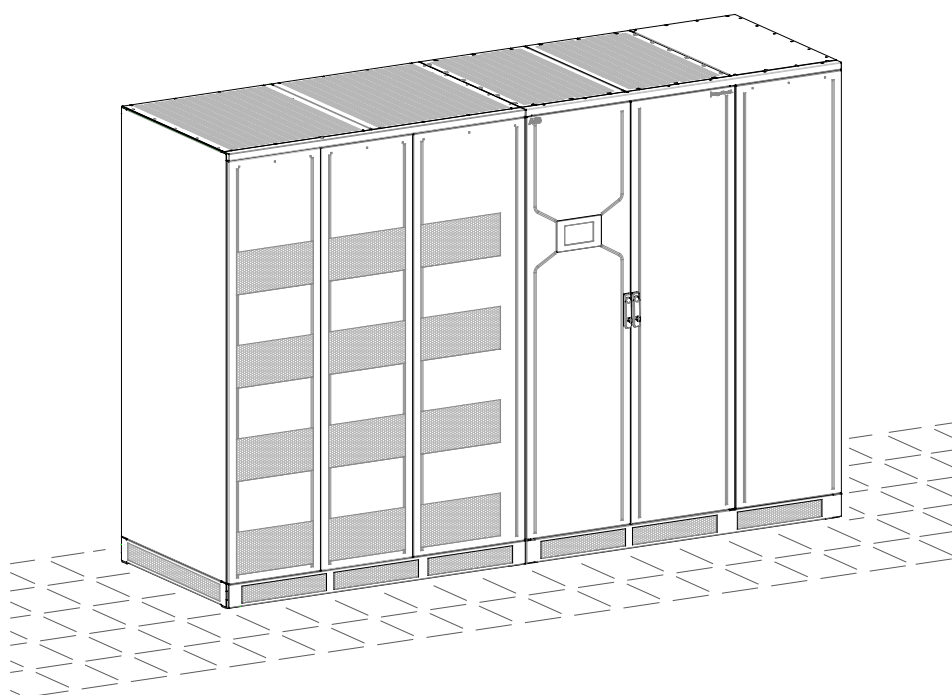


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UPS INSTALLATION GUIDE

# MegaFlex

1000 to 1600 kW UL S1



Model	<b>MegaFlex 1000 – 1100 – 1200 – 1500 – 1600 kW UL S1</b>
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---

**Up-dating**

Revision	Concern	Date
REV-B	UPS cabinet floor fixing points	04/15/2021

---

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The illustrations and plans describing the equipment are intended as general reference only and are not necessarily complete in every detail.

The content of this publication may be subject to modification without prior notice.

**Dear Customer,**

We thank you for selecting our products and are pleased to count you amongst our very valued customers at **ABB**.

We trust that the use of the **MegaFlex 1000 to 1600** Uninterruptible Power Supply System, developed and produced to the highest standards of quality, will give you complete satisfaction.

Please read carefully the Installation Guide, which contains all the necessary information and describes all you need to know about the installation of the UPS.

Thank you for choosing **ABB**!



**Start-up and commissioning!**

**An ABB Global Services Field Engineer must perform start-up and commissioning of the UPS.**

**Please contact ABB Service Center at least two weeks prior to schedule start-up and commissioning at 1-800-292-3739.**

---



**ABB Power Protection SA**

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<http://new.abb.com/ups>

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ABB Service Center



To get important information on all equipment warranties, please contact the ABB Service Center or request service follow-up or by scanning the QR code.

<http://new.abb.com/ups/service-ups>

## Preface

Congratulations on your choice of a MegaFlex 1000 to 1600 Uninterruptible Power Supply (UPS). It will keep you away from any trouble due to unexpected power problems.

This Installation Guide describes how to prepare the installation site, and it provides weight and dimensions and procedures for moving, installing and connecting the UPS.

Please refer to the accompanying User Manual, which describes the function of the UPS module, the purpose and location of the switches, the meaning of the system events related to the front panel indication and provides procedures for starting and stopping the equipment.

While every care has been taken to ensure the completeness and accuracy of this manual, ABB assumes no responsibility or liability for any losses or damages resulting from the use of the information contained in this document.

**Note!**

MegaFlex 1000 to 1600 is a Category C3 UPS Product (according to IEC 62040-2).

This is a product for commercial and industrial application in the second environment – installation restrictions or additional measures may be needed to prevent disturbances.

---

We recommend that this manual be kept next to the UPS for future references.

If any problems are encountered with the procedures contained in this manual, please contact your ABB Service Center before you proceed.

This document shall not be copied or reproduced without the permission of ABB.

Due to technical improvements, some of the information contained in this manual may be changed without notice.

## Safety instructions

Carefully read the safety instructions contained on the following page before the installation, start-up and maintenance of the UPS, options and Battery.

Pay attention to the rectangular boxes included in the text:

They contain important information and warning concerning electrical connections and personnel safety.

---

**RPA**

Redundant Parallel  
Architecture

Parallel System secured with “RPA – Redundant Parallel Architecture”

When included in the text, this symbol refers to operation needed only for the RPA Parallel System.

---



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# 1 Safety rules

## Save these instructions!

This manual contains important instructions for models MegaFlex 1000 to 1600 that should be followed during installation and maintenance of the UPS and Battery.

### General

- Move the UPS in an upright position in its original package to the final destination room.  
To lift the cabinets, use a forklift or lifting belts with spreader bars.
- Check for sufficient floor and elevator loading capacity.
- Check the integrity of the UPS equipment carefully.  
If you notice visible damage, do not install or start the UPS.  
Contact your ABB Service Center immediately.
- **WARNING! RISK OF ELECTRICAL SHOCK!**  
Do not remove covers, there are no user serviceable parts inside.
- After switching off takes 5 minutes for the DC capacitors to discharge because a lethally high voltage remains at the terminals of the electrolytic capacitors.
- UPS's and Battery system require a 12 months periodic maintenance to operate reliably and safely.  
This should be performed by qualified service personnel. The UPS contains its own energy source (Battery).
- The field-wiring outlets may be electrically live, even when the UPS is disconnected from the Utility.
- Dangerous voltages may be present during Battery operation.
- The Battery must be disconnected during maintenance or service work.
- This UPS contains potentially hazardous voltages.
- Be aware that the Inverter can restart automatically after the Utility voltage is restored.
- End user must follow applicable regional occupational safety codes/regulations during installation, operation and equipment maintenance. This may require additional field marking or labelling defining appropriate level of PPE (Personal Protection Equipment) to reduce the risk of Arc-flash related injuries.  
Contact our ABB Service Center for product specific information.

### Installation

- This UPS must be installed and connected only by trained personnel.
- Verify accurately during Commissioning and Maintenance of the UPS, for the following:  
Damaged components, squeezed wires and cables, or not correctly inserted plugs.
- After removing the sidewalls of the UPS, make sure that all earth connections when reassembling, are correctly reattached.
- This UPS is intended for use in a controlled indoor environment free of conductive contaminants and protected against animals intrusion.
- **WARNING! HIGH LEAKAGE CURRENT TO GROUND:**  
Ground connection is essential before connecting to AC input!
- Switching OFF the Unit does not isolate the UPS from the Utility.
- Do not install the UPS in an excessively humid environment or near water.
- Avoid spilling liquids on or dropping any foreign object into the UPS.
- The Unit must be placed in a sufficiently ventilated area; the ambient temperature should not exceed 104°F (40°C).
- Optimal Battery life is obtained if the ambient temperature does not exceed 77°F (25°C).
- It is important that air can move freely around and through the Unit. Do not block the air vents.
- Avoid locations in direct sunlight or near heat sources.

### Storage

- Store the UPS in a dry location; storage temperature must be within -13°F (-25°C) to 131°F (+55°C).
- The optimal temperature for Battery storage is 68°F (20°C) to 77°F (25°C) and shall never exceed the range -4°F (-20°C) to 104°F (40°C).
- If the Unit is stored for a period exceeding 3 months, the Battery must be recharged periodically (time depending on storage temperature).

### Battery

- The Battery-voltage is dangerous for person's safety.
- When replacing the Battery, use the same number, voltage (V) and capacity (Ah).
- Proper disposal or recycling of the Battery is required.  
Refer to your local codes for disposal requirements.
- Never dispose of Battery in a fire: they may explode.
- Do not open or mutilate Battery: their contents (electrolyte) may be extremely toxic.  
If exposed to electrolyte, wash immediately with plenty of water.
- Avoid charging in a sealed container.
- Never short-circuit the Batteries.  
When working with Batteries, remove watches, rings or other metal objects and only use insulated tools.
- In case of air shipment, the cables +/- going to the Battery fuses/terminals shall be disconnected and isolated.

## Safety instructions when working with Battery

---

**Danger!**

**External Battery must be installed and connected to the UPS by Qualified Service Personnel.  
Installation Personnel must read this entire section before handling the UPS and Battery.**

---

Full voltage and current are always present at the Battery terminals.

The Battery used in this system can provide dangerous voltages, extremely high currents and a risk of electric shock.

If the terminals are shorted together or to ground they may cause severe injury.

You must be extremely careful to avoid electric shock and burns caused by contacting Battery terminals or shorting terminals during Battery installation.

Do not touch uninsulated Battery terminals.

A qualified service person, who is familiar with Battery systems and required precautions, must install and service the Battery.

The installation must conform to national and local codes.

Keep unauthorized personnel away from the Battery.

The qualified service person must take these precautions:

- 1 Wear protective clothing, such as rubber gloves and boots and protective eye wear.  
Battery contain caustic acids and toxic materials and can rupture or leak if mistreated.  
Remove rings and metal wristwatches or other metal objects and jewellery.  
Do not carry metal objects in your pockets where the objects can fall into the Battery cabinet.  
High energy through conductive materials could cause severe burns.
- 2 Tools must have insulated handles and must be insulated so that they will not short Battery terminals.  
Do not allow a tool to short between individual or separate Battery terminals or to the cabinet or rack.  
Do not lay tools or metal parts on top of the Battery and do not lay them where they could fall onto the Battery or into the cabinet.
- 3 Disconnect charging source prior to connecting or disconnecting Battery terminals.  
Install the Battery as shown on the drawing provided with the Battery.  
When connecting cables, never allow a cable to short across a Battery's terminals, the string of Battery, or to the cabinet or rack.
- 4 Align the cables on the Battery terminals so that the cable lug will not contact any part of the cabinet or rack, even if the Battery is moved.  
Keep the cable away from any sharp metal edges.
- 5 Install the Battery cables in such a way that the UPS or Battery cabinet doors cannot pinch them.
- 6 Do not connect the Battery terminal to Ground.  
If any Battery terminal is inadvertently grounded, remove the source of the ground.  
Contacting any part of a grounded Battery can cause a risk of electric shock.
- 7 Determine if Battery is inadvertently grounded. If inadvertently grounded, remove source from ground.  
Contact with any part of a grounded Battery can result in electrical shock.  
The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance.
- 8 To reduce the risk of fire or electric shock, install the Battery in a temperature and humidity controlled indoor area, free of contaminants.
- 9 Battery system chassis ground (earth) must be connected to the UPS chassis ground (earth).  
If you use conduits, this ground conductor must be routed in the same conduit as the Battery conductors.
- 10 Where conductors may be exposed to physical damage, protect the conductors in accordance with all applicable codes.
- 11 If you are replacing the Battery or repairing Battery connections, shut OFF the UPS and remove the Battery fuses.

## 1.1 Safety symbols and warnings

### Safety warnings

The text of this manual contains some warnings to avoid risk to the persons and to avoid damages to the UPS system and the supplied critical loads.

The non-observance of the warnings reminding hazardous situations could result in human injury and equipment damages.

Please pay attention to the meaning of the following warnings and symbols.

Throughout this manual the following symbols are defined:



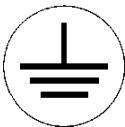
**Warning, if instruction is not followed injury or serious equipment damage may occur!**

---



**Caution, internal parts have dangerous voltage present.  
Risk of electric shock!**

---



**PE (Earth) – GND (Ground)  
Protective Grounding terminal:  
A terminal which must be connected to earth ground prior to making any other connection to the equipment.**

---



**A terminal to which or from which an alternating (sine wave) current or voltage may be applied or supplied.**

---



**A terminal to which or from which a direct current or voltage may be applied or supplied.**

---



**This symbol indicated the word “phase”.**

---



**This symbol indicates the principal ON/OFF switch in the on position.**

---



**This symbol indicates the principal ON/OFF switch in the off position.**

---

## 1.2 Cyber security

---

**UPS must be protected in a Security Restricted Area.**

**UPS must be installed in a location/room with mechanical lock.**

**Limit access to authorized personnel only and it shall stay under Authorized Personnel Operator to manage the accesses.**



The UPS products are designed to be connected and to communicate information and data via a network interface through the optional SNMP card, which should be connected to a secure network. It is customer sole responsibility to provide and continuously ensure a secure connection between the product and customer network or any other network and to establish and maintain appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of antivirus programs, etc.) to protect the UPS product, the network, its system and interfaces against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

ABB Ltd and its affiliates are not liable for damages and/or losses related to such security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. Although ABB provides functionality testing on the products and updates that we release, you should institute your own testing program for any product updates or other major system updates (to include but not limited to code changes, configuration file changes, third party software updates or patches, hardware change out, etc.) to ensure that the security measures that you have implemented have not been compromised and system functionality in your environment is as expected.

---

## 2 Layout

### 2.1 Layout MegaFlex 1000 to 1600

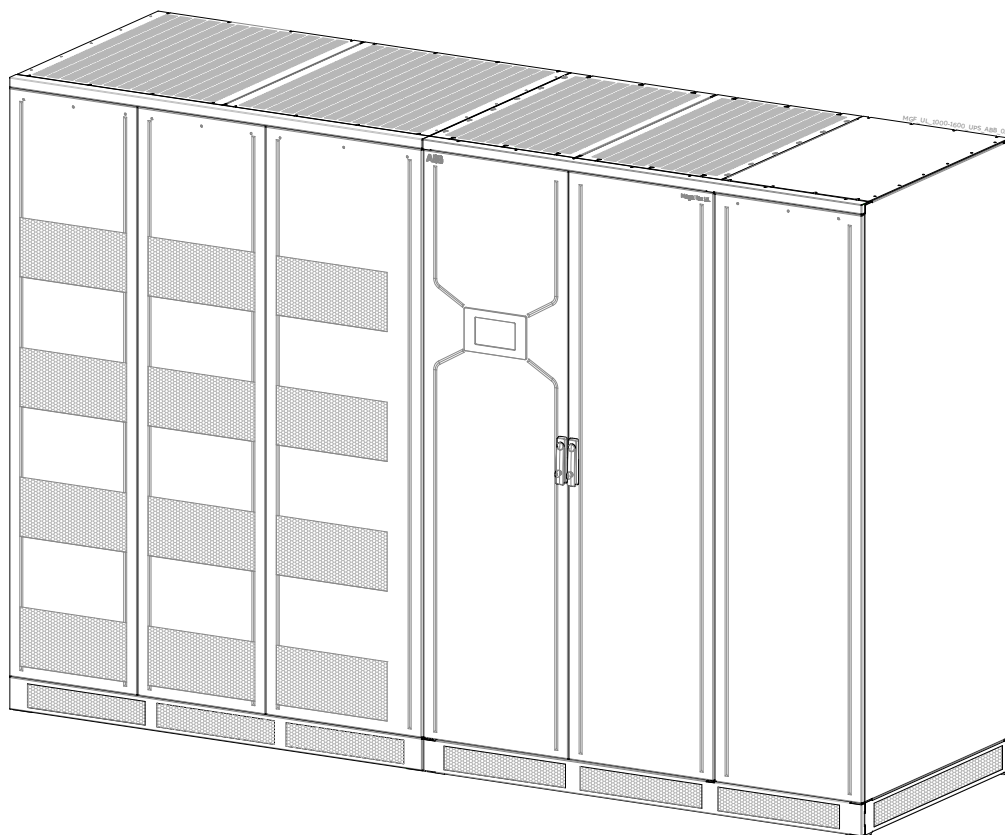


Fig. 2.1-1 MegaFlex 1000 to 1600 - General view

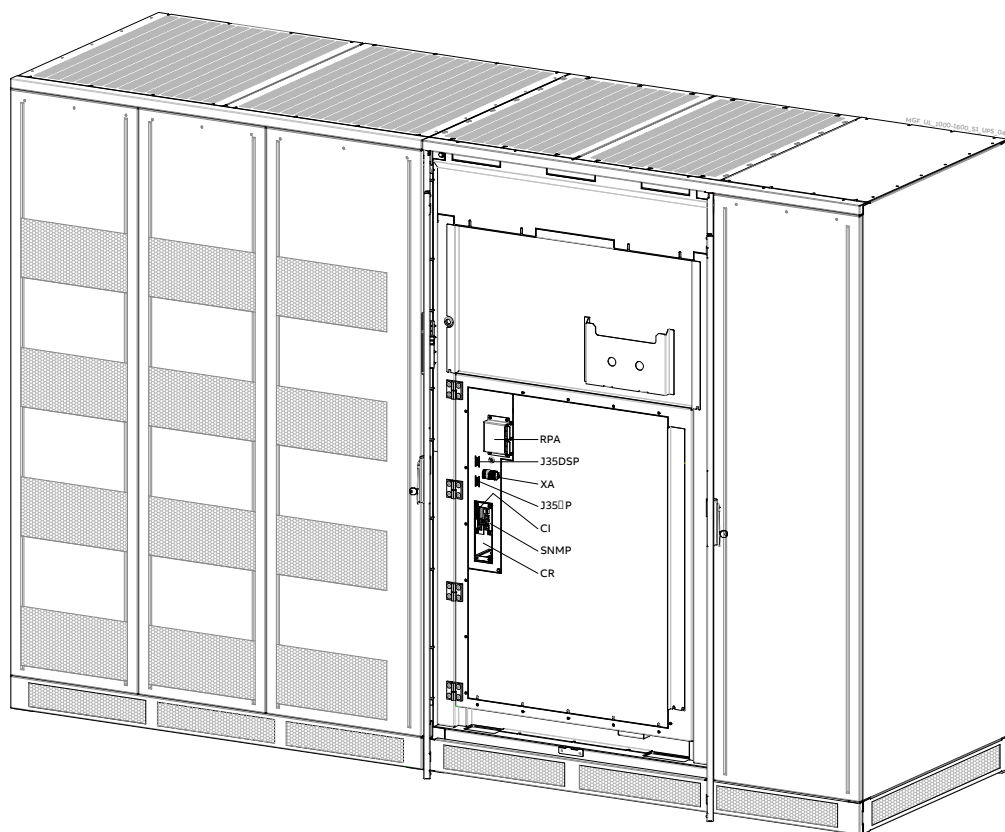


Fig. 2.1-2 MegaFlex 1000 to 1600 - General view with open doors



Fig. 2.1-3 Control Panel

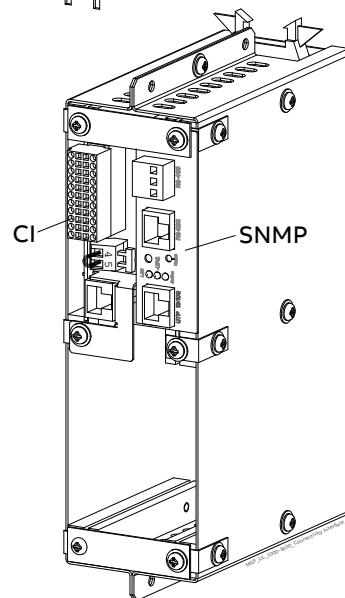
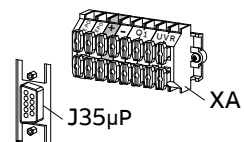
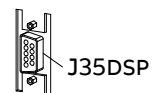


Fig. 2.1-4 Connectivity Rack

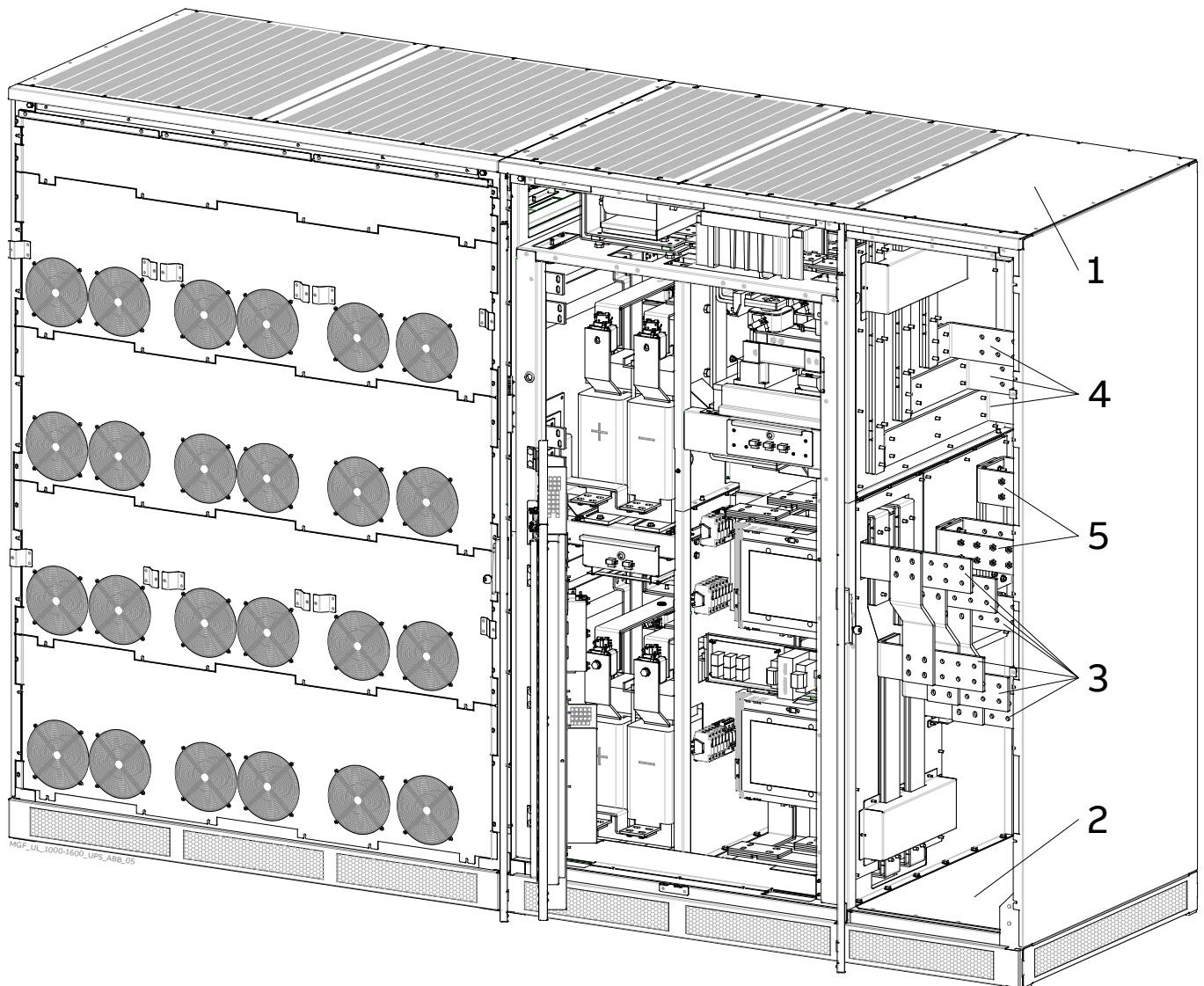


Fig. 2.1-5 MegaFlex 1000 to 1600 - General view without protection panels

- 1** Opening for top cable entry (please remove the plate before drilling any holes)
- 2** Opening for bottom cable entry (please remove the plate before drilling any holes)
- 3** Bus bars for Utility input connection
- 4** Bus bars for Load output connection
- 5** Bus bars for External Battery connection
- CI** Customer Interface Board (see Fig. 2.1-4)
- CR** Connectivity Rack
- J35DSP** Serial port RS232 (only for ABB Service Center)
- J35μP** Serial port RS232 for IMV protocol
- RPA** RPA board (Redundant Parallel Architecture) for Parallel System (option - see Fig. 2.1-2)
- SNMP** 3-ph SNMP/WEB plug-in adapter (option - see Fig. 2.1-4)
- XA** Terminal block (see Section 4.11)

**Caution!**



Convenience test terminals are available for ABB Service Technician only.

