# PowerCube 2.0 DC
# Installation Guide – Australia & New Zealand

**Feb 2018**

V1.5

# Contents

# System Introduction

01

- System Topology
- Power Box DC
- PowerCube 2.0

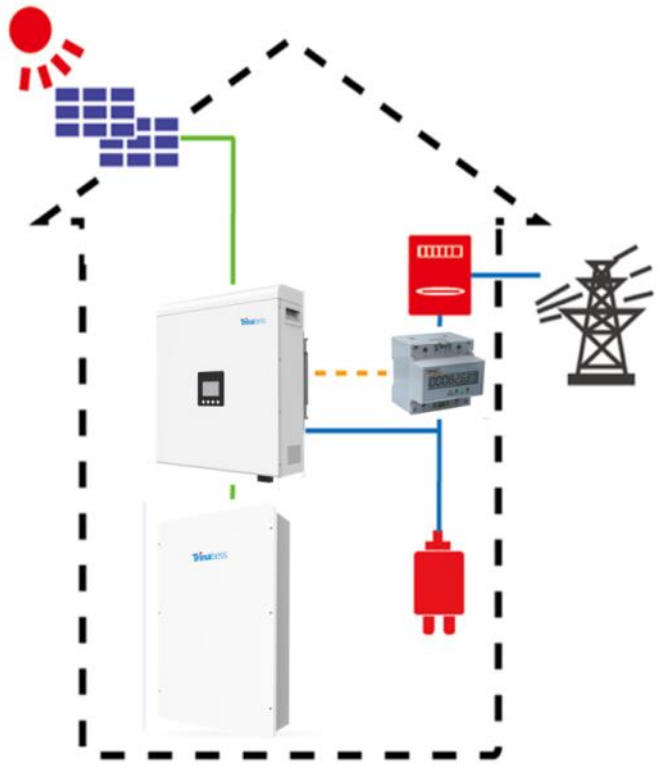
# **PowerCube System** Topology

**Power Box (DC – “Hybrid Inverter”):**

- DC/AC bi-directional Power Conversion Equipment (PCE)
- Mainly applied and developed for the renewable energy generation system
- The interface between the grid, solar PV and the battery storage
- Designed for lithium-ion batteries

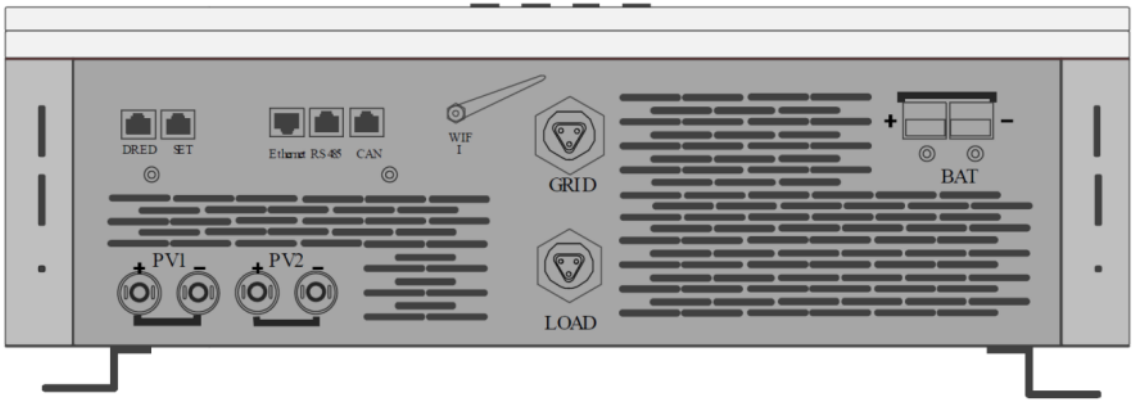
**PowerCube – Battery Energy Storage:**

- Lithium Iron Phosphate (LiFePO4)
- Contain at most 4 battery packs
- Capacity: 4.8kWh – 9.6kWh
- Voltage range: 44.5V – 54V

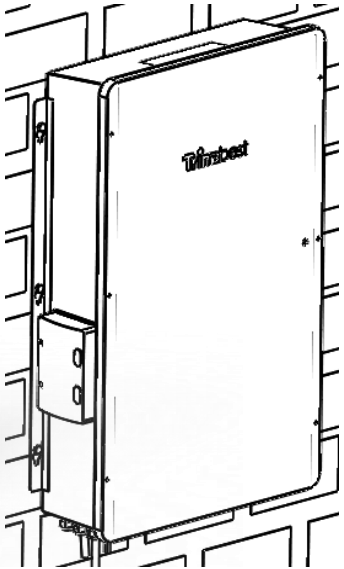


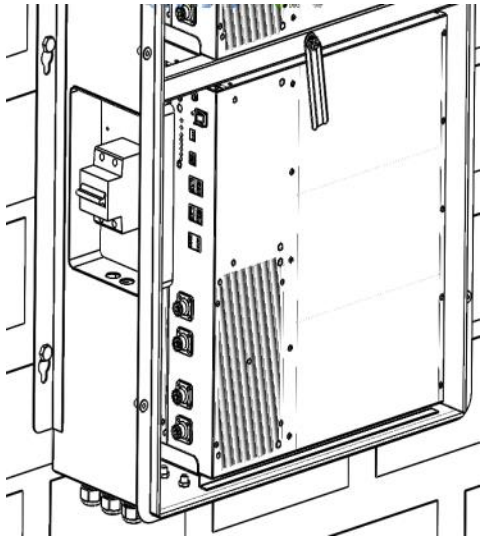
# Power Box (DC – Bess Hybrid Inverter)

| | |
|---|---|
| Length | 610mm |
| Width | 515mm |
| Height | 192mm |
| Weight | 30kg |




# PowerCube (Battery Storage)

**Advantages:**

- The PowerCube and accessories are designed for **simplicity and convenience**
- Can be **completed by one person**
- **Integrated Isolator design** to reduce the cost and time required for installation
- Outdoor rating – **IP54**

**PowerCube 2.0 Casing:**

| | |
|---|---|
| Length | 1000mm |
| Width | 600mm |
| Height | 210mm |
| Weight | app. 20kG |

**Battery Pack:**

| | |
|---|---|
| Length | 410mm |
| Width | 440mm |
| Height | 88.5mm |
| Weight | 25kg |

02

# Upacking the products

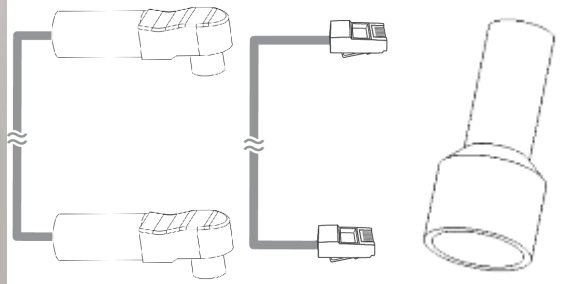
- Battery Packs
- PowerCube 2.0 Casing
- Power Box

# Battery Packs

# PowerCube

| Component | Part Name | Quantity |
|---|---|---|
| A | Casing | 1 |
| B | Battery Pack Power Cable with connectors connecting between battery packs | 6 |
| C | RJ45 communication line with connectors | 3 |
| D | Connectors without Power Cable | 2 |
| E | RJ45 communication connectors | 2 (1*backup) |
| F | Wall plug | 6 |
| G | M8 bolt | 4 |
| H | M8 Anti-Theft bolt | 2 |

A



B C D

E

G H F

# Power Box DC

Aviation Plug (Female)

Aviation Plug (Male)



Solar PV connect (2 pairs)

Communication Cable & Adapter

Anderson plug & connector (Batt)

Plug & Screw Fixings

# 03

## System Installation Steps

- Installation tools and accessories
- Single Line Diagram
- Powerbox installation
- Powercube installation
- BESS installation
- System Initialization
- System Setting

# Installation Tools

| No. | Tool | Model |
|---|---|---|
| 1 |  | Hammer Drill<br>Recommend drill dia. 8 & 10mm |
| 2 |  | Screwdriver |
| 3 |  | Wire stripper |
| 4 |  | 4mm Allen Wrench |
| 5 |  | Crimping tools |
| 6 |  | Multi-meter |

| No. | Tool | Model |
|---|---|---|
| 7 |  | Marker pen |
| 8 |  | Measuring tape |
| 9 |  | Level |
| 10 |  | ESD gloves |
| 11 |  | Safety goggles |
| 12 |  | Anti-dust respirator |

# Installation Accessories

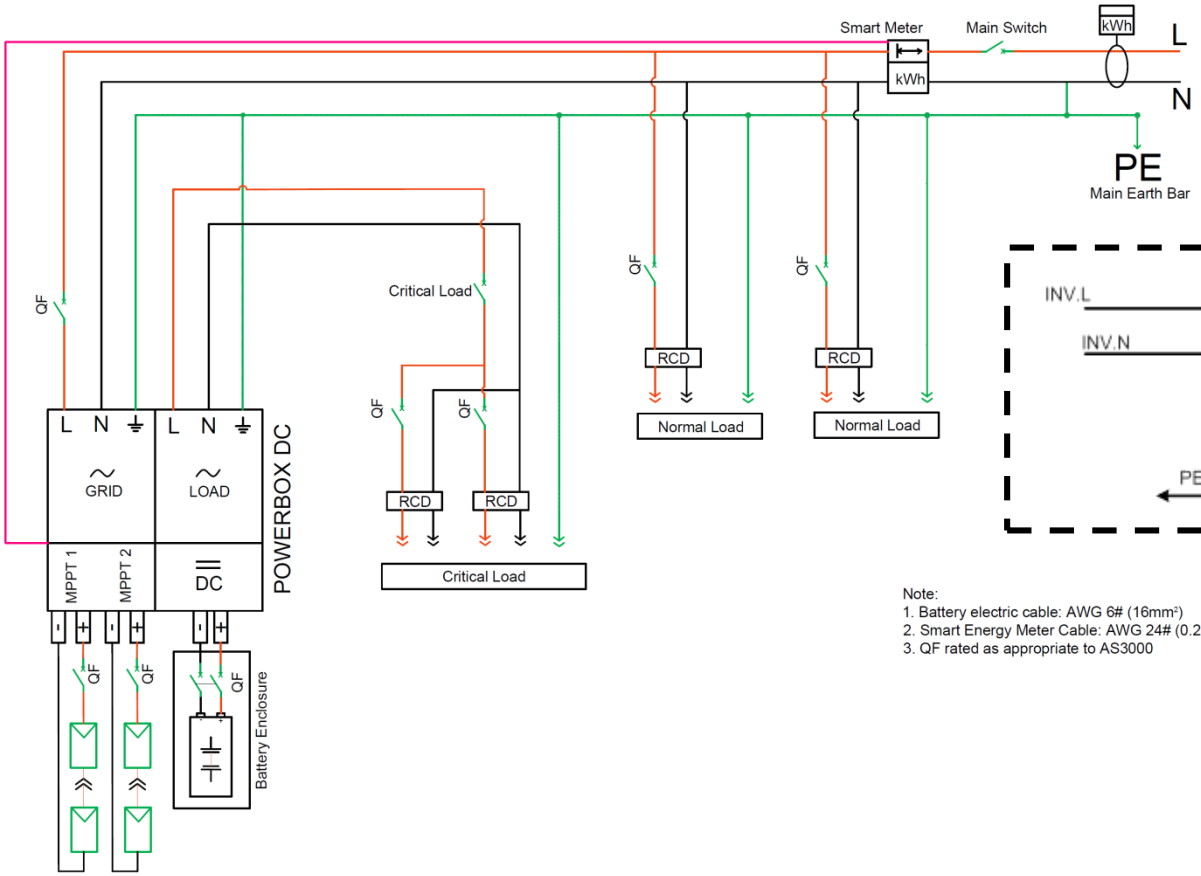
Depending on the site-specific situation and local electrical compliance requirements, some if not all of the following parts will be required:

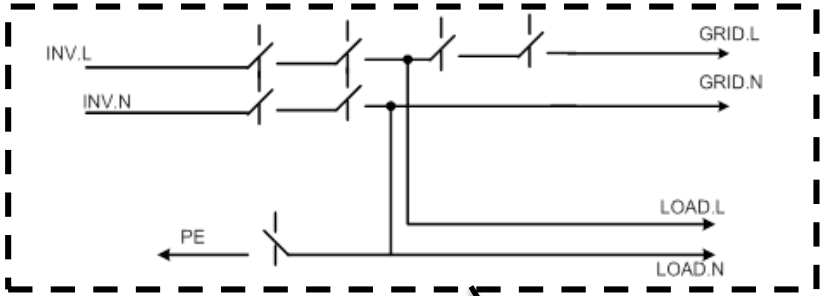
- **AC circuit breakers** – Minimum **four 32A circuit breaker** is required next to the BESS system and inside the main switchboard. Additional ones for extended distance away from switchboard/distribution board

- **AC cables (≥4mm²)** – From powerbox to Switchboard/Distribution board & critical loads
- **DC cables (≥25mm²)**– From powercube to powerbox (2 to 5 metres)

- **Ethernet/CAT5 cables** – To extend the **communication cable**, distance between the powercube and the powerbox. Or to extend the **Energy meter communication cables**.
- **Conduits** – 20mm

# System Connection – Single Line Diagram



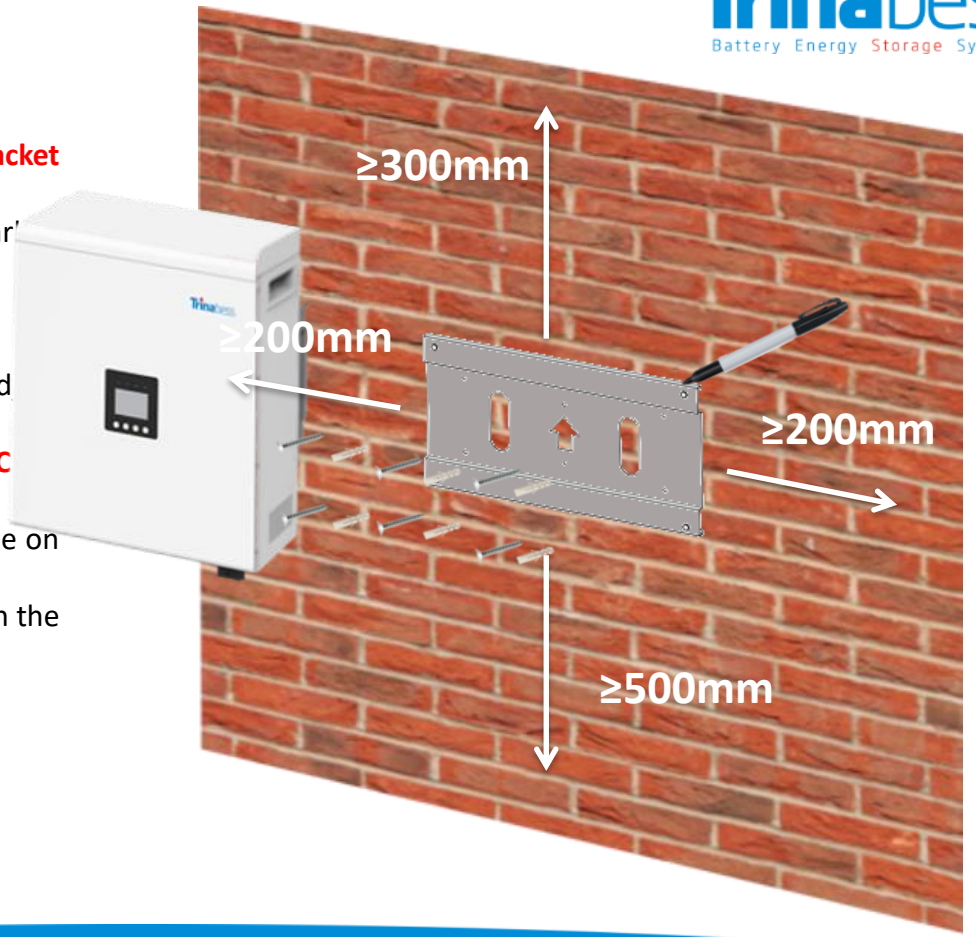




Note:
1. Battery electric cable: AWG 6# (16mm²)
2. Smart Energy Meter Cable: AWG 24# (0.25mm²)
3. QF rated as appropriate to AS3000

**TB5200SH internal wiring diagram**

# Installing the hybrid inverter

1) Choose a **proper position** for the **mounting bracket** on the wall and **mark it**
2) Use **Φ10 drill** template to drill holes on mar' position
3) Fix the **expansion bolt** into the hole
4) Fix wall bracket on the wall
5) Fix screw through bracket to expansion tube, ad the bracket position and screw in
6) Align with wall bracket, mov **box DC horizontal direction** to proper po on
7) Make the hook on wall bracket in rt into the hole on the Powerbox DC inverter
8) Slowly **lower Inverter**, ensure the inverter hang on the hook of wall bracket
9) Check if Inverter is properly fixed on the wall



# Powercube installation – PowerCube Mounting

**Step 1:** Remove the **enclosure cover**

**Step 2:** Remove the **Circuit Breaker cover**

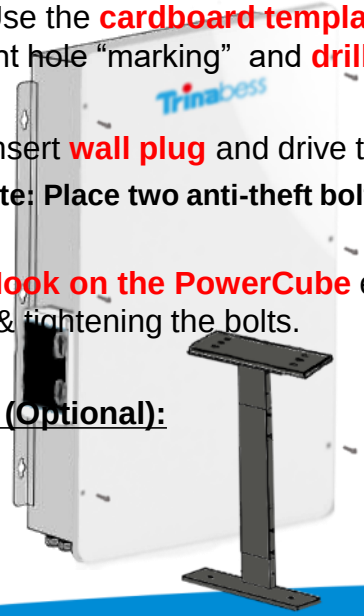
**Step 3:** Use the **cardboard template** provided to do wall-mount hole “marking” and **drill holes** accordi

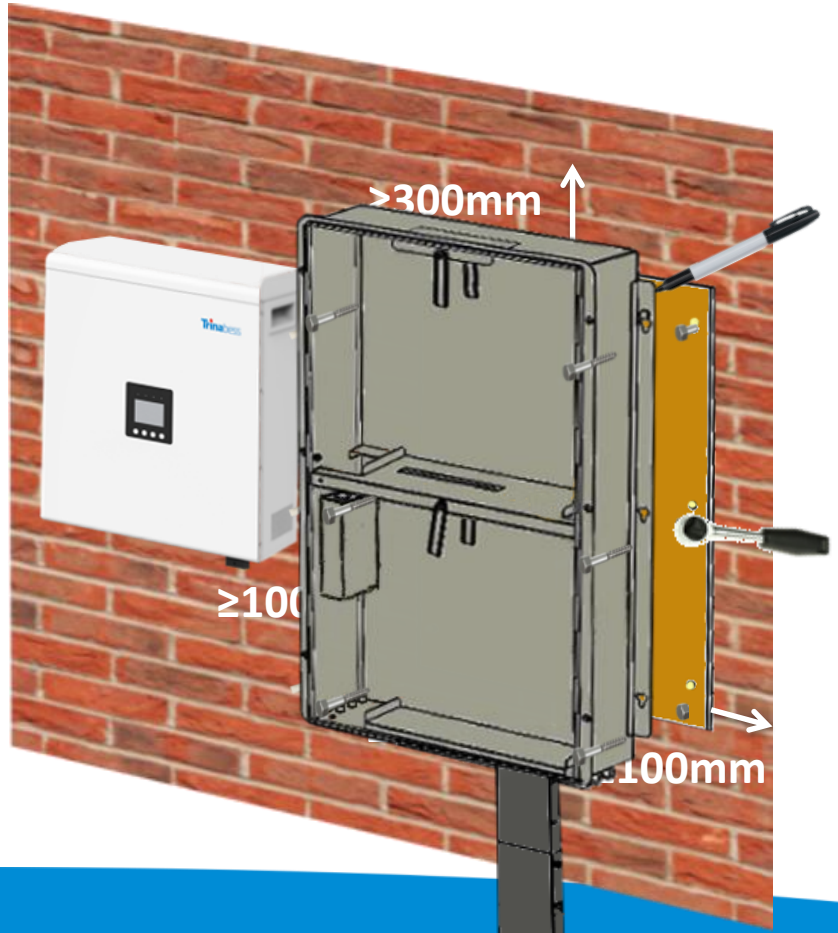
**Step 4:** Insert **wall plug** and drive the **M8 bolts**

