

A1-ESS-G2 SYSTEM

(A1-BI-200-G2)

Installation Guide

Version 6.0

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Updated "8.1 Overview of All Electrical Wiring Methods" (Added the wiring instructions and requirements for communication cables)

Updated the warranty information

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Added the contact information

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Updated "3.3 Specification of Backup Interface" (Added 208V grid)

Updated "9.3 Make Communication Connection" (Updated the QR code for BI CT configuration manual)

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Updated "3.1 Specification of A1-HYB-G2 Inverter" (Added 208V grid)

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Initial release

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1 About this Manual

1.1 Scope of Validity

This manual is an integral part of the A1-ESS-G2 system including A1-HYB-G2 series / A1-AC-G2 series / A1-SMT-G2 series inverter, battery and BI. It describes the assembly, installation, commissioning and maintenance. Please read it carefully before operating. Store this manual where it will be accessible at all times.
The installation and instructions in this manual will take A1-ESS-G2 system including A1-HYB-G2 series inverter, battery and BI as an example.

⚠ WARNING!

- Save these instructions-This manual contains important instructions for the A1-ESS-G2 system that shall be followed during installation of the system.

1.2 Target Group

This manual is for qualified electricians. The tasks described in this manual should only be performed by qualified electricians.

1.3 Symbols Used

The symbols that may be found in this manual are defined as follows.

Symbol	Description
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION!	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, device damage, power generation loss or unanticipated results.
NOTICE!	Provides tips for the optimal operation of the product.

1.4 About A1-ESS-G2 System

A1-HYB-G2 series inverter is transformerless type without galvanic isolation. It is designed and certified to fulfill the directives of ANSI/NFPA 70, NEC 690.41, UL 1741, UL 1741 SA, IEEE 1547 and IEEE 1547.1. The inverter converts the DC power generated by PV strings into AC power and stores the energy into the battery bank or feeds the power into the power grid. With the device, you have acquired the system that can be used to power critical loads during a grid outage by using a battery and realize automatic transfer from grid connection mode to off grid mode or from off grid mode to grid connection model by using backup interface (BI). The inverter also has the ability to use power generated from PV arrays along with other string inverter.

A1-HYB-G2 series
The A1-HYB-G2 series inverter manages battery and system energy.

PV Array
The PV array works in MPPT mode. For 3.8 kW, 5.0 kW and 6.0 kW inverter, the number of PV string is two. For 7.6 kW inverter, the number of PV string is three.

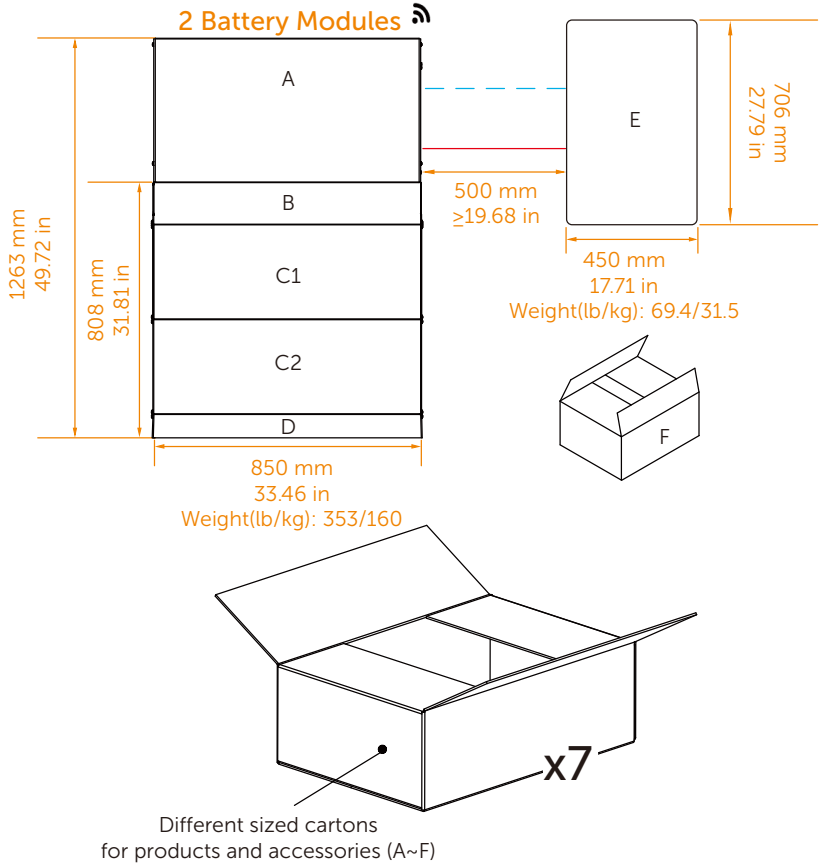
RSD
The RSD provides an automatic disconnect of residential or small commercial PV systems, fully compliant with the rapid shutdown requirements of National Electric Code (NEC), ANSI / NFPA 70 Sections 690.12.

Battery (Optional)
The A1-HYB-G2 series inverter should be coupled a high voltage battery. The battery communicate with inverter via BMS and must comply with the specification of UL 1973.

Backup Interface (Optional)
The backup interface supports multi-inverter parallel connection, controls disconnection of house loads from the grid in case of a power outage and integrates the energy meter, microgrid interconnection device and generator to enable grid-tied solar backup.

SolaXCloud
SolaXCloud is an intelligent, multifunctional monitoring platform that can be accessed either remotely or through a hard wired connection. With the SolaXCloud, the operators and installers can always view key and up to date data.

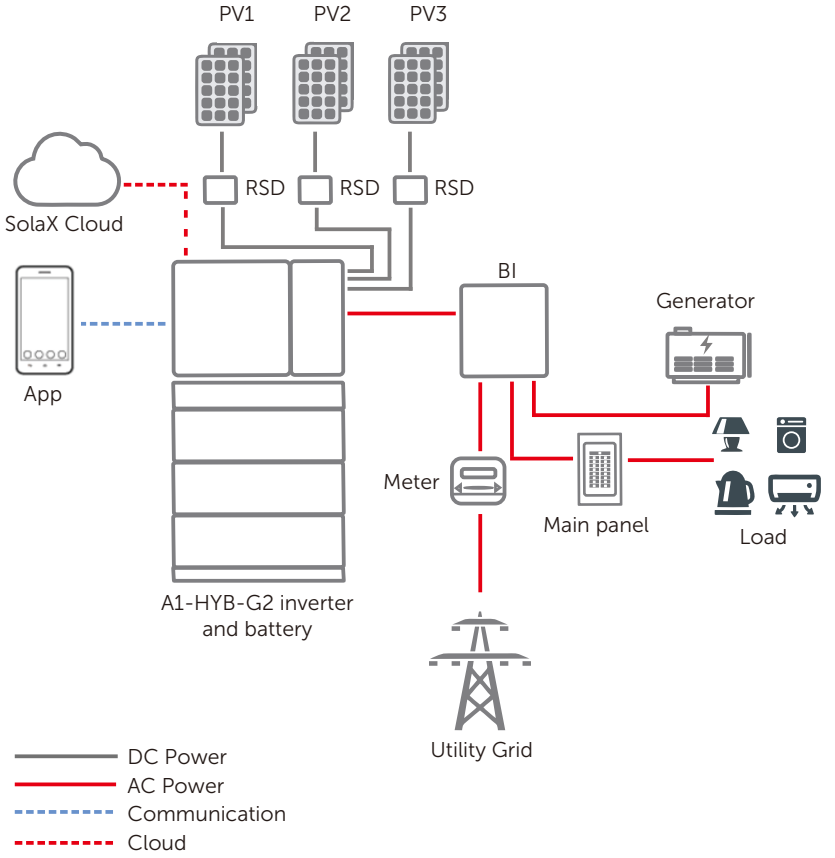
A1-ESS-G2 System and corresponding cartons



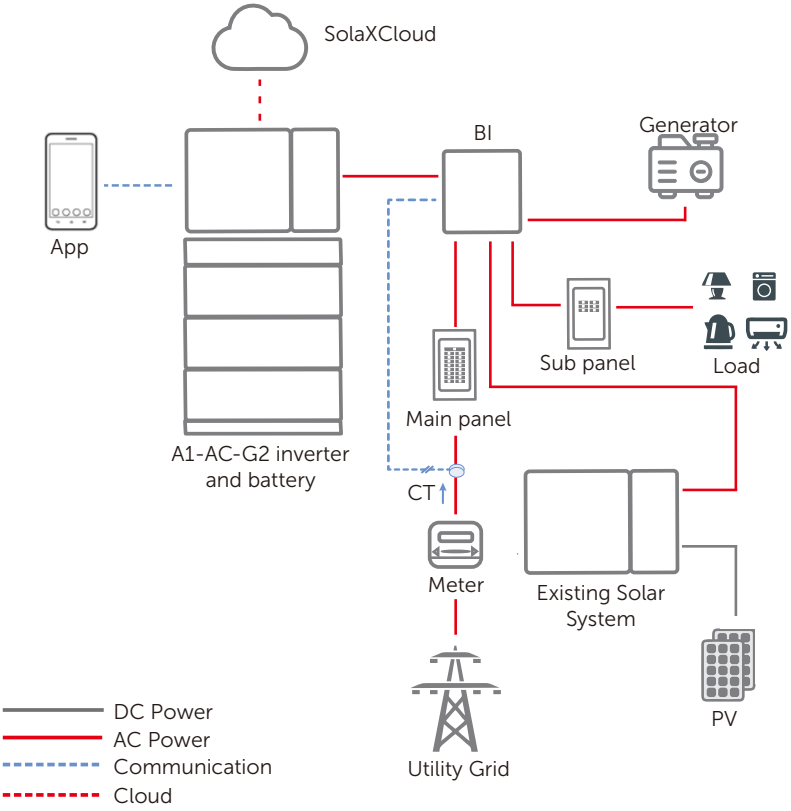
A	Inverter
B	TBMS-MSC60060
C1	Rechargeable Li-ion Battery Module TP-HS50/5kWh
C2	Rechargeable Li-ion Battery Module TP-HS50/5kWh
D	Base for TP-HS50 Battery
E	Backup Interface (referred to as BI)
F	All Accessories Required for Two Installation Modes (T50 Battery)

1.4.1 System Overview

System overview of A1-HYB-G2



System overview of A1-AC-G2



1.4.2 Solutions

- Whole home backup solution
  Up to 4 A1-HYB-G2 series inverter parallel
  Up to 4 battery modules stackable per inverter
  Homeowners are automatically provided with backup power in the event of grid interruption to whole home loads.

- Partial home backup solution
  Up to 4 A1-HYB-G2 series inverter parallel
  Up to 4 battery modules stackable per inverter
  Homeowners are automatically provided with backup power in the event of grid interruption to selected loads.

- Whole home backup solution with microgrid system
  Up to 4 A1-AC-G2 series inverter parallel
  Up to 4 battery modules stackable per inverter
  Friendly with existing PV system
  Homeowners are automatically provided with backup power in the event of grid interruption to whole home loads.

- Partial home backup solution with microgrid system
  Up to 4 A1-AC-G2 series inverter parallel
  Up to 4 battery modules stackable per inverter
  Friendly with existing PV system
  Homeowners are automatically provided with backup power in the event of grid interruption to selected loads.

2 Safety

2.1 General Safety Instructions

This manual contains important instructions for A1-HYB-G2 series inverter that should be followed during installation and maintenance for the inverter.
A1-HYB-G2 series inverter is designed and tested to meet all applicable North American and International safety standards. However, like all electrical and electronic equipment, safety precautions must be observed and followed during installation and operation of the A1-HYB-G2 series inverter to reduce the risk of personal injury and to ensure a safe installation.
Installation, commissioning, service, and maintenance of A1-HYB-G2 series inverter must only be performed by authorized personnel that are licensed and / or satisfy state and local jurisdiction regulations.
Before starting installation or commissioning, read the entire manual carefully to ensure correct and safe installation or commissioning. And keep the user manual in a safe place.
All US electrical installations must comply and be in accordance with all the state, local, utility regulations, and National Electrical Code ANSI/NFPA 70.

2.2 Important Safety Instructions

WARNING!

- This document does not replace and is not intended to replace any local, state, provincial, including without limitation applicable in the jurisdiction of installation. SolaX assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

DANGER!

Danger to life due to high voltages in the product!

- Before installing or using the product, read all the instructions, cautions, and warnings in this manual. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury or death, or may damage the product.
- Before connecting the product to the electrical utility grid, contact the local utility company.
- All work must be carried out by a qualified electrician. Children should be supervised to ensure that they do not play with the appliance.

WARNING!

- Do not install the system in a corrosive environment where it may be exposed to ammonia, corrosive gases, acids, or salts (eg: chemical plant, fertilizer storage areas, tanneries, near volcanic ash eruption).

WARNING!

- Do not disassemble any parts of the product which are not mentioned in the installation guide. It contains no user-serviceable parts. See warranty for instructions on obtaining service. Attempting to service the device by yourself may result in a risk of electric shock or fire and will void your warranty.

WARNING!

- The inverter input and output circuits are isolated from the enclosure. This system does not include an isolation transformer and should be installed with an ungrounded PV array in accordance with the requirements of ANSI / NFPA 70, NEC 690.41.
- Equipment grounding is the responsibility of the installer and must be performed in accordance with all applicable Local and National Codes.

WARNING!

- Before operating the inverter, ensure that the inverter is grounded properly. This product must be connected to a grounded, metal, permanent wiring system, or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the product.

WARNING!

- When a ground fault is indicated, normally grounded conductors may be ungrounded and energized or normally ungrounded conductors may be grounded.

WARNING!

- Do not operate the device when the device is running.

CAUTION!

- Only accessories shipped with the product are recommended to use. Using other accessories may result in a fire or injury to the user.

CAUTION!

Possible damage to health as a result of the effects of radiation!
- Do not stay closer than 7.87 in / 20 cm to system for a long time.

CAUTION!

Danger of burn injuries due to hot enclosure parts!
- During operation, the enclosure may become hot.

CAUTION!

Risk of electric shock from energy stored in the capacitor.
- Never operate on the inverter couplers, the Mains cables, battery cables, and PV cables when power is applied. After switching off the PV, battery and Mains, always wait for 5 minutes to fully discharge the intermediate circuit capacitors discharge before unplugging DC, battery and Mains couplers.

CAUTION!

- A1-HYB-G2 series only supports a certain type of lithium-ion battery (Manufacturer certified battery)!

WARNING!

- Do not expose system to ambient temperatures above 140°F (60°C) or below -13°F (-25°C).

WARNING!

- Do not attempt to open, disassemble, repair, tamper with or modify the product. The product and its components are not user serviceable.

Battery safety instructions

A1-HYB-G2 Series inverter should be coupled with a high voltage battery.
The battery must comply with UL 1973 and must be SolaX certified.
As accumulator batteries may contain potential electric shock and short-circuit current dangers, to avoid accidents that might be thus resulted, the following warnings should be observed during battery replacement:

- Risks of explosion:

Do not subject the battery module to heavy impacts.
Do not crush or puncture the battery module.
Do not dispose of the battery module in a fire.

- Risks of fire:

Do not expose the battery module to temperatures in excess of 140°F.
Do not place the battery module near a heat source, such as a fireplace.
Do not expose the battery module 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 module.
Do not touch the battery module with wet hands.
Do not expose the battery module to moisture or liquids.
Keep the battery module away from children and animals.

- Risks of damage to the battery module:

Do not expose the battery module to liquids.
Do not subject the battery module to high pressures.
Do not place any objects on top of the battery module.

3 Specification

3.1 Specification of A1-HYB-G2 Inverter

- PV Input

Model	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
Max.recommended PV power [W]	7600	10000	10000	15200
Max.MPPT power [W]	5700	7500	9000	11400
Max.DC voltage [V]	550			
Norminal DC operating voltage [V]	360			
Max. input current [A]	A:16/B:16			A:16/B:16/C:16
Max. short circuit current [A]	A:20/B:20			A:20/B:20/C:20
MPPT voltage range [V]	90–500			
MPPT voltage range [V](full load)	176–500	232–500	278–500	235–500
Start input voltage [V]	120			
No. of MPP trackers	2			3
Strings per MPP tracker	A:1/B:1			A:1/B:1/C:1
DC disconnection switch	Yes			
AFCI	Yes			
Max. inverter backfeed current to the array [A]	27 A rms / 1 cycle, 400 A peak / 0.02 ms			

- AC Input/Output

Model	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
Norminal AC power [VA]	3307/3816	4347/5016	5200/6000	6594/7608
Max. apparent AC power [VA]	3307/3816	4347/5016	5200/6000	6594/7608
Rated grid voltage [V]	208/240			
Rated grid Frequency [Hz]	50/60			
Norminal AC current [A]	15.9	20.9	25	31.7
Max. Output Continuous current [A]	15.9	20.9	25	31.7

Model	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
Maximum output fault current and duration [A/ms]	48/90			
Maximum output fault peak current and duration [A/ms]	515/5			
Displacement power factor	0.8 leading to 0.8 lagging			
Total harmonic distortion (THD, rated power)	<3%			
Parallel operation	Yes			
Maximum output overcurrent protection [A/P]	20/2	25/2	30/2	40/2

• General Data

Model	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
Dimensions (WxHxD) [in/mm] ①	33.5 × 17.9 × 5.8 / 850 × 455 × 148			
Weight [lb/Kg] ①	75 / 34			
Cooling concept	Natural convection with internal fan			
Topology	Transformerless			
Communication	RS485, CAN, WiFi (optional) / 4G (optional), Dry Contact			
Revenue Grade Data, ANSIC12.20	0.5% revenue grade (optional)			

Note:

① : The Dimensions and Weight data is for an inverter containing a metal cover.

• Battery Input/Output

Model	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
Battery type	Lithium (LFP)			
Input/output voltage range [V]	75–450			
Rated input/output voltage [V]	150			
Maximum input power [W]	4060	5336	6383	8094
Maximum output power [W]	3816	5016	6000	7600
Maximum Input/output current [A]	54			
Reverse-Polarity Protection	Yes			
Cycle efficiency charging to discharging (PCS Only)	88.5%	90.5%	91.5%	92.5%

- Efficiency, Power Consumption and Standard

Model	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
CEC Weighted Efficiency (PV to GRID)	97.5%			
Maximum Inverter Efficiency	98.0%			
Power consumption				
Internal consumption(night) [W]	<3			
Standard				
Safety and Certifications	UL 1741, UL 1741 SA, UL 1741 SB, UL 1741 PCS, UL 1699B, UL 1998, UL 991, CSA C22.2 No.107.1-16, CSA C22.2 No.292-18, CSA C22.2 No.330-17, IEEE Std 1547-2018, IEEE 1547-2019, IEEE Std 1547.1-2020, Rule 21, HECO SRD V2.0			
EMC	FCC part 15 class B			
RoHS	Yes			

- Environment Limit

Environment limit	A1-HYB-3.8K-G2	A1-HYB-5.0K-G2	A1-HYB-6.0K-G2	A1-HYB-7.6K-G2
Protection class	NEMA 4X			
Operating Temperature Range [°F (°C)]	-13 to +140 (-25 to +60)			
De-rating start temperature [°F (°C)]	113 (45) or above			
Storage temperature Range [°F (°C)]	-13 to +167 (-25 to +75)			
Humidity	0%-95% RH			
Altitude [ft (m)]	9843 (3000) MAX			
Noise emission(typical) [dBA]	< 30			
Overvoltage category	IV (electric supply side), II (PV side)			

3.2 Specification of Battery

Model	T-BAT H 10.0	T-BAT H 15.0	T-BAT H 20.0
Nominal Voltage (Vdc)	102.4	153.6	204.8
Operating Voltage (Vdc)	90-116	135-174	180-232
Nominal Capacity (Ah)	100	100	100
Nominal Energy (kWh)	10	15	20
Usable Energy 90% DOD (kWh)	9.2	13.5	18
Max. Charge/Discharge Current (A)	54	54	54

Model	T-BAT H 10.0	T-BAT H 15.0	T-BAT H 20.0
Recommend Charge/Discharge Current (A)		50	
Standard Power (kW)	5.12	7.68	10.24
Max. Power (kW)	5.5	8.3	11.1
Battery Roundtrip Effciency(0.2C,25°C/77°F)		95%	
Expected Lifetime(25°C/77°F)		10 years	
Cycle Life90% DOD(25°C/77°F)		6000 cycles	
Charge Temperature		32°F~127.4°F/0°C~53°C	
Discharge Temperature		-14°F~127.4°F/-10°C~53°C	
Storage Temperature		-4°F~86°F/-20°C~30°C (12 months) 86°F~122°F/30°C~50°C (6 months)	
Ingress Protection		IP65	

3.3 Specification of Backup Interface

GRID INPUT	
Nominal AC input voltage [V]	120 / 208, 120 / 240
Nominal AC frequency [Hz]	50 / 60
Maximum continuous AC input current [A]	160
OUTPUT TO MAIN PANEL IN GRID TIED OPERATION	
Nominal AC output voltage [V]	120 / 208, 120 / 240
Maximum continuous AC input current [A]	160
OUTPUT TO MAIN PANEL IN BACKUP OPERATION	
Nominal AC output voltage [V]	120 / 208, 120 / 240
Imbalance compensation in backup operation [VA]	5000
Split phase imbalance output current [A]	41.7
INPUT FROM INVERTER	
Number of Inverter Inputs	4
ESS 1 Max. Continuous Current [A]	160
ESS 2 Max. Continuous Current [A]	100
ESS 3 Max. Continuous Current [A]	100

GENERATOR	
Maximum AC power @240V [W]	15000
Maximum AC power @208V [W]	13104
Maximum continuous input current [A]	63
Auto generator start	Yes
GENERAL	
Dimensions (H × W × D) [in / mm]	27.8 × 17.7 × 5.9 / 706 × 450 × 151
Weight [lb / kg]	69.4 / 31.5
Energy meter accuracy	1%
Communication interfaces	RS485, CAN, Dry Contact
Cooling	Fan
STANDARD	
Safety	UL1741, CSA 22.2 NO.107, UL67, UL869A
Emissions	FCC part 15 Class B
INSTALLATION SPECIFICATIONS	
Altitude [ft / m]	9843 / 3000 MAX
Operating temperature range [°F / °C]	–13 to +140 / –25 to +60
Protection class	NEMA 3R
Typical noise emission [dB]	< 50

4 Site Requirements and Pre-installation Guidance

4.1 Physical Requirements

The installation of A1-ESS-G2 system including A1-HYB-G2 inverter, battery and BI must be done in accordance with local codes and the National Electric Code (NEC).

The whole system requires adequate clearance for the installation, cabling or conduit and airflow. Do not install anything above each unit that limits access to the unit or that might fall and damage the unit. Do not mount each unit upside down.

The inverter and battery in the system can be wall-mounted or floor-mounted.
The BI in the system can be wall-mounted and installed on the right side of inverter. It needs to be configured for cable entry at the bottom and sides of the enclosure.

Each unit has mounting bracket to support it. Mounting requirements based on wall type are provided in "7.1 Overview of Installation Schemes".

4.2 Dimensions of the System

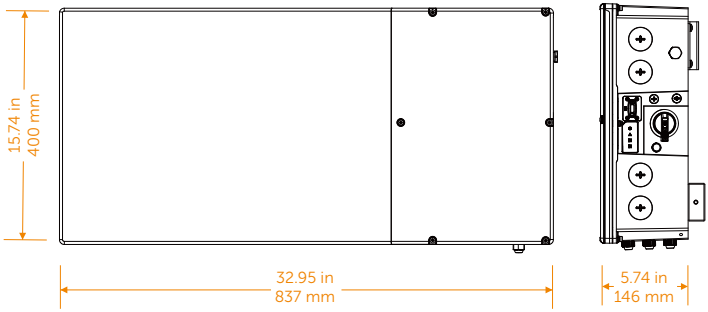


Figure 4-1 Dimensions of inverter

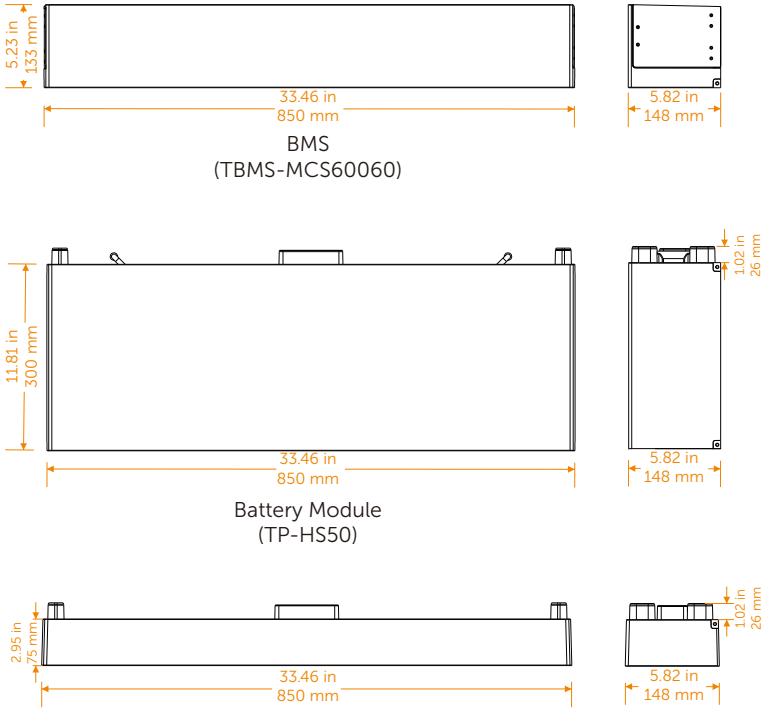


Figure 4-2 Dimensions of battery

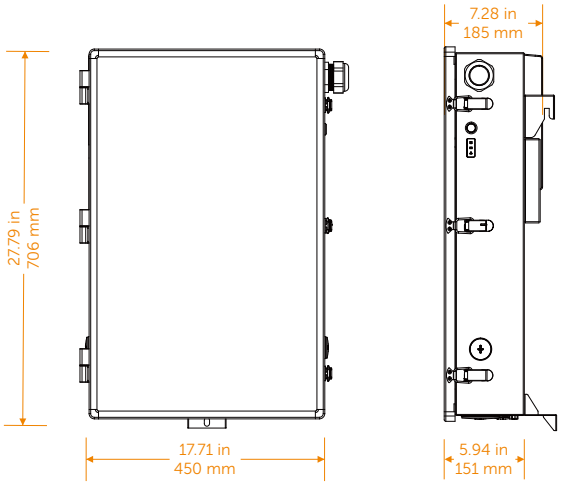
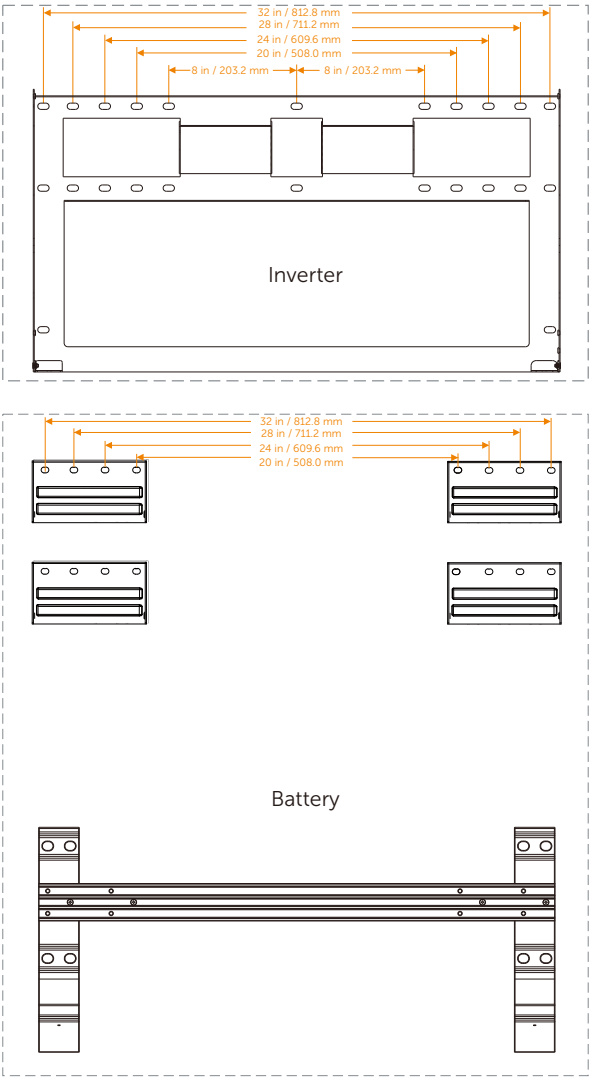


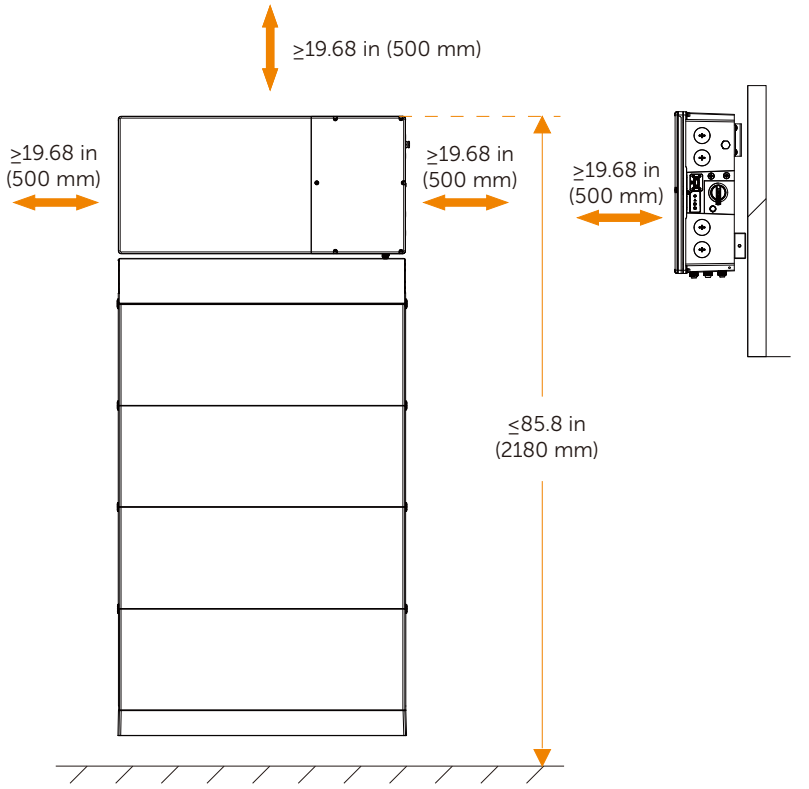
Figure 4-3 Dimensions of BI

4.3 Installation Space Requirement

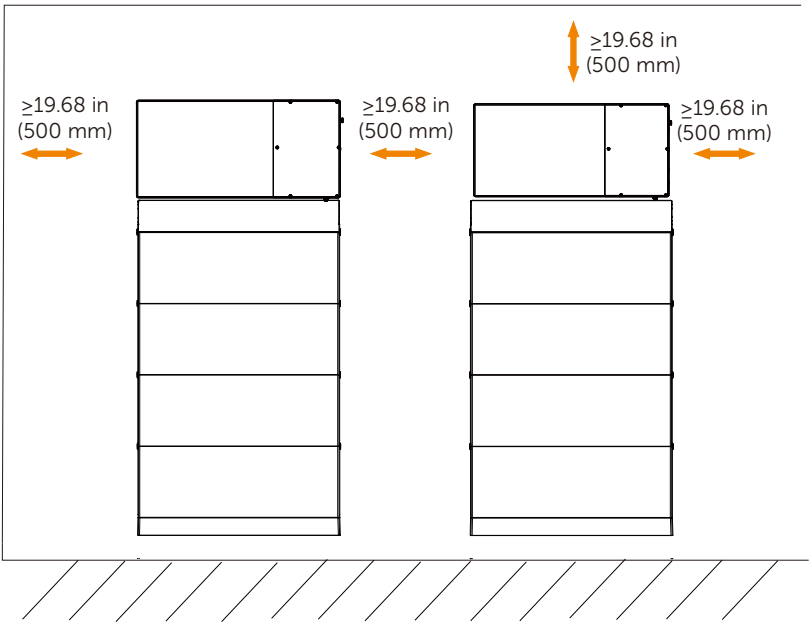
Inverter and battery space requirement



To ensure good heat dissipation and convenient disassembly of the inverter and battery, the minimum clearance around the inverter and battery shall not be less than the following values, as shown below. The height above the ground marked below is recommended assuming that four BATs are installed with floor-mounting.



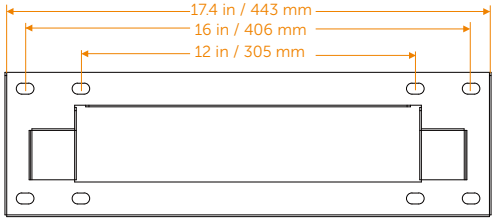
For multi-inverter installation, please reserve the space of 19.68 inch (500 mm) at least between each left and right inverter and at least 19.68 inch (500 mm) distance from the ceiling . If multiple inverter are mounted in areas with high ambient temperatures, increase the clearances between the inverter and batteries and ensure an adequate fresh-air supply if possible.



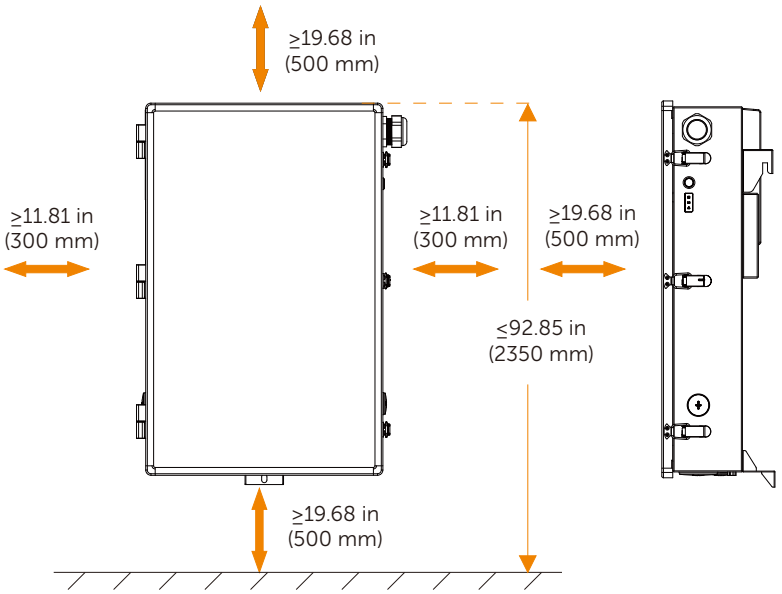
NOTICE!

- In case of wall-mounting, the distance from base to ground is decided according to the local regulations.

BI space requirement



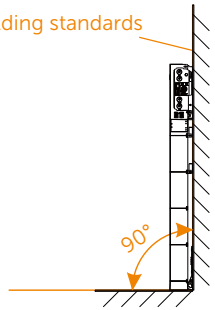
To ensure good heat dissipation and convenient disassembly of the BI, the minimum clearance around the BI shall not be less than the following values, as shown below.



Mounting bracket anchoring details

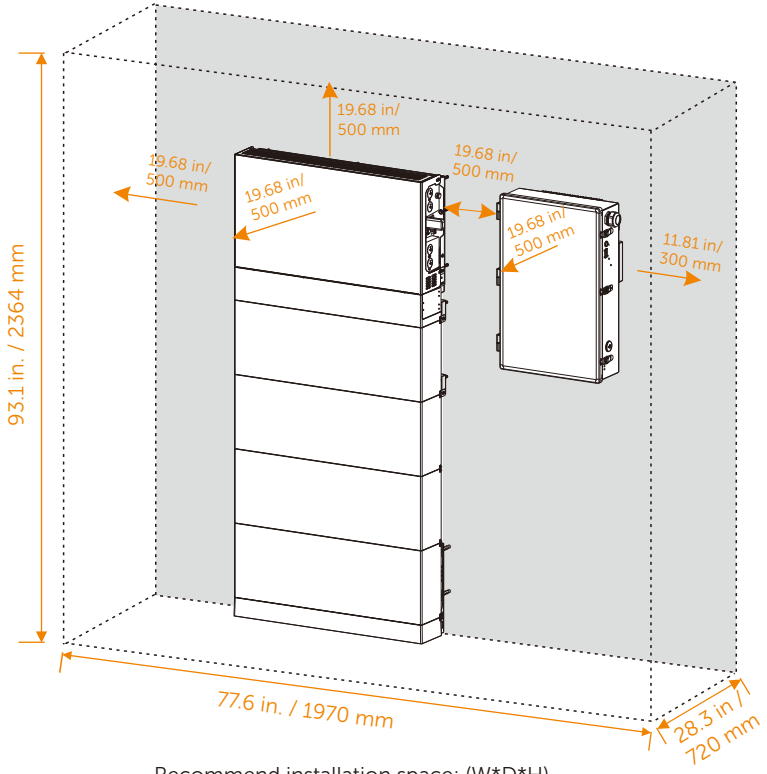
Please refer to the local building codes for actual anchoring conditions.

The following are the specification requirements for wall flatness and perpendicularity.



