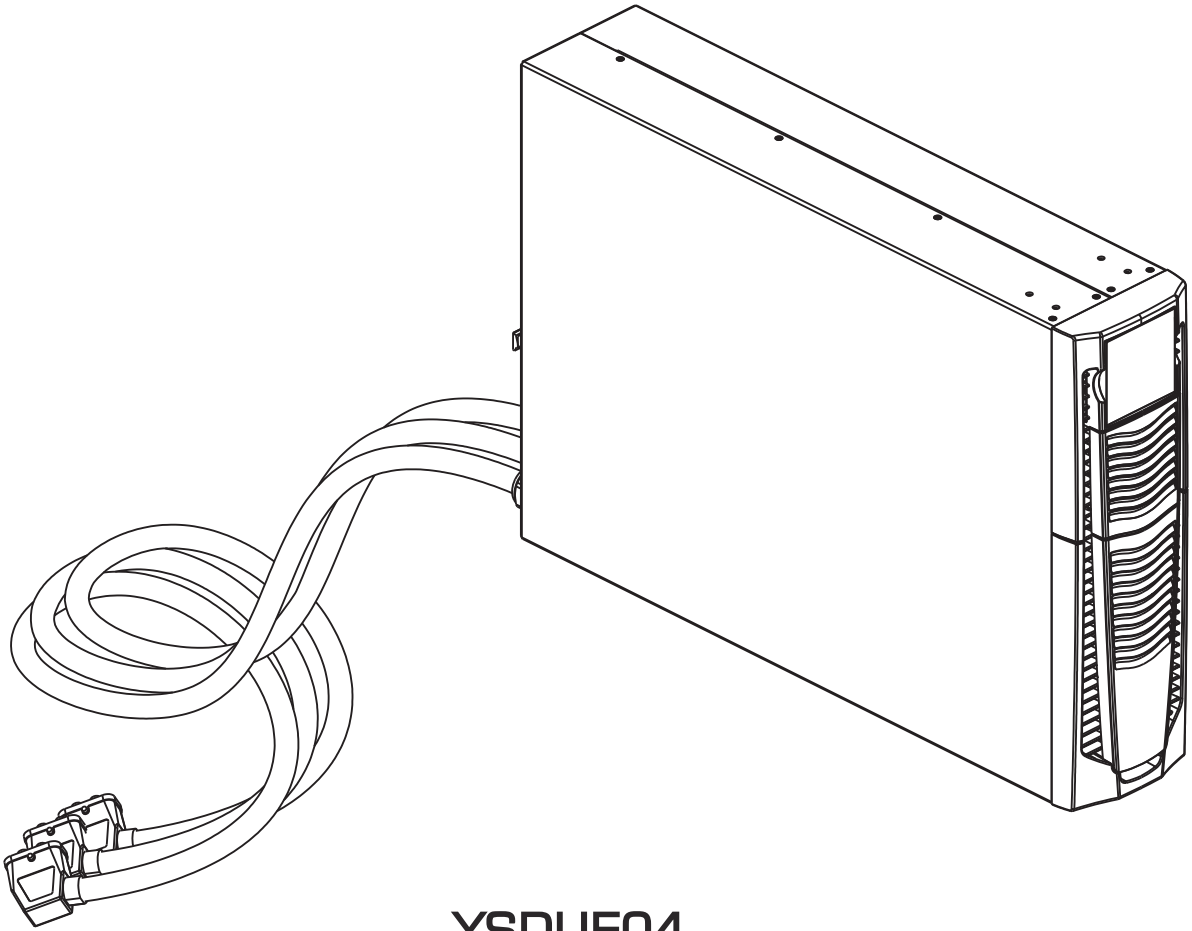


# Maintenance Bypass

for parallel and redundant systems



YSDUE04...

YSDUE05...

## Installation Manual



# INTRODUCTION

---

Thank you for choosing our product.

The accessories described in this manual are of the highest quality, carefully designed and built in order to ensure excellent performance.

This manual contains detailed instructions on how to install and use the product.

**This manual must be stored in a safe place and CONSULTED BEFORE USING THE DEVICE for proper usage instructions as well as maximum performance from the device itself.**

**NOTE:** Some images contained in this document are for informational purposes only and may not faithfully demonstrate the parts of the product they represent.

## *SAFETY*

**This part of the manual contains SAFETY precautions that must be followed scrupulously.**

Ensure that the connectors subjected to high voltages are correctly isolated.

- The device has been designed to operate only in closed environments. It should be installed in rooms where there are no inflammable liquids, gas or other harmful substances.
- Take care that no water or liquids and/or foreign bodies fall into the device.
- The device must be used exclusively for the purpose for which it was designed. Any other use is to be considered improper and as such dangerous. The manufacturer declines all responsibility for damage caused by improper, wrong and unreasonable use.

## *ENVIRONMENTAL PROTECTION*

Our company devotes abundant resources to analysing environmental aspects in the development of its products. All our products pursue the objectives defined in the environmental management system developed by the company in compliance with applicable standards.

Hazardous materials such as CFCs, HCFCs or asbestos have not been used in this product.

When evaluating packaging, the choice of material has been made favouring recyclable materials.

Please separate the different material of which the packaging is made and dispose of all material in compliance with applicable standards in the country in which the product is used.

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# PRESENTATION

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The SDU Modular Bypass MBB enables the user to create a parallel UPS system to increase power or to form a redundant system.

Thanks to the use of the hot-swap connections, disconnection or substitution of a UPS within the parallel system is quick and easy.

In addition, the SDU Modular MBB has a maintenance bypass command at the front, which enables the exclusion of all UPS within the parallel system, without interrupting the power supply to the critical load.

The SDU Modular MBB has been developed to be installed either in a TOWER position close the UPSs or installed inside a 19 " rack cabinet.

The aim of the parallel UPS system is to improve the reliability of the power supplied to the connected load and increase the total power available. Up to 3 units of the same size and power can be connected in a parallel system.

The load that can be supplied by a parallel UPS system can be higher than the load sustained by each single unit, thanks to an automatic power sharing function. The increase in reliability can only be achieved if the total amount of power supplied by the UPS system with one unit disabled, remains higher than the load requires. To increase the reliability of the system, one redundant UPS must be added to the maximum power necessary to supply the load, therefore should a UPS be automatically disconnected from the parallel system, the remaining operational UPS will continue to supply the load.

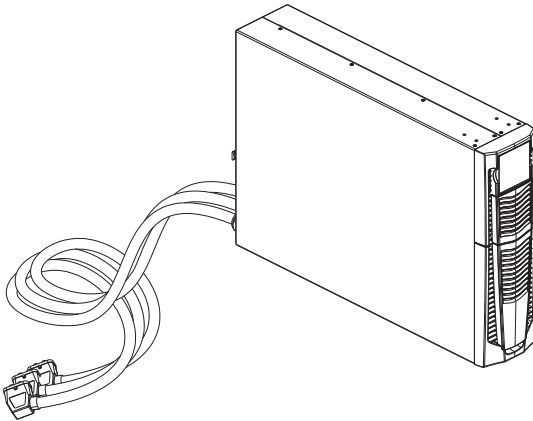
The UPSs connected in parallel are managed by a dedicated control board (Parallel kit) YSDUP00.. which must be installed within each UPS, this control board is sold separately. The control board enables the exchange of data through a connection ring, an architecture that provides redundancy within the connection, thus increasing the reliability of the system.

