



MAKE BEFORE BREAK MANUAL BYPASS PANEL FOR UPS (BM*):

SLC ADAPT 2

SLC CUBE 3+

SLC CUBE 4 (7,5-80 kVA)

SLC X-PERT

SLC X-TRA

SLC TWIN PRO2

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1. INTRODUCTION.

1.1. ACKNOWLEDGEMENT LETTER.

We would like to thank you in advance for the trust you have placed in us by purchasing this product. Read this instruction manual carefully in order to be familiarized with its contents, because, as much as you know and understand the equipment the highest will be your satisfaction and safety levels and their features will be optimized too.

We remain at your entire disposal for any further information or any query you should wish to make.

Yours sincerely.

SALICRU

- The equipment here described **can cause important physical damages due to wrong handling**. This is why, the installation, maintenance and/or fixing of itself must be done by our staff or qualified **personnel exclusively**.
- Although we have made every effort to guarantee a complete and accurate information in this user's manual, we are not responsible for any errors or omissions that may exist.

The images included in this document are mere illustrations and they could not represent the part of the equipment exactly, therefore they are not contractual. Nevertheless, differences that could exist will be alleviated or solved with the correct labelling of the equipment.
- According to our policy of constant evolution, **we reserve the right to modify the specifications, operating or described actions in this document without forewarning**.
- **Any reproduction, copy or third party concession, modification or partial or in whole translations** of this manual or document, in any format or media, **is prohibited without the previous written authorization of our firm**, being reserved the full and exclusive ownership right over it.

2. SAFETY INFORMATION

2.1. USING THIS MANUAL

The generic documentation for the unit is provided in digital format on a pen drive and includes, among other documents, the system user manual itself and document EK266*08 relating to the **"Safety Instructions"**. Please read these instructions carefully before carrying out any action on the unit in terms of installation or start-up, change of location, configuration or handling of any type.

The purpose of the user manual is to provide information relating to safety, as well as explanations about the unit's installation and operating procedures. Read them carefully and follow the steps in the corresponding order. All elements related to connection and start-up are identified via labels indicating their functionality, which are correlated in the instructions of this document, ensuring that all operations can be carried out efficiently and reliably.



Compliance **as regards the "Safety instructions" is mandatory, with the user being legally responsible** for observing and applying them.

Finally, once the unit is installed and in operation, we recommend that you keep the documentation pen drive in a safe place that is easy to access, in case of any future queries that may arise.

The following terms are used interchangeably in the document to refer to:


- **"Bypass, panel, equipment, or unit"**.- Manual bypass panel.
- **"System or set"**.- Group of one or more UPSs and the manual bypass panel.
- **"T.S.S."**.- Technical Service and Support.
- **"Customer, installer, operator or user"**.- They are used interchangeably and, by extension, to refer to the installer and/or the operator who will carry out the corresponding actions, whereby the responsibility for carrying out the respective actions may be held by the same person when they act on behalf or in representation of the installer or operator.
- In case of installing the equipment in IT neutral regime, the switches, circuit breakers and thermal-magnetic protection devices must break the NEUTRAL, as well as the phase or phases.

2.1.1. Conventions and symbols


Some symbols may be used and may appear on the unit and/or in the user manual.

For more information, see section 1.1.1 of document EK266*08 relating to the **"Safety Instructions"**.

2.2. ADDITIONAL SAFETY WARNINGS.

- Bypass panels should be considered as transformers or distribution lines from the point of view of electrical installation and safety.
- As this unit has protection against class I electric shocks, it is essential to install a protective earth conductor (connect the earth cable to the (⊕) terminal).
-  The bypass panel must be installed by **qualified staff** and can **only be used by those with specific training**, with the help of this "User Manual".
- It is very important to follow the safety instructions indicated in the "UPS User, Installation and Start-up Manual".

The instructions you are reading only refer to the manual bypass panel and are complementary to the "UPS User Manual".

- The neutral regimes from the input to the output are identical for bypass panels "with no galvanic isolation". The neutral regime must always be the same, for both the bypass panel and the UPS.
-  When a bypass panel features a galvanic isolation transformer, as an option and factory-installed or installed by you, either at the unit's input or output line, protection devices against indirect contact (differential switch) must be fitted at the output of each transformer, as due to its isolation characteristics, it will prevent the tripping of the protection devices fitted in the primary of the disconnect switch in the event of electric shock in the secondary (isolation transformer output).
- Please note that all factory-installed or factory-supplied isolation transformers have the output neutral (**N**) connected to earth (⊕) via a connection bridge between the neutral and earth terminals (TT regime). If the output neutral must be isolated, this bridge must be removed (IT regime), taking the precautions indicated in the respective local and/or national low voltage regulations.
- In case of installing the equipment in IT neutral regime, the switches, circuit breakers and thermal-magnetic protection devices must break the NEUTRAL, as well as the three phases.

3. QUALITY ASSURANCE AND STANDARDS

3.1. MANAGEMENT STATEMENT

Our aim is to satisfy our customers. Management has established a Quality and Environmental Policy for such purposes. As a result, a Quality and Environmental Management System will be implemented, which will ensure that we are compliant with the requirements of the **ISO 9001** and **ISO 14001** standards and that we meet all customer and stakeholder requirements.

The company management is also committed to the development and improvement of the Quality and Environmental Management System, through:

- Communication to the entire company of the importance of meeting both the customer's requirements, and legal and regulatory requirements.
- Dissemination of the Quality and Environmental Policy and setting of the Quality and Environment targets.
- Management reviews.
- Provision of the necessary resources.

3.2. STANDARDS

The **Manual Bypass** product is designed, manufactured and marketed in accordance with the **EN ISO 9001** standard on Quality Assurance and is certified by SGS. The **CE** mark indicates conformity with the EEC Directives:

- **2014/35/EU**. - Low voltage directive.
- **2014/30/EU**. - Electromagnetic compatibility (EMC).
- **2011/65/EU**. - Restriction of hazardous substances in electrical and electronic equipment (RoHS).



The manufacturer shall not be held responsible for any damage caused by the user altering or tampering with the unit in any way.



The EC declaration of conformity for the product is available for the customer and can be requested from our head office.

3.3. ENVIRONMENT

This product has been designed with the protection of the environment in mind and has been manufactured in accordance with the **ISO 14001** standard.

Recycling the unit at the end of its useful life:

Our company commits to using the services of approved companies that comply with the regulations in order to process the recovered product at the end of its useful life (please contact your distributor).

Packaging:

To recycle the packaging, follow the applicable legal regulations, depending on the particular standards of the country where the unit is installed.

4. DESCRIPTION

- The manual bypass is an optional peripheral for the UPS that allows the power supply source for the loads to be selected from the UPS or directly from the commercial network. If the UPS has an isolation transformer fitted at its output or on the static bypass line, the manual bypass panel must also incorporate it in order to equalise the neutral regime.

The optional isolation transformer provides galvanic isolation between the primary and secondary windings, in such a way that it greatly reduces electrical and transient noise from the network, and this is also transferred to a lesser extent to the secondary.

- The manual bypass panel is of the overlapping type, so the power supply to the loads is not cut due to switching, unless it is operated in an order other than the one established.
- If the “backfeed protection” contactor is incorporated inside the panel, it must be considered that its operation is automatic and it does not require any attention, unless one of the protection fuses trips unexpectedly. Do not operate the disconnect switch with “backfeed protection” fuses, except when replacing one of these protection elements.
- These instructions are generic for each range indicated in the nomenclature, regardless of the type of panel. Disregard the terminal connections and switch operations that are not available on your unit.

4.1. MANUAL BYPASS PANEL TYPES

- In structural terms, there are two types of manual bypass panel, according to the structure of the UPS itself:
 - ☐ Standard or basic (Fig. 1). With a common input for the supply of the UPS (rectifier-PFC) and the static bypass line.

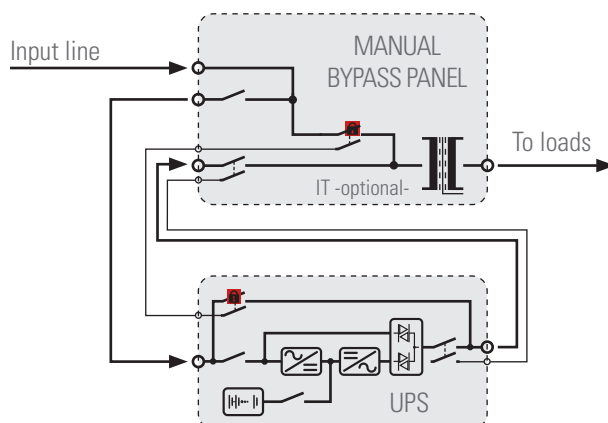


Fig. 1. Connection of the standard manual bypass panel to the UPS.

