

User & Operation Manual
Cumuluspowers™



Table of Content

1	Information on this Document	5
1.1	Validity	5
1.2	Symbols	5
1.3	Nomenclature	5
2	Foreword.....	6
3	Safety.....	7
3.1	Intended Use	7
3.2	Qualified Personnel Skills.....	7
3.3	Safety Precautions	7
3.4	Environmental, Disposal and Recycling Considerations.....	8
3.5	Declarations of Conformity, Safety and CE Marking.....	9
4	Product Description	10
4.1	General System Description	10
4.2	Intelligent Module Technology	10
4.3	Distributed Active-Redundant Architecture (DARA).....	10
5	Delivery Transportation and Storage	12
5.1	Material and UPS Receipt.....	12
5.2	Storage.....	12
5.3	External Visual Inspection	13
5.4	Unpacking.....	13
5.5	General Inspections after Unpacking.....	14
6	Mechanical Dimensions and Installation	16
6.1	Dimensions and Weight	16
6.2	Mechanical Footprint.....	20
6.3	Location and Positioning.....	22
6.4	Battery Installation and Configuration.....	25
6.5	Block Diagram	32
6.6	Cabinets Frontal View.....	34
6.7	Universal Racks Frontal View	40
6.8	Mechanical Installation (only for Universal Rack).....	41
6.9	Distribution and Wiring	42
7	Electrical Installation	47
7.1	Preparation for Electrical Installation.....	47
7.2	Cables, Sections and Fuses Ratings.....	48
7.3	Electrical Connection CAB-CP050-I080-A1, CAB-CP050-I240-A0	50
7.4	Electrical Connection CAB-CP100-I320-B0.....	52

7.5	Electrical Connection CAB-CP100-E-A1	53
7.6	Electrical Connection CAB-CP150-E-A0	54
7.7	Electrical Connection CAB-CP251-E-B0	56
7.8	Electrical Connection CAB-CP300B-E-B0	57
7.9	Electrical Connection CAB-CP300T-E-B0	58
7.10	Electrical Connection CAB-CP600B-E-2B0	59
7.11	Electrical Connection CAB-CP600T-E-L0	60
7.12	Electrical Connection CAB-CP900B-E-3B0	61
7.13	Electrical Connection CAB-UR025-E-C0	62
7.14	Electrical Connection CAB-UR050-E-C0	63
7.15	Electrical Connection CAB-UR100-E-C1	64
7.16	Multi-Cabinet Connection	66
7.17	Multi-Cabinet Connection (only for CP300, CP600 and CP900)	66
8	Interfacing	67
8.1	RS485	68
8.2	Input Spring Terminal Blocks CN11: 1-15	69
8.3	Dry-Output Port (CN14)	71
8.4	RS232 D-Sub Channel	71
8.5	LED Functionality Description	71
8.6	Multidrop Input/Output (CN1/CN2)	72
8.7	Bluetooth	72
9	Operation	73
9.1	3" User Interface (Control Panel)	73
9.2	System Operation Modes	74
9.3	Display Navigation Overview	76
9.4	Manual System Bypass	83
10	Operation Procedures	84
10.1	Start-Up Procedure	84
10.2	Shutdown Procedure	86
10.3	Module Replacement Procedure	87
11	Options	88
11.1	SNMP	88
11.2	Battery Temperature Probe	90
11.3	Battery Cabinet	91
12	Maintenance	93

Legal Provisions

This manual and the information contained in it are the property of Centiel SA. Any partial or complete publication requires prior written approval by Centiel SA.

Internal reproduction for the sole purpose of product evaluation or for other proper use is allowed and does not require prior approval.

Trademarks

All trademarks are recognized, even if not explicitly identified as such. Missing designations do not mean that a product or brand is not a registered trademark.

The BLUETOOTH® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc.

Modbus® is a registered trademark of Schneider Electric and is licensed by the Modbus Organization, Inc.

Product Warranty

Download or ask the manufacturer for the latest version of the warranty policy and procedures, document POL-0002-EN.

Centiel SA

Continuous Power Availability

Via alla Stampa 15

CH6965 Lugano, Switzerland

+41 91 210 36 83

write@centiel.com

www.centiel.com

©2018 Centiel SA. All rights reserved

Changes Revision Table

Revision	Notes
REV01	First English version released
REV02	Battery section included
REV03	Chapter 8 table connector type for RS485 and Multidrop Section 8.4 and 8.5 description modified Section 9.1.1 and 9.1.2 description modified Section 9.2 symbols on display modified Section 10.1 and 10.2 description of Qn open and closed modified Section 11.3 the dry port signals have been added
REV04	Some display pictures and schematics have been corrected
REV05	Data for CP080 and CP200 included
REV06	General formatting and language review
REV07	50 kW module and CP250 included Section 6.3.4 description modified Sections 7.3-7.7 tables updated
REV08	Updated display indications for FW release ≥ 1.6
REV09	Cabinet CP040/80 and CP080-EB included
REV10	Several Modifications and CAB-URxx included Updated display indications for FW release ≥ 2.4
REV11	Modified Chapter 6.4.1 and 10.1 Maintenance section included
REV11.1	Q0 has been added on single line diagrams
REV11.2	Chapter 10 has been revised
REV12	Added 25 kW, 60 kW modules and new cabinets
REV13	Added 600kW cabinets and Battery cabinet Removed Customer Interface PC0111
REV14	Added IM50-480V and IM60-480V
REV15	Added tightening torque for each connection
REV16	Removed CP250 and added CP900. Correct tightening torque
REV17	Updated CP900 distribution drawing Chapter 7.12

1 Information on this Document

1.1 Validity

This document is valid for the following device types:

Modules	IM10, IM20, IM25, IM50 & IM50-480V and IM60 & IM60-480V
Standard Frames	CAB-CP050-I240-A0, CAB-CP050-I080-A1, CAB-CP100-I320-B0, CAB-CP100-E-A1, CAB-CP150-E-A0, CAB-CP251-E-B0, CAB-CP300B-E-B0, CAB-CP300T-E-B0, CAB-CP600B-E-2B0, CAB-CP600T-E-2B0, CAB-CP900-E-3B0
Universal Racks	CAB-UR025-E-C0, CAB-UR050-E-C0, CAB-UR100-E-C1

1.2 Symbols

Symbol	Explanation
	Indicates that operations have to be performed accurately and following this User Manual
	Indicates that the weight of the equipment is higher than 25 kg and it has to be handled by 2 persons
	Indicates that operations have to be carried out by authorized technical personnel only. "Qualified personnel" THE RISK OF ELECTRICAL IMPACT IS HIGH
	Indicates that the batteries could release acid and gas.
	Indicates ground (PE or PEN) connection
	Indicates that parameters and/or values need to be verified
	Article Order Code

1.3 Nomenclature

Complete Designation	Designation in this Document
Intelligent Module	IM
Uninterruptible Power Supply	UPS
Circuit Breaker	CB
Universal Rack	UR

2 Foreword

Dear Customer,

Thank you for choosing a Cumuluspower™ Uninterruptible Power Supply and a warm welcome to Centiel™ world.

Our company's mission is to contribute to the success of your business by protecting your critical applications and by ensuring a continuous power availability.

The innovative technology of our products and the constant support offered by our after-sales team are a guarantee of maximal performance. We will provide you with high-quality products and assistance in each phase of your Cumuluspower™ UPS life.

To help you grow and succeed, we need your contribution. A kind feedback would be highly appreciated. It will allow us to supply you with the most advanced products and solutions.

Sincerely,

CENTIEL™ TEAM

3 Safety

3.1 Intended Use

This User Manual contains all the detailed instructions concerning the handling, installation and operation procedures of this Cumuluspower™ UPS. Therefore, it is strongly recommended to read it carefully before starting the installation. The manufacturer assumes no responsibility for errors and misinterpretations mentioned in this User Manual.

This document may be subject to modifications without notice.

This document must not be copied and imparted to a third party for use in unauthorized purposes.

The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference.

3.2 Qualified Personnel Skills

The UPS can be installed, commissioned and serviced only by technicians and engineers certified by the manufacturer.

Only qualified personnel are allowed to perform the activities marked with the symbol described in section 1.2.

The UPS has been designed to be used in restricted access areas only. If the mentioned conditions are not respected, the manufacturer might be able to invalidate the warranty.

3.3 Safety Precautions

This section describes the safety precautions that must be observed when working with the product.

Danger!

Operations inside the UPS

Operations inside the UPS must be performed only by qualified personnel, service technicians certified by the manufacturer or by an agent authorized by the manufacturer.

Danger!

In operation mode

In order to avoid electrical shocks, in operation mode do not remove any screws or protection panels from the UPS and the Battery Cabinet.

Warning! Operator precautions

The UPS has been designed to be used in restricted access areas and can be operated by authorized personnel only. Therefore, the user has the permission to operate as follows:

- Use the management display as described in this manual;
- Start up and shut down the UPS as described in this manual;
- Perform the connections on the Customer Interface;
- Install and manage the SNMP adapter;
- Install and manage Multidrop communication for parallel configuration.

The manufacturer does not take any responsibility for damages caused by manipulation not conform to the procedures described in this manual.

Notice! Damage to internal components due to electrostatic discharge

Touching electronic components can cause damage and destroy parts of the UPS due to electrostatic discharge. Ground yourself before touching any internal electronic board or component.

3.4 Environmental, Disposal and Recycling Considerations

In accordance with the standard IEC 62040-4, the UPS has been designed by taking into account all environmental aspects.

Notice!

This unit makes use of components dangerous for the environment (electronic cards, electronic components and batteries). At the end of life, Batteries and UPS must be taken to specialized collection and disposal centers.

Notice!

In case of complete unit dismantling, this operation shall be carried out by specialized personnel and the unit must be taken to centers specialized in collection and disposal of dangerous substances.

3.4.1 Battery and UPS Disposal and Recycling

Since the batteries contain dangerous substances that will harm the environment if thrown away, the replaced batteries must be delivered to an entity qualified for disposal and recycling.

The similar situation is the disposal of the UPS at the end of life. It is necessary to deliver the equipment to a local disposing and recycling treatment facility. They disassembling the complete apparatus assuring the recycling and disposal of each specific part.

3.5 Declarations of Conformity, Safety and CE Marking

The UPS complies with CE standards and with the IEC concerning Uninterruptible Power Supply Systems (UPS).

3.5.1 CE Marking

The UPS is provided with CE marking according to:

Type	Directive
Low Voltage Directive	(2014/35/EU)
EMC Directive	(2014/30/EU)



3.5.2 Declarations of Conformity

Type	Standard
Safety (General Requirements)	IEC 60950-1
Safety (UPS Requirements)	IEC 62040-1
EMC (UPS Requirements)	IEC 62040-2
Performance (UPS Requirements)	IEC 62040-3

The Declarations of Conformity regarding Safety, EMC and Performance are available.

4 Product Description

4.1 General System Description

Cumuluspower™ is a new series of 3-phase modular fault-tolerant UPS systems, born to respond to the highest availability requirements, that is to eliminate risks that may cause computer downtime of business-critical applications.

Thanks to our extensive failure analysis research and insights gathered from 25 years of field experience with a large number of data centers and other critical environments, our power protection solutions have reached the **highest levels of availability**. This allows us to reduce downtime risks, avoid costly errors, and increase energy efficiency.

Unlike traditional centralized parallel multi-module systems, the advanced Cumuluspower™ technology combines a unique **Intelligent Module Technology** (IMT) with a fault-tolerant parallel architecture, called **Distributed Active-Redundant Architecture** (DARA), thereby fulfilling the highest availability and reliability requirements.

4.2 Intelligent Module Technology

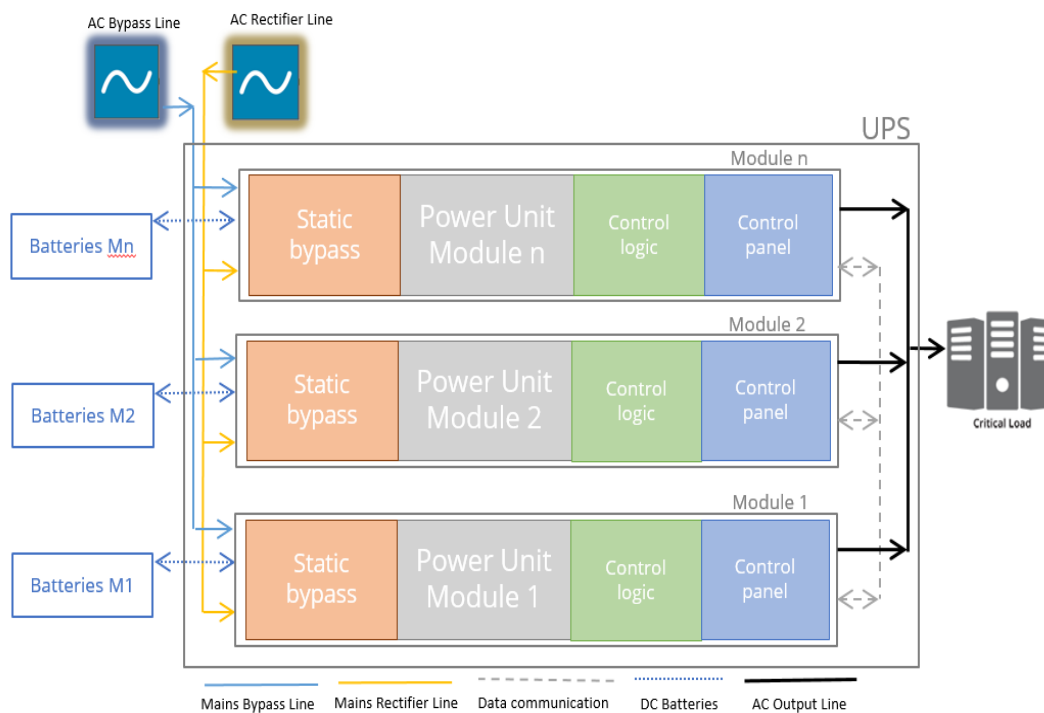
Thanks to our long experience in module design, the Cumuluspower™ modules are equipped with all hardware (power circuits) and all software (intelligence and monitoring) functions, which make them fully independent and capable of safely isolating themselves from the multi-module system whenever an internal fault occurs. The rest of the multi-module system will continue to provide protected power to the critical load without interruptions. The integration of all hardware and software in each module allowed us to eliminate all the risky single points of failure that could compromise the entire system and the power supply to the critical application.

4.3 Distributed Active-Redundant Architecture (DARA)

The Distributed Active-Redundant Architecture of the multi-module UPS system Cumuluspower™ was designed to respond to the highest availability requirements. This is achieved through the implementation of the “democratic” decision making for the load transfer in the event of a critical failure, and through a correct management of the load sharing to avoid crosscurrents between the modules. The communication between the logic circuits of the modules is accomplished by means of a redundant communication BUS.

In the event of a critical failure, every module will decide, by means of its logic circuits, whether the load should remain on the Inverter or be transferred to the Bypass. The load transfer will be conducted depending on the decision made by the majority of the modules. In order to avoid crosscurrents between the modules, a Master-Slave load sharing technique is adopted. The first module is the Master, which provides the load value to be shared with the rest of the modules (Slaves). If the Master fails, the next module will automatically become the leading Master.

DARA Modular Architecture



5 Delivery Transportation and Storage

5.1 Material and UPS Receipt

The equipment must be transported in an upright position, as indicated by the labels on the package.

Please ensure that the received material corresponds to the indications reported on the delivery note.

The UPS, batteries and accessories are delivered on a specific pallet, and they are packed with adequate indications (FRAGILE and position arrows) and protections.



Handle the UPS, the Battery Cabinet and the batteries carefully. The heavy weight can cause injury to persons or damage to facilities in the surrounding area.

5.2 Storage

The UPS should be stored in the original packing. If the UPS is stored unpacked, a protection against dust has to be applied and the environment has to be dry and clean.

5.2.1 Storage without Batteries

If the UPS is not equipped with batteries, the ambient temperature can vary between (-) 25 °C and (+) 70 °C, and the ambient humidity should not exceed 95%, non-condensing.

5.2.2 Storage with Batteries (only for Complete Enclosure)

The ambient temperature can compromise the battery life.

For sealed maintenance-free Lead-Acid batteries, it is suggested to keep them stored at a room temperature varying between (-) 15 °C and (+) 40 °C (e.g. Panasonic VRLA batteries). Since Lead-Acid batteries have to be stored fully charged, for long term storage it is strongly recommended to recharge the batteries every 6 months.

The Ni-Cd batteries can be stored in discharged or charged state. The typical storage temperature is between (-) 20 °C and (+) 45 °C. During long-period storage, a charged battery is subject to self-discharge.

For Lithium-Ion batteries, the storage temperature can range from (-) 20 °C to (+) 60 °C. However, for prolonged storage periods it is recommended to keep it constant to (+) 20 °C. Cells should be stored with a partial charge ranging between 30% and 50%, but cell voltage should not drop below 2.8 V and it should be topped up to prevent over-discharge. The maximum voltage should not exceed 3.4V.

5.3 External Visual Inspection

The UPS and the Battery Cabinet packages are provided with labels indicating the center of gravity, and with a “Tilt watch” label indicating whether the packages have been overturned during transportation.



Correct indication, proceed to unpack.



Do not unpack if the indication on the “Tilt watch” is red. Immediately inform the manufacturer and the transportation company.

During transportation, the UPS could be damaged, but no evident signs are visible. Therefore, it is suggested to unpack the UPS carefully, make a detailed visual inspection and notify the manufacturer of any visible damage.

5.4 Unpacking

Unpack the equipment by removing the shipping materials and verify the status of the goods (see section 5.5).

For wooden box packages, remove the screws from the box and peel off the sides.

Standard packing



Sea freight Light package



Sea freight package



5.4.1 How to remove the anti-shock bars

Remove the 4 x screws of the protection bars located on the bottom of the sides:



Remove the bars fixing screws, lift the cabinet with a trans-pallet, and pull the bars out.



Notice!

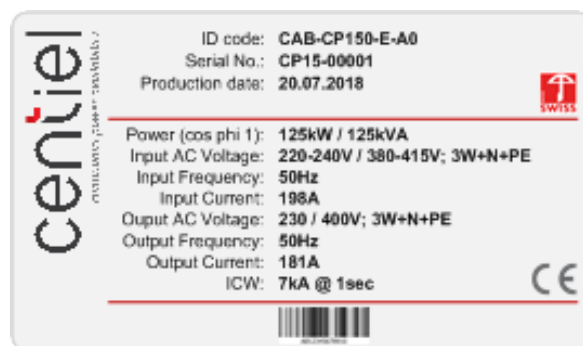
All accessories are located in a box on top of the cabinet.

5.5 General Inspections after Unpacking

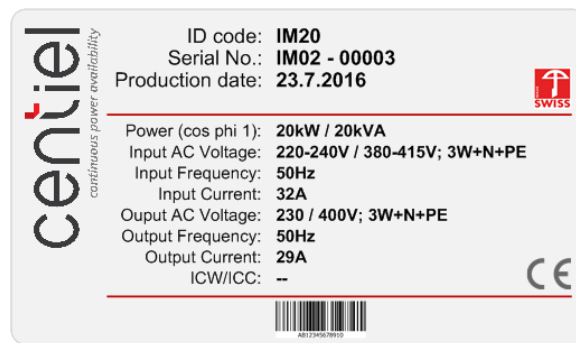
5.5.1 Nameplates and Identifications

The nameplates, indicating technical specifications and serial numbers, are located inside the UPS frame and on the module's right side.

Frame's Nameplate



Module's Nameplate



5.5.2 Documentation

Each UPS is provided with User Manual, ID Cards and Factory Commissioning Report. The User Manual, ID Cards and the Factory Commissioning Report are put in the glove compartment on the top of the cabinet.

For service purposes, these documents shall be kept in their original position.

5.5.3 Internal Visual Inspection

Before positioning the UPS and the Battery Cabinets, remove all panels and perform a visual inspection of all mechanical parts. Pay particular attention to the wirings: they must not have undergone damages during transportation.

5.5.4 Delivered Options

Check the delivery note and verify that all requested options have been added to the box located on top of the UPS cabinet.

The ordered battery links are located inside the accessories box. Make sure that they correspond to the requested battery configuration.

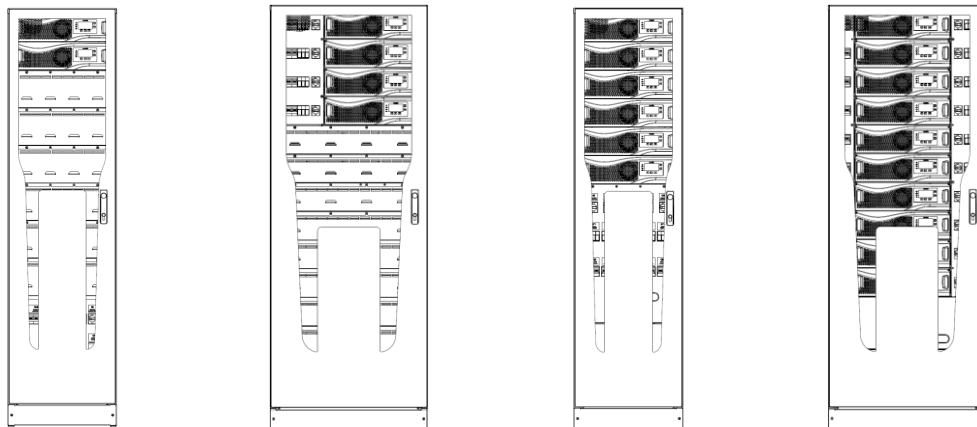
Notice!

If parts are missing or wrong parts are delivered, notify the manufacturer for prompt action.