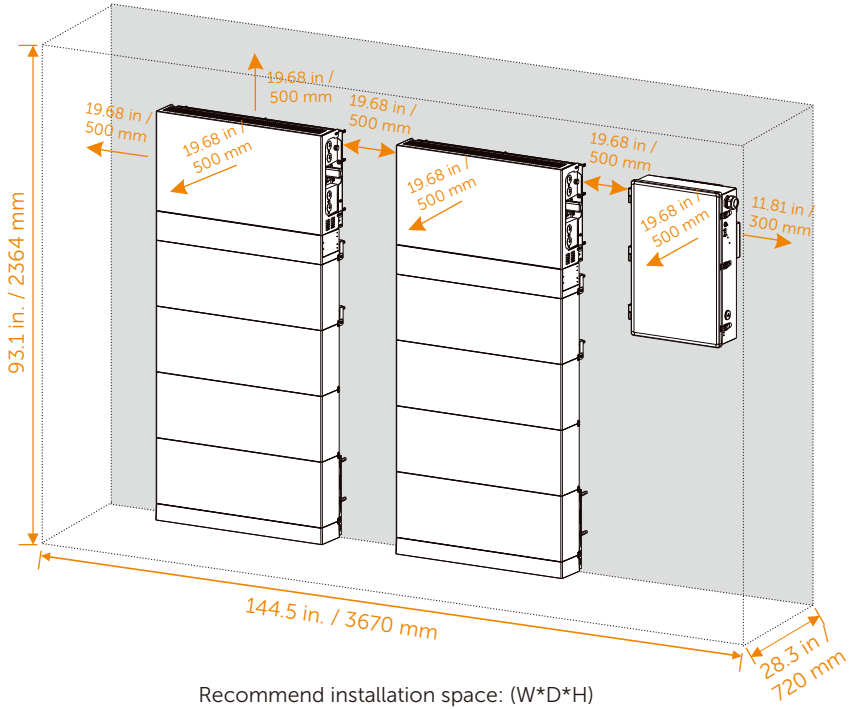
Recommended installation space

Example for single inverter installation:



Recommend installation space: (W*D*H)
77.6 in. * 28.3 in. * 93.1 in. /
1970 mm * 720 mm * 2364 mm

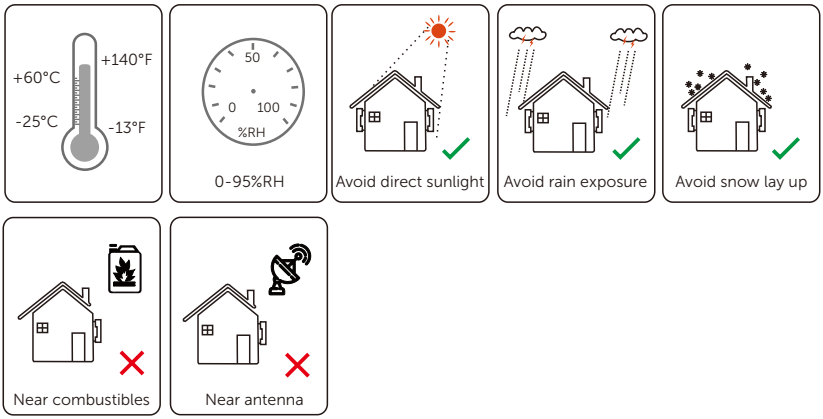
Example for multi-inverter installation:



Recommend installation space: (W*D*H)
144.5 in. * 28.3 in. * 93.1 in. /
3670 mm * 720 mm * 2364 mm

4.4 Installation Environment Requirement

- Not be exposed to glare.
- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not near the television antenna or antenna cable.
- Not higher than altitude of about 9843 ft (3000 m) above sea level.
- Not in environment of precipitation.
- Be sure the ventilation is good enough.
- The ambient temperature in the range of –13°F (-25°C) to +140°F (+60°C).
- Flatness meets local building standards.
- Avoid direct sunlight, rain exposure, snow laying up during installing and operating.



NOTICE!

- For outdoor installation, precautions against direct sunlight, rain exposure and snow accumulation are recommended.
- Exposure to direct sunlight raises the temperature inside the device. This temperature rise poses no safety risks, but may impact the device performance.

5 Preparation before Installation

A1-ESS-G2 is 100% tested and packaged and visually inspected before leaving our manufacturing facility. Please make sure the inverter is intact during transportation. If there are some visible damages, such as cracks, please contact your dealer immediately.
Open the package and fetch out the product, firstly check the accessories. The packing list shows as below.

DANGER!

- Before installation, please make sure the breaker of battery is in "OFF" position. During installation, make sure the battery terminal is not short-circuited.

5.1 Packing List of Inverter



Inverter



Metal cover



Bracket

A



8-pin female terminal block with terminating resistor

B



Grounding terminal

C D



M5 x L10 screw
10 AWG ferrules

E



Fixing plate of cover

F

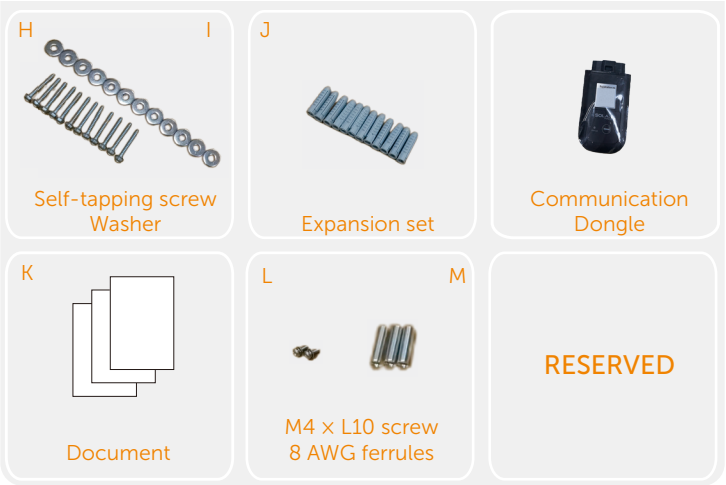


Cable protective guard

G



PE cable



Item	Name	Quantity	Description
/	Inverter	1 pc	Product
/	Metal cover	1 pc	Protect the inverter
/	Bracket	1 pc	Support the inverter
A	8-pin female terminal block with terminating resistor	1 pc	Additional 8-pin female terminal block with terminating resistor
B	Grounding terminal	5 pcs	For grounding
C	M5XL10 screw	10 pcs	Fix the cover, cable protective guard and cover fixing plate
D	10 AWG ferrules	6 pcs	For PV cable
E	Fixing plate of cover	2 pcs	Connect the cover and the bracket
F	Cable protective guard	1 pc	Protect the cable between inverter and BMS
G	PE cable	1 pc	Grounding conductor between inverter and BMS
H	Self-tapping screw	12 pcs	Fix the bracket
I	Washer	12 pcs	Fix the bracket
J	Expansion set	12 pcs	Fix the bracket
/	Communication Dongle	1 pc	For communication
K	Document	/	Guide the installation
L	M4XL10 screw	2 pcs	Fix the fixing plate between inverter bracket and BMS
M	8 AWG ferrules	3 pcs	For AC cable

5.2 Packing List of Battery

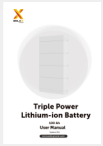
BMS (TBMS-MCS60060)

Hereinafter referred to as "MCS60060"



BMS ×1

A



Document

Battery Module (TP-HS50)

Hereinafter referred to as "TP-HS50"



Battery module

A



Wall bracket

A



Wall bracket

B



ST6*55 self-tapping screw

C



Washer

D



Expansion bolt

E



M5*10 phillips-head screw

F



Platen (3 holes)

G



Platen (2 holes)

Item	Name	Quantity	Description
/	Battery module	1 pc	Product
A	Wall bracket	2 pcs	Support battery module to be mounted on the wall
B	ST6*55 self-tapping screw	2 pcs	Fix the bracket
C	Washer	2 pcs	Fix the bracket
D	Expansion bolt	4 pcs	Fix the bracket
E	M5*10 phillips-head screw	10 pcs	Fix the fixing plate
F	Platen (3 holes)	2 pcs	Connect two battery modules with bracket
G	Platen (2 holes)	2 pcs	Connect two battery modules

NOTICE!

- The above-mentioned accessories are only for one battery module.

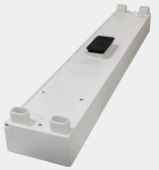
All Accessories Required for Two Installation Modes (T50 Battery)

Hereinafter referred to as "Accessories Required"



Item	Name	Quantity	Description
A	M8*85 expansion screw	6 pcs	Fix the base support in case of concrete wall
B	M5*8 countersunk screw	4 pcs	Fix the transverse plate with base support
C	M5*20 countersunk screw	6 pcs	Fix the two sides of base
D	M8*88 self-tapping screw	6 pcs	Fix the base support in case of wooden wall
E	Washer	6 pcs	Fix the base support in case of wooden wall
F	Adjustment screw	4 pcs	Adjust the base to be leveled
/	Transverse plate	1 pc	Support the base
/	Base support	2 pc	Support the base

Base for TP-HS50 Battery



Base ×1

5.3 Packing List of Backup Interface

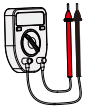


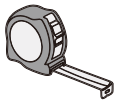
Item	Name	Quantity	Description
/	Backup Inteface	1 pc	Product
/	Bracket	1 pc	Support the BI to be mounted on the wall
/	Perforating paper	1 pc	For hole location
A	Cable tie	12 pcs	Fix the cable
B	Self-tapping screw	5 pcs	Four for fixing the bracket and one for fixing the BI
C	Washer	5 pcs	Four for fixing the bracket and one for fixing the BI
D	Expansion set	5 pcs	Four for fixing the bracket and one for fixing the BI
E	M4*12 cross screw	1 pc	Fix the circuit breaker
F	Communication cable	1 pc	Communicate with inverter
G	Circuit breaker label	1 pc	For attaching to circuit breakers
H	Document	/	Quick installation guide of A1-ESS-G2 System

5.4 Tools Required

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site. Please note that the tools used must comply with local regulations.


Hammer drill
(drill bit: Ø4 mm / Ø10 mm / Ø12 mm)

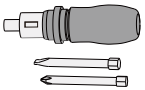

Multimeter
(≥ 1100 V DC)

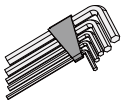

Measuring tape


Utility knife

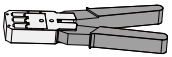

Marker

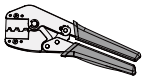

Spirit level

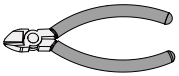

Torque screwdriver
(Flat-head: M2)
(Phillips head: M3/M4/M5)

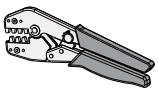

Allen key
(including M5)


Wire stripper

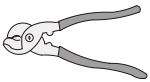

Crimping tool for RJ45

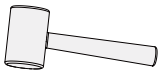

Crimping tool for
PV terminals

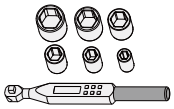

Diagonal pliers


Crimping tool


Crimping tool for ferrules


Wire cutter


Rubber mallet


Torque wrench
(including 16 mm wrench)

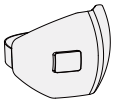

Heat gun


Heat shrink tubing
(Ø6 mm)


Safety gloves


Safety boots


Safety goggles


Anti-dust mask

6 Plan the Installation Site

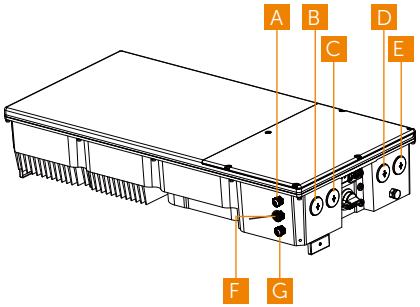
Choose a propriate location

Choose a wall capable of supporting the full weight of inverter, battery and BI. If floor-mounting inverter and battery, choose a level surface adjacent to the below wall.

- Wood studs spaced at 12, 16, 20, 24, 28 and 32 inch
- Steel material of sufficient thickness
- Solid concrete or masonry

Choose cable entry of inverter

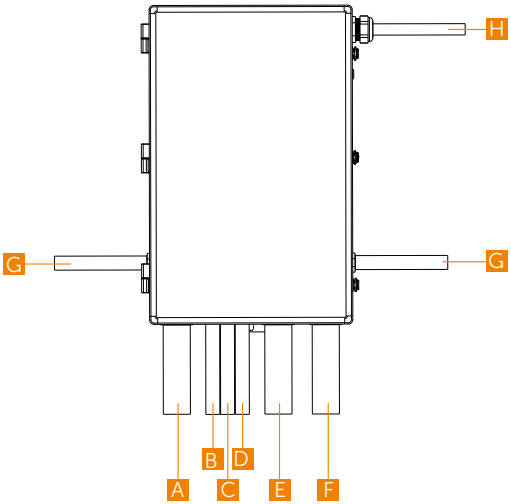
A conduit fitting or cable gland must be used when wiring connection.
For the wiring connection of inverter, the cable is routed from the right side of inverter. Totally four 1 inch openings are available for connecting.



A BAT+
B AC conduit plug
C Inverter communication connection
D PV conduit plugs
E PV conduit plugs
F Battery communication connection
G BAT-

Choose cable entry of BI

A conduit fitting or cable gland must be used when wiring connection.
For the wiring connection of BI, the cable is routed from the bottom and sides of device. Totally three 2 inch (A, E and F), one 3/4 inch (H) and five 1 inch openings are available for connecting.



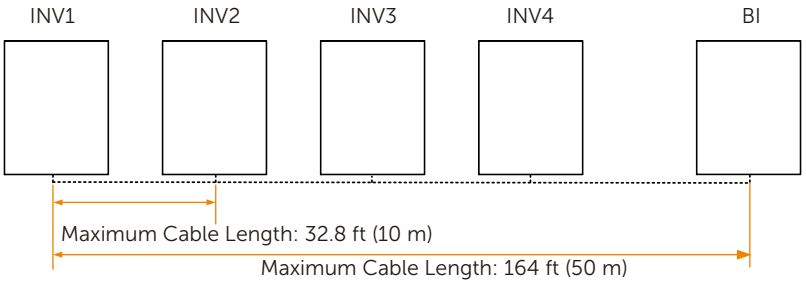
Item	Description
A	ESS plug
B	ESS plug
C	ESS plug
D	Generator plug
E	Backup load plug
F	Grid plug
G	Reserved
H	Communication conduit plug

Plan amount and size of conduit

Calculate the amount and size of conduit needed for the installation, based on filllimits and local code requirements. An adapter may be required between the entry into the wiring compartment and the conduit.

Plan the distance of each unit in the system

The figure below is for maximum distances between each system unit. Wire gauge must meet the local requirements and it changes based on distance. Please refer to "Appendix A: Wiring and Breaker Requirement".



7 Mechanical Installation

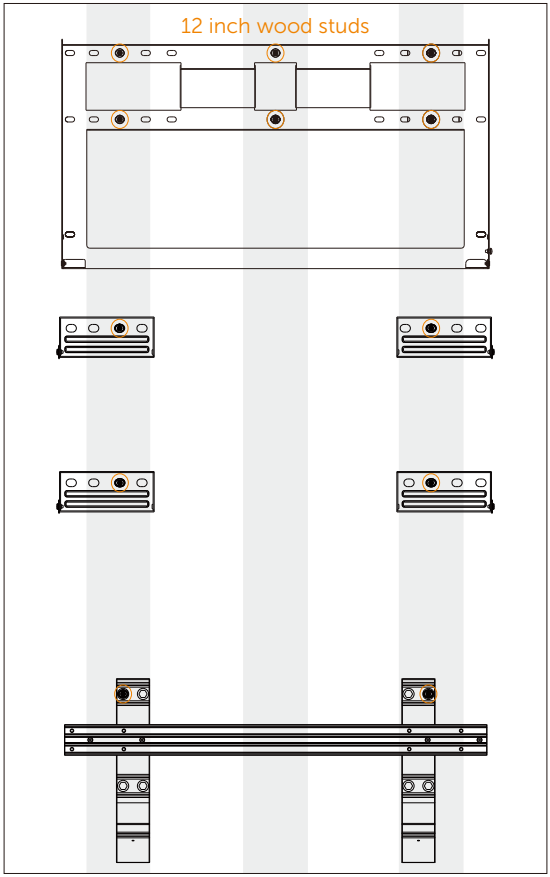
7.1 Overview of Installation Schemes

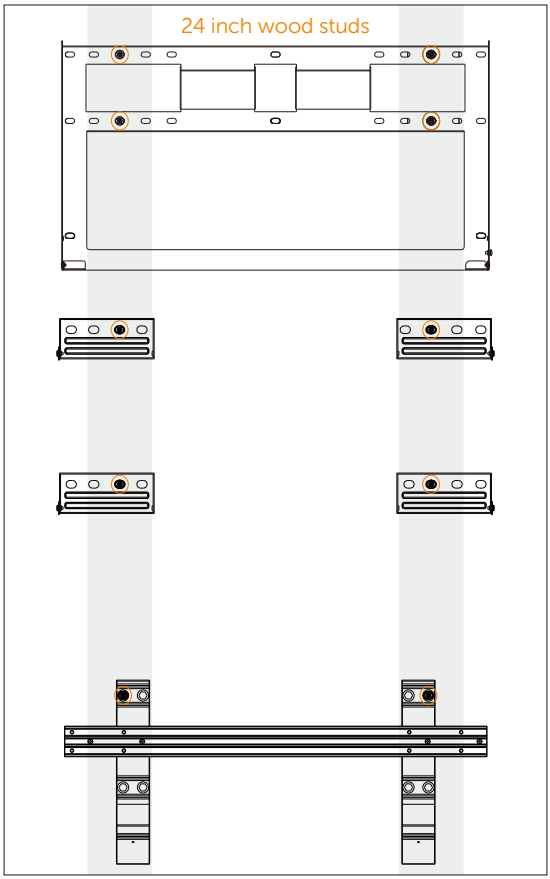
The anchoring details below is demonstrated assuming that four BATs are installed.

Scheme A

Wood Studs (spaced at 12 and 24 inches)

If anchoring directly into wood studs, use at least 8 screws with washers respectively for inverter and battery, of sufficient length into the studs.

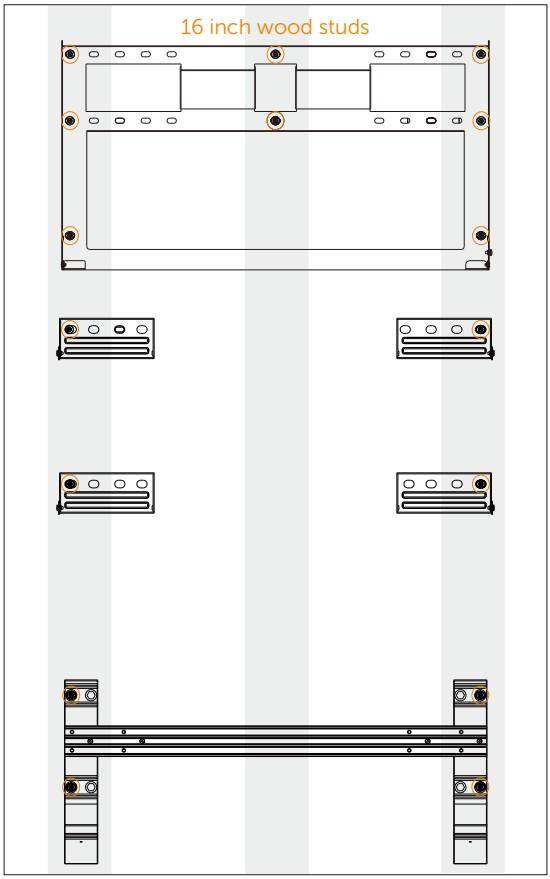


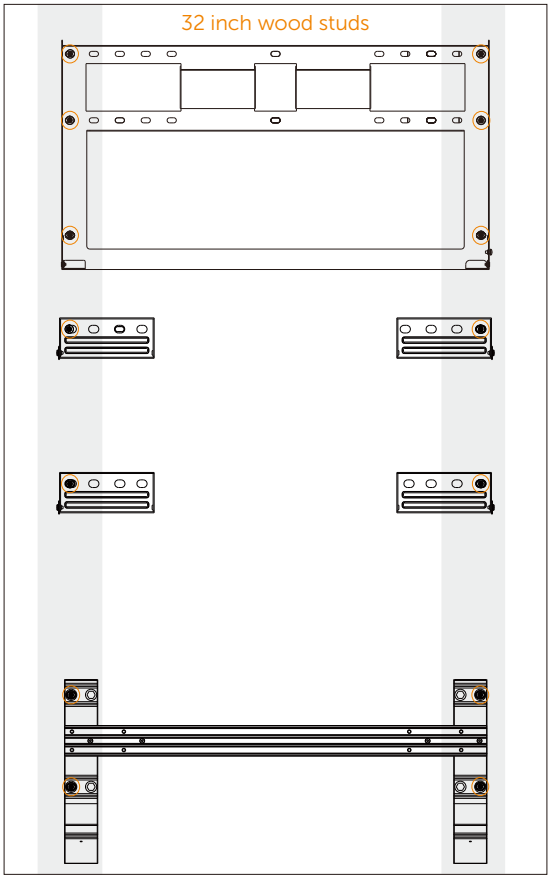

24 inch wood studs

Scheme B

Wood Studs (spaced at 16 and 32 inches)

If anchoring directly into wood studs, use at least 8 screws with washers respectively for inverter and battery, of sufficient length into the studs.

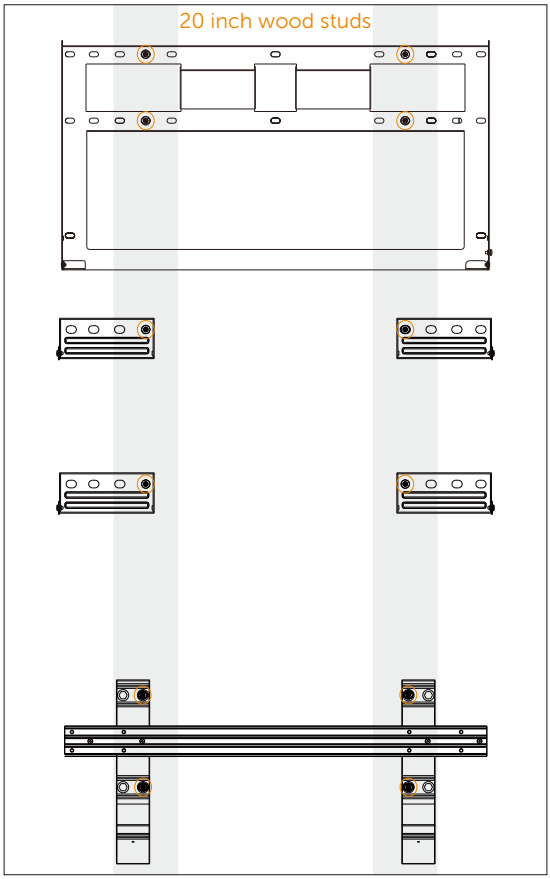



32 inch wood studs

Scheme C

Wood Studs (spaced at 20 inches)

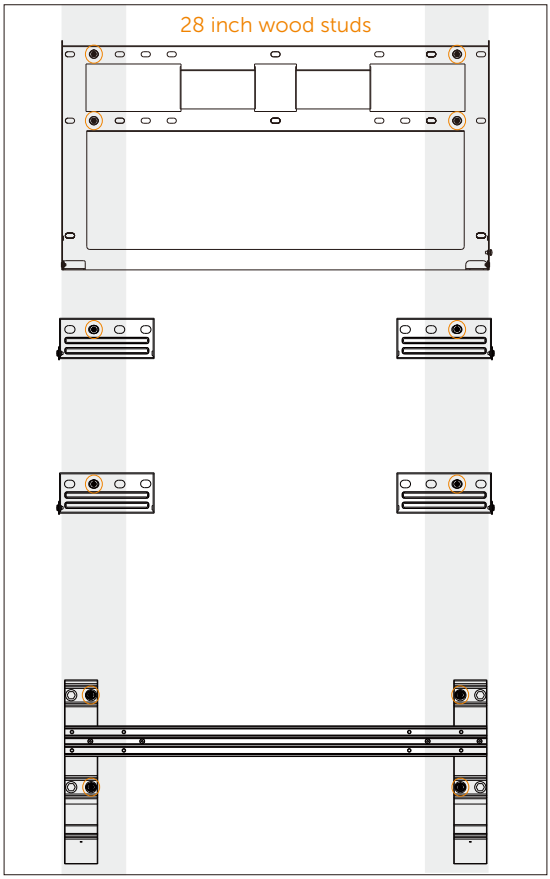
If anchoring directly into wood studs, use at least 8 screws with washers respectively for inverter and battery, of sufficient length into the studs.



Scheme D

Wood Studs (spaced at 28 inches)

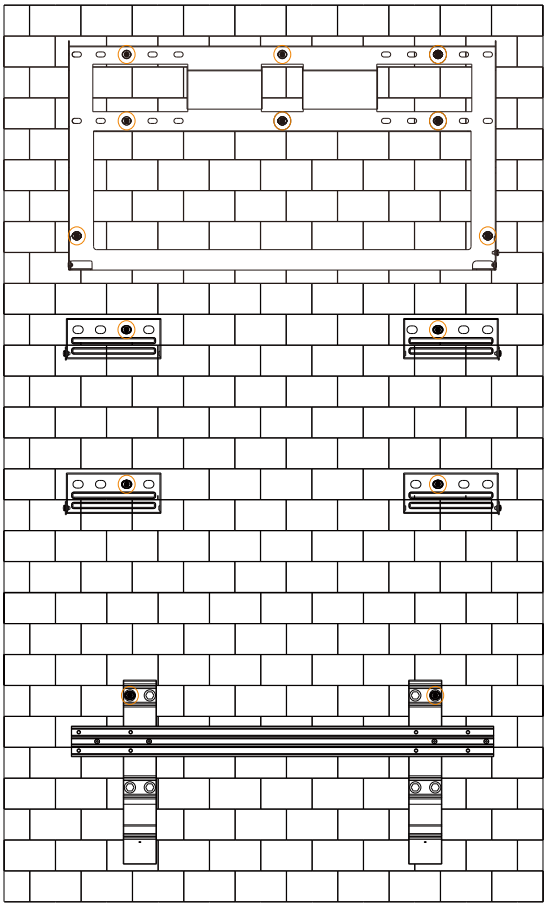
If anchoring directly into wood studs, use at least 8 screws with washers respectively for inverter and battery, of sufficient length into the studs.



Scheme E

Concrete or Masonry

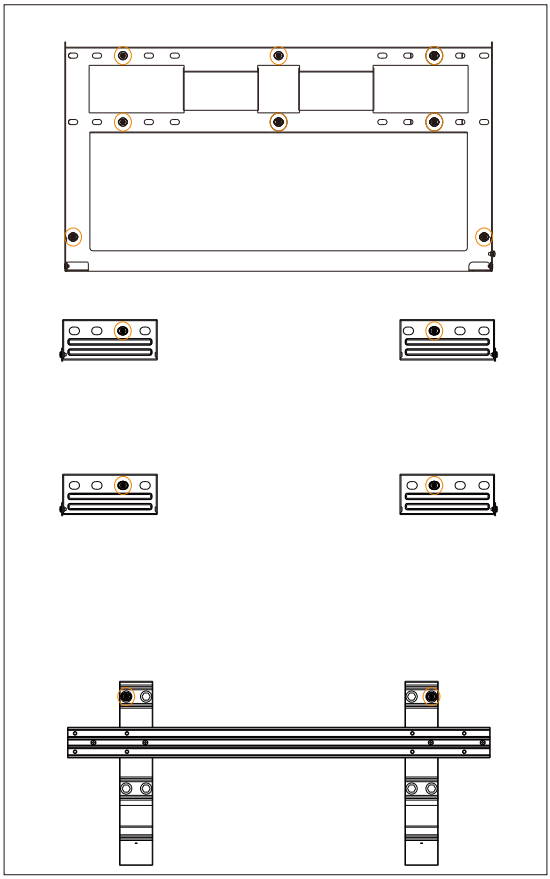
If anchoring to concrete or masonry wall, use 8 screws with washers respectively for inverter and battery and make sure the screws are at least 1.49 in (38 mm) away from the edge of bricks or blocks. Punching holes spaced at 24 inch is recommended.



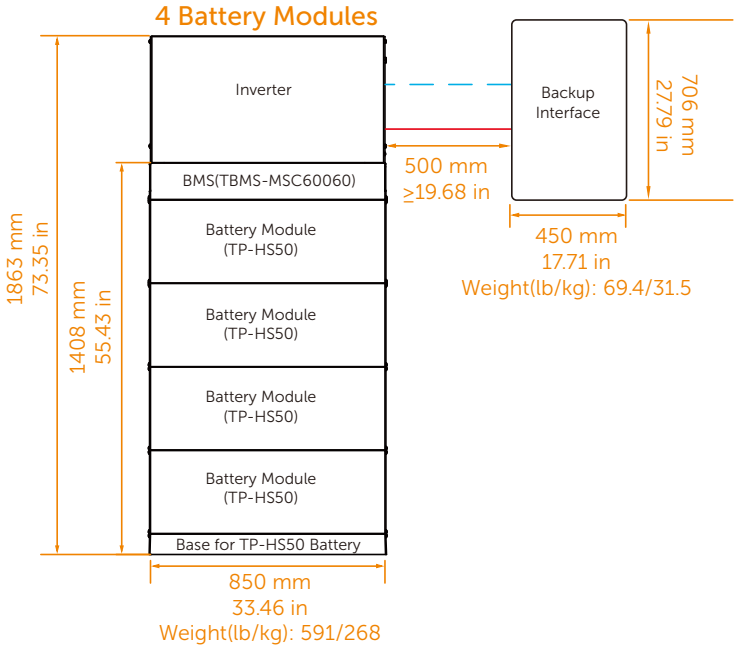
Scheme F

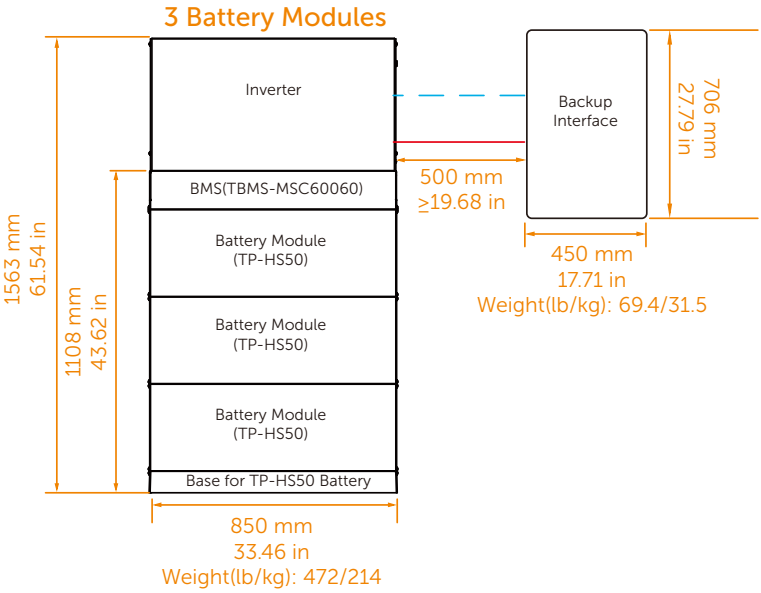
Steel material of sufficient thickness

If anchoring to steel material, use 8 screws with washers respectively for inverter and battery. Punching holes spaced at 24 inch is recommended.



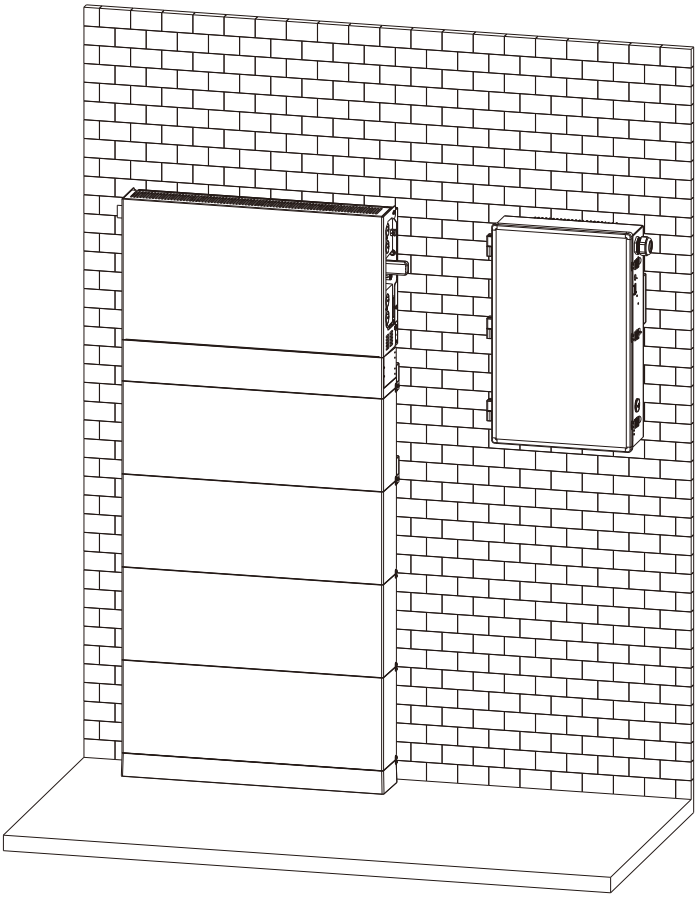
Weight and mounting height instructions





7.2 Installation Methods

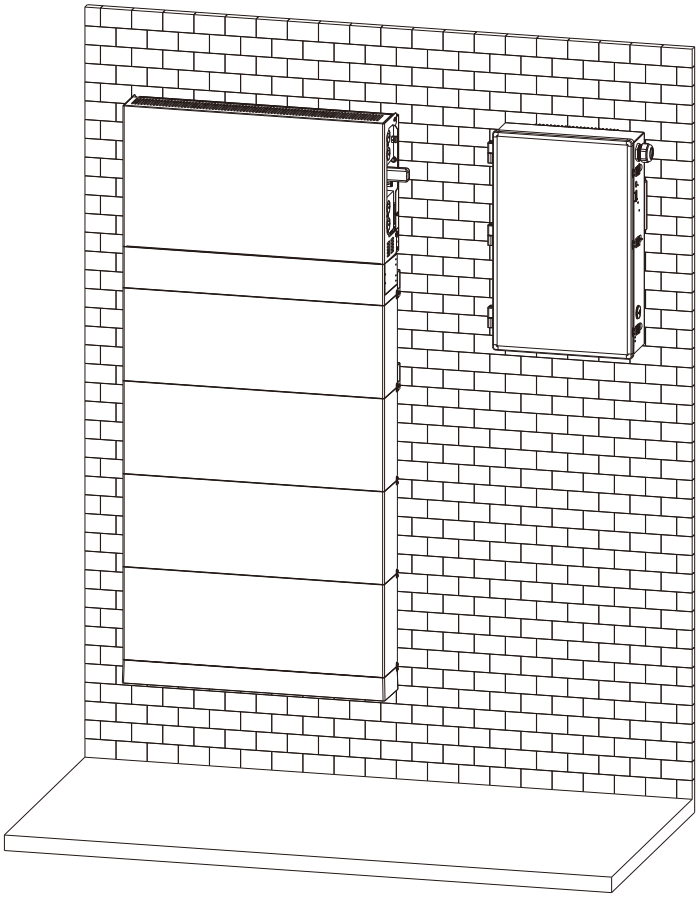
There are two alternative installation methods (wall mounting and floor mounting) and several schemes available for users. For details, please refer to "7.1 Overview of Installation Schemes". The following installation will take Scheme "base+four batterys+BMS+inverter+BI" mounting on the wooden wall with studs spaced at 32 in / 812.8 mm as an example.



Floor-mounting

NOTICE!

- For detailed steps of floor-mounting, please refer to "7.3 Floor-mounting" .



Wall-mounting

NOTICE!

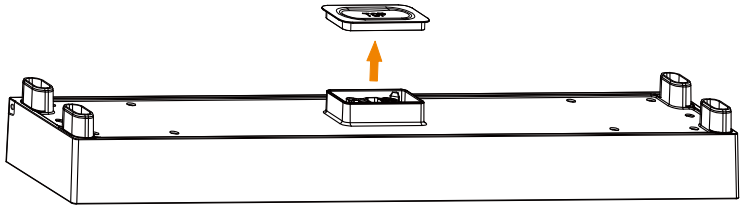
- For detailed steps of wall-mounting, please refer to "7.4 Wall-mounting" .

7.3 Floor-mounting

Step 1: Mount the battery

a) Remove the dust cover of the base.

a



Base for TP-HS50 Battery

WARNING!

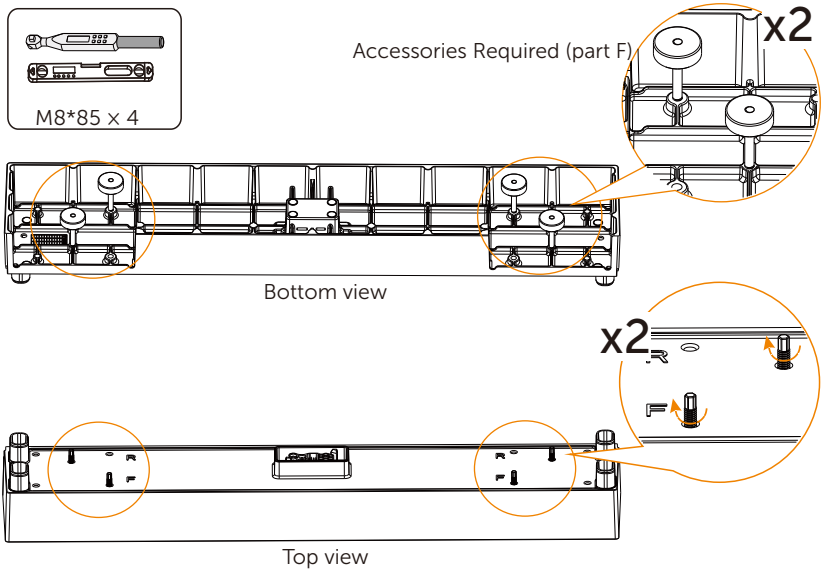
- During installation, please make sure battery port is not short-circuited.

