



## **EU SYN 400E/600E-30 User Manual**

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# Table of Contents

<b>1 Introduction</b>	<b>1</b>
1.1 Notes on this manual	1
1.2 Target group	1
1.3 Symbol convention	1
1.3.1 Warning signs in this manual	1
1.3.2 Symbols on the product	2
<b>2 Safety</b>	<b>3</b>
2.1 Intended use	3
2.2 Commercial ESS application diagram	3
2.3 Safety instruction	4
<b>3 Product overview</b>	<b>5</b>
3.1 Appearance	5
3.2 Nameplate	6
3.3 Dimensions	7
3.4 Storage environment	7
3.5 Installation tools	8
<b>4 Unpacking</b>	<b>9</b>
<b>5 Installation</b>	<b>10</b>
5.1 Basic installation requirements	10
5.2 Installing the wall mount bracket	12
5.3 Installing the ATS	13
<b>6 Cable connections</b>	<b>14</b>
6.1 Cable specifications	14
6.2 Enclosure grounding	15
6.3 Connecting the power cables	15
6.3.1 Grounding on the power side	16
6.3.2 Connecting the LOAD power cables	16
6.3.3 Connecting the GEN power cables	17
6.3.4 Connecting the AC/GRID power cables	17
6.3.5 Connecting the communication cable	18
6.4 Sealing the wiring openings	19
6.5 Securing the front cover	19

**7 Inspection and cleaning..... 20**

**8 Datasheet ..... 21**

**9 Decommission ..... 22**

    9.1 Disassemble the SYN box..... 22

    9.2 Handle the SYN box..... 22

**10 Contact us..... 23**

# 1 Introduction

## 1.1 Notes on this manual

This manual is intended to provide product information and installation instructions for users of the EU SYN 400E-30 and EU SYN 600E-30 Automatic Transfer Switch (ATS) manufactured by Shenzhen Growatt New Energy Co., Ltd. (hereinafter referred to as Growatt). Please read this manual carefully before using the product. This manual and other documents must be stored in a convenient place and be available at all times for installation, operation and maintenance personnel. For possible changes in this manual, Growatt accepts no responsibilities to inform the users.

EU SYN 400E-30 and EU SYN 600E-30 are hereinafter called "SYN" for short.

## 1.2 Target group




Only professional electricians certified by the relevant authority are permitted to install the SYN. Installers should read through this manual prior to installing and troubleshooting the SYN. If questions arise during installation, you can visit [www.ginverter.com](http://www.ginverter.com) to leave a message or contact Growatt support at +86 755 2747 1942.



## 1.3 Symbol convention

The following safety symbols are used throughout this document to denote important safety information. Familiarize yourself with the symbols and their meaning before installing or operating this instrument.








### 1.3.1 Warning signs in this manual

A warning denotes a hazard to equipment or personnel. It calls attention to a procedure or practice, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the SYN equipment or personal injury.

Symbol	Description
 <b>DANGER</b>	<b>DANGER</b> indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	<b>WARNING</b> indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	<b>CAUTION</b> indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Symbol	Description
 <b>NOTICE</b>	<b>NOTICE</b> is used to address practices not related to personal injury.
 <b>Information</b>	<b>Information</b> that you must read and know to ensure optimal system operation.

### 1.3.2 Symbols on the product

Symbol	Explanation
	High voltages! Do not touch!
	Risk of burns due to hot surface! Do not touch!
	Delayed discharge: High voltage exists after the equipment is powered off. It takes 5 minutes to discharge to the safe voltage.
	Grounding: indicates the position for connecting the PE cable
	Refer to the manual
	CE marking This product complies with the requirements of the applicable EU directives.
	Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site

# 2 Safety

## 2.1 Intended use

SYN is a dual-source automatic transfer switch. It works to automatically switch the load circuit from the main power supply (AC/GRID) to another backup power supply (GEN) when the main power supply in the commercial ESS (Energy Storage System) fails to work normally; and it will automatically switch back to the main power source when it becomes normal. The SYN complies with applicable safety requirements. Please be cautioned, however, that improper use of the ATS will cause safety hazards to operation personnel or the third party, device damage, or property loss.