6 Mechanical Dimensions and Installation

6.1 Dimensions and Weight

6.1.1 Frames Dimensions and weight for modules 10 / 20 / 25kW

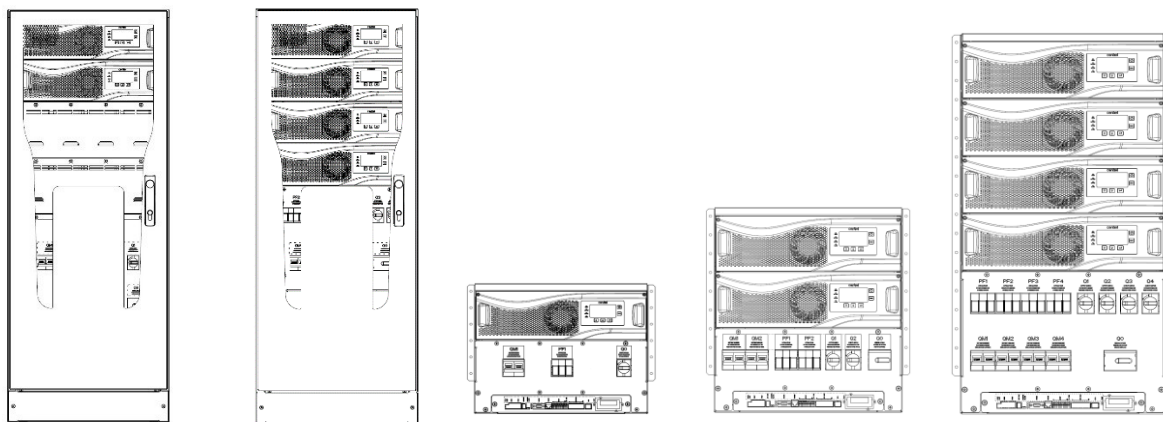


Model	CAB-CP050-I240-A0	CAB-CP100-I320-B0	CAB-CP150-E-A0	CAB-CP251-E-B0
Max # of Modules	2	4	6	10
Module type	IM10/IM20/25	IM10/IM20/25	IM10/IM20/25	IM10/IM20/25
Max Power kVA/kW	50/50	100/100	125/125	250/250
Internal batteries***	240	320	-	-
Dimensions (WxHxD) mm	510x1'980x 815	730x1'980x 815	510x1'980x 815	730x1'980x 815
Weight empty frame*	180 kg	225 kg	148 kg	210 kg
Weight frame**	234 kg	333 kg	310 kg	480 kg
Color	RAL 7024 Graphite grey			

*w/o Batteries, w/o modules

**w/o Batteries, with modules

*** 7/8/9 Ah



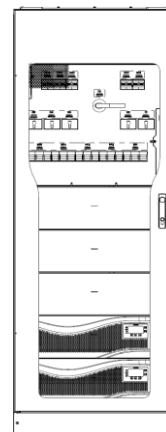
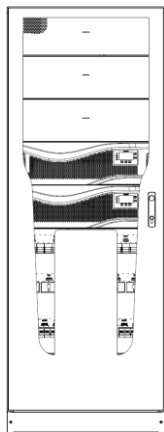
Model	CAB-CP050-I080-A1	CAB-CP100-E-A1	CAB-UR025-E-C0	CAB-UR050-E-C0	CAB-UR100-E-C1
Max # of Modules	2	4	1	2	4
Module type	IM10/IM20/25	IM10/IM20/25	IM10/IM20/25	IM10/IM20/25	IM10/IM20/25
Max Power kVA/kW	50/40	100/100	25 / 25	50 / 50	100 / 100
Internal batteries***	80	-	-	-	-
Dimensions (WxHxD) mm	510x1'315x815	510x1'315x 815	482x8HUx680	482x11HUx680	482x930(21HU)x680
Weight empty frame*	125 kg	107 kg	25kg	40kg	60kg
Weight frame**	179 kg	215 kg	52kg	94kg	168kg
Color	RAL 7024 Graphite grey		Frontal RAL 9011 OP		

* w/o Batteries, w/o modules

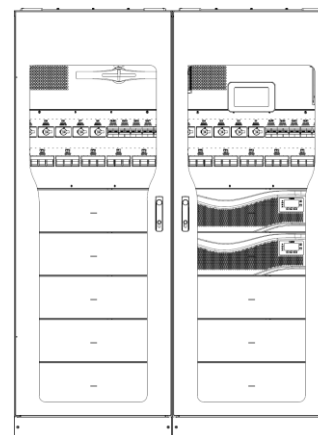
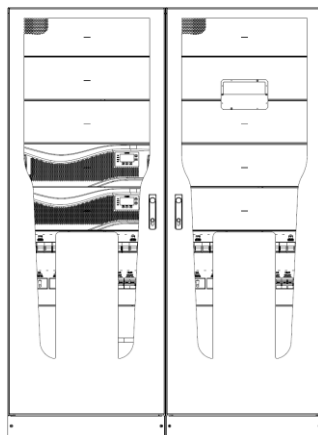
** w/o Batteries, with 20kW modules

*** 7/8/9 Ah

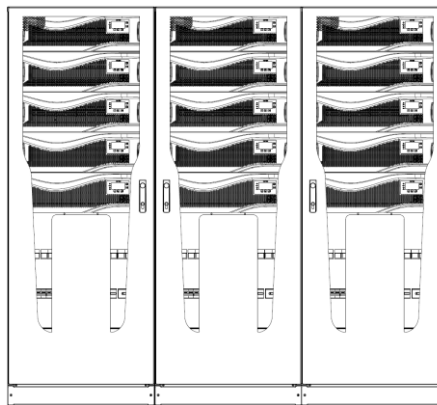
6.1.2 Frames Dimensions and weight for modules 50 / 60kW



Model	CAB-CP300B-E-B0	CAB-CP300T-E-B0
Max # of Modules	5	5
Module type	IM50/60	IM50/60
Max Power kVA/kW	300/300	300/300
Internal batteries***	-	-
Dimensions (WxHxD) mm	730x1'982x 845	730x1'992x 845
Weight empty frame*	225 kg	225 kg
Weight frame**	530 kg	530 kg
Color	RAL 7024 Graphite grey	
*w/o Batteries, w/o modules / **w/o Batteries, with modules / *** 7/8/9 Ah		

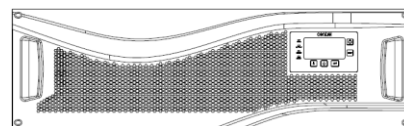
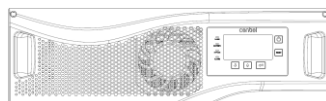


Model	CAB-CP600B-E-2B0	CAB-CP600T-E-2B0
Max # of Modules	10	10
Module type	IM50/60	IM50/60
Max Power kVA/kW	600/600	600/600
Internal batteries***	-	-
Dimensions (WxHxD) mm	1462x1'982x 845	1462x1'982x 845
Weight empty frame*	440 kg	440 kg
Weight frame**	1050 kg	1050 kg
Color	RAL 7024 Graphite grey	
*w/o Batteries, w/o modules / **w/o Batteries, with modules / *** 7/8/9 Ah		



Model	CAB-CP900B-E-3B0
Max # of Modules	15
Module type	IM50/60
Max Power kVA/kW	900/900
Internal batteries***	-
Dimensions (WxHxD) mm	2193x1'982x 851
Weight empty frame*	660 kg
Weight frame**	1575 kg
Color	RAL 7024 Graphite grey
*w/o Batteries, w/o modules / **w/o Batteries, with modules / *** 7/8/9 Ah	

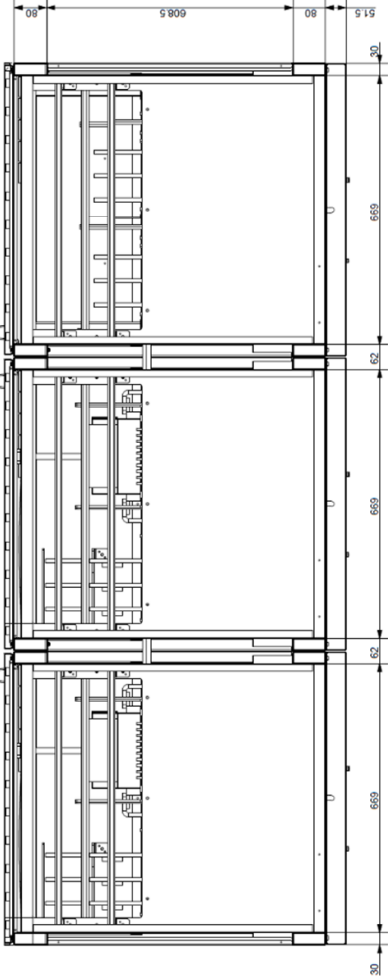
6.1.3 Modules Dimensions and weight



Model	IM10	IM20	IM25	IM50 & IM50-480V	IM60 & IM60-480V
Max Power [kW]	10	20	25	50	60
Output Power Factor	1	1	1	1	1
Battery Blocks	From 20 to 50	From 36 to 50	From 40 to 50	From 36 to 50	From 40 to 50
Battery Charger current	20A	20A	20A	40A	40A
Weight [kg]	25	27	27	61	61
U Height	3U	3U	3U	4.5U	4.5U
Dimensions (WxHxD)	442x132x603	442x132x603	442x132x603	660x197x800	660x197x800
Front panel colour	RAL 9011, matt, thin structure				

6.2 Mechanical Footprint

Drawing	Model	X2 (mm)	Z2 (mm)	X3 (mm)	Z3 (mm)
	CAB-CP050-I240-A0	510	770	30	80
	CAB-CP050-I080-A1	510	770	30	80
	CAB-CP150-E-A0	510	770	30	80
	CAB-CP100-E-A1	510	770	30	80
	CAB-CP251-E-B0	730	770	30	80
	CAB-CP100-I320-B0	730	770	30	80
	CAB-CP300B(T)-E-B0	730	770	30	80
	CAB-CP600B(T)-E-2B0	1460	770	30	80

Drawing	Model	X2 (mm)	Z2 (mm)	X3 (mm)	Z3 (mm)
	CAB-CP900-E-3B0	2190	770	30	80

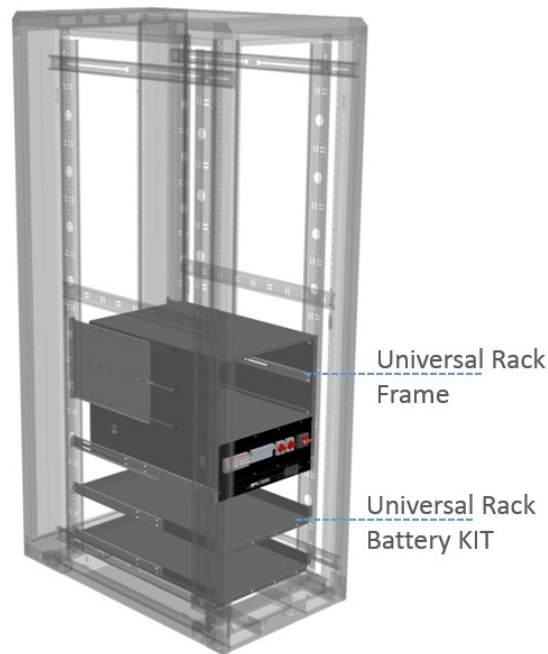
6.2.1 Mechanical Drawings

Mechanical drawings, indicating all quotes, are necessary to move the cabinets through corridors and doors. Pay attention to the weight (see section 6.1) because some floors cannot support excessive load.

A footprint drawing is also available (see section 6.2). It allows the user to design a support frame in case the cabinets are installed on a floating floor (see example in section 6.3.5).

6.2.2 Mechanical Appearance for Universal Rack product

The following picture provides an example of a Universal Rack installed in a cabinet:



6.3 Location and Positioning

6.3.1 Operating Environment

The UPS is intended to be installed indoor, in a dustless room and with adequate clean air ventilation in order to keep the temperature within the specifications reported in section 6.3.2.

The Cumuluspower™ IM10-25kW modules are air-cooled by means of one fan, whereas IM50/60kW modules are air-cooled by means of two fans. Air inlets are in the front of the cabinet and outlets in the rear. Please refer to section 6.3.4 for the recommended clearance distances.

When installed at a maximum altitude of 1000 m above sea level, the UPS will provide the nominal power. For operation between 1000 and 2000 m a.s.l., a power de-rating of 1% for each 100 m over 1000 m has to be applied. If the UPS is installed over 2000 m, please contact the manufacturer to get information about the specific installation conditions.

6.3.2 UPS Room

Installation Room Requirements

Ambient temperature range	0 °C to +40 °C (32 °F to 104 °F)
Recommended operating temperature range (if the UPS is equipped with internal batteries or batteries located in the same room as the UPS)	+20 °C to +25 °C (68 °F to 77 °F)
Maximum relative humidity	From 10 to 95% (non-condensing)
Protected against dust	
Fire protection standard has to be fulfilled	
Corrosive or explosive gases must be absent	

6.3.3 Battery Room

During operation, the battery room has to be kept at a constant temperature in order to avoid damage to the batteries which might cause a drastic loss of their capacity. Typically, the maximal lifetime of the batteries is reached at a temperature of 20-25 °C. The manufacturer kindly suggests providing a room able to maintain this temperature. If it is not possible, an air conditioning system has to be installed.

Notice!

Review specifications of your battery manufacturer for better results.

6.3.4 Positioning Clearances

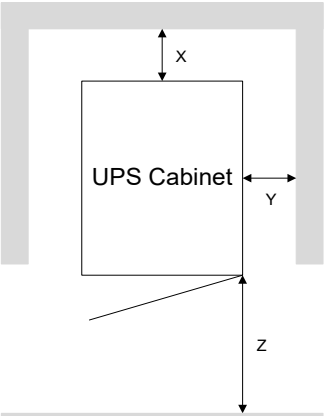
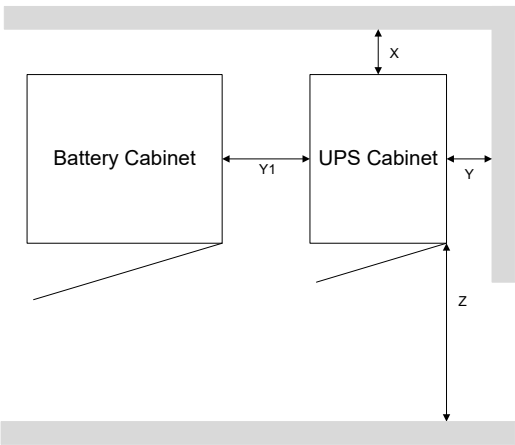
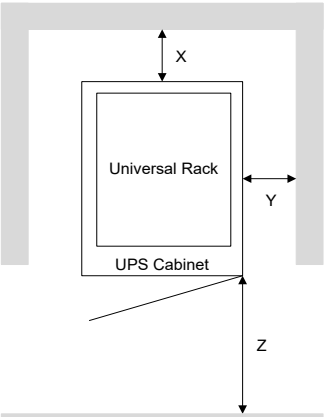
The UPS is designed to be located in restricted access areas only.

It is recommended to provide at least 200 mm clearance between the sides and back of the Cumuluspower™ UPS and any wall of the room.

It is possible to reduce the side clearances if the room is provided with rear air extraction, or if the warm air can be easily evacuated on the rear of the UPS.

If a Battery Cabinet is installed, it is recommended to keep a distance of at least 600 mm between the Battery Cabinet and the UPS sides. This will avoid an increase in the battery temperature caused by the influence of the warm air ejected by the UPS.

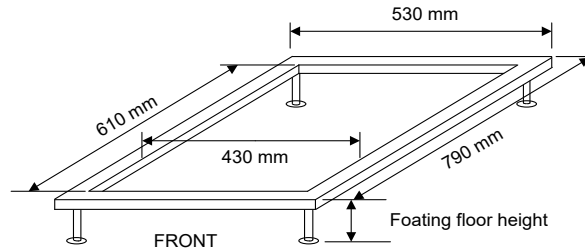
It is possible to reduce the distance between the UPS and the Battery Cabinet sides if the room is provided with rear air extraction, or if the warm air can be easily evacuated on the rear.

Drawing	X(mm)	Y(mm)	Z(mm)	Y1(mm)
 UPS Cabinet Standard CAB	200	200	900	
 Battery Cabinet UPS Cabinet	200	200	900	600
 Universal Rack UPS Cabinet Universal Rack	200	200	900 (pay attention to the safety distances)	

6.3.5 Suggested Support Frame

Frequently, UPS systems are installed in a room provided with raised floor.

The following drawing is an example of how to build a pedestal for CAB-xxx-xxx-Ax frames. The design of these supports must be suitable for the weight of the equipment.



6.4 Battery Installation and Configuration



Battery installation has to be performed by qualified personnel since the exposure to dangerous DC voltage is high.



Damaged battery can release acid and gas

Warning!

Special gloves and glasses have to be worn while working on the batteries.

Warning!

To prevent involuntary risk of arc during the wiring, only insulated tools have to be used.

6.4.1 About Battery Trays and Cable Links for CAB-CP050 with internal batteries

The CAB-CP050-I240-A0 frame can hold up to 240 internal batteries of 7/8/9 Ah. This allows for a maximum of 3 strings of 40 battery blocks per module or 2 strings of 50 battery blocks per module.

When ordering the frame, customers can decide whether to use 40-or 50-blocks battery strings.

The CP050-I080-A1 frame can hold up to 80 internal batteries of 7/8/9 Ah. This allows 2 strings in parallel or 1 string of up to 40 batteries for each module.

Notice!

CAB-CP050 and CAB-CP100 frames with internal batteries are wired in the factory. For CAB-CP050-I240-A0 be sure to provide the battery string size to the manufacturer (≤ 40 blocks or > 40 blocks).

Battery Trays are needed in order to place batteries into the frame; 2 different sets of Battery Trays are available. Customers must order as many sets as the number of needed strings.



Batt Trays Set	Order Code
(1x20/30/40) x 7/8/9 Ah	00-00031
(1x50) x 7/8/9 Ah	00-00032

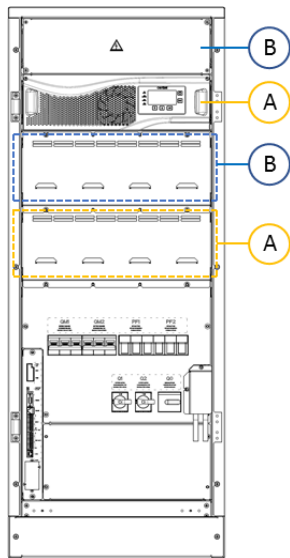
Different battery cable links are available and should be ordered according to the chosen battery configuration. Each set of battery cable links contains the cables and instructions necessary to connect the battery configuration.



Batt Cable Links	Order Code
(1x20) x 7/8/9 Ah	00-00033
(1x30) x 7/8/9 Ah	00-00034
(1x40) x 7/8/9 Ah	00-00035
(1x50) x 7/8/9 Ah	00-00036

6.4.2 CAB-CP050-Ixxx-Ax Battery Configuration and Autonomies

General Concept

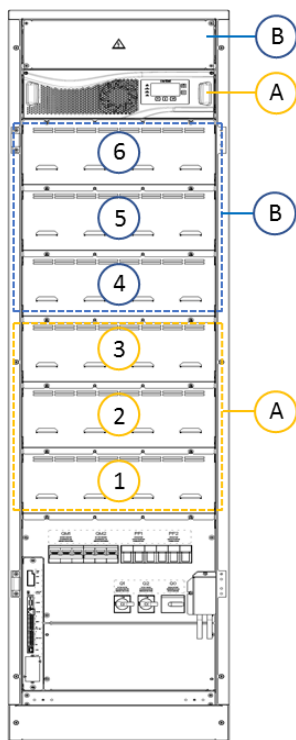


CP050-I080-A1

Each module can have 1 string of 40 battery blocks.

Module 1 (A in this figure) uses battery shelves 1 (yellow area).

Module 2 (B in this figure) uses shelves 2 (blue area).



CP050-I240-A0

Each module can have up to 3 strings of 40 battery blocks.

Module 1 (A in this figure) uses battery shelves 1 to 3 (yellow area).

Module 2 (B in this figure) uses shelves 4 to 6 (blue area).

IM10 (10 kW) and 7.2 Ah batteries @ 25 °C

Autonomy (min)	# Strings	# Blocks/String	Set of Batt Trays	Batt Links
8	2	24	2 x (1x40)	2 x (1x40)
11	2	30	2 x (1x40)	2 x (1x40)
7	1	40	1 x (1x40)	1 x (1x40)
13	2	40	2 x (1x40)	2 x (1x40)
29	3	40	3 x (1x40)	3 x (1x40)
9	1	50	1 x (1x50)	1 x (1x50)
20	2	50	2 x (1x50)	2 x (1x50)

IM20 (20 kW) and 7.2 Ah batteries @ 25 °C

Autonomy (min)	# Strings	# Blocks/String	Set of Batt Trays	Batt Links
7	2	40	2 x (1x40)	2 x (1x40)
8	2	42	1 x (1x50)	2 x (1x50)
9	2	44		
10	2	48		
12	2	50	3 x (1x40)	3 x (1x40)
14	3	40		

IM20 (20 kW) and 9 Ah batteries @ 25 °C				
Autonomy (min)	# Strings	# Blocks/String	Set of Batt Trays	Batt Links
10	2	40	2 x (1x40)	2 x (1x40)
11	2	42	2 x (1x50)	2 x (1x50)
12	2	44		
14	2	48		
15	2	50		
19	3	40	3 x (1x40)	3 x (1x40)

Notice!

The values presented in these tables are for guidance purposes only, be sure to verify such values with the manufacturer of the chosen batteries.

6.4.2.1 Example using CAB-CP050-I240-A0 and IM20 Modules in Non-Redundant Configuration

This example illustrates how to configure a system with the following characteristics:

Characteristic	Requirement
Total power demand	40 kW
Redundancy	Not redundant
Autonomy	10 min
Battery configuration	Separate batteries

To meet the power requirements, 2 IM20 modules are needed. For the autonomy time in this example, 2 strings of 40 blocks of 9 Ah batteries are chosen.

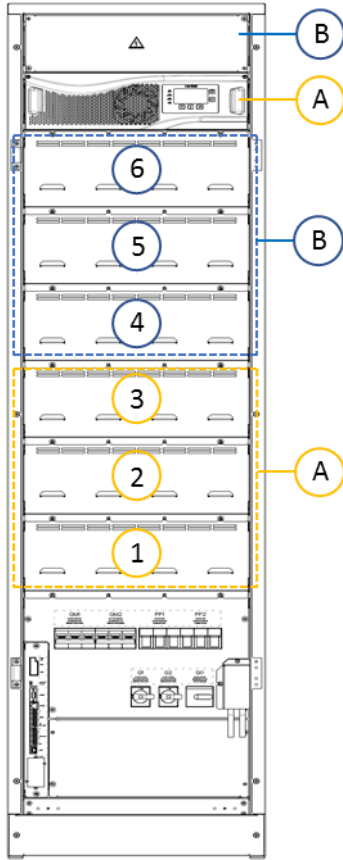
In total, the following components need to be provided:

Element	Quantity	Type
Frame	1	CAB-CP050-I240-A0
Modules	2	IM20
Batteries	160 (2x2x40)	9Ah
Battery Trays	4	(1x40) x 7/8/9 Ah
Battery Cable Links	4	(1x40) x 7/8/9 Ah



Please ask your distributor for specific cabling diagrams and battery configurations.

Battery Shelves Configuration



Shelf 1: 1st string of 1x40 for module 1 (A in this image)

Shelf 2: 2nd string of 1x40 for module 1 (A in this image)

Shelf 3: Free

Shelf 4: 1st string of 1x40 for module 2 (B in this image)

Shelf 5: 2nd string of 1x40 for module 2 (B in this image)

Shelf 6: Free

6.4.3 About Battery Trays and Cable Links for CAB-CP100 with internal batteries

The CAB-CP100-I320-B0 frame can hold up to 320 internal batteries of 7/8/9 Ah. This allows for a maximum of 2 strings of 40 battery blocks per module.

For configurations using common batteries, we strongly recommend not to exceed the limit of 4 x strings in parallel.

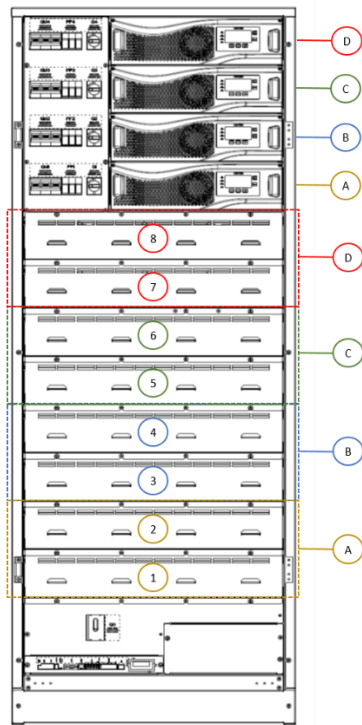
Notice!

CAB-CP100-I320-B0 frames are wired in the factory for a configuration of 2 x 40 blocks for each module.

For common batteries is recommended maximum 4 strings in parallel (160 Battery blocks).

6.4.4 CAB-CP100-I320-B0 Battery Configuration and Autonomies

Battery Shelves Configuration



Shelf 1: 1st string of 1x40 for module 1 (A in this image)

Shelf 2: 2nd string of 1x40 for module 1 (A in this image)

Shelf 3: 1st string of 1x40 for module 2 (B in this image)

Shelf 4: 2nd string of 1x40 for module 2 (B in this image)

Shelf 5: 1st string of 1x40 for module 3 (C in this image)

Shelf 6: 2nd string of 1x40 for module 3 (C in this image)

Shelf 7: 1st string of 1x40 for module 4 (D in this image)

Shelf 8: 2nd string of 1x40 for module 4 (D in this image)

For autonomy times, please refer to CAB-CP050-Ixxx-Ax tables, section 6.4.5.

6.4.5 Battery Configuration and Autonomies for external batteries CAB-CP100-E-A1, CAB-CP150-E-A0, CAB-CP300B(T)-E-B0, CAB-CP600B(T)-E-2B0 and CAB-CP900-E-3B0

CAB-CP100-E-A1, CAB-CP150-E-A0 and CAB-CP251-E-B0 frames hold respectively up to 4 IM10/20/25 modules (max power 100 kW), up to 6 modules (max power 125kW) and up to 10 modules (max power 250 kW) and they are designed for the connection of external batteries.

CAB-CP300B(T)-E-B0 frame holds up to 5 modules IM50/60 while CAB-CP600B(T)-E-2B0 up to 10 and CAB-CP900-E-3B0 up to 15 and are designed for the connection of external batteries only.

The battery line connections are protected, per module, with a battery circuit breaker or fuses (QMx) as shown in section 6.5.

The following table illustrates different examples of autonomy time for an N+1 redundant system, configured with separate batteries (each 20kW module with separate battery).

Notice!

The values presented in this table are for guidance purposes only, be sure to verify such values with the manufacturer of the chosen batteries.

IM20 (20 kW) with 7.2, 9 and 28 Ah batteries @ 25 °C

Autonomy (min)	# Strings	# Blocks/String	Battery Type
7	2	40	7.2 Ah
10	2	40	9 Ah
15	2	50	9 Ah
19	3	40	9 Ah
20	1	40	28 Ah
30	1	50	28 Ah
55	2	40	28 Ah
60	2	42	28 Ah
90	3	44	28 Ah

IM50 (50 kW) and 28 Ah batteries @ 25 °C

Autonomy (min)	# Strings	# Blocks/String	Set of Batt
-	1	40	N.A.
-	1	50	N.A.
13	2	40	2 x (1 x 40)
14	2	42	2 x (1 x 42)
15	2	44	2 x (1 x 44)
16	2	48	2 x (1 x 48)
17	2	50	2 x (1 x 50)
23	3	40	3 x (1 x 40)
30	3	50	3 x (1 x 50)

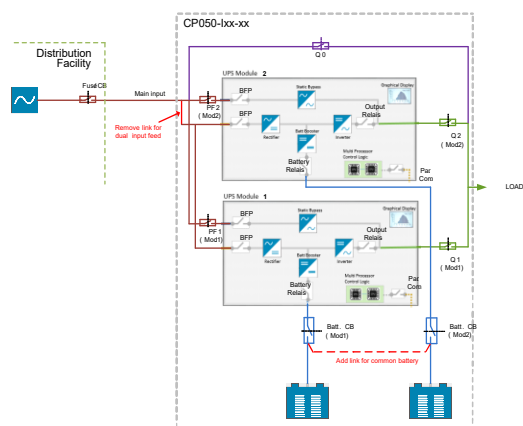
Notice!

It is strictly recommended never connect in parallel battery strings with different battery types and capacity.