**Note: Place two anti-theft bolts in the middle hole**

**Step 5:** **Hook on the PowerCube** enclosure before securing & tightening the bolts.

**Pedestal (Optional):**



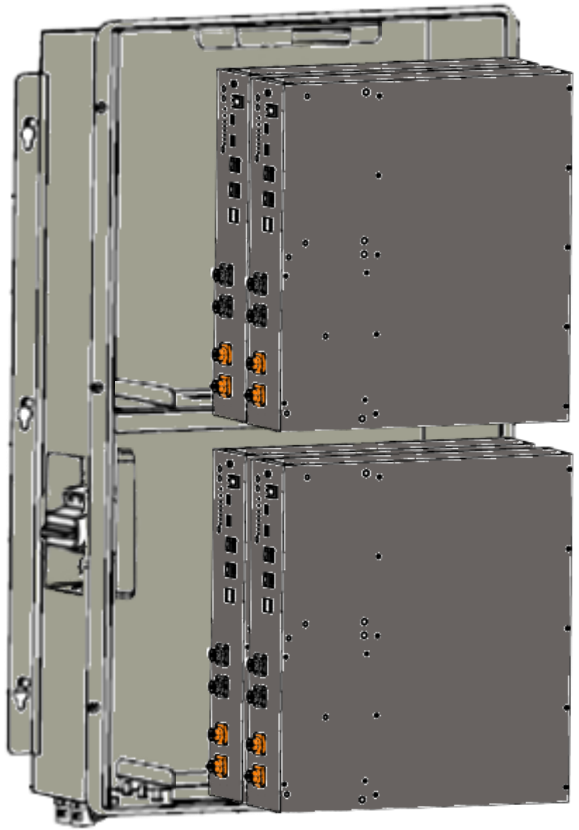



# Powercube installation – Battery packs

**Once the <u>Powercube enclosure</u> have been secured with bolts.**

**Step 1: Insert the packs** into the mounted casing

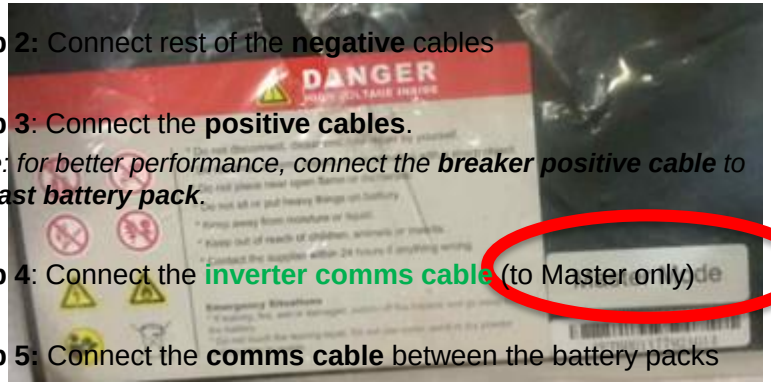
**Step 2: Turn the baffle** to **secure** the battery packs



# Powercube installation – BESS connections

**Connecting the packs together**

**Step 1**: Connect a **master** pack. The master should have the **breaker Negative cable** connected to it. It should also have the label **“Master Mode”**




**Step 2:** Connect rest of the **negative** cables

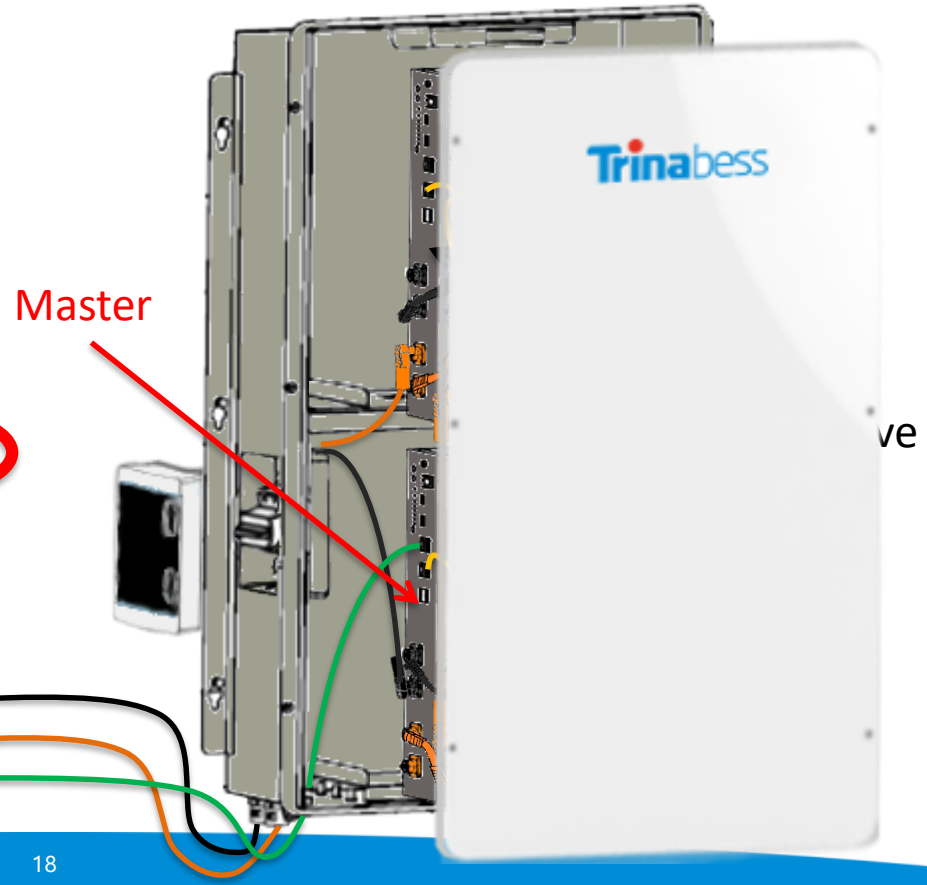
**Step 3**: Connect the **positive cables**.

*Note: for better performance, connect the **breaker positive cable** to the **last battery pack**.*

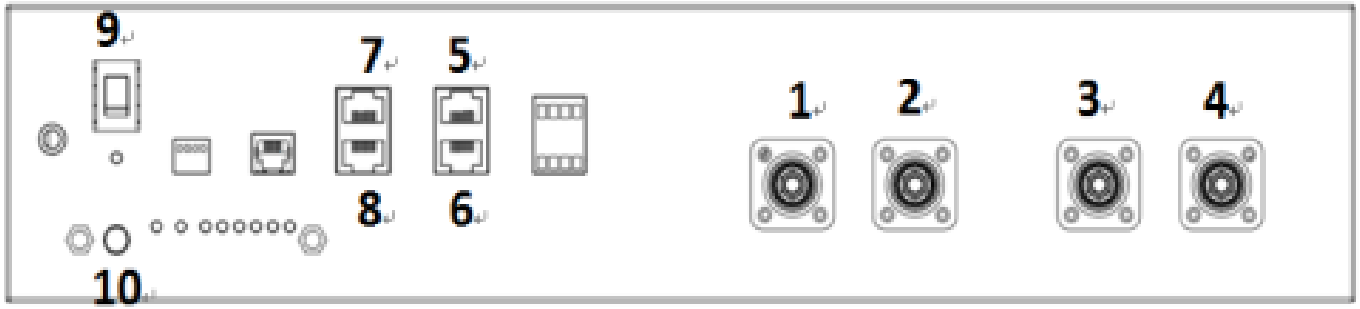
**Step 4**: Connect the **inverter comms cable** (to Master only)

**Step 5:** Connect the **comms cable** between the battery packs

**Step 6**: Measure the **required distance from powercube to Powerbox** & prepare a positive and negative DC cable and connect to battery breaker



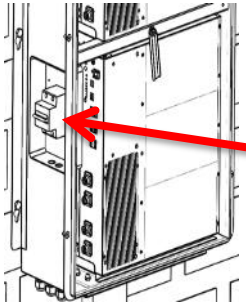
# System connection – Powercube Battery pack overview



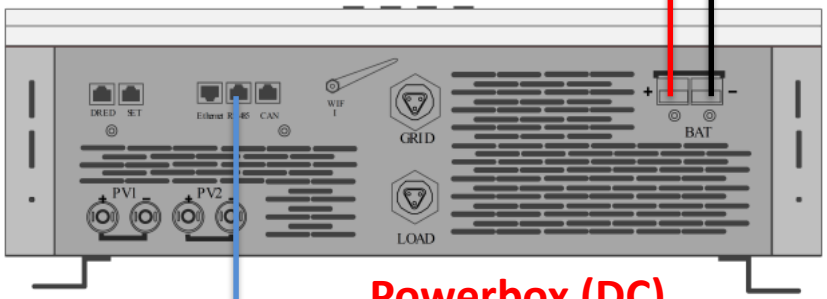

**Connection Points (CP)**

| | | | |
|---|---|---|---|
| **CP 1** | Cathode (-) | **CP 6** | Link Port 1 |
| **CP 2** | Cathode (-) | **CP 7** | CAN |
| **CP 3** | Anode (+) | **CP 8** | RS485 |
| **CP 4** | Anode (+) | **CP 9** | POWER（ON/OFF） |
| **CP 5** | Link Port 0 | **CP 10** | Soft Starter |

# System connection - Battery Modules (2 Packs) Connection - Wire



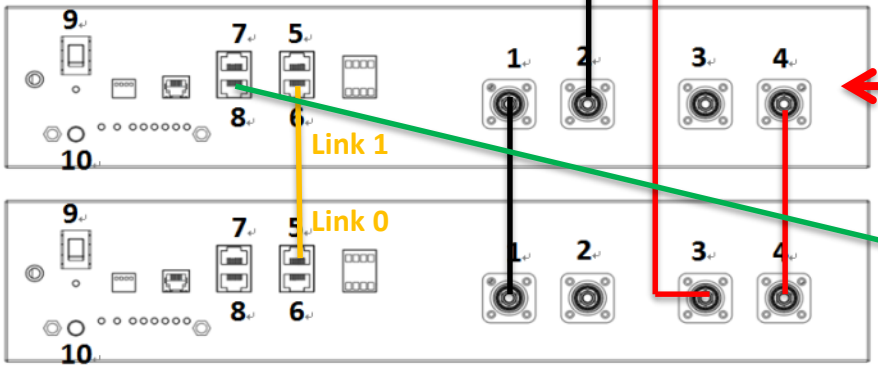
**DC isolator** (supplied)