## 2.2 Commercial ESS application diagram

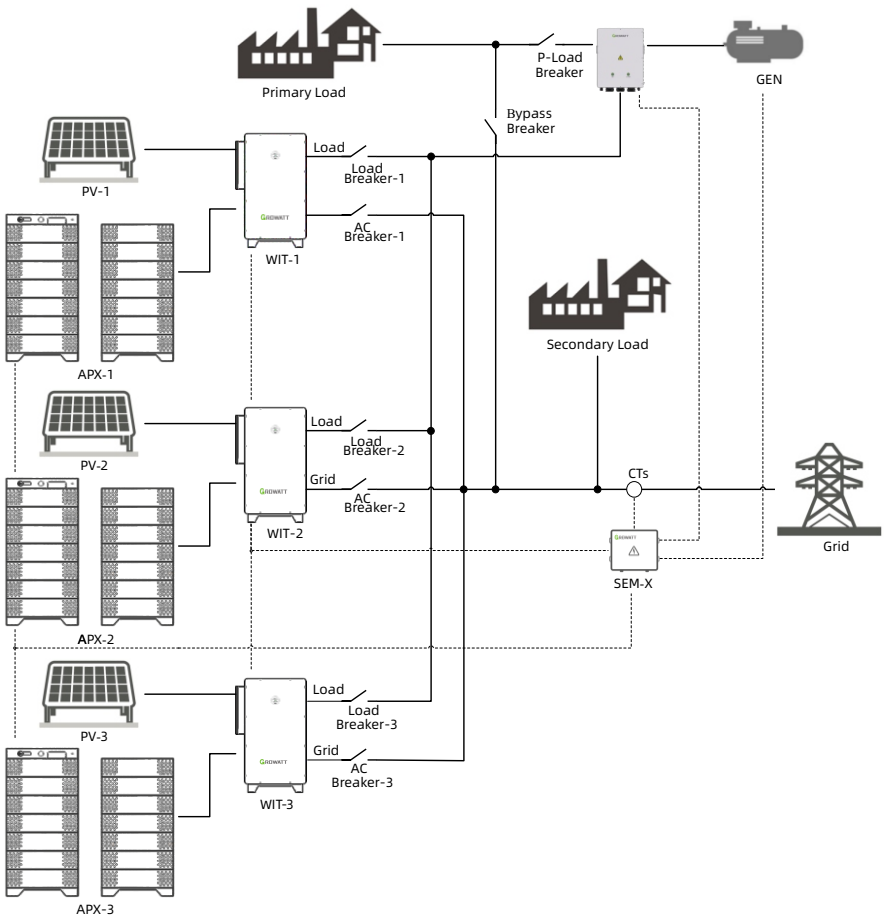


Fig 2.1 Commercial ESS application with multiple inverters connected in parallel

The figure above illustrates the topology diagram of a commercial ESS application with multiple inverters in parallel. The SYN is mainly used to switch power source between the generator and the WIT's LOAD port. The system comprises PV modules, hybrid inverters, the public grid, the SYN, batteries, and SEM-X etc.

## **2.3 Safety instruction**

The SYN has been designed and tested in accordance with international safety regulations. However, certain safety precautions must be observed when installing and operating this product. Read and follow all instructions, cautions and warnings in this installation manual. Should you come into any problem, please contact Growatt's customer services at +86 755 2747 1942.



# 3 Product overview

## 3.1 Appearance

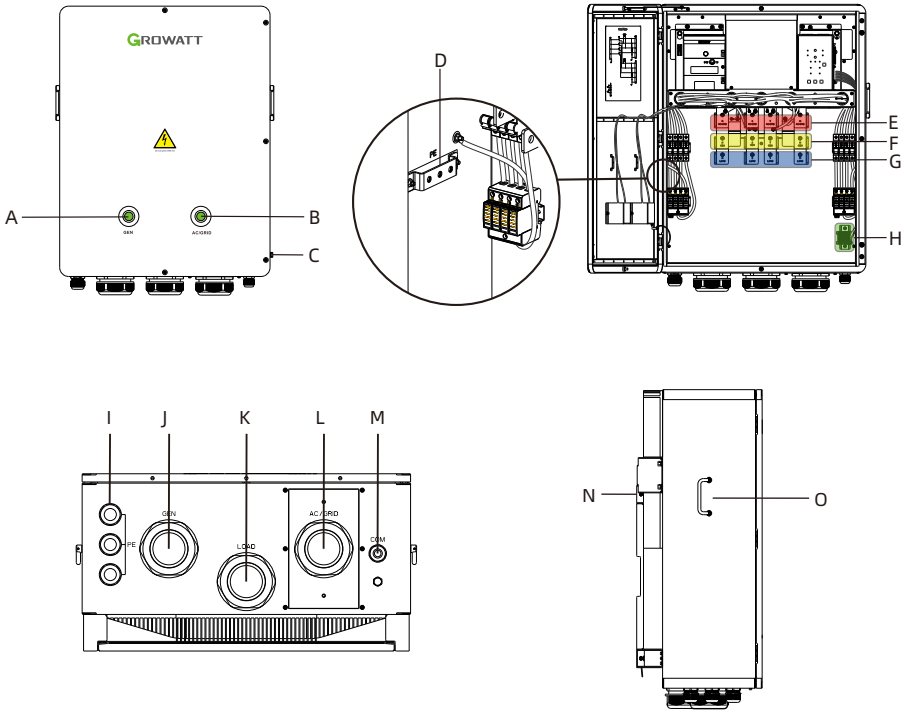


Fig 3.1

No.	Designation	No.	Designation
A	GEN indicator	B	AC/GRID indicator
C	Enclosure ground point	D	Grounding terminal
E	AC/GRID wiring terminal	F	GEN wiring terminal
G	LOAD wiring terminal	H	Communication wiring terminal
I	PE wiring waterproof cable gland	J	GEN wiring waterproof cable gland
K	LOAD wiring waterproof cable gland	L	AC/GRID wiring waterproof cable gland
M	Communication wiring waterproof cable gland	N	Wall mount bracket
O	Handle		

### 3.2 Nameplate

The diagram above shows the nameplate of EU SYN 600E-30. The nameplate is for demonstration purpose only, and the actual nameplate prevails. For other technical specifications, please refer to Section 8.