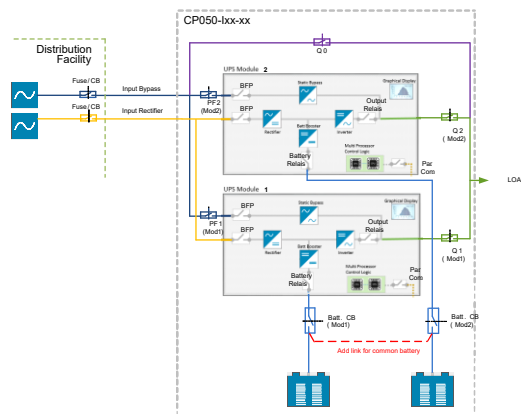
6.5 Block Diagram

6.5.1 CAB-CP050-I080-A1 and CAB-CP050-I240-A0

Single input feed

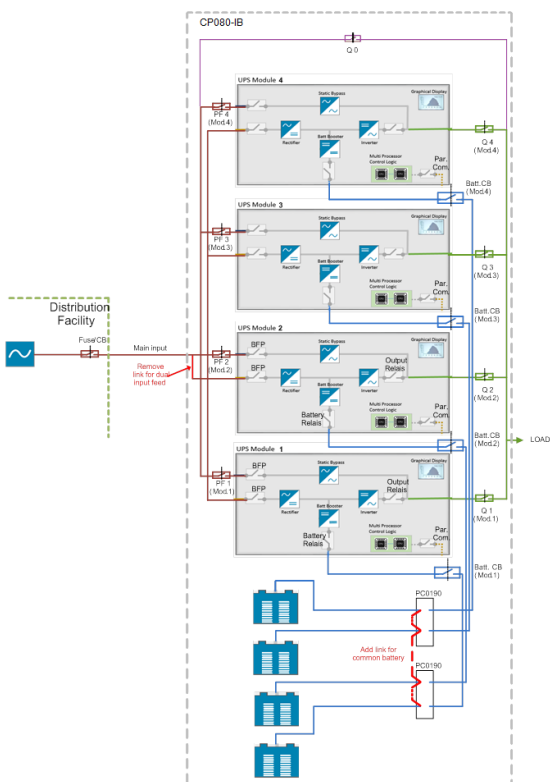


Dual input feed

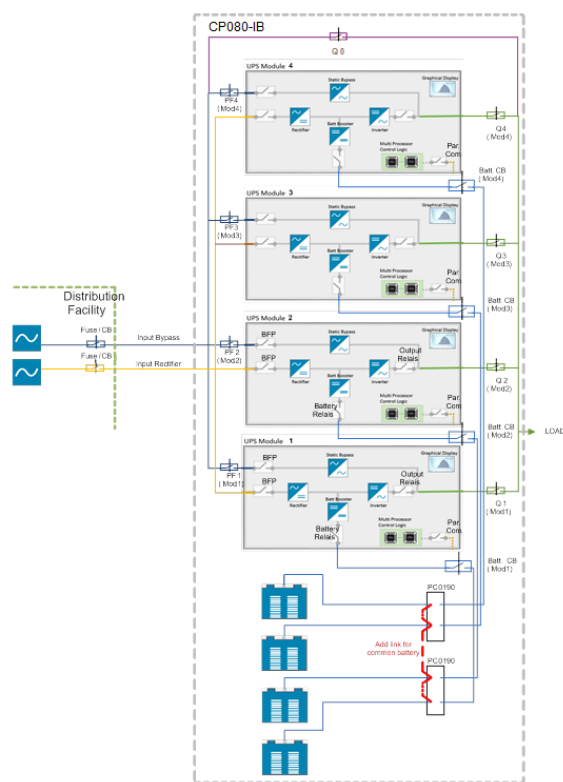


6.5.2 CAB-CP100-I320-B0

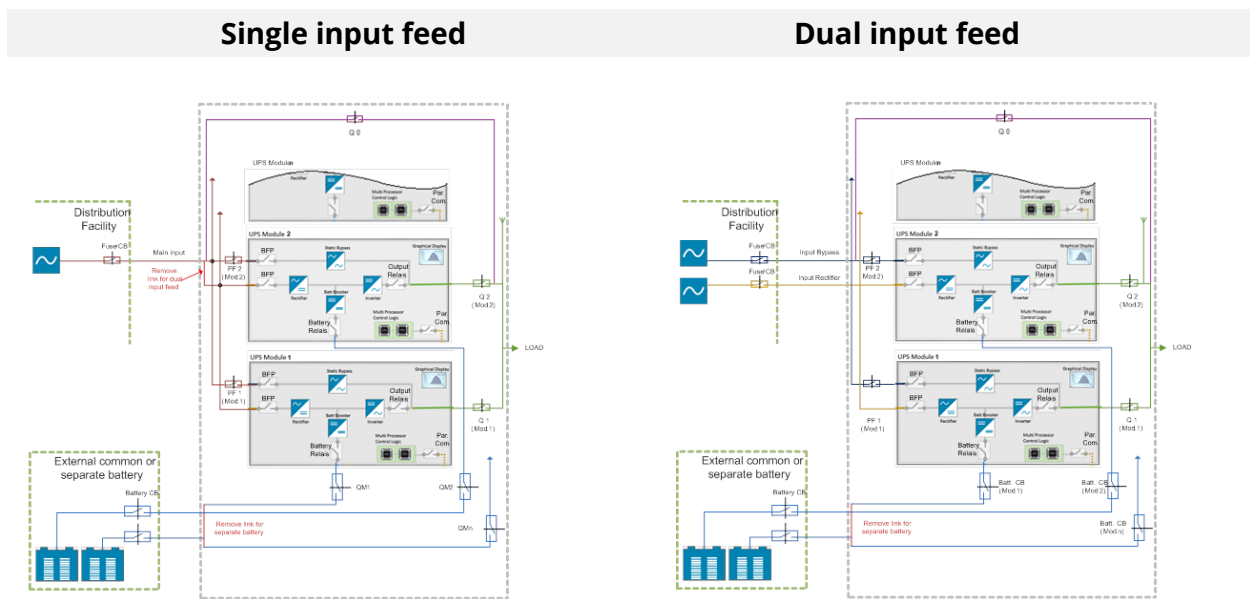
Single input feed



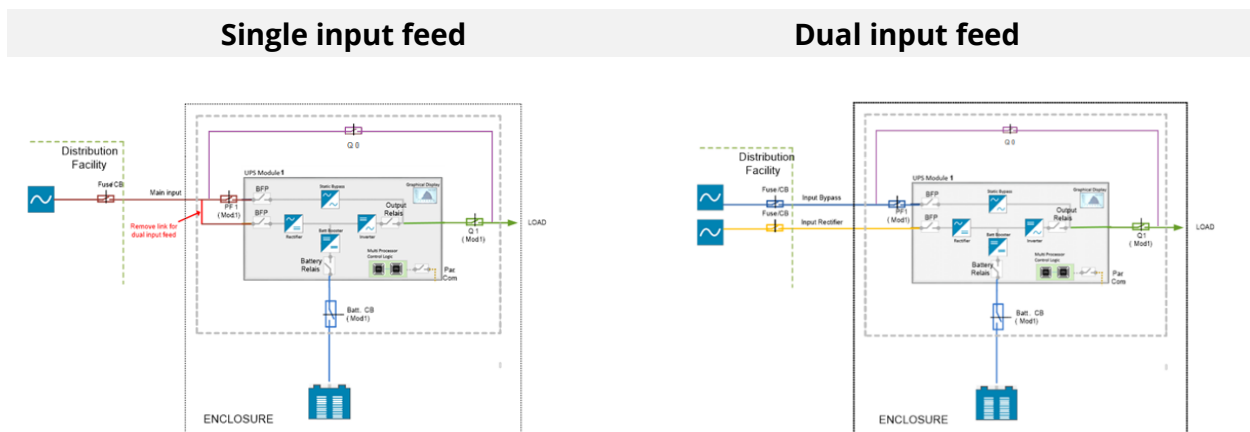
Dual input feed



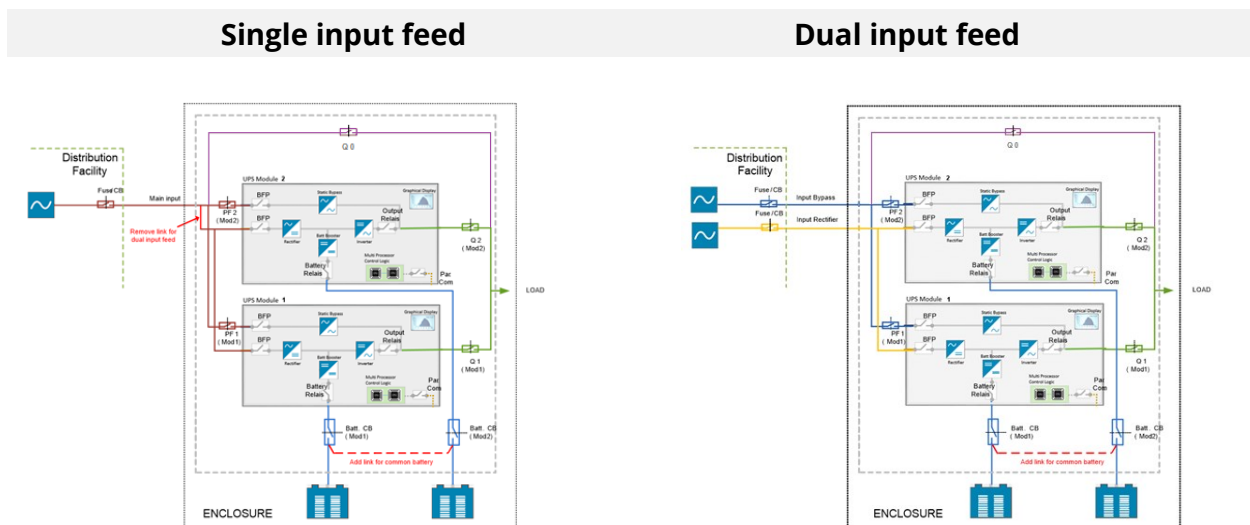
6.5.3 CAB-CP100-E-A1, CAB-CP150-E-A0, CAB-CP251-E-B0, CAB-CP300B(T)-E-B0, CAB-CP600B(T)-E-2B0 and CAB-CP900-E-3B0

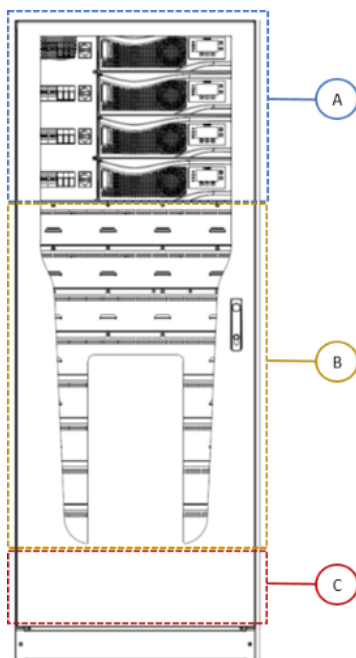


6.5.4 CAB-UR025-E-C0



6.5.5 CAB-UR050-E-C0

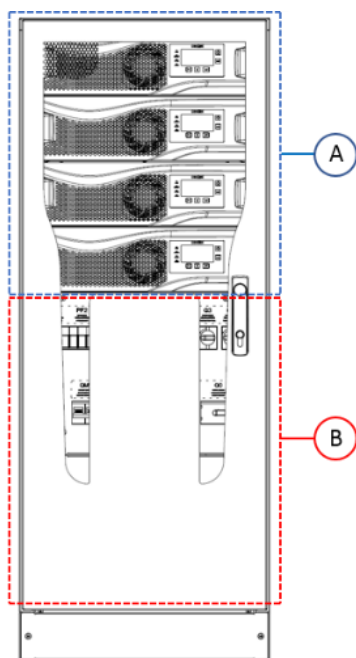


CAB-CP100-I320-B0

A:
Modules Section
Up to 2 Intelligent Modules, IM10, IM20 or IM25

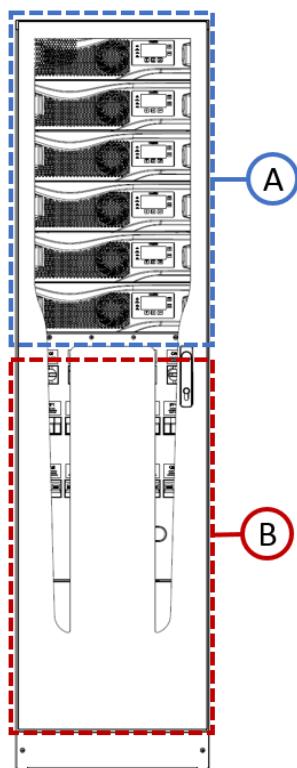
B:
Battery Section
Up to 320 batteries (total)
40 blocks (7/9 Ah) per level (4 Battery Trays of 10 batteries each)
Up to 80 batteries 28Ah
Up to 2 strings of 40 blocks

C:
Distribution and Wiring

AB-CP100-E-A1

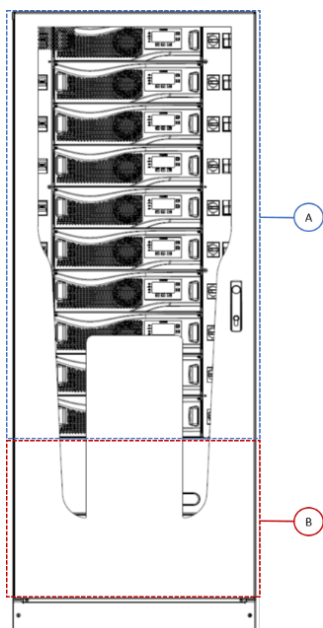
A: Modules Section
Up to 2 Intelligent Modules, IM10, IM20 or IM25

B: Distribution and Wiring

CAB-CP150-E-A0

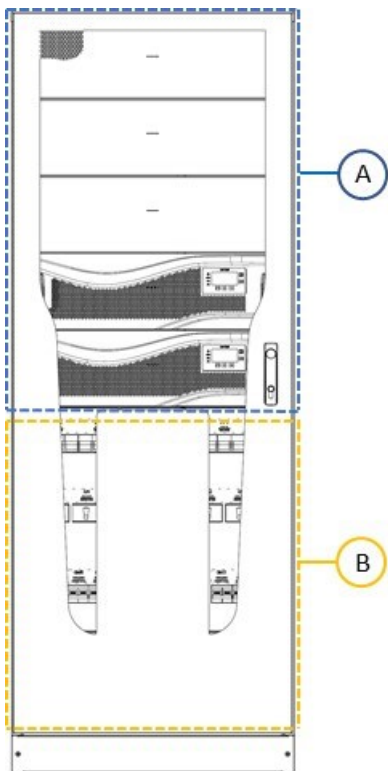
A:
Modules Section
Up to 6 Intelligent Modules, IM10, IM20 or IM25

B:
Distribution and Wiring
Note: The power of the distribution is 125kW which means that the system is composed by 5 modules + 1 redundant.

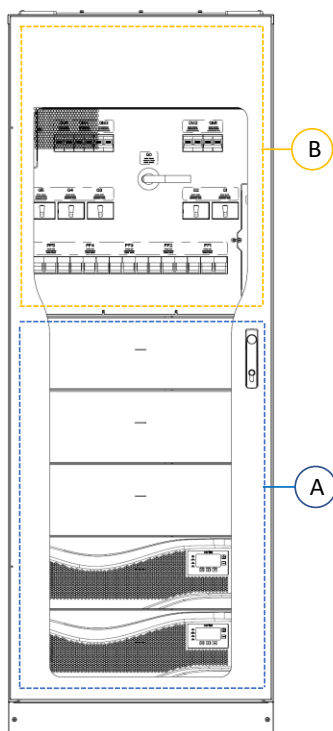
CAB-CP251-E-B0

A:
Modules Section
Up to 10 Intelligent Modules, IM10, IM20 or IM25

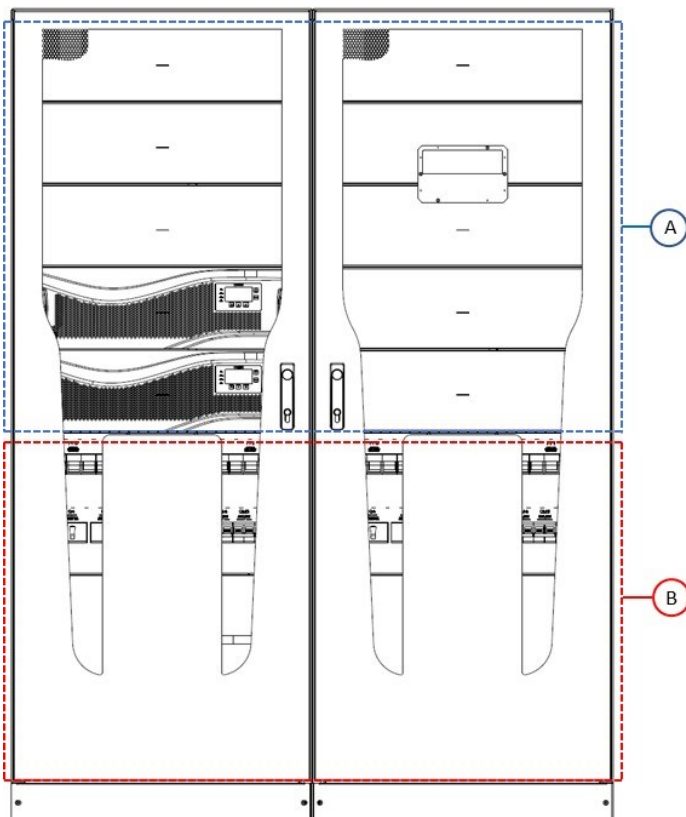
B:
Distribution and Wiring

CAB-CP300B-E-B0

- A:
Modules Section
Up to 5 Intelligent Modules IM50 or IM60
-
- B:
Distribution and Wiring

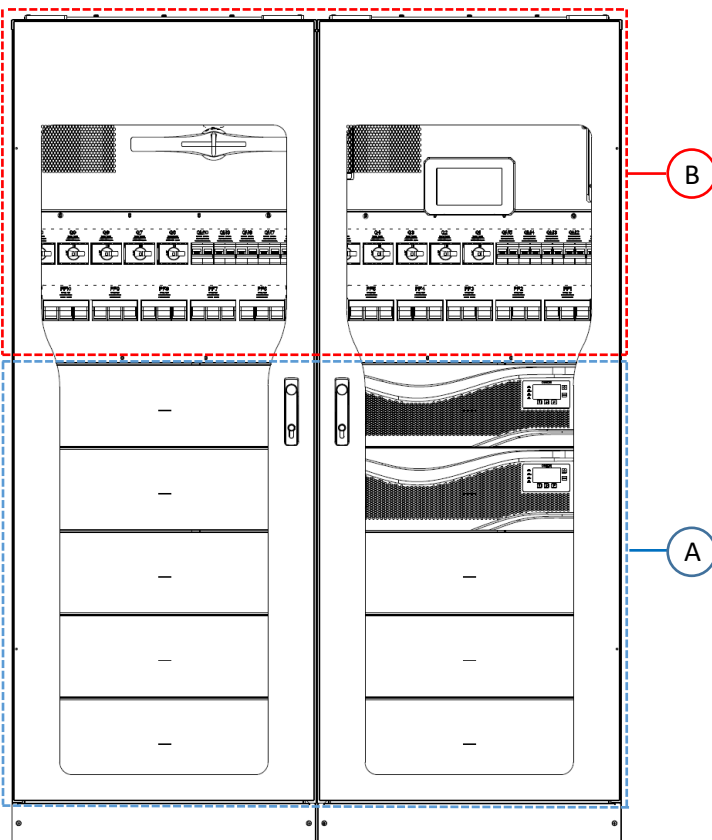
CAB-CP300T-E-B0

- A:
Modules Section
Up to 5 Intelligent Modules IM50 or IM60
-
- B:
Distribution and Wiring

CAB-CP600B-E-2B0

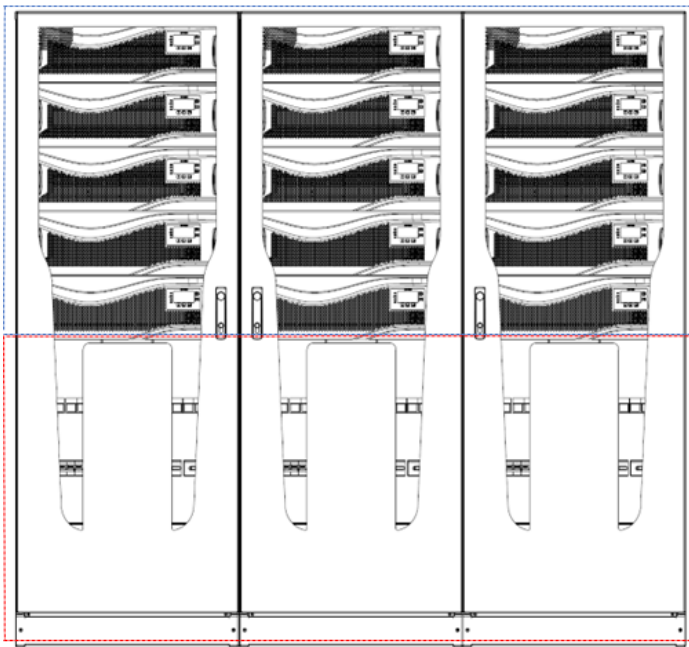
A:
Modules Section
Up to 10 Intelligent Modules
IM50 or IM60

B:
Distribution and Wiring

CAB-CP600T-E-2B0

A:
Modules Section
Up to 10 Intelligent Modules
IM50 or IM60

B:
Distribution and Wiring

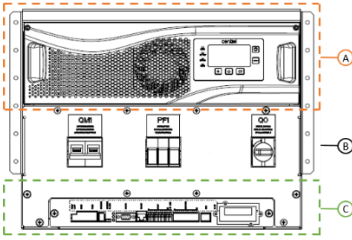
CAB-CP900-E-3B0

A:
Modules Section
Up to 5 Intelligent Modules
IM50

B:
Distribution and Wiring

6.7 Universal Racks Frontal View

CAB-UR025-E-C0

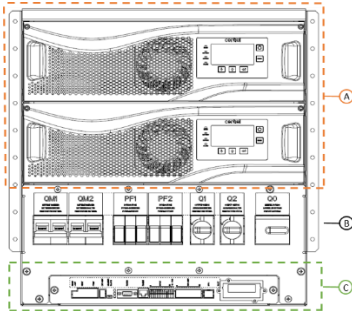


A:
Modules Section
1 x intelligent Module, IM10, IM20 or IM25

B:
Battery Breaker (QM1)
Bypass Fuses (PF1)
Manual Bypass (Q0)

C:
Customer Interface

CAB-UR050-E-C0

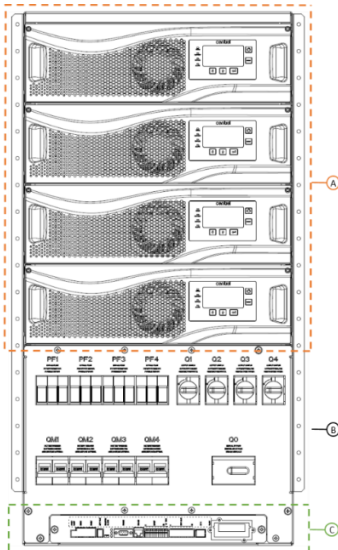


A: Modules Section
Up to 2 Intelligent Modules, IM10, IM20 or IM25

B: Battery Breakers (QM1 / QM2)
Bypass Fuses (PF1 / PF2)
Parallel Isolator Switches (Q1 / Q2)
Manual Bypass (Q0)

C:
Customer Interface

CAB-UR100-E-C1



A:
Modules Section
Up to 4 Intelligent Modules, IM10, IM20 or IM25

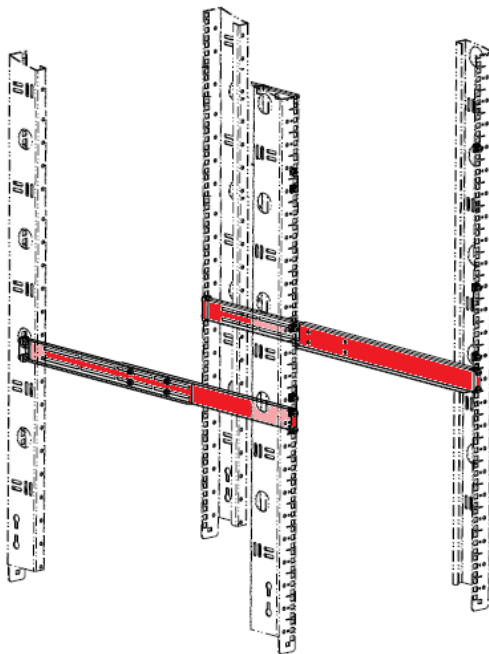
B:
Battery Breakers (QM1, Mod1 / QM2, Mod2 QM3, Mod3 / QM4, Mod4)
Bypass Fuses (PF1, Mod1 / PF2, Mod2 PF3, Mod3 / PF4, Mod4)
Parallel Isolator Switches (Q1, Mod1 / Q2, Mod2 Q3, Mod3 / Q4, Mod4)
Manual Bypass (Q0)

C:
Customer Interface

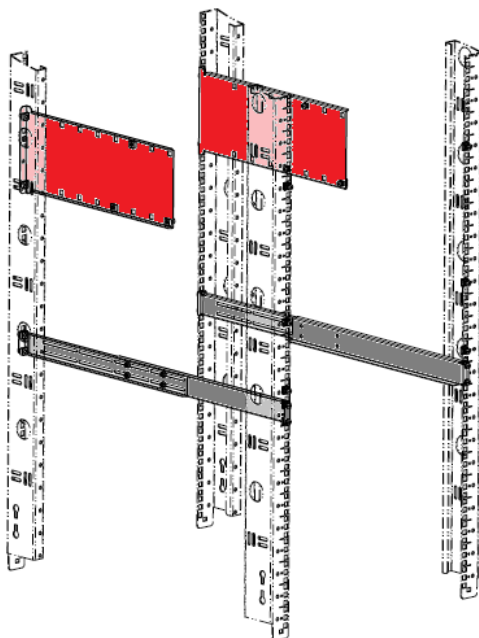
6.8 Mechanical Installation (only for Universal Rack)

The installation of a Universal Rack is similar for all sizes. For more information refer to the UR Installation document (WI-4-00048). Please follow this procedure carefully:

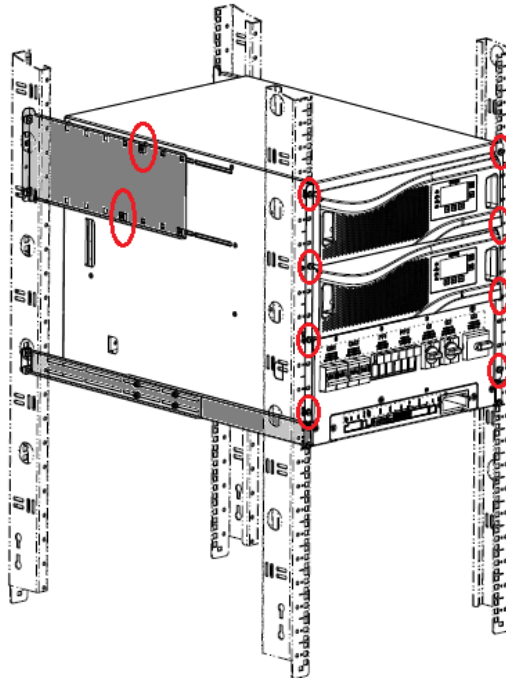
- 1) Secure to the enclosure the right and left bottom rails to the desired height (only for UR050 and UR100)



- 2) Add the rear mounting brackets (UR025/UR050 bracket left and right and UR100 2 x brackets left and right)

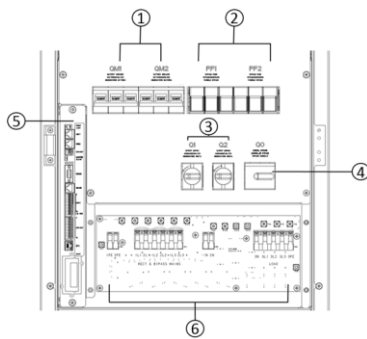


- 3) Insert the UR on the rails and fix it with screws to the side brackets and to the front spars.