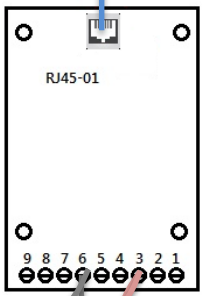

**Powerbox (DC)**

**DC Negative cable**

**DC Positive cable**




**Master**



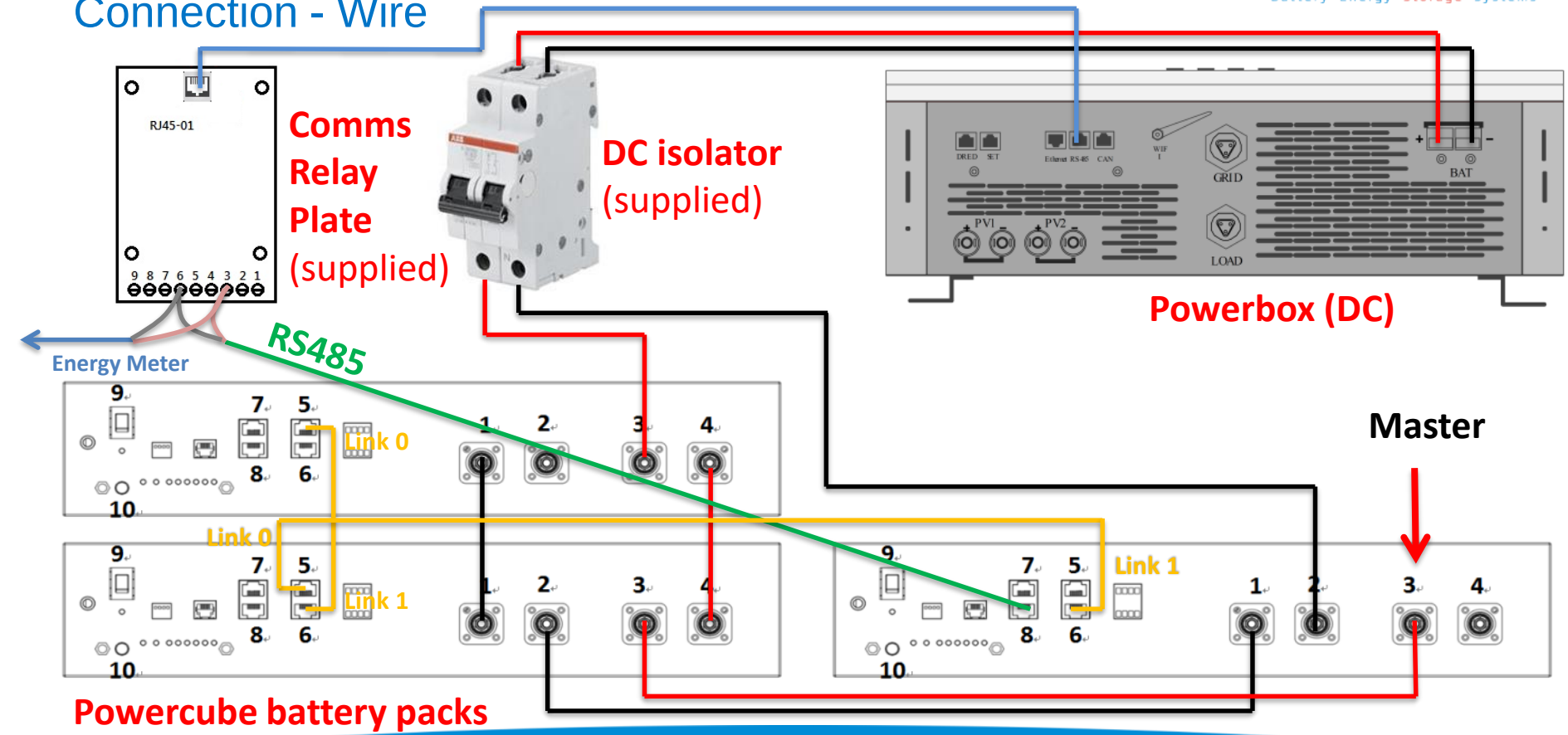

**Comms Relay Plate** (supplied)

**RS485**

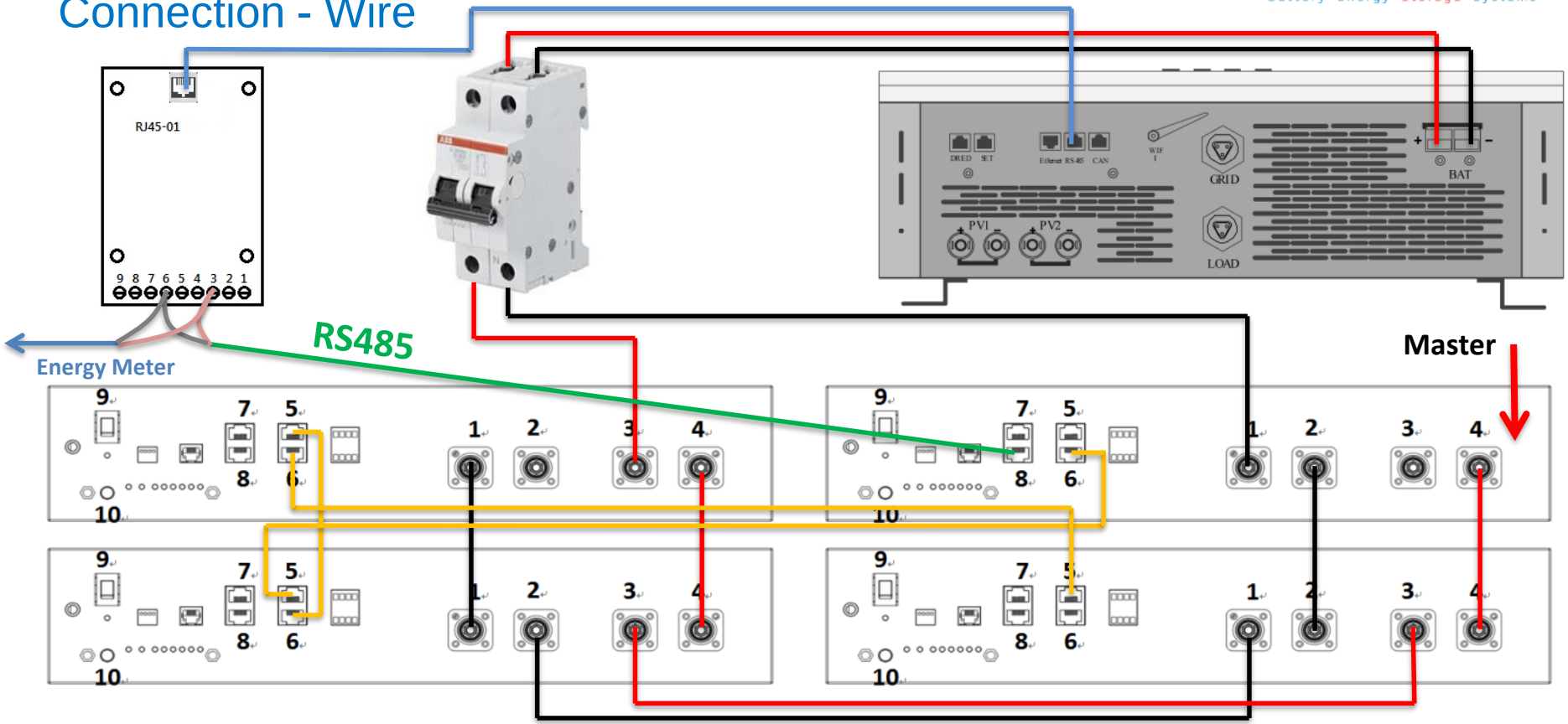
Energy Meter

**Powercube battery packs**

# System connection - Battery Modules (3 Packs)
## Connection - Wire

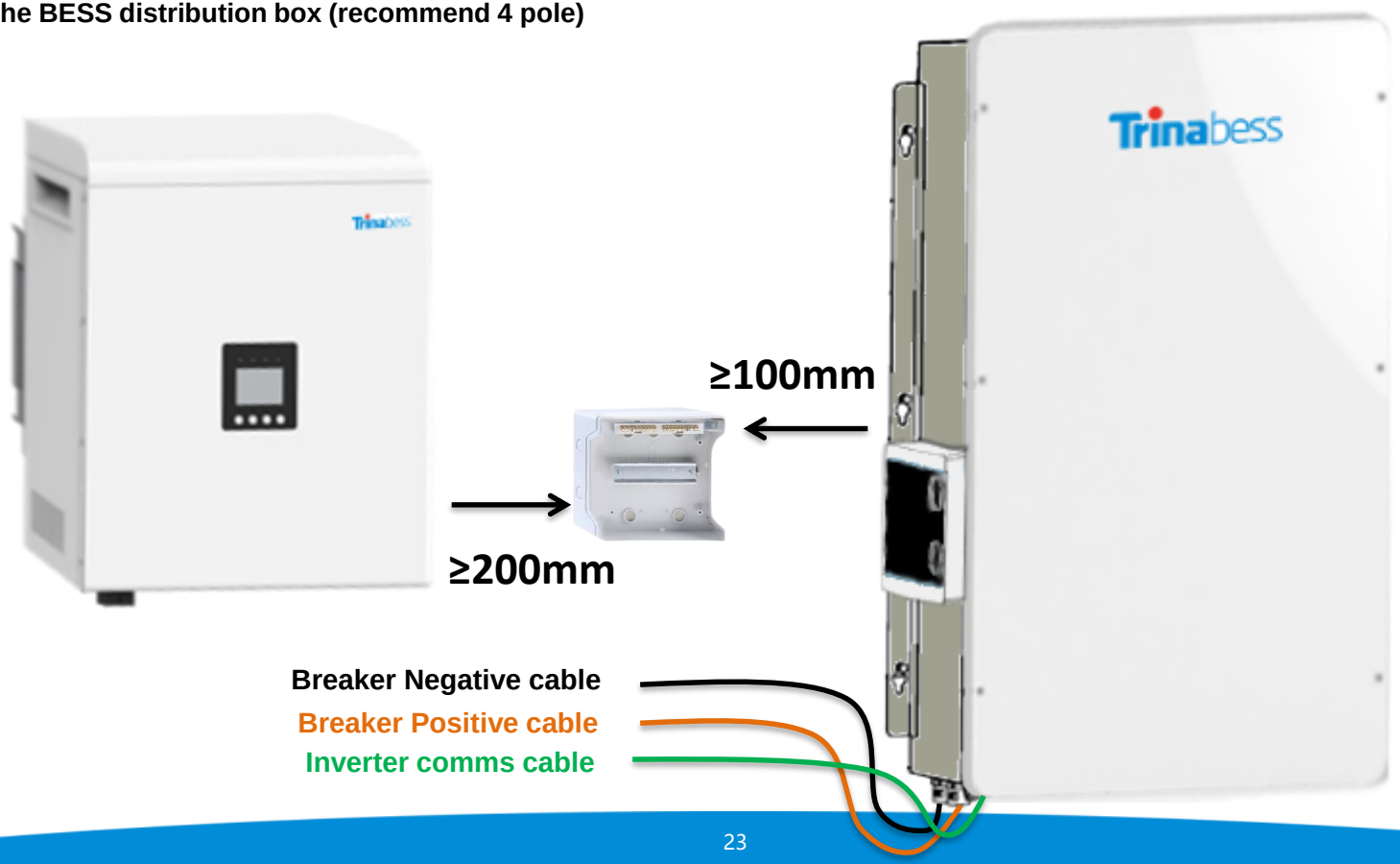


