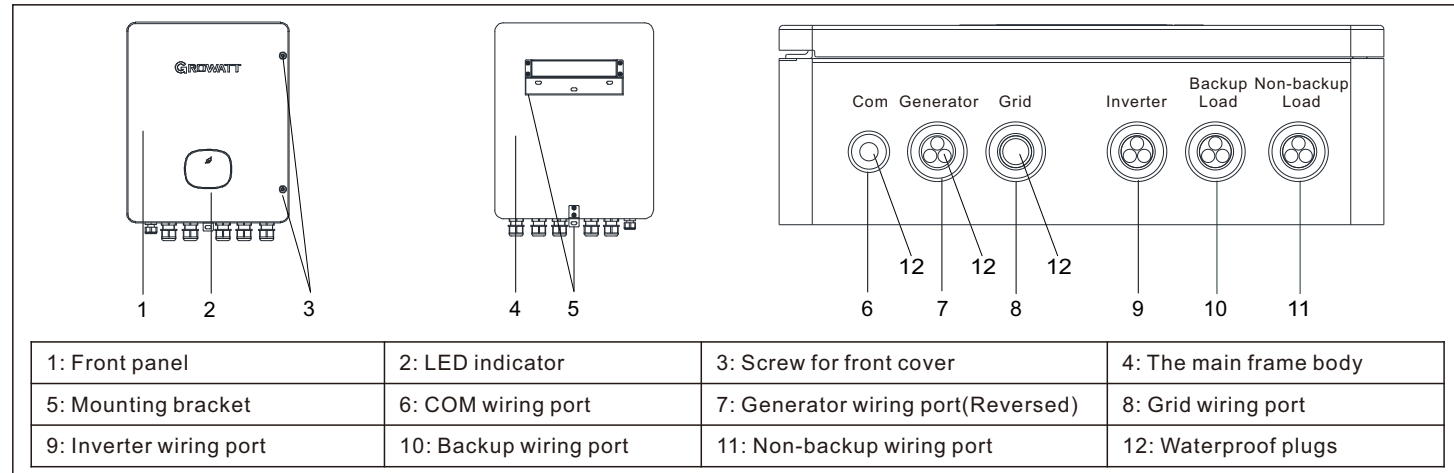


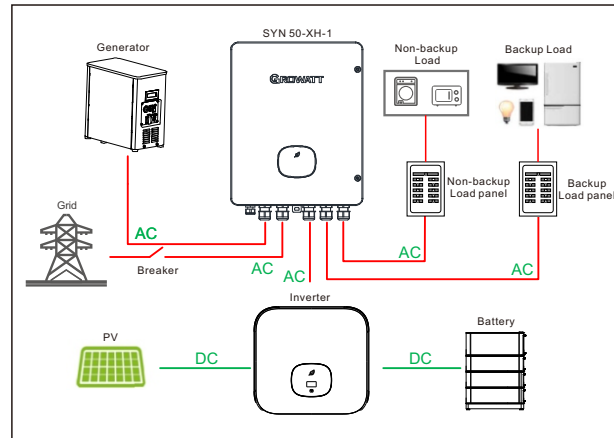
## 1. Overview



## 2. Installation

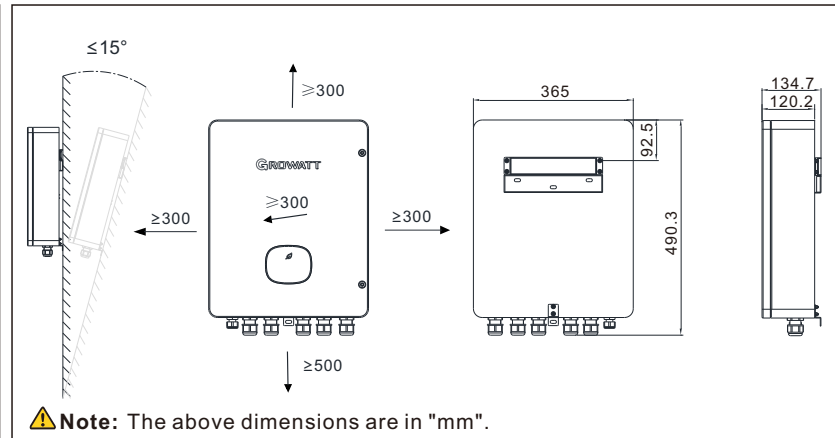
### System overview

The system diagram is as follows:



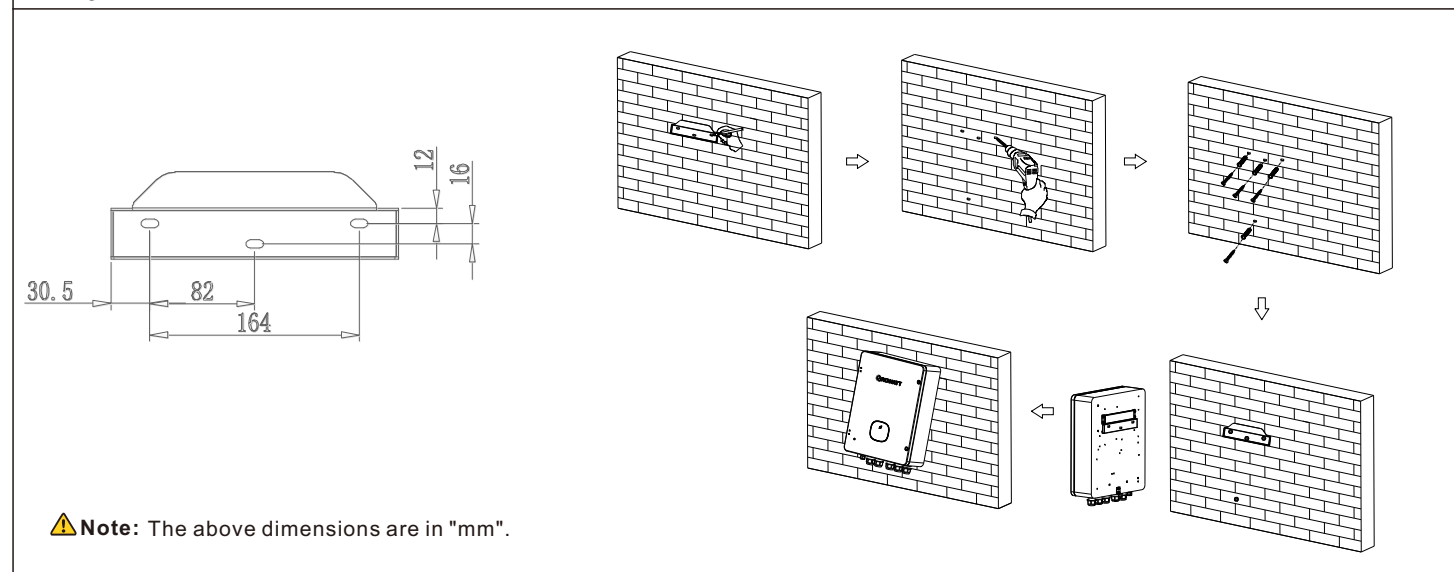
### 2.1 Installation requirements

The front, back and side pictures of the SYN 50-XH-1 are as follows:

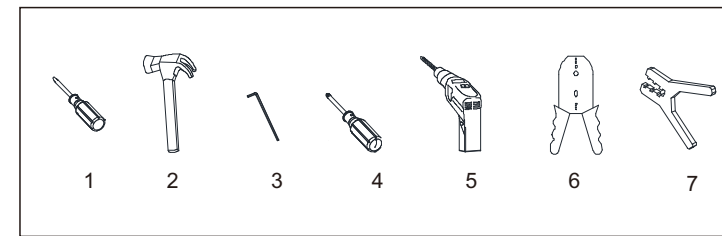


### 2.2 Installation steps

1. Determine SYN 50-XH-1 mounting location, on a wall, stud framing or pole. It is recommended to mount it in a location protected from direct sunlight.
2. To allow proper heat dissipation, maintain at least a 300mm clearance between the SYN 50-XH-1 and other objects.
3. Position the mounting bracket against the wall/pole and mark the drilling hole locations.
4. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.
5. Hang SYN 50-XH-1 on the bracket.