# GROWATT

Auto Transfer Switch  
EU SYN 600E-30

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**Input Data(AC/Grid)**

Nominal AC power	300kW
Nominal AC voltage	380/400/415V
AC grid frequency	50Hz/60Hz
Max. continuous current	600A@40°C 455A@50°C
AC grid connection type	3P4W+PE

---

**Input Data(GEN)**

Nominal AC power	300kW
Nominal AC voltage	380/400/415V
AC grid frequency	50Hz/60Hz
Max. continuous current	600A@40°C 455A@50°C
AC grid connection type	3P4W+PE

---

**Output Data(Load)**






Nominal AC power	300kW
Nominal AC voltage	380/400/415V
AC grid frequency	50Hz/60Hz
Max. continuous current	600A@40°C 455A@50°C


---

**General Data**


Protection degree	IP66
Operation ambient temperature	-25°C ~ +60°C (>50°C derating)

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Manual



Made in China

### 3.3 Dimensions

Table 3.2 Dimensions and weight

EU SYN 400E-30	Height (H)	Width (W)	Depth (D)	Weight
Without package	900mm	700mm	376mm	55kg
With package	1080mm	840mm	515mm	65kg

EU SYN 600E-30	Height (H)	Width (W)	Depth (D)	Weight
Without package	900mm	700mm	376mm	65kg
With package	1080mm	840mm	515mm	75kg

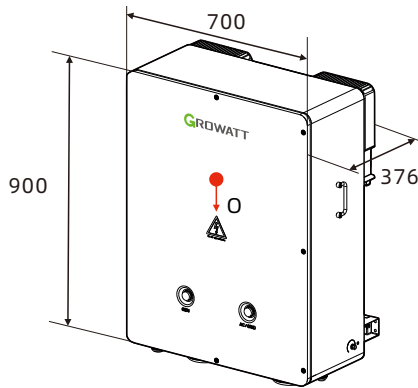


Fig 3.2

### 3.4 Storage environment

1. If possible, always pack the SYN in its original packing box and place it in a well-ventilated location.
2. During storage, keep the temperature between  $-35^{\circ}\text{C}$  and  $60^{\circ}\text{C}$  and the humidity between 0 and 100% RH.
3. A maximum of four SYN can be stacked during storage.
4. After long-term storage, the SYN should be checked and tested by professional personnel before installation.

### 3.5 Installation tools

Please prepare the following tools before installation.

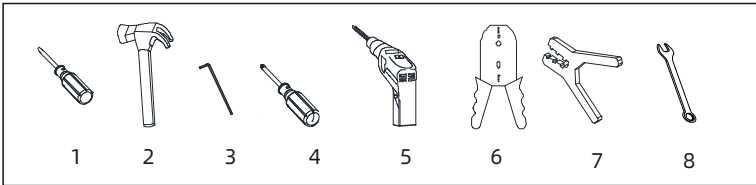


Fig 3.3 Installation tools

Table 3.3 Tool list

No.	Name	Size	No.	Name	Size
1	Flat-head screwdriver	Φ2&5mm	2	Hammer	/
3	Allen key	Φ5mm	4	Cross-head screwdriver	Φ5mm
5	Electric drill	Φ12mm	6	Wire strippers	/
7	Crimping Tool	/	8	Wrench	/

# 4 Unpacking

Before unpacking the SYN, please inspect the outer package for any damage. After opening the package, please check if the device is damaged or any component is missing; if so, please contact your distributor.

## The packing list:

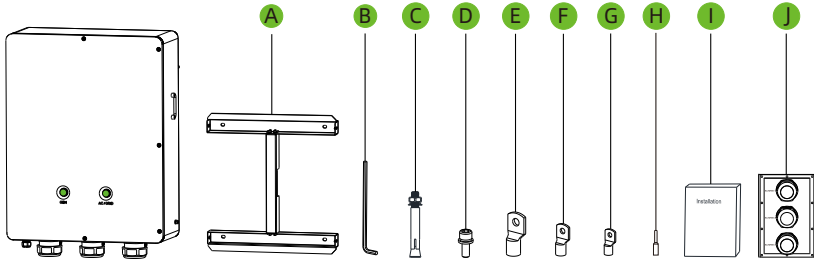


Fig 4.1 Packing list

Table 4.1 Packing list

Item	Description	Quantity (pcs)
A	Wall mount bracket	1
B	Allen key	1
C	M10 expansion screw	1
D	M6*12 Hex socket combination screw	4
E	SC240-12 cable lug	6
F	SC150-12 cable lug	12
G	SC70-8 cable lug	12
H	E1510-12 bootlace ferrule	4
I	User Manual	1
J	Plate with three M5 cable glands	1

### Note:

1. The EU SYN 600E-30 package includes Accessory “F” while the EU SYN 400E-30 package includes Accessory “G”. Please check the terminal specifications against the packing list.
2. Accessory “J” is only provided for the EU SYN 600E-30 model. The EU SYN 400E-30 model does not have Item “J”.