- ☐ With a separate static bypass line (Fig. 2). These panels have separate terminal blocks for the input and static bypass networks, which allows both networks to be supplied from different sources, such as: two companies, a company and a generator set, etc.

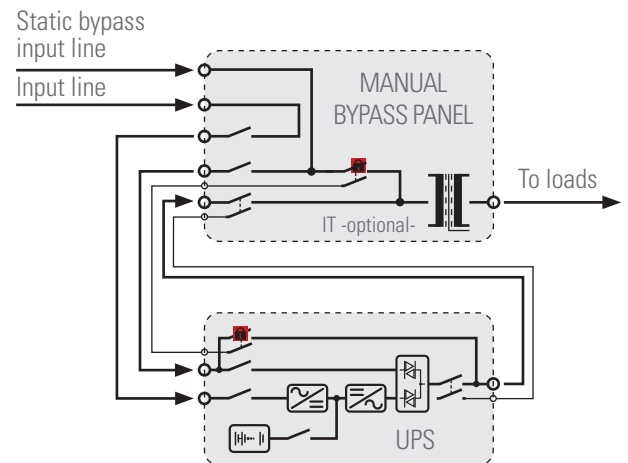



Fig. 2. Connection of the manual bypass panel with separate static bypass line to the UPS.

- The auxiliary contacts of the manual bypass and output switches are not available on all series.
- For parallel or redundant systems made up of “n” UPSs, the number of panel switches will be doubled for each one that is configured, except for the manual bypass itself, which is always common for the entire system.
- In Fig. 2 and 3, the galvanic isolation transformer is shown at the output, as, with the exception of design constraints or particular specifications, it is the most recommended arrangement in terms of taking best advantage of its intrinsic characteristics, performance and price.

However, and depending on whether it has a separate static bypass line or not, the isolation transformer may be located in one position or another:

- ☐ On standard or basic units, and if it is used as an input voltage adapter, its electrical position will have to be on that line.
- ☐ On models with a separate static bypass line, it will be positioned at the input of this line, when the UPS and the static bypass input network comes from two different sources to prevent the direct connection of disparate neutrals at the output of the UPS.
- The manual bypass will be connected to the input line, the static bypass line, the UPS and the loads, **respecting the order of the phase or phases, neutral N and the earth cable** indicated on the labels of all of them.
-  When there are discrepancies between the labels and the instructions in this manual, the labels will always take precedence



4.2. PRODUCT DEFINITION

4.2.1. Nomenclature

3 BM-CUBE+-P-40-LBT-2/2 EE602322-1.

	EE*	Special customer specifications.
	2	First digit of the output voltage for single-phase inverters or voltage between phases for three-phase inverters. Disregard for 230 V or 3x400 V.
	2	First digit of the input voltage for single-phase inverters or voltage between phases for three-phase inverters. Disregard for 230 V or 3x400 V.
	T	Isolation transformer. Located at the output, except on units with a separate bypass line from a source other than the UPS input line.
	B	Unit with separate bypass line.
	L	Single-phase input/single-phase output configuration.
	L	Single-phase input/three-phase output configuration.
	N	Three-phase input/single-phase output.
	N	Three-phase input/three-phase output configuration.
	40	Power in kVA.
	P	Operating mechanisms via circuit breakers. However, on SLC CUBE3+ parallel UPS systems, the output mechanism will always be a disconnect switch, never a circuit breaker.
	ADAPT2	Unit series for which the panel is intended.
	CUBE3+	
	CUBE4	
	X-TRA	
	X-PERT	
	TWIN PRO2	
	M	With overlapping.
	B	Manual bypass.
	C	Exclusive protection panel with no manual bypass.
	3	Number of parallel units. Disregard for a single unit.

5. INSTALLATION

-  Read and follow all of the Safety Information set out or linked in chapter 2 of this document. Failure to adhere to any of the indications set out may cause a serious or very serious accident for those who are in direct contact with the unit or who are in the vicinity, as well as faults in the bypass panel, the unit or units, and/or in the loads connected to the system.
- Check that the information on the name plate is the right information for the installation.
- A bad connection or operation can cause faults in the panel, the unit or units, and/or the loads connected to the system. Read the instructions in this manual carefully and follow the steps in the corresponding order.
-  Only proceed with the connection if all of the switches on the unit or units that make up the system are set to standby and there is no mains supply present (disconnect switch(es) of the power line(s) for the panel set to "OFF").
- All of the bypass panel connections described in this document will be implemented according to the labels on the unit, which in turn is based on the respective block diagrams. In structural terms, there are six different types of panel, regardless of their possible configurations (L, M, N, etc.):
 - ☐ Generic manual bypass panel for a standard UPS (Fig. 3).
 - ☐ Generic manual bypass panel for a UPS with a separate bypass line (Fig. 4).
 - ☐ Manual bypass panel for "n" standard parallel or redundant UPSs (Fig. 5). For UPS series CUBE3+, CUBE4 and TWIN PRO2.
 - ☐ Manual bypass panel for "n" standard parallel or redundant UPSs (Fig. 6), for UPS series ADAPT2, TWIN PRO2, X-PERT and X-TRA.
 - ☐ Manual bypass panel for "n" parallel or redundant UPSs with a separate bypass line (Fig. 7), for UPS series CUBE3+ and CUBE4.
 - ☐ Manual bypass panel for "n" parallel or redundant UPSs with a separate bypass line (Fig. 8), for UPS series ADAPT2, X-PERT and X-TRA.

Beyond the structures indicated, there are slight nuances in terms of control connections between panels for each UPS range, which are clarified later in this chapter.

- The figures in this document are by way of example, and are intended to show the linear and orderly layout of the operating mechanisms, without considering the physical format that may correspond to the unit's power. Another factor to consider is the optional version shown in all figures, "P", which corresponds to operating mechanisms via circuit breakers.


- Depending on the panel model, the enclosure may vary (plastic or metal box, or metal cabinet), so the adjacency between them could be affected, although the order would be maintained.
- Depending on the power of the bypass panel and the version requested, the operating mechanisms may vary in number (parallel systems), in number of poles (according to the configuration), format, size and type (disconnect switch or circuit breaker), but they will always be identified via the labels.




Pay attention to the steps indicated for any change in the operating mode, following the identification labels on the operating mechanisms.

- The manual bypass panel version with a separate static bypass line (-B), has additional connection and operating elements that are only available in this version. Disregard all references to them for the standard or basic version.

5.1. TO BE CONSIDERED IN THE INSTALLATION

- These instructions are generic for any manual bypass panel from this series. Disregard unavailable terminal connections.
- All connections to the panel are made via terminals. However, on some models, and due to their high power or current, cables are connected directly to the disconnect switch or switch plates.
- In terms of the earth and earth bonding cable connection, the panels usually have two points on opposite ends, generally threaded studs.
-  In the documentation provided on Pendrive together with each UPS, the information relating to the "Recommended Installation" is included for each of the input and output configurations. It shows the wiring diagrams, as well as the protection size and the minimum cross-sections of the cables connected to the unit, according to its nominal working voltage. All values are calculated for a **total maximum cable length of 30 m** between the distribution board, unit and loads.
 - ☐ For longer lengths, correct the cross-sections to prevent voltage drops, observing the regulations or standards of the country.
 - ☐ In the same documentation and for each configuration, the information for "N" parallel units is available, as well as the characteristics of the "Backfeed protection".

All indications relating to the "Backfeed protection" referred to in the UPS user manual must be followed, considering the availability or not of the separate static bypass line and the corresponding actions to be taken in each case.

-  In parallel systems, the length and cross-section of the cables that run from the protection board to each UPS and from these to the board will be the same for all of them without exception.

- The cross-section of the cables must always be considered in relation to the size of the switch terminals, so that their entire cross-section is correctly embraced for optimal contact between the two elements.
- Only the nominal currents are printed on the unit's name plate, as indicated in the EN-IEC 62040-1 safety standard. Overload conditions are considered a temporary and exceptional operating mode.
- If peripheral input, output or bypass elements such as transformers or autotransformers are added to the UPS or parallel system, the currents indicated on the name plates of these elements must be considered in order to use the appropriate cross-sections, observing the local and/or national Low Voltage Electrotechnical Regulations.
- It is important to never forget that once the installation is complete, the bypass panel will be connected to a UPS or group of UPSs. Based on the concept that a UPS is a generator of electrical energy, the user must take the necessary precautions to prevent direct or indirect contact.

5.2. UNIT RECEPTION

5.2.1. Unpacking, checking the contents and inspection.

- For the unpacking, see section 5.2.3.
- When receiving the unit, check that it has not been damaged in any way during transport (impact, fall, etc.) and that the characteristics of the unit match those specified in the order. It is therefore recommended to unpack the stabiliser to carry out an initial visual inspection.
- If any damage is detected, make the relevant claims to your supplier, or, failing that, our company.



