

User manual

MULTI POWER2 208V

M2U - 20kW UP TO 136kW

 **multipower**



RIELLO ELETTRONICA  **riello ups**

INTRODUCTION

Thank you for choosing our product.

Our company is specialised in the design, development and manufacture of uninterruptible power supplies (UPS).

The UPS described in this manual is a high-quality product, carefully designed and manufactured to guarantee the best performance.

This manual provides detailed instructions for use and installation of the product.

For information about using and to get the maximum performance from your UPS, this manual should be carefully kept near the UPS and READ IT BEFORE ANY OPERATION ON IT.

NOTE: Some of the images in this document are provided as a guideline only, and they may not accurately reproduce the depicted product components.

SAFETY PRECAUTIONS



Before carrying out any operation on the UPS it's mandatory to read the "Safety Manual".

For any installation and maintenance operations, refer to the Installation manual.







ENVIRONMENTAL PROTECTION

While developing its products, the company spends great efforts in analysing environmental issues. All our products seek the objectives defined by the policies of the environmental management system, developed by the company according to the current legislation.

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

The packaging is made of RECYCLABLE MATERIAL. Please dispose of the individual elements according to the current legislation in force in the country where the product is to be employed. Please refer to the following table for identifying the materials:

DESCRIPTION	MATERIAL	
Pallet	Wood (FOR)	
Packaging box	Corrugated cardboard (PAP)	
Protective bag	High Density Polyethylene (PE-HD)	
Adhesive buffers	Low Density Polyethylene (PE-LD)	
Bubble Cushioning Wrap		

DISPOSAL OF THE PRODUCT

The UPS contains materials which (in case of decommissioning/disposal) are considered TOXIC and DANGEROUS WASTE, for example circuit boards and batteries. Treat such material according to the current legislation by using licensed centres. Their correct disposal helps to protect the environment and human health.

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The manufacturer reserves the right to change the product described at any time without prior notice for improvement purposes.

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MULTI POWER2 208V 20kW UP TO 136kW

Riello UPS Multi Power2 208V is the evolution of our modular UPS range.

It is designed to offer higher performances, increased power scalability, simpler integration to both existing and new systems and above all enhanced operating efficiency and global flexibility to reduce both the upfront investment and the day-to-day operational costs.

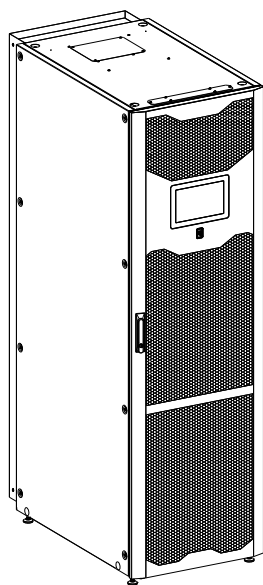
Thanks to 10-inch colour touchscreen display you can easily and quickly access key information, operating conditions and main measurements of the entire system or a single power module.

With its unmatched power density, Multi Power2 208V minimizes the space requirements and delivers up to 136 kW in just 6,35 sq ft (0.59 m²). MultiPower2 208V is compatible both with 3U, 20, 25 and 34 kW Power Modules designed with the latest and most innovative Silicon Carbide technology (M2U 20-25-34 PM BLUE) which are able to reach outstanding efficiency in on line mode.

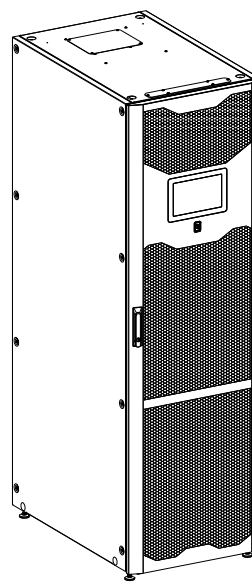
Power scalability can be achieved by adding up to 5 power modules per cabinet and, in parallel operations, the overall power can reach 544 kW.

The Power Modules are fully independent, hot-swappable and plug-in; they ensure full protection of the load in on-line double conversion during system extension or maintenance.

Multi Power2 208V is the most compact, sustainable and reliable solution that guarantees quality power supply to the most demanding applications.



M2U 68 CBC 6



M2U 140 PC0

In the Multi Power2 208V range there are several types of modular UPS with power up to 136 kW in a single unit, which can contain up to 5 Power Modules (PM20-25-34) and one Bypass Module (BM).

PMs are connected in parallel in order to increase reliability in the supply of power to the load and the power available at the system output (ref. to the "Modules and Units" chapters)

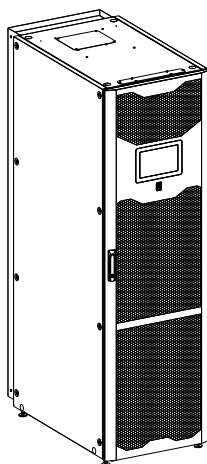
The load that can be applied to a UPS can be higher than the load that can be sustained by each PM thanks to the automatic power-sharing. Increased reliability is only achieved on condition that the total system power, with one or more PMs deactivated, remains higher than the load required. This condition is always achieved by adding at least one redundant PM to the minimum number of elements required to power the load, so that after the automatic exclusion of a faulty PM, the power supply can continue in a correct manner.

Each PM is equipped with a smart control unit, connected through a data bus with the other PMs within the system, achieving a high reliability distributed logic.

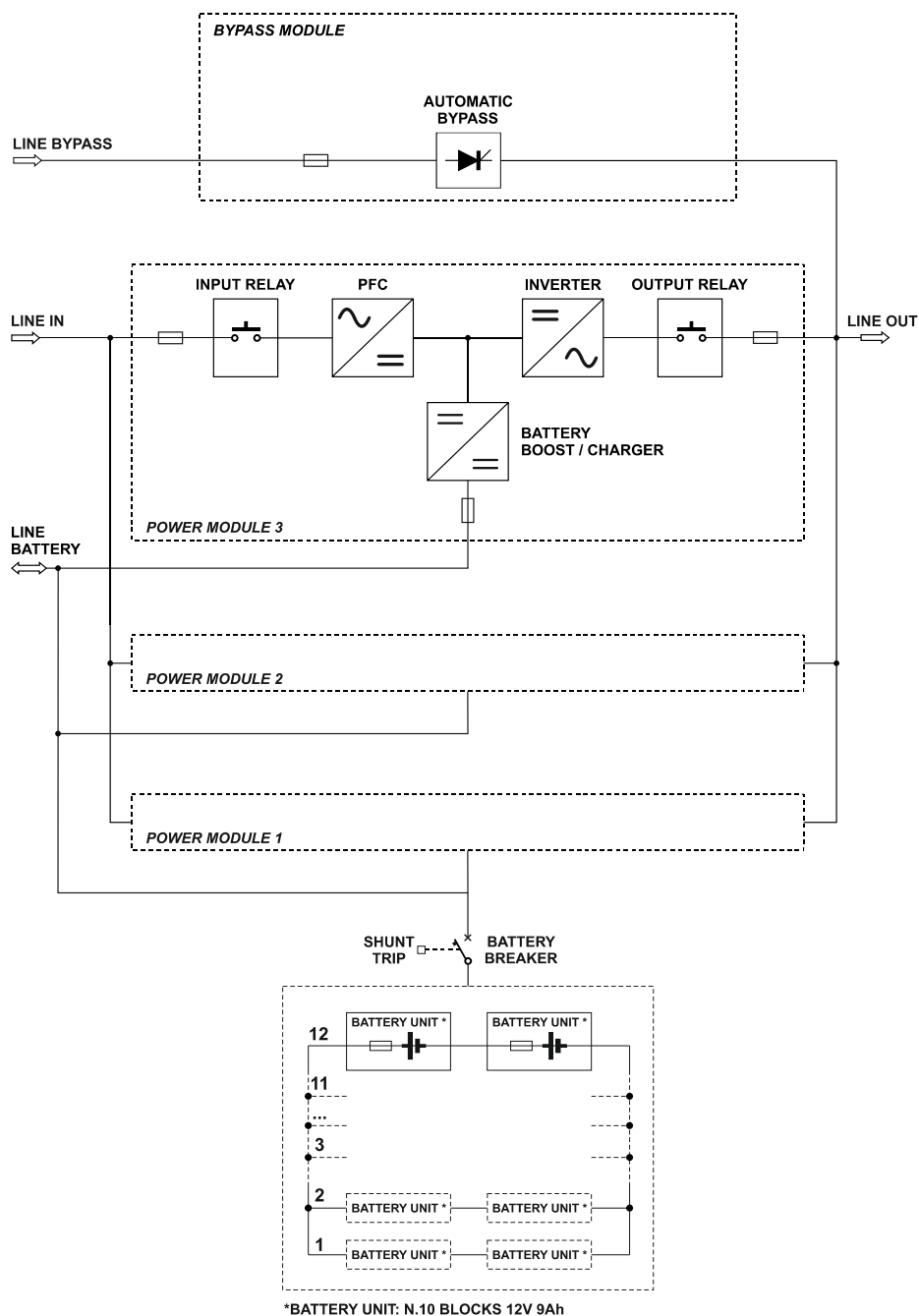
Note: any redundancy of the PMs may be set-up during configuration.

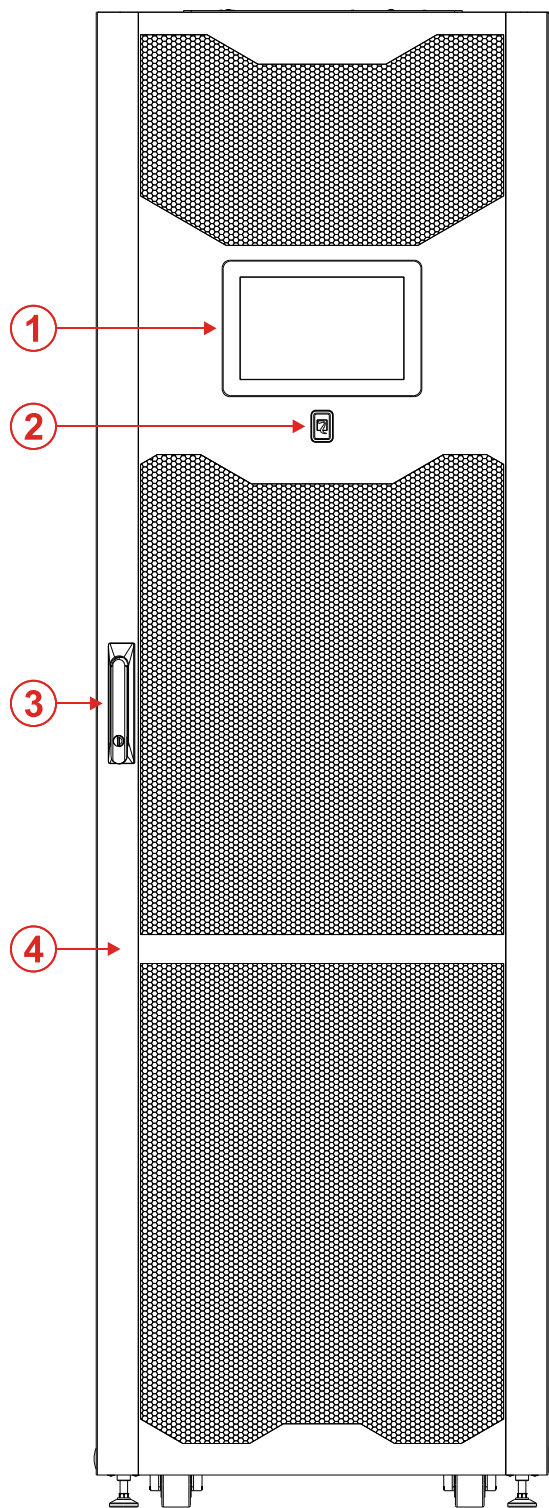
The Bypass Module (BM) operates as the central AUTOMATIC BYPASS for the entire UPS (ref. to chapter "Modules and Units"). In order to further increase the power of the system, multiple Modular UPS can be connected in parallel, up to 4.

M2U 68 CBC 6

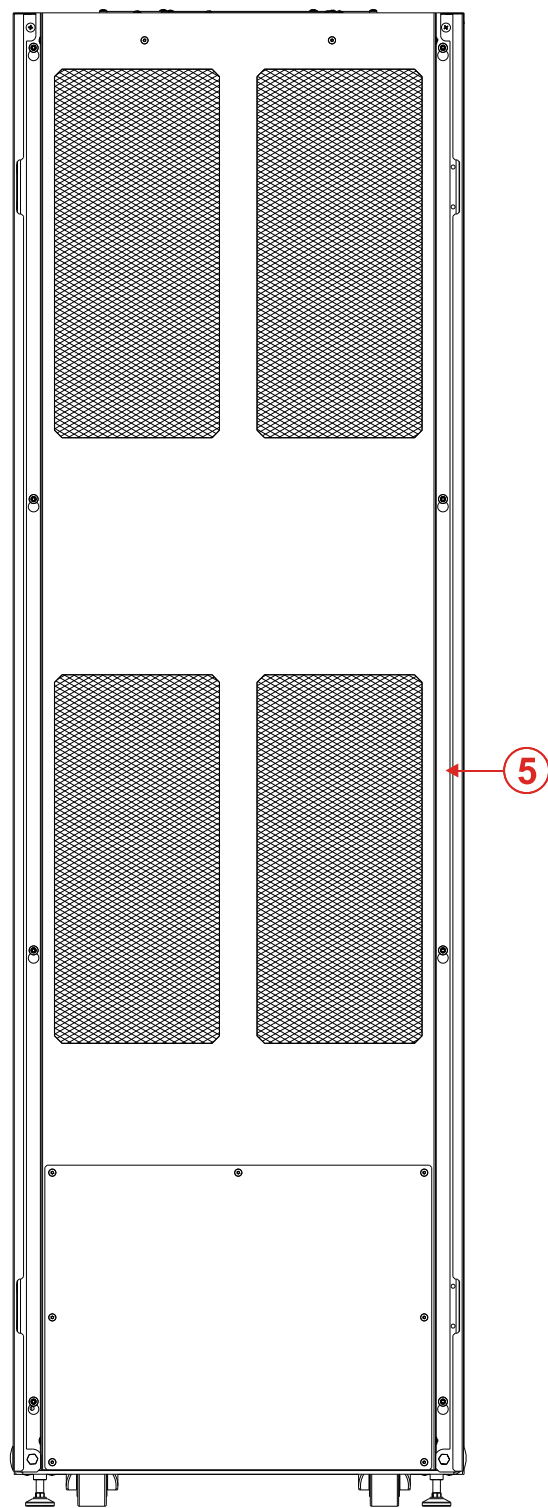


M2U 68 CBC 6 is an UPS with a maximum power of 68 kW which can contain up to 3 Power Modules (PM20-25-34) and one Bypass Module (BM). M2U 68 CBC 6 is provided by default with internal manual battery switch, single input connection and rear cable entry.





