



# Residential AC storage system BX6.3\_AC100

Operation and Installation Manual



# Table of Contents

- 1 Safety . . . . . 06**
  - 1.1 Information of the AC Storage System . . . . . 06
    - 1.1.1 Disclaimer . . . . . 06
    - 1.1.2 Target Group . . . . . 06
  - 1.2 General Safety . . . . . 07
    - 1.2.1 Condition of Use . . . . . 07
    - 1.2.2 Symbols . . . . . 08
    - 1.2.3 Safety Instructions . . . . . 09
      - 1.2.3.1 Handling of Prohibitions . . . . . 09
- 2 Introduction . . . . . 13**
  - 2.1 About this Manual . . . . . 13
  - 2.2 Product Description . . . . . 14
  - 2.3 Additional Information . . . . . 14
  - 2.4 Product Overview . . . . . 15
  - 2.5 LED Indicators . . . . . 18
  - 2.6 Push Button . . . . . 18
- 3 Installation . . . . . 19**
  - 3.1 Installation Environment . . . . . 19
  - 3.2 Unboxing and Review . . . . . 20
  - 3.3 Handle (optional) . . . . . 22
  - 3.4 Mechanical Installation . . . . . 24
  - 3.5 Electrical Installation for AC . . . . . 28
    - 3.5.1 Required Protective Devices and Cable Cross-sections . . . . . 28
    - 3.5.2 AC Connection . . . . . 28
    - 3.5.3 AC Plug Assembly . . . . . 30
    - 3.5.4 AC plug error check . . . . . 32
  - 3.6 Communication Module Connections . . . . . 33
  - 3.7 RS-485 Connection . . . . . 34
  - 3.8 Digital Input / DRM & EPO Functions . . . . . 34
  - 3.9 Dry Contact Connection . . . . . 35
  - 3.10 Sync Signal connection of VSG function . . . . . 36
  - 3.11 Installation of External CT Clamp. . . . . 37
  - 3.12 Assemble DC connectors . . . . . 38
  - 3.13 Installation of BX12.6\_AC100 . . . . . 39
- 4 Startup . . . . . 40**
  - 4.1 Operation Mode . . . . . 41
    - 4.1.1 Self-consumption mode . . . . . 41
    - 4.1.2 Peak cut mode . . . . . 42
    - 4.1.3 Selling first mode . . . . . 43
    - 4.1.4 Charge first mode . . . . . 44

- 4.1.5 Discharge first mode . . . . . 46
- 4.1.6 Special Modes . . . . . 47
- 4.2 Function Setting . . . . . 50
- 4.3 Active & Reactive power control . . . . . 51
- 4.3.1 Q(U) control . . . . . 51
- 4.3.2 P(U) control . . . . . 51
- 5 System application . . . . . 52**
- 6 Maintenance . . . . . 57**
- 7 Error message and Trouble Shooting . . . . . 58**
- 8 De-Commissioning . . . . . 63**
- 9 Technical Data . . . . . 64**

# Figure

- Figure 2-1 : The DELTA BX6.3\_AC100 Series . . . . . 13
- Figure 2-2 : System diagram of BX6.3\_AC100 storage system . . . . . 14
- Figure 2-3 : Shipping Components . . . . . 15
- Figure 2-4 : Dimensions . . . . . 16
- Figure 2-5 : Overview of interface . . . . . 16
- Figure 2-6 : Rating labels . . . . . 17
- Figure 2-7 : LED indicators . . . . . 18
- Figure 3-1 : Unpack . . . . . 20
- Figure 3-2 : General handling method . . . . . 21
- Figure 3-3 : Handling with optional transport handle . . . . . 22
- Figure 3-4 : Handling with optional transport handle\_2 . . . . . 23
- Figure 3-5 : Recommended Installation Space . . . . . 24
- Figure 3-6 : Recommended Installation Space with Flex Inverter . . . . . 25
- Figure 3-7 : Recommended Installation Space of BX12.6\_AC100 . . . . . 25
- Figure 3-8 : Insert rawplug . . . . . 26
- Figure 3-9 : Install the wiring cover . . . . . 27
- Figure 3-10 : Storage system operation illustration . . . . . 28
- Figure 3-11 : AC connection in AU & NZ . . . . . 29
- Figure 3-12 : Striping the wires . . . . . 30
- Figure 3-13 : AC plug illustration . . . . . 31
- Figure 3-14 : Communication module . . . . . 33
- Figure 3-15 : Sync Signal connection of VSG function . . . . . 36
- Figure 3-16 : Current Transformer installation . . . . . 37
- Figure 3-17 : Expanding the Battery Pack with DC(BT+/-) cables . . . . . 39

Figure 4-1 : Self-consumption mode current flows . . . . . 41

Figure 4-2 : Self-consumption mode behavior . . . . . 41

Figure 4-3 : Peak cut mode current flows . . . . . 42

Figure 4-4 : Peak cut mode behavior . . . . . 42

Figure 4-5 : Selling first mode current flows . . . . . 43

Figure 4-6 : Selling first mode behavior . . . . . 43

Figure 4-7 : Charge first mode current flows . . . . . 44

Figure 4-8 : Charge first mode behavior (general) . . . . . 44

Figure 4-9 : Charge first mode behavior (for AU & NZ) . . . . . 45

Figure 4-10 : Discharge first mode current flows . . . . . 46

Figure 4-11 : Discharge first mode behavior . . . . . 46

Figure 4-12 : Standalone mode current flows . . . . . 47

Figure 4-13 : Standalone mode behavior . . . . . 47

Figure 4-14 : Forced charge mode current flows . . . . . 48

Figure 4-15 : Forced charge mode behavior . . . . . 48

Figure 5-1 : Critical Load Backup Power . . . . . 52

Figure 5-2 : Hybrid Energy Storage System . . . . . 53

Figure 5-3 : Off-Grid Support Hybrid Energy Storage System (Internal ATS Mode) . . . . . 54

Figure 5-4 : Off-Grid Support Hybrid Energy Storage System (External ATS Mode) . . . . . 55

Figure 5-5 : Backup Power with Higher Standalone Power . . . . . 56

# Table

Table 2-1 : Packing list . . . . . 15

Table 2-2 : Wi-Fi reset button function . . . . . 16

Table 2-3 : Rating label explanation . . . . . 17

Table 2-4 : LED Indicators . . . . . 18

Table 3-1 : AC input cable requirement . . . . . 28

Table 3-2 : Upstream circuit breaker . . . . . 28

Table 3-3 : Pin definition and data format of RS-485 . . . . . 34

Table 3-4 : Definition of digital input & EPO functions . . . . . 34

Table 3-5 : Definition of digital input & EPO functions (AU / NZ) . . . . . 35

Table 3-6 : Pin definition and data format of VSG port . . . . . 36

Table 5-1 : Requirements for the PV inverter . . . . . 54

Table 7-1 : Error Message . . . . . 58

Table 7-2 : Fault Message . . . . . 60

Table 9-1 : Specifications for BX6.3\_AC100 . . . . . 64

Table 9-2 : Specifications for BX6.3\_EX100 . . . . . 66

# 1 Safety

## 1.1 Information of the AC Storage System

### 1.1.1 Disclaimer

Copyright – DELTA ELECTRONICS, INC. - All rights reserved.

This manual accompanies our product for use by the end users. The technical instructions and illustrations contained in this manual are to be treated as confidential and no part may be reproduced without the prior written permission of DELTA ELECTRONICS, INC. Service engineers and end users may not divulge the information contained herein or use this manual for purpose other than those strictly connected with correct use of the product. All information and specifications are subject to change without notice.

DELTA ELECTRONICS, INC. shall have no obligation to both personal injury and property damage hereinafter with respect to any actions -- (a) the product has been installed and repaired improperly; (b) the product has been misuse without following the instructions on this user manual; (c) the product has failed due to incorrect unpacking.

### 1.1.2 Target Group

This user manual of the AC Storage System is prepared for a person who is well-trained for installing, commissioning, using, and doing maintenance. The well-trained person must have the following basic and advanced skills:

- The fundamentals of electricity, wiring, electrical components and electrical schematic symbols.
- Knowledge of how a AC Storage System works and is operated.
- Training in the installation and commissioning of electrical devices and installations.
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations.
- Compliance with this manual and all safety information.

Please read the user manual before working on the product.

## 1.2 General Safety

### IMPORTANT SAFETY INSTRUCTIONS : SAVE THESE INSTRUCTIONS !



- Please read these instructions carefully and keep them for later use.

To prevent any personal injury and any property damage, also ensure long-term operation of the AC Storage System, you must read this section carefully and review all the safety instructions at all times before using this AC storage system. This user manual provides important instructions for DELTA BX6.3\_AC100 AC storage system. The product is designed, tested, verified, and certified according to international safety requirements, regulations, and standards but precautions must be observed when installing and operating the product.

### 1.2.1 Condition of Use

The DELTA BX6.3\_AC100 is a AC Storage System designed with two battery modules. In order to prolong Lithium-based batteries' life, 100% state of charge (SOC) shown on the device is actually within the range of 95%~100%.

The AC Storage System can be charged/discharged from grid, and provides electricity to household loads and electricity supply backup is available.

The DELTA BX6.3\_AC100 AC Storage System is NOT to be used as a backup for any medical uses or life supporting uses.

Before battery module running one cycle, there might be some error in the SOC accuracy.

If DELTA BX6.3\_AC100 has not used for more than six months, please connect to grid and check the SOC value via APP, if the SOC value is below 30%, please select "Charge first mode" to charge BX6.3\_AC100, it should be charged to at least 30% SOC.

Utilize a brand new battery with used one may lead to reduction of battery lifetime and increase the safety risk. Therefore, we suggest the evaluation of the battery size have to be made thoroughly before installation.

Extend the battery size from 6.3kwh to 12.6kwh is not allowed.

## 1.2.2 Symbols

This section describes the definition of the symbols in this manual. In order to prevent both personal injury and property damage, and to ensure long-term operation of the product, please read this section carefully and follow all the safety instructions while you use the product.

### DANGER!



- This warning indicates an immediate hazard which will lead to death or serious injury may occur.

### WARNING !



- This warning indicates a possible hazard which may lead to death or serious injury may occur.

### CAUTION !



- This warning indicates a possible hazard which may lead to minor injury may happen.

### ATTENTION



- This warning indicates a possible damage to property and the environment might happen.

### INFORMATION



- Additional information is indicated by an exclamation mark enclosed by double circle. This means the following section contains important information and user should follow the instruction to prevent any hazards.

### DANGER : ELECTRICAL HAZARD!!



- This warning indicates an immediate electrical hazard which will lead to death or serious injury may occur.



- Equipment grounding conductor (PE)
- (PE) Équipement conducteur de terre



## 1.2.3 Safety Instructions

The AC Storage System should not be installed under direct sunlight or on flammable surfaces. Please make sure the AC Storage System is mounted tightly on a solid / smooth surface. The optimal temperature range for the AC storage system to operate is 10 to 30°C . The operating humidity is within the range from 0 to 95%. If the ambient temperature is outside the operating range, the AC storage system stops to protect itself from any unexpected damage.

This AC Storage System should be installed by a trained and experienced installer designated by the retailer. Having the product installed by a non-specialized installer is very dangerous and can cause damage or injury. The AC storage system is always installed by 2 or more people. (According to regional regulation, more people may be required.)

Please make sure all the breakers are turned off before connecting cables. Please note that the cable length must within 100 meters.

### 1.2.3.1 Handling of Prohibitions

The battery module contains flammable materials such as organic solvents. Mishandling the battery module may cause fire, smoke, or an explosion and the battery module's functionality will be seriously damaged. Protection circuits are designed into the AC Storage System via BMSS (PCB part inside the battery cabinet) to protect the battery modules.

Please read and check the following prohibited actions.

**DANGER!**



- This warning indicates an immediate hazard which will lead to death or serious injury may occur.

(1) Electrical Shock

Do not touch the terminals of the battery module without protectors.

Be grounded with the specified conditions.

High voltage may occur between the positive and the negative terminals.

Electric shock impairs health or may cause threat to life.

More than 2,000 meters higher, risks of an electric shock will be increased.

(2) Immersion

Do not immerse the battery module in liquid such as water, beverages, or other fluids.

Do not expose to corrosive substances such as sea breeze, steam or chemicals.

Do not install in the humid places or places to condensation.

Exposure to liquid may damage the battery module or the circuit board.

This may cause a battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.

(3) High Temperature

Do not use or place the battery module near an open flame, heater or high temperature. Subjecting the battery module to high temperature may damage the separator and cause internal short circuit.

This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.

(4) Charge Conditions

Only charge the battery module within the specified conditions.

(e.g., temperature range, voltage, current and etc.)

Charging with unspecified conditions (e.g., over charge or abnormal current) may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.

(5) Reverse Polarity

Check the positive (+) and the negative (-) terminals.

If the battery module is connected with a reversed polarity, unexpected reactions may occur.

This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.

- 
- (6) Direct Connection  
Do not connect the battery module to AC power or unspecified DC power. This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.
- (7) Use in Other Equipment  
Do not use the battery module for any other purposes or connecting unspecified equipment.  
If the battery module is used with unapproved applications or systems, the battery module may be damaged, leak electrolyte, generate heat, smoke, catch fire, or explode.
- (8) Incineration and Heat  
Keep the battery module away from heat and fire.  
Heating the battery module and may cause it to be damaged, leak electrolyte, generate heat, smoke, catch fire, or explode.
- (9) Short-Circuit  
Do not connect between the positive (+) and the negative (-) terminals with a conductive material (e.g., wire, a cable, etc.).  
Do not carry or store the battery module with metal objects.  
If the battery module is shorted, the battery module may be overheated.  
This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.
- (10) Disassembly  
Do not disassemble or modify the battery module.  
Disassembly or modification of the battery module may damage the protection circuit.  
This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.
- (11) Charge in High Temperatures  
Do not charge the battery module in high temperature environment.  
If the battery module is charged with exposing high temperature, the battery module's protection circuit may be activated and stop or fail the charging.  
This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.
- (12) Open BX6.3\_AC100 cover  
To avoid risk of electrical shock, It is prohibited to open the front door. The unit contains no user-serviceable parts.  
It may cause failure.  
The warranty is void once the door is opened.
-

### WARNING !



- This warning indicates a possible hazard which may lead to death or serious injury may occur.

#### (1) Magnetism

Do not place the battery module near strong magnetism. (e.g., electromagnetic cooker, etc. )

This may cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.

#### (2) Mixed Use

Do not mix with other batteries.

The battery module should not be used with other batteries having a different capacity, chemistry, manufacturing date or manufacturer.

This could cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode.

### CAUTION !



- This warning indicates a possible hazard which may lead to minor injury may happen.

#### (1) Exposure to Direct Sunlight

Do not use or leave the battery module in a location exposed to excessive heat, such as in direct sunlight or in a car. It could cause the battery module's damage to leak electrolyte, generate heat, smoke, catch fire, or explode. It may also cause the battery's performance and life to deteriorate.

#### (2) Charging Temperature Range

Only charge the battery module within operating temperature range.

Charging outside of this temperature range could cause the battery module's damage to leak electrolyte, generate heat.

It may also cause the battery module's performance and life to deteriorate.

#### (3) Manual

Please read the system manual before use.

Keep the system manual for future reference.

#### (4) Recycling

When disposing of the battery module, recycle it according to local rules and regulations.

## 2 Introduction

### 2.1 About this Manual

The user manual is valid for the following device types :

- BX6.3\_AC100
- BX6.3\_AC101
- BX6.3\_AC100 + BX6.3\_EX100
- BX6.3\_AC101 + BX6.3\_EX100
- BX12.6\_AC100(BX6.3\_AC100 associated with BX6.3\_EX100)
- BX12.6\_AC101(BX6.3\_AC101 associated with BX6.3\_EX100)

The DELTA BX6.3\_AC100 Series have 6 models as shown in **Figure 2-1**.

Delta reserves the right to make modifications to the content and technical data in this user manual without prior notice.



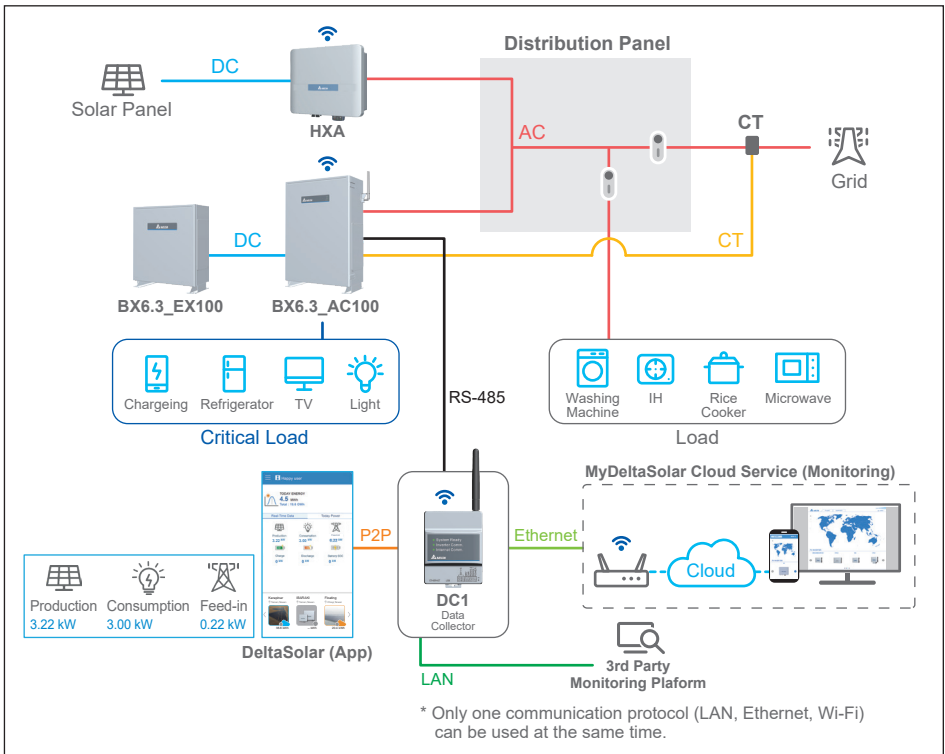
**Figure 2-1 : The DELTA BX6.3\_AC100 Series**

## 2.2 Product Description

This device is an ac coupling battery system with following features:

- Integrated energy management system
- Integrated charger controller and inverter
- Non-isolated

The system diagram of BX6.3\_AC100 is shown as **Figure 2-2**. Delta's BX6.3/12.6\_AC100 series with high reliability Li-ion battery is a home energy storage solution with 6.3/12.6 kWh capacity. It can be integrated with home PV system and can be scalable up to 12kWh for future expansion. With BX6.3/12.6\_AC100, house owner can maximize the efficiency of home energy management by saving and managing excess solar energy from home PV system. Besides, it can be considered as the backup power during emergency or suffering a power outage.



