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# EPS Parallel Box Series

**User Manual**

EPS-PB-50

**RENAC**



## Content

1. About this Manual.....	2
1.1 Applicability .....	2
1.2 Explanation of symbols .....	2
2. Introduction .....	3
2.1 Dimension .....	3
2.2 Technical data.....	3
2.3 Electrical system design .....	4
2.4 EPS Parallel Box and hybrid inverter connection overview .....	5
3. Installation and startup .....	6
3.1 Package information .....	6
3.2 Check for transport damage.....	6
3.3 Installation environment .....	6
3.4 Installation steps .....	7
3.5 Electrical connection .....	8
3.5.1 Backup load port connection .....	9
3.5.2 Grid port connection .....	10
3.5.3 EPS port connection .....	11
3.5.4 Communication connection .....	12
4. Connection of Parallel System .....	13
4.1 Master Inverter and Slave Inverter .....	13
4.2 All communication connection of parallel system .....	13
5. Functional modes.....	14
6. Parallel setting operation on LCD.....	14
7. Exit the parallel system .....	15

## 1. About this Manual

### 1.1 Applicability

N3-HV series inverters support the parallel connection, which could make five inverters connected in one system. To consistently deliver power to large loads in both on-grid and off-grid situations, the hybrid system should connect a large changeover device to achieve parallel functions in any conditions. This manual describes EPS Parallel Box, which could achieve this changeover function.

Please read the safety instructions in this manual first. The manual assumes that the reader is familiar with installations and knows the rules and regulations for electrical equipment and connecting it to the utility AC grid. Being familiar with the general safety rules for working with electrical equipment is especially important.

### 1.2 Explanation of symbols

Throughout the manual important information is shown at different levels depending on the character of the information, as shown here:








	Safety information is important for human safety. Violation of warnings may result in injury to persons or death.
	Danger of high voltage and electric shock!
	Product should not be disposed as normal household waste.
	CE Mark
	Don't work on this inverter until it is isolated from battery, mains supply and on-site PV modules.
	Please read this manual before installation.
	Useful additional information or "Tips and Tricks" on specific subjects.

Table 1-1 Explanation of symbols

## 2. Introduction

### 2.1 Dimension

Figure 2-1 shows the outline dimension of the EPS Parallel Box:

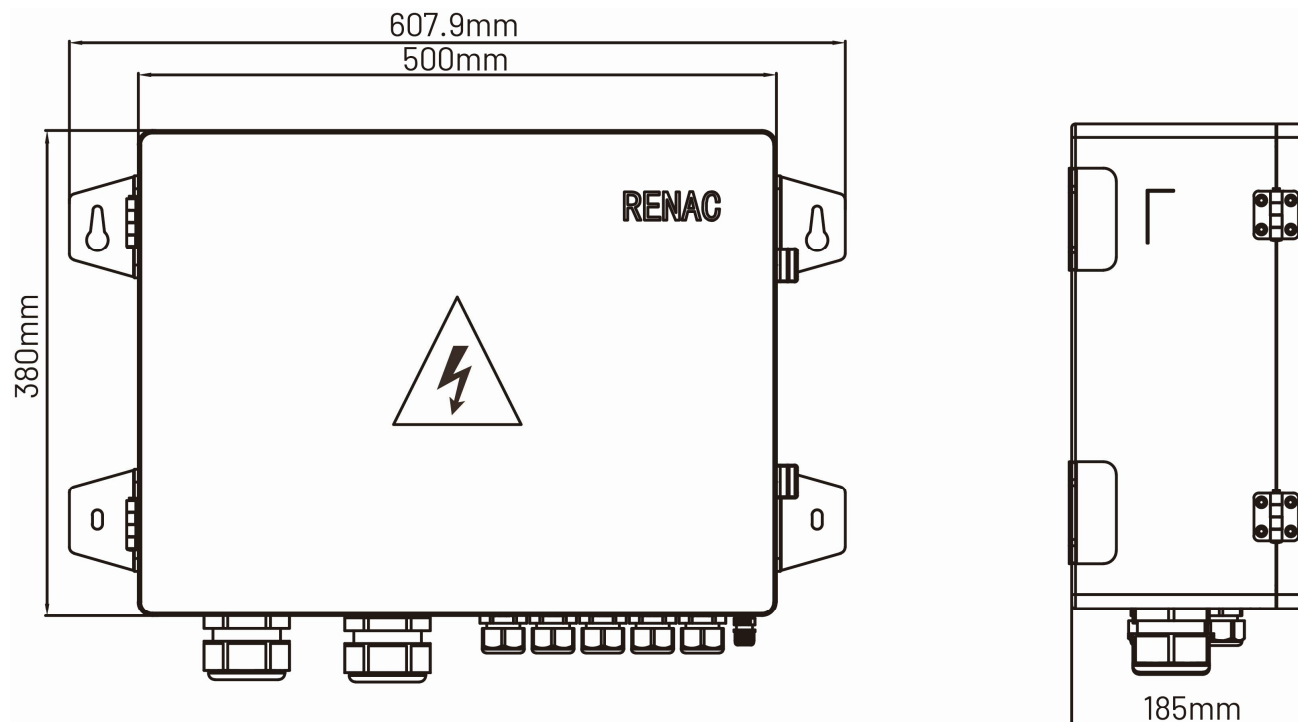


Figure 2-1

### 2.2 Technical data

<b>Model</b>	<b>EPS-PB-50</b>
<b>Grid Parameter</b>	
Rated AC Grid Voltage [V]	3L/N/PE, 220/380, 230/400
Maximum grid input current [A]	76
AC Frequency [Hz]	50 / 60
<b>EPS Parameter</b>	
Rated voltage [V]	3L/N/PE, 220/380, 230/400
Maximum EPS input current [A]	76
Maximum EPS input current per channel [A]	15.2
EPS Frequency [Hz]	50 / 60
<b>Load Parameter</b>	
Rated voltage [V]	Single/Three Phase, 220/380, 230/400
Maximum output current [A]	76
Maximum apparent power [KVA]	50
AC Frequency [Hz]	50 / 60
Switchover time [s]	< 10

