



# USER MANUAL

HYS-3.0LV-EUG1/AUG1  
HYS-3.6LV-EUG1/AUG1  
HYS-4.6LV-EUG1/AUG1  
HYS-5.0LV-EUG1/AUG1  
HYS-6.0LV-EUG1/AUG1  
HAS-3.0LV-EUG1/AUG1  
HAS-3.6LV-EUG1/AUG1  
HAS-4.6LV-EUG1/AUG1  
HAS-5.0LV-EUG1/AUG1













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## 1. Safety Introduction

### 1.1 Explanation of Symbols

The following types of safety precautions and general information symbols used in this manual must be followed during the installation, operation and maintenance of the inverter.

Symbol	Usage
 DANGER	Indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazard with a medium level of risk that, if not avoided, can result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk that, if not avoided, can result in minor or moderate injury.
 NOTICE	Indicates a situation that, if not avoided, can result in property damage. NOTICE is used to address practices not related to personal injury.
	Caution! Failure to observe any warnings contained in this manual may result in injury.
	Danger to life due to high voltages! Only qualified personnel can open and maintain the inverter.
	Burn danger due to hot surface that may exceed 60°C.
	Refer to the operating instructions.
	After the inverter is turned off, wait for at least 10 minutes before opening the inverter or touching live parts.
	Products shall not be disposed as household waste.
	CE mark.
	UKCA mark.



	This side up! This package must always be transported, handled and stored in such a way that the arrows always point upwards.
	Fragile - The package/product should be handled carefully and should never be tipped over or slung.
	Keep dry! The package/product must be protected from excessive humidity and must be stored under cover.
	No more than six (6) identical packages are to be stacked on each other.




## 1.2 Safety Information

This chapter contains important safety and operating instructions. For future reference, please read and keep this manual.

For the purpose of preventing personal injury and property damage, as well as ensuring the long-term operation of the product, please read and follow all the instructions and cautions on the inverter and in this user manual during installation, operation and maintenance.

Safety instructions in this manual cannot cover all precautions that should be taken. Please consider the actual conditions on site when performing operations. Any damage caused by a violation of the safety instructions in this manual shall not be the responsibility of Hoymiles.

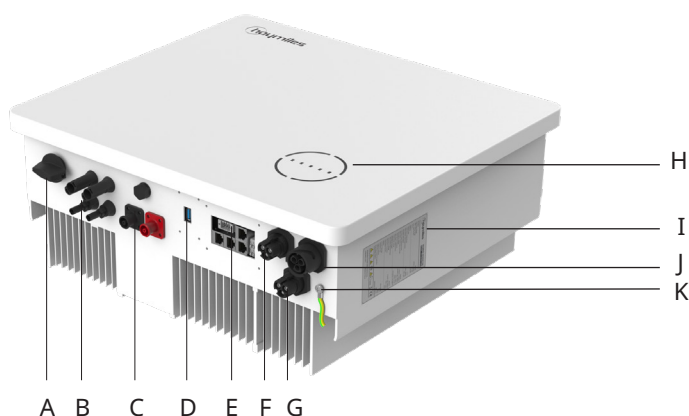
Symbol	Usage
	<p><b>Danger to life from electric shock</b></p> <ul style="list-style-type: none"> <li>Before performing any work on the inverter, disconnect all DC and AC power from inverter and wait for at least 10 minutes. Hazardous voltage will exist for up to 10 minutes after disconnection from power supply.</li> <li>Never insert or remove the AC or DC connections when the inverter is running.</li> <li>Any live parts connected to battery ports cannot be touched before removing all the power from inverter for 10 minutes because there is still danger to life even battery voltage is lower than 60 V.</li> <li>Do not touch DC conductors or any non-isolated cable ends.</li> <li>The mounting location must be inaccessible to children.</li> <li>Never touch either the positive or negative pole of PV connecting device. Strictly prohibit touching both at the same time.</li> </ul>
	<p><b>Risk of burns from hot surfaces</b></p> <ul style="list-style-type: none"> <li>The surface of the inverter might exceed 60°C , and touching the surface may result in burns.</li> <li>Do not touch hot surfaces before it cools down.</li> </ul>

 <p><b>WARNING</b></p>	<ul style="list-style-type: none"> <li>• Only authorized service personnel are allowed to install the inverter or perform servicing and maintenance.</li> <li>• All powers, both AC and DC, should be disconnected from inverter before attempting any maintenance, cleaning or working on any circuits connected to inverter.</li> <li>• Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.</li> <li>• Keep away from flammable and explosive materials to avoid fire disaster.</li> <li>• The installation place should be away from humid or corrosive substances.</li> <li>• The unit contains capacitors that remain charged to a potentially lethal voltage after the mains, battery and PV supply have been disconnected.</li> <li>• When accessing the internal circuit of inverter, wait for at least 10 minutes after disconnecting the power.</li> </ul>
 <p><b>CAUTION</b></p>	<ul style="list-style-type: none"> <li>• The inverter has a transformerless design on PV side. Neither positive nor negative terminals of PV panels should be grounded.</li> <li>• The frames of PV panels should be grounded for safety reasons.</li> <li>• Ensure that existing wiring is in good condition and no wire is undersized.</li> <li>• Do not disassemble any parts of inverter which are not mentioned in installation.</li> <li>• Authorized service personnel must use insulated tools when installing or working with this equipment.</li> <li>• PV modules shall have an IEC 61730 class A rating.</li> </ul>
 <p><b>NOTICE</b></p>	<ul style="list-style-type: none"> <li>• The minimum rated temperature of the wire used is 90°C (194°F).</li> <li>• All electrical connections must be in accordance with local and national standards.</li> <li>• Only with permission of the local utility grid company, the inverter can be connected to the utility grid.</li> <li>• Do not open the inverter cover or change any components without authorization, otherwise the warranty commitment for the inverter will be invalid.</li> <li>• Appropriate methods must be adopted to protect inverter from electrostatic discharge; any damage caused by ESD is not warranted by the manufacturer.</li> <li>• Prior to the application, please read this section carefully to ensure the correct and safe application. Please keep the user manual properly.</li> <li>• The manual contains no instructions for user-serviceable parts. See Warranty for instructions on obtaining service.</li> <li>• If an error occurs, contact your local distributor or qualified electricians.</li> </ul>

## 2. Product Introduction

### 2.1 Product Overview

The HYS-LV series is a high-performance single-phase hybrid inverter with excellent reliability. The HAS-LV series is designed for retrofitting PV systems. The intelligent EMS function supports self-consumption, economic, and backup modes for multi-scenario applications. Monitoring management through S-Miles Cloud allows users to remotely diagnose and track the system performance over time, offering superior energy production.