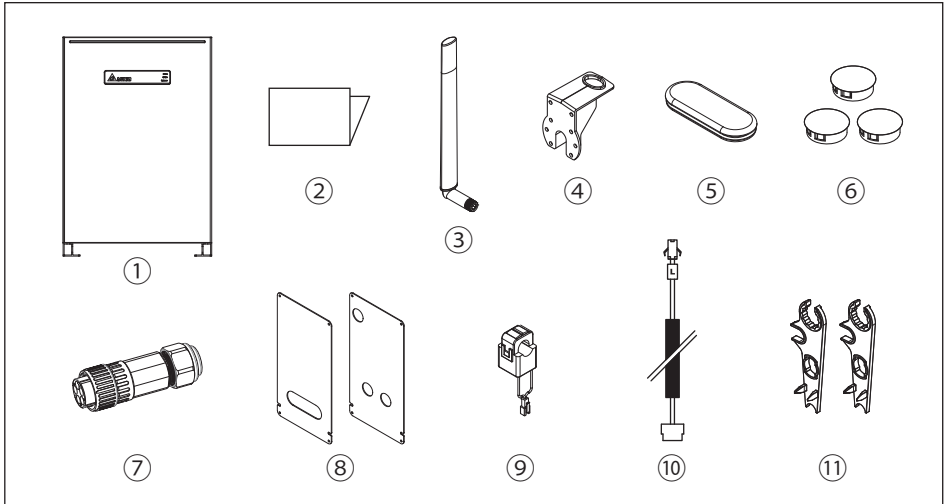
**Figure 2-2 : System diagram of BX6.3\_AC100 storage system**

## 2.3 Additional Information

More details or related product information, please visit: <http://www.deltaww.com>

## 2.4 Product Overview

The shipping components of DELTA BX6.3\_AC100 are shown as **Figure 2-3**.

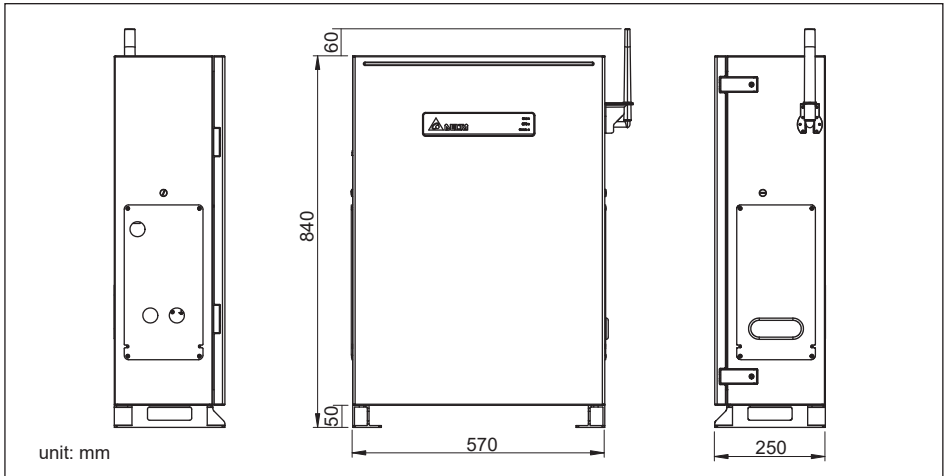


**Figure 2-3 : Shipping Components**

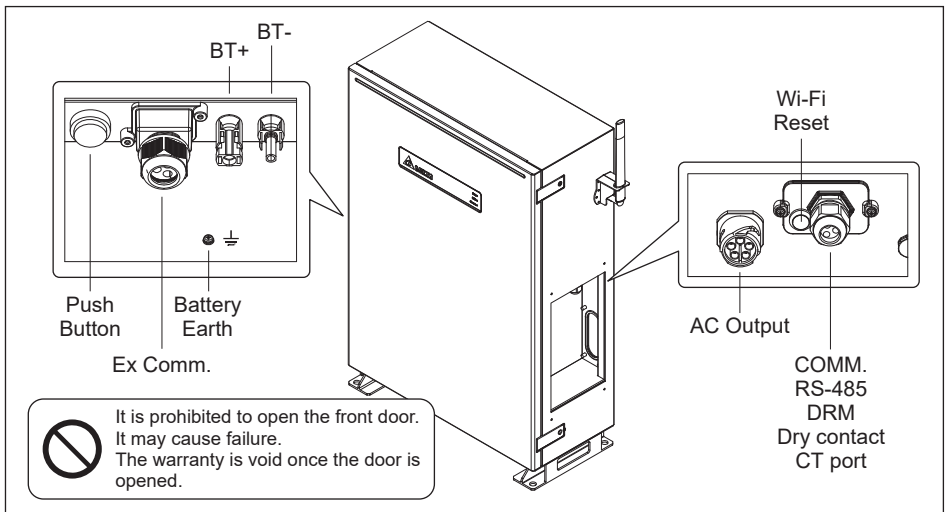
**Table 2-1 : Packing list**

|    | Object                   | Qty | Description   |
|----|--------------------------|-----|---|
| 1  | Delta BX6.3_AC100        | 1   | Residential AC ESS  |
| 2  | Quick Installation Guide | 1   | The Instruction to provide the information of safety, Installation and specification. |
| 3  | WiFi antenna             | 1   | 2.4Ghz Wi-Fi Antenna (IPX7)   |
| 4  | Antenna Bracket          | 1   | To support Wi-Fi antenna on BX6.3_AC100   |
| 5  | Rubber cover             | 1   | Protective cover for non-critical waterproof and dust prevent                         |
| 6  | Plastic cover            | 3   | Protective cover for non-critical waterproof and dust prevent                         |
| 7  | AC Plug                  | 1   | Connector for AC connection   |
| 8  | Wiring Cover             | 2   | Protective cover to prevent users from touching the power cable                       |
| 9  | Current sensor           | 1   | 120A current transformer  |
| 10 | CT cable                 | 1   | Cable for CT connection   |
| 11 | H4 Wrench                | 2   | To disconnect H4 connector  |

**Figure 2-4** shows the dimensions of DELTA BX6.3\_AC100.  
**Figure 2-5** shows the details of interface.



**Figure 2-4 : Dimensions**



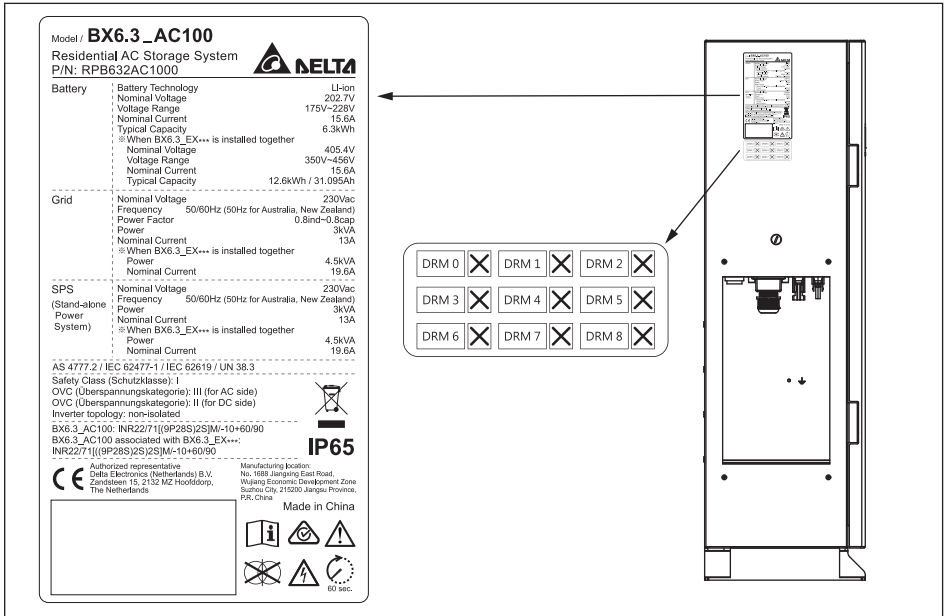
**Figure 2-5 : Overview of interface**

**Table 2-2 : Wi-Fi reset button function**

| Operation    | Wi-Fi LED Status                            | Explanation   |
|--------------|---|---|
| Push 3s~10s  | Wi-Fi LED flashing once every half a second | Reset Wi-Fi module  |
| Push 10s~20s | No flash                                    | No function   |
| Push 20s~    | Wi-Fi LED flashing once every one seconds   | Reset Wi-Fi module, and Wi-Fi password returns to the default: DELTASOL |



Please refer to **Figure 2-6** for the location of product label. You can identify the model number and the specifications by the information on the product label. In Australia and New Zealand, users can also identify the supported Demand Response Modes (DRMs) of BX6.3\_AC100 here. The table (**Table 2-2**) along with these labels explains the definition of the specific mark.



**Figure 2-6 : Rating labels**

**Table 2-3 : Rating label explanation**

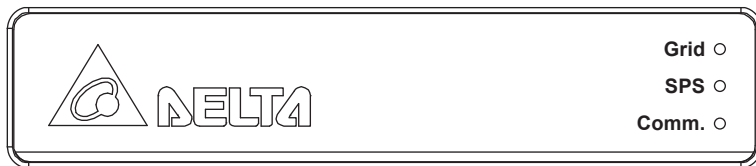
| Symbol | Definition   |
|--------|--|
|        | Before working with the Battery Pack, you must read the supplied manual and follow the instructions contained therein.   |
|        | The housing of the Battery Pack must be grounded if this is required by local regulations.   |
|        | <b>WEEE marking</b><br>The Battery Pack must not be disposed of as standard household waste, but in accordance with the applicable electronic waste disposal regulations of your country or region.  |
|        | BX6.3_AC100 is not separated from the grid with a transformer.   |
|        | <b>Danger to life through electric shock</b><br>Potentially fatal voltage is applied to the unit during operation. This voltage persists even 60 seconds after disconnection of the power supply. Never open the unit. The unit contains no components that must be maintained or repaired by the operator or installer. Opening the housing will void the warranty. |

## 2.5 LED Indicators

The DELTA BX6.3\_AC100 has three different color LED notification on the front cover of the case that signal various system statuses:

**Table 2-4 : LED Indicators**

| LED                               | LED Status                            | Definition  |
|-----------------------------------|---------------------------------------|---|
| Grid                              | GREEN ON                              | On Grid mode  |
|                                   | GREEN FLASH 1s ON/OFF                 | On Grid count down                                      |
|                                   | GREEN FLASH 0.1s ON/OFF               | Grid setting "default"                                  |
|                                   | RED ON                                | PCS Error   |
| SPS<br>(Stand-alone Power System) | GREEN ON                              | Standalone mode   |
|                                   | GREEN FLASH                           | Standalone count down                                   |
|                                   | RED ON                                | Battery Error   |
|                                   | RED FLASH                             | Battery Power OFF                                       |
| Comm.                             | GREEN ON                              | Communicating   |
|                                   | OFF                                   | No communication  |
| Grid / SPS                        | GREEN FLASH<br>Grid ON 1s ↔ SPS ON 1s | SBMS Balance mode<br>SBMS Force_CHG<br>Maintenance Mode |



**Figure 2-7 : LED indicators**

## 2.6 Push Button

Use Push button to turn ON/OFF the unit, or start-up BX6.3\_AC100 with AC supply.

| Status                          | Operation  | Action                               |
|---------------------------------|--|--------------------------------------|
| BX6.3_AC100 power OFF           | Grid supplied  | Power ON the unit<br>(AC start-up)   |
| BX6.3_AC100 power OFF           | Power button push > 20 sec<br>(until grid green LED flash) | Power ON the unit<br>(Cold start-up) |
| BX6.3_AC100 power ON<br>already | Power button push > 1 sec                                  | Power OFF the unit                   |

## 3 Installation

### WARNING !



- Do not install BX6.3\_AC100 near or on flammable surfaces.
- Please mount BX6.3\_AC100 tightly on a solid / smooth surface.
- Install BX6.3\_AC100 in a location that prevents damage from flooding.
- Do not expose BX6.3\_AC100 to ambient temperatures above 60°C or below -20°C.
- Operating or storing BX6.3\_AC100 at the temperatures out of its specified range might cause damage to BX6.3\_AC100.
- BX6.3\_AC100 series should not be installed in multiple phase combinations.

The chapter contains instructions for (1) Installation environment  
(2) Mechanical installation; (3) Electrical Installation; (4) Communication setup.

### 3.1 Installation Environment

#### CAUTION !



- The optimal operation temperature for BX6.3\_AC100 is between 10 to 30°C.
- If the ambient temperature is out of the optimal operating range, BX6.3\_AC100 will be de-rating.
- The operating humidity is within the range from 0 to 95%.
- BX6.3\_AC100 may limit charge or discharge power based on battery cell temperature to improve battery lifespan.
- If the ambient temperature is out of the operating range, BX6.3\_AC100 will stop operating to avoid any unexpected damage.

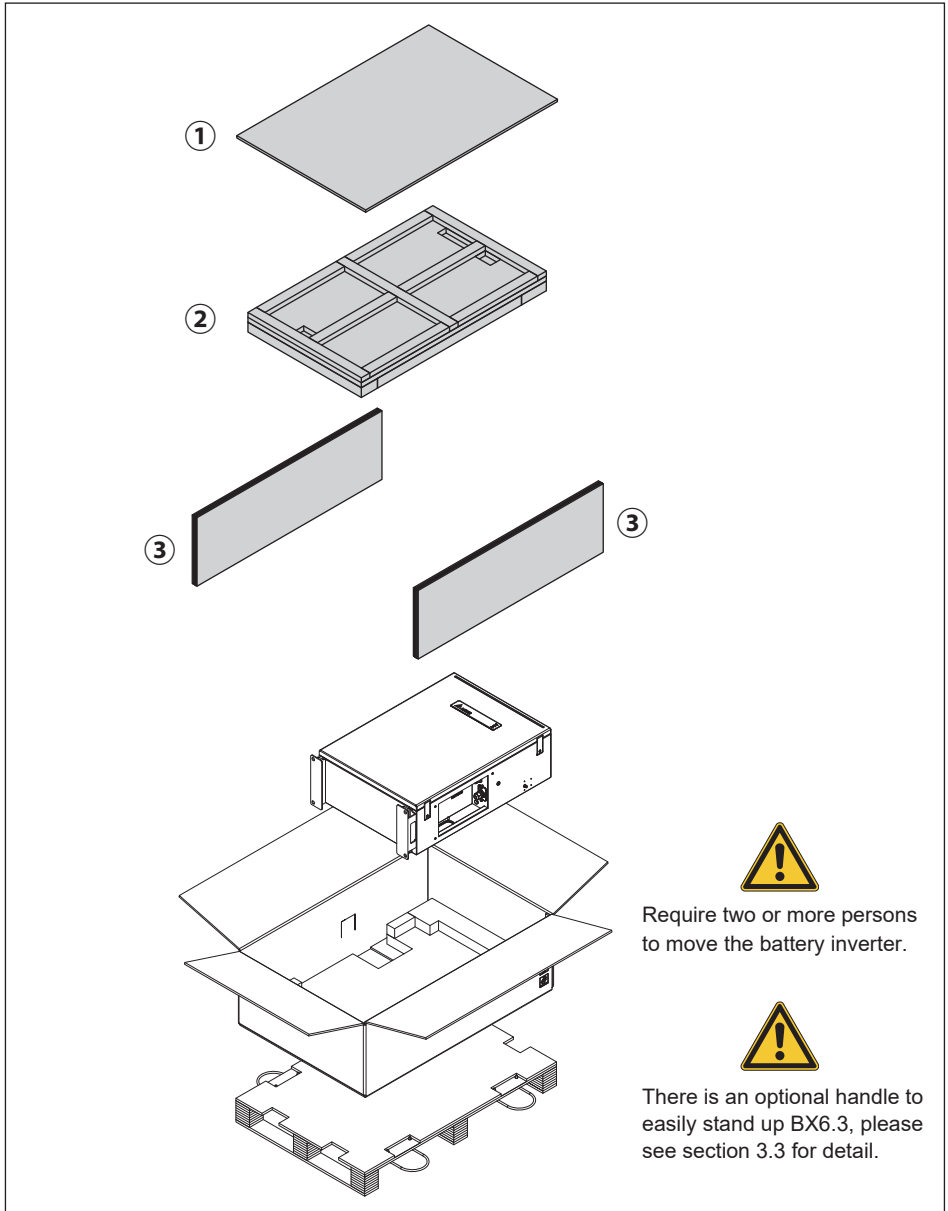
BX6.3\_AC100 is designed to be waterproof and can be installed both indoors and outdoors. However, please avoid exposure to direct sunlight, high temperature and high humidity if installed outdoors.

Please avoid using BX6.3\_AC100 under the following condition, otherwise the device may malfunction.