<b>Model</b>	<b>EPS-PB-50</b>
<b>General Parameter</b>	
Operating temperature range [°C]	-25 ~ +60
Compatible inverter number	5
Installation Type	Wall - mounted
Enclosure	IP65
Size (L * W * H) (mm)	607.9*380*185
Weight (kg)	20.27kg

Table 2-3 Technical data

### 2.3 Electrical system design

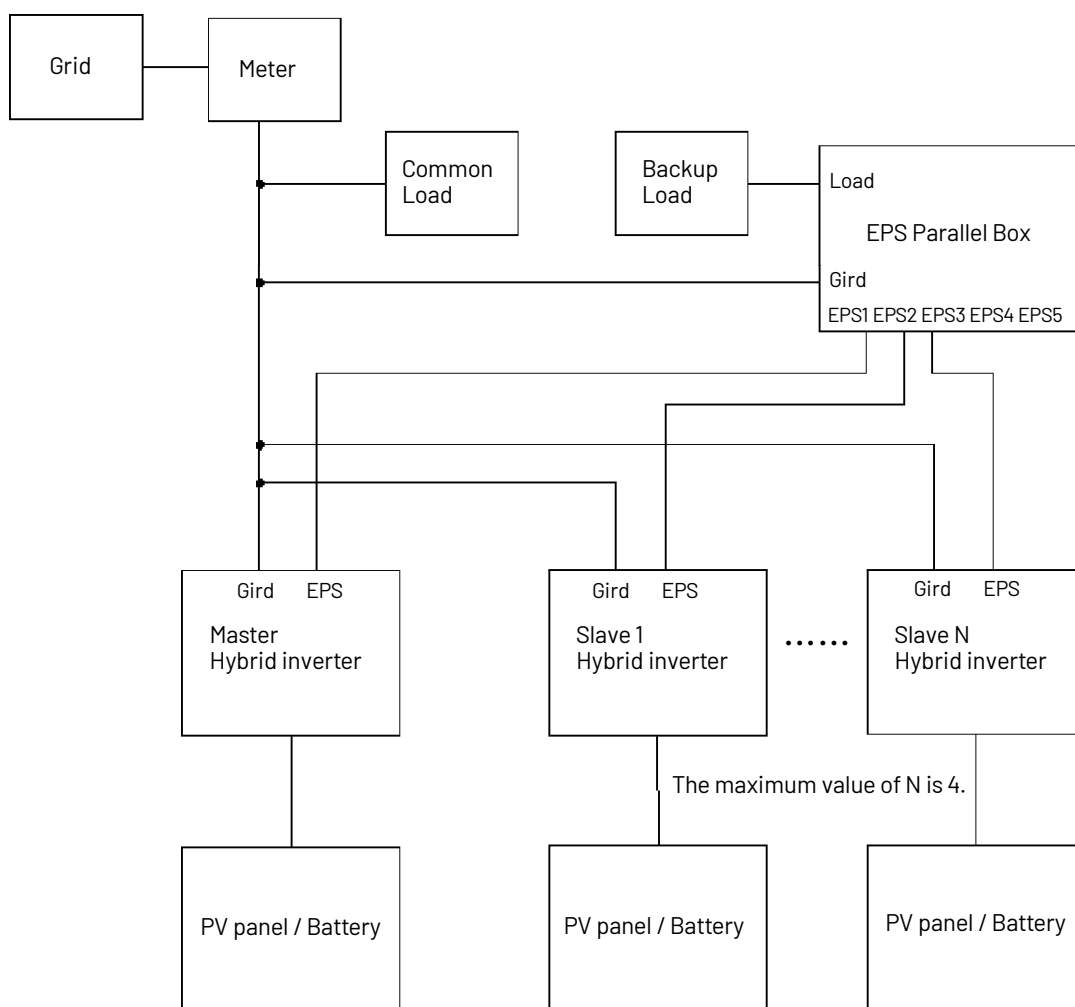


Figure 2-2

2.4 EPS Parallel Box and hybrid inverter connection overview

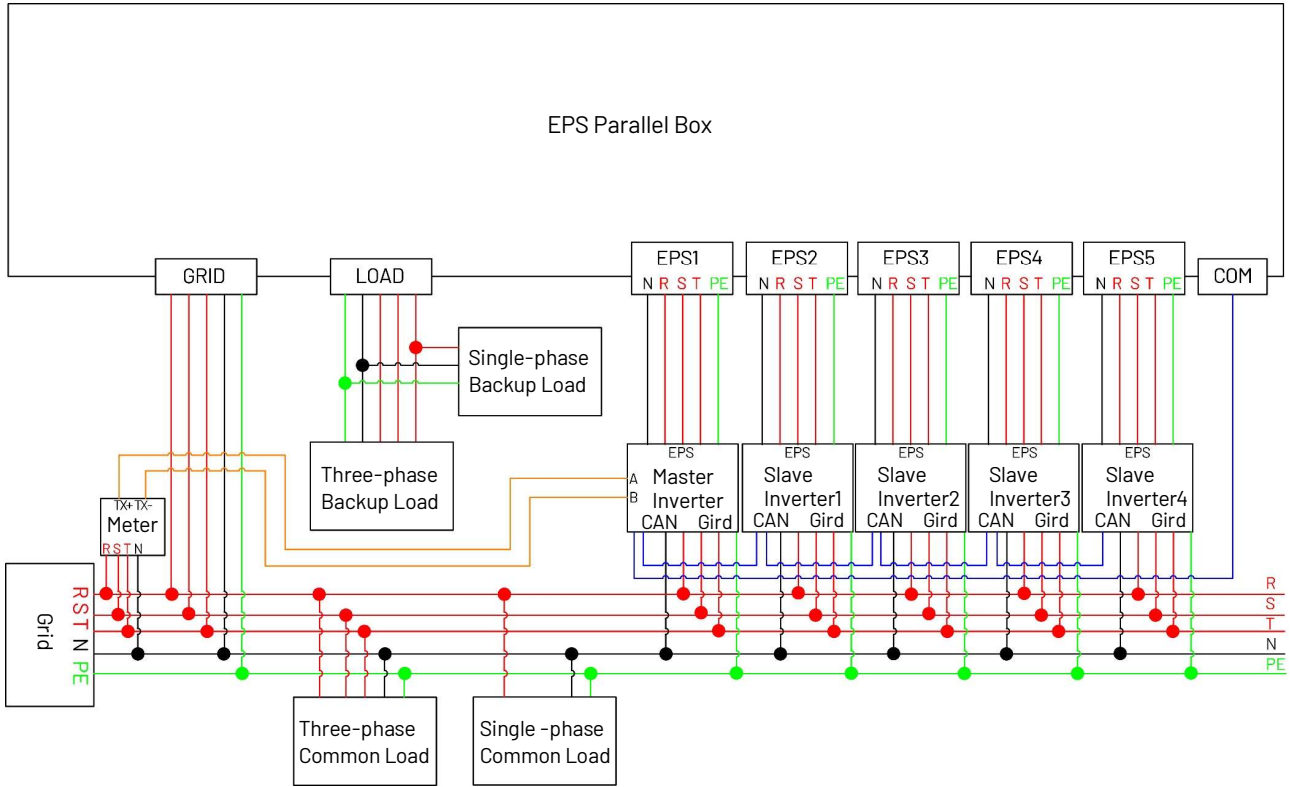


Figure 2-3



**NOTE!**

The CAN communication port is the parallel port of the hybrid inverter (Figure 3-18).  
 The meter, as well as the CT connection, can be referred to the N3-HV user manual.