# System connection - Battery Modules (4 Packs)
## Connection - Wire



# BESS installation – BESS connections

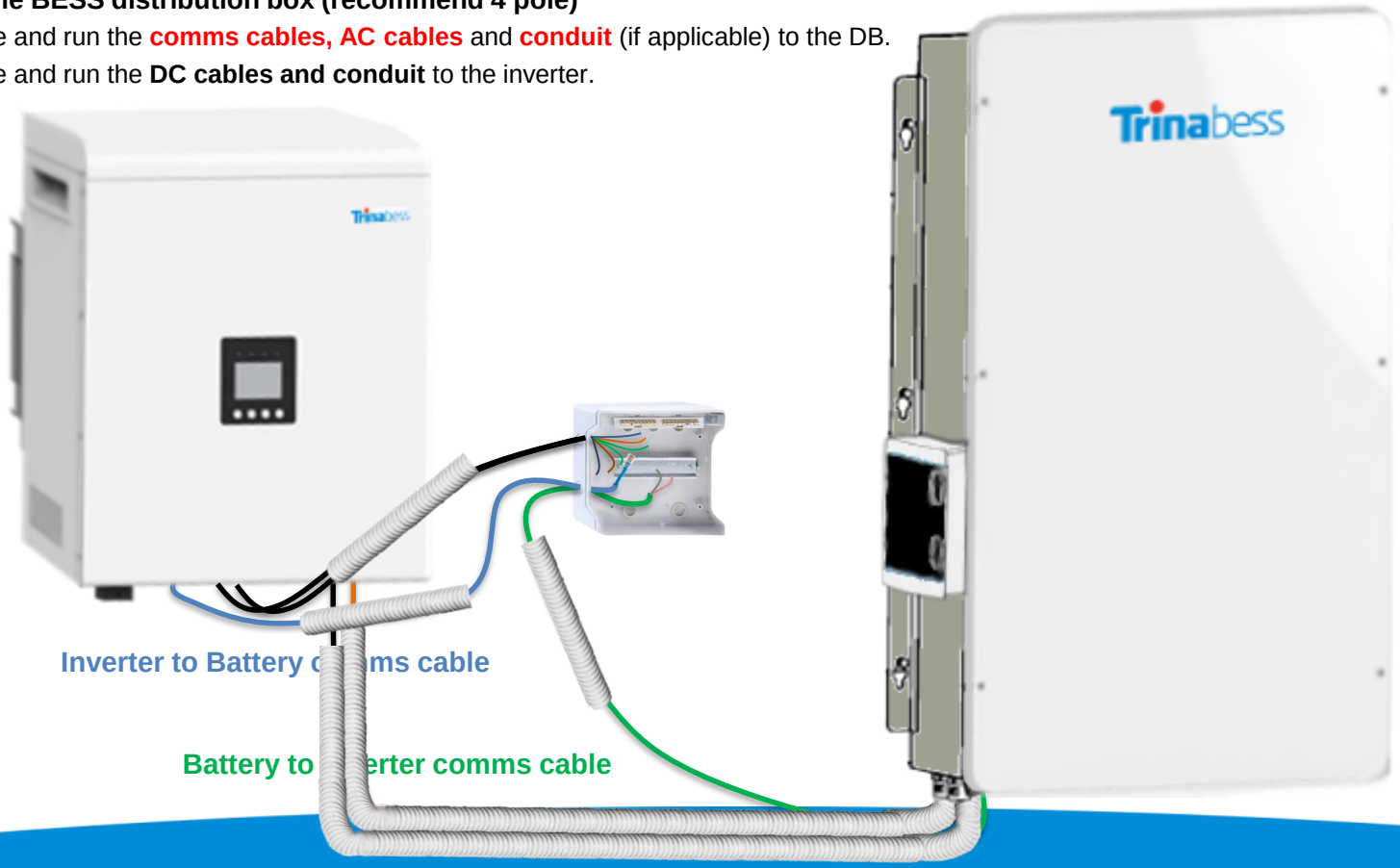
**Position the BESS distribution box (recommend 4 pole)**



# BESS installation – BESS connections

**Position the BESS distribution box (recommend 4 pole)**

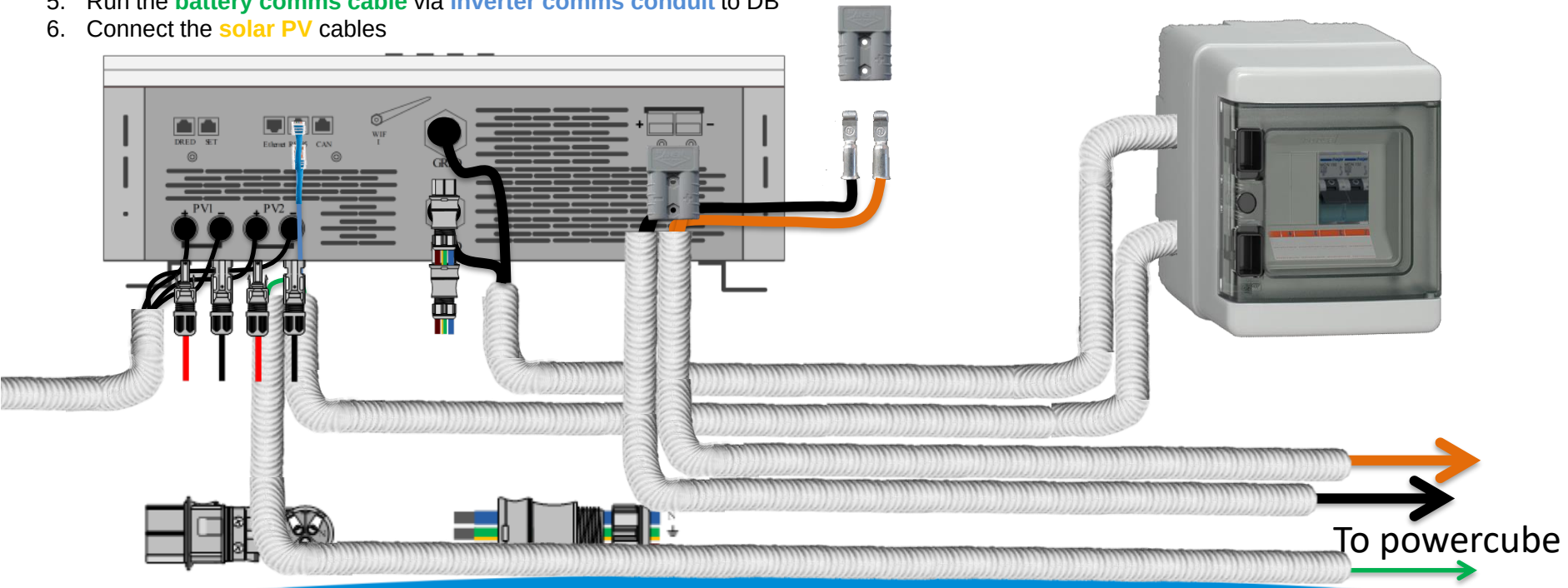
1. Prepare and run the **comms cables, AC cables** and **conduit** (if applicable) to the DB.
2. Prepare and run the **DC cables and conduit** to the inverter.