NOTICE!

- A distance of at least 19.68 in / 500 mm shall be set aside on both sides of the whole system.

b) Insert the adjustment screw [Accessories Required (part F)] from the bottom of base and clockwise / anticlockwise turn the adjustment screws by torque wrench to make the base leveled.

b



NOTICE!

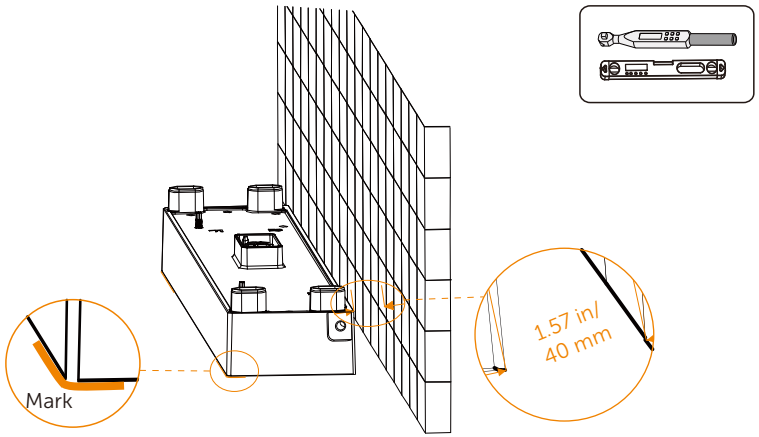
- Use a spirit level to measure the sides of the Base to ensure they are even.

NOTICE!

- Clockwise turn the adjustment screws to lower down the base.
- Anticlockwise turn the adjustment screws to lift up the base.

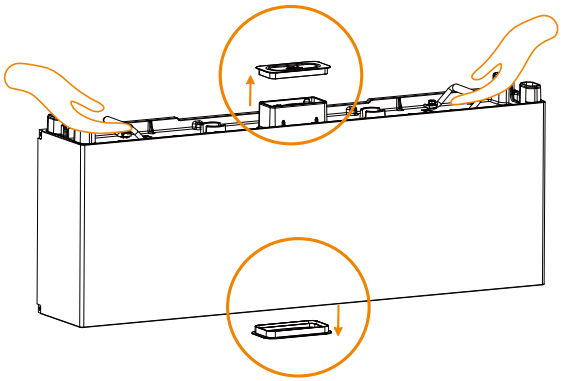
c) Locate the base 1.57 in / 40 mm away from the wall, accurately mark the location of the base on both sides with a marker.

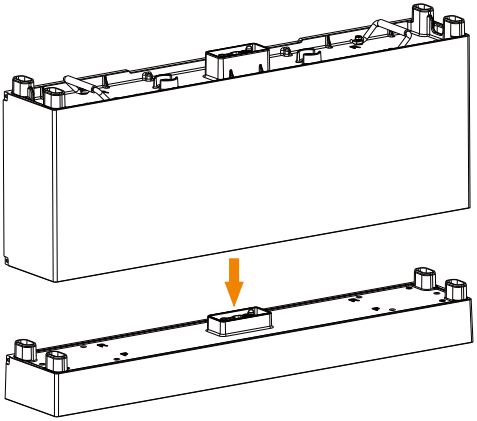
c



d) Manual-remove the top and bottom dust cover of the battery module and catch hold of the handle to stack the battery module to the base. Make sure that each connecting pole of the battery module or base is well plugged into the slot of the next battery module which is on the bottom of the module.

d





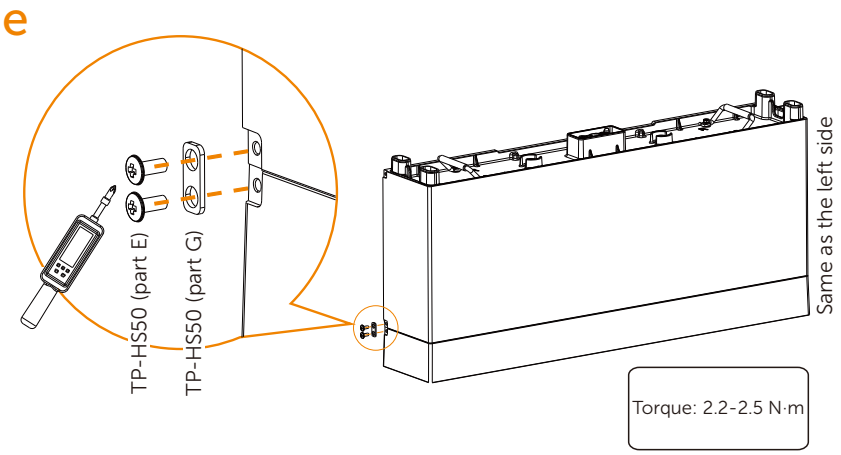
WARNING!

- If the Base is shifted after placing a Battery Module, move it to its original location according to the mark previously drawn.

WARNING!

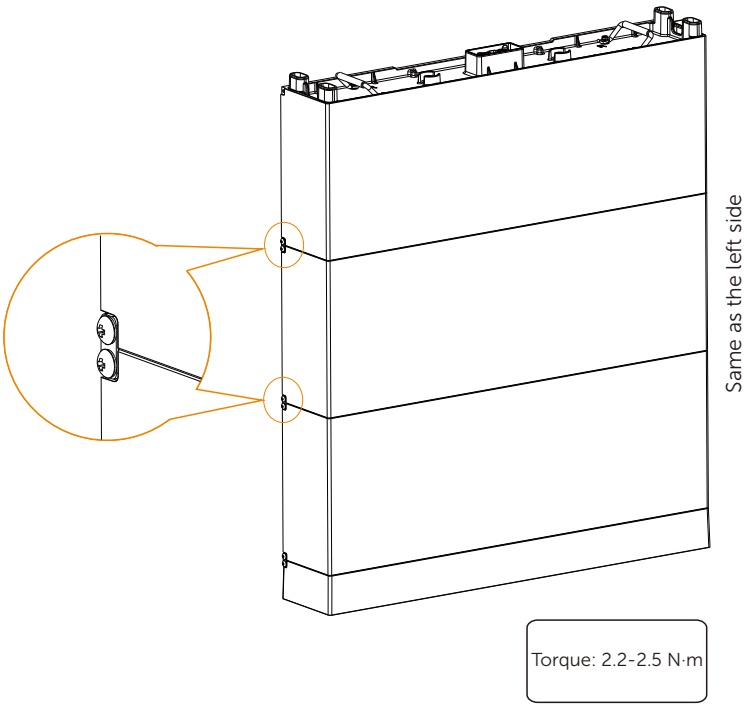
- During installation, please make sure battery port is not short-circuited.

e) Mount the fixing plate (2 holes) [TP-HS50 (part G)] using M5*10 cross screw [TP-HS50 (part E)], and secure M5*10 screws (2 for each side) to connect Base and Battery Module.



f) Place two battery modules in turn, and secure both left and right sides with screws (4×M5*10 countersunk screw).

f



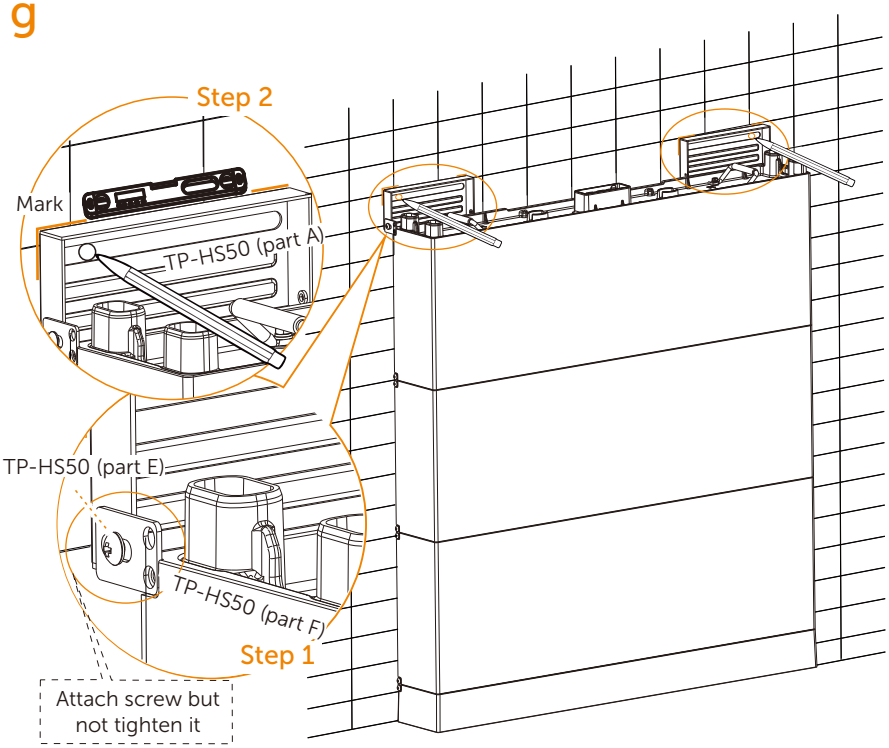
NOTICE!

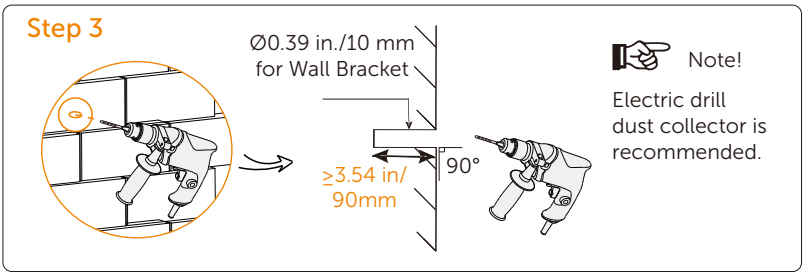
- In the case of the concrete wall, please perform the following steps strictly.
- In the case of the solid wood wall, please go directly to step i.

g) Mount the bracket of the battery module.

(1) Attach M5*10 screw [TP-HS50 (part E)] through the platen [TF-HS50 (part F)] to Wall Bracket, but be sure not to tighten;
(2) Place such Wall Bracket [TP-HS50 (part A)] to the wall, align its holes to the holes on the Battery Module, and use a spirit level to measure the Wall Bracket to ensure it's even;
(3) Accurately mark the location of the Wall Bracket on both sides with a pen;
(4) Draw circles according to the actual stub spacing;
(5) Remove the Wall Bracket, and then drill the two holes (at least 3.54 in./90 mm) by a drill (drill bit: Ø0.39 in./10 mm, at least 9.84 inch/250mm long).

g



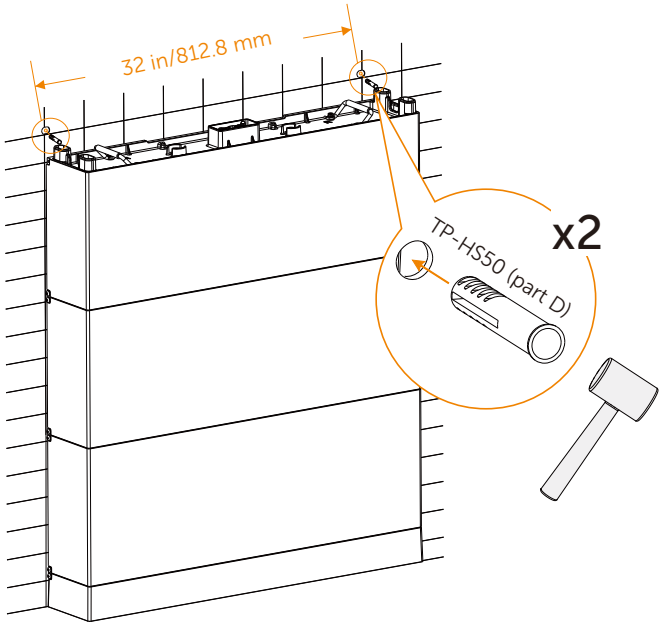


CAUTION!

- Please re-mount the dust cover to the battery module before drilling holes to avoid dust falling into the interface and do remember to remove the dust cover again after the installation wall bracket completed.

h) Place expansion bolts [TP-HS50 (part D)] into the two holes.

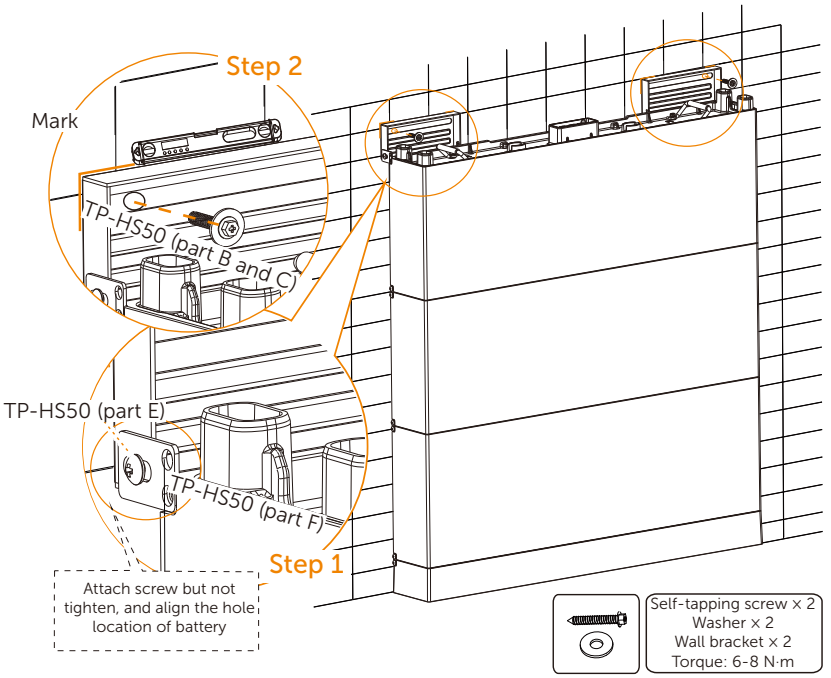
h



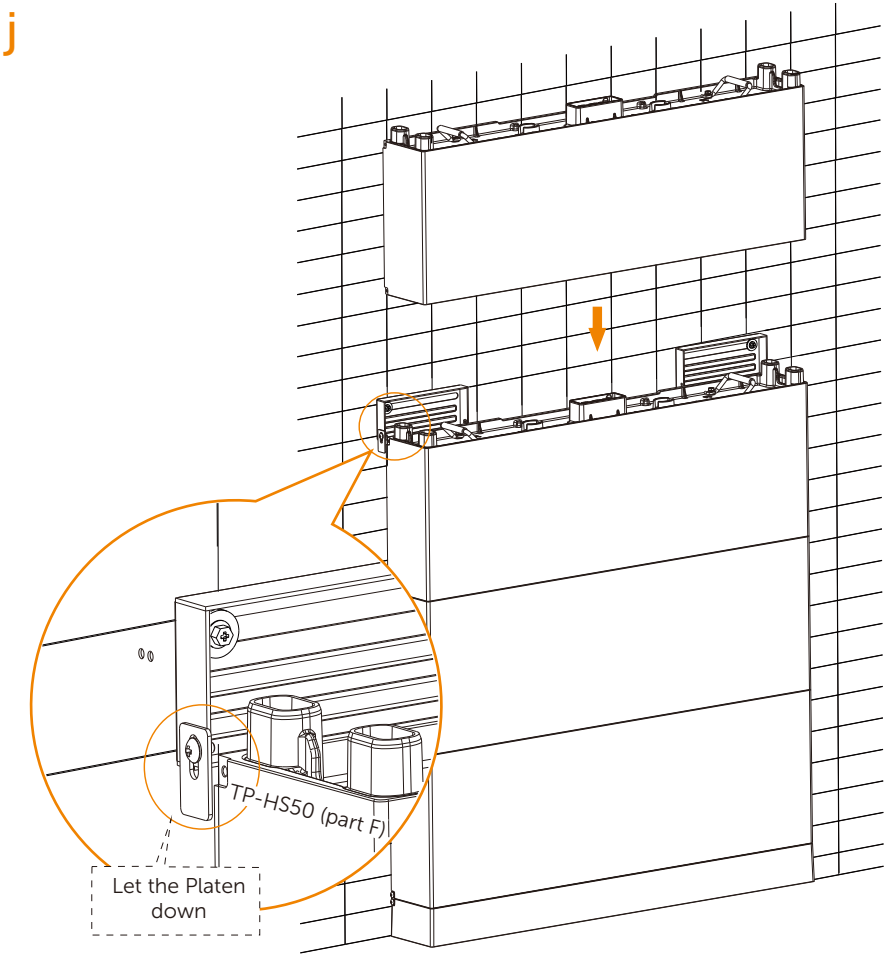
NOTICE!

- In the case of the solid wood wall, the Expansion Bolt is not required to be installed.

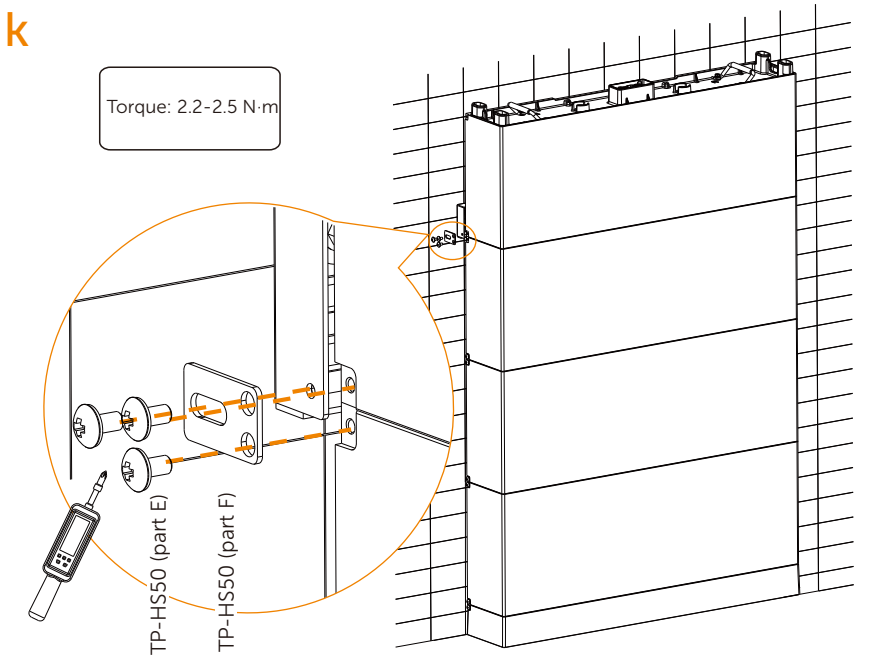
i) Place the Wall Bracket on the wall where the mark is drawn previously, and then secure the Wall Brackets on the wall using M6 Tapping Screws (× 2) and Washers [TP-HS50 (part B and C)] (Torque: 6-8 N·m).



j) Let the platen [TP-HS50 (part F)] down and place the fourth battery module.



k) Fix the fixing plate (3 holes) [TP-HS50 (part F)] on both sides of battery module using M5*10 cross screw [TP-HS50 (part E)], and then tighten M5*10 screws.



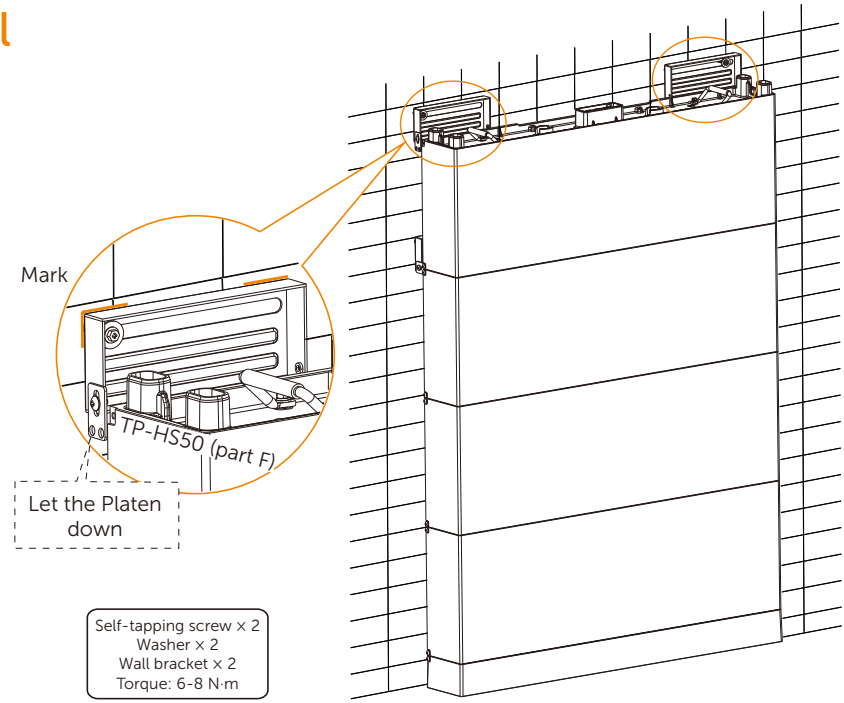
NOTICE!

- In the case of the concrete wall, please perform the following steps strictly.
- In the case of the solid wood wall, please go directly to step l-(7), and the Expansion Blot is not required to be installed.

l) Mount the wall bracket for the four battery module and BMS.

(1) Attach M5*10 screw to Wall Bracket with the platen [TP-HS50 (part F)], but be sure not to tighten;
(2) Place such Wall Bracket to the wall, align its holes to the holes on the Battery Module, and use a spirit level to measure the Wall Bracket to ensure it's even;
(3) Accurately mark the location of the Wall Bracket on both sides with a pen;
(4) Draw circles according to the actual stub spacing;
(5) Remove the Wall Bracket, and then drill the two holes (at least 3.54 in./90 mm) by a drill (drill bit: Ø0.39 in./10 mm, at least 9.84 inch/250mm long);
(6) Place Expansion Bolts;
(7) Secure Wall Brackets using M6 Tapping Screws and Washers (Torque: 6-8 N·m). Refer to the Steps e, f, g and h.

l



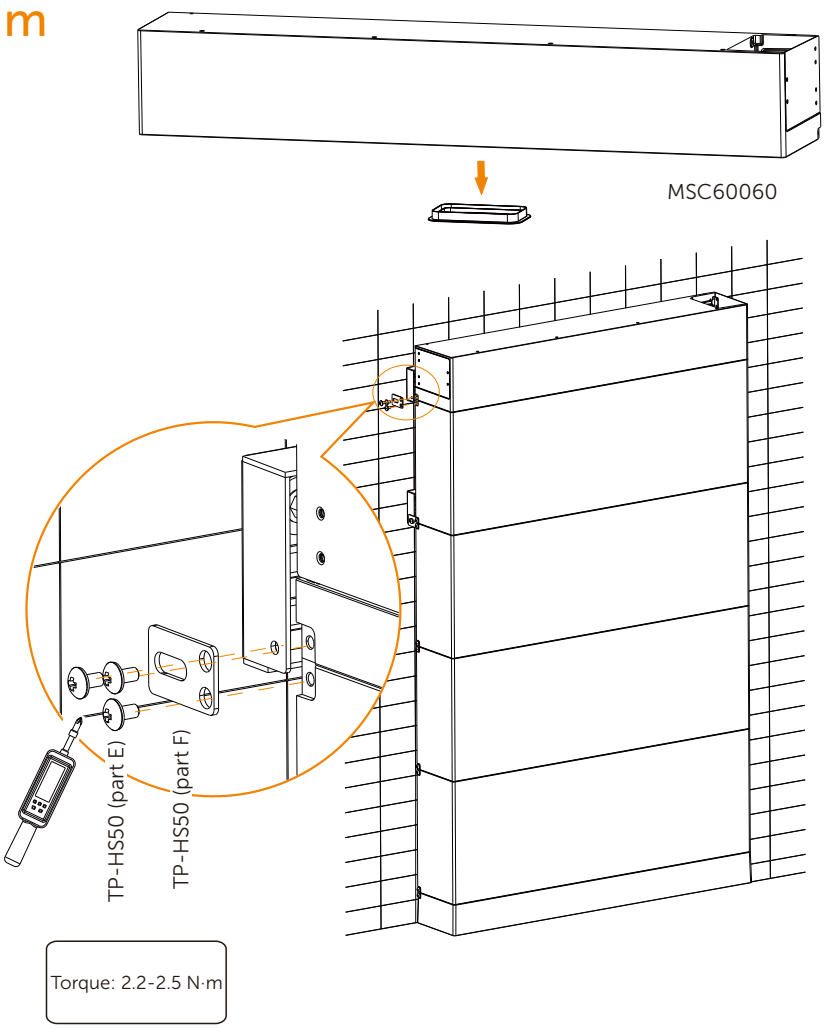
NOTICE!

- Electric drill dust collector is recommended.

CAUTION!

- Please re-mount the dust cover to the battery module before drilling holes to avoid dust falling into the interface and do remember to remove the dust cover again after the installation wall bracket completed.

m) Remove the bottom dust cover of BMS and place the BMS on the top. Fix the fixing plate (3 holes) [TP-HS50 (part F)] on both sides of battery module using M5*10 cross screw [TP-HS50 (part E)], and then tighten M5*10 screws.

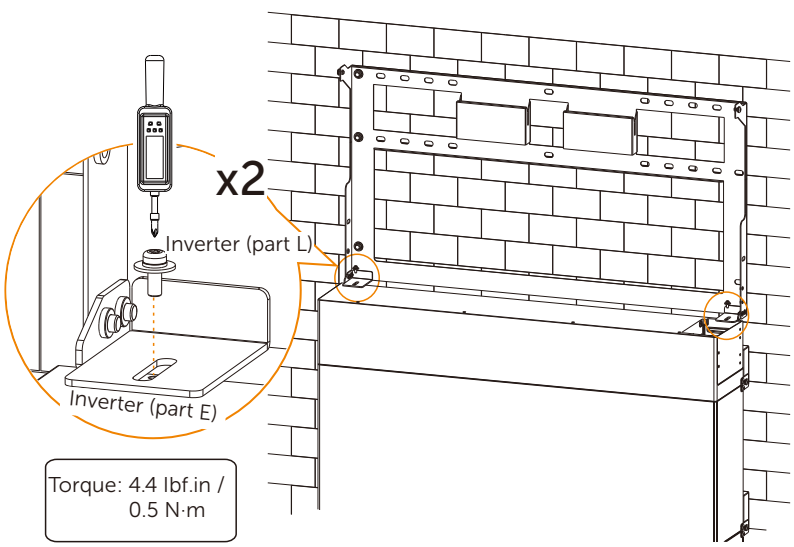


Step 2: Mount the inverter

a) Two M4 holes are reserved on the BMS for fixing the bracket of the inverter.

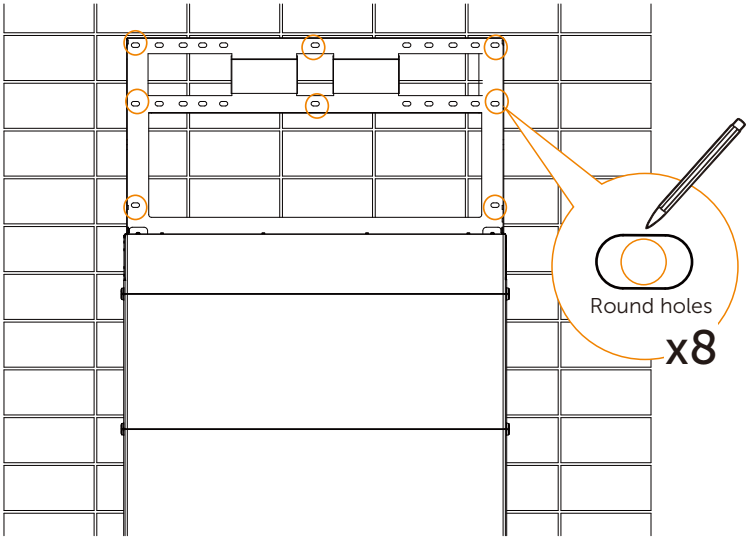
- Screw in M4 screws [Inverter (part L)] through the fixing plate [Inverter (part E)] to pre-fix the bracket on the BMS, but be sure not to tighten.
- Hold the bracket firmly to the wall surface.
- Tighten the M4 screws to fix the bracket on the BMS.

a



b) Use the bracket as the template to mark the screw hole location on the wall.

b

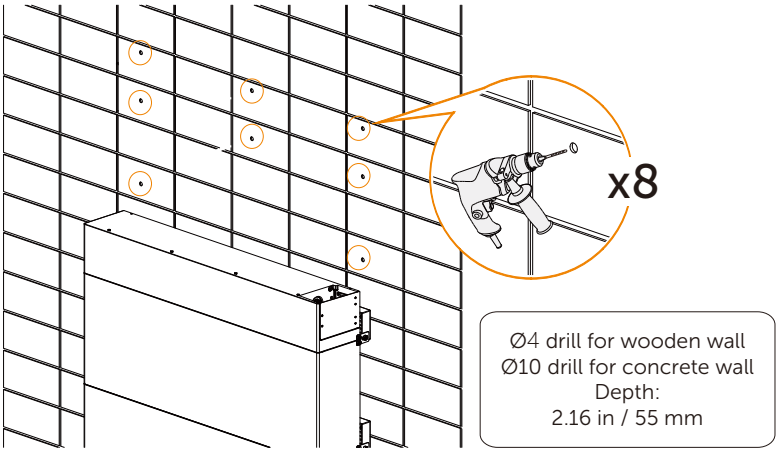


c) Unscrew the two M4 screws to disassemble the bracket. Drill holes with power drill, and make sure the holes are deep enough (2.16 in / 55 mm) to support the inverter.

NOTICE!

- The figure below is only used for showing the depth and location of holes. Make sure the holes are in the center of each stud and keep at least 1.49 in / 38 mm away from the edge of concrete bricks or studs before marking holes.

C

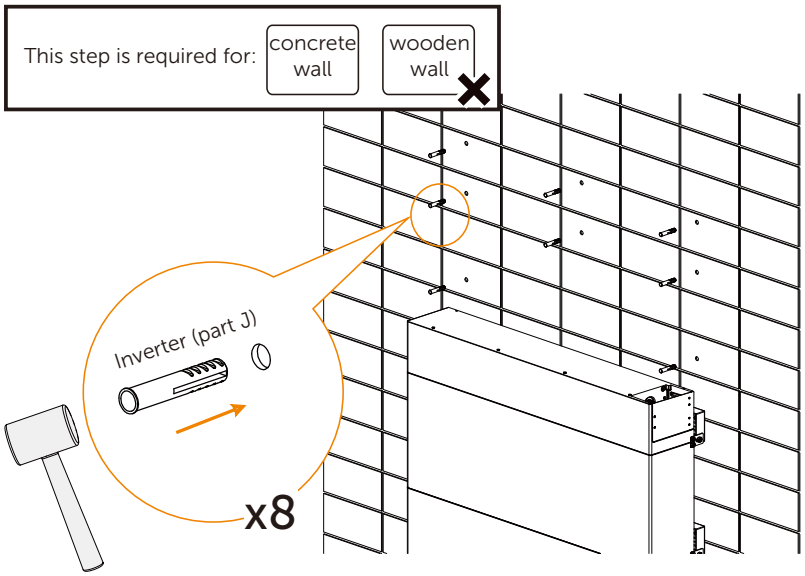


NOTICE!

- For solid concrete wall, please use Ø10 drill.

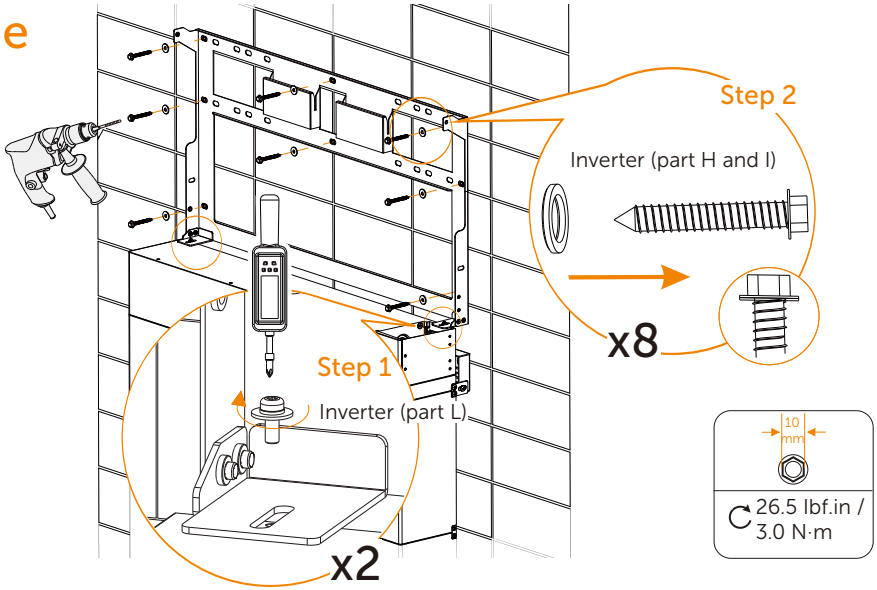
d) Insert the expansion tube [Inverter (part J)] into the hole and use rubber hammer to knock the expansion tube into the wall; (It can be ignored in case of wooden wall.)

d



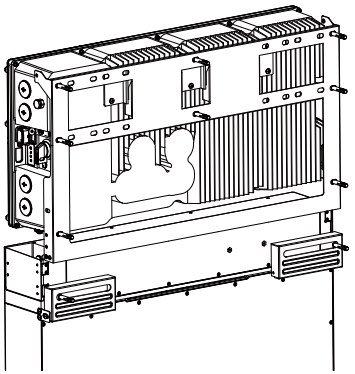
e) Align the bracket over the holes and re-fix the bracket on the BMS with screws [Inverter (part L)]. And set the tapping screw [Inverter (part H)] through the washer [Inverter (part I)] and secure the bracket with tapping screws. Please hold the bracket firmly to the wall surface before fixing it.

e

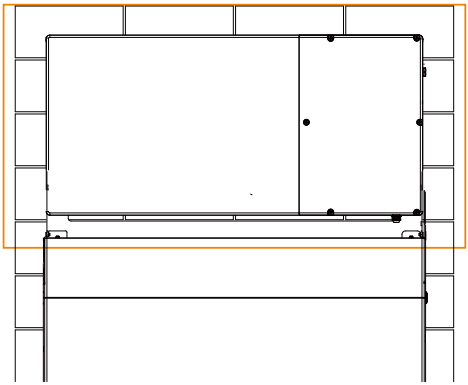


f) Place the inverter to be seated on the corresponding position of the bracket. As A1-HYB-G2 series inverters are heavy, weigh 75 lbs / 34 Kg. They should be lifted up by two persons and placed carefully onto the bracket. Then adjust the inverter to be centered on the whole system.

f



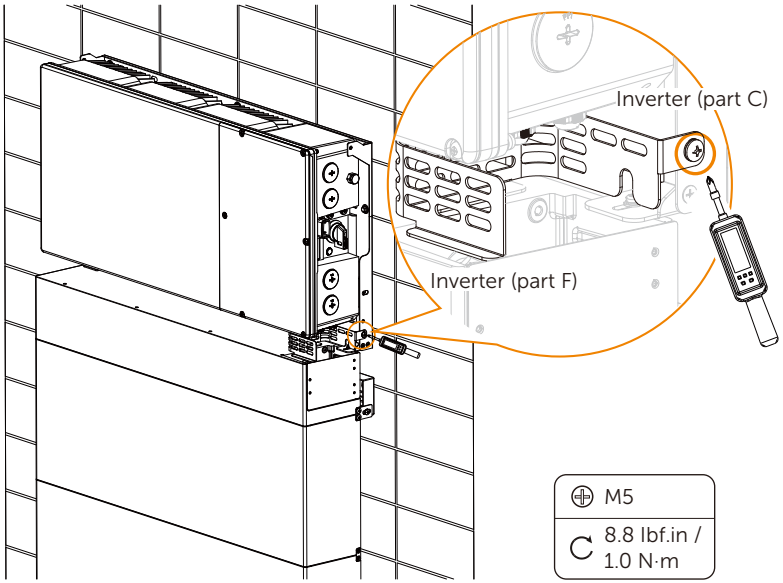
Back view



Front view

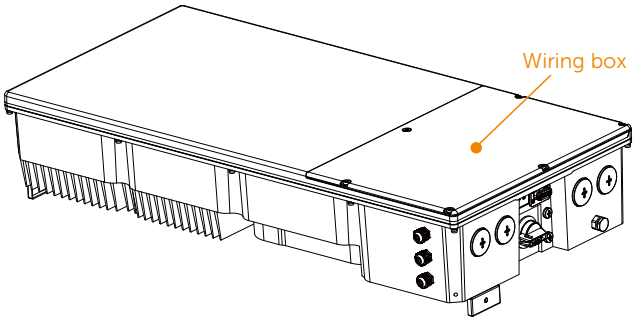
g) Place the protective guard [Inverter (part F)] on the correct position of battery's BMS prior to the wiring connection between inverter and battery and fix it with the inverter bracket with M5 screws [Inverter (part C)].

g





Open the wiring box cover to complete all the wiring connection.