**WARNING:** Without the control board (Parallel Kit) YSDUP00.. the system cannot work correctly and the UPS or connected load can be damaged.

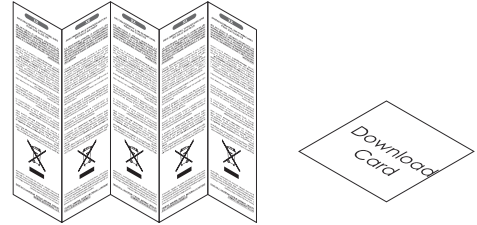
# PACKAGING CONTENT

Verify the items inside the packaging:

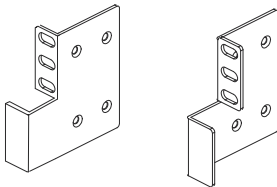
Bypass SDU Modular MBB



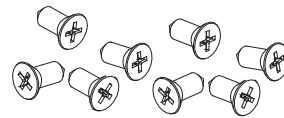
RAEE/WEEE Manual + Download card



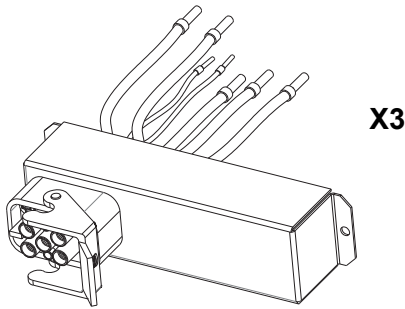
Handles for rack installation



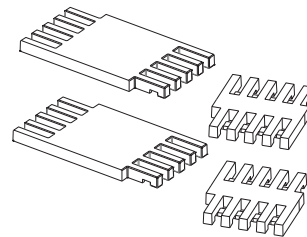
Handles screws



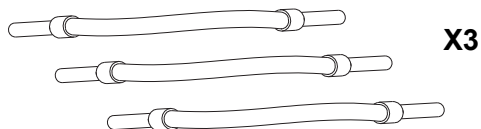
Terminal cover with pre-installed socket



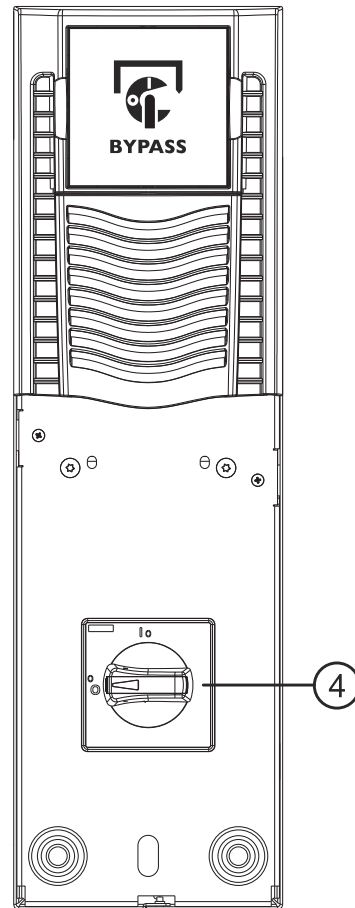
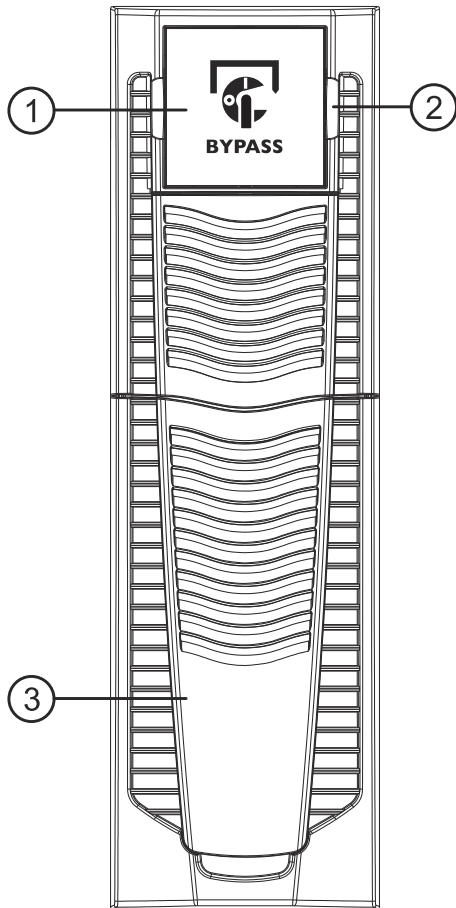
Feet extensions



Wires for separated bypass line (DI) or three-phase (TM) installations  
(Only for YSDUE15... version)



