

**Trinabess**



**INSTALLATION MANUAL**

**Energy Storage System**  
For Home

PowerCube 2.0



# Home Energy Storage Unit PowerCube 2.0

Installation Manual  
June 2017 | Edition 1.5

CONGRATULATIONS on having PowerCube 2.0 on your property as a supplementary power source!

This manual describes how to safely install the Power Cube 2.0 from Trinabess.

Read this manual thoroughly before you attempt to install the product, and follow the instructions carefully throughout the installation process.

If you are uncertain about any of the requirements, recommendations, or safety procedures described in this manual, contact Trinabess immediately for advice and clarification.

**NOTE**

The information included in this document is accurate at the time of publication. However, this product is subject to change without prior notice. In addition, the illustrations in this document are meant only to help explain system configurations concepts and installation instructions. The illustrated items may differ from the actual items at the installation location.

# Contents

1 Introduction.....	5
1.1 Features.....	5
1.2 Package Items.....	5
1.3 LED Indicators.....	6
1.4 Specifications.....	7
2 Safety.....	9
2.1 General Precautions for the Battery Pack.....	9
2.2 Tools.....	10
2.3 Safety Gear.....	10
2.4 Warning Labels.....	11
3 Installation.....	11
3.1 Installation Requirements.....	11
3.2 Installing the PowerCube 2.0.....	14
4 Emergency Situations.....	21
4.1 Batteries Leakage.....	21
4.2 Fire.....	21
4.3 Wet Batteries.....	22
4.4 Damaged Batteries.....	22
5 Warranty.....	22
5.1 Warranty Coverage.....	22
5.2 Limitation of Liability.....	22
5.3 Contact Information.....	23
A Technical Information.....	23
Performance.....	23

# 1 Introduction

## 1.1 Features

The PowerCube 2.0 has the following features:

**Photovoltaic system:** This battery Pack is designed for photovoltaic system compatibility.

**Battery management system (BMS):** The Battery pack's built-in BMS monitors its operation and prevents the battery from operating outside design limitations.

**Expandability:** The Power Cube 2.0 case contains at most 4 battery packs, with a capacity of 2.4kWh per pack.

## 1.2 Package Items

### PowerCube 2.0 (not including components of PowerBox)

Items other than those listed below, such as a power cable, may be provided separately.