\* The image shown here is for reference only. The actual product received may differ.

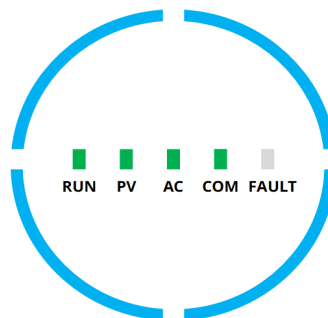
Object	Description
A	DC Switch <sup>(1) (2)</sup>
B	PV Terminals <sup>(3)</sup>
C	Battery Terminals
D	Data Transfer Stick (DTS) Port
E	Communication Port
F	GRID Connector
G	Generator (GEN) Connector
H	LED Indicators
I	Label
J	Emergency Power Supply (EPS) Connector
K	PE Terminal

(1) Only for HYS series inverters.

(2) For HYS-LV-AUG1 series inverters, it has a DC switch lock.

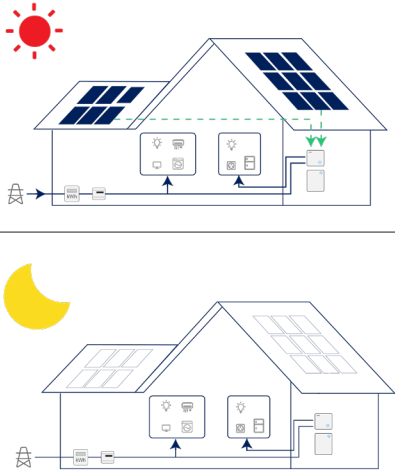
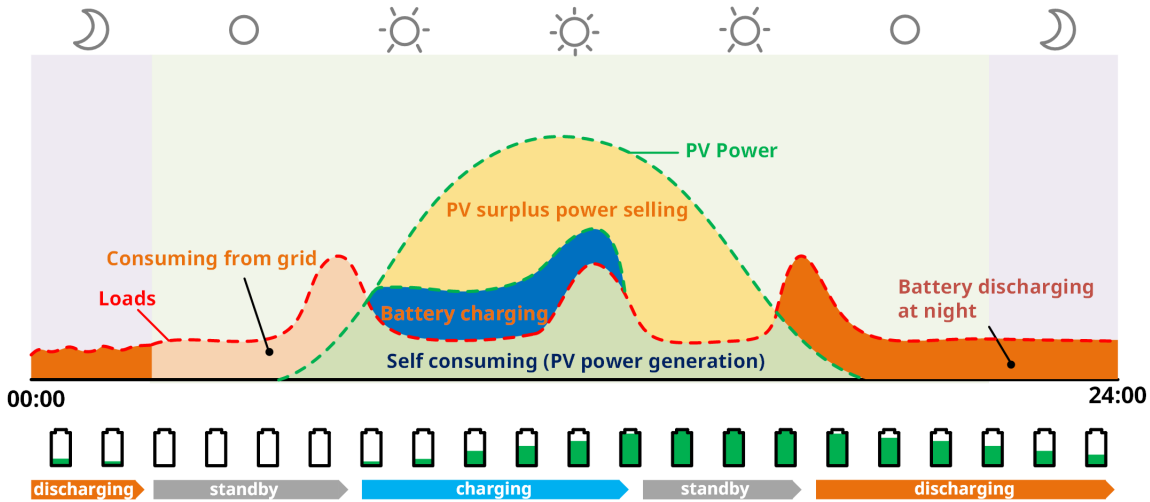
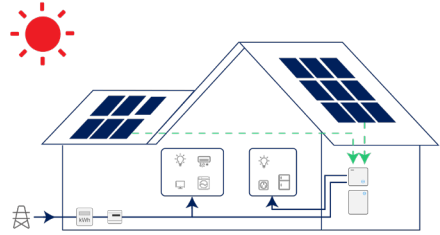
(3) Only for HYS series inverters.