FRONT VIEW

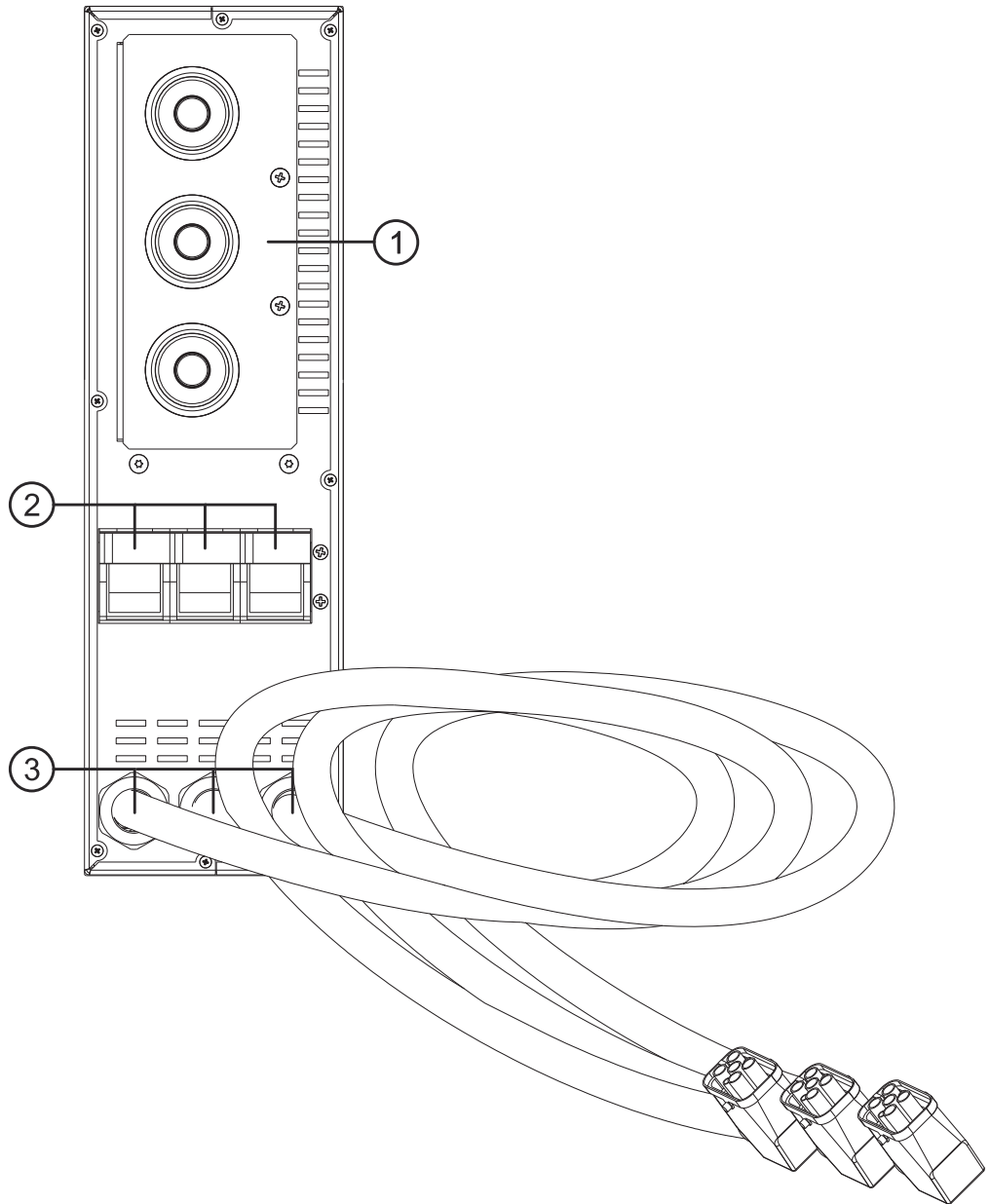


*View without front panel*

- ① Extractable / rotatable plate
- ② Release slits
- ③ Removal front panel
- ④ Bypass switch

Note: with the switch in "1 – Bypass" position is not possible mount the front panel. This is for highlighting that the system is in maintenance status and the load is not protected.

REAR VIEW



- ① Extractable terminal cover
- ② Protection fuses
- ③ Connection cables towards the UPS



# INSTALLATION

Before to go on with the installation, place the UPS and the Battery Cabinet in groups for an easier individualization during the maintenance operations. Refer to the UPS user manual for wiring the UPS to the Battery Cabinets.



**Warning:** each group of Battery Cabinet must supply just one UPS. Do not connect different groups of Battery Cabinet each other. This kind of connection could cause overloads on the battery cables and irreparably compromise the system functionality.

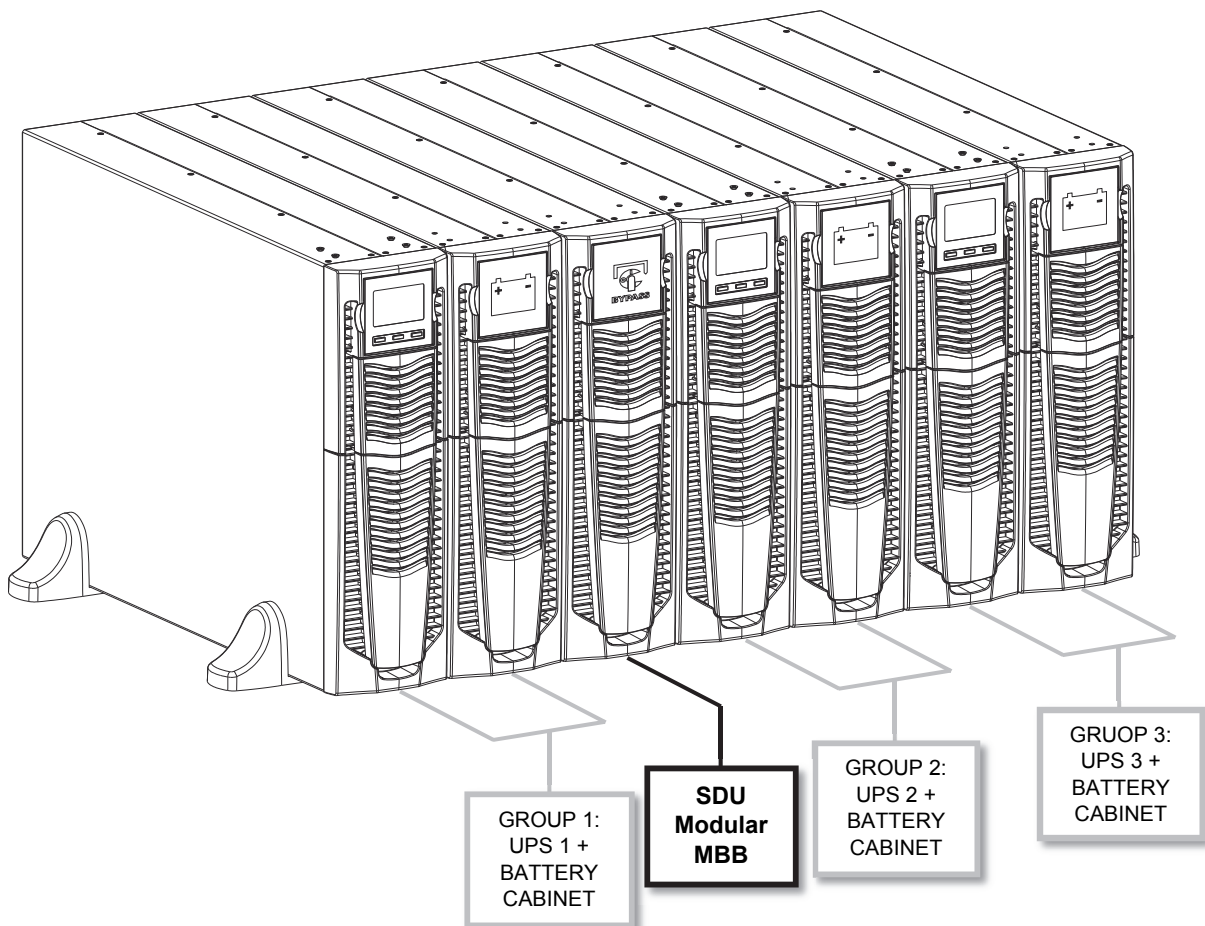
For more information about the availability and the installation of centralized Battery Cabinets for parallel systems consult the web site of the manufacturer.

**Note:** is suggested to don't connect more than 5 Battery Cabinet to a single UPS. To increase the autonomy, is suggested to install one Battery Cabinet with higher capacity batteries.

## INSTALLATION IN TOWER POSITION

For the installation refer to the UPS user manual.  
The image below shows an example of installation.

Note: if there are more than one Battery Cabinet for each UPS, place them close to own group for an easier individualization during the maintenance operations.