Never start a unit when external damage is detected.

- Also check that the information on the name plate on the packaging and on the unit match those specified in the order. Unpack it in order to do so (see section 5.2.3). Otherwise, deal with the non-conformity as soon as possible, citing the unit's manufacturing number and the references on the delivery note.
- Check the contents of the package:
 - ☐ The bypass panel itself.
 - ☐ The user manual in electronic format (CD-ROM).
 - ☐ For panels supplied in wall-type boxes, the accessories required for its attachment (screws and supports) and the mechanical diagram.
- Once the reception process is complete, the panel should be repacked until it is started up in order to protect it against mechanical shock, dust, dirt, etc.

5.2.2. Storage

- The unit must be stored in a dry, well-ventilated area, protected from rain, dust, splashes of water or chemical agents. It is recommended to keep the unit in its original packaging, as it has been specifically designed to ensure maximum protection during transport and storage.

5.2.3. Unpacking

- The unit's packaging may consist of a wooden pallet, cardboard or wooden packaging as applicable, expanded polystyrene (EPS) corner protectors, polyethylene cover and strips, all recyclable materials, so if you do dispose of them, you should do so in accordance with current laws. We recommend that you keep the packaging in case you need to use it in the future.
- Proceed to unpack the unit

To do so, cut the strips around the cardboard packaging and/or the sealing tape. For panels with seaworthy packaging, open the packaging using the most appropriate means available to you.

Remove the unit from the cardboard or wooden box.

5.2.4. Transfer to the installation site

- If the reception area is far from the installation site, it is recommended to move the unit using a pallet truck or the most suitable means of transport, assessing the distance between the two points.

If the distance is considerable, it is recommended to move the unit in its packaging to the vicinity of the installation site and then unpack it.


5.2.5. Siting

- Locate the unit taking the indications and recommendations from the EK266*08 safety instructions into account.
- The unit will be located in the vicinity of the UPS or system of parallel units made up of "n" units.
- Manual bypass panels are provided in wall-type boxes, except for exceptional cases where they are mounted in cabinets.


For the former, carry out the machining tasks on the wall using the paper plane provided with the attachment accessories and proceed to fix it in place.

5.3. CONNECTIONS

- Wall-type boxes are delivered with mounted cable glands, of the right size to correctly block the intended cables.
- Depending on the type of input, bypass and/or output (single-phase or three-phase), the number of terminals on each block may vary. Connect the cables to the corresponding terminals according to each case, respecting the order of the phase (R) or phases (R-S-T) and neutral (N).


-  When there are discrepancies between the labels and the instructions in this manual, the labels on the unit will always take precedence.
- References **in bold in brackets** that appear in the different sections of this chapter, correspond to elements of the UPSs identified in their respective user manual. For more information, consult this document.

5.3.1. Connection of the bypass panel power. UPS input line (rectifier)

-  The earth connection must be connected to the terminal identified with the (⊕) label, ensuring that this is done before supplying input voltage to the bypass panel.
- Connect the bypass panel input line power cables to the terminals indicated as "INPUT LINE", respecting the order of the phase (R) or phases (R-S-T) and neutral (N), indicated on the unit's labels and in this manual.

It is essential to have a neutral (N).

5.3.2. Connection of the bypass panel power. Static bypass line (only on -B panels).


-  The earth connection must be connected to the terminal identified with the (⊕) label, ensuring that this is done before supplying input voltage to the bypass panel.
- Connect the bypass panel's static bypass line power cables to the terminals indicated as "STATIC BYPASS INPUT LINE", respecting the order of the phase (R) or phases (R-S-T) and neutral (N), indicated on the unit's labels and in this manual.

It is essential to have a neutral (N).

5.3.3. Connection of the UPS to the bypass panel


- Connect a cable bundle between the set of terminals identified as "UPS INPUT" on the bypass panel and the UPS input terminals identified as "INPUT", respecting the order of the phase (R) or phases (R-S-T) and neutral (N), indicated on the unit's labels and in this manual.
- On units with a separate static bypass line, connect a cable bundle between the set of terminals identified as "STATIC BYPASS INPUT" on the bypass panel and the UPS input terminals identified as "STATIC BYPASS", respecting the order of the phases (R-S-T) and neutral (N), indicated on the unit's labels and in this manual.
- Connect a cable bundle between the set of terminals identified as "UPS OUTPUT" on the bypass panel and the UPS output terminals identified as "OUTPUT", respecting the order of the phase (R) or phases (R-S-T) and neutral (N), indicated on the unit's labels and in this manual.

5.3.4. Connection of the loads to the bypass panel

-  The earth connection must be connected to the terminal identified with the (⊕) label, ensuring that this is done before supplying input voltage to the bypass panel.

- Connect the loads to the set of terminals identified as "LOADS OUTPUT" on the bypass panel, respecting the order of the phase (R) or phases (R-S-T) and neutral (N), indicated on the unit's labels and in this manual.

5.3.5. Connection of the auxiliary contact of the UPS manual bypass switch to the bypass panel

-  The terminals identified as "BYPASS AUXILIARY CONTACT" on the UPS must be connected to those on the bypass panel using control cables (minimum 1 mm² and maximum 2.5 mm²). These signal terminals are the extension of the normally open auxiliary contact of the respective internal manual bypass switch.

The auxiliary terminals of the UPS are identified as follows, depending on the product series:

- ☐ ADAPT2, pins 1 and 2 of **(IDIG3)**.
 - ☐ CUBE3+, 2-terminal strip **(X51)**.
 - ☐ CUBE4, 2-terminal strip **(IDIG3)**.
 - ☐ X-PERT, terminals **(X10-1)**, **(X10-2)**.
 - ☐ X-TRA, terminals **(MBY-1)** and **(MBY-2)**.
 - ☐ TWIN PRO, 2-terminal strip **(EMBS)**.
- This connection is a safety lock against unwanted or erroneous operations, which, without it, would lead to faults on the UPS and/or in the loads supplied by it, as it transfers the inverter to "OFF" when switching any of the manual bypass switches to "ON".

5.3.6. Connection of the auxiliary contact of the UPS output switch to the bypass panel (only available on panels from the SLC CUBE3+ and SLC CUBE4 series).

The output switch on each UPS has a normally open auxiliary contact with a cable connected as a bridge **(PT)** that closes its circuit respectively on terminal strip **(X45)** on CUBE3+, on terminal strip **(IDIG4)** on CUBE4 30-80 kVA, between the terminals on strip **(XAUX-1)** and **(XAUX-2)** on X-TRA, or between terminals **(X10-5)** and **(X10-6)** on X-PERT.

On CUBE4 7.5-20 kVA models, the output switch does not have an auxiliary contact, but it does have the auxiliary contact signal of the external output switch between terminals 5 and 11 or 9 on the INPUT SIGNAL terminal strip.

- Remove it and, using control cables (minimum 1 mm² and maximum 2.5 mm²), connect the terminals identified as "OUTPUT AUXILIARY CONTACT" on the UPS **(X45)**, **(IDIG4)** and (between terminals **5 and 11 or 9 INPUT SIGNAL**) to those on the bypass panel. Both terminals are the extension of the normally open auxiliary contact of the respective output switch.

The purpose of this connection is none other than to activate the alarm on the control panel due to accidental tripping or voluntary/involuntary switching to "OFF" of either of the two output switches (on the UPS or the panel).

