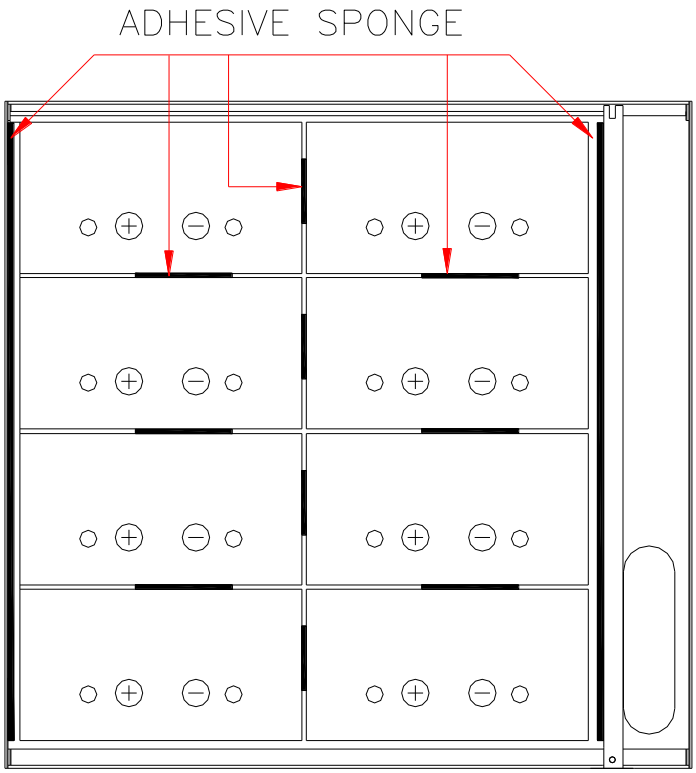


Fig.2.

- **The empty battery cabinet** is supplied with 3 x 125A fuses (gS type, 690V, NH1 size) for cabinets with 40 batteries, or with 3 x 160A fuses (gS type, 690V, NH1 size) for cabinets with 33 batteries.
- The 125A fuses are suitable for use with UPS sizes from 15 to 40kVA, with any battery capacity. For UPS sizes equal or greater than 60kVA an optional fuse kit has to be purchased according with the following table:

UPS POWER RATING [kVA]	FUSE FOR 60÷70Ah Battery	FUSE FOR 80÷90Ah Battery	FUSE FOR 100÷120Ah Battery
10	Not Compatible	Not Compatible	Not Compatible
15	125 A	125 A	125 A
20	125 A	125 A	125 A
30	125 A	125 A	125 A
40	125 A	125 A	125 A
60	160 A	200 A	250 A
80	160 A	200 A	250 A
100	160 A	200 A	250 A
120	160 A	200 A	250 A
160	160 A	200 A	250 A
200	160 A	200 A	250 A

Note: Refer to price list for 160, 200, 250 Ampere fuse kit code.

- **The 40 blocks battery cabinet supplied with batteries already installed from the manufacturer**, is delivered with the appropriate fuses for the given battery type and 3 x 125A fuses. In this case the choice, amongst the two fuse sizes supplied, must be done according with the UPS power rating as shown on the table above.
- **The 33 blocks battery cabinet supplied with batteries already installed from the manufacturer,** is delivered with the appropriate fuses for the given battery type.

ATTENTION

Failure to comply with the regulations above can permanently damage the batteries in the event of battery cabinet cable line faults.

TIGHTENING NUTS

*Wiring nuts and bolts must be tightened in accordance with coupling torque indicated in the **"INSTALLATION DRAWING"**.*

CONNECTION OF BATTERY CABINET WITH 20+20 / 40 BATTERIES

Connect batteries to one another as shown in the following drawing, respecting the position of the shelves.

