



Maintenance Bypass Box

for Parallel UPSs

Installation & Operation Guide

About this Guide

This guide contains information about installing and operating the Delta Maintenance Bypass Box for Parallel UPSs (MBB-P). Before you install this unit, please read the safety instructions below.

Save these Instructions

This guide contains instructions and warnings that should be followed during the installation, operation and storage of this product. Failure to heed these instructions and warnings will void the product warranty.

Safety Precautions

To reduce the risk of personal injury from electric shock, you must observe the following safety precautions when placing, installing, operating, or performing maintenance on the Delta MBB-P.

Warnings!

This product is designed for indoor use only in a controlled environment away from excess moisture, temperature extremes, conductive contaminants, dust or direct sunlight.

- Do not connect the MBB-P to an ungrounded outlet or extension cords or adapters that eliminate the connection to ground
- Do not use this equipment in the presence of flammable substances.
- The power requirement for each piece of equipment connected to the MBB must not exceed the individual outlet's load rating.
- Do not drill into or attempt to open any part of the MBB housing. There are no user serviceable parts inside.
- Do not modify the MBB-P.
- Do not use the MBB-P if any part of it becomes damaged.
- Never install electrical equipment during a thunderstorm.

Precautions for Rack Mounting

- Elevated Operating Ambient** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading** - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as use of power strips).

Maintenance with Input Power

Delta strongly recommends that you do not perform maintenance on the MBB-P if it is receiving input power.

- To reduce your risk of personal injury by electric shock, you must:
 - Be a certified electrician trained in live electrical installation
 - Always work with another qualified person
 - Know how to disconnect electricity to the MBB and data center in case of emergency
 - Wear the right protective equipment
 - Use double-insulated tools
 - Strictly follow local and site regulations

Electromagnetic Interference

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1. MBB-P Overview

The Delta Maintenance Bypass Box for Parallel UPSs (MBB-P) lets you isolate a single UPS from the load without interrupting power to essential applications. In addition, the MBB-P connects to a parallel UPS to provide redundant power protection for the UPS that is undergoing maintenance. This allows you to perform scheduled UPS maintenance or UPS replacement without disrupting power, while maintaining UPS redundancy. The MBB-P easily transfers power between normal and bypass mode using a rotary switch.

2. Package Contents

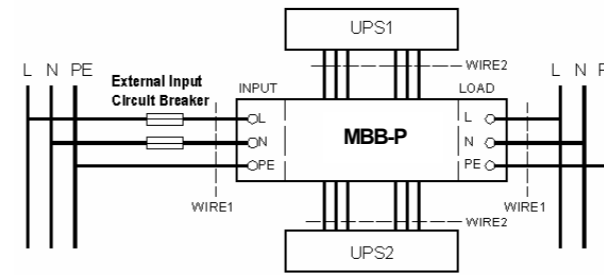
The Delta MBB-P package should contain the following items:

Quantity	Item
1pcs	MBB-P
1set	Fixing Plate
1set	Ear bracket
2pcs	Parallel Cable
1pcs	MBB-P Installation & Operation Guide
6pcs	Cable gland
18pcs	Terminal

3. Installing the MBB-P

CAUTION:

- A licensed electrician must install the Delta MBB-P.
- The two UPS units must be switched off and unplugged before installation.
- Install a utility circuit breaker for input wiring. Refer to the drawing & table below.



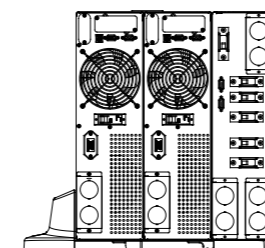
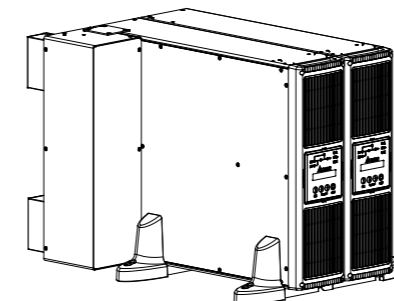
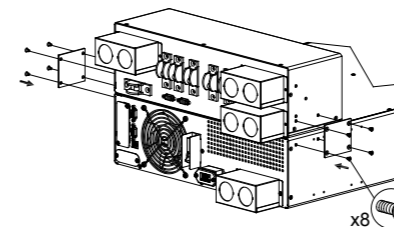
System	Voltage		Current Full Load Nominal		External Input Circuit Breaker Typical	Wire Size Typical (mm ²)			
	Input	Output	Input	Output		WIRE1		WIRE2	
MBB-P	200/208/220/230/240Vac	1Phase	63A	63A	63A 2Pole	For 5/7k UPS	For 9/11k UPS	For 5/7k UPS	For 9/11k UPS
						10	10	8	10

Remark: The External Input Circuit Breaker must use the components approved for its safety certification.