Packing List

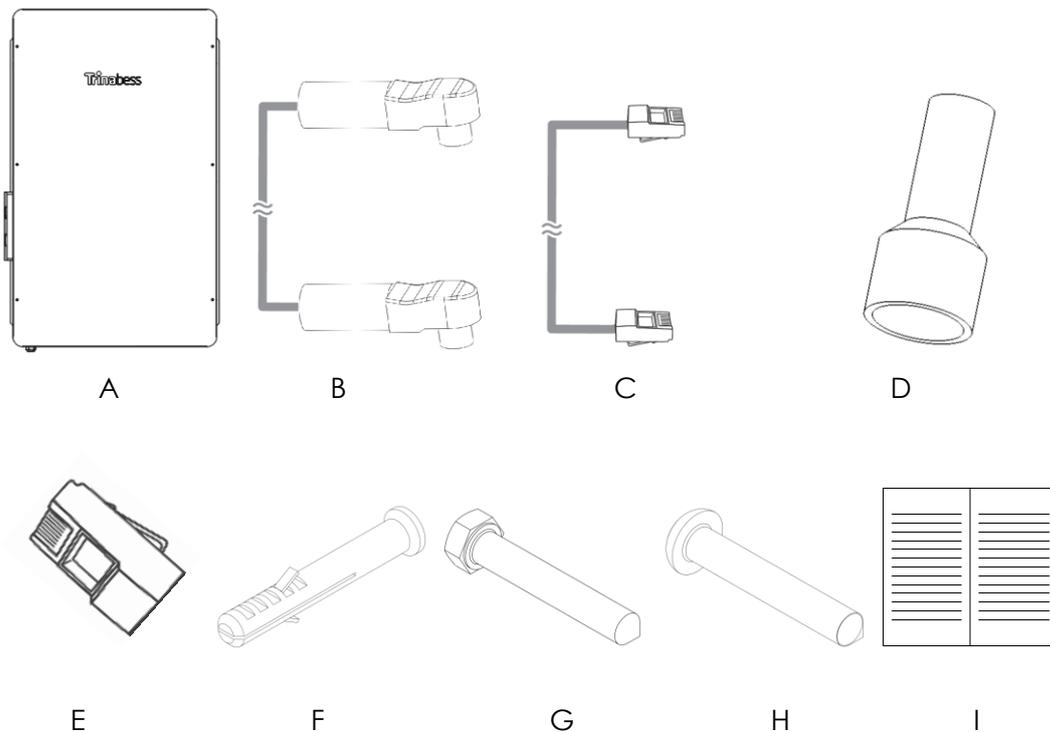


Fig 1-1: Packing list

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

### Battery PACK

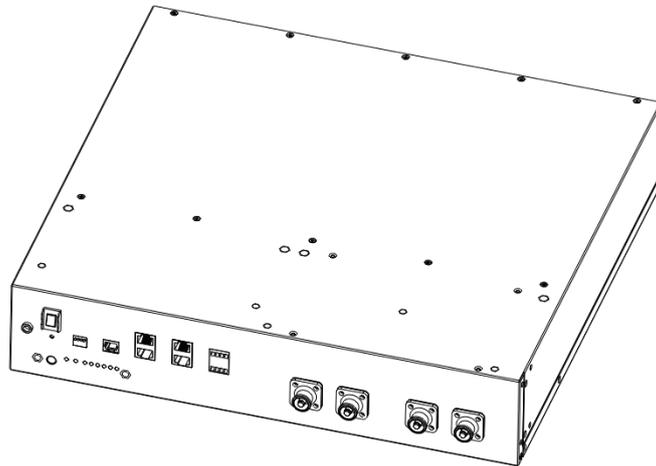


Fig 1-2: Battery PACK

## 1.3 LED Indicators

### Battery PACK

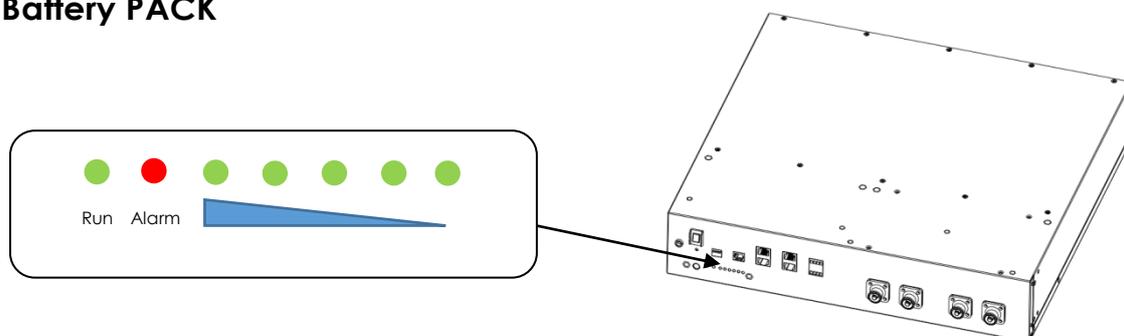


Fig 1-3: LED Indicator

The LED indicators on the front of the battery pack show its operational state as follows:

**Run:**  : When the battery pack is in normal operation, the Run indicator is lit in green.

**Alarm:**  : When the battery pack is in a warning or fault state, the Fault indicator is lit in red.

**SOC**  : The number of lit indicators indicates the state of charge.

Battery Status	Protection/Warning/Normal	RUN	ALM	Battery power LED						notes
										
Off		off	off	off	off	off	off	off	off	All Off
Powering	Normal	on	on	on	on	on	on	on	on	Battery bank is under powering process, all the LED is turn on for 1 second
Standby	Normal	Flash 1	off	off	off	off	off	off	off	The statue of LED light when no charge or discharge
	Warning	off	Flash 3	off	off	off	off	off	off	Low voltage for battery bank
Charging	Normal	Solid Green	Off	Based on battery power indicator, each LED stand for 16.6% SOC, always on means it is fully charged, off means does not charging , flash means still charging						
	Warning	Solid Green	Flash 3							
	Protection	Off	Solid Green	Off	Off	Off	Off	Off	Off	Battery pack stop charging and protection is activated.
Discharging	Normal	Flash 3	Flash 3	Based on battery power indicator, each LED stand for 16.6% SOC, always on means it is fully charged, off means does not charging , flash means still charging						
	Warning	Flash 3	Flash 3							
	Protection	Off	Always on	Off	Off	Off	Off			Battery pack stop discharging and protection is activated

Note: flash 1 --- 0.25 seconds On/ 3.75 seconds off; flash 2 --- 0.5 seconds on / 0.5 seconds off; flash 3 --- 0.5 seconds on / 1.5 seconds off;