Unauthorized access to test terminals exposes to electric shock hazard risk and increases risk of UPS failure.

## 3 Environment

### 3.1 Recycling instructions

---

**Note!**

This product has been designed to respect the environment, using materials and components respecting eco-design rules.

It does not contain CFCs (Carbon Fluor Clorid) or HCFCs (Halogen Carbon Fluor Clorid).

---

**Packing material recycling!**

ABB, in compliance with environment protection, uses only environmentally friendly material at the end of its service life, must be recovered conforming to the local applicable regulations.

UPS packing materials must be recycled in compliance with all applicable regulations.

---

**Recycling at the end of service life!**

ABB, in compliance with environment protection recommends to the User that the UPS equipment, at the end of its service life, must be recovered conforming to the local applicable regulations.

---

**Battery disposal!**

Leads contained in the Batteries is a dangerous substance for the environment, therefore it must be correctly recycled by specialized companies.

---





## 4 Installation

### 4.1 Transport

The UPS is packaged on a pallet suitable for handling with a forklift.

The UPS must be moved in **upright position**.

Do not tilt cabinets **more than  $\pm 10^\circ$**  during handling.

**Move the UPS in its original package to the final destination site.**

**Do not stack other packages on top:** This could damage the UPS.

#### Forklift

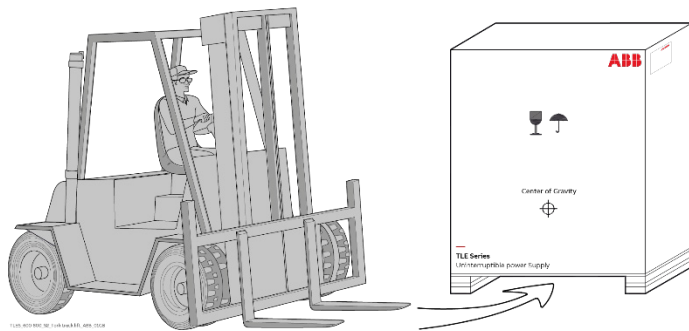


Fig. 4.1-1 Position of the forklift when moving the unpacked UPS

#### Forklift

The UPS must be lifted with a forklift in upright position.

Take note of the **Center of Gravity** marked on the package.



#### Warning!

**Check for sufficient floor and elevator loading capacity.**

**Transport UPS only in upright position.**

**Do not stack other package on top of the UPS.**

#### Crane

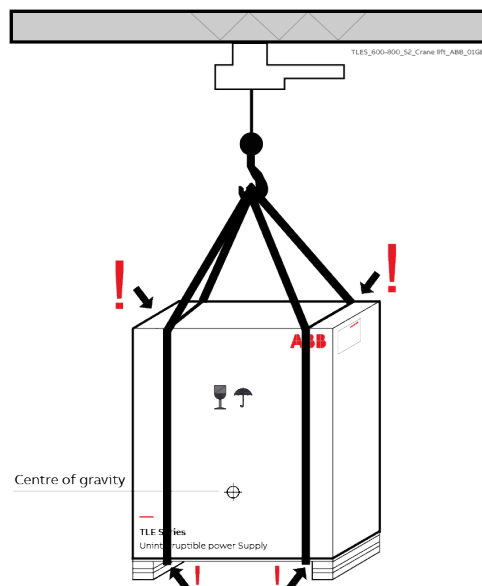


Fig. 4.1-2 Position of the carrying belts when moving the unpacked UPS

#### Crane

If the UPS has to be lifted by crane, use suitable carrying belts taking note of the **Center of Gravity** marked on the package.

**Take all necessary precautions to avoid damage to the cabinet while hoisting the UPS.**



#### Warning!

**When loading / unloading and when moving the UPS, it is forbidden:**

**When loading / unloading and when moving the UPS, pay attention to:**





## 4.2 Delivery

When delivered, inspect the **package integrity** and **the physical conditions of the cabinets** carefully.

In case of any damage sustained during transport, immediately inform the carrier and contact your local **ABB Service Center**.

A **detailed report** of the damage is necessary for any insurance claim.



### Note!

**A damaged UPS must never be installed or connected to Utility or Battery!**

---

## 4.3 Storage

### 4.3.1 Storage of the UPS



The equipment is carefully packed for transport and storage so that it is in a perfect condition when eventually installed.

Never leave an UPS outside the building and do not store the UPS one on top of the other.

It is advisable to store the UPS in its original package in a dry, dust-free room, away from chemical substances, and with a temperature range not exceeding **-13°F (-25°C)** to **131°F (55°C)**.

In case the Battery is included please refer to Section 4.3.2.

Some important functions of the UPS, such as the customized functions, are defined by parameters stored in a **RAM memory**.

A small backup Battery located on the Control Unit board supplies the RAM.

If the storage time of the UPS exceeds **1 year**, these functions **should be verified** by an authorized Service Center before putting the UPS into operation.

### 4.3.2 Storage of Battery

When the delivery includes a maintenance free Battery, keep in mind that they are subject to self-discharge and therefore you must recharge the Battery.

The storage time without Battery recharge depends on the temperature of the storage site.

The optimal room temperature for Battery storage is **68°F (20°C)** to **77°F (25°C)** and shall never exceed the range **-4°F (-20°C)** to **104°F (40°C)**.



### Recharge stored maintenance free Battery every:

**6 months** when the storage temperature is **68°F (20°C)**

**3 months** when the storage temperature is **86°F (30°C)**

**2 months** when the storage temperature is **95°F (35°C)**

---

## 4.4 Place of installation

### 4.4.1 UPS location

**Note!**

UPS installation and connection must be performed only by an ABB Service Technician!

If optional cabinets and accessories are included with the UPS, please refer to those accompanying manuals for installation and operating instructions.

The UPS is intended for use in electrical rooms.

Do not locate or stock easily flammable materials in the same room as the UPS.



It is important to have a clean, dust-free environment provided with proper ventilation and air-conditioning to keep the ambient temperature within the specified operating range.

The recommended air inlet temperature is from **68°F (20°C)** to **77°F (25°C)** (**max. 104°F / 40°C**).

Refer to Section 4.5.

Check for **sufficient floor load capacity** before installing the UPS and the Battery.

Refer to Section 4.1.1.

For Battery installation follow the local codes and the recommendation of the Battery supplier.

**Note!**

Operation at temperatures higher than **77°F (25°C)** will reduce Battery life.

Potential consequences are explained in the User Manual to Section 9.1.4: read and understand them.



The MegaFlex 1000 to 1600 UPS can radiate radio frequency energy.

Although some RFI (Radio Frequency Interference) filtering is inherent to the UPS there is no guarantee that the UPS will not influence sensitive devices such as cameras and monitors that are positioned close by.

If interference is expected, the UPS should be moved away from the sensitive equipment.

### 4.4.2 Later commissioning

It's not recommended to unpack UPS until commissioning can be performed. In any case, care must be taken to prevent foreign object to fall into UPS openings (e.g. debris due to construction works or fasteners). Do not perform construction work over the UPS cabinet.

### 4.4.3 Altitude

Maximum altitude of installation without derating is 3300 ft (1000 m).

### 4.4.4 Positioning of the UPS

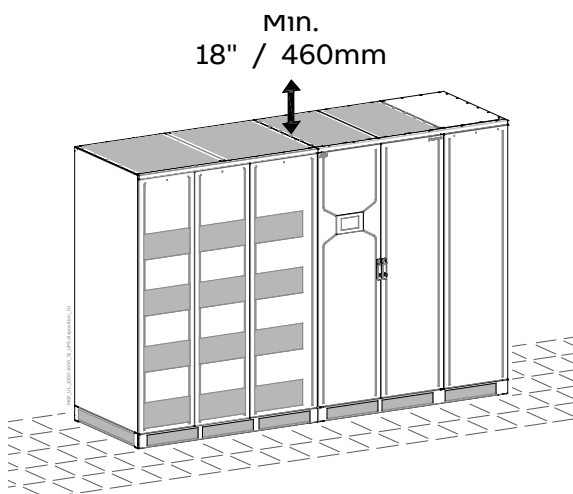


Fig. 4.4.4-1 MegaFlex 1000 to 1600 – Positioning of the UPS

The rear panel of the UPS may be mounted flush to a wall or other structure.

Clearance around the front of the unit should be sufficient to enable free passage of personnel with the doors fully open, and to allow sufficient airflow to the door vents.

**Check Section 110-26(A) of the NEC code for specific requirements.**

To guarantee proper cooling air exhaust, the **mandatory minimum clearance** between ceiling and top of the UPS is **18" (460 mm)**.

A single-phase power outlet (120Vac) should be provided near the UPS for connection of power tools, test equipment or connectivity devices.

This outlet must be grounded.

#### 4.4.5 Standing floor

Make sure standing floor (especially in case of raised floor) has sufficient weight loading capability to tolerate the UPS and extra weight that might occur from time to time.

The UPS must be installed on concrete or another non-combustible surface.

#### MegaFlex 1000 to 1600 Opening for input and output cable connections

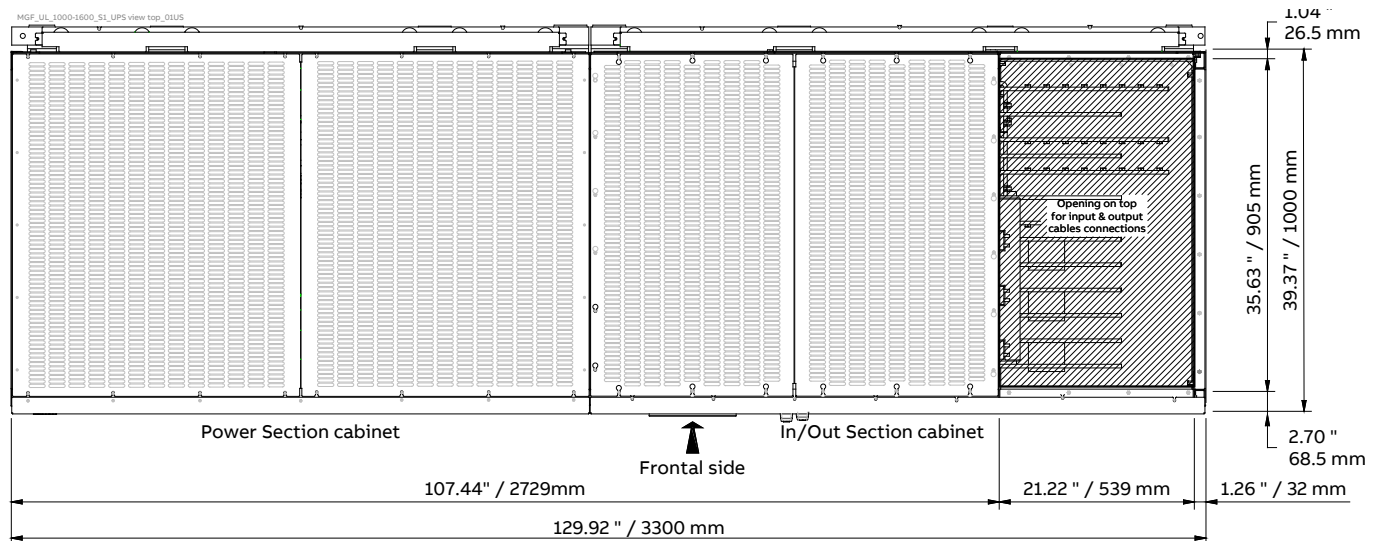


Fig. 4.4.5-1 MegaFlex 1000 to 1600 – Opening on top of the cabinet for input and output cables connections

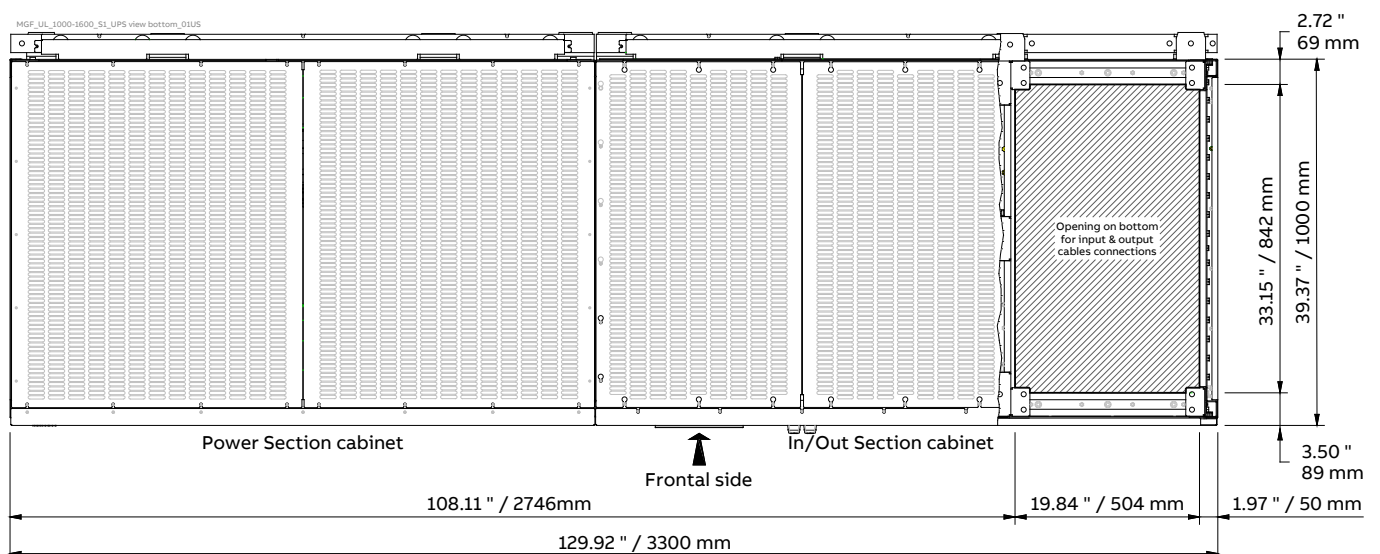


Fig. 4.4.5-2 MegaFlex 1000 to 1600 – Opening on bottom of the cabinet for input & output cables connections

MegaFlex 1000 to 1600 openings are provided on the top (\*) and the bottom (\*) of the UPS cabinet for the connection of input and output cables.

Pay attention to the position of these openings, when choosing the placement of the UPS.

These openings are covered with a protective plate.

\*) Please remove the plate before drilling any holes (see Fig. 4.9-2).

### Fixing of the UPS cabinet MegaFlex 1000 to 1600 on the floor

The UPS cabinet is free standing and normally does not require to be bolted to the floor.

The UPS cabinet can be fixed however to the floor by bolting it with the supporting blocks to the floor.