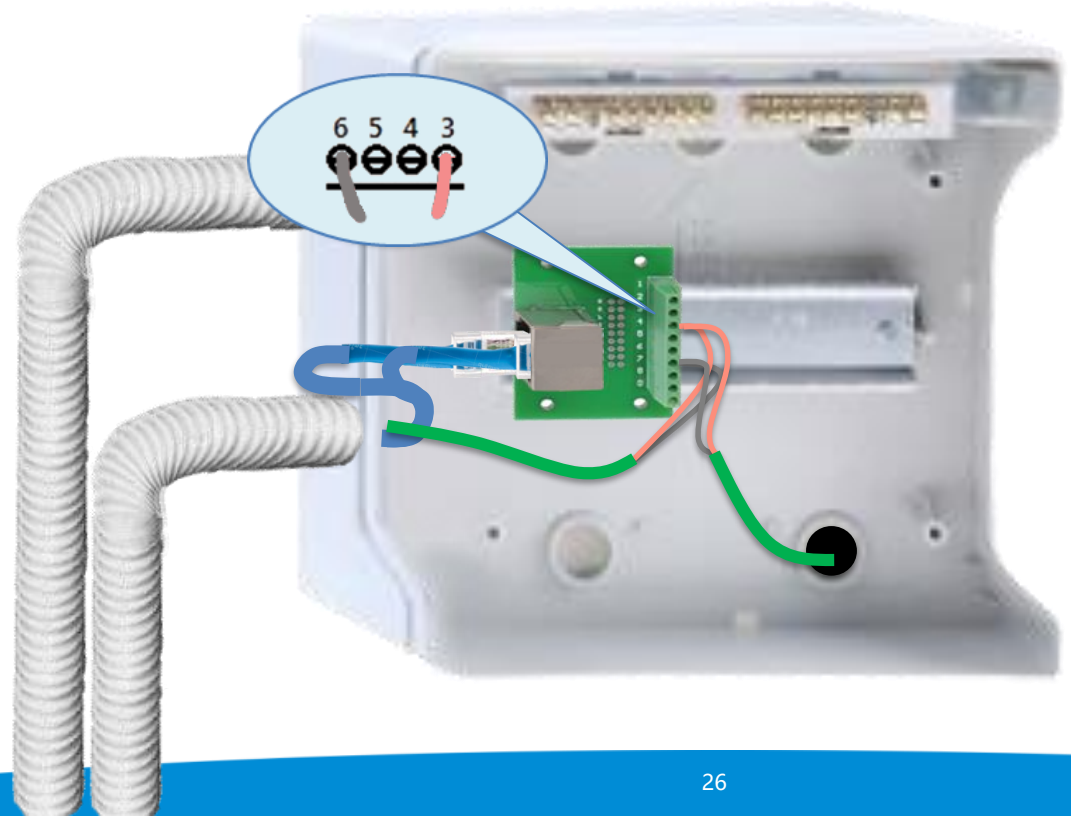
# BESS installation – Hybrid inverter Connections

**Connecting the inverter cables**

1. Prepare the **AC Grid** and **Critical load connectors**.
2. Connect the **AC connectors** to the inverter.
3. Connect the **Anderson plug** to the **DC cables**
4. Connect the **comms cable** to **RS485** port
5. Run the **battery comms cable** via **inverter comms conduit** to DB
6. Connect the **solar PV** cables