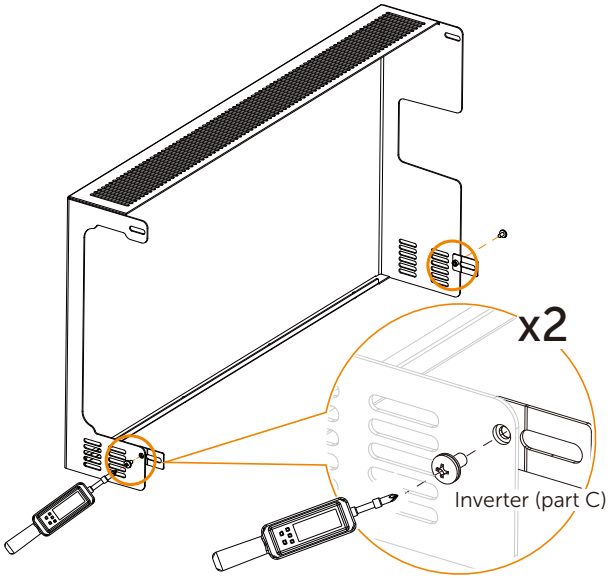


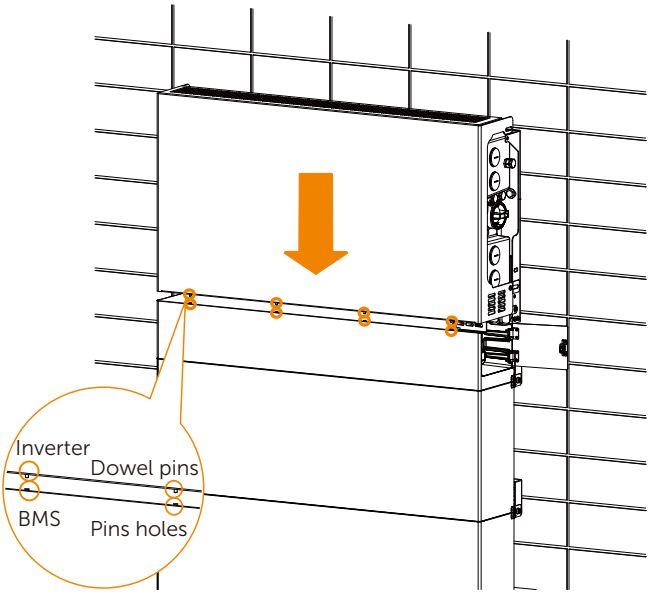
NOTICE!

- For detailed wiring connection, please refer to "8 Wiring Connection on the Inverter" .

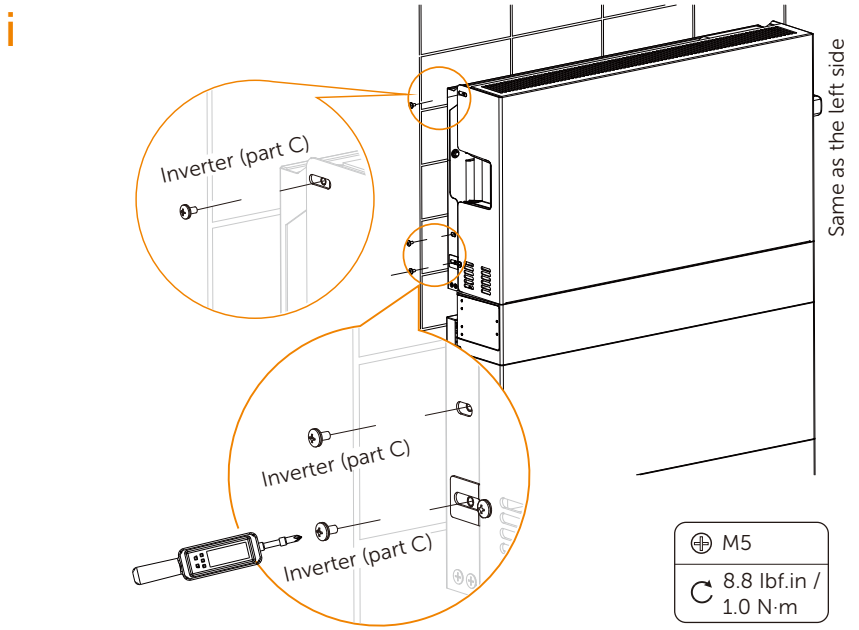
h) Pre-mount the fixing plate with scews [Inverter (part C)] on the two sides of metal cover and mount the metal cover on the inverter. Please make sure the four dowel pins are inserted into the holes of BMS and adjust the whole system (inverter and battery) to be leveled.

h





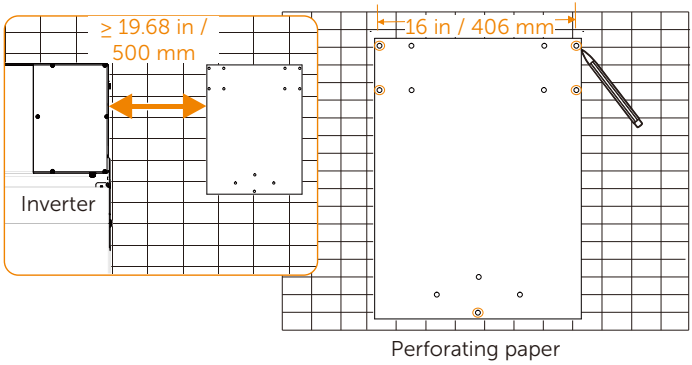
i) Fix the metal cover with six M5 screws [Inverter (part C)].

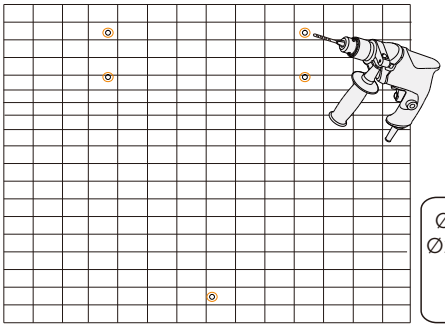


Step3: Mount the BI

a) Use the perforating paper as a template to mark the screw hole location on the wall; And drill five holes on the wall.

a





Ø4 drill for wooden wall
Ø10 drill for concrete wall
Depth:
2.16 in / 55 mm

NOTICE!

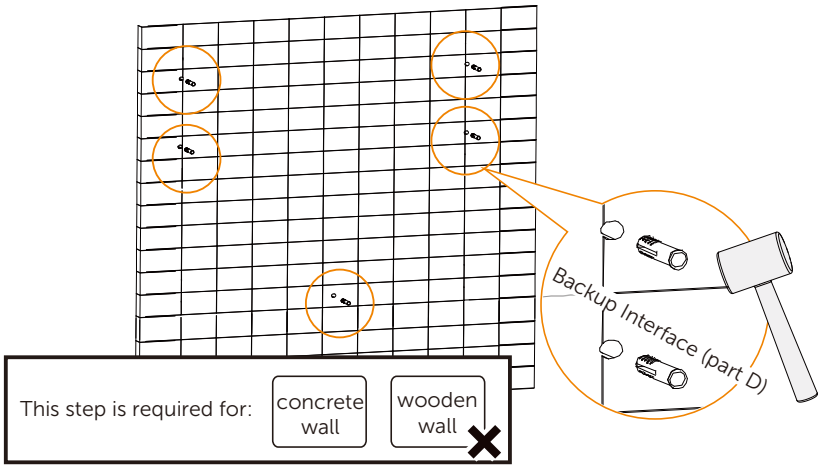
- For solid concrete wall, please use Ø10 drill.

NOTICE!

- The inner-side hole of the bracket is 12 in / 305 mm.

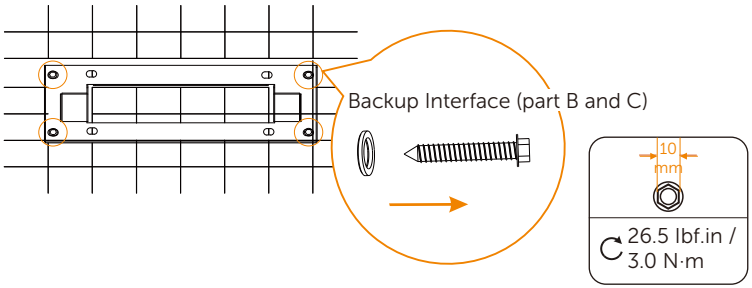
b) Use mallet to knock the five expansion tube [Backup Interface (part D)] into wall (This step can be ignored in case of wooden wall).

b



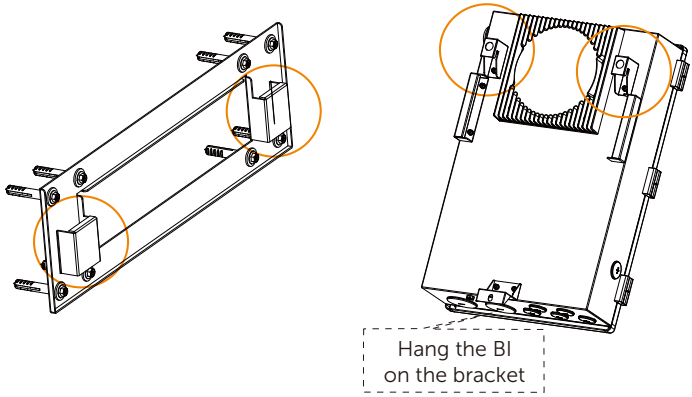
c) Secure the bracket on the wall with tapping screw [Backup Interface (part B)] and washer [Backup Interface (part C)] using torque wrench. Please hold the bracket firmly to the surface of the wall when fixing bracket.

c



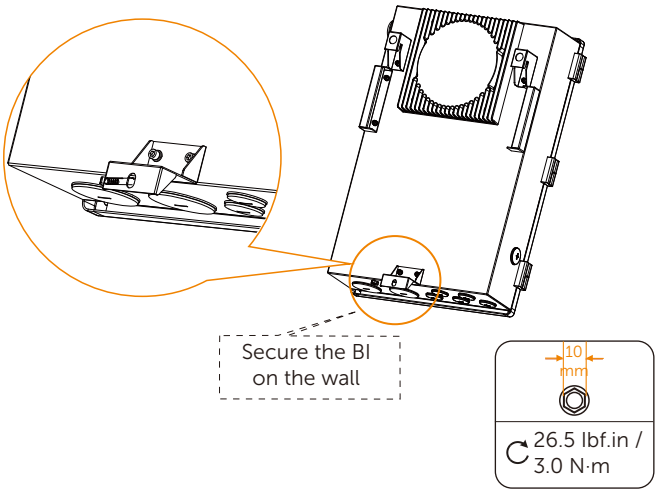
d) Hang the BI on the bracket. Please make sure the cleat is well seated on the bracket.

d



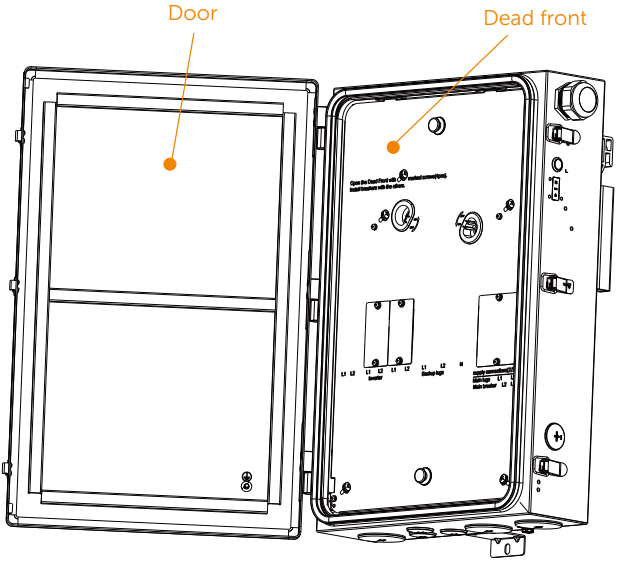
e) Secure the BI by screwing in the tapping screw with washer on the bottom of BI.

e





Open the door of Backup Interface and remove the dead front to complete all the wiring connection.

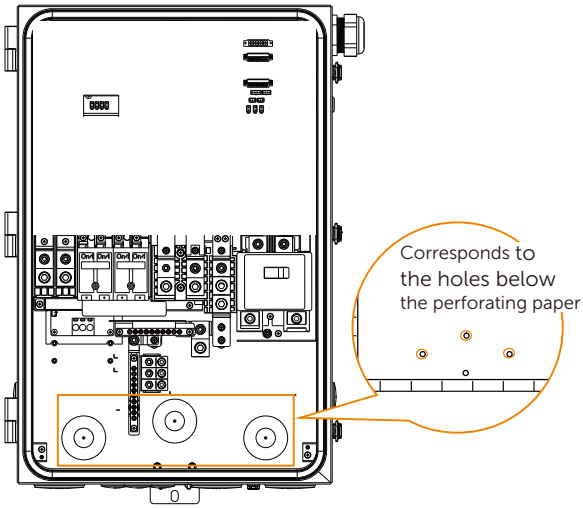


NOTICE!

- For detailed wiring connection, please refer to "9 Wiring Connection on the BI" .

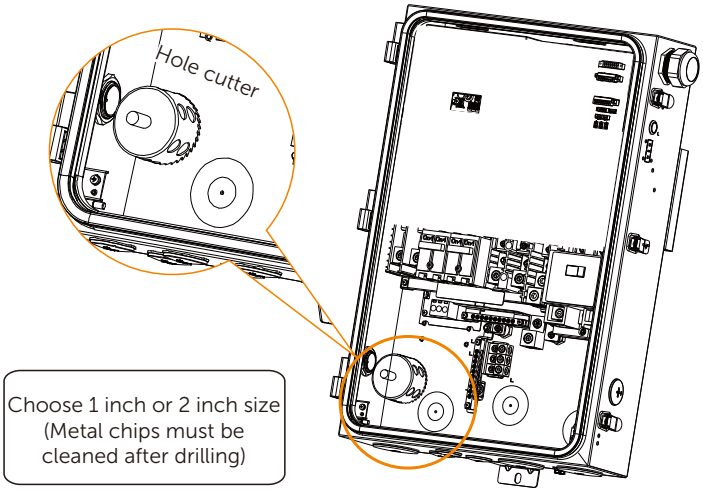
Drill a hole in the back (Not recommended)
a) These three holes correspond to the holes below the perforated paper.

a



b) Drill the hole with a hole cutter. Choose 1 inch or 2 inch size (Metal chips must be cleaned after drilling).

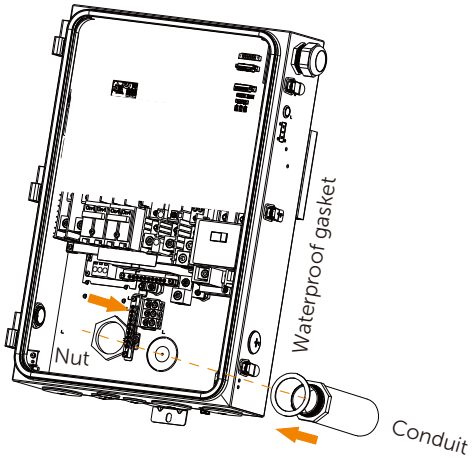
b



c) Lock nut, waterproof gasket(outside), conduit.

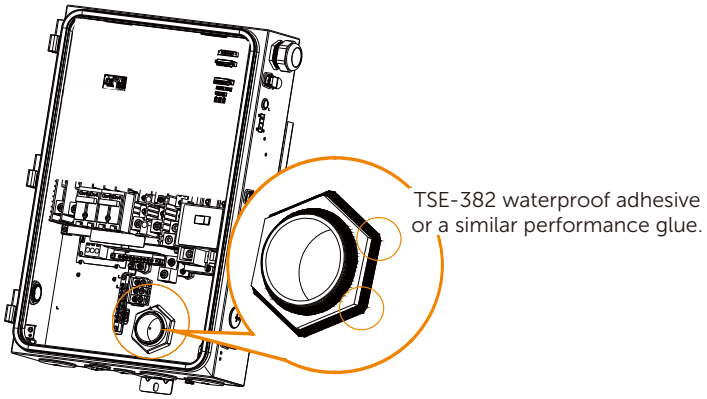
NOTICE!
• Prohibit the flow of water inside the tubing water into the machine!

c



d) The top of the nut and contact surface of the threads must be cleaned after locking the nut, as well as the contact surface between the nut and the box.

d

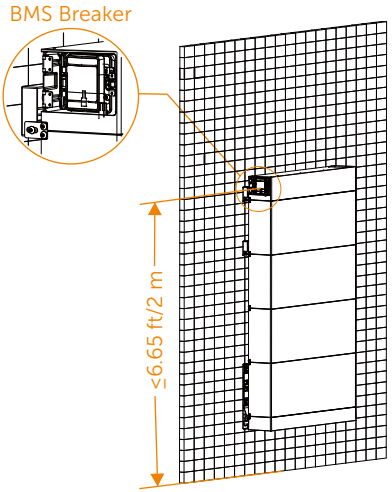


NOTICE!
• Drilling a hole in the wall is required before cutting a hole in the rear. To guarantee easy installation of the conduit and sealing with the chassis, the hole's size must be greater than the conduit's outside diameter.

7.4 Wall-mounting

NOTICE!

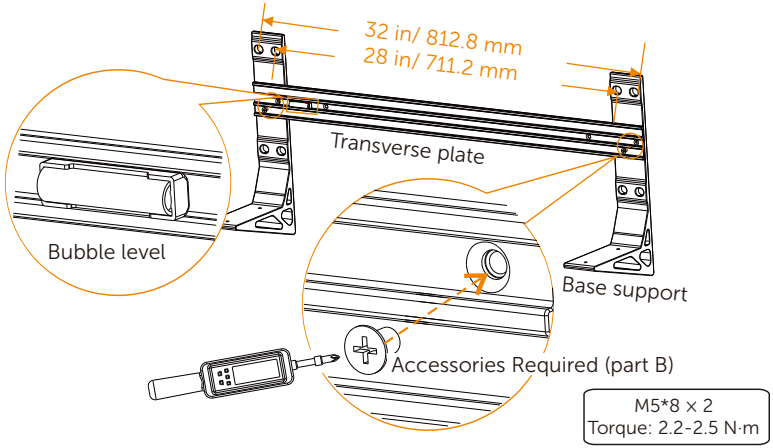
- For wall mounting, make sure the BMS breaker is no more than 6.56 ft /2 m above the ground so that you can easily shut down the system in emergencies.



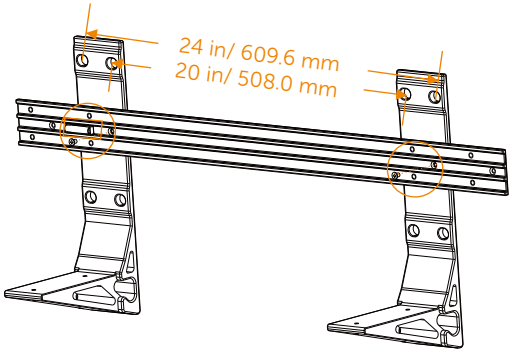
Step 1: Mount the battery

a) Take out of the accessories from a separate accessory box. Fix the base support on the transverse plate with M5 countersunk head screw [Accessories Required (part B)].
Studs spaced at 16, 28 and 32 inch: secure the transverse plate and base support using screws (2×M5*8 countersunk head screw), and tighten them (Torque: 2.2-2.5 N·m).

a



Studs spaced at 12, 20 and 24 inch: secure the transverse plate and base support using screws (2×M5*8 countersunk head screw), and tighten them. See figure below.

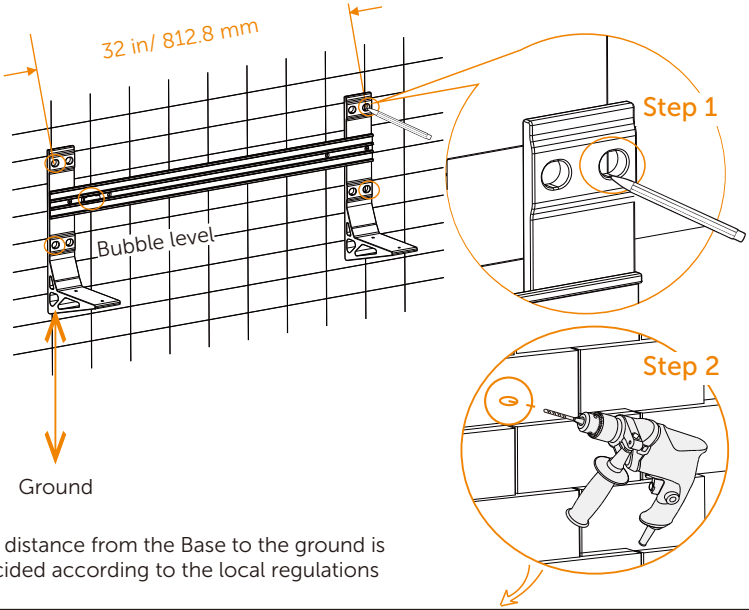


Same as Way a to secure the plate.

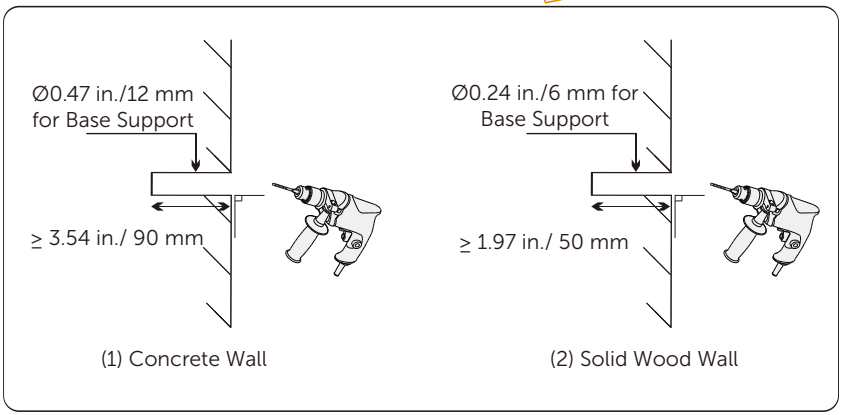
b) Mark the hole location and drill holes;

(1) Place the assembled Transverse Plate and Base Support on the wall, look the cylindrical plastic bubble level on the Transverse Plate. If the bubble isn't in the center, slightly bow it to the horizontal.
(2) Then determine the position of holes.
(3) Mark it with a pen.
(4) Remove it and drill the four holes (at least 3.54 in./90 mm) by a drill (Ø0.47 in./12 mm for concrete wall, or Ø0.24 in./6 mm solid wood wall).

b



The distance from the Base to the ground is decided according to the local regulations



NOTICE!

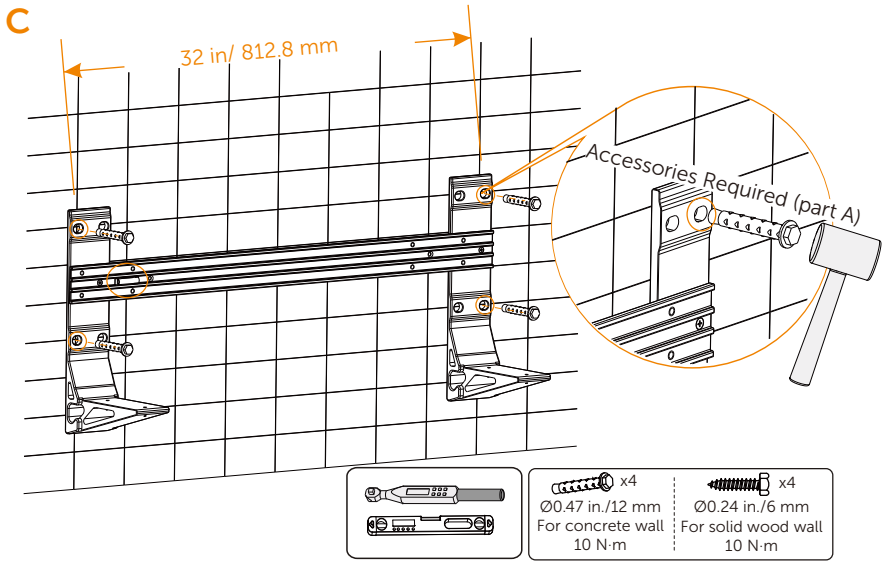
- The bubble level on the transverse plate can be used as an auxiliary tool. Additionally, please prepare a spirit level to measure whether the plate is even or not.

c) Secure the assembled transverse plate on the wall.

(1) Place the assembled Transverse Plate and Base Support to the wall (or solid wood wall);
(2) Attach screws to the holes:

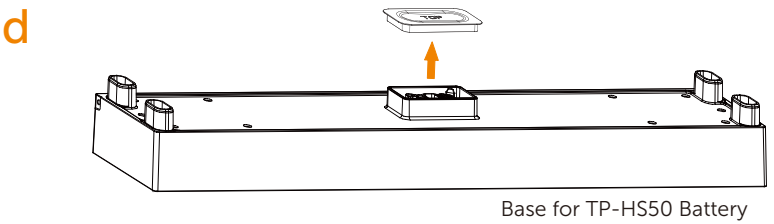
- In the case of the concrete wall, attach the M8*85 Expansion Screw (x 4) to the holes but be sure not to tighten (Torque: 10 N·m);
- Or, in the case of solid wood wall, attach M8*88 Self-tapping Screw (x 4) to the holes but be sure not to tighten (Torque: 10 N·m);

(3) Check whether the cylindrical plastic bubble level is horizontal;
(4) Hammer Expansion Screws with a rubber mallet (expect solid wood wall), and tighten it with torque wrench.



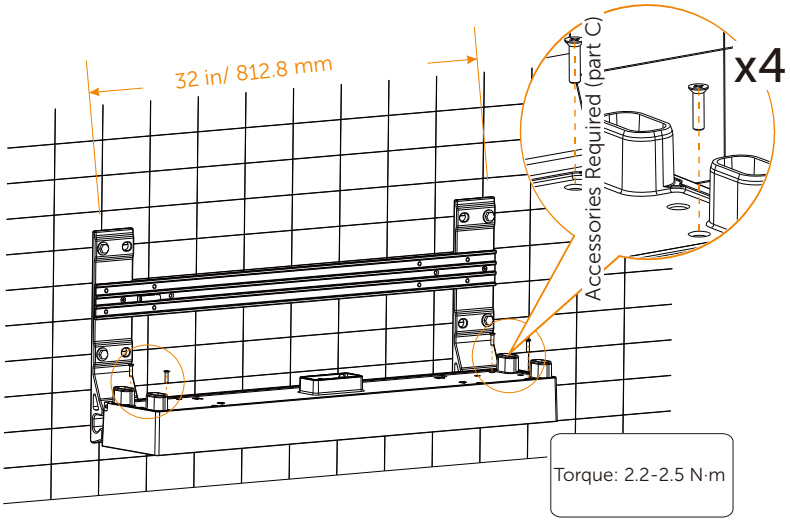
d) Place the base.

(1) Remove the dust cover.



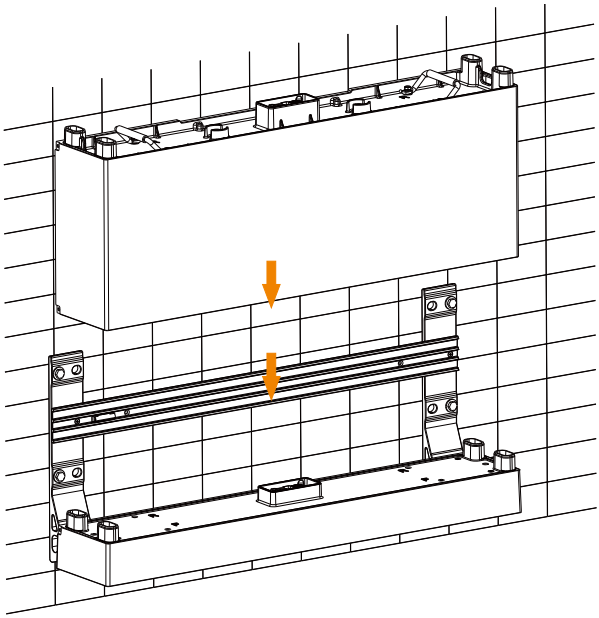
Base for TP-HS50 Battery

(2) Place Base on the Base Support and secure both left and right sides with screws (4 × M5*20 countersunk screw) [Accessories Required (part C)] (Torque: 2.2-2.5 N·m).



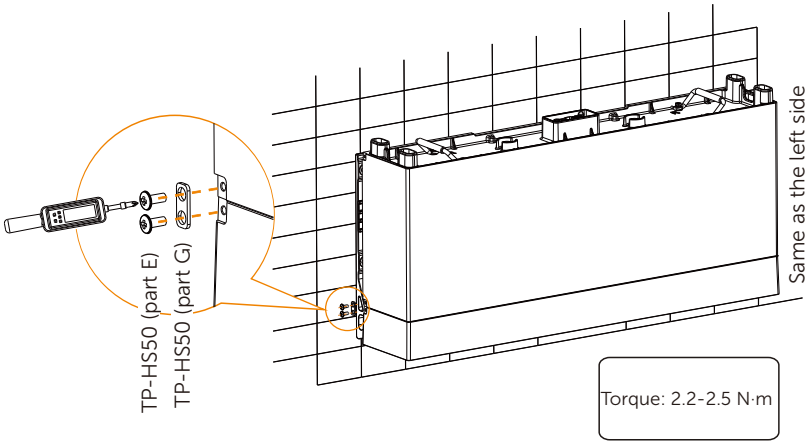
e) Make sure that each connecting pole of the battery module or base is well plugged into the slot of the next battery module which is on the bottom of the module.

e



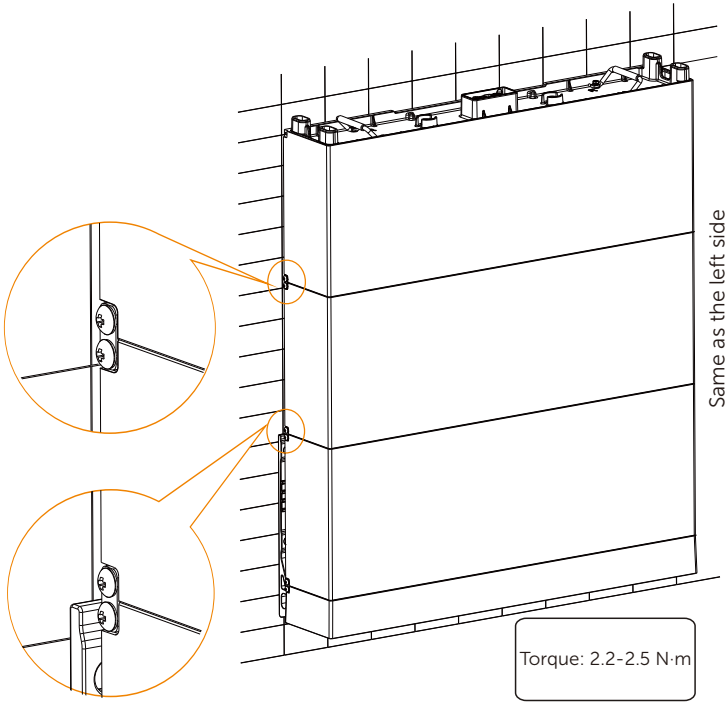
f) Mount the fixing plate (2 holes) [TP-HS50 (part G)] using M5*10 cross screw [TP-HS50 (part E)], and secure M5*10 screws (2 for each side) to connect Base and Battery Module.

f



g) Place two battery modules in turn, and secure both left and right sides with screws (4×M5*10 countersunk screw).

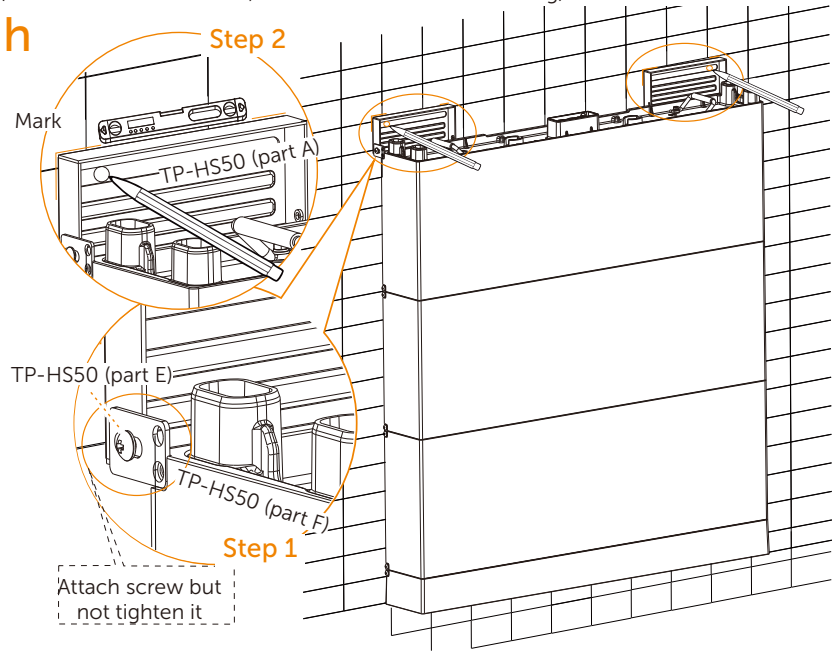
g

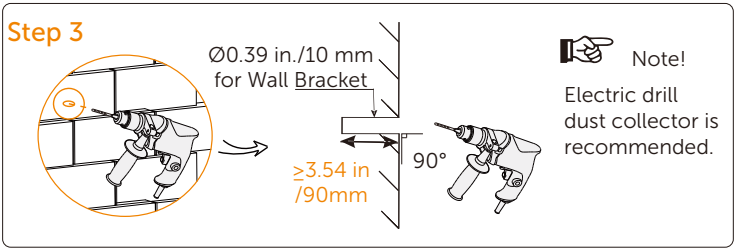


NOTICE!

- In the case of the concrete wall, please perform the following steps strictly.
- In the case of the solid wood wall, please go directly to step j.

h) Mount the bracket of the battery module.
(1) Attach M5*10 screw [TP-HS50 (part E)] through the platen [TP-HS50 (part F)] to Wall Bracket but be sure not to tighten;
(2) Place such Wall Bracket [TP-HS50 (part A)] to the wall, align its holes to the holes on the Battery Module, and use a spirit level to measure the Wall Bracket to ensure it's even;
(3) Accurately mark the location of the Wall Bracket on both sides with a pen;
(4) Draw circles according to the actual stub spacing;
(5) Remove the Wall Bracket, and then drill the two holes (at least 3.54 in./90 mm) by a drill (drill bit: Ø0.39 in./10 mm, at least 9.84 inch/250mm long).

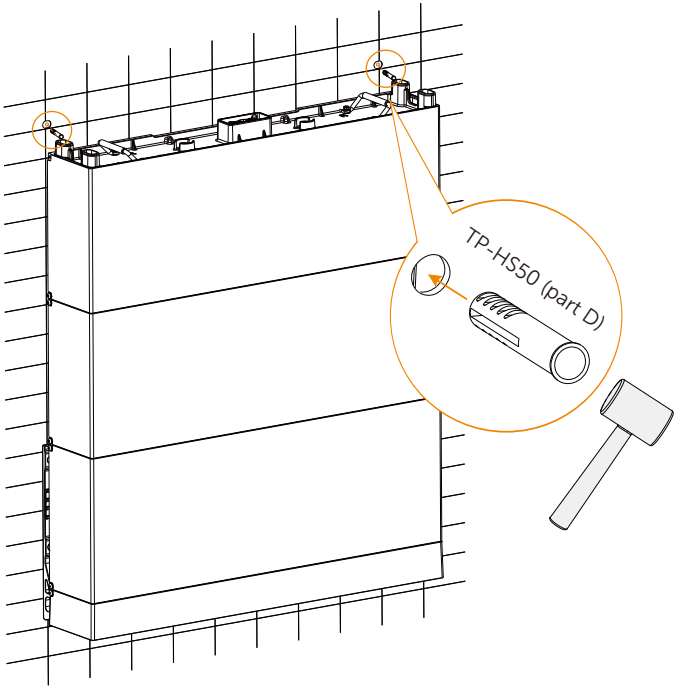




CAUTION!

- Please re-mount the dust cover to the battery module before drilling holes to avoid dust falling into the interface and do remember to remove the dust cover again after the installation wall bracket completed.

i) Place expansion bolts into the two holes.

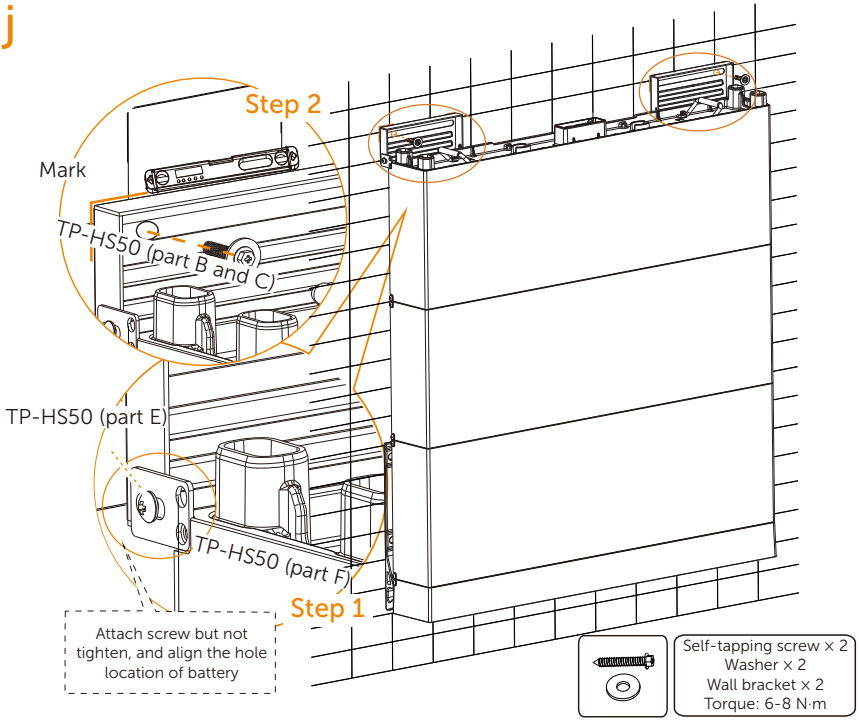


NOTICE!