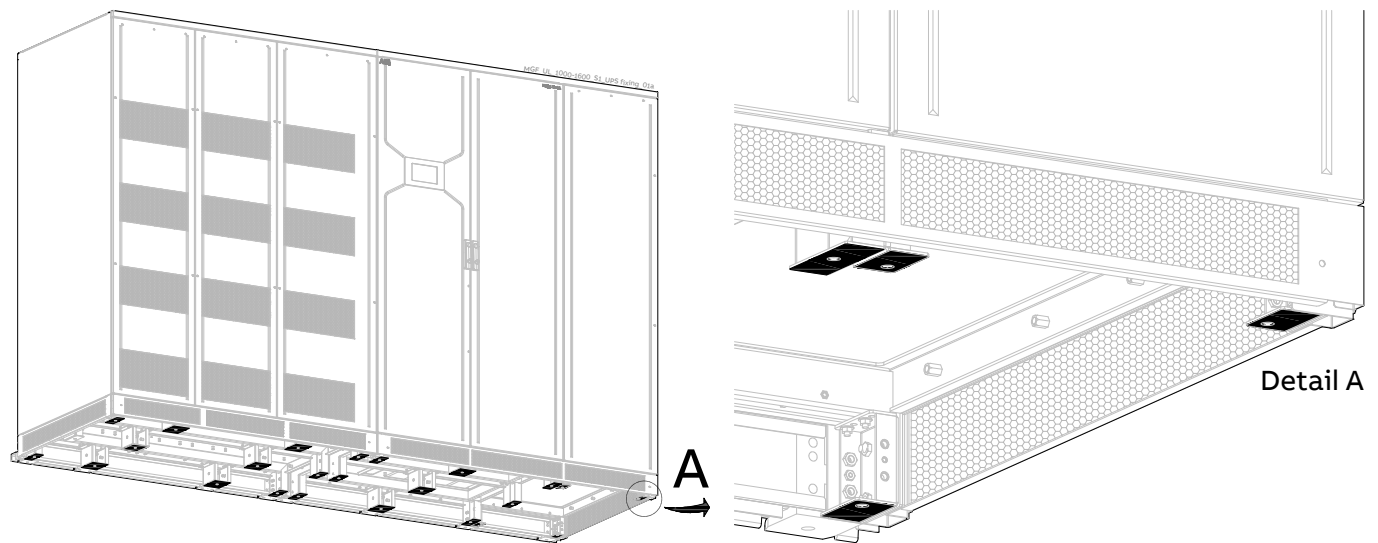


Fig. 4.4.5.3 MegaFlex 1000 to 1600 – Fixing of the UPS cabinet on the floor

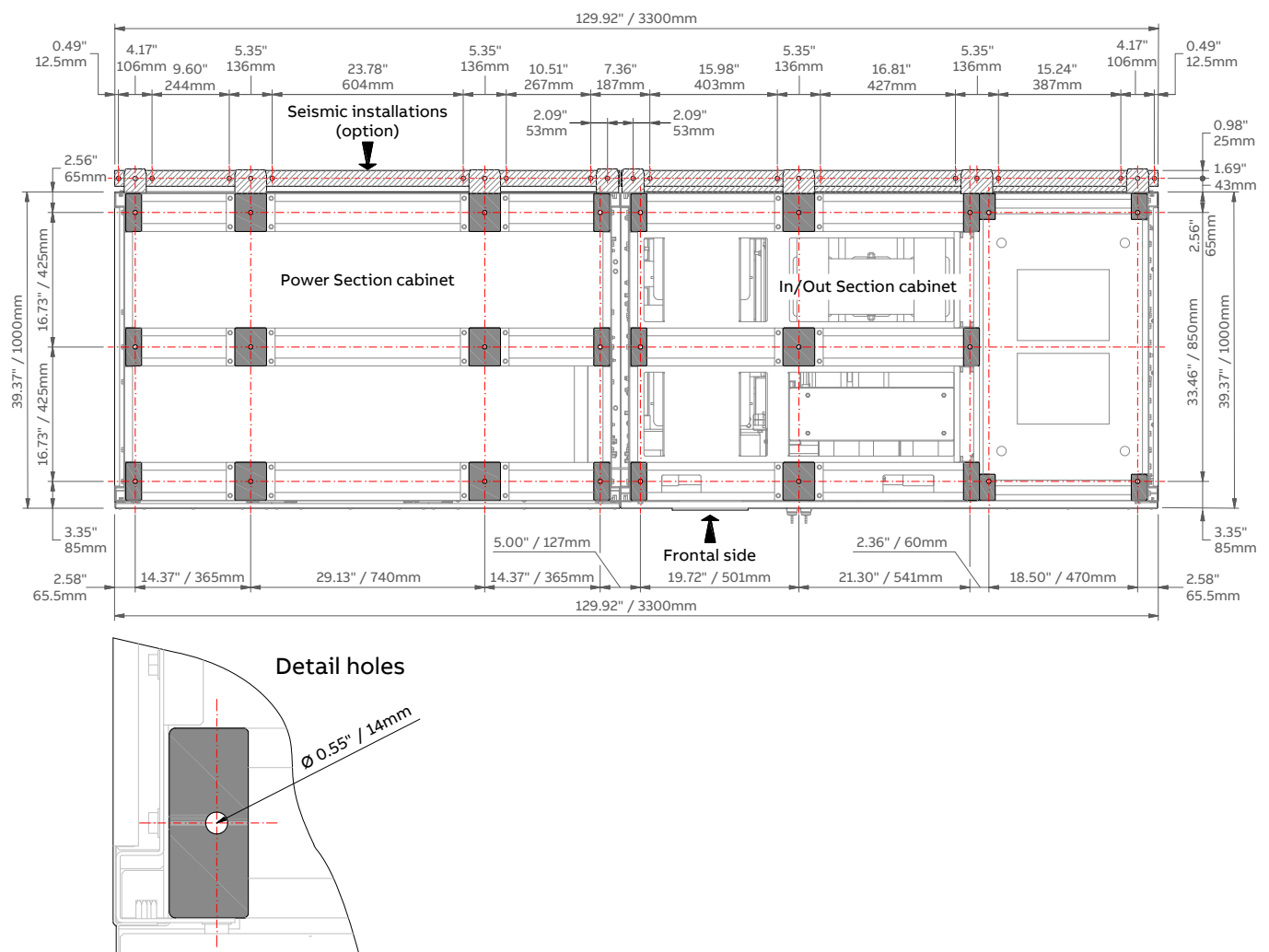


Fig. 4.4.5.4 MegaFlex 1000 to 1600 – UPS cabinet floor fixing points



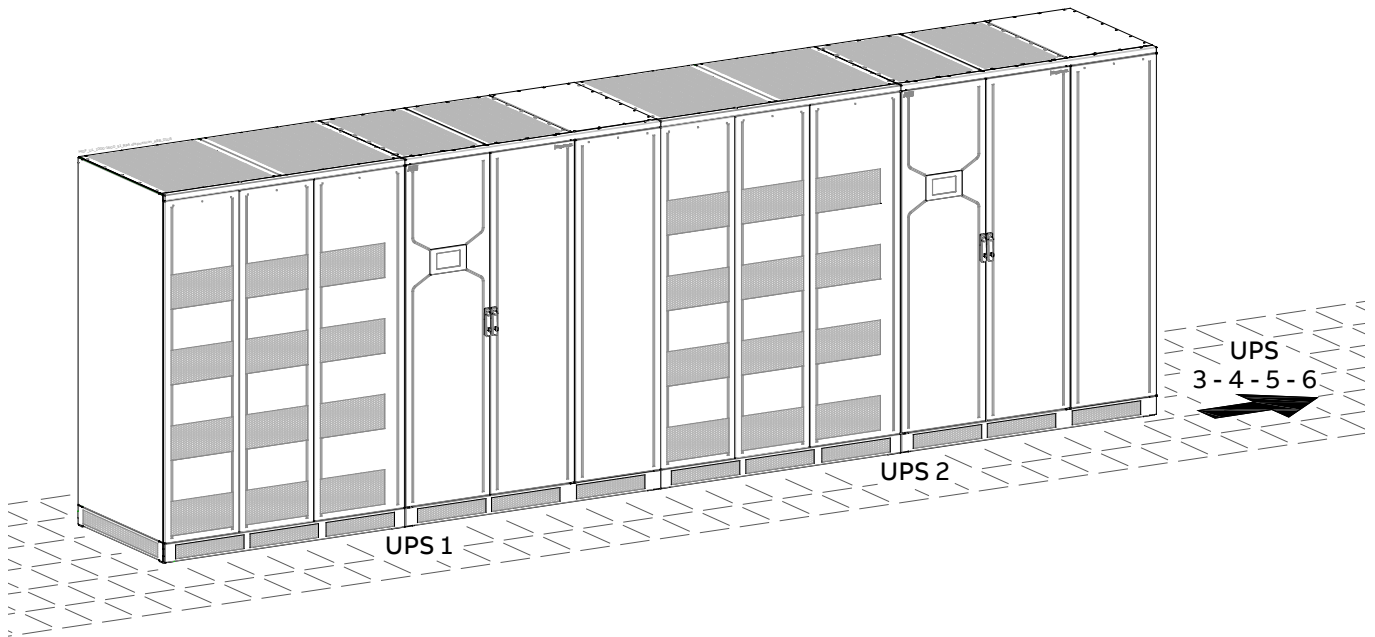


Fig. 4.4.5-5 MegaFlex 1000 to 1600 – RPA Parallel System disposition



**In case of Parallel System, try to place the UPS modules in sequence of their numbers (marked on the packing).**

**If the units are positioned “side by side”, the side panels must be mounted on all units.**

**Remove the side air inlet grids on the intermediate units to run the control bus cable connections.**

#### 4.4.6 Battery location

Batteries require a well-ventilated room with controlled temperature to obtain reliable operation.

The Battery can be installed immediately adjacent to the UPS (left or right side) or remotely from the UPS.

If the Battery is installed remotely from the UPS, a wall mounted DC disconnect device must be installed within line-of-site to both the UPS and the Battery.

The optimal room temperature for Battery storage is **68°F (20°C) to 77°F (25°C)** and shall never exceed the range - **4°F (-20°C) to 104°F (40°C)**.

The life of valve-regulated Battery will be reduced by 50% for each additional **18°F (10°C)** that the Battery ambient temperature is above **77°F (25°C)**.

The Battery System associated with larger UPS is usually either rack mounted or installed in multiple Battery Cabinets.

Installation and assembly must be made according to the local standards and Battery System manufacturer's recommendations.

The Battery Circuit Breaker must be mounted as near as possible to the Battery.

#### Warning!

**Battery installation and connection must be performed by Qualified Personnel only.**

**Read all safety instructions before proceeding with the installation (see Chapter 1).**

**Battery discharging and/or charging activities may cause the emission of hydrogen gas; therefore, the room requires proper ventilation and fresh air.**

**Comply with the UL1778-CSAC22.2no170.3 UPS safety standard, ANSI/IEEE P1184 Guide for Batteries for Uninterruptible Power Supply Systems and applicable codes and governmental regulations.**



## 4.5 Ventilation and cooling

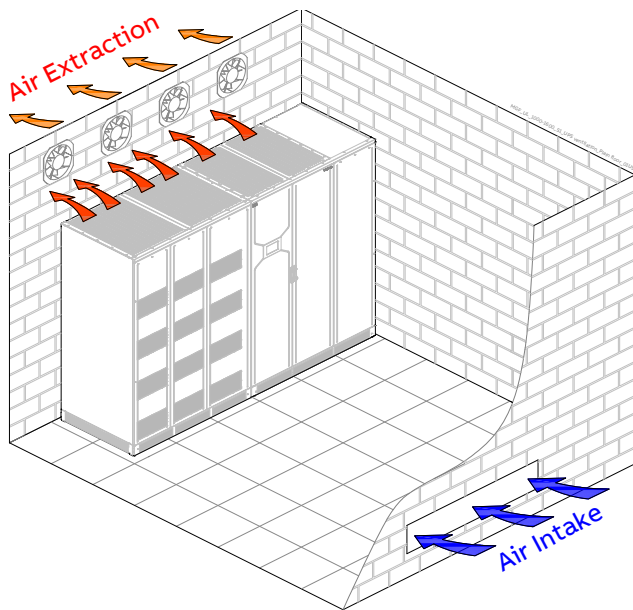


Fig. 4.5-1 Installation on plain floor

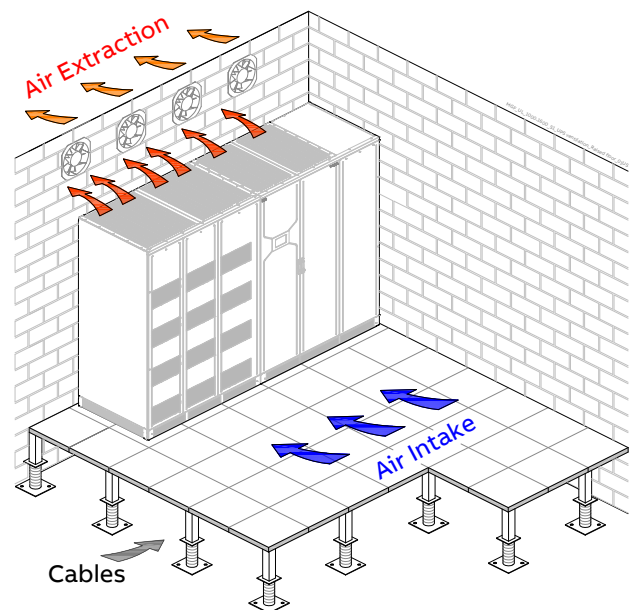


Fig. 4.5-2 Installation on raised floor

The heat produced by the UPS is transferred to the environment by its ventilation.

Air inlets for UPS ventilation are located on the front of the UPS, while air outlets are on top of the cabinet.

A suitable ventilation or cooling system must be installed to extract the heat from the UPS room.



### Note!

**Do not put anything on the top of the cabinet.**

**18" (460mm) of air clearance from the top must be left free of any object for a sufficient exhausted air exchange, proper cooling, service access and safety.**

Air filtering systems could be required when the UPS operates in a dirty environment.

In order to prevent overheating of the UPS, the available air intake flow rate must exceed the total air exhaust flow rate requirement of the UPS system.

Contact your **ABB Service Center** for appropriate solutions.

The below table indicates the heat dissipation at full Load at **PF = 1** and charged Battery, up to **3280 ft** (1000 m) altitude, for cooling air **77°F** (25°C) to **86°F** (30°C).

UPS model	Losses				Cooling air flow	
	VFI		eBoost™ (option)		VFI	
	PF = 1		PF = 1		PF = 1	
<b>MegaFlex 1000</b>	145914 BTU/hr	42753 kW	55495 BTU/hr	16260 kW	7339 CFM	12469 m <sup>3</sup> /h
<b>MegaFlex 1100</b>	156427 BTU/hr	45833 kW	57171 BTU/hr	16751 kW	7868 CFM	13368 m <sup>3</sup> /h
<b>MegaFlex 1200</b>	166209 BTU/hr	48699 kW	58152 BTU/hr	17039 kW	8360 CFM	14204 m <sup>3</sup> /h
<b>MegaFlex 1500</b>	202223 BTU/hr	59252 kW	62179 BTU/hr	18219 kW	10172 CFM	17283 m <sup>3</sup> /h
<b>MegaFlex 1600</b>	209810 BTU/hr	61475 kW	60736 BTU/hr	17796 kW	10553 CFM	17930 m <sup>3</sup> /h



### Note!

**Even when eBoost™ Operating Mode option is available, the ventilation and cooling system shall be rated as for operation in VFI mode.**



## 4.6 Unpacking

Move the equipment in it's original packing, carton box or wooden case, until the place of installation and remove the packing and the transport sockets only just before installing the UPS.

Be aware of the heavy weight of the UPS, pay attention when moving the UPS cabinet.



White color = without any anomaly  
Red color = anomaly evidence



Fig. 4.6-1 ShockWatch device

The package of the MegaFlex 1000 to 1600 is equipped with ShockWatch (indicator for shock) and TiltWatch (indicator for overthrow) on the outside.

These devices indicate an eventual shock or overthrow during transport.



Fig. 4.6-2 TiltWatch device



### Note!

Whenever these devices show a possible anomaly, the UPS shall not be commissioned before consulting an ABB Service Centre.



### Note!

Be aware of the heavy weight of the UPS, pay attention when moving the UPS cabinet.

Take care not to damage the UPS when moving by forklift.



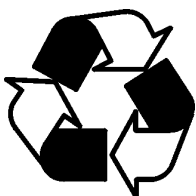
A damaged UPS must never be installed or connected to Utility or Battery!

In case of any damage sustained during the transport, immediately inform the shipping agent!

A detailed report of the damage is necessary for any indemnity claim.

Included in the delivery you can find the following parts:

- An accessory bag.
- Lower closures with air inlet grids, which must be mounted on the bottom of the cabinet UPS with the screws included.
- Bus bars interconnection "Power Section cabinet" and "In/Out Module cabinet" with the screws included.
- Junction metal to connect "Power Section cabinet" and "In/Out Module cabinet" with the screws included.
- Control Bus cables for inter-connecting the UPS modules (only for the RPA Parallel System).
- The documentation includes the "Installation Guide & User Manual" and the "UPS Safety Rules".



### Packing material recycling

ABB, in compliance with environment protection, use only environmentally friendly material.

UPS packing materials must be recycled in compliance with all applicable regulations.

## Anti-humidity & corrosion devices

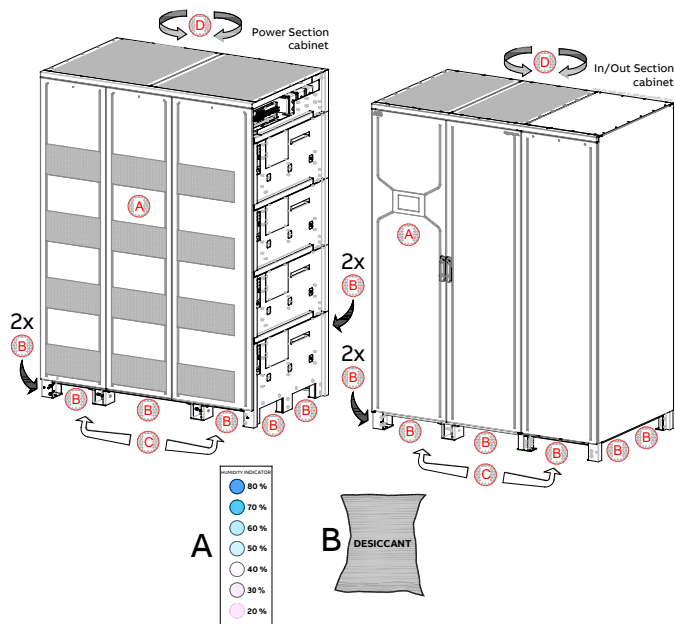


Fig. 4.6-3 MegaFlex 1000 to 1600  
Location of the “Anti-Humidity & Corrosion devices”

The package of the MegaFlex 1000 to 1600 includes “Anti-Humidity & Corrosion devices” against the formation of humidity and corrosion during the transportation and the storage of the UPS.

“Anti-Humidity & Corrosion devices” components for any cabinet (“Power Section cabinet” and “In/Out Module cabinet”):

- A Humidity indicator
- B Desiccant bag (9 pcs.)
- C VCI foil base
- D PE stretch foil

### Warning!

It's **mandatory** to remove the “Anti-Humidity & Corrosion devices” during the unpacking of the UPS!

### Humidity indicator

Before removing the devices “C - VCI foil base” & “D - PE stretch foil”, check the status of the “A - Humidity indicator”.

10% to 70%:

The UPS can be commissioned.

80%:

The UPS shall not be commissioned.

Please contact your ABB Service Centre.



## Protective foil

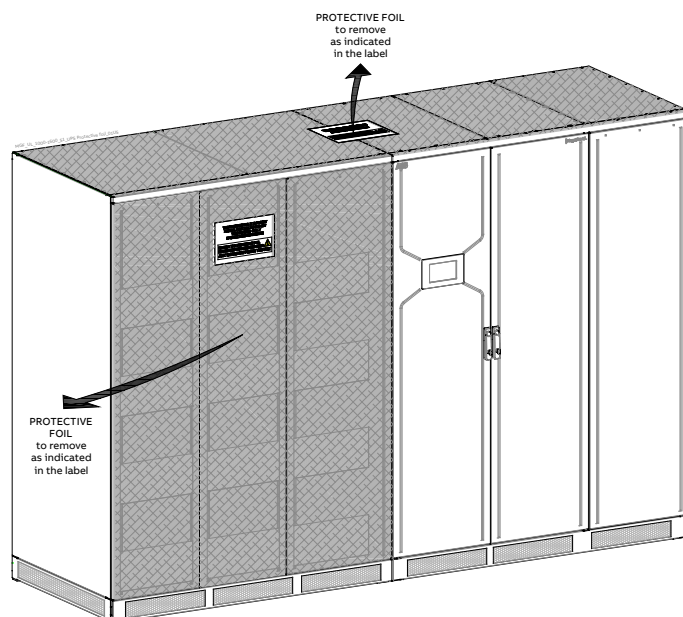


Fig. 4.6-4 MegaFlex 1000 to 1600 - “Power Section cabinet”  
Location of the “Protective Foil”

MegaFlex 1000 to 1600 is provided with a “Protective Foil”, on the roof and door/front panels, to prevent material from falling into UPS.

### Warning!

It's **mandatory** to remove the “Protective Foil” but only just before the first start-up of the UPS as indicated in the appropriate label!

The removal of the “Protective Foil” should be performed only by an ABB Service Technician!



### Packing material recycling!

ABB, in compliance with environment protection, uses only environmentally friendly material.

UPS packing materials must be recycled in compliance with all applicable regulations.



## 4.7 Inter cabinet connections

### Note!



The “Power Section cabinet” and “In/Out Section cabinet” must be installed on levelled floor.  
Be aware of the heavy weight of the UPS cabinets, pay attention when moving the UPS cabinet.  
Take care not to damage the UPS cabinets when moving by forklift.

### MegaFlex 1000 to 1600 Preparation for interconnection of UPS cabinets

MegaFlex 1000 to 1600 is delivered split into two cabinets, “Power Section cabinet” and “In/Out Section cabinet” (cabinet with Control Panel).

Align them together with the “In/Out Section cabinet” on the right side (cabinet with Control Panel).  
Pay attention, that no loose cables are trapped when pushing the cabinets together.

For “Power Section cabinet” proceed in the following way:

- Remove the front protection panels “A and B”.
- Remove the top panel “C”.

For “In/Out Section cabinet” proceed in the following way:

- Open the doors “D”.
- Open the Electronic Module “E”.
- Remove the front protection panels “F”.
- Remove the top panel “G”.

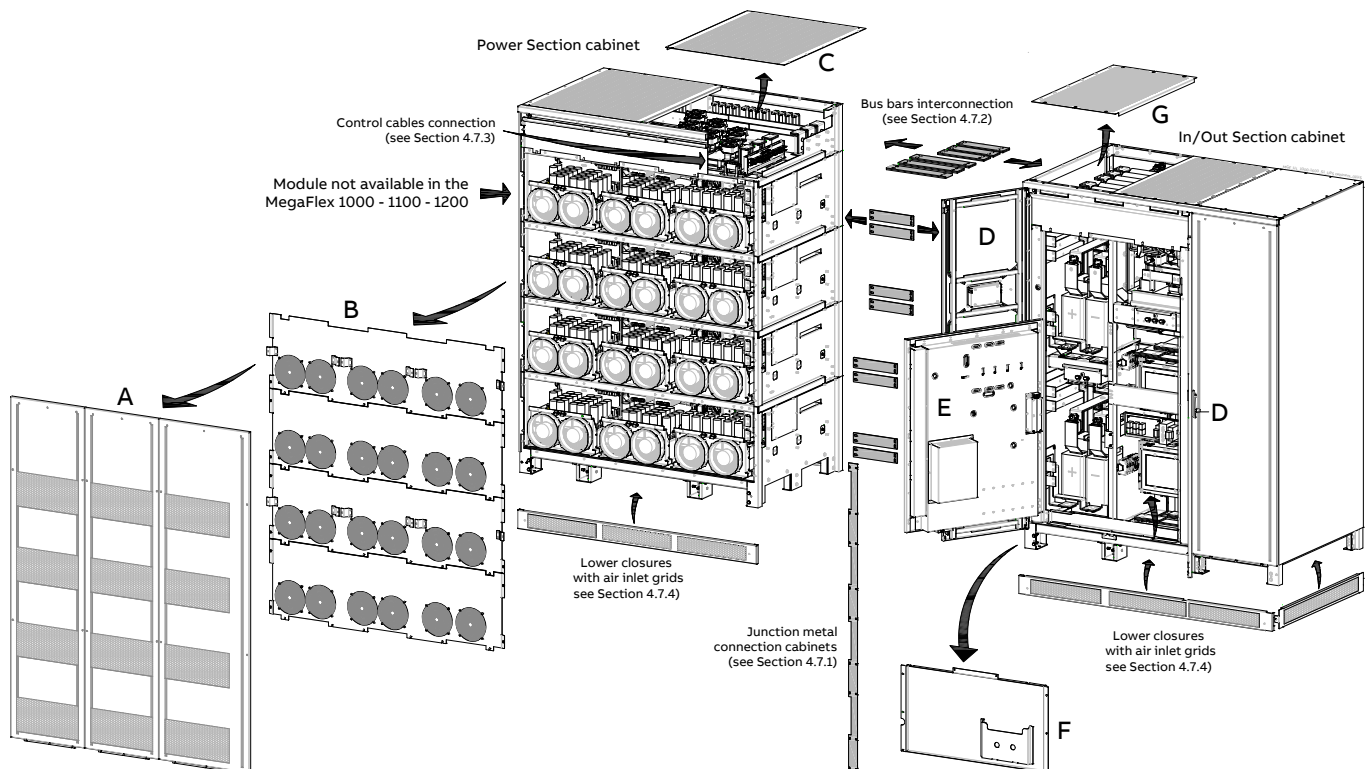


Fig. 4.7-1 MegaFlex 1000 to 1600 – Cabinets positioning and interconnection

Once the 2 cabinets have been positioned and the various operations described in Fig. 4.7 have been carried out, you can proceed to the various interconnections described in Section 4.7.1, 4.7.2, 4.7.3 and 4.7.4.

### Note!



Performed all the interconnection procedures, describe in Section 4.7.1, 4.7.2, 4.7.3 and 4.7.4, you must reassemble all the protections previously removed.

### 4.7.1 Cabinets positioning and interconnection for electrical safety grounding

**Note!**



The “Power Section cabinet” and “In/Out Section cabinet” must be installed on levelled floor.

Mechanical interconnection is essential to ensure the electrical safety grounding of the “Power Section cabinet”. Failure in grounding generates risks of electric shock.