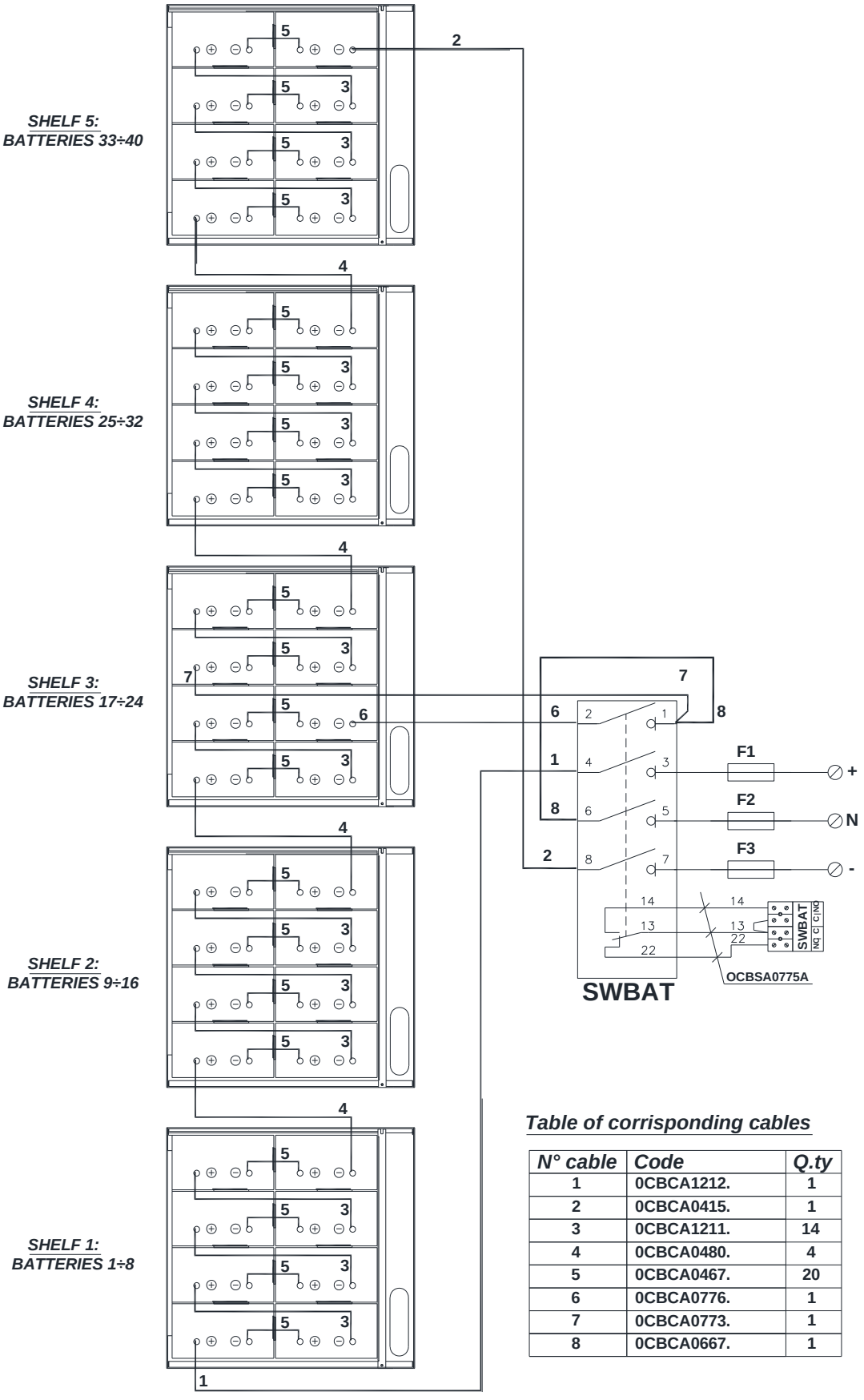


Table of corrisponding cables

N° cable	*Code*	*Q.ty*
1	0CBCA1212.	1
2	0CBCA0415.	1
3	0CBCA1211.	14
4	0CBCA0480.	4
5	0CBCA0467.	20
6	0CBCA0776.	1
7	0CBCA0773.	1
8	0CBCA0667.	1

Fig. 3.

BATTERY CABINET (20+20 / 40 BATTERIES) - UPS INTERCONNECTIONS

Operations described in this chapter should only be performed by a ***skilled technician*** wearing appropriate protective equipment.
The first connection to be performed is that of the earth conductor.
THE BATTERY CABINET MUST NOT OPERATE WITHOUT EARTH CONNECTION

*Connect wires (*not supplied*) from the battery cabinet to the UPS terminals.*
Connections to be made:

a) Earth or PE connection (yellow-green wire) - FIRST CONNECTION TO BE MADE.
*b) When working with a UPS where a central battery tap is required, connect "+", "-" and "**N**"(central point or tap).*
*c) connection "**N**" must be omitted when working with a UPS with only "+" and "-".*

