

ZBENY

DLB Box Manual



ZHEJIANG BENYI NEW ENERGY CO.,LTD.

Address : Changjiang Rd, Wenzhou Daqiao Industry Park,
Beibaixiang Town, Yueqing, Wenzhou City, Zhejiang Province, China, 325600
TEL : +86-577-5717 7008 Email : benyi@zjbeny.com
VERSION : 20221210



For the latest version of specification, please refer to www.benyi.com or contact to benyi@zjbeny.com
We reserve the right to explain the terms of specification.

CONTENTS

Normal DLB

| | |
|--|----|
| 1. About DLB | 01 |
| 2. DLB Model Selection | 01 |
| 3. How DLB Box Works? | 03 |
| 4. How to install the DLB box? | 07 |
| 5. How to Set the Max Grid Current on DLB Box? | 11 |
| 6. DLB Troubleshooting | 13 |

Solar DLB

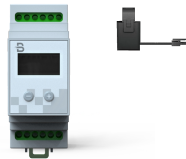
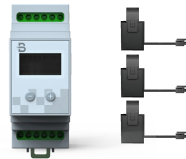
| | |
|---|----|
| 1. About solar DLB | 14 |
| 2. Solar DLB Model Selection | 15 |
| 3. How the solar DLB box works? | 17 |
| 3.1. CT Installation Diagram | 17 |
| 3.2. Once the inverter is too far to install PV CT | 21 |
| 3.2.1. How to set on DLB box when you can not install PV CT | 22 |
| 4. How to install the DLB box? | 23 |
| 5. Instrustions for using solar DLB | 29 |
| 6. Solar DLB Troubleshooting | 31 |

Normal DLB

1.About DLB

DLB (Dynamic Load Balancing) is available in the BCP series AC EV Charger for home use, when the EV charger is working with other household appliances at the same time, the DLB box can maintain the dynamic balance of the total household current and ensure the safety of electricity to avoid home over load.

2. DLB Model Selection

| | | |
|--|---|---|
| |  |  |
| Model | BCP-DLB-01S | BCP-DLB-03S |
| Phase | Single Phase | Three Phase |
| Extreme Mode | √ | √ |
| Number of Current Transformers | 1 | 3 |
| Display | OLED | |
| Allow Distance between DLB and Charger | More than 300M | |
| Current Transformer Default Length | 1.5m(Can be customized up to 15 meters) | |
| Installation | Rail installation/screw fixing | |
| Communication | RS485(Use RJ45 interface to connect with network) | |

Normal DLB

• What is Extreme Mode?

In this mode, charging will be stopped once the home loads keep increasing to avoid home over load.

Restart to charging once there is enough current like 10A for charger.

If the Extreme Mode is not turned on, the EV charger will not stop charging due to the DLB limit, and the lowest current that DLB can limit will be 6A.

• How to Active Extreme Mode?

The DLB Extreme Mode:

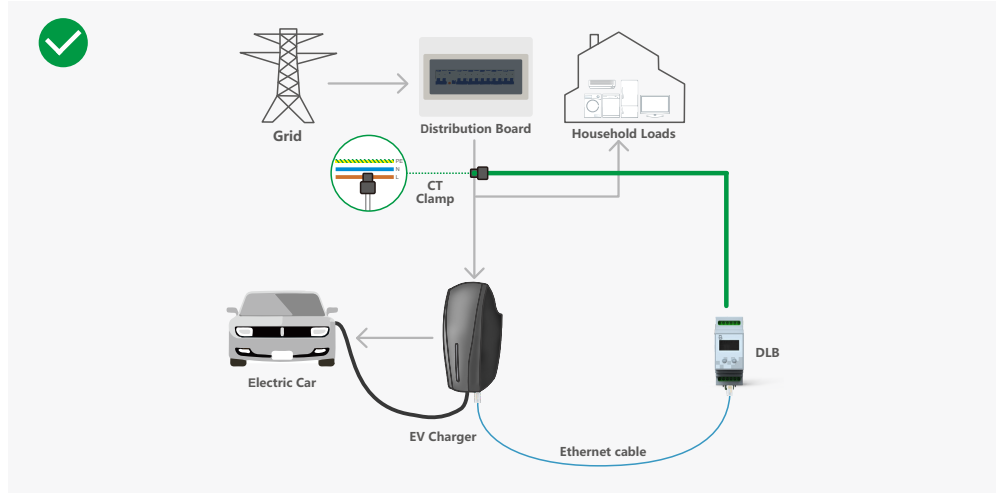
For a unsmart ev charger can be activated via DIP switch (the third one);

For a smart ev charger can be activated via APP setting.

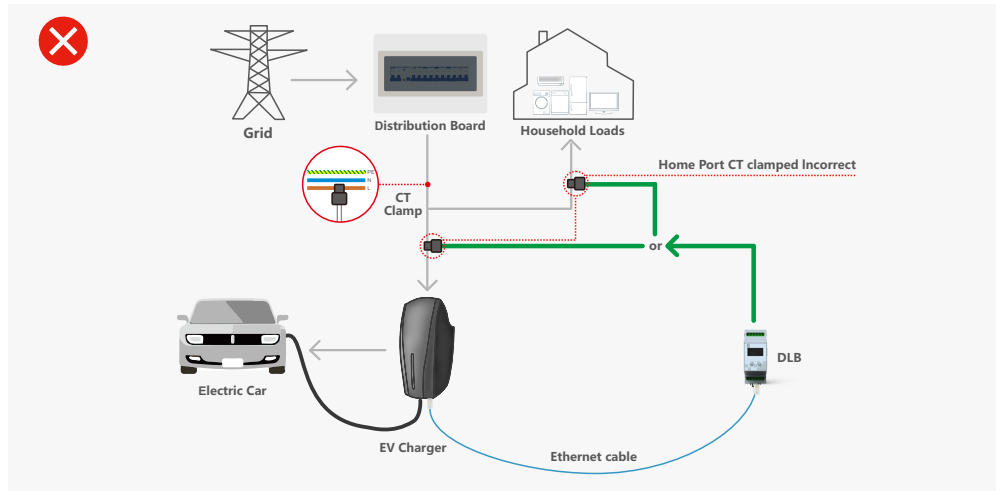
Normal DLB

3. How DLB Box Works?

- 1 Phase System with DLB: BCP-DLB-01S (Correct Installation)

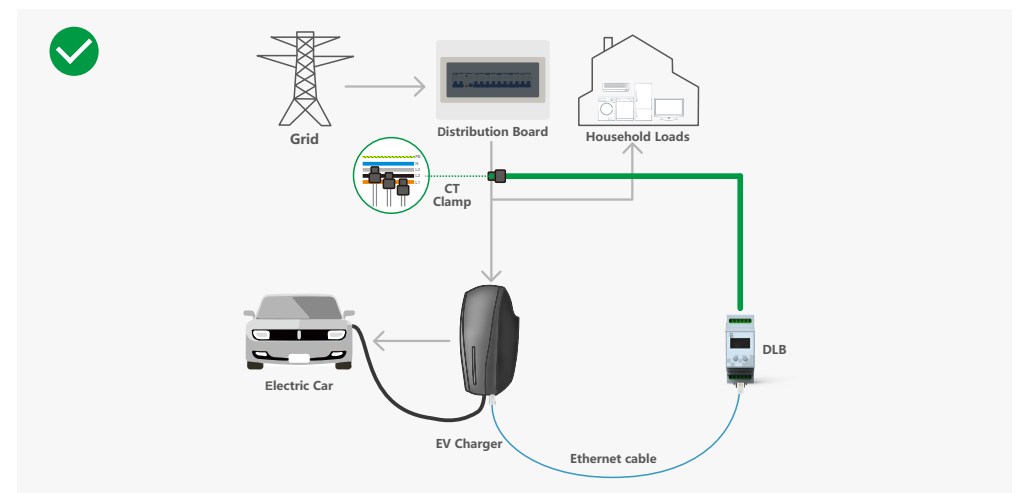


- 1 Phase System with DLB: BCP-DLB-01S (Incorrect Installation Demo)

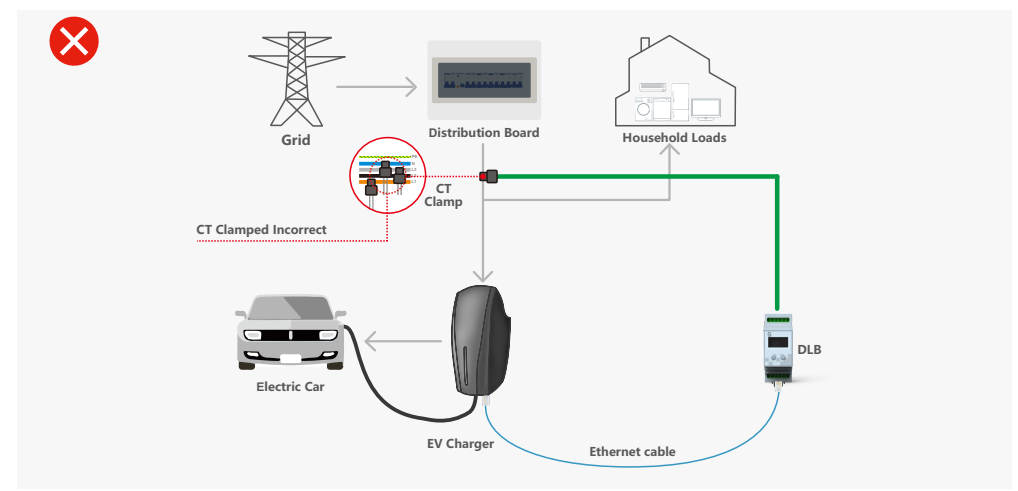


Normal DLB

- 3 Phase System with DLB: BCP-DLB-03S (Correct Installation)



- 3 Phase System with DLB: BCP-DLB-03S (Incorrect Installation Demo)



Normal DLB

What the current is that you set on DLB box?