## 1.4 Specifications

### PowerCube 2.0 casing dimensions and weight

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

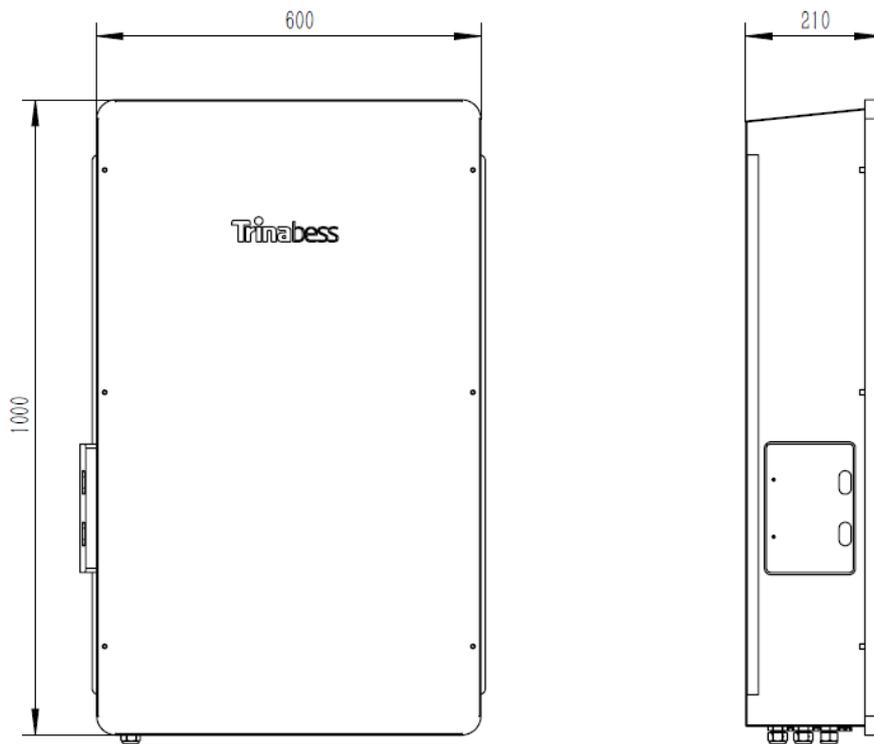


Fig 1-4: Casing dimensions

**Battery PACK's dimensions and weight**

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

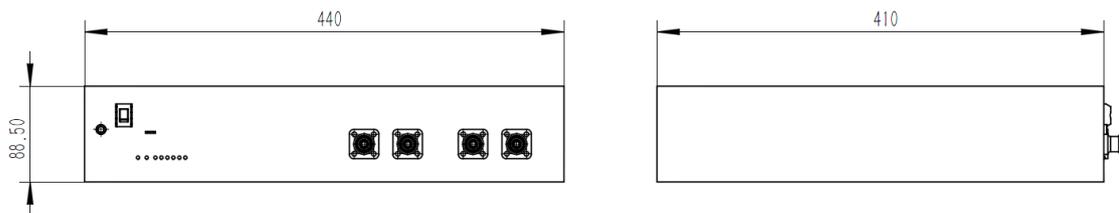


Fig 1-5: PACK dimensions

## Power cable requirements

Conductor cross-sectional area <sup>1)</sup>	25mm <sup>2</sup>
Cable outer diameter	7mm to 13mm

- 1) The external resistance of the power cable between the battery PACK and the inverter must be below 10mΩ.

## Communication interface

Protocol	RS485
Channel	3(RXD\TXD)
Protocol	RS232
Channel	3(RXD\TXD)
Protocol	CAN
Channel	1(CANH\CANL)

# 2 Safety

## 2.1 General Precautions for the Battery PACK

### WARNING

Failure to observe the precautions described in this section can cause serious injury to persons or damage to property.

Observe the following precautions:

- Risks of explosion
  - Do not subject the battery PACK to strong impacts.
  - Do not crush or puncture the battery PACK.
  - Do not dispose the battery PACK in a fire.
- Risks of fire
  - Do not place the battery PACK near a heat source such as a fire place.
  - Do not expose the battery PACK to direct sunlight.
  - Do not allow the battery connectors to touch conductive objects such as wires.
- Risks of electric shock
  - Do not disassemble the battery PACK.
  - Do not touch the battery PACK with wet hands.
  - Do not expose the battery PACK to moisture or liquids.
  - Keep the battery PACK away from children and animals.
- Risks of damage to the battery PACK
  - Do not allow the battery PACK to come in contact with liquids.

- Do not subject the battery PACK to high pressures.
- Do not place any objects on top of the battery PACK.

## 2.2 Tools

The following tools are required to install the battery PACK:

Note: The details below are only guidance and are not guaranteed to be applicable. Consult local building codes and a structural engineer.

- Drill and a drill bit suitable for drilling pilot holes in the desired mounting surface
- socket wrench
- Large flathead screwdriver
- Torque wrench
- Stud finder (for wood installations)
- Painter's tape and/or pencil
- Wire stripper and wiring
- Conduit fitting or cable gland (as appropriate)

Use properly insulated tools to prevent accidental electric shock or short-circuits. It is highly recommended to use adjustable tools and measuring instruments that are certified for precision and accuracy.

## 2.3 Safety Gear

It is recommended to wear the following safety gear when dealing with the battery PACK.



**Insulated Gloves**



**Safety Goggles**



**Safety Shoes**

Fig 2-1: Safety Gear

## 2.4 Warning Labels

### The PowerCube 2.0

The name plate and warning labels are attached to the right side of the main battery PACK.



Fig 2-2: Labels

## 3 Installation

### 3.1 Installation Requirements

#### Physical Requirements

#### CAUTION

- Ensure that no water sources are above or near PowerCube 2.0, including downspouts, sprinklers, or faucets.
- Ensure that snow does not accumulate on top of or around PowerCube 2.0.
- When installing PowerCube 2.0 in a garage or near vehicles, keep it out of the driving path. If possible, install the PowerCube 2.0 on a side wall

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and/or above the height of vehicle bumpers.