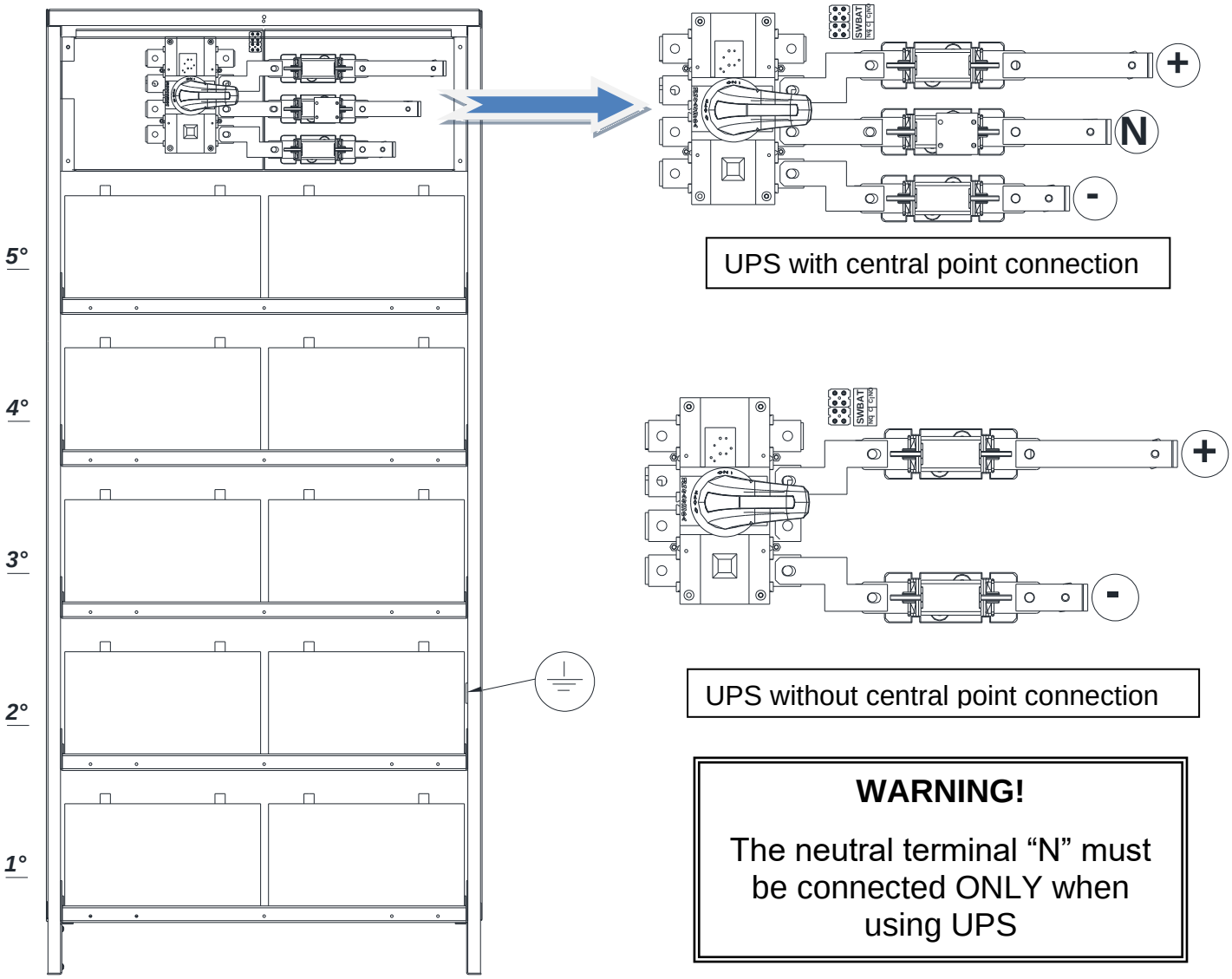


Fig. 4

CABLES SECTION

For dimensions of connection cables between the battery cabinet and UPS, refer to the ***"INSTALLATION DRAWING"*** supplied with the battery cabinet.