For Single Phase DLB System:

The Current of EVC = Max Grid Current(Set on DLB Box) - Household Load Current

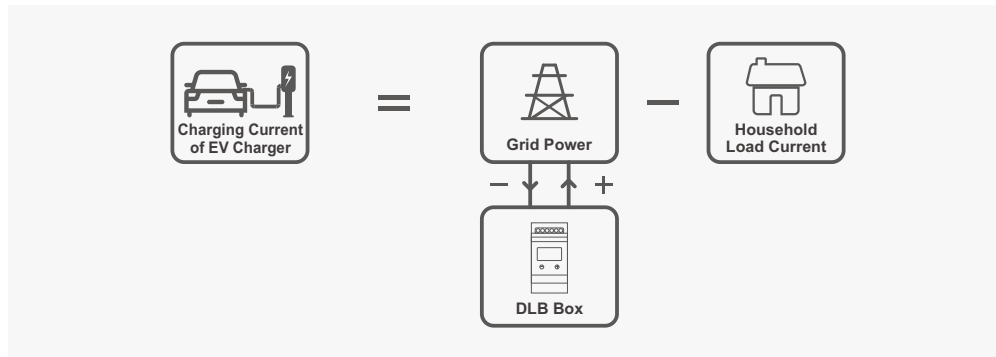
For Three Phase DLB System:

The Current of EVC = The Minimum between:

Max Grid Current A Phase(Set on DLB Box) - Household Load Current A Phase

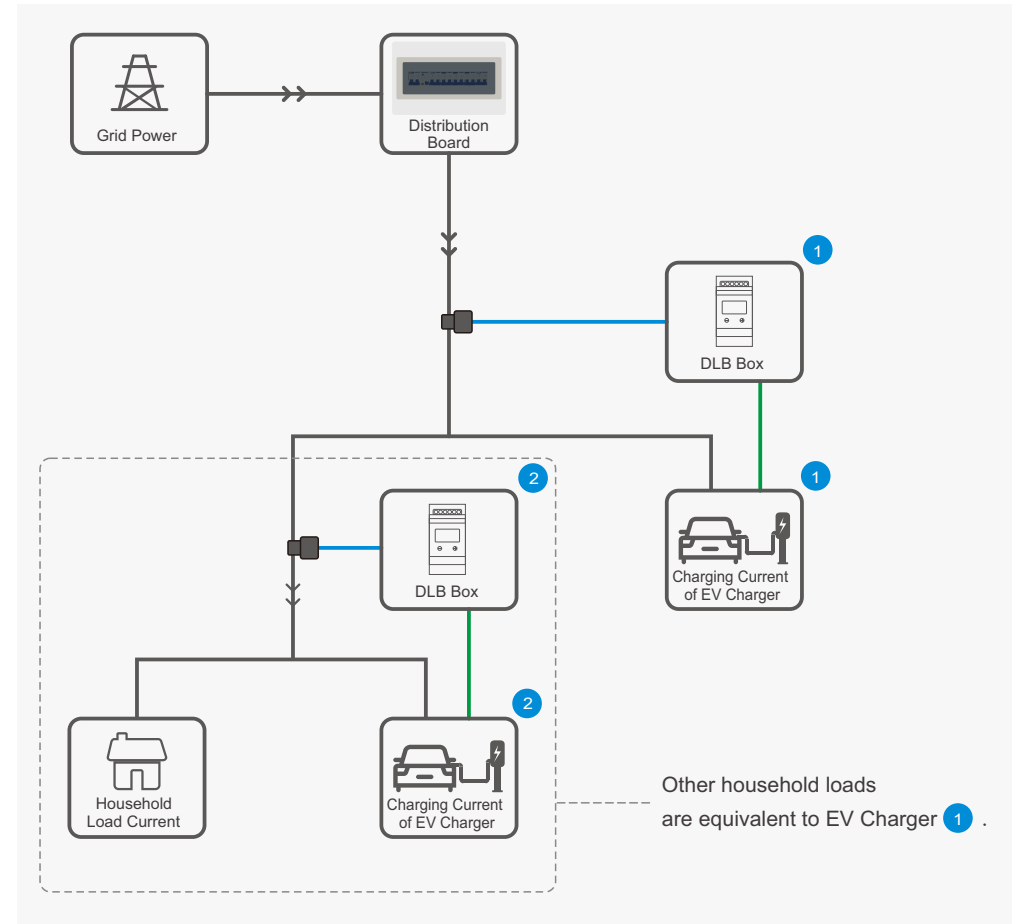
Max Grid Current B Phase(Set on DLB Box) - Household Load Current B Phase

Max Grid Current C Phase(Set on DLB Box) - Household Load Current C Phase



Normal DLB

• Multiple EV chargers System with DLB



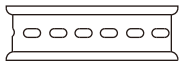
The Current of EVC **2** = Max Grid Current (Set on DLB Box **2**)- Household Load Current

The Current of EVC **1** = Max Grid Current (Set on DLB Box **1**) - Household Load Current -EV Charger **2**

Normal DLB

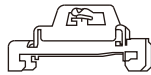
4. How to install the DLB box?

- Please double check your accessories



Din rail 105mm

X1



Din rail fixing parts

X2



M4*30 expansion screw kit

X2



Current Transformer
(1-phase DLB)*1
or
(3-phase DLB)*3

X1



Network cable - 5m
(RJ45 TIA/EIA-568B
8-core cat5 twisted pair cables)

X1



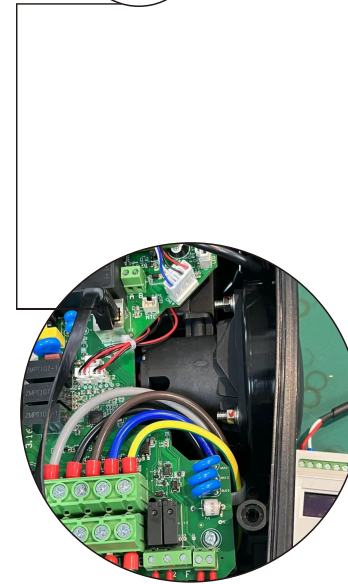
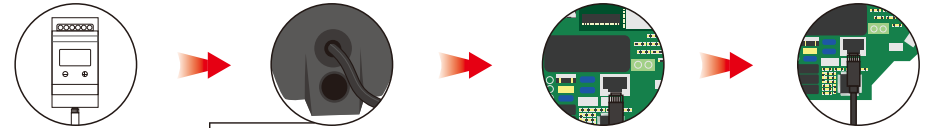
Normal DLB box

X1

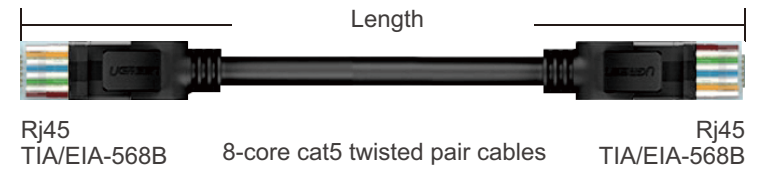
Normal DLB

- Network cable connection

Connect the DLB box with charger by the network cable.



- Network Cable Recommended



Normal DLB

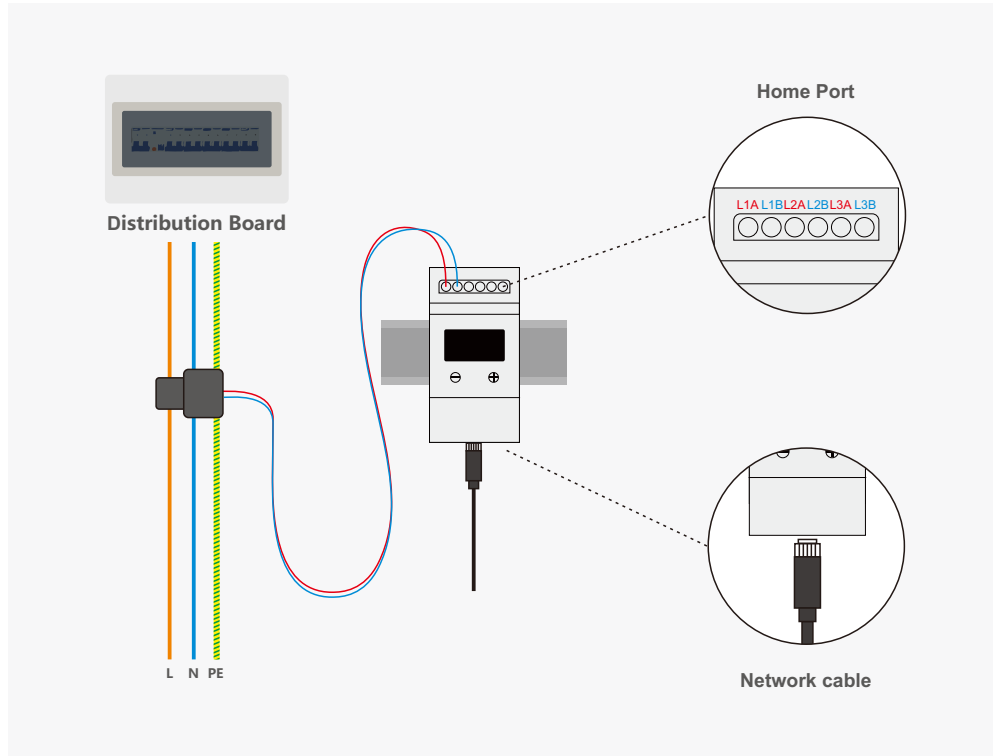
- CT installation of single phase DLB Box (BCP-DLB-01S)

Make CT clamp on house mains cable.