PowerCube 2.0 must be installed on an upright wall that can support 120 kg (The PowerCube 2.0 can be fixed on the floor with an installing attachment, in case the wall fails to support it), the maximum weight of PowerCube 2.0. The wall must be flush and extend to all edges of the system, allowing no access to the back of the unit once it is mounted. Do not mount PowerCube 2.0 horizontally or upside down. Do not mount PowerCube 2.0 on a wall that is tilted backward or forward more than 5 degrees.

PowerCube 2.0 requires adequate clearance for installation and airflow (ref to Fig 3-1). Do not mount any other objects within the clearance space illustrated below, except those explicitly required by the installation (for example, conduit or DC disconnects depending on local installation codes). Do not install anything between PowerCube 2.0 and the ceiling.

### **Temperature requirements**

PowerCube 2.0 is capable of charging and discharging within the full ambient temperature range listed in the Specifications section. At the high and low ends of the temperature range, PowerCube 2.0 may limit charge or discharge power based on battery cell temperature to improve battery lifespan.

Installation in full sun raises the temperature inside the enclosure above ambient temperature. This temperature rise is not a safety risk, but can impact the performance of the batteries. Installation in full sun is not recommended to optimize the use of PowerCube 2.0.

Do not install PowerCube 2.0 in a room with sustained elevated temperatures, such as a boiler room. The optimal ambient temperature for the optimal system's life is recommended to be around 30 Degree Celsius.

### **Installation requirements**

PowerCube 2.0 must be installed with a compatible inverter. Wiring and conduit (where necessary) must be provided by the installer.

DC disconnects requirements between PowerCube 2.0 and the PowerCube 2.0 / Inverter are subject to local codes. Ensure that the installation meets local DC disconnect requirements. Check the inverter installation manual to understand site connections and overcurrent protection.

All installations must conform to the laws, regulations, codes, and standards applicable in the jurisdiction of installation.

## Clearance

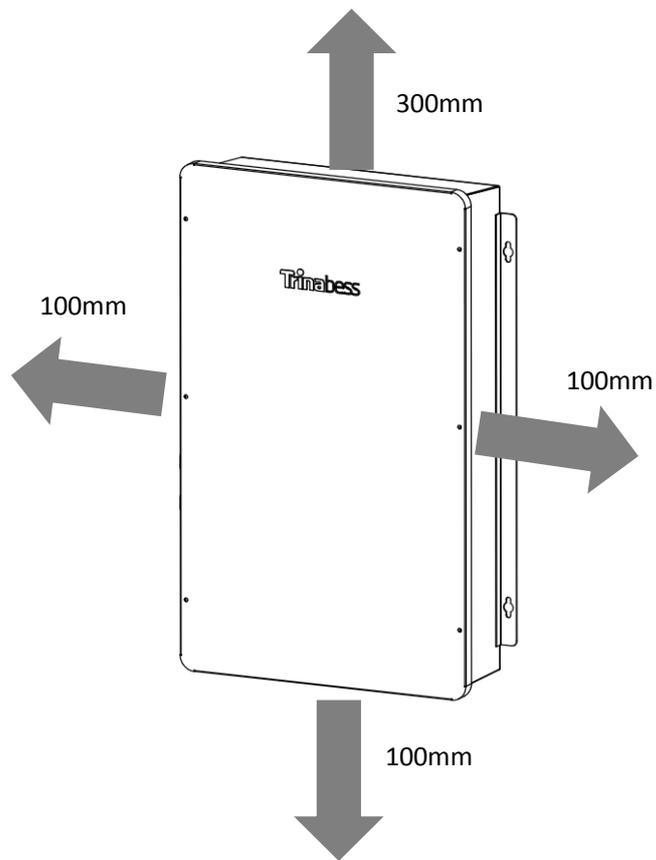


Fig 3-1: Clearance requirement

## 3.2 Installing the PowerCube 2.0

### Step 1-Securing the PowerCube 2.0 case

#### • Wall-mounted

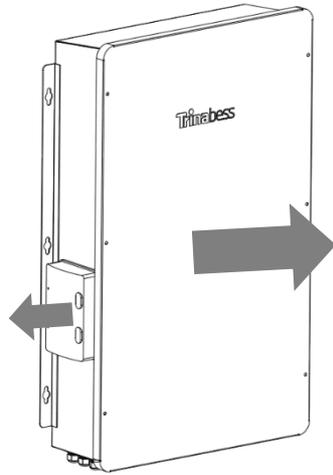


Fig 3-2: Remove the enclosure of the PowerCube 2.0

1. Remove the enclosure.
2. Remove the Breaker cover.

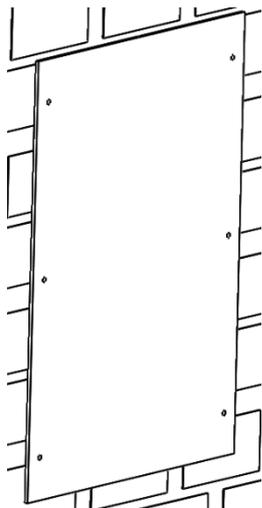
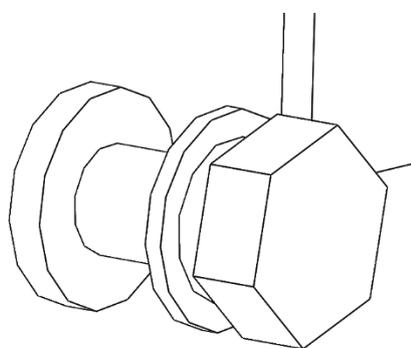