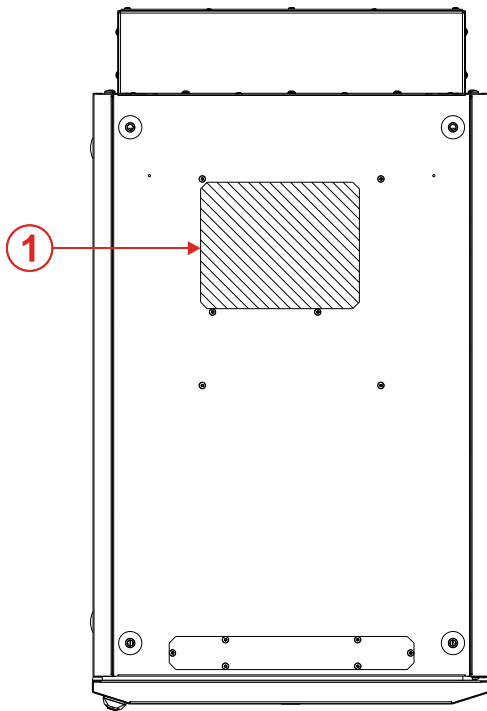
Front view



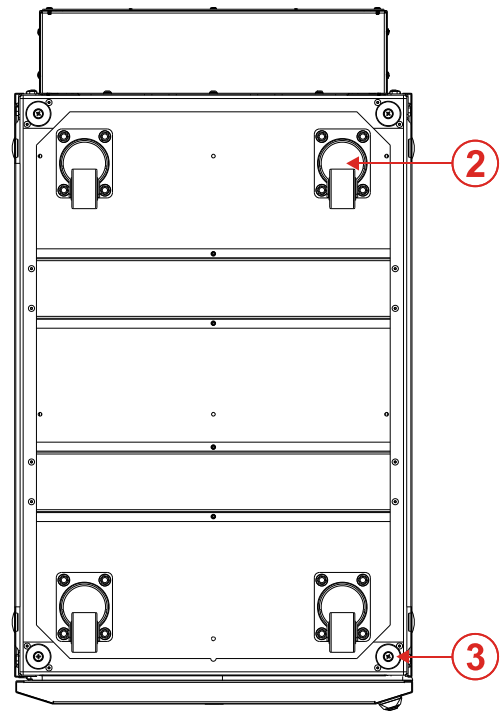
Rear view

- ① Frame
- ② UPS status LED
- ③ Handle with lock

- ④ Door
- ⑤ Back Panel

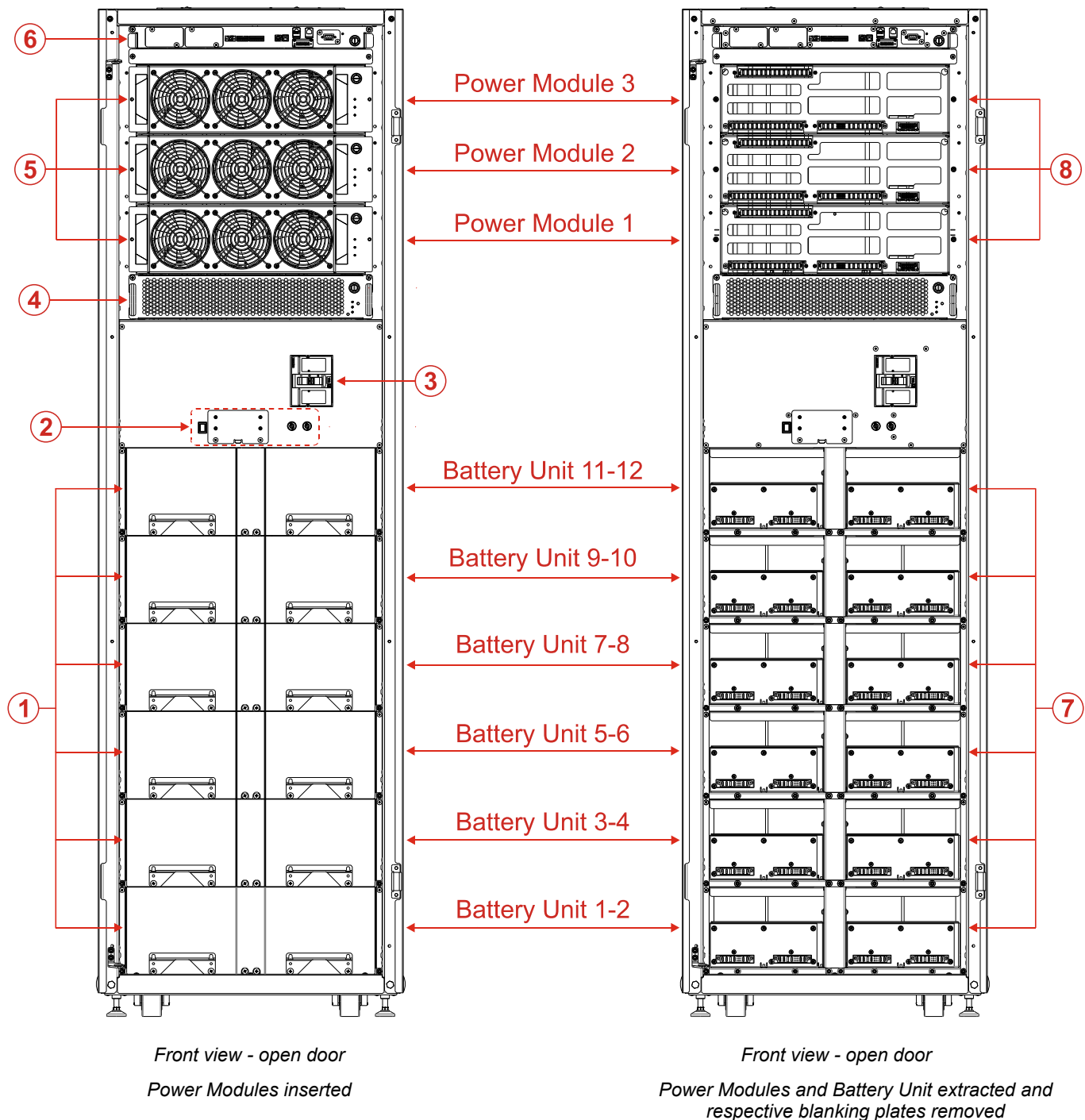


Top view



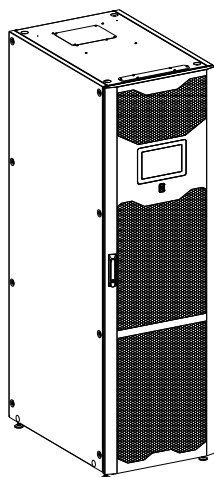
Bottom view

- ① PIB
- ② Swivel castors for positioning
- ③ Leveling stands

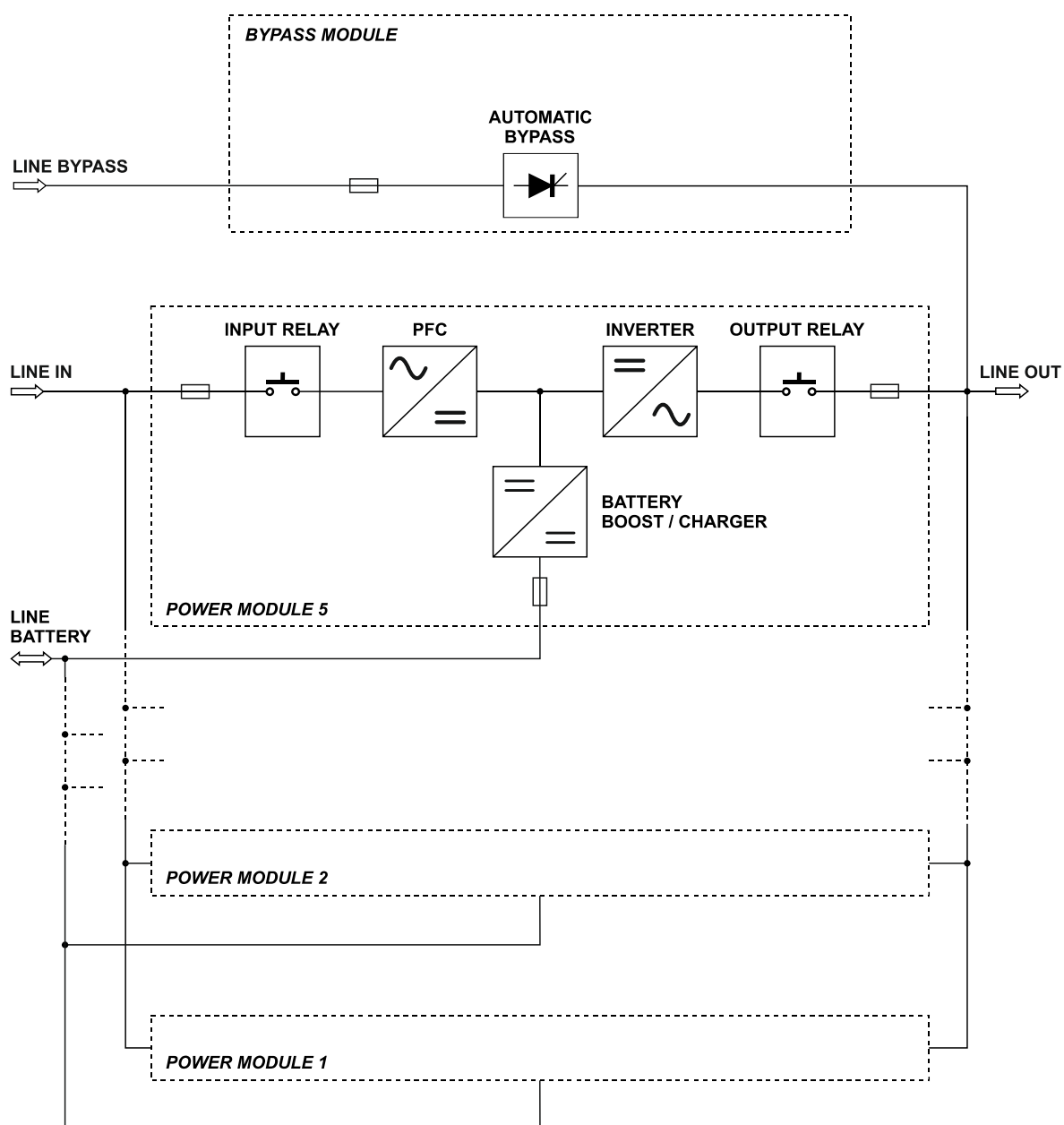


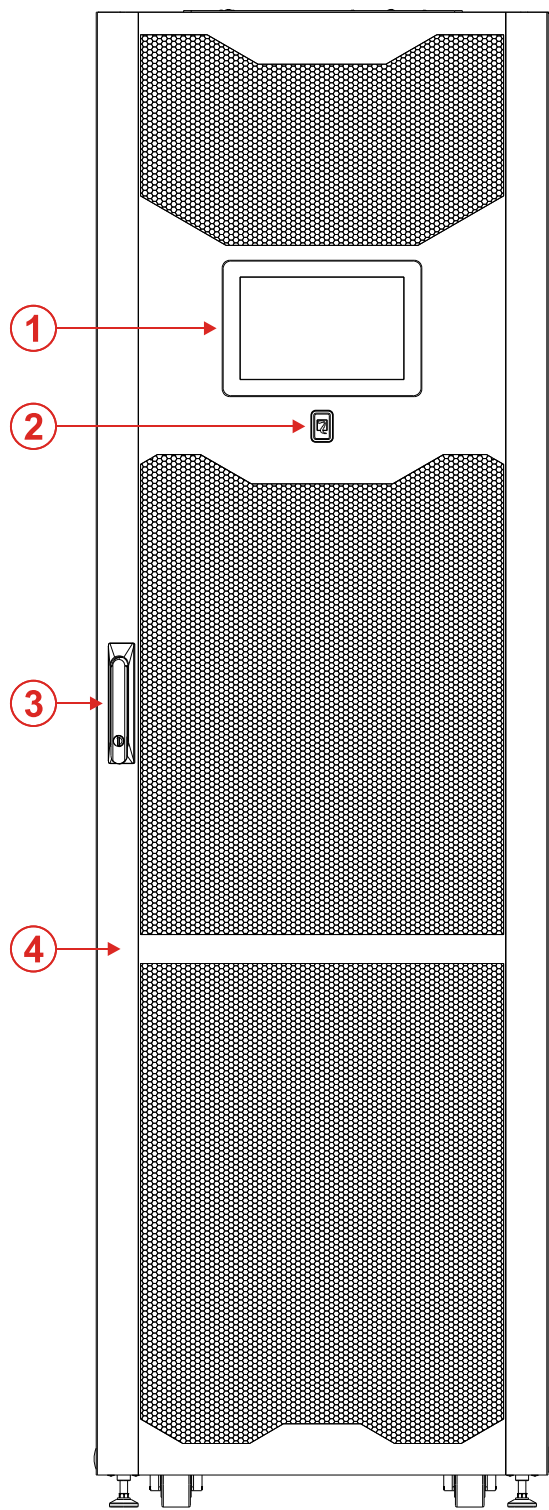
- | | |
|---------------------------|--|
| ① Battery Section (BU) | ⑤ Power Module (PM) |
| ② Cold Start section | ⑥ Connectivity panel |
| ③ Battery switch (SWBATT) | ⑦ Battery backplane: batteries monitoring interface connections between BU and cabinet |
| ④ Bypass Module (BM) | ⑧ Backplane: power and communication interface connections between PM and cabinet |

M2U 140 PC0

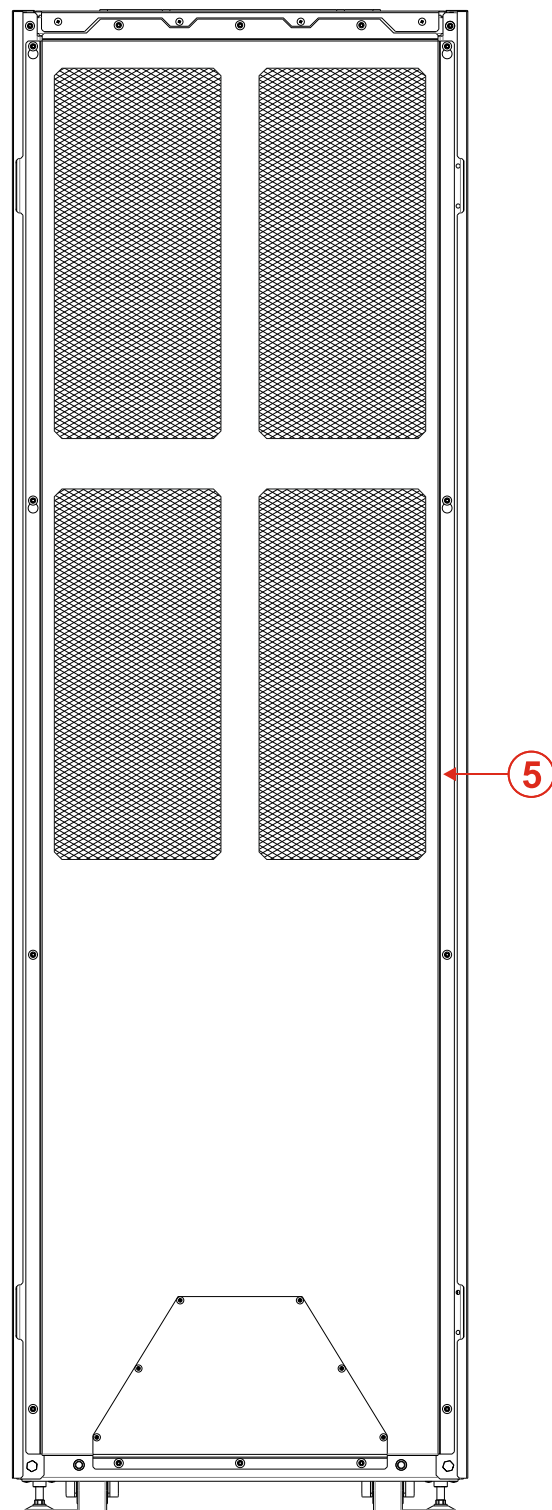


M2U 140 PC0 is an UPS with a maximum power of 136 kW which can contain up to 5 Power Modules (PM20-25-34) and one Bypass Module (BM). M2U 140 PC0 is provided by default with single input connection and bottom or on the rear cable entry.





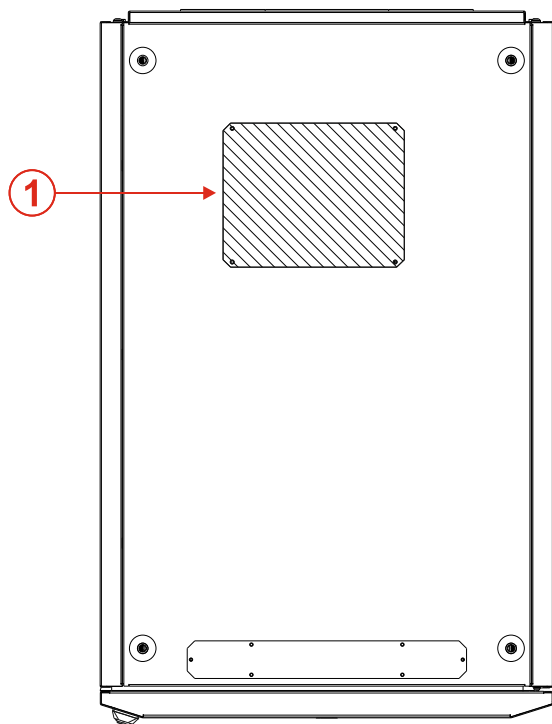
Front view



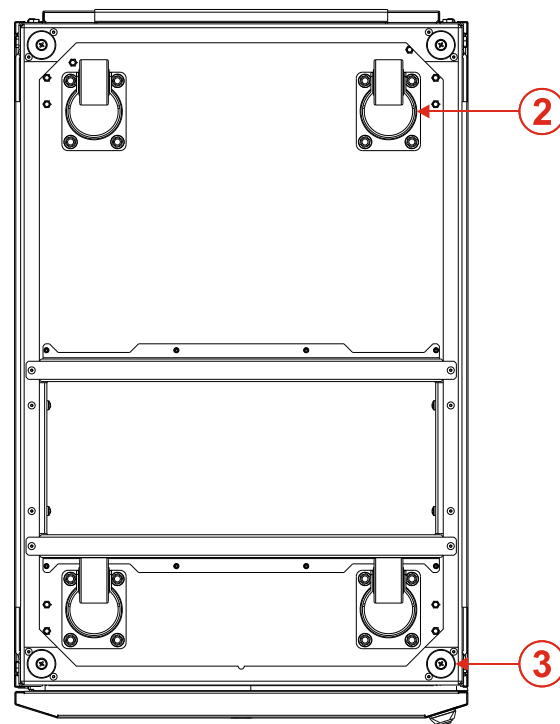
Rear view

- ① Frame
- ② UPS status LED
- ③ Handle with lock

- ④ Door
- ⑤ Back Panel

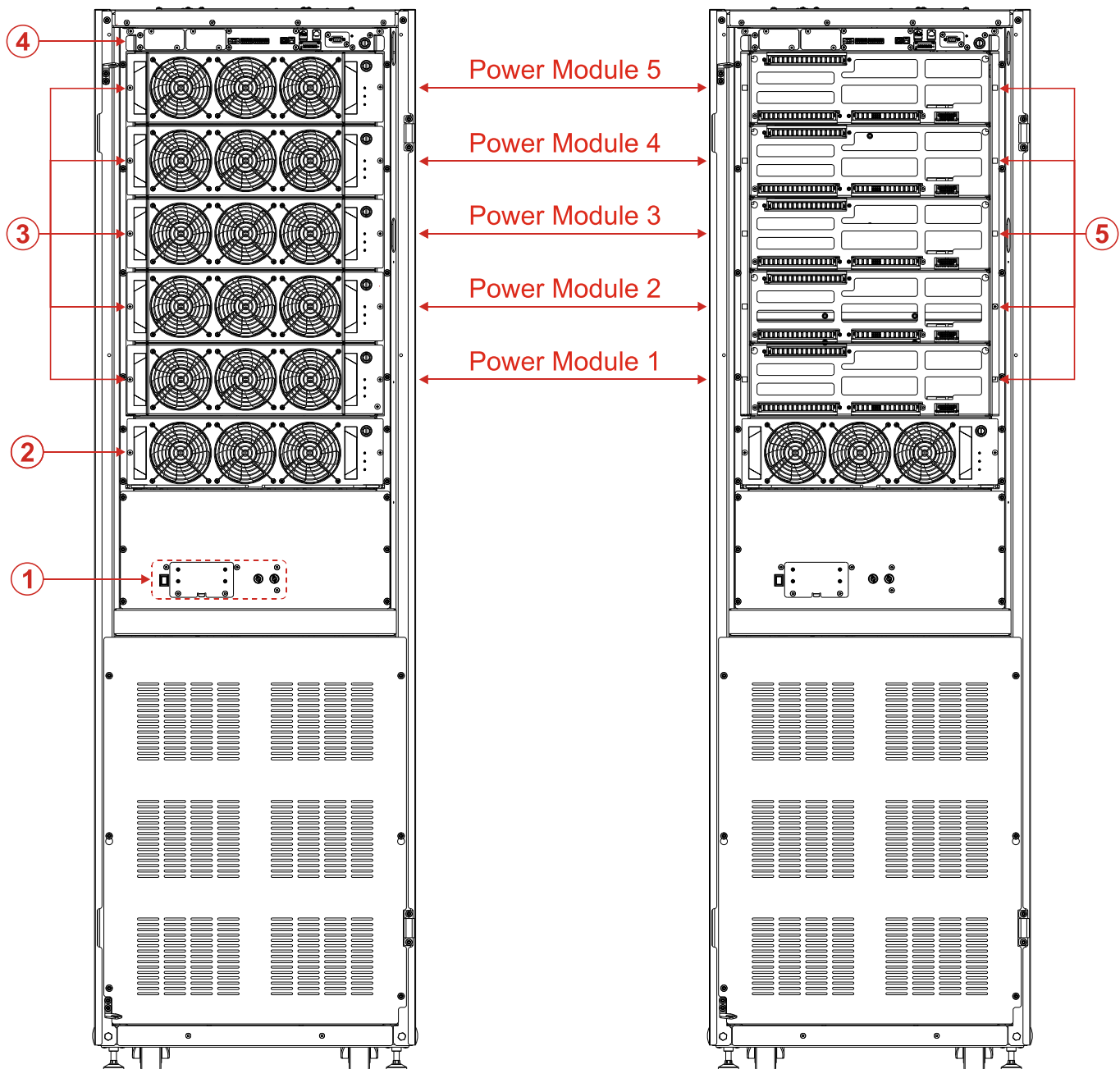


Top view



Bottom view

- ① PIB
- ② Swivel castors for positioning
- ③ Leveling stands



Front view - open door
Power Modules inserted

Front view - open door
Power Modules and Battery Unit extracted
and respective blanking plates removed

- ① Cold Start section
- ② Bypass Module (BM)
- ③ Power Module (PM)
- ④ Connectivity panel
- ⑤ Backplane: power and communication interface connections between PM and cabinet

MODULAR UPS SYSTEM

Modular UPS Systems are intended to ensure a perfect voltage supply for the equipment connected to it, both with and without a power supply network. Once connected and powered, the system generates an alternating sinusoidal voltage, with stable amplitude and frequency, regardless of surges and/or variations affecting the electrical supply.

The elements of the Modular UPS System are designed and manufactured to be durable. However as with any electrical power system, they require regular maintenance. Furthermore, some of the components have, inevitably, a fixed life cycle and therefore they must be regularly checked and replaced, if the conditions require it, in particular batteries and fans.

It is therefore recommended that a preventative maintenance program is implemented and performed by specialized staff whom are approved and certified by the manufacturer.

Our Service Department is at your disposal for customizing preventative maintenance options to suit your requirements.

ONLINE MODE

During ONLINE MODE the system operates in double conversion operation. This mode provides maximum protection for the load. During operation the energy coming from the electrical supply network (AC), is converted into a clean and stable output. The voltage supplied to the load is a perfect sinewave, with the frequency and voltage independent of the incoming mains supply (V.F.I. Voltage and Frequency Independent). During this mode, the batteries are constantly maintained in a charged condition.

BATTERY MODE

When the AC power network falls outside the pre-set tolerances, for example, in case of a blackout or voltage or frequency interferences, the system automatically switches to the BATTERY MODE and takes power from the batteries to support the load. When the AC network is again clean and stable, the system returns back to the normal mode operation.

The Power Walk-In function can be activated through the configuration software. This function allows, upon reconnection to the network (following a supply failure), a progressive absorption of power from the incoming supply, in order to avoid stressing (due to the inrush current) a generator which is installed upstream, if fitted. The duration of the transition mode can be set between 1 to 120 seconds.). During the transition mode the required power is partially collected from the batteries and partially from the network keeping the sinusoidal take-up. The battery charger is switched on again when the transition mode ends.

AUTOMATIC STATIC BYPASS MODE

During this operation mode, the UPS is forced to bypass and the load is directly powered by the AC supply, therefore, any input interference will directly affect the connected load.

ECO MODE

In order to optimise efficiency, in ECO mode, the load is normally powered via bypass (any disturbances that occur in the network can have effects on the load). In the event of a mains power supply failure or if the power supply is not within the pre-set tolerances, the UPS will switch to normal ON LINE operation with double conversion. Approximately five minutes after the power supply returns within tolerance, the load is switched back to bypass. All these procedures can be only selected by authorized personnel.

FREQUENCY CONVERTER MODE

The UPS can be configured in this mode to generate a fixed output frequency different from the input frequency. This configuration automatically disables the bypass line.

SMART ACTIVE MODE

The UPS may be set in SMART ACTIVE mode during which, according to the statistical data of the quality of the mains power supply, the UPS will autonomously decide the most appropriate operating mode between ON LINE and ECO MODE.

EFFICIENCY CONTROL MODE (ECM)

In case of very low load operations, the EFFICIENCY CONTROL mode improves the total system efficiency, while preserving the ON LINE mode and the set redundancy. The algorithm behind the ECM is designed to ensure that the active modules operate close to their maximum efficiency values (between 30 to 50%), monitor the variation of the load and equalize the hours worked by each PM to ensure that all electronic components age evenly and provide dynamic performances close to ONLINE mode. The PMs that are not required to support the applied load are placed in a low consumption state. In the event of a mains power supply failure or if the power supply is not within the specified conditions, all of the PMs switch to normal ON LINE operation with double conversion. If the load suddenly and significantly increases, the system could temporarily switch to the bypass line.

MANUAL BYPASS MODE



ATTENTION: The modular UPS Cabinet is not equipped with an internal manual bypass disconnection switch. To switch the system to manual bypass it is necessary to connect an external maintenance bypass disconnection switch.



CAUTION: Contact a service center if any malfunctions are detected. Maintenance can be carried out only by skilled staff authorized by the manufacturer.

CAUTION: dangerous voltages can be present inside the device, even if the input, bypass, output and battery switches are open.

The removal of any enclosure panels from the Modular UPS Cabinet by non-skilled personnel is dangerous and may cause damage to the operator, to the equipment and to the loads connected to it.

Operation to be performed in order to switch the UPS to “Manual Bypass” (in system with only one cabinet).

NOTE: if the bypass line is not present, the manual bypass operation may cut off power to the load. With the maintenance bypass switch closed the bypass input line supplies the load directly. During this mode of operation, any disturbances or blackouts on the power supply line will directly affect the connected equipment.

The switching of the System to manual bypass can be done with the following procedure:

- Verify that the bypass voltages are correct on the “System Status” page.
- Verify that the inverters are synchronized to the bypass line (no presence of the message “Bypass not available”).
- Verify that the BM has no anomalies on the “System Status” page.
- From the “Command Panel” page, slide “Bypass Unforced/Forced” from “O” to “I” to start the system to static bypass.
- Confirm “Load On Bypass Command”.
- Close the external maintenance bypass switch.
- The load is now supplied directly by the bypass line through the maintenance bypass switch.
- From the “Command Panel” page, slide “System: OFF/ON” from “I” to “O”.

NOTE: The maintenance bypass is an external switch, always verify the proper connection of the relative Auxiliary Contact.

SYSTEM ON COMMAND VIA BATTERY (COLD START)

For the COLD START button location, please refer to the “General views” chapter.

Note: Avoid turning on the system from battery if the battery charge status and/or the autonomy information are unknown

- Close the battery switch.
- Press the “Cold start” button and keep it pressed for at least 5 seconds.
- The system will turn on in the “STAND-BY WITH CB OFF” mode (The status led will light up and the display will start).

NOTE: if no actions are taken within one minute, the system will automatically shut down to avoid discharging the batteries.

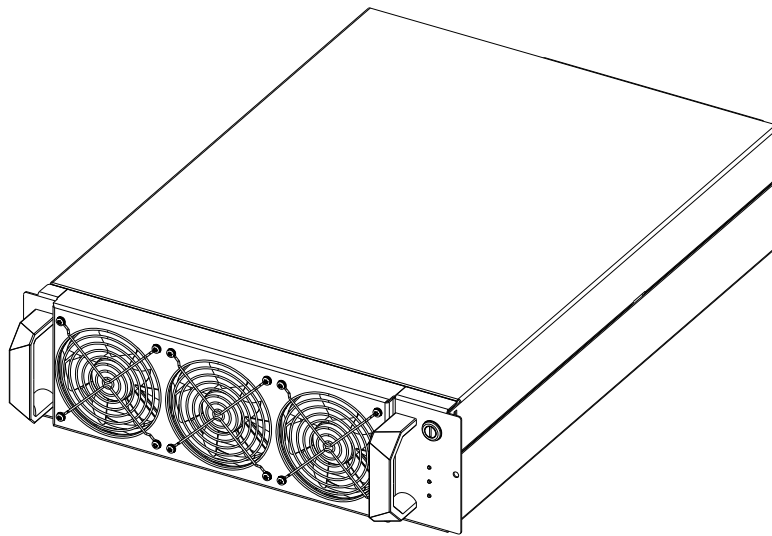
- Verify that no anomalies are present on the status bar (except for the anomalies/faults “PM/PMs fault/lock or PM/PMs anomaly”, “Bypass not available”, “Bypass volt. out of range”, “Inverter asynchronous”)
- From the “Command Panel” page, press the “System: OFF/ON” from “O” to “I”.
- Confirm the “SYSTEM ON Command”. The UPS will turn on.
- Verify the output voltages on the Output status page.
- The system is now in the BATTERY WORKING mode.
- To restore the UPS to ON LINE mode, the mains voltage must be present. The UPS will change to ON LINE mode and the batteries will begin to charge.