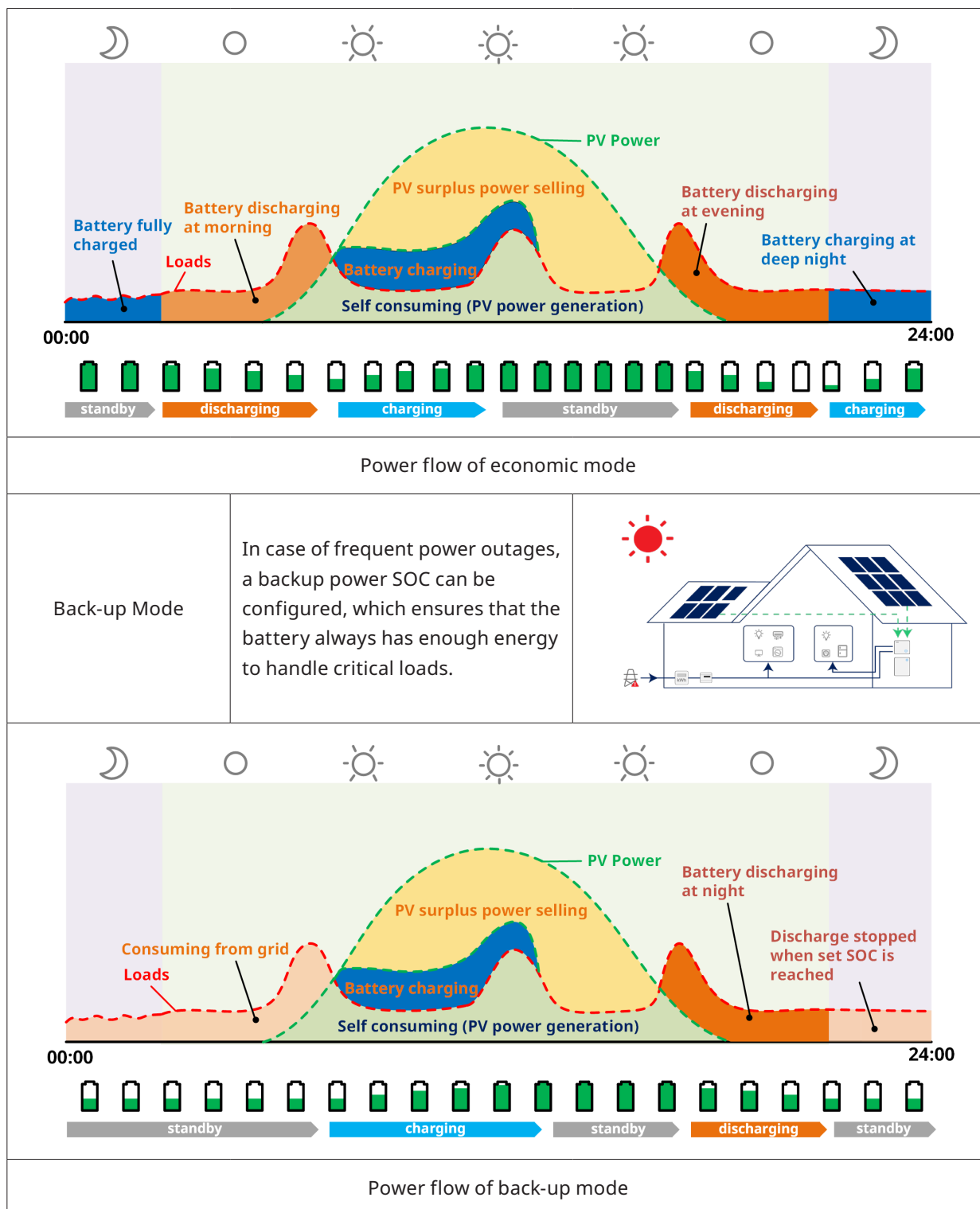
## LED Indicators



Indicator	Status	Explanation
SOC	<p>0~25%      25~50% 50~75%      75~100%</p>	<p>Full circle LEDs on – SOC is 75-100%</p> <p>3/4 circle LEDs on – SOC is 50-75%</p> <p>2/4 circle LEDs on – SOC is 25-50%</p> <p>1/4 circle LED on – SOC is 10-25%</p> <p>1/4 circle LED blink – SOC is below 10%</p> <p>All circle LEDs off – No BMS communication</p>
RUN		<p>Off – Inverter is shut down</p> <p>Blink 1 – Inverter is booting</p> <p>Blink 2 – Inverter is in bypass mode</p> <p>On – Inverter is turned on</p>
PV (Only for HYS)		<p>Off – PV voltage is low</p> <p>Blink 1 – PV power is low</p> <p>On – PV is generating power</p>
AC		<p>Off – Grid is disconnected and EPS is off</p> <p>Blink 1 – Grid is disconnected but EPS is on</p> <p>On – Grid is connected</p>
COM		<p>Off – Communication error of both meter and BMS</p> <p>Blink 1 – Meter communication failure</p> <p>Blink 2 – BMS communication failure</p> <p>On – BMS and meter communications are normal</p>
FAULT		<p>Off – No fault</p> <p>On – A fault happens</p> <p>Blink 1 – EPS port overload</p> <p>Blink 2 – ISO/RCD fault</p> <p>Blink 3 – Arc fault</p>

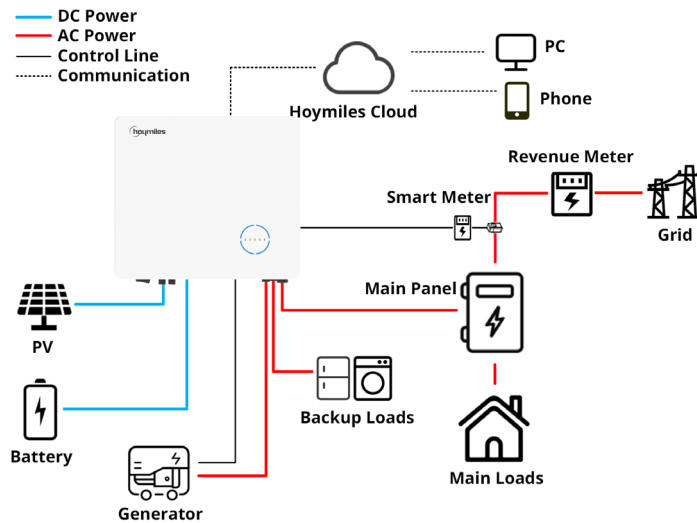
2.2 Operating Modes

Main Operation Modes		
The following operation modes are applicable for the HYS series inverter, and are also applicable for the HAS series inverter which is connected with the PV inverter through the GEN port.		
Self-consumption Mode	<p>In the daytime, solar energy supports the loads first and surplus energy is stored in the battery. When the battery is fully charged or reaches the maximum charge power, the rest energy is fed into grid (or limited if required).</p> <p>At night, the battery discharges for the loads firstly and the grid will supply the loads once the battery power is not enough. In this mode, battery cannot be charged from grid at night.</p>	
		
Power flow of self-consumption mode		
Economic Mode	<p>In this mode, the time of battery charge and discharge needs to be set. Meanwhile, the battery can be forced to charge from the grid during the preset charge time. For instance, the battery could be charged or discharged according to valley or peak electricity price.</p>	

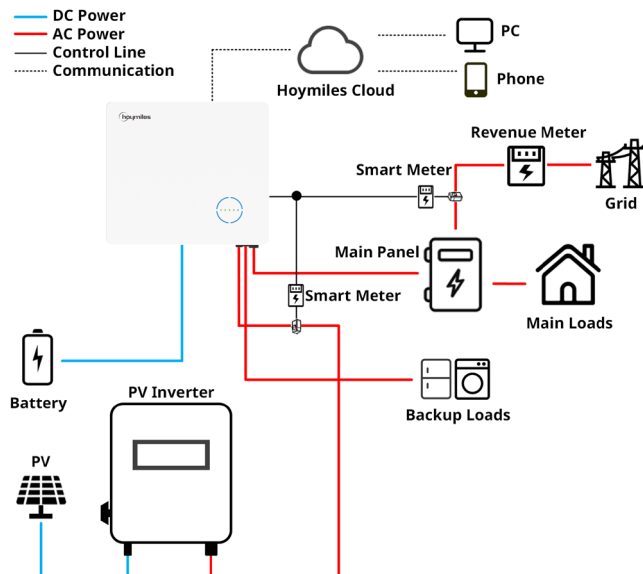


## 2.3 System Diagram

The HYS-LV series inverter can be connected to a battery and PV panels to form a PV Energy Storage System (ESS). In the event of a grid outage, it can be used as an emergency power supply (EPS) through the self-consumption of solar energy. It can either form a DC-coupled system for a new installation or an AC-coupled system to retrofit existing installations.



The HAS-LV series inverter can be connected to a battery and any grid-connected PV inverters to form a PV Energy Storage System (ESS). In the event of a grid outage, it can be used as an emergency power supply (EPS) through the self-consumption of solar energy, as the grid-connected PV inverter can also work when it is connected to the GEN port even if there is a grid outage.