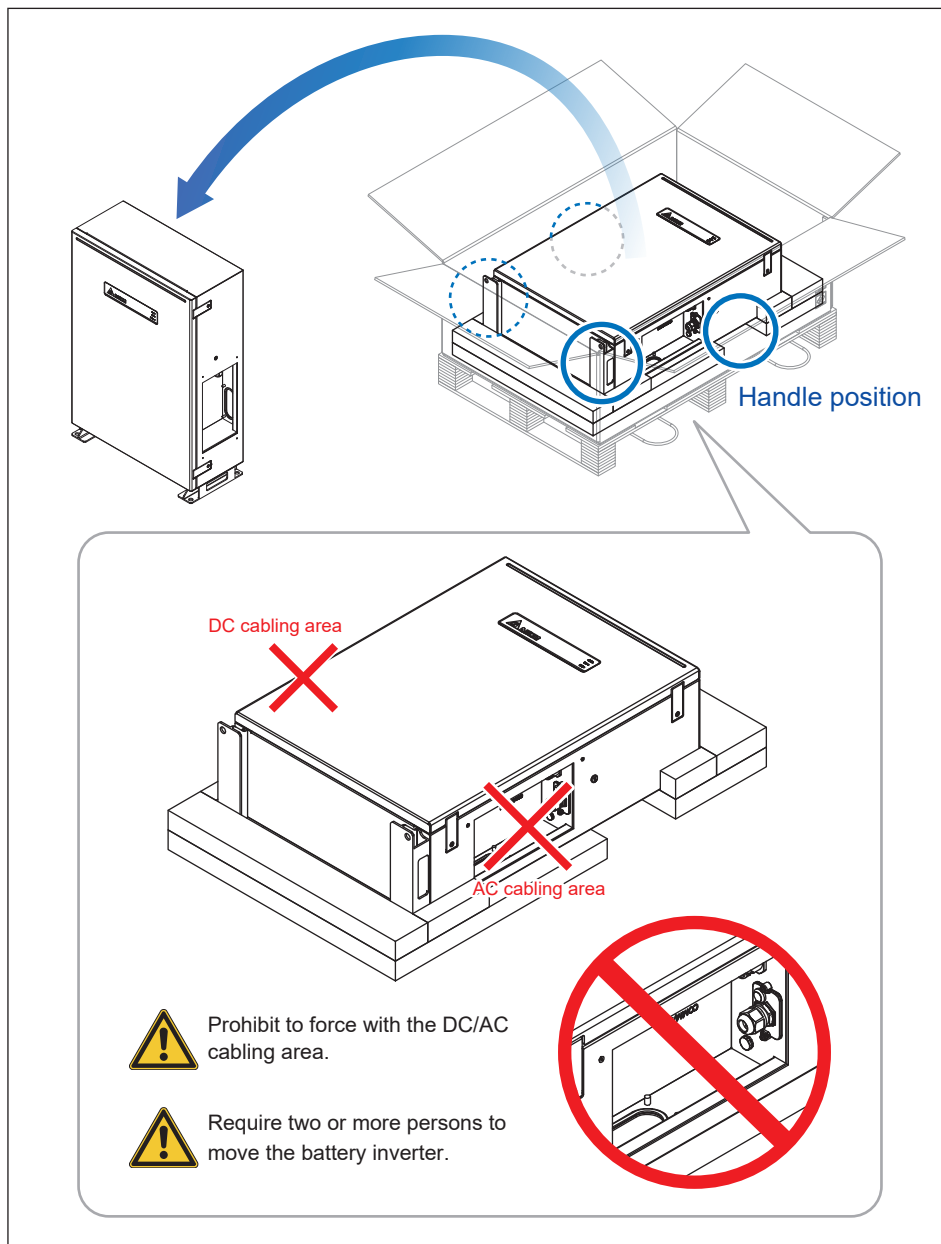
- Locations where IP65 isn't satisfied.
- Locations where temperature changes severely.
- Locations where the device is directly exposed to saltwater, sea breezes and high humidity.
- Locations that are or might be affected by explosive, combustible, corrosive and other poisonous gases.
- Location exposed dust and dirt.
- Location with poor ventilation.
- Locations with other special conditions.
- At altitude above 2000m.

## 3.2 Unboxing and Review

The unpacking procedure of BX6.3\_AC100 is shown as **Figure 3-1**.



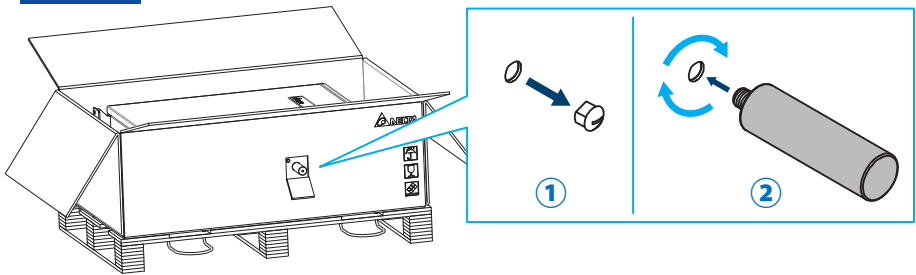
**Figure 3-1 : Unpack**



**Figure 3-2 : General handling method**

### 3.3 Handle (optional)

Step 1



Step 2

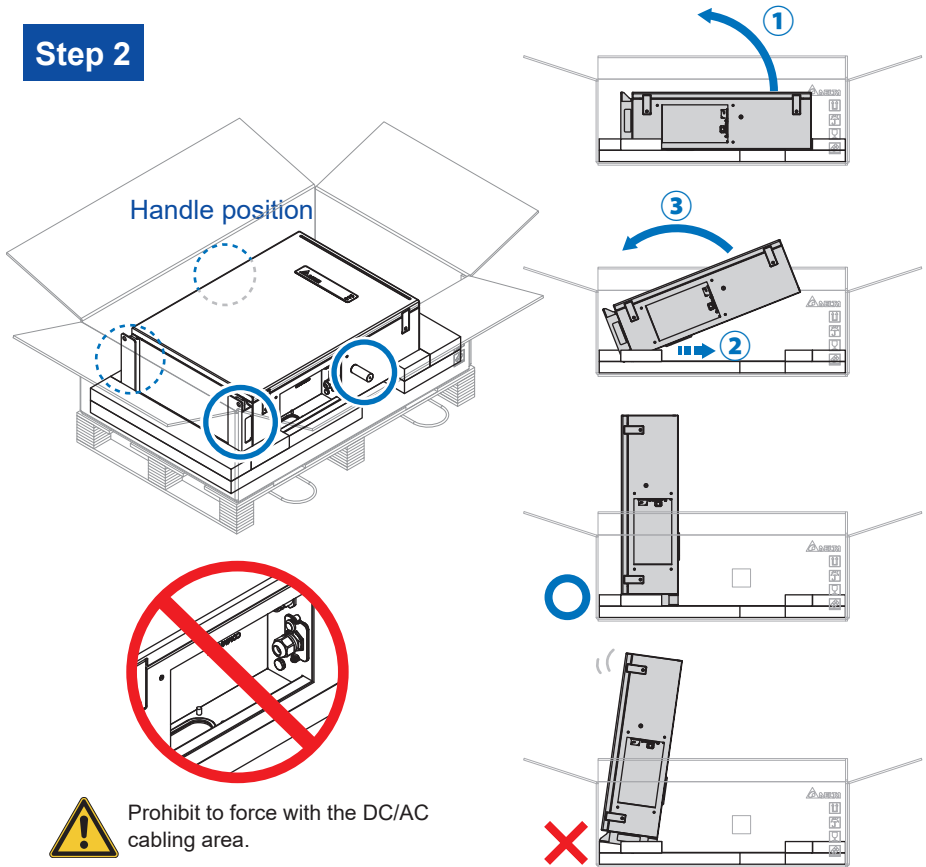
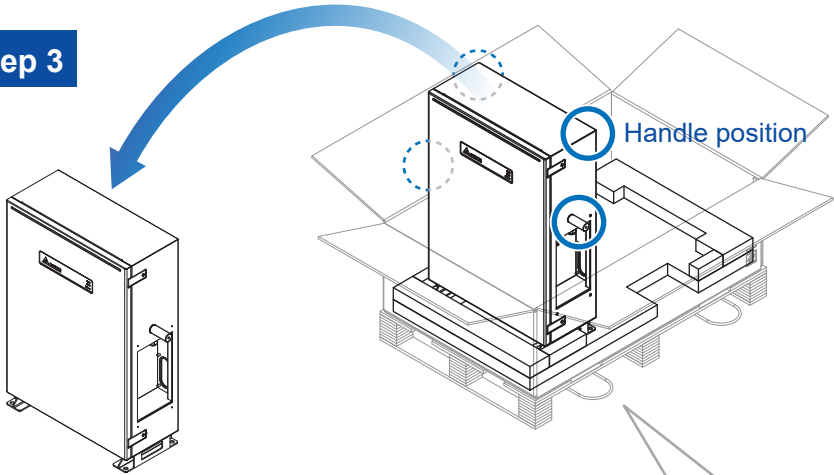


Figure 3-3 : Handling with optional transport handle

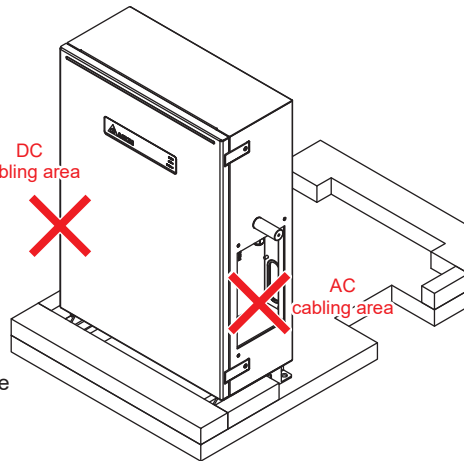
**Step 3**



DC cabling area



AC cabling area



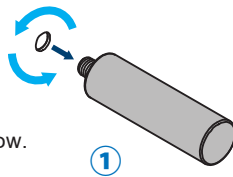
Prohibit to force with the DC/AC cabling area.



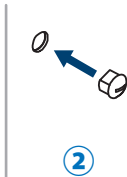
Require two or more persons to move the battery inverter.



Please lock screw (0.5N·m) plugs on the case after installation to avoid water inflow.



①



②

**Figure 3-4 : Handling with optional transport handle\_2**

### 3.4 Mechanical Installation

#### WARNING !



- BX6.3\_AC100 should be installed by a trained and experienced installer designated by the retailer.
- Having the product installed by a non-specialized installer is very dangerous and can cause damage or injury.

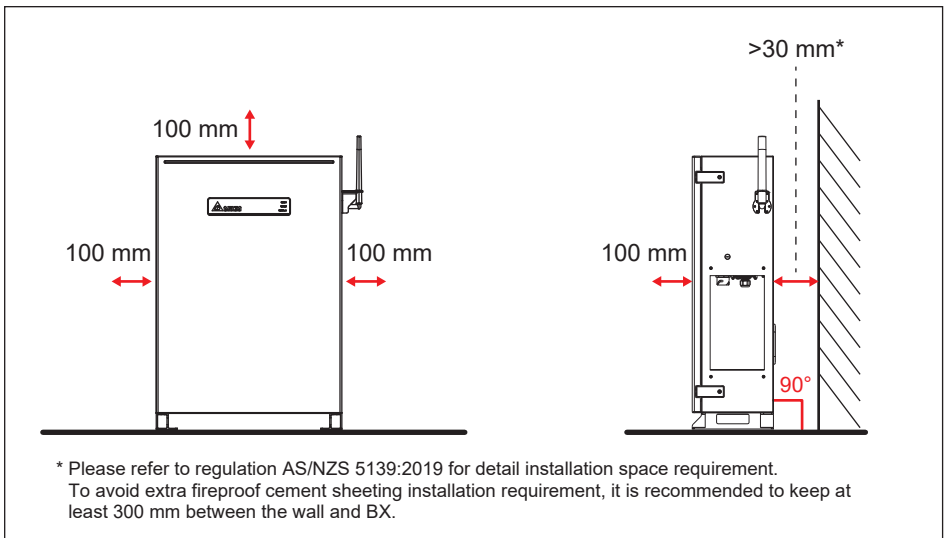
#### ATTENTION



- Please check the space for installation which meets the recommended location.
- Remember that DELTA will in not responsible for damage resulting from BX6.3\_AC100 falling due to insufficient mounting strength.

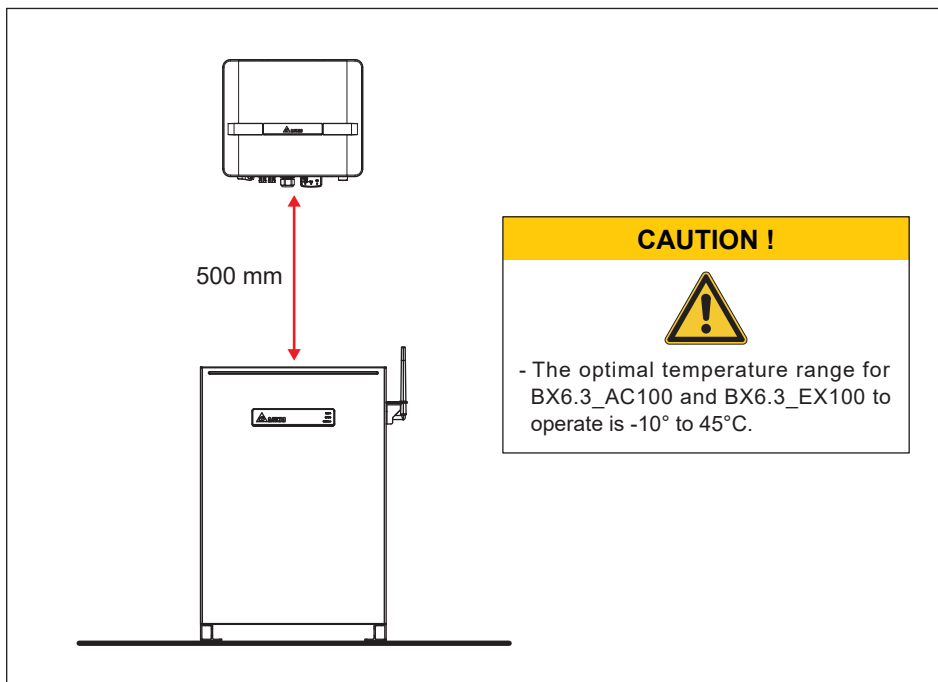
This AC Storage System is designed for ground-mounted.  
Please ensure that the installation is perpendicular to the floor.  
Please follow the instructions as shown from **Figure 3-5** through **3-8**.

Please make sure there is enough space for the AC Storage System, especially reverse side of the AC Storage System (heatsink requirement).

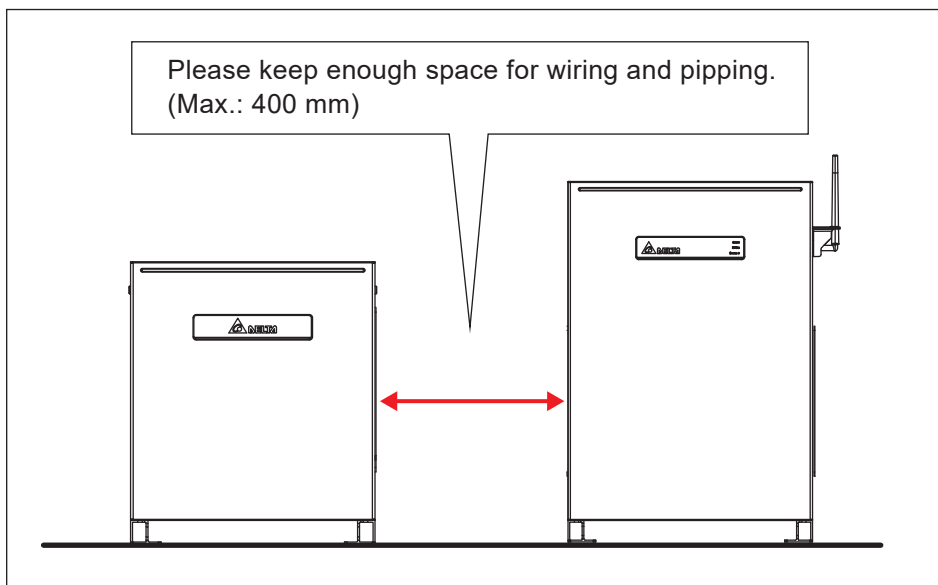


**Figure 3-5 : Recommended Installation Space**





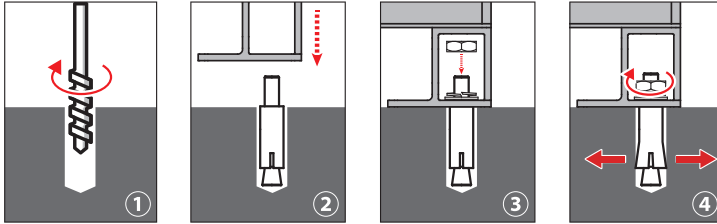
**Figure 3-6 : Recommended Installation Space with Flex Inverter**



**Figure 3-7 : Recommended Installation Space of BX12.6\_AC100**

The recommended spacing to wall is 100mm, please be sure the minimum space should more than 30mm. Be sure to select the flat floor surface for installation and strength can afford storage system weight.

The Power ON/OFF button is located at the left side of BX6.3\_AC100, please make sure enough space is reserved to access this button.

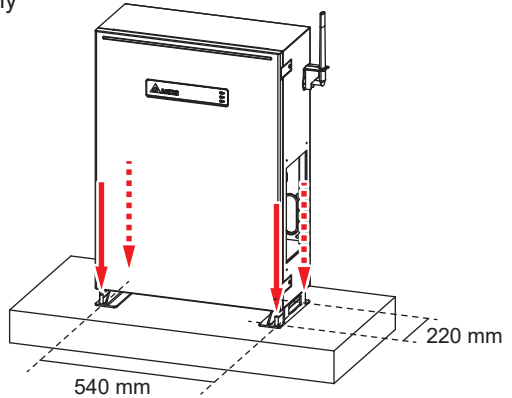


1. Drill 4 holes with  $\Phi 16$  mm diameter in dimension 540 mm x 220 mm
2. Insert Rawlplug into these hole
3. Put on and fix BX6.3\_AC100 firmly

**CAUTION !**

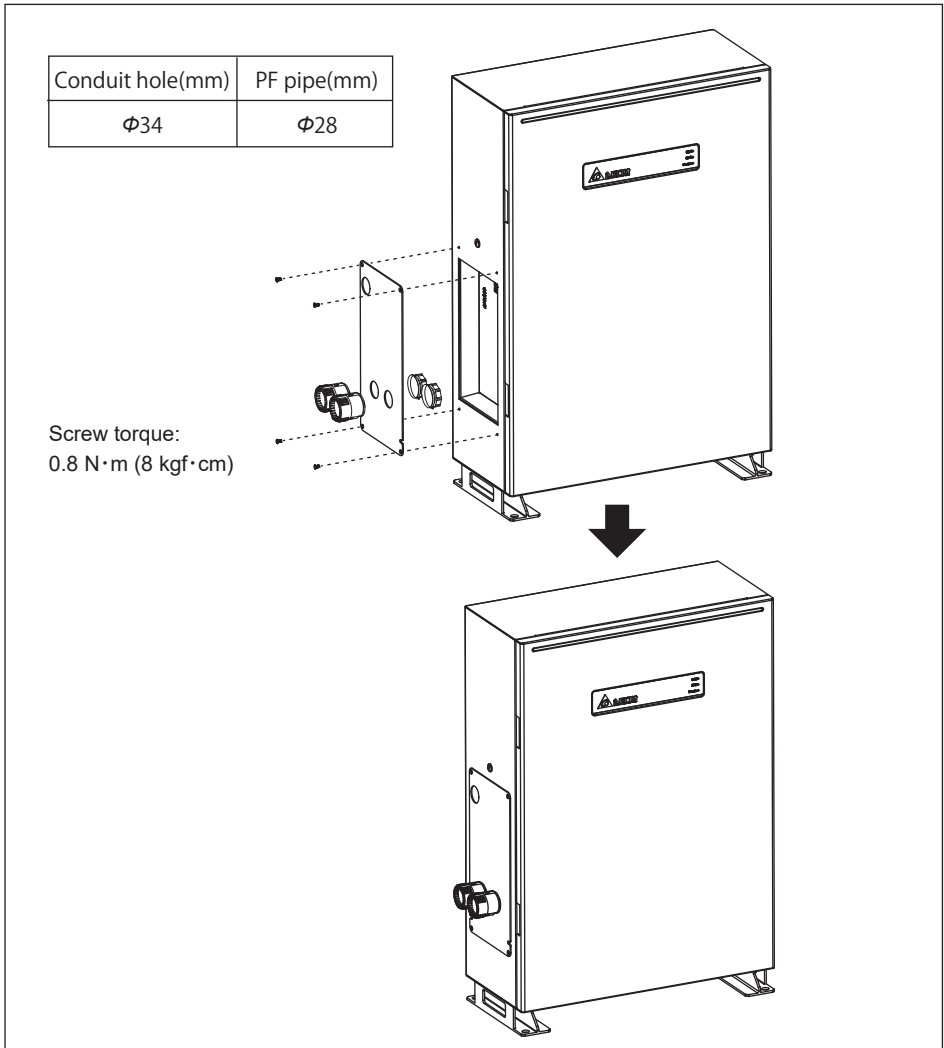


- Please do not install the battery pack on uneven floor surfaces.
- Holes size is 16 mm diameter for attaching the battery pack.