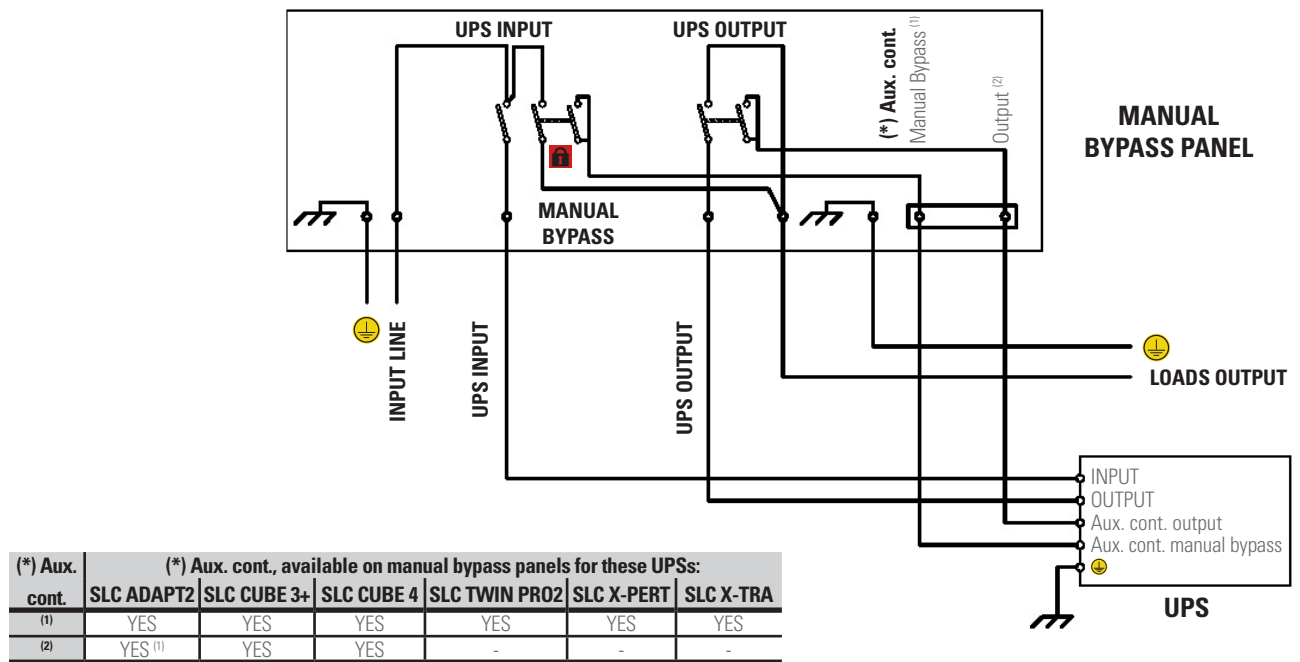


Fig. 3. Generic manual bypass panel for a standard UPS.

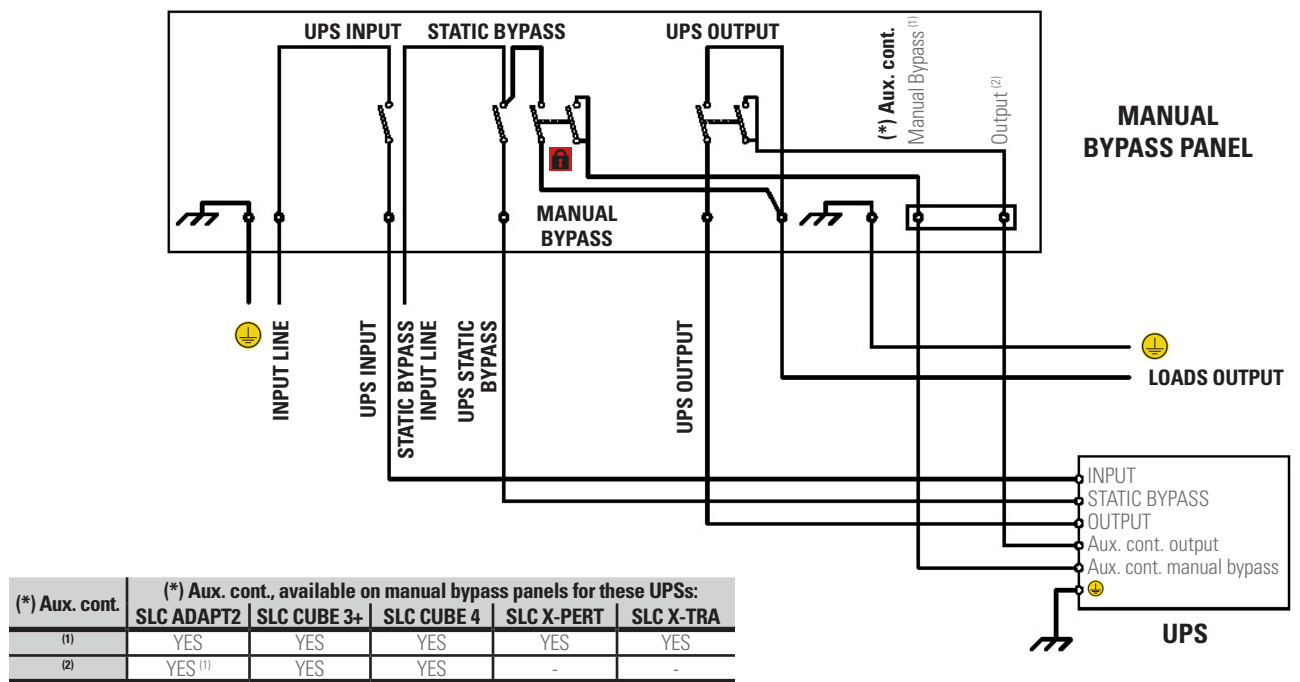



Fig. 4. Generic manual bypass panel for a UPS with a separate bypass line.

5.3.7. Systems with “n” parallel or redundant units.

5.3.7.1. Power connections

- Make the connections of sections 5.3.1 and 5.3.2.
- For each unit that makes up the system, make and repeat the connections indicated in section 5.3.3.

5.3.7.2. Connection of the auxiliary contact of the manual bypass switch of each UPS to that of the bypass panel (not available on panels from the TWIN PRO 33 series).

-  The terminals identified as “BYPASS AUXILIARY CONTACT” on the UPS must be connected to those on the bypass panel using control cables (minimum 1 mm² and maximum 2.5 mm²). These signal terminals are the extension of the normally open auxiliary contact of the respective internal manual bypass switch.

The auxiliary terminals of the UPS are identified as follows, depending on the product series:

- ❑ ADAPT2, pins 1 and 2 (**IDIG3**).
 - ❑ CUBE3+, 2-terminal strip (**X51**).
 - ❑ CUBE4, 2-terminal strip (**IDIG3**).
 - ❑ X-PERT, terminals (**X10-1**), (**X10-2**).
 - ❑ X-TRA, terminals (**MBY-1**) and (**MBY-2**).
 - ❑ TWIN PRO, 2-terminal strip (**EMBS**).
- The way to connect the UPS control cables to the panel will vary depending on its series, as will the number of terminals available on the control strip:
 - ❑ CUBE3+ and CUBE4.
Make the parallel connection between the auxiliary contacts of the manual bypass switch on each unit and those on the bypass panel (see Fig. 5 and 7).

- ❑ ADAPT2, pins 1 and 2 of IDIG3, TWIN PRO2, X-TRA and X-PERT.

The manual bypass switch on the panel will have as many auxiliary contacts extended to the control strip as numbers of UPSs to be connected in parallel (see Fig. 6 and 8). Connect the terminals of the panel strip to each UPS of the parallel system respectively. These connections **must never be joined**, as internally, each UPS has different masses.

As stated earlier, this connection is a safety lock against unwanted or erroneous operations.

5.3.7.3. Connection between the auxiliary contact of the output switch on each UPS and those of the bypass panel (only available on panels from the SLC CUBE3+, SLC CUBE4, SLC X-PERT and SLC X-TRA series).

The output switch on each UPS has a normally open auxiliary contact with a cable connected as a bridge (**PT**) that closes its circuit respectively on terminal strip (**X45**) on CUBE3+, on terminal strip (**IDIG4**) on CUBE4 30-80 kVA, between the terminals on strip (**XAUX-1**) and (**XAUX-2**) on X-TRA, or between terminals (**X10-5**) and (**X10-6**) on X-PERT.

On CUBE4 7.5-20 kVA models, the output switch does not have an auxiliary contact, but it does have the auxiliary contact signal of the external output switch between terminals 5 and 11 or 9 on the INPUT SIGNAL terminal strip.

- Remove it on each unit and, using control cables (minimum 1 mm² and maximum 2.5 mm²), connect the terminals identified as “OUTPUT AUXILIARY CONTACT” on each UPS (**X45**), (**IDIG4**), (between terminals **5** and **11** or **9** INPUT SIGNAL), (**XAUX-1**) and (**XAUX-2**) or (**X10-5**) and (**X10-6**) to the respective terminals on the manual bypass panel, paying attention to the correlative order of each one.

That is to say, the “OUTPUT AUXILIARY CONTACT” terminals (**X45**), (**IDIG4**), (between terminals **5** and **11** or **9** INPUT SIGNAL), (**XAUX-1**) and (**XAUX-2**) or (**X10-5**) and (**X10-6**) on UPS no. 1 to the terminals on auxiliary strip “OUTPUT 1 UPS”, the “OUTPUT AUXILIARY CONTACT” terminals (**X45**), (**IDIG4**), (between terminals **5** and **11** or **9** INPUT SIGNAL), (**XAUX-1**) and (**XAUX-2**) or (**X10-5**) and (**X10-6**) on UPS no. 2 to the terminals on auxiliary strip “OUTPUT 2 UPS” and so on according to the number of units that make up the system.