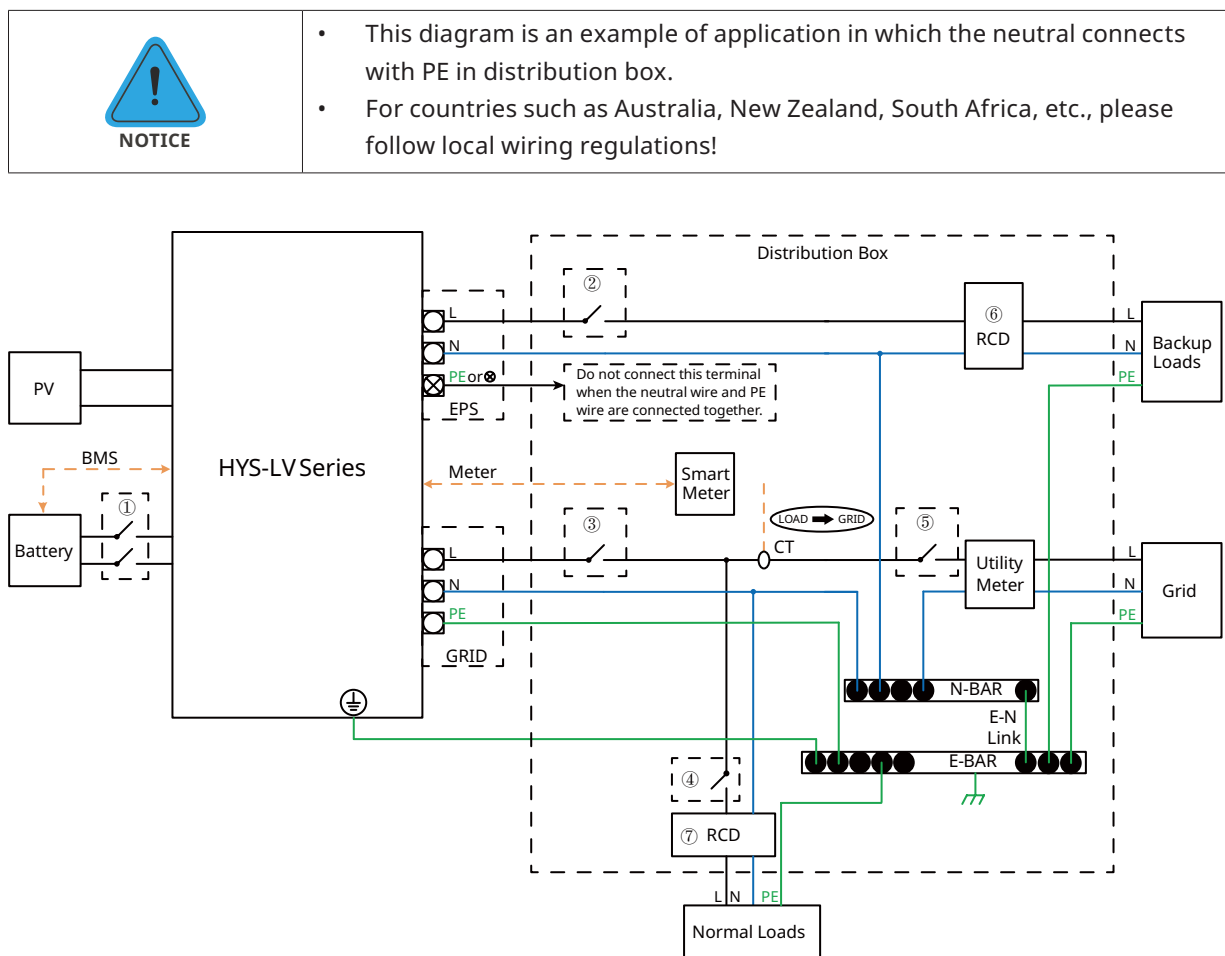


NOTICE

- This diagram is a simplified system sketch that is only intended to explain system architecture.
- Please refer to <https://www.hoymiles.com> for compatible battery list, and the user should first contact Hoymiles for technical consultation and obtain official confirmation prior to installing any battery not included in the official published list.
- Lead-acid battery is not recommended for general customers as it requires experienced installers and technicians who can fully understand the battery parameters and configure the setting and installations correctly. Please contact Hoymiles for technical support on lead-acid battery installation.

### 2.3.1 Basic Diagram

A. Diagram for Australia, New Zealand, South Africa, etc. (for HYS series inverters)




Model	①	②	③	④	⑤	⑥⑦
HYS-3.0LV-G1	100 A/60 V DC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker	Depends on Loads	Main Breaker	30 mA RCD
HYS-3.6LV-G1	125 A/60 V DC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker			
HYS-4.6LV-G1	125 A/60 V DC Breaker	25 A/230 V AC Breaker	40 A/230 V AC Breaker			
HYS-5.0LV-G1	125 A/60 V DC Breaker	32 A/230 V AC Breaker	40 A/230 V AC Breaker			
HYS-6.0LV-G1	125 A/60 V DC Breaker	40 A/230 V AC Breaker	40 A/230 V AC Breaker			

**Note:**

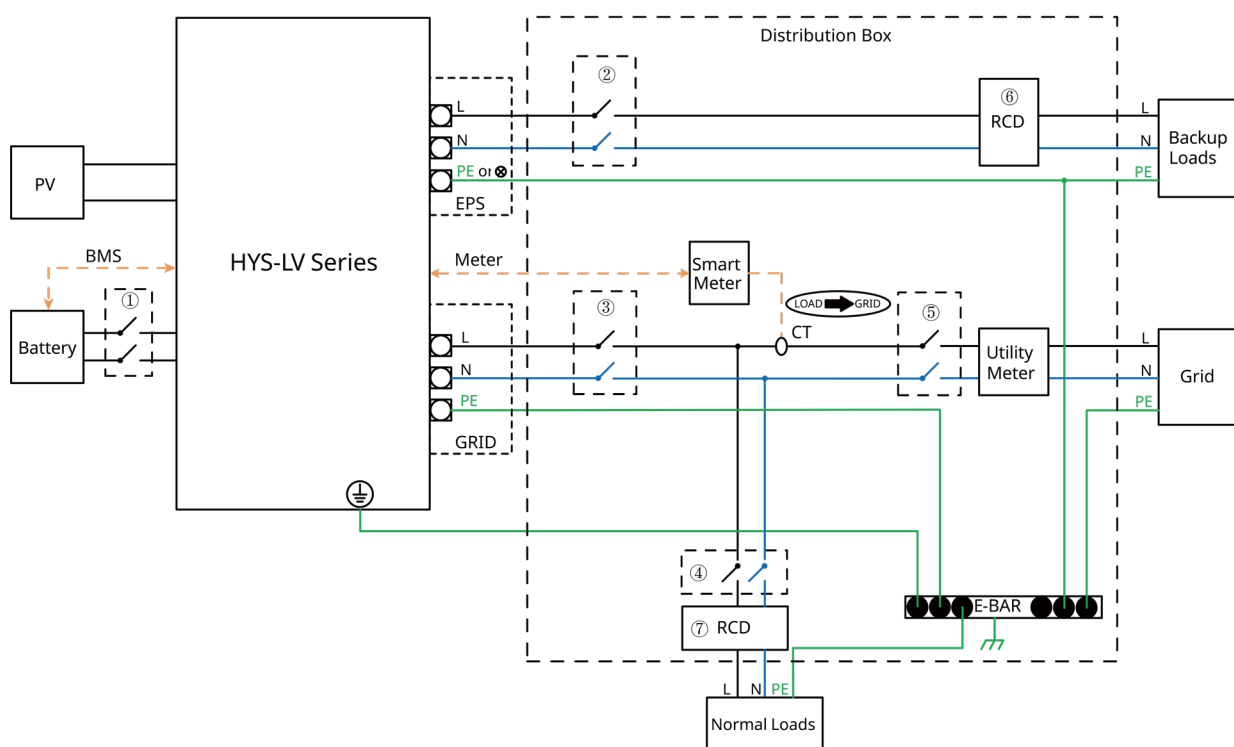
- If the battery integrates a readily accessible internal DC breaker, no additional ① DC breaker is required.
- ⑥⑦ 30 mA RCD is recommended but not mandatory; please comply with local regulation.