# BESS installation – BESS connections




**Connecting the comms cables (cables already labelled)**

**Step 1**: Insert the **relay board** on to the DIN rail.

**Step 2**: Connect **inverter comms cable** to **relay board**

**Step 3**: Insert the **powercube comms cable** positive to 3, negative to 6

**Step 4:** Run the **energy meter comms cable** to the energy meter (to be located on the main switchboard)

**To Energy Meter**

# BESS installation – BESS connections

**Step 2:** Connect to the **critical load**

**Actives:**

A) Wire the **Critical load AC breaker**

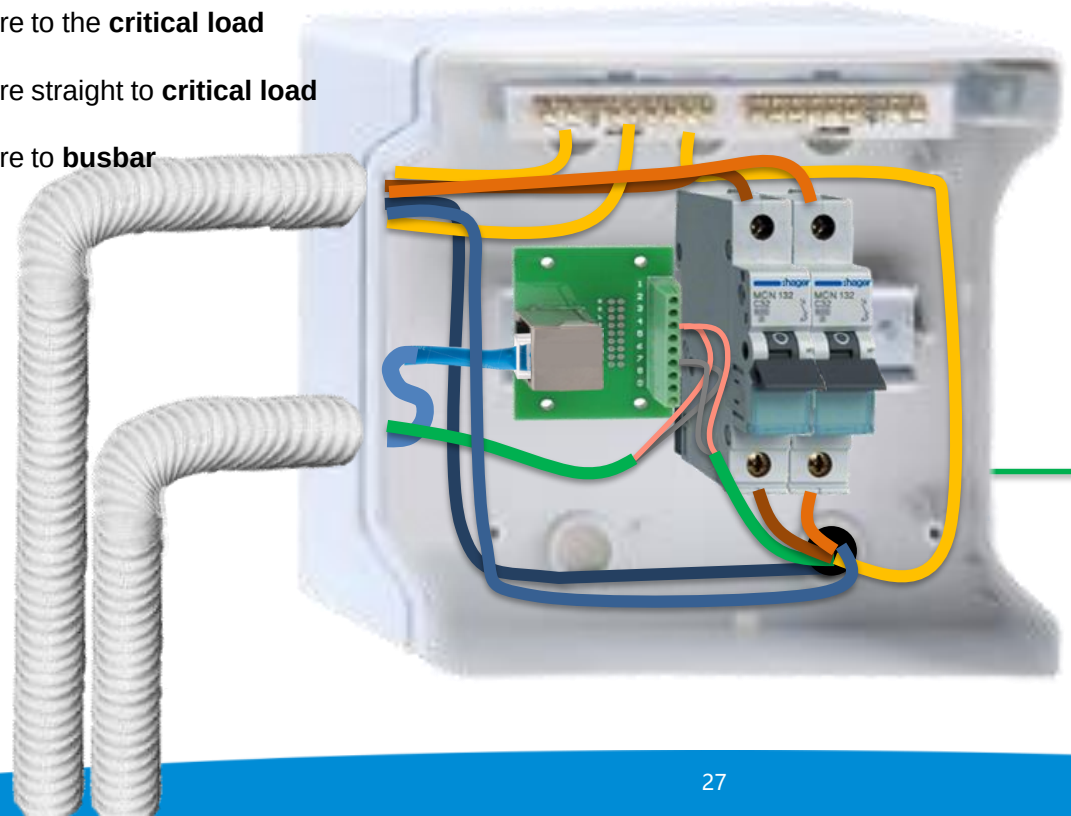
B) Wire to the **critical load**

**Neutrals:**

A) Wire straight to **critical load**

**Earth:**

A) Wire to **busbar**



**Connecting the AC cables**

**Step 1**: Connect to the **grid**:

**Actives:**

A) Wire the **Grid AC breaker**

B) Wire to the **Energy Meter**

**Neutrals**:

A) Wire to the **Neutral busbar**

**Earth:**

A) Wire to **busbar**

B) Busbar to the **mains earth**

To Energy Meter

N
L

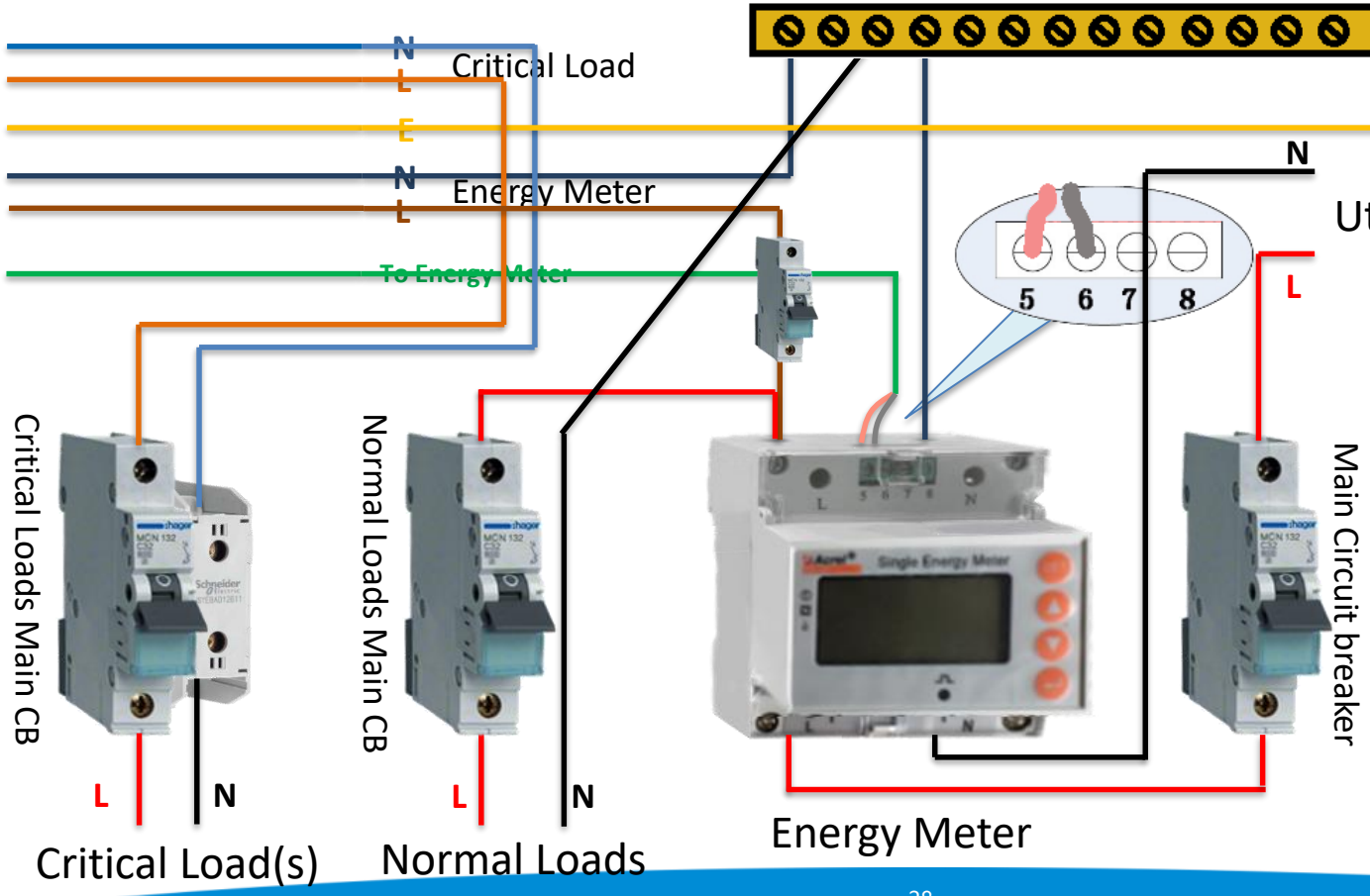
Critical Load

E

N
L

Energy Meter

# BESS installation – Main Switchboard connections




**Connecting Wires from BESS DB**

**Step 1**: Connect the **Critical Loads** circuits

**Step 2**: Connect **energy meter circuits** (an **AC Circuit Breaker** may be needed for local wiring requirements)

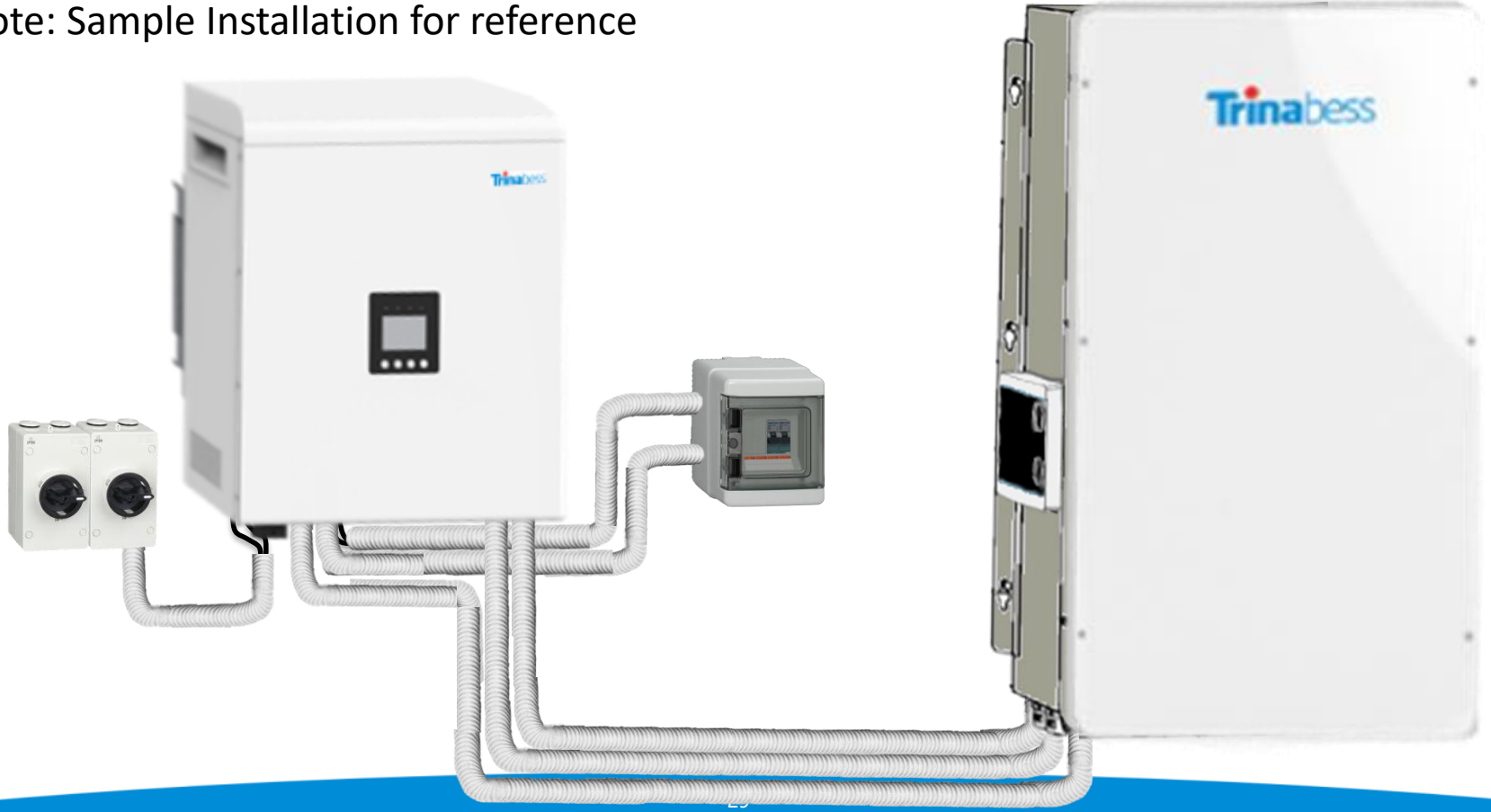
**Step 3:** Connect energy meter to **main circuit breaker**

**Step 4:** Connect **Normal loads** to energy meter circuits

**Step 5**: Connect **Earth** circuit

# BESS installation – Complete

Note: Sample Installation for reference



# System Initialization – Changing settings

**Note: Please double check the connections (notably AC & DC) before operation.**

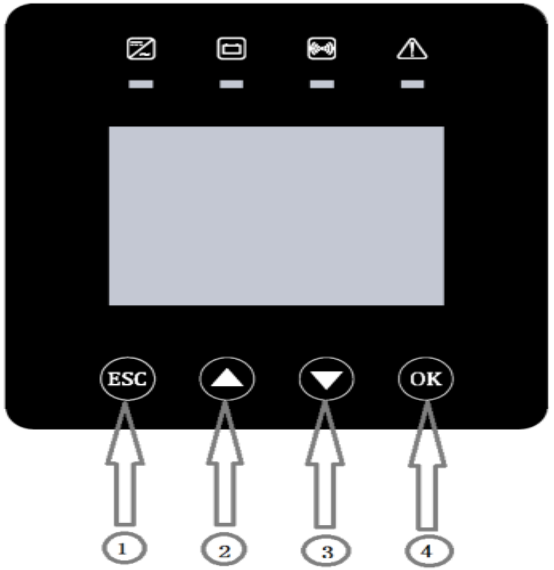
**Power on the BESS system per the following steps:**

1. Turn **ON PV array** isolators/circuit breakers (if applicable)
2. Turn **ON AC circuit breaker** between Power Box Grid port & Grid. The Power Box should start to operate now. You should be able to see the LCD display powered on.
3. Change the **inverter parameters** to the **correct settings** (next few slides)

# System Initialization - System menu keys

| Item | Symbol | Meaning | Illustration |
|---|---|---|---|
| ① | ESC | Cancel | Move back to the upper item or close |
| ② | ▲ | Up | Move back to the upper item or previous page |
| ③ | ▼ | Down | Move forward to next item or next page |
| ④ | OK | Enter/ Escape | Enter into or exit from the current page |

| Item | Definition | Description |
|---|---|---|
|  | System operation light | Light on when hybrid inverter system is running smoothly |
|  | Battery operation light | Light on if the communication between PV inverter and BMS is fine |
|  | WiFi operation light | Light on when the WiFi is running |
|  | Warning light | Light on when system warning occurs |



# System Initialization – Primary Settings

| Item | Description | | | |
|---|---|---|---|---|
| PW | Password 1111 or 6666 | | | |
| TIM | Time | | | |
| TYP | Battery type | 00 | Lithium-ion battery(default) | |
| | | 01 | Lead battery | |
| BVH | Battery charging stop voltage (default 54V) | | | |
| BVL | Battery discharging stop voltage (default 46V) | | | |
| Id | Max discharging current(default 80A) | | | |
| Ic | Max charging current(default 50A) | | | |
| CER | Certification | 00 | G83 | |
| | | 01 | VDE 0126/4105 | |
| | | 02 | **AS4777(default)** | |
| CNY | PV connection | 01 | Only PV1 | |
| | | 02 | Only PV2 | |
| | | **03** | **PV independent** | |
| | | 04 | PV parallel | |
| MDE | Operation mode | **00** | **PV self of use(default)** | |
| | | 01 | Forced Time of Use(TOU) | 00charging time<br>01discharging time |
| | | 02 | Back up reserved | |
| | | 04 | Slave mode | |
| ADR | **Meter address(001-255)** | | | |
| CT | **Current transformer(01-99)(default 01)** | | | |
| BMS | 00 | Trinabess | Communication mode: RS485 | |
| SOC | Discharging stop capacity (default 20%) | | | |
| FED | Grid feed-in power (0-100%) **(default 100%)** | | | |
| RST | Restore to the default factory setting(RST1111) | | | |

Highlighted section required to be adjusted to the correct setting for the system to start working. Other items are the default settings and is not required to be adjusted

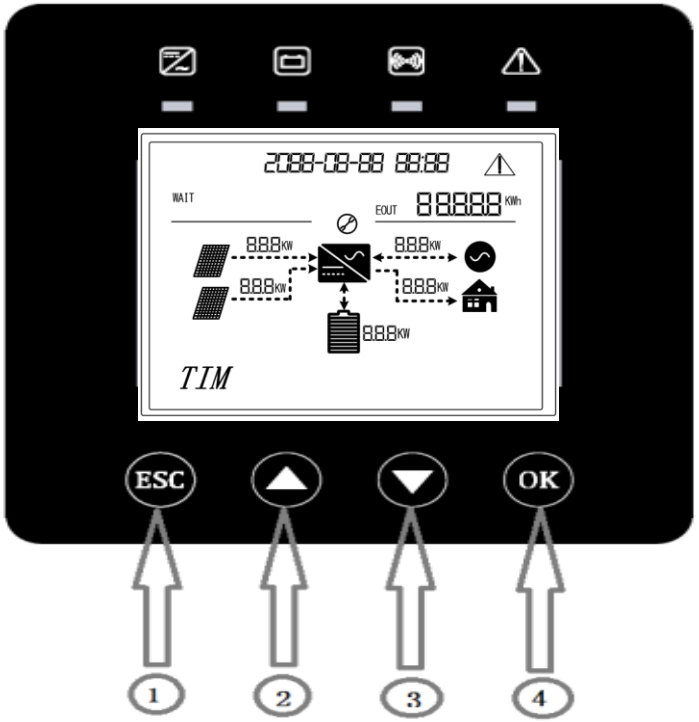
Note: the LCD background light will be turned off if no actions within 2 minutes.

# System Setting – Changing the time for the first time

**Time Setting:**

Usually during the **first initialization**, the time need to be changed.