### 3. Installation and startup

#### 3.1 Package information

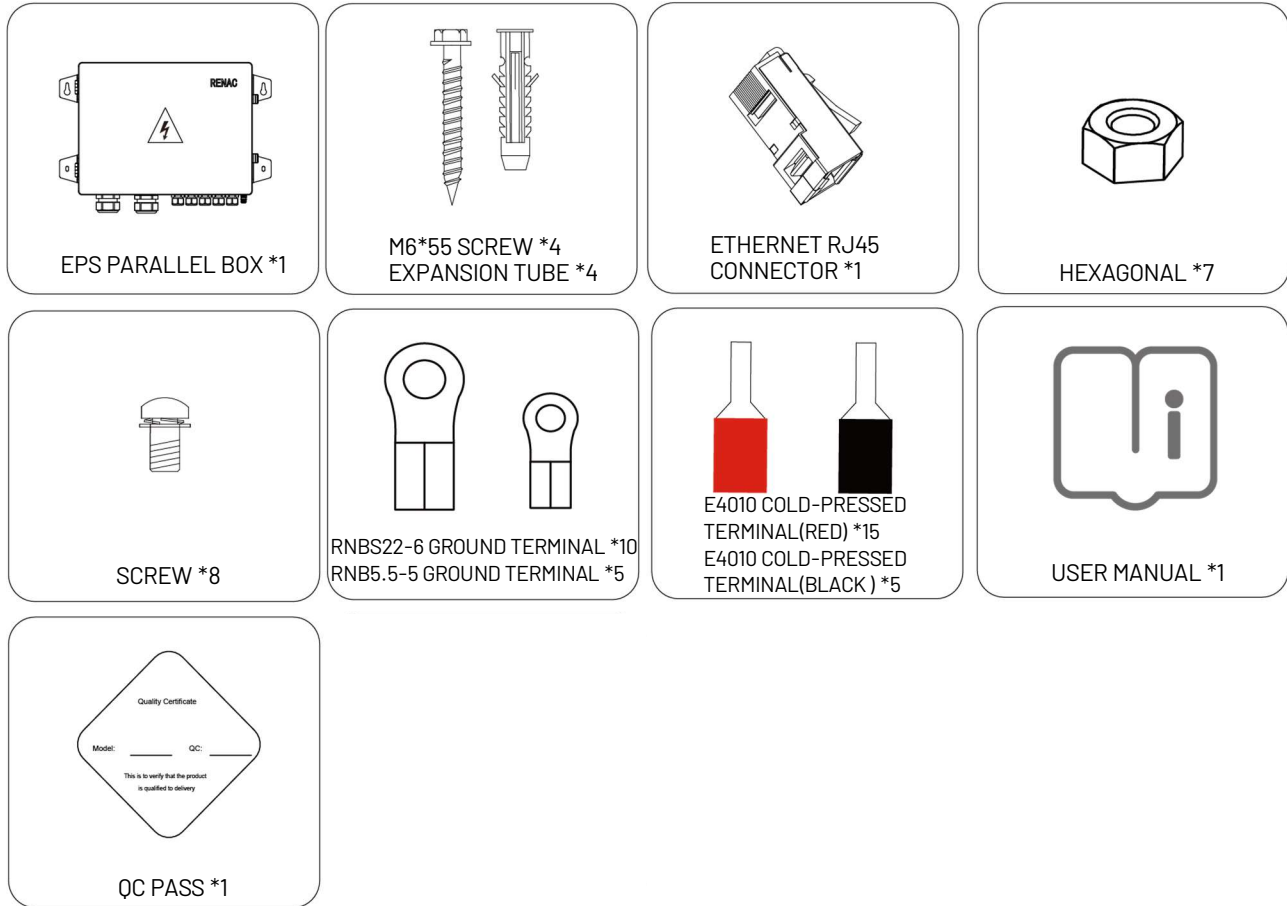


Figure 3-1 Package information

#### 3.2 Check for transport damage

On opening the packaging, inspect the product for any damage. In case of concern, please contact the dealer immediately.

#### 3.3 Installation environment

The EPS Parallel Box is designed for outdoor installation (IP65)

- Do not install EPS Parallel Box in direct sunlight.
- Do not mount EPS Parallel Box on flammable material.
- Do not install EPS Parallel Box in areas where flammable materials are stored.
- Do not install EPS Parallel Box in areas where flammable materials are stored.
- Do not install EPS Parallel Box during rain or high humidity (>95%).
- Provide adequate ventilation when using batteries.
- Install EPS Parallel Box where air temperature would be below 40°C.
- Children should not have access to EPS Parallel Box.