(Including some of or all of house loads and EV charger power cable)

Red cable of CT should be connected to L1A at the home port;

Blue cable of CT should be connected to L1B at the home port.



Normal DLB

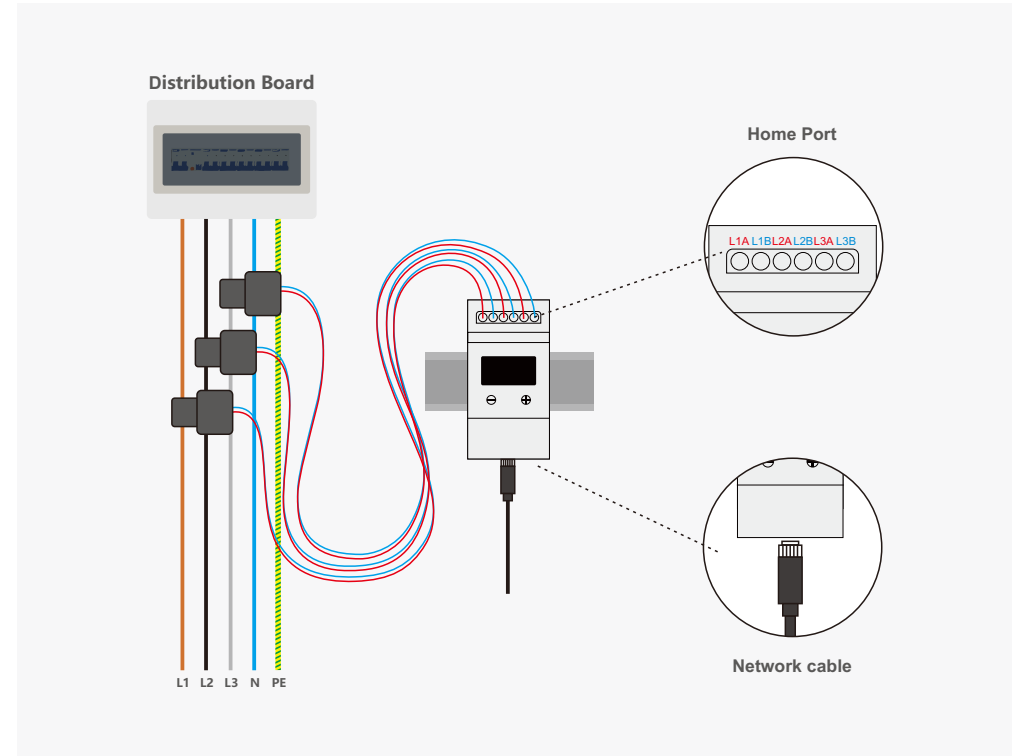
- CT installation of Three phase DLB Box (BCP-DLB-03S)

Make CT clamp on house mains cable.

(Including some of or all of house loads and EV charger power cable)

Red cable of CT should be connected to L1A, L2A, L3A at the home port;

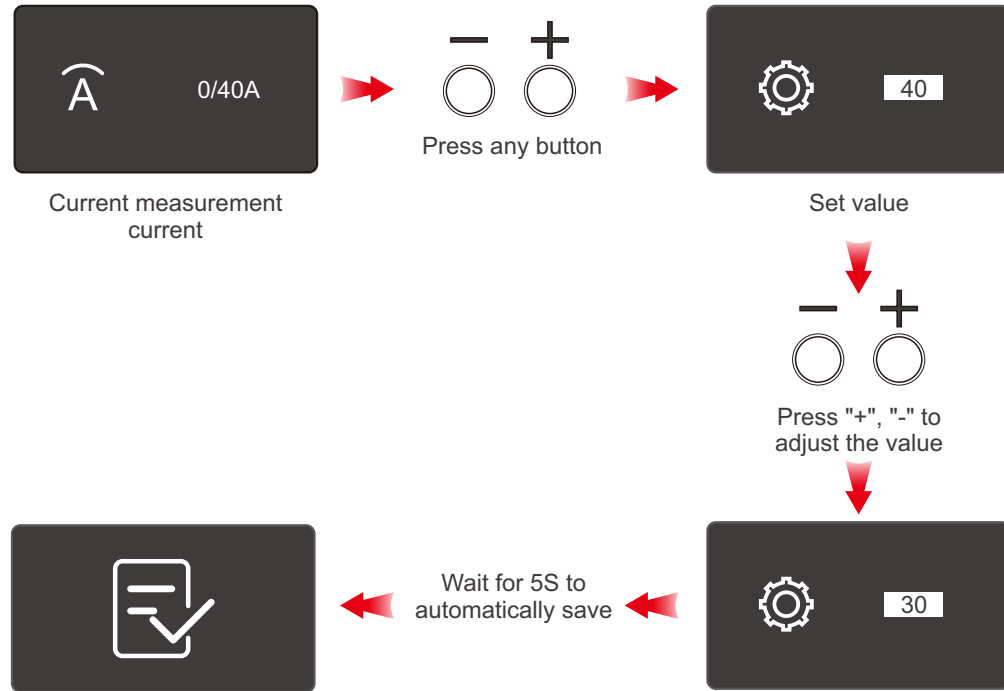
Blue cable of CT should be connected to L1B, L2B, L3B at the home port.



Normal DLB

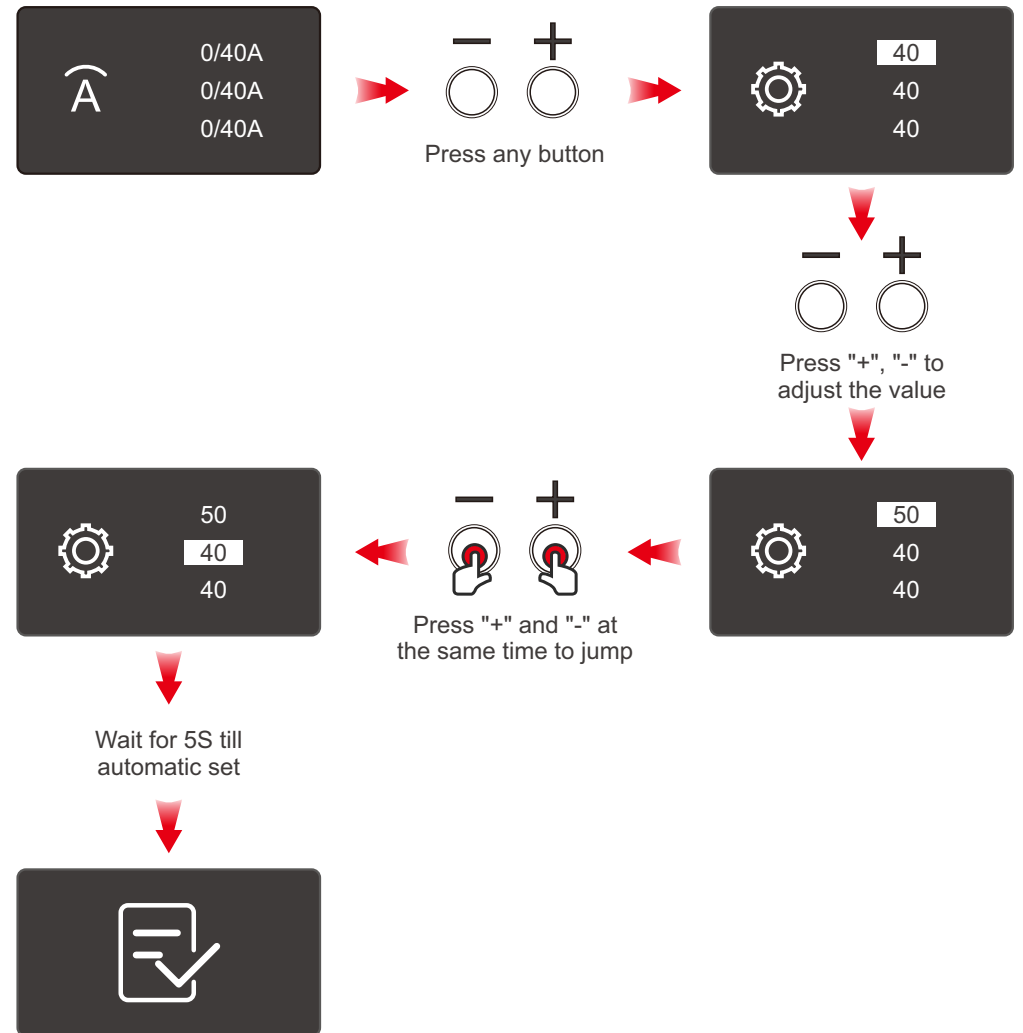
5. How to Set the Max Grid Current on DLB Box?

