

sentryum

S3U - S3U SW

10/20/30kVA



Installation manual

SUMMARY

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GLOSSARY OF ACRONYMS

| Acronym | ITEM | Description |
|---------------------------|------------------------------------|--|
| S3U | Sentryum UL | <i>Three phase output voltage UPS</i> |
| SW | Four switch version | <i>UPS model type</i> |
| SLOT | Expansion Slot | <i>Slot to accommodate the communication cards and relays expansion board</i> |
| COM | Communication Board | <i>It includes R.E.P.O., IN/OUT signals interface, USB communication port, serial port</i> |
| PAR | Parallel Board | <i>Communication interface card between UPS for parallel function</i> |
| EXT SYNC | External Sync Connector | <i>Connector for external synchronization kit</i> |
| EXT T_BATT | External Battery Temperature Probe | <i>Connector for external battery temperature kit</i> |
| B_BOX R.E.P.O. | Battery box REPO | <i>Remote power off for the battery cabinet breaker trip coil</i> |
| FBATT | Battery Fuses | <i>Internal Battery fuses</i> |
| SWMB | Manual Bypass Switch | <i>Maintenance bypass switch disconnecter</i> |
| SWIN | Mains Input Switch | <i>Mains input switch disconnecter</i> |
| SWBYP | Bypass Input Switch | <i>Bypass line input switch disconnecter</i> |
| SWOUT | Output Switch | <i>Output switch disconnecter</i> |
| B+ | - | <i>Positive battery voltage/current/temp.</i> |
| B- | - | <i>Negative battery voltage/current/temp.</i> |
| CB | <i>Battery Charger</i> | <i>UPS internal battery charger</i> |
| PE | <i>Protective earth</i> | <i>Earth connection of the UPS</i> |

PREPARATIONS



SAVE THIS INSTRUCTIONS: *This manual contains important instruction to properly install the UPS unit. Read safety manual before starting UPS installation.*



ALL THE OPERATIONS DESCRIBED IN THIS SECTION ARE TO BE PERFORMED EXCLUSIVELY BY QUALIFIED STAFF.



The company declines all liability for damage caused by incorrect connections or operations not described in this manual.

INSTALLATION ENVIRONMENT

When choosing the site in which to install the UPS and the Battery Box, the following points should be taken into consideration:

- Avoid dusty environments
- Check that the floor is level and capable of withstanding the weight of the UPS and the Battery Box
- Avoid cramped environments that could impede the normal maintenance activities
- The relative humidity should not exceed 90%, non-condensing
- This equipment is intended for use in a controlled environment, hence the temperature must be regulated in a range between 0 and 40°C



The UPS may be operated with an ambient temperature of between 0 and 40°C. The recommended working temperature for the UPS and the batteries is between 20 and 25°C. In fact, if the battery has an average life of 5 years with a working temperature of 20°C, the life is halved if the working temperature is increased to 30°C.

- Avoid installing the equipment in places exposed to the direct sunlight or hot air

To keep the temperature of the installation room within the range indicated above, there must be a system for eliminating the dissipated heat (the UPS kW / kcal/h / B.T.U./h dissipation values are shown in the table on the previous page). The methods that may be used are:

- *Natural ventilation*
- *Forced ventilation*, recommended if the outside temperature is less (e.g. 20°C) than the temperature at which the UPS or Battery Box is to be operated (e.g. 25°C)
- *Air-conditioning system*, recommended if the outside temperature is higher (e.g. 30°C) than the temperature at which the UPS or Battery Box is to be operated (e.g. 25°C)

| ENVIRONMENTAL CONDITIONS | |
|---|---|
| Operating temperature | 0 °C ÷ 40 °C |
| Recommended working temperature for optimum battery performance | 20 °C ÷ 25 °C |
| Storage temperature | -25 °C ÷ +60 °C (UPS) -15 °C ÷ +40 °C (UPS with batteries) |
| Max relative humidity in operation | 90% (without condensation) |
| Max installation height | 1000 m a.s.l. at nominal power (-1% power for every 100 m above 1000 m) – max 4000 m |

| TECHNICAL DATA | | | | |
|--|-----------------|--|--|---|
| Power | | 10 kVA / 9 kW | 20 kVA / 18 kW | 30 kVA / 27 kW |
| V Input | | 208 V ± 20% (3PH + N) | | |
| Frequency Input | | 50 – 60 Hz | | |
| V Output [Δ/Y] | | 208/120 V – 220/127 V (3PH + N) | | |
| Frequency Output | | 50 / 60 Hz | | |
| Power loss with no load | | 0.210 kW 181 kcal/hr 717 BTU/hr | 0.210 kW 181 kcal/hr 717 BTU/hr | 0.210 kW 181 kcal/hr 717 BTU/hr |
| Power loss @ 50% load (1) | | 0.284 kW 244 kcal/hr 969 BTU/hr | 0.453 kW 389 kcal/hr 1545 BTU/hr | 0.679 kW 584 kcal/hr 2316 BTU/hr |
| Power loss @ 100% load (1) | | 0.453 kW 389 kcal/hr 1545 BTU/hr | 0.965 kW 829 kcal/hr 3291 BTU/hr | 1.487 kW 1353 kcal/hr 5370 BTU/hr |
| Flow rate of fans for removing heat from installation room (2) | | 266 m ³ /hr | 566 m ³ /hr | 923 m ³ /hr |
| Isolation protection | | IP20 | | |
| Cable input | | On the rear from bottom / top without additional cabinet | | |
| Net weight W/O batteries | Single switch | 324 lb / 147 Kg | 324 lb / 147 Kg | 340 lb / 154 Kg |
| | Four switches | 333 lb / 151 Kg | 333 lb / 151 Kg | 355 lb / 161 Kg |
| Net weight with full battery configuration | Single switch | 814 lb / 369 Kg | 814 lb / 369 Kg | 829 lb / 376 Kg |
| | Four switches | 822 lb / 373 Kg | 822 lb / 373 Kg | 844 lb / 383 Kg |
| UPS dimensions (W x D x H) | (W/O TB cover) | 21.7 x 32.7 x 59 in 550 x 830 x 1500 mm | | |
| | (With TB cover) | 21.7 x 40.5 x 59 in 550 x 1030 x 1500 mm | | |
| Shipping dimensions (W x D x H) | | 26.8 x 41.3 x 75.6 in 680 x 1050 x 1920 mm | | |
| Audible noise | | <52 dB(A) | | |
| Colour | | Pantone Black "C" | | |

1) 3.97 B.T.U./h = 1 kcal/h

2) To calculate the air flow rate, the following formula may be used: $Q [m^3/h] = 3.1 \times P_{diss} [Kcal/h] / (t_a - t_e) [^{\circ}C]$

P_{diss} is the power expressed in Kcal/h dissipated by all the devices installed in the installation environment.

t_a = ambient temperature, t_e =outside temperature. To take leaks into account, the value obtained should be increased by 10%.

The table shows an example of a flow rate with $(t_a - t_e)=5^{\circ}C$ and a rated resistive load ($pf=1$).

(Note: This formula is applicable if $t_a > t_e$, only; if the UPS installation does not require an air-conditioning system).

ELECTROMAGNETIC COMPATIBILITY

This UPS complies with Part 15 of the FCC rules (Class A). It may cause radio interference in the home environment. The user may have to adopt supplementary measures.

This product is for professional use in industrial and commercial environments. Connections to USB must be made with the cable provided. Connection to RS232 (RJ10 connector) have to be made with a shielded cable less than 3 metres (10 ft) long.

PRELIMINARY INFORMATION FOR INSTALLATION

ALL OPERATIONS DESCRIBED IN THIS SECTION MUST BE PERFORMED BY QUALIFIED AND TRAINED PERSONNEL ONLY.



Our Company assumes no liability for damages caused by incorrect connections or operations not described in this manual.

The following operations have to be performed with the UPS disconnected from the power mains, off and with all equipment switches open.



Before making the connection, open all cabinet switches and verify that the UPS is completely isolated from power sources: battery and AC power line. In particular, check that:

- the UPS input line is completely disconnected
- the UPS bypass line is completely disconnected
- the external UPS battery line switch/fuses are open
- all UPS switches are in the open position
- check with a multimeter that there are no dangerous voltages



The first connection to be made is the protective conductor (earth wire), this must be connected to the bar marked as PE with a circled earth symbol.

The UPS must operate while connected to the earthing system.



The input Neutral must always be connected.



ATTENTION: a three-phase four-wire distribution system is required.

The standard UPS version must be connected to a 3 Phase + Neutral + PE (ground protection) power line. Comply with clockwise phase sequence.



ATTENTION: After the installation operation is complete, refit the cabinet protection panels using the appropriate screws.

INTERNAL BATTERIES



CAUTION: If the UPS has INTERNAL BATTERIES, follow all the PRECAUTIONS AND SAFETY RULES listed below.

- The UPS has HAZARDOUS electrical voltages inside, even when the input and/or battery switches are off. The inside of the UPS is protected by safety panels which should not be removed by untrained personnel. All installation and maintenance or operations involving access inside the UPS require the use of tools and may ONLY be performed by trained personnel.
- The UPS contains an internal source of energy: batteries. All terminals and sockets may be live even without connecting the UPS to the mains.
- The total battery voltage is potentially dangerous: it may generate an electric shock. The battery compartment is protected by safety panels which should not be removed by untrained personnel. All installation and maintenance of the batteries involve access inside the UPS and require the use of tools: such operations may ONLY be performed by trained personnel.
- Replaced batteries must be considered TOXIC WASTE and treated accordingly. Do not dispose of batteries in a fire: they may explode. Do not attempt to open the batteries: they are maintenance-free. In addition, the electrolyte is harmful to the skin and eyes and can be toxic.
- Do not turn on the UPS if it is leaking fluid or if you see a residual white powder.
- Do not allow water, liquids in general and/or other foreign objects to get inside the UPS.
- Do not open the battery fuse holder while the UPS is powering the load in battery operation mode. The interruption of the battery DC may cause an electrical arc resulting in broken equipment and/or fire. In addition, if there is no mains power, the energy to power the load is provided by the batteries, therefore opening the battery caps would lead to the shutdown of the load.
- Follow these recommendations when working on the batteries:
 - Remove wristwatches, rings and other metal objects
 - Use tools with insulated handles
 - Wear rubber shoes and gloves
 - Do not lay tools or metal objects on top of the batteries
 - Disconnect the charging source before connecting or disconnecting the battery connectors.