**Figure 3-8 : Insert rawlplug**

- To install the wiring cover on BX6.3\_AC100, please follow the procedure below:
- BX6.3\_AC100 has a  $\Phi 38 \times 76$  backward hole for AC and COMM wiring, use 4 screws to fix side cover after wiring.
  - For BX12.6\_AC100 model installation, please remove the plastic cover, pass the DC and COMM cables through pipe and attach the pipe to the wiring cover.
  - Recommend screw type/ PF pipe/ conduit are shown in **figure 3-9**.
  - It is recommended to install the wiring cover as it is used to prevent users from touching the electric cable.



**Figure 3-9 : Install the wiring cover**

### 3.5 Electrical Installation for AC

Important information regarding safety

- Always follow the specific regulations of your country or region.
- Always follow the specific regulations of your energy provider.
- Install all stipulated safety and protective devices (e.g. automatic circuit breakers and/or surge protection devices).

#### 3.5.1 Required Protective Devices and Cable Cross-sections

The AC cable must be jacked and meet the specifications in **Table 3-1**.

**Table 3-1 : AC input cable requirement**

| Model            | Current Rating | Wire Size             | Max.Cable Overall Diameter |
|------------------|----------------|-----------------------|----------------------------|
| BX6.3/12.6_AC100 | 25 A           | 3 - 5 mm <sup>2</sup> | 22 mm                      |

Please use the proper upstream circuit breaker to protect the unit.

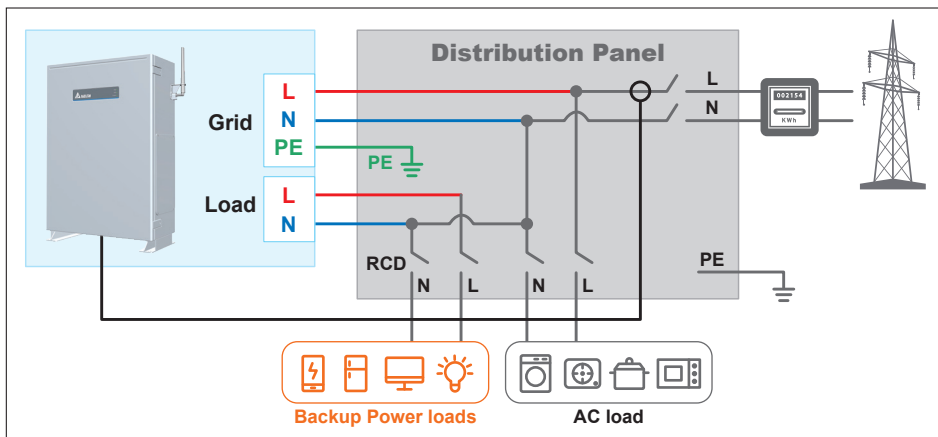
**Table 3-2 : Upstream circuit breaker**

| Model        | Current Rating |
|--------------|----------------|
| BX6.3_AC100  | 16 A           |
| BX12.6_AC100 | 25 A           |

#### 3.5.2 AC Connection

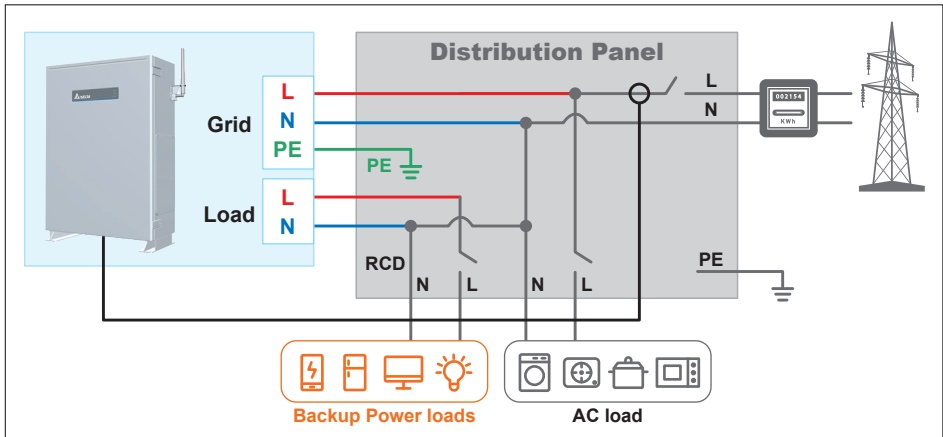
Areas outside Australia and New Zealand, it recommended to connect AC wiring as shown in **Figure 3-10**. The connection between Grid N and Load N is used to eliminate the floating voltage between Load N and PE.

However, BX6.3\_AC100 can still works without the Grid N and Load N connection.



**Figure 3-10 : Storage system operation illustration**

In Australia and New Zealand, please connect the AC wiring as shown in **Figure 3-11**. The connection between Grid N and Load N is necessary due to the grid code requirement to ensure the continuity of the neutral conductor when inverter is in standalone mode.



**Figure 3-11 : AC connection in AU & NZ**

The integrated all-pole sensitive RCMU provides additional safety. RCD Type A can be used for this unit. Minimum tripping current 30mA of the type A RCD is recommended for Load connection.

## ATTENTION



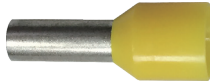
- Short circuit occurred at the backup power load may cause damage to the unit.
- Motor and half-wave rectification Load is not suitable for backup power load, it will lead to error and cause unit shut down.

### 3.5.3 AC Plug Assembly

**CAUTION: Machine And Equipment Damage May Occur!**

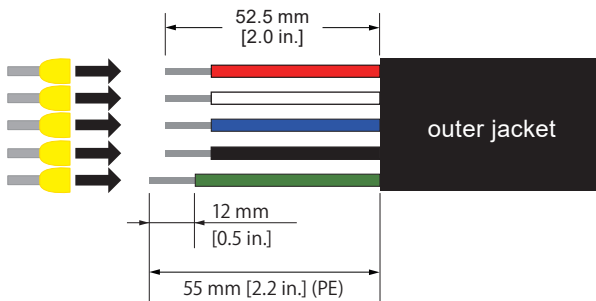


- Please make sure to use the proper size AC cable.
- Please choose the terminals as shown below for wires crimping.
- Failed to follow these instructions may cause AC plug damage.



Follow the steps below to strip the wires before assembling the AC plug as shown in **Figure 3-12** :

- (1) Remove 55 mm (2.2 inch) of AC cable outer jacket.
- (2) Trim the L-N(Grid), L-N(Load) wire to 52.5 mm (2.0 inch).
- (3) Strip 10 mm (0.5 inch) of insulation from all wires ends.
- (4) Crimp terminals for all wires.



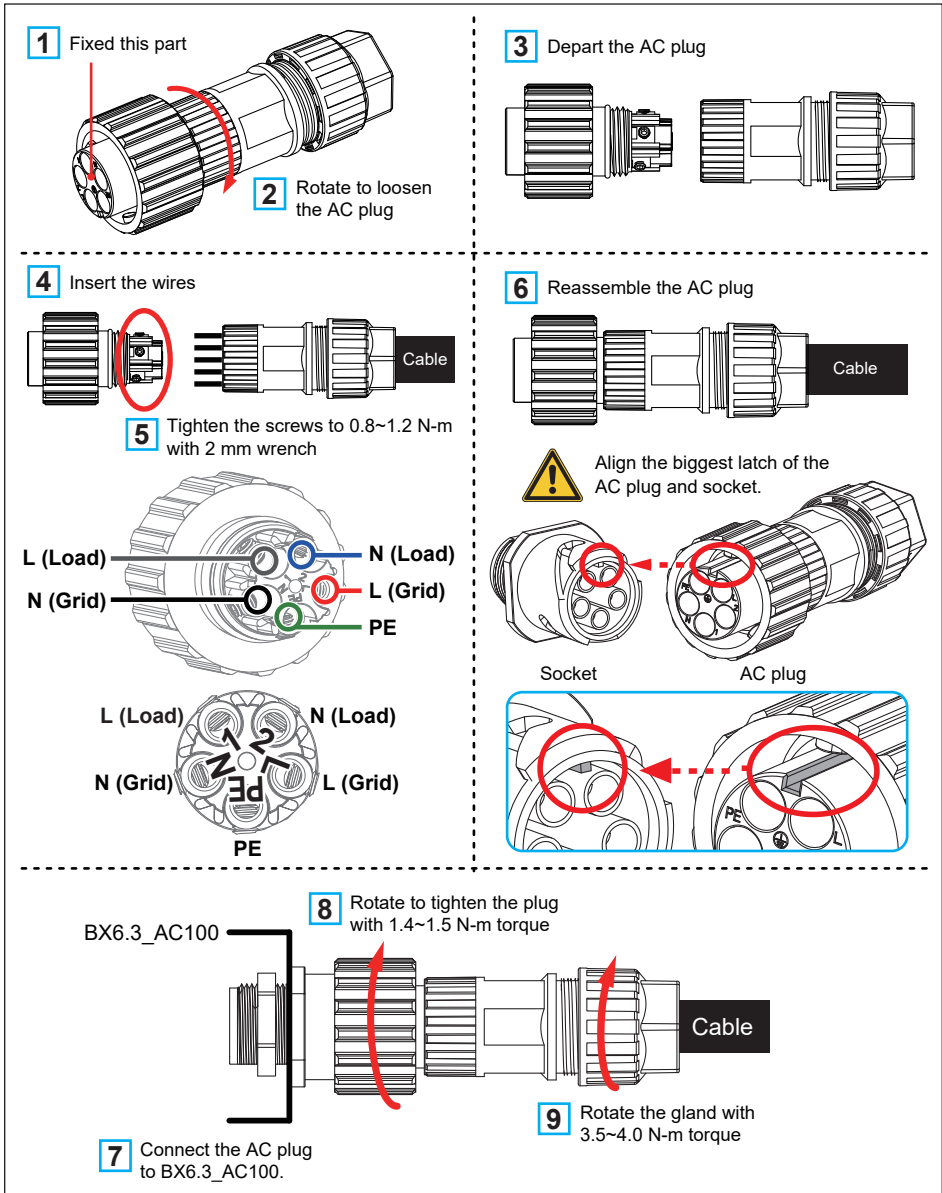
**Figure 3-12 : Stripping the wires**

**DANGER: ELECTRICAL HARZARD!!**



- Any electric power connected to the battery pack during cabling is prohibited.
- Please make sure any breaker is turned off before connecting cables.

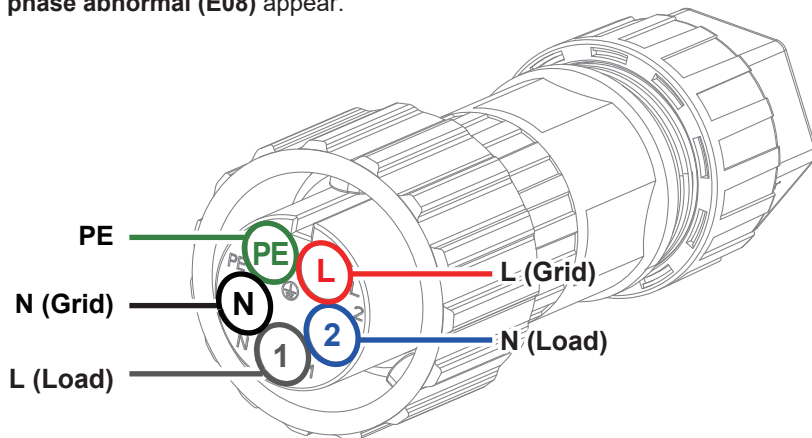
Assemble the AC plug and wires as the procedures shown in **Figure 3-13**. The AC wire must be connected to the AC plug according to the correct sequence. The AC voltage should be L-N 230 Vac  $\pm$  10%.



**Figure 3-13 : AC plug illustration**

### 3.5.4 AC plug error check

Check the cable correction of AC plug by following instructions when error code: **AC phase abnormal (E08)** appear.



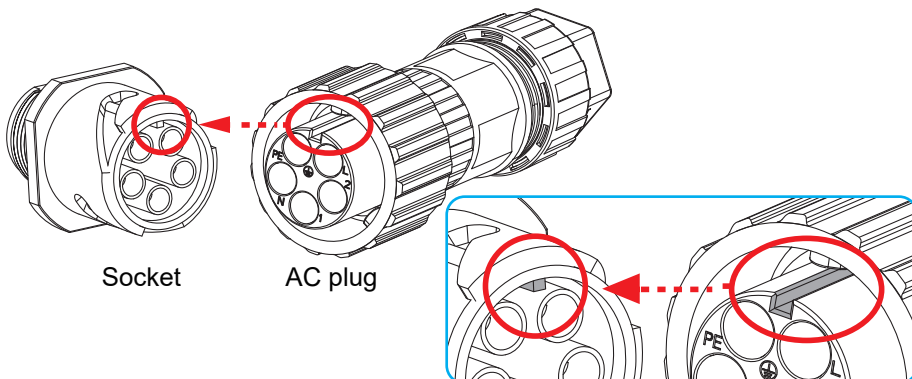
**AC plug side (print)**

**AC panel side**

|    |       |          |
|----|-------|----------|
| PE | ----- | PE       |
| N  | ----- | N (Grid) |
| 1  | ----- | L (Load) |
| 2  | ----- | N (Load) |
| L  | ----- | L (Grid) |

**Step1.** Check the connection of each cable from AC panel.

**Step2.** Check the foolproof brick on socket and AC plug is located correct.



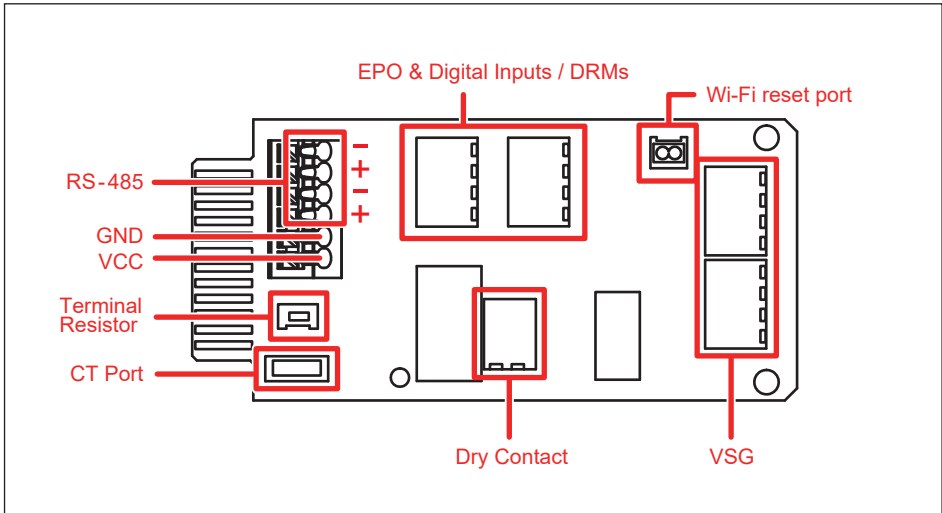
**Step3.** Check the continuity between N(Grid) and N(Load).



## 3.6 Communication Module Connections

Please refer to **Figure 3-14** for the Communication Module illustration.

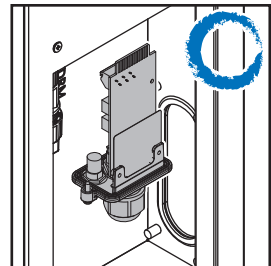
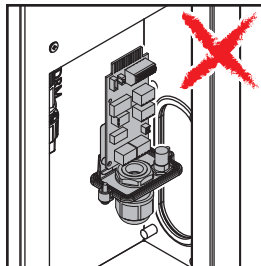
The module provides VCC, RS-485, dry contact, and EPO terminals for different use. The maximum supply current of VCC(16V) is 0.8A. The maximum input rating of dry contact connector is 250Vac/12Vdc/10A.



**Figure 3-14 : Communication module**



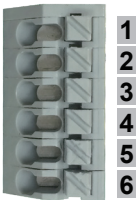
Please refer to the direction shown as the figure to install the communication module.



### 3.7 RS-485 Connection

The pin definition and data format of RS-485 is shown in **Table 3-3**. Installers should switch ON the terminal resistor when single inverter is installed.

**Table 3-3 : Pin definition and data format of RS-485**

| PIN                                       | Function  |   | Data Format  |
|---|-----------|---|--|
| 1   | VCC(+16V) |  | Baud rate: 19200<br>Data bits: 8<br>Stop bit: 1<br>Parity: N/A |
| 2   | GND       |   |  |
| 3   | DATA+     |   |  |
| 4   | DATA-     |   |  |
| 5   | DATA+     |   |  |
| 6   | DATA-     |   |  |
| Maximum supply current of VCC(+16V): 0.8A |           |   |  |

### 3.8 Digital Input / DRM & EPO Functions

Communication Module has 1 set of emergency power off function (EPO). When the VCC and INV OFF pins are short-circuited, inverter will shut down immediately. The module also provides 6 sets of digital input function (K1~K6). Please refer to **Table 3-4** for the digital input definition. The suitable wire size is 30-16 AWG.

