Eaton 9SX 15-20K Series

Maintenance ByPass (MBP)

MBP20K
MBP20KPDU
MBP20KPARA

Powering Business Worldwide

Safety Instructions

- SAVE THESE INSTRUCTIONS. See installation instructions before connecting to the supply. This manual contains important instructions that should be followed during installation and maintenance of the MBP.
- In the event of a fire, please use a dry powder fire extinguisher to extinguish the fire. Do not use liquid fire extinguishers to avoid electric shock.
- The MBP models that are covered in this manual are intended for installation in an environment within 0 to 50°C, free of conductive contaminant.

Special Symbols

The following are examples of symbols used on the MBP or accessories to alert you of the below important information:

RISK OF ELECTRICAL SHOCK - Observe the warning associated with the risk of electric shock symbol.

Important instructions that must always be followed.

The crossed-out wheeled bin symbol indicates that electrical and electronic waste should not be discarded together with general household waste as they must be collected separately. The product should be handed in for recycling in accordance to the local environmental regulations for waste disposal.
By separating electrical and electronic waste, you will help reduce the volume of waste sent for incineration or land-fills and minimize any potential negative impact on human health and environment.

Information, advice, help.

Refer to the user manual.

Personnel Safety

- RISK OF VOLTAGE BACKFEED. Isolate the MBP and check for hazardous voltage upstream and downstream during lockout-tagout operation. The terminal blocks may be energized even if the system is disconnected from the AC power source.

- Dangerous voltage levels are present within the system. It should be opened exclusively by qualified service personnel.
- High leakage current may be present. Earth connection is essential before connecting to the supply.
- Precautions must be taken for all handling, Wear rubber gloves and boots.

Product Safety

- The MBP connection instructions and operation described in this manual must be followed in the indicated order.
- The upstream circuit breaker for Normal AC / Bypass AC must be easily accessible so that the unit can be disconnected from AC power source by opening this circuit breaker.
- An additional AC contactor should be used for backfeed protection and must comply with IEC/EN 62040-1 (the creepage and clearance distances shall meet the basic insulation requirements for pollution degree 2).
- Disconnection and overcurrent protection devices shall be provided by others for permanently connected AC input (Normal AC/Bypass AC) and AC output circuits.
- Check that the indications on the rating plate corresponds to your AC powered system and to the actual electrical consumption of all the equipment to be connected to the system.
- For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible
- Never install the system near liquids or in an excessively damp environment.
- Never let a foreign object penetrate inside the system.
- Never block the ventilation grates of the system.
- Never expose the system to direct sunlight or source of heat.
- If the system must be stored prior to installation, storage must be in a dry place.
- The admissible storage temperature range is -25°C to +60°C.

Special precautions

- The unit is heavy: wear safety shoes and use vacuum lifter preferentially for handling operations.
- All handling operations will require at least two people (unpacking, lifting,

installation in rack system).

- Straps are provided only for unpacking the unit manually from the carton; don't use the straps to carry the unit around. The unit may slip from the straps during handling (risk of injury and product damage):
  - keep 12" / 30cm minimum distance between the straps
  - lift the unit carefully and keep it at a low height
  - keep the unit horizontal during unpacking.

Contents

1. Introduction

Thank you for selecting the Eaton MBP (Maintenance ByPass) for use with the Eaton 9SX 15-20KPMAU series UPS.. When installed and used properly as outlined in this manual, the MBP provides the ability to bypass the UPS power and battery modules for servicing whist keeping the critical load up.

We recommend that you take the time to read this manual to take full advantage of the many features of your MBP.

Before installing your MBP, please read the booklet presenting the safety instructions. Then follow the indications in this manual.

Environmental protection

Products are developed according to an eco-design approach.

Substances

This product does not contain CFCs, HCFCs or asbestos.

Packaging

- To improve waste treatment and facilitate recycling, separate the various packaging components.
- The cardboard comprises of over 50% recycled cardboard.
- Sacks and bags are made of polyethylene.
- Packaging materials are recyclable and bear the appropriate identification symbol

Materials	Abbreviations	Number in the symbols 
Polyethylene terephthalate	PET	01
High-density polyethylene	HDPE	02
Polyvinyl chloride	PVC	03
Low-density polyethylene	LDPE	04
Polypropylene	PP	05
Polystyrene	PS	06

Follow all local regulations for the disposal of packaging materials.

Product

The product is made up of recyclable materials.

Dismantling and destruction must take place in compliance with all local regulations

concerning waste. At the end of its service life, the product must be transported to a processing center for electrical and electronic waste.

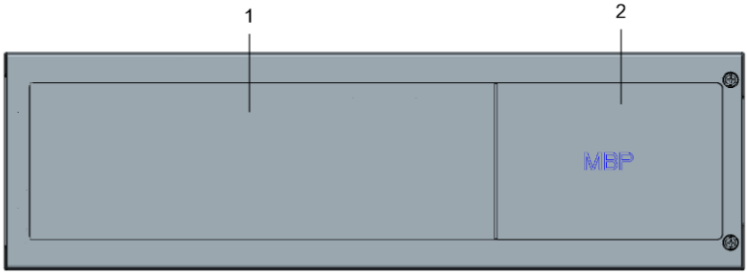
1.1 Model configuration

Model name	Size W*H*D(mm)	N.W.(kg)	Note
MBP20K	438*129（3U）*465	12.8	single MBP (Basic version)
MBP20KPDU	438*129（3U）*465	13.6	single MBP (Standard version)
MBP20KPARA	438*129（3U）*465	19.9	1+1 parallel MBP (Standard version)

Notes:

1. *Total of 4 input/output modes are included:*
    - *3-3 phase (single source)/(dual source)*
    - *3-1 phase (single source {default})/(dual source)*
    - *1-1 phase (single source)/(dual source)*
    - *1-3 phase (single source)/(dual source)*
2. *Dimension D(465mm) is not including front-panel.*

1.2 Appearance

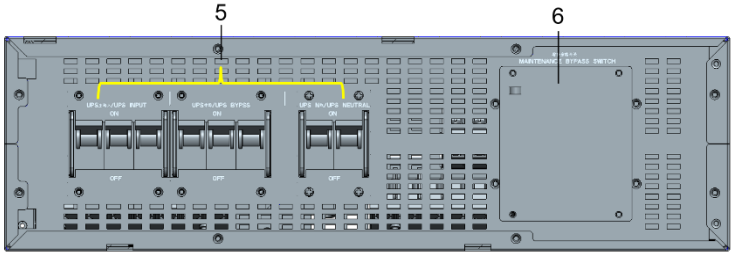


Front view (With front panel)

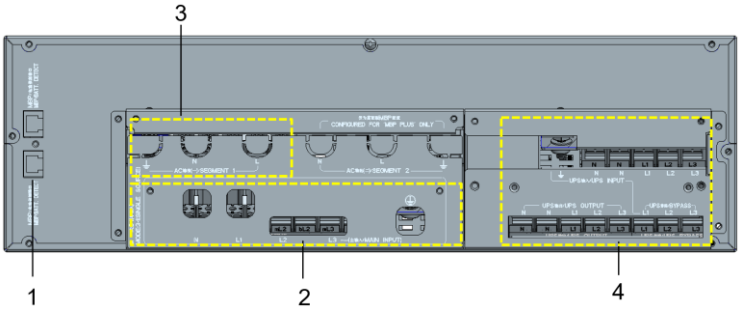
Notes:

1. *Ventilation area*
2. *Maintenance Bypass label*

1.2.1 Single MBP (Basic version)



Front view (Remove front panel)

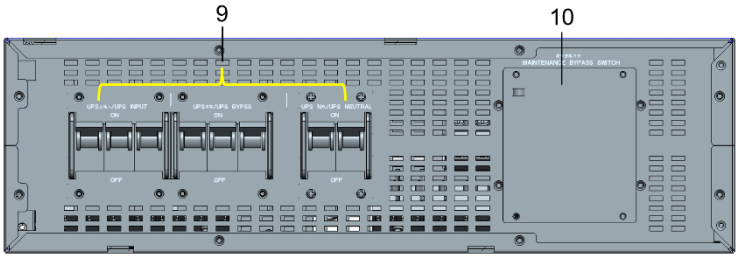


Rear view

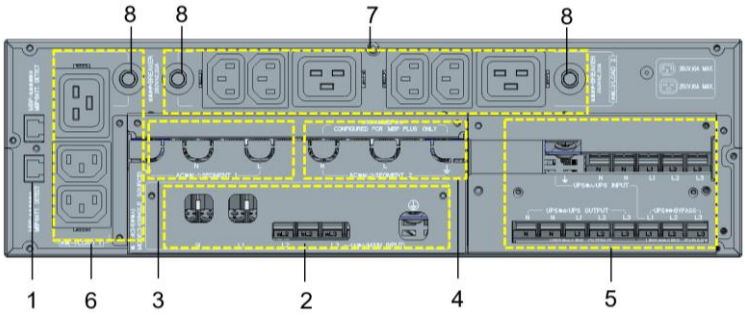
Notes:

1. *RJ45 ports (Detect EBM / MBP)*
2. *AC input terminal ports*
3. *AC output segment 1(Not programmable)*
4. *UPS ports*
5. *Input switch*
6. *Maintenance bypass switch*

1.2.2 Single MBP (standard version):



Front view (Remove front panel)



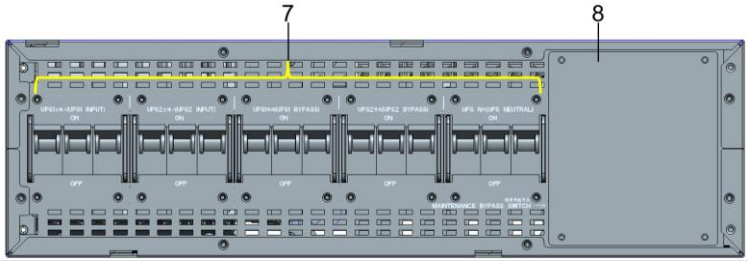
Rear view

Note:

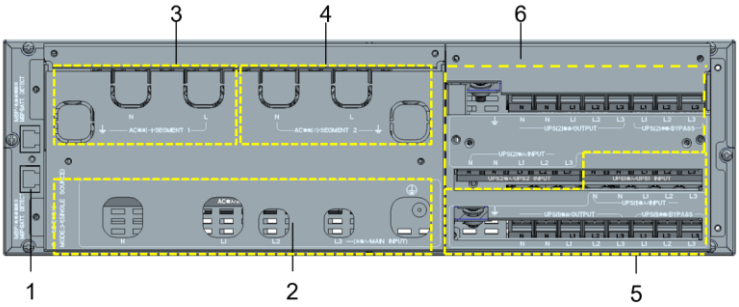
1. *RJ45 ports (Detect EBM / MBP)*
2. *AC input terminal ports*
3. *AC output segment 1(Not programmable)*
4. *AC output segment 2(Programmable)*
5. *UPS ports*
6. *Load 1 with IEC output sockets (Not programmable)*
7. *Load 2 with IEC output sockets (Programmable)*

8. *Breakers for IEC output sockets*
9. *Input switch*
10. *Maintenance bypass switch*

1.2.3 1+1 parallel MBP (standard version):



Front view (Remove front panel)



Rear view

Note:

1. *RJ45 ports (Detect EBM / MBP)*
2. *AC input terminal ports*
3. *AC output segment 1 (Not programmable)*
4. *AC output segment 2 (Programmable)*
5. *UPS1 ports*
6. *UPS2 ports*
7. *Input switch*
8. *Maintenance bypass switch*

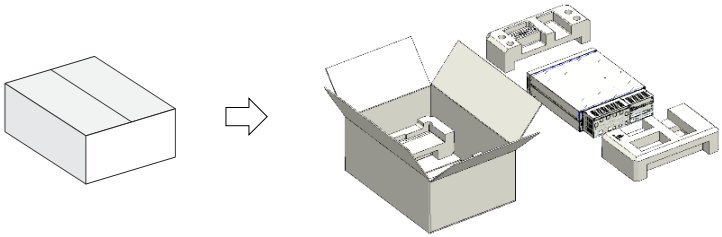
2. Installation

2.1 Unpacking and inspection

Please carefully check the module for damages during transportation. Any damages or missing accessories should be reported to the supplier or carrier immediately.