MODULES AND UNITS

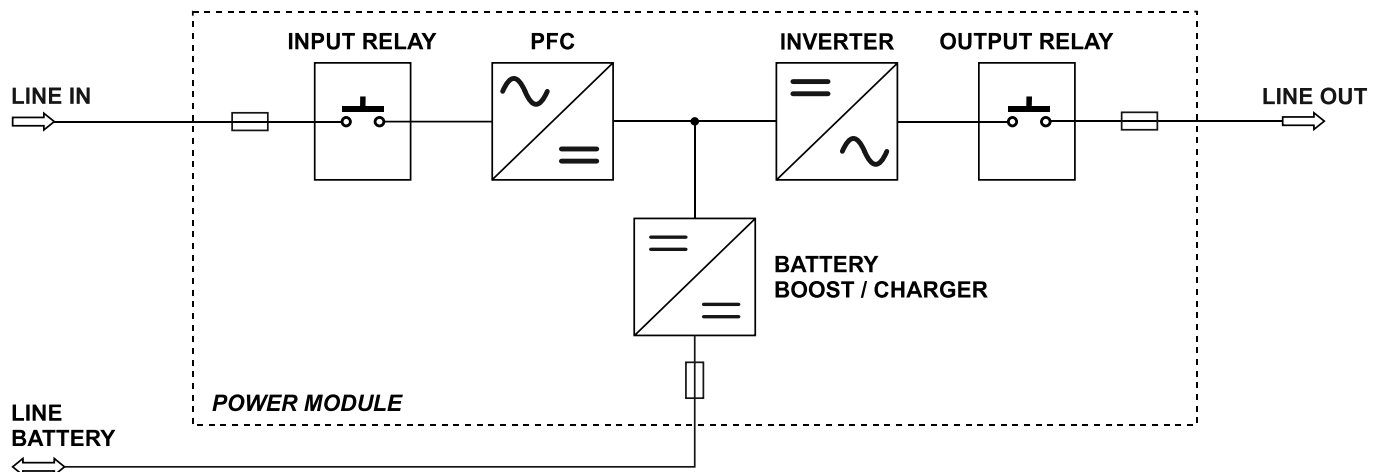
The cabinet consists of modules and units which allow quick maintenance and expandability of the system. The easy-to-swap parts are:

- Power Module (PM)
- Bypass Module (BM)
- Connectivity Panel (CP)
 - System Monitoring Unit (SMU)
 - Parallel Interface Board (PIB) [optional]

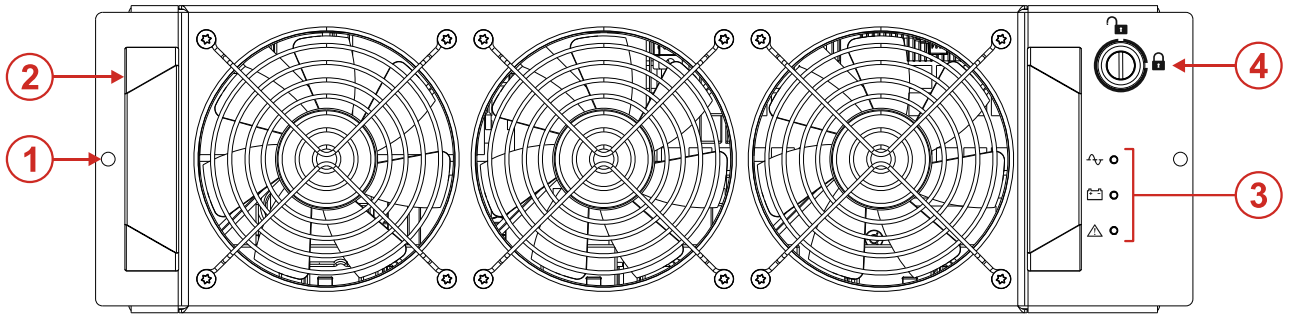
POWER MODULE (PM)



The Power Module (PM) is a three-phase double-conversion UPS module available in the size 20, 25 and 34 kW (PM20, PM25, PM34), with Silicon Carbide Mosfets (M2U 20 PM BLUE, M2U 25 PM BLUE, M2U 34 PM BLUE). The wiring diagram of the PM, which shows its individual components, is provided below:



Power Module wiring diagram



- | | |
|---|---|
| <p>1 Holes for fastening the PM to the cabinet using the specific screws</p> <p>2 Handles for inserting and extracting the module</p> | <p>3 Interface panel</p> <p>4 Switch Lock: rotating switch and mechanical lock of the PM to the cabinet</p> |
|---|---|



ATTENTION: for the insertion and extraction of the PM please refer to the installation manual.

INTERFACE PANEL

Mains operation LED



Green

- *On steady*: mains operation with good bypass line and synchronised inverter
- *Slow blinking*:
 - 500 ms ON - 800 ms OFF: mains operation with bad or disabled bypass line and/or non-synchronised inverter.
 - 130 ms ON - 2.5 s OFF: module in ENERGY SAVING mode



Yellow

Battery operation LED

- *On steady*: battery operating mode
- *Slow blinking*: battery operation with early low battery or imminent shutdown warning



Red

Standby/alarm LED

- *On steady*: alarm present
- *Slow blinking*: Stand-by mode
- *Fast blinking*: initialization communication BUS



+

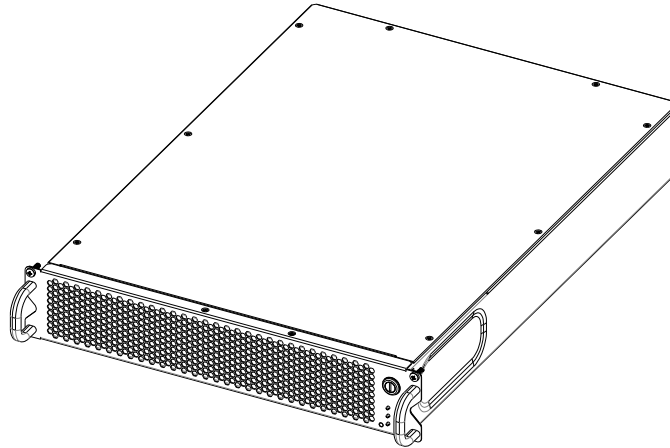


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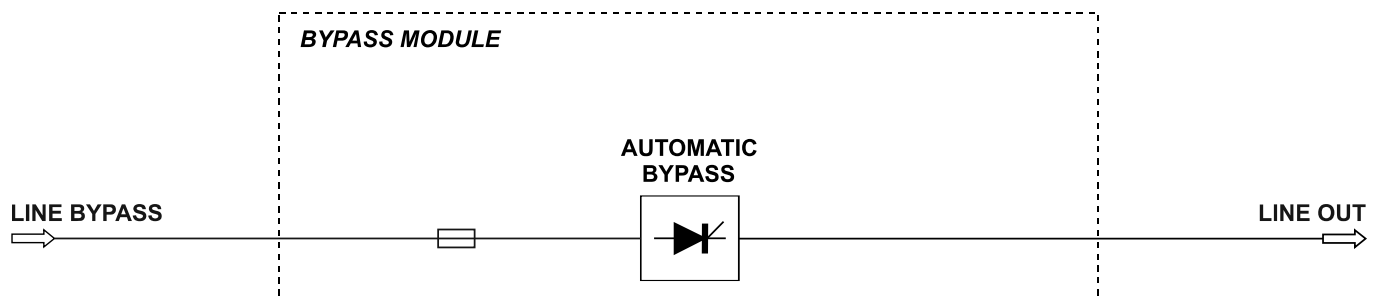


Slow blinking: Starting

BYPASS MODULE 200AMP (BM)



The Bypass Module (BM) allows the direct connection, electronically governed, between input and output of the UPS. In the M2U 68 CBC 6 the BM works in a centralized way for the total amount of power of the UPS, equals to 68 kW. The wiring diagram of the BM, which shows its individual components, is provided below:



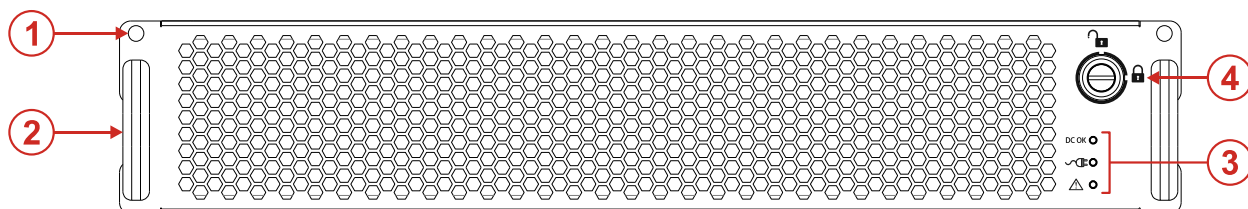
Bypass Module wiring diagram

BACKFEED PROTECTION

The UPS has an internal protection against backfeed. This protection acts by means of a sensing circuit which turns the inverter off if a fault within the static switch is detected. During this condition, to avoid interrupting the supply to the connected load, the UPS switches to the bypass line.

If this fault occurs during battery operation, the inverter is stopped.

A volt free contact can be configured to drive a disconnecting device to be installed upstream of the bypass input to the UPS, in this case when a backfeed fault occurs, the system opens the external disconnecting device, hence avoiding the requirement to stop the inverter.



① Holes for fastening the BM to the cabinet using the specific screws

② Handles for inserting and extracting the bypass module

③ Interface panel

④ Switch Lock: rotating switch and mechanical lock of the BM to the cabinet



ATTENTION: for the insertion and extraction of the BM please refer to the installation manual.

INTERFACE PANEL

DC OK

Green

LED DC

- *On steady:* Bypass ready



Green

LED operation from bypass

- *On steady:* Bypass operating

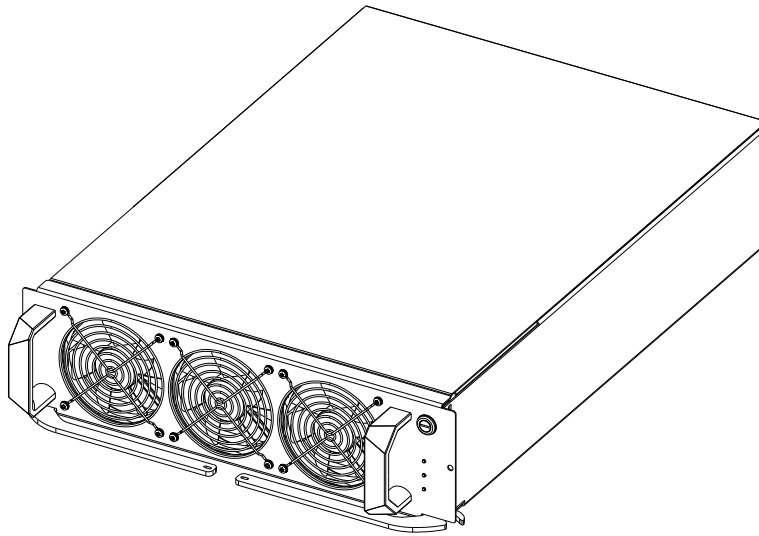


Red

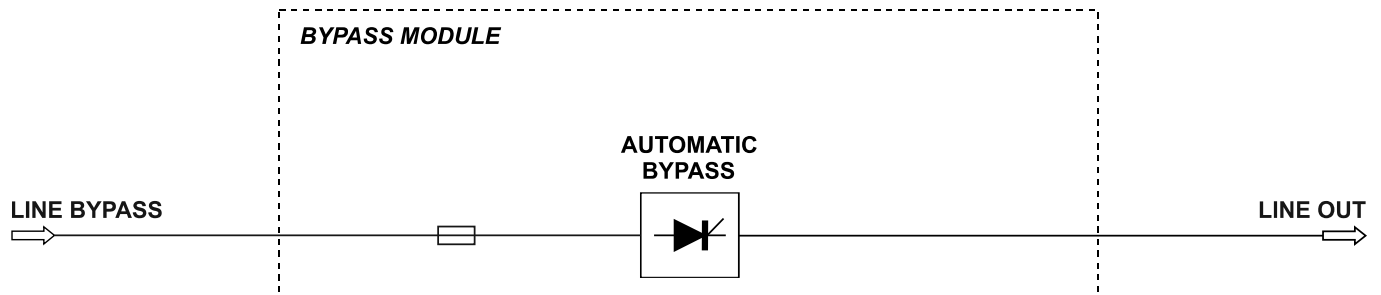
LED alarm

- *On steady:* Alarm
- *Slow blinking:* Initialisation

BYPASS MODULE 500AMP (BM)



The Bypass Module (BM) allows the direct connection, electronically governed, between input and output of the UPS. In the M2U 140 PC0 the BM works in a centralized way for the total amount of power of the UPS, equals to 136 kW. The wiring diagram of the BM, which shows its individual components, is provided below:



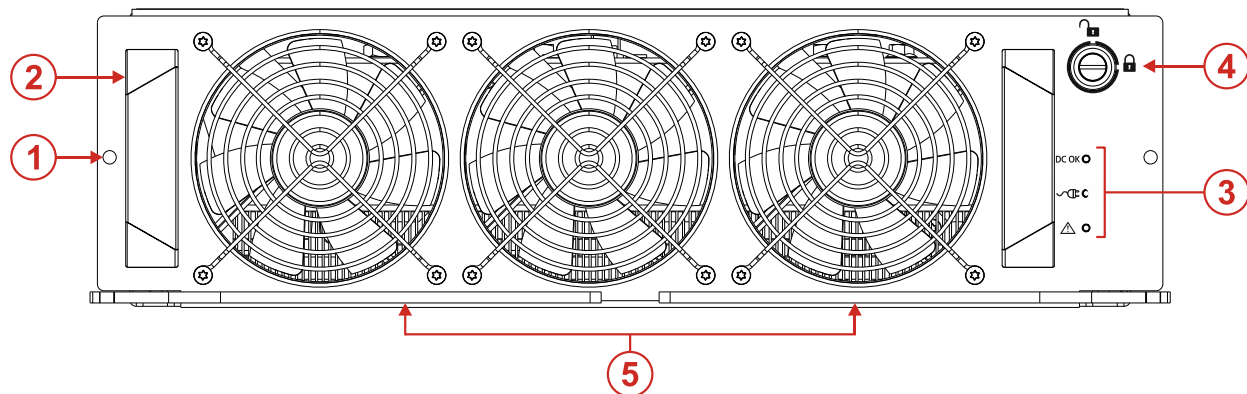
Bypass Module wiring diagram

BACKFEED PROTECTION

The UPS has an internal protection against backfeed. This protection acts by means of a sensing circuit which turns the inverter off if a fault within the static switch is detected. During this condition, to avoid interrupting the supply to the connected load, the UPS switches to the bypass line.

If this fault occurs during battery operation, the inverter is stopped.

A volt free contact can be configured to drive a disconnecting device to be installed upstream of the bypass input to the UPS, in this case when a backfeed fault occurs, the system opens the external disconnecting device, hence avoiding the requirement to stop the inverter.



- 1** Holes for fastening the BM to the cabinet using the specific screws

2 Handles for inserting and extracting from the cabinet

3 Interface panel
- 4** Switch Lock: rotating switch and mechanical lock of the BM to the cabinet

5 Levers for extraction/insertion



ATTENTION: for the insertion and extraction of the BM please refer to the installation manual.

INTERFACE PANEL

DC OK
Green

LED DC

- *On steady:* bypass module power supply OK
- *OFF:* bypass module power supply KO



Green

LED operation from bypass

- *On steady:* load supplied by static bypass
- *OFF:* load not supplied by static bypass



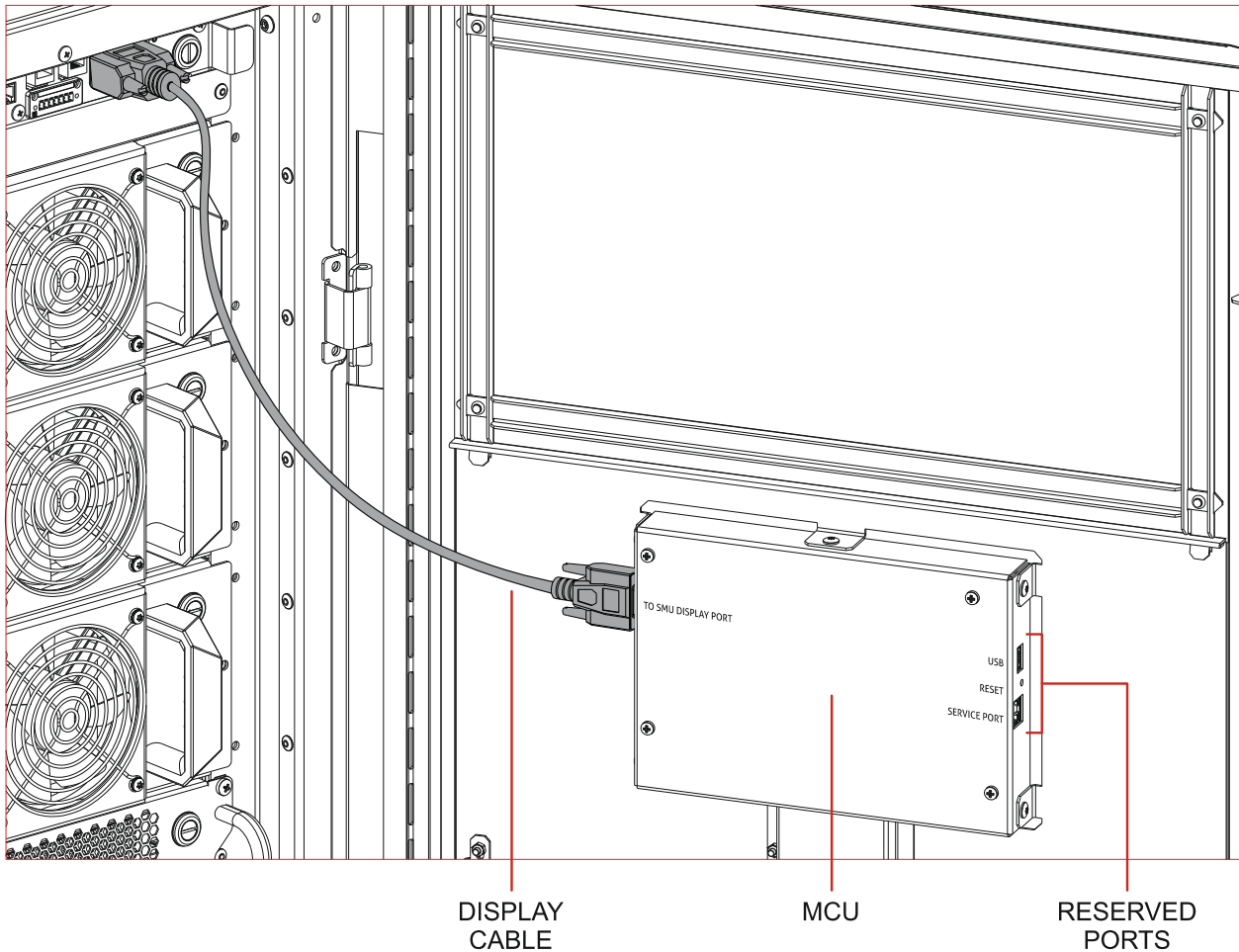
Red

LED alarm

- *On steady:* alarm present
- *Slow blinking:* bypass stand-by mode
- *OFF:* bypass ready

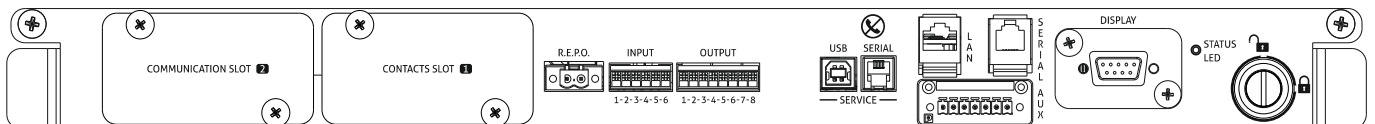
MAIN COMMUNICATION UNIT (MCU)

This unit is the UPS synoptic. Thanks to the 10-inch color touchscreen display, you can control the system, easily and quickly access key information and main measurements of the entire system or a single power module (to use the synoptic, see the "Display" chapter).



CONNECTIVITY PANEL (CP)

The Connectivity Panel (CP) realizes, together with the display, the user interface panel of the UPS. The Connectivity Panel includes the system monitoring unit (SMU), a microprocessor-controlled board dedicated to the management of input and output signals, such as temperature sensors, status of external switches (if any), communication boards and it is also responsible of the operation of the display. For more details, please refer to the paragraph "MODULES AND UNITS".



SMU (SYSTEM MONITORING UNIT)

The system monitoring unit (SMU) is dedicated to the management of input and output signals, such as temperature sensors, status of external switches (if any), communication boards and it is also responsible of the operation of the display. Even this item, in case of a fault, immediately warns the user and the replacing procedure can be easily performed based on a hot swappable principle.

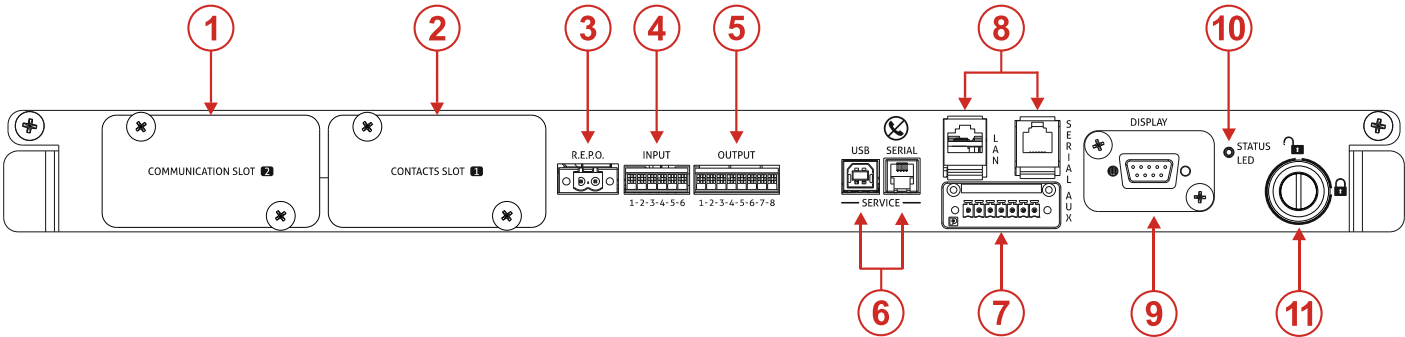
SMU specifically hosts the communication ports for the remote monitoring by the user and personal service. There is a one input for R.E.P.O. (Remote Emergency Power Off); five programmable inputs; four programmable outputs; one input for the connection of an external temperature sensor; one output dedicated to backfeed protection management and one output dedicated to batteries disconnection (in case of serious anomalies).

In addition to the color touchscreen 10" display (on the door), it's also possible to connect to the SMU a PC for update the FW of the PMs and units of the UPS (only for Service).

There are also two SLOTS: one is for the accessory communication board and the other ones are for other accessory contacts. For more details about the use of the interface, please refer to the installation manual.



ATTENTION: connect to the SMU only non-hazardous low voltage signals



1 Communication Slot (SLOT 2)

2 Contacts Slot (SLOT 1)

3 R.E.P.O.

4 Signal input

5 Signal output

6 Service ports

7 Signal AUX

8 NETMAN port

9 Display port

10 SMU status LEDs

11 Switch Lock



ATTENTION: for the insertion and extraction of the SMU please refer to the installation manual.

INTERFACE PANEL

STATUS LED indicate the status of the SMU.