# Installation 5

## 5.1 Basic installation requirements

1. Select a solid wall that can support the weight of the ATS.
2. Do not mount the ATS on structures constructed of flammable or heat-intolerant materials.
3. Select the installation location at eye level for the convenience of viewing and maintenance.
4. The device is protected to IP66 and can be installed both indoors and outdoors.
5. The humidity of the installation location should be between 0 and 100%.
6. The ambient temperature should be between  $-35^{\circ}\text{C}$  and  $60^{\circ}\text{C}$ .
7. Mount the ATS vertically or at a maximum back tilt of  $15^{\circ}$ .

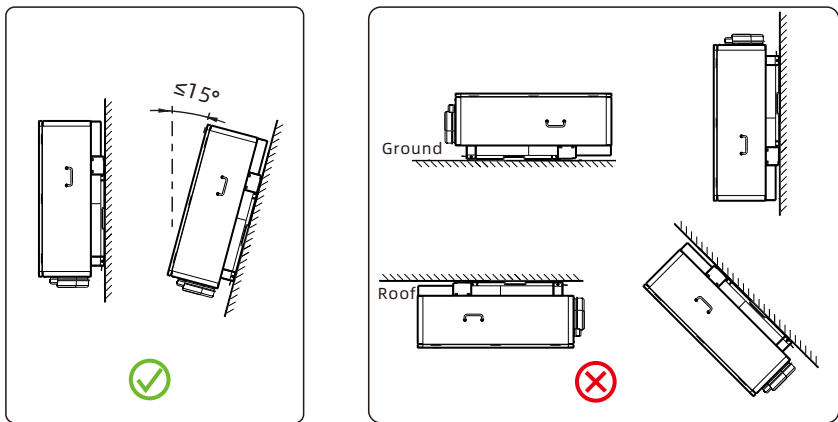


Fig 5.1 Installation angle

In order to ensure that the device can work properly and facilitate operation, please reserve enough space around the ATS. The clearance requirements are as follows:

Table 5.1

Direction	Min. clearance (mm)
Up	300
Down	1000
Left/Right	600

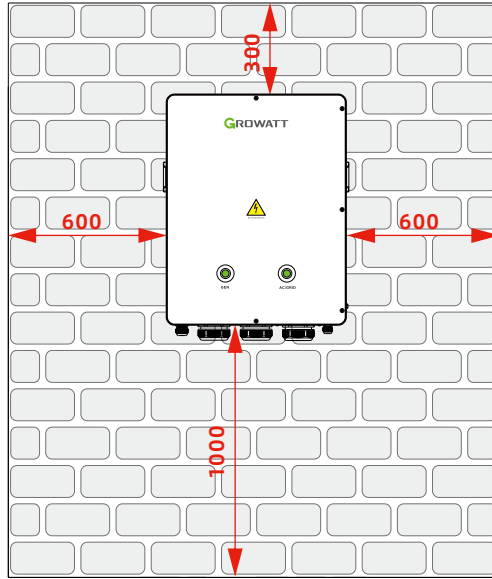


Fig 5.2 Installation clearance

1. Do not install the ATS near the television antenna or any other antennas and antenna cables.
2. Ensure that the ATS is out of children's reach.
3. Though the ATS is protected to IP66, it might initiate power de-rating if exposed to direct sunlight for a long period. To extend its service life, please refer to the following figures for the installation environment requirements:

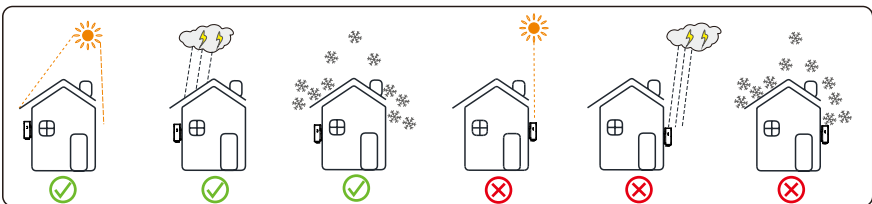


Fig 5.3

Make sure that the ATS is installed at a proper location. Do not install it inside an enclosed space.

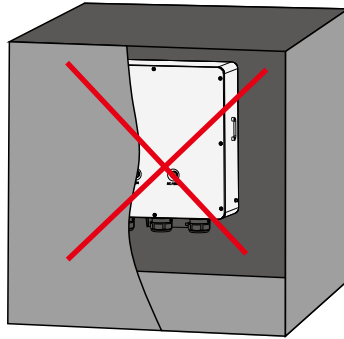


Fig 5.4

## 5.2 Installing the wall mount bracket



**DANGER**

In order to avoid electrical shock or other injury, inspect existing electronic or plumbing installations before drilling holes.