START-UP PROCEDURE

Checks to be made on the battery cabinet:

- Check grounding connection (PE).
- **Check that the battery switch (-SWBAT) is open**
- ***Verify proper + N and – polarity in the connection between the battery cabinet and the UPS(*)***
- *Verify the following battery voltages:*
  - Between terminals 7 (-) and 5 (+) on the switch, Fig. 3-4, check that voltage is within the range of 235 - 270Vdc.
  - Between terminals 1 (-) and 3 (+) on the switch, Fig. 3-4, check that voltage is within the range of 235 - 270Vdc.
- *Reposition the previously removed side panels.*
- *Reposition previously removed internal panels A and B, see Fig.1.*
- *Replace the front door if previously removed*

START-UP
Follow instructions contained in the UPS user's manual to start up the UPS system + Battery cabinet.

(*) When working with a UPS where the central battery point "N" is not required, this connection must be omitted

CONNECTION OF BATTERY CABINET WITH 33 BATTERIES

Connect batteries to one another as shown in the following drawing, respecting the position of the trays.

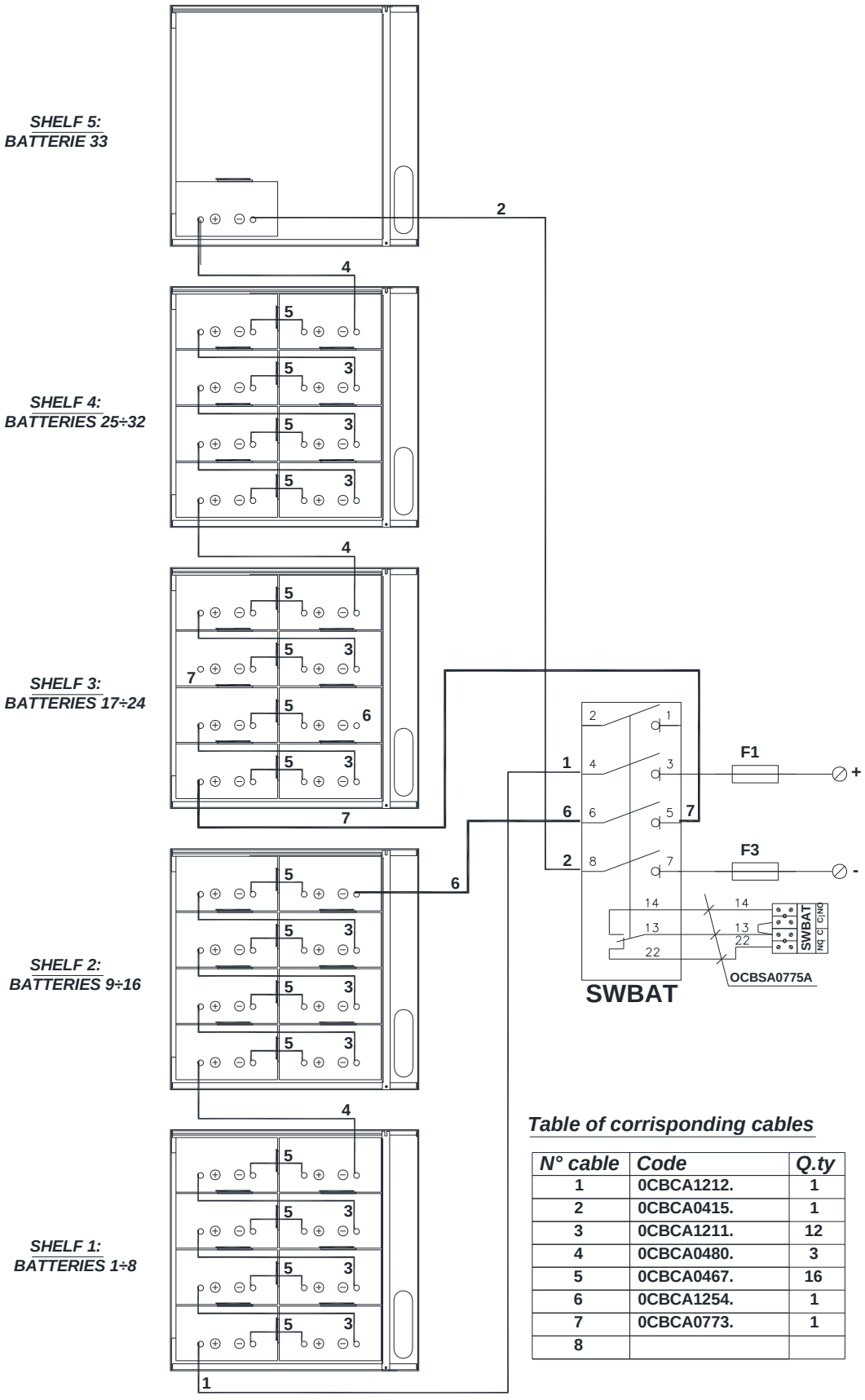


Table of corrisponding cables

N° cable	*Code*	*Q.ty*
1	0CBCA1212.	1
2	0CBCA0415.	1
3	0CBCA1211.	12
4	0CBCA0480.	3
5	0CBCA0467.	16
6	0CBCA1254.	1
7	0CBCA0773.	1
8		

Fig. 5.