Do not carry the modules by the front and rear panels

2.1.1 Unpacking the Unit



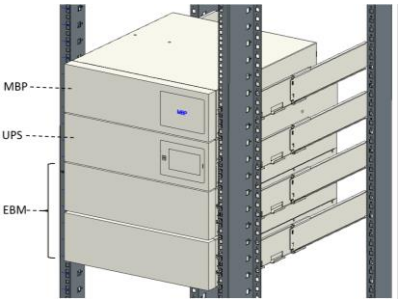
2.1.2 Inspecting accessories

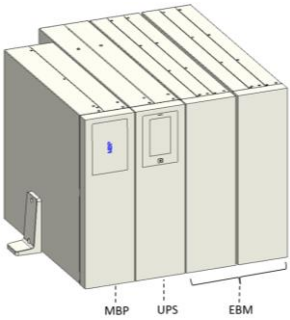
MBP accessories	MBP20K	MBP20KPDU	MBP20KPARA
MBP detection cable	√	√	√
Cable to UPS1	√	√	√
Cable to UPS2	-	-	√
Cable locker (for IEC outlets)	-	√	-
Copper bus-bar (including 'mode-seting label')	√	√	√
Rack ear	√	√	√
Rack rail kit	O	O	O
User manual	√	√	√

Note：√---Included;　O---Option, default is Not configured;　"-"---Not applicable

2.2 Mechanical installation

The MBP supports two installation modes: Tower installation and rack installation. The MBP should be located at the top (rack installation), or to the left (tower installation) of the power module for cable connection access. (as shown below)





Rack installation *Tower installation*

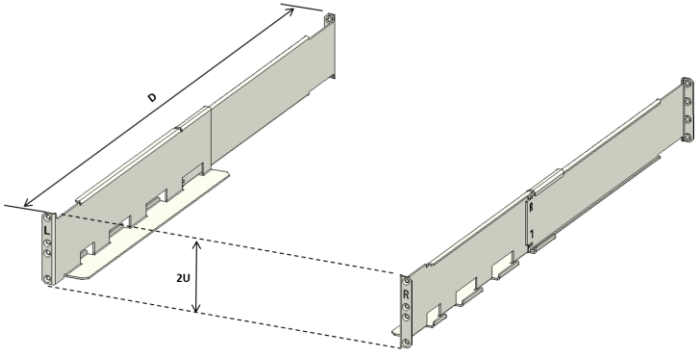
Allow for 500mm front and rear clearance from the module for ventilation

Do not carry the front/rear panel of the module during installing.

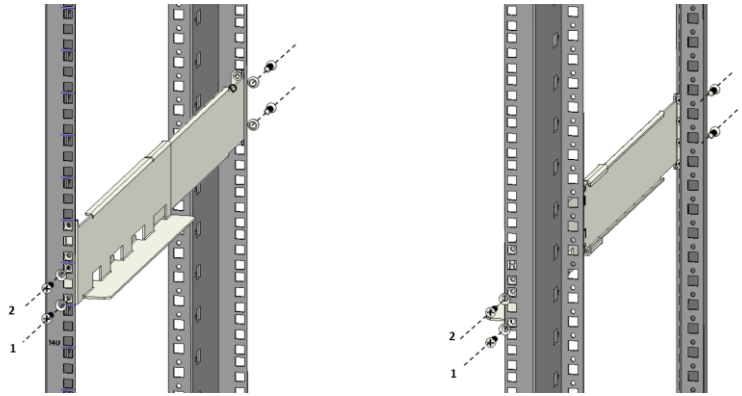
2.2.1 Rack mount

The Installation steps are the same as that of the UPS Power module. The MBP is suitable for installation in a 19-inch standard rack cabinet. It is recommended that the depth of the cabinet be no less than 800mm.

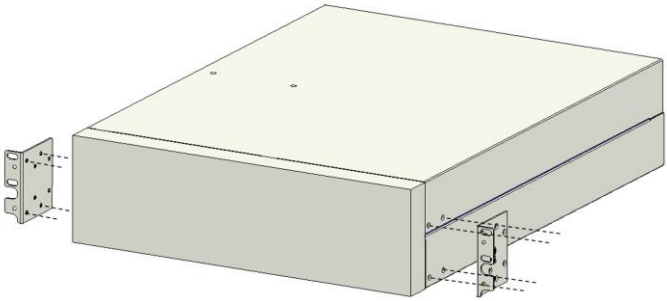
1. Install the optional rail kit. This rail kit is '2U & with M5 sized screw holes, the depth of the rail kit is: 415-763mm.



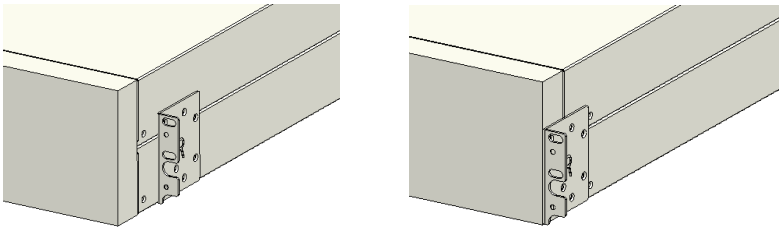
Fasten the rail kit to cabinet with 8pcs M5 screws + washers (as below):



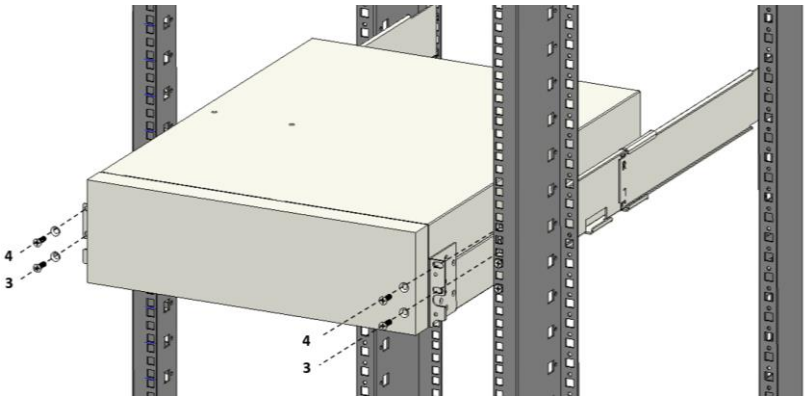
2. Install the mounting ears. Lock the left/right mounting ears into the MBP with 8pcs of M4 flat screws (take note of the correct orientation of the mounting ears as below)



Note: There are 2 other possible mounting positions for the mounting ears to suit different rack depths:

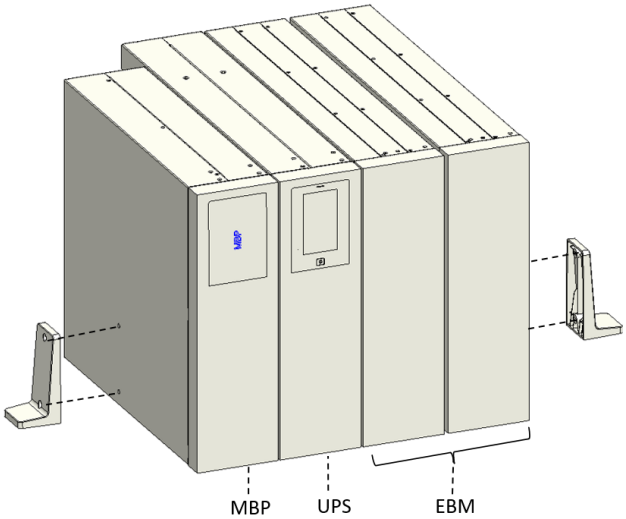


3. Take the MBP to the rail kit and push backwards; secure to the cabinet posts with 4pcs M5 screws + washers (as below).



2.2.2 Tower mount

1. Place the MBP on the left side of the UPS and align it with the front panel of the UPS module.
2. Position the pedestal feet that is included as part of the UPS power module's accessories, one end to the side of the MBP, and the other to the last UPS/EBM module as shown below:

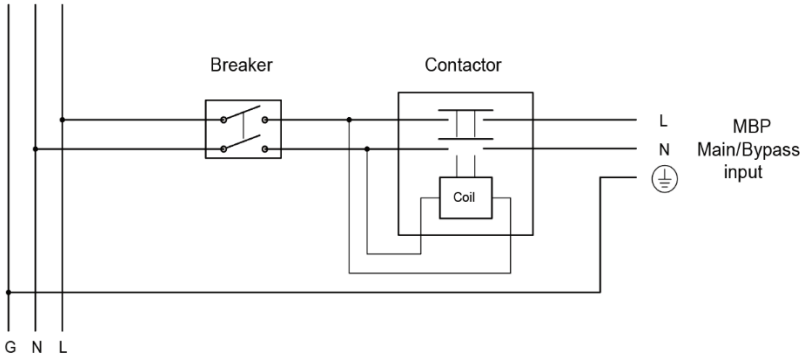


3. Wiring

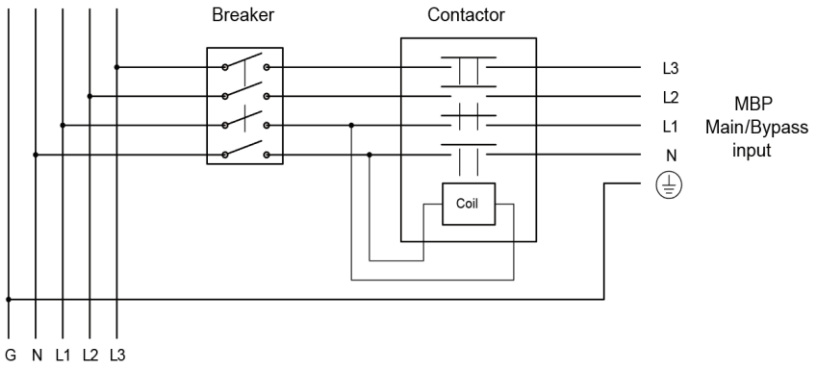
This section outlines the AC input/output cable connections for the MBP, and the connection to the UPS' power module.