LED APPEARANCE



**STATUS
LED**

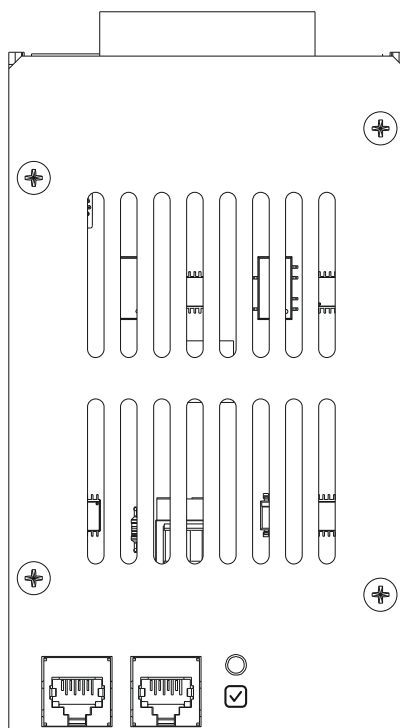
- *On steady*: Ready
- *Slow blinking*: Initialization, operating communication BUS
- *Fast blinking*: Initialization, not operating communication BUS
- *Off*: Not ready

PIB (PARALLEL INTERFACE BOARD) [OPTION]

The PIB (Parallel Interface Board) is a board that allows data exchange between UPSs in parallel. The connection of UPSs in parallel allows you to increase the reliability and power of the system. It's possible to connect in parallel up to four M2U 68 CBC 6 or up to four M2U 140 PC0.

In a parallel system the information is sent between UPS thanks to PIBs and data BUS. In order to increase the reliability, there are two identical connections, one made via PIB1 (blue color) and the other one made via PIB2 (yellow color).

The PIBs are optional boards placed inside the appropriate parallel kit, for more details refer to the specific manual.



INTERFACE PANEL



Green

LED parallel operation

- *On Steady:* Ready
- *Slow blinking:* Not ready

DISPLAY

Display navigation is divided into 3 levels, according to a tree structure of this type:

SYSTEM > UPS > MODULES

UPS: it is defined as an equipment, composed by one PM cabinet equipped with a single BM and a display.

SYSTEM: it is defined as a group of UPSs connected in parallel. In case of a single UPS, the latter corresponds to the System.

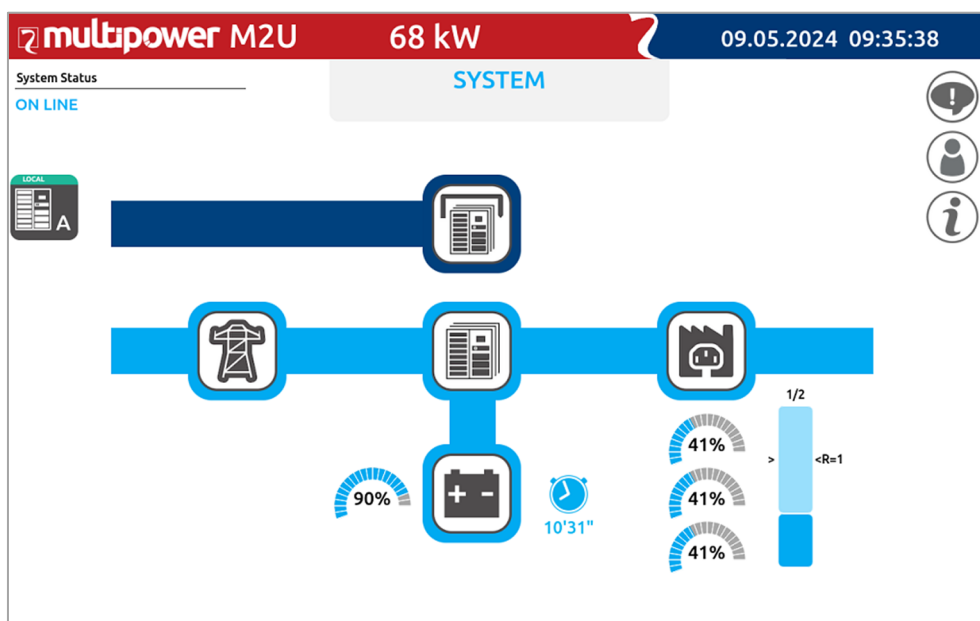
MODULES: PM, BM, SMU.

Through the display is possible to:

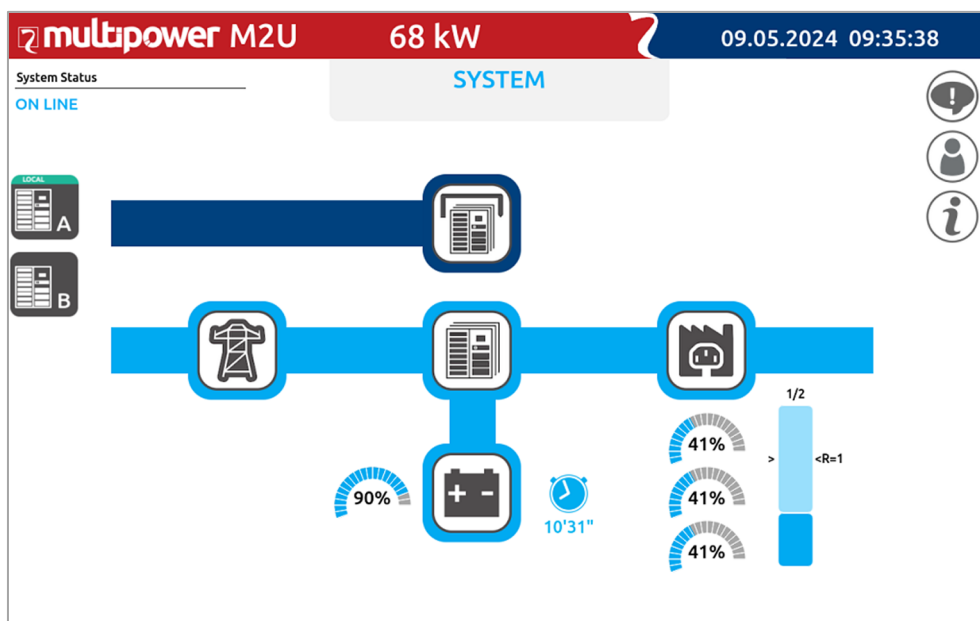
- view the status of the SYSTEM, UPSs and PMs;
- activate switch on / switch off / battery test / bypass operation commands;
- configure the SYSTEM, access levels and the network services (e-mail sending, anomaly reporting, etc.).

The “Home” page shows a diagram of the general operation status of the SYSTEM. It is possible to interact with the system and see the details through the icons.

NOTE: The example shows a 68kW SYSTEM.



Example of a System with a single UPS



Example of PARALLEL System with 2 UPSs connected



NOTE: For the navigation of the SYSTEM refer to “SECTION 1 – SYSTEM”, for UPS refer to “SECTION 2 - UPS” and for PM/BM/SMU refer to “SECTION 3 – MODULES”.

DISPLAY OVERVIEW

STATUS BAR

The status bar at the top shows UPS model, configured power, UPS power and date and time. Configured power and deliverable power can be different when some modules are not active. If they are the same a single value is showed.

NOTE: The example shows a 68kW SYSTEM.



ICONS, SYMBOLS AND TEXTS

MAIN DIAGRAM

The main active icons present in the diagram are:



Mains input



Output



Battery



Automatic static bypass



System status

In general, the color and the shape of the icons provide instant information to the status of the system:



Grey:
communication lost
(Com-Lost)



Light blue:
normal status



Blue:
load on status



Orange:
anomaly



Red:
alarm

Colored bars indicate the route that power is following in the system:



Normal mode. The power goes from input to load through UPS that loads battery if they are connected



Working on Bypass. Power flows through static bypass



Battery working. Power flows from battery to load through UPS. Pay attention to back-up time and charge percentage of the battery



Load supplied solely via Manual Bypass (*MANUAL BYPASS SWITCH closed*)

In addition to the main diagram, there are additional information icons:



% Battery charge gauge
it represents charge percentage of the battery



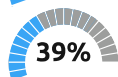
Back-up time estimate
The calculus of back-up time is function of
applied load and the battery charge status



L1

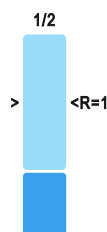


L2



L3

% Load gauge phase 1, 2, 3
are based on power that active
modules can be kept



Redundancy bar
see paragraph "Load level and redundancy
system status"

ACTIVE TEXT AREAS

Parallel System Status

ON LINE

At the top left of the display, active area which reports the current state of the SYSTEM.

POWER MODULE
[A.1.1]

At the top center of the display, active area showing the name and possibly the address (A, B, C, D) of the SYSTEM, UPS or Module being viewed.

Ups Status

MANUAL BYPASS ACTIVE

At the top right of the display, active area which reports the current status of the selected UPS or Module (present only when the UPS or Module tabs are displayed).

UPSs LIST



Address list of all UPSs of the SYSTEM. Every UPS that composes the system has a unique address (identified to a letter from A to D). The written LOCAL informs that this display belongs to this specific UPS.



Some symbols may appear inside the icon, which identify a particular state of the related UPS. For further information on the meaning of the possible symbols, refer to *SECTION 2, "UPS/modules status"* paragraph.

MENU



On the right side of the Home page there are a series of icons that allow you to set commands, configurations or view various information relating to the SYSTEM.

NOTE: the menu may change depending on the pre-set access level.



in the various pop-up screens, on the right side at least one of these icons will always be present:



button to exit the active pop-up screen (any changes will not be saved)




button to confirm any insertion and/or modification operations



For further information refer to the dedicated paragraph *Menu Entries*.

SLIDE SWITCHES STATUS

Located on the "Control Panel" page , these slide switches are necessary to activate the various system on/off commands.



OFF



ON - LOCK STATUS



ON



OFF - LOCK STATUS

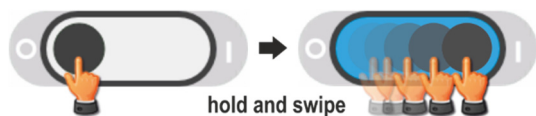


PARTIALLY ON
(SOME "OFF" – SOME "ON")



UNAVAILABLE

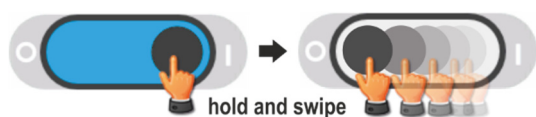
LEGEND OF THE USED SYMBOLS



hold and swipe

**SWIPE
LEFT-RIGHT**

Movement for the sliding graphical elements for the status switch from O to I.



hold and swipe

**SWIPE
RIGHT-LEFT**

Movement for the sliding graphical elements for the status switch from I to O.

LOAD LEVEL AND REDUNDANCY SYSTEM STATUS

The “Home” page provides a graphic bar showing the current load level and the system redundancy.

Load level: the bar is a representation of the number of PMs configured and their use as a function of the applied load level:

- Dark tonality indicates the number of operating Power Modules (PMs) that are necessary to supply the current load.
- Clear tonality indicates the number of operating PMs but not necessary to supply the current load.
- Grey colour indicates one or more unavailable PMs.

NOTE:

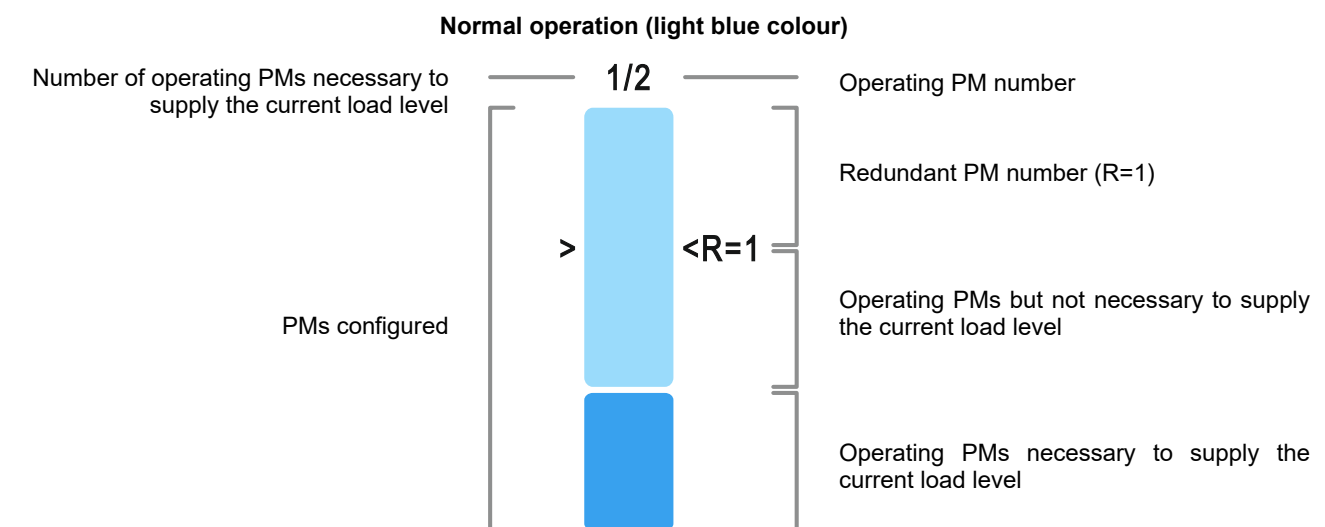
Whenever the installation includes one or more UPSs in parallel, the bar will show the SYSTEM load level and not the single UPS load level.

Redundancy: To increase system reliability, the user can add one or more redundant PMs rather than just install the number strictly required to supply the load.

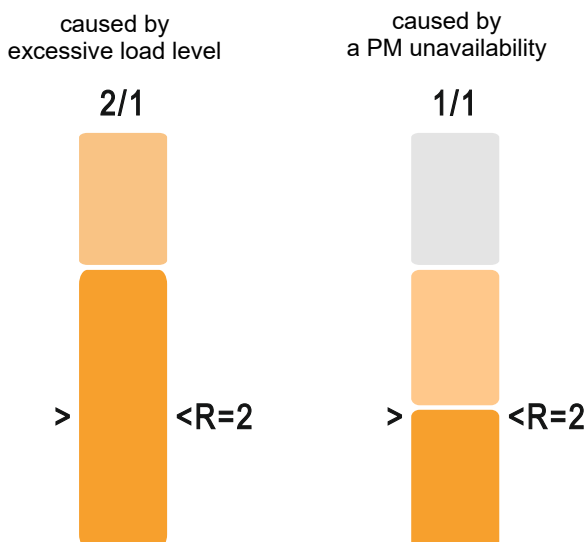
The diagrams below show the possible “Load level” bar status according to the system conditions with respect to the load level, redundancy and PM availability.

The example shows a 68kW SYSTEM with PM34 modules. This system includes:

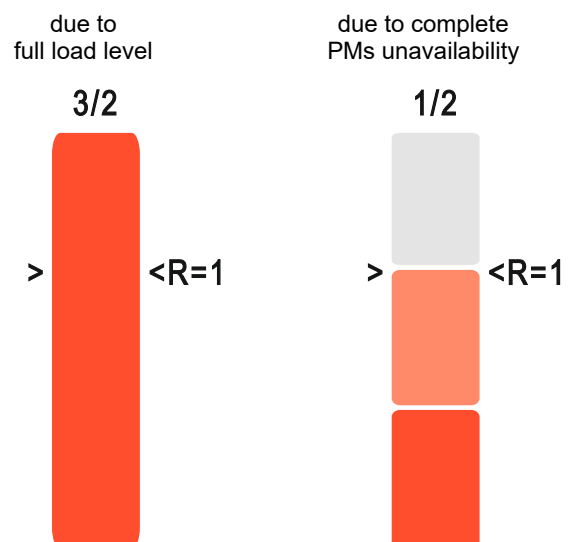
1 UPS, 3 PMs configured, 1 of which as redundant (R=1); 2 PMs necessary to supply the current load.



Redundancy level reduction (orange colour) ⁽¹⁾



Redundancy lost (red colour)



(1) Only with 2 or more modules as redundant (R≥2)

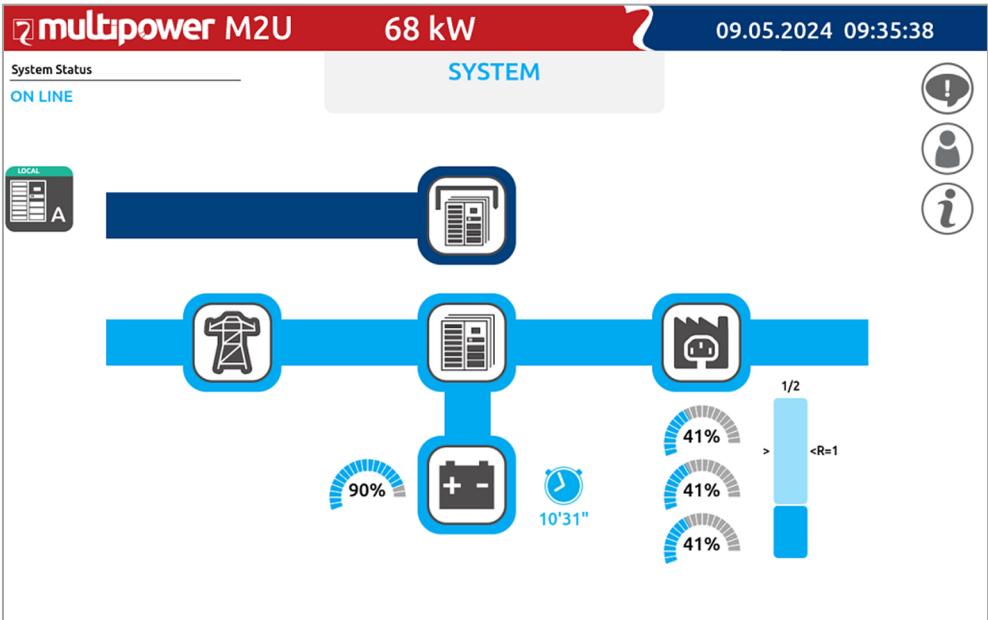
NOTE: All PMs, including the redundant units operate together sharing the load.

Thanks to this reliable feature, we strongly suggest that the user configures one or more redundant PM according to the power required and the installation type.

SECTION 1 - SYSTEM

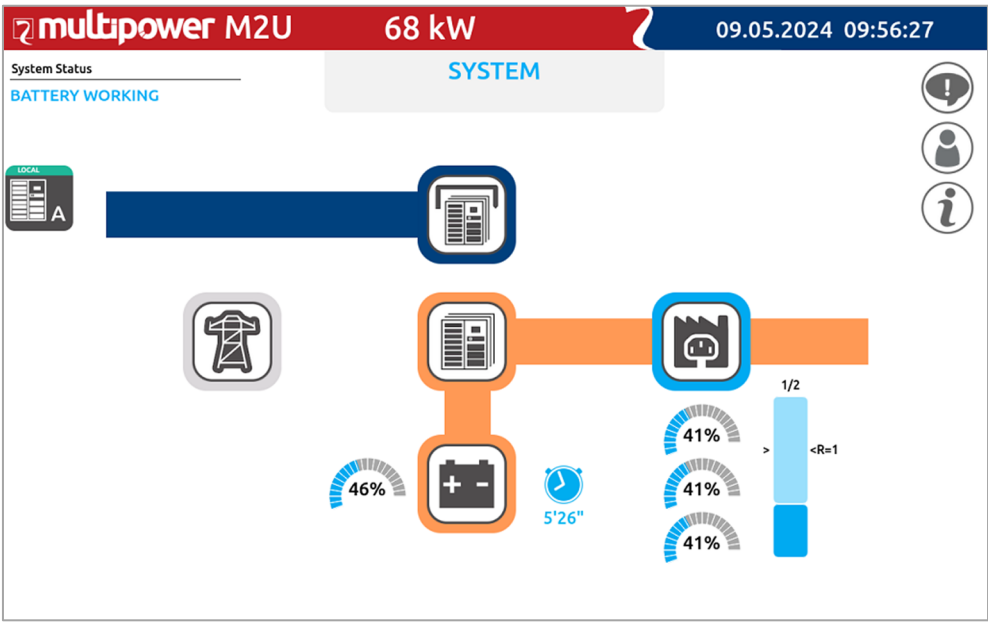
The home page provides a schematic view of the overall operating condition of the SYSTEM. It is possible to interact with the SYSTEM and access further information via the icons.
Depending on the current state of the SYSTEM, this page may assume different appearances as shown in the examples below.
The following are some examples of the home page whilst displaying various operating conditions:

NOTE: The example shows a 68kW SYSTEM.

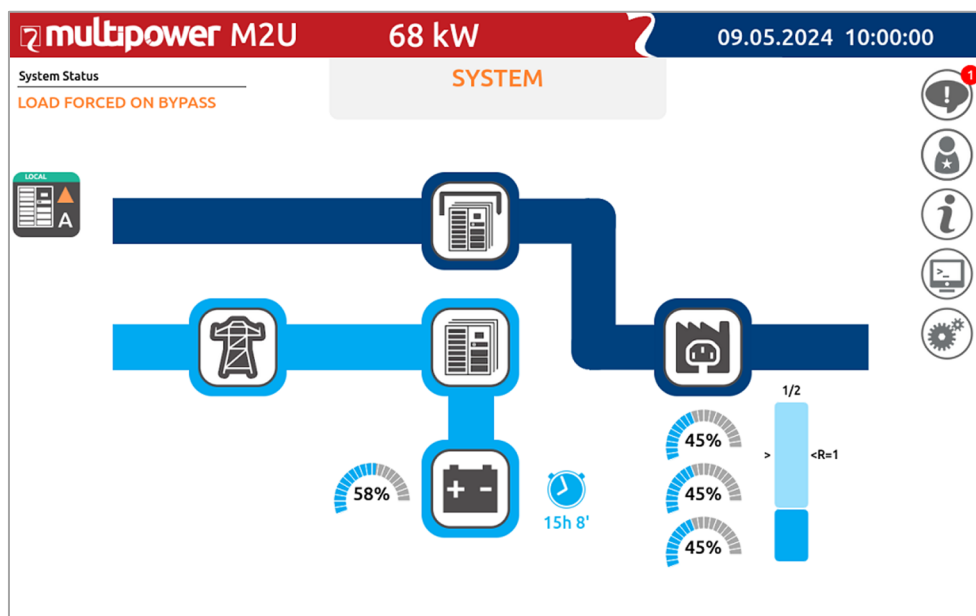


Home page displaying SYSTEM in ON LINE mode (load on inverter)

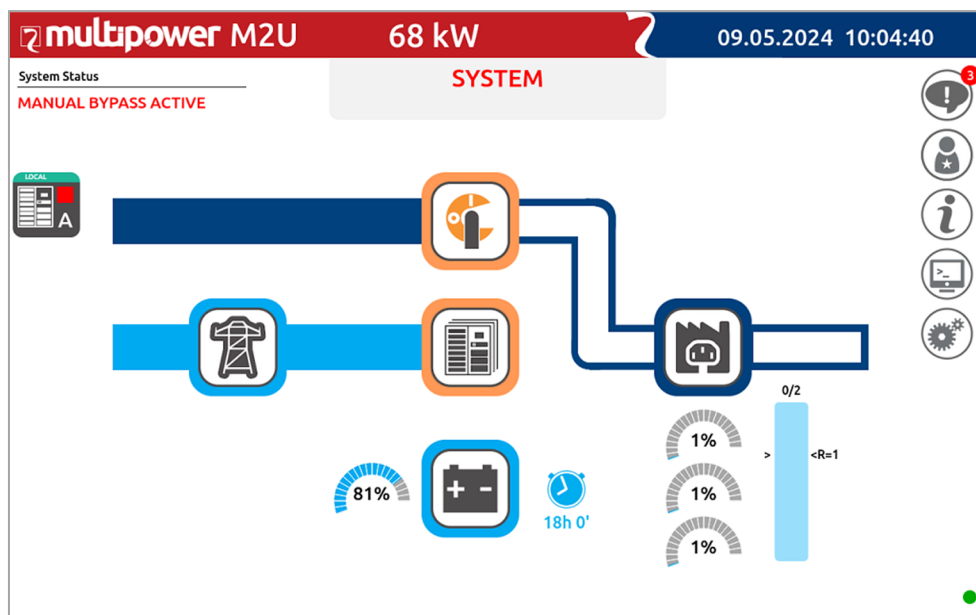
NOTE: In this following screen, we will refer to a Single Input System.