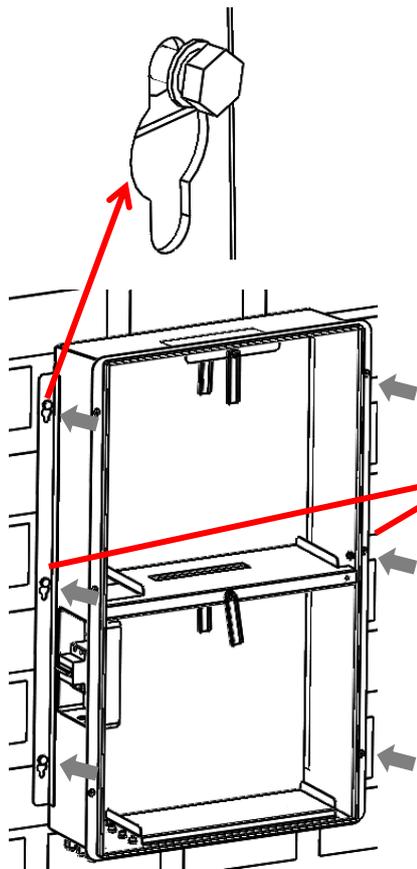
Fig 3-3: Use cardboard template provided to do wall-mount hole "marking"

3. Use the cardboard template provided to do wall-mount hole "marking"
4. Drill holes follow by wall plug before fitting in the M8 bolts in the wall.



5. Drive the M8 bolts in either with power tool or ratchet after drilling and inserted with wall plug into the holes. Please take note to place two anti-theft bolts [provided] in the middle hole). Please do not drive in the bolt completely and leave 3~5mm for next step (step 7) installation
- 6.

Fig 3-4: Illustration to hook PowerCube 2.0 enclosure to the bolt for wall-mount



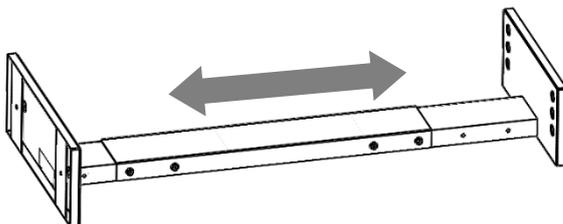
7. Leaving 3~5mm (as mentioned on Step #6) to hook on the PowerCube casing to the pre-installed bolt
8. After hooking and fitting in the M8 bolts for all 6 wall holes, tighten the nuts to a torque of 15 N . M

Middle Hole for anti-theft bolt

Fig 3-5: Casing Installation

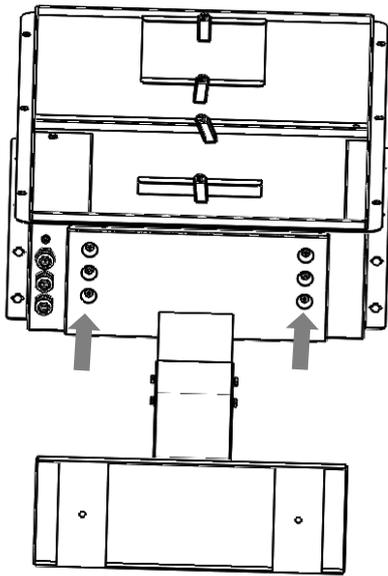
• Pedestal (Optional)

If the weight of PowerCube outstrips the load-bearing capacity of wall, PowerCube can be installed against the wall with supplementary support using the pedestal.(Pedestal to be purchased separately)



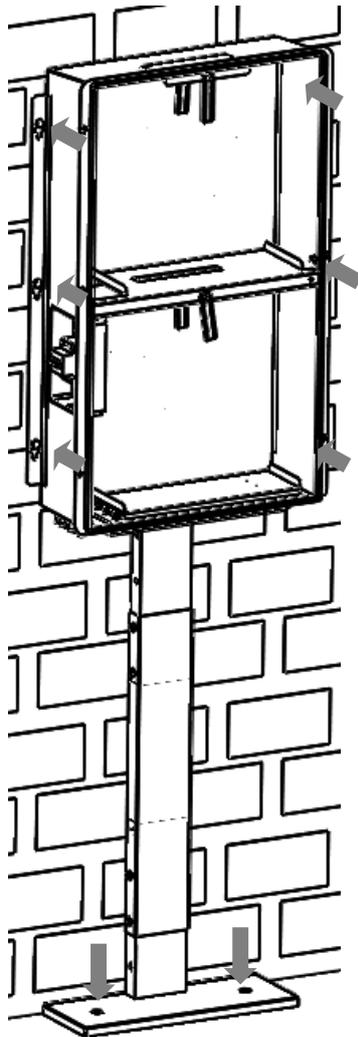
1. Adjust pedestal to required height and fix it with bolt provided (adjustable height range is 800~1200mm)