When installing and connecting the MBP, configure the circuit breaker and the feed protection contactor before connecting the MBP to prevent current feedback. a "voltage feedback risk" warning label must be added to the feeder protection contactor or similar feeder. Disconnect the MBP before operation and check to ensure that there are no dangerous voltages on all terminals. The rated current requirement of the feeder protection contactor is greater than the rated current of the MBP. Wiring diagram as shown below:

Before any connections, ensure that upstream circuit breakers and backfeed contactors are in place to avoid power backfeed to the utility. A warning label with "Backfeed voltage may be present" text or similar must be to be added on the backfeed contactor device. Disconnect the MBP before operation and check to ensure that there are no dangerous voltages on all terminals. The current rating of the backfeed contactor should be greater than that of the MBP. Refer to he figures below



Single phase system



Three phase system

Recommended circuit breaker and contactor current specifications:

UPS	MBP model	Input mode	Breaker	Contactor
15KVA	MBP20K MBP20KPDU	1 phase main input	D type 125A	≥125A
		3 phase main input	D type 63A	≥63A
		1 phase bypass input	D type 100A	≥100A
		3 phase bypass input	D type 40A	≥40A
		1 phase output	D type 100A	≥100A
		3 phase output	D type 40A	≥40A
	MBP20KPARA	1 phase main input	D type 230A	≥230A
		3 phase main input	D type 80A	≥80A
		1 phase bypass input	D type 160A	≥160A
		3 phase bypass input	D type 63A	≥63A
		1 phase output	D type 160A	≥160A
		3 phase output	D type 63A	≥63A
20KVA	MBP20K MBP20KPDU	1 phase main input	D type 160A	≥160A
		3 phase main input	D type 63A	≥63A
		1 phase bypass input	D type 125A	≥125A
		3 phase bypass input	D type 63A	≥63A
		1 phase output	D type 125A	≥125A
		3 phase output	D type 63A	≥63A
	MBP20KPARA	1 phase main input	D type 300A	≥300A
		3 phase main input	D type 100A	≥100A

		1 phase bypass input	D type 230A	≥230A
		3 phase bypass input	D type 80A	≥80A
		1 phase output	D type 230A	≥230A
		3 phase output	D type 80A	≥80A

Cable and connector

The cable's conductor size should be selected based on the size of the UPS power module. Refer to the following two tables for the cross-sectional dimensions in mm². Each for 15kVA and 20kVA UPS respectively:

15kVA UPS

MBP Model	Input/ Output Mode	Input					Output		
		Main input		Bypass input		Ground wire			
		L wire	N wire	L wire	N wire		L wire	N wire	Ground wire
MBP20K MBP20KPDU	3-1	6	6	16	16	16	16	16	16
	3-3	6	6	6	6	6	6	6	6
	1-1	35	35	16	16	35	16	16	16
	1-3	35	35	6	6	35	6	6	6
MBP20KPARA	3-1	16	16	50	50	50	50	50	50
	3-3	16	16	10	10	16	10	10	10
	1-1	95	95	50	50	95	50	50	50
	1-3	95	95	10	10	95	10	10	10

20kVA UPS

20KVA UPS									
MBP Model	Input/ Output Mode	Input					Output		
		Main input		Bypass input		Ground wire			
		L wire	N wire	L wire	N wire		L wire	N wire	Ground wire
MBP20K MBP20KPDU	3-1	10	10	25	25	25	25	25	25
	3-3	10	10	10	10	10	10	10	10
	1-1	50	50	25	25	50	25	25	25
	1-3	50	50	10	10	50	10	10	10
MBP20KPARA	3-1	25	25	70	70	70	70	70	70
	3-3	25	25	16	16	25	16	16	16
	1-1	120	120	70	70	120	70	70	70
	1-3	120	120	16	16	120	16	16	16

Notes：

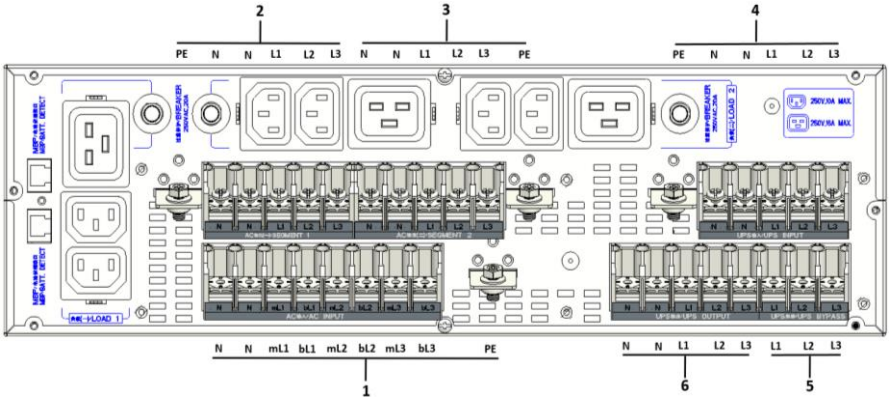
1. *For single input connection, please select the larger conductor size cross-section.*
2. *UPS output cable length is recommended not to exceed 10m.*

Please refer to the following table for conductor's terminal selection:

Conductor cross-section (Unit:mm²)	Ring terminal type
6	DRNB6-6
10	DRNB6-10
16	DRNB8-16
25	DRNB8-25
35	DRNB8-35
50	DRNB8-50
70	DRNB8-70
95	DRNB8-95
120	DRNB8-120

3.1 Wiring of single MBP (Standard version)

Single MBP (Standard version) terminal block (TB) layout as below:

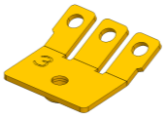


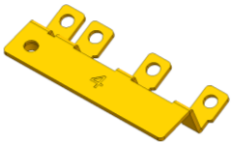
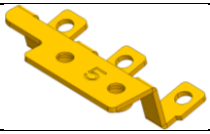
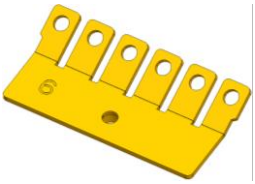
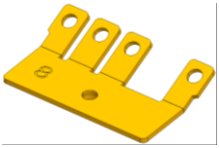
Notes:

1. *AC input TB: N/N/mL1/ bL1/ mL2/bL2/ mL3/bL3/PE ('m' is main input,'b' is bypass input)*
2. *AC segment 1 (Not programmable): PE/N/N/L1/L2/ L3*
3. *AC segment 2 (Programmable): N/N/L1/L2/ L3/ PE*
4. *UPS input TB: PE/N/N/L1/L2/L3*
5. *UPS bypass TB: L1/L2/L3*
6. *UPS output TB: N/N/L1/L2/L3*

This section outlines the 8 different possible modes of input/output wiring applications. Below is a list of copper busbars and a label plate available for the different connection modes.

To gain access to the terminal blocks, it is only necessary to remove the terminal block's top cover, without removing the whole box.

	Item	Quantity(PC)	Figure
Copper busbar	1	6	
	3	2	

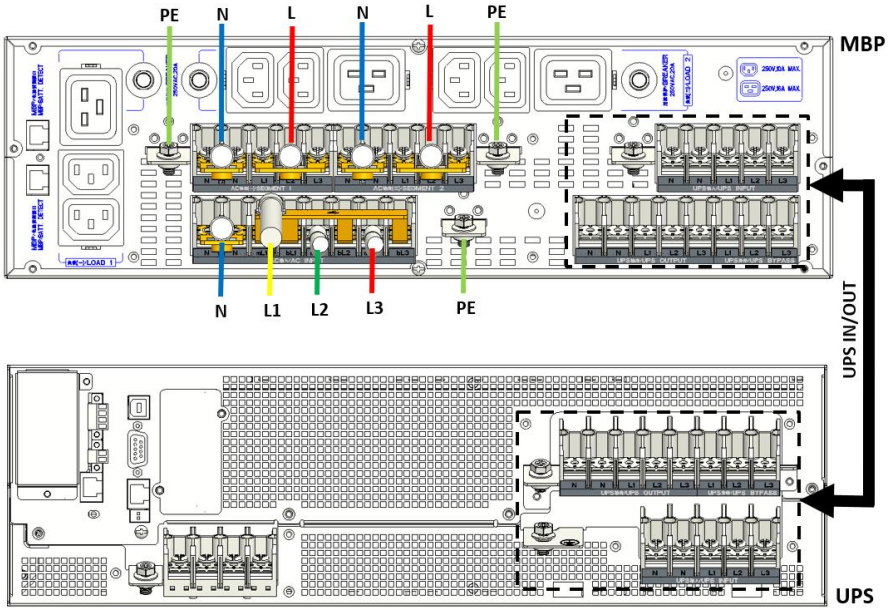
	4	1	
	5	1	
	6	1	
	7	1	
	8	1	
Label for Mode-setting	NA	8	

Note:

1. *This MBP supports the following 4 modes of connection by default, with Copper busbars #1, #3, #4, and #5, as well as 4 pieces of 'Mode-setting label' are included as accessories.*
   3-3(single source)/ 3-3(dual source)
   3-1(single source)/ 3-1(dual source)
2. *To configure to the following 4 modes of connection, contact your supplier for the issue of Copper Busbars #6, #7, and #8, as well as the corresponding 'Mode-setting label'.*
   1-1(single source)/ 1-1(dual source)
   1-3(single source)/ 1-3(dual source)

2

3.1.1 Mode 3-1(single source) (Default)

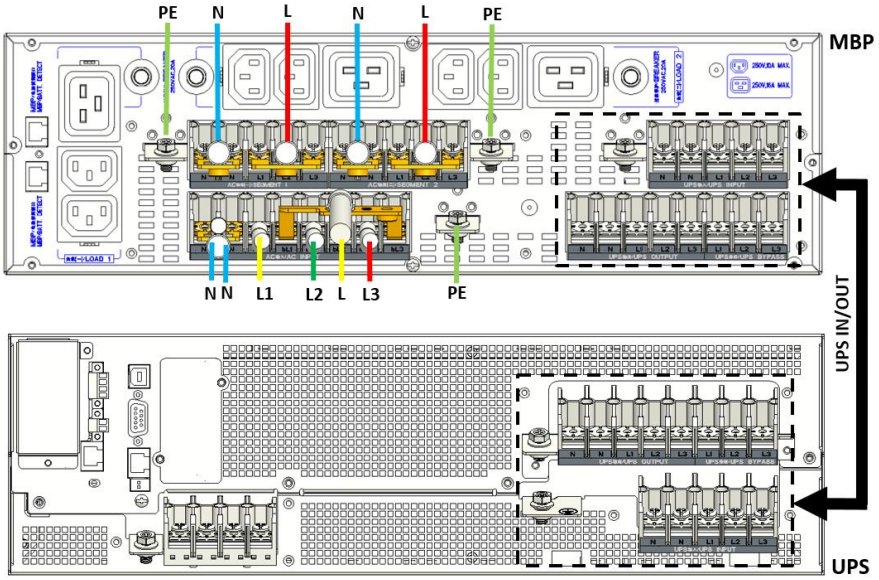


1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’, then connect the AC cabe (N) to it
   III. Bridge the ‘AC input terminal mL1/bL1/bL2/bL3’ with ‘busbar #4’, then connect the AC cable (L1) to it
   IV. Connect the ‘AC input terminal mL2/mL3’ to the AC cable(L2/L3).
2. Output:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
   III. Bridge the ‘AC segment terminal L1/L2/L3’ with ‘busbar #3’, then connec the AC cable (L) to it
3. Connection to the UPS:

I. Remove all busbars from the UPS

II. Connect the UPS to MBP with the 'Cable to UPS1' included in the MBP's accessory

3.1.2 **Mode 3-1(Dual source)**



1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the 'AC input terminal N/N' with 'busbar #1'
   III. Connect the AC main source cable (N) and bypass source cable (N) with lugs on top of each other to the aforementioned N/N terminal busbar #1
   IV. Connect the 'AC input terminals mL1/mL2/mL3 to main source cable (L1/L2/L3)
   V. Bridge the 'AC input terminals bL1/bL2/bL3' with 'busbar #5', then connect the bypass source cable (L) to it
2. Output:
   I. Connect the ground cable (PE) to the chassis
   II. Bridge the 'AC segment terminal N/N' with 'busbar #1', then connect the AC cable (N) to it