BATTERY CABINET (33 BATTERIES) - UPS INTERCONNECTIONS

Operations described in this chapter should only be performed by a ***skilled technician*** wearing appropriate protective equipment.
The first connection to be performed is that of the earth conductor.
THE BATTERY CABINET MUST NOT OPERATE WITHOUT EARTH CONNECTION

*Connect wires (***not supplied***) from the battery cabinet, see Fig. 6, to the UPS terminals.*
Connections to be made:

a) Earth or PE connection (yellow-green wire), first connection to be made
b) "+" and " - "connection

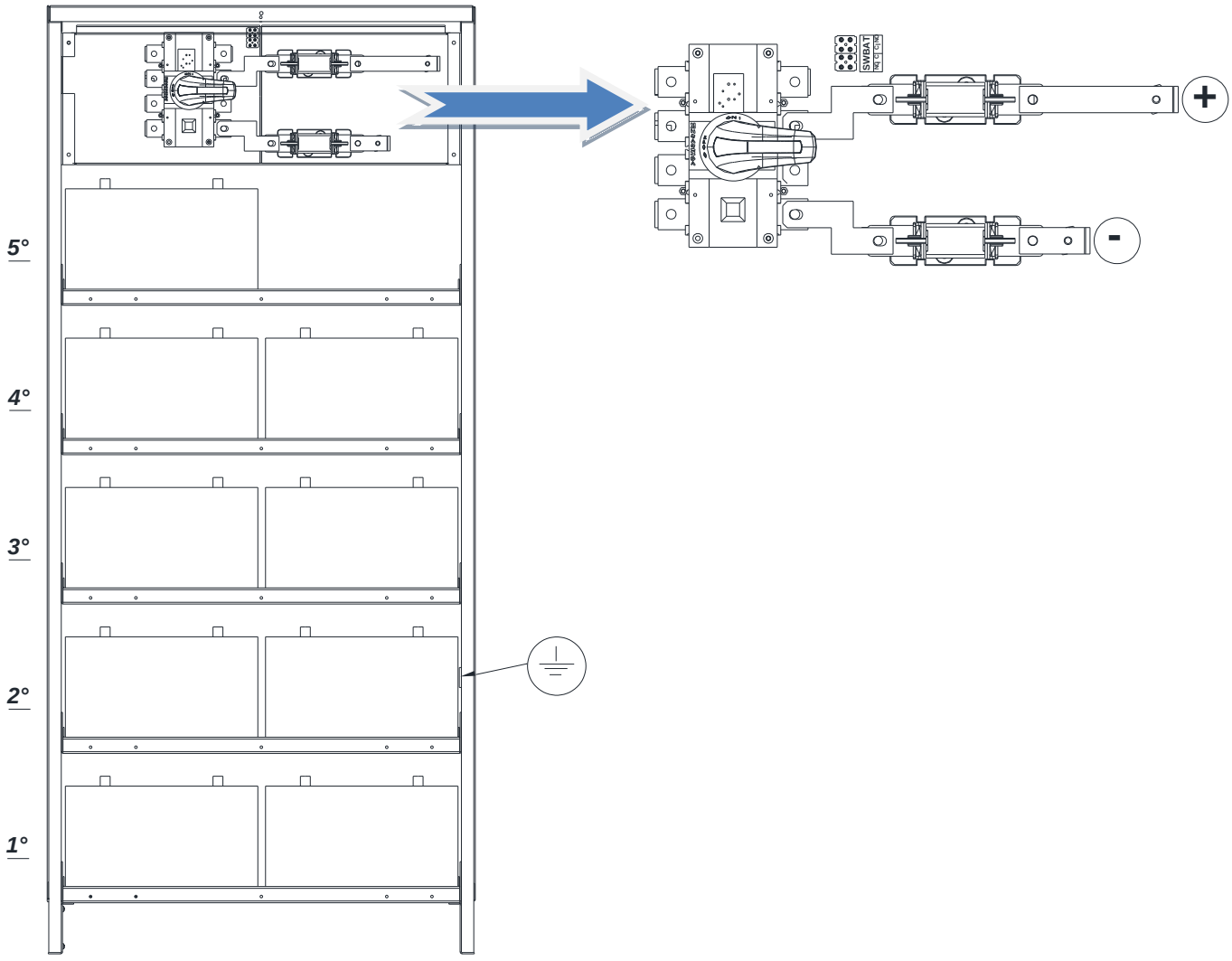


Fig.6.