ALLOWED BATTERY MODELS



Risk of explosion if batteries are replaced by an incorrect type.
Refer to the following table to identify the correct quantities and models:
Replace only with the same type and number of batteries or battery packs.

| | |
|------------------------------------|---|
| Battery Type | 12V Valve regulated sealed lead-acid rechargeable |
| Maximum number of batteries | 20+20+20+20 |
| Total rated battery voltage | 240 VDC |

| Manufacturer | Type | Computer room installation permitted |
|--|------------------|--------------------------------------|
| Hitachi Chemical Energy Technology Co Ltd (MH14533) | UPS 12460 | N |
| | UPS 12460 FR | Y |
| | HRL 1234W | N |
| | HRL 1234W FR | Y |
| | HRL 1234W F2 | N |
| | HRL 1234W FRF2 | Y |
| | HR 1234W F2 | N |
| | HR 1234W FRF2 | Y |
| | UPS 12360 7 F2 | N |
| | UPS 12360 7 F2FR | Y |
| Fabit Enertech Co Ltd (MH27960) Note: trademark "FIAMM" | 12FGH36 | N |
| GS Yuasa International Ltd (MH12970) | NPW45-12 | N |
| | NPW45-12 FR | Y |
| Taiwan Yuasa Battery Co Ltd (MH28947) | NPW45-12 | N |
| | NPW45-12FR | Y |
| Yuasa Battery (Guangdong) Co Ltd (MH29616) | NPW45-12 | N |
| | NPW45-12FR | Y |



ATTENTION: If the installed batteries are less than V-2 flame class, the Ups is considered *not for use in a computer room* as defined in the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75. Please refer to the table above.

For correct interconnection of the batteries, refer to the wiring diagrams available to service personnel only or to the battery kit installation manual.

BATTERY MAINTENANCE



WARNING: HAZARDOUS VOLTAGE INSIDE!
Never open the battery compartment for any reason. If any anomaly is noted, please contact the service department.



In order to preserve a high level of efficiency and a good lifespan, the batteries must be periodically charged using the UPS itself.

Batteries are subject to self-discharge. If the internal batteries or the battery boxes are stocked and not immediately installed, a full charge must be performed.

In order to re-charge the batteries, it is required to connect the battery box or the batteries internal to the UPS unit for at least 24hrs in "NORMAL MODE".

If a long battery stocking period is planned, please contact the service department.

INTERNAL PROTECTIVE DEVICES

The table below shows the sizes of the switch disconnectors of the UPS and the sizes of the battery fuses: these devices are accessible from the front of the UPS.

There are also indications about the internal fuses (not accessible) protecting the input and output lines and the maximum input and rated output currents.

Fuses must be replaced with ones of the same size and the characteristics indicated in the table below.

| UPS (kVA) | UPS Switch disconnectors and internal protective devices | | | | | |
|-----------|--|----------------------|-----------------|----------------------|---------------|---------------|
| | Disconnect switches | | Internal fuses | | | |
| | SWIN / SWOUT / SWBYP / SWMB * | Rectifier input fuse | Fast DC fuses** | Main battery fuses** | Output fuse** | Bypass fuse** |
| 10 | 80A (3P) | 100 LET | 63 FE | FWH-125 | 35 LET | 160LET |
| 20 | 80A (3P) | 100 LET | 63 FE | FWH-125 | 63 LET | 160LET |
| 30 | 125A (3P) | 125 LET | 100 FE | FWH-200 | 100 LET | 180 LET |

* SWBYP, SWOUT, SWMB: not available in the single switch version.

**All fuses mentioned in this table are produced by COOPER BUSSMANN

BACKFEED PROTECTION

The UPS is electronically protected against backfeed. This protection acts by means of a sensing circuit which turns off the inverter if a fault on the static switch is detected. In this condition, to avoid interrupting the load supply, the UPS switches to bypass line.

An optional dry contact is provided for the driving of a disconnecting device to be installed upstream to the UPS.

A dry contact can be set to drive a disconnecting device to be installed upstream the UPS, in this case when a backfeed fault occurs, the system opens the external disconnecting device avoiding the stop of the inverter.

See user manual for function configuration.

LATCH-ON-BYPASS FUNCTION



The UPS has an internal device (redundant bypass power supply) which activates the bypass automatically when a failure occurs on the machine; thus keeping the load powered without any internal protection and without any limitation to the power supplied to the load.

Under these emergency conditions, any disturbance present at the input line will affect the load.

EXTERNAL PROTECTIVE DEVICES

EXTERNAL OVERCURRENT PROTECTIONS

INPUT

To reduce the risk of fire, connect only to a circuit provided with the branch circuit overcurrent protection as reported in the table below, in accordance with the National Electric Code, ANSI/NFPA 70.

| UPS (kVA) | Input external protective devices | |
|--------------------|-----------------------------------|--|
| | Mains input | Separate bypass input (only SW versions) |
| S3U 10 / S3U 10 SW | 60A, "C" curve | 60A, "C" curve |
| S3U 20 / S3U 20 SW | 100A, "C" curve | 100A, "C" curve |
| S3U 30 / S3U 30 SW | 150A, "C" curve | 150A, "C" curve |



If the protective device upstream to the UPS interrupts the neutral wire, it must also interrupt all the phase wires at the same time (four-pole switch).

OUTPUT

To avoid potential safety hazards and unwanted power outages the system must be designed with proper selectivity. This will assure that only the overcurrent protection device for a faulted circuit will open.

To limit a power outage to the faulted circuit, select the UPS output protection devices according to the table below:

| Output protections (recommended values for selectivity) | |
|---|---------------------------|
| Normal fuses (GI) | I_n (Nominal current)/4 |
| Breakers (C curve) | I_n (Nominal current)/4 |
| Ultra-fast fuses (GF) | I_n (Nominal current)/3 |

SHORT CIRCUIT PROTECTION

If a failure at the output occurs, the UPS protects itself by limiting the value and duration of the current output (short-circuit current). These values also depend on the operating status of the UPS at the time of the failure; there are two different cases:

- UPS in NORMAL OPERATION with bypass: the load is instantly switched to the bypass line, the input line is connected to the output (blocked after $t > 500\text{ms}$).
- UPS in NORMAL OPERATION without bypass: the UPS protects itself supplying 2.5 times the nominal current to the output for the first 200ms, which is then reduced to 1.5 times nominal for 300 ms. After this time (500 ms) it switches off.
- UPS in BATTERY OPERATION: the UPS protects itself supplying 2.5 times the nominal current to the output for the first 200ms, which is then reduced to 1.5 times nominal for 300 ms. After this time (500 ms) it switches off.

SHORT CIRCUIT WITHSTANDING

This equipment is rated for use on a circuit capable of delivering no more than the current reported in the following table, at 220V maximum.

| Short circuit current withstanding (values in symmetrical Amperes) | | | | | | |
|--|--------|-----------|--------|-----------|--------|-----------|
| UPS model | S3U 10 | S3U 10 SW | S3U 20 | S3U 20 SW | S3U 30 | S3U 30 SW |
| Main input | 30kA | 30kA | 30kA | 30kA | 30kA | 30kA |
| Separate bypass input | NP | 5kA | NP | 5kA | NP | 10kA |
| Separate bypass input with service bypass disabled * | NP | 30kA | NP | 30kA | NP | 30kA |

* ATTENTION: To disable the service bypass, the service personnel must remove the MBSW handle. This action is mandatory in order to prevent the user from closing it in parallel systems or to increase the short circuit current withstanding of the bypass line.

RCD BREAKER



WARNING: risk of electric shock from high leakage current.
The earth leakage current of this UPS may exceed 3.5 mA.
A proper earth connection must be provided.

Basing on the electrical system adopted, a Residual Current Device may be requested by the local regulations.

Transient and steady-state earth leakage currents, which may occur when starting the equipment, and the additional leakage current of the load should be taken into account when selecting instantaneous RCD or GFI devices.

During normal operation, when the mains supply is present, a RCD breaker at the input of the UPS will activate if a fault occurs at the output side, since the output circuit is not isolated from the input.

In any case, other RCD breakers may still be installed at the output, preferably in coordination with those present at the input.

Residual current devices must be selected sensitive to DC unidirectional pulses and insensitive to transient current pulses.

ELECTRICAL CONNECTIONS



WARNING: a 4-wire three-phase distribution system is required.

The UPS must be connected to a power supply line made up of 3 phases + neutral + PE (protective earth) and must be earthed in accordance with the local electrical code of practice. The phase sequence must be respected.

Make sure that the equipment is properly connected to the input neutral, otherwise serious damages can occur to the UPS.

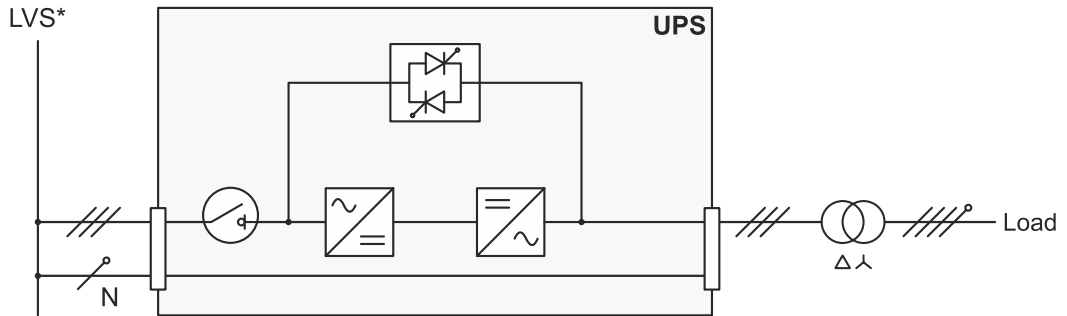
**THE UPS INPUT NEUTRAL IS CONNECTED TO THE UPS OUTPUT NEUTRAL
THE DISTRIBUTION SYSTEM THAT POWERS THE UPS IS NOT MODIFIED BY THE UPS**

The neutral condition is only modified if an isolation transformer is present or when the UPS works with a neutral isolated upstream. If an input isolation transformer is not present, the neutral from the mains power supply is connected to the UPS output neutral. As a result, there will be no change to the neutral arrangements of the installation:

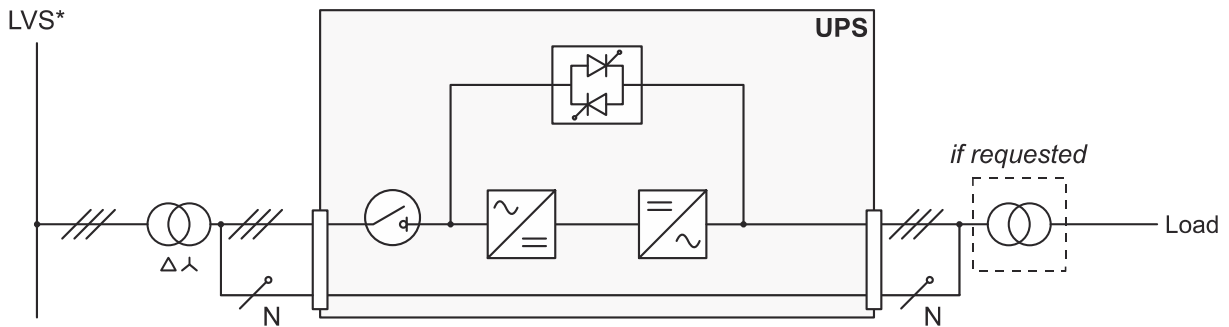
WIRING DIAGRAMS FOR CONNECTING TO THE ELECTRICAL SYSTEM

S3U, SINGLE INPUT

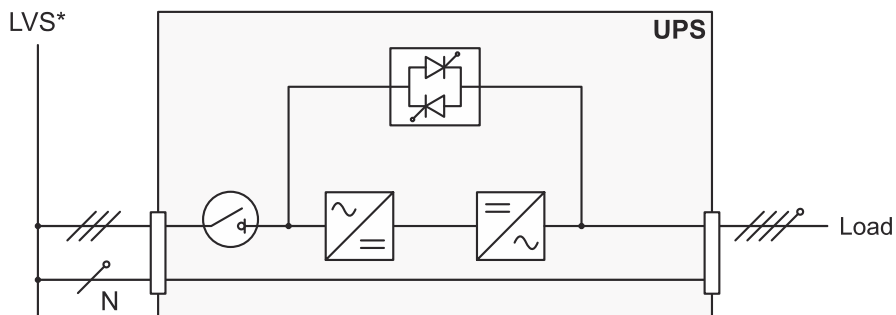
UPS with galvanic isolation at output



UPS with galvanic isolation at input



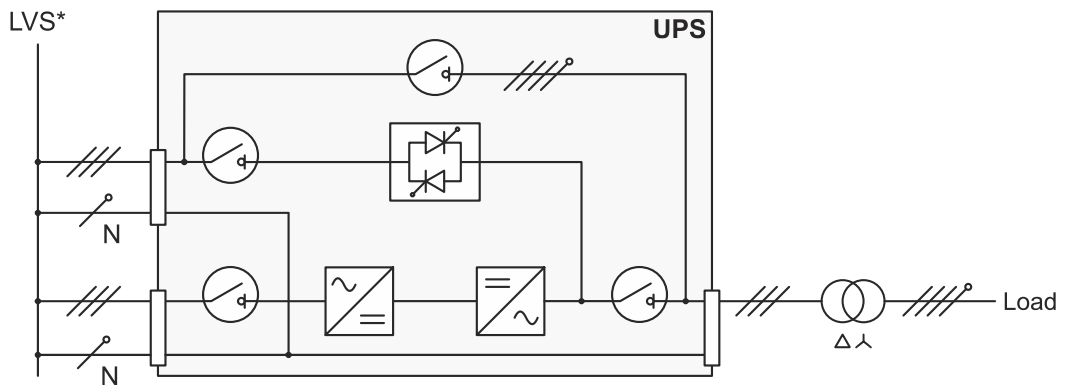
UPS without any variation in neutral condition



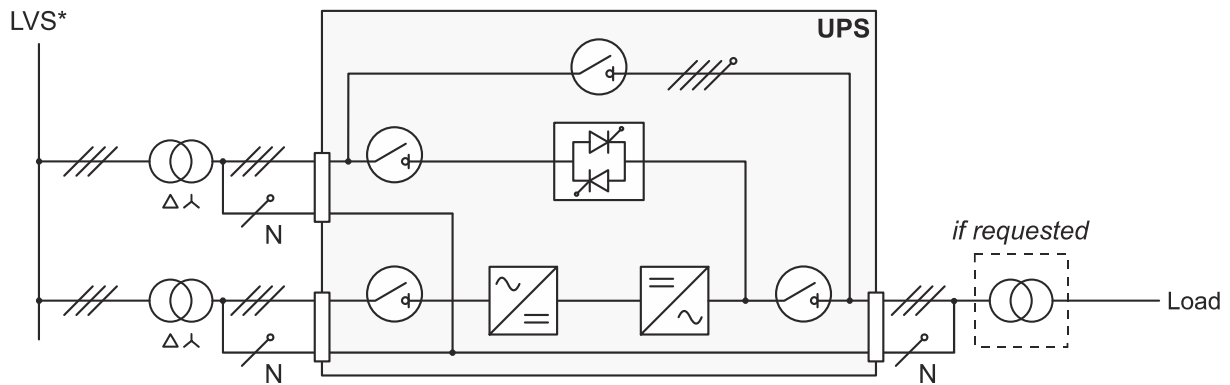
* LVS: low voltage source

S3U SW, FOUR SWITCHES, DUAL INPUT

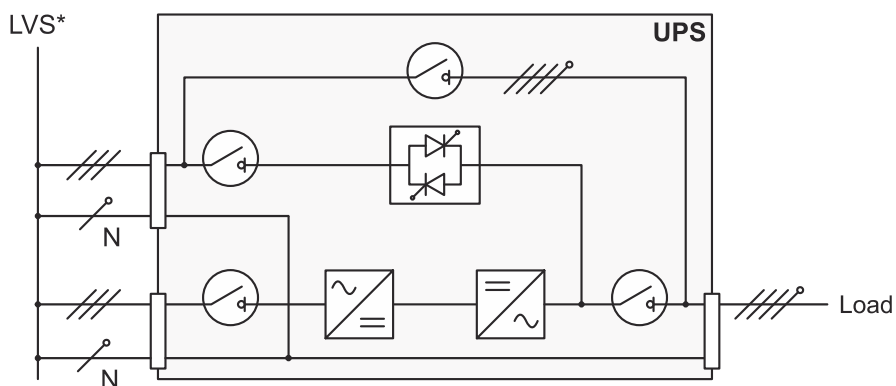
UPS with galvanic isolation at output and with separate bypass input



UPS with galvanic isolation and with separate bypass input



UPS without any variation in neutral condition and with separate bypass input



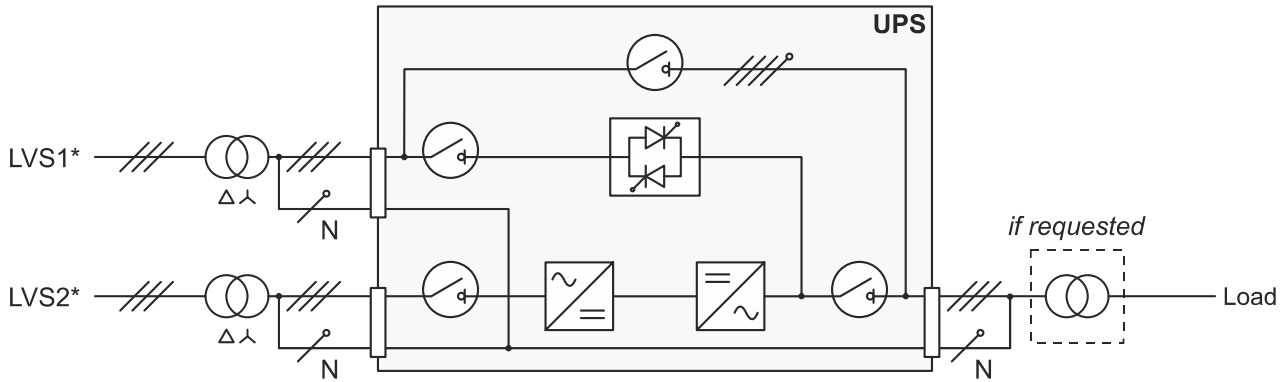
* LVS: low voltage source

Separate bypass:

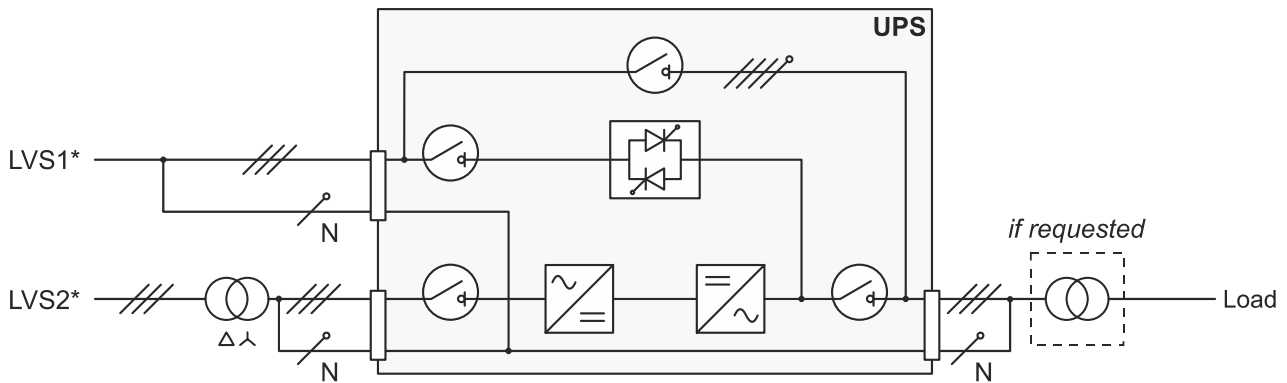
if the separate bypass (four switches version "SW") option is present and the bypass is fed by a separate low voltage source, protective devices must be present on both the main input line and the bypass line.

Note: the neutral of the input line and that of the bypass are commoned inside the equipment, so they must refer to the same potential. If the two power supplies are different, an isolation transformer has to be used on either of the inputs.