- Mounting should not tilt more than 5 degrees.



- The EPS Parallel Box is heavy, ensure the mounting is strong enough to hold the weight of the EPS Parallel Box.
- If installed in a cabinet, closet, or other small enclosed areas, sufficient air circulation must be ensured in order to dissipate heat generated by the unit.

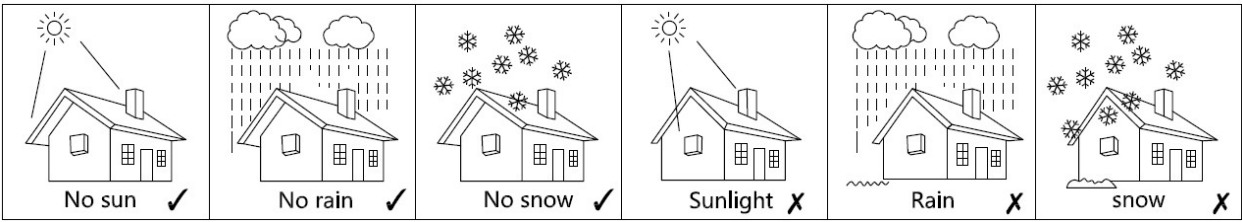


Figure 3-2 Installation environment

**3.4 Installation steps**

Step 1: Drill 4 Fix  $\varnothing 10$  holes in the wall according to the dimensions.

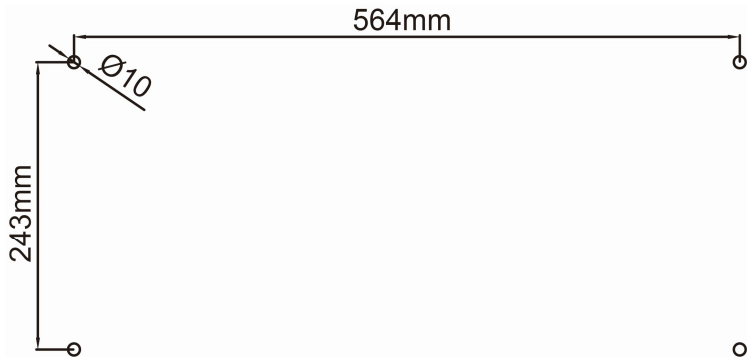


Figure 3-3 Wall mounting

Step 2: Fix two expansion screws in the upper row of the wall, but do not tighten them completely, and knock the two expansion tubes to the below row of the wall.

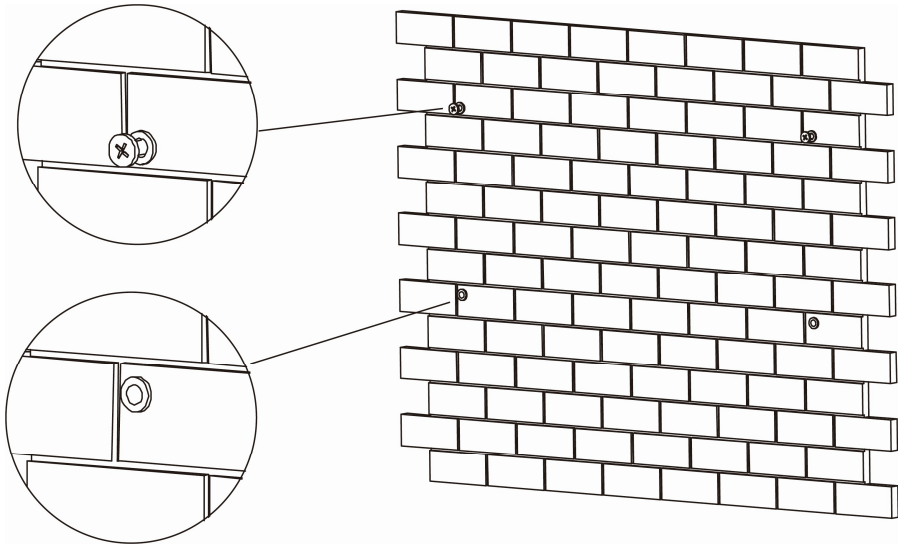


Figure 3-4

Step 3: Fix the EPS Parallel Box on the wall as shown in the figure, and screw all expansion screws on the wall.