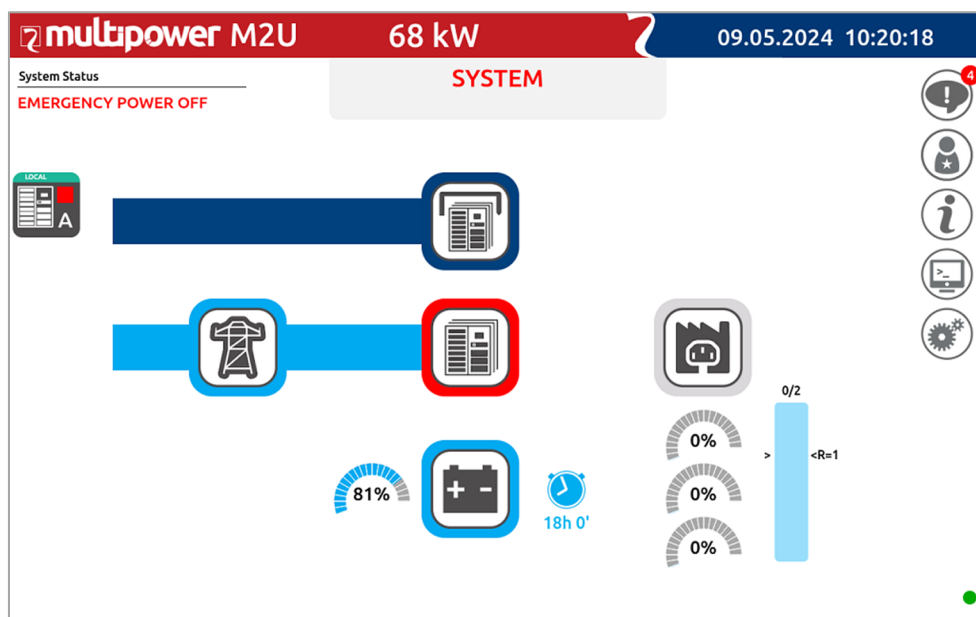
Home page displaying BATTERY WORKING status



Home page displaying SYSTEM in STATIC BYPASS mode (load forced on bypass)



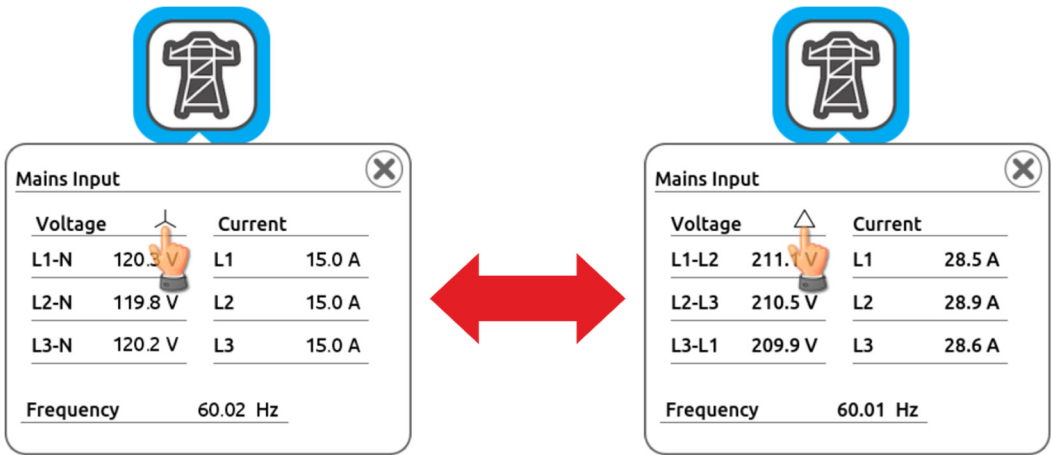
Home page displaying MANUAL BYPASS SWITCH CLOSED (load supplied solely via the external manual bypass)



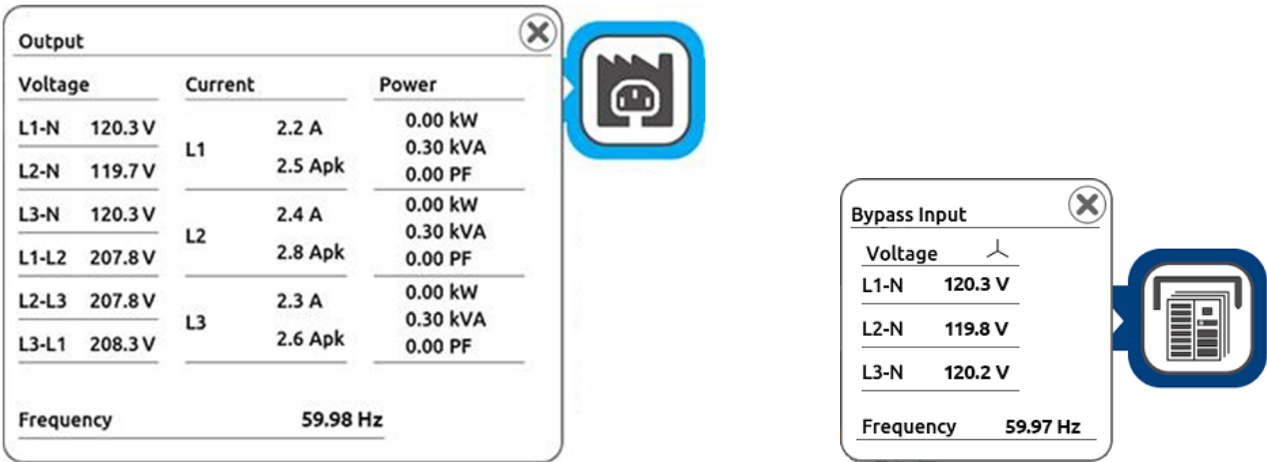
Home page displaying System with EPO (Emergency Power Off) ACTIVE

SYSTEM MEASUREMENTS

Through the icons on the Home page it is possible to access the pop-up screens that display the main electrical values of the system.

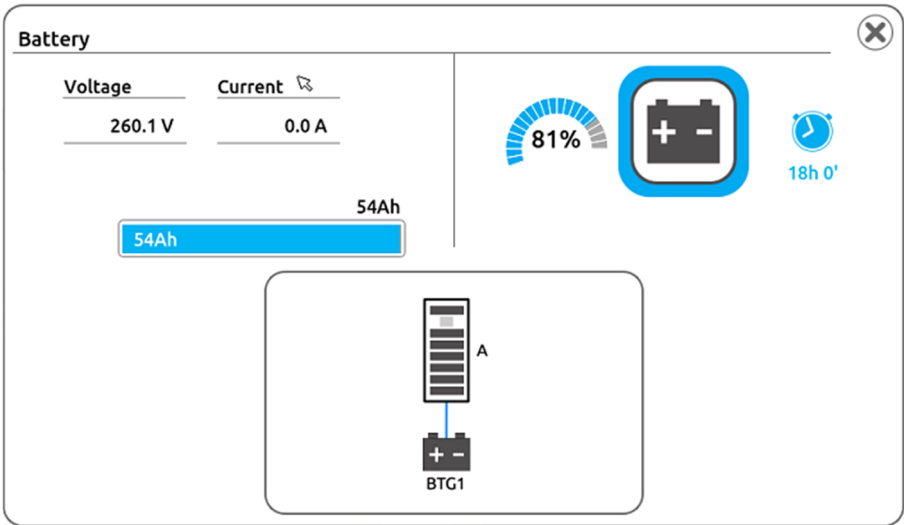


Mains Input page:
displays the status and the parameters relating to the system input.
By pressing the indicated symbols, it is possible to switch from one image to another.



Output status page:
displays the status and the parameters of the system output

Bypass section page:
displays the status and the parameters of the system bypass line



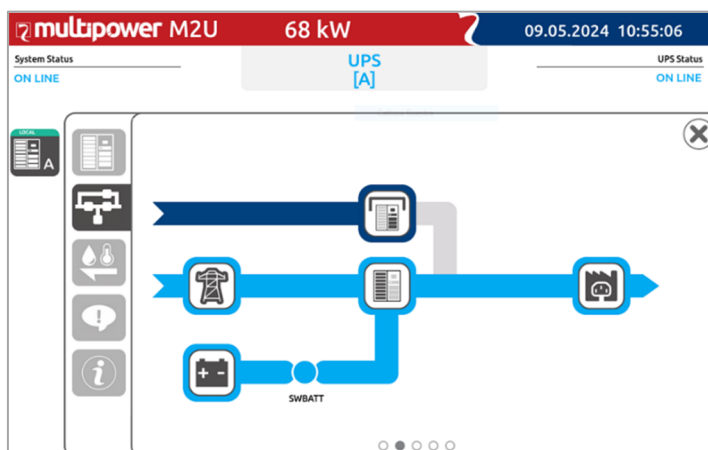
Battery status page:
displays the status and the parameters related to the system batteries

SYSTEM STATUS

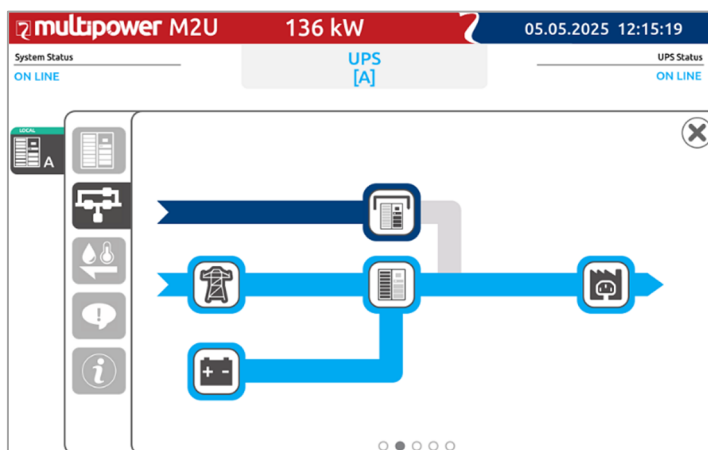
Through the central icon called “System status” it is possible to view all the synoptics of the UPS present in the system..



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



M2U 68 CBC 6



M2U 140 PC0

MENU ENTRIES

On the right side of the Home page there are a series of icons that allow you to set commands, configurations or view various information relating to the SYSTEM.

NOTE: The list of icons changes in relation with the preset access level.



Notifications/alarm



Access level selection

NOTE: the icon changes depending on the preset access level (see “Access level selection” paragraph)



Global System information



Command panel

NOTE: available only with “Power User” or “Expert” access level



Settings menu

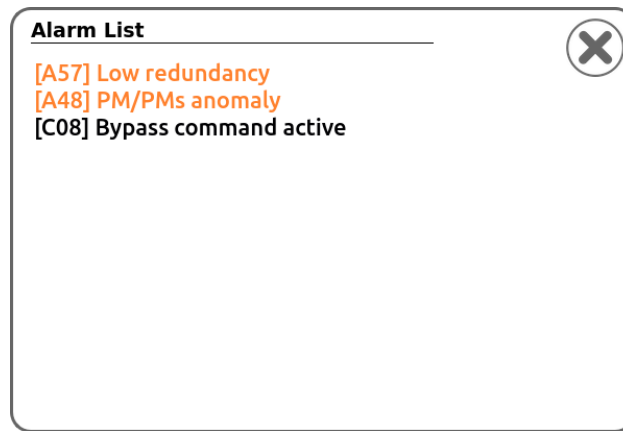
NOTE: available only with “Power User” or “Expert” access level

NOTIFICATION/ALARM



In the case of a particular events (command, warning, anomaly or alarm) a notification number icon will also be present indicating the existence and number of events that are active at that time.

If you tap on the icon, a pop-up will appear showing the individual alarms in detail.



In the list of alarms:

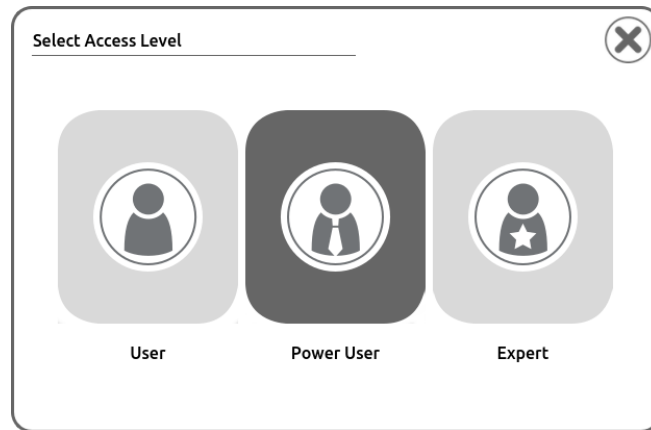
- Black messages indicate Command (C) alarms;
- Orange messages indicate Warning (W) or Anomalies (A) alarms;
- Red messages indicate Lock (L) or Faults (F) alarms.

For the alarm code list, refer to the "STATUS/ALARM CODES" chapter.

ACCESS LEVEL SELECTION



This icon enables the selection of the access level for the user operating the System. If preset, a safety password may be requested, based on the selected level.
NOTE: the icon may be different depending on the preset access level



Access level selection page



User: only allows you to view data and information from the System, UPS, PM. With this level it is not possible to operate on the system, access commands, configurations or change system settings.



Power User: adds the ability to operate on the System, access commands or change system settings. Setting the Power User password prevents access to the “Command launcher” and “Settings menu” to unauthorised users.



Expert: adds the ability to configure and modify ALL System parameters. This level is reserved only for trained personnel with knowledge of the System parameter configuration. A password is required. Insert the preset password “**expert**” to access this level.

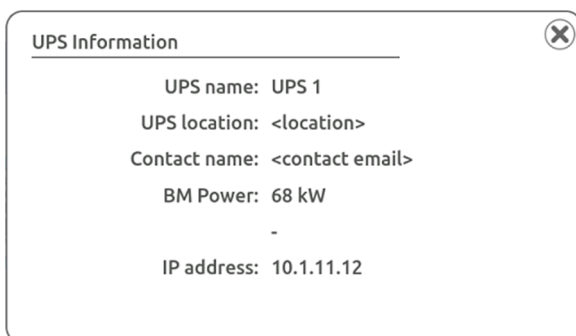
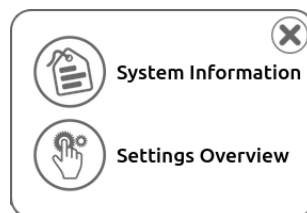
NOTE: the password may be different to the default setting if it has been previously configured. To set/change your password refer to the “Change Password” paragraph.

GLOBAL SYSTEM INFORMATION



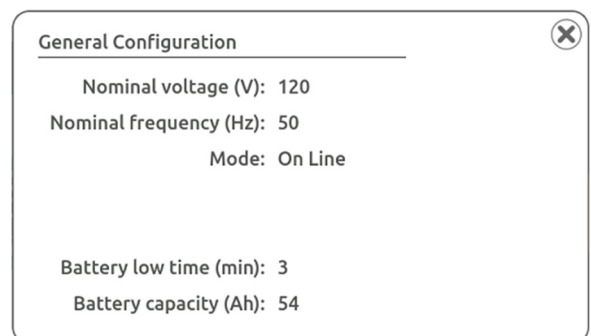
Through this icon it is possible to view general information about the System. By tapping on it a pop-up will appear to choose which information to see in detail.

NOTE: The example shows a 68kW SYSTEM.



System Information

allows you to view general System information. (System name, IP address, Display software, etc.).



Settings Overview

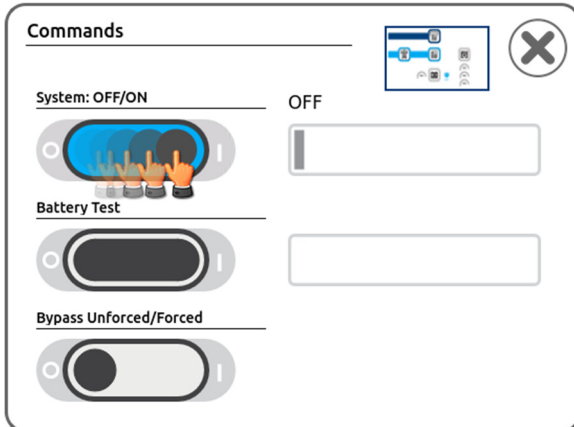
allows you to view the overall System parameters set by the user.

COMMAND PANEL

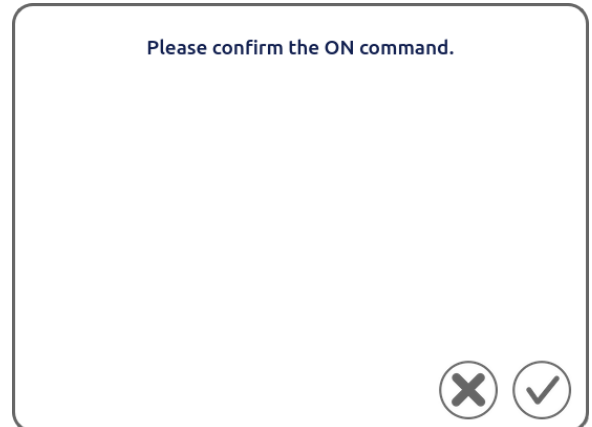


Through this icon it is possible to activate the various System On/Off commands.
By tapping on it the System commands panel will open.
NOTE: available only with "Power User" or "Expert" access level.

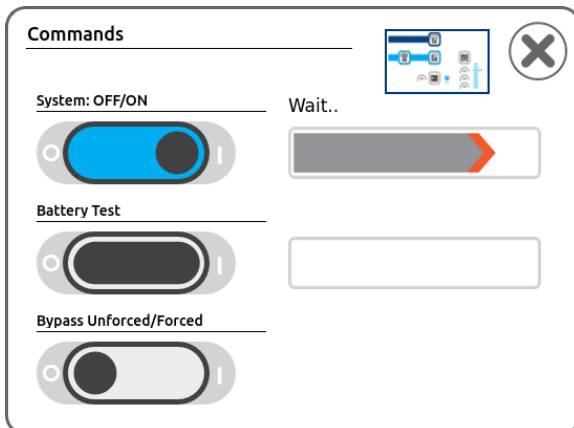
SYSTEM OFF/ON COMMAND



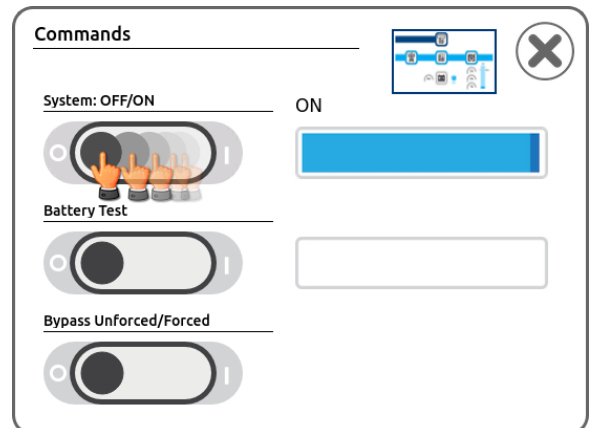
Operate the sliding switch from O to I to switch the System ON.



A confirmation of the action is required for some of the commands.



After confirmation, a bar will show the progress of the command completion.



Operate the sliding switch from I to O to switch the System OFF.

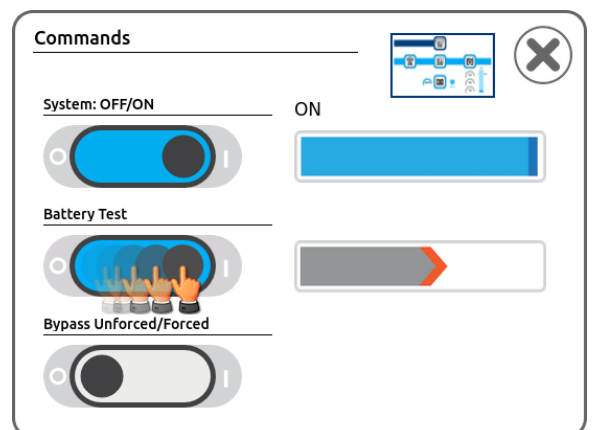
BATTERY TEST COMMAND

Operate the sliding switch from O to I to execute the battery test.
The progress bar shows the progress of the battery test.

Our system are equipped with a built-in battery test function. This function forces the system to work from battery and monitors the battery voltage under load to check if the battery is healthy.

NOTE: the System switches to battery just for the short time needed to execute the battery test and only when the main supply is present as backup, therefore the battery charge level and the load safety are not compromised.

The battery test is activated only when the System is ON, the SWOUT is closed and the battery charge level is $\geq 90\%$. Otherwise, the test will not be executed immediately, however the command remains active and the battery test will start as soon as these conditions are met.



BYPASS UNFORCED/FORCED COMMAND

Operate the switch from O to I to switch the System on static bypass. A confirmation is required.

NOTE: This command is available only if the System ON command is activated and, if enabled, the System will be switched into bypass. If the System is in Stand-by mode, the command is disabled. Switch the Bypass Unforced/Forced command to "O" to switch the load back onto the inverter.

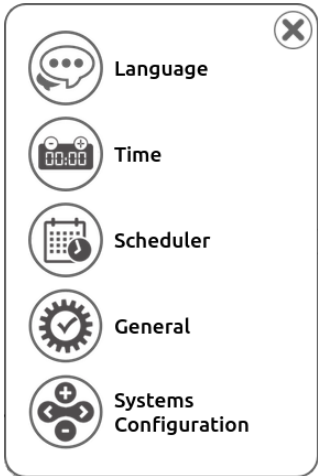


SETTINGS MENU




Tap the Settings Menu icon to access the list of System settings icons.
NOTE: available only with “Power User” or “Expert” access level.

“Systems Configuration” icon is available only with “**Expert**” access level.



“Settings Menu” page in the “**Expert**” mode

To make the changes to the various settings effective, it is necessary to confirm the operation with the appropriate button .