1. At the standard interface, long press the “OK” button for 3 seconds to **enter the setting menu**.
2. Input the **password “1111”**
3. Choose **parameters** by pressing “▲”, “▼” buttons. Go into “**TIM**” which refers to system time
4. Press “▲” or “▼” to change the 1st digit, press “OK” to switch to next digit, after inputting the current time, **press “OK”**

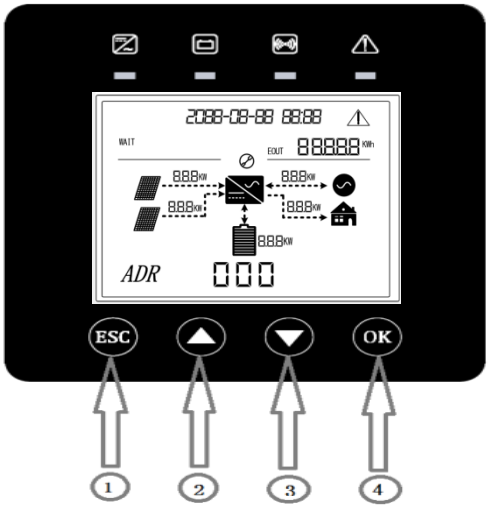


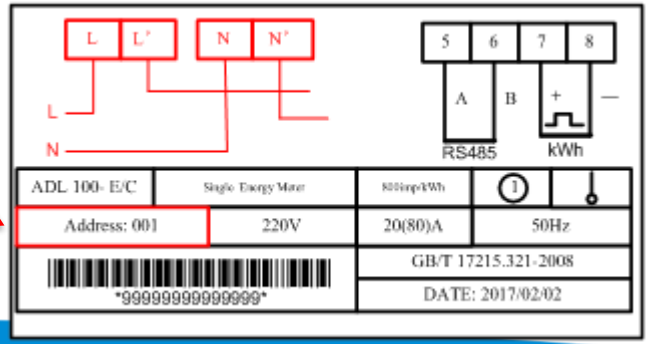
# System Setting – Setting Smart Meter address

**Smart Meter Address Setting:**

Usually during the **first initialization**, the smart meter address need to be changed.

1. At the standard interface, long press the “OK” button for 3 seconds to **enter the setting menu**.
2. Input the **password “1111”**
3. Choose **parameters** by pressing “▲”, “▼” buttons. Go into “**ADR**” which refers to smart meter address
4. Check the **address column** is the same as that **on smart meter label**
5. Press “▲” or “▼” to change the 1st digit, press “OK” to switch to next digit, after inputting the correct address, **press “OK”**



# System Setting – CT address

**Smart Meter Address Setting:**

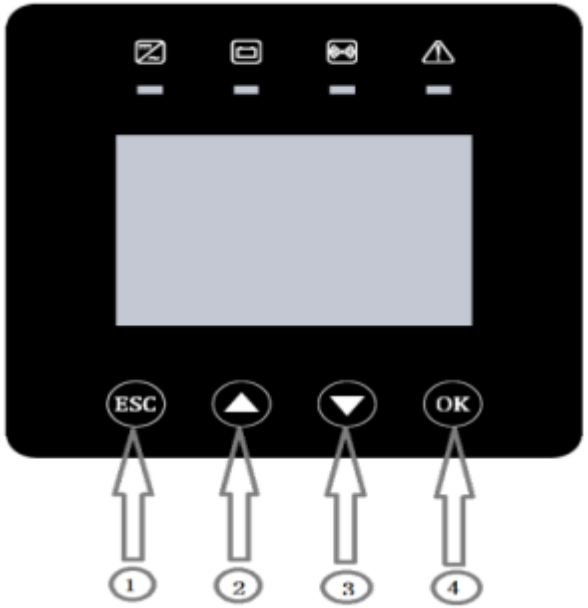
Usually during the **first initialization**, the CT address need to be changed.

1. At the standard interface, long press the “OK” button for 3 seconds to **enter the setting menu**.

2. Input the **password “1111”**

3. Choose **parameters** by pressing “▲”, “▼” buttons. Go into “**CT**” which refers to CT address

4. Change to **01**. Press “▲” or “▼” to change the 1st digit, press “OK” to switch to next digit, after inputting the correct address, **press “OK”**



# System Setting – Zero Export function (optional)

**Smart Meter Address Setting:**

The Zero export function can be utilized in some regions by changing in the “**FED**” settings.

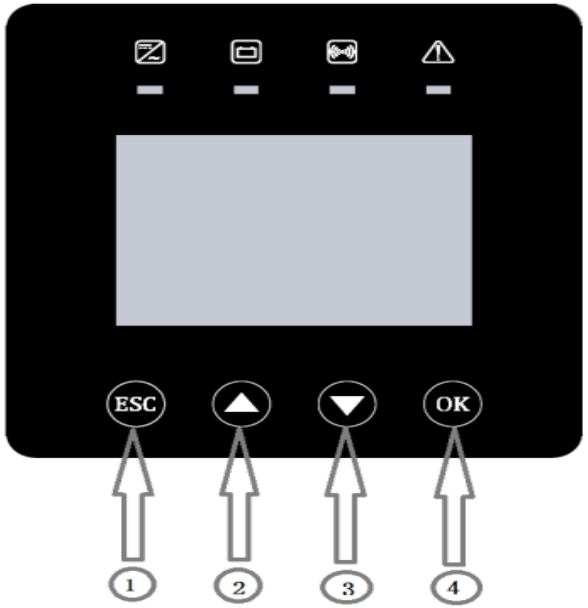
1.At the standard interface, long press the “OK” button for 3 seconds to **enter the setting menu**.

2.Input the **password “1111”**

3.Choose **parameters** by pressing “▲”, “▼” buttons. Go into “**FED**” which refers to Grid feed-in power

4.Grid feed-in power XXXX% (5000*x%)X; **default 100**. Enter a value between 0 to 100%. 0 = zero export.

5.Press “▲” or “▼” to change the 1st digit, press “OK” to switch to next digit, after inputting the correct address, **press “OK”**



# System Initialization – Start-up

**Note: Please double check the connections (notably AC & DC) before operation.**


**Power on the BESS system per the following steps:**

1. After changing all the setting. **Restart the system** by turning off all AC & DC circuit breakers (no particular order)
2. Turn **ON PV array** isolators/circuit breakers (if applicable)
3. Turn **ON AC circuit breaker** between Power Box Grid port & Grid. The Power Box should start to operate now.
4. Turn **ON all the battery packs** by pressing any one of the red softstart button on the pack
5. Turn **ON DC circuit breaker/isolator** between PowerCube 2.0 & Power Box (Only when you see inverter LCD screen shows **"Wait"** which indicate success start-up)
6. Turn **ON some home appliances or load**. Make sure power consumption in the Power Box's phase is greater than 200W.
7. You should be able to **read the data on the screen**.

# System Initialization – LCD display menu definition

| Item list | Display contents | |
|---|---|---|
| PV1 | Voltage | Current |
| PV2 | Voltage | Current |
| BAT | Voltage | Current |
| AC | GRID voltage(on-grid) | GRID voltage(on-grid) |
| | EMERGENCY LOAD voltage(off-grid) | EMERGENCY LOAD current(off-grid) |
| TEM | Inverter Temperature | |
| FRE | Grid frequency | |
| ET1 | Daily PV production | |
| SOC | Battery capacity | |
| SWC | software version No. of SolDate5200TLcommunication conversion board | |
| SWM | CPU software version No. of SolDate5200TL Master | |
| SWS | CPU software version No. of SolDate5200TL Slave | |
| SWB | CPU software version No. of BM024 | |

# 04

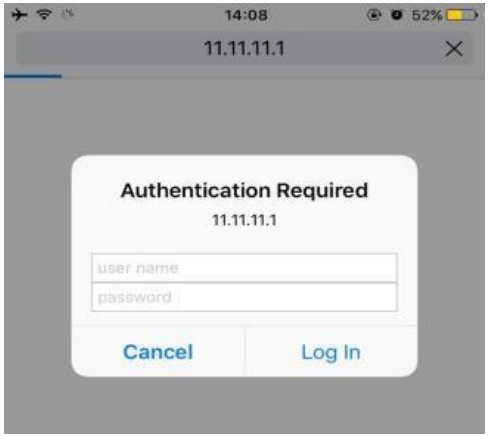
# WIFI Monitoring Setup Guide

- Establish WLAN (Wi-Fi) Connection
- APP Setup
- BESS System Monitoring

# Establish WLAN (Wi-Fi) Connection - Connecting to inverter Wi-Fi

Get **Connected with the Inverter Wi-Fi SSID** which is same as **inverter serial number**


- Open up an **internet browser** using a computer PC or from any smart device.
- Enter the **inverter IP address** in the address bar (URL) to open up its settings and configurations: **11.11.11.1**.
- Default **username: admin Password: admin**



# Establish WLAN (Wi-Fi) Connection - Set-up the WLAN connection

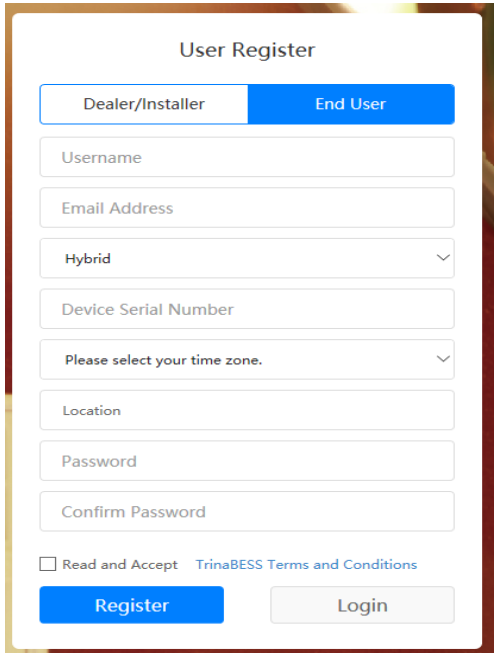
Enter and connect to **local WiFi network SSID** and password

OR go to **“Find AP”** to choose one of the SSID from the list. Enter the **password** into the “Key” table.


- Click **“Save & Reboot”** and restart, wait at least 2 minutes. If the device IP address is **no longer 0.0.0.0**, then the device is connected to the Internet successfully.

# Establish WLAN (Wi-Fi) Connection - Set-up the user account

Visit the website portal (http://cloud.trinabess.com) and click “register”




- *Username: free to create (with 5-15 letters /figures).
- **Caution: when Username is created, it cannot be changed.**
- * Email Address: fill in a frequently-used email address. (in case of forgetting the actual password).
- * Hybrid: the type of your device, it can be selected Hybrid only.
- * Device Serial Number: EMS serial number (on the right side of your inverter).
- * Location: choose the address of your device on the map.
- * Password: 5-15 letters/figures etc.
- * Confirm Password.

# APP setup
# - Downloading the APP

Search “Trinabess” in app store (IOS)


For android, download via this link or QR code:

http://cloud.trinabess.com/TrinabestAgent/resources/app/trinabess.apk

# BESS System monitoring - Demo account

**Webpage: http://cloud.trinabess.com/**

**Username:** pan1

**Password:** 123456


Thank You