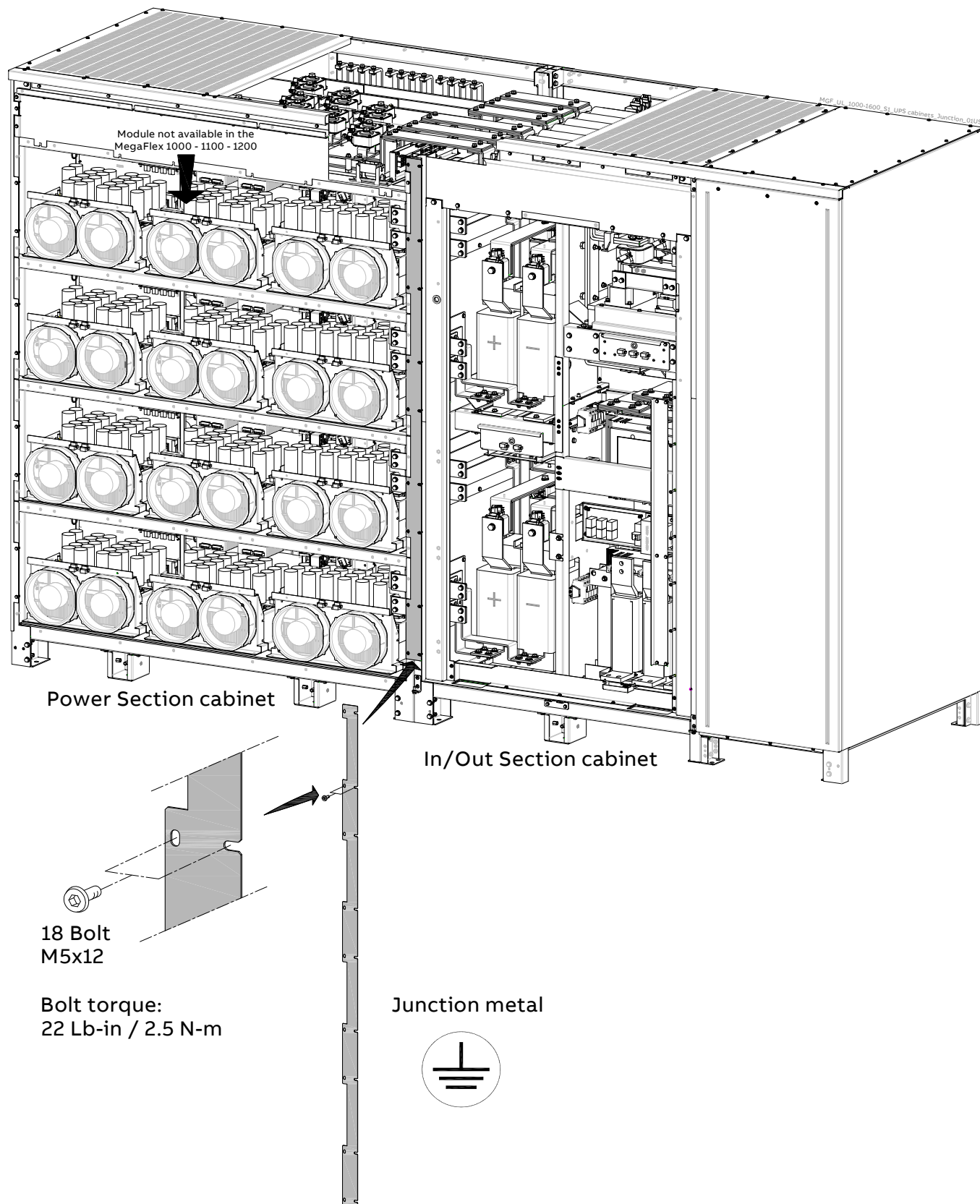


Fig. 4.7.1-1 MegaFlex 1000 to 1600 – Cabinets positioning and interconnection for electrical safety grounding

## 4.7.2 Bus bars interconnection



### Note!

All the bus bars interconnection must be performed only by an ABB Service Technician!

### MegaFlex 1000 to 1600 - Bus bars interconnection

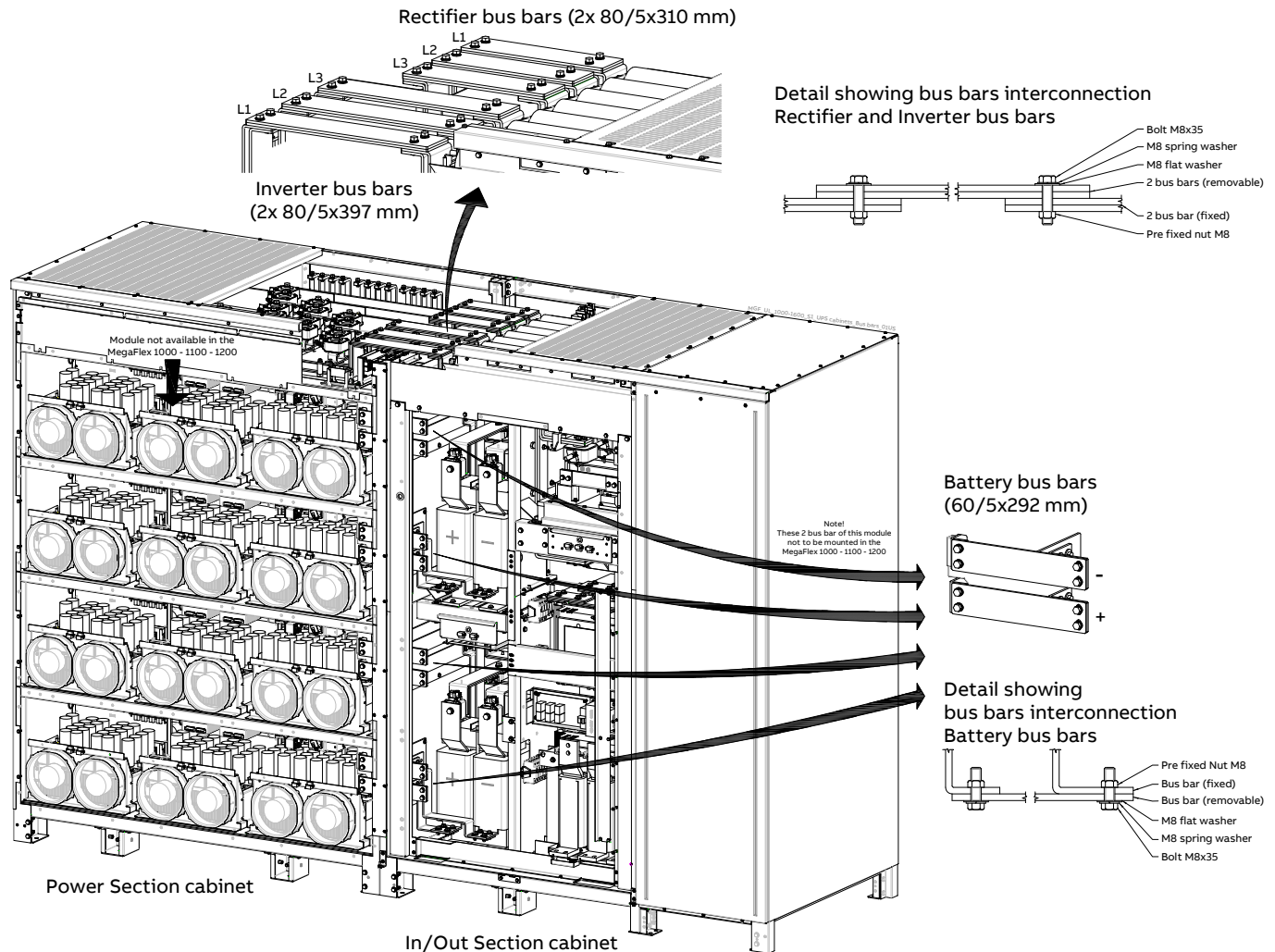


Fig. 4.7.2-1 MegaFlex 1000 to 1600 – Bus bars interconnection

### Torque Specifications

Bolt size (mm): **M8**

Bolt torque: **195 Lb-in / 22 N-m**

Connection	Description of connection	Bus bars interconnection
L1 Inverter	Interconnection L1 Inverter	2 Bus bar 80/5 x 397 mm
L2 Inverter	Interconnection L2 Inverter	2 Bus bar 80/5 x 397 mm
L3 Inverter	Interconnection L3 Inverter	2 Bus bar 80/5 x 397 mm
L1 Rectifier	Interconnection L1 Rectifier	2 Bus bar 80/5 x 310 mm
L2 Rectifier	Interconnection L2 Rectifier	2 Bus bar 80/5 x 310 mm
L3 Rectifier	Interconnection L3 Rectifier	2 Bus bar 80/5 x 310 mm
Battery +	Interconnection Battery +	Bus bar 60/5 x 292 mm (1 for every module, total 4)
Battery -	Interconnection Battery +-	Bus bar 60/5 x 292 mm (1 for every module, total 4)



### 4.7.3 Control cables interconnection



#### Note!

All the cables interconnection must be performed only by an ABB Service Technician!

#### MegaFlex 1000 to 1600 - Control cables interconnection

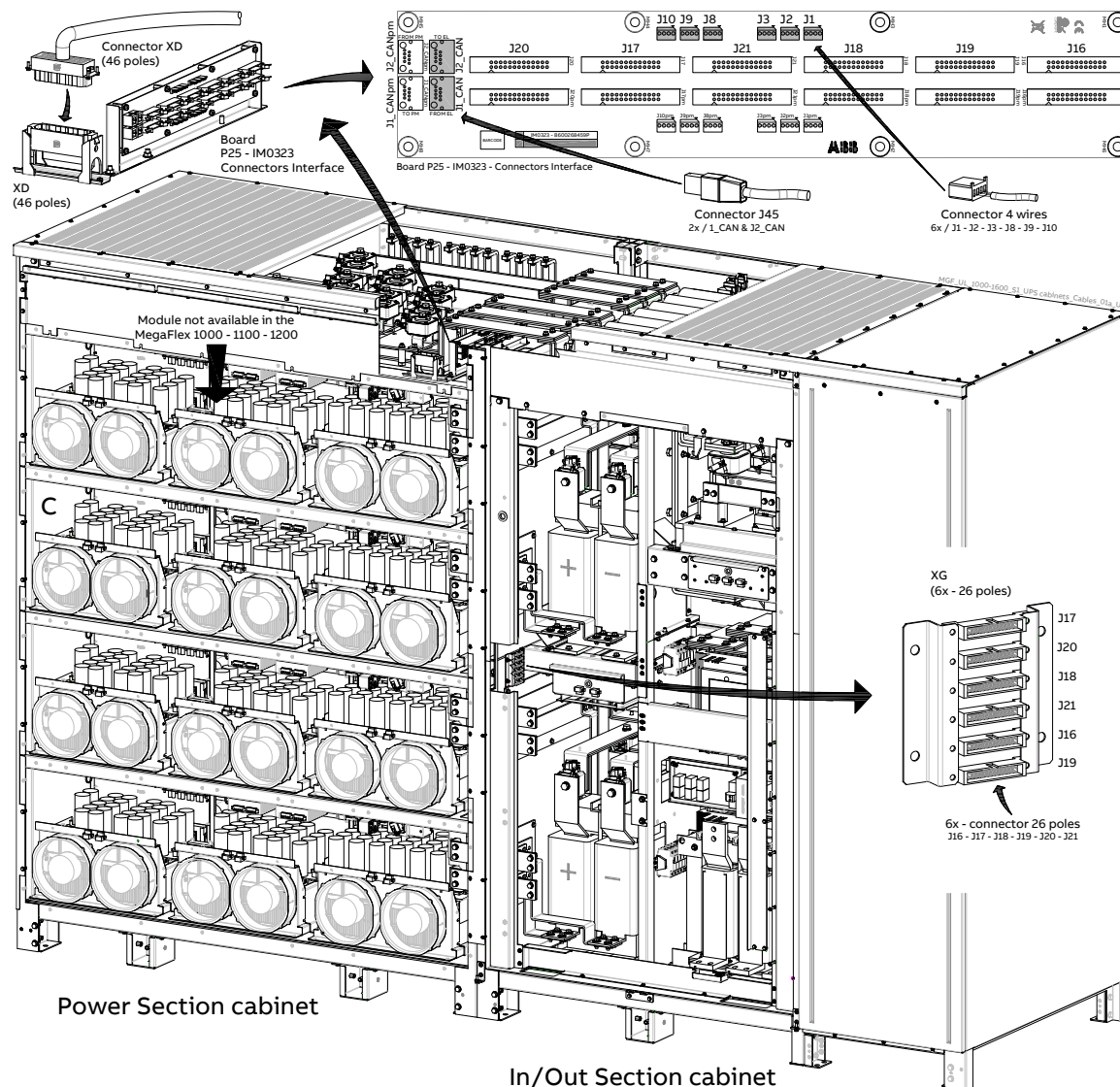


Fig. 4.7.3-1 MegaFlex 1000 to 1600 – Control cables interconnection

#### Connection

XD – HAN Connector male (46 p.)

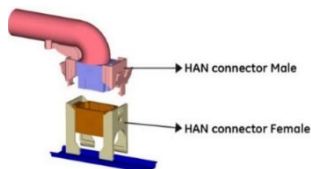


Fig. 4.7.3-2 Connection HAN connector

#### From (already connected)

“In/Out Section” cabinet

**Note! All these connections must be performed only by an ABB Service Technician!**

Proper dressing needs to be done for each cable assembly in order to reduce the stress.

All the cables must be sufficiently (at least 4"/10cm) away from all live parts.

Cable binders used to support the wiring must not be overly tightened.

#### Connecting to

“Power Section” cabinet - HD Connector

6x – Connector 4 wires

“In/Out Section” cabinet

“Power Section” cabinet / Board “P25 - IM0323”  
J1 - J2 - J3 - J8 - J9 - J10

6x – Connector 26 poles

“Power Section” cabinet/  
Module C

“In/Out Section” cabinet / Connectors “XG”  
J16 - J17 - J18 - J19 - J20 - J21

2x – Connector J45

“In/Out Section” cabinet

“Power Section” cabinet / Board “P25 - IM0323”  
J1\_CAN and J2\_CAN

#### 4.7.4 Lower closures with air inlet grids assembling

UPS is delivered with lower closures with air inlet grids to be installed on the bottom of the UPS cabinet, over standing feet.



**Warning!**

Such covers compete UPS enclosure and are essential to ensure compliance protection level against access IP2X.

Failure to install them exposes to risk of electric shock.

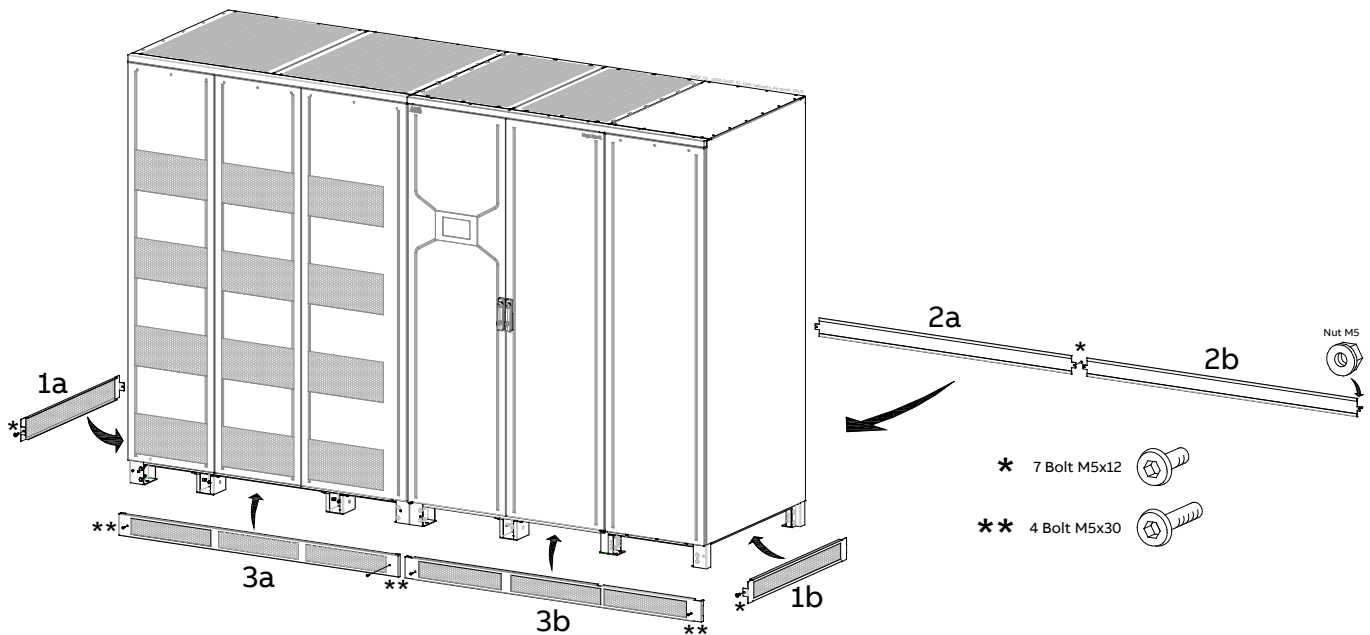


Fig. 4.7.4-1 MegaFlex 1000 to 1600 – Lower closures with air inlet grids assembling

Installation sequence of the lower covers with air grids of the UPS cabinet:

- Assembling the 2 lateral lower covers “**1a** and **1b**”.
  - Assembling the 2 rear lower covers “**2a** and **2b**”.
- Note! In case the UPS is located against the wall, the 2 rear covers “**2a** and **2b**” must be assembled before moving the UPS cabinet.
- Assembling the 2 front lower covers “**3a** and **3b**”

## 4.8 Electrical wiring



### Warning!

UPS installation and connection must be performed only by an ABB Service Technician!

Refer to the “Safety prescriptions - Installation” described on Chapter 1.

It is the responsibility of the installation technician to ensure that all local and national electric codes are adhered to.

### 4.8.1 Utility input connection



### Note!

Ensure that the AC and DC external isolators are OFF and locked out to prevent their inadvertent operation.

Do not apply power to the equipment prior to the commissioning by an ABB Service Technician.

Before any other input connection, connect and check the grounding wire.

The UPS has available input terminations for the Rectifier and Bypass.

The unit may be powered from a Common Input source or Dual Input sources if desired.

#### Dual Input Utility Configuration Rectifier & Bypass

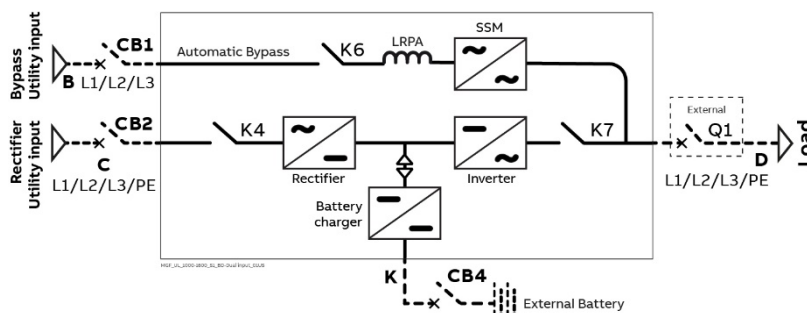


Fig. 4.8.1-1 Dual Input Utility Rectifier & Bypass

The Bypass and Rectifier use different power sources (CB1 and CB2 inputs).

In this case, when the Rectifier-input breakers are opened, the Automatic Bypass is supplied by the other connection.



### Note!

Always verify that the received UPS is as per the configuration ordered.

While installing UPS dual source, the interconnection links BR1, BR2 and BR3 must be removed. See Fig. 4.9.2-3 & Fig. 4.9.4-3.

#### Common Input Utility Rectifier & Bypass

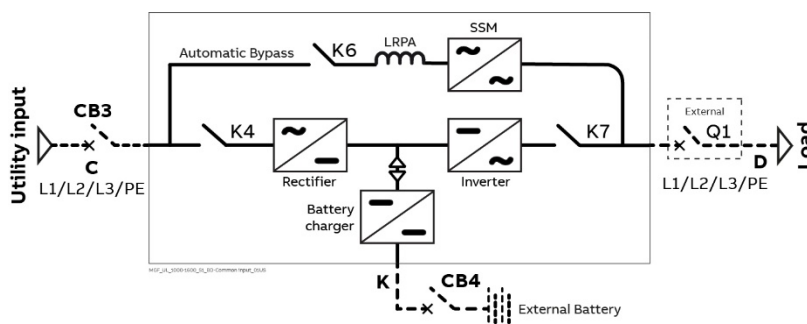


Fig. 4.8.1-2 Common Input Utility Rectifier & Bypass

The **same power source** is to be used for both Bypass supply and Rectifier input (input CB3).

Bear in mind that when the Utility breakers are opened there is a supply failure to the Rectifier as well as to the Automatic Bypass.



### Note!

In this case, the interconnection links BR1, BR2 and BR3 on the input bus bars must remain connected.



### 4.8.2 Input/output over current protection and wire sizing

Wiring must be sized according to UPS power rating.

Sizing of Circuit Breakers and cables for Input Utility, Output Load and Battery must meet the requirements of local and national electrical code and any other local regulation that may apply.

Utility Voltage, Frequency, Short Circuit Current, Load Voltage, Frequency, Current and Battery data (cells number, floating voltage, autonomy) must be within UPS rating. This must be verified prior installation.

Avoid running the input cables in parallel with the output cables to prevent them from noise induction.

The connection of the Battery to the UPS must be protected with breakers or similar devices according to technical specifications and in accordance with local standards.

Power cables must run into dedicated conduits. Signal and RPA cables shall not share routing with power cables.

---

**Note!**

**If you use ELCB breaker (Earth Limiting Circuit Breaker) to protect the input connections, consider the high leakage current generated by the noise suppression capacitors.**

**If these ELCB breakers are strictly necessary, we suggest using the largest type suitable for non-linear current and for delayed operations.**

---

To ensure the Circuit Selectivity in case of **Short- Circuit in the Load equipment**, special care must be taken in choosing the **Circuit Breaker ratings** installed in the output distribution circuits.

Due to the relatively low short-circuit capability of the UPS Inverter, a short-circuit in the Load will cause an immediate transfer to Utility.

The largest breaker in the output distribution should be **at least 1.6 time** smaller than breaker supplying Bypass line.

If Circuit Selectivity is required while the Load is fed from the Inverter (Bypass Utility not available), the Largest Circuit Breaker should be rated at no more than **20%** of the UPS Output Current Rating.

---

**Note!**

**The delivery and installation of breakers and input/output connections of the UPS are at the customer's expense, unless agreed otherwise.**

---

### 4.8.3 Battery connection

Remote Battery cabinet is external and not provided with UPS.

Battery poles must be insulated from ground (floating). Center-tapping is not allowed.

Battery cabinet's ground must be connected to UPS ground.

UPS internal protections can cope short circuit fault currents from 8 kA to 100 kA.

Make sure Battery overall short circuit capacity falls into this range.

### 4.8.4 Input grounding systems

MegaFlex 1000 to 1600 UL UPS is compatible with the following grounding systems:

480V, 3-phase, 3-wire grounded or 480V, 3-phase, 3-wire ungrounded and 480V, 3-phase, 3-wire ungrounded high resistance ground. Equipment connected to UPS shall meet the grounding system intended.

As defined by NFPA 70 Article 250, grounding detectors and cautionary marking shall be provided to operate in ungrounded systems.

Under no circumstances neutral bonding shall be pulled to UPS: only phase-to-phase balanced loads are allowed.

When UPS operates in VFI mode, grounding on the AC input is delivered to the AC output circuit (non-separately derived system). During temporary Battery operation, the output is always ungrounded.

## 4.8.5 Data for Input/Output and Battery over current protection and wire sizing

### Note!



Please read the safety precautions at the front of this guide carefully, and thoroughly review the Battery manufacturers installation and maintenance manual before connecting the Batteries to the UPS.

Disconnect devices on DC input and AC output are required and are not provided inside the UPS. They shall be part of the building installation.