4. Fixing the MBB-P

4-1. Tower Configuration

- Place the MBB-P on the top rear of the UPS unit.
- Locate and align the fixing holes on the MBB-P and UPS unit. Use a screwdriver to fasten the fixing plates with the provided screws and attach the MBB-P to the UPS unit.
- Place the UPS and MBB-P in the upright tower position and secure the mounting feet.

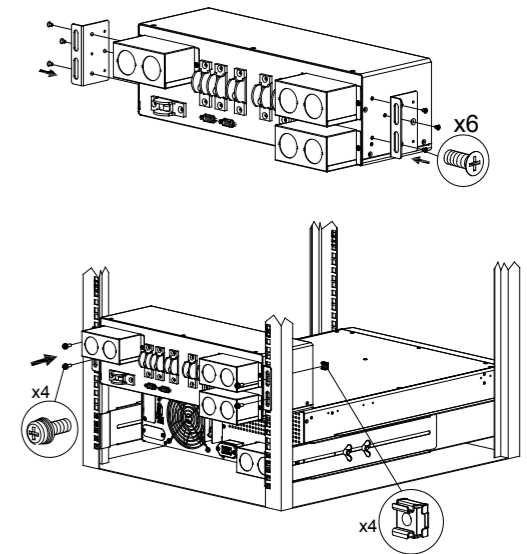


(The mounting feet are provided with the UPS or from a dealer.)

Fig. 1

4-2. Rack-mount Configuration

- Attach the mounting brackets to the MBB-P using the M4*6mm screws that came with the brackets.
- Choose a location in the rack for the MBB-P.
- Install the MBB-P on your rack using the screws and cage nuts.



(The screws and cage nuts are provided with the rack frame.)

Fig. 2

5. Making Connections

The steps below show you how to connect power cables so the path of AC power flows through the MBB-P to the two UPS units, or alternately, bypassing UPS1 and through UPS2 to the connected load.

- Unscrew and remove the cable entry boxes on the MBB-P. See Fig. 3.

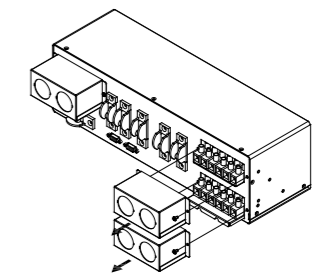


Fig. 3

- Attach the cable glands to the cable entry box of UPS2. Unscrew and pull out the tray of UPS2 terminal block from the enclosure. Insert the cables through the cable glands and then insert the leads of the cables into the terminal blocks of UPS2 and fasten screws. See Fig. 4.

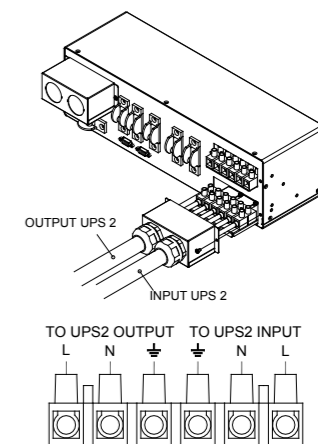


Fig. 4

5-3. Attach the cable glands to the cable entry box of UPS1. Insert the cables through the cable glands and then insert the leads of the cables into the terminal blocks of UPS1 and fasten screws. See Fig. 5.

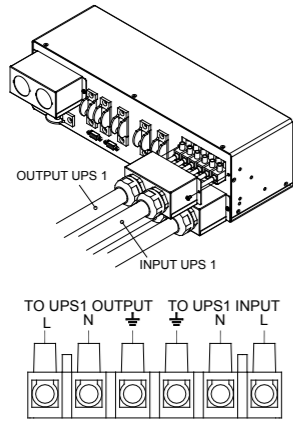


Fig. 5

5-4. Fasten the tray of UPS2 terminal block, fasten the cable entry boxes of UPS1 & UPS2 to the MBB-P unit, and fasten cables with the locking nuts of cable glands. See Fig. 6.