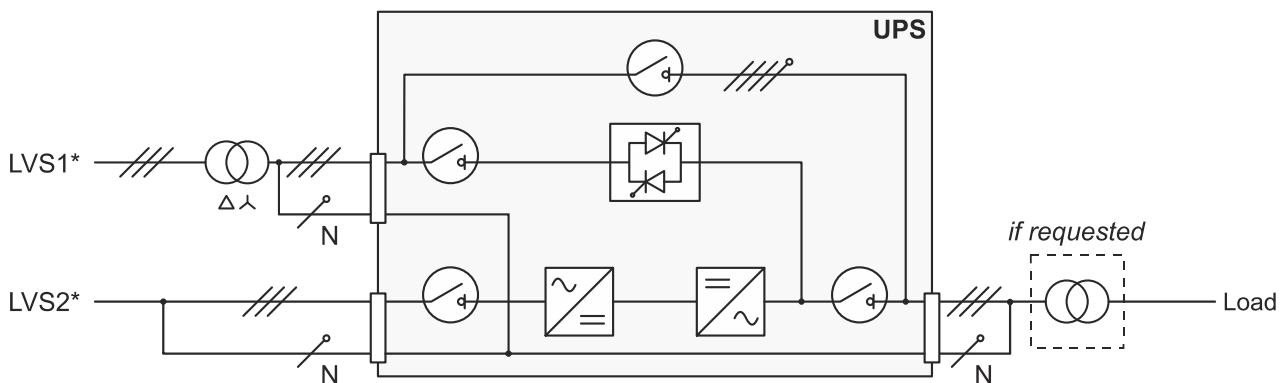
UPS with galvanic isolation and with separate bypass input



UPS with galvanic isolation at input and with separate bypass input



UPS with galvanic isolation and with separate bypass input

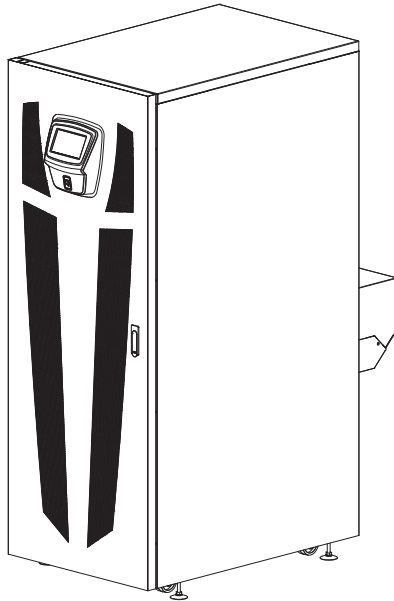


* LVS1: low voltage source 1

* LVS2: low voltage source 2

INSTALLATION

READ "SAFETY MANUAL" BEFORE STARTING THE UPS INSTALLATION



PRELIMINARY INFORMATION FOR INSTALLATION



ALL OPERATIONS DESCRIBED IN THIS SECTION MUST BE PERFORMED BY QUALIFIED AND TRAINED PERSONNEL ONLY.



Our Company assumes no liability for damages caused by incorrect connections or operations not contained in this manual.

The following operations have to be performed with the UPS disconnected from the power mains, and with all equipment switches open.

Before making the connection, open all cabinet switches and verify that the UPS is completely isolated from power sources: battery and AC power line. In particular, check that:

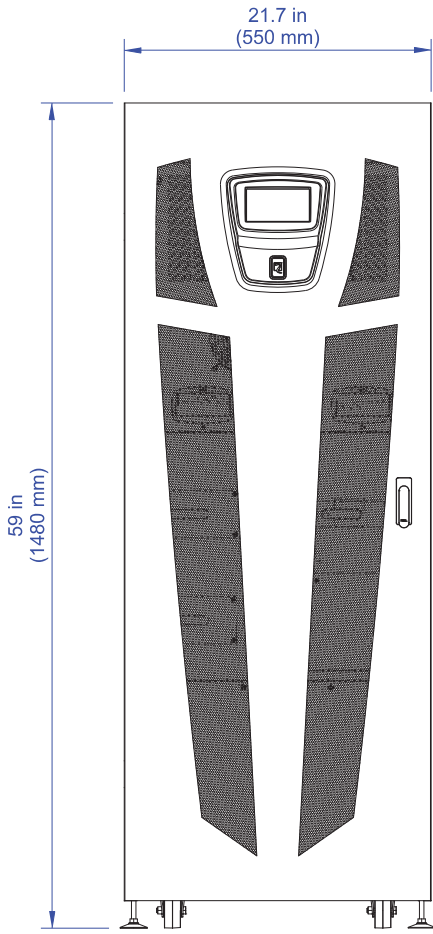
- *the UPS input line is completely disconnected*
- *the UPS bypass line is completely disconnected*
- *the external UPS battery line switch/fuses are open*
- *all UPS switches are in the open position*
- *all the battery drawers connectors are unplugged*
- *the battery cabinet protective device is in the open position*
- *check with a multimeter that there are no dangerous voltages on ac and dc terminal blocks*

The input Neutral must always be connected.

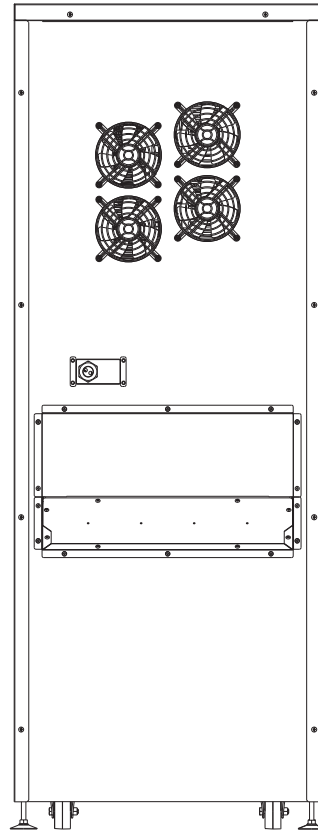


ATTENTION: a three-phase four-wire distribution system is required.
The standard UPS version must be connected to a 3 Phase + Neutral + PE (ground protection) power line.
Comply with clockwise phase rotation.

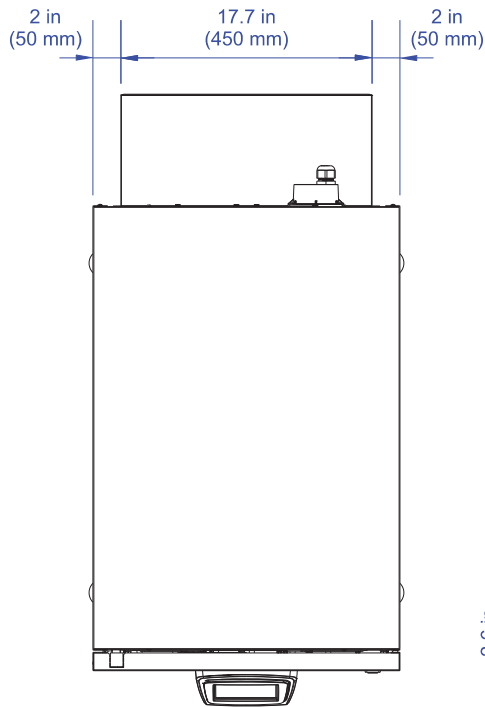
POSITIONING INFORMATION



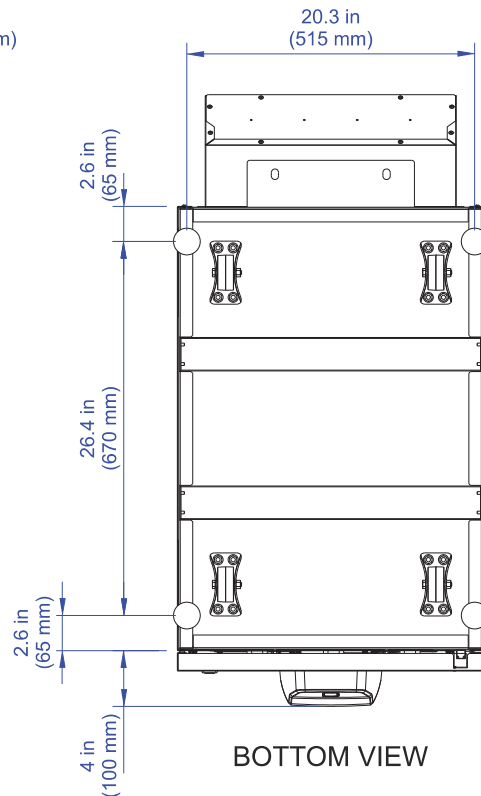
FRONT VIEW



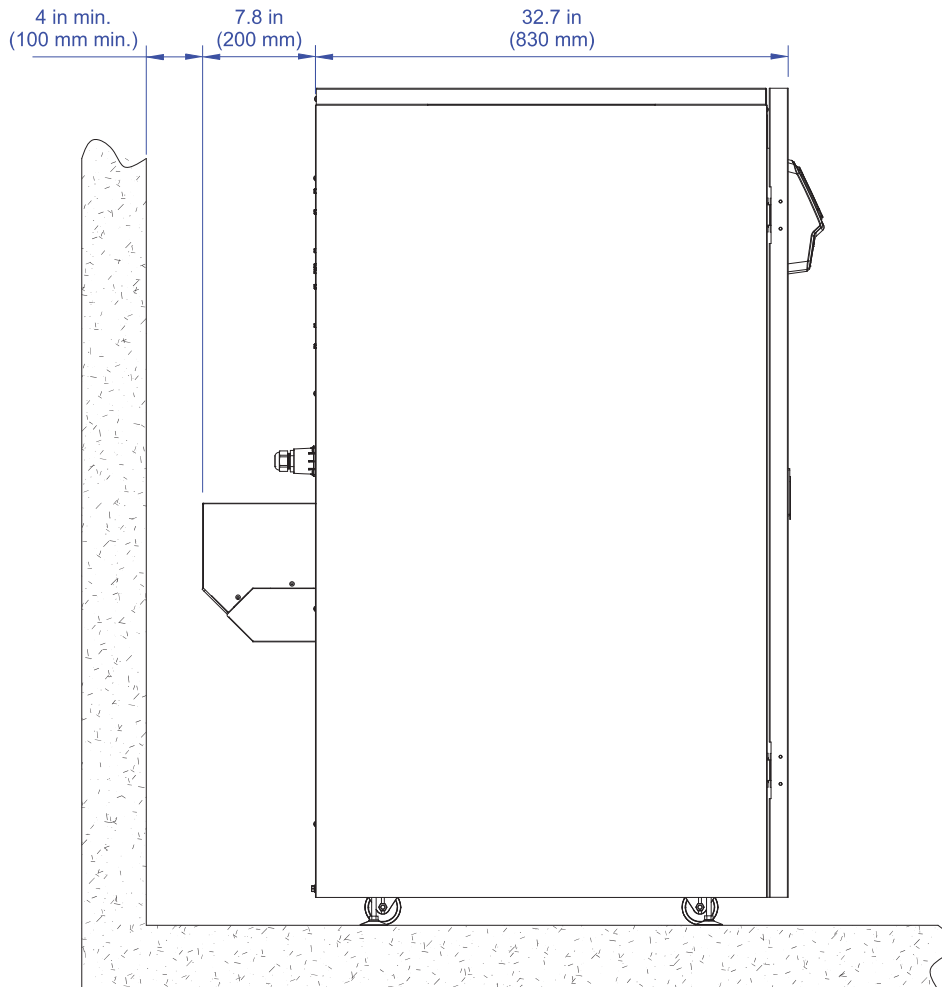
REAR VIEW



TOP VIEW



BOTTOM VIEW



SIDE VIEW

UPS CABINET POSITIONING

When positioning, take into account that:

- the wheels are to be used for final positioning only. Suitable moving equipment must be used to transport the UPS near to the final position.
- plastic parts and the door are not able to act as pushing points or handles.
- for user operation and maintenance, is needed to ensure enough free space in front of the UPS (≈1.5 m).
- no objects should rest on the upper part of the UPS.