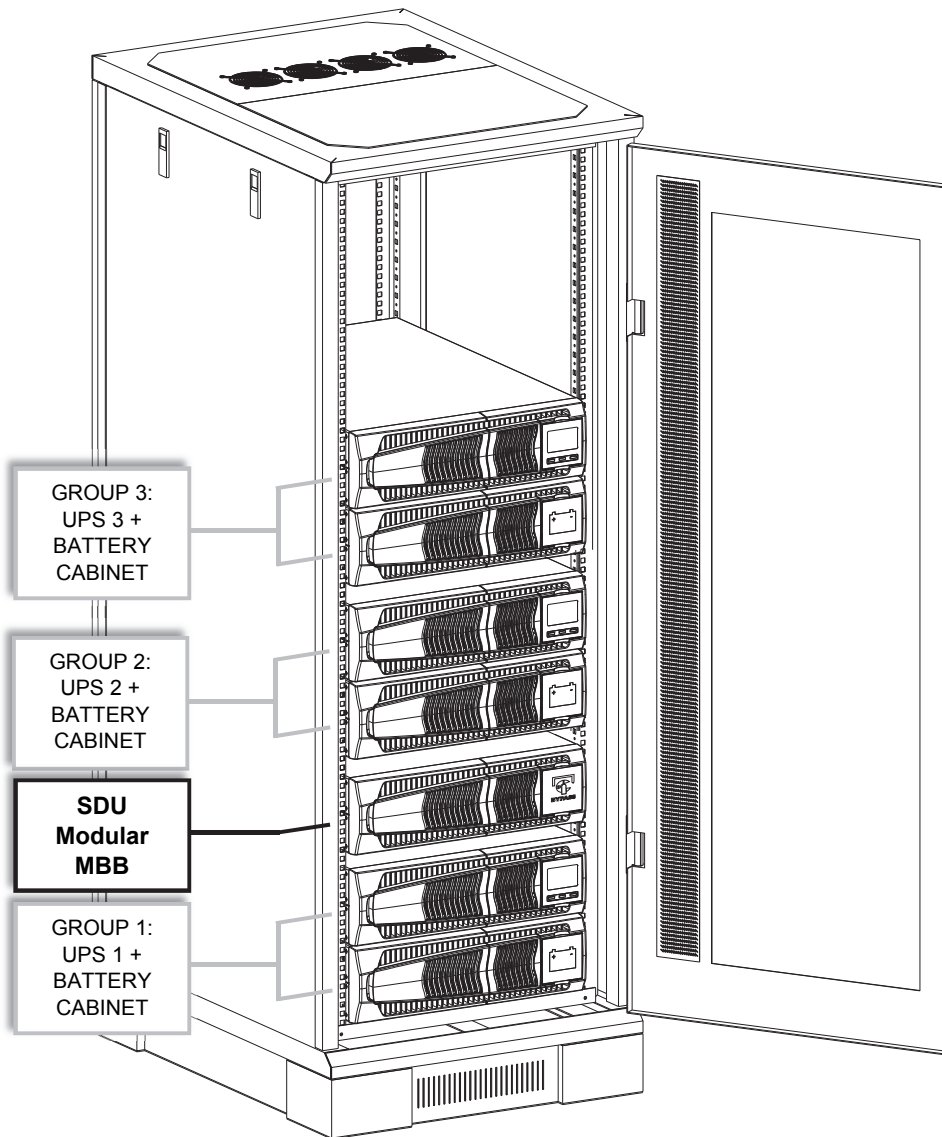


## INSTALLATION ON 19" RACK

For the installation refer to the UPS user manual.

The image below shows an example of installation in a 19" rack cabinet.

Is suggested to keep one unit free between the groups of UPS and Battery Cabinets. This operation will allow a better thermal insulation between the UPS and the Battery Cabinet placed above.



**NOTE:** Due to the heavyweight, the use of support brackets (guides with L support) is mandatory for the installation. If possible, is recommended to install the UPS and the Battery Cabinets in the lower part of the rack cabinet.

# PARALLEL SYSTEM CONNECTION

## REPLACING THE UPS IN/OUT TERMINAL COVER

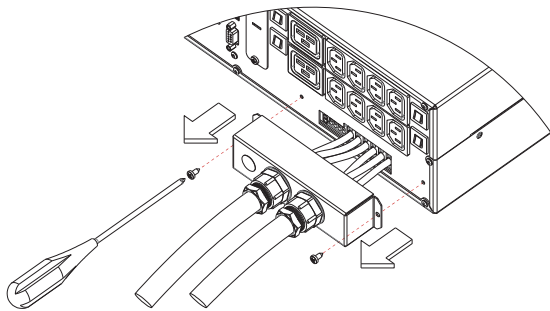


**ALL OPERATIONS DESCRIBED IN THIS SECTION MUST BE PERFORMED BY QUALIFIED PERSONNEL ONLY.** Our Company assumes no liability for damages caused by incorrect connections or operations not contained in this manual.



The UPS has **HAZARDOUS** electrical voltages inside it, even when the input and/or battery switches are off. The inside of the UPS is protected by safety panels which should be removed by trained personnel **EXCLUSIVELY**. All installation and maintenance or operations involving access inside the UPS require the use of tools and may **ONLY** be performed by trained personnel.

To carry out the following operations, the UPS must be disconnected from the mains power supply, switched off, and with all the equipment switches and fuse holders open.



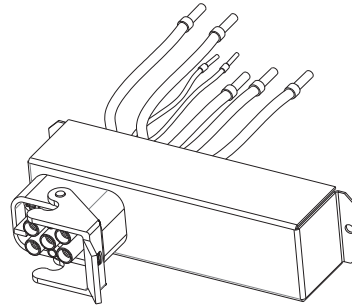
Removal example (Model 5-6 kVA)

Fit the newly supplied terminal cover complete with socket as shown in the figure

Remove the terminal cover by removing the securing screws as shown in the figure.

Remove any existing connections from the terminals.

**NOTE:** To remove the cables, insert a flat screwdriver in the slot of the clamp located above the cable entry.



New cover (Model 5-6 kVA)

## CONNECTION PROCEDURE FOR SINGLE-PHASE UPS (SDU 5-6 kVA)

Make the electrical connection of the new terminal cover drawer as shown in the figure below.



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

### **INPUT:**

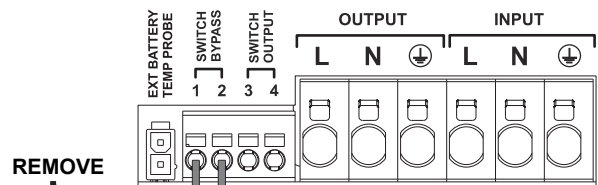
- Connect the ground wire (yellow/green) to the input ground terminal
- Connect the neutral wire "N\_IN" (blue) to the N<sub>INPUT</sub> terminal
- Connect the phase wire "L\_IN" (brown) to the L<sub>INPUT</sub> terminal

### **OUTPUT:**

- Connect the neutral wire "N\_OUT" (white) to N<sub>OUTPUT</sub> terminal
- Connect the phase wire "L\_OUT" (black) to the L<sub>OUTPUT</sub> terminal

### **SWITCH BYPASS:**

Connect the two small command wires (black) to terminals 1 and 2 (if present remove the pre-installed jumper)



Model 5-6kVA

## CONNECTION PROCEDURE FOR SINGLE-PHASE UPS (SDU 8-10 kVA)

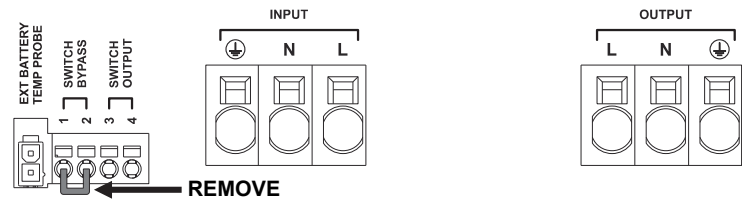
Make the electrical connection of the new terminal cover drawer as shown in the figure below.