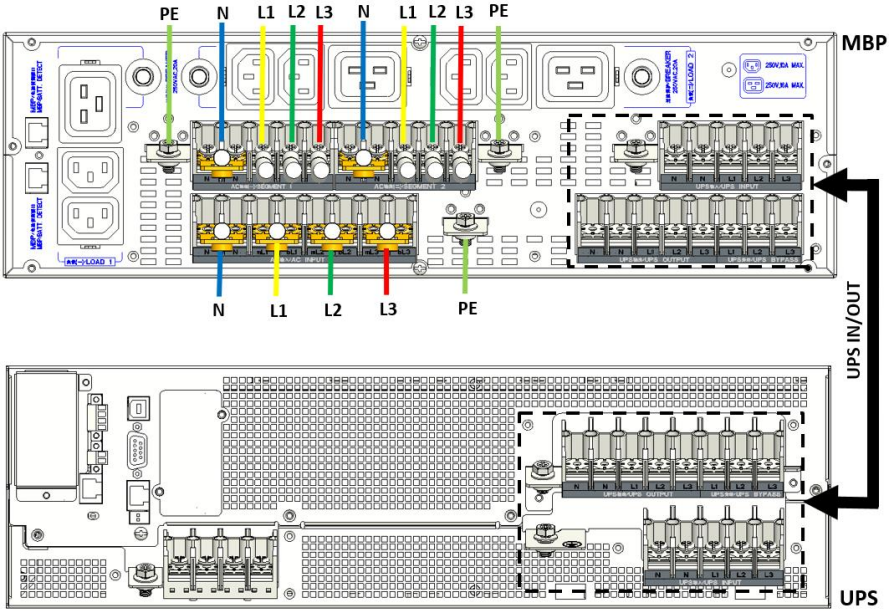
III. Bridge the ‘AC segment terminal L1/L2/L3’ with ‘busbar #3’, then connect the AC cable(L) to it

3. Connection to the UPS:

I. Remove all busbars from the UPS

II. Connect the UPS to MBP with the ‘Cable to UPS1’ included in the MBP’s accessory

3.1.3 Mode 3-3(single source) ：



1. Input:

I. Connect the main-ground cable (PE) to the chassis

II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it

III. Bridge the ‘AC input terminal mL1/bL1’ with ‘busbar #1’, then connect the AC cable (L1) to it

IV. Bridge the ‘AC input terminal mL2/bL2’ with ‘busbar #1’, then connect the AC cable (L2) to it

V. Bridge the ‘AC input terminal mL3/bL3’ with ‘busbar #1’, then connect the AC cable (L3) to it

2. Output:

I. Connect the ground cable (PE) to the chassis

II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it

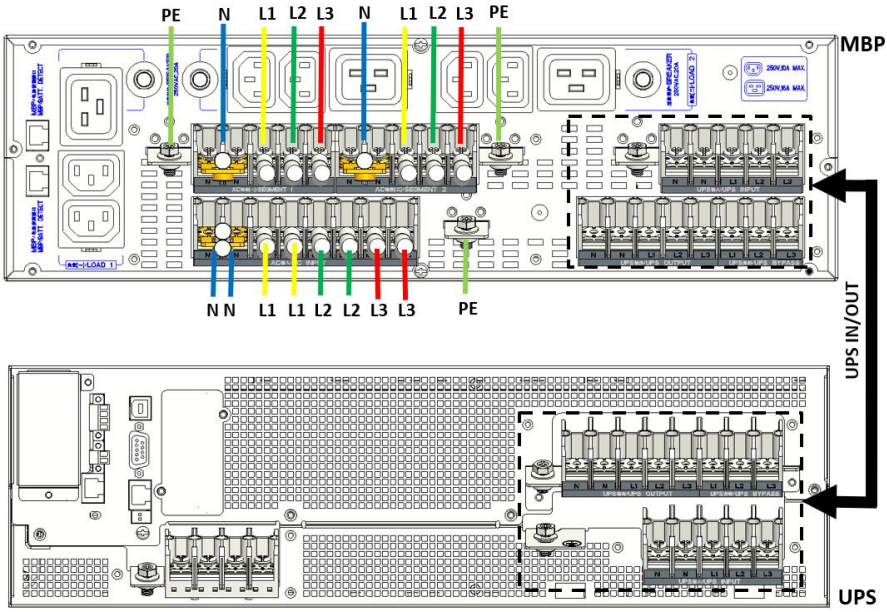
III. Connect the ‘AC segment terminals L1/L2/L3’ to the AC cables (L1/L2/L3)

3. Connection to the UPS:

I. Remove all the busbars of the UPS

II. Connect the UPS to MBP with the ‘Cable to UPS1’ included in the MBP’s accessories

3.1.4 Mode 3-3(Dual source)

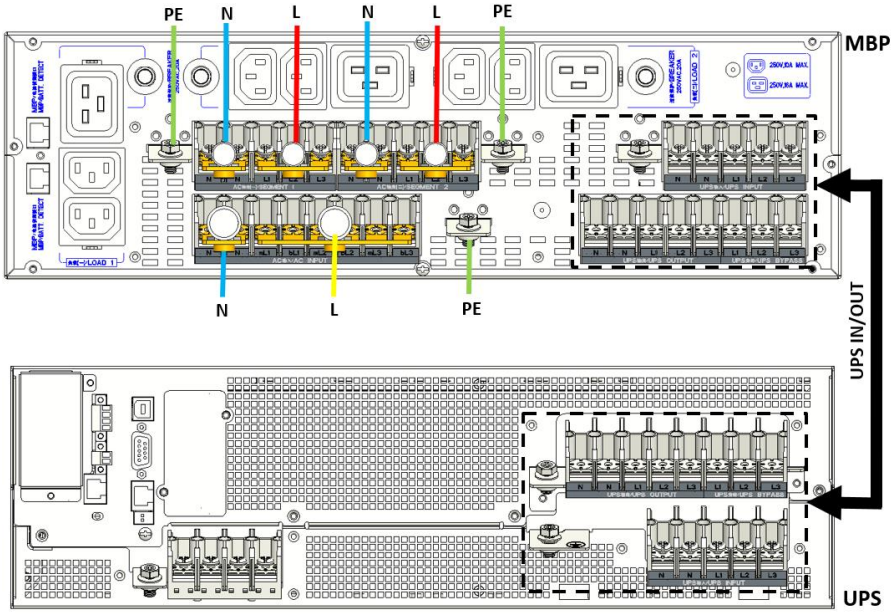


1. Input:
    I. Connect the main-ground cable (PE) to the chassis
    II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’
    III. Connect the AC main source cable (N) and bypass source cable with lugs on top of each other to the aforementioned (N) terminal busbar #1
    IV. Connect the ‘AC input terminals mL1/mL2/mL3’ to the main source cables (L1/L2/L3)
    V. Connectthe ‘AC input terminals bL1/bL2/bL3’ to bypass source cables (L1/L2/L3)

2. Output:
    I. Connect the ground cable (PE) to the chassis
    II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
    III. Connect the ‘AC segment terminals L1/L2/L3’ to the AC cables (L1/L2/L3)

3. Connection to the UPS:
    III. Remove all the busbars of the UPS
    IV. Connect the UPS to MBP with the ‘Cable to UPS1’ included in the MBP’s accessories

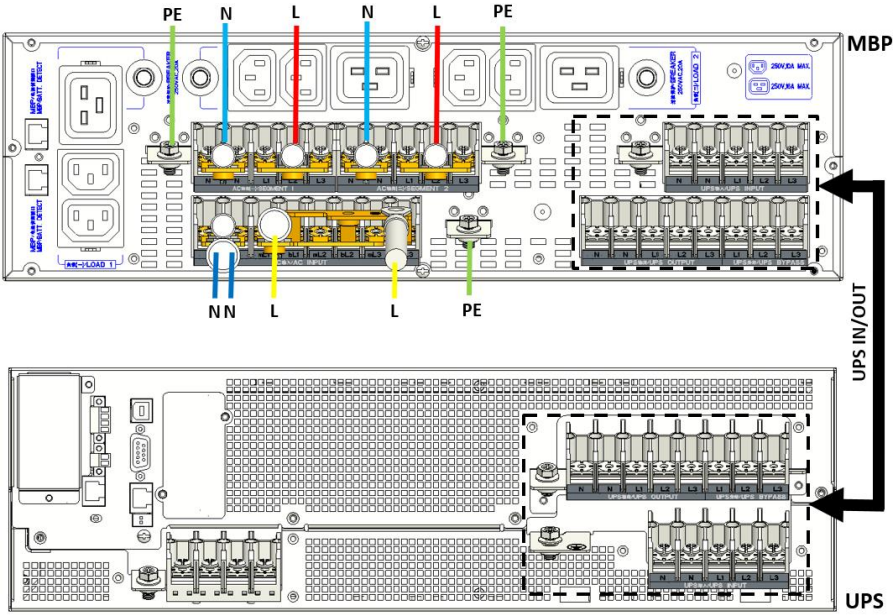
3.1.5 Mode 1-1(single source)



1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
   III. Bridge the ‘AC input terminals mL1/bL1/mL2/bL2/mL3/bL3 with ‘busbar #6’, then connect the AC cable (L) to it
2. Output:
   I. Connect the ground cable (PE) to the chassis
   II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
   III. Bridge the ‘AC segment terminals L1/L2/L3’ with ‘busbar #3’, then connect the AC cable (L) to it
3. Connection to the UPS:
   I. Remove all the busbars of the UPS

II. Connect the UPS to MBP with the ‘Cable to UPS1’ included in the MBP’s accessories

3.1.6 Mode 1-1(Dual source)



1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’
   III. Connect the AC main source cable (N) and bypass source cable (N) with lugs on top of each other to the aforementioned N/N busbar #1
   IV. Bridge the ‘AC input terminals mL1/mL2/mL3 with ‘busbar #7’, then connect the AC cable (L) to it
   V. Bridge the ‘AC input terminals bL1/bL2/bL3’ with ‘busbar #5’, then connect the bypass source cable (L) to it
2. Output:
   I. Connect the ground cable (PE) to the chassis

II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it

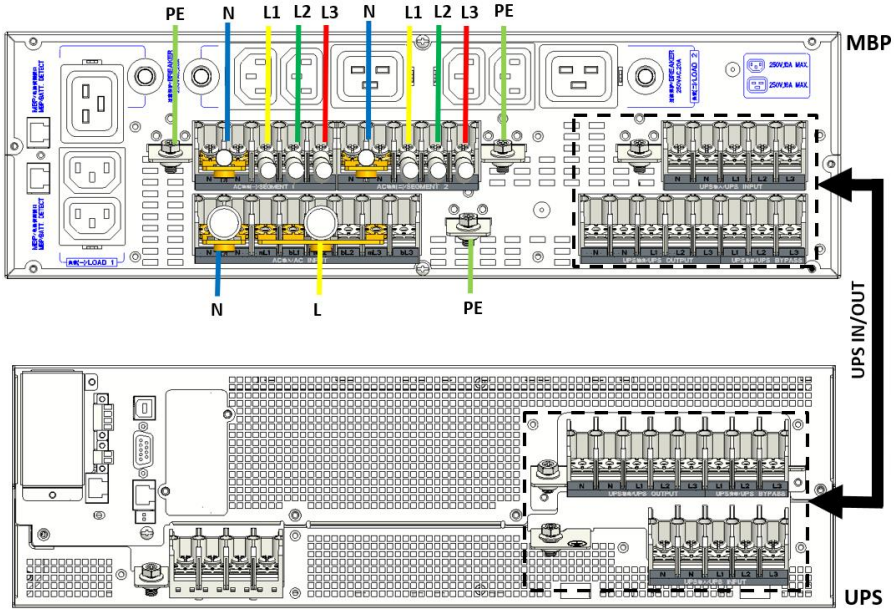
III. Bridge the ‘AC segment terminals L1/L2/L3’ with ‘busbar #3’, then connect the AC cable (L) to it