Fig 3-6: Pedestal



2. Attach pedestal to casing.

Fig 3-7: Pedestal installation



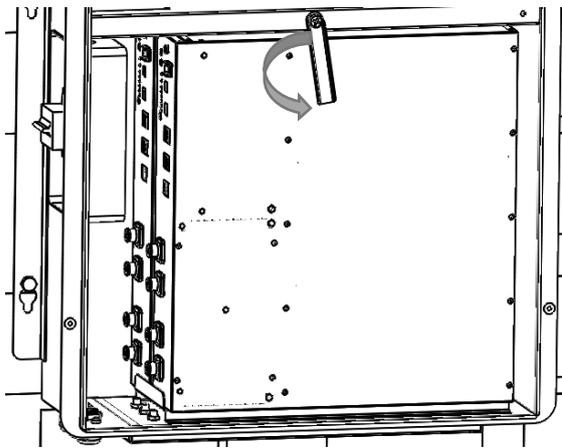
3. Drill holes to suit M8 bolts in the floor and wall. (Use the cardboard template provided to do wall-mount hole "marking" )
4. Drive the anchor bolts through the mounting brackets into the holes (two anti-theft screws on middle).
5. Tighten the nuts to a torque of 15 N · M.

Fig 3-8: Case installation

**CAUTION**

Make sure that the PowerCube 2.0 is at all times exposed to the ambient air. The PowerCube 2.0 is cooled by natural convection. If PowerCube 2.0 is entirely or partially covered or shielded causing the rise of temperature may cause the PowerCube 2.0 to stop operating.

**Installing the Battery packs**



1. Insert the Pack into the case.
2. Switch the baffle to fasten the Pack

Fig 3-9: PACK installation

**Connecting PowerCube 2.0 to PowerBox/Inverter**

(Instruction of wiring to PowerBox/Inverter is contained in PowerBox/Inverter Installation manual)  
Interface Instruction

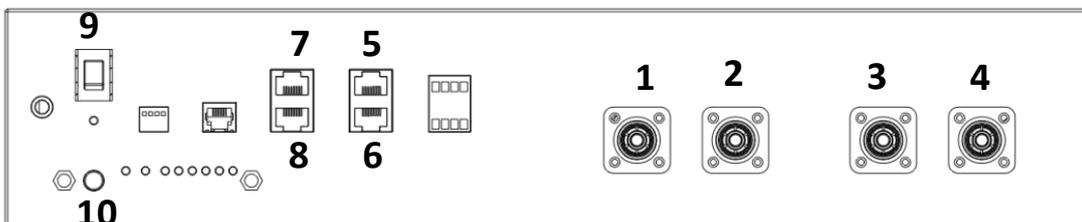


Fig 3-10: PACK Connect Points (CP) Illustration

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

**Battery  
Packs  
breaker**

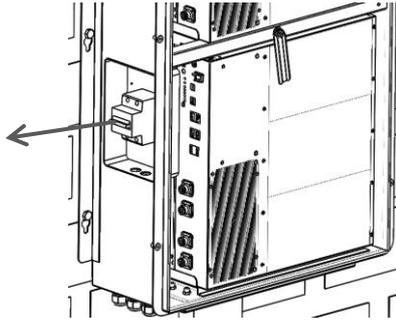
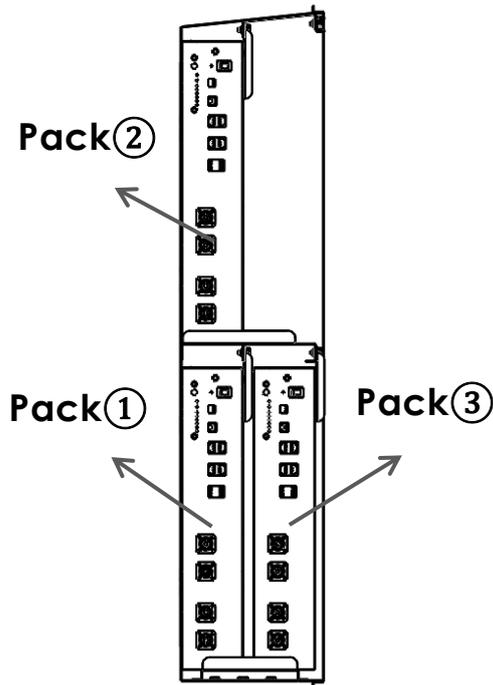


Fig 3-11: 3 Battery Packs breaker

When installing 3 battery packs in the case, wiring details as follow:



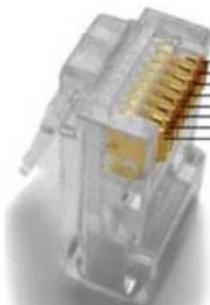
1. Wire to Anode (+)  
Pack③CP3 to Pack②CP3;  
Pack②CP4 to Pack①CP3;  
Pack①CP4 to PACKS breaker;  
PACKS breaker to  
PowerBox/Inventer<sup>1)</sup>

1) Connect component D(ref back to Packing List) to AWG4 wire (cable not provided);

2. Wire to Cathode (-):  
Pack③CP1 to Pack②CP2;  
Pack②CP1 to Pack①CP1;  
Pack③CP2 to PACKS breaker;  
PACKS breaker to  
PowerBox/Inventer<sup>2)</sup>

2) Connect accessory component D to AWG4 wire (cable not provided);

Fig 3-12: 3 Battery Packs wiring instruction



Pin Position  
8  
7  
6  
5  
4  
3  
2  
1

	CAN	485
1	--	RS485B
2	GND	RS485A
3	--	GND
4	CANH	
5	CANL	
6	--	GND
7	--	RS485A
8	--	RS485B

3. Wire the communication line:  
Pack①CP5 to Pack②CP6;  
Pack ②CP5 to Pack③CP6;  
Pack ③CP8 to  
PowerBox/Inventer<sup>3)</sup>

3) Connect accessory component E-RJ45 plug to network cable (a standard 2 metre cable is supplied for CAN port)(Fig 3-13) (Connect either RS485/CAN, for RS485, refer to Fig 3-15 for wiring instructions)

Fig 3-13: Communication port

When installing 4 Battery Packs in the case, wiring details as follow:

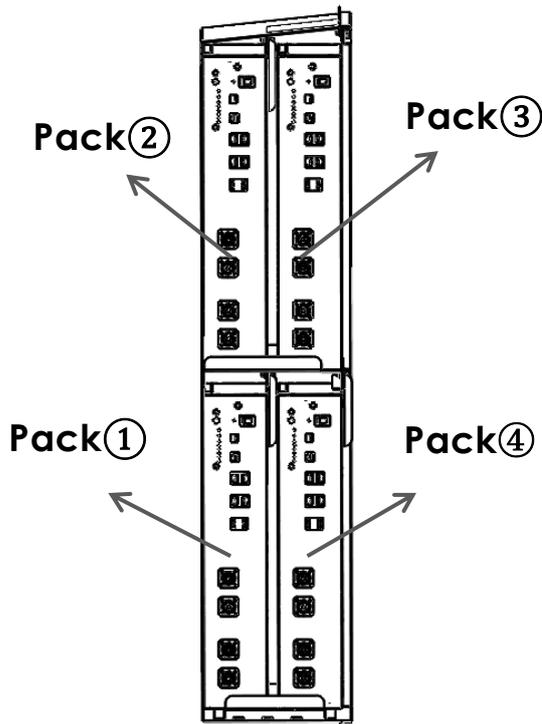
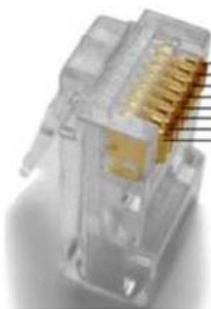


Fig 3-14: 4 Battery Packs wiring instruction

1. Wire to Anode (+):  
 Pack④CP3 to Pack ③CP3;  
 Pack③CP4 to Pack②CP3;  
 Pack②CP4 to Pack①CP3;  
 Pack①CP4 to PACKS breaker;  
 PACKS breaker to PowerBox/Inventer<sup>1)</sup>  
<sup>1)</sup> Connect accessory component D to AWG4 wire; cable not provided;
2. Wire to Cathode (-):  
 Pack①CP1 to Pack②CP1;  
 Pack②CP2 to Pack③CP1;  
 Pack③CP2 to Pack ④CP1;  
 Pack④CP2 to PACKS breaker;  
 PACKS breaker to PowerBox/Inventer<sup>2)</sup>  
<sup>2)</sup> Connect accessory component D to AWG4 wire; cable not provided;



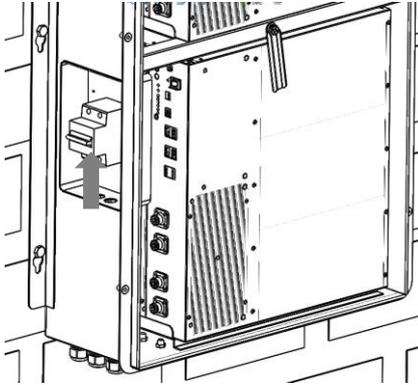
Pin Position

	CAN	485
1	--	RS485B
2	GND	RS485A
3	--	GND
4	CANH	
5	CANL	
6	--	GND
7	--	RS485A
8	--	RS485B

3. Wire the communication line:  
 Pack①CP5 to Pack②CP6  
 Pack②CP5 to Pack③CP6  
 Pack③CP5 to Pack④CP6  
 Pack④CP8 to PowerBox/Inventer<sup>3)</sup>  
<sup>3)</sup> Connect accessory component E-RJ45 plug to network cable (a standard 2 metre cable is supplied for CAN port)(Fig 3-13) (Connect either RS485/CAN, for RS485, refer to Fig 3-15 for wiring instructions)