**Table 3-4 : Definition of digital input & EPO functions**

| Short         | Inverter's action         |
|---------------|---------------------------|
| VCC & INV OFF | Emergency power off (EPO) |
| VCC & K1      | 0% active power           |
| VCC & K2      | Maximum 30% active power  |
| VCC & K3      | Maximum 60% active power  |
| VCC & K4      | Maximum 100% active power |
| VCC & K5      | Reserved                  |
| VCC & K6      | Reserved                  |

In Australia and New Zealand, the Demand Response Modes (DRMs) are also use digital input function to assert. The definition is different from normal digital input function; please refer to **Table 3-5** for the DRMs pin definitions.

**Table 3-5 : Definition of digital input & EPO functions (AU / NZ)**

| Short         | Inverter's action            |                       |
|---------------|------------------------------|-----------------------|
| VCC & INV OFF | DRM 0 (Disconnect from grid) | Charge/Discharge mode |
| VCC & K1 & K5 | DRM 1 (0%)                   | Charge mode           |
| VCC & K2 & K5 | DRM 2 (50%)                  |                       |
| VCC & K3 & K5 | DRM 3 (75%)                  |                       |
| VCC & K4 & K5 | DRM 4 (100%)                 |                       |
| VCC & K1      | DRM 5 (0%)                   | Discharge mode        |
| VCC & K2      | DRM 6 (50%)                  |                       |
| VCC & K3      | DRM 7 (75%)                  |                       |
| VCC & K4      | DRM 8 (100%)                 |                       |

### 3.9 Dry Contact Connection

Communication Module has 1 set of Dry Contact. The maximum input rating of dry contact connector is 250Vac/12Vdc/10A. The trigger condition of this function can be customized by Installer. When the function is triggered, the output two ports will be short-circuited.

It allows following configuration:

- Fault indicator or Grid status indicator
- Power production
- Control of external loads
- Fan control

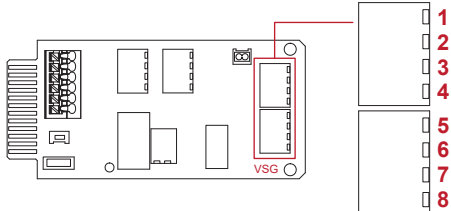
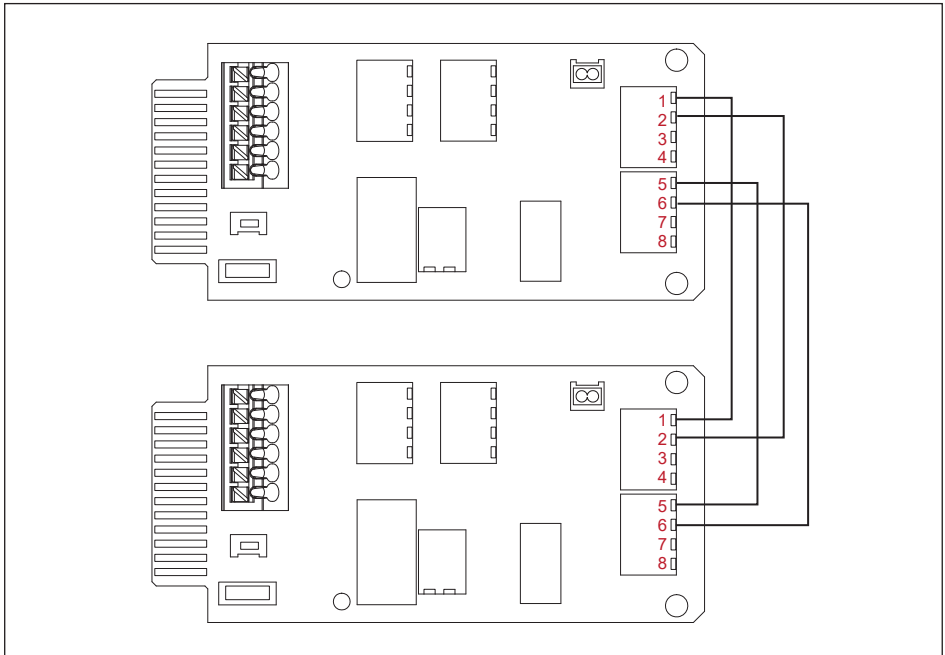
### 3.10 Sync Signal connection of VSG function

For a higher backup output power application during off-grid, it is allowed to connect the SPS port of multiple BX6.3 systems. For further information about this application, please refer to **Chapter 5 System Application**.

For this application, please follow the instruction below to connect the pins on the communication module of each BX6.3 \_AC100.

**Table 3-6 : Pin definition and data format of VSG port**

| PIN  | Function |
|------|----------|
| 1, 3 | CAN_H    |
| 2, 4 | CAN_L    |
| 5, 7 | COM_S    |
| 6, 8 | SYNC     |

**Figure 3-15 : Sync Signal connection of VSG function**

## 3.11 Installation of External CT Clamp.

BX6.3\_AC100 has an built-in power meter with an external CT clamp.

With this power meter, system can achieve the function bellows:

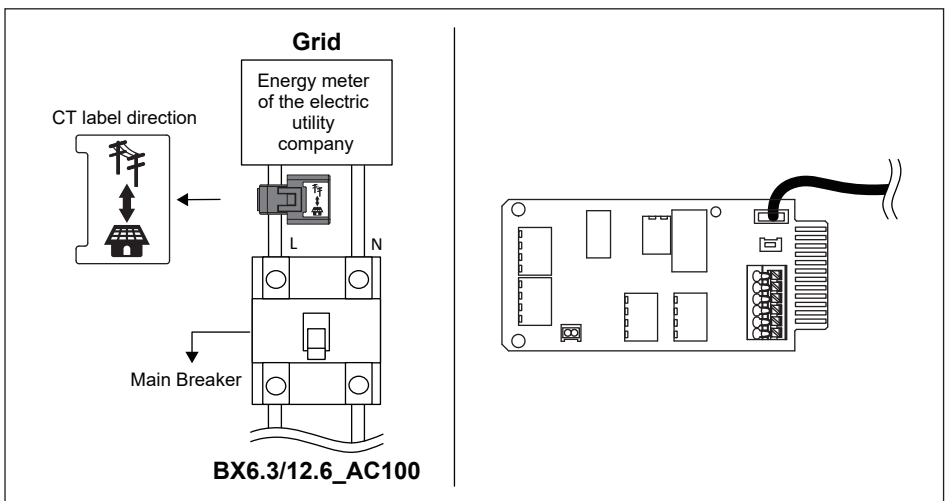
1. Measure the amount of feed-in power and the power-consumption of the house.
2. To perform the export control function in compatible with another PV inverter in the system.

### DANGER : ELECTRICAL HAZARD!!



- The product is intended to be installed and operated by qualified personnel or service personnel only.
- Do not power up the device before installation is complete.
- All circuit breakers must be in the OFF position before commencing installation.

1. The CT can be opened.
2. Take the CT clip on the Line conductor wire.
3. Please refer to the symbol on the CT clamp and make sure the CT clamp is installed in the correct direction as the figure below.
4. Connect the CT wires to the device.
5. Connect the CT cable to the connector on the Comm. Module as the figure below.



*Figure 3-16 : Current Transformer installation*

### 3.12 Assemble DC connectors

**Prepare for expansion battery pack.**

BX series uses Amphenol H4 connectors which provide along with the package of BX6.3\_EX100 are genuine parts that are certified the quality and reliable from DELTA. Please follow the below requirements to choose the DC cable and crimp.

- DC cable must choose the cooper conductor which insulation is above 600V withstands voltage.
- Acceptable cross-section range of the conductor is 4.0mm<sup>2</sup>~6.0mm<sup>2</sup>.
- Recommend crimping is by using Amphenol special tool (H4TC0002)
- If accessories DC connectors are in shortage or have other application issues, please contact DELTA Service Center for help.

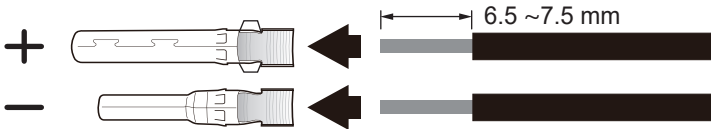
**Assemble Battery connectors:**

Please follow step to assemble DC connectors.

- (1) Male connector with Socket Type terminal is for Positive side.  
Female connector with Pin Type terminal is for Negative side.



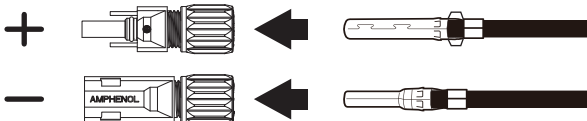
- (2) Strip off the cable insulation around 6.5 ~ 7.5 mm length, neat the conductor, then put it into its belong terminal hole well.



- (3) Put them into the stopper of the Amphenol crimping tool(H4TC0002), then crimp to fix.



- (4) Connect the terminal and its belonging connector. The terminal will be locked if well assembling. Fasten the cap with 2.6 ~ 2.9 N.m force for the waterproof.



## 3.13 Installation of BX12.6\_AC100

### DANGER: ELECTRICAL HARZARD!!



- Before expansion battery pack, please power OFF the unit entirely to avoid risk of electrical shock.
- Please check the battery pack regularly. If there are any impaired or loose parts, please contact your installer. Ensure that there are no fallen objects.

For the higher capacity system - BX12.6\_AC100, BX6.3\_AC100 should be installed with the BX6.3\_EX100 as the following instruction.

1. Connect positive/negative cable from BX6.3\_EX100 to BX6.3\_AC100
2. Connect Communication cable (3 wires) from BX6.3\_EX100 to BX6.3\_AC100
3. Connect grounding cable from BX6.3\_EX100 to BX6.3\_AC100.

Recommended cable length (about 1000mm) / 12AWG with ring terminal lug.  
Please make sure the polarity is properly connected as shown below.

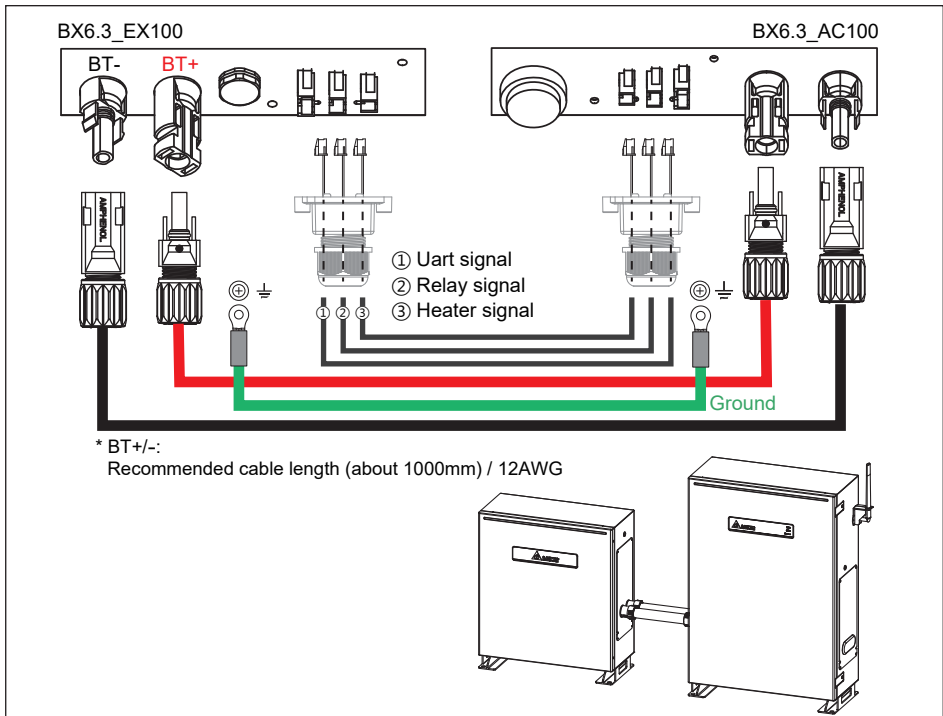


Figure 3-17 : Expanding the Battery Pack with DC(BT+/-) cables

### ATTENTION



- Please do not remove all the rubber covers on BX6.3\_AC100 if BX6.3\_EX100 is not installed.

## 4 Startup

**To startup BX6.3\_AC100, please follow the steps below:**

1. Turn ON the AC grid breaker.
2. Ensure the LED light-on, follow the "MyDeltaSolar" APP user's guide to operate the APP.
3. When DC1 is also in the system, please ensure the connection between DC1 and BX6.3\_AC100 and check if DC1 is powered correctly.

\* For AU market, to comply with AS/NZS 4777.2:2020 grid settings, select from Australia Region A, B, C. Please contact your local electricity grid operator on which Region to select.

**How to make Wi-Fi communication with BX6.3\_AC100:**

1. Turn on the device's Wi-Fi function.
2. Select the Wi-Fi SSID: Delta-[serial number]  
(e.g. Delta-O9J20500001W0; See rating label on the case as **Figure 2-6** )
3. Enter the Wi-Fi password: DELTASOL
4. Use the "MyDeltaSolar" APP (You can download the APP via google play or App Store)

Please note :

- (1) The product only support one device communicating at the same time.
- (2) If the Wi-Fi password is forgotten, press and hold the Reset Button more than 20s to return the Default password to "DELTASOL"

Due to the variety of installation environments, installation of the unit and start-up procedures must be carried out by an accredited technician. Incorrect settings may cause the inverter to malfunction.

### ATTENTION



To establish a successful communication between Inverter Wi-Fi to MyDeltaSolar Cloud, in the Wi-Fi connection setup page, the signal strength must be above **-70dBm** between each Wi-Fi device (Wi-Fi router, inverter, DC1...etc.). In case the signal strength is below -70dbm, it may cause certain communication errors which may prevent a successful Wi-Fi communication. To avoid such issues, Please adjust the Wi-Fi device position to improve the signal strength/quality.

### ATTENTION



- Please refer the QR-code for the operation guideline of Wi-Fi and APP  
[https://mydeltasolar.deltaww.com/?p=product\\_manual](https://mydeltasolar.deltaww.com/?p=product_manual)





## 4.1 Operation Mode

BX6.3\_AC100 has 6 normal operation modes for users to choose.

Each mode has different behavior between battery, grid, and home load.

The following are the description of these modes.

In some area, the detail behavior of each operation mode may be different due to the local electricity regulations.

### 4.1.1 Self-consumption mode

Self-consumption mode is standard mode when BX6.3\_AC100 installed with another PV system.

In this mode, BX6.3\_AC100 is operated in following priority :

1. Charge the battery with the excess PV energy which feed-in to the grid until the battery is fully charged.
2. Discharge the battery when the PV energy is insufficient to provide the home load consumption until the battery is fully discharged.

When there is no PV power, battery starts to discharge and supply home load until it's empty.

If the time setting function is enabled, the behavior of the BX6.3\_AC100 will according to the time setting in priority. The detail operation of time setting function is described in Chapter 4.2.

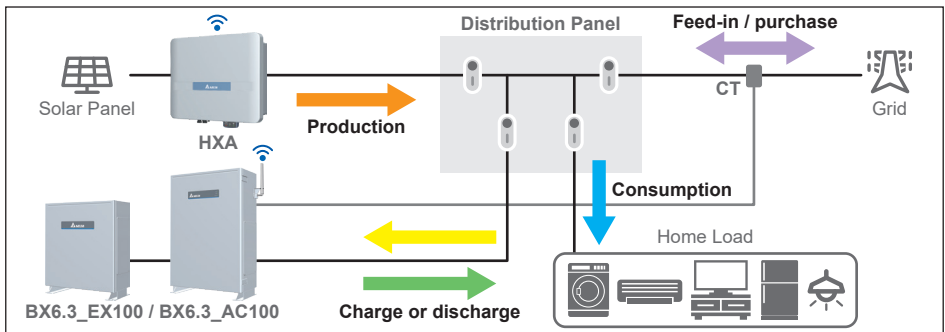


Figure 4-1 : Self-consumption mode current flows

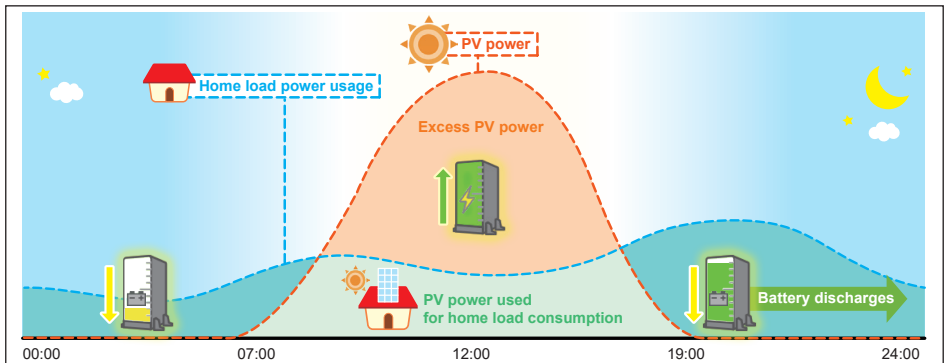


Figure 4-2 : Self-consumption mode behavior

## 4.1.2 Peak cut mode

In this mode, the home load will consume the power from the PV inverter in priority. When the home load consume more power than the power generated by the inverter, it will consume the power from the grid. Then, battery will only discharged to the supply the extra load after the power consume from the grid exceeds the “peak cut power” setting value. “Peak cut power” can be assigned in the Battery Control page.