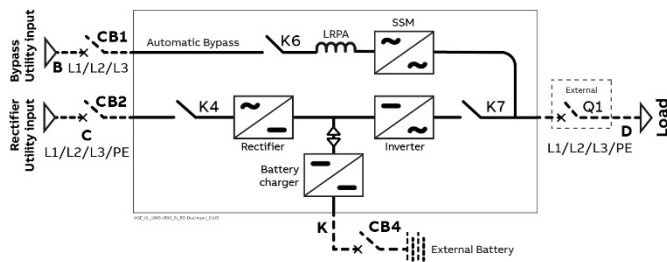


Fig. 4.8.5-1 Dual Input Utility Rectifier & Bypass

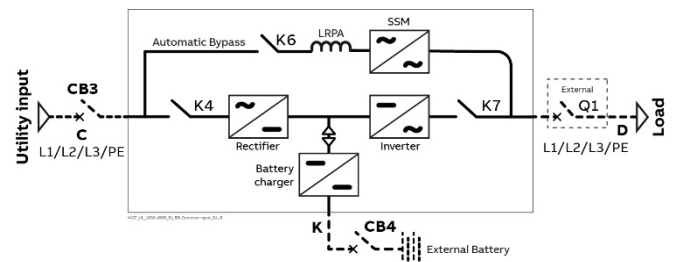


Fig. 4.8.5-2 Common Input Utility Rectifier & Bypass

The AC values below are current ratings per phase.

These maximum and nominal ratings should be considered when choosing the appropriate AC over current protection device.

DC current rating is the nominal Battery discharge current with 1.8 V/cell (see Fig. 4.8.4-1 & Fig. 4.8.4.2). Wiring shall not be sized for more than 2.0 Vdc/cell.

UPS rating	AC Input Rectifier		AC Input Bypass	AC Input		DC Input
	CB1			CB3		
	Nom.	Max.		Nom.	Max.	
			CB2			CB4
MegaFlex 1000	1260 A	1386 A	1202 A	1260 A	1386 A	2388 A
MegaFlex 1100	1385 A	1510 A	1323 A	1385 A	1510 A	2626 A
MegaFlex 1200	1510 A	1638 A	1443 A	1510 A	1638 A	2865 A
MegaFlex 1500	1890 A	2058 A	1805 A	1890 A	2058 A	3582 A
MegaFlex 1600	2015 A	2185 A	1925 A	2015 A	2185 A	3820 A

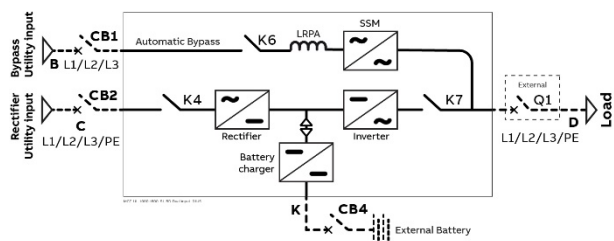


Fig. 4.8.5-3 Dual Input Utility Rectifier &amp; Bypass

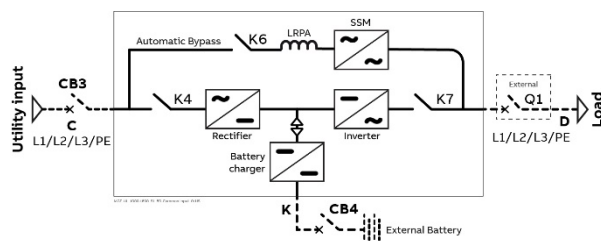


Fig. 4.8.5-4 Common Input Utility Rectifier &amp; Bypass

**Size of Branch Circuit Over Current Protection:**

Every power line must be singularly protected by UL 489 overcurrent protective devices (provided by others) according to the ampacity table below.

Non-standard Circuit Breakers shall be restricted to access, in accordance with NEC 240.6(c).

Maximum input short circuit current at CB1 and CB2 is 100 kArms.

UPS rating	CB1 - AC Input Rectifier	CB2 - AC Input Bypass	CB3 - AC Input	CB4 - DC Input
	100% Rated	100% Rated	100% Rated	100% Rated
<b>MegaFlex 1000</b>	1400 A	1400 A	1400 A	3000 A
<b>MegaFlex 1100</b>	1600 A	1400 A	1600 A	3000 A
<b>MegaFlex 1200</b>	2000 A	1600 A	2000 A	3000 A
<b>MegaFlex 1500</b>	2500 A	2000 A	2500 A	4000 A
<b>MegaFlex 1600</b>	2500 A	2000 A	2500 A	4000 A

**Wiring!**

Wire sizing according to NEC for 167°F (75°C) copper or aluminum wire at 104°F (40°C).

**Wiring requirements:**

Rectifier AC input/Bypass AC input / AC output ports.

3-phase, 3-wire plus ground (each conduit shall contain one cable per circuit's phase and one ground cable).

DC Input.

2 poles (positive and negative) plus ground (each conduit shall contain one positive, one negative and one ground cable).

Maximum recommended cable size (type THWN/THHN copper, 167°F/75°C) \* per phase/pole and ground conductors.

Each conduit shall terminate its ground conductor to UPS ground bus bar. Wires shall be rated 600V.

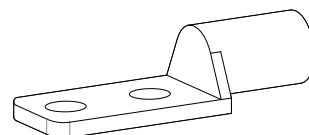
Conduits (provided by others) must be installed between UPS and the power source.

UPS rating	AC Input Rectifier (C)	AC Input Bypass (B)	AC Output (D)	DC Input (K)
<b>MegaFlex 1000</b>	6x500 + AWG 4/0	6x500 kcmil + AWG 4/0	6x500 kcmil + AWG 4/0	8x600 + 250 kcmil
<b>MegaFlex 1100</b>	8x500 kcmil + AWG 4/0	6x500 kcmil + AWG 4/0	8x500 kcmil + AWG 4/0	8x600 + 250 kcmil
<b>MegaFlex 1200</b>	8x500 + 250 kcmil	8x500 kcmil + AWG 4/0	8x500 kcmil + AWG 4/0	8x600 + 250 kcmil
<b>MegaFlex 1500</b>	10x500 + 350 kcmil	8x500 + 250 kcmil	8x500 + 250 kcmil	14x600 + 250 kcmil
<b>MegaFlex 1600</b>				

\*) for AA-8000 Aluminum cables contact ABB Service Center.

**Recommended two-hole cable lugs:**

Cable Size	T&B Copper / Two holes	T&B Aluminum / Two holes
500 kcmil	TnB 54223	-
750 kcmil	-	TnB 60278NT



## 4.8.6 Installation requirements

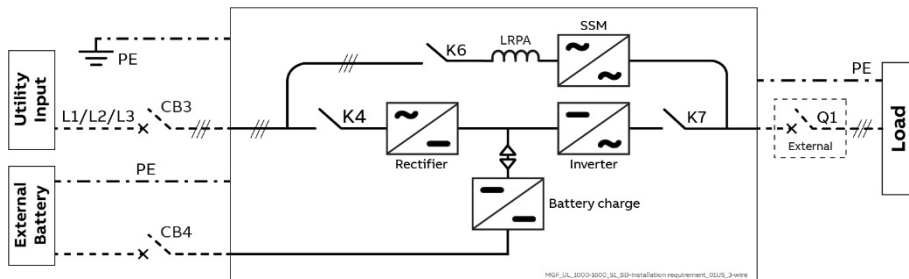
Typical examples for the connection of the MegaFlex 1000 to 1600.



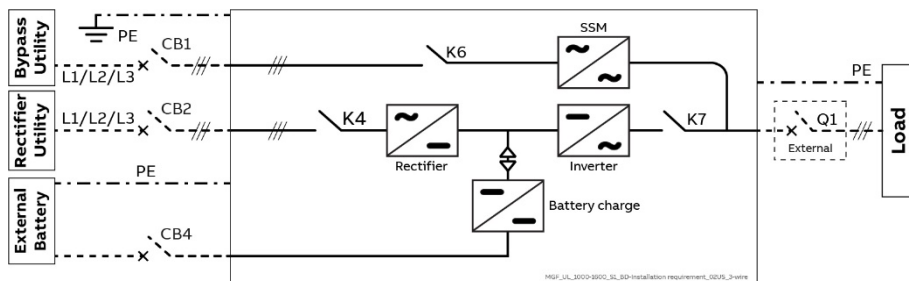
### Note!

Under no circumstance's low impedance or high impedance bonding shall be introduce inside UPS cabinet, between internal mid-point and ground.

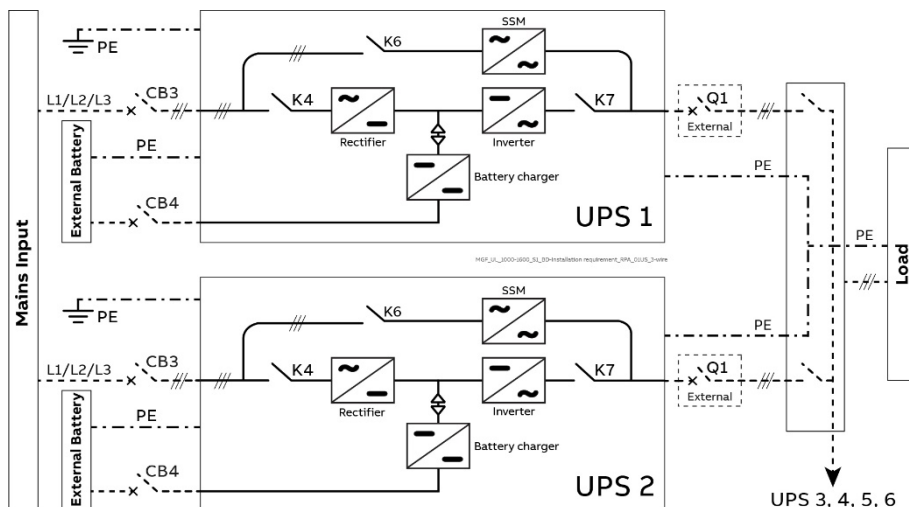
Single UPS  
with Common Input Utility  
for Rectifier & Bypass



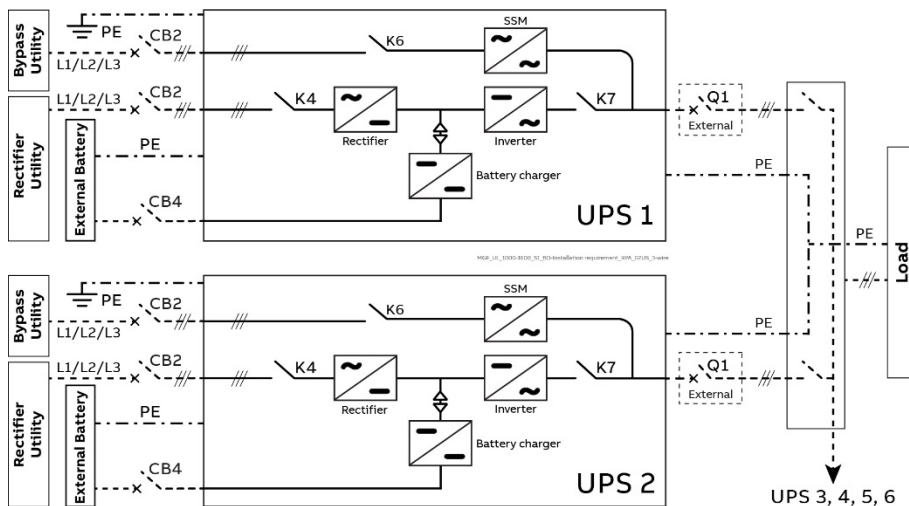
Single UPS  
with Dual Input Utility  
for Rectifier & Bypass



UPS Parallel System  
with Common Input Utility  
for Rectifier & Bypass



UPS Parallel System  
with Dual Input Utility  
for Rectifier & Bypass



## 4.9 Wiring connection

### Note!



UPS installation and connection must be performed only by an ABB Service Technician!

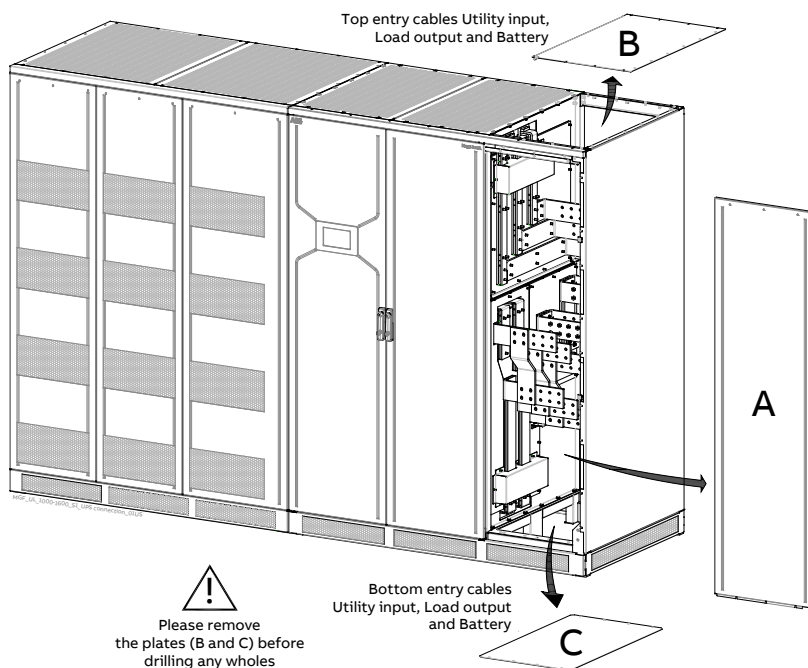
Refer to the “Safety prescriptions - Installation” described on Chapter 1.

In case of UPS equipped with options or customized parts not covered by this manual, please consult the appropriate technical documentation before proceeding with electrical connections.

Carefully read the following recommendations before proceeding:

- Ensure that the AC and DC external isolators are Off and prevent their inadvertent operation.
- Do not close any external isolators prior to the commissioning of the equipment.
- The input/output cables must be connected in clockwise phase rotation for both Bypass and Rectifier Input Bars if separate, taking care to avoid risk of short circuit between different poles.
- The grounding connection of the electrical system must be in accordance with local regulations.
- In case of additional cabinets containing Batteries, Input/Output Transformers, etc., their ground terminals must be connected to the UPS main ground terminal.
- Once the power cables have been connected, re-install the internal safety shields and close the cabinets by re-installing all external panels.

### MegaFlex 1000 to 1600 Access to the bus bars for the cable connections



### Note!



For UPS correct operation, the input mains phase rotation must be clock-wise.

To access Input, Output and Battery connections proceed as follows:

- Remove the front protection panel “A”.
- Top cable entry: remove the plate “B”.
- Bottom cable entry: remove the plate “C”.

Fig. 4.9-1 MegaFlex 1000 to 1600 - Access to connection bus bars

### Note!



Drill the cover plate “B and/or C” appropriate holes for cable conduits entry. See Fig. 4.9-2.

The holes must be drilled with the cover plate “B and/or C” removed from the UPS to avoid metal dust falling in the connection bars area.

### Warning!



Panel “A, B and C” should never be removed or replaced with power applied to the UPS. These panels are in close proximity to 480V live buss bars.

Always disconnect the Rectifier, Bypass, Load and Battery sources from the UPS before removing or replacing these panels. If not serious injury or death could occur!

## Cable conduits entry

MegaFlex 1000 to 1600 openings are provided on the top and the bottom of the UPS cabinet for the connection of input and output cables.

Pay attention to the position of these openings, when choosing the placement of the UPS.

These openings are covered with a protective plate (A and B) which need to be prepared with appropriate cable conduits.

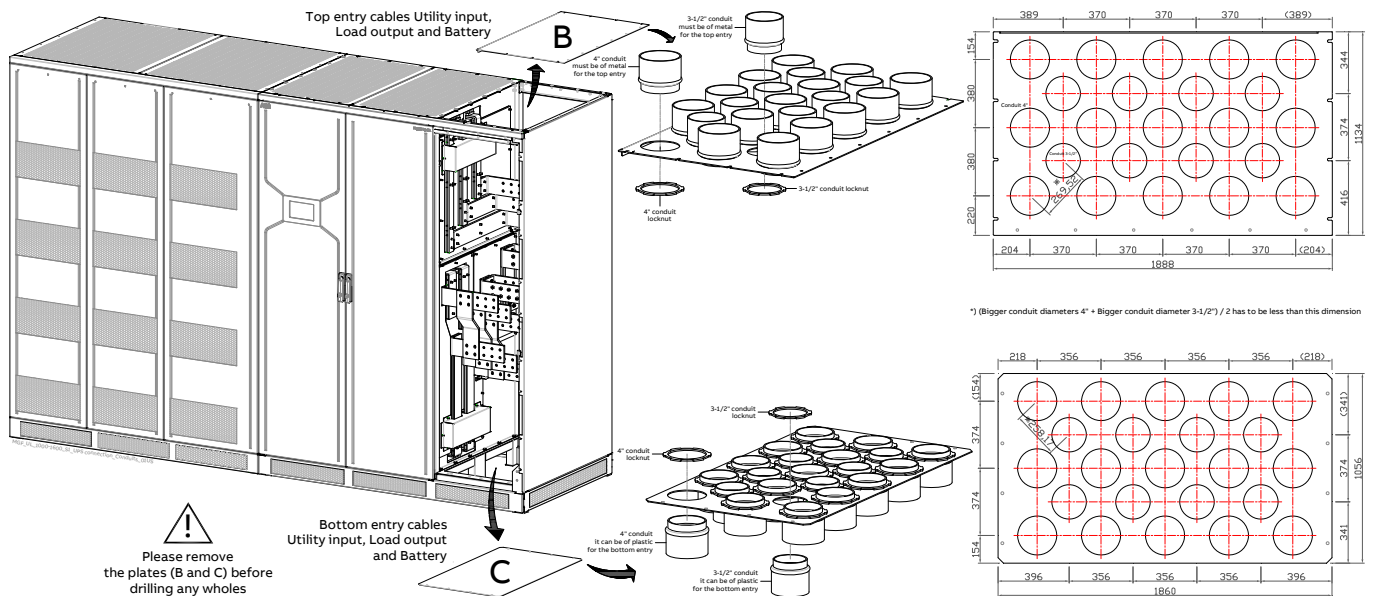


Fig. 4.9-2 MegaFlex 1000 to 1600 – Cable conduits entry

### Note!



Drill the cover plate "B and/or C" appropriate holes for cable conduits entry. See Fig. 4.9-2.

The holes must be drilled with the cover plate "B and/or C" removed from the UPS to avoid metal dust falling in the connection bars area.

Top entry cables: the conduits must be of metal!

Bottom entry cables: the conduit can be of plastic!

### 4.9.1 MegaFlex 1000 to 1600 - Power connection with Common Input Utility

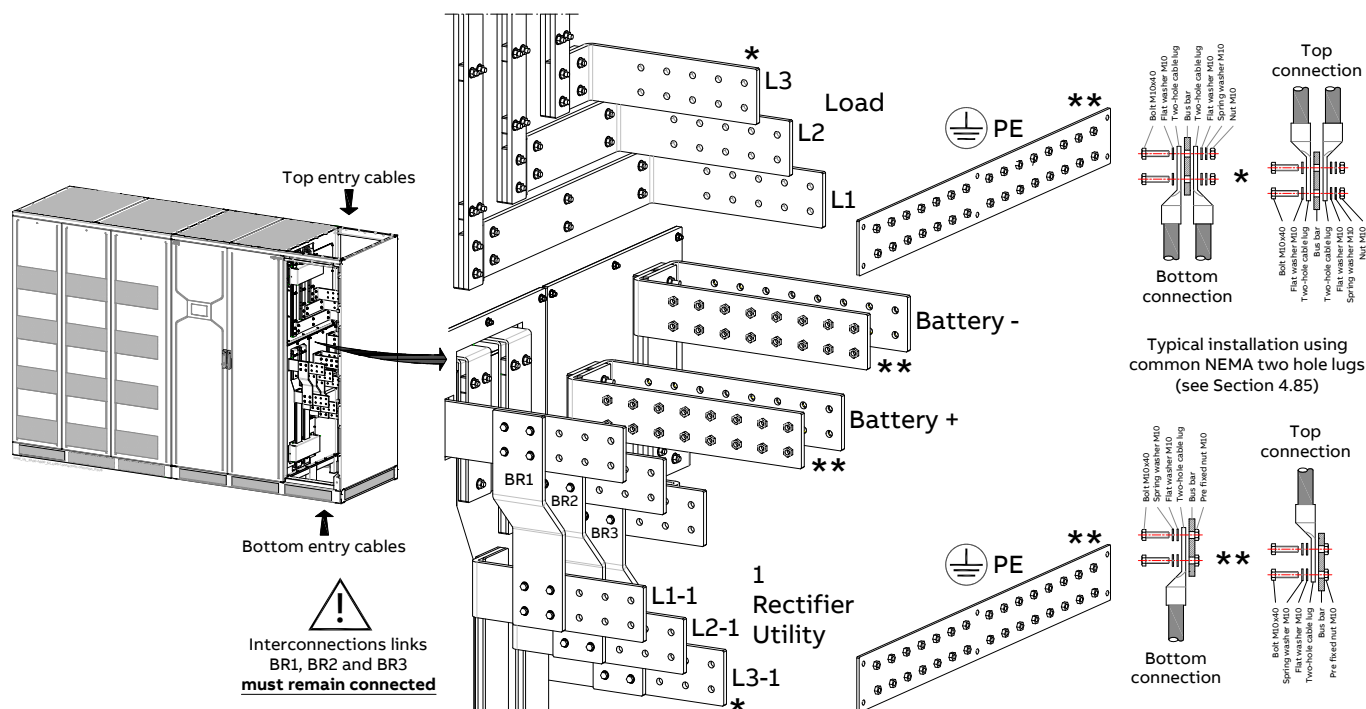


Fig. 4.9.1-1 MegaFlex 1000 to 1600 - Power connection Common Input Utility

Power connection cables are connected to bus bars using **M10 x 40 bolts** (supplied with UPS). The bolts of the connection cables must be tightened with a torque wrench at **355 Lb-in - 40 Nm**.

#### Common Input Utility - Rectifier / Bypass

**L1-1** Rectifier + Bypass Phase A (L1)  
**L2-1** Rectifier + Bypass Phase B (L2)

**L3-1** Rectifier + Bypass Phase C (L3)  
**PE** Ground



#### Note!

The interconnection links **BR1, BR2 and BR3** must remain connected (see Fig. 4.9.1-1).