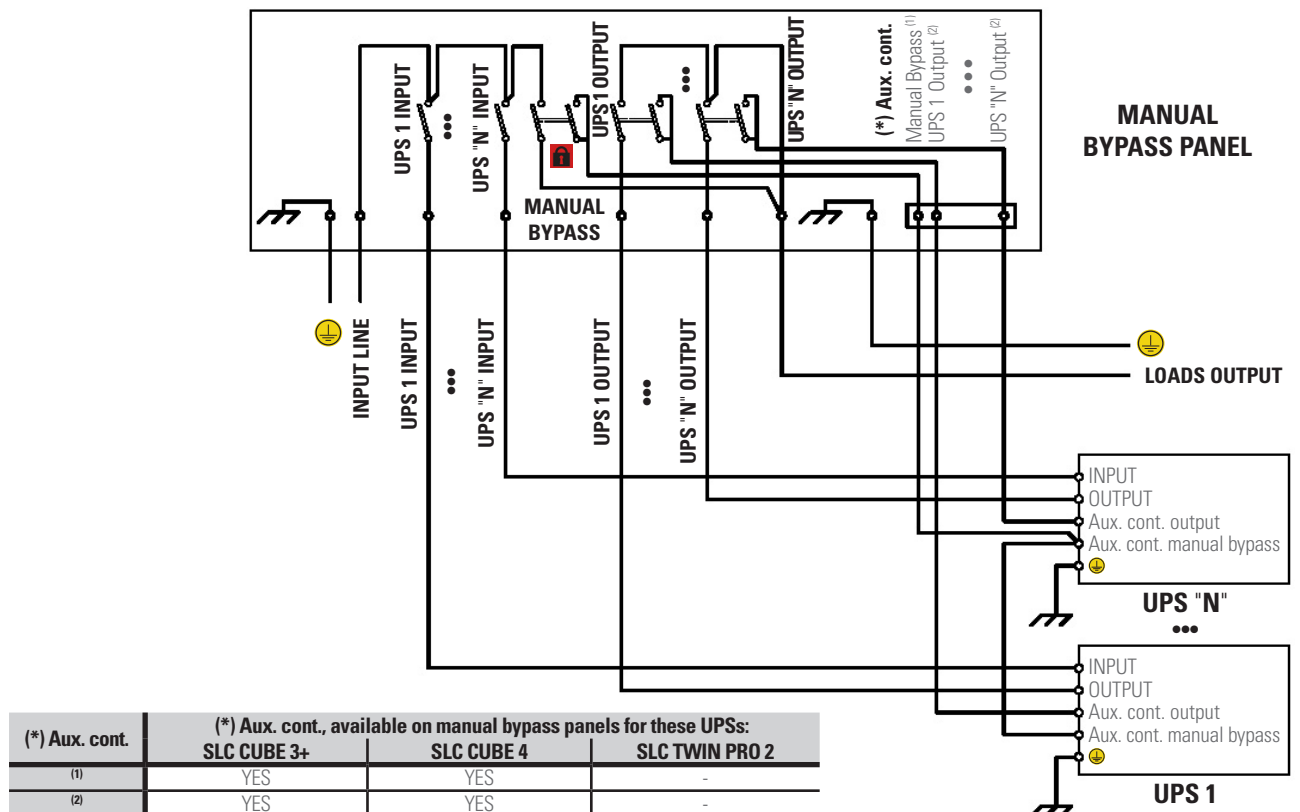
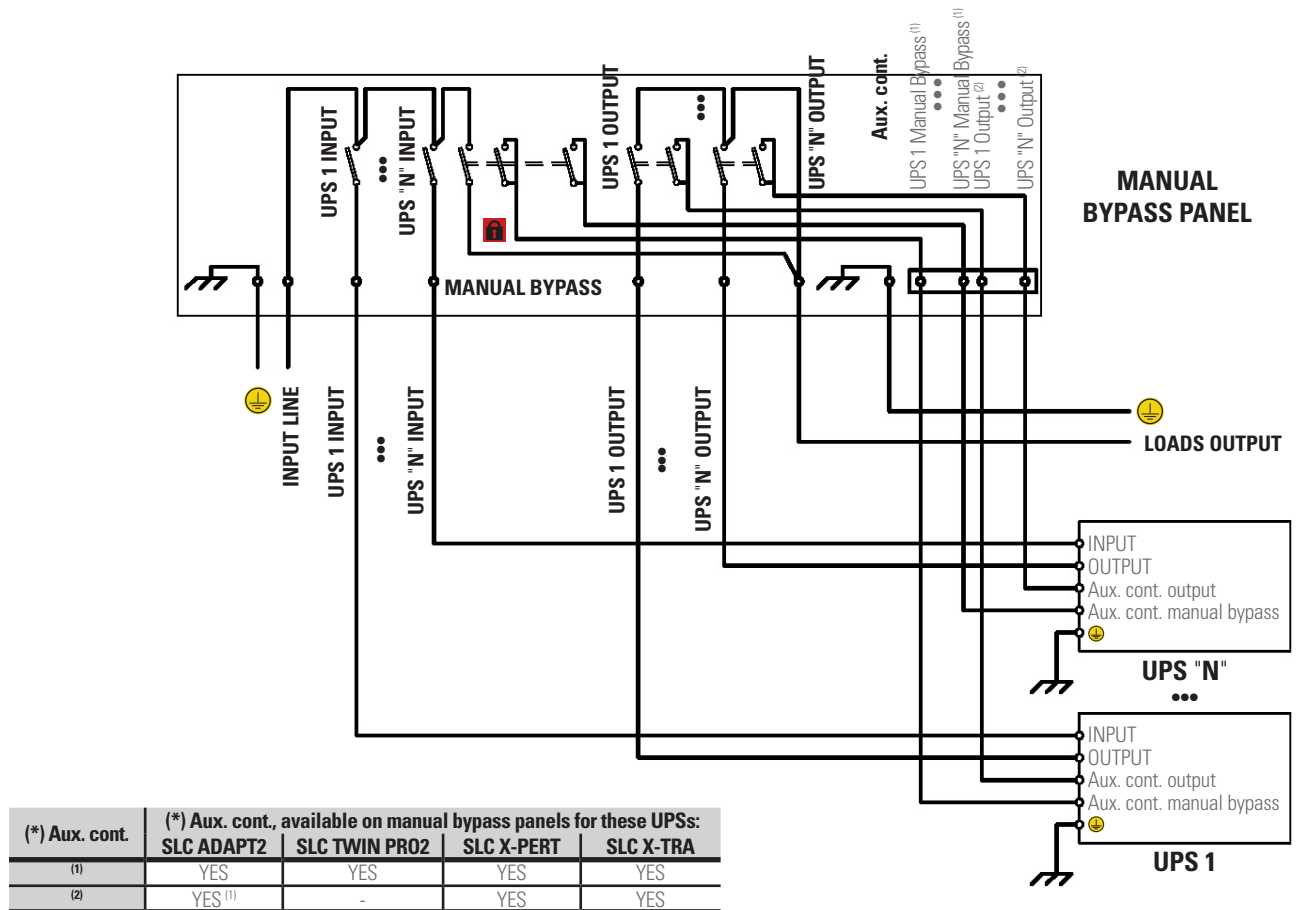


Fig. 5. Manual bypass panel for “n” standard parallel or redundant UPSs, for UPS series CUBE3+, CUBE4 and TWIN PRO 2.



(1) The IDIG4 input must be programmed as an auxiliary contact for the NC output circuit breaker.

Fig. 6. Manual bypass panel for "n" standard parallel or redundant UPSs, for the ADAPT2, TWIN PRO2, X-PERT and X-TRA series.