LANGUAGE CONFIGURATION



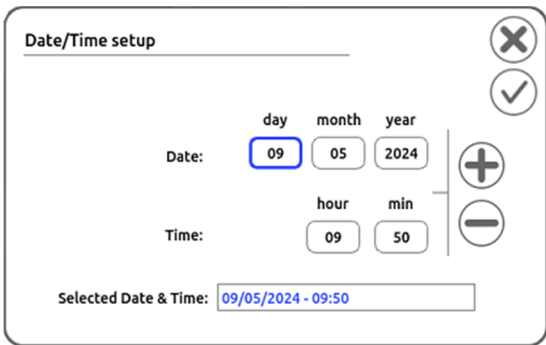
Enables the language configuration of the system menus.
Tap the flag to select the language.



DATE AND TIME SETTING



This screen enables the user to configure the date and the time of the system.



SCHEDULED OPERATIONS SETTING

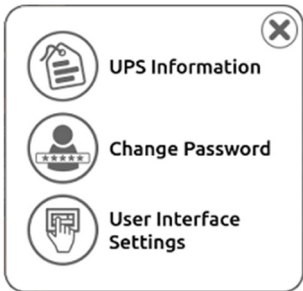


This screen enables the configuration of the scheduling for some automatic operation (e.g. battery test)

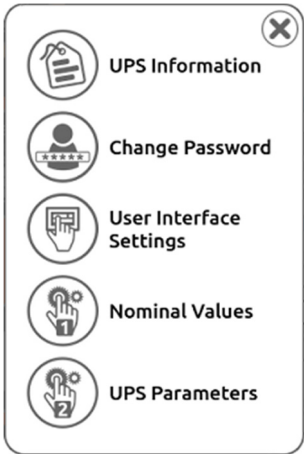
GENERAL SYSTEM SETTINGS



Through this icon it is possible to access the General System settings menu.
NOTE: The list of icons changes in relation with the preset access level.



“General” menu in the “Power user” mode



“General” menu in the “Expert” mode

SYSTEM INFORMATION

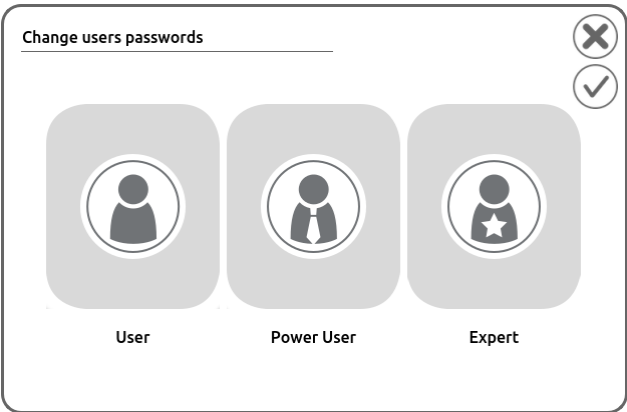


Through this icon you can enter the system name, place of installation and a reference ID for the system.

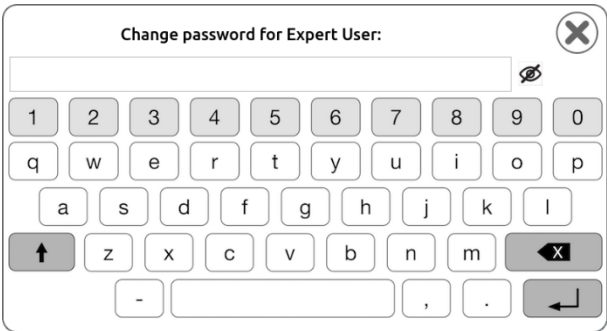
CHANGE PASSWORD



Through this icon it is possible to set or change the password for the various access levels.
NOTE: password protection has to be configured from the higher user level.



“Change users passwords” page



Keyboard for entering password

Touch one of the three user icons matching the access level for which it is intended to set or change the password and type/change the password.

To validate the new password, after entering it you must confirm using the appropriate icon



WARNING:
If no password is configured for a given user-level, the function relative to that access level are available to anyone.
Pay attention not to forget the password. If the access level password is forgotten, it is impossible to access the specific operations for that level.

USER INTERFACE SETTINGS



Through this icon it is possible to set:

- Timeout home page: the inactivity period (in minutes) after which the Home page will be displayed
- Buzzer Mode: enable/disable the buzzer

NOMINAL VALUES



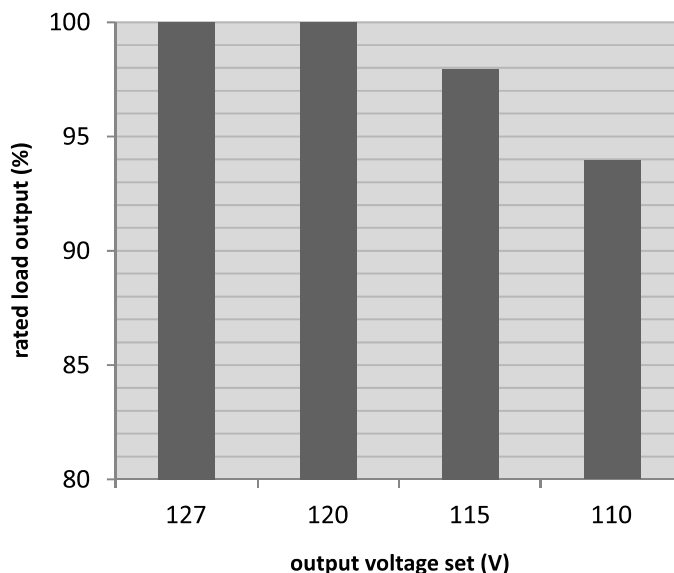
From this screen, available only with **Expert** access level, the user can set the rated output voltage, the frequency and the operation mode

WARNING: These settings must be correctly configured by expert personnel only; improper settings can lead to severe damage of the load connected to the System output.

Nominal frequency configuration

Operating Mode configuration

Nominal voltage (V): to set the desired output voltage, tap on the corresponding select box. The first selection is customisable by writing the voltage in the text box. By selecting a low output voltage (110 and 115V), the output power will be consequently reduced. Refer to the graph below:



Nominal frequency (Hz): To set the desired output frequency, tap on the corresponding select box. Preset frequencies are 50 and 60 Hz. Custom output frequencies are set by using the service configuration software. If a custom output frequency is set the value can be read within the text box.

NOTE: The frequency setting is available only when the UPS is in stand-by or the output switch is open.

Mode: select the desired operational mode from the drop-down menu. Refer to the Chapter “OPERATING MODE” for further details.

UPS PARAMETERS



From this screen, available only with **Expert** access level, the user can set the estimated runtime (expressed in minutes between 1 and 60), below which the system displays the battery low alarm and the buzzer starts to beep. [Default → 3 min].

Ups Parameters
✕

✓

Battery Low Time: (1-60)

ADVANCED SYSTEMS CONFIGURATIONS



Through this icon it is possible to access the advanced System configurations.

NOTE: available only with “Expert” access level.

IMPORTANT: this level is reserved only for trained personnel with knowledge of the System parameter configuration.

From this screen it is possible to activate/deactivate the modules of each individual UPS present in the System, configure the batteries, set the maximum power of the System. The current configuration of the selected UPS is displayed in the center of the screen.

Systems
✕

✓

SMU

PM3

✓

PM2

✓

PM1

✓

BM

BU (6/12)

M2U 68 CBC 6

Systems
✕

✓

SMU

PM5

✓

PM4

✓

PM3

✓

PM2

✓

PM1

✓

BM

PM power: 34 kW

M2U 140 PC0

The power module size (PM20/20kW, PM25/25kW, PM34/34kW) must be specified before selecting the number of modules installed in the system.

Select the power module type:

☐
20 kW

☐
25 kW

☐
34 kW

✕
✓

SYSTEM CONFIGURATION



Systems



Allows selection of the UPS to be configured.
Using the + and - keys it is possible to add or delete one or more UPSs from the System.



Module configured as present in the System.



Module configured as not present in the System.



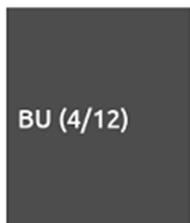
Module not selectable



Selects all of the elements within the UPS.

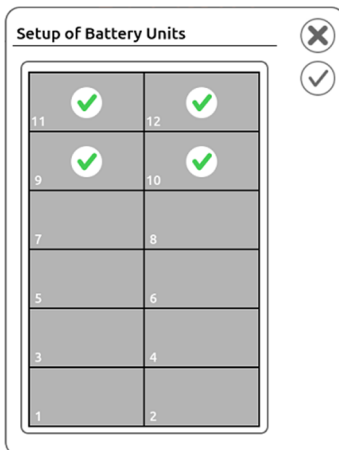


De-selects all of the elements within the UPS.



Setup of Battery Units

BATTERY UNITE CONFIGURATION



Through this icon it is possible to access the batteries unit configurations



Battery module configured as present in the System.



Battery module configured as not present in the System.

BATTERIES CONFIGURATION



Through this icon it is possible to access the batteries configurations.

There are 2 possible battery connection types:

- Shared: with a single battery connection shared by all the UPS within the system.
- Separate: each UPS Cabinet is connected exclusively to one or more Battery Cabinets electrically separated from the Battery Cabinets connected to the other UPS.

According to the chosen battery connection, it is possible to select the battery type and set the battery capacity (Ah).

Setup of Battery Groups

Choose battery group connection type:

A

B

BTG1

Battery Capacity:

1 x 600 Ah

Total System capacity: 600

Shared batteries

Setup of Battery Groups

Choose battery group connection type:

A

B

BTG1

BTG2

Battery Capacity:

2 x 600 Ah

Total System capacity: 1200

Separated batteries

SYSTEM POWER SETUP



Through this icon it is possible to setup the desired System power.
Redundancy will be automatically calculated based on the set power compared to the system configuration.

Setup of System Power

Enter the desired system power: 68 kW

The System will have redundancy: 0

M2U 68 CBC 6


Setup of System Power

Enter the desired system power: 136 kW


The System will have redundancy: 0

M2U 140 PC0

SECTION 2 - UPS

- 

The UPSs connected to the SYSTEM are shown on the left side of the Home page. Every UPS that composes the System has a unique address (identified by a letter from A to D). The label LOCAL informs that this display belongs to this specific UPS.

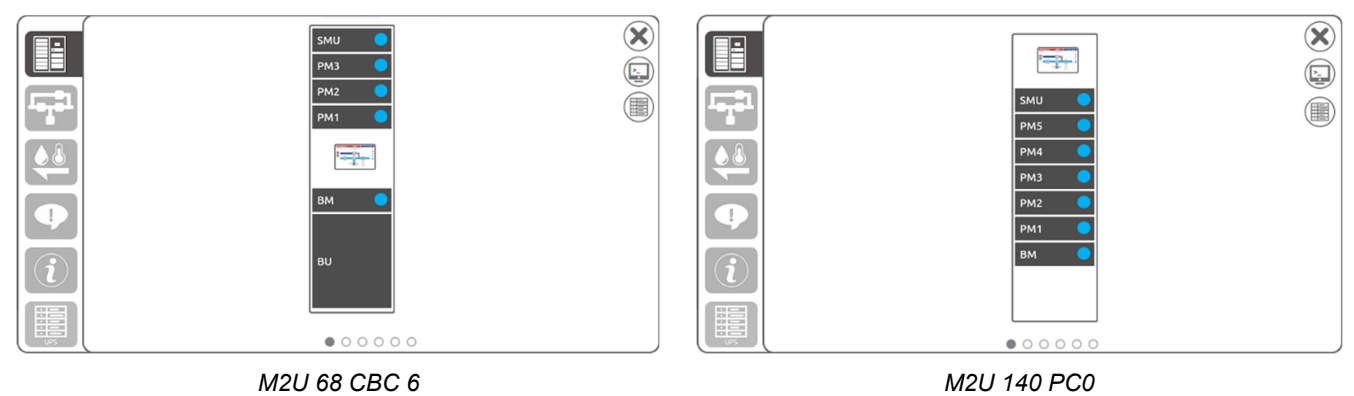
NOTE: alongside there is an example of a parallel system composed by 2 UPSs
- 

Some symbols may appear inside the icon, which identify a particular state of the related UPS. For further information about symbols, refer to “UPS/modules status” paragraph in this section.



By tapping on the icon of one of the UPS, you will access the configuration and status page of the selected UPS.


On the side there are various selectable tabs, explained below, to set or monitoring in detail the main parameters of the selected UPS.


“UPS STATUS” TAB





The first tab shows the graphic composition of the UPS and the current status of the parts that compose it, specifically:


-  or 

Indicates the status of the external Maintenance Bypass Switch of the selected UPS.
BLUE: Switch open - ORANGE: Switch closed
- 

By tapping the display icon, it is possible view the local display information
- 

Depending on the symbol displayed, reports the status of the various available modules (PM, BM, SMU). For further information refer to the next paragraph “UPS/modules status table”
- 

Module configured as not present in the System
- 

UPS Command Panel (*Power User* and *Expert* level only). Allows you to turn the UPS On or Off. For operation, follow the same instructions given in the SECTION 1, “Command Panel” paragraph
- 

By tapping this icon (available only in expert mode) you can view the UPS alarm history (modules also have their own specific alarm history table).

“HISTORY ALARM” TAB

Event log of UPS A

E	Type	DateTime	Code and Description
		28-01-24 17:23:25	[L23] Output overload L1
		28-01-24 17:23:25	[L24] Output overload L2
		28-01-24 17:23:25	[L25] Output overload L3
		28-01-24 17:23:25	[F64] PM/PMs fault/lock
		28-01-24 17:23:25	[L63] Bypass locked
		28-01-24 17:23:25	[E14] Load on bypass
		28-01-24 17:23:25	[A22] Load > user threshold L1
		28-01-24 17:23:25	[A23] Load > user threshold L2
		28-01-24 17:23:25	[A24] Load > user threshold L3
		28-01-24 17:55:38	[A56] PM/PMs commLost
		-----	[E08] Power On
		-----	[E08] Power On

Command

Warning

Anomaly

Fault

Lock





Event start

























Event End















This tab represents alarm of UPS or modules





UPS/MODULE STATUS

In addition to the colors that can highlight anomalies/alarms or operating states of the UPS, thanks to particular pictograms, the status of UPS and each individual module (PM, BM, SMU) is reported.

UPS STATUS	NORMAL OPERATION	ANY ANOMALY-WARNING	ANY FAULT	ANY LOCK	ANY COMM LOST
PRESENT					
COMM LOST					

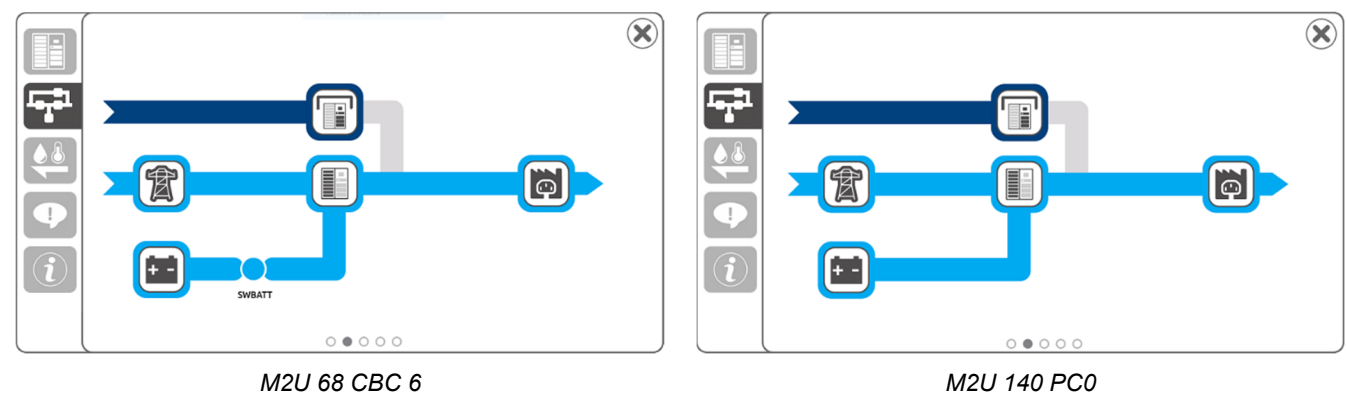
PM STATUS	NORMAL OPERATION	ANOMALY-WARNING	FAULT	LOCK	COMM LOST
STAND-BY					
PRECHARGE					
STARTING - CALIBRATION					
WAIT BATTERY RECHARGE					
LOAD ON INVERTER					
FROM BATTERY					
LOAD ON BYPASS					
EFFICIENCY CONTROL					
LOCKED					
COMM LOST					

BM STATUS	NORMAL OPERATION	ANOMALY-WARNING	FAULT	LOCK	COMM LOST
STAND-BY					
SWITCH ON					
READY					
LOAD ON BYPASS					
LOCKED					
COMM LOST					

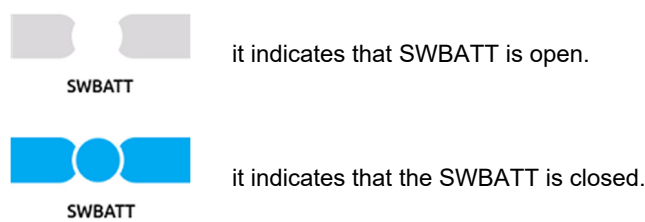
SMU STATUS	NORMAL OPERATION	ANOMALY-WARNING	FAULT	COMM LOST
PRESENT				
COMM LOST				

"UPS SYNOPTIC" TAB

This tab provides a schematic view (synoptic) of the overall operating condition of the selected UPS.



Synoptic caption: SWBATT = Battery Switch



Through the Mains Input, Battery, Bypass Input and Output icons on the synoptic, it is possible to access the pages that display the main electrical values of the selected icon.

Mains Input

Voltage		Current	
L1-N	120.3 V	L1	15.0 A
L2-N	119.8 V		
L3-N	120.2 V	L2	15.2 A
L1-L2	207.8 V		
L2-L3	207.8 V	L3	15.2 A
L3-L1	208.3 V		
Frequency		59.99 Hz	

Example of display of the Mains Input page.
Through the upper tabs, it is possible to access the pages of the various electrical values

"SENSORS" TAB

This tab shows in real time the various data detected by the sensors installed on the UPS.

Sensors

Temperatures

Cabinet29.7 °C

SMU33.0 °CHumidity38.6 %

ExternalN.A. °C

"ALARM LIST" TAB

This tab shows any alarms present on the UPS.
For further information about this list, please refer to SECTION 1, "Notification/alarm" paragraph.

Alarm List

[C05] Manual bypass command

- 47 -

"FIRMWARE/SERIAL NUMBER" TAB

Through this tab it is possible to view the firmware version and serial number of the various elements of the UPS.

using the appropriate icon on the right it is possible to switch from viewing the firmware to viewing the serial number:

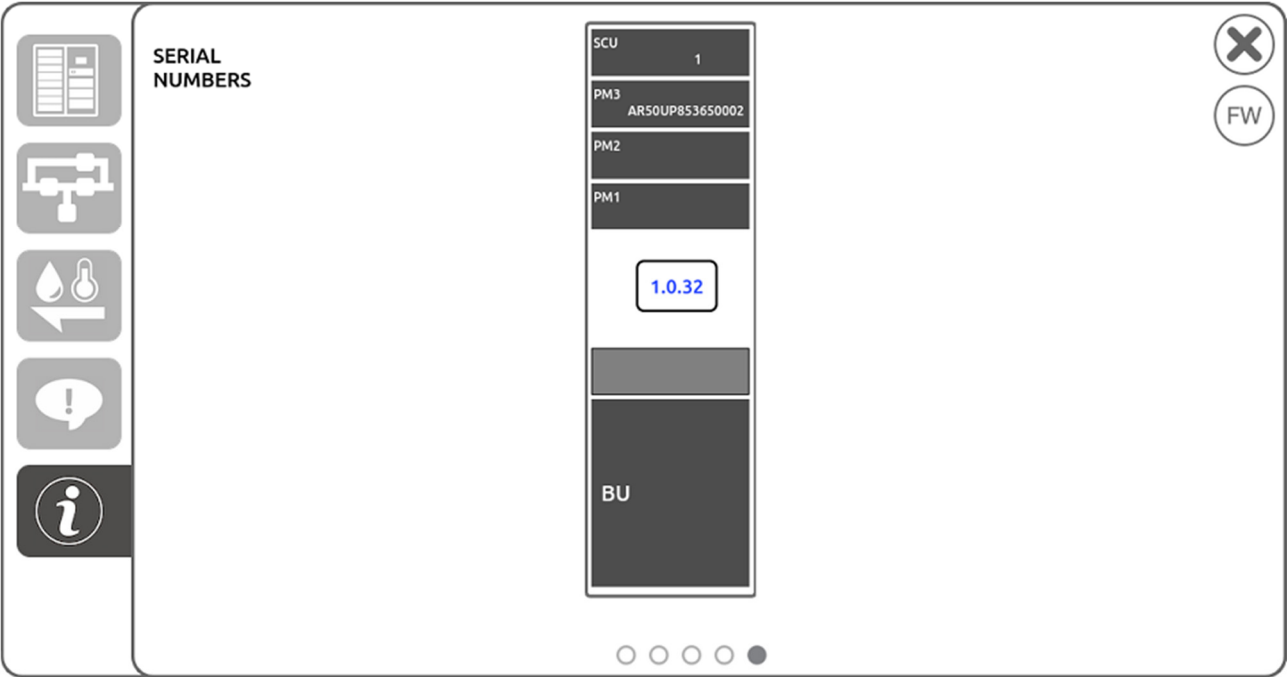
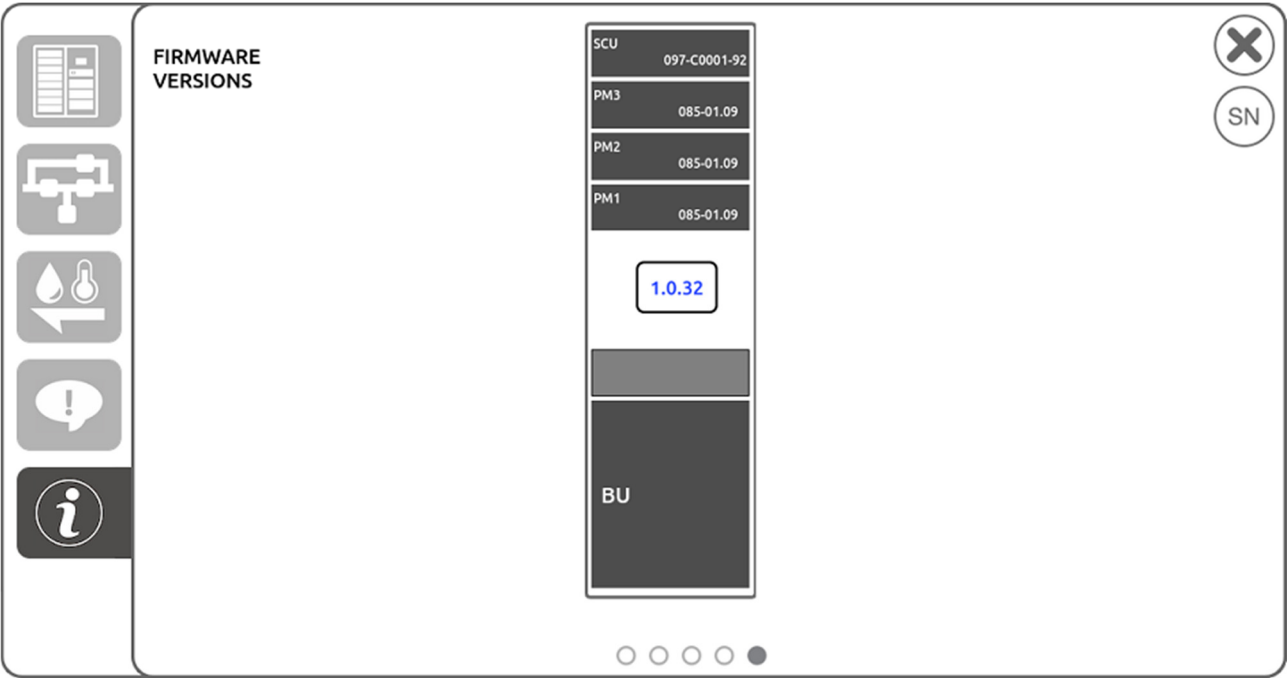


switches to the serial number display



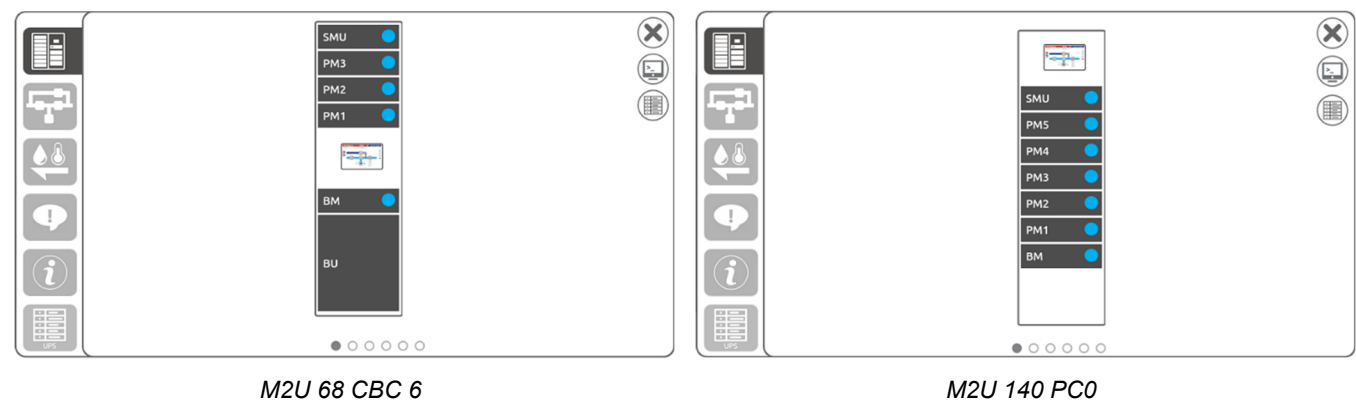
switches to the firmware version display


NOTE: The example shows a 68kW SYSTEM.