#### Output Load

**L1** Load phase A (L1)  
**N** Neutral

**L2** Load phase B (L2)  
**PE** Ground

**L3** Load phase C (L3)

#### External Battery connection

**+** Positive pole of the Battery  
**-** Negative pole of the Battery  
**PE** External Battery Ground



#### UPS paralleled on the same Battery

This configuration is not possible for UPS RPA Parallel System.

Before closing the “External Battery Breaker”, verify for correct polarity of the Battery connection.

Do not close the “External Battery Breaker” before the commissioning!



#### Note!

To meet standards concerning electromagnetic compliance, the connection between the UPS and external Battery must be done by using a shielded cable or suitable shielded (steel) conduit!



## 4.9.2 MegaFlex 1000 to 1600 - Power connection with Dual Input Utility

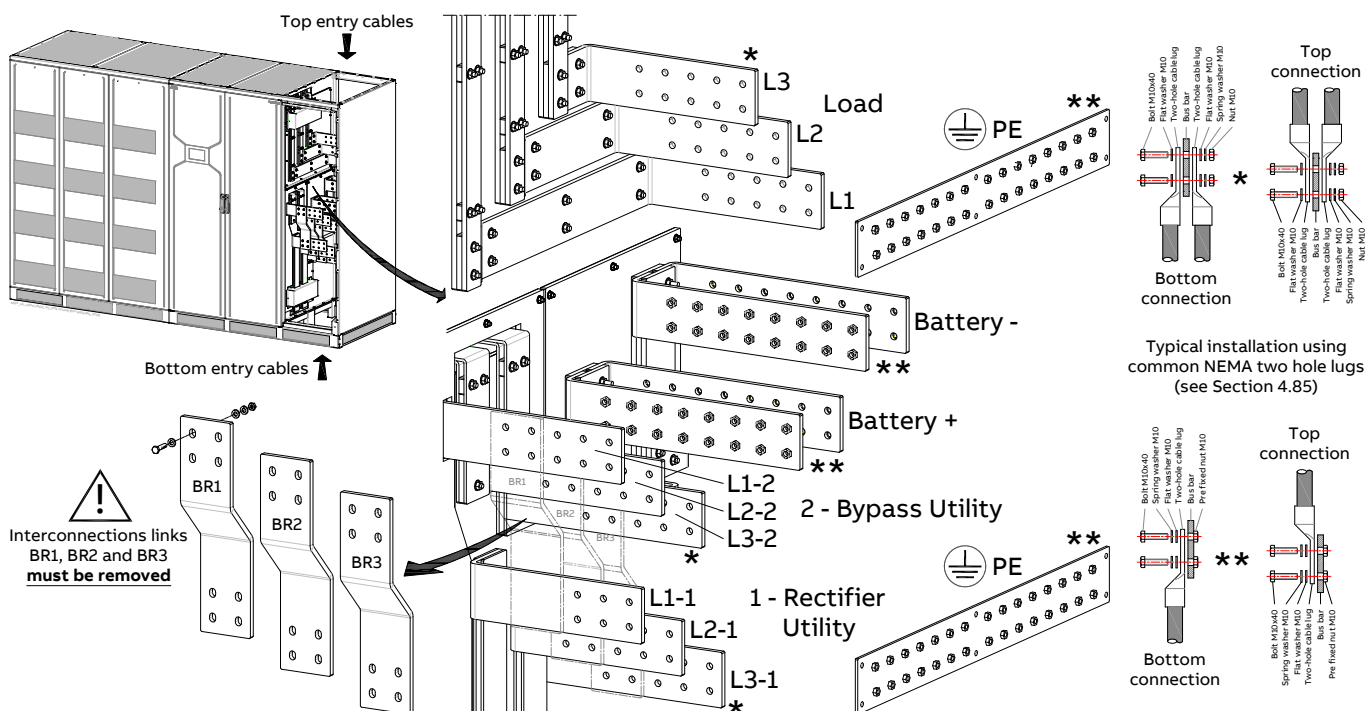


Fig. 4.9.2-1 MegaFlex 1000 to 1600 - Power connection with Dual Input Utility

Power connection cables are connected to bus bars using **M10 x 40 bolts** (supplied with UPS). The bolts of the connection cables must be tightened with a torque wrench at **355 Lb-in - 40 Nm**.

### Dual Input Utility - Rectifier / Bypass

<b>L1-1</b>	Rectifier phase A (L1)	<b>L1-2</b>	Bypass phase A (L1)
<b>L2-1</b>	Rectifier phase B (L2)	<b>L2-2</b>	Bypass phase B (L2)
<b>L3-1</b>	Rectifier phase C (L3)	<b>L3-2</b>	Bypass phase C (L3)
<b>PE</b>	Ground		



#### Note!

The interconnection links BR1, BR2 and BR3 on the input bus bars must be removed (see Fig. 4.9.2-1).

### Output Load

<b>L1</b>	Load phase A (L1)	<b>L2</b>	Load phase B (L2)	<b>L3</b>	Load phase C (L3)
<b>PE</b>	Ground				

### External Battery connection

<b>+</b>	Positive pole of the Battery
<b>-</b>	Negative pole of the Battery
<b>PE</b>	External Battery Ground



#### UPS paralleled on the same Battery

This configuration is not possible for UPS RPA Parallel System.

Before closing the "External Battery Breaker", verify for correct polarity of the Battery connection.

Do not close the "External Battery Breaker" before the commissioning!



#### Note!

To meet standards concerning electromagnetic compliance, the connection between the UPS and external Battery must be done by using a shielded cable or suitable shielded (steel) conduit!



### 4.9.3 Use of MegaFlex 1000 to 1600 in eBoost™ Operation Mode

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**Note!**



For systems intended to be operated in eBoost™ Operation Mode, the installation shall be protected with suitable surge protection devices (SPDs) on the AC bus feeding the UPSs.

Please contact your ABB Service Centre for more information.

---

**Note!**

In eBoost™ Operation Mode the Inverter output filter is placed in parallel with the Load and combined with the Load current it contributes to the UPS input characteristic.



As the Inverter output filter exhibits a predominantly capacitive characteristic, it may provide some degree of reactive power compensation when combined with lagging power factor loads.

Conversely, depending on the load type and level, the UPS input characteristic may exhibit a leading power factor in eBoost™ Operation Mode.

Please contact your ABB Service Centre for more information.

---

**Note!**



If an emergency generator set supplies the UPS in case of Utility Failure and the system is intended to be operated in eBoost™ Operation Mode, eBoost operation shall be prevented during generator operation.

This can be accomplished by either installing a “GENERATOR ON” signal (refer to Section 5.2.5) or an “eBoost CONTROL” signal (refer to Section 5.2.7).

Please contact your ABB Service Centre for more information.

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#### 4.9.4 Use of MegaFlex 1000 to 1600 as Frequency Converter



**Note!**

Permanently running the UPS without Bypass supply requires a change of internal wiring to be performed by an ABB Service Technician only.

When the MegaFlex 1000 to 1600 is utilized for **different Output Frequency compared to the Input Frequency**, the Automatic Bypass is disabled, therefore the Load cannot be transferred to Utility in case of overload, short circuit, or Inverter failure.

In situations where the UPS needs to be powered down for maintenance purposes, the critical Load must also be powered down during this time.

When the set-up parameters of the UPS are set for frequency converter, the **eBoost™ Operation Mode** is automatically disabled.

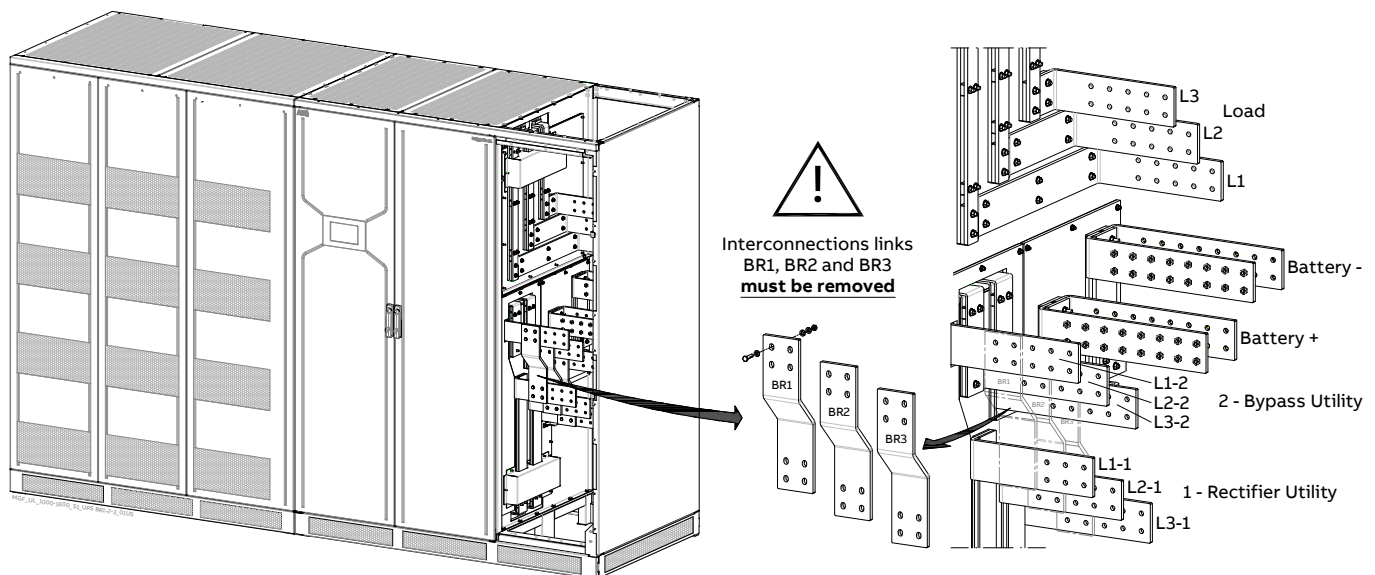


Fig. 4.9.4-1 MegaFlex 1000 to 1600 - Interconnection links BR1, BR2 and BR3

In order to avoid improper operation, only the Rectifier Utility input should be powered (**L1-1, L2-1 and L3-1** / Fig. 4.9.1-1), therefore the interconnection links **BR1, BR2 and BR3**, on the input bus bars, **must be removed**. See pictures above and Fig. 4.9.4-1.

Special care must be taken in choosing the **fuse ratings** installed in the output distribution (**max. 20% of the UPS rated current**).

Avoid high inrush current due to transformer magnetization or motor starting.



**Note!**

Only an ABB Service Technician may change a unit from Frequency Converter into a normal UPS (with Bypass) or a normal UPS to a Frequency Converter (with Bypass).



## 4.10 RPA Parallel System connection

### Warning!



This operation must be performed only by an ABB Service Technician before the initial start-up (ensure that the UPS installation is completely powered down).

Use Class 2 method for RPA cables.

### 4.10.1 Power wiring of Parallel Units

To guarantee good Load sharing between the units of a Parallel System, we recommend that the cable length from the input distribution board (5) to the output distribution board (9) is equal for each unit ( $a+b = c+d = e+f = g+h = i+l = m+n = o+p = q+r$ ).

Tolerance:  $\pm 20\%$ .

The AC input power of the Bypass must be the same for all units of the Parallel System - no phase shift allowed between units.

### Note!



It is strongly recommended that no Transformers, Automatic Circuit Breakers should be inserted between the unit's output and the Load common bus bars.

However, it is recommended that a disconnection or isolation switch is installed in order to totally isolate a unit if needed.

Verify that power wiring and control wiring run in separate conduits or cable trays.

The power wiring requires two separate conduits: one for input and one for output cables.

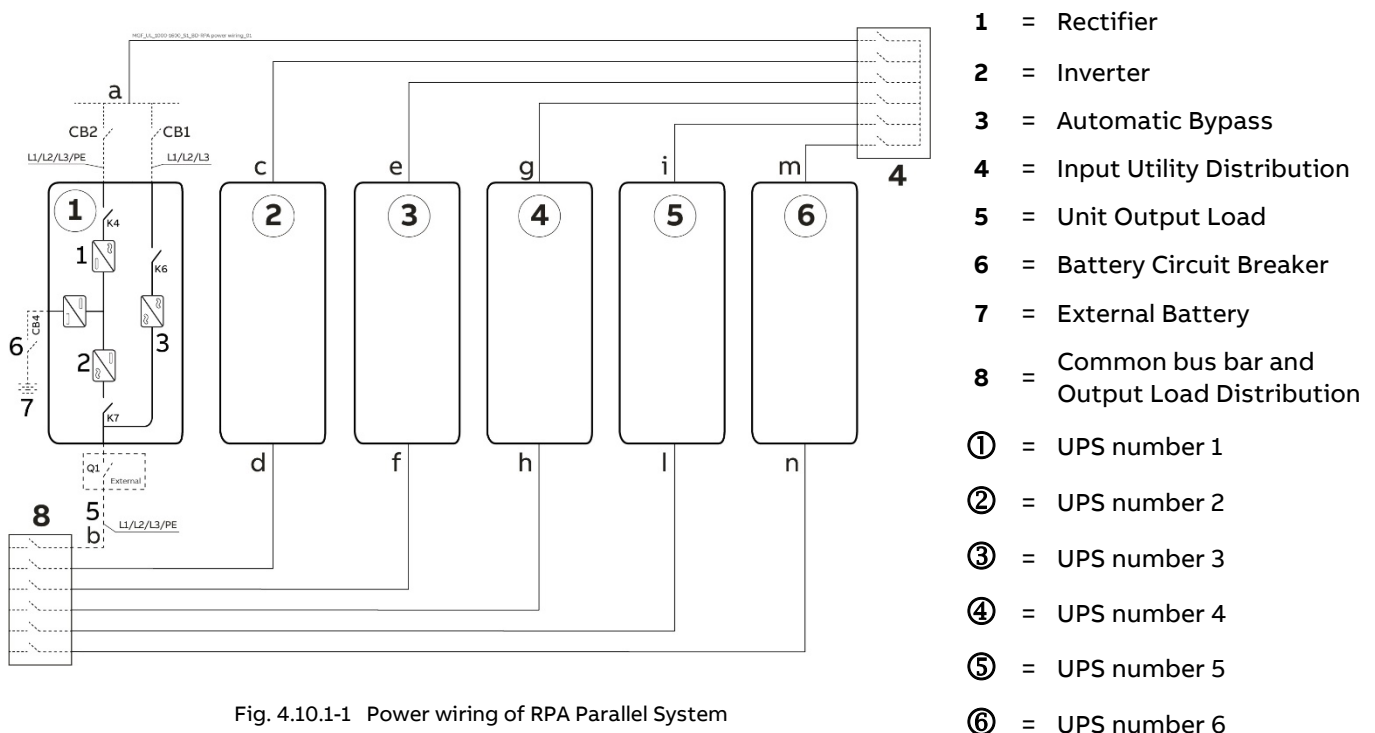


Fig. 4.10.1-1 Power wiring of RPA Parallel System

### 4.10.2 Parallel Control Bus connection

In case of Parallel System, the communication between the units takes place through the **Control Bus Cables**.

Each Parallel Unit contains the two boards “**P13/P14 – IM0222 – Bus Interface Board**” (mounted on top of the board “**P12 – IM0196 – RPA Board**”) on which four connectors **J1A - J2A** and **J1B - J2B** are allocated. All the parallel units are connected to the same control bus.

This connection allows:

- The microprocessors of each unit to communicate with each other.
- The oscillators of each unit to be locked together.
- The regulation loops to compare the output current of each unit in order to equally share the Load current.

For increased reliability, this connection is made with redundant cables.

In this way, communication is maintained between units in case one of the control cables should fail or be accidentally damaged or disconnected.

The standard length of the control bus cable between two parallel units is **40 ft / 12m**.

The maximal overall length of bus connection, between the first and the last unit, should not exceed **295 ft / 90m**.

Verify that control wiring run in an individual separate steel conduit.



**Note!**

**Under no circumstance should the control bus cable connecting J1A - J2A (1/2/3/4/5) and J1B - J2B (1/2/3/4/5) be connected or disconnected after the system has been powered ON.**

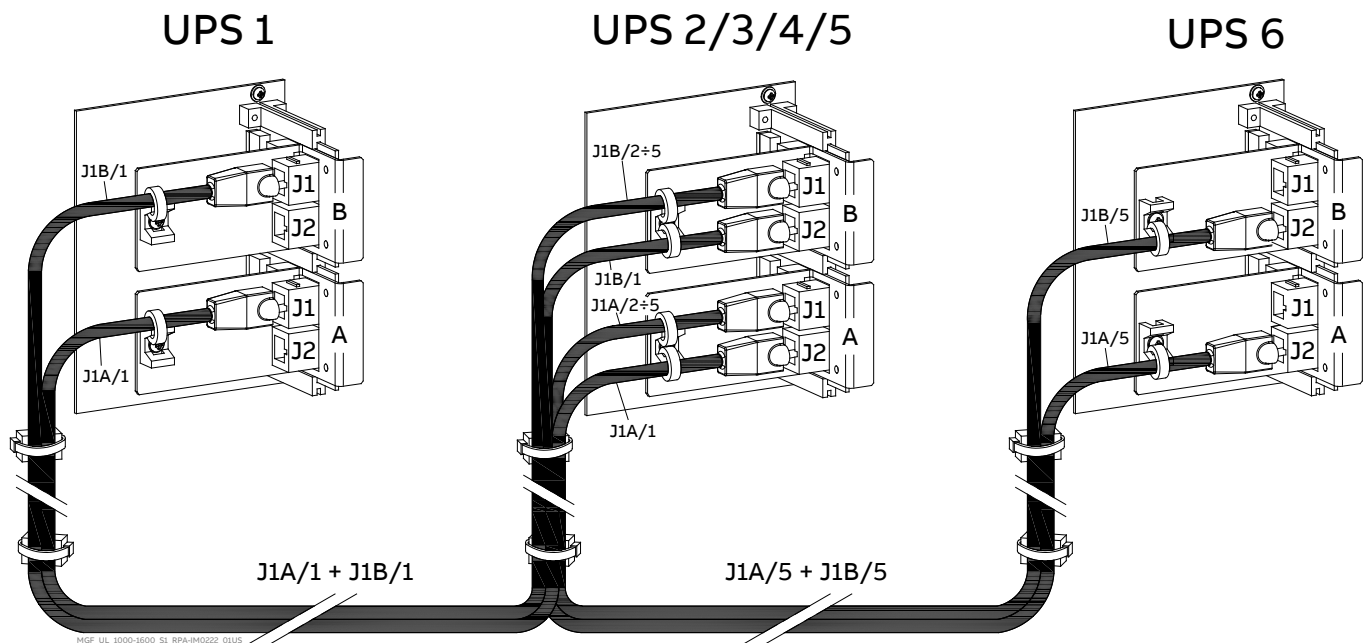


Fig. 4.10.2-1 RPA System - Control bus connection

It is important to place the units in sequence of their assigned number.

A unit number from **1** to **6** is defined by the setting of parameters and displayed on the panel (**1** to **6**).

This number is also marked inside and outside the packaging.

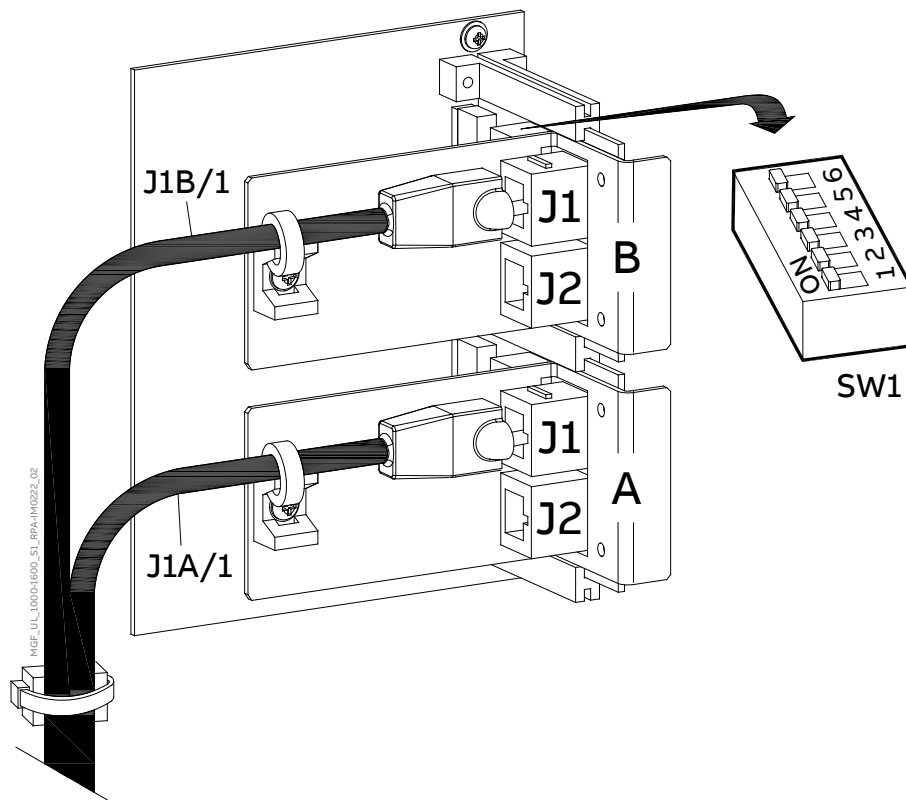


Fig. 4.10.2-2 Bus connection on first and last units

**Note!**

**Final units, first and last, of an RPA Parallel System.**

On the two boards P13/P14 – IM0222 – Bus Interface Board, of the first and last units of a Parallel System, the switches SW1-1/2/3/4/5/6 **must be in position ON** (see Fig. 4.10.2-2).