## B. Diagram for Other Countries (for HYS series inverters)



**NOTICE**

- This diagram is an example of application in which the neutral is separated from the PE in the distribution box.
- For countries such as China, Germany, Italy, etc., please follow local wiring regulations!
- The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise, the back-up function may be abnormal when the grid fails.

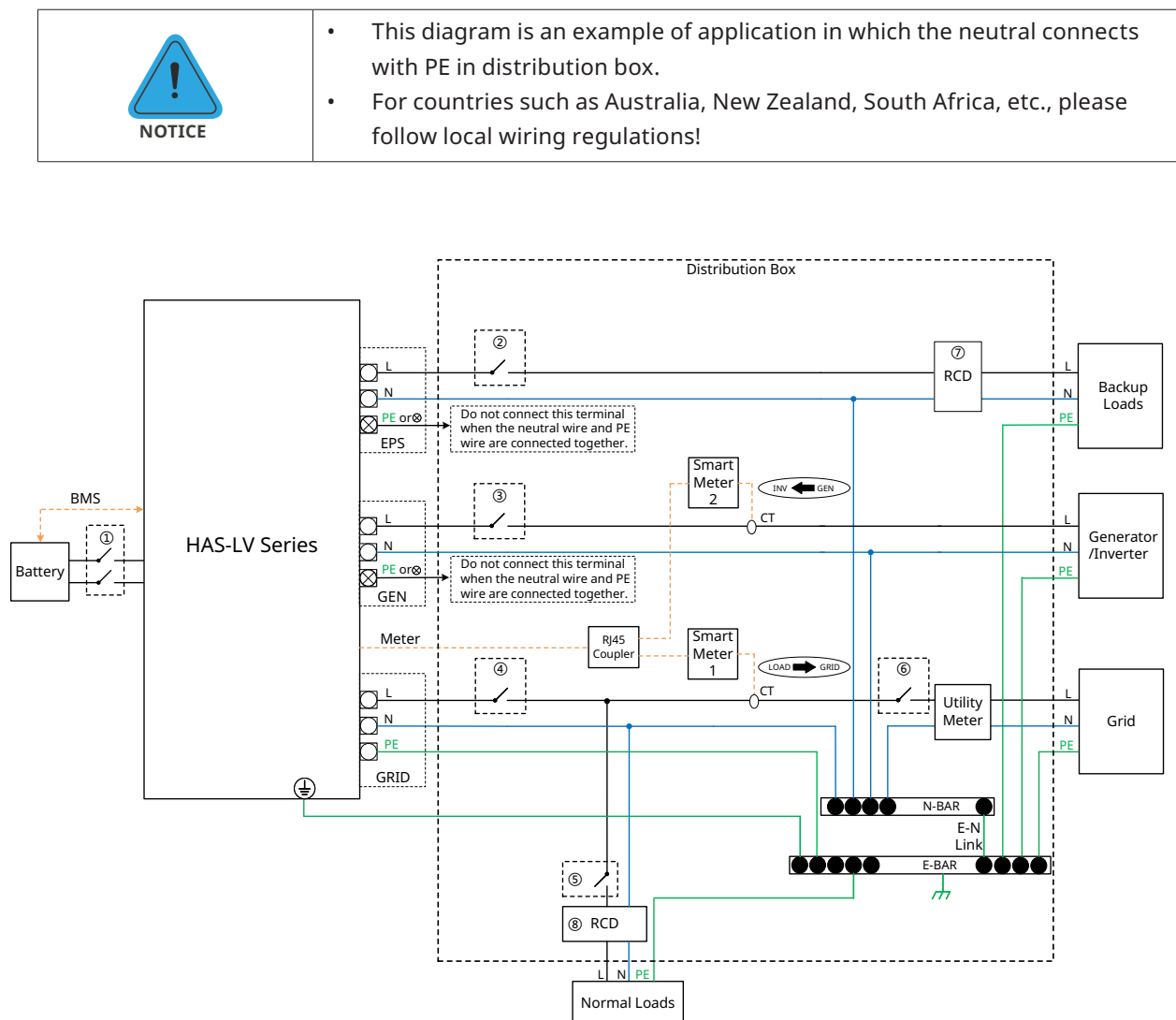


Model	①	②	③	④	⑤	⑥⑦
HYS-3.0LV-G1	100 A/60 V DC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker	Depends on Loads	Main Breaker	30 mA RCD
HYS-3.6LV-G1	125 A/60 V DC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker			
HYS-4.6LV-G1	125 A/60 V DC Breaker	25 A/230 V AC Breaker	40 A/230 V AC Breaker			
HYS-5.0LV-G1	125 A/60 V DC Breaker	32 A/230 V AC Breaker	40 A/230 V AC Breaker			
HYS-6.0LV-G1	125 A/60 V DC Breaker	40 A/230 V AC Breaker	40 A/230 V AC Breaker			

**Note:**

- If the battery integrates a readily accessible internal DC breaker, no additional ① DC breaker is required.
- ⑥⑦ 30 mA RCD is recommended but not mandatory; please comply with local regulation.