- In the case of the solid wood wall, the Expansion Bolt is not required to be installed.

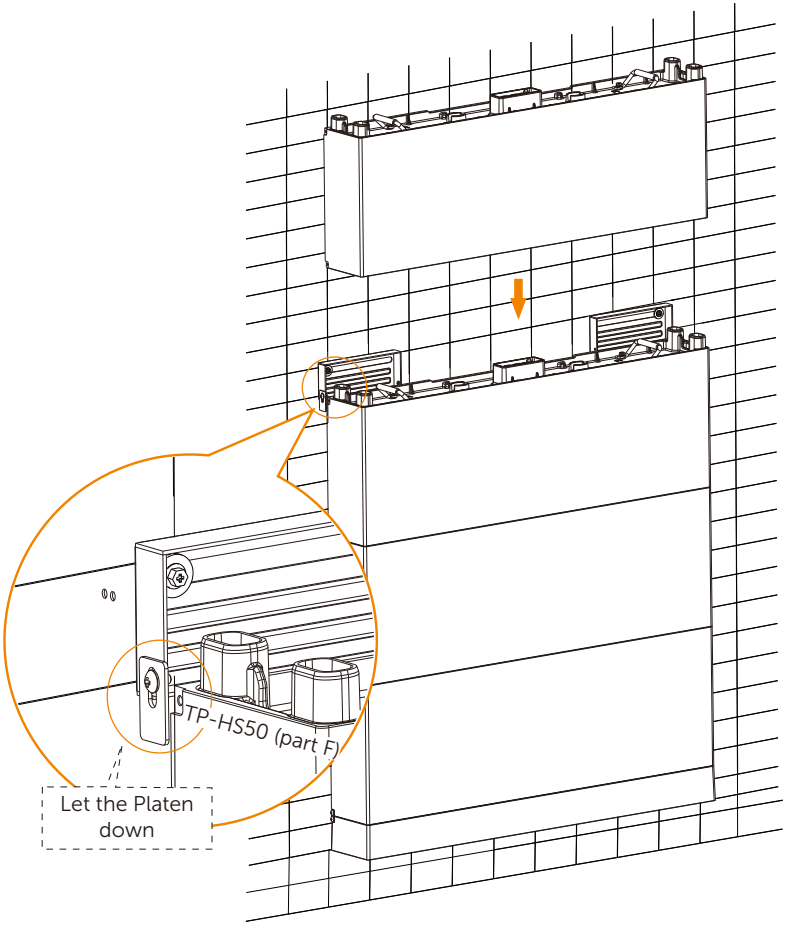
j) Place the Wall Bracket on the wall where the mark is drawn previously, and then secure the Wall Brackets on the wall using M6 Tapping Screws (x2) [TP-HS50 and Washers [TP-HS50 (part B and C)] (Torque: 6-8 N·m).

j



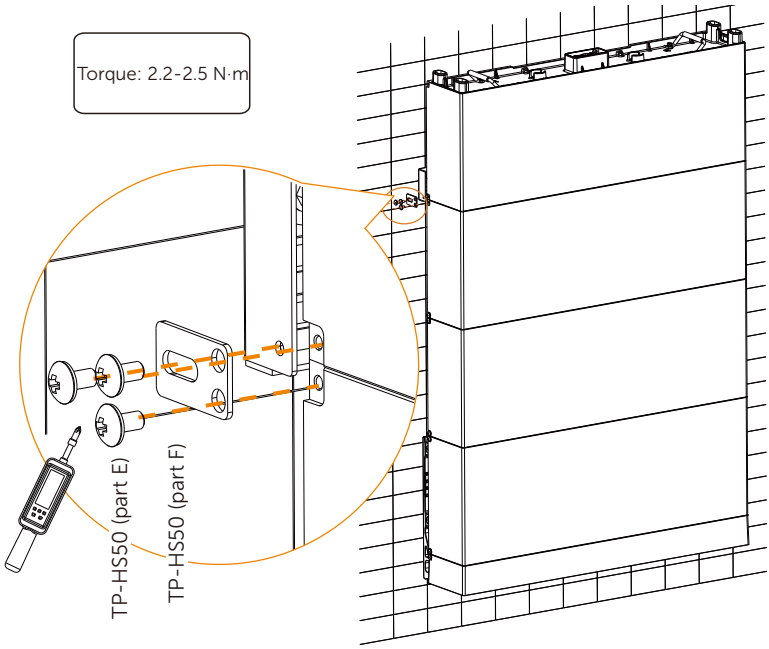
k) Let the platen [TP-HS50 (part F)] down and place the fourth battery module.

k



l) Fix the fixing plate (3 holes) [TP-HS50 (part F)] on both sides of battery module using M5*10 cross screw [TP-HS50 (part E)], and then tighten M5*10 screws.

l



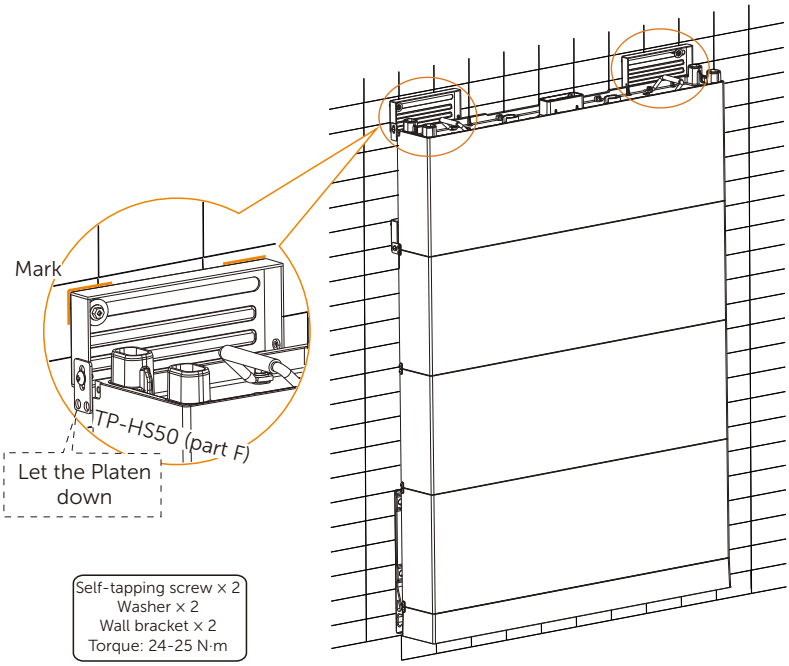
NOTICE!

- In the case of the concrete wall, please perform the following steps strictly.
- In the case of the solid wood wall, please go directly to step m-(7), and the Expansion Blot is not required to be installed.

m) Mount the wall bracket for the four battery module and BMS.

(1) Attach M5*10 screw through the platen [TP-HS50 (part F)] to Wall Bracket but be sure not to tighten;
(2) Place such Wall Bracket to the wall, align its holes to the holes on the Battery Module, and use a spirit level to measure the Wall Bracket to ensure it's even;
(3) Accurately mark the location of the Wall Bracket on both sides with a pen;
(4) Draw circles according to the actual stub spacing;
(5) Remove the Wall Bracket, and then drill the two holes (at least 3.54 in./90 mm) by a drill (drill bit: Ø0.39 in./10 mm, at least 9.84 inch/250mm long);
(6) Place Expansion Bolts;
(7) Secure Wall Brackets using M6 Tapping Screws and Washers (Torque: 6-8 N·m). Refer to the Steps e, f, g and h.

m



NOTICE!

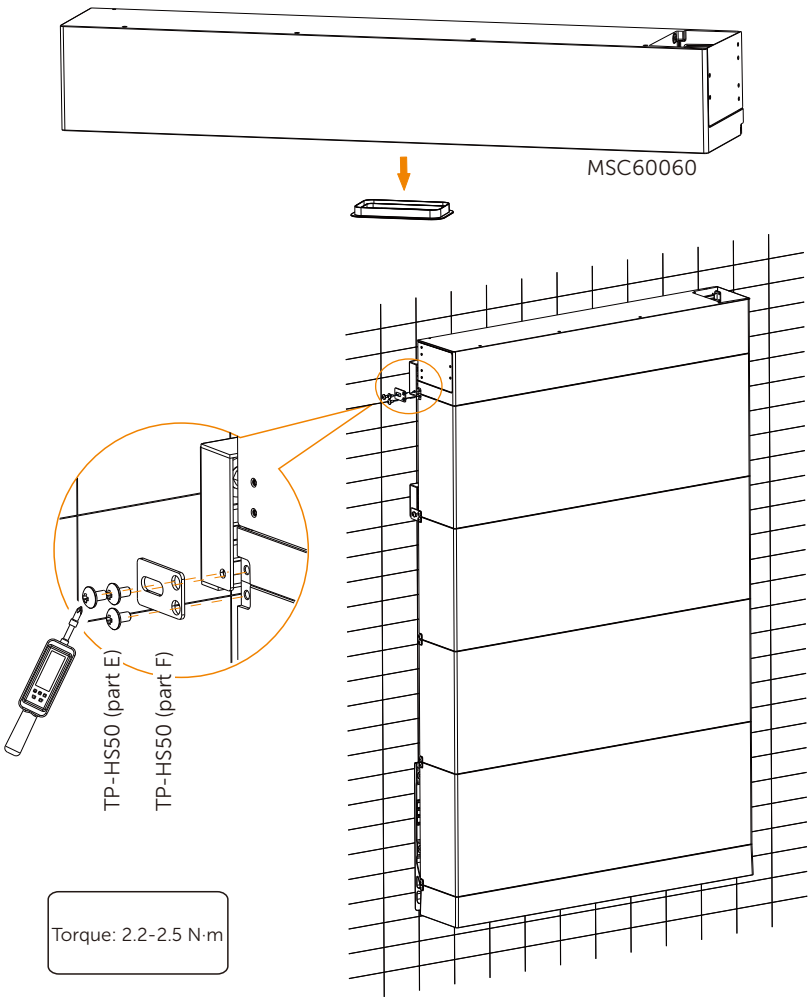
- Electric drill dust collector is recommended.

CAUTION!

- Please re-mount the dust cover to the battery module before drilling holes to avoid dust falling into the interface and do remember to remove the dust cover again after the installation wall bracket completed.

n) Remove the bottom dust cover of BMS and place the BMS on the top. Fix the fixing plate (3 holes) on both sides of battery module using M5*10 cross screw, and then tighten M5*10 screws.

n

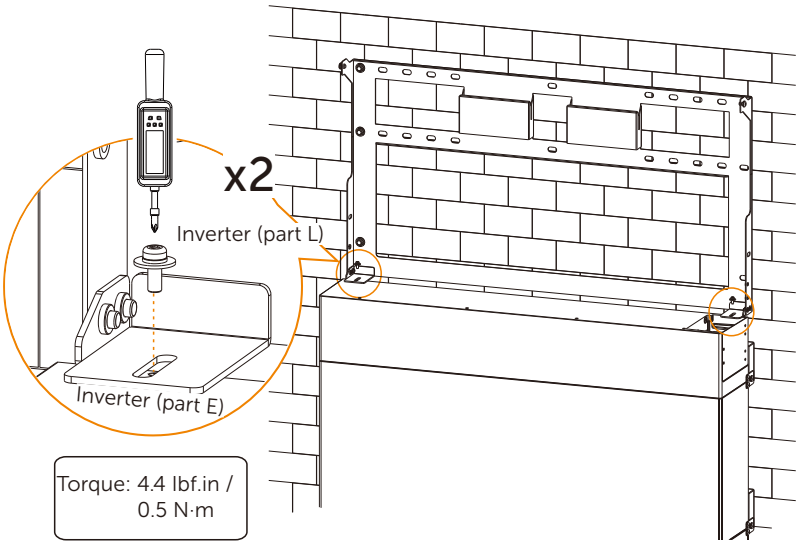


Step 2: Mount the inverter

a) Two M4 holes are reserved on the BMS for fixing the bracket of the inverter.

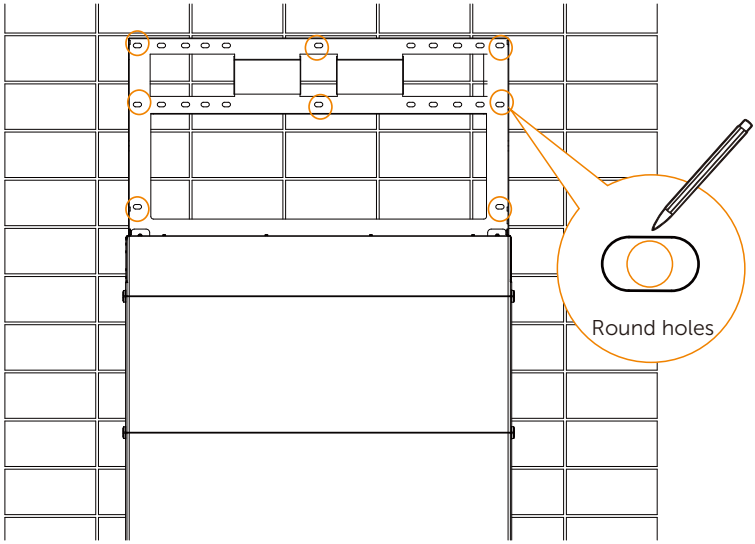
- Screw M4 screws [Inverter (part L)] through the fixing plate [Inverter (part E)] to pre-fix the bracket on the BMS but be sure not to tighten.
- Hold the bracket firmly to the wall surface.
- Tighten the M4 screws to fix the bracket on the BMS.

a



b) Use the bracket as the template to mark the screw hole location on the wall.

b

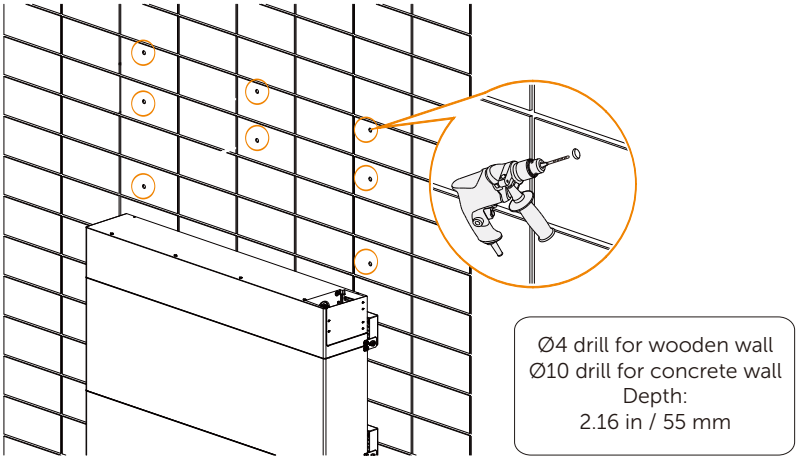


c) Unscrew the two M4 screws to disassemble the bracket. Drill holes with power drill, and make sure the holes are deep enough (2.16 in / 55 mm) to support the inverter.

NOTICE!

- The figure below is only used for showing the depth and location of holes. Make sure the holes are in the center of each stud and keep at least 1.49 in / 38 mm away from the edge of concrete bricks or studs before marking holes.

C

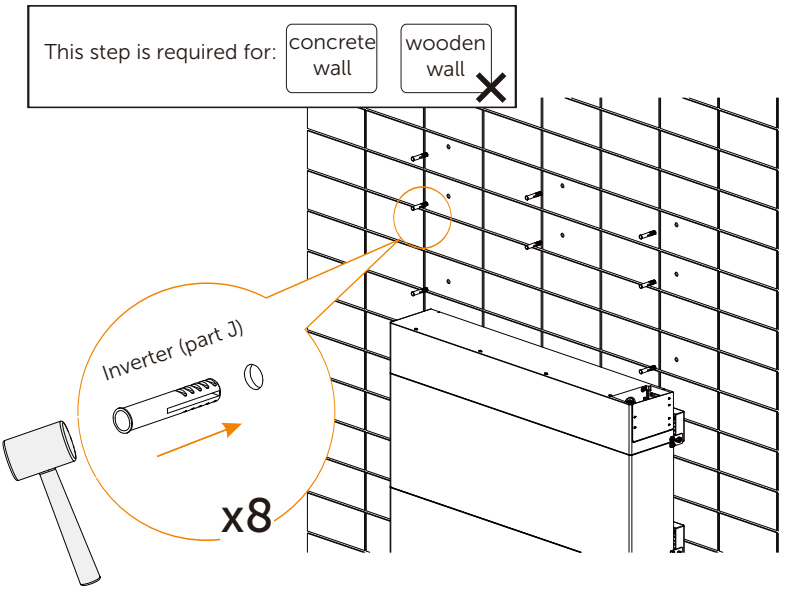


CAUTION!

- Remove the screws on the bracket and disassemble the bracket before drill holes.

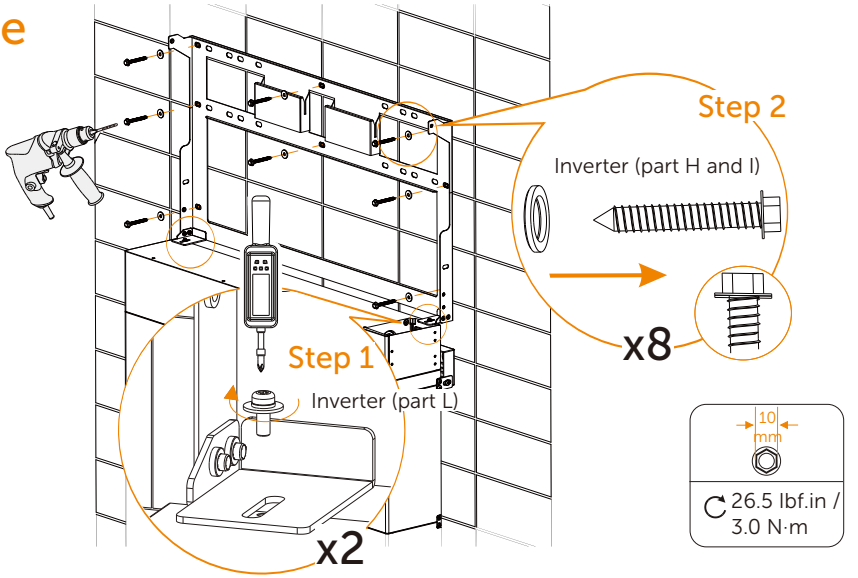
d) Insert the expansion tube [Inverter (part J)] into the hole and use rubber hammer to knock the expansion tube into the wall; (It can be ignored in case of wooden wall.)

d



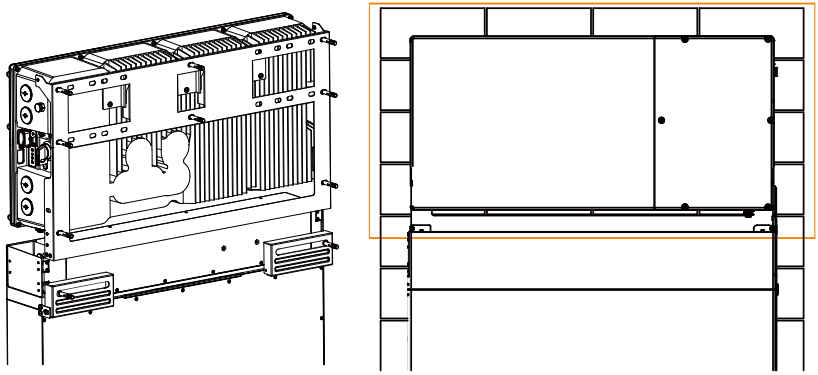
e) Align the bracket over the holes and re-fix the bracket on the BMS with screws [Inverter (part L)]. And screw the tapping screw [Inverter (part H)] through the washer [Inverter (part I)] and secure the bracket with tapping screws. Please hold the bracket firmly to the wall surface before fixing it.

e



f) Place the inverter to be seated on the corresponding position of the bracket. As A1-HYB-G2 series inverters are heavy, weigh 75 lbs / 34 Kg. They should be lifted up by two persons and placed carefully onto the bracket. Then adjust the inverter to be centered on the whole system;

f

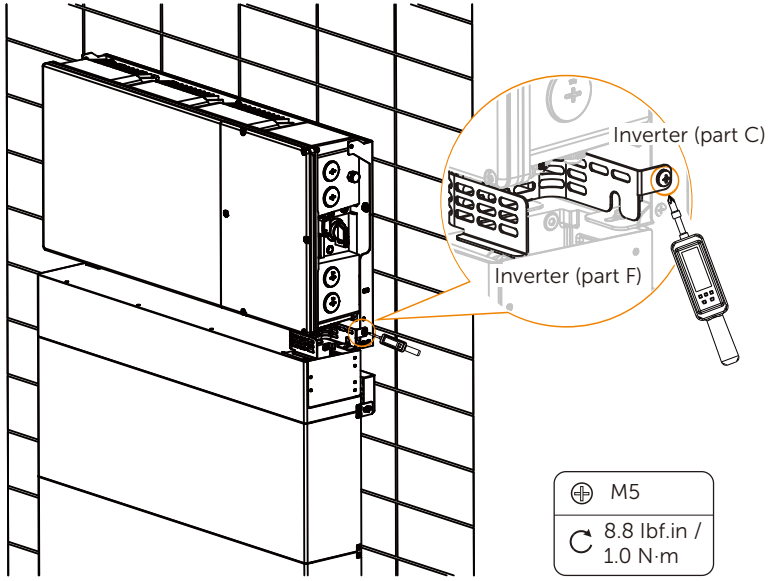


Back view

Front view

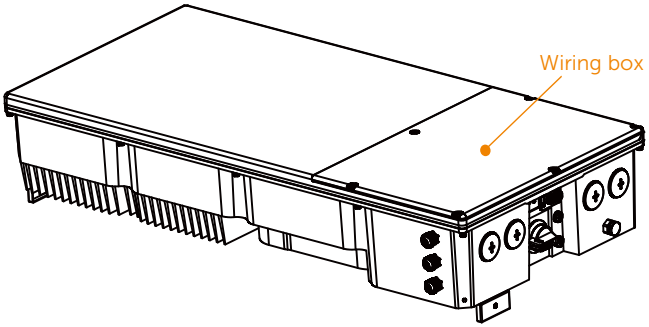
g) Place the protective guard [Inverter (part F)] on the correct position of battery's BMS prior to the wiring connection between inverter and battery and fix it with the inverter bracket with M5 screws [Inverter (part C)].

g





Open the wiring box cover to complete all the wiring connection.

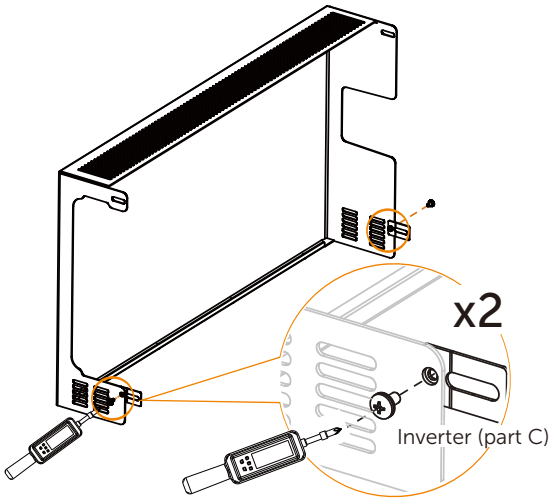


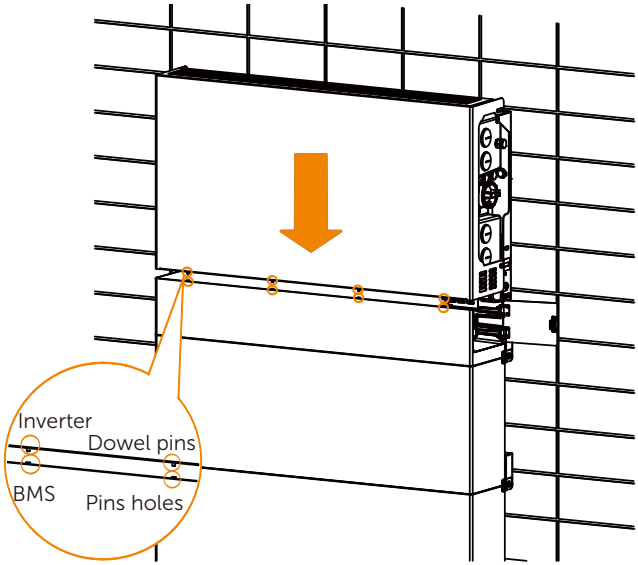
NOTICE!

- For detailed wiring connection, please refer to "8 Wiring Connection on the Inverter" .

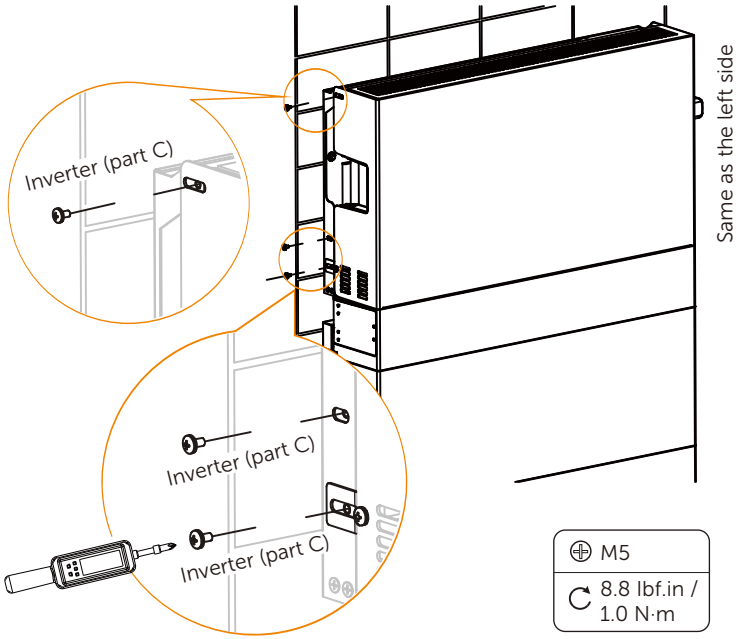
h) Pre-mount the fixing plate with screws [Inverter (part C)] on the two sides of metal cover and mount the metal cover on the inverter. Please make sure the four dowel pins are inserted into the holes of BMS and adjust the whole system (inverter and battery) to be leveled.

h





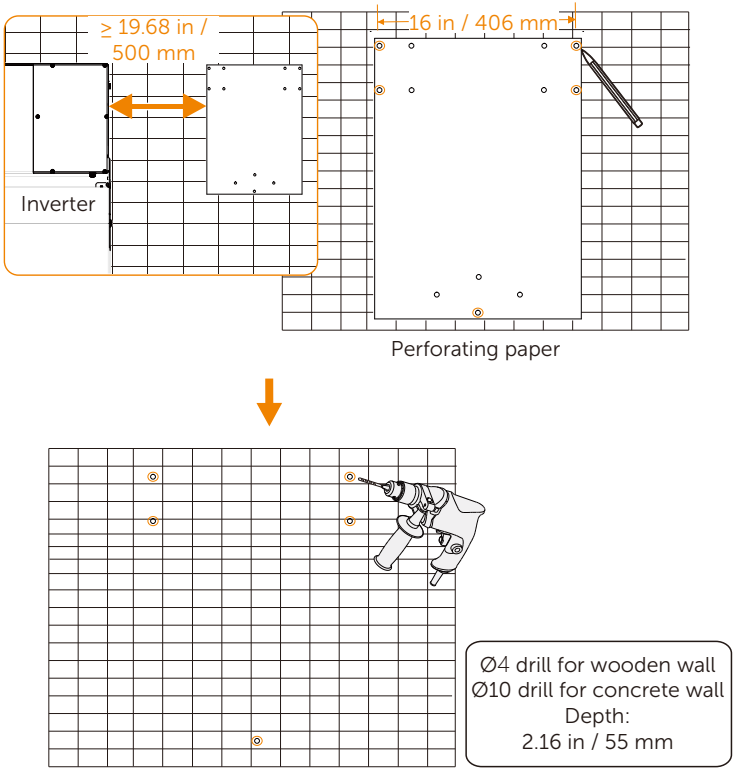
i) Fix the metal cover with six M5 screws [Inverter (part C)].



Step3: Mount the BI

a) Use the perforating paper as a template to mark the screw hole location on the wall; And drill five holes on the wall.

a



NOTICE!

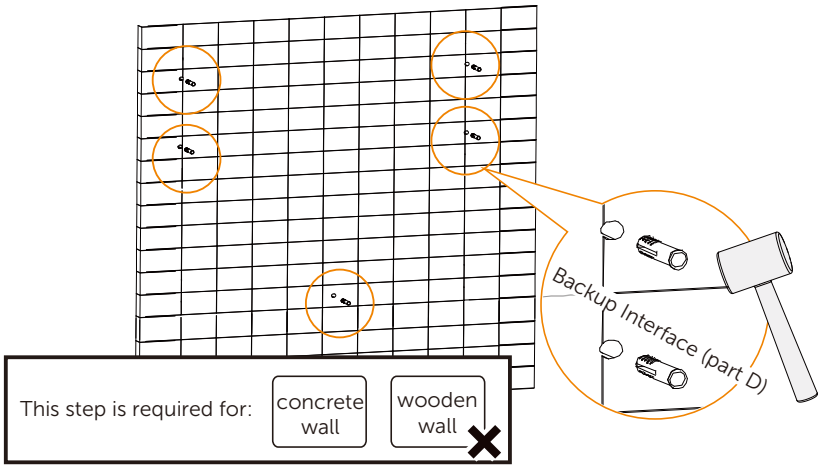
- For solid concrete wall, please use Ø10 drill.

NOTICE!

- The inner-side hole of the bracket is 12 in / 305 mm.

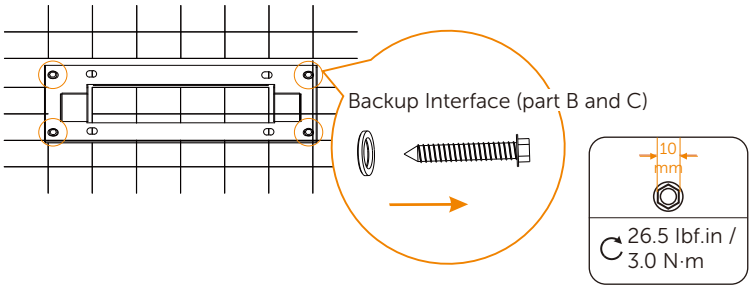
b) Use mallet to knock the five expansion tube [Backup Interface (part D)] into wall (This step can be ignored in case of wooden wall).

b



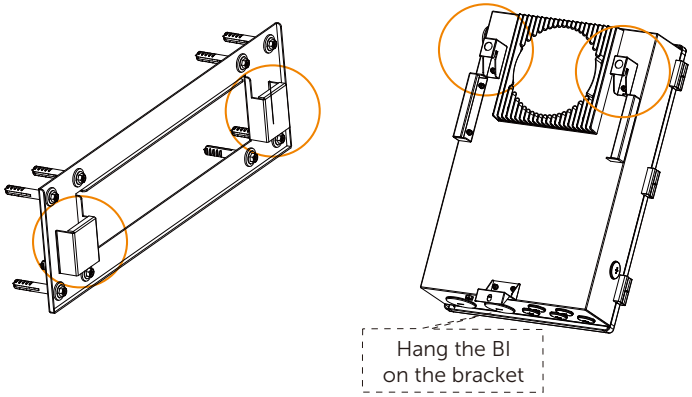
c) Secure the bracket on the wall with tapping screw [Backup Interface (part B)] and washer [Backup Interface (part C)] using torque wrench. Please hold the bracket firmly to the surface of the wall when fixing bracket.

c



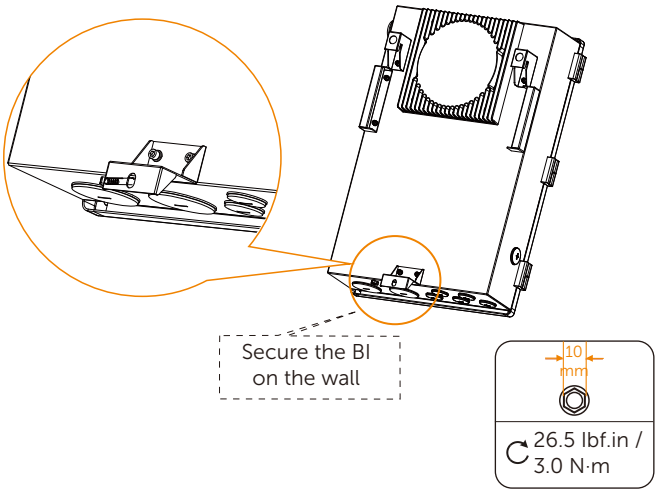
d) Hang the BI on the bracket. Please make sure the cleat is well seated on the bracket.

d



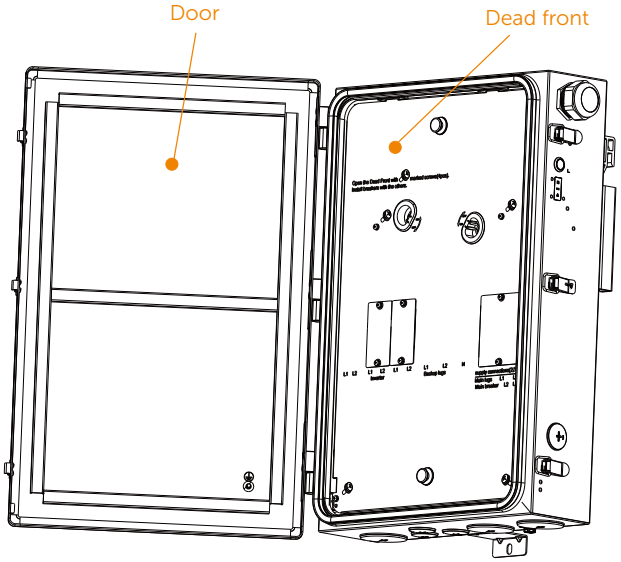
e) Secure the BI by screwing in the tapping screw with washer on the bottom of BI.

e





Open the door of Backup Interface and remove the dead front to complete all the wiring connection.

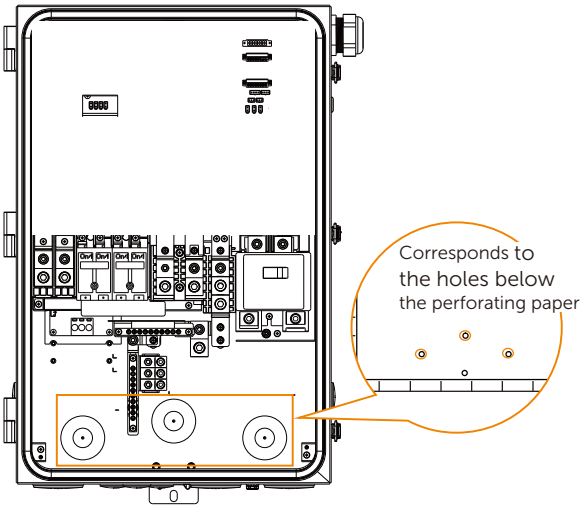


NOTICE!

- For detailed wiring connection, please refer to "9 Wiring Connection on the BI" .

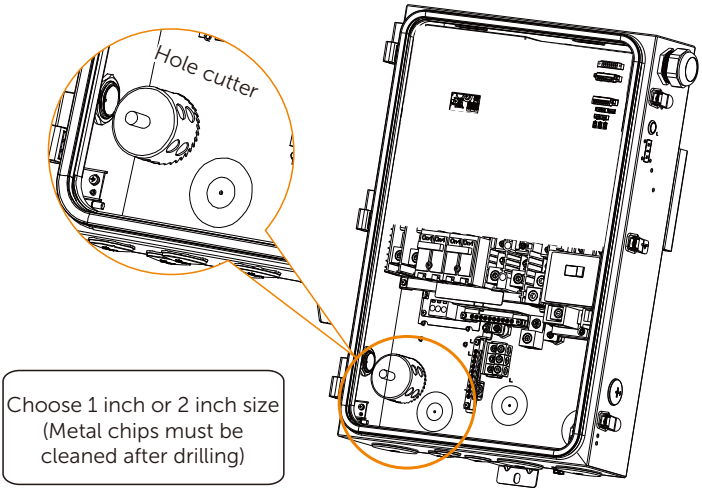
Drill a hole in the back (Not recommended)
a) These three holes correspond to the holes below the perforated paper.

a



b) Drill the hole with a hole cutter. Choose 1 inch or 2 inch size (Metal chips must be cleaned after drilling).

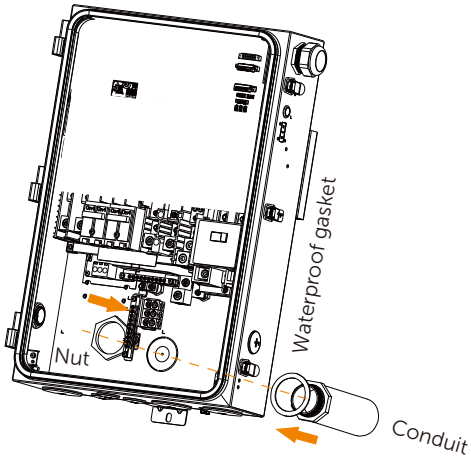
b



c) Lock nut, waterproof gasket (outside), conduit.