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

### INPUT:

- Connect the ground wire (yellow/green) to the input ground terminal
- Connect the neutral wire marked "N\_IN" (blue) to the N<sub>INPUT</sub> terminal
- Connect the phase wire marked "L\_FUSE" (brown) to the L<sub>INPUT</sub> terminal



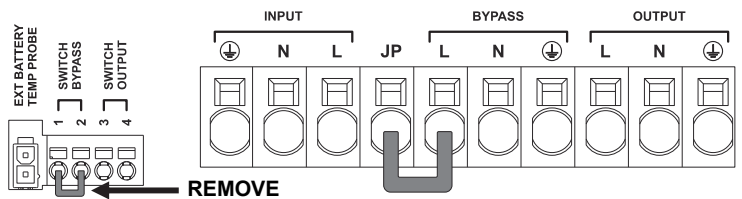
Model 8-10kVA

### OUTPUT:

- Connect the neutral wire marked "N\_OUT" (white) to N<sub>OUTPUT</sub> terminal
- Connect the phase wire marked "L\_OUT" (black) to the L<sub>OUTPUT</sub> terminal

### SWITCH BYPASS:

Connect the two small command wires (black) to terminals 1 and 2 (if present remove the pre-installed jumper)



Model 10kVA DI

## CONNECTION PROCEDURE FOR SEPARATED BYPASS LINE UPS (SDU 10kVA DI)

Make the electrical connection of the new terminal cover drawer as shown in the figure below.



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

### PRELIMINARY OPERATIONS:

- On the terminal cover drawer connector, insert the supplied wire marked "LINE" (red) in position 1 of MODULE B, as shown in the figure
- Remove the jumper between the terminals JP e L<sub>BYPASS</sub> on the UPS terminals

### INPUT:

- Connect the ground wire (yellow/green) to the input ground terminal
- Connect the neutral wire marked "N\_IN" (blue) to the N<sub>INPUT</sub> terminal
- Connect the phase wire marked "LINE" (red) to the L<sub>INPUT</sub> terminal

### BYPASS:

- Connect the phase wire marked "L\_FUSE" (brown) to the L<sub>BYPASS</sub> terminal.

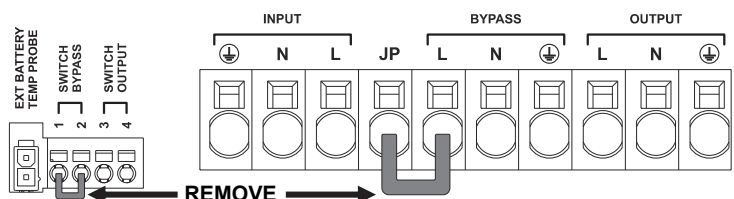
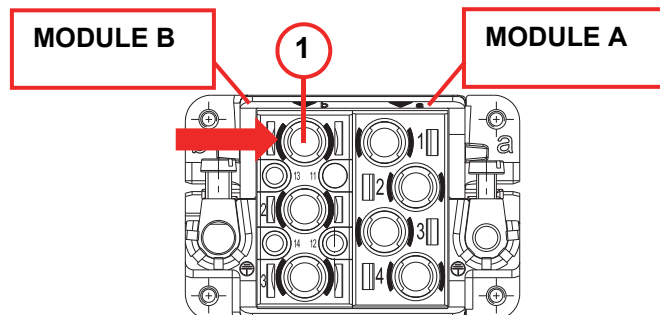
WARNING: no other cable must be inserted in the terminal "JP"

### OUTPUT:

- Connect the neutral wire "N\_OUT" (white) to N<sub>OUTPUT</sub> terminal
- Connect the phase wire "L\_OUT" (black) to the L<sub>OUTPUT</sub> terminal

### SWITCH BYPASS:

Connect the two small command wires (black) to terminals 1 and 2 (if present remove the pre-installed jumper)



Model 10kVA DI

## CONNECTION PROCEDURE FOR THREE-PHASE UPS (SDU 8-10 kVA TM)

Make the electrical connection of the new terminal cover drawer as shown in the figure below.



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

### **PRELIMINARY OPERATIONS:**

- On the terminal cover drawer connector, insert the supplied wire marked "L2\_IN" (brown) in position 2 of MODULE A, insert the supplied wire marked "L3\_IN" (grey) in position 3 of MODULE A, as shown in the figure

### **INPUT:**

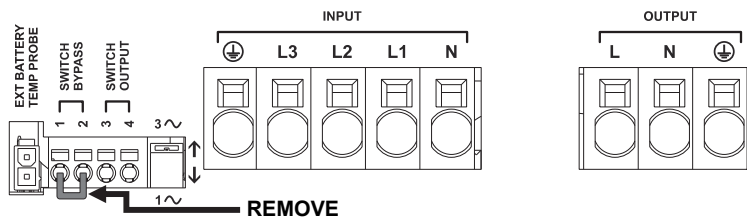
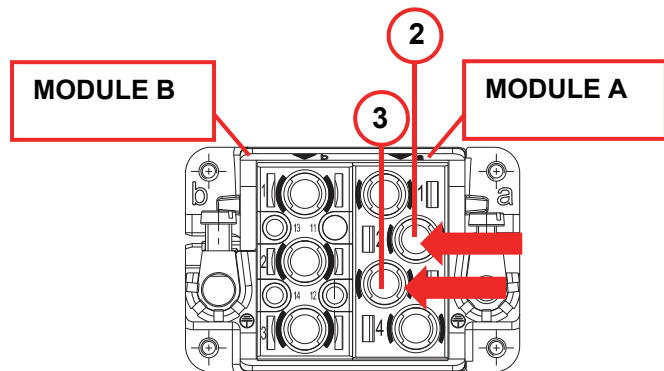
- Connect the ground wire (yellow/green) to the input ground terminal
- Connect the neutral wire marked "N\_IN" (blue) to the N<sub>INPUT</sub> terminal
- Connect the phase wire marked "L\_FUSE" (brown) to the L1<sub>INPUT</sub> terminal
- Connect the phase wire marked "L2\_IN" (brown) to the L2<sub>INPUT</sub> terminal
- Connect the phase wire marked "L3\_IN" (grey) to the L3<sub>INPUT</sub> terminal

### **OUTPUT:**

- Connect the neutral wire "N\_OUT" (white) to N<sub>OUTPUT</sub> terminal
- Connect the phase wire "L\_OUT" (black) to the L<sub>OUTPUT</sub> terminal

### **SWITCH BYPASS:**

Connect the two small command wires (black) to terminals 1 and 2 (if present remove the pre-installed jumper)



Model 8-10kVA TM



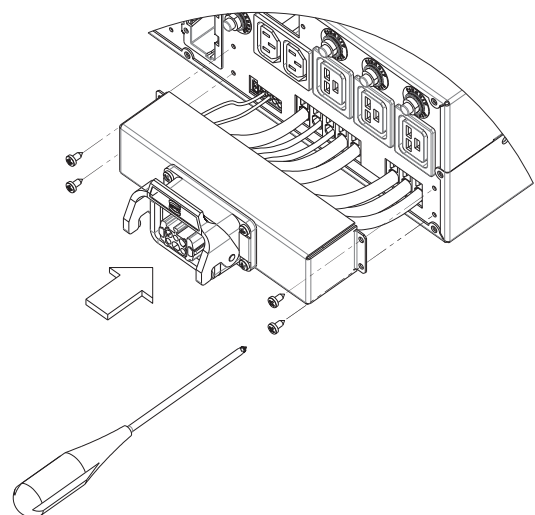
**Warning:** before powering the UPS and starting the operative procedures, in order to avoid any system damage, follow the operations below:

- Visual check of the connection
- Check that all the isolators are open.
- Check that all the connections have been made strictly following the indications given in the "Installation manual".

**Warning:** before any attempt to turn the system on, it is mandatory to check the power supply and connection of phase, neutral and external battery wires (if present). Refer to the Installation manual.