- For 1 Phase DLB box








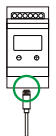


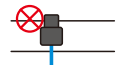
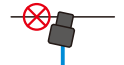


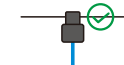

Normal DLB

- For 3 Phase DLB box



Normal DLB

6. DLB Troubleshooting

| LED light status | Fault type | Potential Cause | Action |
|---|----------------------|---|--|
|  Yellow light on for 1s  Red light flashes 1 time The yellow light of the charger light board lights for 1s, then the red light flashes for one time, and this happened in turn. | DLB offline |  RS485 cable is damaged  RS485 cable is not connected firmly |  Replace RS485 cable  Reconnect |
|  Yellow light on for 1s  The red light flashes twice in a row The yellow light of the charger light board lights on for 1s, and then the red light flashes twice in succession. This happens in turn. | DLB current abnormal |  CT is clamped on the wrong power cord  CT open coil is not connected firmly  The connection between the CT cable and the DLB is loose |  Check if the CT position is correct  Reconnect  Reconnect The DLB box doesn't measure the charging current of EV charger, check whether the cable is connected. |

Solar DLB

Solar DLB

1. About solar DLB

Solar DLB (Dynamic Load Balancing) is available in the BCP series AC EV charger for home and solar home use, controlling and monitoring the different powers from PV to make different modes come true.

*Full Speed Mode (As faster charging as possible)

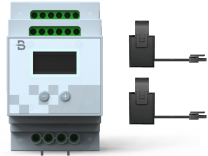
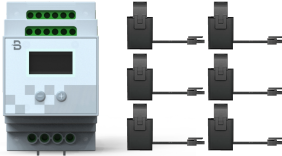
*Pure PV Mode (Almost 0 power from grid)

*Hybrid Mode

Solar DLB box can be used for the home without solar power as normal DLB box.

Solar DLB

2. Solar DLB Model Selection

| | | |
|---|---|--|
| |  |  |
| Model | BCP-DLB-11M | BCP-DLB-13M |
| Phase | Single Phase | Three Phase |
| Operating Mode | PV | PV |
| Extreme Mode | ✓ | ✓ |
| Night Automatic Full Speed Mode | ✓ | ✓ |
| PV to Normal /Normal to PV | ✓ | ✓ |
| Number of Current Transformers | 2 | 6 |
| Display | OLED | |
| Distance between DLB box and RV charger support | More than 300M | |
| Current Transformer Default Length | 1.5m(Can be customized up to 15 meters) | |
| Installation | Rail installation/Screw fixing | |
| Communication | RS485(Use RJ45 interface to connect with network) | |

- **What is PV Extreme Mode?**

In this mode, once the household load continues to increase and the photovoltaic power generation is not enough to maintain the minimum current of the EV charger, it will stop charging to avoid using too much grid power (this power depends on the set value). When the EV charger has enough current (eg 10A), restart charging.

Solar DLB

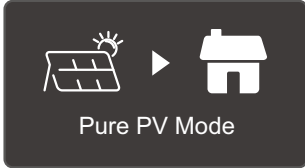
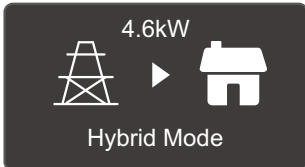
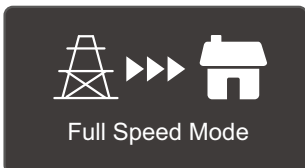
- **What is Night Automatic Full Speed Mode?**

In this mode the EV charger will remain charged at full speed (Pm20:00- Am6:00). Note: The coin cell battery is not installed in the original factory charger (the battery is installed by yourself if required), the EV charger will lose this configuration after restarting, and it needs to reconnect the APP to configure it.

- **How to Active Night Automatic Full Speed Mode?**

We can set the Night Automatic Mode through APP.

- Introduction to the three modes of DLB

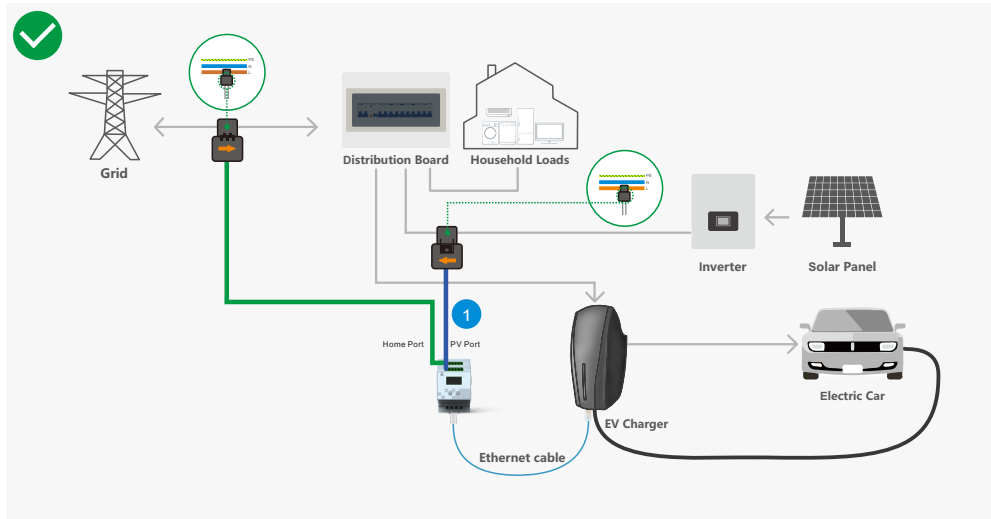
| | |
|---|---|
| <p>Pure PV Mode</p>  <p>Pure PV Mode</p> | <p>The EV charger in the pure PV mode will control its own charging current as much as possible, so that the actual input value of the grid current is as close as possible to 0A.</p> |
| <p>Hybrid Mode</p>  <p>Hybrid Mode</p> | <p>The EV charger in hybrid mode will control its own charging power to keep the grid input power as close as possible to the DLB setting.</p> |
| <p>Full Speed Mode</p>  <p>Full Speed Mode</p> | <p>When the EV charger is working in full speed mode, the DLB will no longer limit the charging current of the EV charger, and the charging pile will use the maximum current supported for charging.</p> |

Solar DLB

3. How the solar DLB box works?

3.1 CT Installation Diagram

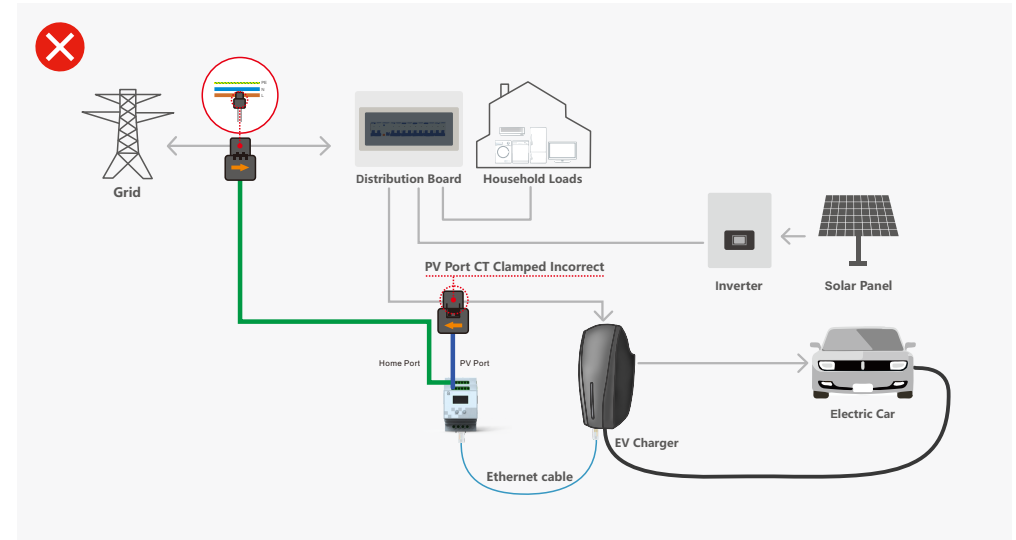
- 1 Phase System with DLB: BCP-DLB-11M (Correct Installation)



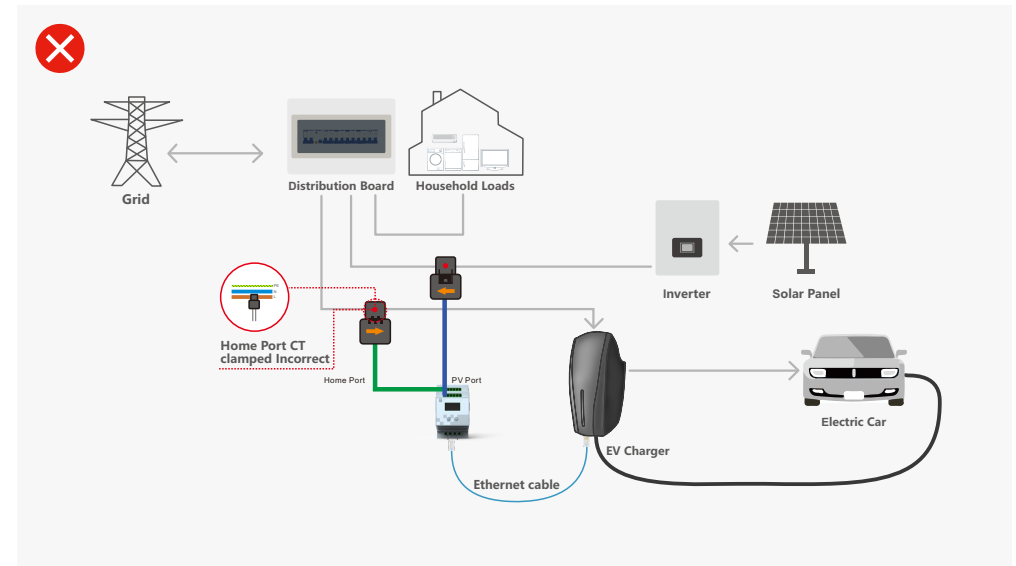
- 1 If it is impossible to connect due to distance or other reasons, you can refer to the installation method described in the following chapters and don't need to install the CT clamp.