### 2.3 Required tools



No.	Name	Size	No.	Name	Size
1	straight screwdriver	Φ2&5mm	2	hammer	/
3	Allen wrench	Φ5mm	4	Cross rise	Φ5mm
5	Electric drill	Φ6mm	6	Wire stripper	/
7	Line pressing pliers	/			

## 3. Wire specification suggestions

The cable specifications of this SYN 50-XH-1 are as follows, and the wiring end is stripped 10mm.

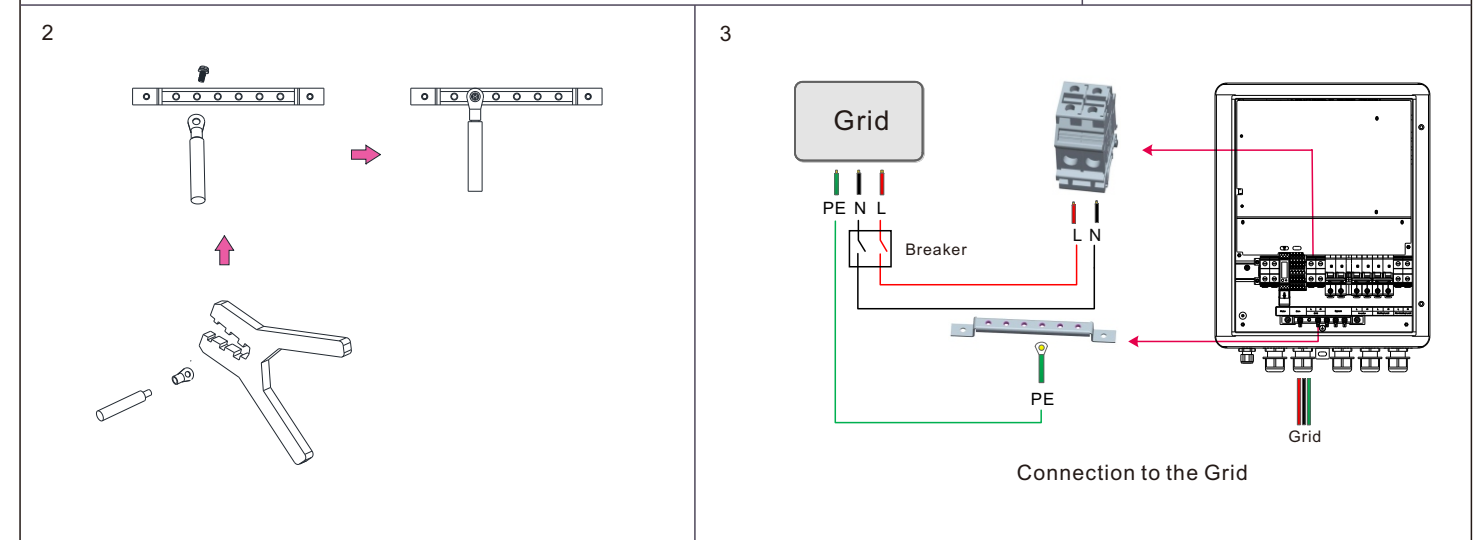
project	Wire diameter	Line length
Grid input cable	6-8AWG	10m
Inverter input cable	8-12AWG	20m
Load output cable	8-12AWG	20m
Generator input cable	6-8AWG	10m
Communication cable	22-26AWG	20m

### 3.1 Wiring instructions

#### 3.1.1 Connecting SYN 50-XH-1 to the Grid

1. Take out the two screws on the front cover of the SYN 50-XH-1, open the front cover, and do not remove the safety plate inside the machine.
2. Loosen the plastic cover printed as "Grid" counterclockwise, remove the three waterproof plugs, and reserve three holes.
3. Route the three power grid cables (L/N/PE) through the three holes and connect them to the power grid input terminal and the ground copper bar. The screw torque on the power grid terminal is 26.5 in\*lbs / 3.0 N\*m to 31 in\*lbs / 3.5 N\*m, and the screw torque on the ground terminal is 13 in\*lbs / 1.5 N\*m.
4. Finally, fasten the plastic cover clockwise. Wiring as shown in Figure 3:

**Note:** PE cables needs to be pressed into the O-type terminal in the accessory bag, as shown in Figure 2.



#### 3.1.2 Connecting SYN 50-XH-1 to the Inverter

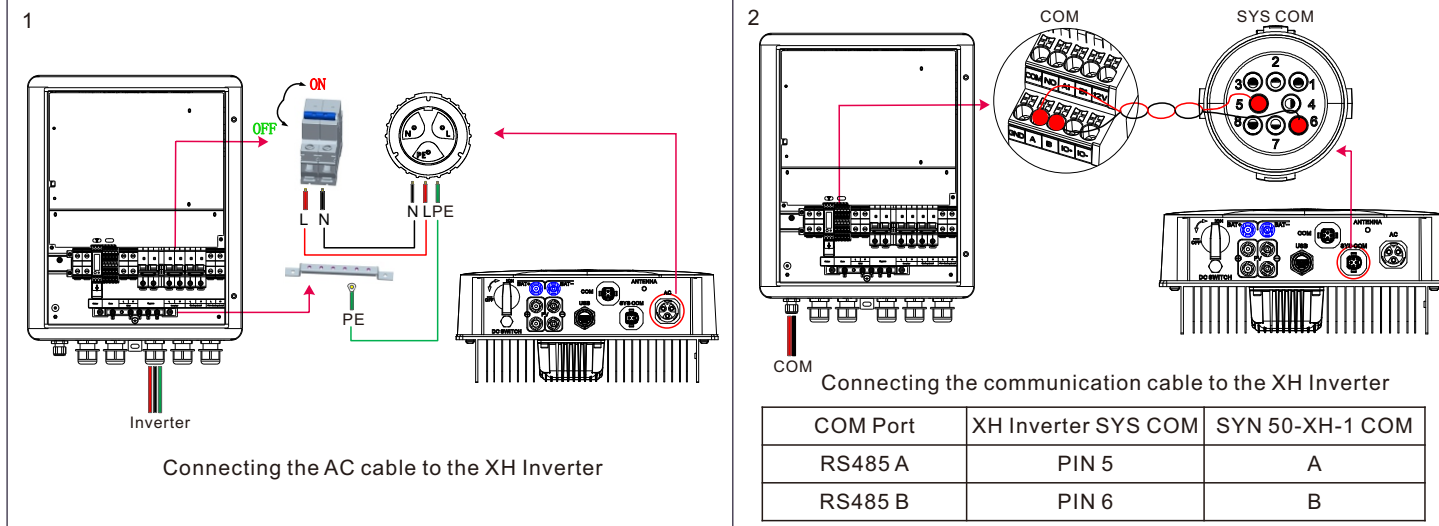
When connecting the SYN 50-XH-1 to the XH Inverter, we need to connect AC power cable and communication cable.

##### 1) Connecting the AC cable:

1. Loosen the plastic cover printed as "Inverter" counterclockwise, remove the three waterproof plugs, and reserve three holes.
2. Route the cables of the three inverters (L/N/PE) through the three holes, connect the cables to the inverter circuit breaker terminal and the ground copper bar. The screw torque of the inverter circuit breaker terminal is 17.5 in\*lbs / 2 N\*m, and the screw torque on the ground terminal is 13 in\*lbs / 1.5 N\*m.
3. Finally, fasten the plastic cover clockwise. Wiring is shown as follows:

2)Connecting the communication cable:

- 1.Loosen the plastic cover printed with "COM" on the machine counterclockwise, remove the waterproof plug, and reserve a hole.
- 2.Route the two communication cables (A/B) through the hole. Connect one end of the cable to the COM terminal of the SYN, and the other end to the SYS COM terminal of the inverter, then tighten the screws. The following table lists the corresponding terminal pins. The wiring method is shown as follows:



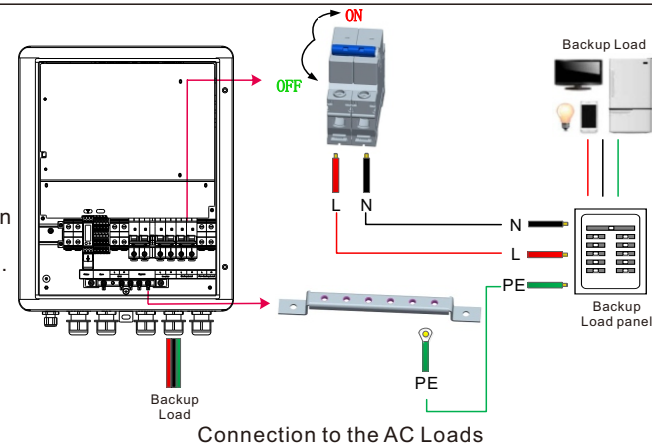
3.1.3 Connecting SYN 50-XH-1 to the load

The SYN can connect to both backup and non-backup loads. The following wiring instructions serve as an example for connecting to backup loads.

- 1.Loosen the plastic cover printed with "Backup Load" counterclockwise, remove the three waterproof plugs, and reserve the three holes.
- 2.Route the three load cables (L/N/PE) through the three holes, connect them to the load circuit breaker terminal and the ground copper bar. The load breaker terminal screw torque is 17.5 in\*lbs / 2 N\*m, and the ground terminal screw torque is 13 in\*lbs / 1.5N\*m.
- 3.Finally, fasten the plastic cover clockwise. The wiring diagram is shown on the right:
- 4.Please follow the steps mentioned above to connect the non-backup load.

**Note:**

Please note that the maximum backup load capacity is determined by the Growatt inverter's maximum output power. (For instance, if you have installed a MIN 5000TL-XH hybrid inverter, a maximum of 5kW load can be connected to the backup box. If the total load power exceeds 5kW, please connect the excess load to the non-backup load terminal.)



3.1.4 Connecting SYN 50-XH-1 to the Generator

This part is only applicable to models with generator function (SYN 50-XH-12).When connecting the SYN 50-XH-12 to the Generator, we need to connect generator AC cables and the control signal cable.

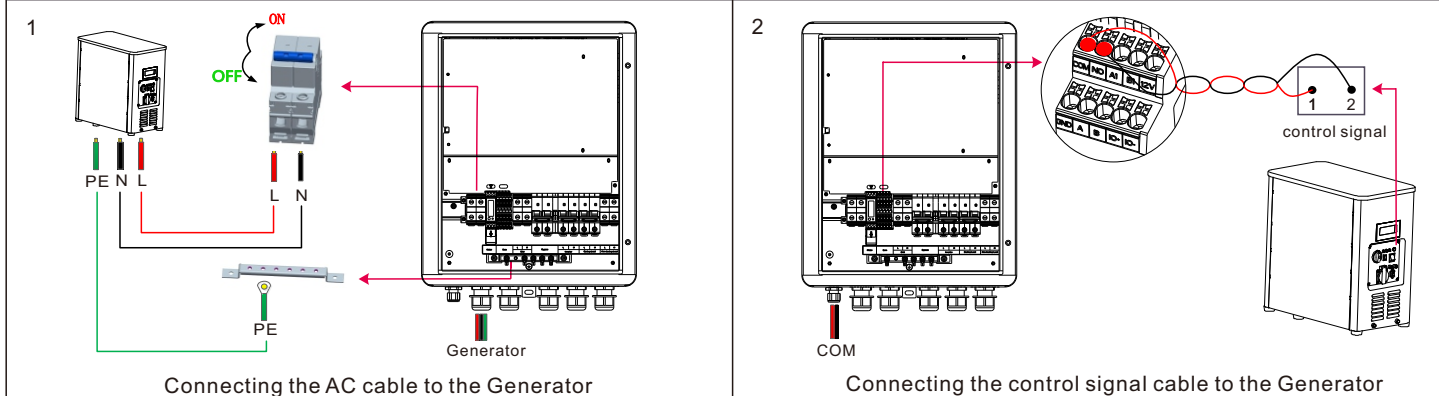
1)Connecting the AC cable:

- 1.Loosen the plastic cover printed as "Generator" counterclockwise, remove the three waterproof plugs, and reserve three holes.
- 2.Route the three generator cables (L/N/PE) through the three holes, connect them to the generator circuit breaker terminal and ground copper bar. The screw torque of the generator circuit breaker terminal is 17.5 in\*lbs / 2 N\*m, and the screw torque on the ground terminal is 13 in\*lbs / 1.5 N\*m.
- 3.Finally, fasten the plastic cover clockwise. Wiring is shown as follows:

2)Connecting the dry signal cable:

- 1.Route the two communication cables (DRY+/DRY-) through the COM hole and connect the COM and NO holes on the COM terminal of the SYN, the other end of the communication cable is connected to the signal control point of the generator.
- 2.Fasten the plastic cover labeled "COM" by rotating it clockwise.
- 3.Reinstall the front cover and tighten the screws to a torque of 31 in\* lbs / 3.5 N\*m. The wiring diagrams are shown below:

**Note:**The system only supports 2-wire start generator access !



4. LED Description

System state	LED state	
	Green	Red
On-grid Mode	On	Off
Back-up Mode	Blinking, on 1s,off 1s	Off
No communication with the inverter	Off	Blinking, on 1s,off 1s
System fault	Off	On
Generator Mode	Blinking, on 3s,off 3s	Off
Firmware upgrade	The yellow light blinks, on and off for one second	

5. System startup and shutdown operations

5.1 To start the system, please follow the following steps:

- 1.Turn on the DC switch of the battery. For details, please refer to the ARK battery manual.
- 2.Turn on the DC switch of the inverter. For details, please refer to the XH inverter manual.
- 3.Turn on the inverter input breaker of the SYN 50-XH-1, and observe whether the inverter and battery indicators are displayed. If yes, go to the next step. If there is no display, it means that there is no grid supply. You need to press the POWER button of the battery for a long time to wake up the battery. Please refer to the battery installation manual.
- 4.Enable the off-grid box function. The setting can be performed by using the one-click Start Off-grid Box function of shinetools APP.
- 5.Turn on the grid switch.
- 6.After the preceding steps, if the indicator of the SYN 50-XH-1 is green, it indicates that the SYN 50-XH-1 is working properly.
- 7.If the above steps fail to start the system, check the operation methods carefully or contact us.

5.2 Shut down the system, please refer to the following steps:

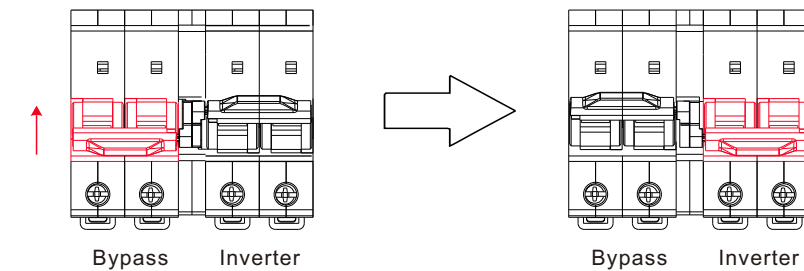
- 1.Disconnect the inverter input breaker on the SYN 50-XH-1 and then disconnect the power grid switch.
- 2.Turn off the DC switch of the inverter.
- 3.Turn off the DC switch of the ARK battery.
- 4.Waiting for a while, and then all the indicators of the inverter, the ARK battery, and the SYN 50-XH-1 went out. The system is powered off completely.

6. Manual bypass operation

When SYN 50-XH-1 fails, it cannot work normally, in order to ensure that the household power supply can be manually switched to the grid bypass state.

Please perform the following steps:

- 1.Shut down the entire system. For details, please refer to section 5.2.
- 2.Close the bypass switch in SYN 50-XH-1, and the inverter switch will automatically disconnect. The switch status is as follows.
3. Power on the entire system. For details, please refer to section 5.1.



7. Service and contact

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