## CLOSING THE TERMINALS DRAWER

Fix the new terminal cover to the UPS using the previously removed screws taking care not to damaged or crush the connection cables.

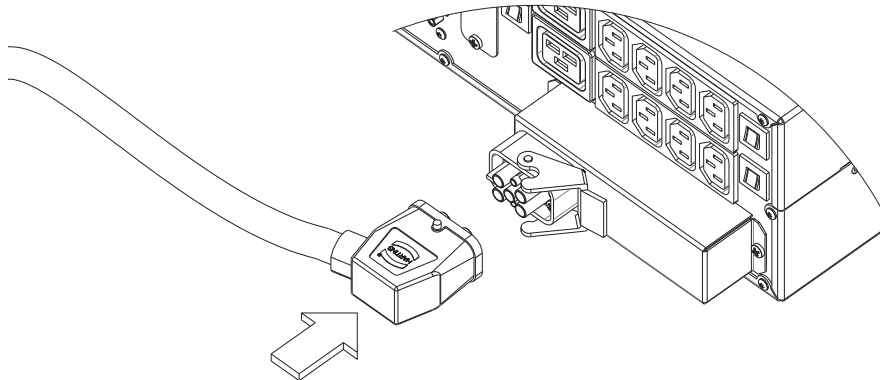


Fixing example (Model 8-10kVA TM)

## CONNECTION OF THE BYPASS TO THE UPS

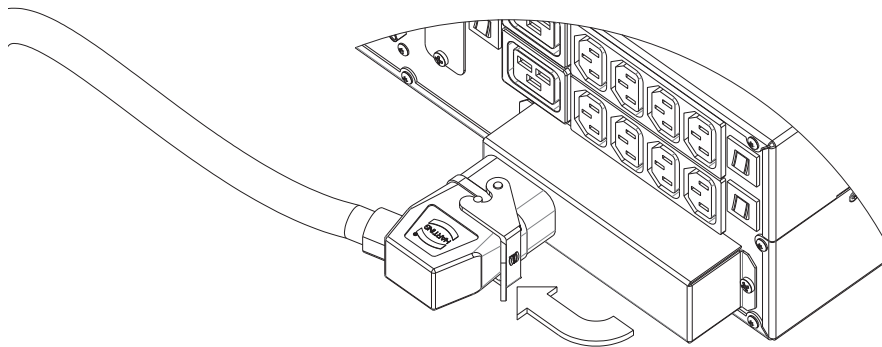
Insert the Bypass plug into the newly installed socket on the rear of the UPS.

NOTE: the plug and socket are designed in such a way as not to allow connection errors.



Example (Model 5-6 kVA)

Finally, lock the plug to the socket using the special retaining hook, as shown in the figure below.



Example image (Model 5-6 kVA)



**WARNING:** do not remove the UPS/Load power connector with the UPS running. This could cause damage to connected equipment.

## PARALLEL KITS INSTALLATION

For the installation and system configuration refer to the Parallel Kit user manual.



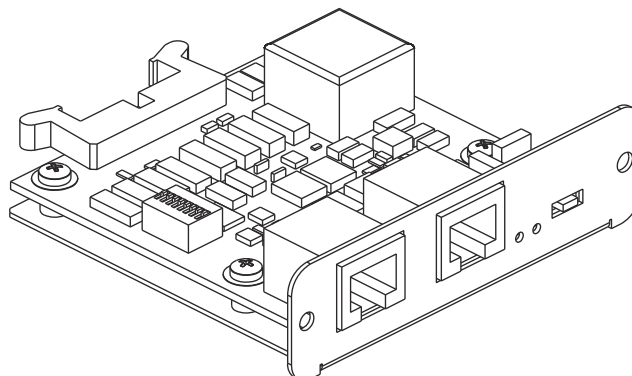
**Warning:** a scrupulous reading of the following chapters of the “Parallel Kit” manual is recommended:



### INSTALLATION

- PARALLEL CARD ASSEMBLY AND CONFIGURATION PROCEDURE
- SIGNAL CONNECTION
- REMOTE EMERGENCY POWER OFF COMMAND CONNECTION (R.E.P.O.)

Parallel card:



# CONNECTION OF THE BYPASS TO THE MAINS

## SAFETY DEVICE: DIFFERENTIAL

The differential switch located upstream must have the following characteristics:

- Differential current adjusted to the sum of UPS + Load; we recommend a suitable margin be kept to prevent unwanted activation.
- Differential type B.

## LINE PROTECTION: MAGNETOTHERMAL OR FUSE

Within the UPS there are protection devices for output and internal faults.

You must protect the input line (and the separate bypass line if present) with the appropriate protection devices.



**Warning:** the Maintenance Bypass is equipped with three “protection fuses”. The only object of each fuse is to protect the internal bypass line of each single UPS. These fuses are not sectioning devices of the UPS and their opening does not guarantee the complete disconnection of the UPS from the mains.

Is possible connect to 3 UPS in parallel to the maintenance bypass. The 3 UPSs can work in parallel for full system power or they can work at 2/3 or 1/3 of the maximum power for redundancy system.

As minimum prescription for the Maintenance Bypass line protection, install a magnetothermal switch upstream from the Bypass line with intervention curve C or D or gR type fuse. These devices must comply with the regulations of the country where the UPS is installed.

Depending on the choice made, the line protections must be coordinate according to the rated currents reported in the data plate of the UPS, and in any case the protections do not be higher than the currents shown in the table below:

Installation type	Automatic external protective devices			
	YSDUE04...	YSDUE05...		
	Single-phase Input (1W+N) Models 5k and 6k	Single-phase Input (1W+N) Models 8k and 10k	Three-phase Input (3W+N) Models 8k and 10k	Single-phase Input (1W+N) + Separated Bypass line (1W+N) Model 10k DI
Full power: • 3 UPS	120A	160A	160A	63A (mains line) 150A (Bypass line)
2/3 of the power: • 2 UPS • 2 UPS + 1 redundant UPS	80A	120A	120A	40A (mains line) 100A (Bypass line)
1/3 of the power: • 1 UPS • 1 UPS + 1 redundant UPS • 1 UPS + 2 redundant UPSs	40A	63A	63A	20A (mains line) 50A (Bypass line)

## CONNECTION CABLE CROSS SECTION DETAILS

Sizing the cables related to the power of the system which be installed. The cable cross sections suggested for the input and output cables (and of the bypass line if present) are indicated in the table below:

Installation type	Cross section of the cables (mm <sup>2</sup> ) *			
	YSDUE04...	YSDUE05...		
	Input PE ⊕   N   L  Output PE ⊕   N   L	Input PE ⊕   N   L  Output PE ⊕   N   L	Three-phase input PE ⊕   N   L1   L2   L3  Output PE ⊕   N   L	Input PE ⊕   N   L  Separated Bypass line PE ⊕   N   L  Output PE ⊕   N   L
Full power: • 3 UPS	35mm <sup>2</sup>	50mm <sup>2</sup>	50mm <sup>2</sup> (10mm <sup>2</sup> for L2 and L3)	50mm <sup>2</sup>
2/3 of the power: • 2 UPS • 2 UPS + 1 redundant UPS	16mm <sup>2</sup>	35mm <sup>2</sup>	35mm <sup>2</sup> (6mm <sup>2</sup> for L2 and L3)	35mm <sup>2</sup>
1/3 of the power: • 1 UPS • 1 UPS + 1 redundant UPS • 1 UPS + 2 redundant UPSs	6mm <sup>2</sup> (**)	10mm <sup>2</sup>	10mm <sup>2</sup> (2.5mm <sup>2</sup> for L2 and L3)	10mm <sup>2</sup>