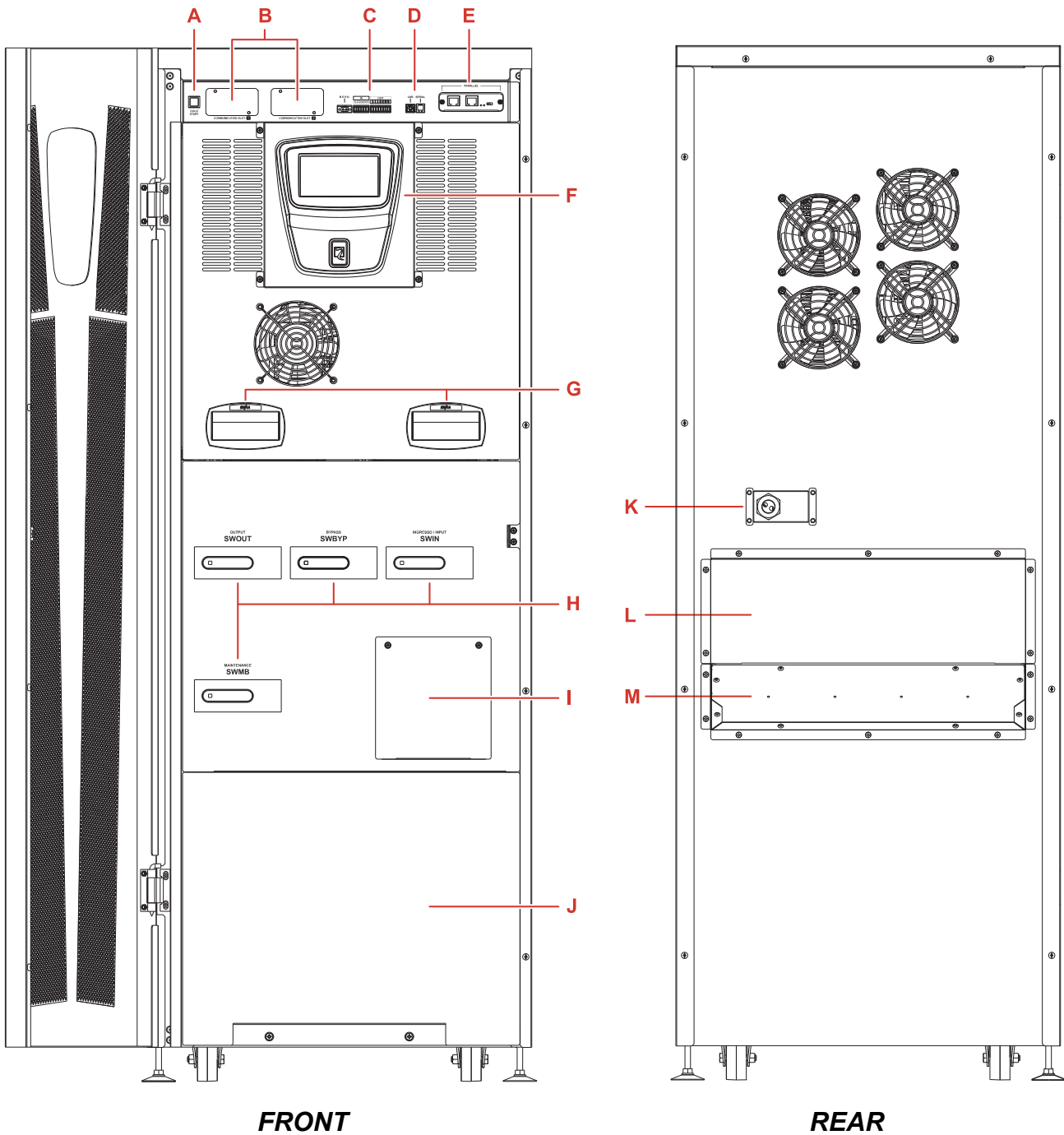
WARNING!

The UPS must be positioned on a level floor.
Ensure that the floor can support the total weight of the system. Refer to the TECHNICAL DATA table.

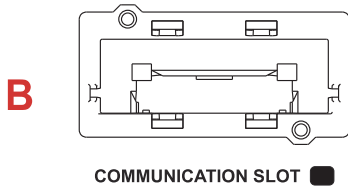
**After positioning, lower the four feet at the floor, using an appropriate spanner.
Ensure that the total weight of the cabinet is distributed on feet only (the casters must be lifted from floor).
Ensure that the UPS is level.**

It is possible to reuse the brackets for pallet fastening to anchor the UPS to the floor.

UPS DETAILS



Cold start button: This button allows the user to turn the UPS on from battery, even without the mains present. Refer to User Manual for further information.



Communication slots: The UPS is endowed with two communication slots to host optional boards. Slots are not generally interchangeable.

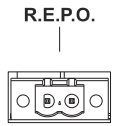
SLOT 1 - Communication Slot

Slot to accommodate the communication cards (e.g. Netman 204).

SLOT 2 - Relay Slot

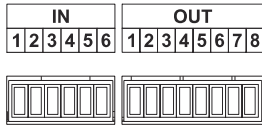
Slot to accommodate an additional communication board (default configuration), or relay expansion boards (e.g. Multicom 384 and Multicom 392, to be set by configuration software).

Please refer to the optional board kit user manual for further information.



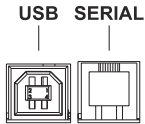
R.E.P.O. : Emergency Power Off contact.

C



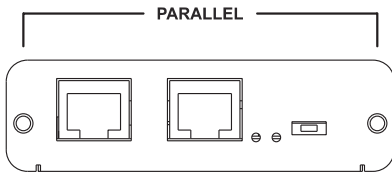
Programmable auxiliary contacts: Programmable input and output contacts.

D



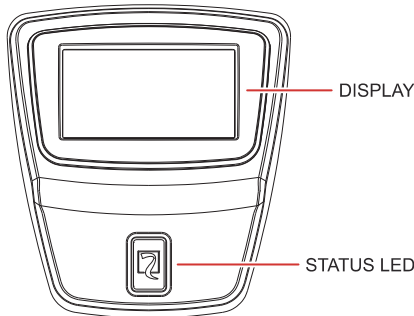
Communication ports: The UPS is provided with two serial ports (USB and RS232) for computer connection.

E



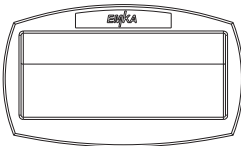
Parallel board (optional): The optional parallel kit will enable the connection of up to six units in parallel.

F



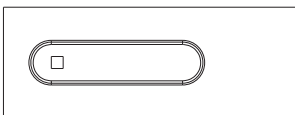
Touch screen display and led indicator: Through the 5" touch panel display the user can monitor the system parameter and configure the UPS. The Riello logo backlight color indicates the system status. Refer to User Manual for further information.

G



Power module handles: In case of frontal service the UPS power module can be removed. Pull out the module from these handles.

H



Switch disconnectors handles: input, bypass, output and service bypass switches. The closed position is vertical.

I

Battery fuses cover: service personnel can access the battery fuse by removing this hatch.

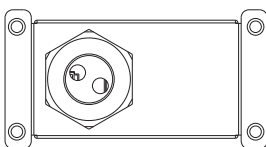
WARNING: the fuses are always energized by the battery. Before opening the fuse cover, disconnect all the battery drawers and open the battery box breaker (if present).

J

Battery drawers cover: Service personnel can access battery drawers by opening this cover.

WARNING: Be sure to disconnect all drawer connectors before performing any maintenance activity on the UPS

K



External signals cover: remove this cover to access the external signal connectors.

- EXT T-BATT
- EXT SYNCH
- BATTERY BOX REPO

See "auxiliary connectors section" below for further informations

L

Terminal blocks cover: remove this cover to access the terminal blocks for UPS wiring.

M

Cable output: This aluminum panel can be drilled for cable output. To maintain the IP20 protection degree, suitable cable glands must be used.

POWER CONNECTION INFORMATION

Wiring information:

For power cable connection, use Phoenix Contact "AI" type copper ferrules (or equivalent) of proper diameter, crimp with suitable hexagonal shape crimping tool.