## C. Diagram for Australia, New Zealand, South Africa, etc. (for HAS series inverters)




Model	①	②	③	④	⑤	⑥	⑦⑧
HAS-3.0LV-G1	100 A/60 V DC Breaker	20 A/230 V AC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker	Depends on Loads	Main Breaker	30 mA RCD
HAS-3.6LV-G1	125 A/60 V DC Breaker	20 A/230 V AC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker			
HAS-4.6LV-G1	125 A/60 V DC Breaker	25 A/230 V AC Breaker	25 A/230 V AC Breaker	40 A/230 V AC Breaker			
HAS-5.0LV-G1	125 A/60 V DC Breaker	32 A/230 V AC Breaker	32 A/230 V AC Breaker	40 A/230 V AC Breaker			

## Note:

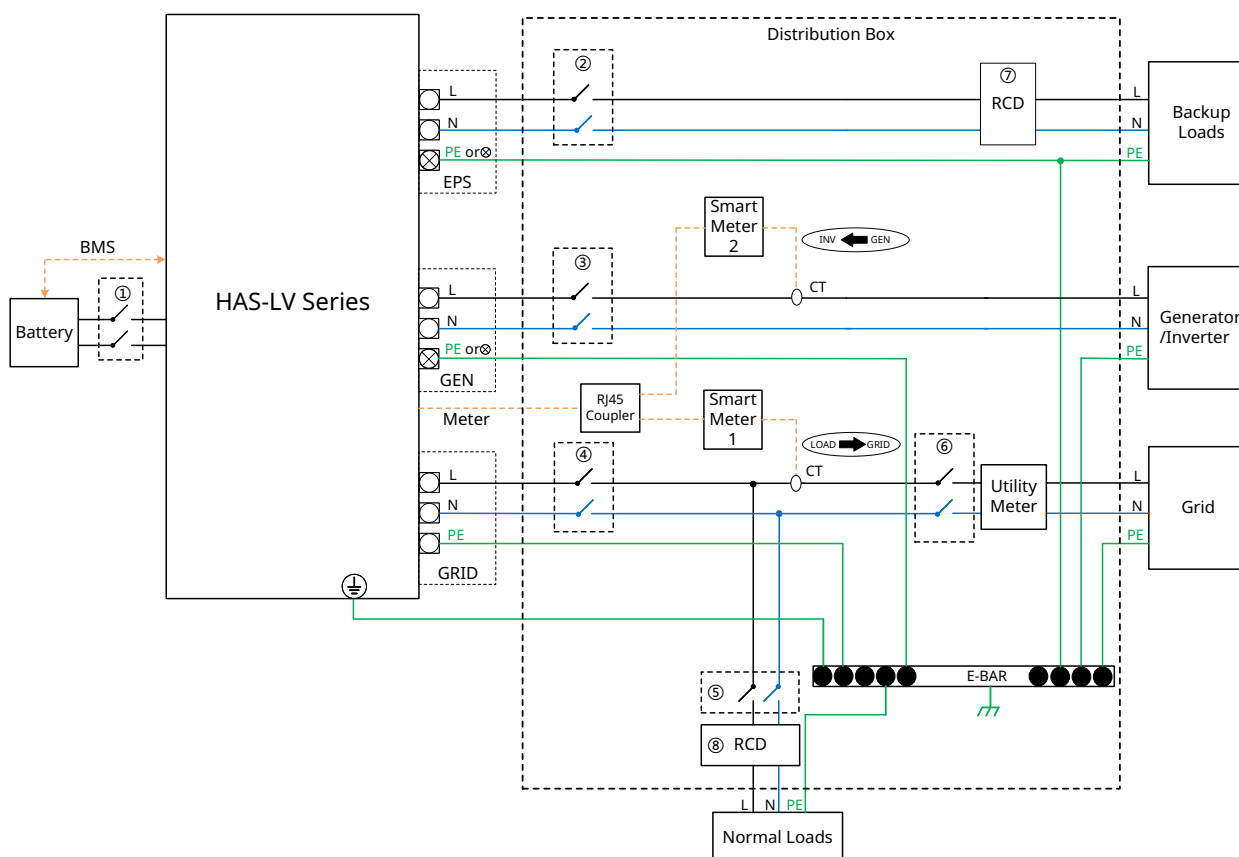
- If the battery integrates a readily accessible internal DC breaker, no additional ① DC breaker is required.
- ⑦⑧ 30 mA RCD is recommended but not mandatory; please comply with local regulation.

## D. Diagram for Other Countries (for HAS series inverters)



**NOTICE**

- This diagram is an example of application in which the neutral is separated from the PE in the distribution box.
- For countries such as China, Germany, Italy, etc., please follow local wiring regulations!
- The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise, the back-up function may be abnormal when the grid fails.



Model	①	②	③	④	⑤	⑥	⑦⑧
HAS-3.0LV-G1	100 A/60 V DC Breaker	20 A/230 V AC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker	Depends on Loads	Main Breaker	30 mA RCD
HAS-3.6LV-G1	125 A/60 V DC Breaker	20 A/230 V AC Breaker	20 A/230 V AC Breaker	40 A/230 V AC Breaker			
HAS-4.6LV-G1	125 A/60 V DC Breaker	25 A/230 V AC Breaker	25 A/230 V AC Breaker	40 A/230 V AC Breaker			
HAS-5.0LV-G1	125 A/60 V DC Breaker	32 A/230 V AC Breaker	32 A/230 V AC Breaker	40 A/230 V AC Breaker			