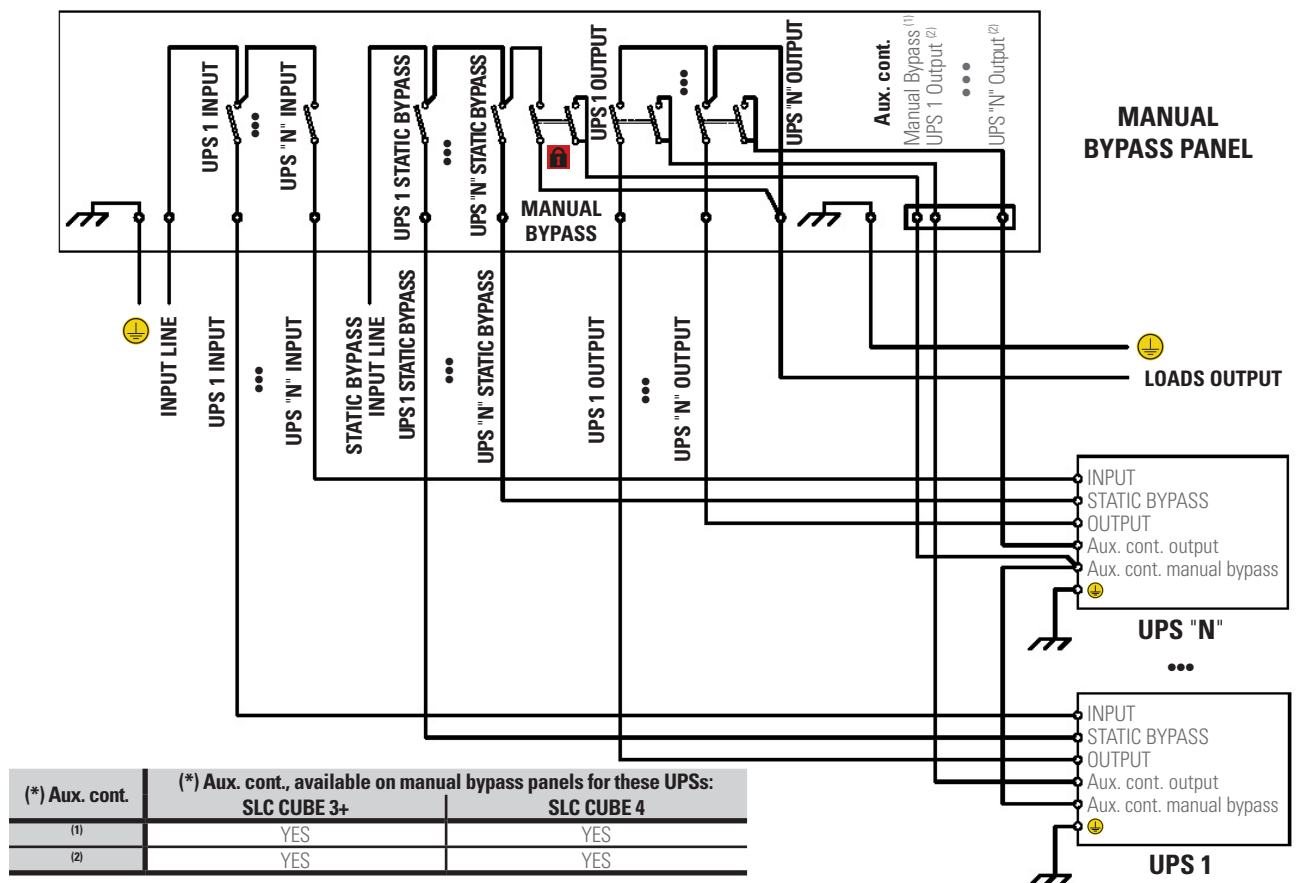


Fig. 7. Manual bypass panel for "n" parallel or redundant UPSs with a separate bypass line, for the CUBE3+ and CUBE4 series.

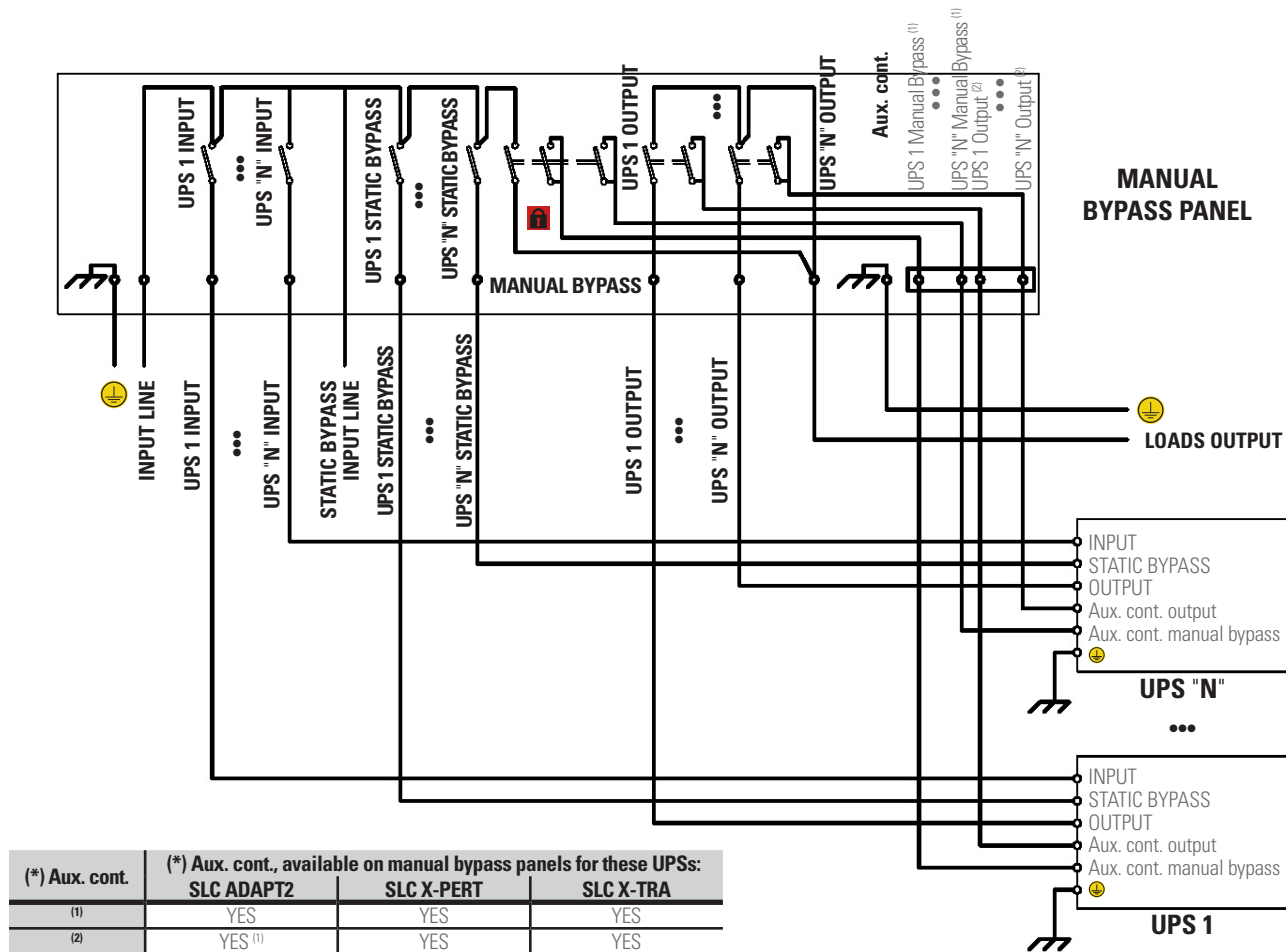


Fig. 8. Manual bypass panel for "n" standard parallel or redundant UPSs with a separate bypass line, for the ADAPT2, TWIN, X-PERT and X-TRA series.

Note¹ In the SLC ADAPT2 series, the IDIG3 digital input is normally configured as an auxiliary contact input for the manual bypass circuit breaker. The IDIG4 digital input, on the other hand, is not normally programmed, meaning that for parallel configuration, it must be configured as an auxiliary disconnector input for the NC output circuit breaker.

So, the suitable configuration of digital inputs for a parallel system will be:

	Genset Input	Shutdown Input	Maintenance Bypass Input	Output Auxiliary Contact Input	Battery Circuit Breaker Auxiliary Contact Input	External Digital Input
SREG_INP_DIG_IN3_BOOLSET	0	0	1	0	0	0
SREG_INP_DIG_IN4_BOOLSET	0	0	0	1	0	0

	Genset Input	Shutdown Input	Maintenance Bypass Input	Output Auxiliary Contact Input	Battery Circuit Breaker Auxiliary Contact Input	External Digital Input	External Digital Input	External Digital Input	External Digital Input
SREG_LOGIC_POS_NEG_DIG_ALMS_BOOLSET Boolset logic definition Positive(0)/Negative(1)	0	0	0	1	0	0	0	0	0

6. START UP AND SHUTDOWN.

- These instructions are generic for any manual bypass panel of this series, parallel and redundant equipments included. Omit those manoeuvring of the switches that your unit doesn't have.
- The references **in bold between brackets**, which are shown in the different points of this section, correspond to the UPS elements identified in their own user's manual. For more information consult that document.
- The shown illustrations in this section are mere examples and they are with four poles switches of DIN rail type, but in practice they can differ in one or more aspects like: type of panel configuration, format, size or protection type. Nevertheless, in any case the order will not be different from the stated in them.

Also, in the manual bypass panels in parallel or redundant equipments, the illustrations do not match with any preset system, so they are generic for any panel regardless of the quantity of equipments in parallel or redundant that belong to.