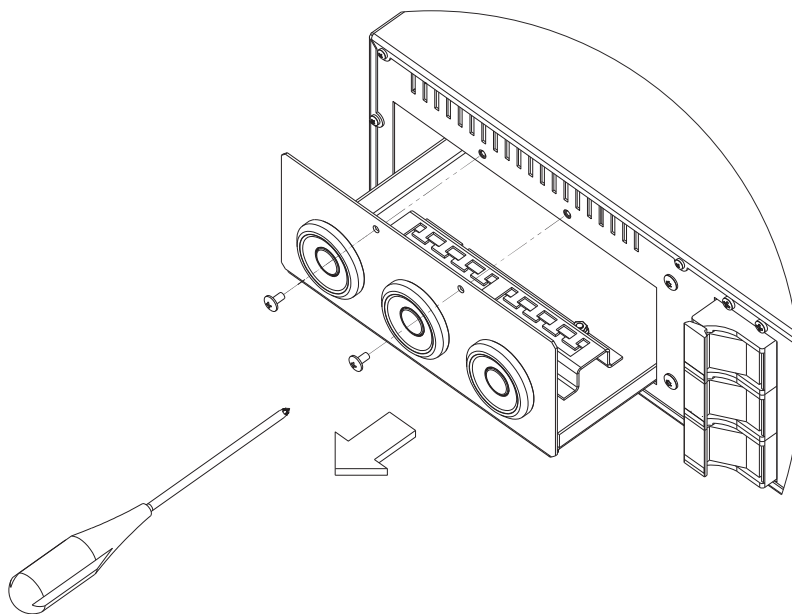
\* The cross sections indicated in the table refer to a maximum length of 10 meters.

\*\* The cable cross section for the earth connection cannot be smaller than 10mm<sup>2</sup>

The cable cross section for the L2 and L3 line can be reduced to the values reported in parentheses.

## ACCESS TO THE CONNECTION TERMINALS



Remove the drawer with the connection terminals by unscrewing the screws shown in the figure below.

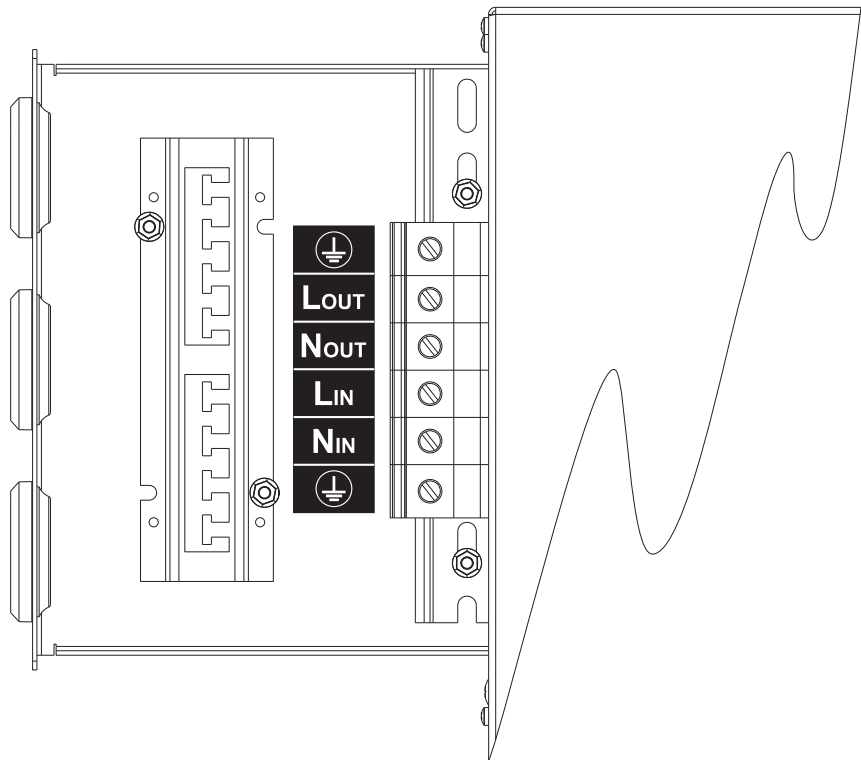




## INPUT/OUTPUT TERMINALS CONNECTION ON BYPASS YSDUE04...

Make the connections to the terminals as indicated below:

-  Ground
- L<sub>OUT</sub>** Output phase line (LOAD)
- N<sub>OUT</sub>** Output neutral line (LOAD)
- L<sub>IN</sub>** Input phase line (MAINS)
- N<sub>IN</sub>** Input phase line (MAINS)
-  Ground



Terminate the links in this order:




- Connect the Input Supply and Output GROUND cables (if present)
- Connect the Input Supply PHASE and NEUTRAL cables
- Connect the Output Load PHASE and NEUTRAL cables

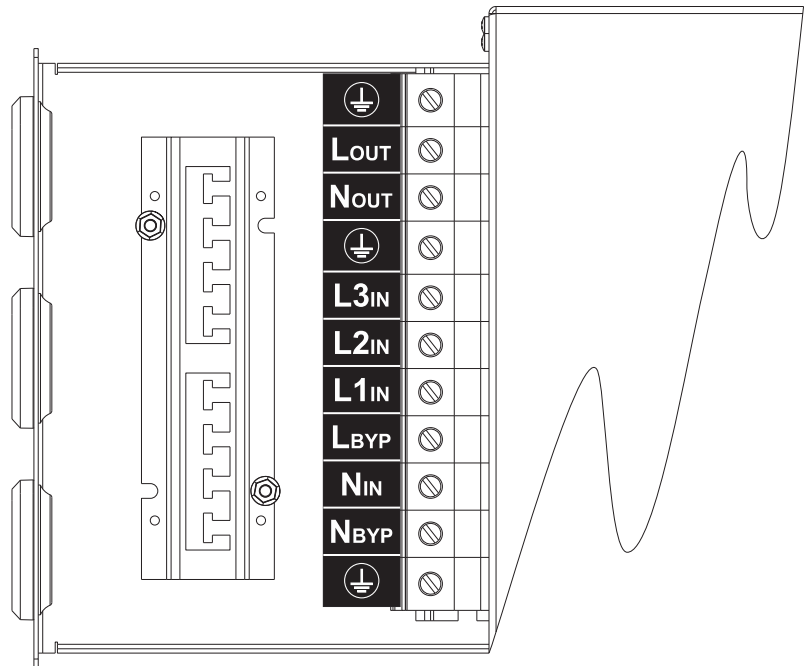
**WARNING!** Pay attention to the connection of the input neutral (N<sub>IN</sub>) and output neutral (N<sub>OUT</sub>), an incorrect connection could cause a short circuit when the bypass switch is closed.