SECTION 3 - MODULES

From the "UPS status" tab described in the previous chapter, it is possible to access information relating to the elements that compose the UPS. In the representation of the UPS displayed in the centre of the screen, by tapping on the image of one of the present modules (PM, BM, SMU) you will access the configuration and status page of the selected element.

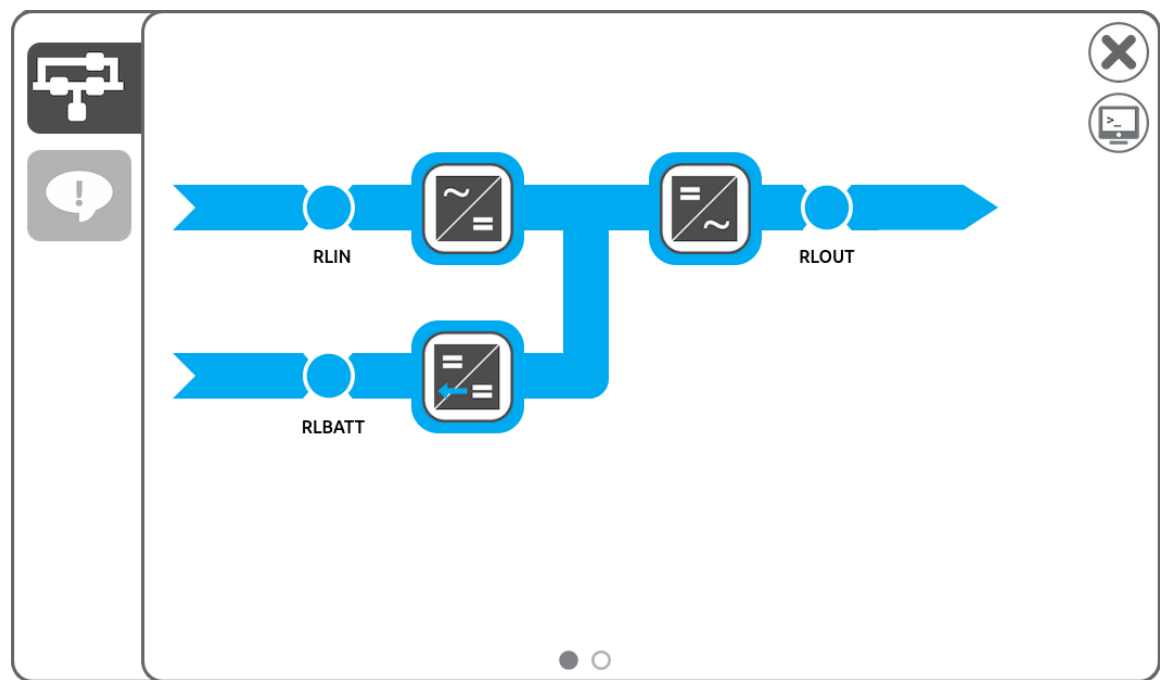


 Depending on the module selected (PM or BM), this is the Command Panel of the corresponding module (*Power User* and *Expert* level only). Allows you to turn the module selected On or Off. For operation, follow the same instructions given in the SECTION 1, "Command Panel" paragraph.



POWER MODULE (PM) PAGE

"PM STATUS" TAB

This tab provides a schematic view (synoptic) of the overall operating condition of the selected PM.



Synoptic caption: *RLIN* = Input relay; *RLOUT* = Output relay; *RLBATT* = Battery relay.

-  it indicates that the corresponding relay is closed.
-  it indicates that the corresponding relay is open.

“ALARM LIST AND INFO” TAB

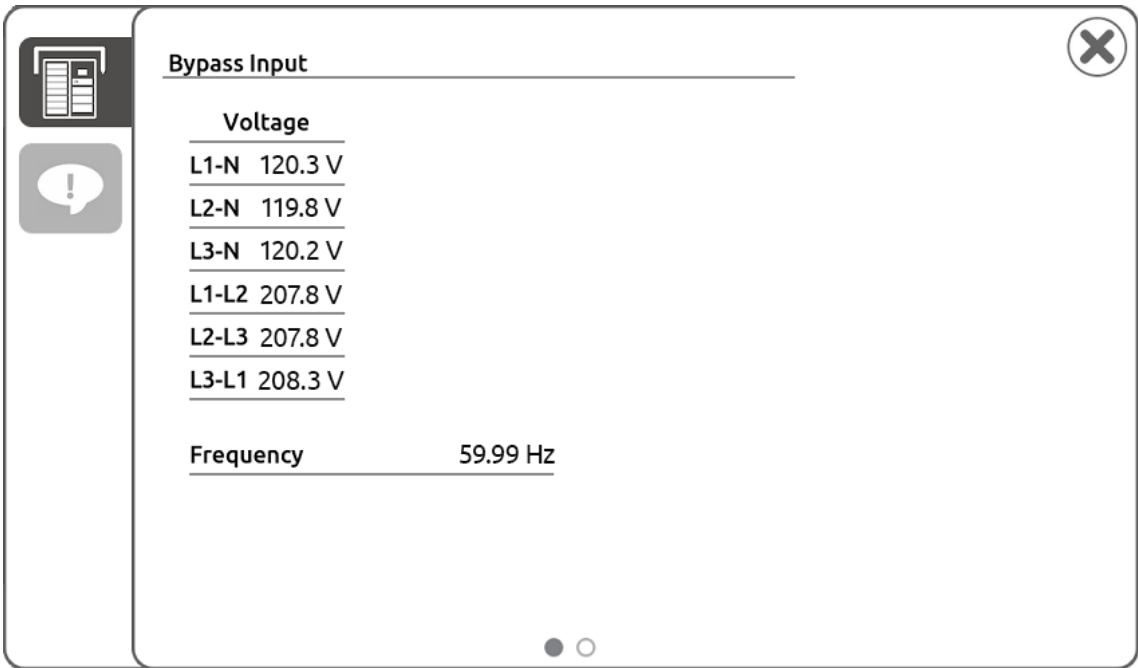


This tab shows any alarms present on the Power Module.
Furthermore, here are shown the main information of the PM (P/N, S/N, FW, Type).
For further information about the alarms please refer to SECTION 1, “Notification/alarm” paragraph.

BYPASS MODULE (BM) PAGE

“BM ELECTRICAL VALUES” TAB

Through this tab it is possible to view the main electrical values of the Bypass Module.



“ALARM LIST” TAB

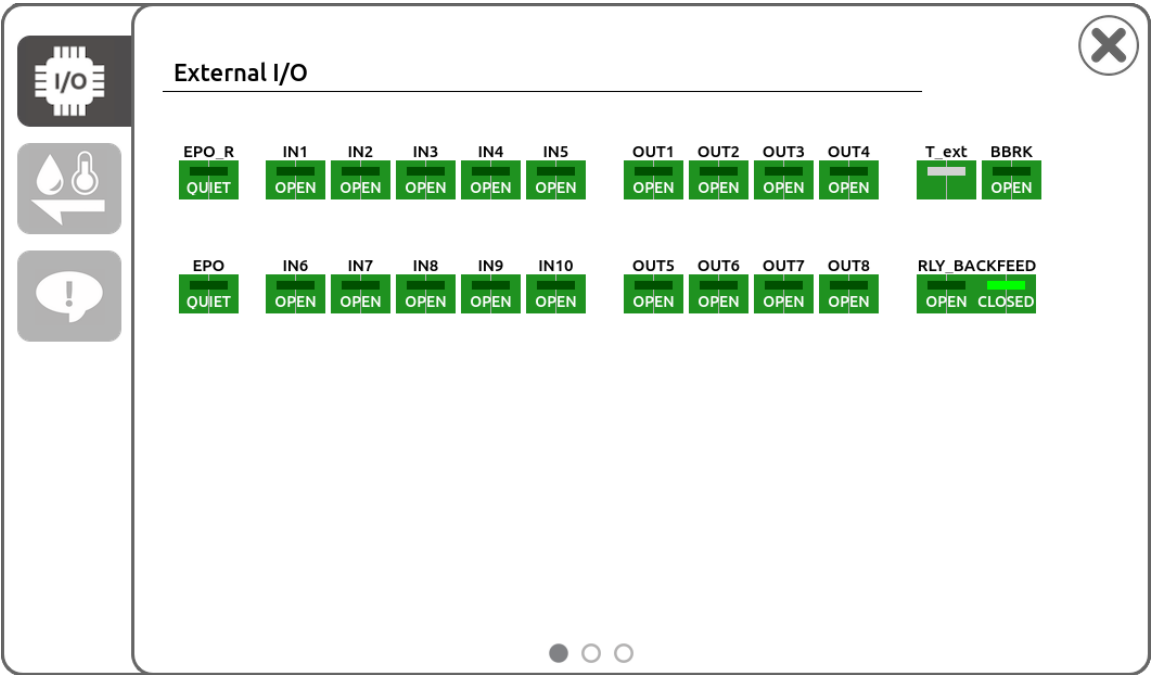


This tab shows any alarms present on the Bypass Module.
For further information about the alarms please refer to SECTION 1, “Notification/alarm” paragraph.

SYSTEM MONITORING UNIT (SMU) PAGE

“EXTERNAL I/O” TAB

The first tab shows an image of the status of the SMU, specifically the status of the I/O communication ports for remote monitoring. The contact ports used are highlighted. Furthermore, each port contains a description of its status. For further information regarding the SMU, refer to the “SMU (System Monitoring Unit)” paragraph in the first part of the manual.



“SENSORS” TAB

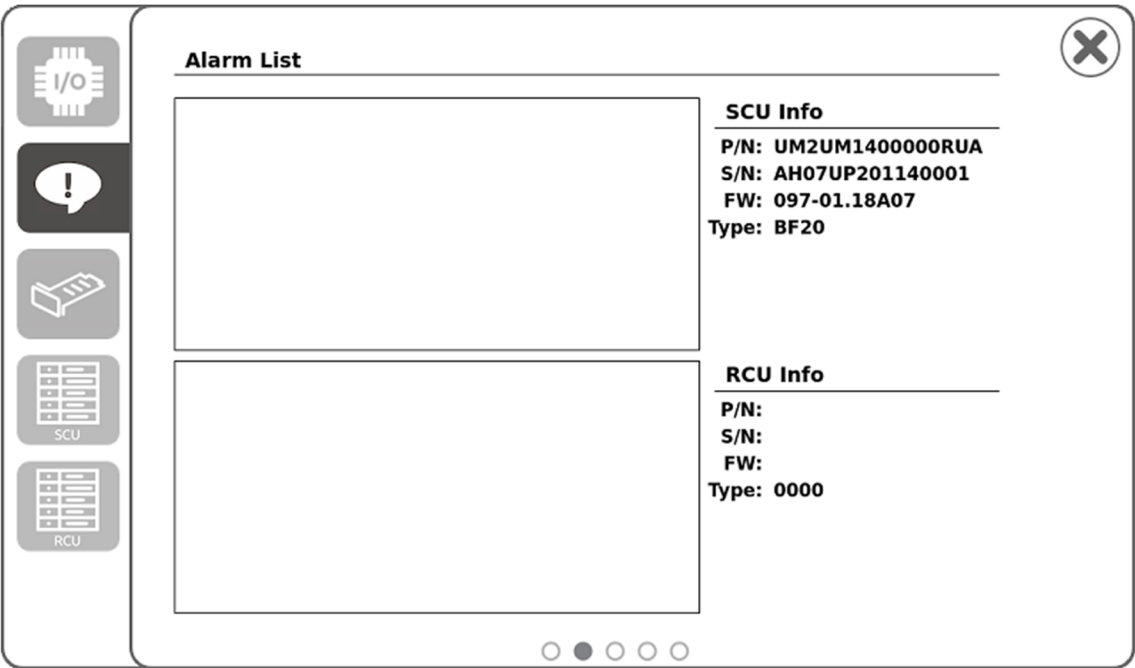


This tab shows in real time the various data detected by the sensors installed on the SMU. Since this is a copy of the same tab already displayed in the UPS section, for further information please refer to the SECTION 2 - UPS, “Sensors” tab paragraph.

“ALARM LIST AND INFO” TAB

This tab shows any alarms present on the System Monitoring Unit. For further information about the alarms please refer to SECTION 1, “Notification/alarm” paragraph.

Furthermore, here are shown the main information (P/N, S/N, FW, Type) of the two internal monitoring boards present on the SMU.



OPERATIVE PROCEDURES




Before any attempt to put the system online it is mandatory to check the power supply and connections (PHASE, NEUTRAL, BATTERY). Refer to “M2U Installation manual”.

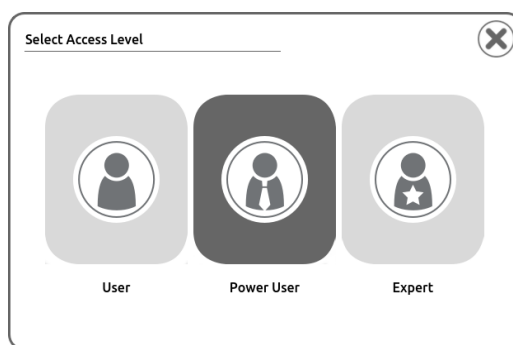
SYSTEM ON COMMAND





Operations to be performed in order to Switch On the MP2.

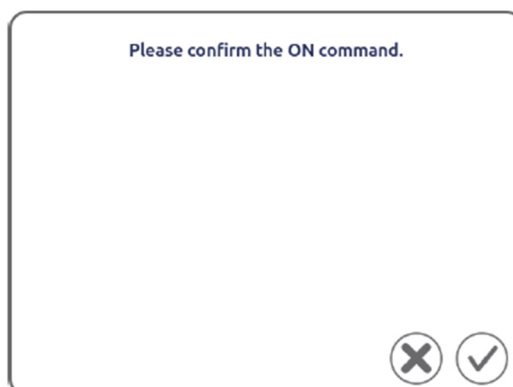
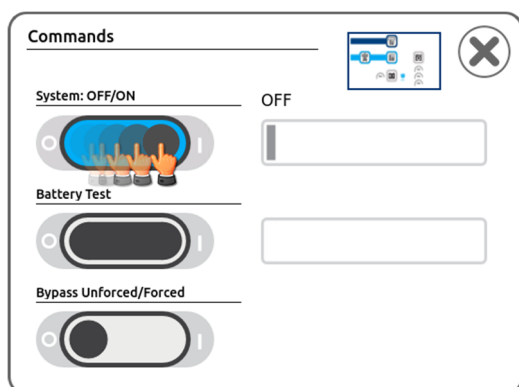
The MP2 can be switched to “Normal Operation” in two ways:

A. SYSTEM ON: DIRECT COMMAND

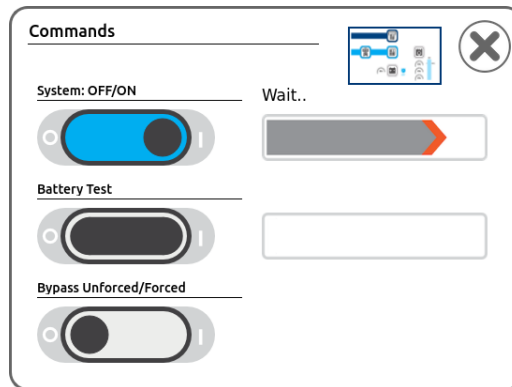
- Switch on the Mains and Bypass Input lines.
- Close the internal SWOUT (if present).
- The System will activate and turn in “STAND-BY WITH CB CB OFF”.
- Press  to select the proper access level and perform the start-up procedure (refer to user manual for further details).



- Verify the Mains  and Bypass  input voltages on the “System Status” page.
- Verify that no anomalies are present on the System status page .
- Verify that all the configured PMs are ready (the red led “ALARM” blinks slowly).
- Verify that Bypass Module has a steady green led on DC OK.
- From the “Commands” Panel page , slide “System OFF/ON” command from “O” to “I” to start the System. Then, confirm “System On command” in the window that appears.






- This command will automatically Start Up the System, showing the progress on the status bar as per the following picture:

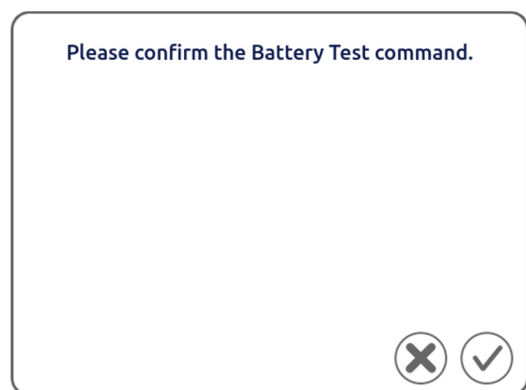
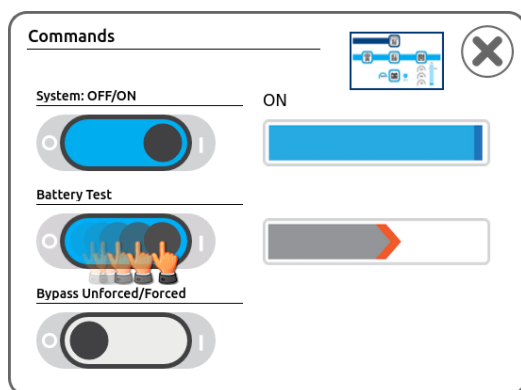


During the start up the unit will:

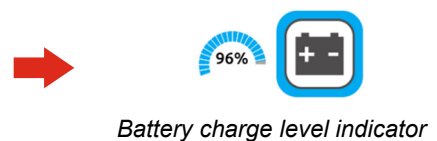
1. Precharge the PMs.
2. Synchronize PMs Inverters.
3. Transfer the load to the Static Bypass Line.
4. Transfer the load on the Inverter Output.

The “Awaiting Start Up” process will take approximately one minute.

- Verify that no anomalies are present on the “System Status” page (except, in case, alarms related to battery status).
- Verify that the measures of inverter voltages  are correct and the System status is “ON LINE”.
- Connect the batteries to the System.
- Check the batteries status  and verify the measures.
- From the “Commands” Panel page  slide the “Battery Test” from “O” to “I” to execute the test. Then, confirm “Battery Test command” in the window that appears.




Note: the battery test is activated only when the System is ON, the SWOUT is closed and the battery charge level is $\geq 90\%$.

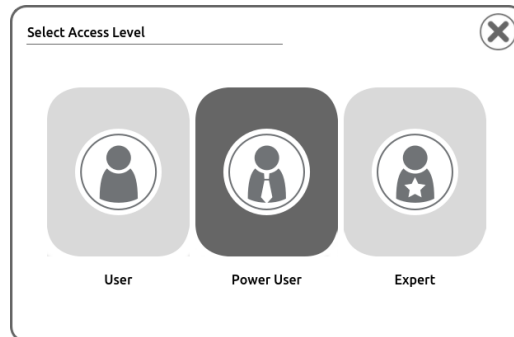





Otherwise, the test will not be executed immediately, however the command remains active and the battery test will start as soon as these conditions are met.

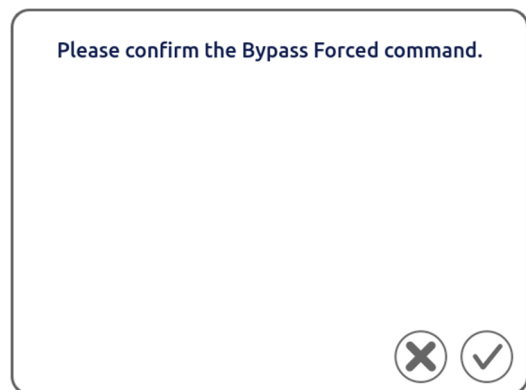
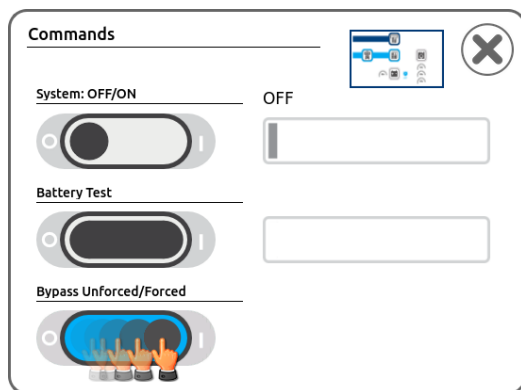
- Verify that the Alarm “Batteries Not Present” is not present.
- From this point the System is in normal operation.