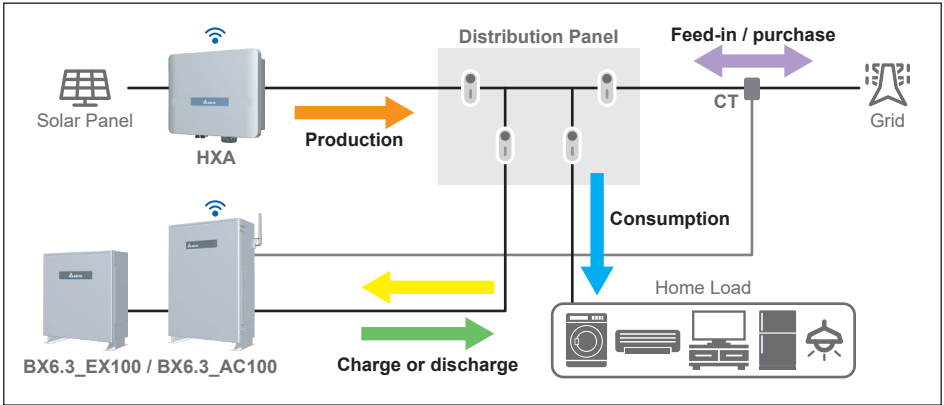


Figure 4-3 : Peak cut mode current flows

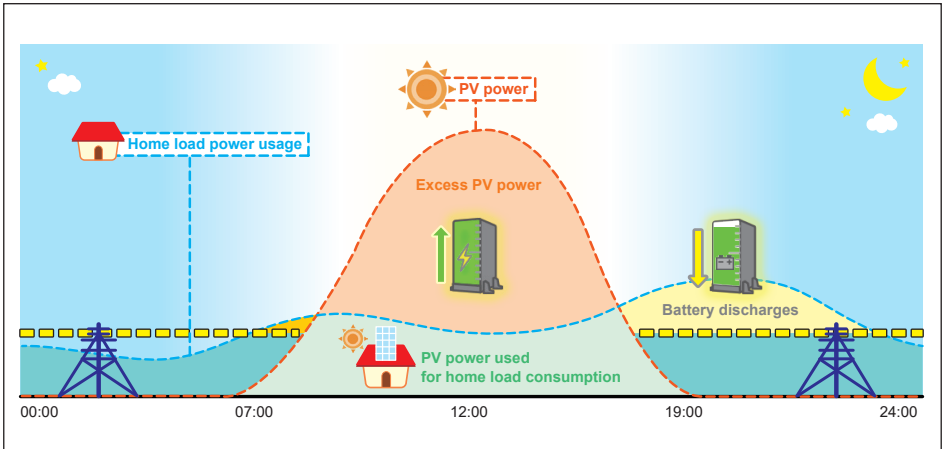


Figure 4-4 : Peak cut mode behavior

### 4.1.3 Selling first mode

Selling first mode is a standard mode combining with 6 time settings. In this mode, BX6.3\_AC100 is operated in following priority:

1. If users have set the time settings, inverter will change behavior in these time intervals
2. Discharge the battery when purchased power from grid is detected until battery empty.

Please refer to 4.2 Function Setting chapter for more detail about time settings.

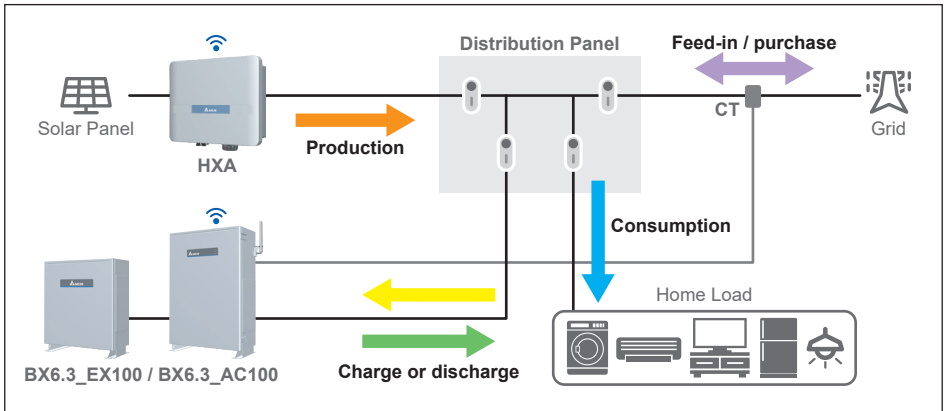


Figure 4-5 : Selling first mode current flows

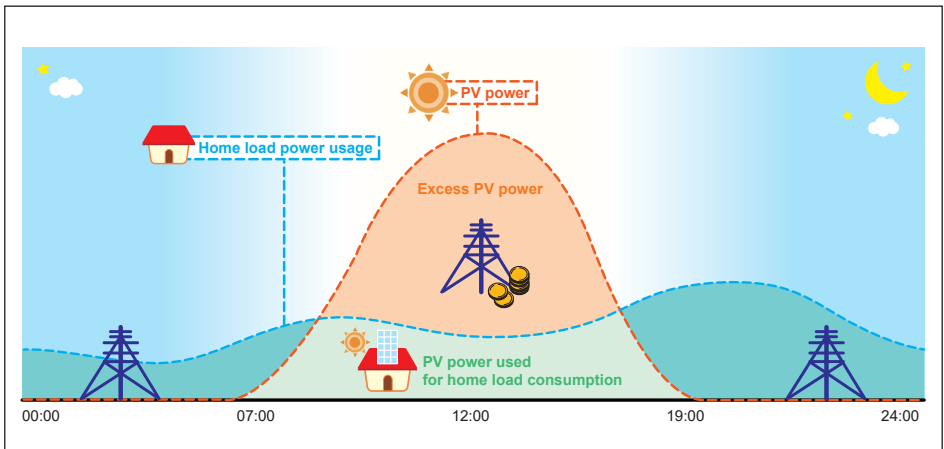


Figure 4-6 : Selling first mode behavior

### 4.1.4 Charge first mode

In this mode, battery will be charged by PV or grid in priority, after battery is fully charged, the remaining PV power then feed-in to home load and grid. Battery will not be discharged in this mode even there is demand in the home load.

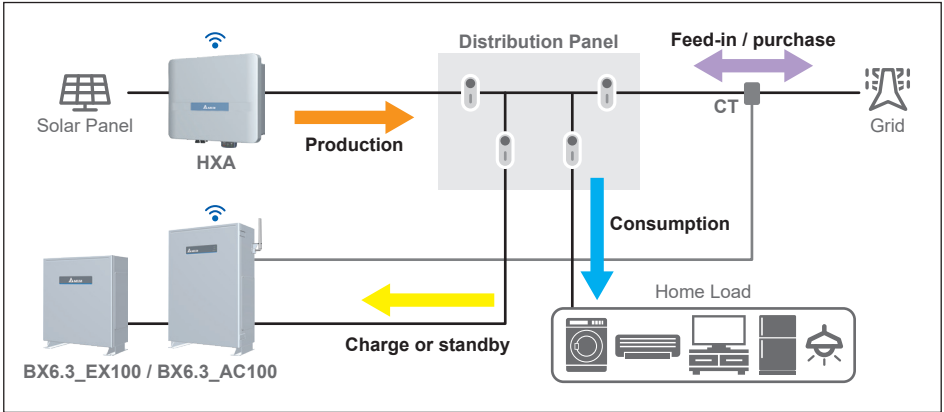


Figure 4-7 : Charge first mode current flows

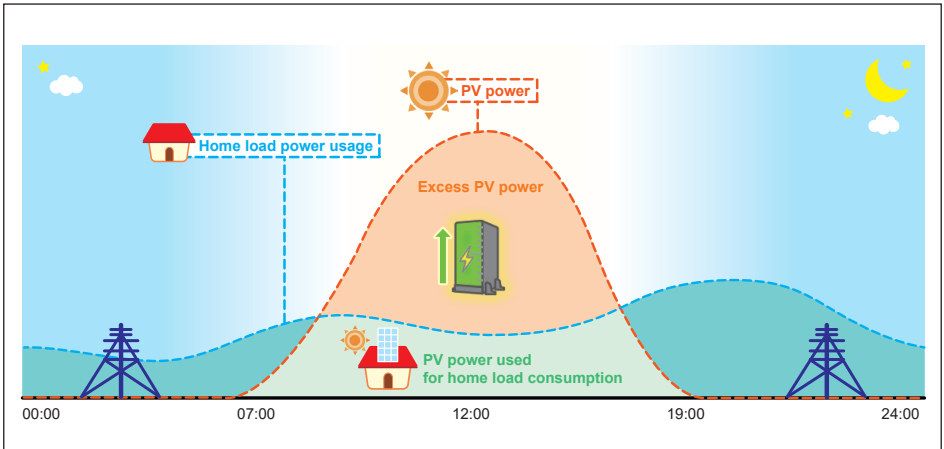
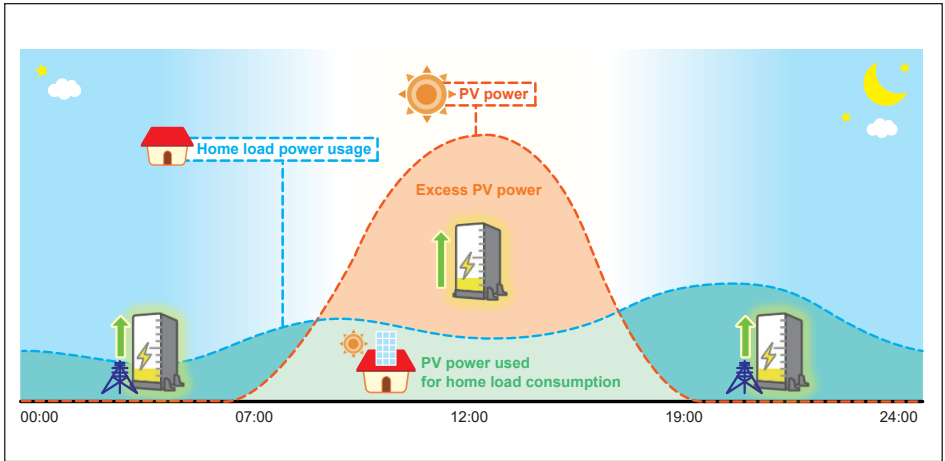


Figure 4-8 : Charge first mode behavior (general)



**Figure 4-9 : Charge first mode behavior (for AU & NZ)**

### 4.1.5 Discharge first mode

In this mode, the battery will only be discharged depends on the load consumption. It will not be charged even there is excess PV power. All the PV power is feed-in to home load and grid. Battery will keep discharging when there is demand in the home load until it fully discharged.

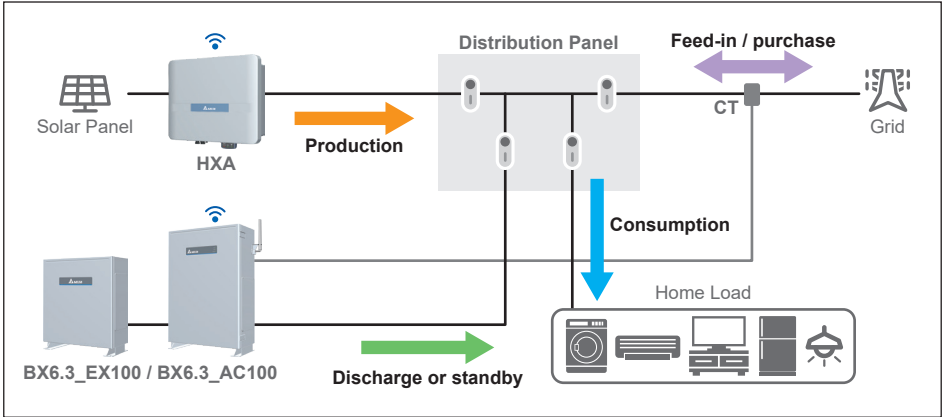


Figure 4-10 : Discharge first mode current flows

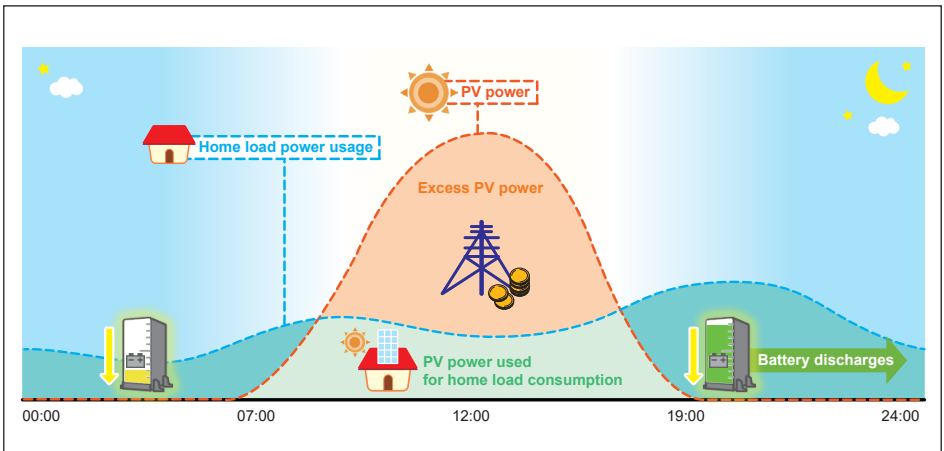


Figure 4-11 : Discharge first mode behavior

## 4.1.6 Special Modes

In addition to the modes mentioned above, there are three special modes in BX6.3\_AC100. These are passive modes, they will be enabled automatically under special condition.

- **Standalone mode**

BX6.3\_AC100 changes to standalone mode automatically during a power outage occur. At this time, grid side is disconnected and home load are supported by battery power as much as possible.

BX6.3\_AC100 can be micro-grid under this mode, to provide simulated grid for load and PV inverter.

| Model        | Max charge / discharge load current |
|--------------|-------------------------------------|
| BX6.3_AC100  | 13 A                                |
| BX12.6_AC100 | 19.6 A                              |

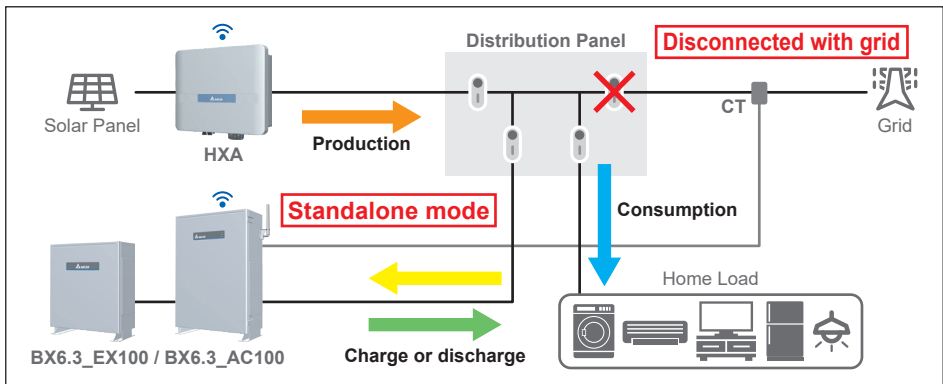


Figure 4-12 : Standalone mode current flows

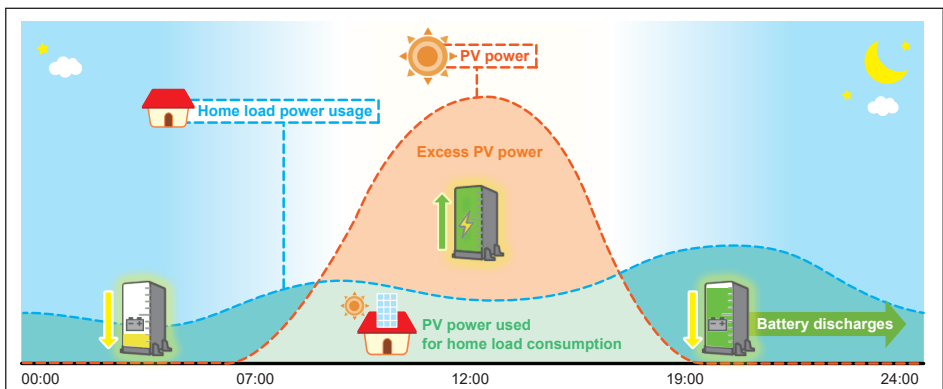
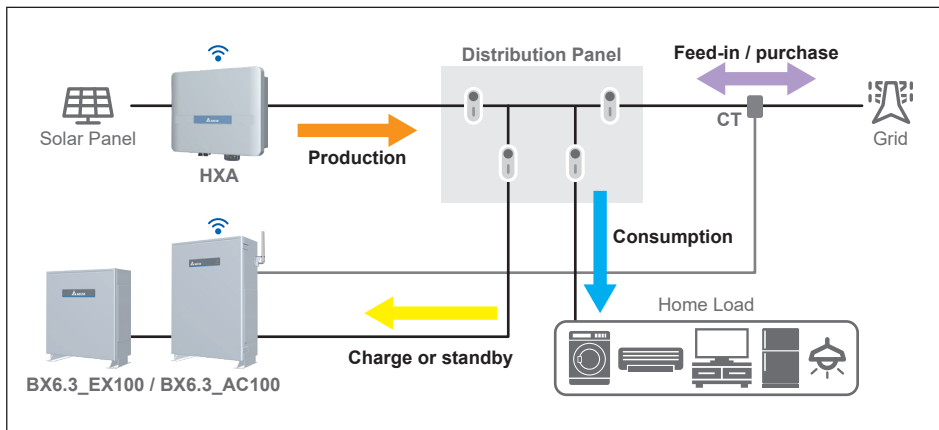


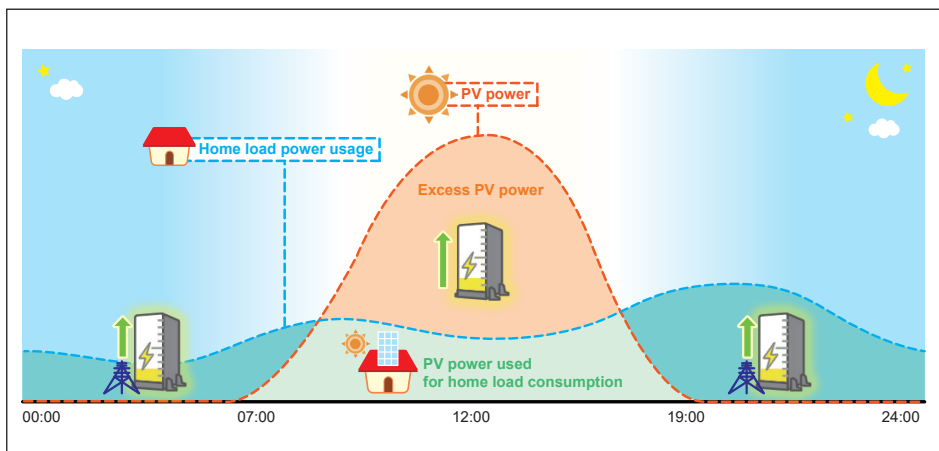
Figure 4-13 : Standalone mode behavior

• **Forced charge mode**

Although battery stops any action when SOC (state of charge) reach 0%, the self-discharge phenomenon may still causing SOC lower than 0%. At this time, BX6.3\_AC100 will force battery charging from PV power and grid power until the battery SOC reaching SOC limit setting (default is 30%).