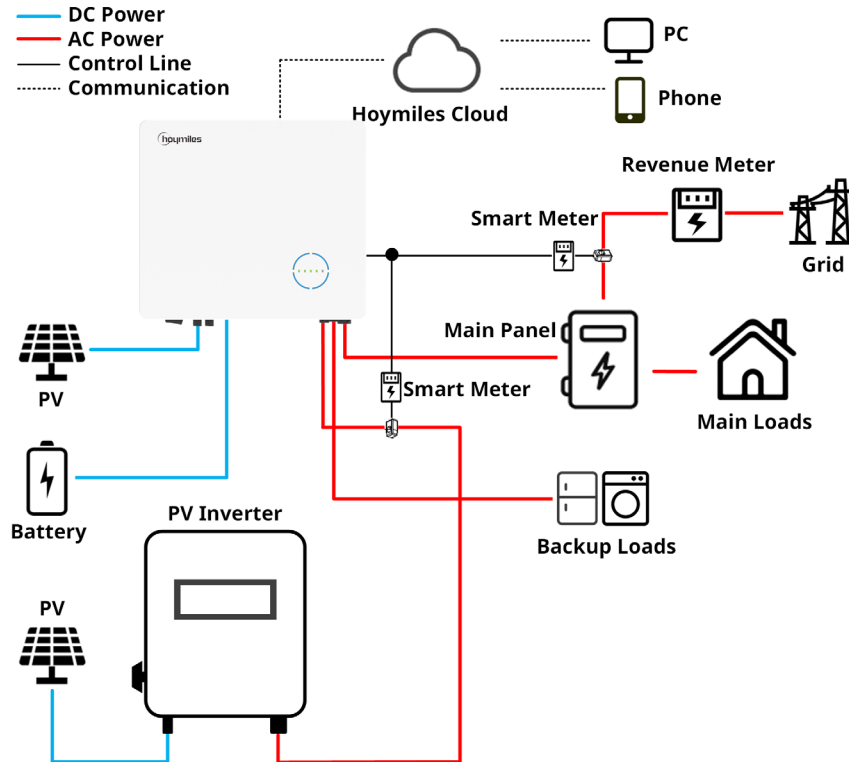
**Note:**

- If the battery integrates a readily accessible internal DC breaker, no additional ① DC breaker is required.
- ⑦⑧ 30 mA RCD is recommended but not mandatory; please comply with local regulation.

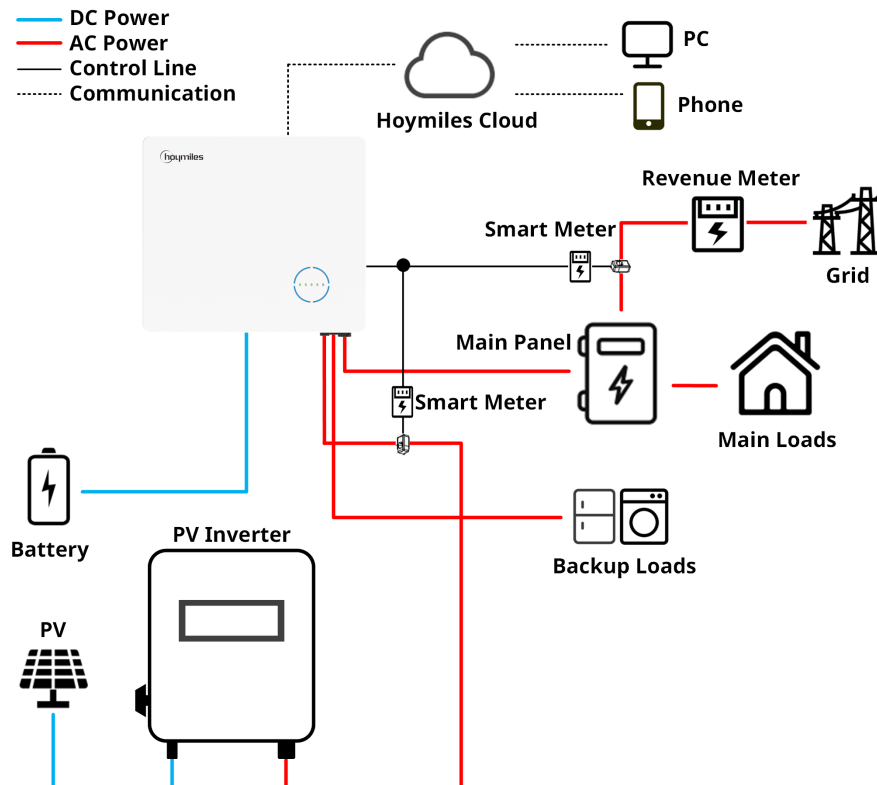
### 2.3.2 Retrofit System

The HYS/HAS-LV series inverter is compatible with any single-phase grid-connected PV inverters. With the addition of Hoymiles hybrid inverter or AC-coupled inverter, existing PV system can be retrofitted to be a PV Energy Storage System (ESS) allowing more self-consumption energy and more back-up energy. Consult with your system integrator for detailed wirings according to your requirements.

#### HYS Series

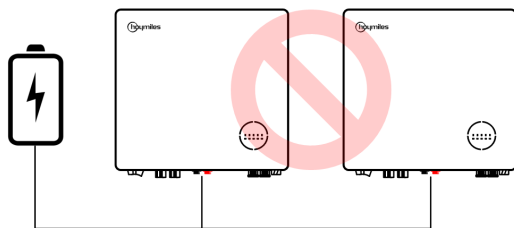


#### HAS Series

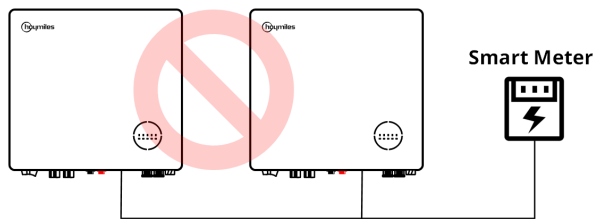


### 2.3.3 Unacceptable Diagram

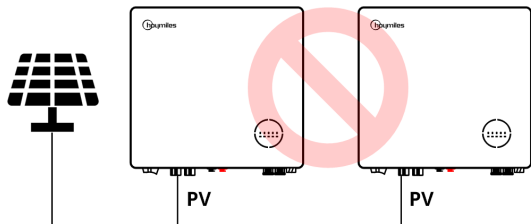
Avoid the following installation types to prevent damage to the system or the HYS/HAS series inverter.



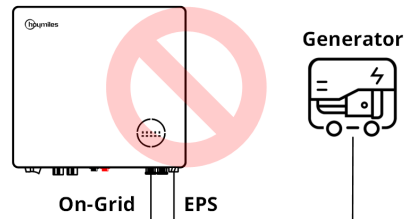
One battery cannot be connected to multiple inverters.



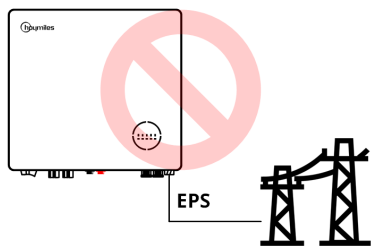
One meter cannot be connected to multiple inverters and different CTs cannot be connected to the same line cable.



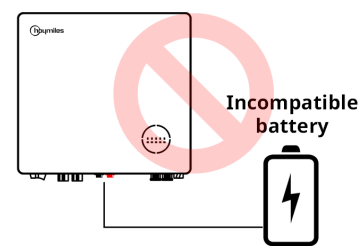
Single PV cannot be connected to multiple inverters.



Neither EPS or on-grid port can be connected to generator directly.



EPS port cannot be connected to grid directly.