Drill four holes into the wall following the dimensions below:

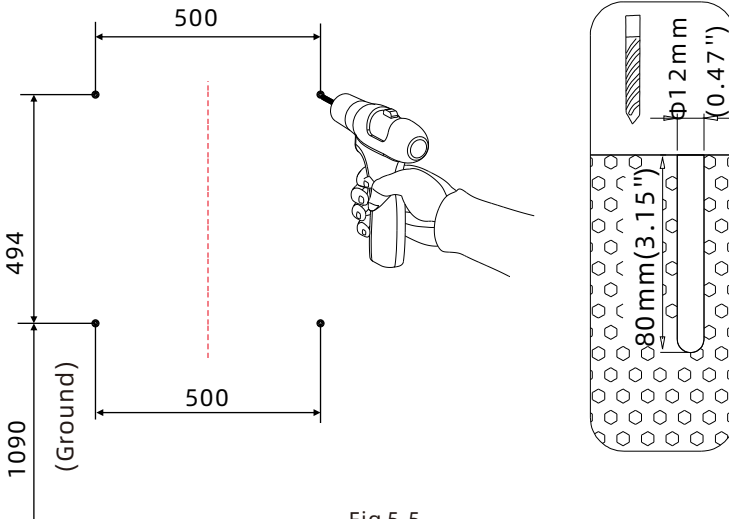


Fig 5.5



1. Hammer the four expansion bolts into the holes;
2. Disassemble the nut, flat washer and spring washer of the expansion bolt;
3. Align the holes on the mounting bracket with those on the wall, then secure the bracket with the four sets of nuts, flat washers and spring washers.

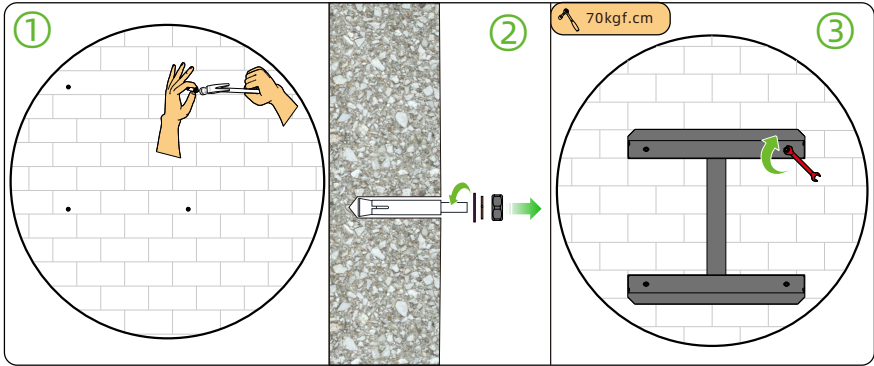


Fig 5.6

### 5.3 Installing the ATS



**NOTICE**

Before installing the ATS, make sure that the mounting bracket has been securely fixed to the wall.

Hang the ATS onto the mounting bracket and secure two M6×12 Hex socket combination screws on both sides of the bracket.

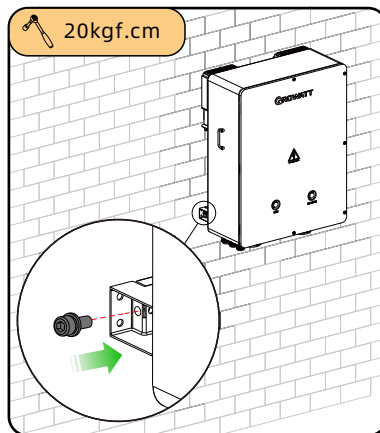


Fig 5.7

# Cable connections 6

## 6.1 Cable specifications



### NOTICE

- Before installing the ATS, please prepare all cables with recommended specifications listed below. You need to select appropriate cables in according to the power level of the hybrid inverter.
- The recommended wiring terminals are provided in the accessory bag. If any terminal is damaged or the terminal is mismatched with the cable, please contact our after-sales services.

EU SYN 400E-30 wiring cables:

Table 6.1

No.	Cable type	Recommended type	Recommended specification
1	PE cable	UL10269 PE cable (green & yellow)	70mm <sup>2</sup>
2	AC/GRID power cable	UL10269 black cable	70mm <sup>2</sup> -150mm <sup>2</sup>
3	GEN power cable	UL10269 black cable	70mm <sup>2</sup> -150mm <sup>2</sup>
4	LOAD power cable	UL10269 black cable	70mm <sup>2</sup> -150mm <sup>2</sup>
5	Communication cable	UL1015 black cable	0.5mm <sup>2</sup> -2.0mm <sup>2</sup>

EU SYN 600E-30 wiring cables:

Table 6.2

No.	Cable type	Recommended type	Recommended specification
1	PE cable	UL10269 PE cable (green & yellow)	70mm <sup>2</sup>
2	AC/GRID power cable	UL10269 black cable	70mm <sup>2</sup> -240mm <sup>2</sup>
3	GEN power cable	UL10269 black cable	70mm <sup>2</sup> -240mm <sup>2</sup>
4	LOAD power cable	UL10269 black cable	70mm <sup>2</sup> -240mm <sup>2</sup>
5	Communication cable	UL1015 black cable	0.5mm <sup>2</sup> -2.0mm <sup>2</sup>

## 6.2 Grounding the enclosure

1. Strip the insulation of the PE cable by 18 mm with a stripper. Take out the SC70-8 cable lug and insert the copper cable into it. Crimp the cord end terminal using a crimper.
2. Connect the PE cable to the ground point on the enclosure of the SYN and the system grounding bar. Check and ensure that the cable has been reliably and securely connected.

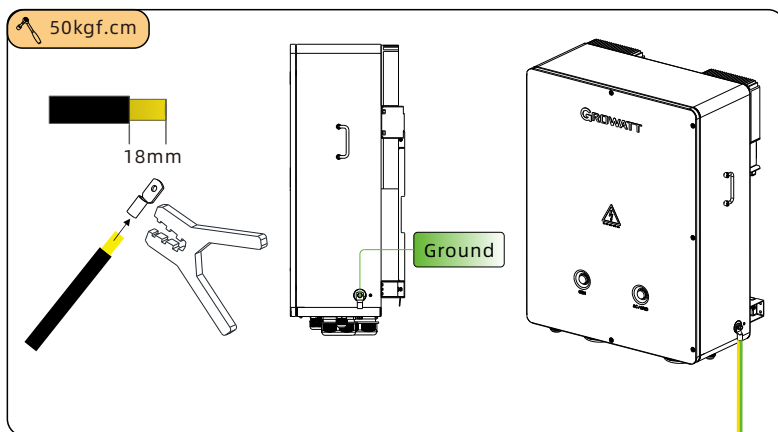


Fig 6.1

## 6.3 Connecting the power cables



**NOTICE**

- Route the cables through the waterproof cable gland before crimping them.
- The alternative plate with three cable glands for the AC/GRID port of the EU SYN 600E-30 is provided. You can determine whether to replace it based on the number of cables. If replaced, please ensure good sealing performance.
- Select the corresponding power terminals when connecting the following power cables.

### 6.3.1 Grounding on the power side

1. Strip the insulation of the PE cable by 18 mm with a stripper. Take out the SC70-8 cable lug and insert the copper cable into it. Crimp the cord end terminal using a crimper.
2. Connect the three PE cables to the GEN, LOAD and AC/GRID ground points inside the SYN and the ground points at the generator side, load side and WIT side. Check and ensure the PE cables are securely and reliably connected.

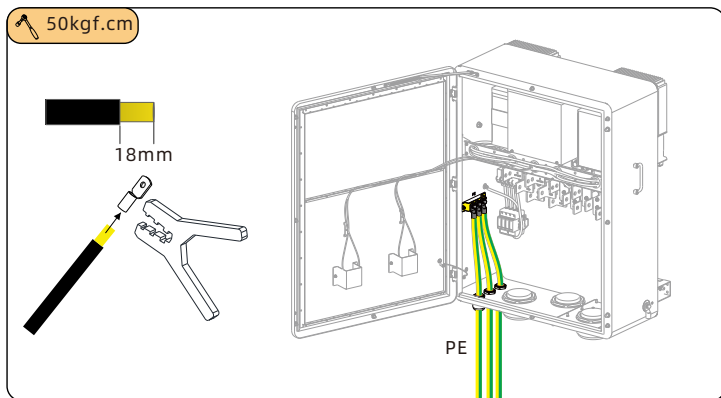


Fig 6.2

### 6.3.2 Connecting the LOAD power cables

1. Strip the insulation layer of the power cable by 22 mm with a stripper. Take out the corresponding terminal and insert the copper cable into it. Crimp the cord end terminal using a crimper.
2. Connect the four power cables to the user-side load terminal (labeled with R, S, T, N) and the Load port of SYN (labeled with R, S, T, N) respectively, then check the wiring.

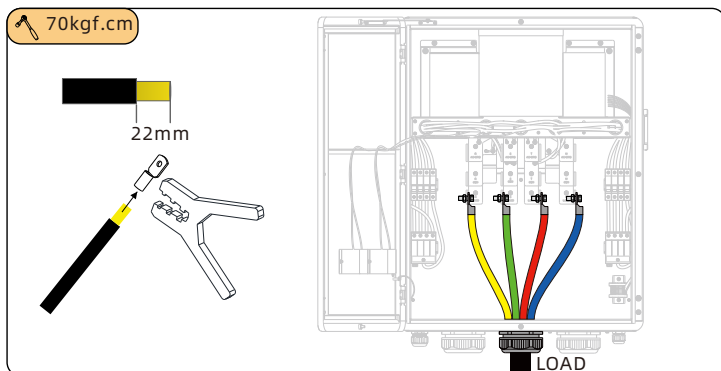


Fig 6.3

### 6.3.3 Connecting the GEN power cables

1. Strip the insulation layer of the power cable by 22 mm with a stripper. Take out the corresponding terminal and insert the copper cable into it. Crimp the cord end terminal using a crimper.
2. Connect the four power cables to the diesel generator (labeled with R, S, T, N) and the GEN port of the SYN (labeled with R, S, T, N) correspondingly, then check the wiring.