**Figure 4-14 : Forced charge mode current flows**



**Figure 4-15 : Forced charge mode behavior**



- **Balance mode**

This operation is only applied to BX12.6\_AC100 system.

During the installation, the battery voltage of BX6.3 series might be different. Due to the specifications of the battery module, the system will be switched to this mode automatically to balance the voltage of BX6.3 series.

When the system is operating under this mode, the system will either discharge the battery with 3 kW power to the load and the grid or charge the battery with 3 kW power from the grid.

Once the battery voltage of BX6.3 series are balance, this balance mode will stop and the system will automatically be switched to the operational mode selected by the user.

## 4.2 Function Setting

You can assign SOC limit, peak cut power, BT charge / discharge time interval, Main Supply Breaker Capacity and Time Schedule for SOH-cycle.

- **SOC Limit**

You can assign the lower limit of battery SOC. Battery will stop discharging when its SOC reach this limit.

- **Peak Cut Power**

Peak cut power is used in peak cut mode. You can assign the peak power of home load usage from grid. When the home load consumption exceeds this value, battery will discharge to supply remaining power.

- **Time Settings**

Time settings can be separated into BT charge time and BT discharge time. Each setting has 3 time setting intervals. The time setting of all the intervals cannot overlap with each other.

Time setting function is only available under self-consumption mode and selling first mode. Under either mode, BX6.3\_AC100 will automatically switched to charge first / discharge first mode according to the time setting function and switched back to the original mode when the time is out of the setting interval.

- **Main Supply Breaker Capacity**

Please set the current rating of the main supply breaker of the household. The system will refer to this setting to adjust its maximum charging power drawn from the grid during peak hours to avoid the unnecessary tripping of the breaker.

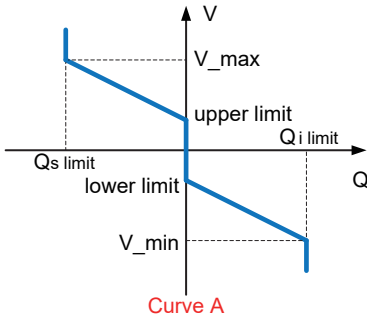
- **Time Schedule for SOH-cycle**

Once a year the BX6.3\_AC100 and BX12.6\_AC100 must do a FULL un-interrupted discharge and re-charge cycle. This will be completed and undertaken at a scheduled day and time as set by the user. Should the temperature of the battery be below 20 degrees Celsius the battery will postpone the process for 90 days.

## 4.3 Active & Reactive power control

### 4.3.1 Q(U) control

Q(U) is a control mode that inverter will provide reactive power according to grid voltage.



| Grid Setting                  |                         |
|-------------------------------|-------------------------|
| <b>REACTIVE POWER CONTROL</b> |                         |
| Mode :                        | Reactive power via Grid |
| Delay Time (S):               | 4                       |
| Upper limit(%):               | Cap 30                  |
| Lower limit(%):               | Ind 30                  |
| V_max (V):                    | 265                     |
| V_min (V):                    | 207                     |
| Lower limit(V):               | 220                     |
| Upper limit(V):               | 250                     |
| Lock-in Power (%):            | 20                      |
| Lock-out Power (%):           | 5                       |
| Hysteresis (V):               | 0                       |
| Delay Time (S):               | 0                       |
| K factor (%):                 | Ind 0                   |

| Reactive power via Grid |  |
|-------------------------|--|
| Delay Time (S):         | 4  |
| Mode :                  | <input type="checkbox"/> Constant cos phi<br><input type="checkbox"/> Cos phi via Active Power<br><input type="checkbox"/> Constant Reactive Power<br><input checked="" type="checkbox"/> Reactive power via Grid Voltage Q(V)<br><input type="checkbox"/> CosPhi of U |
| Lock-out Power (%):     | 5  |
| Hysteresis (V):         | 0  |

### 4.3.2 P(U) control

When grid voltage rises up to a lock-in voltage ( $V_{lock-in}$ ) and inverter's present output power is greater than lock-in power ( $P_{lock-in}$ ), inverter will reduce the output power and keep it at a certain value ( $P_{lock-out}$ ) until grid voltage drop back to lock-out voltage ( $V_{lock-out}$ ) and passing a certain time ( $T_{recovery}$ ).

| Grid Setting                            |         |
|---|---------|
| <b>P(U)</b>                             |         |
| Mode :                                  | OFF     |
| Recovery Time (S):                      | 0       |
| Lock-in Power(%) :                      | 100     |
| Lock-out Power(%) :                     | 20      |
| Lock-in Voltage (V):                    | 250     |
| Lock-out Voltage (V):                   | 265     |
| <input type="button" value="P(U) Set"/> |         |
| <b>FRT</b>                              |         |
| [HVRT MODE]                             |         |
| Mode :                                  | Disable |
| V1 (V):                                 | 125     |
| V2 (V):                                 | 120     |
| T1 Time (S):                            | 0.15    |

# 5 System application

## ATTENTION



- Short circuit at the critical load may cause damage to the inverter.

### 1. Critical Load Backup Power

This system can provide power to the critical load once there is a power failure. The maximum power consumption for the critical load is 3 kVA for BX6.3\_AC100 and 4.5 kVA for BX12.6\_AC100.

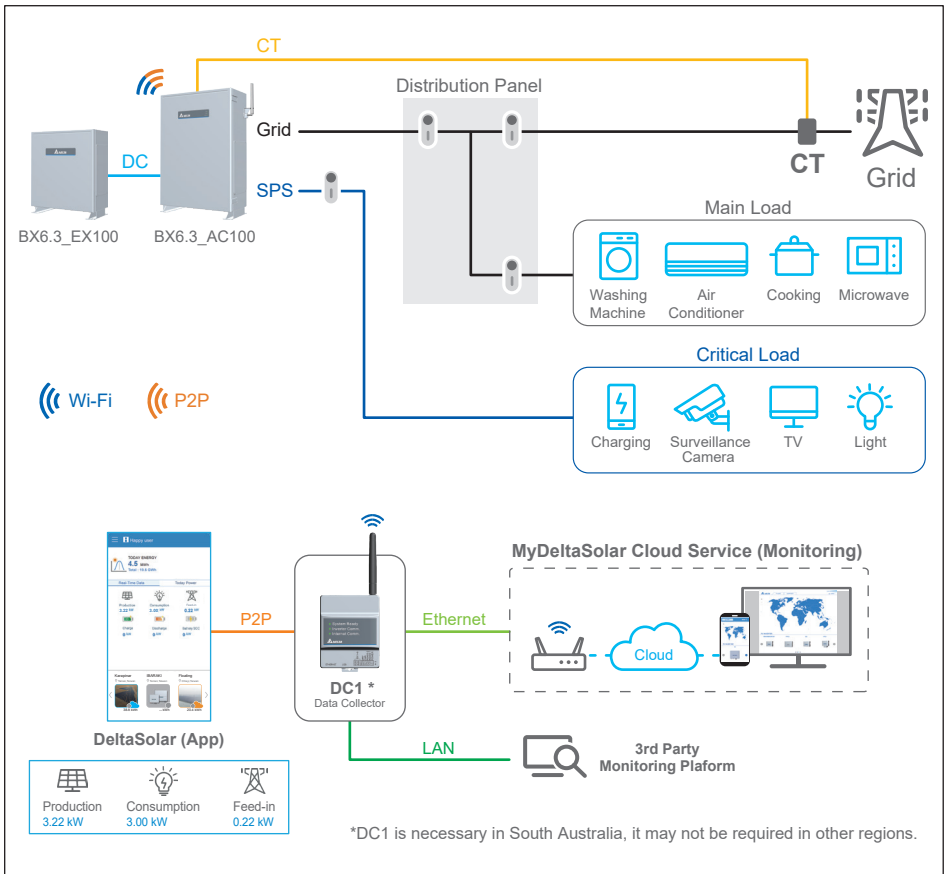


Figure 5-1 : Critical Load Backup Power

## 2. Hybrid Energy Storage System

This system is a combination of PV inverter and BX6.3\_AC100, it can be considered as a hybrid energy storage system.

In this system, BX6.3\_AC100 can store the excess PV energy during daytime and provide energy to the load when there is load demand.

This system can support multiple HxA PV inverters depends on the customer requirement. Other than Delta inverters, it is compatible with 3rd party PV inverter.

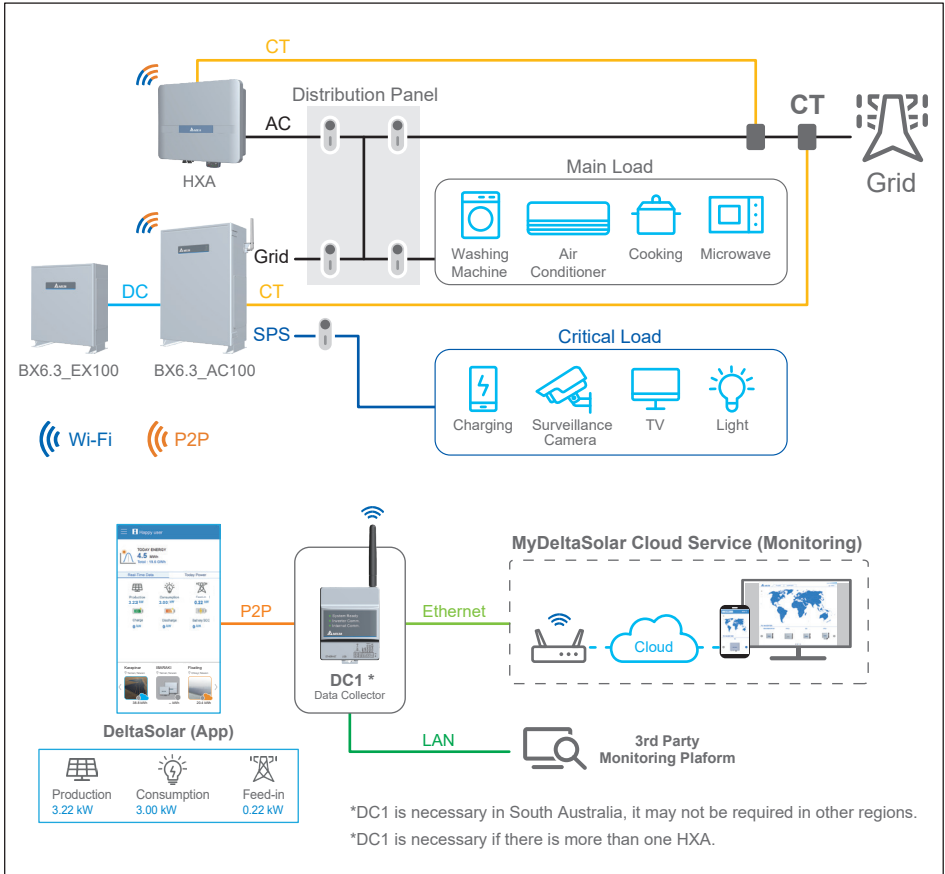
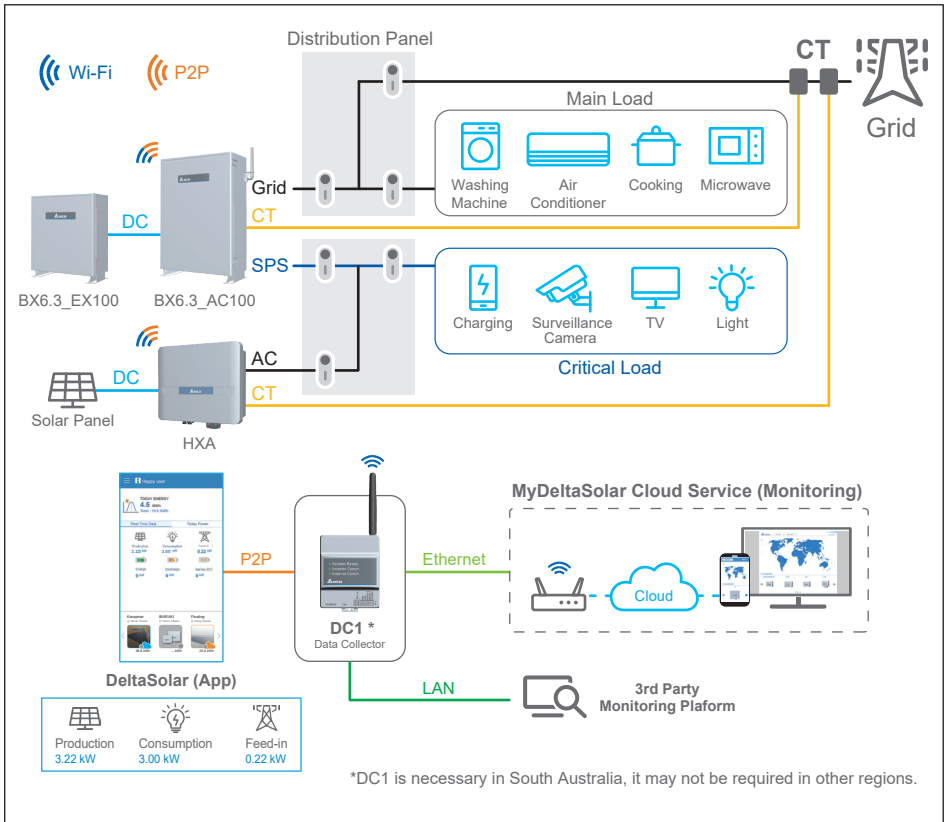


Figure 5-2 : Hybrid Energy Storage System

### 3. Off-Grid Support Hybrid Energy Storage System (Internal ATS Mode)

The key feature of this system is that it can support off-grid application and the PV inverter can continue generating power during power failure. In this application, the auto contactor is not necessary as it applies the internal contactor of BX6.3\_AC100. Due to hardware limitation, this system can only provide max. power of 5 kVA to the main load. For the PV inverter connected at the SPS port, not only support Delta PV inverters, 3rd party PV inverter is compatible. For Delta PV inverters, FW updates might be performed to get access to this function. Please refer to **Table5-1** for the requirements of inverter.



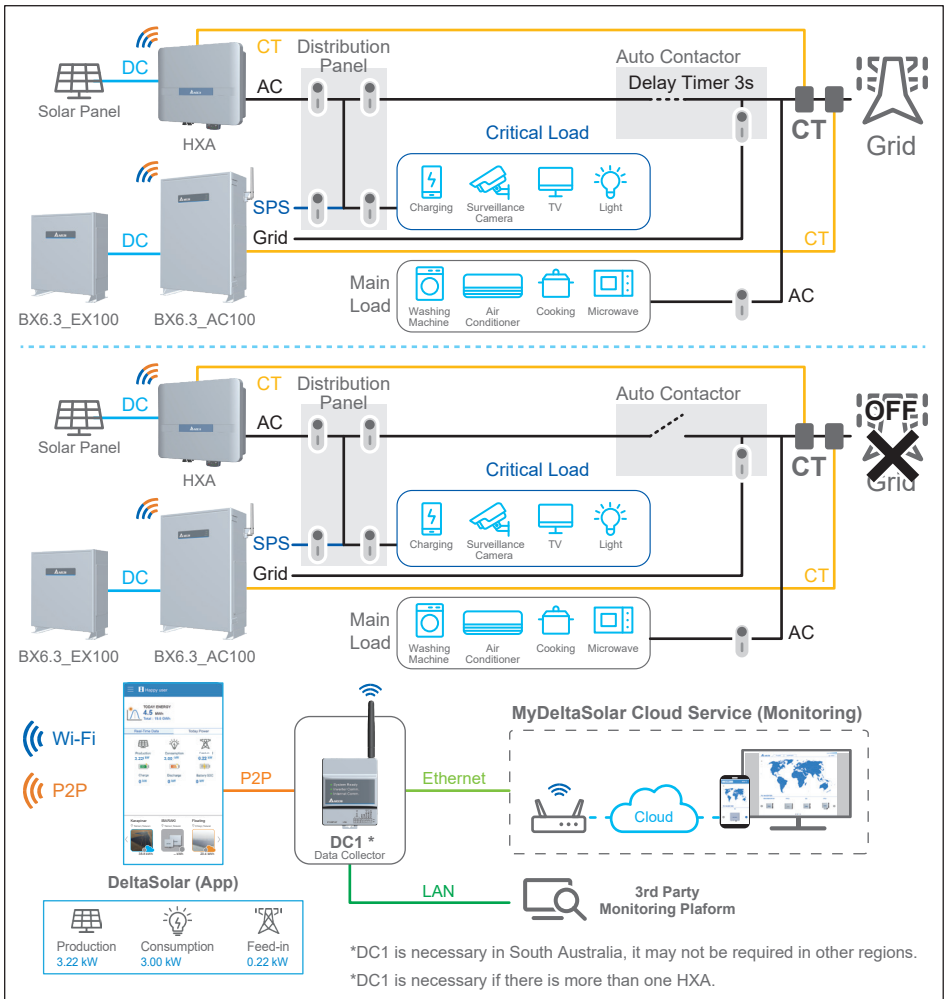
**Figure 5-3 : Off-Grid Support Hybrid Energy Storage System (Internal ATS Mode)**

**Table 5-1 : Requirements for the PV inverter**

| Requirements for the PV inverter in application 3. and 4. |   |   |  |
|---|---|---|--|
| 1   | Power rating should not exceed 5kVA.          | 2 | Should compliant with regulation AS4777.2  |
| 3   | P(f) function should be enabled all the time. | 4 | 3rd party inverter with built-in external CT might need to be able to turn off its CT detection. |

#### 4. Off-Grid Support Hybrid Energy Storage System (External ATS Mode)

This system is similar to *application 3*, it can support off-grid application and the PV inverter can continue generating power during power failure. However, a time-delay external auto contactor is required in this system. The time-delay auto contactor will trip off immediately when power failure and closed after the grid is recovered for 3 seconds. The key benefit of this system is that it reduces the risk of causing damage to the inverter when short circuit occurred at the critical load during on-grid mode. This system can support Delta PV inverters and 3rd party PV inverters. Please refer to **Table5-1** for the requirements of inverter.