6.1. CONTROLS BEFORE THE START UP.

- Check that all connections have done properly, by respecting the labelling of the equipment and the instructions in section «INSTALLATION». If phase or phases and neutral rotation is not respected, important damages can be caused to the panel, UPS or UPS's and/or connected loads.
- In order to avoid bad electrical contacts, check the connections screws are firmly tighten.
- Check all switches coming from the power supply which feeds the bypass panel, the own ones in the panel (see Fig. 9 or 10 depending on the case) and the ones in the UPS or UPS's are turned «Off».

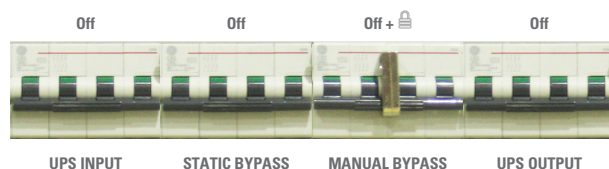


Fig. 9. Position of the manual bypass switches «Out of service» (with one UPS only).

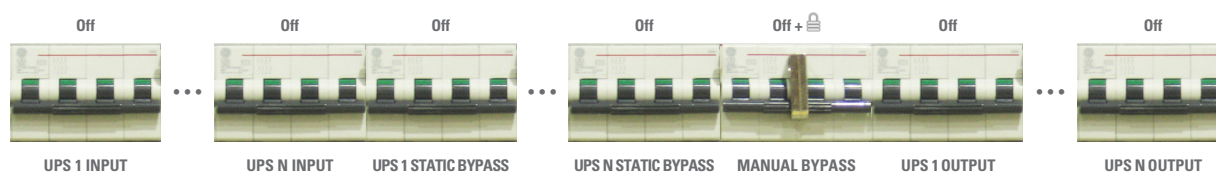




Fig. 10. Position of the manual bypass switches «Out of service» (with several UPS's).

- Make sure that all the loads are shutdown (start up switches turned «Off»).
-  Proceed in the established order of this document. Any wrong manoeuvring over the stated switches of the bypass panel, or the ones in the UPS or UPS's, can cause a break or short-circuits in the power supply to the loads, with the unintended and unexpected consequences for any part of the set.
- In the installation section, for single and parallel equipments, it is stated the need of connecting the auxiliary contact of the manual bypass with the one in the manual bypass panel. Thanks to this auxiliary safety contact, in case of wrong or different manoeuvring than the stated in this section, it is avoided to overlap the inverter output with the UPS input power supply.

For any change in the operating mode, respect the steps stated in the instructions of this section strictly, and in particular, for the TWIN PRO 33 series, which do not have this auxiliary contact, but they have the needed protections, in order to make the steps in the established order.

 Before starting the equipment up, check that the manual bypass switch of the equipment or equipments and the one in the manual bypass panel are in the same position (UPS and Off or BYPASS and On).

6.2. OPERATION TO SHIFT FROM «OUT OF SERVICE» (UPS OR UPS'S TO «OFF») TO «NORMAL OPERATING» (LOADS SUPPLIED BY THE UPS OR UPS'S).

- Turn the external protections of the bypass panel «On» (RCD and/or circuit breaker switches), they will supply energy to the terminals labelled as «INPUT LINE».
- In panels with separate bypass line (-B), turn the external protections of the bypass panel «On» (RCD and/or circuit breaker switches) «On», they will supply energy to the terminals labelled as «STATIC BYPASS INPUT LINE».

6.2.1. Manual bypass panel with one UPS only.

- Turn the «UPS INPUT» and «UPS OUTPUT» switches of the bypass panel to «On». In case of including the separate bypass line (-B), turn the «STATIC BYPASS» switch of the bypass

panel «On» too. In the illustration of Fig. 11, it is shown the position of switches once the manoeuvring has been done.

- Start up the UPS according to the procedure stated in the «User's, installation and start up manual» of the equipment. The bypass panel supplies voltage to the terminals labelled as «LOADS OUTPUT».

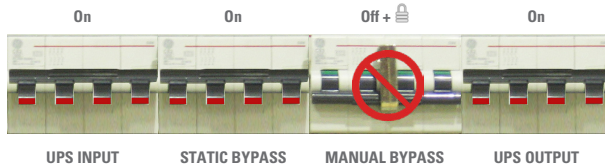


Fig. 11. Position of the bypass panel switches in «Normal operating» (with one UPS only).

- Start up the loads, they are supplied from the output terminals of the panel, through the UPS.

6.2.2. Manual bypass panels with two or more UPS's.

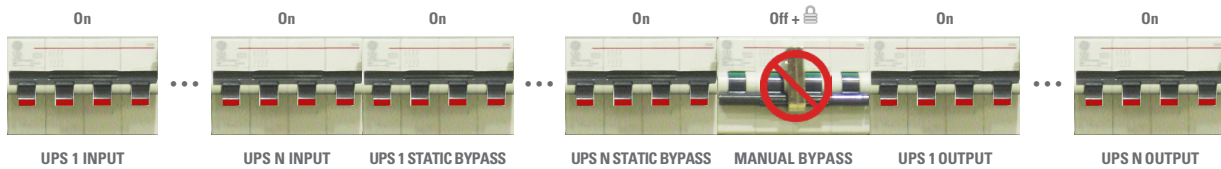


Fig. 12. Position of the bypass panel switches in «Normal operating» (with several UPS's).

- Turn the bypass panel switches «UPS 1 INPUT» to «UPS N INPUT» and «UPS 1 OUTPUT» to «UPS N OUTPUT» to «On». If the separate bypass line is also available (-B), turn the «UPS 1 STATIC BYPASS» to «UPS N STATIC BYPASS» switches from panel to «On» too. In the illustration of Fig. 12, it is shown the position of switches once the manoeuvring has been done.
- Start up all the UPS's according to the procedure stated in the «User's, installation and start up manual» of the equipment. The bypass panel supplies voltage to the terminals labelled as «LOADS OUTPUT».
- Start up the loads, they are supplied from the output terminals of the panel, through the UPS's.

6.3. SHIFTING FROM «NORMAL OPERATING» (LOADS SUPPLIED BY THE UPS OR UPS'S) TO «MAINTENANCE OPERATING» (LOADS SUPPLIED THROUGH THE MANUAL BYPASS).

6.3.1. Manual bypass panels with one UPS only.

- Put the UPS **on bypass (inverter «Off»)**, according to the procedure stated in the «User's, installation and start up manual» of the UPS.



It is essential **to shutdown the inverter** of the UPS before proceeding, otherwise a short-circuit at its output will be made with unexpected and unintended outcomes for any part of the set (UPS, panel and loads).

- Remove the mechanical lock from the switch labelled as «MANUAL BYPASS» in the bypass panel and turn it «On». Keep the mechanical lock in a safe place, because it will have to put it back, once the maintenance or fixing tasks have been finished.
- Manual bypass panels with isolation transformer, the loads will be supplied with a clean and/or attenuated voltage from electrical noises.
- Turn «UPS INPUT» and «UPS OUTPUT» switches from bypass panel to «Off». In case the separate bypass line (-B) was available, turn the «STATIC BYPASS» switch of the bypass panel to «Off» too. In the illustration of Fig. 13, it is shown the position of the switches once the manoeuvring has been finished.

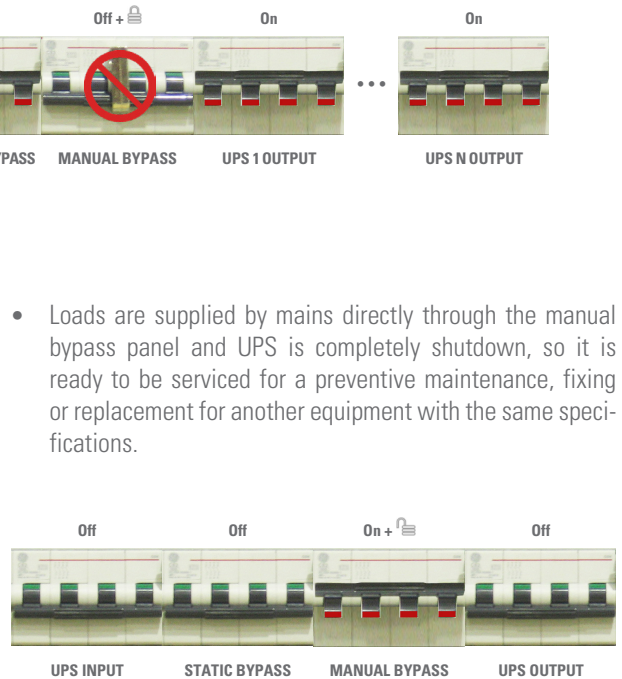


Fig. 13. Position of the bypass panel switches in «maintenance operating» (with one UPS only).


- In case of faulty UPS, it can also be removed and sent to the factory for its fixing. Nevertheless it is better not do it, because loads would be connected to mains directly and so exposed to mains fluctuations.