Use torque force indicated in the following tables when connecting AC and DC wiring terminals.

| INPUT AC Line Connection 3PH + N + PE (Single / Dual Mains) | | | | | | | | | |
|---|--------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|-----------------------------------|---------------------------|
| UPS size | Max Power [kW-kVA] | Max Current [A] | Terminal A, B, C, N | | PE | | Wire A, B, C, N, PE | | |
| | | | Maximum cross section | Tight. torque [in-lb] | Maximum cross section | Tight. torque [in-lb] | Type | Cross sectional area A, B, C, N** | Cross sectional area PE** |
| 10 | 9 - 10 | 47 | AWG 2/0 | 94* | AWG 2/0 | 110* | 75°C or 90°C copper wire | AWG 6* | AWG 10* |
| 20 | 18 - 20 | 69 | AWG 2/0 | 94* | AWG 2/0 | 110* | 75°C or 90°C copper wire | AWG 3* | AWG 10* |
| 30 | 27 - 30 | 103 | AWG 2/0 | 110* | AWG 2/0 | 110* | 75°C or 90°C copper wire | AWG 1/0* | AWG 6* |

| BYPASS AC Line Connection 3PH + N + PE (Dual Mains) | | | | | | | | | |
|---|--------------------|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|---------------------------------|-------------------------|
| UPS size | Max Power [kW-kVA] | Max continuous current [A] | Terminal A, B, C, N | | PE | | Wire A _{Byp} , B _{Byp} , C _{Byp} , N, PE | | |
| | | | Maximum cross section | Tight. torque [in-lb] | Maximum cross section | Tight. torque [in-lb] | Type | Cross sectional area A, B, C, N | Cross sectional area PE |
| 10 | 9 - 10 | 31 | AWG 2/0 | 94 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 6* | AWG 10* |
| 20 | 18 - 20 | 61 | AWG 2/0 | 94 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 3* | AWG 10* |
| 30 | 27 - 30 | 92 | AWG 2/0 | 110 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 1/0* | AWG 6* |

| OUTPUT AC Line Connection 3PH + N + PE | | | | | | | | | |
|--|--------------------|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|---------------------------------|-------------------------|
| UPS size | Max Power [kW-kVA] | Nominal current [A] | Terminal A, B, C, N | | PE | | Wire A, B, C, N, PE | | |
| | | | Maximum cross section | Tight. torque [in-lb] | Maximum cross section | Tight. torque [in-lb] | Type | Cross sectional area A, B, C, N | Cross sectional area PE |
| 10 | 9 - 10 | 28 | AWG 2/0 | 94 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 6* | AWG 10* |
| 20 | 18 - 20 | 56 | AWG 2/0 | 94 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 3* | AWG 10* |
| 30 | 27 - 30 | 83 | AWG 2/0 | 110 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 1/0* | AWG 6* |

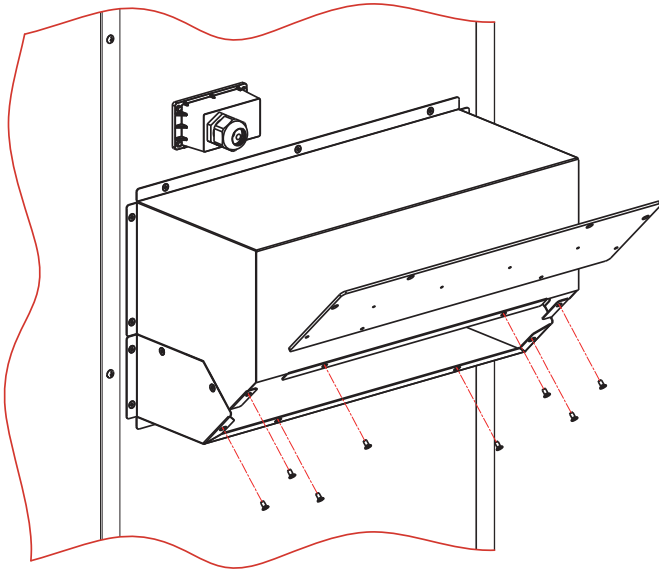
| Input Battery DC Line Connection BATT+, BATT-, PE (Nominal voltage 240V) | | | | | | | | | | |
|--|--------------------|--------------------------|---------------------------|-------------------------|-----------------------|-----------------------|-----------------------|----------------------------|---------------------------|-------------------------|
| UPS size | Max Power [kW-kVA] | Rated Current [A] | | Terminal BATT +, BATT - | | PE | | Wire BATT +, BATT -, PE ** | | |
| | | @nominal battery voltage | @end of discharge voltage | Maximum cross section | Tight. torque [in-lb] | Maximum cross section | Tight. torque [in-lb] | Type | Cross sectional area +, - | Cross sectional area PE |
| 10 | 9 - 10 | 40 | 50 | AWG 2/0 | 94 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 6* | AWG 10* |
| 20 | 18 - 20 | 79 | 100 | AWG 2/0 | 94 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 3* | AWG 10* |
| 30 | 27 - 30 | 118 | 150 | AWG 2/0 | 110 | AWG 2/0 | 110 | 75°C or 90°C copper wire | AWG 1* | AWG 6* |

(*) The suggested cross section refers to 90°C rated cables with an ambient temperature of 30°C. If different cables are used, or installed at a higher ambient temperature, the cable size need to be reviewed according to the National Electric Code (Table 310.16).

(**) The maximum length of the cables for connecting the Battery Box (optional) is 10 metres (33 ft).

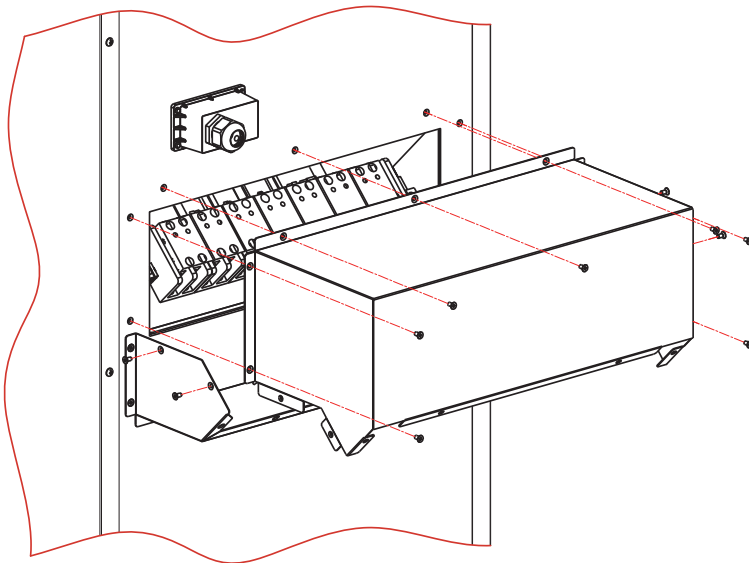
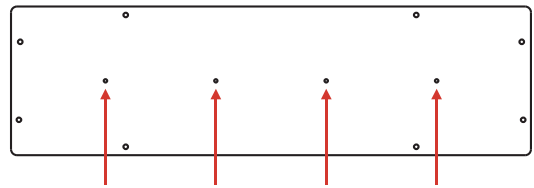
POWER CONNECTION INSTALLATION

To install the UPS to the power mains, follow the indications below:

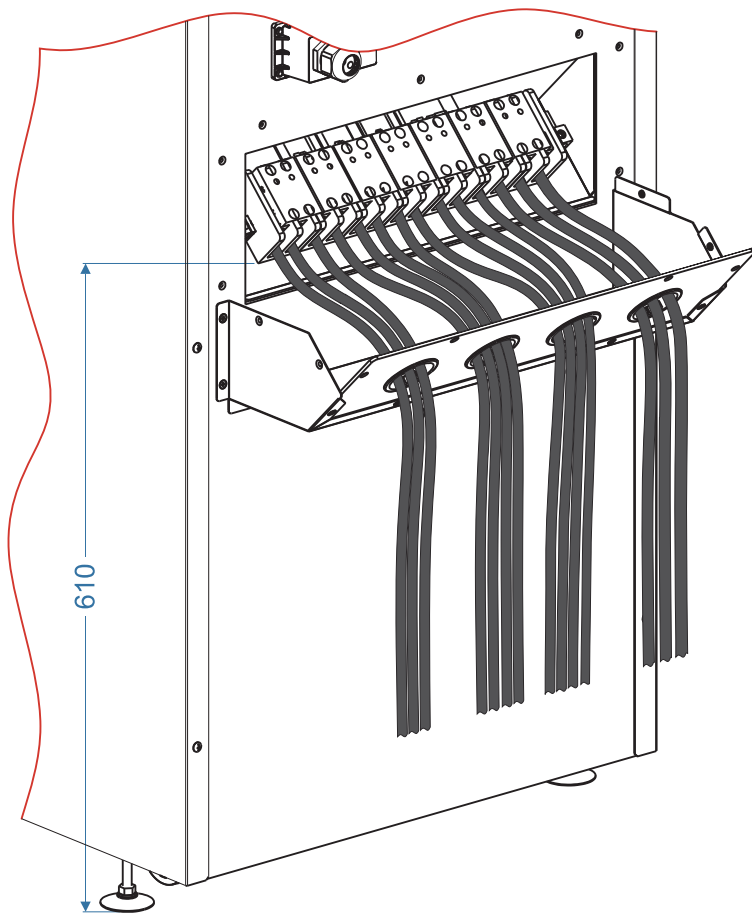


Remove the terminal block cover aluminum panel.

Make on the panel the appropriate holes to pass the input/output power cables according to plant needs. If needed, use suitable cable glands to achieve the required degree of protection.



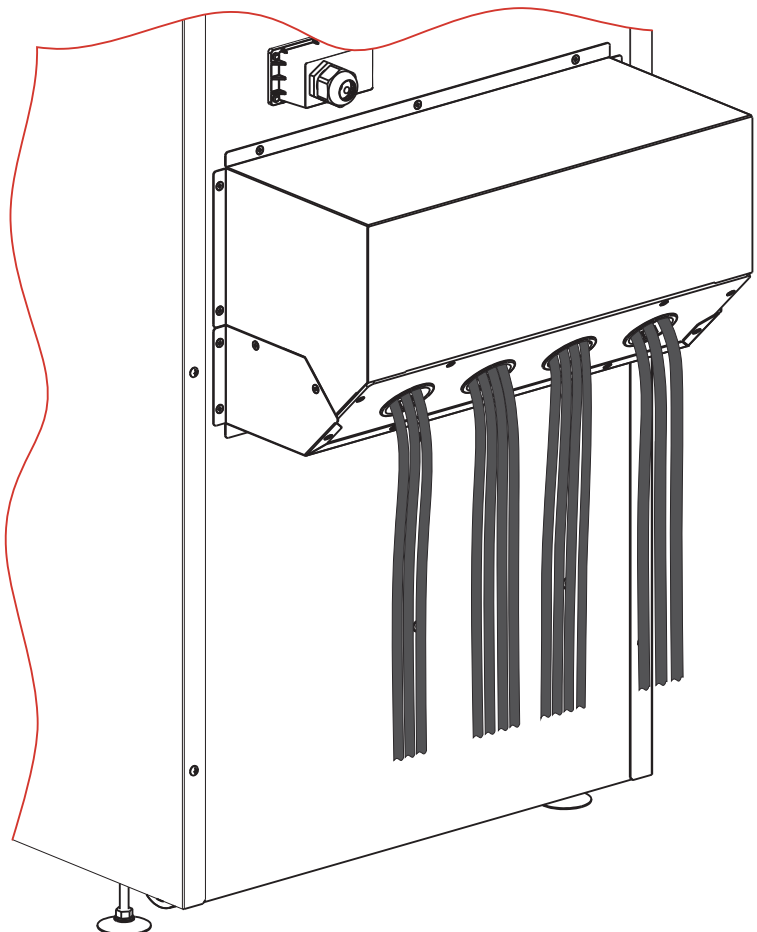
Remove the upper cover to access the terminal blocks.