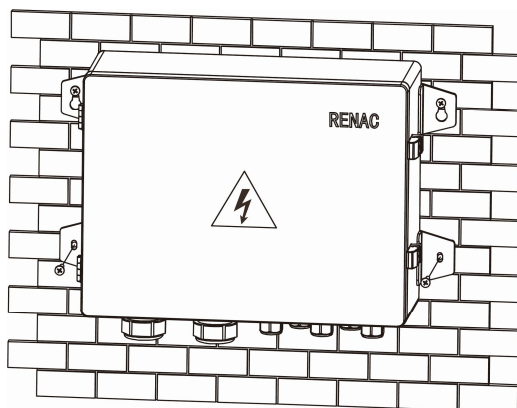


Figure 3-5

### 3.5 Electrical connection

For an overview of the connection terminals of the EPS Parallel Box, please refer to Figure 3-6.

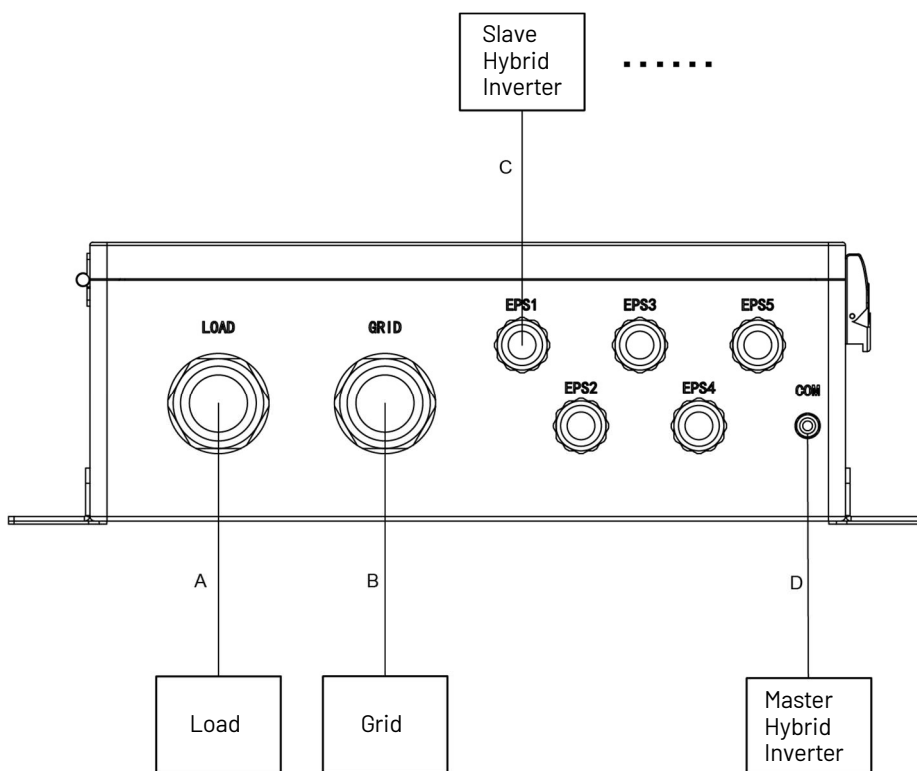


Figure 3-6

A	Load port Connection	B	Grid port Connection
C	EPS port Connection	D	Communication interface



**WARNING!**

The hybrid on & off grid parallel system is extremely complex and a large number of cables need to be connected. Therefore, it is strongly required that every cable must be connected according to the correct line sequence(R-R, S-S, T-T, N-N). Otherwise, any small misoperation may cause the system run to fail.

### 3.5.1 Backup load port connection

The backup load port connection is between the parallel box and backup loads, which needs to connect five cables (R, S, T, N, PE).

#### Backup load port connection of the parallel box side:

Step1: Remove the cable jacket by 40 mm, and strip the wire insulation by 8 mm-12 mm.

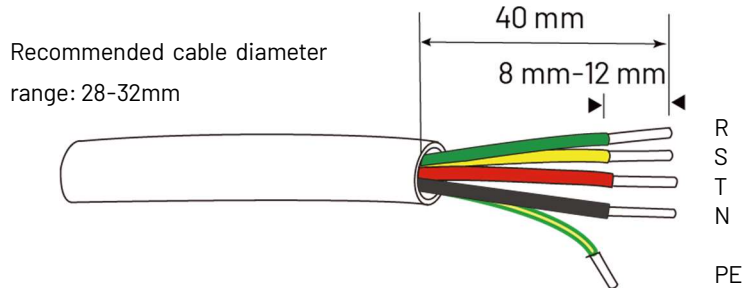


Figure 3-7

Step2: Insert the stripping terminal, and press the terminal head with the blank holder.

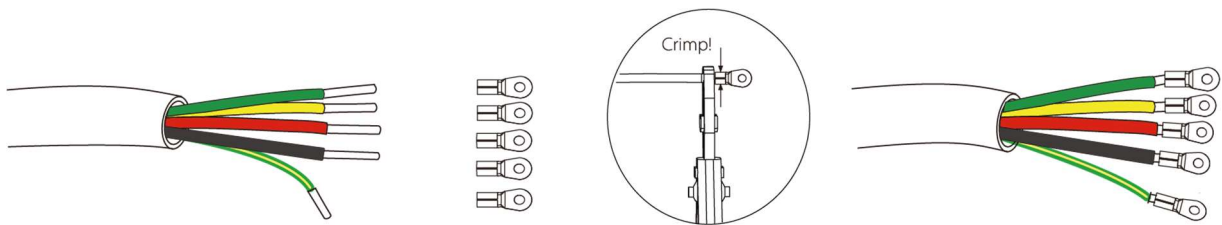


Figure 3-8

Step3: Screw through cable port (R, S, T, N, PE) and corresponding load ports (R-bar, S-bar, T-bar, N-bar, PE-bar) and tighten.