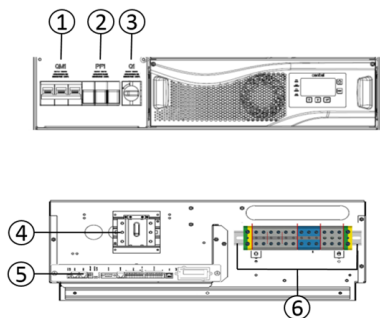
6.9 Distribution and Wiring

CAB-CP050-I080-A1 and CAB-CP050-I240-A0

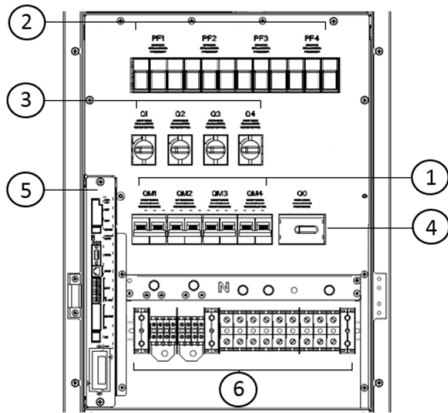


- | | |
|----|--|
| 1: | Per-module Battery Breaker QM1/QM2 |
| 2: | Per-module Bypass Fuse Holders PF1/PF2 |
| 3: | Per-module Parallel Isolator Q1/Q2 |
| 4: | Manual Bypass Switch Q0 |
| 5: | Interfacing Board (see chapter 8) |
| 6: | Connections and Wiring (see chapter 7.3) |

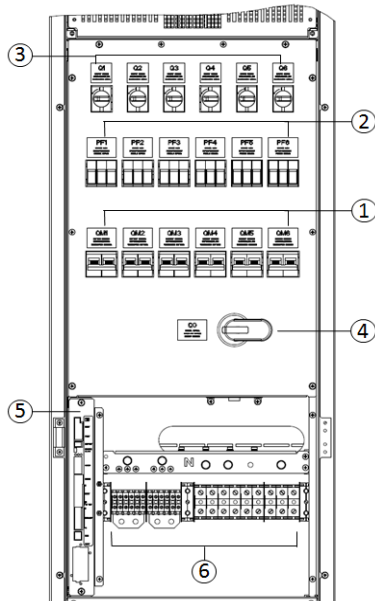
CAB-CP100-I320-B0



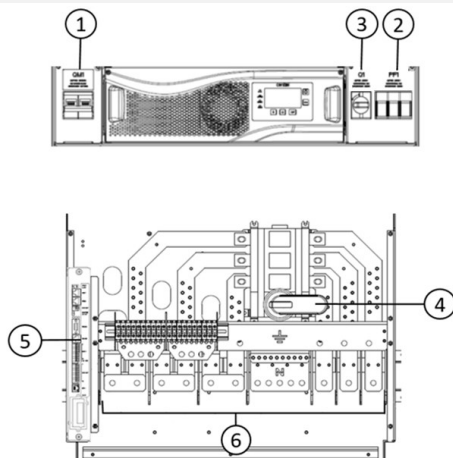
- | | |
|----|--|
| 1: | Per-module Battery Breaker QM1/QM2/QM3/QM4 |
| 2: | Per-module Bypass Fuse Holders PF1/PF2/PF3/PF4 |
| 3: | Per-module Parallel Isolator Q1/Q2/Q3/Q4 |
| 4: | Manual Bypass Switch Q0 |
| 5: | Interfacing Board (see chapter 8) |
| 6: | Connections and Wiring (see chapter 7.4) |

CAB-CP100-E-A1

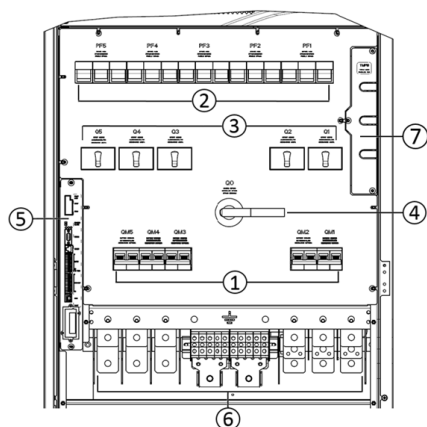
- | | |
|----|--|
| 1: | Per-module Battery Breaker QM1/QM2/QM3/QM4 |
| 2: | Per-module Bypass Fuse Holders PF1/PF2/PF3/PF4 |
| 3: | Per-module Parallel Isolator Q1/Q2/Q3/Q4 |
| 4: | Manual Bypass Switch Q0 |
| 5: | Interfacing Board (see chapter 8) |
| 6: | Connections and Wiring (see chapter 7.5) |

CAB-CP150-E-A0

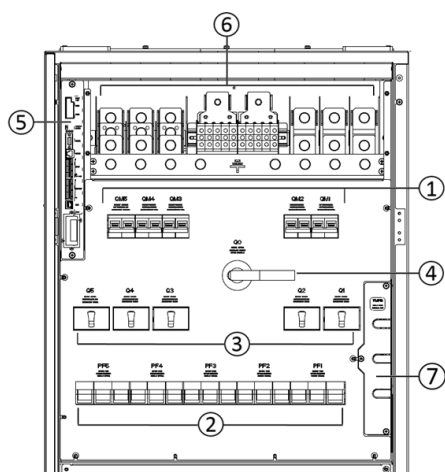
- | | |
|----|---|
| 1: | Per-module Battery Breaker QM1/QM2.../QM6 |
| 2: | Per-module Bypass Fuse Holders PF1/PF2.../PF6 |
| 3: | Per-module Parallel Isolator Q1/Q2.../Q6 |
| 4: | Manual Bypass Switch Q0 |
| 5: | Interfacing Board (see chapter 8) |
| 6: | Connections and Wiring (see chapter 7.6) |

CAB-CP251-E-B0

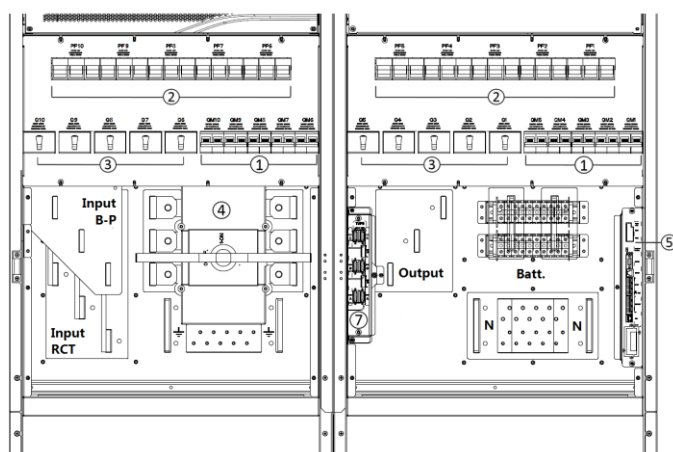
- | | |
|----|--|
| 1: | Per-module Battery Breaker QM1/QM2.../QM10 |
| 2: | Per-module Bypass Fuse Holders PF1/PF2.../PF10 |
| 3: | Per-module Parallel Isolator Q1/Q2.../Q10 |
| 4: | Manual Bypass Switch Q0 |
| 5: | Interfacing Board (see chapter 8) |
| 6: | Connections and Wiring (see chapter 7.7) |

CAB-CP300-E-B0

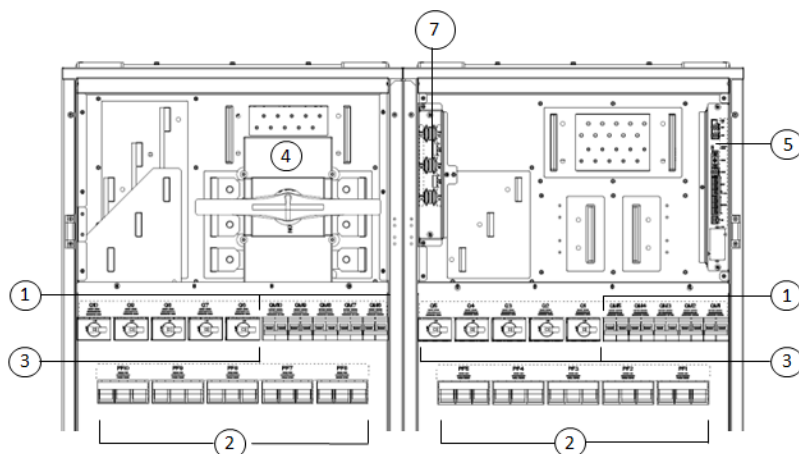
- 1: Per-module Battery Breaker
QM5/QM4/QM3/QM2/QM1
- 2: Per-module Bypass Fuse Holders PF5/PF4/PF3/PF2/PF1
- 3: Per-module Parallel Isolator Q5/Q4/Q3/Q2/Q1
- 4: Manual Bypass Switch Q0
- 5: Interfacing Board (see chapter 8)
- 6: Connections and Wiring (see chapter 7.8)
- 7: Multi-cabinet parallel communication

CAB-CP300T-E-B0

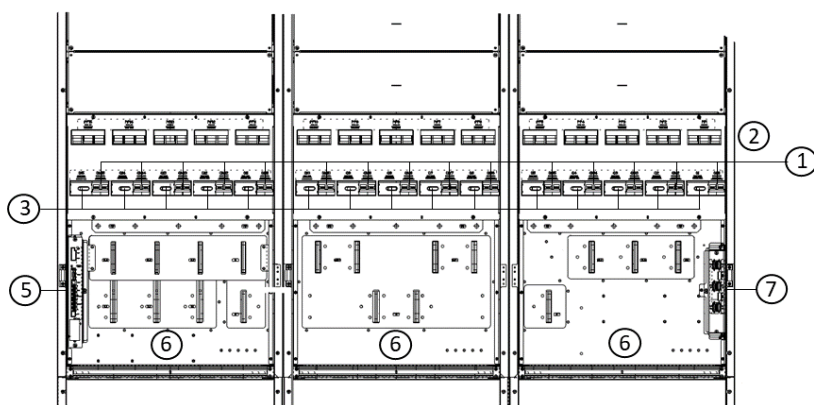
- 1: Per-module Battery Breaker
QM5/QM4/QM3/QM2/QM1
- 2: Per-module Bypass Fuse Holders PF5/PF4/PF3/PF2/PF1
- 3: Per-module Parallel Isolator Q5/Q4/Q3/Q2/Q1
- 4: Manual Bypass Switch Q0
- 5: Interfacing Board (see chapter 8)
- 6: Connections and Wiring (see chapter 7.9)
- 7: Multi-cabinet parallel communication

CAB-CP600B-E-2B0

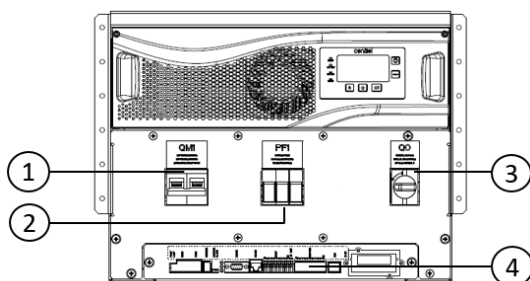
- 1: Per-module Battery Breaker:
QM10/QM9/QM8/QM7/QM6 and
QM5/QM4/QM3/QM2/QM1
- 2: Per-module Bypass Fuse Holders:
PF10/PF9/PF8/PF7/PF6 and PF5/PF4/PF3/PF2/PF1
- 3: Per-module Parallel Isolator:
Q10/Q9/Q8/Q7/Q6/Q5/Q4/Q3/Q2/Q1
- 4: Manual Bypass Switch Q0 (optional)
- 5: Interfacing Board (see chapter 8)
- 6: Connections and Wiring (see chapter 7.10)
- 7: Multi-cabinet parallel communication

CAB-CP600T-E-2B0

- 1: Per-module Battery Breaker:
QM10/QM9/QM8/QM7/QM6 and
QM5/QM4/QM3/QM2/QM1
- 2: Per-module Bypass Fuse Holders:
PF10/PF9/PF8/PF7/PF6 and
PF5/PF4/PF3/PF2/PF1
- 3: Per-module Parallel Isolator:
Q10/Q9/Q8/Q7/Q6
Q5/Q4/Q3/Q2/Q1
- 4: Manual Bypass Switch Q0
- 5: Interfacing Board (see chapter 8)
- 6: Connections and Wiring
(see chapter 7.11)
- 7: Multi-cabinet parallel
communication

CAB-CP900-E-3B0

- 1: Per-module Battery Breaker:
QM15/QM14/QM13/QM12/QM11,
QM10/QM9/QM8/QM7/QM6 and
QM5/QM4/QM3/QM2/QM1
- 2: Per-module Bypass Fuse Holders:
PF15/PF14/PF13/PF12/PF11
PF10/PF9/PF8/PF7/PF6 and
PF5/PF4/PF3/PF2/PF1
- 3: Per-module Parallel Isolator:
Q15/Q14/Q13/Q12/Q11
Q10/Q9/Q8/Q7/Q6 and
Q5/Q4/Q3/Q2/Q1
- 4: Manual Bypass Switch Q0
- 5: Interfacing Board (see chapter 8)
- 6: Connections and Wiring
(see chapter 7.12)
- 7: Multi-cabinet parallel
communication

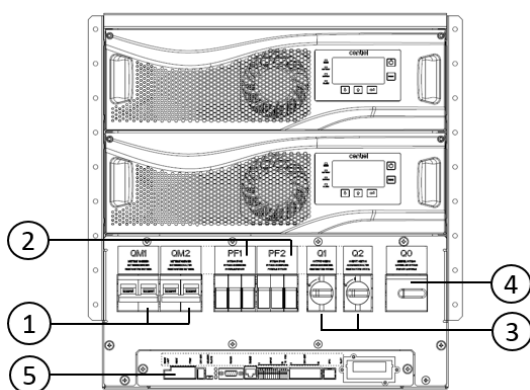
CAB-UR025-E-C0

- 1: Module Battery Breaker QM1

- 2: Module Bypass Fuse Holders PF1

- 3: Manual Bypass Switch Q0

- 4: Interfacing Board (see chapter 8)

CAB-UR050-E-C0

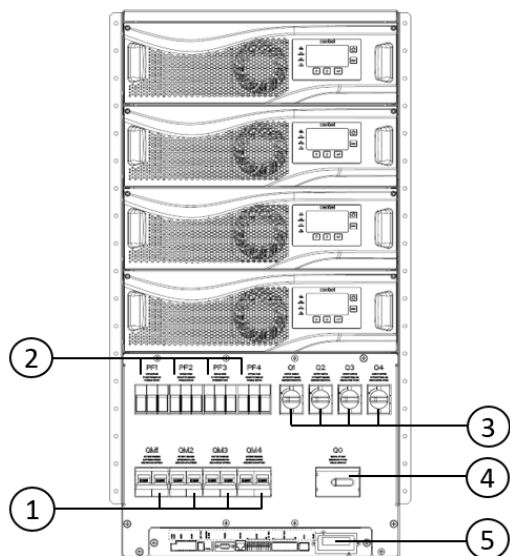
- 1: Per-module Battery Breaker QM1/QM2

- 2: Per-module Bypass Fuse Holders PF1/PF2

- 3: Per-module Parallel Isolator Q1/Q2

- 4: Manual Bypass Switch Q0

- 5: Interfacing Board (see chapter 8)

CAB-UR100-E-C1

- 1: Per-module Battery Breaker QM1/QM2/QM3/QM4

- 2: Per-module Bypass Fuse Holders PF1/PF2/PF3/PF4

- 3: Per-module Parallel Isolator Q1/Q2/Q3/Q4

- 4: Manual Bypass Switch Q0

- 5: Interfacing Board (see chapter 8)

7 Electrical Installation

7.1 Preparation for Electrical Installation

Warning!

Prior to connecting the power cables, make sure that all the Circuit Breakers and Fuses of the UPS, as well as the protections of the distribution facility and of the external batteries, are open.



The input and output wires connection must be performed by authorized electricians or by qualified technical personnel only.



Mains voltage and frequency shall be in accordance with the values indicated on the nameplate of the UPS (see 5.5.1).

PE (earth) and Neutral connections have to be performed according to local and national electrical codes.



The input values of the UPS shall be within the limits in accordance with IEC 61000-2-2. If the limits exceed the 75% of the specified values, the end user has to receive the approval from the manufacturer before installing the system.



The input of the UPS must be fitted through Fuses or CBs installed in dedicated facilities, as listed in the tables presented in sections 7.2.1 and 7.2.1.1. Usually, the input CB should be 3-poles, with fix Neutral connection.

A 4-poles CB is also allowed, but be aware that when open, the neutral of the UPS and the load will be floating against the ground.



If differential CBs are used, the earth leakage current could exceed 3.5 mA when starting the UPS. Therefore, it is essential to connect the earth terminal before connecting the input wires.



Input neutral is required to operate the UPS.

The UPS has been designed to work with the following AC power distribution systems: TT, TN-C, TN-S. For IT power distribution systems without neutral, it is necessary to install a 3-poles/4-poles converter transformer in order to recreate a reference PEN on the secondary windings connected to the input of the UPS. It is suggested to restart the power distribution in TN-S configuration.

7.2 Cables, Sections and Fuses Ratings

7.2.1 Single Input Feed connection

Single input feed is the most common connection, and it implies the installation of one group of fuses or Circuit Breakers (CBs) in the customer's input distribution facility since only one grid is available. In case of a Mains failure, the only power available will come from the batteries.

Feed	Description	CAB-CP404-SP25-116A0	CAB-CP360-100-A0	CAB-CP100-0320-B0	CAB-CP100-EA1	CAB-CP100-EA0	CAB-CP251-E80	CAB-CP300 (IT)-E80	CAB-CP600 (IT)-E200	CAB-CP900-E300	CAB-UR25-EC0	CAB-UR50-EC0	CAB-UR100-EC1
Input voltage 3 x 230/400 V	Maximum input current with batteries charging	75 A	79 A	158 A	158 A	198 A	396 A	470 A	940 A	1410 A	39.5 A	79 A	158 A
	Input cables 3 x 95 G or CB	80 A	80 A	160 A	160 A	200 A	400 A	500 A	1000 A	1600 A	40 A	80 A	160 A
	Output cables (mm ²) (VDE0298)	5 x 16	5 x 16	5 x 50	5 x 50	5 x 70	5 x 240 or 2 x (5 x 95)	5 x 300 or 2 x (5 x 120)	3 x (5 x 150)	4 x (5 x 300)	5 x 6	5 x 16	5 x 50
Output voltage 3 x 230/400 V	Nominal output current (In)	69 A	72.5 A	145 A	145 A	181 A	362 A	435 A	870 A	1305 A	36 A	72.5 A	145 A
	Output cables (mm ²) (VDE0298)	5 x 16	5 x 16	5 x 50	5 x 50	5 x 70	5 x 240 or 2 x (5 x 95)	5 x 300 or 2 x (5 x 120)	3 x (5 x 150)	4 x (5 x 300)	5 x 6	5 x 16	5 x 50
	Max battery current for common batteries (A @ min voltage with 40 batt.)	-	-	-	250 A	312 A	625 A	750 A	1500 A	2250 A	-	-	-
Battery	Common battery fuses or CB (1000A _{IC})	N/A	N/A	N/A	250 A	315 A	630 A	800 A	1500 A	2500 A	N/A	N/A	N/A
	Common battery cables (mm ²)	N/A	N/A	N/A	3 x 120	3 x 150 or 2 x (3 x 70)	2 x (3 x 185) or 3 x (3 x 95)	2 x (3 x 240) or 3 x (3 x 120)	4 x (3 x 304)	6 x (3 x 300)	N/A	N/A	N/A
	Battery cables, separate for each battery (A @ min voltage with 40 batt.)	N/A	N/A	N/A	4 x (3 x 10)	6 x (3 x 10)	10 x (3 x 10)	5 x (3 x 35)	10 x (3 x 35)	N/A	N/A	N/A	N/A

7.2.1.1 Dual Input Feed connection

The dual feed connection, with separate protections, is used with the aim of increasing the safety in case of batteries discharge. It should have two different power supply grids with neutrals connected together.

If the Rectifier Mains fails, the UPS switches over to batteries. As soon as the batteries are fully discharged, the load will be transferred to Bypass without interruption, and it will be continuously supplied by the Bypass Mains until the Rectifier Mains is again available.

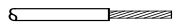
If the Bypass Mains fails, the UPS will work as normal, but the Bypass will not be available anymore.

Feed	Description	CAB-CP048-SP38-100-40	CAB-CP058-100-AX	CAB-CP100-0320-B0	CAB-CP100-EA1	CAB-CP150-EA0	CAB-CP251-E-B0	CAB-CP300-T1-E-B0	CAB-CP500-T1-E-B0	CAB-CP900-E-3B0	CAB-UR025-E-C0	CAB-UR050-E-C0	CAB-UR100-E-C1
Input rectifier voltage 3 x 230/400V	Maximum input current with batteries charging	75 A	79 A	158 A	158 A	198 A	396 A	470 A	940 A	1410 A	39.5 A	79 A	158 A
	Input fuses 3 x g-50 or CB	80 A	80 A	160 A	160 A	200 A	400 A	500 A	1000 A	1500 A	40 A	80 A	160 A
Input Bypass 3 x 230/400V	Input cables (mm ²) (VDE0298)	5 x 16	5 x 16	5 x 50	5 x 50	5 x 70	5 x 240 or 2 x (5 x 95)	5 x 300 or 2 x (5 x 120)	3 x (5 x 150)	4 x (5 x 300)	5 x 6	5 x 16	5 x 50
	Input fuses 3 x g-50 or CB	80 A	80 A	160 A	160 A	200 A	400 A	500 A	1000 A	1500 A	40 A	80 A	160 A
Output voltage 3 x 230/400 V	Input cables (mm ²) (VDE0298)	5 x 16	5 x 16	5 x 50	5 x 50	5 x 70	5 x 240 or 2 x (5 x 95)	5 x 300 or 2 x (5 x 120)	3 x (5 x 150)	4 x (5 x 300)	5 x 6	5 x 16	5 x 50
	Nominal output current (In)	69 A	72.5 A	145 A	145 A	181 A	362 A	435 A	870 A	1305 A	36 A	72.5 A	145 A
Battery	Output cables (mm ²) (VDE0298)	5 x 16	5 x 16	5 x 50	5 x 50	5 x 70	5 x 240 or 2 x (5 x 95)	5 x 300 or 2 x (5 x 120)	3 x (5 x 150)	4 x (5 x 300)	5 x 6	5 x 16	5 x 50
	Max battery current for common batteries (A @ min voltage with 40 batt)	-	-	-	250 A	312 A	625 A	750 A	1500 A	2250 A	-	-	-
	Common battery fuses or CB (1000 V _{DC})	N/A	N/A	N/A	250 A	315 A	630 A	800 A	1500 A	2500 A	N/A	N/A	N/A
	Common battery cables (mm ²)	N/A	N/A	N/A	3 x 120	3 x 150 or 2 x (3 x 70)	2 x (3 x 185) or 3 x (3 x 95)	2 x (3 x 240) or 3 x (3 x 120)	3 x (3 x 240)	6 x (3 x 300)	N/A	N/A	N/A
	Battery cables, separate batteries (50 A @ min voltage with 40 batt)	N/A	N/A	N/A	4 x (3 x 10)	6 x (3 x 10)	10 x (3 x 10)	5 x (3 x 35)	10 x (3 x 35)	N/A	N/A	N/A	N/A

7.3 Electrical Connection CAB-CP050-I080-A1, CAB-CP050-I240-A0

Notice!