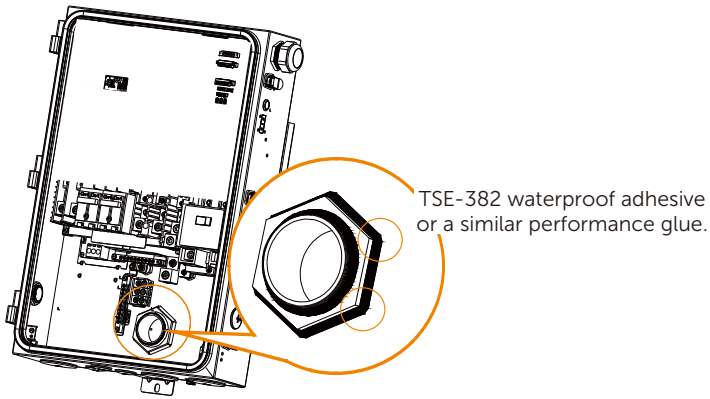
NOTICE!
• Prohibit the flow of water inside the tubing water into the machine!

c



d) The top of the nut and contact surface of the threads must be cleaned after locking the nut, as well as the contact surface between the nut and the box.

d



NOTICE!
• Drilling a hole in the wall is required before cutting a hole in the rear. To guarantee easy installation of the conduit and sealing with the chassis, the hole's size must be greater than the conduit's outside diameter.

8 Wiring Connection on the Inverter

8.1 Overview of All Electrical Wiring Methods

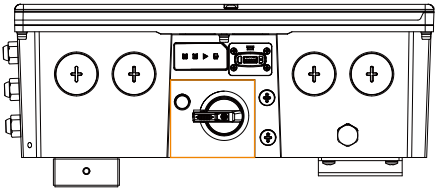
All electrical wiring will be done in the wiring box, and all electrical wiring methods are similar. Therefore this section will introduce all electrical wiring steps and requirements.

- Opening the wiring box cover

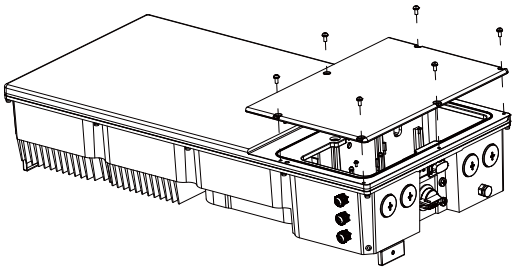
WARNING!

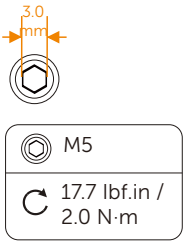
- Before inverter wiring connection, Make sure no live voltages are present on PV input and AC output circuits, and make sure that the DC switch is in "OFF" position, meanwhile, the breaker of battery is in "OFF" position.

Step 1: Turn DC switch to "OFF" position. Note that the cover cannot be removed when the DC switch is in "ON" position.



Step 2: Make sure the breaker of battery is in "OFF" position.
Step 3: Remove the 6 cover screws using Allen key, then disassemble the cover.



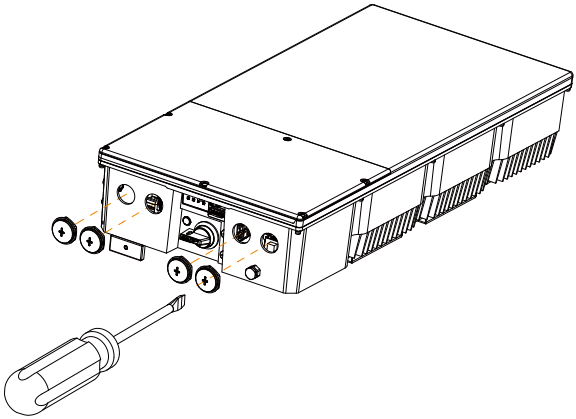


- Removing wiring box waterproof plugs

A1-HYB-G2 series inverter is equipped with four 1 inch conduit fittings which are used for electrical wiring access. Four waterproof plugs have been installed on the inverter at the factory. Before wiring connection, these waterproof plugs should be removed by the operator.

Step 1: Remove the waterproof plugs by placing a flat blade screwdriver in the slot on the waterproof plug face and turning while gripping the nut on the inside of the enclosure to ensure it does not slip.

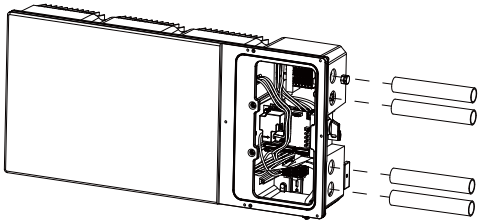
Step 2: Unscrew the nut from the waterproof plug and slip the conduit plug out of the waterproof opening.



- Conduit installation

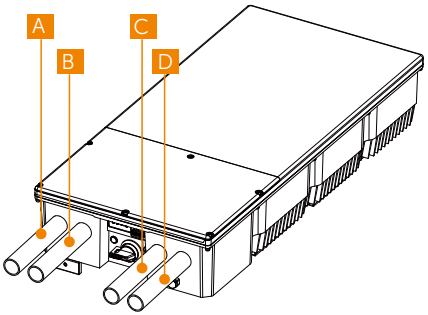
Operator should use the conduits and plugs with standard size which must fit with the holes on the right side of the inverter. Conduit fittings need to be water tight, and an insulated type is preferred.

Once conduit and fittings are installed, wires should go through the conduit and be locked into the corresponding terminals.



- **Cable entry of inverter**

A conduit fitting or cable gland must be used when wiring connection. The cable is routed from the right side of inverter.



Item	Type of Cable Entry
A	Conduit plug for AC connection
B	Conduit plug for communication connection
C	Conduit plugs for PV connection
D	Conduit plugs for PV connection

WARNING!

- Electrical wiring (especially the wiring of communication cables) must comply with local electrical regulations and standards.

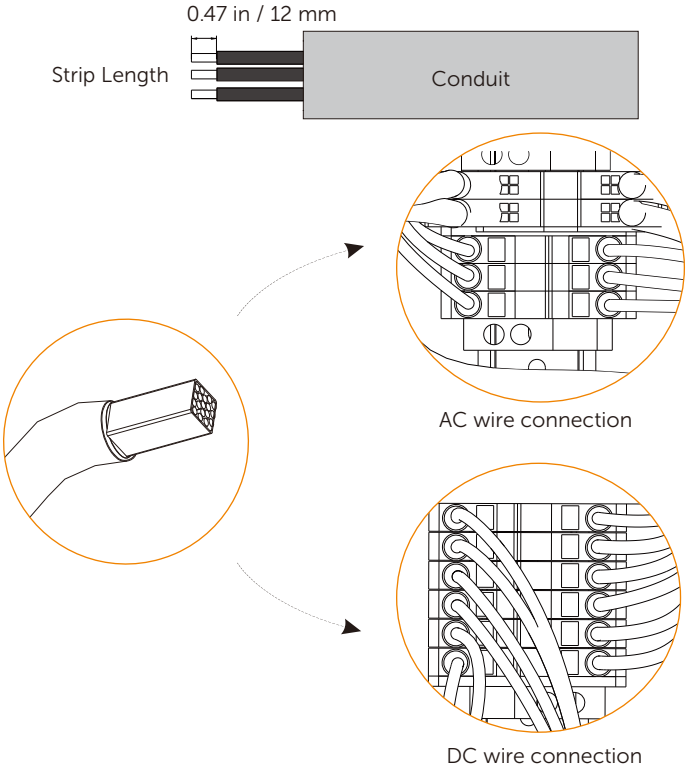
NOTICE!

- When communication cables and power cables share the same conduit, the communication cables must meet the following requirements:
  - » Withstand voltage: ≥ 600 V
  - » Recommended outer diameter: ≤ 11.5 mm
  - » Characteristic impedance: 120 Ω
  - » Conductor wire gauge: ≥ 22 AWG

8.2 Power Connection

- General steps of connecting electrical wirings to terminals

Step 1: Choose the appropriate wire according to the specific connection.
Step 2: Remove 0.47 in / 12 mm of insulation from the end of DC wire and the AC wire.
Step 3: Insert the end of wires into the Cord End Terminal, and then use the crimping tool to crimp the Cord End Terminal tightly (the shape will be square). Please determine whether Cord End Terminals need to be installed based on the selected wire type and the regulations of the National Electrical Code ANSI/NFPA 70.
Step 4: Use the slot screwdriver to compress the orange button of the terminals. Then insert stripped wires into the terminal and ensure that all conductor strands are captured in the terminal.
Step 5: Loosen the slot screwdriver.
Step 6: For the specific requirement of power cable, please refer to "Appendix A: Wiring and Breaker Requirement".



8.2.1 PV Connection

CAUTION!

- Never reverse the polarity of the array string cables as it can cause damage to the inverter. Always ensure correct polarity.

WARNING!

- Select PV modules with excellent functioning and reliable quality. Open-circuit voltage of module arrays connected in series should be less than the inverter Max. DC input voltage of 550 V. The inverter warranty is VOID if the DC input voltage is exceeded.

WARNING!

- Ensure no live voltages are present on the PV input and AC output circuit, and verify that the DC disconnect, AC disconnect, and dedicated AC circuit breaker are in the "OFF" position before installation.

WARNING!

- Use dark, opaque sheets to cover the PV solar panels before performing any wiring or connection.

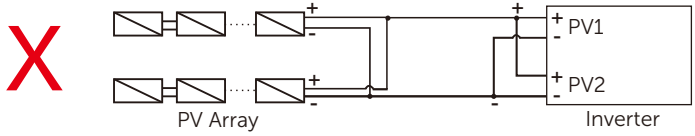
WARNING!

- Power is fed from more than one source and more than one live circuit. Note that all DC and AC terminals may carry current even without connected wires.

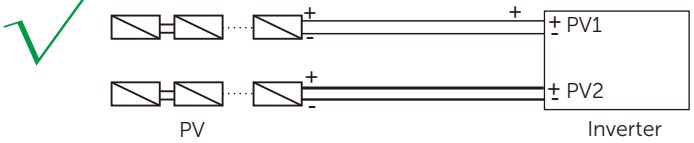
WARNING!

- Ensure maximum protection against hazardous contact voltages while assembling PV panel installations. Both the positive and negative leads must be strictly isolated electrically from the protective ground potential (PE).

NOTE!
The PV connection mode below is NOT allowed!

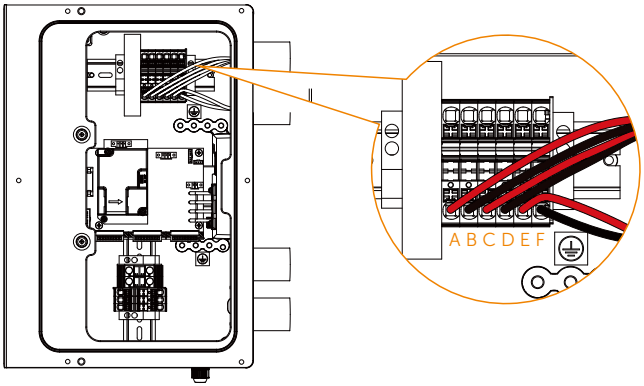


The inverter supports the following PV module connection modes.



- PV String Connection

A1-HYB-G2 Series inverter can be connected with PV modules in series with 2 MPPTs for A1-HYB-3.8K-G2, A1-HYB-5.0K-G2 and A1-HYB-6.0K-G2, 3 MPPTs for A1-HYB-7.6K-G2.



A: PV1 Positive terminal
B: PV1 Negative terminal
C: PV2 Positive terminal
D: PV2 Negative terminal
E: PV3 Positive terminal
F: PV3 Negative terminal

8.2.2 Grid Connection

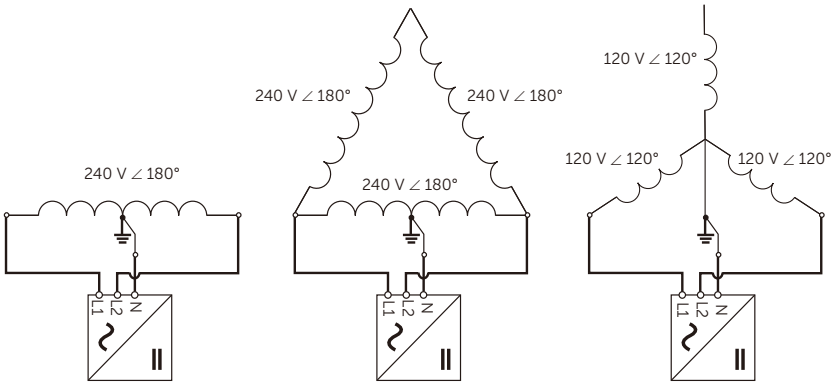
CAUTION!

- The installer is responsible for providing overcurrent protection. To reduce the risk of fire, only connect to a circuit provided with overcurrent protection in accordance with the National Electrical Code, ANSI/NFPA 70.

The connection procedure will vary depending on the grid configuration.

The following diagram provides an overview of the compatible grid configurations of which voltage limit, frequency limit and conductors have to be connected to the inverter to comply with the grid configuration.

Public grid configuration allowed:

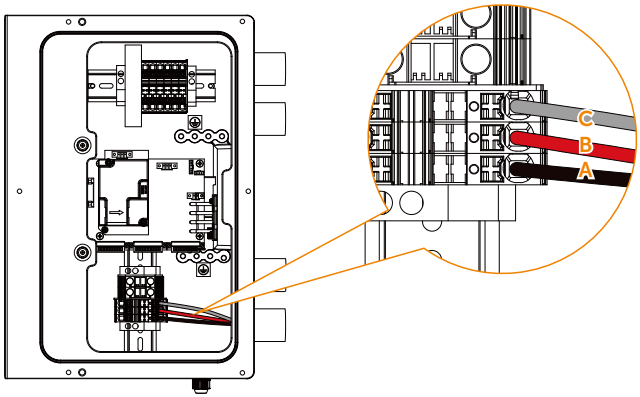


Grid terminal connection on the side of inverter

CAUTION!

DANGER — HIGH VOLTAGE!

- For the specific requirement of power cable, please refer to "Appendix A: Wiring and Breaker Requirement".



A: L1 cable B: L2 cable C: N cable

AC circuit breaker requirements

The AC circuit breaker is required to protect each AC line (L1 and L2) of the HYB series inverter. The circuit breaker should be able to handle the rated maximum output voltage and current of the inverter.

Refer to the table below to determine the specific circuit breaker in order to avoid potential fire hazards. The AC circuit breaker selection and installation must follow the National Electrical Code(NEC), ANSI / NFPA 70 or local electrical codes.

Inverter model	Description	Source
A1-HYB-3.8K-G2	2-pole, 20 A, 240 Vac	can be purchased from manufacturer
A1-HYB-5.0K-G2	2-pole, 30 A, 240 Vac	
A1-HYB-6.0K-G2	2-pole, 35 A, 240 Vac	
A1-HYB-7.6K-G2	2-pole, 40 A, 240 Vac	

NOTICE!

- If the system is equipped with BI, connect another end of AC cable to BI. Please refer to "9 Wiring Connection on the BI" .

8.2.3 Battery Connection

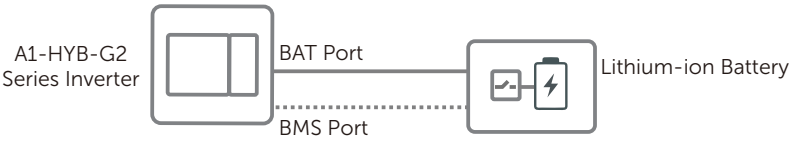
CAUTION!

- Never reverse the polarity of the battery cables as this will result in inverter damage. Always ensure correct polarity.

Charging and Discharging system of A1-HYB-G2 series inverter is designed for high-voltage lithium-ion battery.

As a Lithium-ion battery will be connected with HYB series inverter, the battery communication should be compatible with A1-HYB-G2 series inverter and the BMS must be connected between inverter and battery.

Battery connection diagram for Lithium-ion battery



BAT terminal connection

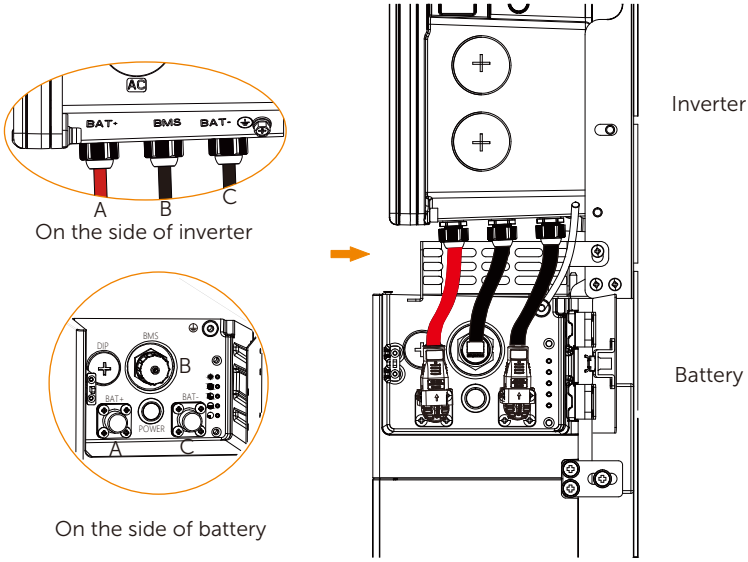
CAUTION!

DANGER — HIGH VOLTAGE!
- Make sure the breaker of battery is in "OFF" position.

NOTICE!

- Before wiring, the guards (if any) shall be removed from connectors.
- Before wiring,
  1. Unscrew the cap at BMS clockwise;
  2. Unscrew the screws at BAT+ and BAT- respectively.

The parts where BMS needs to wire are as follows:
1. The BAT+ (red) , communication cable and BAT- (black) cables have been already connected on the inverter's side. Only connecting the other end of the cables to the corresponding port of BMS is needed.
2. Make sure that both ends of the cables are connected correctly to the connector on the right side of the BMS module.



A: BAT+ B: Communication connection C: BAT-

NOTICE!

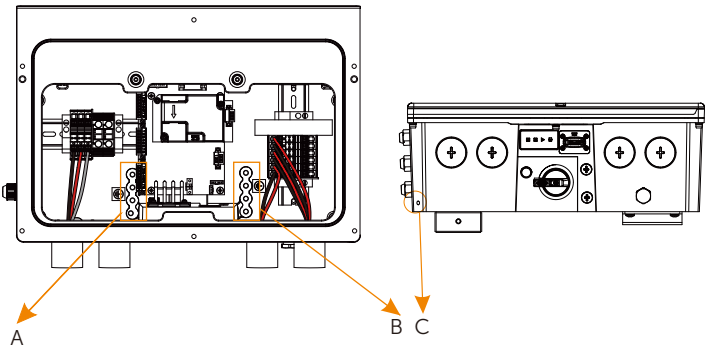
- Don't violently remove cables when they are locked.

8.3 Ground Connection

Please additionally earth the inverter to the enclosure of a second earthing or equipotential bonding if it is required by local safety. This prevents electric shock if the original protective conductor fails.

- **Ground terminal**

Ground terminals are as follows. Terminals on bus-bar A and B are for AC and DC ground connection. Ground terminal C is for ground connection between inverter and battery.

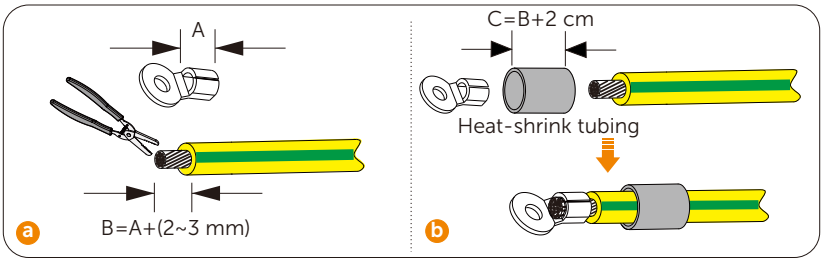


- **Steps of Ground Connection**

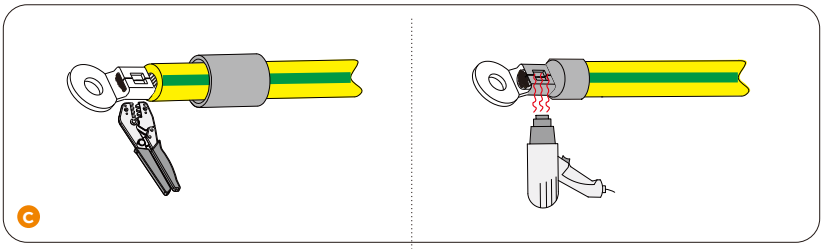
a) Strip the insulation of conductor by wire stripper;
b) Pull the heat-shrink tubing over the PE cable and insert the stripped section into the grounding terminal;

NOTICE!

- For the specific requirement of power cable, please refer to "Appendix A: Wiring and Breaker Requirement".

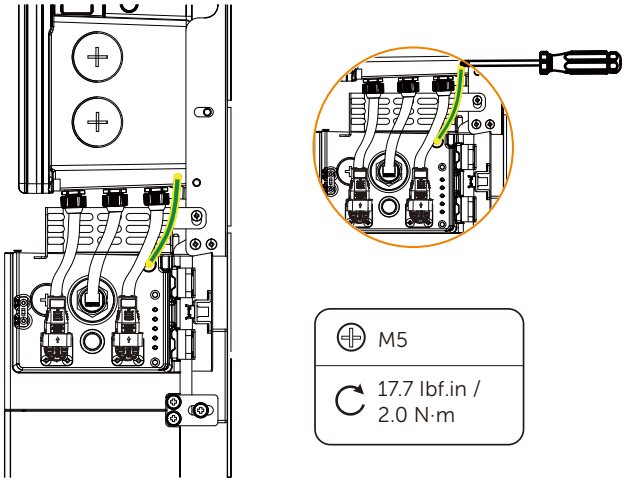


c) Crimp it with crimping tool, pull the heat-shrink tubing over the stripped section of the grounding terminal and use a heat gun to shrink it so that it can be firmly contacted with the terminal;



d) Connect the ground cable to the inverter and fix it with M4 screw.
When PV connection, please connect the ground cable to B bus-bars.
When grid connection, please connect the ground cable to A bus-bars.

e) Connect the ground cable between the inverter and battery with M5 screws. For easier connection, please connect the grounding cable on the BMS first.



NOTICE!
• Ensure to connect the ground cable.

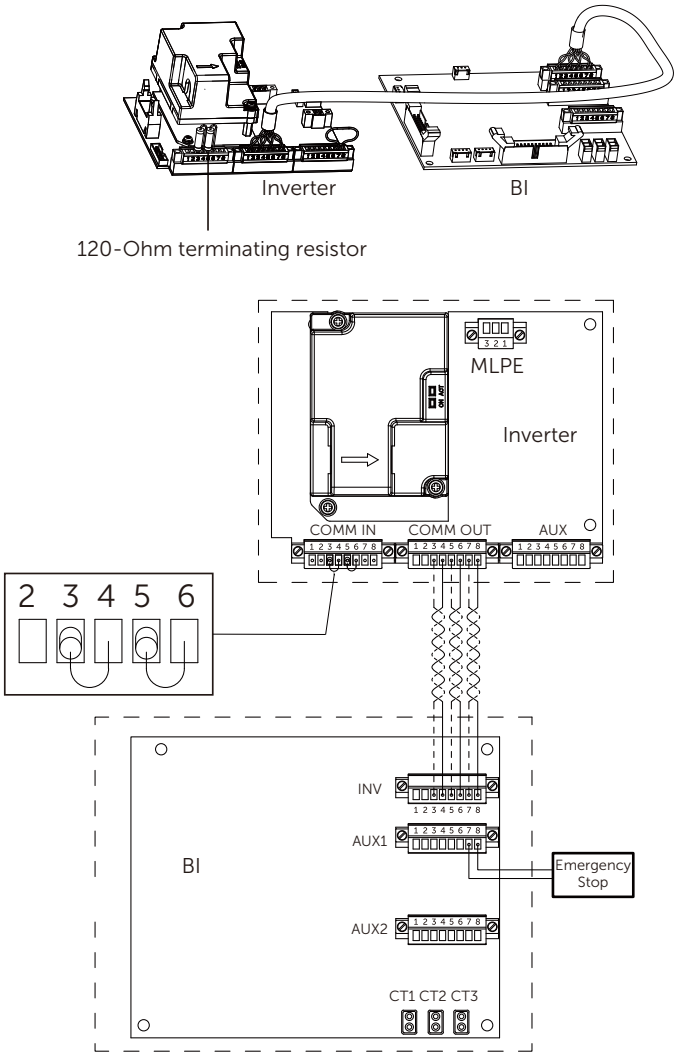
8.4 Communication Connection

All communication cables will be done on the communication board which is in the wiring box. For the specific requirement of cable, please refer to "Appendix A: Wiring and Breaker Requirement".

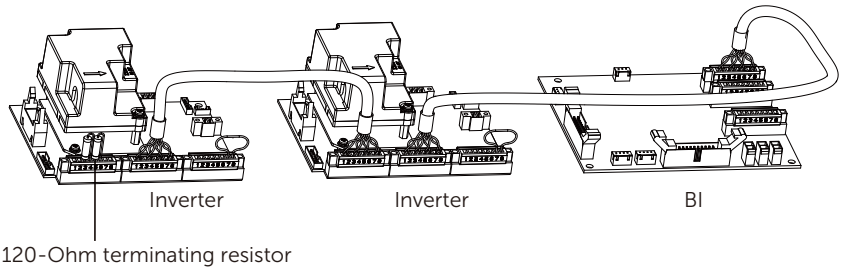
8.4.1 Make Communication Connection to Another Inverter/BI

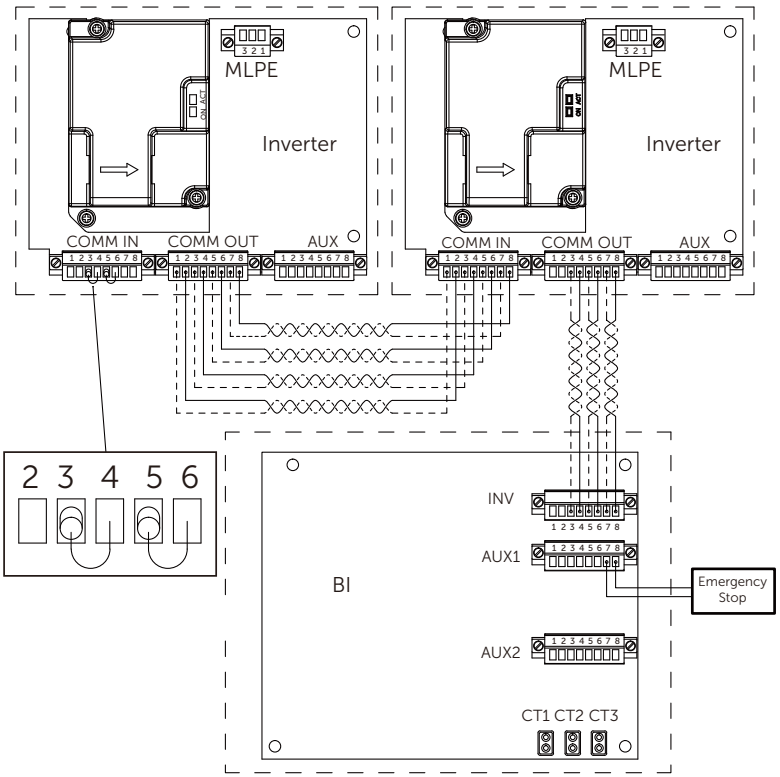
- Inverter communication system diagram

Single inverter



Multi-inverter





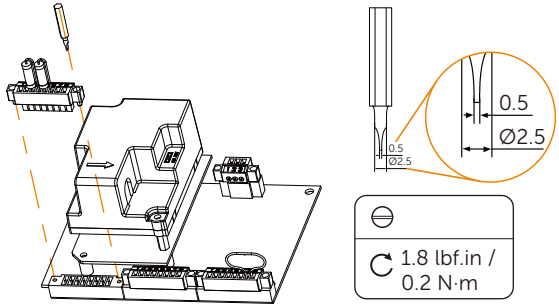
NOTICE!

- In the first inverter in the communication chain, plug the 8-pin female block with the terminating 120-Ohm resistor into the 8-pin male block. Maximum four inverters can be communicated via communication cable.

- Connection steps of terminating resistor

Step 1: The 120-Ohm resistor has been pre-installed on the 8-pin female block before leaving factory. Take it out from the accessory box.

Step 2: Install the 8-pin female block with resistor to the COMM in male terminal by using slot screwdriver.



- Connection steps of communication wire

Step 1: A1-HYB-G2 series inverter supports to be connected with additional three inverters in maximum. Disassemble 8-pin female blocks prior to communication connection.

Step 2:

Communication connection between inverters:

Pin 1-Pin 6: Select the CAT5 or better (24-18 AWG), use diagonal plier to cut off two wires and leave six wires for connection. Remove 0.24 in / 6 mm of insulation from the end of the six wires.

Pin 7-Pin8: Select two 18-16 AWG wires and remove 0.24 in / 6 mm of insulation from the end of the two wires.

Communication connection between inverter and BI:

Pin 3-Pin 6: Select the CAT5 or better (24-18 AWG), use diagonal plier to cut off four wires and leave four wires for connection. Remove 0.24 in / 6 mm of insulation from the end of the four wires.

Pin 7-Pin8: Select two 18-16AWG wires and remove 0.24 in / 6 mm of insulation from the end of the two wires.

Step 3: Plug stripped wires into female terminal and ensure that all conductor strands are captured in the terminal.

Step 4: Screw down screw cap tightly.

Step 5:

Connection between inverters:

Plug the female terminal block into the COMM OUT male terminal block on the communication board of the first inverter and screw in each screw tightly. And plug another end of female terminal block into the COMM IN male terminal block on the communication board of the second inverter.

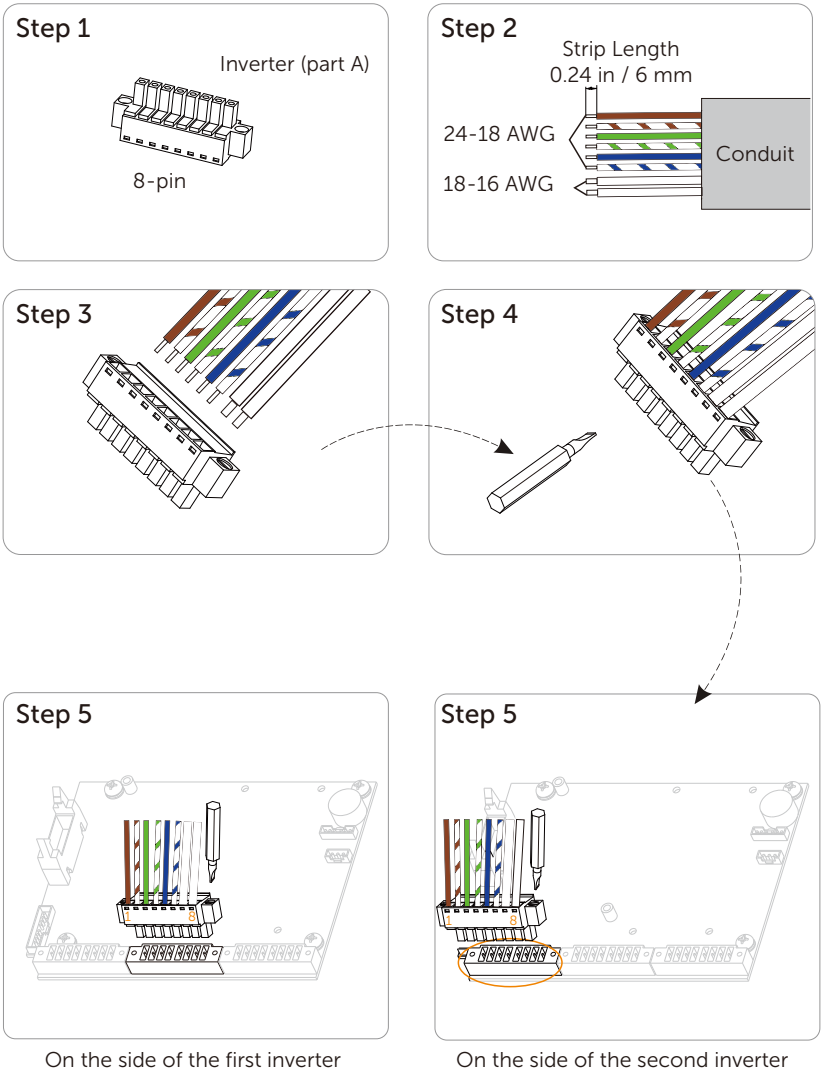
Connection between inverter and BI:

Plug the female terminal block into the COMM OUT male terminal block on the communication board of the inverter and screw in each screw tightly. And plug another end of female terminal block into the INV communication terminal of BI.

NOTICE!

- For the specific communication terminal on the BI, please refer to "9 Wiring Connection on the BI" .

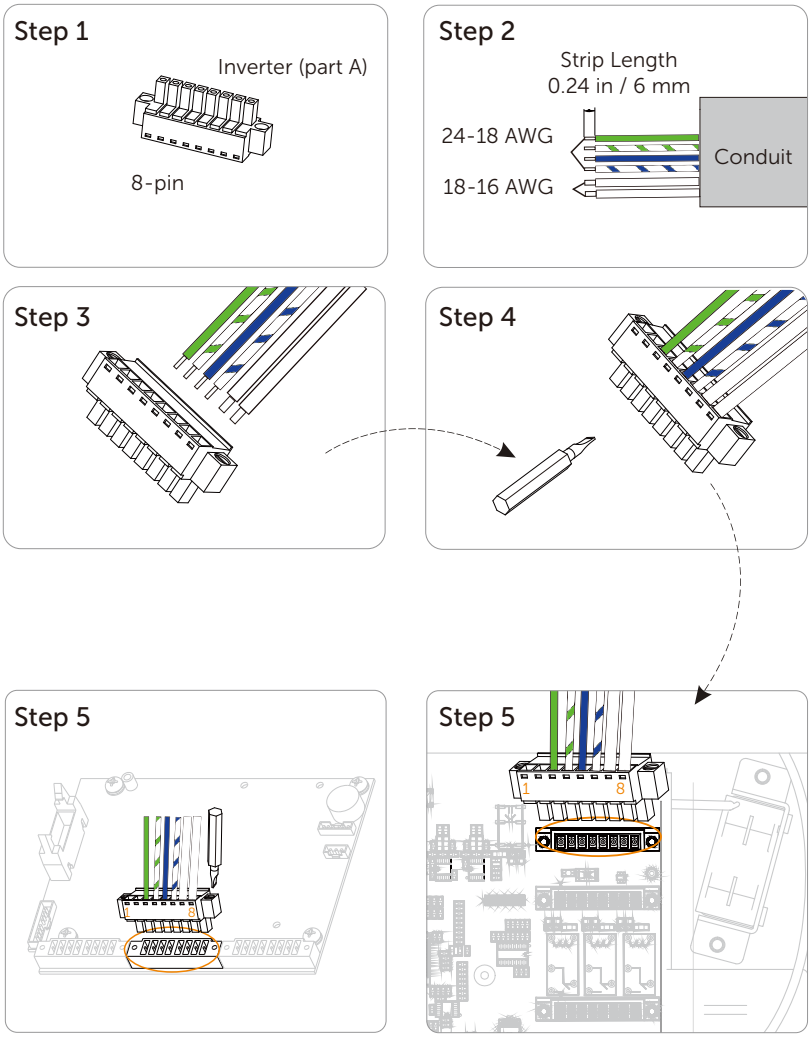
Diagram for communication connection steps between inverters



On the side of the first inverter

On the side of the second inverter

Diagram for communication connection steps between inverter and BI



On the side of inverter

On the side of BI

8.4.2 Emergency Stop Connection

Generally, Emergency stop is connected to backup interface to simultaneously command the whole system to become idle and enter a safe mode. While SolaX A1-HYB-G2 series inverter can be wired to include an emergency stop switch as well. Emergency stop connects to inverter only if no backup interface is equipped. Please refer to "Appendix B: Emergency Stop Connection Steps 1" for more details.

8.4.3 RGM (Meter X) Connection (Optional)

The RGM (Meter X) is used to get the information about the energy flow. If the Meter X has been purchased from SolaX, it will be pre-mounted inside the inverter before leaving factory.

8.4.4 External Electricity Meter (Meter Y) Connection (Optional)

The external electricity meter (Meter Y) will be integrated in the backup interface if Meter Y has been purchased from SolaX. It connects to inverter only if no backup interface is equipped in the whole system. Please refer to "Appendix C: Meter Y Connection Diagram" for more details about meter connection on the inverter.

8.4.5 RSD Transmitter Connection

The APsmart Rapid Shutdown System Transmitter-PLC-1P is part of a rapid shutdown solution when paired with APsmart signal receiver (RSD-S-PLC-A, RSD-D15-1000 or RSD-D-25-1000), a PV module rapid shutdown unit. While powered on, the Transmitter-PLC-1P sends a signal to the signal receiver to keep their PV modules connected and supplying energy. The signal receiver automatically enter rapid shutdown mode when the Transmitter-PLC-1P is switched off and resume energy production when power is restored to the Transmitter PLC-1P. This solution complies with NEC 690.12 specifications for 2017&2020 and supports the SunSpec signal for rapid shutdown.