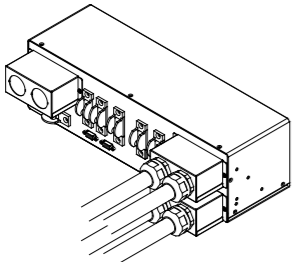


Fig. 6

5-5. Unscrew and remove the cable entry box of AC Input/Output on the MBB-P. See Fig. 7.

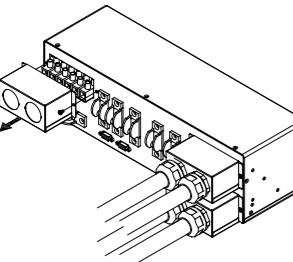


Fig. 7

5-6. Attach the cable glands to the cable entry box of AC Input/Output. Insert the cables through the cable glands and then insert the leads of the cables into the terminal blocks of AC Input/Output and fasten screws. See Fig 8.

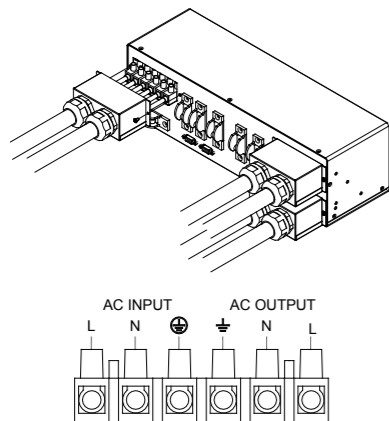


Fig. 8

5-7. Fasten the cable entry box to the MBB-P unit, and then fasten the cables with the locking nuts of the cable glands, See Fig. 9.

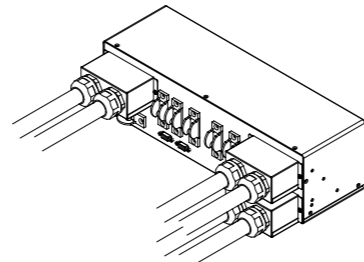
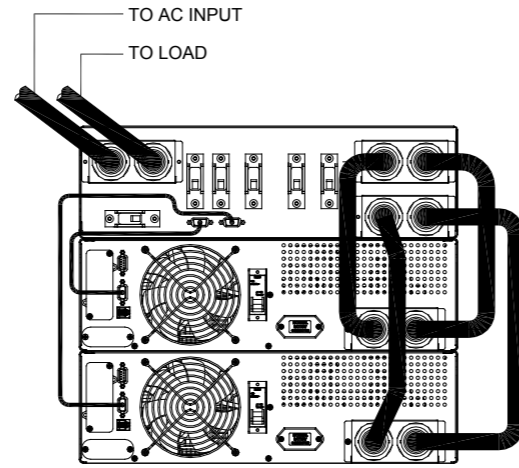


Fig. 9

5-8. After connecting power cables to the MBB-P, make connections to the UPS1 and UPS2 units as below. See Fig. 10.

- Connect the short parallel cable from the MBB-P to UPS1.
- Connect the long parallel cable from the MBB-P to UPS2.
- Connect the power cables from the MBB-P to UPS1 and UPS2 as follows: Attach the cable glands to the cables. Insert the appropriate cable glands into each UPS cable entry box and fasten with the locking nuts. Insert the leads of the cables into the UPS terminals marked "Output 230Vac 50/60Hz" and "Input 230Vac 50/60Hz". Fasten the cable entry box to each UPS unit.