Put the aluminum plate in place after inserting the power cables through it.
Connect the power cables to terminal blocks.

ATTENTION: connect always the PE wire first.

Close the top cover with the previously removed screws.



CONNECTION DETAIL

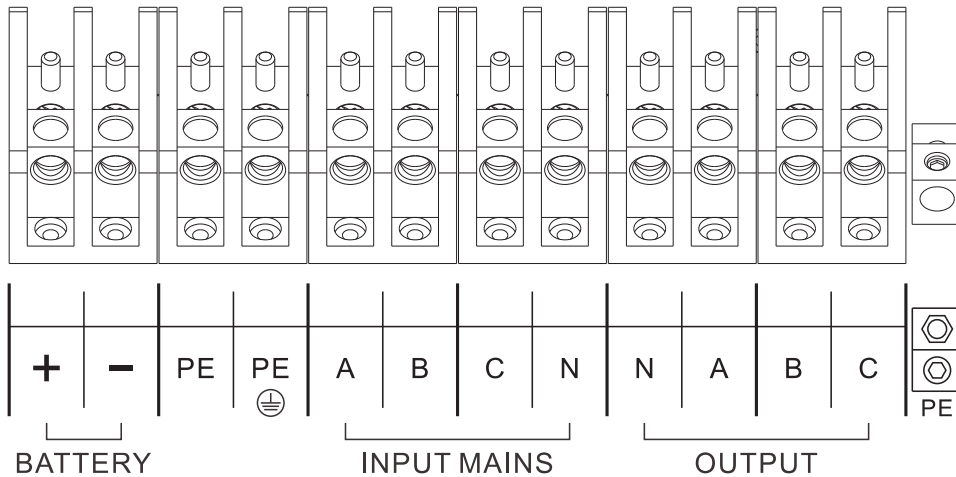


The first wire to be connected is the protective earth wire, which is to be inserted in the terminal marked PE with a circled earth symbol. During operation the UPS must be connected to the earthing system.

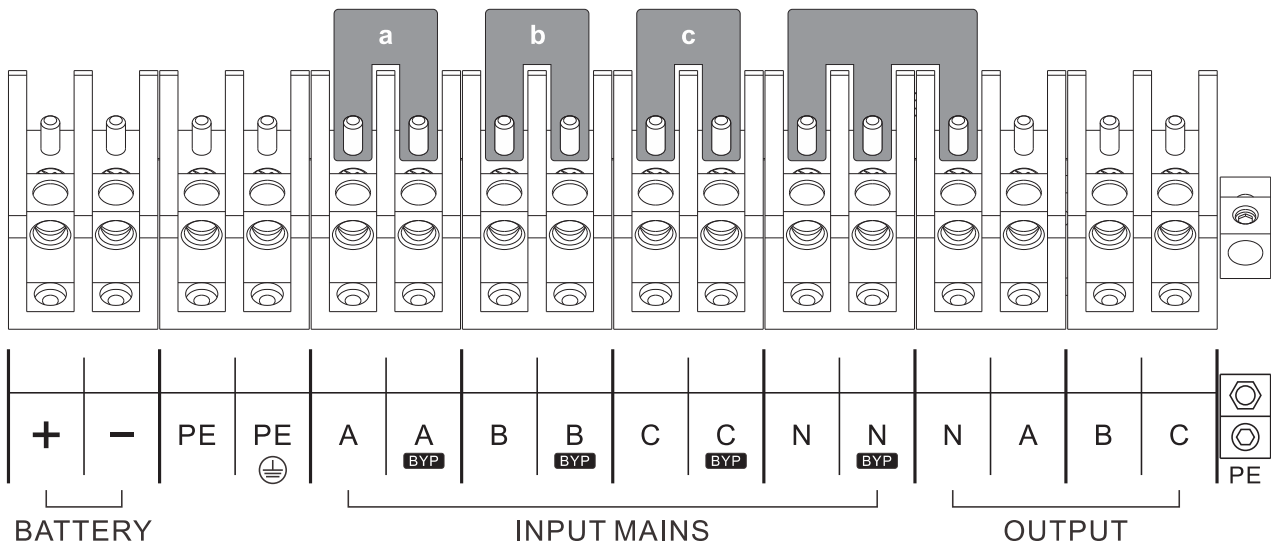
Connect the input and output cables to the terminal blocks as indicated in the figure below:

POWER CONNECTIONS

S3U (single input version)



S3U SW (dual input, four switches version)



NOTE: In order to link the mains input with bypass for single input connection of the “SW” versions, three bridges are installed by default to short-circuit bypass to input terminal blocks (a, b, c). Remove these bridges if a separate bypass has to be connected (the neutral bridge should be leaved in its position).



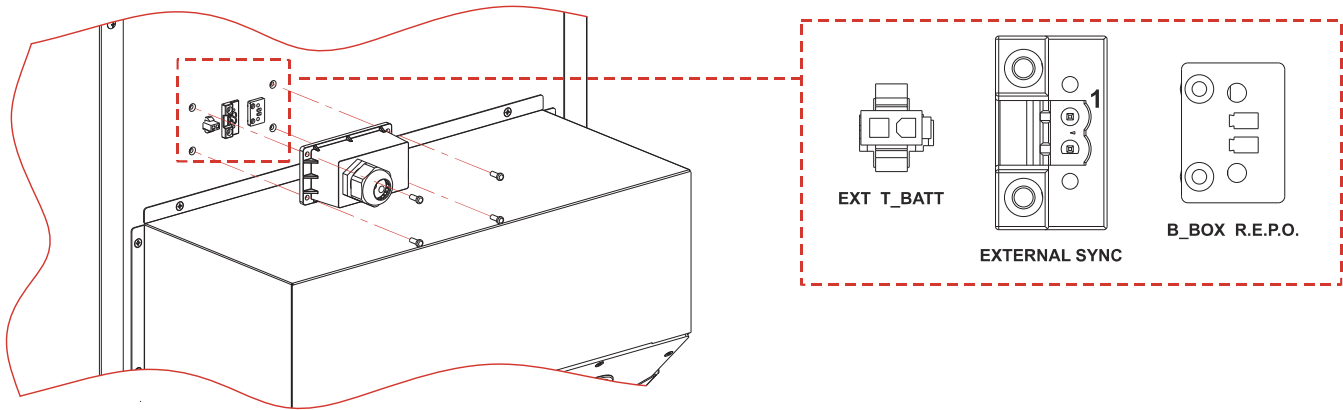
**THE INPUT AND BYPASS NEUTRALS MUST ALWAYS BE CONNECTED.
THE INPUT AND BYPASS LINES MUST REFER TO THE SAME NEUTRAL POTENTIAL.**

Note: the connections to the BATTERY terminal blocks are only to be made if the (optional) Battery Box is present.



WARNING: Before connecting the battery box, remove all the connectors from the battery drawers.

AUXILIARY CONNECTORS



EXT T_BATT External battery box temperature

- Through this input the UPS is able to read the temperature of the external batteries and compensate the floating charge level.

For more information please refer to the “BATTERY BOX INSTALLATION” section of this manual.

WARNING: This input is not isolated.

EXTERNAL SYNC External synchronization

- Through this input it is possible to synchronize the output with an external source having the same frequency of the inverter output.

For more information please refer to the “OPTION” section of this manual.

B_BOX REPO Battery box breaker remote trip

- Connect the battery box REPO wires to the battery box to make the battery breaker trip when the UPS REPO is pressed to disconnect the battery circuit from UPS.

This feature is required by National Electrical Code (Article 645.11) and it is mandatory for computer room installations.

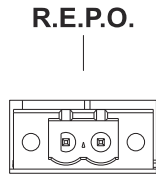
COMMUNICATION BOARD CONNECTORS

R.E.P.O.: This isolated input is used to turn off the UPS remotely in case of emergency.

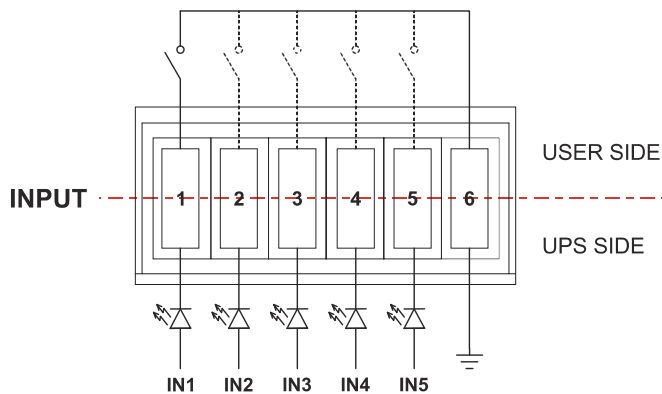
The UPS is supplied from the factory with the "Remote Emergency Power Off" (R.E.P.O.) terminals short-circuited. If it is to be installed, remove the short-circuit and connect to the normally closed contact of the stop device using a cable that provides a double isolation connection.

In case of emergency, by activating the stop device, the R.E.P.O. control is opened and the UPS shut-down (see USER MANUAL), and powers off the load completely.

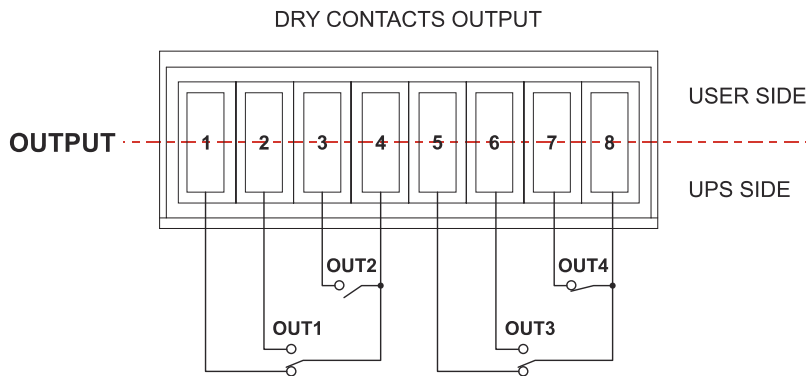
The R.E.P.O. circuit is self-powered with SELV type circuits. No external power supply voltage is therefore required. When it is closed (normal condition), a maximum current of 15mA is present.