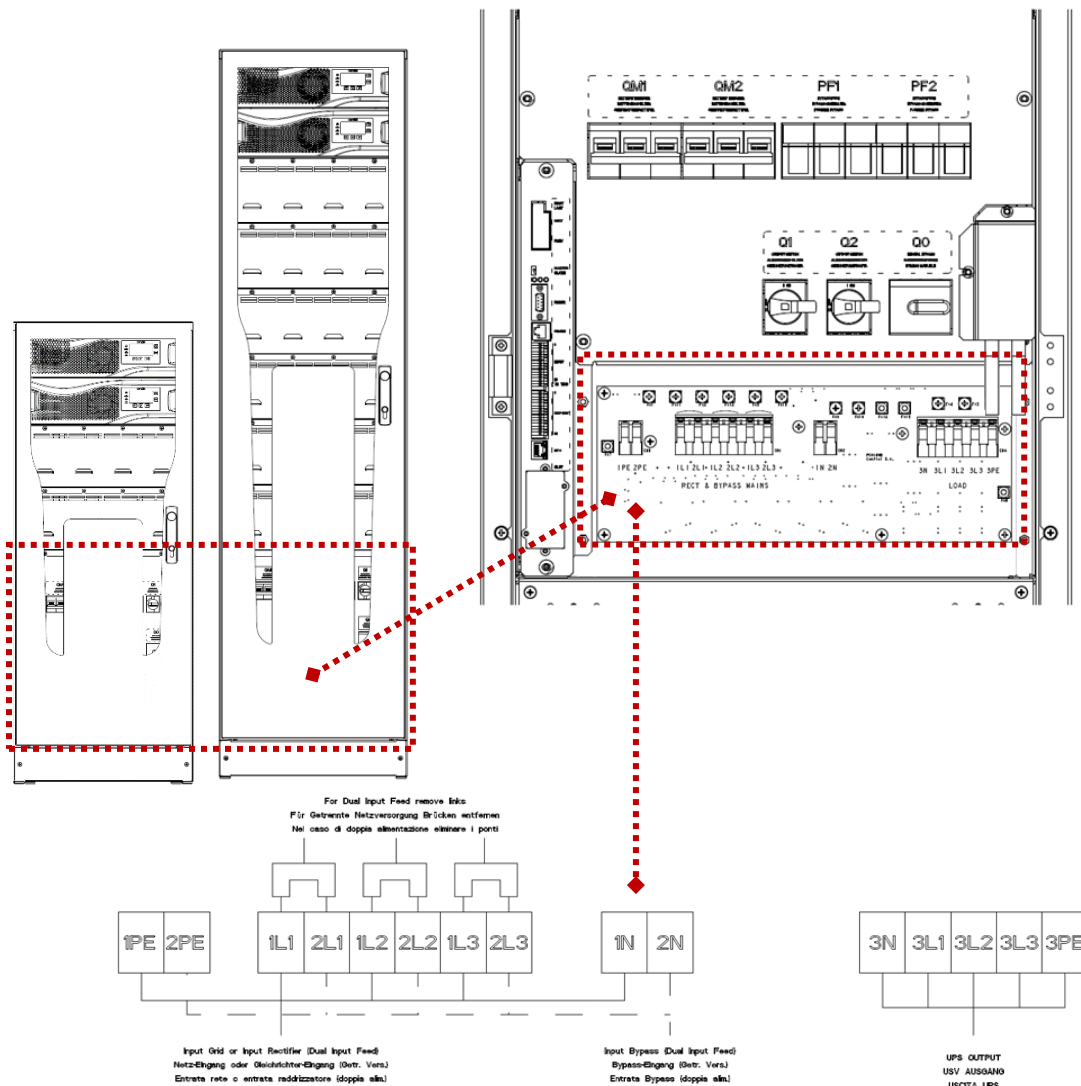
Terminal strips for 16 mm² conductors without ferrule.

( 12 -13 mm / 0.49 in)

Notice!

For dual input feed remove links between 1L1 and 2L1, 1L2 and 2L2, 1L3 and 2L3.

Electrical Connection



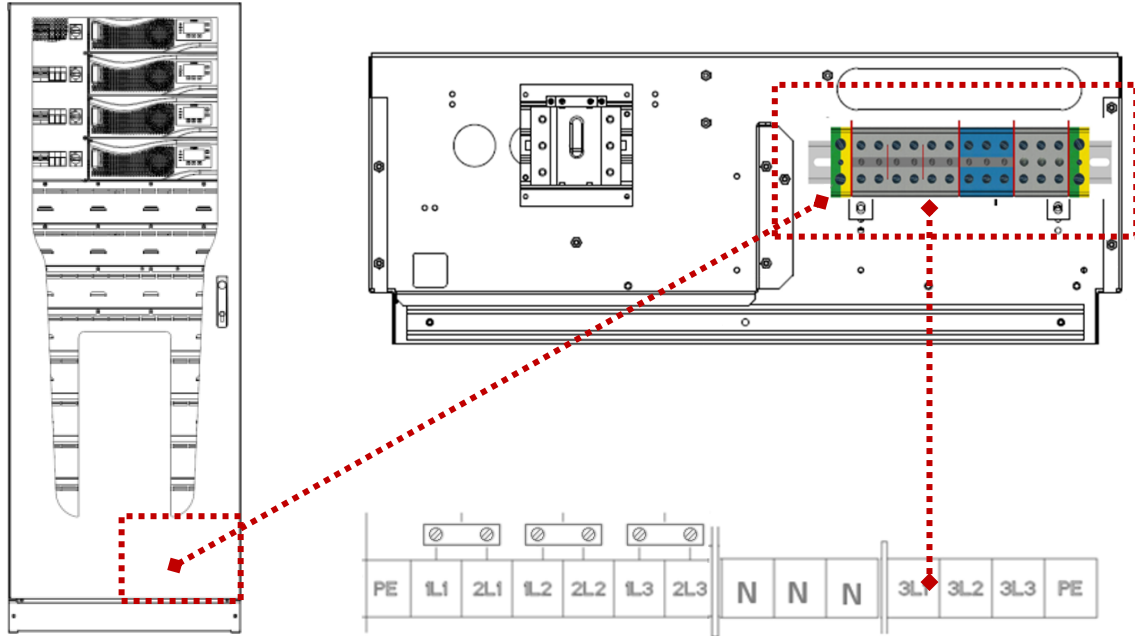
Label	Description	Wires on Terminals
1PE/2PE	Connect earth cable	Up to 16 mm ² (without ferrule for 16 mm ² wires)
Input		
1L1	Input Rectifier L1	Up to 16 mm ² (without ferrule for 16 mm ² wires)
2L1	Input Bypass L1	Up to 16 mm ² (without ferrule for 16 mm ² wires)
1L2	Input Rectifier L2	Up to 16 mm ² (without ferrule for 16 mm ² wires)
2L2	Input Bypass L2	Up to 16 mm ² (without ferrule for 16 mm ² wires)
1L3	Input Rectifier L3	Up to 16 mm ² (without ferrule for 16 mm ² wires)
2L3	Input Bypass L3	Up to 16 mm ² (without ferrule for 16 mm ² wires)
1N	Input Rectifier N	Up to 16 mm ² (without ferrule for 16 mm ² wires)
2N	Input Bypass N	Up to 16 mm ² (without ferrule for 16 mm ² wires)
Output		
3N	Output N	Up to 16 mm ² (without ferrule for 16 mm ² wires)
3L1	Output L1	Up to 16 mm ² (without ferrule for 16 mm ² wires)
3L2	Output L2	Up to 16 mm ² (without ferrule for 16 mm ² wires)
3L3	Output L3	Up to 16 mm ² (without ferrule for 16 mm ² wires)
3PE	Connect earth cable	Up to 16 mm ² (without ferrule for 16 mm ² wires)

7.4 Electrical Connection CAB-CP100-I320-B0

Notice!

For dual input feed remove links between 1L1 and 2L1, 1L2 and 2L2, 1L3 and 2L3.

Electrical Connection (Maximum permitted torque In/Out: 5Nm)



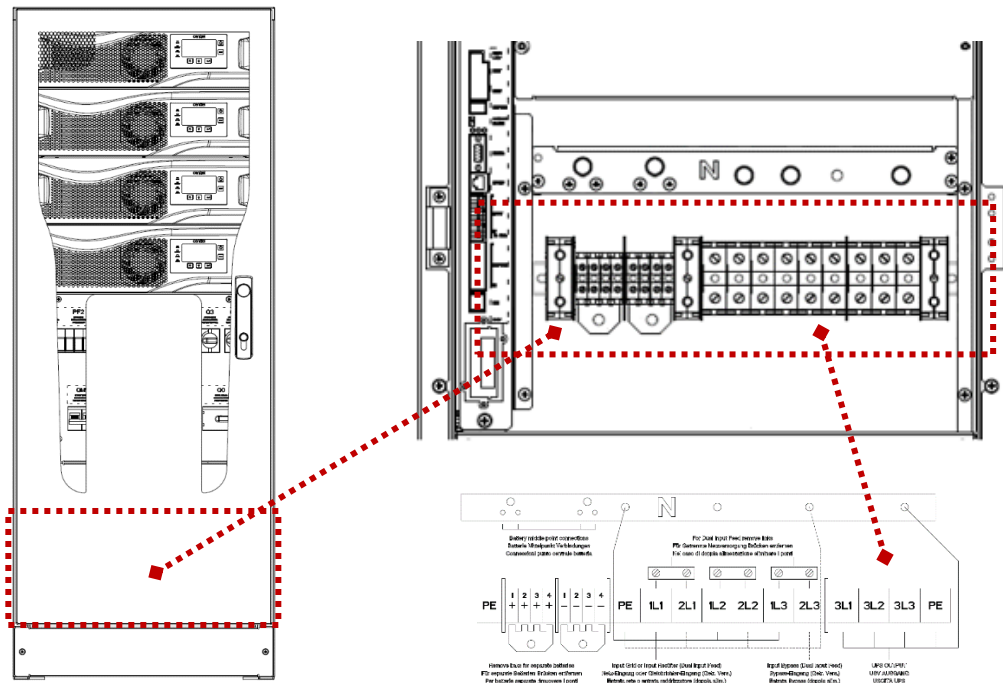
Notice!

Screw terminals for 70 mm² rigid conductors, Input and Output lines.

Label	Description	Wires on Terminals
PE	Connect earth cable	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Input		
1L1	Input Rectifier L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L1	Input Bypass L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
1L2	Input Rectifier L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L2	Input Bypass L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
1L3	Input Rectifier L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L3	Input Bypass L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
N	Input Rectifier N	Up to 50 mm ² (up to 70 mm ² rigid conductor)
N	Input Bypass N	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Output		
N	Output N	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L1	Output L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L2	Output L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L3	Output L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
PE	Connect earth cable	Up to 50 mm ² (up to 70 mm ² rigid conductor)

7.5 Electrical Connection CAB-CP100-E-A1

Electrical Connection (Maximum permitted torque In/Out: 5Nm, N and Batt. M8: 25Nm; for separate batteries, N Batt. M5: 5Nm, Batt. Terminal: 1.9Nm)



Label	Description	Wires on Terminals
PE	Connect earth cable	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Battery		
(+) for module 1/2/3/4	Common	M8 bolt for common battery
(-) for module 1/2/3/4	Separate	Up to 16 mm ² (without ferrule for 16 mm ² wires)
(-) for module 1/2/3/4	Common	M8 bolt for common battery
	Separate	Up to 16 mm ² (without ferrule for 16 mm ² wires)
Battery Neutral	Connected to the common neutral bar	2 x M8 bolts for common battery 2 x 2 M5 screws for separate battery
Input		
1L1	Input Rectifier L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L1	Input Bypass L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
1L2	Input Rectifier L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L2	Input Bypass L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
1L3	Input Rectifier L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L3	Input Bypass L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
N	Input Rectifier N	Up to 50 mm ² (up to 70 mm ² rigid conductor)
N	Input Bypass N	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Output		
N	Output N	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L1	Output L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L2	Output L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L3	Output L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
PE	Connect earth cable	Up to 50 mm ² (up to 70 mm ² rigid conductor)

7.6 Electrical Connection CAB-CP150-E-A0

Notice!

CAB-CP150-E-A0 consists in a 125kW cabinet + 1 redundant module.

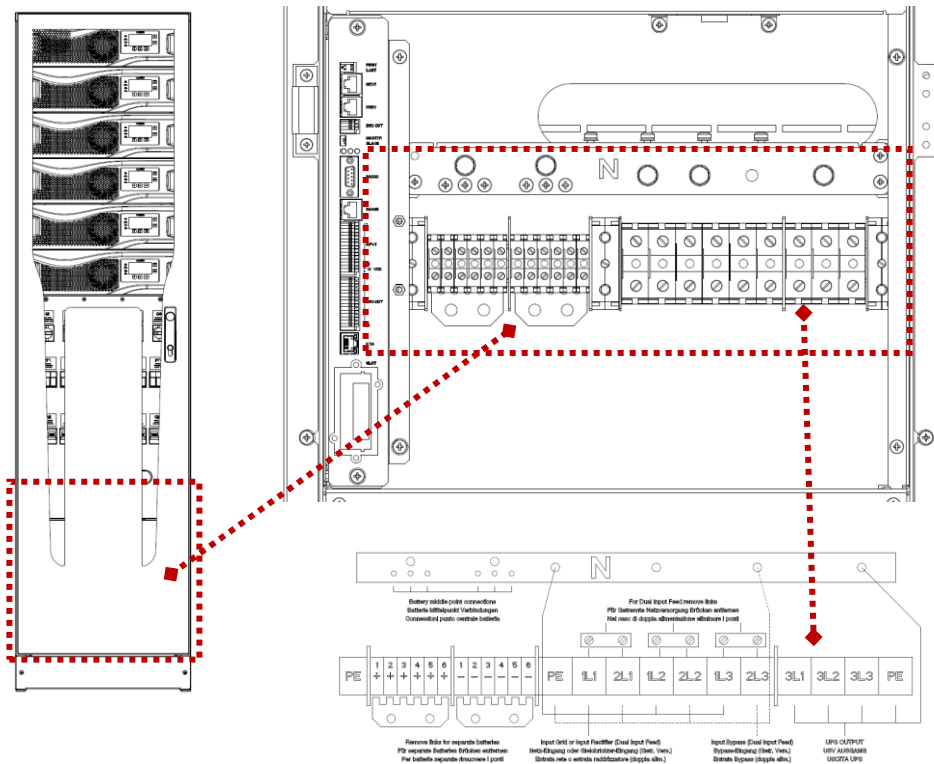
Notice!

For dual input feed remove links between 1L1 and 2L1, 1L2 and 2L2, 1L3 and 2L3.

Notice!

For separate batteries, remove the links between connections 1/2/3/4/5/6 (+) and connections 1/2/3/4/5/6 (-).

Electrical Connection (Maximum permitted torque for In/Out terminals: 8Nm, Neutral M8: 25Nm; for separate batteries, Batt. terminals: 1.9Nm, and M5: 5Nm)



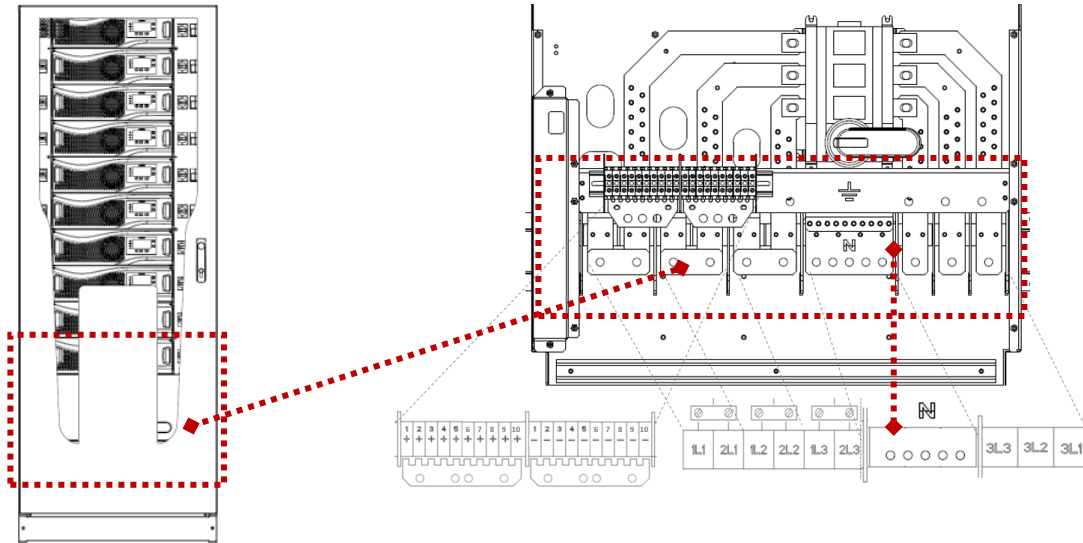
Notice!

Screw terminals for up to 95 mm² conductors (without ferrule) on Input and Output lines.

Label	Description	Wires on Terminals
PE	Connect earth cable	Up to 70 mm ² (without ferrule for 95 mm ² wires)
Battery		
(+) for modules 1/2/3/4/5/6	Common Separate	2 x M8 bolts for common battery Up to 16 mm ² (without ferrule for 16 mm ² wires)
(-) for modules 1/2/3/4/5/6	Common Separate	2 x M8 bolts for common battery Up to 16 mm ² (without ferrule for 16 mm ² wires)
Battery Neutral	Connected to the common neutral bar	2 x M8 bolts for common battery 2 x 3 M5 screws for separate battery
Input		
1L1	Input Rectifier L1	Up to 70 mm ² (without ferrule for 95 mm ² wires)
2L1	Input Bypass L1	Up to 70 mm ² (without ferrule for 95 mm ² wires)
1L2	Input Rectifier L2	Up to 70 mm ² (without ferrule for 95 mm ² wires)
2L2	Input Bypass L2	Up to 70 mm ² (without ferrule for 95 mm ² wires)
1L3	Input Rectifier L3	Up to 70 mm ² (without ferrule for 95 mm ² wires)
2L3	Input Bypass L3	Up to 70 mm ² (without ferrule for 95 mm ² wires)
Neutral Input Rectifier and Bypass	Connected to the common neutral connection bar	3 x M8 bolts
Output		
3L1	Output L1	Up to 70 mm ² (without ferrule for 95 mm ² wires)
3L2	Output L2	Up to 70 mm ² (without ferrule for 95 mm ² wires)
3L3	Output L3	Up to 70 mm ² (without ferrule for 95 mm ² wires)
PE	Connect earth cable	Up to 70 mm ² (without ferrule for 95 mm ² wires)
Output Neutral	Connected to the common neutral connection bar	3 x M8 bolts

7.7 Electrical Connection CAB-CP251-E-B0

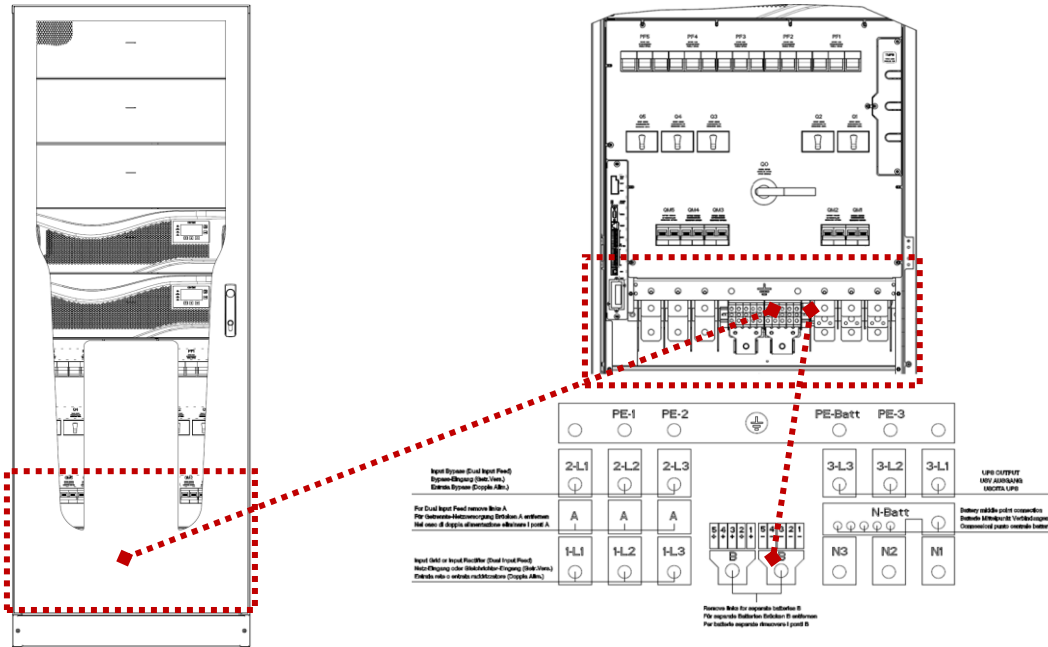
Electrical Connection (Maximum permitted torque for M10: 50Nm; for separate batteries, Batt terminals: 1.9Nm, Batt. neutral M5: 5Nm)



Label	Description	Wires on Terminals
	Connect earth cable	4 x M10 bolts
Battery		
(+) for modules	Common	2 x M10 bolts
1/2/3/4/5/6/7/8/9/10	Separate	Up to 16 mm ² without ferrule
(-) for modules	Common	2 x M10 bolts
1/2/3/4/5/6/7/8/9/10	Separate	Up to 16 mm ² without ferrule
Battery Neutral	Connected to the common neutral bar	2 x M10 bolts for common battery 10 x M5 screws for separate battery
Input		
1L1	Input Rectifier L1	M10 bolt
2L1	Input Bypass L1	M10 bolt
1L2	Input Rectifier L2	M10 bolt
2L2	Input Bypass L2	M10 bolt
1L3	Input Rectifier L3	M10 bolt
2L3	Input Bypass L3	M10 bolt
N	Input Rectifier N	M10 bolt
N	Input Bypass N	M10 bolt
Output		
N	Output N	3 x M10 bolts
3L1	Output L1	M10 bolt
3L2	Output L2	M10 bolt
3L3	Output L3	M10 bolt
	Connect earth cable	4 x M10 bolts

7.8 Electrical Connection CAB-CP300B-E-B0

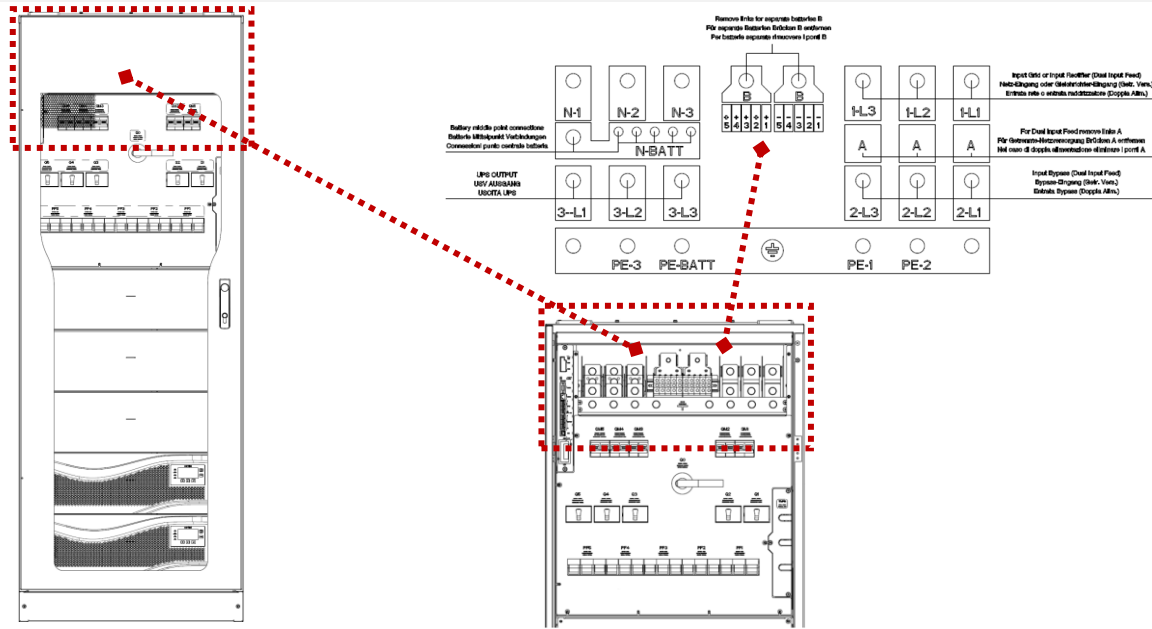
Electrical Connection (Maximum permitted torque for M12: 80Nm; for separate batteries, Batt terminals: 3.5Nm, Batt. neutral M5: 5Nm)