Solar DLB

- 1 Phase System with DLB: BCP-DLB-11M (Incorrect Installation Demo)

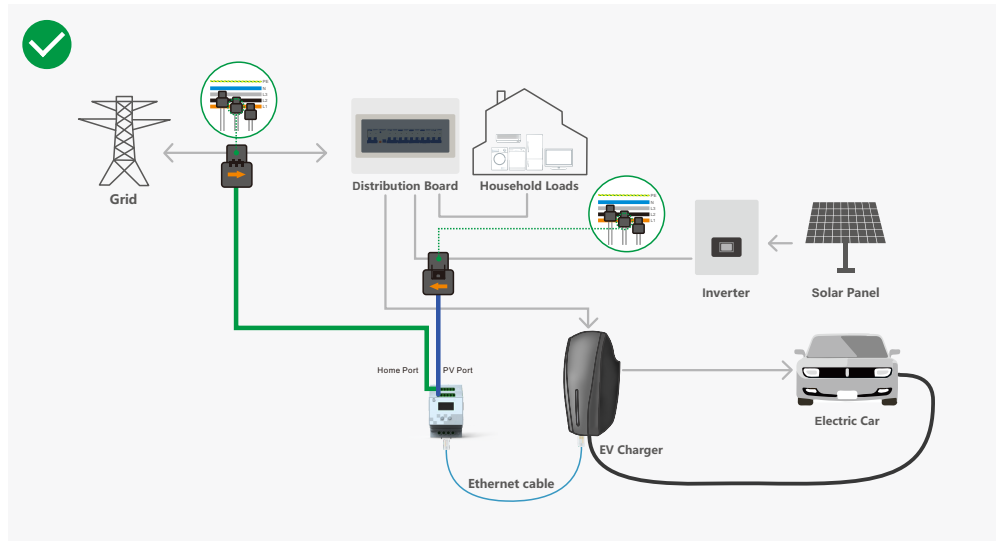


- 1 Phase System with DLB: BCP-DLB-11M (Incorrect Installation Demo)

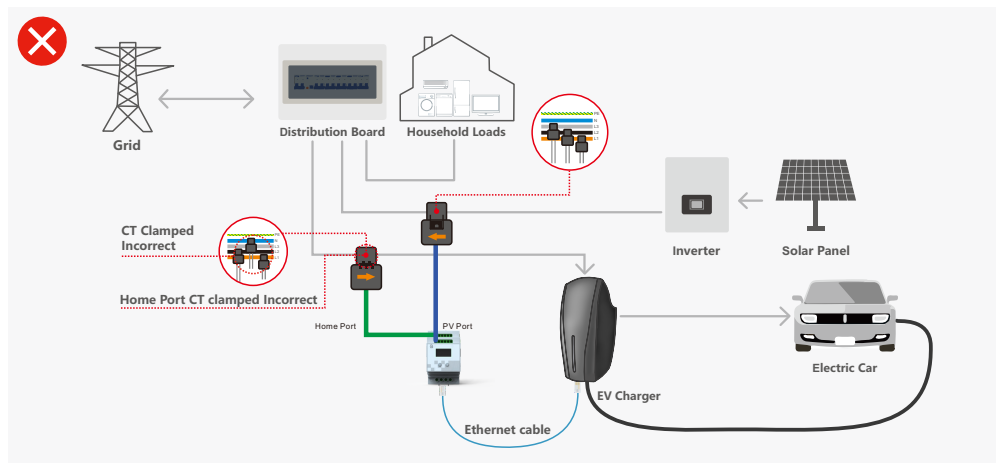


Solar DLB

- 3 Phase System with DLB:BCP-DLB-13M (Correct Installation)

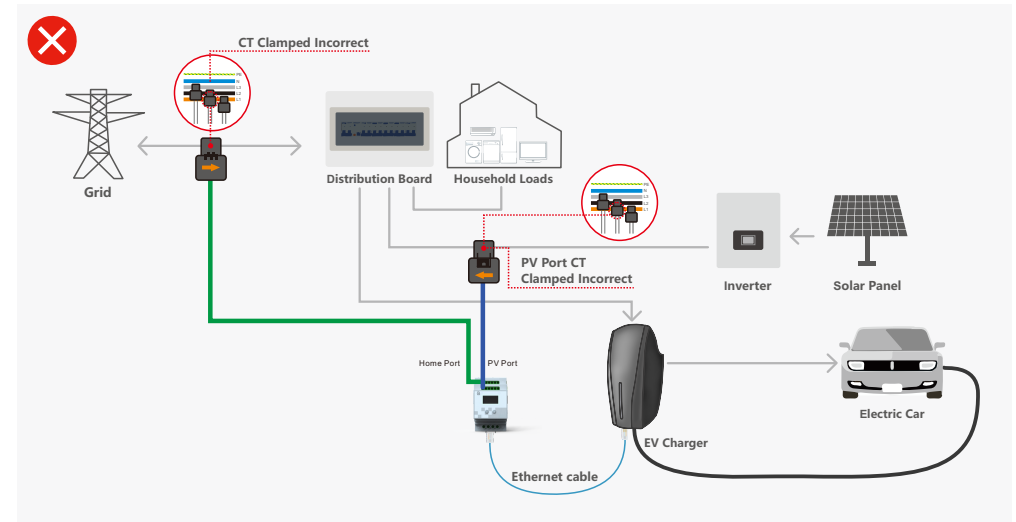


- 3 Phase System with DLB:BCP-DLB-13M (Incorrect Installation Demo)



Solar DLB

- 3 Phase System with DLB:BCP-DLB-13M (Incorrect Installation Demo)



What the current is that you set on Solar DLB box?

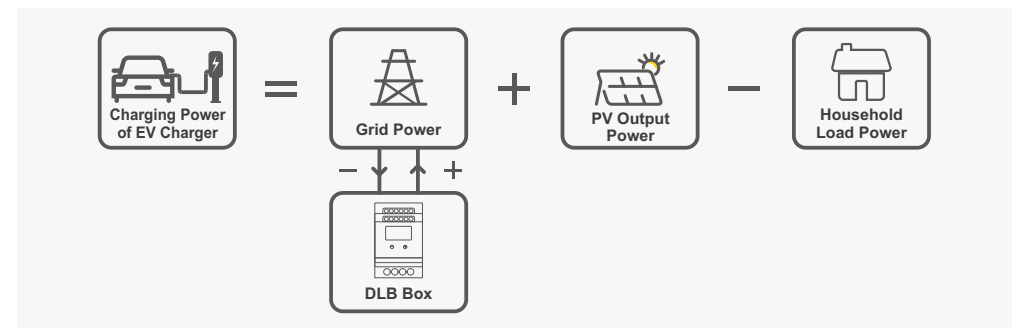
For 1-Phase Solar DLB System:

“The allowable power of EVC”=

“Max grid power”(set via DLB) + “PV output power” - “household load power”

For 3-Phase Solar DLB System:

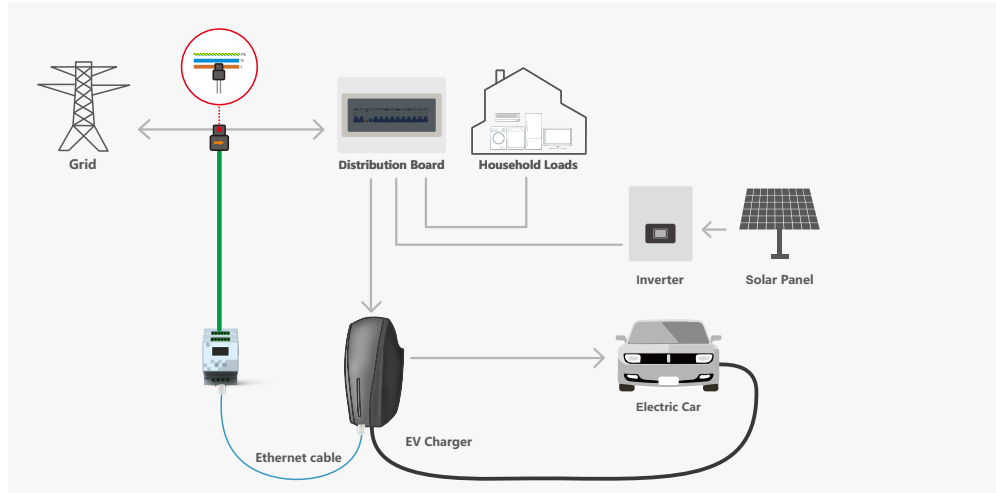
“The allowable power of EVC”=Max grid power (set via DLB)*(Phase of the current EV charger)”+“The sum of the three phase power of PV power” - “The sum of the three phase power of household load”