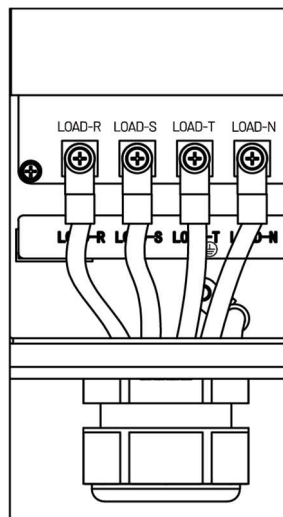


Figure 3-9



#### WARNING!

Before the system installation, users must project some necessary load as the backup loads, which need to be worked on when there is an outage. Some requirements shown below must be satisfied.

The algebraic apparent power of backup loads must be less than the Algebraic apparent power of hybrid system \* 0.9.

The algebraic RCD apparent power of RCD backup loads must be less than the Algebraic apparent power of hybrid system \* 0.6.

3.5.2 Grid port connection

The grid port connection is between the parallel box and grid, which needs to connect five cables (R, S, T, N, PE).

Backup load port connection of the parallel box side:

Step1: Remove the cable jacket by 40 mm, and strip the wire insulation by 8 mm-12 mm.

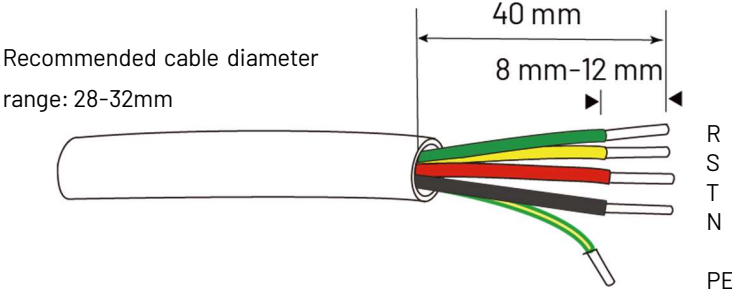


Figure 3-10

Step2: Insert the stripping terminal, and press the terminal head with the blank holder.

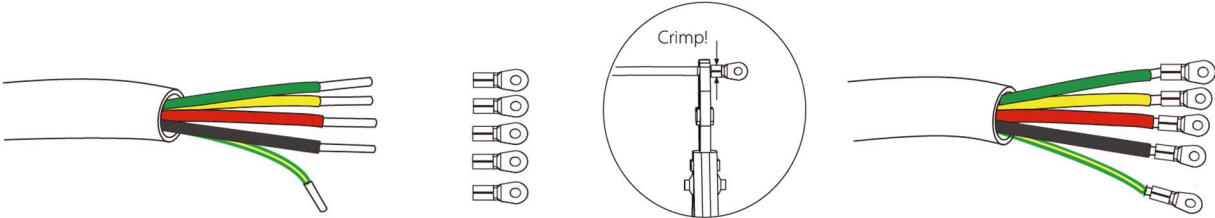


Figure 3-11

Step3: Screw through cable port (R, S, T, N, PE) and corresponding grid ports (R-bar, S-bar, T-bar, N-bar, PE-bar) and tighten.

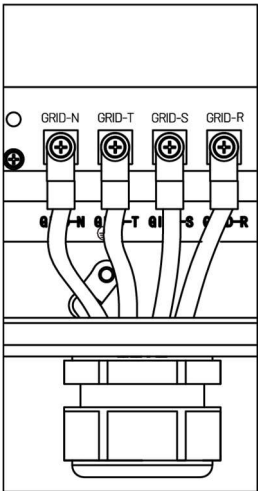


Figure 3-12

### 3.5.3 EPS port connection

The EPS port connection is between the parallel box and hybrid inverters, which needs to connect five cables (R, S, T, N, PE).

#### EPS port connection of the parallel box side:

Step 1: Remove the cable jacket by 40 mm, and strip the wire insulation by 8 mm-12 mm.

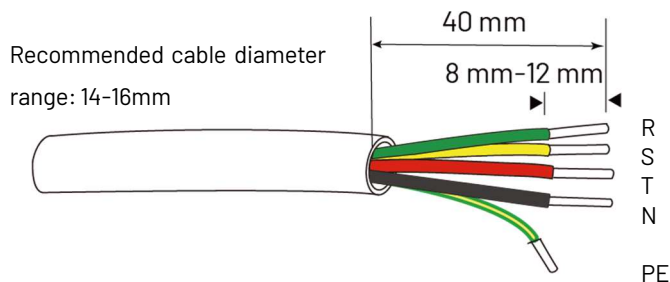


Figure 3-13

Step 2: Insert the stripping terminal, and press the terminal head with the blank holder.