3. Connection to the UPS:

I. Remove all the busbars of the UPS

II. Connect the UPS to the MBP with the ‘Cable to UPS1’ included in the MBP’s accessory

3.1.7 Mode 1-3(single source)



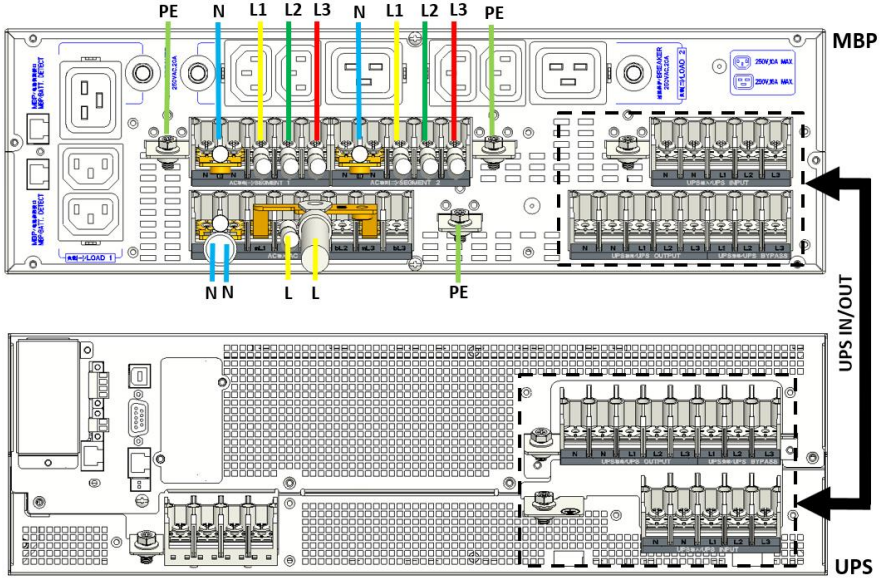
1. Input:
    I. Connect the main-ground cable (PE) to the chassis
    II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
    III. Bridge the ‘AC input terminals mL1/bL1/mL2/mL3 with ‘busbar #8’, then connect the AC cable (L) to it
2. Output:
    I. Connect the ground cable (PE) to the chassis
    II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
    III. Connect the ‘AC segment terminals L1/L2/L3’ to the AC cables (L1/L2/L3)

3. Connection to the UPS:
    I. Remove all the busbars of the UPS
    II. Connect the UPS to the MBP with the ‘Cable to UPS1’ included in the MBP’s accessory

Note:

Bypass is not available in this mode. Please use with caution.

3.1.8 Mode 1-3(Dual source)

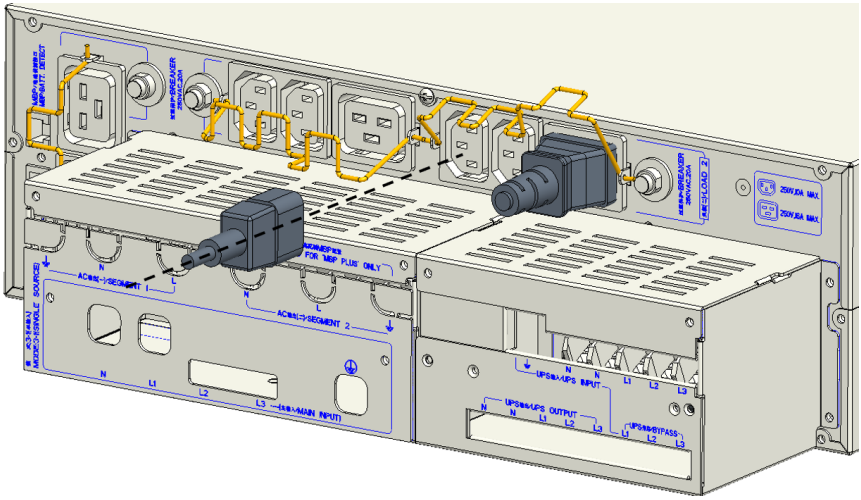


1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N’ with ‘busbar #1’
   III. Connect the AC main source cable (N) and bypass source cable (N) with lugs on top of each other to the aforementioned N/N terminal busbar #1
   IV. Bridge the ‘AC input terminals mL1/mL2/mL3 with ‘busbar #5’, then connect the main source cable (L) to it
2. Output:
   I. Connect the ground cable (PE) to the chassis
   II. Bridge the ‘AC segment terminal N/N’ with ‘busbar #1’, then connect the AC cable (N) to it
   III. Connect the ‘AC segment terminals L1/L2/L3’ to the AC cables (L1/L2/L3)

3. Connection to the UPS:
    I. Remove all the busbars of the UPS
    II. Connect the UPS to the MBP with the ‘Cable to UPS1’ included in the MBP’s accessory

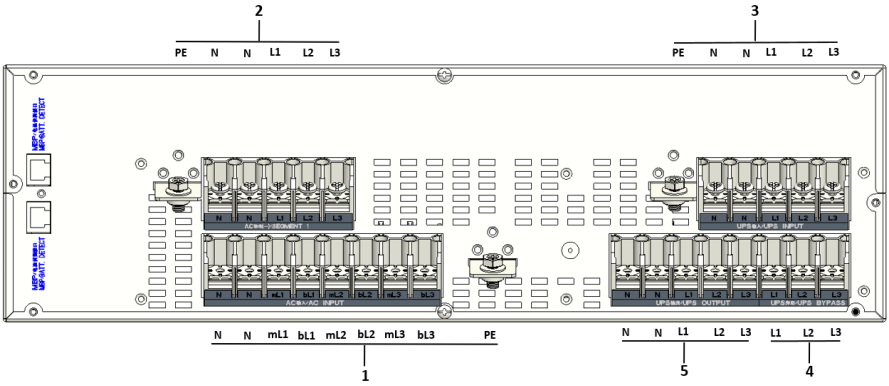
Notes:

- *Bypass is not available in this mode. Please use with caution.*
- *Single MBP (standard verson) includes IEC output sockets. It is recommended to install the ‘Cable Locker’ (as shown below) if these sockets are used to prevent accidental unplugging of the IEC leads causing load drop.*



3.2 Wiring of single MBP (Basic version)

Single MBP (Basic version) terminal block (TB) layout as below:

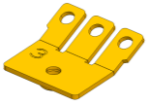


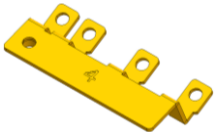
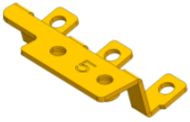
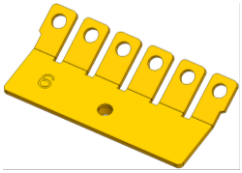
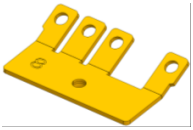
Notes:

1. *AC input TB: N/N/mL1/ bL1/ mL2/bL2/ mL3/bL3/PE ('m' is main input,'b' is bypass input)*
2. *AC segment 1 (Not programmable): PE/N/N/L1/L2/ L3*
3. *UPS input TB: PE/N/N/L1/L2/L3*
4. *UPS bypass TB: L1/L2/L3*
5. *UPS output TB: N/N/L1/L2/L3*

As like the MBP (standard version), the MBP (Basic version) also provides 8 possible modes of wiring applications. Please select a mode and connect the system with the appropriate jumpers below.

To gain access to the terminal blocks, it is only necessary to remove the terminal block's top cover, without removing the whole box.

	Item	Quantity(PC)	Figure
Copper busbar	1	5	
	3	2	

	4	1	
	5	1	
	6	1	
	7	1	
	8	1	
Label for Mode-setting	NA	8	

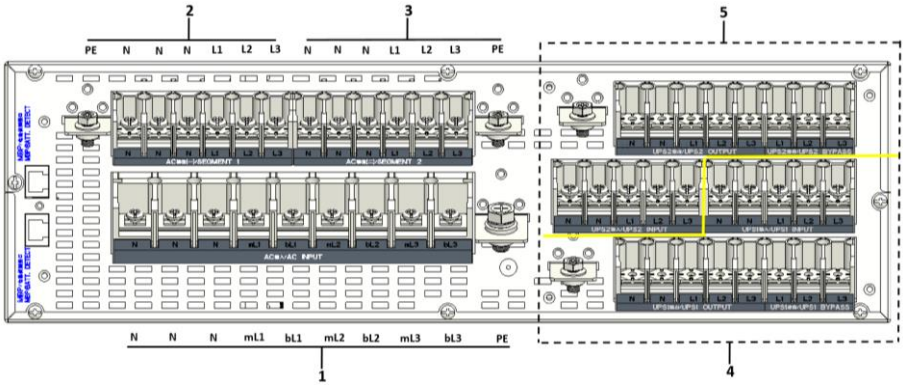
Notes:

1. *This MBP supports the following 4 modes of connection by default, with Copper busbars #1, #3, #4, and #5, as well as 4 pieces of 'Mode-setting label' are included as accessories.*
   3-3(single source)/ 3-3(dual source)
   3-1(single source)/ 3-1(dual source)
2. *To configure to the following 4 modes of connection, contact your supplier for the issue of Copper Busbars #6, #7, and #8, as well as the corresponding 'Mode-setting label'.*
   1-1(single source)/ 1-1(dual source)
   1-3(single source)/ 1-3(dual source)

Please refer to **Chaper 3.1 (Wiring of single MBP (Standard MBP))** for the detailed wiring procedures of all 8 modes of connections. The default configuration of this MBP is 3-1 phase (single source).

3.3 Wiring of 1+1 parallel MBP(standard version)

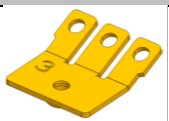
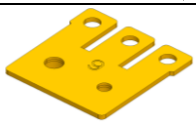
1+1 parallel MBP (standard version) terminal block (TB) layout is as below:

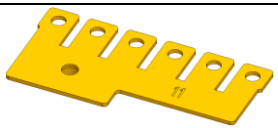
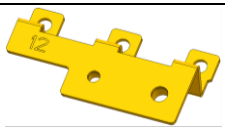
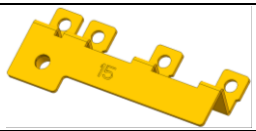
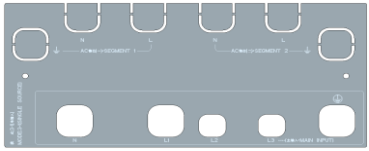


Notes:

1. AC input TB: N/N/N/mL1/ bL1/ mL2/bL2/ mL3/bL3/PE (‘m’ is main input,’b’ is bypass input)
2. AC segment 1 (Not programmable): PE/N/N/N/L1/L2/L3
3. AC segment 2 (Programmable): N/N/N/L1/L2/L3/PE
4. UPS1 TB ports
5. UPS2 TB ports

This section outlines the 8 different possible modes of input/output wiring applications. Below is a list of copper busbars and a label plate available for the different connection modes.
To gain access to the terminal blocks, it is only necessary to remove the terminal block’s top cover, without removing the whole box.