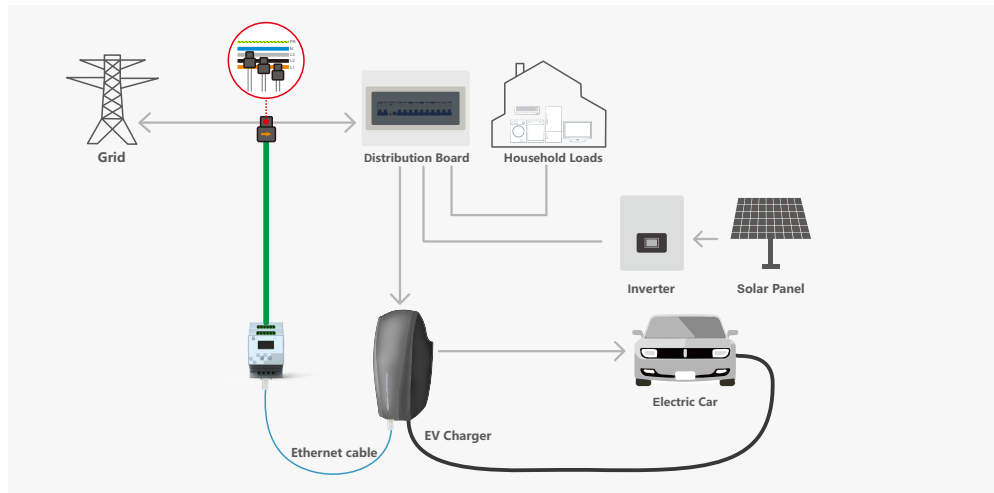
Solar DLB

3.2 Once the inverter is too far to install PV CT

- 1 Phase System with Solar DLB

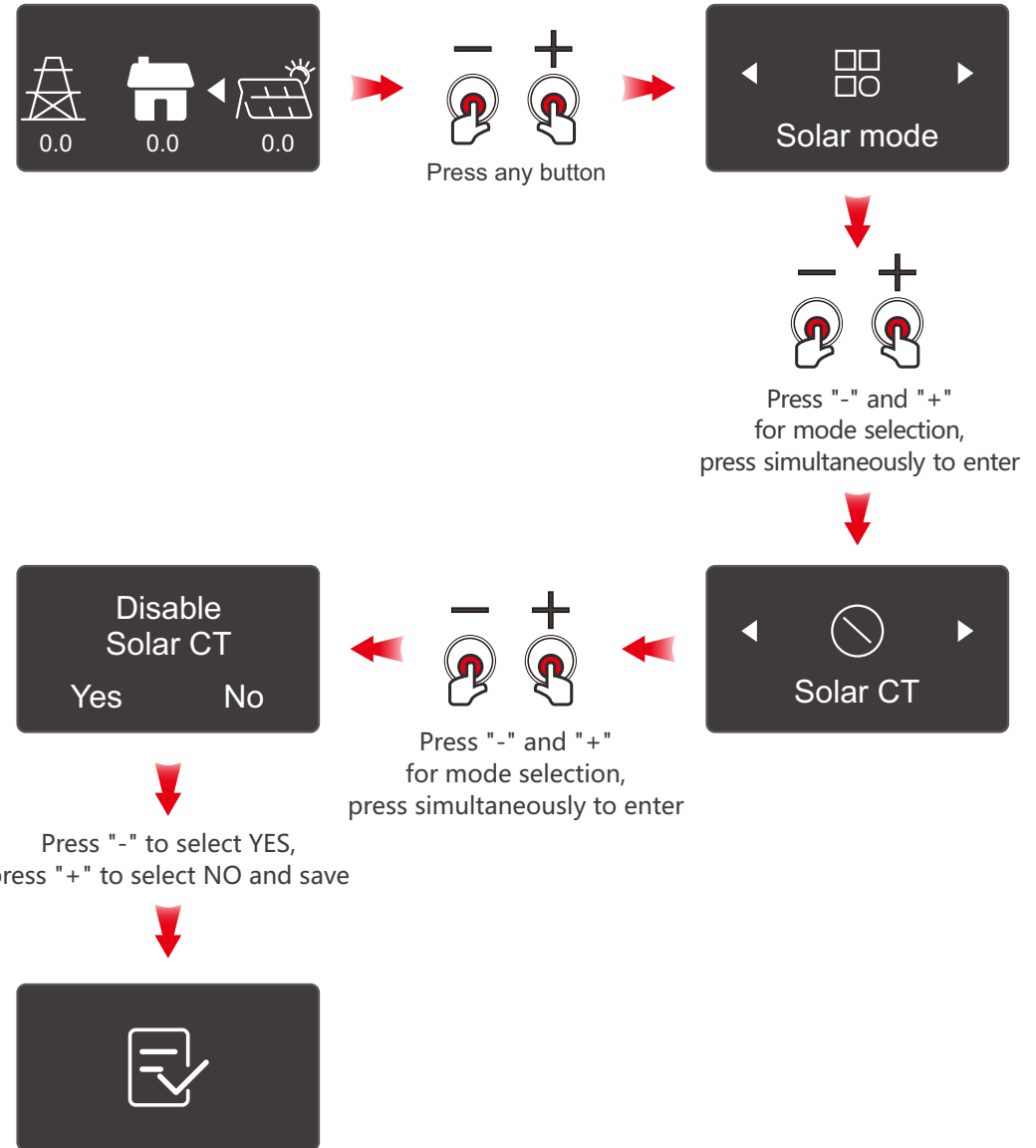


- 3 Phase System with Solar DLB



Solar DLB

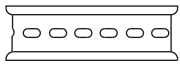
3.2.1 How to set on DLB box when you can not install PV CT



Solar DLB

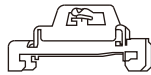
4. How to install the DLB box?

- Please double check your accessories



Din rail 105mm

X1



Din rail fixing parts

X2



M4*30 expansion screw kit

X2



Current Transformer
(1-phase Solar DLB)*2
or
(3-phase Solar DLB)*6

X1



Network cable - 5m
(RJ45 TIA/EIA-568B
8-core cat5 twisted pair cables)

X1



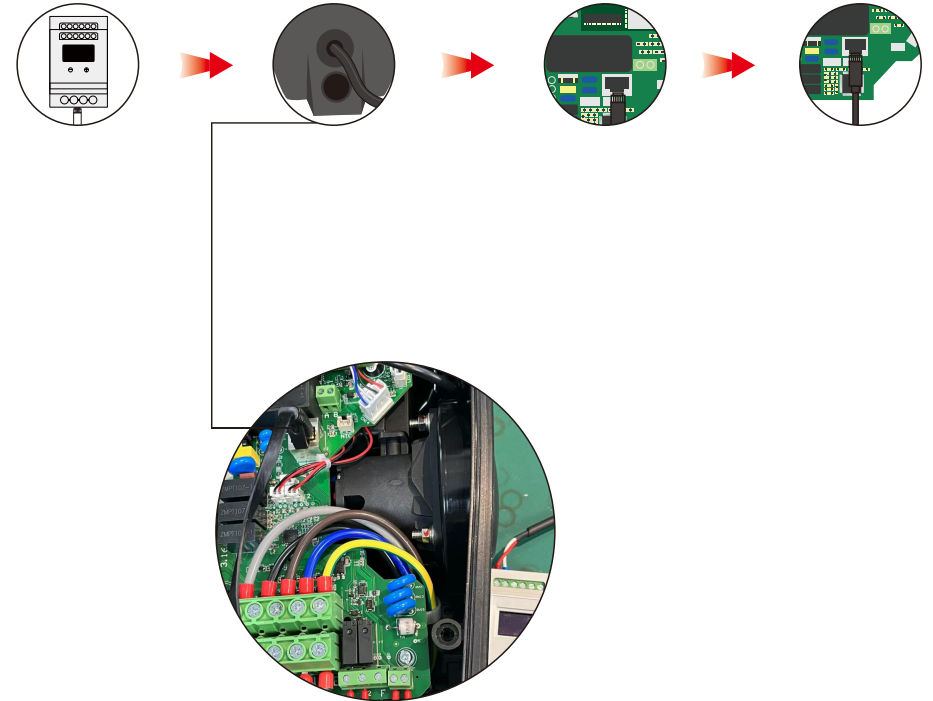
Solar DLB box

X1

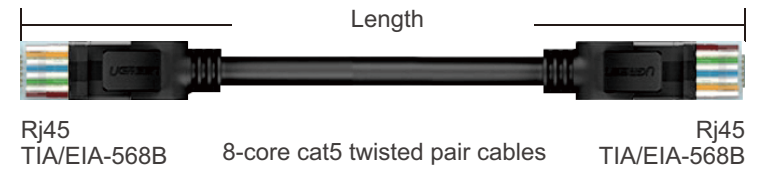
Solar DLB

- Network cable connection

Connect the DLB box with charger by the network cable.