NOTICE!

- The RSD has been integrated in the inverter before leaving factory.

NOTICE!

- If an emergency stop switch is required, the customer needs to purchase and wire it.

8.4.6 Parallel Connection

A1-HYB-G2 series same-power inverters support up to 4 parallel connection, Unified EMS management function by the primary machine. The primary and secondary machines are interconnected via CAN and RS485 buses.
For detailed diagram, please refer to "Appendix D: System Wiring Diagram".

1) All parallel solutions must be equipped with BI as standard, and A1-HYB-G2 AC direct parallel external power meter solution is not supported.
2) The EMS under grid parallel can support the same modes as the stand-alone EMS mode, including:

- Self-Use (default)
- Backup mode
- Time of Use mode
- Feed in Priority
- Demand mode
- Constant power discharge mode

Concurrent Primary-Secondary role setting

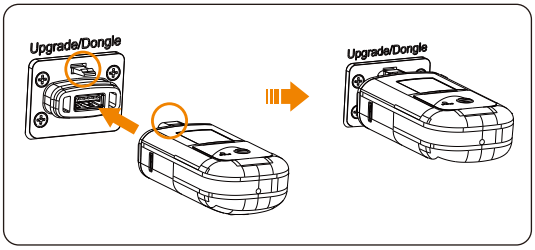
1) All machines need to set parallel enable/ disable. Enabling parallel machine does not allow running standalone mode.
2) The Primary also needs to set the number of parallel machines.
3) Primary communication lost, system down waiting for human intervention to recover.
4) Loss of Secondary communication (CAN), the primary operates normally, but reports a "Loss of Secondary Communication Alarm". The lost Secondary stops and reports a parallel communication failure until the communication is restored and then tries to integrate into the system again.
For details, please refer to "Parallel Connection Guide".

8.4.7 Monitoring Connection (Optional)

The inverter provides a **Dongle** terminal, which can transmit data of the inverter to the monitoring website via WiFi / WiFi+LAN / WiFi+4G Dongle (Optional). (Purchase products from SolaX if needed.)

Dongle connection procedure

a. Plug the dongle to the inverter.



9 Wiring Connection on the BI

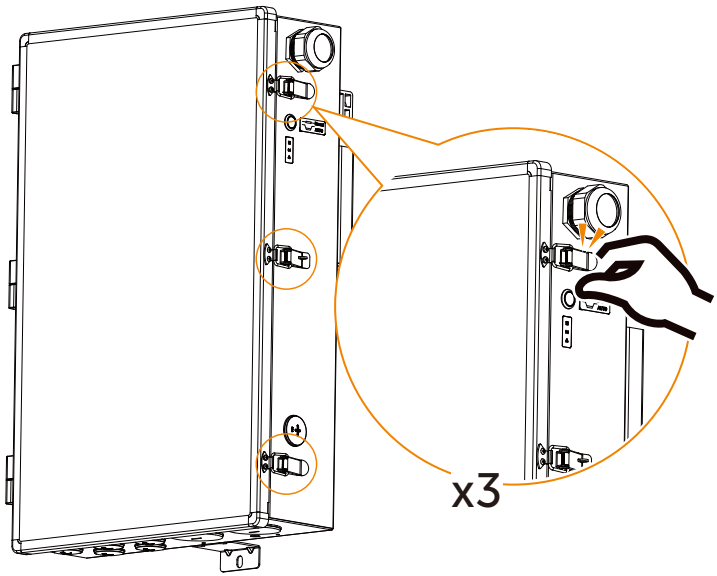
WARNING!

- To avoid shock hazard, never power on the system without a connection to Earth at BI.

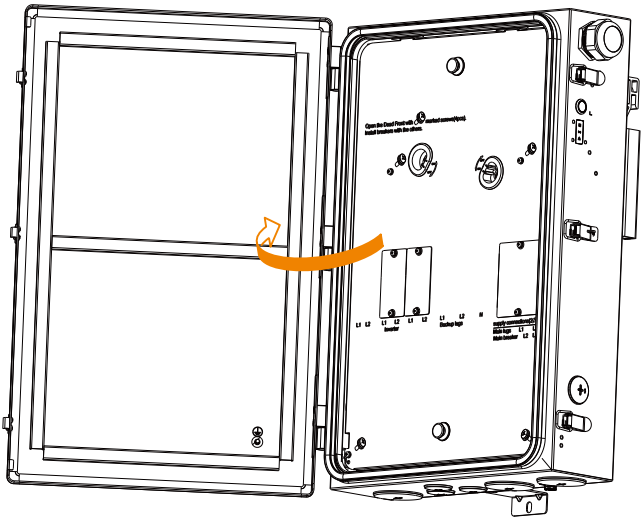
CAUTION!

- Before BI wiring connection, please make sure the BI is correctly wall-mounted and can be configured for cable entry at the bottom and sides of the enclosure.

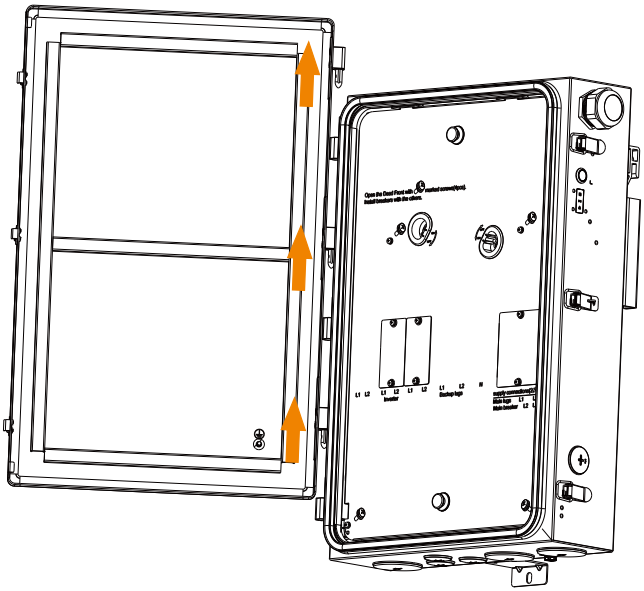
Please open the door and remove dead front first.
Step 1: Break the buckle by hand.



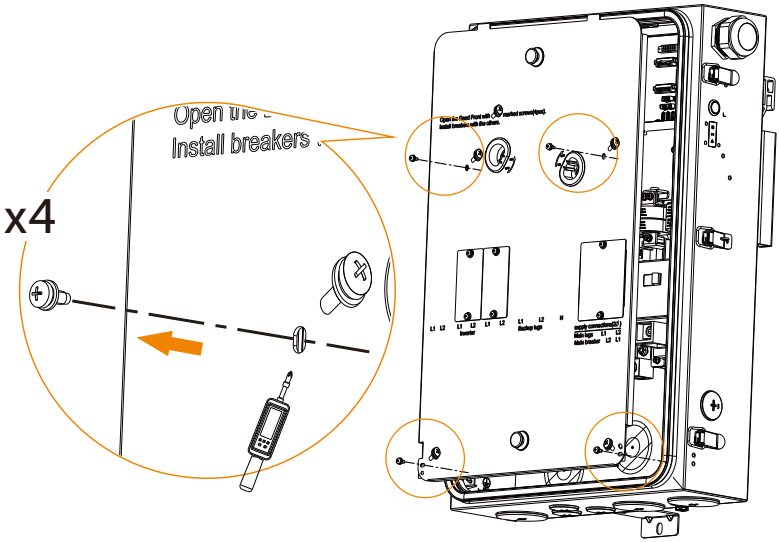
Step 2: Open the door.



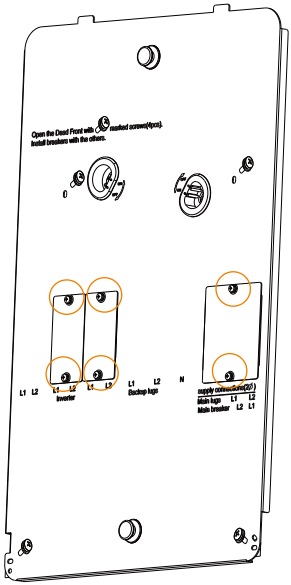
Step 3: Remove the door upwards.



Step 4: Remove the dead front by unscrewing the four screws with a screwdriver.



Unscrew the metal cover where circuit breakers are to be installed.



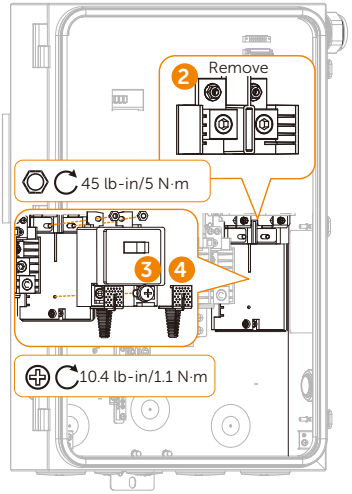
9.1 Install Breakers

For Service Equipment

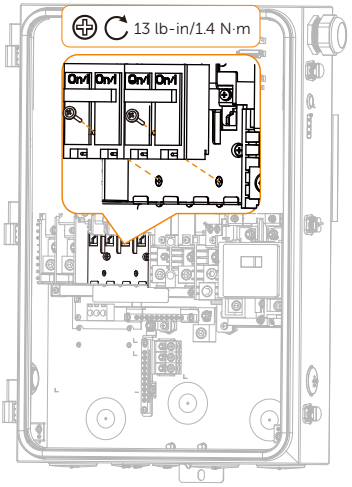
The product is "SUITABLE FOR USE AS SERVICE EQUIPMENT". For this scenario,

1. The following main breaker accessory needs to be installed.
   a. EATON main breaker b. Line side barriers
2. .Loosen the original terminals; remove the plastic terminal block.
3. Install and fasten main breaker with M4*12 screw, with a torque of 10.4 lb-in/1.1 N·m.
4. To cover the main breaker with line side barrier.
5. Apply the marked as "SUITABLE FOR USE AS SERVICE EQUIPMENT".
6. Neutral is bonded to ground with "Bonding Jumper".
7. Apply the "SERVICE DISCONNECT" labels adjacent to appropriate circuit breakers.

For Subpanel: Disconnect the "Bonding Jumper" from ground.



Install a main breaker



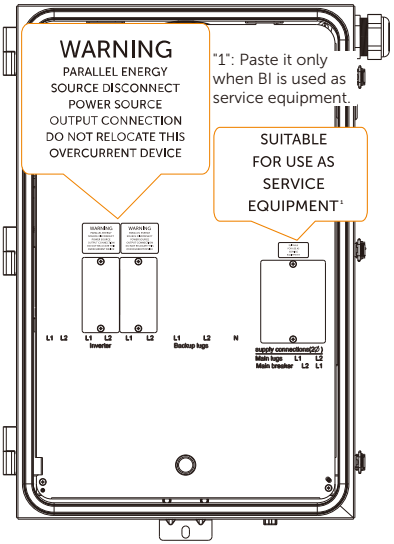
Install a branch breaker

Breaker List and Short Current:

Main Breaker	Branch Breaker	Then the maximum short circuit rating in RMS symmetrical amperes, 240V is:
When the panelboard service disconnect is a Type:	And the branch breakers installed are Type:	
EATON CSR	EATON BR BRAF BRH BD BQ.	10,000 A
EATON CSR+Bussmann Class J Fuse (LPJ-500-SP)	EATON BR BRAF BRH BD BQ.	22,000 A

Main Breaker Line side barriers: EATON TICSR300.
Hold down kit: EATON BRHDK125.

Paste labels: Labels are in the accessory box of Backup Interface.



9.2 Make AC Connection to Inverter, Generator, Load and Grid

NOTICE!

- Before any wiring connection, the conduit must be installed according to the national and local requirement.

NOTICE!

- For the specific conductor requirement of size and torque, please refer to "Appendix A: Wiring and Breaker Requirement".

⚠ WARNING!

- The system supports to install four inverters in maximum. Never power on the system without a connection to Earth at the BI.

⚠ WARNING!

- Incorrect wiring of AC conductors presents a risk of electrical shock or damage to the equipment. Before powering on the system, ensure all the connections are correctly made according instructions in this documents and in accordance with local wiring codes and regulations.

General steps:

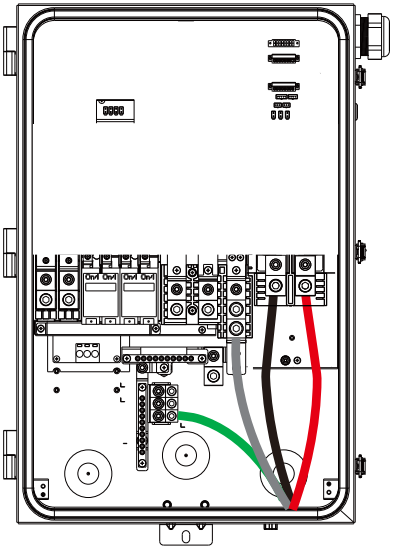
Step 1: Route AC wires through the conduit. Strip the ends of the wires and plug the corresponding terminal lugs.

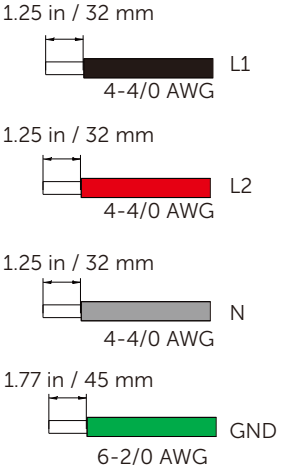
Step 2: Use an appropriate torque tool to tighten the lugs according to "Appendix A: Wiring and Breaker Requirement".

Step 3: Use copper wire only.

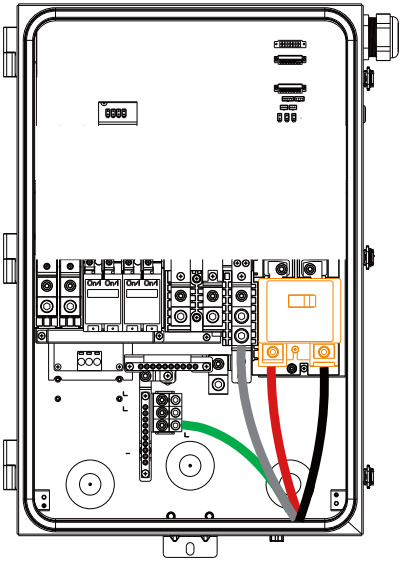
- Connect the Grid Conductors to BI

A main breaker not installed

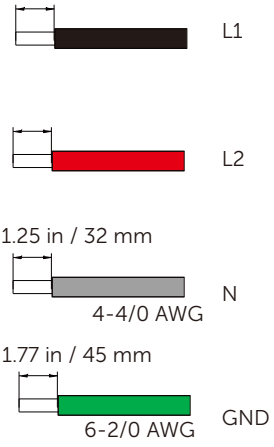




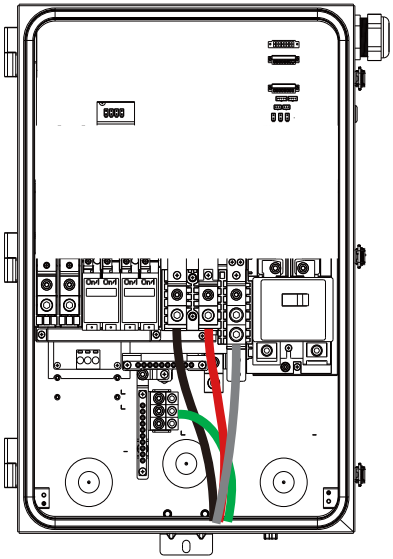
A main breaker installed



L1 and L2 required wire sizes and torques should refer to the circuit breaker label requirements.



- Connect Load Conductors to BI



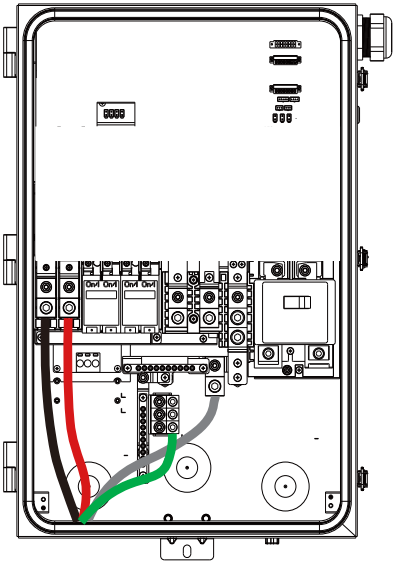
1.25 in / 32 mm
L1
4-4/0 AWG

1.25 in / 32 mm
L2
4-4/0 AWG

1.25 in / 32 mm
N
4-4/0 AWG

1.77 in / 45 mm
GND
6-2/0 AWG

- Connect ESS1 Conductors to BI



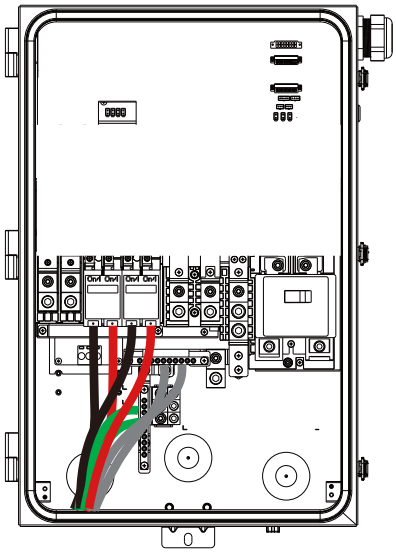
1.25 in / 32 mm
L1
4-4/0 AWG

1.25 in / 32 mm
L2
4-4/0 AWG

1.25 in / 32 mm
N
4-4/0 AWG

1.77 in / 45 mm
GND
6-2/0 AWG

- Connect ESS2&3 Conductors to BI



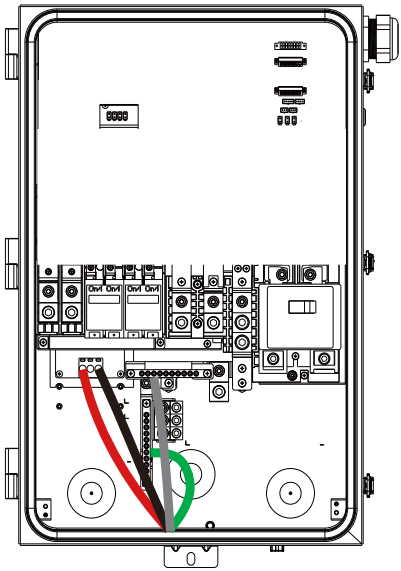
1.25 in / 32 mm
L1
4-4/0 AWG

1.25 in / 32 mm
L2
4-4/0 AWG

0.79 in / 20 mm
N
14-4 AWG

0.79 in / 20 mm
GND
14-4 AWG

- Connect Generator Conductors to BI



0.67 in / 17 mm
L1
8-4 AWG

0.67 in / 17 mm
L2
8-4 AWG

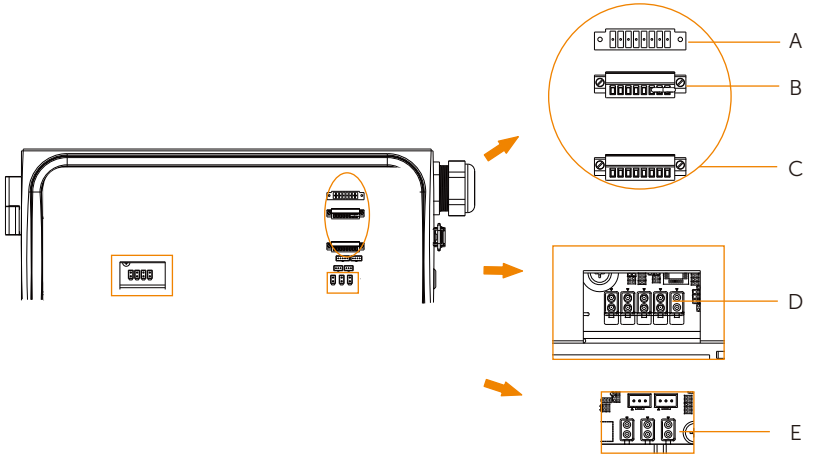
0.79 in / 20 mm
N
14-4 AWG

0.79 in / 20 mm
GND
14-4 AWG

9.3 Make Communication Connection

- **Overview of all communication cables connection methods**

All communication cables will be done on the communication board of BI. This section will introduce the steps and requirements for all communication cables connections.



Item	Terminals	Port Pin
A	INV communication terminal (for communication between inverter and BI)	Pin 1: RESERVE
		Pin 2: RESERVE
		Pin 3: CAN_L
		Pin 4: CAN_H
		Pin 5: RS485_BI_A
		Pin 6: RS485_BI_B
		Pin 7: +12V
		Pin 8: GND

Item	Terminals	Port Pin
B	AUX1 terminal (for communication between generator and BI, Emergency stop and BI)	Pin 1: DRY_GEN
		Pin 2: GND_GEN
		Pin 3: RS485_RESERVE_A
		Pin 4: RS485_RESERVE_B
		Pin 5: RESERVE
		Pin 6: RESERVE
		Pin 7: STOP_NO+
		Pin 8: STOP_NO-
C	Reserved	Pin 1: NO_1
		Pin 2: COM_1
		Pin 3: NC_1
		Pin 4: NO_2
		Pin 5: COM_2/3
		Pin 6: NC_2
		Pin 7: NO_3
		Pin 8: NC_3
D	CT L1A terminal	Pin 1: CT L1A+
		Pin 2: CT L1A-
	CT L1B terminal	Pin 1: CT L1B+
		Pin 2: CT L1B-
	CT L2A terminal	Pin 1: CT L2A+
		Pin 2: CT L2A-
	CT L2B terminal	Pin 1: CT L2B+
		Pin 2: CT L2B-
E	CT1 terminal	Pin 1: CT 1+
		Pin 2: CT 1-
	CT2 terminal	Pin 1: CT 2+
		Pin 2: CT 2-
	CT3 terminal	Pin 1: CT 2+
		Pin 2: CT 2-

- **Communication connection between inverter and BI**

Please refer to "8.4.1 Make Communication Connection to Another Inverter/BI" for the detailed steps of connection.

- **Communication connection of Emergency stop and generator**

The Emergency stop and generator share the same AUX1 port.

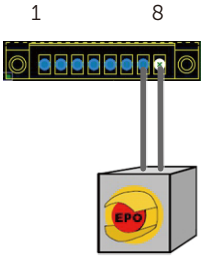
Install optional Emergency stop

The BI can be wired to include an external emergency stop switch that can switch off the whole system.

Step 1: Remove the factory-installed jumper from Pin 7 and Pin 8 of the 8-position "AUX1" connector inside the BI.

Step 2: Use minimum 24 AWG conductors (maximum 18 AWG) for Emergency stop to connect Pin 7 and Pin 8.

Step 3: Confirm the system will cease operation when the switch is open.



Emergency stop

NOTICE!

- Turn the switch to OFF (open) position: The whole system will go to idle.
- Turn the switch to ON (closed) position: The whole system will resume shortly.

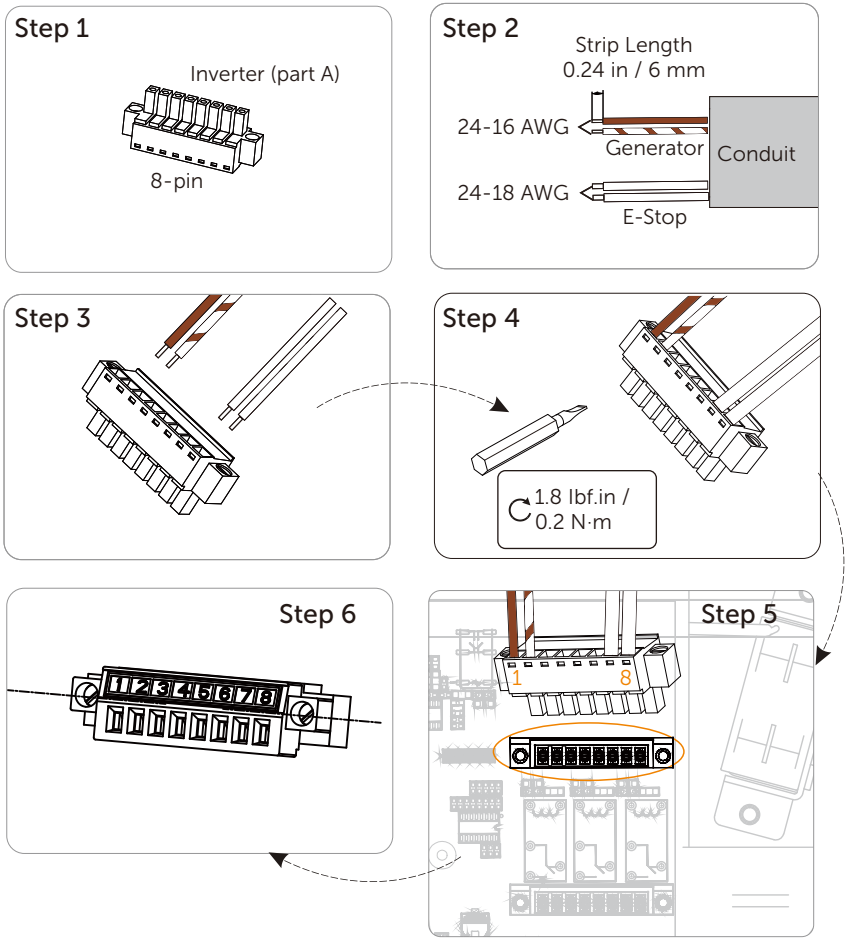
Install generator

Step 1: Use the same 8-Pin female terminal of Emergency stop.

Step 2: Use minimum 24 AWG conductors (maximum 16 AWG) for generator to connect Pin 1 and Pin 2 (Pin 7 and Pin 8 for Emergency stop). The rest pins are reserved.

Step 3: Remove 0.24 in / 6 mm of insulation from the end of the four wires.

Step 4: Insert the stripped wires into female terminal and ensure that all conductor strands are captured in the terminal. and plug the female terminal to AUX1 port.



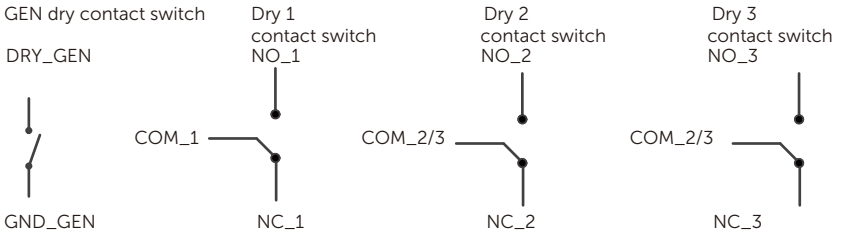
On the side of BI

Dry contact switch

The GEN dry contact switch is used as a controller for an AC generator with a remote start function. The GEN dry contact switch may be used to start the generator by closing the appropriate circuit.

NOTICE!

- When using generation remote start function, the generator must be connected to the BI's GEN terminals.



Item	Value
GEN dry contact switch current/voltage rating	2 A / 30 VDC
DRY 1 contact switch current/voltage rating	3 A / 30 VDC
DRY 2 contact switch current/voltage rating	3 A / 30 VDC
DRY 3 contact switch current/voltage rating	3 A / 30 VDC

The dry 1 contact switch / dry 2 contact switch / dry 3 contact switch can be used to implement Load Shed function.
Load Shed function can perform load management. It is intended to turn off designated loads during low battery periods to conserve remaining battery power.

- **Connecting external CTs**

CT placement locations include the following:

A set of CTs (CT L1A , CT L2A, 200A) has been built in the BI. In some application scenarios, it can measure both load and generation and there is no need to connect external CTs. But in some application scenarios, such as Partial-Home Backup solution, connecting external CTs (CT L1B , CT L2B) to measure total current both load and generation is needed. In addition, if the site includes solar equipment, a solar CT is placed after the solar inverter to measure the solar output.

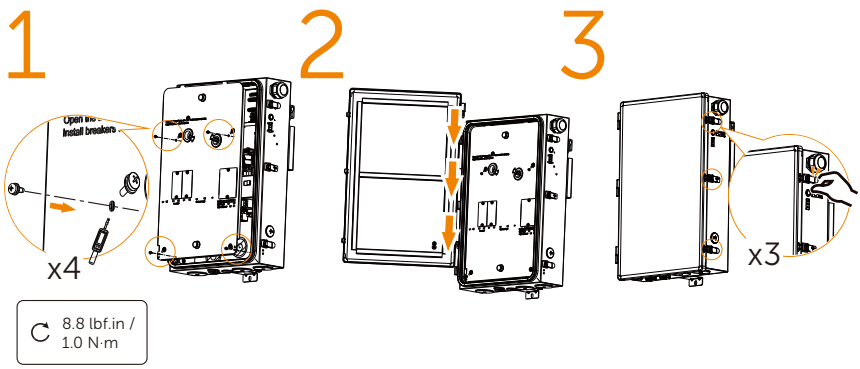
CT L1A terminal and CT L1B terminal have been connected in parallel on PCB. CT L1A and CT L1B are used to measure total current both load and generation of the same phase L1.

CT L2A terminal and CT L2B terminal have been connected in parallel on PCB. CT L2A and CT L2B are used to measure total current both load and generation of the same phase L2.

NOTICE!

- For detailed information about how to configure external CT, please refer to "BI CT configuration for A1-ESS-G2" by scanning the QR code.

Lock the dead front and close the door.



10 Close Wiring Cover and Turn on the System

10.1 Check Below Steps before Turn on the System

Step 1: Ensure the system is properly mounted.
Step 2: Ensure all grounding wire to the grounding bus-bar are connected properly.
Step 3: Ensure all the communication wirings are connected properly.
Step 4: Ensure all the DC wirings and AC wirings are completed.
Step 5: Ensure the CT is connected properly.
Step 6: Ensure the battery is connected properly.
Step 7: Ensure all loads are connected properly, and that the combined ratings of all backed-up loads are within the rating capacity of the system without grid support.
Step 8: Ensure the PV arrays are connected properly. Ensure the battery has been turned off, and all the indicator light of the battery are off.

10.2 Turn on the System

Step 1: Before closing any wiring cover, please take photos of the completed wiring in the inverter, battery and BI.
Step 2: Install the wiring box cover of the inverter and secure it firmly with the original screw.
Step 3: Install the internal cover of the BI.
Step 4: Switch on the BI power button (turn to "AUTO").
Step 5: Switch on the AC circuit breakers for the BI and inverter.
Step 6: Make sure that the battery has been turned off, and all the indicator light of the battery are off.
Step 7: Switch on the circuit breaker of battery.
Step 8: Switch on the PV DC switch of the inverter (turn to "ON" position).
Step 9: Press the battery POWER button to start the battery.
Step 10: Install the outer cover of the BI.
Step 11: The system will start up. Check the status of indicators on inverter, battery and BI for more information on the codes displayed for error and warning messages, refer to "12 Troubleshooting".
Step 12: Download and configure the APP.

NOTICE!

- Before you switch on the circuit breaker of the battery, make sure that the battery has been turned off, and all the indicator light of the battery are off. If the battery has been turn on, then you switch on the circuit breaker of the battery, the inverter and the battery may be damaged.

NOTICE!

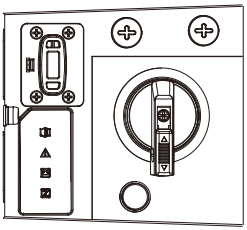
- If the left indicator do not turn green please check the below points:
  - All the connections are correct.
  - All the external breakers are switched on.
  - The DC switch on the inverter is in the "ON" position.

10.3 Shut Down the System

Step 1: If the system is on, press the inverter POWER button for 1 second to turn off the inverter.
Step 2: Switch off the PV DC switch of the inverter (turn to "OFF" position).
Step 3: Press the battery POWER button to turn off the battery.
Step 4: Switch off the circuit breaker of the battery.
Step 5: Switch off the AC circuit breakers for the BI and inverter.

11 Indicator Light and Button

Indicator light and button of inverter



Fault LED 1 and Fault LED 2

LED1 flashes green (0.5s on, 0.5s off) and LED2 is red when arc fault occurs.

LED1 flashes green (2s on, 2s off) and LED2 is red when ground fault occurs.

LED1 flashes green (0.5s on, 0.5s off) and LED2 is off when PV voltage fault occurs.

LED1 flashes green (2s on, 2s off) and LED2 is off when Grid error occurs.

LED1 flashes green (0.5s on, 0.5s off) and LED2 flashes red (0.5s on, 0.5s off) when firmware upgrading is ongoing.

LED1 is green and LED2 is red when other fault occurs.

LED1 is off and LED2 is off when no fault occurs.

Operation LED (Free / Secondary)

Green when the inverter is in normal status or in backup status.

Flashing green (1s on, 1s off) when the inverter is in waiting or checking status.

Off when the inverter has a fault.



Operation LED (Primary)

Green for 2s and then quick flashing green for 1s (0.2s on, 0.2s off) when the inverter is in normal or backup status.

Flashing green for 2s (1s on, 1s off) and then quick flashing green for 1s (0.2s on, 0.2s off) when the inverter is in waiting or checking status.

Off for 2s and quick flashing green for 1s (0.2s on, 0.2s off) when the inverter has a fault.



BAT LED

Green when the battery communication is normal and working.

Flashing green (1s on, 1s off) when the battery communication is normal and the battery is in idle status.

Off when the battery does not communicate with inverter.

All LEDs

All LEDs flash (0.5s on, 0.5s off) when firmware upgrading has been completed but the U drive is still connected

All LEDs will be back to the normal state if the U drive is unplugged after the upgrading finished.



Inverter power button

Press the button for 0.5 second: Clear EPS OverLoad Fault / EPS Bat Power Low / BI_TransformerImbalanceHighFault / BI_VoltImbalanceFault / BatBreakOpen Fault.

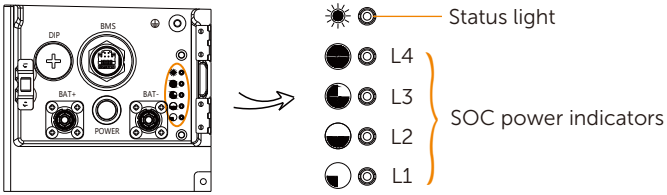
Press the button for 1 second: Turn on the inverter if it has been turned off.

Press the button for 1 second: Turn off the inverter if it has been turned on. The control circuitry remains powered up.

Press the button for 5 seconds: Run arc self-test if there is no arc fault.

Press the button for 5 seconds: Clear arc fault if arc fault occurs.

Indicator light and button of battery



Working:
When charging, status light will remain on solid green light; when discharging, status light will flash green every 0.5 sec.

Fault:
Status light begins on solid red; 10 mins later, the status light will flash red for 1 sec and turn off for 4 sec, and the SOC power indicators will flash to indicate a malfunction (for details, refer to the User Manual).

Upgrade:
Status light flashes green, red and yellow; SOC power indicators flash blue every 0.2 sec.

Idle State:
Status light begins on green for 1 sec and turns off for 4 sec; all SOC power indicators are off.

Power On:
Open air switch's guard, toggle switch (red background of inspection window), and press Power for 1 to 2 sec to start system.

Power Off:
Status light and SOC power indicators are off.

Indicator light and button of BI



Operation LED

- Green when the BI is in on-grid status.
- Flashing green (2s on, 2s off) when the BI is in backup status.
- Flashing green (0.5s on, 0.5s off) when the BI is in generator status.
- Off when the load port of the BI has no power.

Communication LED

- Green when the BI communication is normal.
- Flashing green (2s on, 2s off) when the BI RS485 fault occurs.
- Off when the BI communication fault occurs.

Fault LED

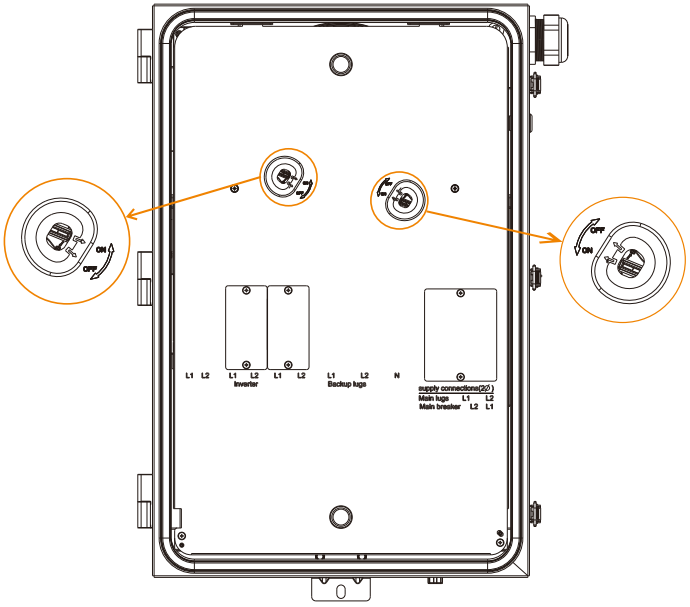
- Red when relay fault or over temperature fault occurs.
- Flashing red (2s on, 2s off) when other fault occurs.
- Flashing red (0.5s on, 0.5s off) when BI power button is off or Emergency stop fault occurs.
- Off if no Fault occurs.