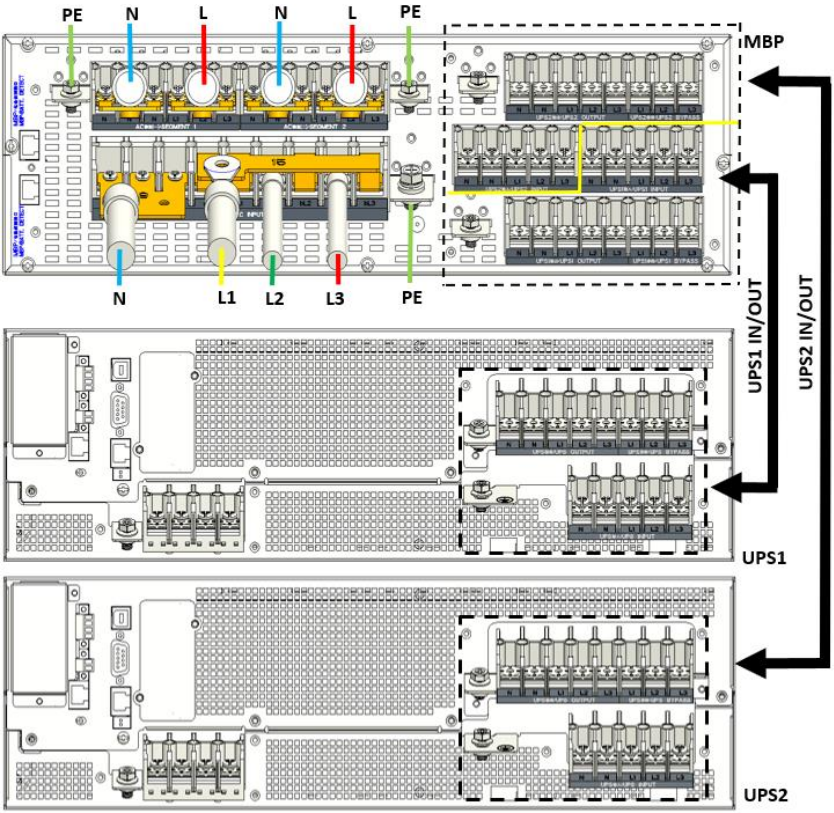
	Item	Quantity(PC)	Figure
Copper busbar	3	4	
	9	1	

	10	3	
	11	1	
	12	1	
	13	1	
	14	1	
	15	1	
Label for Mode-setting	NA	8	

Note:

1. *This MBP supports the following 4 modes of connection by default, with Copper busbars #3, #9, #10, #12, #15, as well as 4 pcs of 'Mode-setting label' are included as accessories.*
   3-3(single source)/ 3-3(dual source)
   3-1(single source)/ 3-1(dual source)
2. *To configure to the following 4 modes of connection, contact your supplier for the issue fo Copper Busbars #6, #7, #8, as well as the corresponding 'Mode-setting label'.*
   1-1(single source)/ 1-1(dual source)
   1-3(single source)/ 1-3(dual source)

3.3.1 Mode 3-1(single source) (Default MBP wiring mode)



1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #9’, then connect the AC source cable (N) to it
   III. Bridge the ‘AC input terminals mL1/bL1/bL2/bL3’ with ‘busbar #15’, then connect the AC cable (L1) to it
   IV. Connect the ‘AC input terminal mL2/mL3’ to AC cable (L2/L3)

2. Output:
   I. Connect the ground cable (PE) to the chassis

II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it

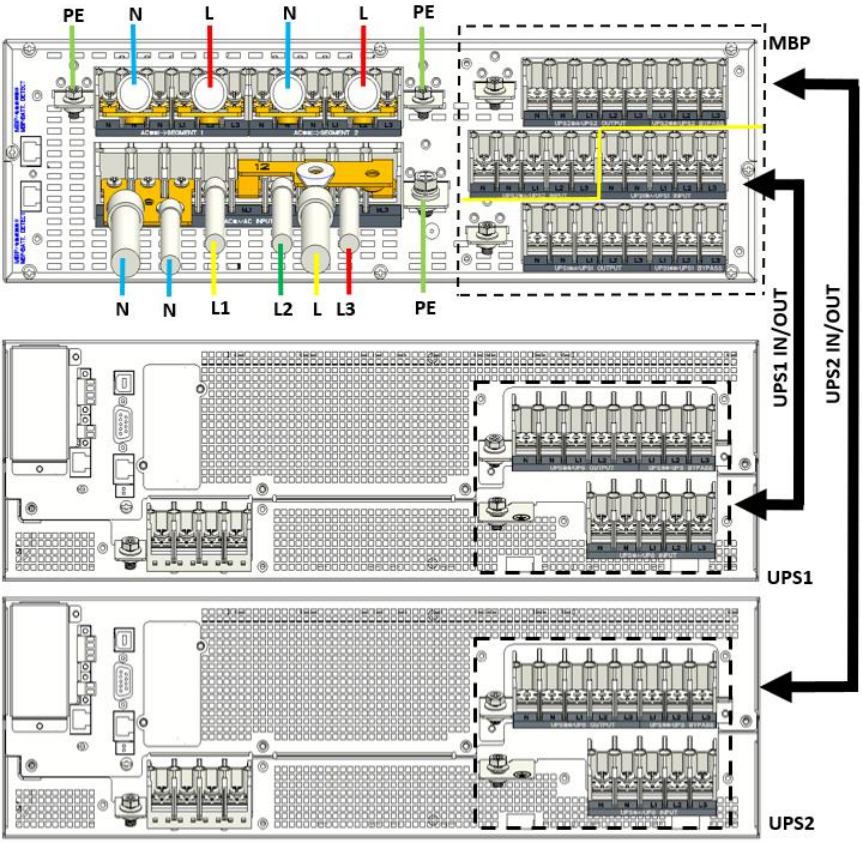
III. Bridge the ‘AC segment terminals L1/L2/L3’ with ‘busbar #3’, then connect the AC cable (L) to it

3. Connecting to UPS 1 and UPS 2:

I. Remove all busbars of the UPS

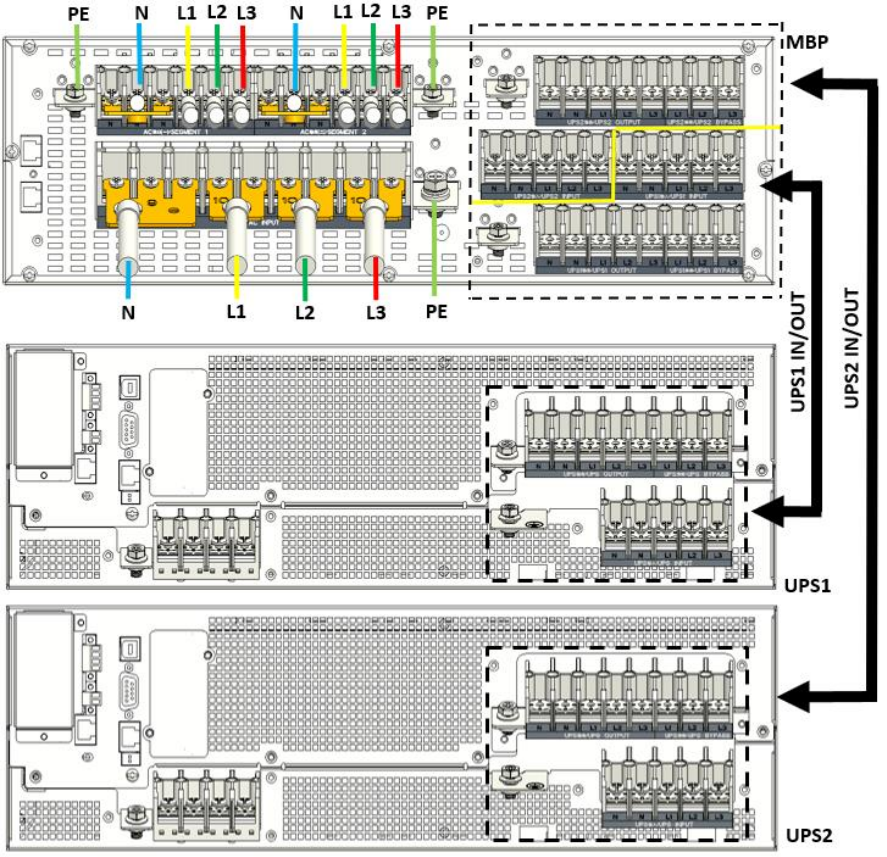
II. Connect UPS 1 and UPS 2 to the MBP with ‘Cable to UPS 1’ and Cable to UPS 2’ included in the MBP’s accessory

3.3.2 Mode 3-1(Dual source)



1. Input:
    I. Connect the main-ground cable (PE) to the chassis
    II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #3’
    III. Connect the AC main source cable (N), and bypass source cable (N) to the aforementioned N/N/N terminal busbar #3
    IV. Connect the ‘AC input terminals mL1/mL2/mL3’ to the main source cable (L1/L2/L3)
    V. Bridge the ‘AC input terminal bL1/bL2/bL3’ with ‘busbar #12’, then connect the bypass source cable (L) to it
2. Output:
    I. Connect the ground cable (PE) to the chassis
    II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it
    III. Bridge the ‘AC segment terminals L1/L2/L3’ with ‘busbar #3’, then connect the AC cable (L) to it
3. Connecting to UPS 1 and UPS 2:
    I. Remove all busbars of the UPS
    II. Connect UPS 1 and UPS 2 to the MBP with ‘Cable to UPS 1’ and Cable to UPS 2’ included in the MBP’s accessory

3.3.3 Mode 3-3(single source) ：

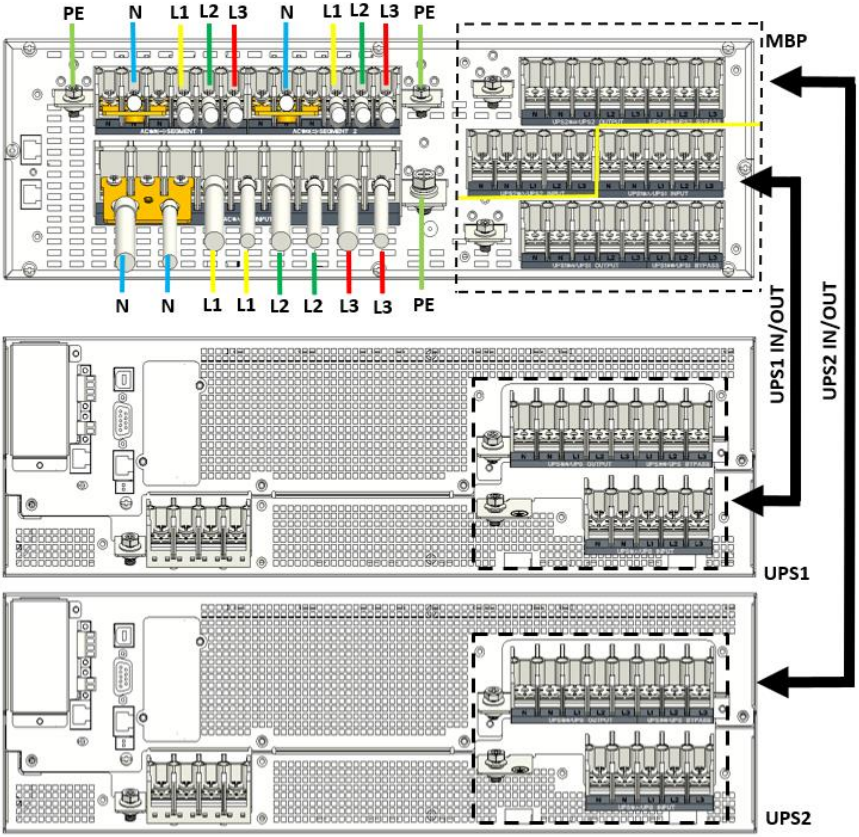


1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #9’, then connect the AC cable (N) to it
   III. Bridge the ‘AC input terminal mL1/bL1’ with busbar #10’, then connect the AC cable (L1) to it
   IV. Bridge the ‘AC input terminal mL2/bL2’ with busbar #10’, then connect the AC cable (L2) to it
   V. Bridge the ‘AC input terminal mL3/bL3’ with busbar #10’, then connect the AC

cable (L3) to it

2. Output:
   I. Connect the ground cable (PE) to the chassis
   II. Bridge the 'AC segment terminal N/N/N' with 'busbar #3', then connect the AC cable (N) to it
   III. Connect the 'AC segment terminal L1/L2/L3' to AC cable (L1/L2/L3)
3. Connecting to UPS 1 and UPS 2:
   III. Remove all busbars of the UPS
   IV. Connect UPS 1 and UPS 2 to the MBP with 'Cable to UPS 1' and Cable to UPS 2' included in the MBP's accessory