Label	Description	Wires on Terminals
	Connected to the common earth bar	3 x M12 bolts
Battery		
(+) for module 1/2/3/4/5	Common Separate	M12 bolt Up to 50 mm ² without ferrule
(-) for module 1/2/3/4/5	Common Separate	M12 bolt Up to 50 mm ² without ferrule
Battery Neutral	Connected to the common neutral bar	2 x M12 bolts for common battery 5 x M6 screws for separate battery
Input		
1L1	Input Rectifier L1	M12 bolt
2L1	Input Bypass L1	M12 bolt
1L2	Input Rectifier L2	M12 bolt
2L2	Input Bypass L2	M12 bolt
1L3	Input Rectifier L3	M12 bolt
2L3	Input Bypass L3	M12 bolt
N	Input Rectifier N	M12 bolt
N	Input Bypass N	M12 bolt
Output		
N	Output N	M12 bolt
3L1	Output L1	M12 bolt
3L2	Output L2	M12 bolt
3L3	Output L3	M12 bolt
	Connect earth cable	3 x M12 bolts

7.9 Electrical Connection CAB-CP300T-E-B0

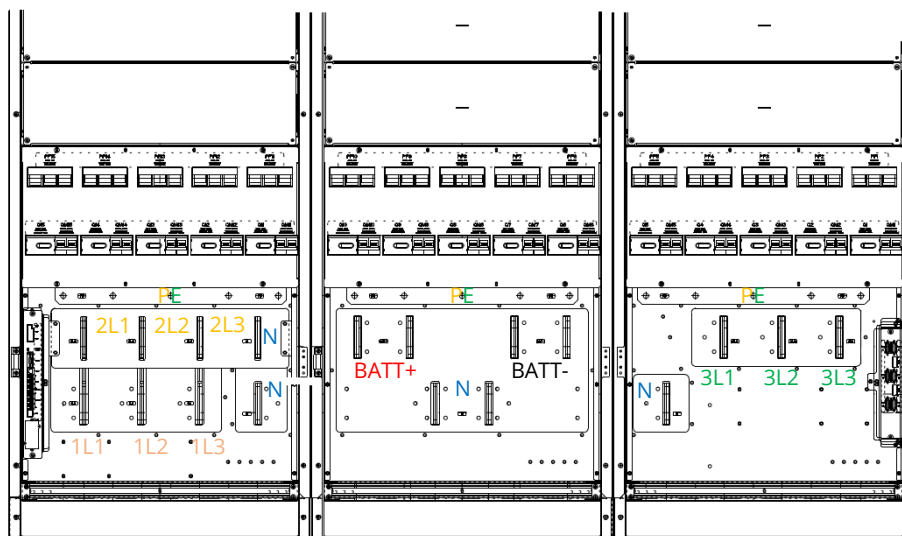
Electrical Connection (Maximum permitted torque for M12: 80Nm; for separate batteries, Batt terminals: 3.5Nm, Batt. neutral M5: 5Nm)



Label	Description	Wires on Terminals
	Connected to the common earth bar	3 x M12 bolts
Battery		
(+) for module 1/2/3/4/5	Common Separate	M12 bolt Up to 50 mm ² without ferrule
(-) for module 1/2/3/4/5	Common Separate	M12 bolt Up to 50 mm ² without ferrule
Battery Neutral	Connected to the common neutral bar	2 x M12 bolts for common battery 5 x M6 screws for separate battery
Input		
1L1	Input Rectifier L1	M12 bolt
2L1	Input Bypass L1	M12 bolt
1L2	Input Rectifier L2	M12 bolt
2L2	Input Bypass L2	M12 bolt
1L3	Input Rectifier L3	M12 bolt
2L3	Input Bypass L3	M12 bolt
N	Input Rectifier N	M12 bolt
N	Input Bypass N	M12 bolt
Output		
N	Output N	M12 bolt
3L1	Output L1	M12 bolt
3L2	Output L2	M12 bolt
3L3	Output L3	M12 bolt
	Connect earth cable	3 x M12 bolts

7.12 Electrical Connection CAB-CP900B-E-3B0

Electrical Connection (Maximum permitted torque for M12: 80Nm)



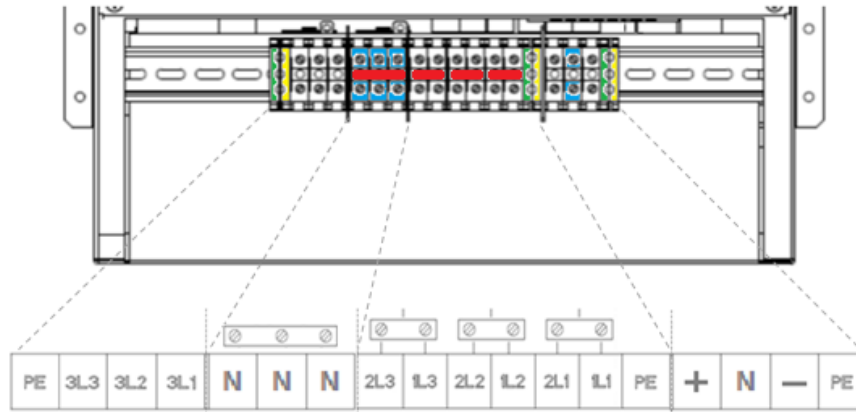
Label	Description	Wires on Terminals
	Connected to the common earth bar	
Battery		
(+) for module	Common	2 x 6 x M12 bolts
(-) for module	Common	2 x 6 x M12 bolts
Battery Neutral (4N)	Connected to the	2 x 6 x M12 bolts
Input		
1L1	Input Rectifier L1	6 x M12 bolts
2L1	Input Bypass L1	6 x M12 bolts
1L2	Input Rectifier L2	6 x M12 bolts
2L2	Input Bypass L2	6 x M12 bolts
1L3	Input Rectifier L3	6 x M12 bolts
2L3	Input Bypass L3	6 x M12 bolts
1N	Input Rectifier N	6 x M12 bolts
2N	Input Bypass N	6 x M12 bolts
Output		
3N	Output N	6 x M12 bolts
3L1	Output L1	6 x M12 bolts
3L2	Output L2	6 x M12 bolts
3L3	Output L3	6 x M12 bolts

7.13 Electrical Connection CAB-UR025-E-C0

Notice!

For dual input feed remove links between 1L1 and 2L1, 1L2 and 2L2, 1L3 and 2L3. (Maximum permitted torque: 1.9Nm)

The distribution terminals are located on the back of the UR.



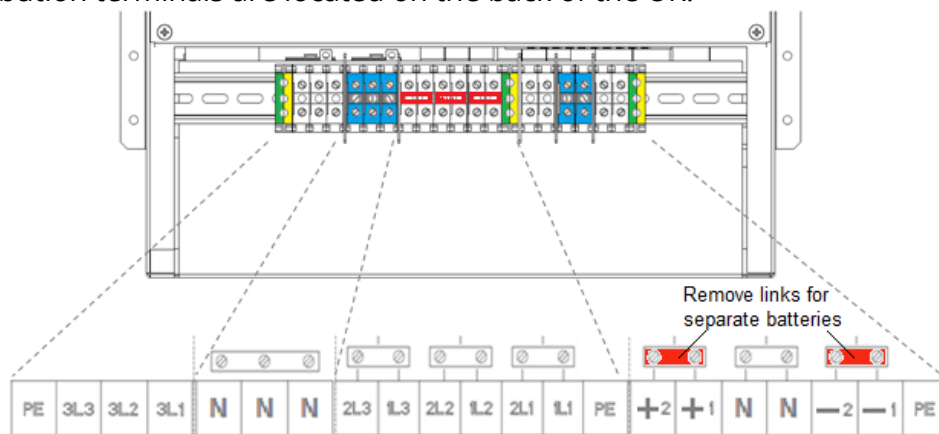
Label	Description	Wires Terminals
1PE/2PE	Connect earth cable	Up to 16 mm ² without ferrule
Input		
1L1	Input rectifier L1	Up to 16 mm ² without ferrule
2L1	Input bypass L1	Up to 16 mm ² without ferrule
1L2	Input rectifier L2	Up to 16 mm ² without ferrule
2L2	Input bypass L2	Up to 16 mm ² without ferrule
1L3	Input rectifier L3	Up to 16 mm ² without ferrule
2L3	Input bypass L3	Up to 16 mm ² without ferrule
1N	Input rectifier N	Up to 16 mm ² without ferrule
2N	Input bypass N	Up to 16 mm ² without ferrule
Output		
3N	Output N	Up to 16 mm ² without ferrule
3L1	Output L1	Up to 16 mm ² without ferrule
3L2	Output L2	Up to 16 mm ² without ferrule
3L3	Output L3	Up to 16 mm ² without ferrule
3PE	Connect earth cable	Up to 16 mm ² without ferrule
Battery		
(+)	Positive battery connection	Up to 16 mm ² without ferrule
(-)	Negative battery connection	Up to 16 mm ² without ferrule
Battery neutral	Middle point battery connection	Up to 16 mm ² without ferrule

7.14 Electrical Connection CAB-UR050-E-C0

Notice!

For dual input feed remove links between 1L1 and 2L1, 1L2 and 2L2, 1L3 and 2L3.

The distribution terminals are located on the back of the UR.



Notice!

Screw terminals for 16 mm² conductors for Input and Output lines. (Maximum permitted torque: 3Nm)

Label	Description	Wires on Terminals
PE	Connect earth cable	Up to 25 mm ²
Input		
1L1	Input Rectifier L1	Up to 25 mm ²
2L1	Input Bypass L1	Up to 25 mm ²
1L2	Input Rectifier L2	Up to 25 mm ²
2L2	Input Bypass L2	Up to 25 mm ²
1L3	Input Rectifier L3	Up to 25 mm ²
2L3	Input Bypass L3	Up to 25 mm ²
N	N Input Rectifier and B-P	Up to 25 mm ²
Output		
N	Output N	Up to 25 mm ²
3L1	Output L1	Up to 25 mm ²
3L2	Output L2	Up to 25 mm ²
3L3	Output L3	Up to 25 mm ²
PE	Connect earth cable	Up to 25 mm ²
Battery		
(+) for modules 1/2	Common Separate	Up to 25 mm ² (Link On) Up to 25 mm ²
(-) for modules 1/2	Common Separate	Up to 25 mm ² (Link On) Up to 25 mm ²
Battery Neutral	Common Separate	Up to 25 mm ² (Link On) Up to 25 mm ²

7.15 Electrical Connection CAB-UR100-E-C1

Notice!

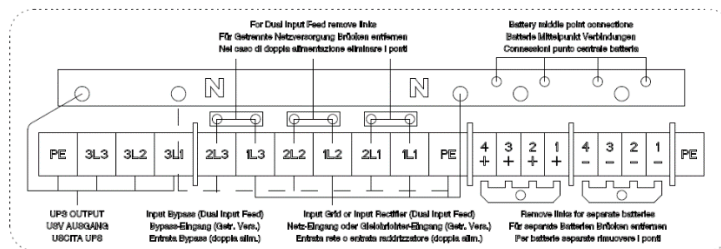
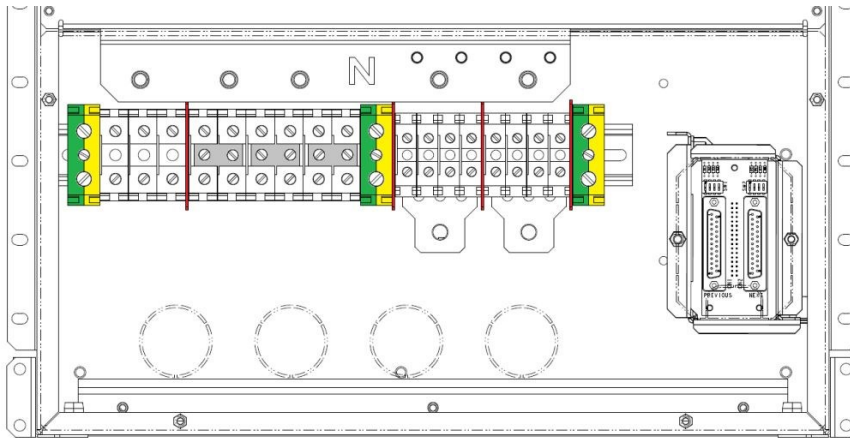
For dual input feed remove links between 1L1 and 2L1, 1L2 and 2L2, 1L3 and 2L3.

Notice!

For separate batteries, remove the links between connections 1/2/3/4 (+) and connections 1/2/3/4 (-).

Maximum permitted torque for In/Out terminals: 5Nm; Neutral and com. Batt. M8: 25Nm; separate batteries terminals: 1.9Nm, and M5: 5Nm)

The distribution terminals are located on the back of the UR.



Notice!

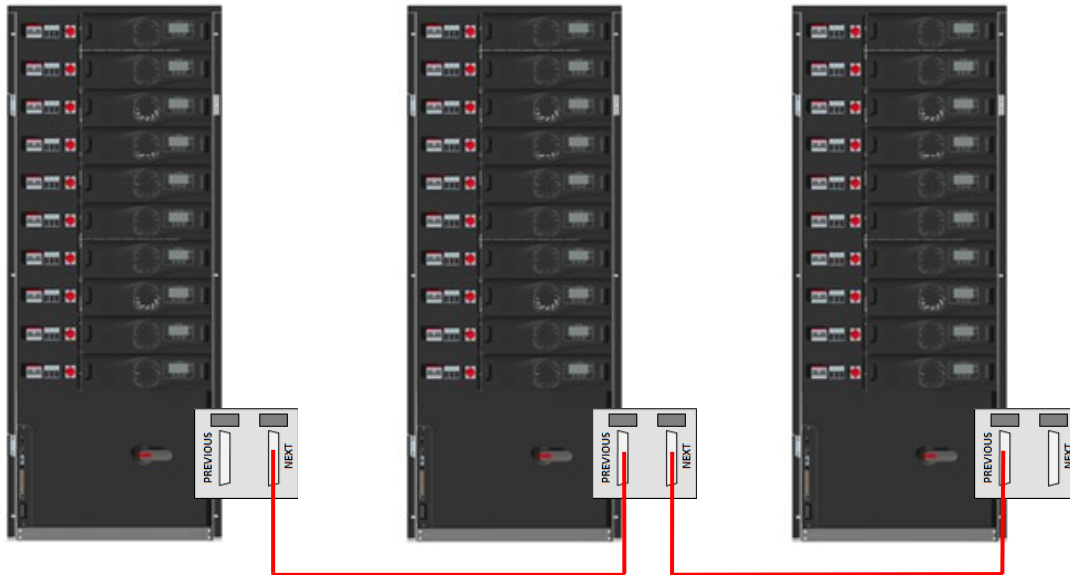
Screw terminals for 70 mm² rigid conductors for Input and Output lines.

Label	Description	Wires on Terminals
PE	Connect earth cable	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Battery		
(+) for modules 1/2/3/4	Common Separate	M8 bolt for common battery Up to 16 mm ²
(-) for modules 1/2/3/4	Common Separate	M8 bolt for common battery Up to 16 mm ²
Battery Neutral	Connected to the common neutral bar	2 x M8 bolts for common battery 4 x M5 screws for separate battery
Input		
1L1	Input Rectifier L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L1	Input Bypass L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
1L2	Input Rectifier L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L2	Input Bypass L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
1L3	Input Rectifier L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
2L3	Input Bypass L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Neutral Input Rectifier and Bypass	Connected to the common neutral bar	3 x M8 bolts
Output		
3L1	Output L1	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L2	Output L2	Up to 50 mm ² (up to 70 mm ² rigid conductor)
3L3	Output L3	Up to 50 mm ² (up to 70 mm ² rigid conductor)
PE	Connect earth cable	Up to 50 mm ² (up to 70 mm ² rigid conductor)
Output Neutral	Connected to the common neutral bar	3 x M8 bolts

7.16 Multi-Cabinet Connection

The multi-cabinet configuration allows the user to connect up to 40 modules in parallel in different frames configuration. Each cabinet is equipped with input and output parallel communication plugs (optional) located in the front while d on the back for Universal Racks.

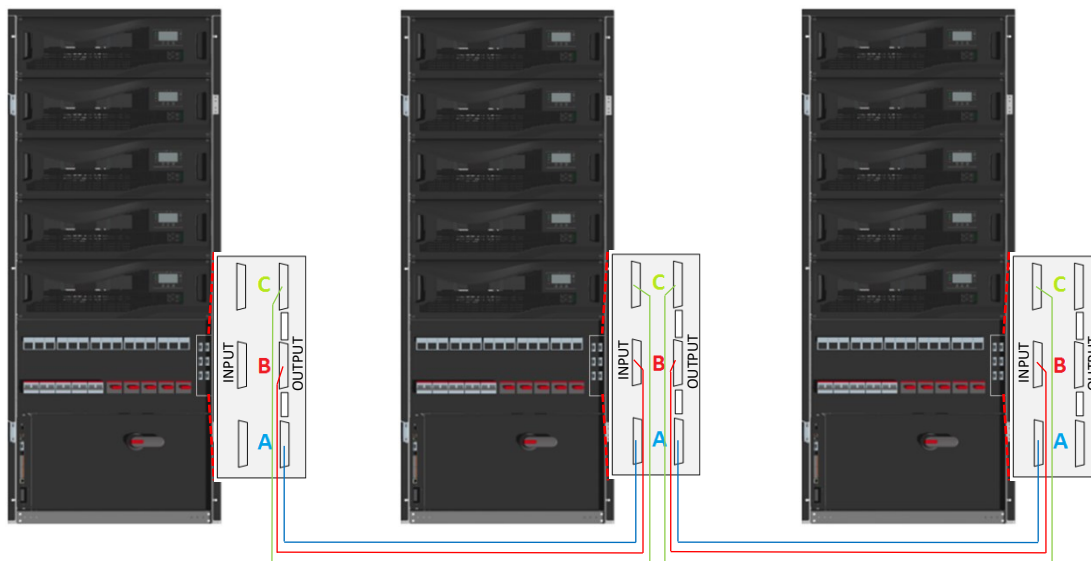
Example: parallel communication wiring for 3 x cabinets and 30 modules:



7.17 Multi-Cabinet Connection (only for CP300, CP600 and CP900)

For cabinets with 50 and 60kW modules the multi-cabinet configuration is guaranteed by means of a “triple-parallel communication bus©” and allows to connect in parallel up to 40 modules in different frame configurations.

Example: parallel communication wiring for 3 x cabinets and 15 modules:



For the correct cable connection and parallel configuration of the cabinet, refer to the Commissioning Guidelines from Rev.05 and later.

8 Interfacing

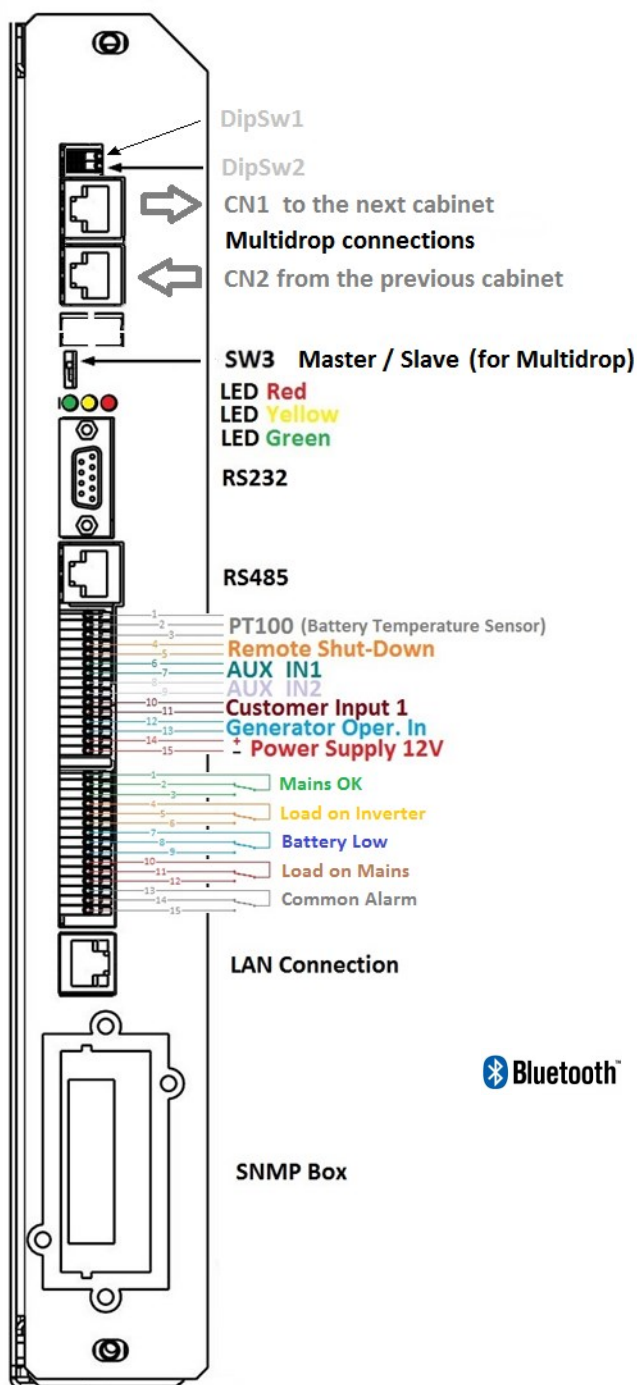
Each UPS cabinet is equipped with a Customer Interface (PC0110), which allows the user to monitor the condition of the system with different communication devices.

The Cumuluspower™ UPS can be equipped with several options, specific for customer applications.

The available options are:

- Multidrop for parallel multi-cabinet configuration;
- Dry port with NC or NO contact for “MAINS OK”, “LOAD ON INVERTER”, “LOAD ON BYPASS”, “BATTERY LOW” and “COMMON ALARM”;
- Bluetooth communication for iOS/Android mobile devices.
- Battery Temperature Probe (Optional)
- SNMP (Optional)
- Wavemon (Optional)
- 7" TFT system Display (Optional)

Function	Signal	I/O	Connector	PC0110
Programmable Dry Output	RL1	OUT	Spring type	✓
Programmable Dry Output	RL2	OUT	Spring type	✓
Programmable Dry Output	RL3	OUT	Spring type	✓
Programmable Dry Output	RL4	OUT	Spring type	✓
Programmable Dry Output	RL5	OUT	Spring type	✓
Battery Temperature Probe	PT100	IN	Spring type	✓
Voltage Source 12 V (200 mA)	12V	OUT	Spring type	✓
Emergency Power Off	EPO	IN	Spring type	✓
Generator Operation Input	GEN OP	IN	Spring type	✓
Programmable Dry Input	CUST IN1	IN	Spring type	✓
Options Slot	SNMP	I/O	Slot	✓
Ethernet (Not Active)		I/O	RJ45	✗
RS232 Channel	RS232	I/O	DB9	✓
AUX_IN1 (Ext Bypass)	AUX1	IN	Spring type	✓
AUX_IN2 (Ext Output Switch)	AUX2	IN	Spring type	✓
Bluetooth	BTLE	I/O		✓
RS485 Channel	DISPLAY	I/O	RJ45	✓
Multidrop (1 x In / 1 x Out)	Mdrop	I/O	RJ45	✓
R Bus Terminator (RS485)	Rclose(RS485)	IN	Dip SW	✓
Master/Slave Configuration	M/Slave	IN	Dip SW	✓



Notice!

Input and Dry-Output connectors are provided with spring terminal blocks for a cable section between 0.2 and 1.0 mm².

8.1 RS485

This communication port allows the user to get information through the RS485 serial communications standard. The RJ45 connector also provides a 15 V power supply with a maximum current of 200 mA, protected by means of an internal fuse.

8.2 Input Spring Terminal Blocks CN11: 1-15

Terminal	PIN	Signal	Description
CN11	1	_____	PT100 Temperature Measure (PWR)
CN11	2	←_____	PT100 Temperature Measure (MEAS 2)
CN11	3	←_____	PT100 Temperature Measure (MEAS 1)
CN11	4	←_____	Remote Shutdown
CN11	5	_____	Remote Shutdown (GND)
CN11	6	←_____	Input AUX_IN1 (External B-P Switch Monitor)
CN11	7	_____	Input AUX_IN1 (GND)
CN11	8	←_____	Input AUX_IN2 (External Q_out Switch Monitor)
CN11	9	_____	Input AUX_IN2 (GND)
CN11	10	←_____	Customer Input 1
CN11	11	_____	Customer Input 1 (GND)
CN11	12	←_____	Generator Operation Input
CN11	13	_____	Generator Operation Input (GND)
CN11	14	←_____	Auxiliary + 12 V (max 200 mA)
CN11	15	_____	Auxiliary GND

8.2.1 Temperature Probe (PT100)

A Battery Temperature Probe is strongly recommended to avoid degradation of battery life caused by using batteries in environments with varying temperature. The Battery Charger voltage will adapt to the room temperature, guaranteeing a longer battery life.



Battery Temperature Probe order code 00-00013

A recharge floating voltage of 2.275 V/cell is applied to the batteries as standard. The UPS assumes a 25 °C ambient temperature.