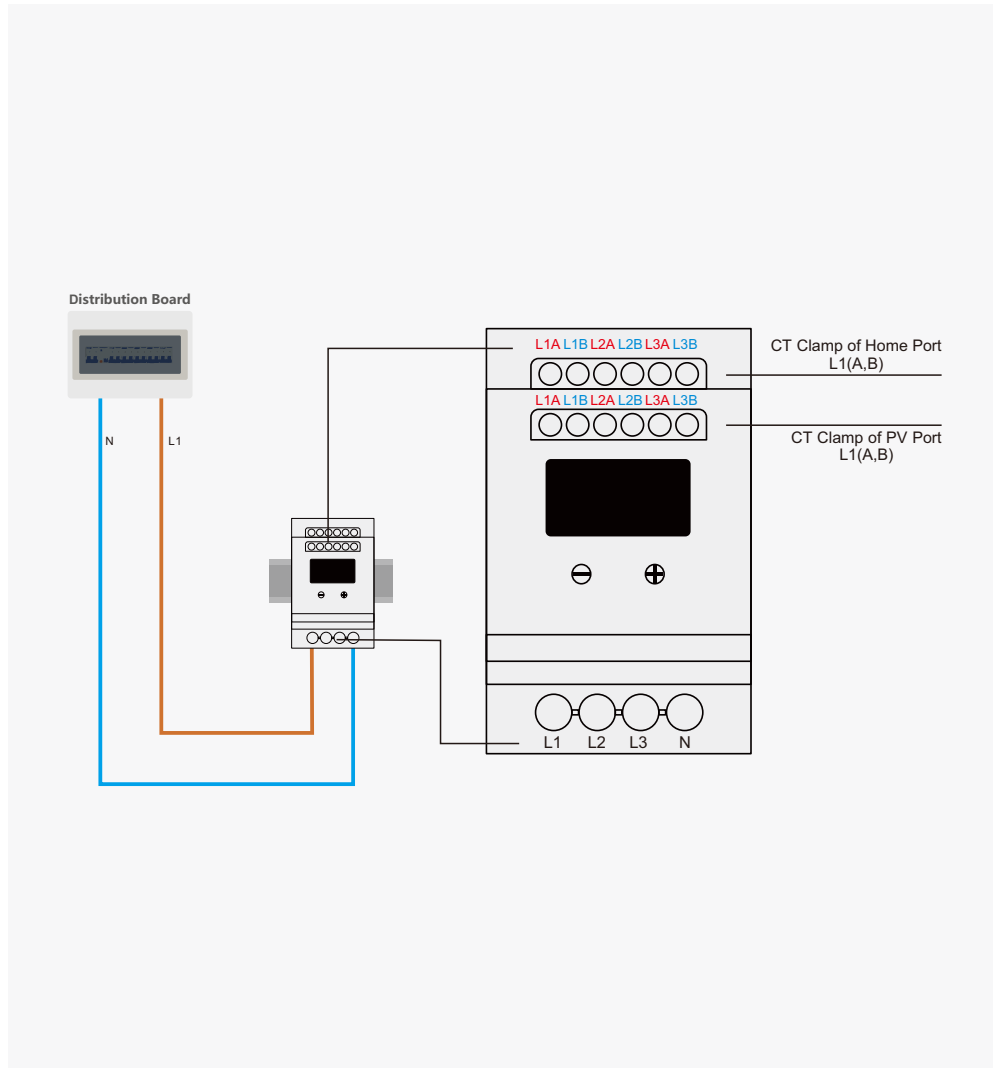


- Network Cable Recommended



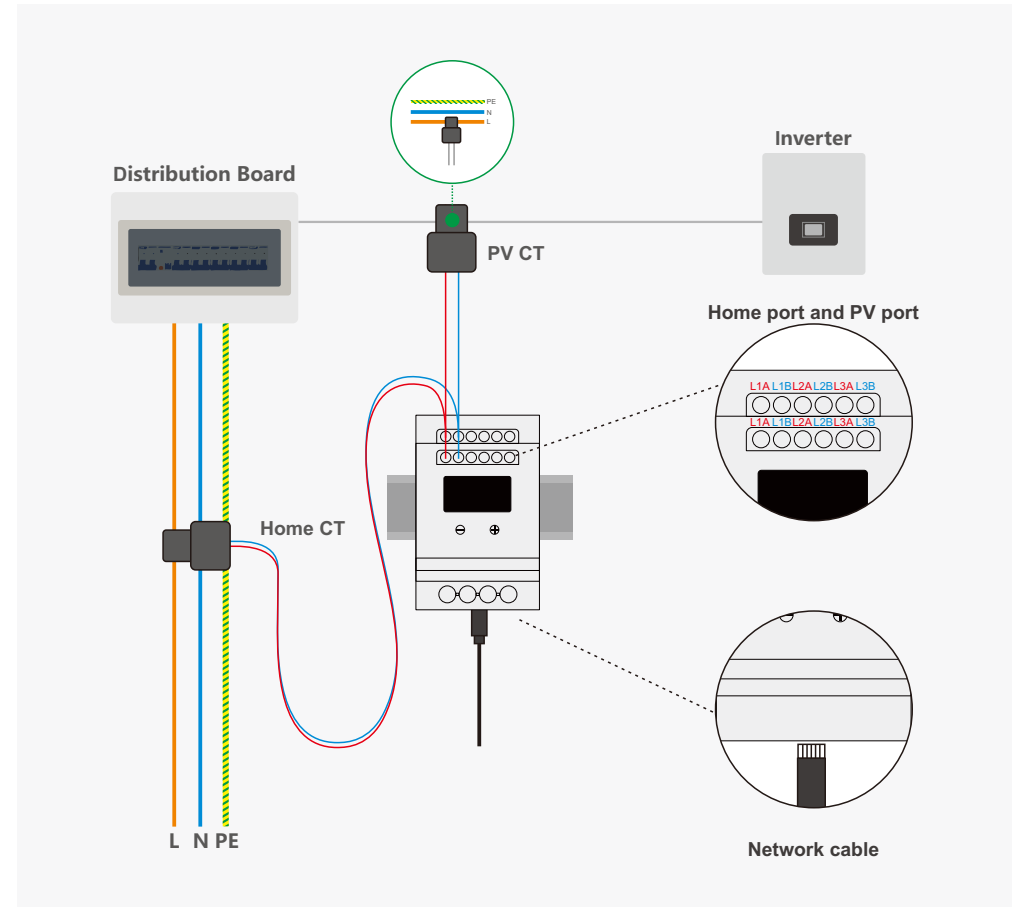
Solar DLB

- DLB voltage signal acquisition line connection (single phase)



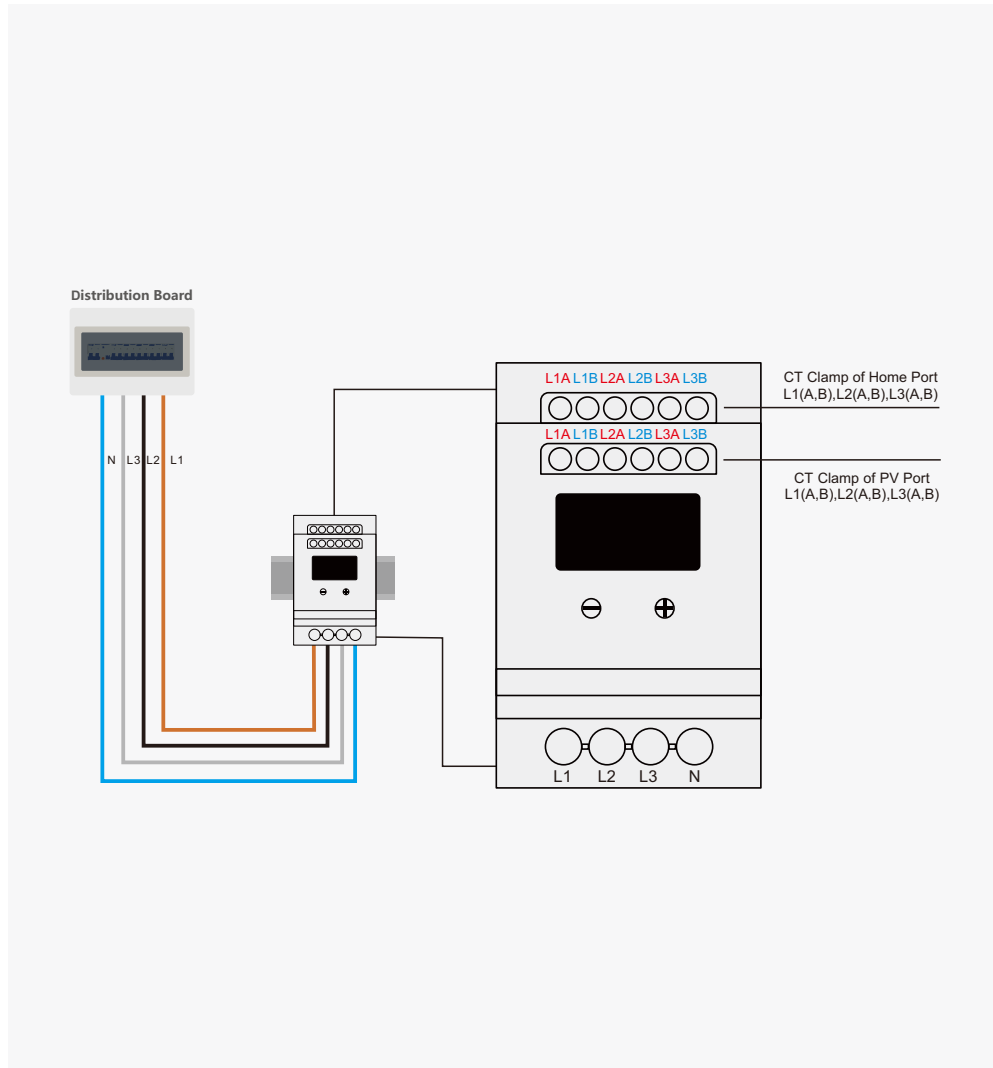
Solar DLB

- CT installation of single phase solar DLB Box (BCP-DLB-11M)
Make CT clamp on house mains cable.
(Including some of or all of house loads and EV charger power cable)
Red cable of CT should be connected to L1A at the home port and PV port;
Blue cable of CT should be connected to L1B at the home port and PV port.