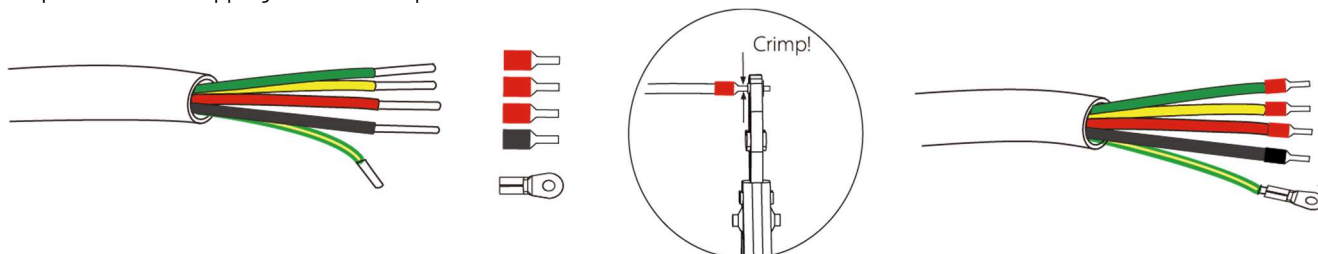


Figure 3-14

Step 3: Insert the cable port (R, S, T, N) into corresponding EPS ports (R-bar, S-bar, T-bar, N-bar). Screw through the cable port (PE) and corresponding EPS ports (PE-bar) and tighten.

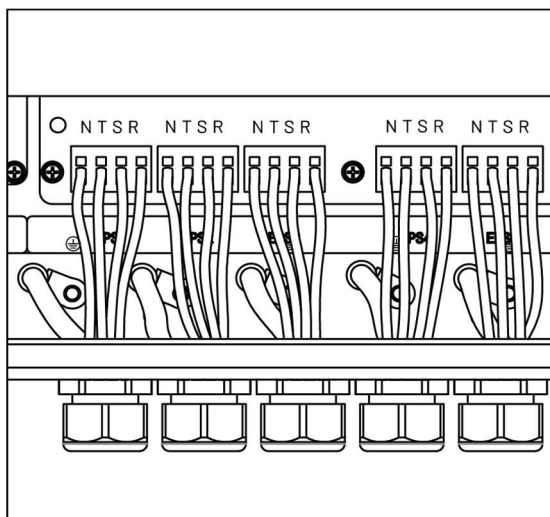


Figure 3-15

### 3.5.4 Communication connection

The communication connection is between the parallel box and the Master hybrid inverter. The interface is CAN with a RJ45 connector. The Pin definitions are as below.

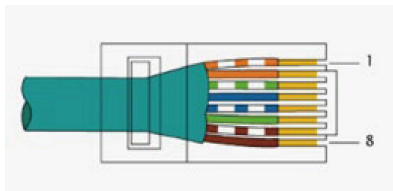


Figure 3-16

Pin	1	2	3	4	5	6	7	8
Function	RS485A	RS485B	VCC	CANH	CANL	GND	SYNA	SYNB

Note: Only 3 and 6 PIN pins are used.

#### Communication connection of the parallel box side:

Step1: Select the right cable with two RJ45 connectors as above Pin definitions.

Step2: Plug one side of the cable into the COM port of the parallel box.

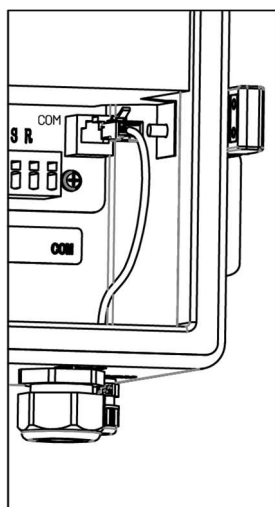


Figure 3-17

#### Communication connection of the master hybrid inverter side:

Plug the other side of the cable into the parallel port of the hybrid inverter.

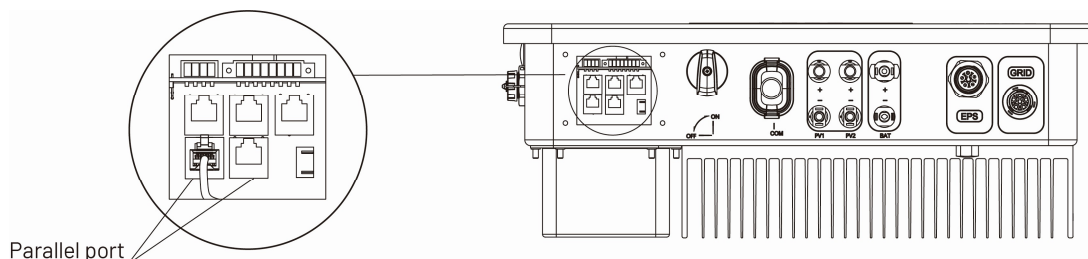


Figure 3-18

## 4. Connection of Parallel System

### 4.1 Master Inverter and Slave Inverter

In a parallel system, users need to set one inverter as the master inverter and other inverters as the slave inverters. The master inverter controls the energy management and scheduling control of other inverters. Only the master inverter needs to connect to the meter communication, and the rest of the slave inverters and the master inverter are connected in parallel through CAN communication.

### 4.2 All communication connection of parallel system

- The communication connection between Master Inverter and meter:

Connect the meter "TX+" "TX-" to inverter RS485 A and B referring to the 5.7.5 communication connection in the N3-HV User Manual.

- The communication connection between the Master Inverter and the parallel box:

Insert one side of the CAT7 cable into the first inverter's Parallel port and the other side into the COM port of the parallel box as Figure 3-17.

- The communication connection between Inverters:

Insert one side of the CAT7 cable into the first inverter's CAN port and the other side into the next inverter's CAN port.