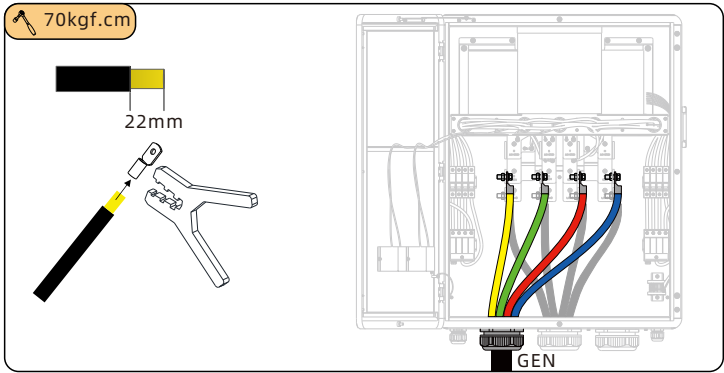


Fig 6.4

### 6.3.4 Connecting the AC/GRID power cables

1. Strip the insulation layer of the power cable by 22 mm with a stripper. Take out the corresponding terminal and insert the copper cable into it. Crimp the cord end terminal using a crimper.
2. Connect the four power cables to WIT's Load port (labeled with R, S, T, N) and the AC/GRID port of SYN (labeled with R, S, T, N) correspondingly, then check the wiring.

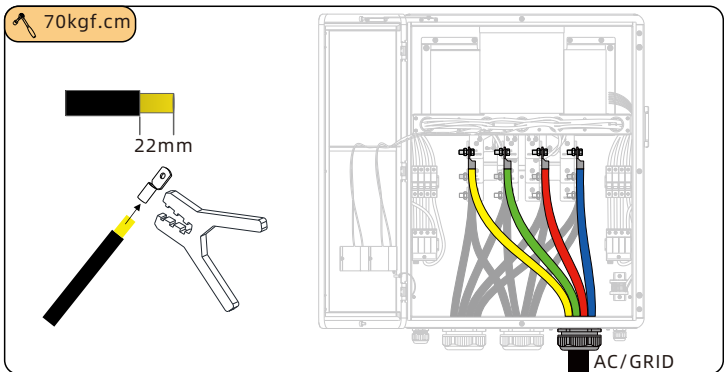


Fig 6.5

**Note:**

If you are using the plate with three cable glands, perform back-to-back cable connections on one set of the cable glands and connect the other single hole separately.

**6.3.5 Connecting the communication cable**

1. Strip the insulation of the communication cable by 13 mm with a stripper. Take out the red E1510-12 bootlace ferrule and insert the cable into it. Crimp the cord end terminal using a crimper.
2. Connect the cable to the corresponding terminals based on your needs. The port definition is shown in Table 6.1.

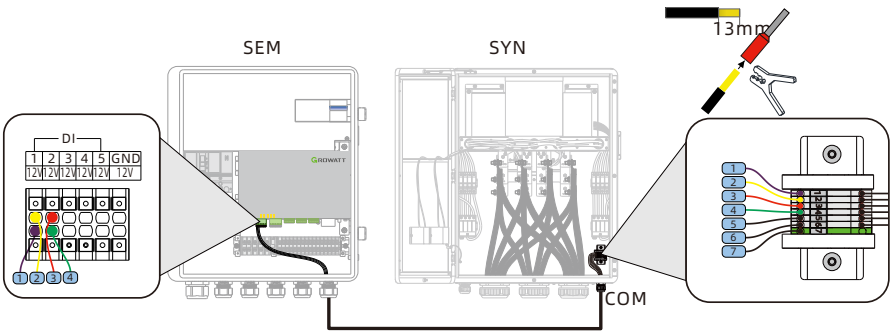


Fig 6.6

Table 6.1

NO	Signal definition	Note
1	DO1	Status "AC/Grid to Load" feedback contact
2	DO2	
3	DO3	Status "GEN to Load" feedback contact
4	DO4	
5	RS485-A	SYN RS485 external communication port
6	RS485-B	
7	PE	Grounding

## 6.4 Sealing the wiring openings

1. Check and ensure all cable connections are correct and secure.
2. Tighten all cable glands counterclockwise. Then seal the cable inlet openings that the power cables and communication cable thread through by applying fireproof mud evenly.