Solar DLB

- DLB voltage signal acquisition line connection (three-phase)



Solar DLB

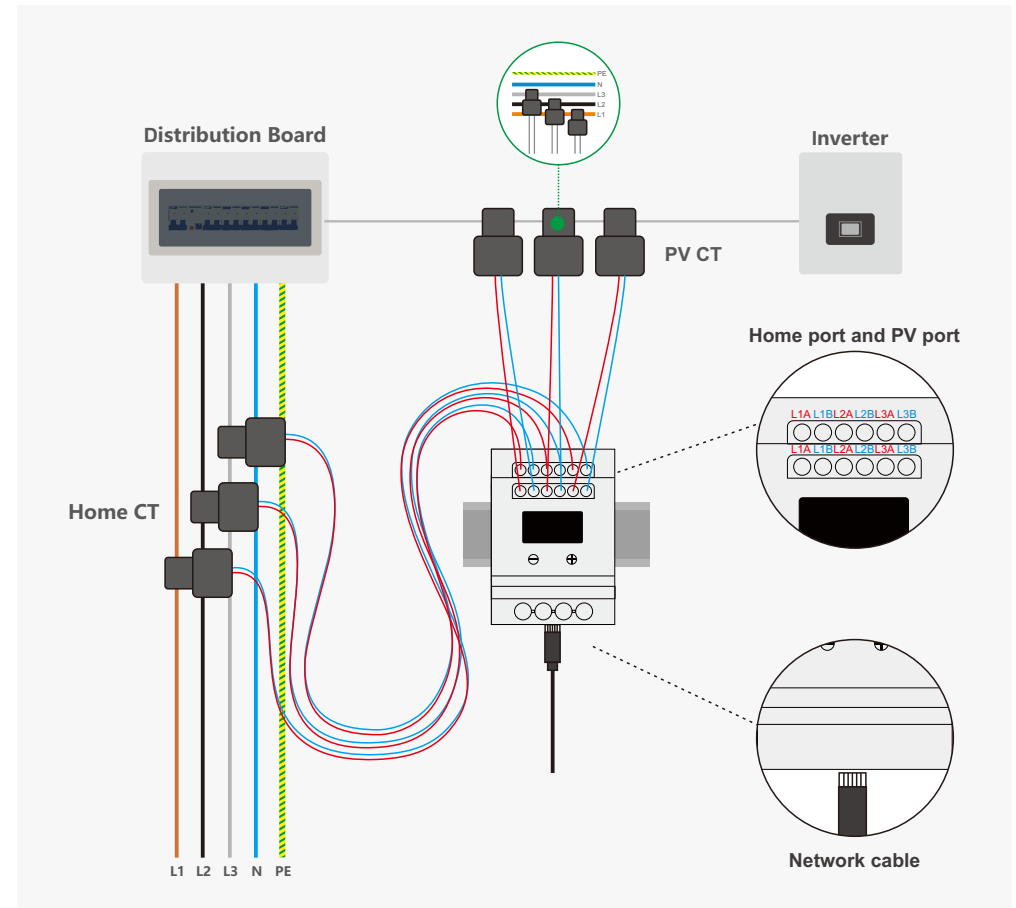
- CT installation of three phase solar DLB Box (BCP-DLB-13M)

Make CT clamp on house mains cable.

(Including some of or all of house loads and EV charger power cable)

Red cable of CT should be connected to L1A, L2A, L3A at the home port and PV port;

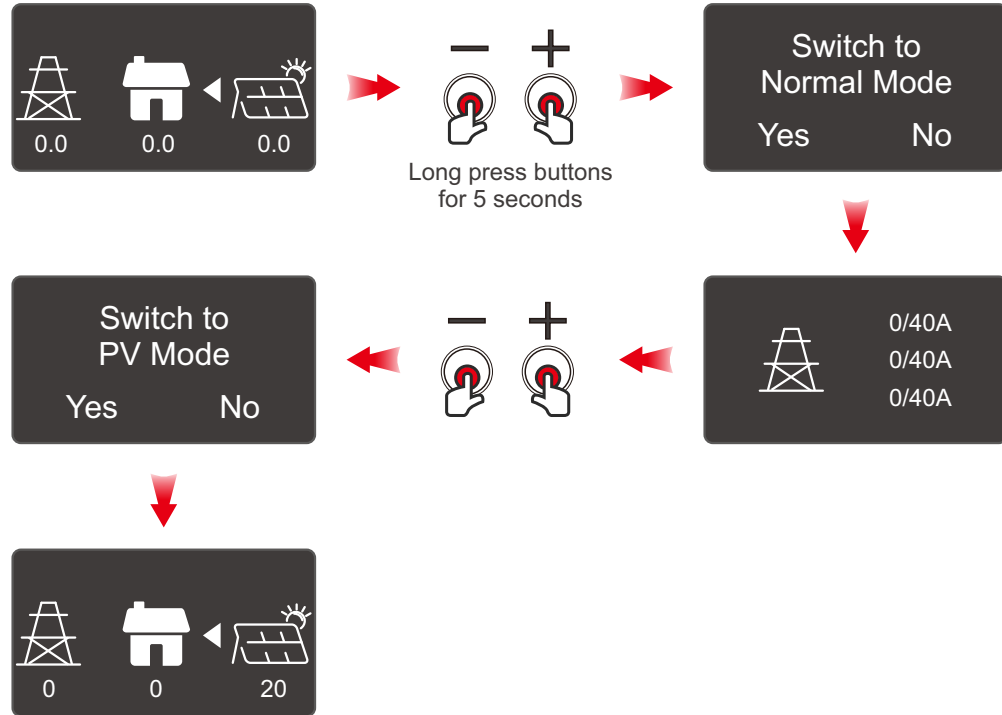
Blue cable of CT should be connected to L1B, L2B, L3B at the home port and PV port.



Solar DLB

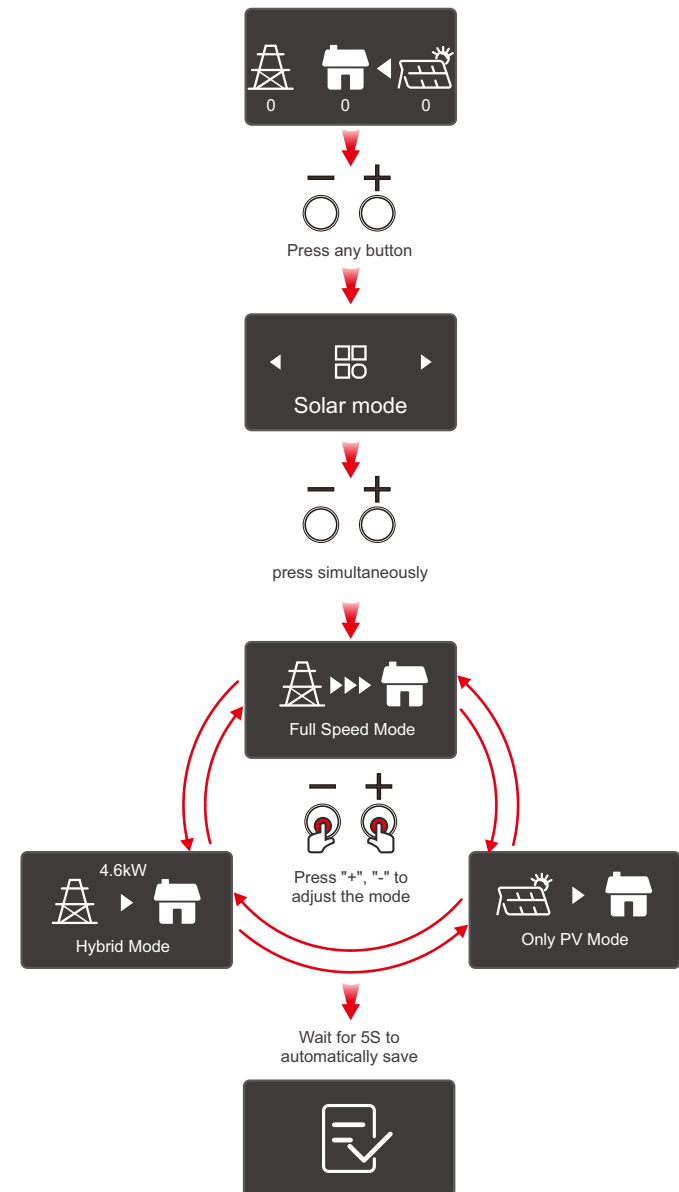
5. Instructions for using solar DLB

- How to switchover between solar DLB and normal DLB?








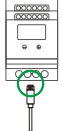


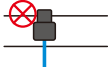
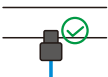
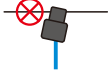
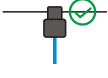


Solar DLB

- How to switchover between different Modes of solar DLB?



Solar DLB

6. Solar DLB Troubleshooting

| LED light status | Fault type | Potential Cause | Action |
|---|----------------------|---|---|
|  Yellow light on for 1s  Red light flashes 1 time The yellow light of the charger light board lights for 1s, then the red light flashes for one time, and this happened in turn. | DLB offline |  RS485 cable is damaged |  Replace RS485 cable |
| | |  RS485 cable is not connected firmly |  Reconnect |
|  Yellow light on for 1s  The red light flashes twice in a row The yellow light of the charger light board lights on for 1s, and then the red light flashes twice in succession. This happens in turn. | DLB current abnormal |  CT is clamped on the wrong power cord |  Check if the CT position is correct |
| | |  CT open coil is not connected firmly |  Reconnect |
| | |  The connection between the CT cable and the DLB is loose |  Reconnect |
| | | The DLB box doesn't measure the charging current of EV charger, check whether the cable is connected. | Check if the CT position is correct |