**Secure the cables with cable ties to the cable lock bar located between the terminals and the cable exit.**

## INPUT/OUTPUT TERMINALS CONNECTION ON BYPASS YSDUE05...

Make the connections to the terminals as indicated below:

-  Ground
- L<sub>OUT</sub>** Output phase line (LOAD)
- N<sub>OUT</sub>** Output neutral line (LOAD)
-  Ground
- L<sub>3IN</sub>** Input phase line 3 (MAINS)
- L<sub>2IN</sub>** Input phase line 2 (MAINS)
- L<sub>1IN</sub>** Input phase line 1 (MAINS)
- L<sub>BYP</sub>** Bypass phase line (BYPASS)
- N<sub>IN</sub>** Input neutral line (MAINS)
- N<sub>BYP</sub>** Bypass neutral line (BYPASS)
-  Ground



### **SINGLE-PHASE CONNECTION**

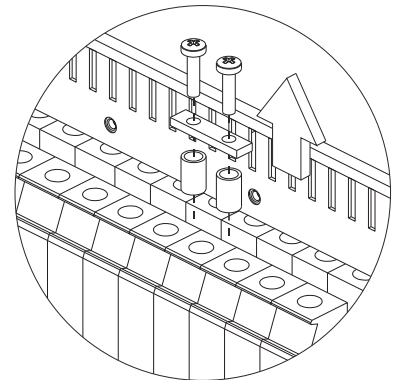
Terminate the links in this order:

- Connect the Input Supply and Output GROUND cables (if present)
- Connect the Input Supply PHASE and NEUTRAL cables
- Connect the Output Load PHASE and NEUTRAL cables

### **SINGLE-PHASE WITH SEPARATE BYPASS LINE CONNECTION**

Terminate the links in this order:

- Remove link between terminal L<sub>BYP</sub> e L<sub>1IN</sub>
- Connect the Input Supply and Output GROUND cables (if present)
- Connect the Input Supply PHASE and NEUTRAL cables
- Connect the Bypass line PHASE and NEUTRAL cables
- Connect the Output Load PHASE and NEUTRAL cables



**WARNING!** Make sure you have removed the parallel link between the terminals L<sub>BYP</sub> e L<sub>1IN</sub>, an incorrect connection could cause a short circuit. Do not remove the parallel link between the terminals N<sub>IN</sub> and N<sub>BYP</sub>

### **THREE-PHASE CONNECTION**

Terminate the links in this order:

- Connect the Input Supply and Output GROUND cables (if present)
- Connect the Input Supply PHASE 1, PHASE 2, PHASE 3 and NEUTRAL cables
- Connect the Output Load PHASE and NEUTRAL cables

**WARNING!** Pay attention to the connection of the input neutral (N<sub>IN</sub>) and output neutral (N<sub>OUT</sub>), an incorrect connection could cause a short circuit when the bypass switch is closed.

**Secure the cables with cable ties to the cable lock bar located between the terminals and the cable exit.**

# OPERATION

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Refer to the UPS manual for start-up and operation.



**Warning:** before powering the UPS and starting the operative procedures, in order to avoid any system damage, follow the operations below:

- Visual check of the connection
- Check that all the isolators are open.
- Check that all the connections have been made strictly following the indications given in the “Installation manual”.

**Warning:** before any attempt to turn the system on, it is mandatory to check the power supply and connection of phase, neutral and external battery wires (if present). Refer to the Installation manual.



**Warning:** a scrupulous reading of the following chapters of the “Parallel Kit” manual is recommended:

## **INITIAL START-UP**

- *INVERTER OPERATION AND CONNECTION CHECKS*
- *BYPASS OPERATION CHECK*

## **SYSTEM CONFIGURATION**

### **OPERATION**

- *OPERATION FROM MAINS*
- *OPERATION FROM BATTERY*
- *OVERLOAD*
- *ASYNCHRONOUS START-UP PROCEDURE*
- *SYNCHRONOUS START-UP PROCEDURE*
- *INSERTION AND REMOVAL WITH UPS ON (HOT-PLUG)*

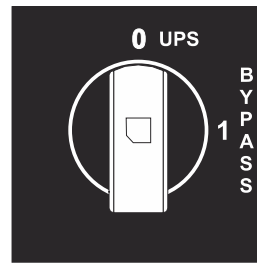
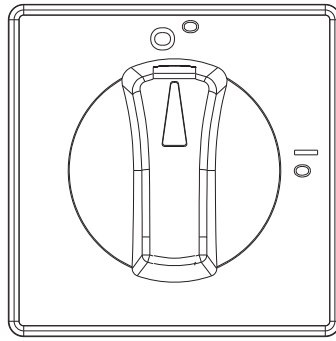
## **FAULTS AND ALARM SIGNALS**



**WARNING:** do not open the *Battery Cabinets* switches while the *UPS* is working. Risk of electric arch in case the *UPS* is working on battery, the results are the damages on the fuse and the fuse holder.

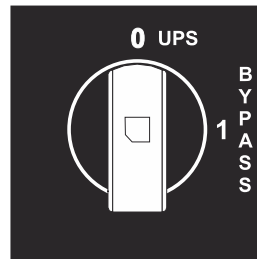
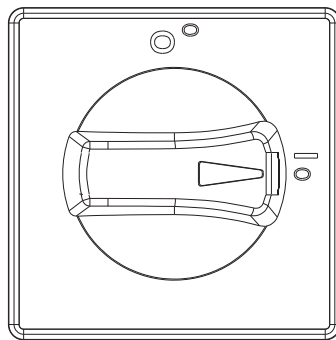
**WARNING:** do not remove the supply connector from the *UPS* and the Load while the *UPS* is working. This operation could cause damages on the devices connected.

## MAINTENANCE BYPASS OPERATION



Switch in UPS position:

- The load is powered by the UPS system parallel



Switch in BYPASS position

- The load is powered by the mains (or by the bypass line for Dual Input versions)
- The UPS system parallel is in bypass mode. The UPS can be disconnected for replacement / maintenance
- ATTENTION: any disturbance of the mains will affect the load

Note: with the switch in "1 – Bypass" position is not possible mount the front panel. This is for highlighting that the system is in maintenance status and the load is not protected.



**WARNING: UPS Maintenance must only be carried out by qualified personnel.**

**Dangerous voltages are present inside the equipment even when the UPS is switched off and electrically disconnected from the mains and from the batteries.**



**Removal of any covers by unqualified personnel can cause injury to the operator and damages the equipment**

# TECHNICAL DATA

## YSDUE04... version

	SINGLE PHASE CONFIGURATION
Input voltage [V]	220-240 1W+N+PE
Input frequency [Hz]	50-60
Input current [A]	120A
Output voltage [V]	220-240 1W+N+PE
Output current [A]	120A
Current for each connector [A]	40A for each connection
Input frequency [Hz]	50-60
Dimensions (WxHxD) [mm]	131 x 640 x 448 - Tower 19" x 640 x 3U - Rack
Weight [kg]	21

## YSDUE05... version

	SINGLE PHASE CONFIGURATION		THREE-PHASE CONFIGURATION
	STANDARD	SEPARATED BYPASS LINE	
Input voltage [V]	220-240 1W+N+PE		380-415 3W+N+PE
Input frequency [Hz]	50-60		
Input current [A]	150		each phase 60
Voltage on BYPASS operation	220-240 1W+N+PE		220-240 1W+N+PE
Current on BYPASS operation	150	L1 = 0 L <sub>BYP</sub> = 150	L1 = 150 L2, L3 = 0
Output voltage [V]	220-240V 1W+N+PE		380-415V 3W+N+PE
Output current [A]	150		
Current for each connector [A]	50A for each connection		
Output frequency [Hz]	50-60 Hz		
Dimensions (WxHxD) [mm]	131 x 640 x 448 - Tower 19" x 640 x 3U - Rack		
Weight [kg]	22		