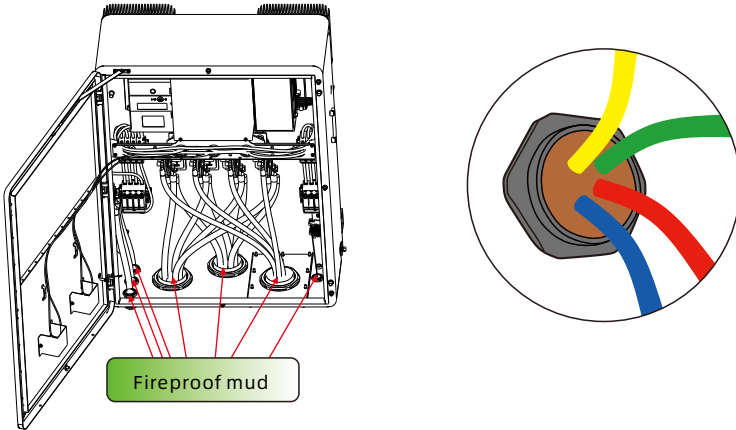


Fig 6.7

## 6.5 Securing the front cover

### Note:

To ensure the proper operation of the SYN, you must tighten all screws to avoid water penetration, which might device failure.

1. Check if all cable connections are correct and the fireproof mud has been applied.
2. Close the front cover and secure it with the five screws.

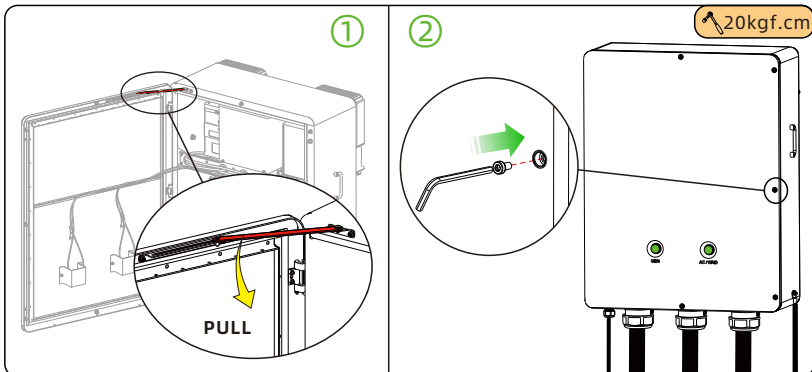


Fig 6.8

# Inspection and cleaning 7

It is recommended to check if the GEN, AC/GRID, LOAD, PE and communication cable are damaged every three months. If any cable is damaged, please contact professional technicians for maintenance. The followings are the major maintenance items:

1. Check if all cable connections are reliable and secure. If any cable is loose, tighten the screws.
2. Check if any cable is damaged. If so, fix or replace the cable.
3. Check if there is dust accumulation on the back panel of the heat sink. If so, clean it in time.
4. Check if the fireproof mud has fallen off. If so, reapply the fireproof mud.
5. Check if the front cover is open or loose. If it is loose, re-tighten the five screws on the cover.



# 8 Datasheet

Model	SYN 600E-30	SYN 400E-30
<b>Specifications</b>		
Input data (WIT)		
Nominal AC power	300kW	200kW
Nominal AC voltage	380V/400V/415V	
AC grid frequency	50Hz/60Hz	
Max. continuous current	600A@40°C 455A@50°C	380A@40°C 303A@50°C
AC grid connection type	3P4W+PE	
Input data (GEN)		
Nominal AC power	300kW	200kW
Nominal AC voltage	380V/400V/415V	
AC grid frequency	50Hz/60Hz	
Max. continuous current	600A@40°C 455A@50°C	380A@40°C 303A@50°C
AC grid connection type	3P4W+PE	
Output data (Load)		
Nominal AC power	300kW	200kW
Nominal AC voltage	380V/400V/415V	
AC grid frequency	50Hz/60Hz	
Max. continuous current	600A@40°C 455A@50°C	380A@40°C 303A@50°C
General data		
Dimensions (W / H / D)	660*770*288mm	
Weight	65kg	55kg
Operating temperature range	-25 ~ 60°C, (> 50°C, derating)	
Altitude	4000m	
Cooling	Natural convection	
Protection degree	IP66	
Installation	Wall Mountable	

# Decommission 9

## 9.1 Disassembling the SYN box

1. Turn off all upstream switches of SYN, then wait five minutes before you open the cover.
2. Open the front cover, ensure that no residual voltage is present using a multimeter, then disconnect all cables.
3. Remove the fixing screws on both sides of the wall mount, then remove the ATS from the wall mount.

## 9.2 Handling the SYN box



Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

# 10 Contact us

If you have technical problems concerning our products, please contact Growatt Service. To provide you with the necessary support, please have the following information ready:

- SYN type
- SYN serial number
- Connection mode of the SYN and inverter and number of the inverter

**Shenzhen Growatt New Energy Co., Ltd.**

4-13/F, Building A, Sino-German (Europe) Industrial Park,  
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**T** +86 755 2747 1942

**E** [service@ginverter.com](mailto:service@ginverter.com)

**W** [www.ginverter.com](http://www.ginverter.com)



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