When the ambient temperature of the UPS battery compartment or battery rooms is not constant between 20-25°C, it is highly recommended to install a battery temperature probe.

The recharge floating voltage is compensated according to the sensed temperature by applying the following:

- 2.3 V/cell @ 15 °C linear to 2.23 V/cell @ 35 °C (step of 3.5 mV/cell x °C)

For Battery Cabinets, it is recommended to install the Battery Temperature Probe on top of the cabinet and in case of separate battery room, in the hottest point of the room.

8.2.2 Remote Shutdown

The Remote Shutdown allows the user to remotely turn off the full UPS system by using a linked contact installed in the customer facilities. Typically, and for safety reasons, a NC contact has to be used. This contact must open to operate the shutdown.

8.2.3 Input Auxiliary 1: External Manual Bypass Switch

This port allows the user to connect the auxiliary contact of an **external Manual Bypass Switch**, usually installed in customer facilities. This contact will provide to the UPS system the information about the status of the external Manual Bypass Switch. To enable the external Manual Bypass, insert the JP1 link in the PC0131 Parallel Board for 10/20/25 kW modules cabinets and in the PC0231 board for 50/60 kW modules cabinets. The operation of the external manual Bypass is the same as the one of the manual Bypass located on the UPS cabinet.

8.2.4 Input Auxiliary 2: External Output Breaker

This port allows the user to connect the auxiliary contact of an **external Output Breaker**.

Similar to AUX_IN1, the input has to be enabled by removing JP2 in the PC0131 Parallel Board for 10/20/25 kW modules cabinets and in the PC0231 board for 50/60 kW modules cabinets.

8.2.5 Customer Input 1

This is a generic input port which can be customized according to customers' needs. Ask the manufacturer for more details.

8.2.6 Generator Operation

This port allows the user to provide information to the UPS system about when it is supplied by the generator. An external normally open (NO) contact, which will close as soon as the UPS is supplied by the gen-set, has to be used. In this operation mode, two options can be selected by means of the control panel in the "Set-up User" menu:

- Block Bypass synchronization: in order to avoid output frequency oscillations caused by the generator, the UPS will not synchronize with input Bypass Mains.
- Block Battery Charger: in order to avoid waste of energy of the generator, the UPS will not charge the batteries when supplied by it.

Notice!

It is recommended to inform the manufacturer about the characteristics of the generator.

8.2.7 Auxiliary 12 V (200 mA)

The Customer Interface provides a 12 V (DC) power supply with a maximum of 200 mA for any customer application.

8.3 Dry-Output Port (CN14)

The interface has a Dry-Output port contact for the information “Common Alarm”. The contact is connected with spring terminal blocks for cable size from 0.2 to 1.0 mm², and it allows maximum 30W(VA) switching power by rated voltage and current of 125VAC/60VDC/1A

Terminal	PIN	Signal	Description	Pos
CN14	1		Mains OK dry port (Common)	(RL1)
CN14	2		Mains OK dry port (NC)	
CN14	3		Mains OK dry port (NO)	
CN14	4		Load on Inverter dry port (Common)	(RL2)
CN14	5		Load on Inverter dry port (NC)	
CN14	6		Load on Inverter dry port (NO)	
CN14	7		Battery Low dry port (Common)	(RL3)
CN14	8		Battery Low dry port (NC)	
CN14	9		Battery Low dry port (NO)	
CN14	10		Load on Mains dry port (Common)	(RL4)
CN14	11		Load on Mains dry port (NC)	
CN14	12		Load on Mains dry port (NO)	
CN14	13		Common Alarm dry port (Common)	(RL5)
CN14	14		Common Alarm dry port (NC)	
CN14	15		Common Alarm dry port (NO)	

8.4 RS232 D-Sub Channel

The RS232 serial port allows the user to connect a PC and to communicate with the Interface Board itself or with every module in the frame.

This port is intended to be used only by service engineers for service purposes.

8.5 LED Functionality Description

The aim of the external visible LED is to provide information about the operating status of the Customer Interface.

LED	Description
Green	The status of the Interface is OK, it is working as Master board
Yellow	The status of the Interface is OK, it is working as Slave board
Red	The Communication Board is blocked, contact service support

8.6 Multidrop Input/Output (CN1/CN2)

Multidrop input and output communication plugs.

Typically, multidrop connection is used for Parallel frames, and they allow the user to communicate through the Master Interface Board with all modules that make up the system

For the installation and the correct settings, please refer to the Commissioning Guideline Rev.05 and over.

8.6.1 Master/Slave Switch for Multidrop Application (SW3)

This switch sets the working behavior of the Communication Board.

Status	Description
Master	The Communication Board is active and can access the UPS modules, collect system information and provide the UPS status through the Dry-Output port or through any other communication channel.
Slave	The Communication Board is in “Active-sleep mode”. The board is active and ready to be Master. While in this state, the board does not communicate with the UPS modules, nor does it provide any system status through the Dry-Output port, and it does not collect any Dry-Input information.

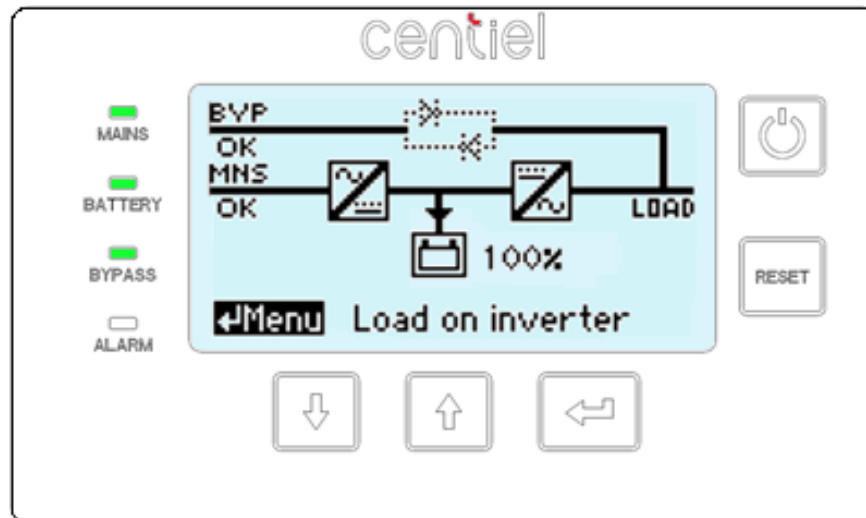
8.7 Bluetooth

The interface can be connected to a device equipped with Bluetooth communication. The communication characteristic will be the same as RS485.

9 Operation

9.1 3" User Interface (Control Panel)

Each module is provided with a 3" graphical LCD display, four LED indicators and a five-buttons dial pad.

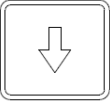
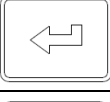


9.1.1 LED Indicators

The four LED indicators provide an easy and quick view of the operating status of the UPS. Each LED can have two states, ON or OFF.

Function	Color	Status	Description
Mains	Green	OFF	Mains Rectifier out of tolerance or not present
		ON	Mains Rectifier is OK (within tolerances)
Battery	Green	OFF	Batteries not connected
		ON	Batteries connected
		BLINKING	Batteries running-down condition
Bypass	Green	OFF	Mains Bypass out of tolerance or not present (only visible with module on)
		ON	Mains Bypass is OK (within tolerances)
Alarm	Red	OFF	No alarm is present
		BLINKING	An alarm condition is present
		ON	An alarm is active, but the buzzer has been silenced

9.1.2 Keyboard Buttons Description

Button	Description
	Navigate the menus DOWN The first press turns the backlight on
	Navigate the menus UP The first press turns the backlight on
	Enter The first press turns the backlight on
	Turn module ON/OFF (To turn off the module, hold the button for 4 seconds)
	Allows the user to silence the buzzer (only if the synoptic is displayed) and to exit the active menu If pressed, the backlight turns on (if there are no active alarms)

9.2 System Operation Modes

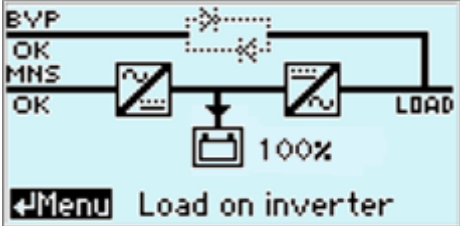
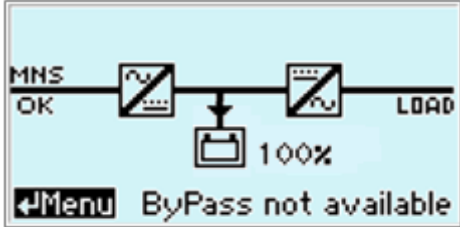
As soon as the Mains power supply is available, the display shows the status of the equipment.

Operation Mode	Display Mimic
UPS is Off	

9.2.1 On-line Operation Mode

In accordance with the classification mode VFI-SS-111.

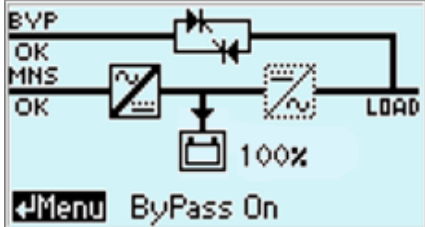
The Inverter constantly supplies the load, so that it is fully protected from any Mains abnormal event, such as utility disturbances, surges, failures and out-of-tolerance conditions.

Operation Mode	Display Mimic
On-line (VFI-SS-111) Bypass line present	 ←Menu Load on inverter
On-line (VFI-SS-111) Bypass line <u>not</u> present	 ←Menu ByPass not available

9.2.2 Off-line Operation Mode

In accordance with the classification mode VFD-SS-311.

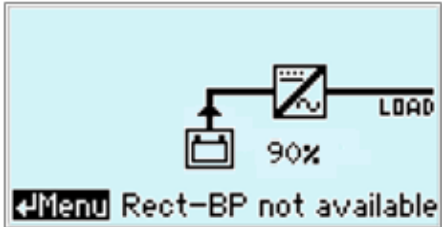
The load is transferred to static Bypass and it is protected from Mains failures and out-of-tolerance (voltage and frequency) conditions according to the technical datasheet. The off-line mode (ECONOMY MODE) is highly efficient, and in case of Mains failure, the UPS is able to transfer the load to the Inverter in a very short time.

Operation Mode	Display Mimic
Off-line (VFD-SS-311)	 ←Menu ByPass On

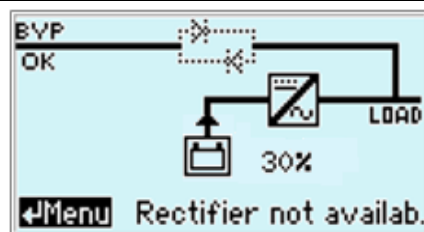
9.2.3 Battery Operation Mode

In battery operation mode, the load is supplied through batteries because of Mains Rectifier failure or out-of-tolerance voltage.

In battery mode, the display will show the following mimic:

Operation Mode	Display Mimic
Battery operation with <u>single</u> <u>input</u> <u>feed</u>	 ←Menu Rect-BP not available

Battery operation with dual input
feed

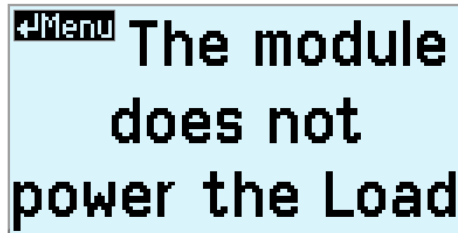
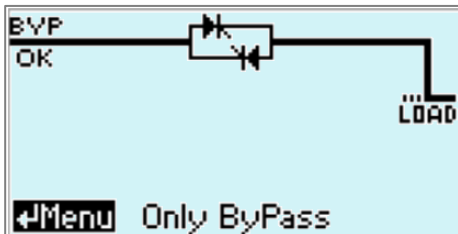


Each input line (Mains Rectifier and Bypass) has its own tolerance controls (see technical specifications for details).

When any of these lines are out of tolerance, the line is declared “unavailable” (the respective LED is turned off, see 9.1.1).

In a system with dual input feed, in the event of Mains Rectifier failure the Bypass line is available (as seen in the mimic shown before).

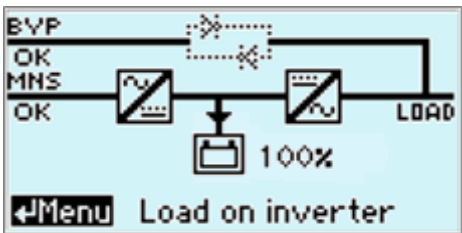
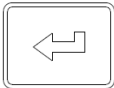
At the end of the battery discharge, the following conditions will be displayed:

Operation Mode	Display Mimic
End of battery discharge with <u>single input</u> <u>feed</u> (the Inverter is off and the load is not supplied)	
End of battery discharge with <u>dual input</u> <u>feed</u> (the load is transferred to Bypass)	

9.3 Display Navigation Overview

The 3” module display shows the operation mode of the system as described in previous chapters. Moreover, it allows the visualization of a series of parameters, commands and configurations of the specific module.

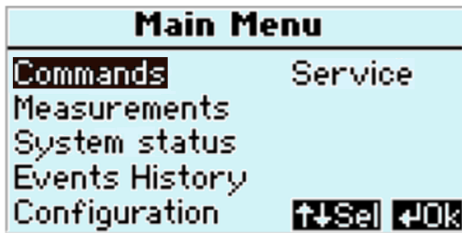
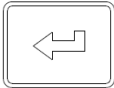
9.3.1 Main Menu

Current View	B. Pressed	Next View
		

Main Menu	Description
Commands (see 9.3.1.1)	Lists a series of commands to be executed by the UPS
Measurements (see 9.3.1.2)	Visualizes a series of measurements of the UPS
System Status (see 9.3.1.3)	Provides a quick view of the system status
Events History (see 9.3.1.4)	Visualizes the recorded event log
Configuration (see 9.3.1.5)	Is a first level password-protected area reserved for service personnel
Service (see 9.3.1.6)	Is a second level password-protected area reserved for service personnel

Every sub-menu mentioned before is detailed in the next chapters.

9.3.1.1 Commands Menu

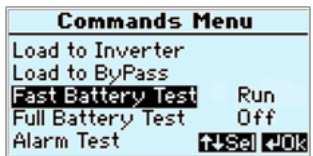
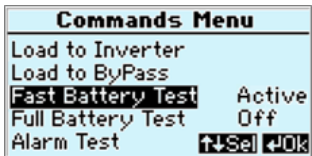
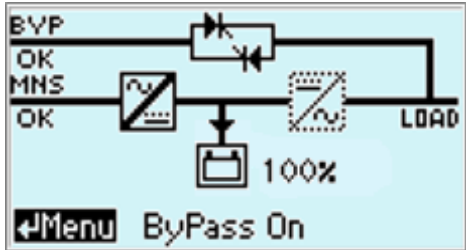
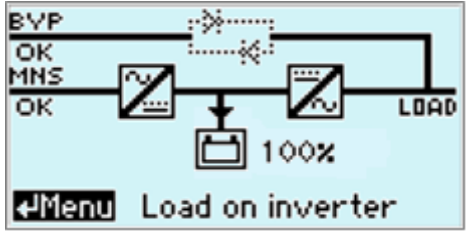
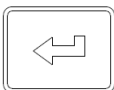
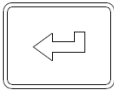
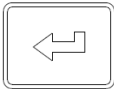
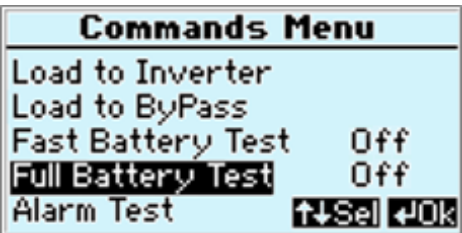
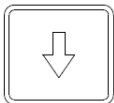
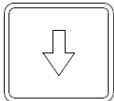
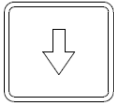
Current View	B. Pressed	Next View
		

Commands Menu	Description
Load to Inverter	Transfers the load from Bypass to Inverter
Load to Bypass	Transfers the load from Inverter to Bypass
Fast Battery Test	Verifies the status of the batteries (1-minute test)
Full Battery Test	Performs a complete battery discharge in order to check the health of the batteries
Alarm Test	Simulates an alarm status in order to verify if the Dry-Output Common Alarm is activated

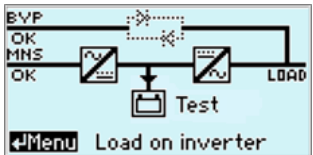
Current View

B. Pressed

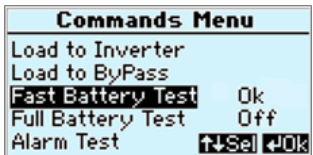
Next View



The mimic shows as follows



The test result must be verified

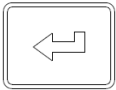


The behaviour of the "Full battery test" is similar to the "Fast battery test", but it can

be stopped at any time by pressing

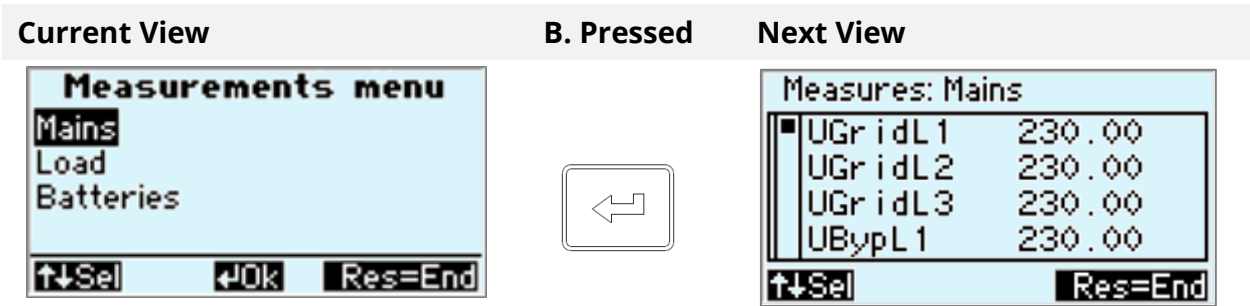
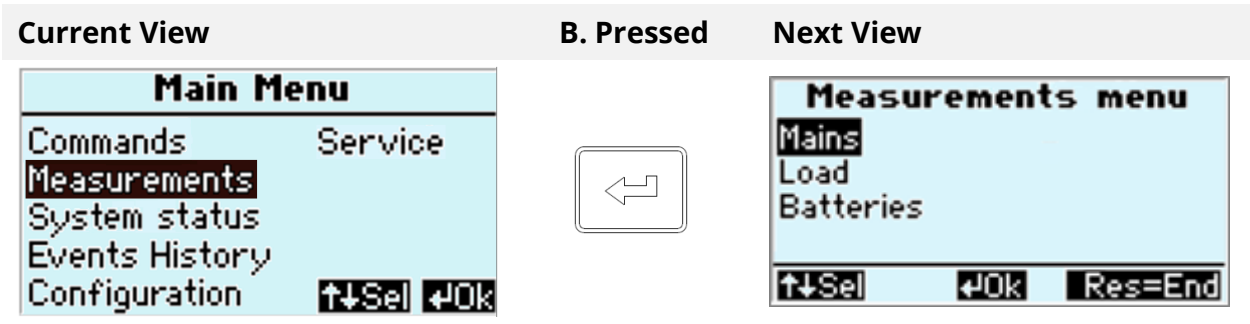


Note: If not stopped, the battery will be discharged until the alarm "BattLow 3Min" appears

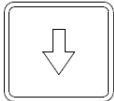
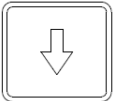


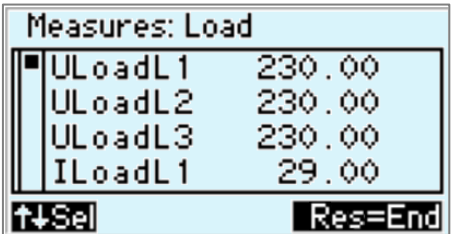
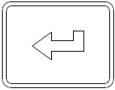
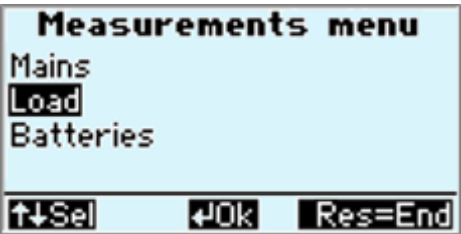
By pressing  the alarm LED and buzzer will be checked, as well as the Dry-Output Common Alarm

9.3.1.2 Measurements Menu



UGridL1	Mains Input Voltage L1
UGridL2	Mains Input Voltage L2
UGridL3	Mains Input Voltage L3
UBypl1	Bypass Input Voltage L1
UBypl2	Bypass Input Voltage L2
UBypl3	Bypass Input Voltage L3





ULoadL1 Output Voltage L1

ULoadL2 Output Voltage L2

ULoadL3 Output Voltage L3

ILoadL1 Output Current L1

ILoadL2 Output Current L2

ILoadL3 Output Current L3

PkWL1 Output Active Power L1

PkWL2 Output Active Power L2

PkWL3 Output Active Power L3

PkVAL1 Out Reactive Power L1

PkVAL2 Out Reactive Power L2

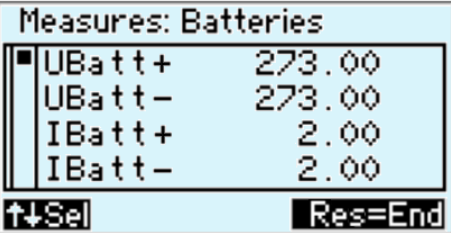
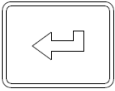
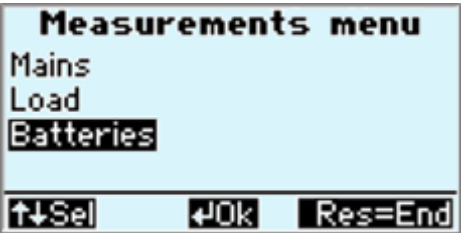
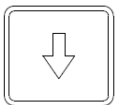
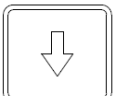
PkVAL3 Out Reactive Power L3

PkW%L1 Output Load % L1

PkW%L2 Output Load % L2

PkW%L3 Output Load % L3

FreqLoad Output Frequency (Hz)



UBattPos Battery Voltage (+)

UBattNeg Battery Voltage (-)

IBattPos Charge/Discharge
Battery Current (+)

IBattNeg Charge/Discharge
Battery Current (-)

Charge% Battery Charged %

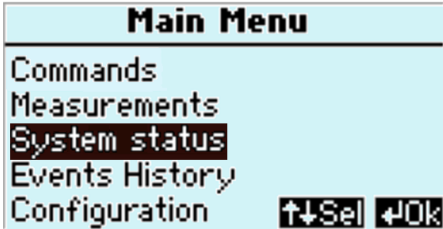
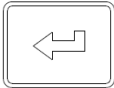
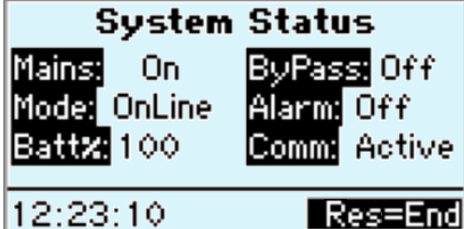
Autonomy Autonomy Available

TempBatt Battery Temperature*

Notice!

***When the Battery Temperature Probe is not connected, no measurement is shown on the display under "TempBatt".**

9.3.1.3 System Status Menu

Current View	B. Pressed	Next View
		

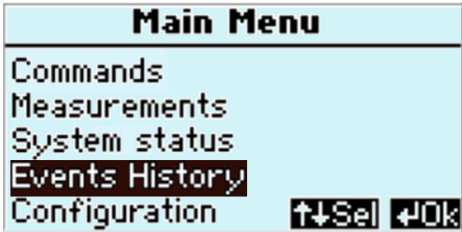
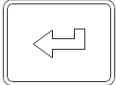
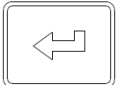
The following table describes the meaning of every parameter in this view:

Parameter	Status	Description
Mains	On	Rectifier Input Voltage is present and within tolerances
	Off	Rectifier Input Voltage is out of range or not present
Mode	On-line	UPS is running on Inverter (VFI-SS-111)
	Off-line	UPS is running on Bypass (VFD-SS-311)
Battery	%	Battery Capacity Available
Bypass	On	Bypass Input Voltage is present and within tolerances
	Off	Bypass Input Voltage is out of range or not present
Alarm	Active	An alarm is active and has not been acknowledged
	Off	No alarm is present
Comm	Active	Interface Communication detected and OK
	Off	Interface Communication not detected, verify

9.3.1.4 Events History Menu

As soon you enter in the “Event History” menu and the alarm condition is present (red LED on) the module will show the active alarms (max 5; event 5 is the last). By pressing  you will enter in the “Stored Events” menu where you can explore all detailed information.