Cables section

For dimensions of connection cables between the battery cabinet and UPS, refer to the ***"INSTALLATION DRAWING"*** supplied with the battery cabinet.

START-UP PROCEDURE

Checks to be made on the battery cabinet

- Check grounding connection (PE).
- **Check that the battery switch (SWBAT) is open**
- ***Verify proper + and – polarity in the connection between the battery cabinet and the UPS***
- *Verify the following battery voltages:*
  range of 188 - 216Vdc.
  - Between terminals 1 (-) and 4 (+) on the switch, Fig. 5-6, check that voltage is within the range of 199.5 – 229.5Vdc.
- *Reposition the previously removed side panels.*
- *Reposition previously removed internal panels A and B, see Fig.1.*
- *Replace the front door if previously removed*

START-UP
 *Follow instructions contained in the UPS user's manual to start up the UPS system + Battery cabinet.*

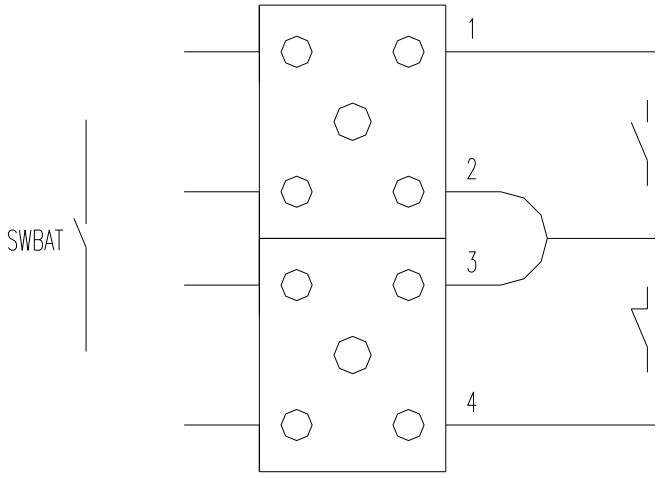
AUXILIARY CONTACTS, STATE OF BATTERY SWITCH

The battery disconnector switch (SWBAT) is equipped with auxiliary contacts to be able to understand and manage their status of a supervision systems. In the following picture the two states of the battery disconnector.

With the battery disconnector open the NC contact is closed and the NO contact is open
With the battery disconnector closed the NC contact is open and the NO contact is closed

How to get the status of the switch (SWBAT) in exchange.

To get the status of the switch in the exchange is necessary to make a jumper between the two central points of the auxiliary terminal board, see image below. The picture represents the state of the auxiliary contacts with the battery disconnector open.



TECHNICAL FEATURES

Composition	20+20	40	33
Storage temperature	0 ÷ 40 °C (32 ÷ 104 °F)		
Relative humidity	95 % max.		
Degree of protection	IP20		
Recommended operating temperature	20 ÷ 25 °C (68 ÷ 77 °F)		
Battery type	sealed lead		
Dimensions [L x D x H] [mm]	860 x 800 x 1900		
Circuit breaker with fuse-box	4 poles 250A		
Number of battery [12Vdc]	20+20	40	33
Usable capacity [Ah]	65, 80, 100 and 120 Slim		
Nominal voltage [Vdc]	240 + 240	480	396
Painting	RAL 7016		
Cross section for auxiliary cables [mm²]	1,5 (*)		
Fuses type : gS, 690V, NH1	For UPS sizes from 15 to 40kVA: 125A For batteries 60 ÷ 70Ah: 160A For batteries 80 ÷ 90Ah: 200A For batteries 100 ÷ 120Ah: 250A		

(*) We suggest you use the type FG16R16 (previously named FG7R) cable with two conductors

The Company reserves the right to change the product described in this manual at any time without prior notice

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