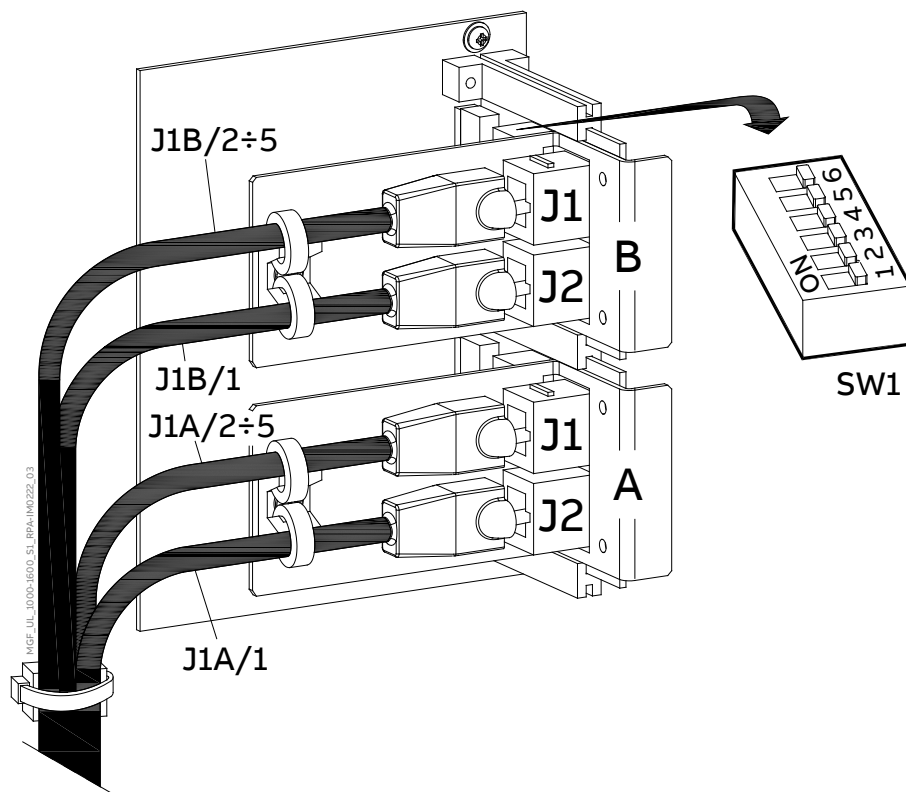


Fig. 4.10.2-3 Bus connection on intermediate units

**Note!**

**Intermediate units of an RPA Parallel System.**

On the two boards P13/P14 – IM0222 – Bus Interface Board, of the intermediate units of a Parallel System, the switches SW1-1/2/3/4/5/6 **must be in position OFF** (see Fig.4.10.2-3).

### 4.10.3 Control Bus cable location

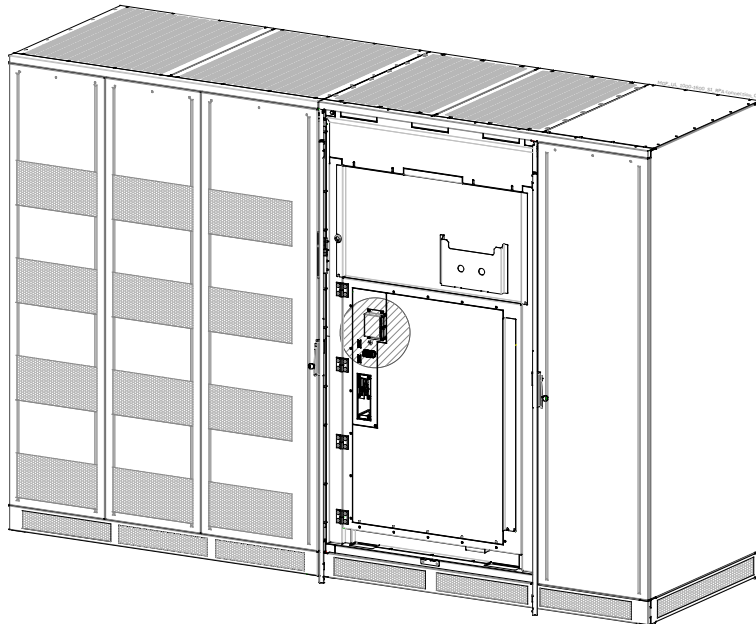
#### Warning!



This installation must be performed and verified by an ABB Service Technician before the initial start-up.

Ensure that the ups installation is completely powered down.

Keep SELV cables separated from high voltage cables.

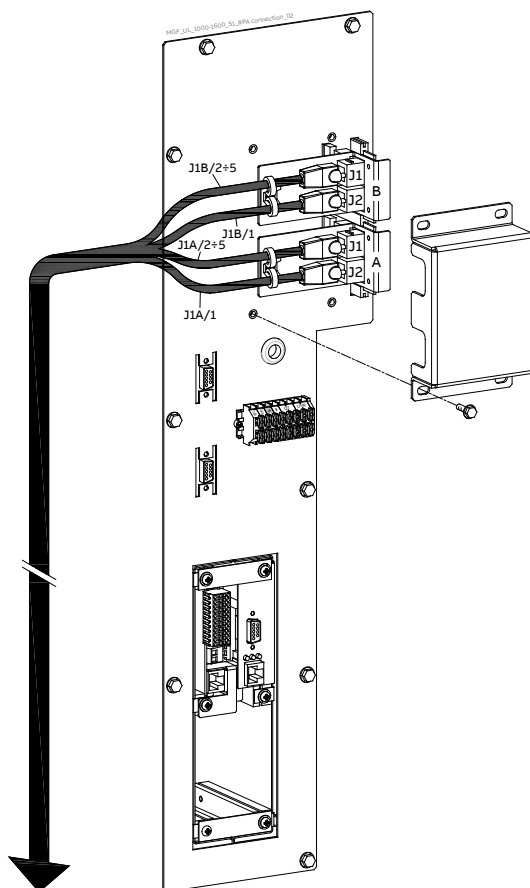


#### Access to the Control Bus connection

The communication bus cable connectors are placed on the two boards “P13/P14 – IM0222 – Bus Interface Board”.

See Fig. 4.10.3-1.

Fig.4.10.3-1 MegaFlex 1000 to 1600 - View electronic module on intermediate unit



#### Control bus cables connection

- Plug the cables **J1A – J2A** (1/2/3/4/5) and **J1B – J2B** (1/2/3/4/5) on the connectors **J1A – J2A** and **J1B – J2B** placed on the two boards “P13/P14 – IM0222 – Bus Interface Board”.
- Fix the communication bus cables **J1A – J2A** (1/2/3/4/5) and **J1B – J2B** (1/2/3/4/5) with the provided cable clamps “A”.

Fig. 4.10.3-2 View electronic module on intermediate unit

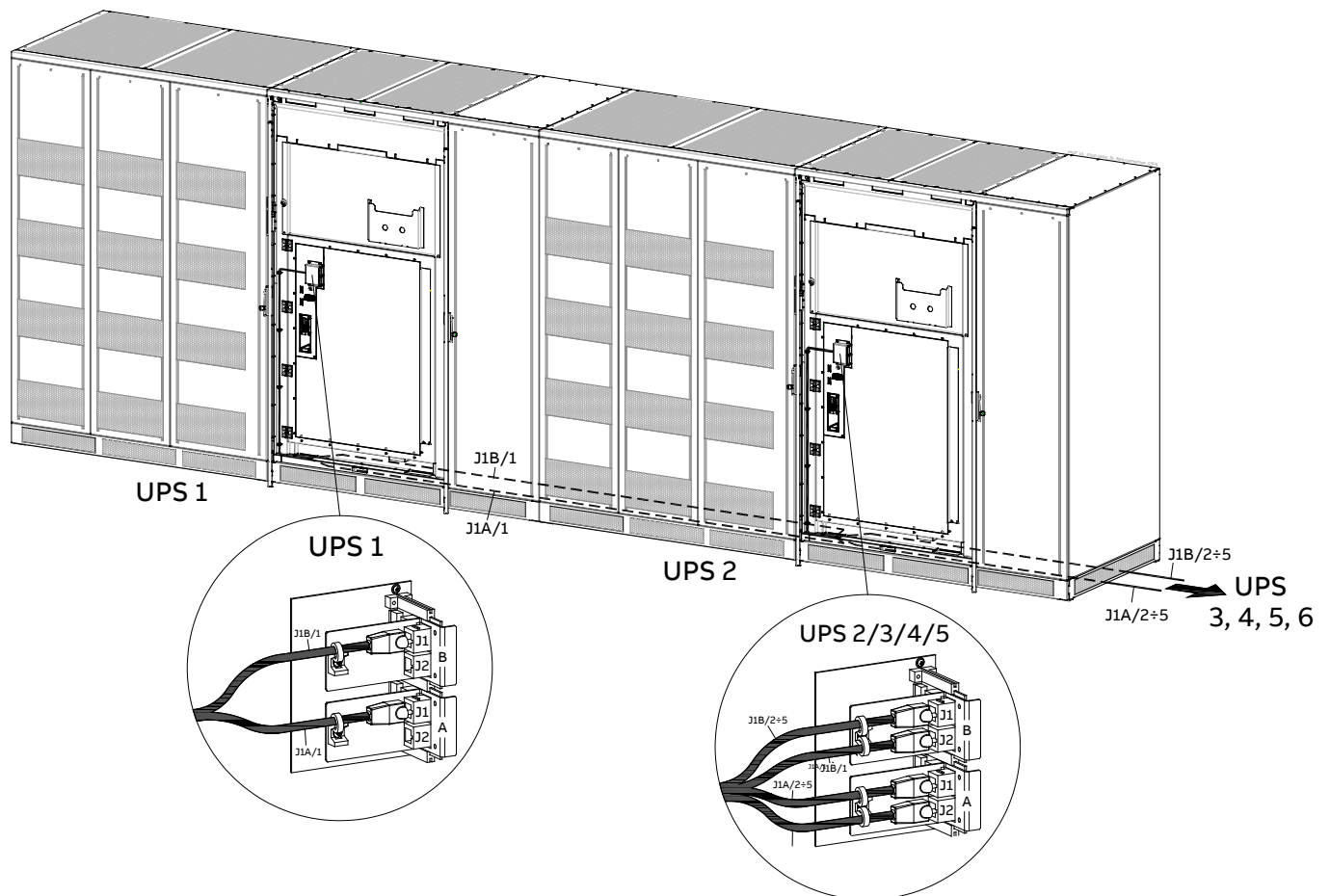


Fig. 4.10.3-3 MegaFlex 1000 to 1600 - Control Bus cable routing and connection

### Control bus cables routing

Place and fix the cables **J1A – J2A (1/2/3/4/5)** and **J1B – J2B (1/2/3/4/5)** inside the UPS cabinets in the position illustrated in the drawing Fig. 4.10.3-3.

#### Note!



Pay attention when cabling and routing the communication bus cables **J1A – J2A (1/2/3/4/5)** and **J1B – J2B (1/2/3/4/5)** inside the UPS cabinet.

In case one unit must be removed from the Parallel System, the communication bus cables must be taken out the UPS cabinet without disconnecting them from the two boards “P13/P14 – IM0222 – Bus Interface Board”.

For reliability reasons, the cables **J1A – J2A (1/2/3/4/5)** and **J1B – J2B (1/2/3/4/5)** connecting the units should be run in separated protected conduits (as indicated in Fig. 4.10.3-3) separated from the power cables.

It is important that the cable **J1A – J2A (1/2/3/4/5)** must be the same length as cable **J1B – J2B (1/2/3/4/5)**.



#### Warning!

Connection and commissioning of an additional UPS to an existing Parallel System must be performed only by an ABB Service Technician.



## 4.11 XA terminal Block



### Warning!

The connection on the XA terminal block must be performed only by an ABB Service Technician when the UPS is completely powered down!

Keep SELV cables separated from high voltage cables!

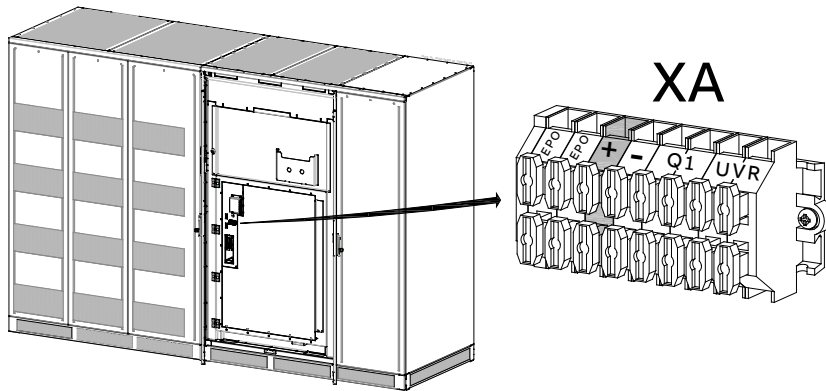


Fig. 4.11-1 XA terminal block

### XA terminal block

MegaFlex 1000 to 1600 is provided of a XA terminal block that allow connection for various function described in the section below.

Max. rating XA terminals: **AWG 14** (2.5mm<sup>2</sup>).

### 4.11.1 XA Terminal block - UVR Command Contact

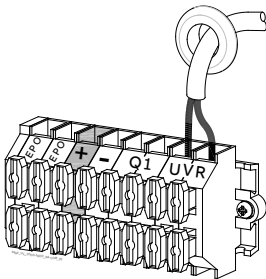


Fig. 4.11.1-1 XA terminal block – UVR Command Contact

#### UVR (Under Voltage Release) Command Contact

24Vdc Command Contact for the Remote Control of the external Battery Breaker (option).

### 4.11.2 XA Terminal block – Q1 Auxiliary Contact

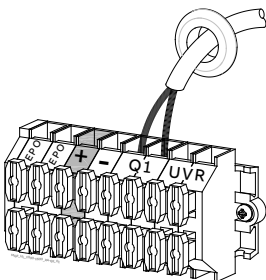


Fig. 4.11.2-1 XA terminal block – Q1 Auxiliary Contact

#### Q1 Auxiliary Contact

Auxiliary Contact for “Q1 – External UPS Output Circuit Breaker” status recognition.  
The dedicated Auxiliary Contact to be connected to the UPS is required!

### 4.11.3 XA Terminal block – 24 Vdc Power Supply

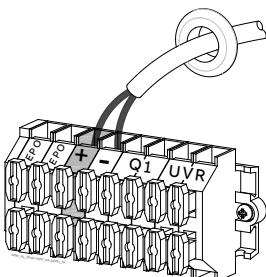


Fig. 4.11.3-1 XA terminal block – 24 Vdc Power Supply

#### 24 Vdc Power Supply

Additional 24 VDC auxiliary Power Supply (option).

- + 24 Vdc terminal + (positive)
- 24 Vdc terminal - (negative)



#### 4.11.4 “EPO - Emergency Power OFF” command connection

##### Warning!



The connection of an emergency button EPO (Emergency Power Off) must be performed only by an ABB Service Technician when the UPS is completely powered down!

##### Note!

The reliability of the system depends on this contact NC (Normally Closed)!

An Emergency button (Normally Closed voltage-free contact) can be connected on terminals **XA / EPO-1, EPO-2**.  
Max. rating XA terminals: **AWG 14** (2.5mm<sup>2</sup>).

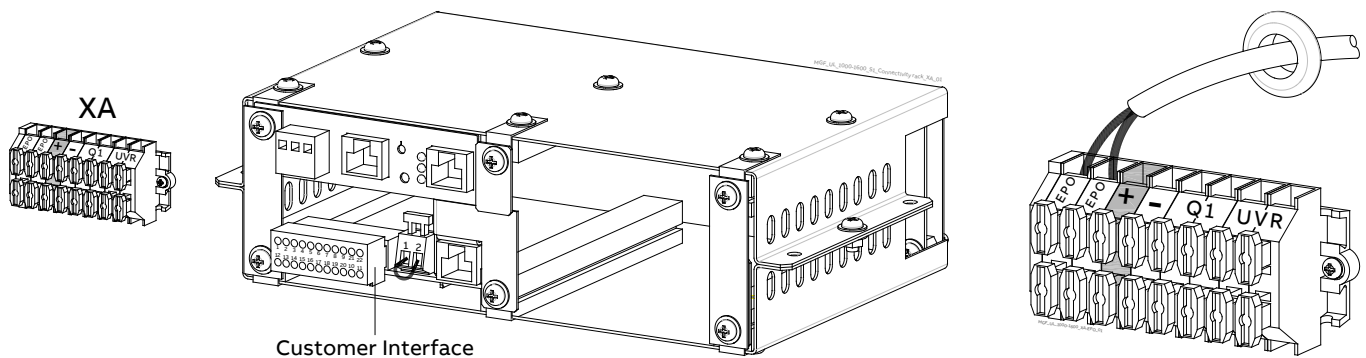


Fig. 4.11.4-1 XA terminal block for EPO command connection

When opened, this contact causes the immediate opening of the **Contactors K3, K6 and K7** as well as the shut-down of **Rectifier, Inverter and Static-Switch**.



##### Note!

This procedure could imply a Load shut-down.

Keep SELV cables separated from high voltage cables.

**RPA**  
Redundant Parallel  
Architecture

In a Parallel System a separate NC (Normally Closed) contact must be connected individually to each unit.

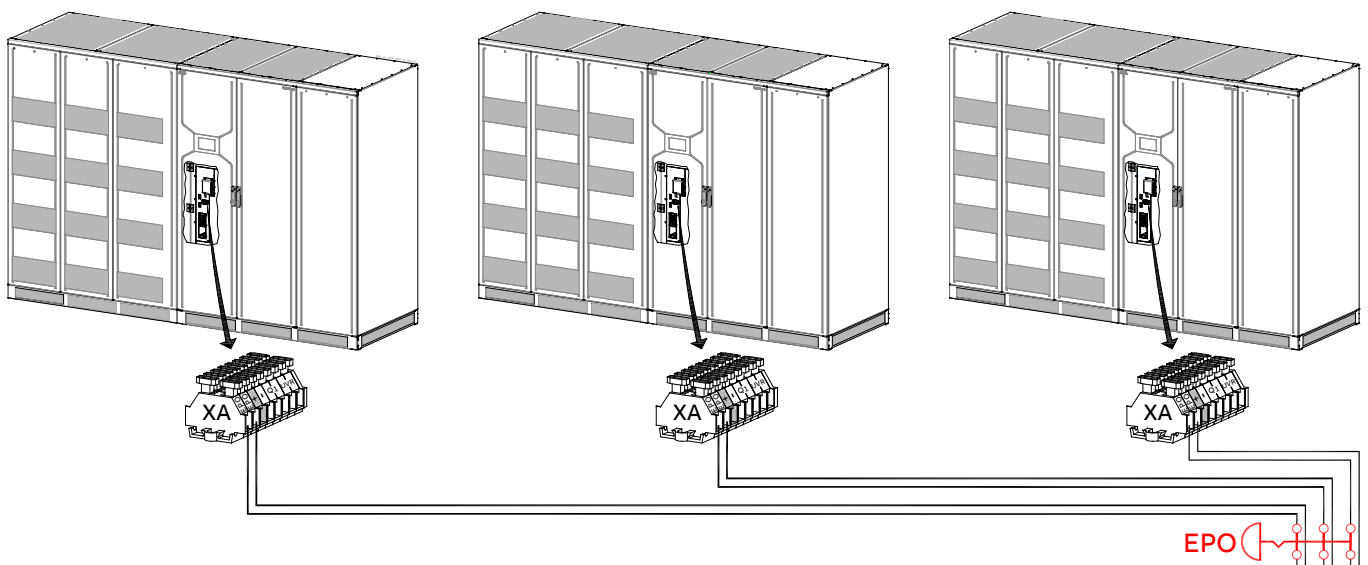


Fig. 4.11.4-2 XA “EPO - Emergency Power Off” – RPA Parallel System connection schematics

**Note!**

To operationalize this function, in case that the UPS was provided with one or more cards “Customer Interface” (max. 3 - see Chapter 5), there must be on each card the following:

- Remove the cable short-circuiting terminals X2 / 1, 2 (see Fig. 4.11.4-3).
- Remove the Jumper JP2 (see Fig. 4.11.4-3).

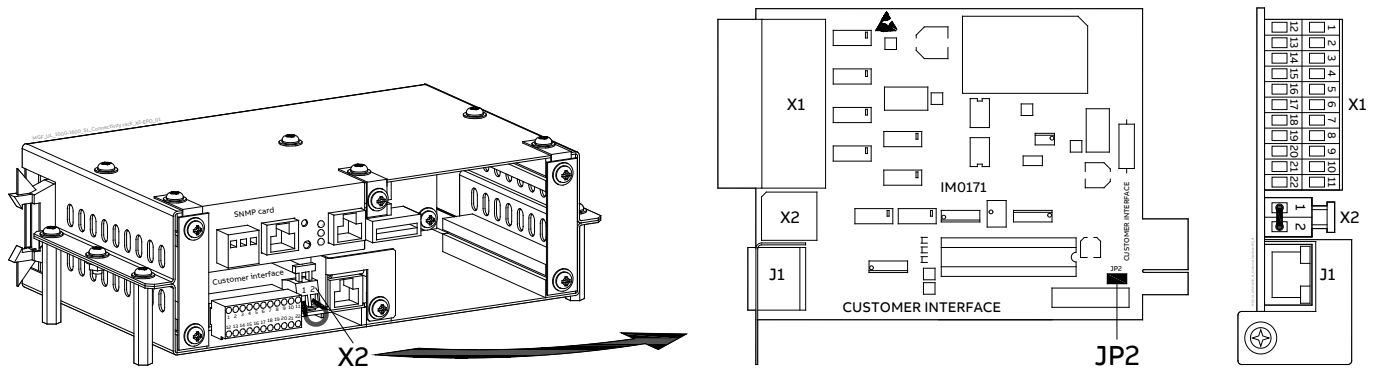


Fig. 4.11.4-3 X2 terminal block and Jumper JP2 on the “Customer Interface” board

When the “EPO - Emergency Power Off” has been activated, the system must be restored as follows:

- Realize the push-button “EPO - Emergency Power Off” (contact on XA / EPO-1, EPO-2 is closed again).
- Perform the “Inverter OFF” command from the screen:  
Commands 1 / Inverter / **OFF**.  
(see User Manual to Section 6.5).