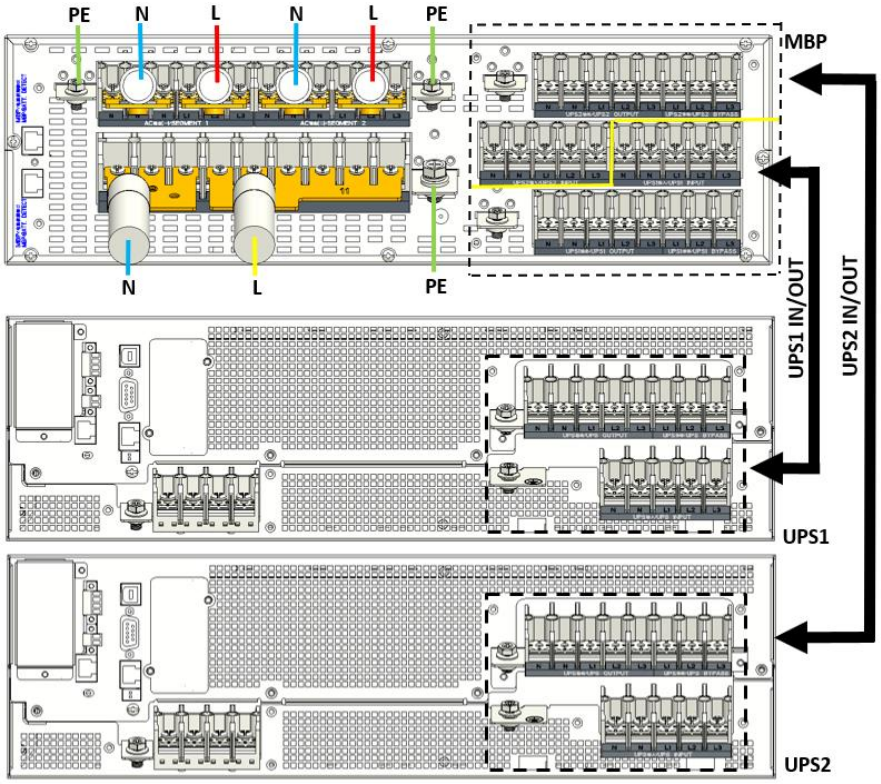
3.3.4 Mode 3-3(Dual source):



1. Input:
    I. Connect the main-ground cable (PE) to the chassis
    II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #9’, then connect the AC cable (N), and bypass source cable (N) to it
    III. Connect the ‘AC input terminal mL1/mL2/mL3’ to the main source cable (L1/L2/L3)
    IV. Connect the ‘AC input terminal bL1/bL2/bL3’ to the bypass source cable (L1/L2/L3)
2. Output:
    I. Connect the ground cable (PE) to the chassis
    II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it
    III. Connect the ‘AC segment terminal L1/L2/L3’ to AC cable (L1/L2/L3)

3. Connecting to UPS 1 and UPS 2:
    I. Remove all busbars of the UPS
    II. Connect UPS 1 and UPS 2 to the MBP with ‘Cable to UPS 1’ and Cable to UPS 2’ included in the MBP’s accessory

3.3.5 Mode 1-1(single source) ：

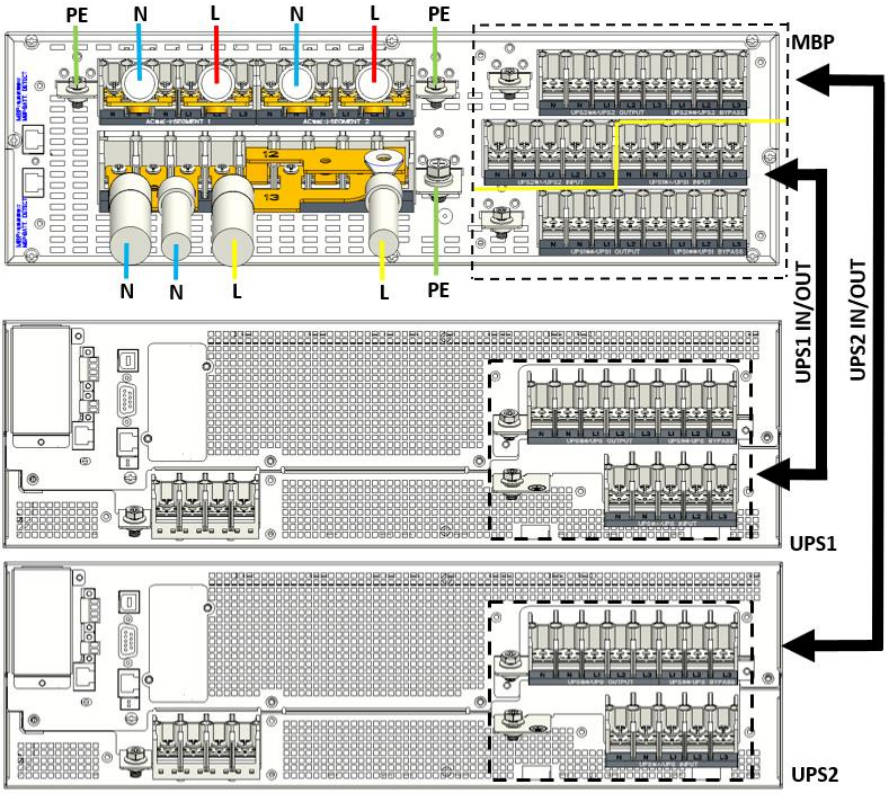


1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #9’, then connect the AC cable (N) to it
   III. Bridge the ‘AC input terminal mL1/bL1/mL2/bL2/mL3/bL3’ with ‘busbar #11’, then connect the AC cable (L) to it
2. Output:
   I. Connect the ground cable (PE) to the chassis
   II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it
   III. Bridge the ‘AC segment terminal L1/L2/L3’ with ‘busbar #3’, then connect the

AC cable (L) to it

3. Connecting to UPS 1 and UPS 2:
   I. Remove all busbars of the UPS
   II. Connect UPS 1 and UPS 2 to the MBP with 'Cable to UPS 1' and Cable to UPS 2' included in the MBP's accessory

3.3.6 Mode 1-1(Dual source) :



1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the 'AC input terminal N/N/N' with 'busbar #9', then connect the AC main source cable (N) and bypass source cable (N) to it

III. Bridge the ‘AC input terminal mL1/mL2/mL3’ with ‘busbar #13’, then connect the main source cable (L) to it

IV. Bridge the ‘AC input terminal bL1/bL2/bL3’ with ‘busbar #12’, then connect the bypass source cable (L) to it

2. Output:

I. Connect the ground cable (PE) to the chassis

II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it

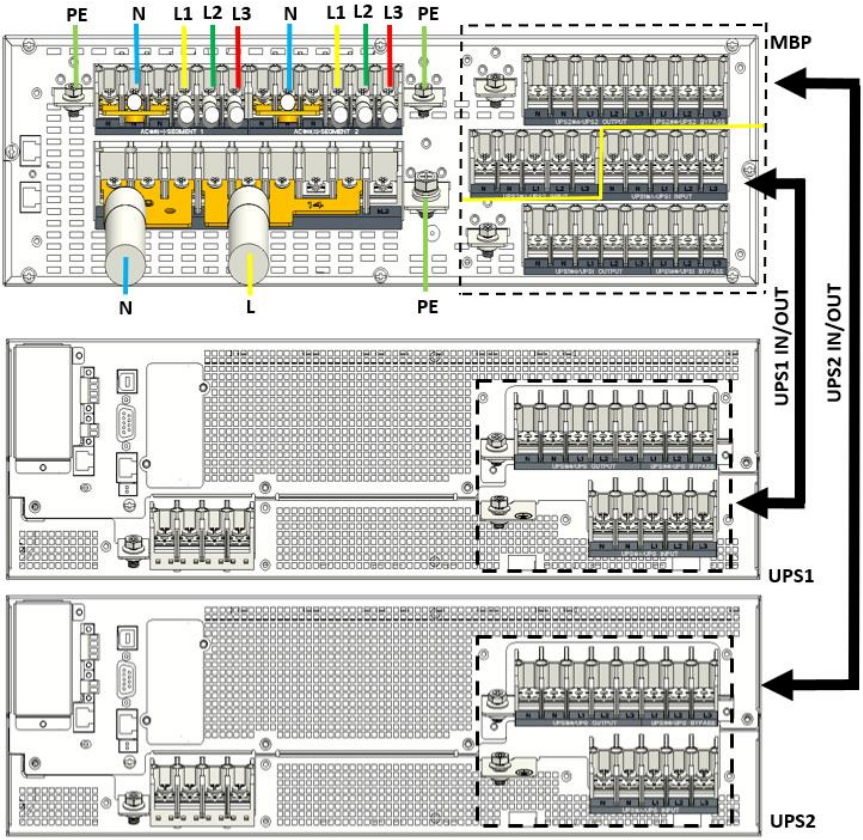
III. Bridge the ‘AC segment terminal L1/L2/L3’ with ‘busbar #3’, then connect the AC cable (L) to it

3. Connecting to UPS 1 and UPS 2:

I. Remove all busbars of the UPS

II. Connect UPS 1 and UPS 2 to the MBP with ‘Cable to UPS 1’ and Cable to UPS 2’ included in the MBP’s accessory

3.3.7 Mode 1-3(single source) ：



1. Input:
   I. Connect the main-ground cable (PE) to the chassis
   II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #9’, then connect the AC cable (N) to it
   III. Bridge the ‘AC input terminal mL1/bL1/mL2/mL3’ with ‘busbar #14’, then connect the AC cable (L) to it
2. Output:
   I. Connect the ground cable (PE) to the chassis
   II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it

III. Connect the ‘AC segment terminal L1/L2/L3’ to AC cable (L1/L2/L3)

3. Connecting to UPS 1 and UPS 2:

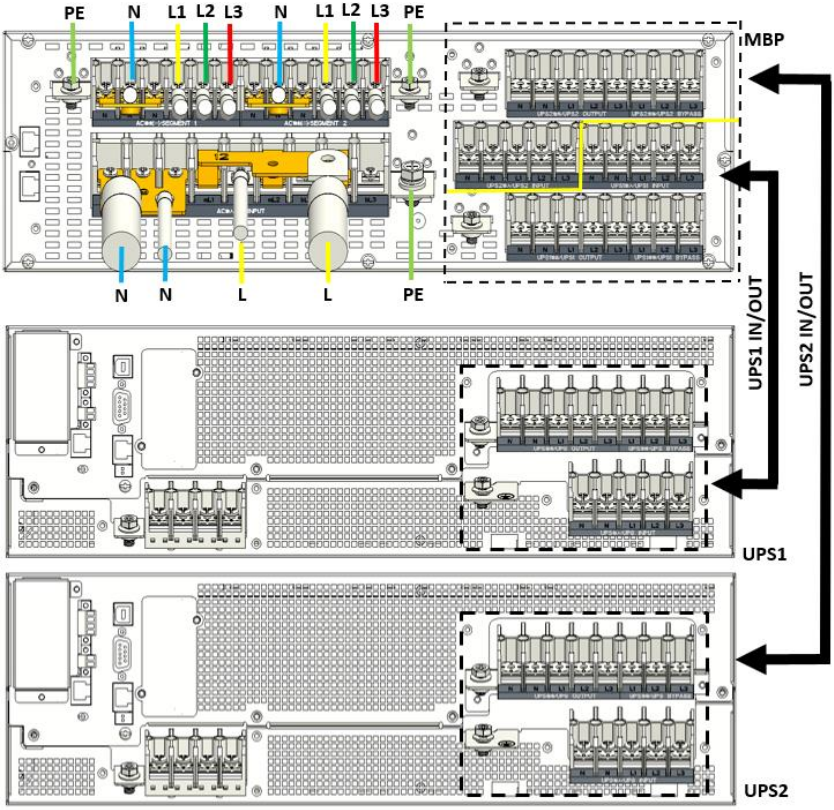
I. Remove all busbars of the UPS

II. Connect UPS 1 and UPS 2 to the MBP with ‘Cable to UPS 1’ and Cable to UPS 2’ included in the MBP’s accessory

Note:

Bypass is not available in this mode. Please use with caution.