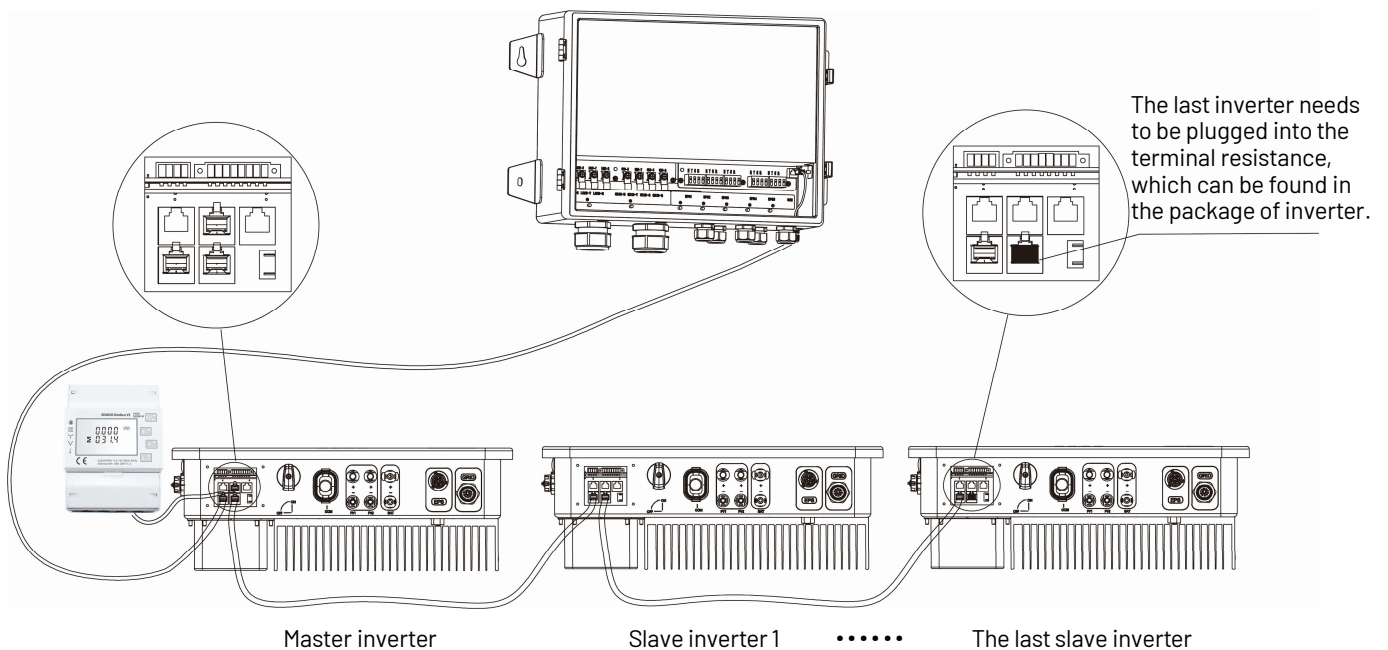


Figure 4-1



**NOTE!**

Fig.4-1 In order to show clarity, the devices are displayed as pictures of opening the upper cover or opening the terminal cover. After the actual wiring is completed, it should be in the box cover state.

## 5. Functional modes

The parallel system has the following functional modes based on the connected equipment.

### Functional mode: Single mode

No one inverter is set as a "Master". All inverters are in single mode in the system.

### Functional mode: Master mode

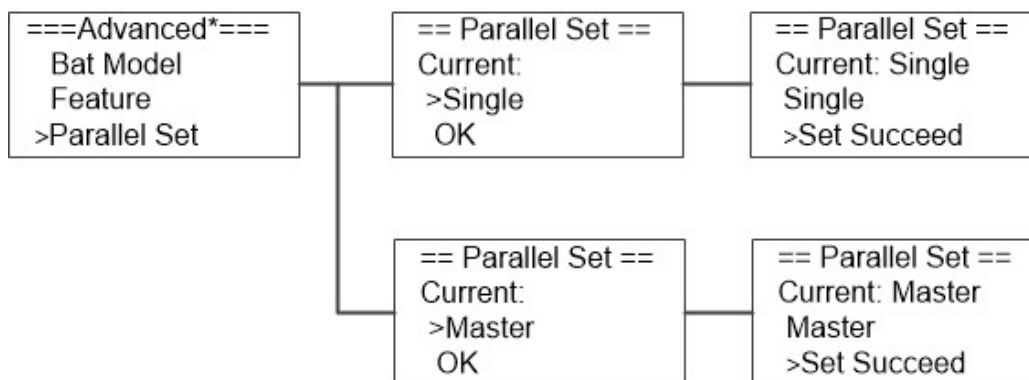
When one inverter is set as a "Master," this inverter enters master mode. The master mode can be changed to the single mode by LCD setting.

### Functional mode: Slave mode

When one inverter is set as a "Master," all other inverters will enter slave mode automatically. Slave mode can not be changed from other modes by LCD setting.

## 6. Parallel setting operation on LCD

The menu structure of the inverter has been described in the N3-HV Series User Manual. Users must turn the operation interface to "Advanced\*". Press up or down button to set the parallel functional mode. Press 'OK' to confirm.



**WARNING!**

If you want to replace the master inverter, you must first set the original master to single mode and then set the inverter to be replaced as the master.



## 7. Exit the parallel system

If one inverter wants to exit from this parallel system, please do the steps below:

Step 1: Disconnect all the network cables on the CAN port.

Step 2: Enter the "Advanced\*" page, click "parallel set", and choose "Single".



**NOTE!**

If a slave inverter is set to "Single" mode but does not disconnect the network cable, this inverter will return to "Slave" mode automatically.

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