Fig 3-15: Communication Port

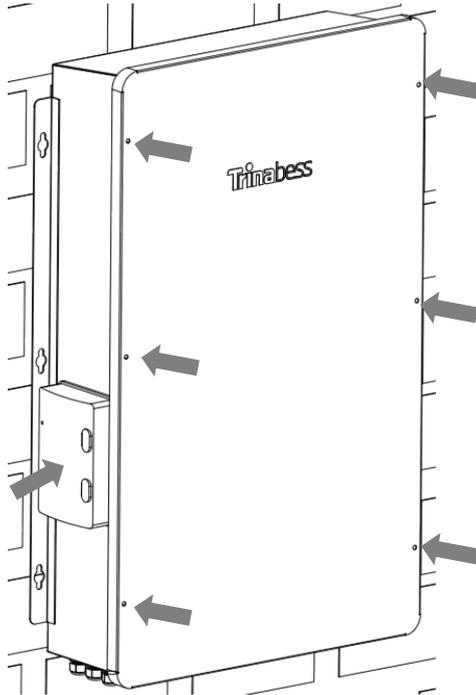
After wiring your circuit, turn on switch 9 of all packs and press their soft starter. Turn on packs breaker.



1. Turn on packs breaker.

Fig 3-16: Turn on battery packs breaker

Assemble the enclosure after activating the system.



1. Assemble the cover, tighten the nuts to a torque of 6 N.M.
2. Assemble the Breakers cover, tighten the nuts to a torque of 2.5 N.M.

Fig 3-17: Cover installation

## 4 Emergency Situations

The PowerCube 2.0 comprises multiple batteries that are designed to prevent hazards resulting from failures. However, Trinabess cannot guarantee their absolute safety.

### 4.1 Batteries Leakage

If the battery PACK leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below.

**Inhalation:** Evacuate the contaminated area, and seek medical attention.

**Contact with eyes:** Rinse eyes with flowing water for 15 minutes, and seek medical attention.

**Contact with skin:** Wash the affected area thoroughly with soap and water, and seek medical attention.

**Ingestion:** Induce vomiting, and seek medical attention.

### 4.2 Fire



In case of fires, it is recommended to have an ABC or carbon dioxide extinguisher

If a fire breaks out in the place where the battery PACK is installed, perform as the following counter measures:

1. Extinguish the fire before the battery PACK catches fire.
2. If it is nearly impossible to extinguish the fire but you have time, move the battery PACK to a safe area before it catches fire.
3. If the battery PACK has caught fire, do not try to extinguish the fire on the Battery PACK, but evacuate people immediately.

#### **WARNING**

When the battery PACK is burning, it produces poisonous gases.

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## 4.3 Wet Batteries

If the battery PACK is wet or submerged in water, do not let people access it. Contact Trinabess or your distributor for technical assistance.

## 4.4 Damaged Batteries

Damaged batteries are dangerous and must be handled with the utmost care. They are not fit for use and may pose a danger to people or property. If the battery PACK seems to be damaged, Pack it in its original container, and then return it to Trinabess or your distributor.

### CAUTION

Damaged batteries may leak electrolyte or produce flammable gas. If such a damage occurs, immediately contact Trinabess on +0519 8517 6686.

# 5 Warranty

## 5.1 Warranty Coverage

Trinabess protects this product under warranty when this product is installed and used as detailed in this manual. Violating the installation procedure or using this product in any way not described in this manual immediately voids all warranties on this product.

## 5.2 Limitation of Liability

Trinabess does not provide warranty coverage or assume any liability for direct or indirect damages or defects that result from the following causes:

- Improper transportation or storage
- Incorrect installation
- Operating the product in an inappropriate environment
- Incorrect or inappropriate operation
- Insufficient ventilation
- Failure to adhere to safety warnings or instructions
- Repairs or modifications performed by unauthorized personnel

- Inverter failure or over-current.
- Force majeure events
- External influences, such as unusual physical or electrical stress.
- Use of an incompatible inverter

## 5.3 Contact Information

You can contact Trinabess for technical assistance or our local representative.

# A Technical Information

## Performance

Nominal voltage(V)	48
Nominal Capacity(Ah)	150(3 battery packs) / 200(4 battery packs)
Energy Capacity(kWh)	7.2(3 battery packs) / 9.6(4 battery packs)
Standard Charging &Discharging Current(A)	75(3 battery packs) / 100(4 battery packs)
DOD	90%
Working Temp(°C)	-10~50
Storage Temp(°C)	-25~60
Round-trip DC Efficiency	92.5%
Dimension W x H x D(mm)	600x1000x210
Weight(kg)	App. 95(3 battery packs)/120(4 battery packs)
Protection Level	IP54

## 6 Technical Service

Trinabess

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**Trinabess**

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