IN/OUT Programmable in/out ports: These contacts can be programmed by the user with the configuration software for additional interfacing.



In case of external maintenance bypass or battery box installation, the relative switch auxiliary contacts must be connected to these inputs.

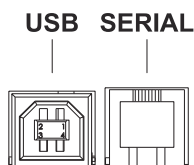


The output dry contacts are rated 1A @ 24Vdc or 1A @ 30Vac

Communication ports: Use these ports to connect the UPS to a personal computer for remote monitoring, service configuration or firmware update.

These two ports cannot be used together. The USB port is to be used in alternative to the RS232 serial interface.

USB port function is guaranteed only with cable length within 1,5m (5 ft). In case of longer wire, RS232 serial interface is recommended.



WARNING: These connectors are not intended for connection to the telephone network.

BATTERY INSTALLATION

The UPS can be provided with dedicated battery drawers to allow an easy installation or replacement of the batteries.

WARNING: for your safety and that of the product, the information below should be carefully followed.

The nominal battery voltage of this UPS is 240V which corresponds to twenty 12V batteries in series. Since each drawer contains ten batteries in series, the drawers must be installed in multiple-of-two quantity. Look at the table below for information about the minimum number of batteries:

| Minimum battery capacity | | | |
|--|--------------------|--------------------|--------------------|
| UPS model | S3U 10 / S3U 10 SW | S3U 20 / S3U 20 SW | S3U 30 / S3U 30 SW |
| Minimum capacity: (number of battery drawers / total n° of batteries) | 9Ah (1/20) | 18Ah (2/40) | 27Ah (3/60) |



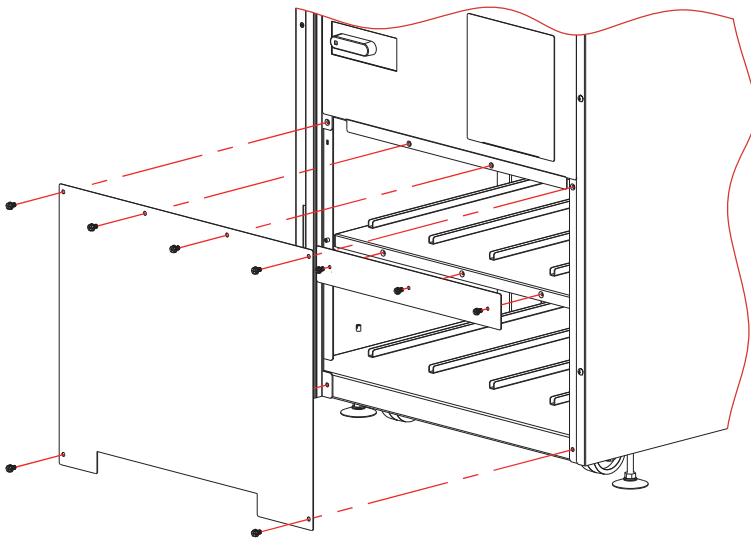
WARNING: The installation of a battery capacity smaller than the recommended, could lead to a load loss when UPS switches to battery mode due to the intervention of the battery drawers overcurrent protection.



ATTENTION: the battery drawers are very heavy. Be very careful when installing them.

Battery drawers have to be installed exclusively by qualified staff.

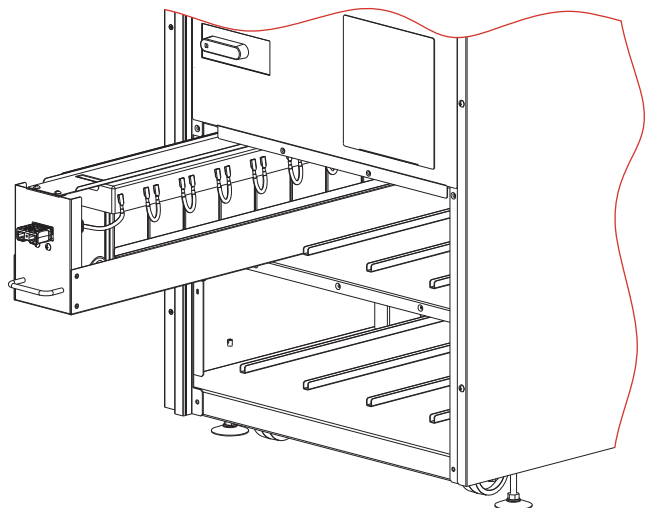
Before installing the batteries, put the UPS in maintenance bypass mode (see user manual) and shut down the UPS.

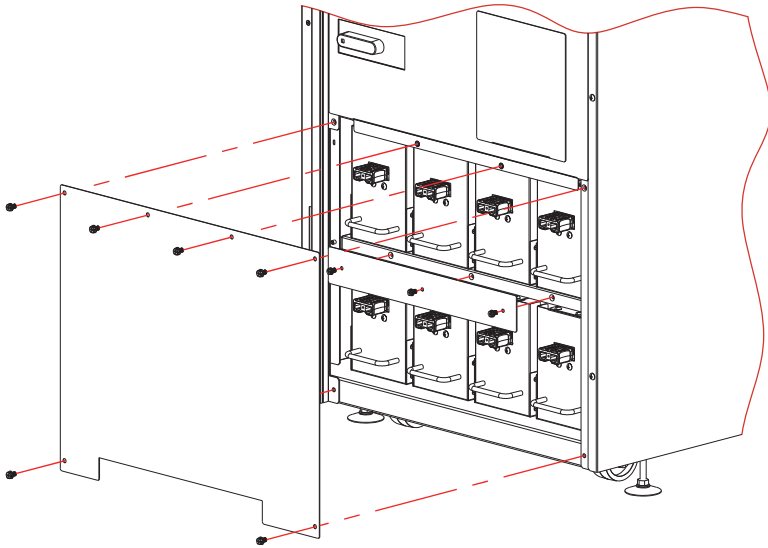


1. The battery packs are located behind the UPS front-bottom panel. To install/replace the batteries, remove the cover panel and the drawers retaining bracket.

2. Remove the exhausted batteries, if present, by removing all connectors and pulling the drawers outwards. Insert all the new battery drawers and insert the connectors back.

WARNING: the new battery pack must have the same number and type of batteries as the one it is replacing.

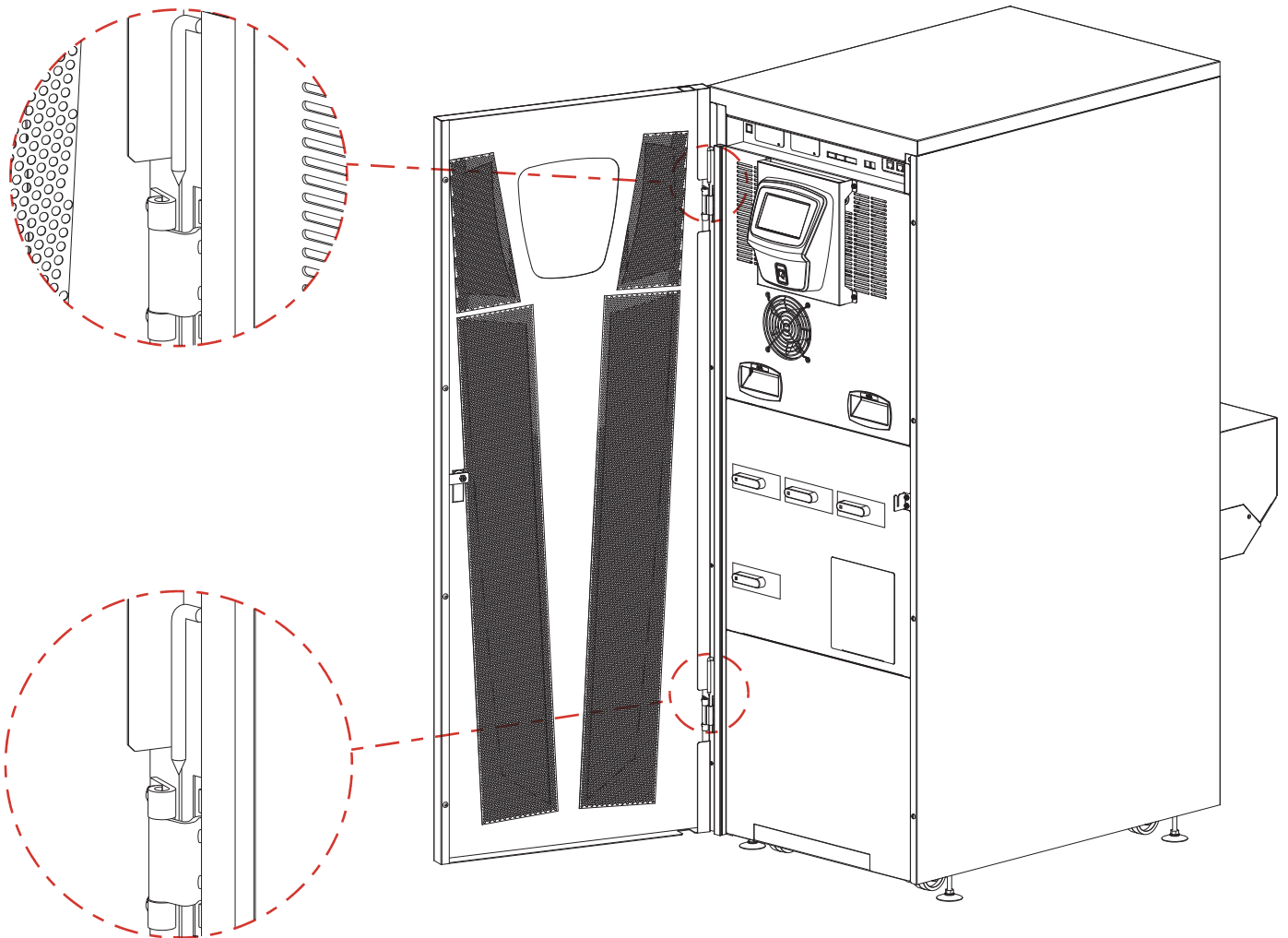




3. Once the batteries are installed in the UPS, put the retaining bracket and the cover panel back in place.

Once the new battery drawers have been secured and panel is closed, turn on the UPS again and open the manual bypass switch following the instruction in the user manual.

REMOVING DOOR





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