## 5 Connectivity interface

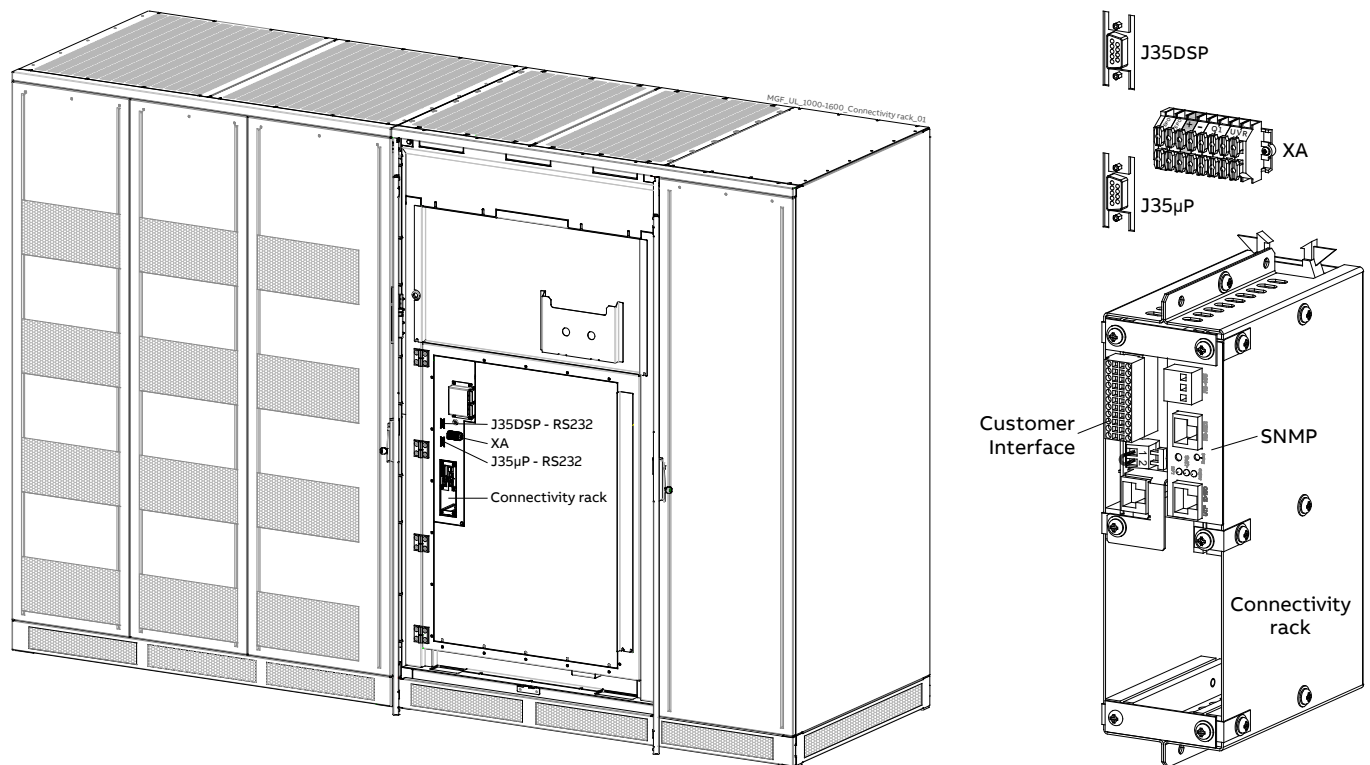


Fig. 5-1 MegaFlex 1000 to 1600 - Connectivity rack and Serial port J35μP - RS232 / J35DSP - RS232

MegaFlex 1000 to 1600 has the following equipment's:

**Serial Port J35μP - RS232** (see Section 5.1).

**Serial Port J35DSP - RS232** (only for ABB Service Center).

**Customer Interface board** (see Section 5.2).

**Connectivity rack** ready for the installation of four connectivity boards.

**XA terminal block** (see Section 4.11).

### Possible connectivity configurations with MegaFlex 1000 to 1600

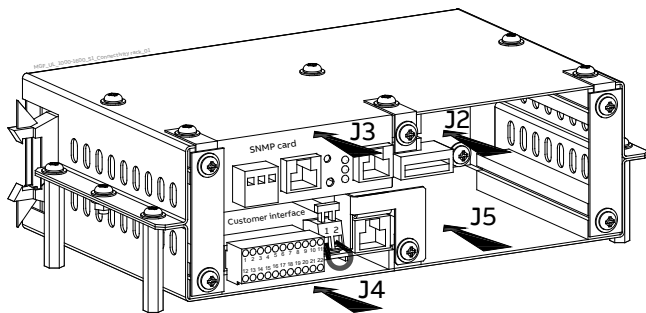


Fig. 5-2 Connectivity Slots

For a **Single UPS** it's possible to install the following connectivity boards:

- max. 3 "Customer Interface" boards;
- max. 2 "3-ph SNMP/WEB Plug-in Adapter" boards.

For a **Parallel System** (max. 6 UPS) it's possible to install the following connectivity boards:

- max. 3 "Customer Interface" boards for each UPS;
- max. 2 "3-ph SNMP/WEB Plug-in Adapter" boards for RPA Parallel System.

#### Note!

The installation of any option board must be performed only by an ABB Service Technician.

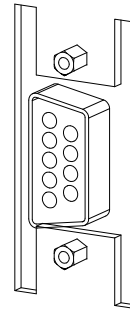
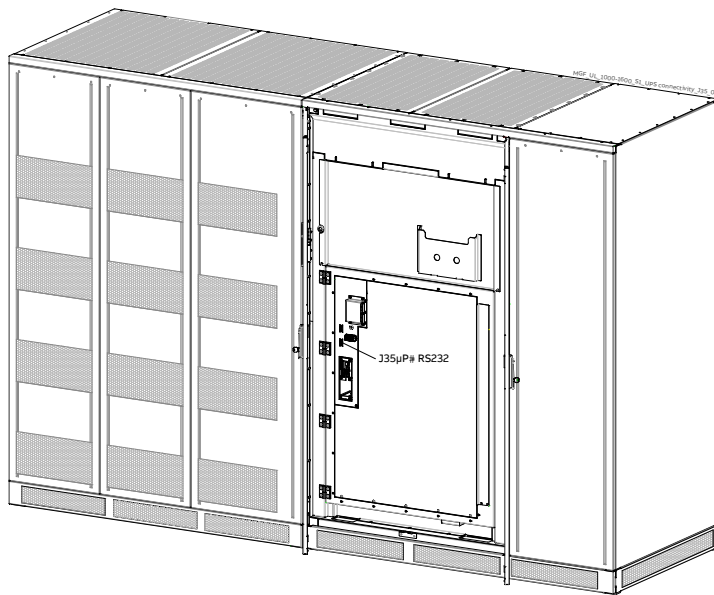
Prior to the installation, connection and cabling of any option board the UPS must be completely powered down and all the power sources that will be connected to the option board must be de-energized.

Option board shall be connected only to Safety Extra Low Voltage circuits (SELV for IEC-UL-CSA60950-1): voltage up to 30Vac / 42.4Vpk or 60Vdc maximum and galvanically separated from AC Mains supply.

Keep SELV cables separated from high voltage cables.



## 5.1 Serial port J35μP - RS232 (Sub D, Female 9 pin)



J35μP - RS232

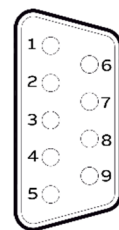
### Serial Port J35μP - RS232 for IMV protocol

Total remote management of the system using software iUPSGuard, Data Protection or ABB Service Software for system protection and management of the UPS systems.14

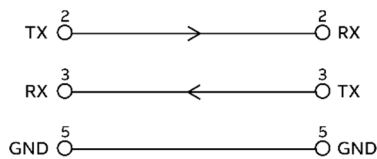
Fig. 5.1-1 MegaFlex 1000 to 1600 - Serial Port J35μP – RS232

### Connection of a serial printer

From the display panel it is possible to select printing of measurements, alarms and parameters (see Section 6.4 – SETUP / PRINTER).



J35μP



PC

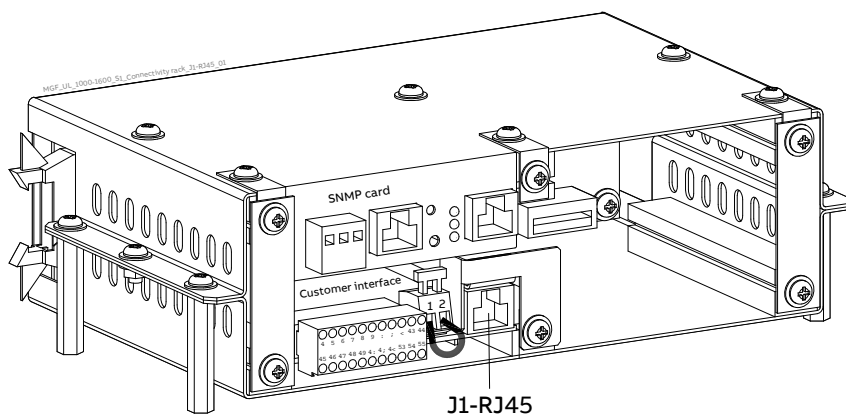


Fig. 5.1-2 Serial port J35μP connection to PC with RS232 1:1 cable DB9m – DB9f

# RPA

Redundant Parallel  
Architecture

The serial port J35μP - RS232 is enabled on all the units of the RPA Parallel System.



J1-RJ45

Fig. 5.1-3 Connector J1 – RJ45 8P8C

### Note!

The serial port J35μP - RS232 is enabled also in case the J1- RJ45 connector of the “P4 - Customer Interface” (see Section 5.2.1) is already connected.



## 5.2 Customer interface board

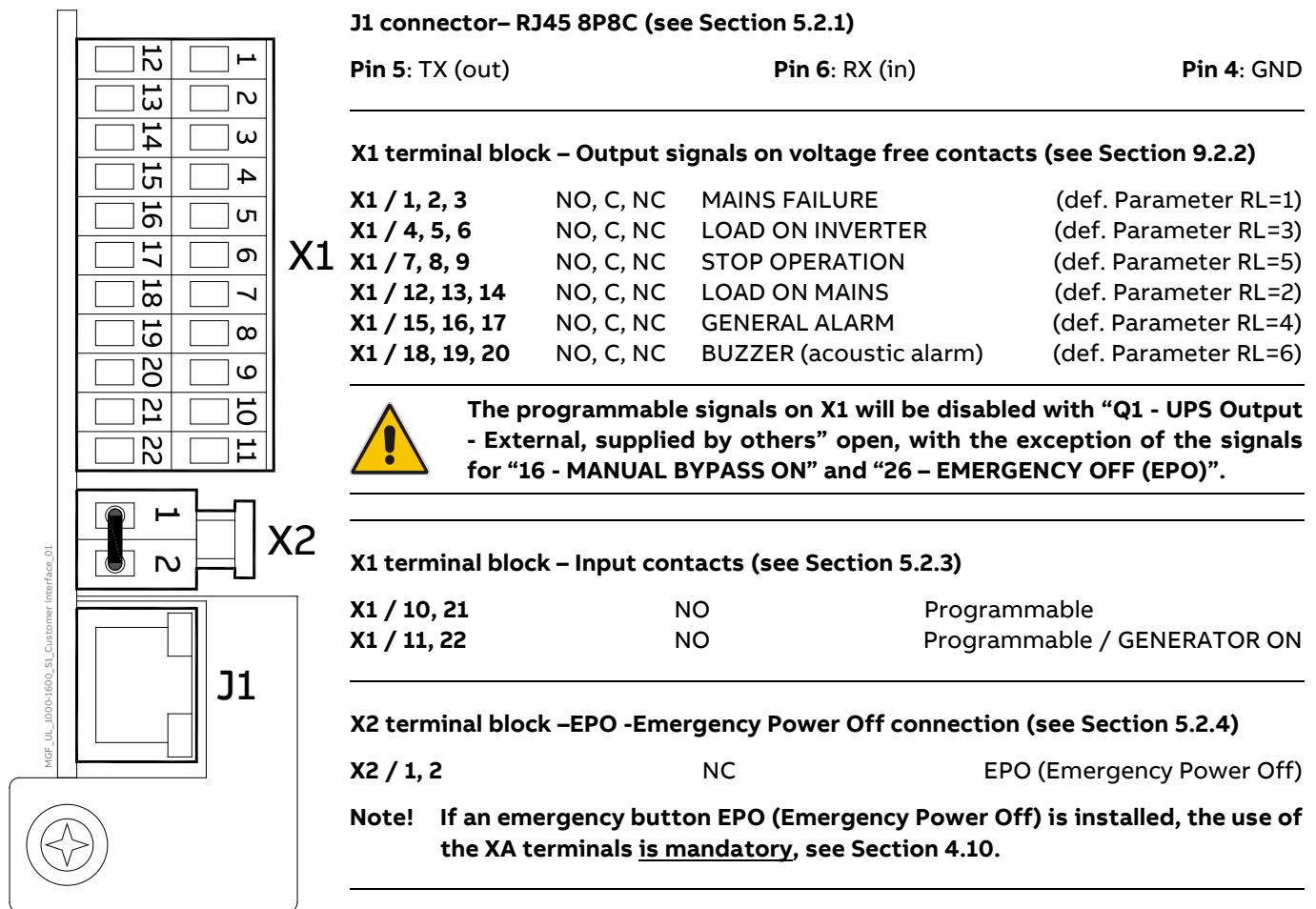


Fig. 5.2-1 Customer Interface Board    **NO** = Normally Open                      **C** = Common                      **NC** = Normally Closed

### Output signals on voltage-free contacts

On terminals X1, 6 of the following 27 signals can be selected from the display, entering with the appropriate “Service Code”.

0- NO SIGNAL	14- RECTIFIER MAINS FAILURE
1- BUZZER	15- BATTERY DISCHARGE
2- GENERAL ALARM	16- MANUAL BYPASS ON
3- LOAD ON MAINS	17- RECTIFIER ON
4- STOP OPERATION	18- INVERTER ON
5- LOAD ON INVERTER	19- BOOST CHARGE
6- MAINS FAILURE	20- BATTERY EARTH FAULT
7- DC OVERVOLTAGE	21- BATTERY FAULT
8- LOW BATTERY	22- RELAY INPUT 1
9- OVERLOAD	23- RELAY INPUT 2
10- OVERTEMPERATURE	24- RELAY OUTPUT ON
11- INVERTER-BYPASS NOT SYNCHR.	25- RELAY OUTPUT OFF
12- BYPASS LOCKED	26- EMERGENCY OFF (EPO)
13- BYPASS MAINS FAILURE	27- eBoost MODE

### Programmable functions on input contacts

Some UPS functions can be activated with parameters when an external Normally Open (NO) contact is closed on:

#### X1/10, 21 or X1/11, 22

Selectable functions by changing parameters (“Service Code” required) are:

- 0 - NO FUNCTION
- 1 - INVERTER ON
- 2 - INVERTER OFF
- 3 – PRINT ALL
- 4 - STATUS RELAY
- 5 - GENERATOR ON
- 6 - EXTERNAL BYPASS
- 7 - BATTERY FUSES OR EXTERNAL K3 (See Alarm 4104 - Battery Fuses)
- 8 – eBoost CONTROL

#### Voltage free contacts:

Max. 24Vac / 1A or 60Vdc / 0,5A  
IEC-UL-CSA 60950-1 (SELV circuit)  
Min. Signal Level: 5Vdc / 5mA

### 5.2.1 Connector J1 – RJ45 8P8C

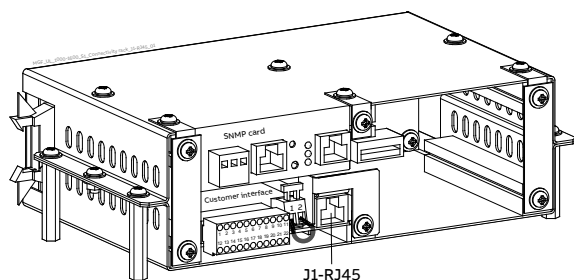


Fig. 5.2.1-1 Connector J1 – RJ45 8P8C

Total remote management of the system using software iUPSGuard, Data Protection or Service Software for system protection and management of the UPS systems.

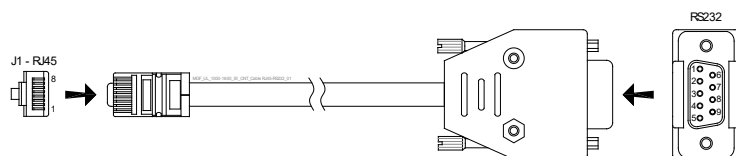


Fig. 5.2.1-2 RJ45 –RS232 adaptation cable

MegaFlex 1000 to 1600 is supplied with an adaptation cable for a serial port RS232 / sub DB9 connection.



**The connector J1 – RJ45 is enabled on all the units of the Parallel System.**

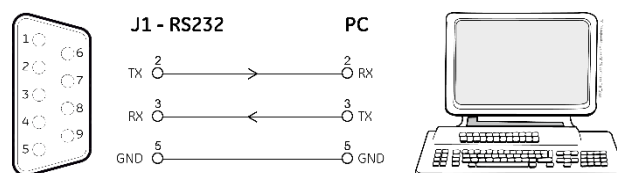


Fig. 5.2.1-3 Connector J1 to PC with RJ45 –RS232 adaptation cable

### 5.2.2 X1 terminal block - Output signals on voltage-free contacts

The Customer Interface board provides **6 voltage free relay contacts** giving some UPS critical alarms and operation mode.

These signals are available on terminal blocks **X1**. Max. rating terminals: **AWG 18 (1mm<sup>2</sup>)**.

The meaning of the alarms on the free contacts in standard configuration (default) is the following:

X1 / 1, 2, 3	(NO, C, NC)	MAINS FAILURE	(def. Parameter RL=1)
X1 / 4, 5, 6	(NO, C, NC)	LOAD ON INVERTER	(def. Parameter RL=3)
X1 / 7, 8, 9	(NO, C, NC)	STOP OPERATION	(def. Parameter RL=5)
X1 / 12, 13, 14	(NO, C, NC)	LOAD ON MAINS	(def. Parameter RL=2)
X1 / 15, 16, 17	(NO, C, NC)	GENERAL ALARM	(def. Parameter RL=4)
X1 / 18, 19, 20	(NO, C, NC)	BUZZER (ACOUSTIC ALARM)	(def. Parameter RL=6)

In case different alarms or operating status are required, they can be configured on the same terminals via software from the Control Panel.

The configuration can be changed in parameters mode by an ABB Service Technician using the appropriate "Service Code".



**Note!**

The programmable signals on X1 will be disabled with "Q1 - UPS Output - External, supplied by others" open, with the exception of the signals for "16 - MANUAL BYPASS ON" and "26 - EMERGENCY ON (EPO)"!

### 5.2.3 X1 terminal block - Programmable input free contacts

Some programmable UPS functions (indicated in Section 9.2), can be activated by closing an external contact, if connected, on:

X1 / 10, 21 User Input 1 (default = Not used)

X1 / 11, 22 User Input 2 (default = GENERATOR ON)



## 5.2.4 X2 terminal block – “EPO - Emergency Power Off”



### Note!

If an emergency button EPO (Emergency Power Off) is installed, the use of the XA terminals is mandatory (see Section 4.11.4).

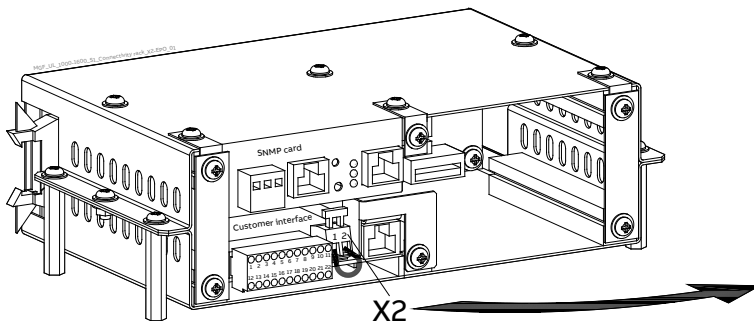


Fig. 5.2.4-1 X2 terminals in the Customer Interface

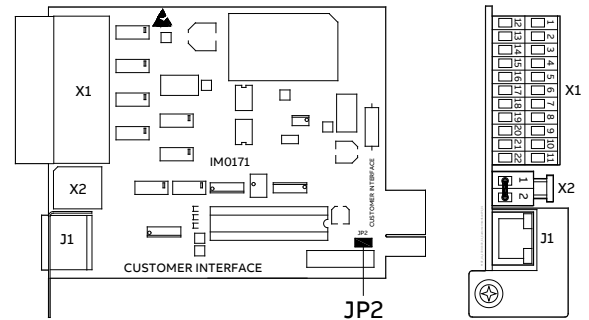


Fig. 5.2.4-2 Jumper JP2 on the Customer Interface

### Note!



To activate the connection of an emergency button “EPO - Emergency Power Off” on the terminals XA / EPO-1, EPO-2, performed on each card “P4 – Customer Interface” the following operation:

- Remove the cable short-circuiting terminals X2 / 1, 2 (see Fig. 5.2-4-1).
- Remove the Jumper JP2 (see Fig. 5.2-4-2).

## 5.2.5 X1 terminal block - Gen Set Signaling (GEN ON)

If an emergency generator set supplies the UPS in case of Utility Failure and the generator is considerably unstable in frequency, it should be suitable to install the signal “**GENERATOR ON**” on X1 / 11, 22. See Fig. 5.2-1 / X1.

Since the Parameter for of the reading of the Generator function is “Service Code” protected, call the nearest ABB Service Centre for it's activation.

When this contact closes, it changes certain (programmable) functions such as:

- Enabling or disabling of synchronization and consequently the Load transfer to generator.
- Reduction or elimination or delay of Battery recharging during the generator operation.

Additionally, when the “**GENERATOR ON**” input contact is closed, the UPS will inhibit eBoost™ Operation Mode and revert to double-conversion operation.

It is advised to contact your ABB Service Center for further details.

### 5.2.6 X1 terminal block - AUX External Maintenance Bypass

If the UPS system is equipped with an external Maintenance Bypass Switch, it is possible to connect a NO (Normally Open) voltage-free aux. contact from the External Bypass Switch to the programmable input **X1 / 10, 21**, making the UPS operate as if the internal switch “**Q2 – Bypass Manual**” (if provided by customer) has closed.

This function can be activated by changing a dedicated parameter (“Service Code” required).

When this NO (Normally Open) contact closes, the output Inverter Contactor **K7** it is automatically opened and the Load transfer back to Inverter will be inhibited.



**In a Parallel System, the input on the Customer Interface of each unit must be connected to a separate AUX contact of the External Maintenance Bypass Switch.**

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### 5.2.7 X1 terminal block – eBoost control signal

The UPS operation in either eBoost operating mode can be controlled via a NO (Normally Open) contact by installing the “**eBoost**” signal, routed to the programmable function contacts (see Section 5.2.3).

When this contact closes, eBoost operation mode is inhibited.

The Parameter for the activation of such function is “Service Code” protected.

Contact your ABB Service Center for its activation.

This function is particularly useful for controlling eBoost operation following critical conditions on either the load side or the input utility, including generator operation when the “GENERATOR ON” signal has not been installed.



**When using the “eBoost control” function on the programmable user relays of the Customer Interface X1 terminals in a Parallel System, a separate NO (Normally Open) contact must be connected to each individual unit.**

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## 6.1 Notes Form

It is recommended to note in this section **Notes**, with date and short description all the operations performed on the UPS, as: maintenance, components replacement, abnormal situations, etc.

[illegible]



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