Even, if this alternative is going to be done, it is mandatory to remove any cable bundle connected to the panel, which has at its opposite end the cables bare from isolation, resulting in a risk of electrocution or short-circuit in case of turning on any of the panel switches.

6.3.2. Manual bypass panel with two or more UPS's.

- Put all the UPS's **on bypass (inverters «Off»)**, according to the procedure stated in the «User's, installation and start up manual» of the UPS.

 It is essential **to shutdown the inverters** of the UPS's before proceeding, otherwise a short-circuit at its output will be made with unexpected and unintended outcomes for any part of the set (UPS's, panel and loads).

- Remove the mechanical lock from the switch labelled as «MANUAL BYPASS» in the bypass panel and turn it «On». Keep the mechanical lock in a safe place, because it will have to put it back, once the maintenance or fixing tasks have been finished.
- Manual bypass panels with isolation transformer, the loads will be supplied with a clean and/or attenuated voltage from electrical noises.
- Turn the «UPS 1 INPUT» to «UPS N INPUT» and «UPS 1 OUTPUT» to «UPS N OUTPUT» switches of the bypass panel to «Off». In case of including the separate bypass line (-B), turn the «UPS 1 STATIC BYPASS» to «UPS N STATIC BYPASS» switches of the bypass panel «Off» too. In the illustration of Fig. 14, it is shown the position of switches once the manoeuvring has been done.

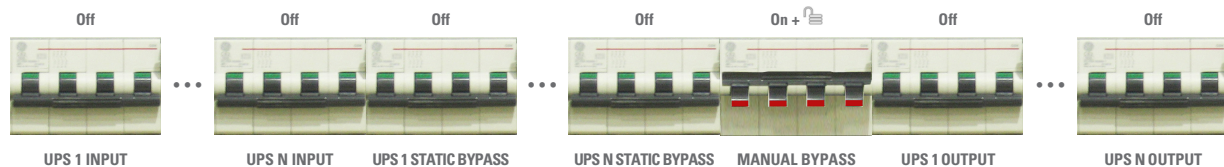



Fig. 14. Position of the bypass panel switches in «Maintenance operating» (with several UPS's).


- Loads are supplied by mains directly through the manual bypass panel and UPS's are completely shutdown, so they are ready to be serviced for a preventive maintenance, fixing or replacement for another equipment with the same specifications.
- In case of faulty UPS, it can also be removed and sent to the factory for its fixing. This option is valid when the power of the equipments, which are still installed is enough to supply the loads. Even it is unlikely but not impossible, any new fault in any of the remaining equipments and the possible consequences that could happen will be assumed.

 Even, if this alternative is going to be done, it is mandatory to remove any cable bundle connected to the panel, which has at its opposite end the cables bare from isolation, resulting in a risk of electrocution or short-circuit in case of turning on any of the panel switches.

6.4. SHIFTING FROM «MAINTENANCE OPERATING» (LOADS SUPPLIED THROUGH THE MANUAL BYPASS) TO «NORMAL OPERATING» (LOADS SUPPLIED BY THE UPS OR UPS'S).

6.4.1. Manual bypass panels with one UPS only.

- Once the preventive maintenance, fixing or UPS replacing tasks have been finished, loads must be shifted to UPS, but checking the following points previously:
 - ☐ UPS switches are turned «Off».
 - ☐ Bypass panel switches, less the «MANUAL BYPASS» switch are turned «Off».
- Turn the «UPS INPUT» and «UPS OUTPUT» switches of the bypass panel to «On». In case of including the separate bypass line (-B), turn the «STATIC BYPASS» switch of the bypass panel «On» too.
- Turn the «MANUAL BYPASS» switch of panel bypass to «Off» and put the mechanical lock back.

 For safety it is mandatory to put back the mechanical lock before proceeding with the operating.

- In the illustration of Fig. 15 it is shown the position of the panel switches after doing the manoeuvring of this point.
- Start the UPS up according to the procedure stated in the «User's, installation and start up manual» of the equipment. The bypass panel supplies voltage to the terminals labelled as «LOADS OUTPUT» to the loads from UPS.

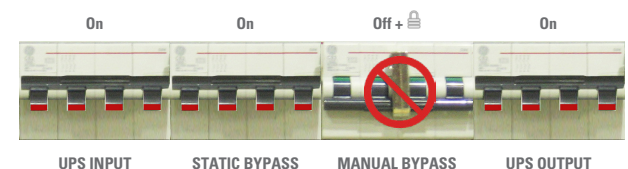


Fig. 15. Position of the bypass panel switches in «Normal operating» (with one UPS only).

6.4.2. Manual bypass panels with two or more UPS's.

- Once the preventive maintenance, fixing or UPS or UPS's replacing tasks have been finished, loads must be shifted to them, but checking the following points previously:
 - ☐ UPS's switches are turned «Off».
 - ☐ Bypass panel switches, less the «MANUAL BYPASS» switch are turned «Off».
- Turn the «UPS 1 INPUT» to «UPS N INPUT» and «UPS 1 OUTPUT» to «UPS N OUTPUT» switches of the bypass panel to «On». In case of including the separate bypass line (-B), turn the «UPS 1 STATIC BYPASS» to «UPS N STATIC BYPASS» switches of the bypass panel «On» too.
- Turn the «MANUAL BYPASS» switch of panel bypass to «Off» and put the mechanical lock back.



For safety it is mandatory to put back the mechanical lock before proceeding with the operating.

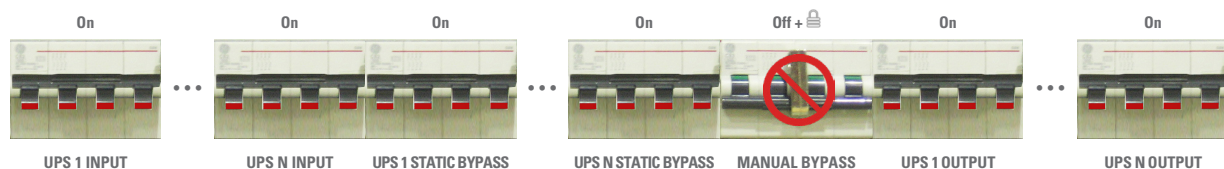


Fig. 16. Position of the bypass panel switches in «Normal operating» (with one UPS only).

- In the illustration of Fig. 16 it is shown the position of the panel switches after doing the manoeuvring of this point
- Start the UPS's up according to the procedure stated in the «User's, installation and start up manual» of the equipment. The bypass panel supplies voltage to the terminals labelled as «LOADS OUTPUT» to the loads from UPS's.

6.5. DAILY START UP/SHUTDOWN PROCEDURE OF THE UPS OR UPS'S (INVERTER START UP / SHUTDOWN).

- In case of need it, see the procedure stated in the «User's, installation and start up manual» of the equipment.

6.6. COMPLETE SHUTDOWN OF THE PANEL-UPS SET.

6.6.1. Manual bypass panel with one UPS only.

- Shutdown the load or loads.
- Shutdown the UPS according to the procedure stated in the «User's, installation and start up manual» of the equipment.
- Turn the «UPS INPUT» and «UPS OUTPUT» switches of the bypass panel to «Off». In case of including the separate bypass line (-B), turn the «STATIC BYPASS» switch of the bypass panel «Off» too. In the illustration of Fig. 9, it is shown the position of switches once the manoeuvring has been done.

- Turn «Off» the external protections of the bypass panel (RCD and/or circuit breaker switches), which are supplying the energy to the terminals labelled as «INPUT LINE».
- Those panels with separate static bypass line (-B), turn «Off» the external protections of the bypass panel (RCD and/or circuit breaker switches), which are supplying the energy to the terminals labelled as «STATIC BYPASS INPUT LINE».
- The set is out of service completely and with no power supply.

6.6.2. Manual bypass panels with two or more UPS's.

- Shutdown the load or loads.
- Shutdown the UPS's according to the procedure stated in the «User's, installation and start up manual» of the equipment.

- Turn the «UPS 1 INPUT» to «UPS N INPUT» and «UPS 1 OUTPUT» to «UPS N OUTPUT» switches of the bypass panel to «Off». In case of including the separate bypass line (-B), turn the «UPS 1 STATIC BYPASS» to «UPS N STATIC BYPASS» switches of the bypass panel «Off» too. In the illustration of Fig. 10, it is shown the position of switches once the manoeuvring has been done.
- Turn «Off» the external protections of the bypass panel (RCD and/or circuit breaker switches), which are supplying the energy to the terminals labelled as «INPUT LINE».
- Those panels with separate static bypass line (-B), turn «Off» the external protections of the bypass panel (RCD and/or circuit breaker switches), which are supplying the energy to the terminals labelled as «STATIC BYPASS INPUT LINE».
- The set is out of service completely and with no power supply.



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