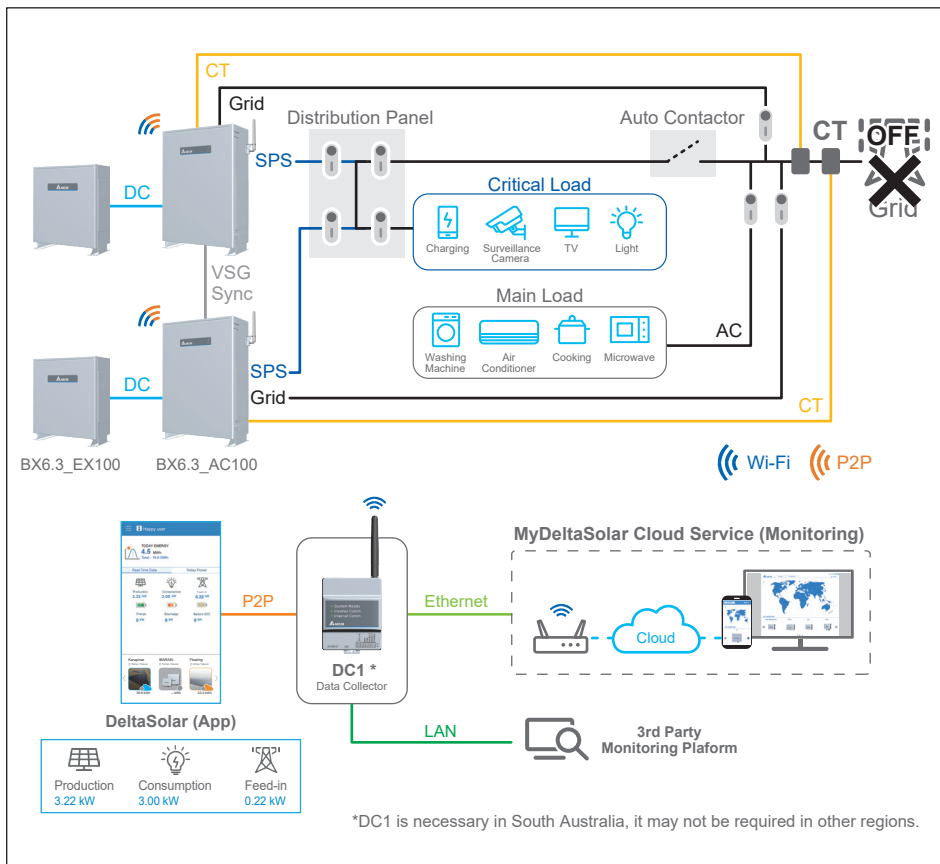


**Figure 5-4 : Off-Grid Support Hybrid Energy Storage System (External ATS Mode)**

### 5. Backup Power with Higher Standalone Power

This system can provide higher output power to the critical load once there is a power failure. To achieve a higher standalone power, the SPS port of multiple BX6.3\_AC100 should be connected together. The output power during power failure will depend on the number of BX6.3\_AC100 connected. For example, the output power is 6 kVA for the system of 2\*BX6.3\_AC100 and 9 kVA for 2\*BX12.6\_AC100

Data Collector (DC1) and time-delay auto contactor is necessary in this system. The time-delay auto contactor will trip off immediately when power failure and closed after the grid is recovered for 3 seconds.



**Figure 5-5 : Backup Power with Higher Standalone Power**



## 6 Maintenance

### **DANGER : ELECTRICAL HAZARD!!**



- Before any maintenance, please make sure you are well insulated to avoid risk of electric shock.

In order to ensure the normal operation of inverter, please check and clean the unit regularly. Once there are any impaired or loose parts, please contact your inverter installer.

## 7 Error message and Trouble Shooting

**Table 7-1 : Error Message**

| ERROR |                   |   |   |
|-------|-------------------|---|---|
| Code  | Message           | Cause   | Action  |
| E01   | AC Freq High      | Grid frequency over the limit of electricity regulation.  | Check the grid frequency.<br>If grid frequency is not in acceptable range, contact the utility operator to modify it.<br>If grid frequency lies in acceptable range but the error still exist, please contact your inverter supplier. |
| E02   | AC Freq Low       | Grid frequency under the limit of electricity regulation. | Check the grid frequency.<br>If grid frequency is not in acceptable range, ask the utility operator to modify it.<br>If grid frequency lies in acceptable range but the error still exist, please contact your inverter supplier.     |
| E07   | Grid Quality      | Grid harmonic distortion >8.5% and >2.2s                  | Check AC wiring; keep the wire short and straight.<br>Contact the utility operator to improve the grid quality.<br>If the grid quality is good but the error still exist, please contact your inverter supplier.                      |
| E08   | AC phase abnormal | Wrong connection at AC plug                               | Check the AC connection in accordance with the user manual.   |
| E09   | No Grid           | Grid voltage <20V or voltage half-cycle > 50ms            | Check the triggering of upstream circuit breaker.<br>Check the wire connection between inverter side and grid side.<br>Contact the utility operator for the information about power failure.  |
| E10   | AC Volt Low       | Grid voltage under the limit of electricity regulation.   | Check the grid voltage.<br>If grid voltage is not in acceptable range, ask the utility operator to modify it.<br>If grid voltage lies in acceptable range but the error still exist, please contact your inverter supplier.           |
| E11   | AC Volt High      | Grid voltage over the limit of electricity regulation.    | Check the grid voltage.<br>If grid voltage is not in acceptable range, ask the utility operator to modify it.<br>If grid voltage lies in acceptable range but the error still exist, please contact your inverter supplier.           |

| ERROR |                               |  |   |
|-------|-------------------------------|--|---|
| Code  | Message                       | Cause  | Action  |
| E12   | AC Volt High                  | Grid voltage over the limit of electricity regulation. | Check the grid voltage.<br>If grid voltage is not in acceptable range, ask the utility operator to modify it.<br>If grid voltage lies in acceptable range but the error still exist, please contact your inverter supplier. |
| E13   | AC Volt High                  | Grid voltage over the limit of electricity regulation. | Check the grid voltage.<br>If grid voltage is not in acceptable range, ask the utility operator to modify it.<br>If grid voltage lies in acceptable range but the error still exist, please contact your inverter supplier. |
| E34   | Insulation (Insulation Fault) | BT to ground Impedance in either input < 550 kohm      | Check the insulation of DC wiring.<br>For Delta cloud registered user, system will send alarm message to your e-mail when this Error code occurred.   |

**Table 7-2 : Fault Message**

| Fault |                                    |  |  |
|-------|------------------------------------|--|--|
| Code  | Message                            | Cause  | Action   |
| F01   | DC Injection                       | DC component in grid current over the limit              | Check the power supply line for direct current.<br>Contact the utility operator to improve the grid quality. |
| F05   | Temp High (Temperature High)       | Internal temperature too high to cause power output < 5% | Check the temperature of installation environment.<br>Contact your inverter supplier.                        |
| F06   | HW NTC1 Fail (Amb Temp Fault)      | Internal fault   | Contact your inverter supplier.  |
| F07   | Temp Low (Temperature Low)         | Internal temperature < -25°C                             | Check the temperature of installation environment.<br>Contact your inverter supplier.                        |
| F08   | HW NTC2 Fail (Boost Temp Fault)    | Internal fault   | Contact your inverter supplier.  |
| F09   | HW NTC3 Fail (Bidir. Temp Fault)   | Internal fault   | Contact your inverter supplier.  |
| F10   | HW NTC4 Fail (Inverter Temp Fault) | Internal fault   | Contact your inverter supplier.  |
| F13   | HW RLY (AC RLY Fault)              | Internal device fault                                    | Contact your inverter supplier.  |
| F15   | HW DSP ADC1 (AC Sensor Fault)      | Internal fault   | Contact your inverter supplier.  |
| F16   | HW DSP ADC2 (Vdc Sensor Fault)     | Internal fault   | Contact your inverter supplier.  |
| F17   | HW DSP ADC3 (Idc Sensor Fault)     | Internal fault   | Contact your inverter supplier.  |
| F18   | HW Red ADC1 (AC Sensor Fault)      | Internal fault   | Contact your inverter supplier.  |
| F19   | HW Red ADC2 (Idc Sensor Fault)     | Internal fault   | Contact your inverter supplier.  |

| Fault |                                   |   |  |
|-------|-----------------------------------|---|--|
| Code  | Message                           | Cause   | Action   |
| F22   | HW COMM2<br>(Red COMM Fault)      | Internal fault                                  | Contact your inverter supplier.  |
| F23   | HW COMM1<br>(DSP COMM Fault)      | Internal fault                                  | Contact your inverter supplier.  |
| F24   | Ground Cur.<br>(Ground Cur. High) | Residual current over the limit<br>DC > 150mA   | Check the insulation of DC wiring.   |
| F27   | RCMU Fail<br>(RCMU Fault)         | Internal device fault                           | Contact your inverter supplier.  |
| F28   | RLY Short<br>(AC RLY Short)       | Internal device fault                           | Contact your inverter supplier.  |
| F29   | RLY Open<br>(AC RLY Open)         | Internal device fault                           | Contact your inverter supplier.  |
| F30   | Bus Unbal.<br>(Bus Unbalance)     | Internal fault                                  | Contact your inverter supplier.  |
| F31   | HW Bus OVR<br>(Bus Voltage High)  | Internal fault                                  | Contact your inverter supplier.  |
| F33   | HW Bus OVR<br>(Bus Voltage High)  | Internal fault                                  | Contact your inverter supplier.  |
| F35   | HW Bus OVR<br>(Bus Voltage High)  | Internal fault                                  | Contact your inverter supplier.  |
| F36   | AC Cur. High<br>(AC Current High) | Grid current >135% rated and<br>keep over 50ms  | Contact your inverter supplier.  |
| F37   | AC Cur. High<br>(AC Current High) | Grid current >125% rated and<br>keep over 5s    | Contact your inverter supplier.  |
| F42   | HW CT<br>(AC CT Fault)            | Internal device fault                           | Contact your inverter supplier.  |
| F45   | HW AC OCR<br>(AC Current High)    | AC current over the limit<br>20 times within 2s | Check AC and DC wiring for ground faults.<br>Inverter may be struck by the lightning.<br>Check the whole wiring of hybrid system.<br>If this fault occurs often, please contact<br>your inverter supplier. |
| F48   | SA OPP<br>(SA Over Load)          | System overload                                 | In standalone mode, PV and BT power is<br>insufficient to supply the home load.<br>Please reduce the load.   |

| Fault |                                  |  |  |
|-------|----------------------------------|--|--|
| Code  | Message                          | Cause  | Action   |
| F50   | HW ZC Fail<br>(ZC Circuit Fault) | Internal fault   | Contact your inverter supplier.                    |
| F97   | BT OVP                           | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F98   | BT UVP                           | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F99   | BT OTP                           | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F100  | BT UTP                           | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F101  | BT OCP                           | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F102  | BT CVI                           | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F103  | BT TF                            | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F104  | BT PF                            | Battery system internal fault                                    | Contact your inverter supplier.                    |
| F112  | HW COMM BT                       | Loss communication between inverter and battery over 10 seconds. | Check CAN connection between inverter and battery. |
| F113  | BT EOL                           | Battery system SOH < 50%   | Contact your inverter supplier.                    |

## 8 De-Commissioning

### WARNING !



- To avoid injuries, please follow the procedures to unload the inverter.

If it is necessary to put the device out of operation for maintenance or storage, please follow the procedures below:

At inverter side:

1. Push Power button until BX6.3\_AC100 shutdown, all LED indicators will show "OFF" status.
2. Switch off AC power line breaker to disconnect from grid.
3. Wait for all LED indicator turning off.
4. Remove the AC and battery wiring.
5. Remove the communication module RS-485 connection from the computer connection.

Now you may unload the inverter.

## 9 Technical Data

**Table 9-1 : Specifications for BX6.3\_AC100**

| Model                     | BX6.3_AC100                                   | BX12.6_AC100                                 |
|---------------------------|---|--|
| <b>GENERAL</b>            |   |  |
| Enclosure                 | Aluminum with powder coating                  |  |
| Operating temperature     | -10°C* ~ 45°C                                 |  |
| Operating Altitude        | 0 to 2000m (0 to 6666 ft.)                    |  |
| Relative humidity         | 0% – 95% non-condensing.                      |  |
| Environmental category    | Indoor / Outdoor                              |  |
| Protection degree         | IP65 (Electronics)                            |  |
| Pollution degree          | PD 2  |  |
| Overvoltage category      | AC output :III                                |  |
| Galvanic isolation        | NO  |  |
| Safety class              | Class I metal enclosure with protective earth |  |
| Weight                    | 77kg  | 77 kg (BX6.3_AC100)<br>+ 60 kg (BX6.3_EX100) |
| Dimensions (W x H x D)    | 570 × 840 × 250 mm                            | 570 × 840 × 250 mm<br>+ 520 × 600 × 230 mm   |
| Connectors                | Weather resistant connectors                  |  |
| Audible noise             | < 40dB  |  |
| Decisive Voltage Class    | COMM. Port: DVC A                             |  |
|                           | DC Input Port: DVC C                          |  |
|                           | AC Output Port: DVC C                         |  |
| <b>BT INPUT</b>           |   |  |
| Type                      | Li-ion  |  |
| Battery Module            | Samsung SDI 41J (21700)                       |  |
| Nominal Battery Capacity  | 6.3 kWh                                       | 12.6 kWh                                     |
| Usable Battery Capacity   | 6.17 kWh                                      | 12.34 kWh                                    |
| Typical Voltage           | DC 202.7 V                                    | DC 405.4 V                                   |
| Voltage Range             | DC 175 - 228 V                                | DC 350 - 456 V                               |
| Depth of Discharge (DoD)  | 98 %  |  |
| Cycle Stability (98% DoD) | 6000 Cycle                                    |  |

\* 0 degree for the first time installation.



| Model  | BX6.3_AC100   | BX12.6_AC100 |
|--|---|--------------|
| <b>AC INPUT / OUTPUT</b>                                     |   |              |
| Nominal power  | 3000VA  | 4500VA       |
| Maximum power  | 3000VA  | 4500VA       |
| Voltage  | According to country setting<br>(Programmable 230Vac ± 20%)                 |              |
| On Grid Nominal current                                      | 13A   | 19.6A        |
| Stand-Alone Nominal current                                  | 13A   | 19.6A        |
| Inrush current   | 16A / 100us   |              |
| Maximum output fault current (rms)                           | 25A   | 25A          |
| Maximum overcurrent protection                               | 25A   | 25A          |
| Frequency  | Rated 50/60 Hz (Programmable 45-65 Hz)<br>(50Hz for Australia, New Zealand) |              |
| Active anti-islanding method                                 | Reactive power injection  |              |
| Total harmonic distortion                                    | < 3 %   |              |
| Power factor   | > 0.99 @ full power   |              |
| Output current DC component                                  | < 0.5% rated current  |              |
| Tare loss  | < 10 W  |              |
| Maximum efficiency   | 96.5%   |              |
| EU efficiency  | 96%   |              |
| <b>SYSTEM INFORMATION / COMMUNICATION</b>                    |   |              |
| User interface   | Wi-Fi connection  |              |
|  | 365 days data logger and real time clock                                    |              |
|  | 30 events record  |              |
| External communication                                       | 2 RS-485 connections  |              |
| Firmware Version<br>(Subject to change without prior notice) | BX63-126_AC_DSP_V0100.HEX   |              |
|  | BX63-126_AC_COMM_V0100.HEX  |              |
|  | BX63-126_AC_BMS_V0100.HEX   |              |

| Model                               |       | BX6.3_AC100                      | BX12.6_AC100 |
|-------------------------------------|-------|----------------------------------|--------------|
| <b>REGULATIONS &amp; DIRECTIVES</b> |       |                                  |              |
| CE conformity                       |       | Yes                              |              |
| Grid interface                      |       | AS/NZS 4777.2 :2015              |              |
| Emission                            |       | EN 61000-6-3                     |              |
| Harmonics                           |       | EN 61000-3-2                     |              |
| Variations and flicker              |       | EN 61000-3-3                     |              |
| Immunity                            |       | EN 61000-6-2                     |              |
| Immunity                            | ESD   | IEC 61000-4-2                    |              |
|                                     | RS    | IEC 61000-4-3                    |              |
|                                     | EFT   | IEC 61000-4-4                    |              |
|                                     | Surge | IEC 61000-4-5                    |              |
|                                     | CS    | IEC 61000-4-6                    |              |
|                                     | PFMF  | IEC 61000-4-8                    |              |
| Electrical safety                   |       | IEC 62619:2017, IEC 62040-1:2017 |              |

**Table 9-2 : Specifications for BX6.3\_EX100**

| Model                        | BX6.3_EX100              |
|------------------------------|--------------------------|
| Type                         | Li-ion                   |
| Battery Module               | Samsung SDI 41J (21700)  |
| Nominal Battery Capacity     | 6.3 kWh                  |
| Usable Battery Capacity      | 6.17 kWh                 |
| Typical Voltage              | DC 200 V                 |
| Voltage Range                | DC 175 - 228 V           |
| Min Output Voltage           | DC 175V                  |
| Max Output Voltage           | DC 228V                  |
| Depth of Discharge (DoD)     | 98%                      |
| Rated DC Power               | 3000VA                   |
| Max Charge/Discharge Current | 25A                      |
| Dimensions (W x H x D)       | 520 × 600 × 230 mm       |
| Operating temperature        | -10°C ~ 45°C             |
| Weight                       | 60 kg                    |
| Environmental category       | Indoor / Outdoor         |
| Protection degree            | IP65 (Electronics)       |
| Relative humidity            | 0% – 95% non-condensing. |

# Model Listing

| Model   | Inverter           | Battery            | Wi-Fi              |
|---|--------------------|--------------------|--------------------|
| <b>BX6.3_AC100</b>  | ●<br>(BX6.3_AC100) |                    | ●<br>(BX6.3_AC100) |
| <b>BX12.6_AC100</b><br>(BX6.3_AC100 associated with BX6.3_EX100 ) | ●<br>(BX6.3_AC100) | ●<br>(BX6.3_EX100) | ●<br>(BX6.3_AC100) |
| <b>BX6.3_AC101</b>  | ●<br>(BX6.3_AC101) |                    |                    |
| <b>BX12.6_AC101</b><br>(BX6.3_AC101 associated with BX6.3_EX100 ) | ●<br>(BX6.3_AC101) | ●<br>(BX6.3_EX100) |                    |
| <b>BX6.3_EX100*</b>   |                    | ●<br>(BX6.3_EX100) |                    |

\* BX6.3\_EX100 can only be used with the BX6.3\_AC100 / BX6.3\_AC101.