If the alarm LED is off you will enter directly in the “Stored Events” menu

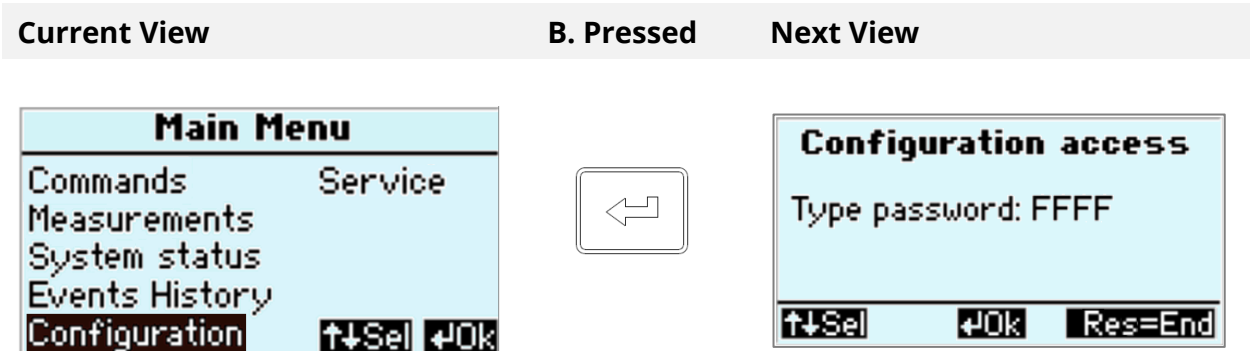
Current View	B. Pressed	Next View
		
	In the absence of alarms 	

Event Code Icon	Description	Action to take
	Information Event	No action required
	Warning Event	Pay attention to the indication
	Alarm Event	Verify troubleshooting
	Technician Intervention required	Call your service provider or manufacturer

9.3.1.5 Configuration Menu

Notice!

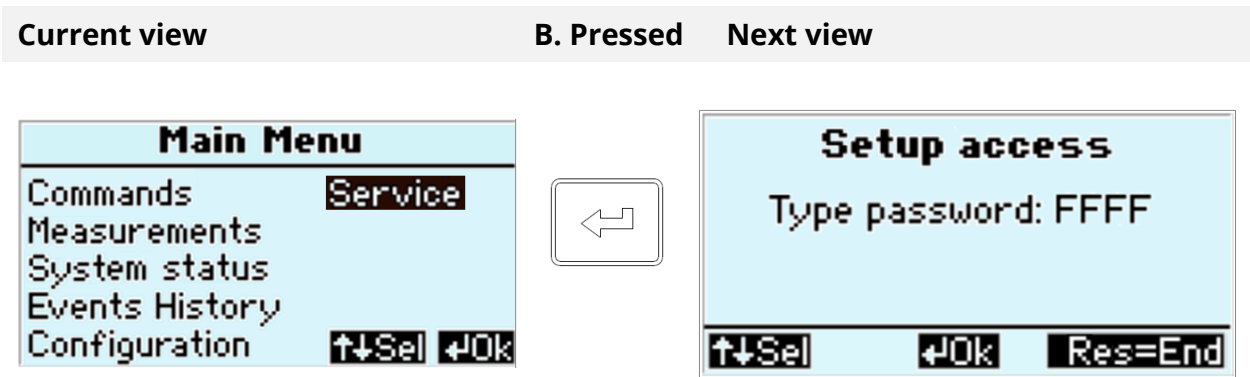
Only service personnel are allowed to access the “Configuration” menu in a first level service, therefore a password is needed.



9.3.1.6 Service Menu

Notice!

Only service personnel are allowed to access the “Service” menu in a second level service, therefore a password is needed.



9.4 Manual System Bypass

Sometimes it is called “Maintenance Bypass Switch”. When the load is transferred to the manual Bypass, **it will not be protected anymore**. Normally, this option is used only during full installation maintenance.



The load transfer to the manual Bypass is a critical operation. The load is not protected anymore. Be sure to inform and have permission from the customer before performing this operation.

10 Operation Procedures

10.1 Start-Up Procedure



The commissioning of the UPS, as well as shutdown, start-up and module replacement, must be performed by authorized service engineers only. Control panel operations can be performed by trained persons only.



Before commissioning the UPS, verify that all electrical facilities, including battery connections and environmental conditions, comply with the instructions reported in this manual.

10.1.1 Preparation for Start-Up Procedure

Make sure that all Bypass Fuses (PF1, PF2, ...), battery CBs (QM1, QM2, ...), Parallel Isolators (Q1, Q2, ...) and the Manual Bypass Switch (Q0) of the UPS are open.

Make sure that all inputs, outputs and Battery Fuses or CBs on customer facilities are open.

10.1.2 Start-Up Procedure

- a) Insert Fuses or close input Circuit Breaker (CB) on customer distribution facilities.
For dual input feed connection close also the bypass fuses or CB.

- b) Verify the correctness of the phase rotation.



If the phase rotation is wrong, the alarm “Phase sequence error” (Rect. and B-P check separately) will be activated. If switched on, the module does not start up, and the indication “The module does not power the Load” will be displayed.

- c) If the phase rotation is ok, the display will turn on and the “Mains” LED will light up green.

Action Performed	Display Mimic
The module power supply is ON	

The module completed its own checks and is in OFF condition



- d) If necessary, close the Manual Bypass Switch (Q0) and verify the maximum current applied on each output phase of the UPS by means of a current probe. If load is not connected no need to close Q0.
- e) While keeping the Parallel Isolators Switch (Q1, Q2, ..., Qn) open, close Bypass Fuses (PF1, PF2, ..., PFn) and turn on the modules one by one, beginning from module 1 to module n. Verify that they work properly. Unexpected alarms should not appear.
- f) Close the Battery Circuit Breakers (QM1, QM2, ..., QMn) and check in the "Measurements" menu the correctness of the Battery Charger current.
- g) Switch off all modules (hold the button for 4 seconds) and close Parallel Isolator switch Q1 of the first module. If Q0 is closed, verify that the indication "Manual Byp Closed" is also listed.

Note: as soon as the Parallel Isolator is handled, the information "Q_out state changed" will appear blinking.

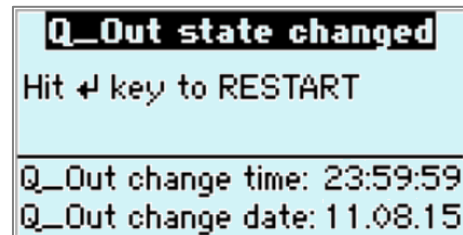
Action Performed

Qn closed



Whenever closing or opening Q_out, this message MUST appear on the display. Do not turn on the module if the message is not shown. Risk of malfunction.

Display Mimic



In this condition, the Inverter of the module is locked. Press ENTER  to unlock it.

- h) Switch on the module, it will start in bypass and the Bypass LED will light on. After few seconds it appears the synoptic (without inverter symbol if Q0 is closed). If necessary, give the order "load to inverter".
- i) Startup the rest of the modules one by one by closing the Parallel Isolator Switch (Q2, ..., Qn). The indication "The module does not supply the load" will be displayed before the appearance of the synoptic.
- j) When all modules are on, open the Manual Bypass Switch (Q0) if previously closed (on the display the Inverter symbol will appear).
- k) By giving the command "Load to Inverter" on one of the modules, the full system will transfer the load to the Inverter. Verify the correct load sharing between the modules.

10.2 Shutdown Procedure

If the load does not need power for an extended period of time, the full UPS can be switched off by applying the following procedure:

- a) By giving the command “Load to Bypass” on one module, the full system will transfer the load to static Bypass.
- l) Close the Manual Bypass Switch (Q0). The Inverter symbol will disappear from the display and verify the indication “Manual Byp Closed” on each module.
- b) Turn off each module one by one by pressing the ON/OFF button for 4 seconds, and open the corresponding Parallel Isolator Switch (Q1, Q2, ..., Qn). The information indicating that the output switch has been handled will appear blinking. Press the



key to unlock the Inverter.

Action Performed	Display Mimic
Qn opened  Whenever closing or opening Q_out, this message MUST appear on the display. <u>Do not turn on the module if the message is not shown. Risk of malfunction.</u>	

- a) When all modules are off and no any display is blinking anymore, open the Bypass Fuses (PF1, PF2, ..., PFn) and battery Circuit Breaker (QM1, QM2, ..., QMn). Now the full system is off, only the modules power supply is kept on and the remaining load is supplied through manual Bypass.



Beware: the load is not protected anymore since it is supplied directly through manual Bypass. However, the UPS cabinet is still powered and the shock hazard is high.

- b) If for sure no load is connected to the UPS, the input Fuses or CBs on the customer facilities can be opened as well. In this case the UPS will be completely off.

Notice!

To restart the system, please follow the indications described in section 10.1.

10.3 Module Replacement Procedure



The weight of the module reaches 27 kg (e.g. IM20) and 55 kg (e.g. IM50), therefore it has to be handled by two persons. If inappropriately removed, it can fall down, causing serious injuries to persons and damage to the module itself.

Notice!

If your Cumuluspower™ equipment consists of a single module and it has to be replaced, please begin with the instructions in paragraphs a) to d) of section 10.2 and finish with paragraphs b) to f) described in this section.

If your Cumuluspower™ equipment consists of an at least N+1 redundancy system and a module must be replaced, proceed as following:

- a) After identifying the faulty module, if still working, switch it off and open the corresponding Parallel Isolator (Q1: for the first slot; Q2: for the second slot and so on).
- b) Remove the fixing screws, pull the module out 10 cm and wait about 5 minutes before dislodging it.
- c) Insert in the slot the replacement module and, as soon as the power supply is on (display on), check if the configuration parameters are equal to the ones of the replaced module.
- d) Put back the fixing screws.
- e) Switch on the module, without closing Qn, and verify if it works properly. No unexpected alarms should be displayed.
- f) Turn off the module and close the Parallel Isolator (Q1, Q2, ..., Qn). The information indicating that the switch has changed the status will appear blinking. Press the key  to unlock the Inverter.
- g) Turn on the module again and as soon as it works in parallel (load on Inverter), compare all measurements with the rest of the modules. All modules shall indicate the same values.

11 Options

11.1 SNMP

The Simple Network Management Protocol (SNMP) is a typical worldwide standardized communication protocol, and it is used to monitor the status of the UPS in the network via simple control language. The SNMP adapter can act as interface for environmental monitoring of devices installed in the UPS room, such as open doors detectors, ambient temperature probes, emergency system controls and so on (PRO version). Typically, it is also used as Remote Console Command Module (RCCMD) for a multi-server shutdown.

The UPS is equipped with a slot allowing for an easy installation of the SNMP card, which may be configured via serial connection, Telnet or HTTP (Web Browser). The SNMP adapter can manage the full parallel system; each single module or the whole system as a stand-alone UPS can be monitored.

Three types of SNMP adapters are available:

- CS141 BDG slot in adapter
- CS141 Professional
- CS141 Professional with MODBUS RS485 and I/O options

Notice!

For SNMP configuration and installation, review the dedicated documentation.

11.1.1 SNMP CS141 BDG

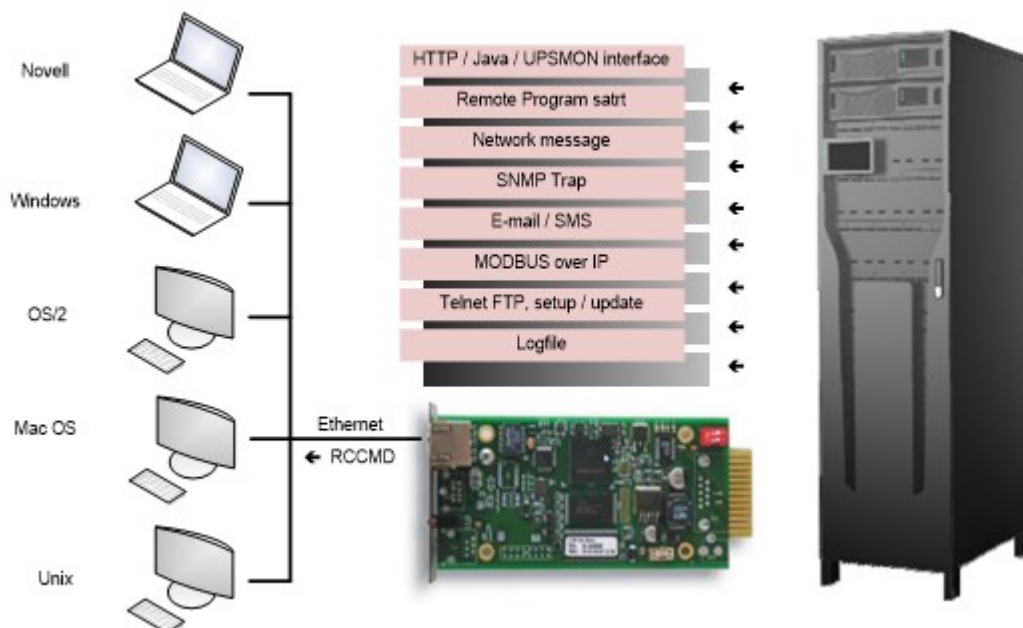
The CS141 BDG includes the UPSMAN server with SNMP agent RFC 1628 with SNMP V and V 3 support, the CS141 Webserver and supports IPv6, HTTP, HTTPS, DNS, NTP, FTP, UPSTCP (UNMS), RADIUS, PPP, SMTP (email client) and MODBUS-over IP server is on board. The full qualified RCCMD server is integrated and cares for the shutdown and messaging on all computers and OS in your network.



CS141 Basic order code 00-00015

Notice!

CS141 BDG does not support environmental and external sensors.

CS141 BDG

11.1.2 SNMP CS141 Professional

In addition to the features of CS141 BDG, CS141 Professional allows the user to install and control accessories for environmental and building alarm management, such as sensors, actuators and detectors.



CS141 Professional order code 00-00014

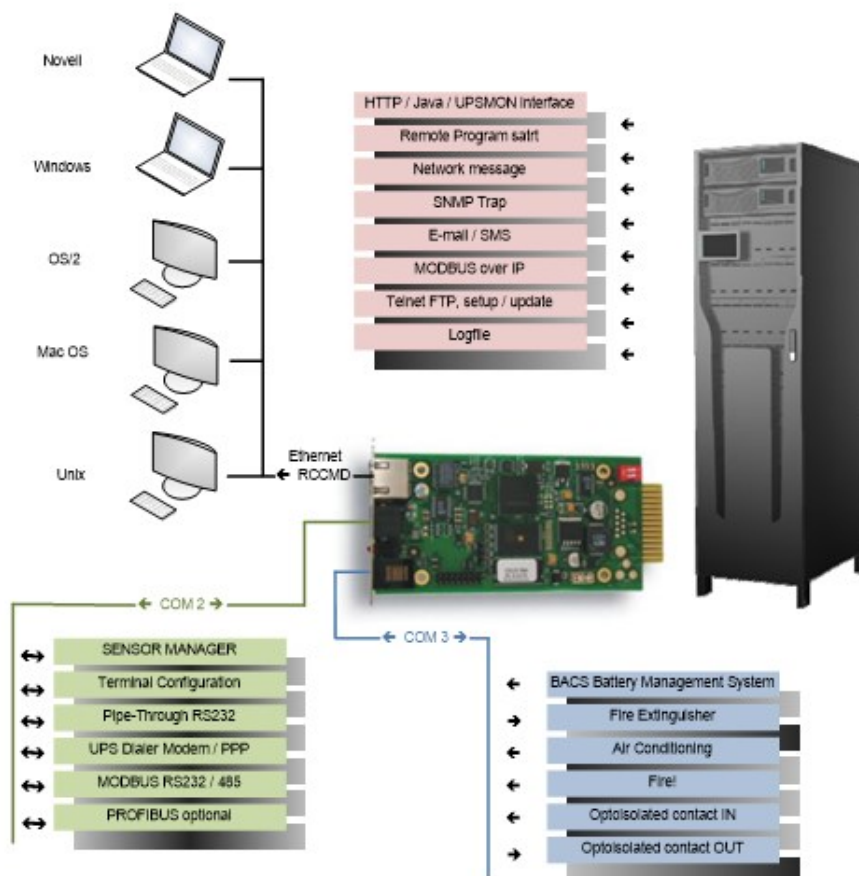
11.1.3 SNMP CS141 Professional with MODBUS RS485

CS141 Professional with MODBUS RS485 with 3-pole screw terminal connectors.



CS141 Professional with MODBUS order code 00-00016

CS141 Professional



11.1.4 7" TFT Touchscreen System Display



7" TFT Touchscreen system display order code 00-00012

Please refer to the specific TFT User Manual, which will be included together with the UPS User Manual if the system is equipped with this option.

11.2 Battery Temperature Probe

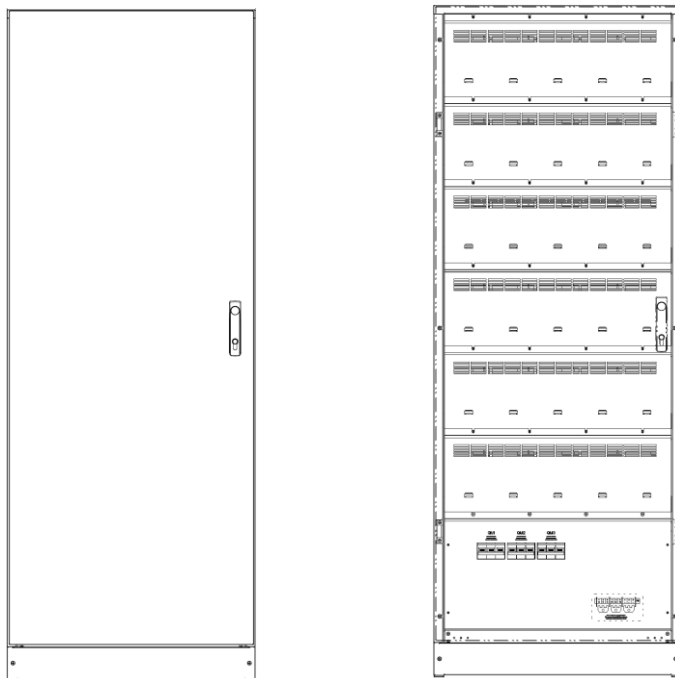
Notice!

See section 8.2.1

11.3 Battery Cabinet

For Cumuluspower UPS with external battery connection, a battery cabinet is available.

This cabinets, with up to 120 blocks 28Ah batteries, allows the configuration for common or separate battery connection.



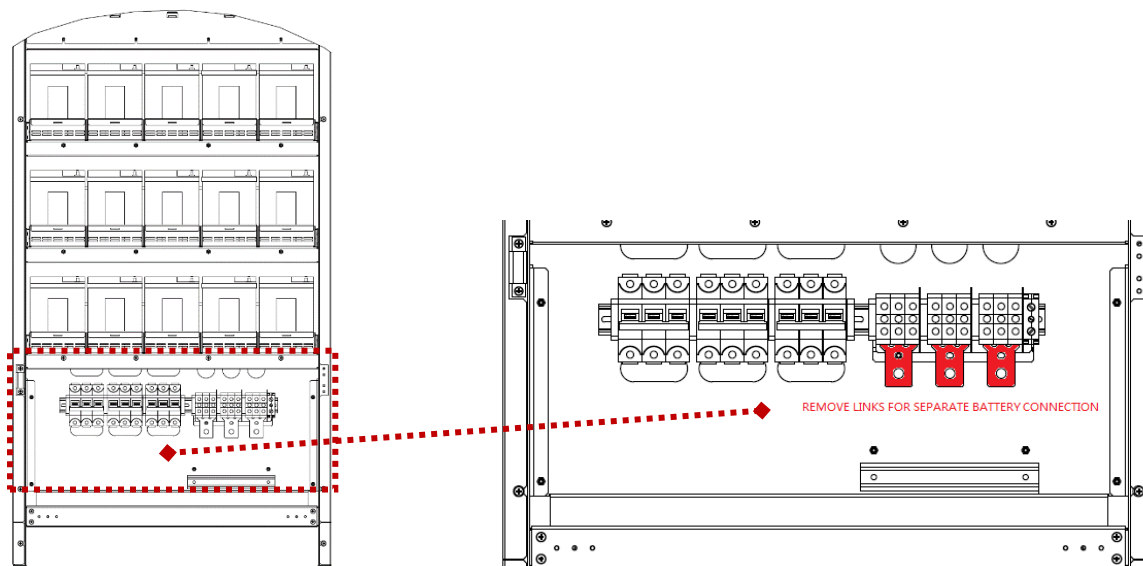
General Data

Dimensions (WxHxD) mm	730 x 1980 x 815
Weight empty frame	190kg
Frame weight with 120 battery blocks (11kg /bloc)	1510kg
Door opening	Left or Right
Colour	RAL 7024 Graphite Grey

Battery

Battery type and dimensions in mm (WxHxD)	VRLA 24 or 28Ah (175 x 168 x 125)
Battery compartment	5 trays per shelf
Number of shelves	6
Number of batteries per tray	4
Maximal number of battery blocks (24 or 28Ah)	120
Maximal strings number	3

11.3.1 Electrical Connection



Distribution

Wires on Terminals

Battery connection common battery

3 x M10 bolts

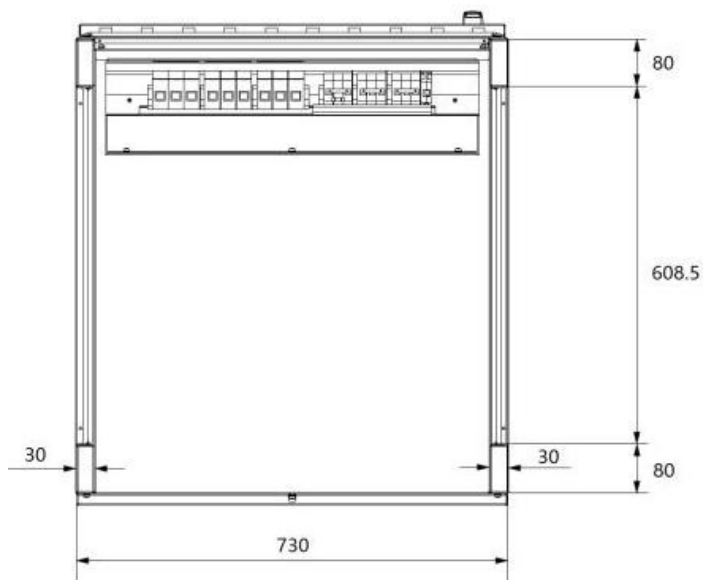
Battery connection separate battery

9 x terminals (up to 50mm² wires)

Fuse Protection

3 x Photovoltaic MCB 125A

11.3.2 Footprint



12 Maintenance

The user is not allowed to carry out any maintenance of the UPS. This will be performed only by authorized service personnel.

The Cumuluspower UPS shall be installed in an environment condition dry, dust free and with an ambience temperature not exceeding the limits described in this manual. If the UPS is equipped with internal batteries the temperature limits shall not exceed 25°C.

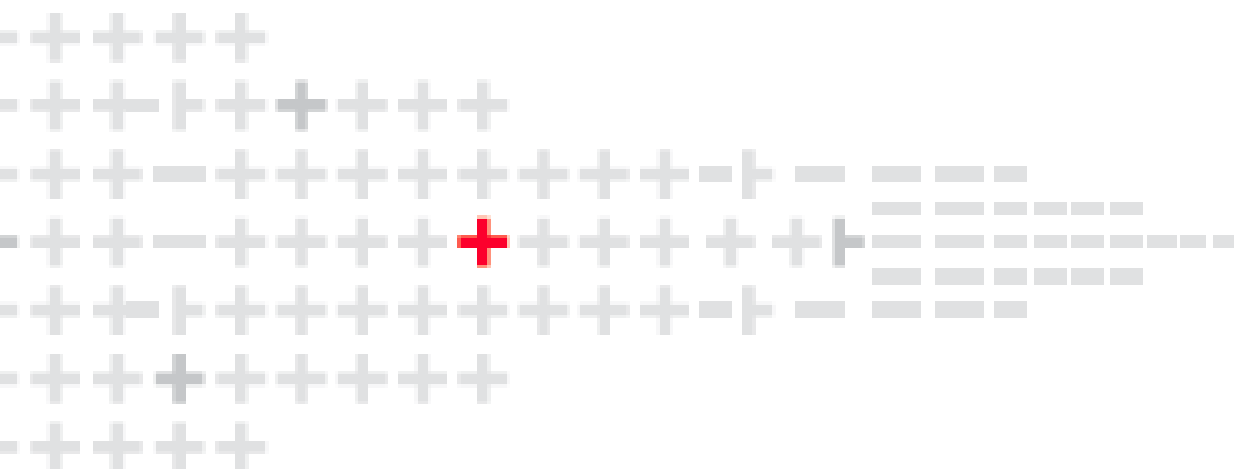
It is recommended to perform annually a maintenance inspection to maintain the reliability and prevent malfunction on the equipment. In this circumstance the status of the batteries must be checked.

As follow the activities suggested for a correct maintenance:

1. Visual inspection of the UPS system and batteries
2. Check the environment of the UPS (dust, humidity, air conditioning, and so on)
3. Verify the “Events history” menu if no strange alarms have been recorded. If Ok delete the events.
4. Verify the status of the fans
5. Battery discharge test
6. If the UPS is dusty use a vacuum cleaner to clean the equipment
7. In this case verify the status of the fans

The UPS has been designed to be maintenance friendly, this means that the AC and DC capacitors as well as the fans can be easily replaced.

The replacement time must be evaluated by the service engineer considering the environmental and load conditions. For further information, please consult the manufacturer.



 Centiel SA
Continuous Power Availability

Via alla Stampa 15
CH6965 Lugano, Switzerland
+41 91 210 36 83
write@centiel.com
www.centiel.com
©2018 Centiel SA. All rights reserved