3.3.8 Mode 1-3(Dual source) ：



1. Input:
    I. Connect the main-ground cable (PE) to the chassis
    II. Bridge the ‘AC input terminal N/N/N’ with ‘busbar #9’, then connect the AC main source cable (N) and bypass source cable (N) to it
    III. Bridge the ‘AC input terminal mL1/mL2/mL3’ with ‘busbar #12’, then connect the main source cable (L) to it
    IV. Connect the ‘AC input terminal bL1’ to the bypass source cable (L)

2. Output:
    I. Connect the ground cable (PE) to the chassis
    II. Bridge the ‘AC segment terminal N/N/N’ with ‘busbar #3’, then connect the AC cable (N) to it
    III. Connect the ‘AC segment terminal L1/L2/L3’ to AC cable (L1/L2/L3)

3. Connecting to UPS 1 and UPS 2:
    III. Remove all busbars of the UPS
    IV. Connect UPS 1 and UPS 2 to the MBP with ‘Cable to UPS 1’ and Cable to UPS 2’ included in the MBP’s accessory

Note:

Bypass is not available in this mode. Please use with caution.

4. Operation

This section describes the operation of the MBP, using the operation of the 1+1 Parallel MBP as an example.

4.1 Wiring of detection cable

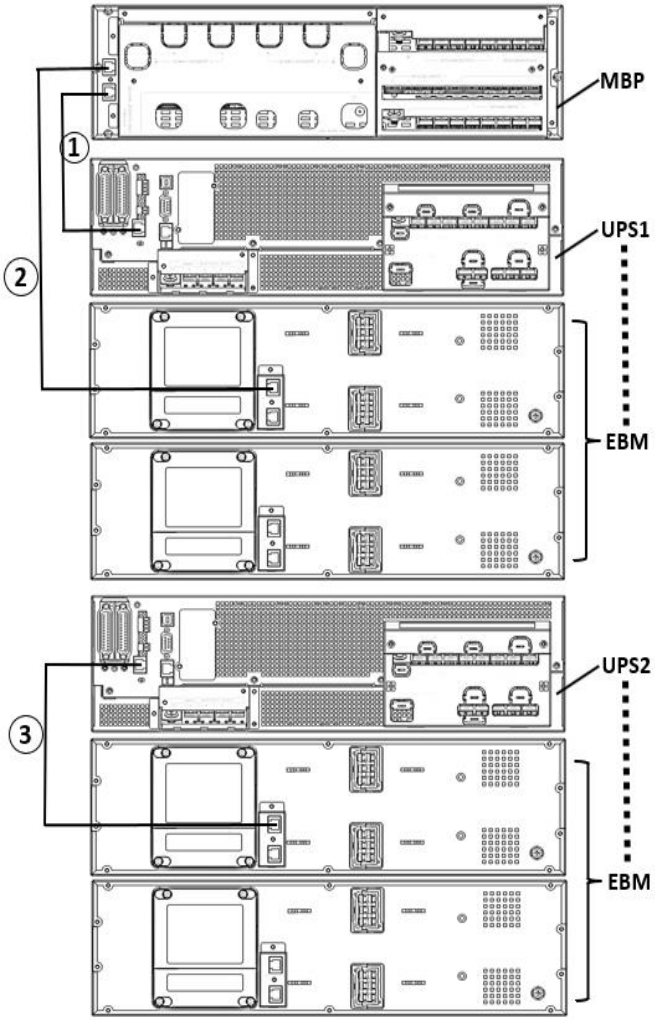
Notes:

- *Refer to section 3 to complete the AC connection of the UPS and MBP.*
- *Refer to the UPS user manual or EBM quick start guide to complete the EBM connection*
- *Refer to the UPS user manual for the connection of the 'parallel cable' between multiple UPS*

Set up the system's detection loop following the steps below:

1. MBP detection: connect the MBP to UPS1 via the 'MBP Detection cable', included with the MBP
2. EBM 1 detection: connect EBM 1 of UPS 1 to the MBP via the 'EBM Detection cable', included in the EBM box
3. EBM 2 detection: connect EBM 1 of UPS 2 to the MBP via the 'EBM Detection cable', included in the EBM box

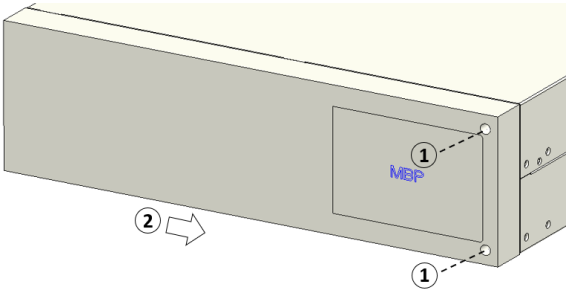
Note: If the paralleled UPS system is used for redundancy, the Neutral switch needs to be kept at the 'ON' position when any of the UPS is removed.


MBP
1
UPS1
2
EBM
UPS2
3
EBM

4.2 Normal mode to maintenance bypass mode

Remove plastic-panel:

Loosen the plastic panel screws of the MBP and remove the plastic panel as shown below.

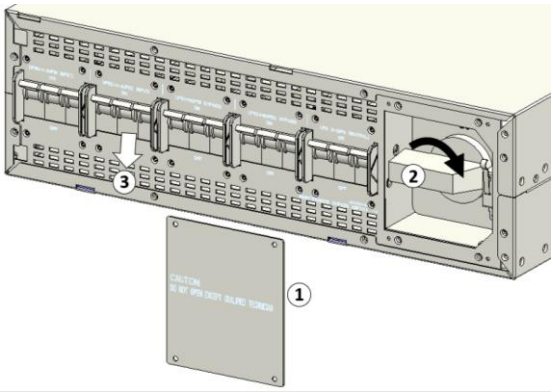


Rotate the 'Maintenance Bypass Switch':

1. Remove the protective panel of 'Maintenance Bypass Switch'.
2. At this point, the UPS will transfer to internal bypass automatically (given MBP detection cables are connected properly).
3. Rotate the handle of the Maintenance Bypass Switch to the 'MAINTENANCE' position.

Open the 'Input switch':

1. Set the UPS to standby mode from the LED screen control
2. Open all the 'Input switch' by pushing the swith levers downwards on the front panel of the MBP to the 'OFF' position
3. The recommended operation sequence is: UPS input switch → UPS bypass switch → UPS Neutral switch.

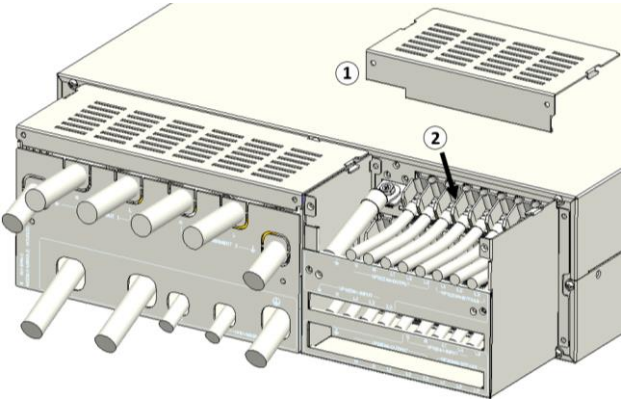


Remove the UPS:

1. Disconnect all the EBMs from the UPS and ensure that the UPS has been completely shut down.
2. Remove all the wiring between the MBP and the UPS, then remove the UPS for maintenance/replacement.

Caution:

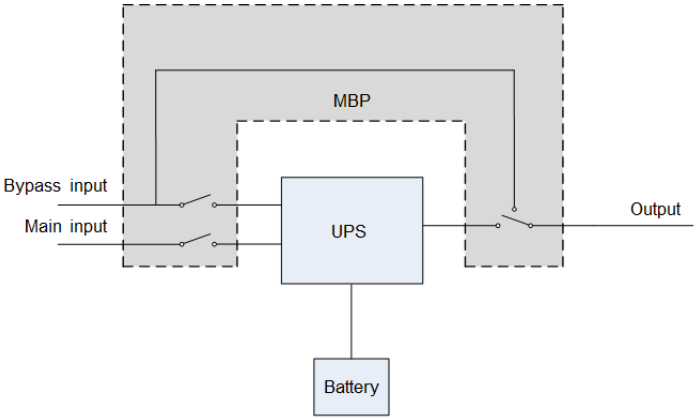
When removing the 'UPS to MBP' connection cables, only remove the top cover of the terminal box. Leave the AC input/output connection terminal box as is to prevent electric shock.



Note:

After the removal of the UPS, it is recommended to replace the plastic panel to the MBP to prevent accidental operation of the switch, causing potential electric shock.

Appendix 1: System block diagram



Appendix 2: Product specification

<table>
<tr><th colspan="2">Model name</th><th>MBP20K</th><th>MBP20KPDU</th><th>MBP20KPARA</th></tr>
<tr><td rowspan="4">Input</td><td>Voltage range
(Phase voltage)</td><td colspan="3">220/230/240VAC</td></tr>
<tr><td>Frequency</td><td colspan="3">50/60Hz</td></tr>
<tr><td>Rated current
(Single phase input)</td><td colspan="2">129A MAX</td><td>258A MAX</td></tr>
<tr><td>Rated current
(Three phase input)</td><td colspan="2">43A MAX</td><td>86A MAX</td></tr>
<tr><td rowspan="4">Bypass</td><td>Rated voltage
(Phase voltage)</td><td colspan="3">220/230/240VAC</td></tr>
<tr><td>Frequency</td><td colspan="3">50/60Hz</td></tr>
<tr><td>Rated current
(Single phase input)</td><td colspan="2">93A MAX</td><td>186A MAX</td></tr>
<tr><td>Rated current
(Three phase input)</td><td colspan="2">31A MAX</td><td>62A MAX</td></tr>
<tr><td rowspan="5">Output</td><td>Voltage range</td><td colspan="3">220/230/240VAC</td></tr>
<tr><td>Frequency</td><td colspan="3">50/60Hz</td></tr>
<tr><td>Rated power</td><td colspan="2">20kVA/20kW</td><td>40kVA/40kW</td></tr>
<tr><td>Socket rated current</td><td>/</td><td>16A[1]/10A</td><td>/</td></tr>
<tr><td>Overload</td><td colspan="3">Refer to UPS overload</td></tr>
<tr><td colspan="5">Environment: Refer to UPS</td></tr>
</table>