Color and Status			Message Explanation	
Operation LED	Communication	Fault LED		
0.5s on, 0.5s off	0.5s on, 0.5s off	0.5s on, 0.5s off	Firmware upgrading	
OFF	OFF	OFF	Upgrade 0%-29%	Cycle
OFF	OFF	ON	Upgrade 30%-69%	
OFF	ON	ON	Upgrade 70%-99%	
ON	ON	ON	Upgrade 100%	

BI power button

When ON, the A1-ESS-G2 system can intelligently switch between on-grid and off-grid without human intervention.
When OFF, manual control of the BI will be enabled when the internal relay is not switched automatically. When some unrecoverable failure is encountered, causing the system to stop running and the home load to lose power, the following operations can be performed:

1. Open the door of the BI.
2. Turn off the breaker between the inverter and the BI, as well as the breaker between the BI and the generator.
3. Turn off the main breaker on the grid side.
4. Wait for 60s.
5. Press the BI power button to enter manual maintenance mode.
6. Use the tool to turn the left and right relays to ON.
7. Turn on the main breaker to make the grid ready to power the home load.
8. Turn on the breaker between the inverter and the BI to make the inverter run again.
9. Close the door of the BI.



12 Troubleshooting

This section contains information and procedures for solving possible problems with A1-ESS-G2 system, and provides you with troubleshooting tips to identify and solve most problems that could occur with the system.
This section will help you narrow down the source of the problems you may encounter. Please read the following troubleshooting steps.
Check warnings or fault messages on the SolaXCloud. If a message is displayed, record it before doing anything further operation.

Troubleshooting for inverter

Faults	Diagnosis and solution
AFD Self Check Fault	AFD Self Check • Please check if the AFDI module connects normally • Or contact SolaX Technical Support
Arc Detect Fault	DC Arc occurs or DC Arc Check Fault • Please check if there is any visible arc vestige firstly • Clear the PV input and solar battery board connects normally • If Arc is detected five times in one hour, please manually clear Arc. Otherwise, it will re-connect to grid in five minutes
PV Conn Dir Fault	PV Reverse Connection Fault • Re-connect the PV correctly
BAT Volt Fault	Battery Voltage Over high or Over low Fault • Check if the battery input voltage is within the normal range • Please contact SolaX Technical Support
E-Stop Fault	Emergency stop Activated or Inverter Emergency Off
BI Comm Fault	Communication Fault between Inverter and BI • Check if the RS485 communication cable of BI connects to communication board of inverter. • Please contact SolaX Technical Support
Update File Fail	File Upgrade Fault • Check if the file and the folder are correct • Please contact SolaX Technical Support

Faults	Diagnosis and solution
Udisk Update Fault	U Disk Upgrade Fault • Check if the U disk is correctly plugged and the file is correct • Please contact SolaX Technical Support
Meter Fault	Meter Communication Fault • Check if the communication cable between inverter and BI connects normally or contact SolaX Technical Support
BMS_Lost	BMS Communication Lost • Check the communication connection between the battery and the inverter • Please contact SolaX Technical Support
Update Fault	Software Upgrade Fault • Check if the communication cable between inverter and BI and re-upgrade the software • Check the communication cable between control board and communication board and re-upgrade the software • Check the communication cable between inverter and battery • Or contact SolaX Technical Support
PV Volt Fault	PV Voltage Out of Normal Range • Decrease the PV voltage • Or contact SolaX Technical Support
DCI OCP Fault	DCI over current protection Fault • Please contact SolaX Technical Support
DCV OVP Fault	DCV EPS over voltage protection Fault • Please contact SolaX Technical Support
Bat Current Imbalance	The Firmware Fault of Battery Charge • Please contact SolaX Technical Support
Bat ConDir Fault	The Positive and Negative Pole of Battery Connected Reversely • Re-connect the battery
InvEEPROMFault	Inverter EEPROM Fault • Please contact SolaX Technical Support
EPSBatPowerLow	Battery Power Low in EPS Mode • Turn off high power device and charge for the battery

Faults	Diagnosis and solution
EPS OverLoad Fault	Over Load in EPS Mode. • Turn off some device and clear the error
Grid Over Freq Fault	Grid Frequency Out of Range • System will reconnect if the utility is back to normal • Or please contact SolaX Technical Support
Grid Over Volt Fault	Grid Voltage Out of Range • System will reconnect if the utility is back to normal • Or please contact SolaX Technical Support
Grid Relay Fault	GIRD Relay Fault • Please contact SolaX Technical Support
Grid Under Freq Fault	Grid Frequency Out of Range • System will reconnect if the utility is back to normal • Or please contact SolaX Technical Support
Grid Under Volt Fault	Grid Voltage Out of Range • System will reconnect if the utility is back to normal • Or please contact SolaX Technical Support
Bus Volt Fault	Bus Voltage Out of Normal Range • Please contact SolaX Technical Support
Sample Fault	Gird Frequency or Voltage Sample Fault • Please contact SolaX Technical Support
Inter Com Fault	Internal Communication Fault • Check the connection between inverter and BI connects normally • Or contact SolaX Technical Support
Isolation Fault	Isolation Fault • Check if the insulation of electric wires are damaged or too wet • Or contact SolaX Technical Support
Mgr EEPROM Fault	Manager EEPROM Fault • Please contact SolaX Technical Support
Other Device Fault	CPU Self-check Fault or Internal Flash Fault or RAM Fault • Please contact SolaX Technical Support

Faults	Diagnosis and solution
UnderTemp Fault	Temperature Below the Limitation or Temperature Sensor Fault • Please contact SolaX Technical Support
Over Temp Fault	Temperature over the limitation • Check if the environment temperature is over limitation • Check if the internal fan is fault • Or contact SolaX Technical Support
RC OCP Fault	Leakage Current Fault • Check if the insulation of electric wires are damaged or too wet • Or contactSolaX Technical Support
Bat Break Open Fault	Battery Break Open Fault • Check if the circuit break of battery is open.
Fan Fault	Inverter Internal Fan Fault • Please contact SolaX Technical Support
SW OCP Fault	Battery Charge and Discharge Over Current Fault or PV Over Current Fault or Inverter Over Current • Please contact SolaX Technical Support
RCD Fault	Residual Current Device Sensor Fault • Please contact SolaX Technical Support
Rtc Fault	Rtc Fault • Please contact SolaX Technical Support
SoftVerFault	Program Write Fails or Incorrent Program Written in • Re-write the program • Or contact SolaX Technical Support
Grid Lost Fault	Grid Lost Fault • System will reconnect if the utility is back to normal • Check if the grid is normal
TZ Protect Fault	The Firmware of PV or Inverter or Battery Over Current Fault • Please contact SolaX Technical Support

Troubleshooting for battery

Faults	Diagnosis and solution
BMS_External_Err	Unable to establish communication with inverter. • Restart BMS • Contact SolaX Technical Support
BMS_Internal_Err	Unable to establish communication among batteries. • Restart BMS; • Check if the connection among batteries is normal; • Contact SolaX Technical Support
BMS_OverVoltage	Overvoltage of single battery. • Contact SolaX Technical Support
BMS_LowerVoltage	Undervoltage of single battery. • Battery is forced to charge through inverter; • Contact SolaX Technical Support
BMS_Charge OverCurrent	Overcurrent charging of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Discharge OverCurrent	Discharge overcurrent of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_TemHigh	The temperature of BMS is too high. • Let BMS cool down to normal temperature and restart; • Contact SolaX Technical Support
BMS_TemLow	The temperature of BMS is too low. • Warm up BMS and restart; • Contact SolaX Technical Support
BMS_CellImbalance	Inconsistency of battery. • Restart BMS; • Contact SolaX Technical Support
BMS_Hardware_ Protect	Hardware protection of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Circuit_Fault	Circuit fault of BMS. • Restart BMS; • Contact SolaX Technical Support

Faults	Diagnosis and solution
BMS_Insulation_Fault	Insulation fault of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_VoltSensor_Fault	Voltage sampling fault of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_TempSensor_Fault	Temperature sampling fault of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_TempSensor_Fault	Current sampling fault of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Relay_Fault	Relay contact adhesion fault of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Type_Unmatch	Different type of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Version_Unmatch	Different type of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Manufacturer_Unmatch	Different type of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_SW&HW_Unmatch	Different type of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_M&S_Unmatch	Different type of BMS. • Restart BMS; • Contact SolaX Technical Support

Faults	Diagnosis and solution
BMS_CR_Unresponsive	Inverter does not respond the charging request. • Restart BMS or inverter; • Contact SolaX Technical Support
S_Software_Protect	Software protection of battery module. • Restart BMS; • Contact SolaX Technical Support
BMS_536_Fault	BMS voltage sampling fault. • Restart BMS; • Contact SolaX Technical Support
BMS_Selfchecking_Fault	Self-test fault of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Tempdiff_Fault	BMS temperature varies greatly. • Restart BMS; • Contact SolaX Technical Support
BMS_Break	BMS sampling fault. • Restart BMS; • Contact SolaX Technical Support
BMS_Flash_Fault	External short circuit of BMS. • Restart BMS; • Contact SolaX Technical Support
BMS_Precharge_Fault	External short circuit of BMS. • Check the external connection and restart BMS; • Contact SolaX Technical Support
BMS_AirSwitch_Break	Disconnection of switch break of BMS. • Restart BMS; • Contact SolaX Technical Support

Troubleshooting for BI

Faults	Diagnosis and solution
BI_InvCommFlt	CAN Communication Fault between BI and Inverter • Check the communication cable between BI and inverter • Please SolaX Technical Support
BI_E-Stop	Emergently switched off or Emergency stop activated
BI_ManualOverride	BI manual switch activatted
BI_GridRlyFlt	Grid Relay Fault • Please contact SolaX Technical Support
BI_OverTempFlt	Parallel Relay Fault • Please contact SolaX Technical Support
BI_AutoTxRlyFlt	Autotransformer Temperature High • Check if two-phase imbalance is high in off-grid or ambient temperature is high • Or please contact SolaX Technical Support
BI_PhsImblHigh	Two-phas with Load Imbalance High in Off-grid • Decrease the imbalance of two-phase with load in off-grid
BI_EEpromFlt	Internal EEPROM Read/Write Fault • Please contact SolaX Technical Support
BI_IntMeterFlt	Internal Meter Fault • Please contact SolaX Technical Support
BI_GenOverLoad	Generator Overload Fault
BI_GenRlyFlt	Generator Relay Fault • Please contact SolaX Technical Support
BI_VoltImbalanceFlt	Output Voltage Imbalance High in Off-grid • Decrease the imbalance of two-phase with load in off-grid
BI_PrllRlyFlt	Parallel Relay Fault • Please contact SolaX Technical Support
BI_AutoTxRlyFlt	Transformer Relay Fault • Please contact SolaX Technical Support
BI_AmbTempHigh	BI Ambient Temperature High
BI_AmbTempLow	BI Ambient Temperature Low
BI_485CommFlt	RS485 Communication Fault between BI and Inverter • Check the RS485 communication cable between BI and Inverter • Please contact SolaX Technical Support

Faults	Diagnosis and solution
BI_OverTempFlt	Transformer Temperature High or Transformer with Load Imbalance in Off-grid • Check if the imbalance is over high in off-grid • Please contact SolaX Technical Support
BI_InvEngyLow	Battery Energy Low in Off-grid Detected
BI_GridLost	Grid Lost Detected
BI_GridVolHigh	Grid Voltage High Detected
BI_GridVolLow	Grid Voltage Low Detected
BI_GridFreHigh	Grid Frequency High Detected
BI_GridFreLow	Grid Frequency Low Detected
BI_GenLost	No Generator Detected
BI_GenVolHigh	Generator Voltage High Detected
BI_GenVolLow	Generator Voltage High Detected
BI_GenFreHigh	Generator Frequency High Detected
BI_GenFreLow	Generator Frequency Low Detected
BI_Fan1StopRotor	Fan 1 Stop Detected
BI_Fan2StopRotor	Fan 2 Stop Detected

13 Maintenance

Maintenance of battery

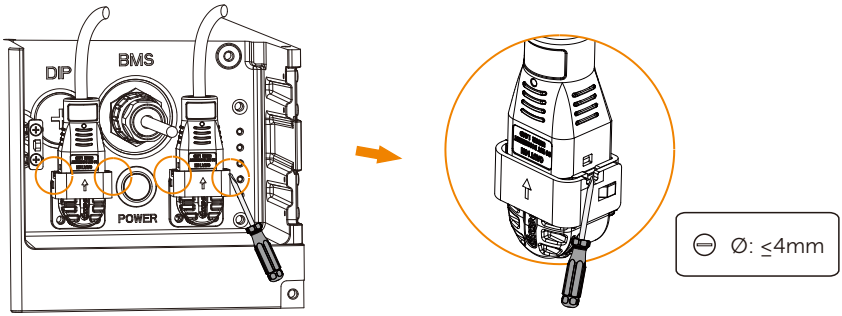
- If the ambient temperature for storage is -4°F~122°F/-20°C~50°C, recharge the batteries at least once every 3 months.
- If the ambient temperature for storage is 32°F~104°F/0°C~40°C, recharge the batteries at least once every 12 months.
- If the battery(ies) has(have) not been used for more than 9 months, the battery(ies) must be charged to at least SOC 50 % each time.
- For the first installation, the interval among manufacture dates of batteries shall not exceed 3 months.
- If one of the batteries is replaced, the SOC of the battery after replacement shall be consistent with those of batteries that have not been replaced, with the maximum difference of between -5% and 5%.
- If users want to increase their battery system capacity, please ensure that the SOC of the existing system capacity is about 40%. The manufacture date of the new battery shall not exceed 6 months; in case of exceeding 6 months, please charge the new battery to around 40%.

Dismantling the battery

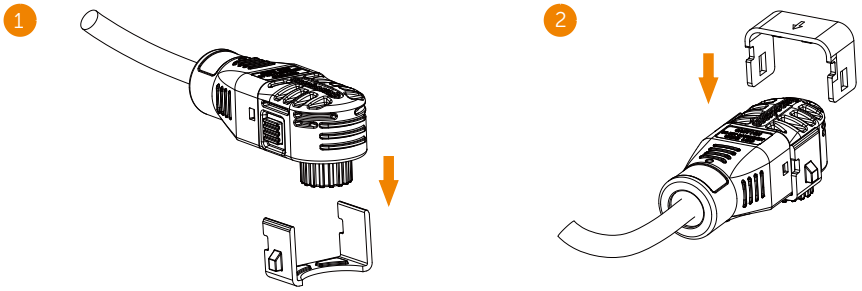
NOTICE!

- Before dismantling the battery, make sure you have shut down the battery system.
- If the BAT cables will be reused after disconnecting, please reinstall and secure the buckles back onto these cables first before reconnecting them. For details, see step 2.
- The arrow direction on the buckle indicates the vertical direction of the groove.

Step 1: Disconnect the cables between BMS and the inverter.
(1) Unscrew the communication cable from the BMS port.
(2) Find the overall position of the groove according to the buckle arrow, place a flat-head screwdriver on the groove at either left or right side of the buckle, and then pry open the buckles fastened on BAT+ and BAT- cables.



Step 2: (Optional) Reinstall and secure the buckles to the BAT cables.
(1) Align the curve of the cable head to that of the buckle, and then stick the cable head into the buckle base.
(2) Align the buckle cover to the buckle base, and then press the cover down to lock it until a "click" sound is heard.



Step 3: Disconnect the series wiring terminal on the battery.
Step 4: Disconnect the rest cables.

Maintenance of inverter

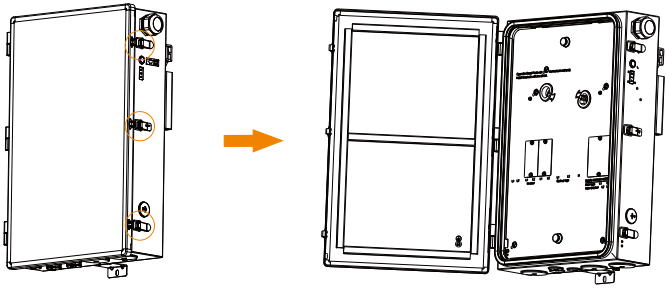
Regular maintenance is required for the inverter.
The table below lists the operational maintenance for expressing the optimum device performance. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance.

Item	Check Note	Maintenance Interval
Indicators / button	Check if the indicators and button of the inverter are in normal state	Every 6 months
Wires	Check that if the input and output wires are damaged or aged.	Every 6 months
DC switch	By operating the switch a few times (5x), the contacts will clean themselves and the switch will have a longer life.	/
Signs	Check the installation for signs of overload, overheating, and that the terminals do not exceed the limit of 167°F/75°C under full load.	/

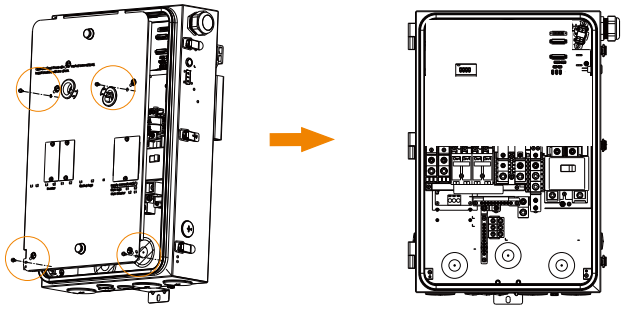
Maintenance of BI

The internal fan of BI needs to be replaced when BI prompts fan error. The replacement of fan shall be performed by professional electricians. Before replacement, make sure all the power of BI is switched off.

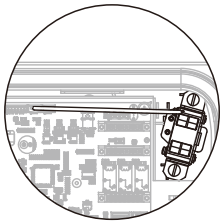
Step 1: First open the outer cover of BI.



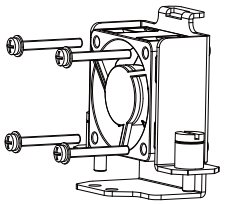
Step 2: Unscrew the four M4 screws below with crosshead screw driver to disassemble the internal cover of BI.



Step 3: Disconnect the fan cable, and unscrew the two M4 screws to disassemble the fan (pull out the fan).
Please note that the fan cable is locked on the BI. Pinch and hold the buckle on the cable terminal to disconnect it.



Before



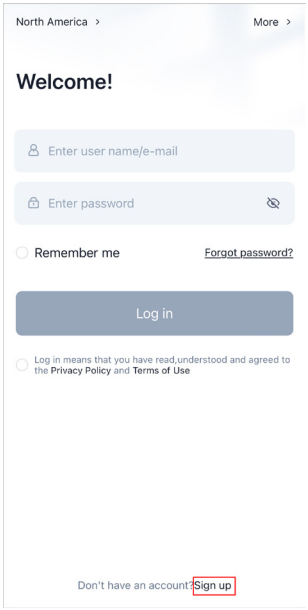
After

14 Commission the System

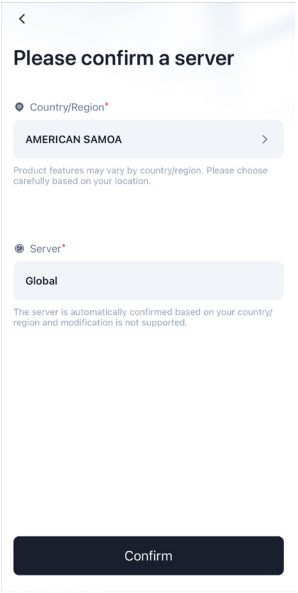
Step 1: Scan the QR code below to download SolaXCloud APP. You can also find the QR code at www.solaxcloud.com.

NOTICE!
• The screenshots in this chapter correspond to the SolaXCloud App V6.0.4.

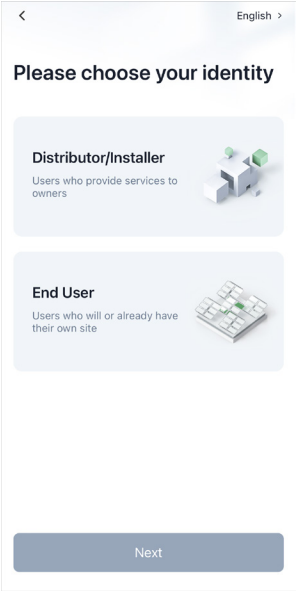
Step 2: Create a new account:
a) Touch **Sign up** to start the registration.



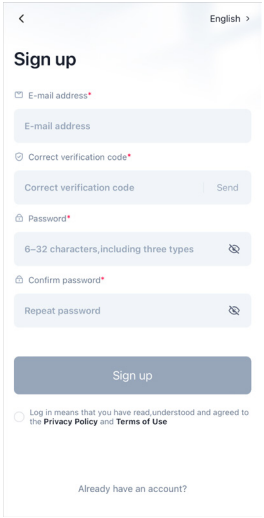
b) Select your **Country/Region** and **Server**, then touch **Confirm**.



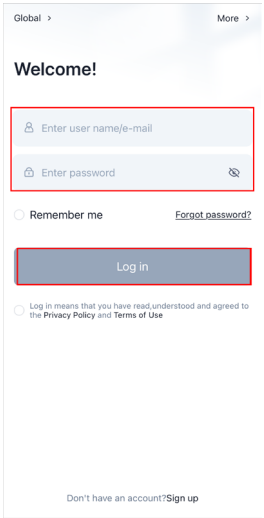
c) Select your identity type and touch **Next**.



d) Fill in the information as shown in the picture below, then tick **Log in means that you have read, understood and agreed to the Privacy Policy and Terms of Use**. Then touch **Sign up**.

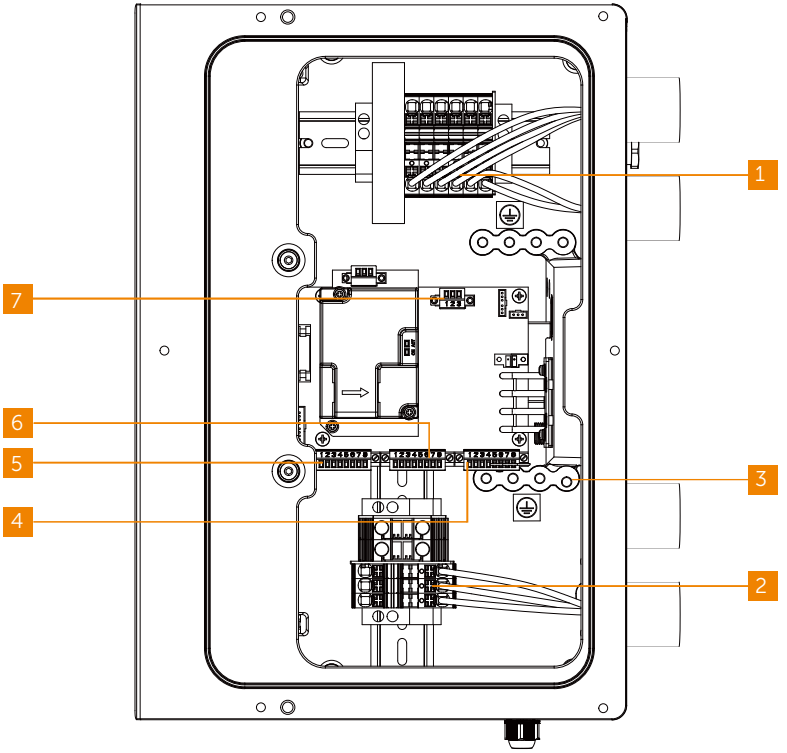


Step 3: Log in.
Open the SolaXCloud APP, enter your **user name** and **password**, then tick **Log in means that you have read, understood and agreed to the Privacy Policy and Terms of Use**. Then tick **Log in** to enter.
It will be directly log in your account next time if you tick the **Remember me.** Touch the **Forgot password** to refresh password through your E-mail.



Appendix A: Wiring and Breaker Requirement

Inverter wiring



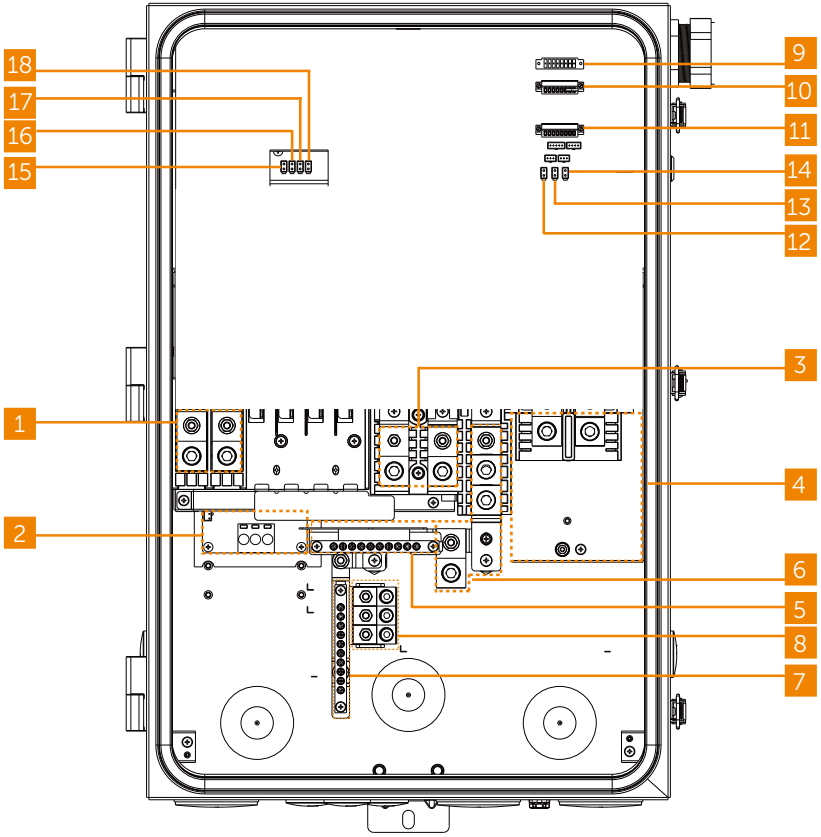
Inverter power terminal (Purchased by customer)

No.	Terminals	Type	Cross-sectional Area Range	Strip Length
1	PV terminals	90°C(194°F), 600 V, copper	10-8 AWG	0.47 in / 12 mm
2	AC terminals	90°C(194°F), 600 V, copper	12-8 AWG(3.8 kW), 10-8 AWG(5/6/7.6 kW)	0.47 in / 12 mm
3	Ground terminals	90°C(194°F), 600 V, copper	8 AWG	0.47 in / 12 mm

Inverter communication terminal (Purchased by customer)

No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
4	AUX terminal	Pin 1: RS485_METER_A	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: RS485_METER_B				
		Pin 3: GND	/			
		Pin 4: +12V_RELAY_OUT				
		Pin 5: DRM0				
		Pin 6: +12V_COM				
		Pin 7: STOP_NO+				
		Pin 8: STOP_NO-				
5	COMM in terminal	Pin 1: SYSR_L	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: SYSR_H				
		Pin 3: CAN_L				
		Pin 4: CAN_H				
		Pin 5: RS485_BI_A				
		Pin 6: RS485_BI_B				
		Pin 7: +12V	/	18-16 AWG		
		Pin 8: GND				
6	COMM out terminal	Pin 1: SYSR_L	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: SYSR_H				
		Pin 3: CAN_L				
		Pin 4: CAN_H				
		Pin 5: RS485_BI_A				
		Pin 6: RS485_BI_B				
		Pin 7: +12V	/	18-16 AWG		
		Pin 8: GND				
7	MLPE terminal	Pin 1: GND	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: RS485_MLPE_A				
		Pin 3: RS485_MLPE_B				

BI wiring



BI power terminal required wire sizes and torques

No.	Terminals	Cross-sectional Area Range	Strip Length	Torque (in-lbs)	Tool
1	ESS 1 lugs	4-4/0 AWG	1.25 in./32 mm	275	5/16 HEX key
2	GEN terminals	8-4 AWG	0.67 in./17 mm	-	-
3	Backup Load lugs	4-4/0 AWG	1.25 in./32 mm	275	5/16 HEX key
4	Grid terminals	4-4/0 AWG	1.25 in./32 mm	275	5/16 HEX key
5	Neutral terminals small hole	14-4 AWG	0.79 in./20 mm	26	1.0*5.0 mm Slotted
6	Neutral terminals large hole	4-4/0 AWG	1.25 in./32 mm	275	5/16 HEX key
7	Ground terminals small hole	14-4 AWG	0.79 in./20 mm	26	1.0*5.0 mm Slotted
8	Ground terminals large hole	6-2/0 AWG	1.77 in./45 mm	110	3/16 HEX key

BI communication terminal (Purchased by customer)

No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
9	INV Communication terminal	Pin 1: RESERVE	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8 lbf.in / 0.2 N·m
		Pin 2: RESERVE				
		Pin 3: CAN_L				
		Pin 4: CAN_H				
		Pin 5: RS485_BI_A				
		Pin 6: RS485_BI_B				
		Pin 7: +12 V	/	18-16 AWG		
		Pin 8: GND				
10	AUX1 terminal	Pin 1: DRY_GEN	/	24-16 AWG	0.24 in / 6 mm	1.8 lbf.in / 0.2 N·m
		Pin 2: GEND_GEN				
		Pin 3: RS485_RESERVE_A	CAT5 or better	24-18 AWG		
		Pin 4: RS485_RESERVE_B				
		Pin 5: RESERVE	/			
		Pin 6: RESERVE				
		Pin 7: STOP_NO+				
		Pin 8: STOP_NO-				

BI communication terminal (Purchased by customer)

No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
11	AUX2 terminal	Pin 1: NO_1	/	24-16 AWG	0.24 in / 6 mm	1.8 lbf.in / 0.2 N·m
		Pin 2: COM_1				
		Pin 3: NC_1				
		Pin 4: NO_2				
		Pin 5: CON_2/3				
		Pin 6: NC_2				
		Pin 7: NO_3				
		Pin 8: NC_3				
12	CT1 terminal	Pin 1: CT1+	Shielded, twisted pair	/	/	/
		Pin 2: CT1-				
13	CT2 terminal	Pin 1: CT2+	Shielded, twisted pair	/	/	/
		Pin 2: CT2-				
14	CT3 terminal	Pin 1: CT3+	Shielded, twisted pair	/	/	/
		Pin 2: CT3-				
15	CT L1A terminal	Pin 1: CT L1A+	Shielded, twisted pair	/	/	/
		Pin 2: CT L1A-				
16	CT L1B terminal	Pin 1: CT L1B+	Shielded, twisted pair	/	/	/
		Pin 2: CT L1B-				
17	CT L2A terminal	Pin 1: CT L2A+	Shielded, twisted pair	/	/	/
		Pin 2: CT L2A-				
18	CT L2B terminal	Pin 1: CT L2B+	Shielded, twisted pair	/	/	/
		Pin 2: CT L2B-				

BI breaker and switch (Purchased by customer)

Main Breaker	Branch Breaker	Then the maximum short circuit rating in RMS symmetrical amperes, 240V is:
When the panelboard service disconnect is a Type:	And the branch breakers installed are Type:	
EATON CSR	EATON BR BRAF BRH BD BQ.	10,000 A
EATON CSR+Bussmann Class J Fuse (LPJ-500-SP)	EATON BR BRAF BRH BD BQ.	22,000 A

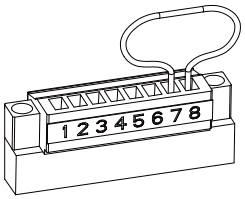
Main Breaker Line side barriers: EATON TICSR300.
Hold down kit: EATON BRHDK125.

Component	Description
Emergency stop switch	Normally closed (NC) contact The UL certification is required for the emergency stop switch.

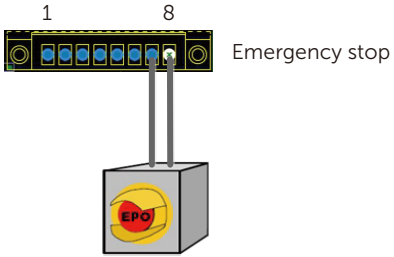
Appendix B: Emergency Stop Connection Steps

For installing Emergency Stop on the inverter, follow the below installation instructions.

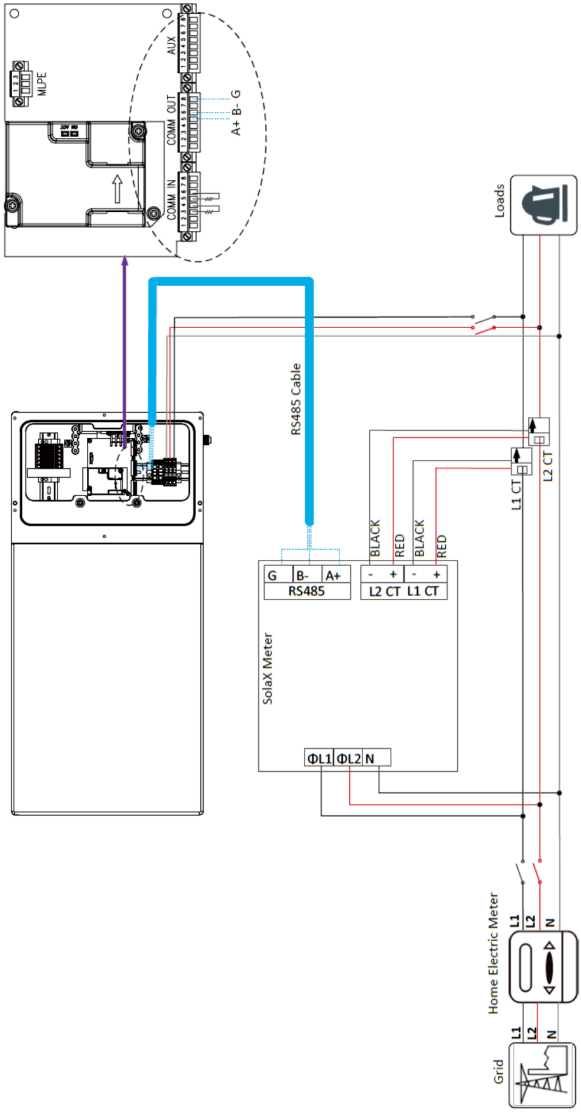
Step 1: Remove the factory-installed jumper from Pin 7 and 8 of the 8-position "AUX" connector inside the inverter.



Step 2: Use minimum 24 AWG conductors to connect Pin 7 and Pin 8 (labeled "12V" and "STOP_NO") to a suitable emergency stop switch.

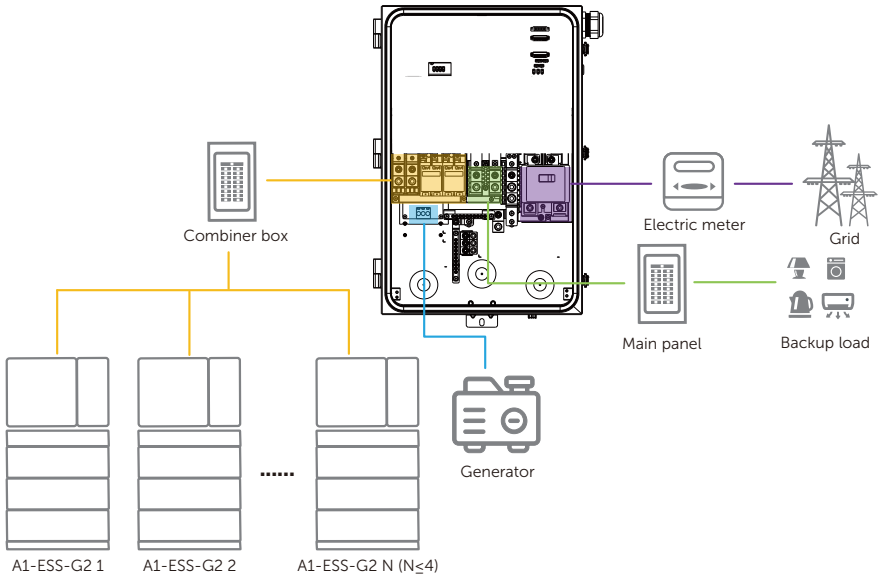


Appendix C: Meter Y Connection Diagram

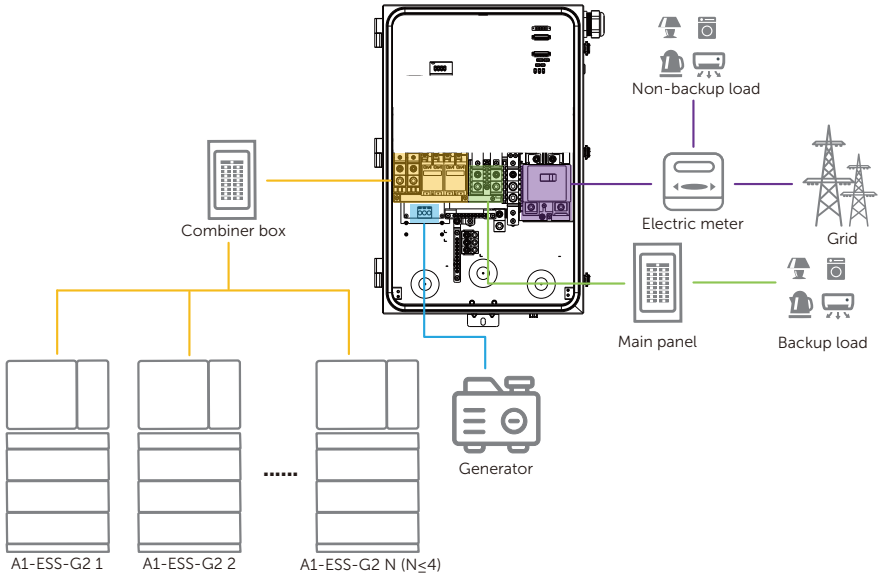


Appendix D: System Wiring Diagram

1 Whole home backup solution



2 Partial home backup solution





SolaX Power Network Technology (Zhejiang) Co., Ltd.

Add.: No. 278, Shizhu Road, Chengnan Sub-district, Tonglu County,
Hangzhou, Zhejiang, China
E-mail: info@solaxpower.com

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