OR

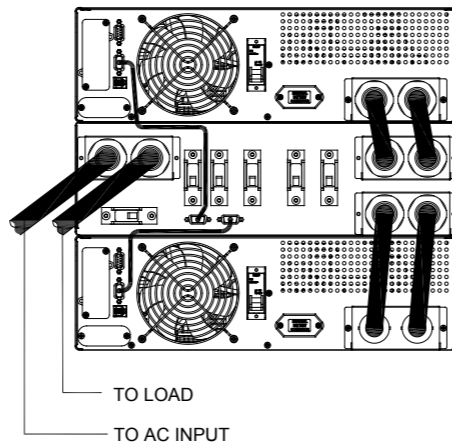
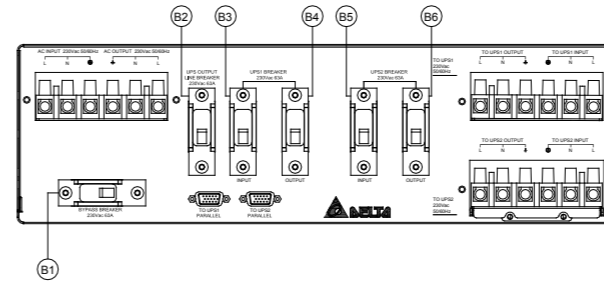


Fig. 10

6. Operation

CAUTION:

- You must put the UPS units in maintenance bypass mode before switching modes.
- Please see your UPS operation guide for instructions.



Supply Mode	B1	B2	B3	B4	B5	B6
Normal mode (UPS1+UPS2)	OFF	ON	ON	ON	ON	ON
UPS1	OFF	ON	ON	ON	OFF	OFF
UPS2	OFF	ON	OFF	OFF	ON	ON
Bypass mode (Utility)	ON	OFF	OFF	OFF	OFF	OFF

Note:

- B1: Breaker for bypass switch
- B2: Breaker for UPS total output line
- B3: Breaker for UPS1 input
- B4: Breaker for UPS1 output
- B5: Breaker for UPS2 input
- B6: Breaker for UPS2 output
- Default: All breakers are OFF

6-1. Normal Mode

In Normal Mode the load is protected by the two UPS units in parallel redundancy.

- After connecting all cables between the MBB-P and the UPS1 and UPS2 units, make sure all breakers on the MBB-P are OFF, and then turn on the AC utility power.
- On the MBB-P, turn the UPS1 Breaker (B3&B4) ON, and turn the UPS2 Breaker (B5&B6) ON, then turn the Breaker (B2) ON.
- On the MBB-P, make sure the Bypass Breaker (B1) is OFF.
- Turn on the UPS1 unit and then the UPS2 unit.

6-2. Switching to Bypass Mode

When the MBB-P Bypass Breaker is ON the MBB-P is providing an alternate path for the AC power to the connected load. If one of the UPS units fails or requires maintenance, for example the UPS2 unit, then proceed as follows:

- If UPS2 fails, turn the MBB-P UPS2 Breaker (B5&B6) OFF. Note that UPS1 is still protecting the connected load.
- Disconnect all cables of the UPS2 and remove the UPS2 unit for service or repair.
- Replace the repaired UPS2 unit and reconnect the cables.
- Turn the MBB-P UPS2 Breaker (B5&B6) ON.
- Turn the UPS2 unit ON.

7. Environmental

Temperature: Operating: 0°C to 40°C;
Storage: -15°C to 50°C.

Altitude: Operating: 0 to 6,600 feet (0 to 2000 meters);
Non-operating: 0 to 49,000 feet (0 to 15,000 meters).

Humidity: Operating: 5 to 95% relative humidity (non-condensing);
Non-operating: 5 to 95% relative humidity (non-condensing).

8. Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship for its lifetime. If the product should prove defective in material or workmanship within that period, Seller will repair or replace the product, at its sole discretion.

THIS WARRANTY DOES NOT APPLY TO NORMAL WEAR OR TO DAMAGE RESULTING FROM ACCIDENT, MISUSE, ABUSE OR NEGLIGENCE. SELLER MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY EXPRESSLY SET FORTH HEREIN. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ALL IMPLIED WARRANTIES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY OR FITNESS, ARE LIMITED IN DURATION TO THE WARRANTY PERIOD SET FORTH ABOVE; THIS WARRANTY EXPRESSLY EXCLUDES ALL INCIDENTAL AND CONSEQUENTIAL DAMAGES.

WARNING: The individual user should take care to determine prior to use whether this device is suitable, adequate or safe for the use intended. Since individual applications are subject to great variation, the manufacturer makes no representation or warranty as to the suitability or fitness of these devices for any specific application.