B. SYSTEM ON: VIA STATIC BYPASS

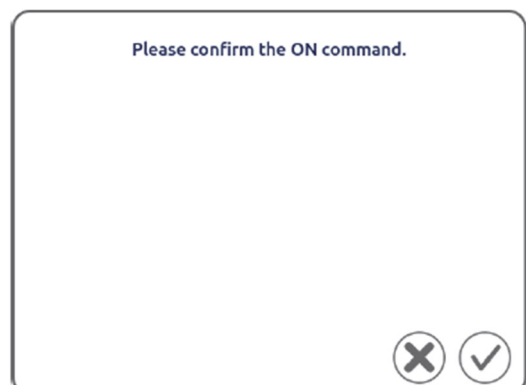
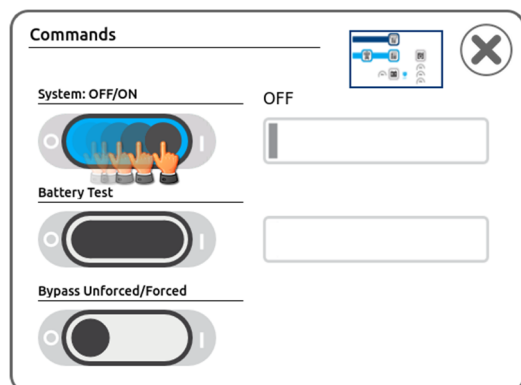
- Switch on the Mains and Bypass Input lines.
- Close the internal SWOUT (if present).
- The System will activate and turn in “STAND-BY WITH CB CB OFF”.
- Press  to select the proper access level and perform the startup procedure (refer to user manual for further details).




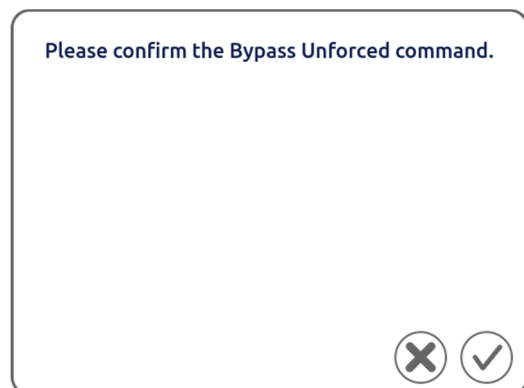
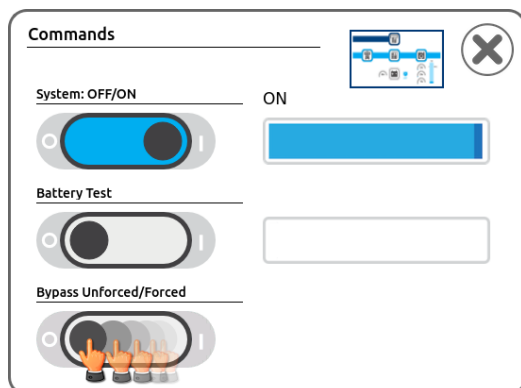
- Verify the Mains  and Bypass  input voltages on the “System Status” page.
- Verify that no anomalies are present on the System status page.
- Verify that all the configured PMs are ready (the red led “ALARM” blinks slowly).
- Verify that Bypass Module has a steady green led on DC OK.
- From the “Command” Panel page , slide “Bypass Unforced/Forced” from “O” to “I” to start the System to static bypass. Then, confirm “Bypass Forced command” in the window that appears (the load will not be supplied yet).






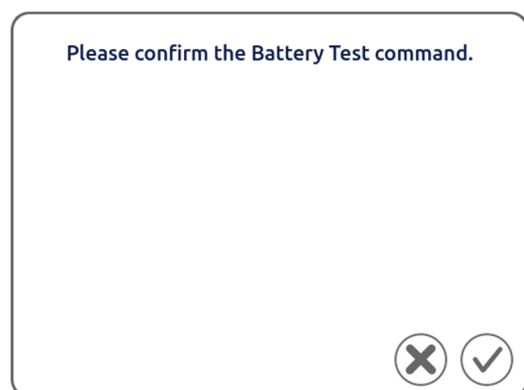
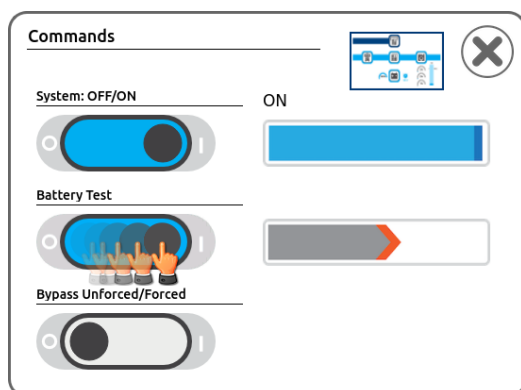
- From the “Commands” Panel page , slide “System OFF/ON” command from “O” to “I” to start the System. Then, confirm “System On command” in the window that appears.



- The power to the load will be supplied via the bypass line. The PMs will be available but not working.
- Verify the output Voltages  on the “System Status” page.
- Deactivate the “Bypass Unforced/Forced” command.
Then, confirm "Bypass Unforced command" in the window that appears.



- The inverter will synchronize all of the PMs ready to start.
- In just few seconds the System will transfer the load from the bypass to the inverter output
- Verify that no anomalies are present on the System status page (except, in case, alarms related to battery status).
- Verify that the output  Voltages and the operational status are correct on the “System Status” page.
- Connect the batteries to the System.
- Check the batteries status  and verify the measures.
- From the “Commands” Panel page  slide the “Battery Test” from “O” to “I” to execute the test.
Then, confirm "Battery Test command" in the window that appears.



Note: the battery test is activated only when the System is ON, the SWOUT is closed and the battery charge level is $\geq 90\%$.



Battery charge level indicator

Otherwise, the test will not be executed immediately, however the command remains active and the battery test will start as soon as these conditions are met.

- Verify that the Alarm “Batteries Not Present” is not present anymore.
- From this point the System is in normal operation.

STATUS / ALARM CODES

Using a sophisticated self-diagnosis system, UPS and PM can check and indicate on the display their status and any errors and/or faults that may have occurred during their operation. When a problem occurs, the UPS and/or PM signal the event by showing the code and corresponding type of alarm on the display.

NOTE: UPS and PM have dedicated codes. Below will be listed first all the status/alarm codes of the UPSs, followed by all the codes of the PMs.

In case of status/alarm, depending on where the signal appears (UPS or PM), refer to the correct section and table.

UPS

STATUSES

These codes indicate the current UPS status.

CODE	DESCRIPTION
S06	Stand-by mode with CB off
S07	Lock stand-by and CB off
S10	Precharge
S11	Precharge from battery
S20	Power off active
S21	Stand-by with CB on
S30	Wait recharge batteries
S31	Calibration
S32	Starting
S40	ON LINE mode
S41	ON LINE / Saving mode
S42	Economy mode
S43	Economy plus mode
S44	Active economy mode
S45	Frequency converter mode
S46	Frequency converter / Saving mode
S47	Ready for emergency
S50	Battery Working
S51	Battery Working forced
S52	Battery low
S60	Temporary bypass
S61	On bypass due to inverter lock
S62	Load forced on bypass
S63	Remote bypass command
S64	Manual bypass active
S65	On bypass due to battery ended
S70	Temporary inverter
S71	On inverter due to bypass lock
S72	Load forced on inverter
S80	Power circulation
S81	Power circulation on battery
S90	Load off
S91	Emergency power off
S92	Disconnected from the load

UPS status list

COMMANDS

These codes indicate that a command has been activated.

CODE	DESCRIPTION
C01	Remote off command
C02	Remote bypass command
C03	Remote on command
C04	Battery test active
C05	Manual bypass command
C06	Emergency off command
C07	Remote battery charger off command
C08	Bypass command active

UPS command list

WARNING

Messages that refer to a specific configuration or operation of the UPS.

CODE	DESCRIPTION
W01	Battery low warning
W02	Shutdown active
W03	Shutdown imminent
W04	Bypass disabled
W05	Synchronisation disabled
W07	Service UPS
W08	Service Battery
W09	BMS status - Warning
W10	BMS cmd - Stop charge
W11	BMS cmd - Stop discharge
W13	Sys. humidity sensor fault
W14	High humidity
W15	Very high umidity
W16	ComRT1 bus degraded
W17	ComRT2 bus degraded
W19	Inconsistent out. powered
W20	Inconsistent batt. working
W21	Inconsistent bypass status
W23	Different MCU firmware ver
W24	PM/PMs warning

UPS warning list

ANOMALIES

Minor problems that do not stop the operation of the UPS, but affect its performance or inhibit the use of some of its functions.

CODE	DESCRIPTION
A01	Configuration data corrupted
A02	Display communication lost
A03	Inverter asynchronous
A04	External synchronism out of range
A05	Mains overvoltage L1
A06	Mains overvoltage L2
A07	Mains overvoltage L3
A08	Mains undervoltage L1
A09	Mains undervoltage L2
A10	Mains undervoltage L3
A11	Mains frequency abnormal
A12	Input switch open
A13	Bypass voltage abnormal L1
A14	Bypass voltage abnormal L2
A15	Bypass voltage abnormal L3
A16	Bypass frequency abnormal
A17	Bypass switch open
A18	Bypass voltage out of range
A22	Load > user threshold L1
A23	Load > user threshold L2
A24	Load > user threshold L3
A25	Output switch open
A26	Battery not present B+
A27	Battery not present B-
A29	System temperature sensor fault
A30	System undertemperature
A31	System overtemperature
A32	Cabinet temperature sensor fault
A33	Cabinet undertemperature
A34	Cabinet overtemperature
A35	Air temperature sensor fault
A36	Air overtemperature
A37	External temperature sensor fault
A38	External sensor overtemperature
A39	Replace battery B+
A40	Replace battery B-
A41	SMU switch ON open
A42	Battery switch open
A43	Alarm from input contact
A44	Main voltage out of range
A45	Load > CSS limit
A46	Deep discharge protection
A47	Different firmware version
A48	PM/PMs anomaly
A49	Date and time not set
A50	Calibration data error A
A51	Calibration data error B
A52	BM switch ON open
A53	BMS status - Anomaly
A54	BMS - Communication lost
A55	ENM - Communication lost
A56	PM/PMs communication lost
A57	Low redundancy
A58	Battery unit high current
A59	Battery unit low current
A60	Battery unit anomaly
A61	Battery configuration error
A62	External output switch open
A63	External input switch open
A64	External bypass switch open

UPS alarm list

FAULTS

Faults are problems more critical than “Anomalies” in that, if they persist, they may bring the UPS to a stop.

CODE	DESCRIPTION
F01	Internal communication error
F02	Mains phases reversed
F03	SCU auxiliary power fault
F06	SCU EPO fault
F08	EPO redundancy error
F09	SWOUT redundancy error
F10	SWMB redundancy error
F11	UGS disconnected
F12	Bypass phases reversed
F13	Vneutral – Vground overlimit
F14	Inverter sinewave abnormal L1
F15	Inverter sinewave abnormal L2
F16	Inverter sinewave abnormal L3
F18	Output Vdc balance error
F19	Battery overvoltage B+
F20	Battery overvoltage B-
F21	Battery undervoltage B+
F22	Battery undervoltage B-
F23	Output overload
F24	Bypass not available
F25	Output negative power
F26	SCU link open
F29	SCU communication lost
F32	Lost redundancy
F33	Bypass overtemperature L1
F34	Bypass overtemperature L2
F35	Bypass overtemperature L3
F36	Bypass fan1 fault
F37	Bypass fan2 fault
F38	Bypass fan3 fault
F39	SMU switch_ON redund. err.
F40	17V_CAB redundancy error
F41	SCU code/FW incompatible
F44	PIB1 communication lost
F45	PIB2 communication lost
F46	ComRT1 bus off
F47	ComRT2 bus off
F48	Battery polarity error
F49	Battery unit fault
F50	SLOT LAN communicat. lost
F51	SLOT communication lost
F52	BMS status - Fault
F53	17V_CAB aux. power fault
F54	Memory access error A
F55	Memory access error B
F64	PM/PMs fault/lock

UPS fault list

LOCKS

Locks indicate a breakdown of the UPS or one of its parts. Locks are normally preceded by an alarm signal. In the event of a fault and resultant breakdown of the inverter, the inverter will be switched off and the load will be powered by the bypass line (this procedure is excluded for breakdowns caused by high and persistent overloads and by short circuits).

CODE	DESCRIPTION
L01	Auxiliary power fault
L03	Bypass fuse fault L1
L04	Bypass fuse fault L2
L05	Bypass fuse fault L3
L08	Bypass backfeed L1
L09	Bypass backfeed L2
L10	Bypass backfeed L3
L11	Bypass output fault L1
L12	Bypass output fault L2
L13	Bypass output fault L3
L14	Inverter overvoltage L1
L15	Inverter overvoltage L2
L16	Inverter overvoltage L3
L17	Inverter undervoltage L1
L18	Inverter undervoltage L2
L19	Inverter undervoltage L3
L20	Inverter sinewave abnormal L1
L21	Inverter sinewave abnormal L2
L22	Inverter sinewave abnormal L3
L23	Output overload L1
L24	Output overload L2
L25	Output overload L3
L26	Output short-circuit L1
L27	Output short-circuit L2
L28	Output short-circuit L3
L29	Bypass auxiliary power fault L1
L30	Bypass auxiliary power fault L2
L31	Bypass auxiliary power fault L3
L38	Bypass temperature sensor fault L1
L39	Bypass temperature sensor fault L2
L40	Bypass temperature sensor fault L3
L45	Parallel bus division
L46	Parallel communication fault
L47	PIB address error
L52	Module link open
L53	Board code/FW incompatible
L58	BMS status - Lock
L63	Bypass locked
L64	All Inverters locked

UPS lock list

PM

STATUSES

These codes indicate the current PM status.

CODE	DESCRIPTION
S06	Stand-by mode with CB off
S07	Lock stand-by and CB off
S10	Precharge
S11	Precharge from battery
S20	Power off active
S21	Stand-by with CB on
S30	Wait recharge batteries
S31	Calibration
S32	Starting
S40	ON LINE mode
S41	ON LINE / Saving mode
S42	Economy mode
S43	Economy plus mode
S44	Active economy mode
S45	Frequency converter mode
S46	Frequency converter / Saving mode
S47	Ready for emergency
S50	Battery Working
S51	Battery Working forced
S52	Battery low
S60	Temporary bypass
S61	On bypass due to inverter lock
S62	Load forced on bypass
S63	Remote bypass command
S64	Manual bypass active
S65	On bypass due to battery ended
S70	Temporary inverter
S71	On inverter due to bypass lock
S72	Load forced on inverter
S80	Power circulation
S81	Power circulation on battery
S90	Load off
S91	Emergency power off
S92	Disconnected from the load

PM status list

COMMANDS

These codes indicate that a command has been activated.

CODE	DESCRIPTION
C04	Battery test active

PM command list

WARNING

Messages that refer to a specific configuration or operation of the UPS.

CODE	DESCRIPTION
W01	Battery low warning
W02	Shutdown active
W03	Shutdown imminent
W07	Service UPS
W16	ComRT1 bus degraded
W17	ComRT2 bus degraded
W19	Phases load very unbalanced

PM warning list

ANOMALIES

Minor problems that do not stop the operation of the PM, but affect its performance or inhibit the use of some of its functions.

CODE	DESCRIPTION
A01	Configuration data corrupted
A03	Inverter asynchronous
A04	External synchronism out of range
A05	Mains overvoltage L1
A06	Mains overvoltage L2
A07	Mains overvoltage L3
A08	Mains undervoltage L1
A09	Mains undervoltage L2
A10	Mains undervoltage L3
A11	Mains frequency abnormal
A13	Bypass voltage abnormal L1
A14	Bypass voltage abnormal L2
A15	Bypass voltage abnormal L3
A16	Bypass frequency abnormal
A18	Bypass voltage out of range
A26	Battery not present B+
A27	Battery not present B-
A29	System temperature sensor fault
A30	System undertemperature
A31	System overtemperature
A32	Buck-boost undertemperature
A33	Inverter undertemperature
A35	Air temperature sensor fault
A36	Air overtemperature
A37	Aux temperature sensor fault
A38	Aux overtemperature
A39	Replace battery B+
A40	Replace battery B-
A41	Switch ON open
A44	Mains voltage out of range
A47	Different firmware version
A49	Date and time not set
A50	Calibration data error A
A51	Calibration data error B

PM alarm list

FAULTS

Faults are problems more critical than “Anomalies” in that, if they persist, they may bring the PM to a stop.

CODE	DESCRIPTION
F01	Internal communication error
F02	Mains phases reversed
F03	Input fuse/contact fault L1
F04	Input fuse/contact fault L2
F05	Input fuse/contact fault L3
F06	Input contact short cct L1
F07	Input contact short cct L2
F08	Input contact short cct L3
F09	Precharge DC bus error B+
F10	Precharge DC bus error B-
F11	Booster fault
F12	Bypass phases reversed
F13	Boost voltage error
F14	Inverter sinewave abnormal L1
F15	Inverter sinewave abnormal L2
F16	Inverter sinewave abnormal L3
F17	Inverter error
F18	Output Vdc balance error
F19	Battery overvoltage B+
F20	Battery overvoltage B-
F21	Battery undervoltage B+
F22	Battery undervoltage B-
F23	Output overload
F24	Bypass not available
F25	Output negative power
F26	Output contact short cct L1
F27	Output contact short cct L2
F28	Output contact short cct L3
F29	Output fuse/contact fault L1
F30	Output fuse/contact fault L2
F31	Output fuse/contact fault L3
F32	Battery charger fault
F33	Battery measures error
F34	Power module overtemperature
F36	Fan fault F1
F37	Fan fault F2
F38	Fan fault F3
F39	Vdc bus measures error
F40	Battery fuse B+
F41	Battery fuse B-
F44	PIB1 communication lost
F45	PIB2 communication lost
F46	ComRT1 bus off
F47	ComRT2 bus off
F48	Battery polarity error
F49	Battery contact cmd fault
F51	Battery contact short cct
F54	Memory access error A
F55	Memory access error B
F56	Calibration error PFC
F57	Calibration error INV
F58	Calibration error BAT
F60	SCU Communication lost

PM fault list

LOCKS

Locks indicate a breakdown of the PM or one of its parts. Locks are normally preceded by an alarm signal.

CODE	DESCRIPTION
L01	Auxiliary power fault
L02	Boards link fault
L03	Input fuse/contact fault L1
L04	Input fuse/contact fault L2
L05	Input fuse/contact fault L3
L06	Boost overvoltage B+
L07	Boost overvoltage B-
L08	Boost undervoltage B+
L09	Boost undervoltage B-
L14	Inverter overvoltage L1
L15	Inverter overvoltage L2
L16	Inverter overvoltage L3
L17	Inverter undervoltage L1
L18	Inverter undervoltage L2
L19	Inverter undervoltage L3
L20	Inverter sinewave abnormal L1
L21	Inverter sinewave abnormal L2
L22	Inverter sinewave abnormal L3
L23	Output overload L1
L24	Output overload L2
L25	Output overload L3
L26	Output short-circuit L1
L27	Output short-circuit L2
L28	Output short-circuit L3
L29	Output fuse/contact fault L1
L30	Output fuse/contact fault L2
L31	Output fuse/contact fault L3
L34	Buck-boost overtemperature
L35	Inverter overtemperature
L38	Boost temperature sensor fault
L39	Inverter temperature sensor fault
L42	Battery fuse fault
L43	Battery contact short cct
L45	Parallel bus division
L46	Parallel communication fault
L47	PIB address error
L49	Output capacitor overtemperature
L50	Input capacitor overtemperature
L51	Battery charger short-circuit
L52	PM link open
L53	Board code/FW incompatible
L54	Input board code unknown
L64	Self-exclusion activated

PM lock list

TECHNICAL DATA TABLE

M2U - from 20 to 136kW		
INPUT		
Voltage [V _{LL}]	208-220 AC 3 phase plus neutral	
Accepted tolerance for input voltage [%]	- 20 + 20 @ 100% load -40 + 20 @ 50% load	
Frequency tolerance [Hz]	40-72	
Power factor	≥ 0,99	
THDI [%]	≤ 3	
Power Walk-in	Programmable from 1 to 120 sec. in steps of 1 sec.	
BYPASS		
Nominal power [kW]	68 or 136	
Nominal voltage [V _{LL}]	208-220 AC 3 phase plus neutral	
Voltage tolerance [%]	from -22 to +15 (adjustable in step of 2V)	
Nominal frequency [Hz]	50 / 60	
Overload [%]	101÷110 for 120 min 111÷125 for 10 min 126÷150 for 1 min > 150 for 1 s	
BATTERIES		
Battery arrangement	Separate or common batteries at UPS level	
Number of poles	2 wires (+/-)	
Battery block per string – VRLA	20 (other configurations available upon request)	
Standard maximum recharging current [A]	20 A per power module (PM20), 30 A per power module (PM25-34)	
Compatible with	VRLA, Li-Ion ⁴	
OUTPUT		
Nominal voltage [V _{LL}]	208-220 AC 3-phase plus neutral	
Nominal frequency [Hz]	50 or 60	
Voltage stability [%]	± 1	
Dynamic stability	IEC EN 62040-3 Performance Class 1	
Overload [%]	103÷110 for 60 minutes 111÷125 for 10 minutes 126÷150 for 1 minute > 150 for 0.5 s	
GENERAL SPECIFICATIONS		
UPS type	M2U 68 CBC 6	M2U 140 PC0
Power Module nominal power [kW]	20 or 25 or 34 (M2U 20-25-34 PM BLUE,)	20 or 25 or 34 (M2U 20-25-34 PM BLUE,)
Nominal power [kW]	68 ¹	136 ¹
Output power factor	1	
Can be installed in parallel	Up to 4	
Cabinet configuration	Up to 3 x PM20 or PM25 or PM34	Up to 5 x PM20 or PM25 or PM34
Air ventilation	Front to rear	
UPS acoustic noise level at 1 m and 50% load [dBA±2]	≤ 62	
Cabinet IP Class	IP20 protection for fingers (with open or closed cabinet doors)	
Colour	RAL 9005	
Operating ambient temperature [°C/°F]	0–40 / 32–104	
Standards	Safety: UL1778, CSA C22.2 No. 107.3-14 EMC: FCC Part 15 Subpart B, Class A	
Mobile Cabinet	Castors (UPS are sent without PM ²)	
DIMENSIONS AND WEIGHT ³		
Dimensions (WxDxH) [in/mm]	23.6 x 41.3 x 78.5 / 600 x 1050 x 1995	23.6 x 37 x 78.5 / 600 x 940 x 1995
Weight (without PM and batteries) [lb/kg]	591 / 268	525 / 238

¹ The power shown is the maximum values according with cabinet type; the real value is associated to the number of PM installed.

² PM = Power Module (referring to the 20 or 25 or 34 kW [PM 20 or PM 25 or 34 BLUE] module)

³ Without packaging

⁴ Contact the manufacturer for more details



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