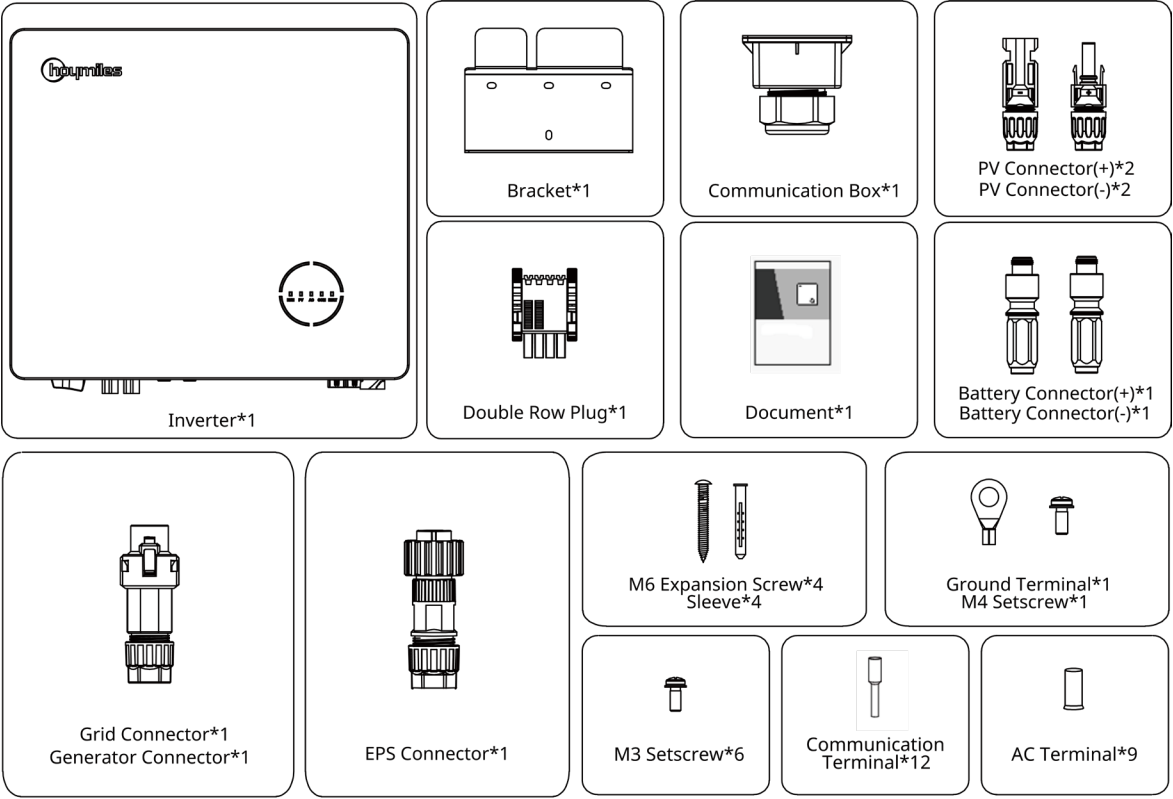
Incompatible battery cannot be connected to battery port.

### 3. Installation Instruction

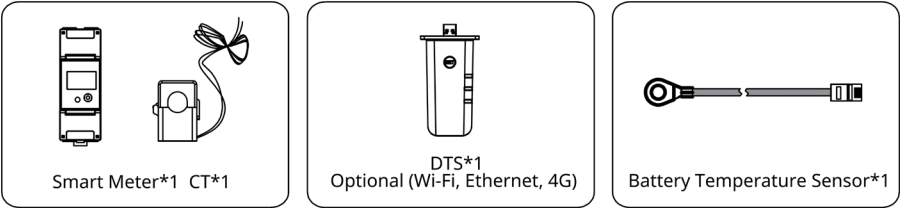
#### 3.1 Packing List

Please ensure that none of the components listed below are missing or damaged upon receipt of the hybrid inverter or AC-coupled inverter.

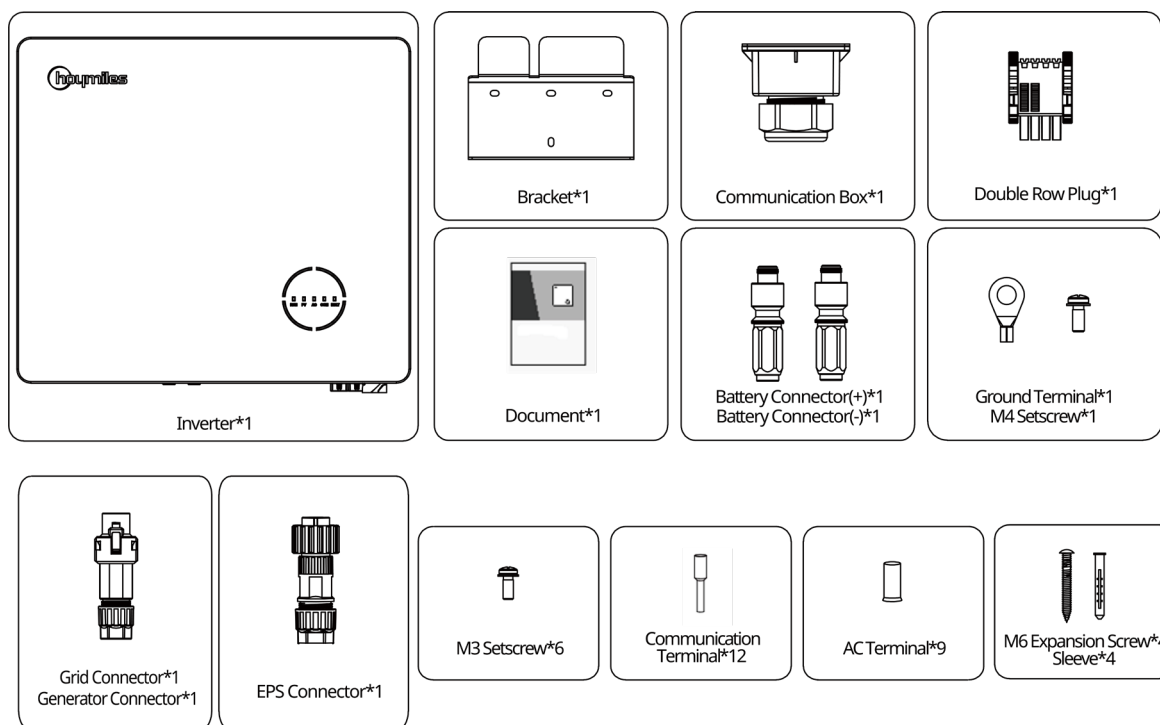
#### HYS Series



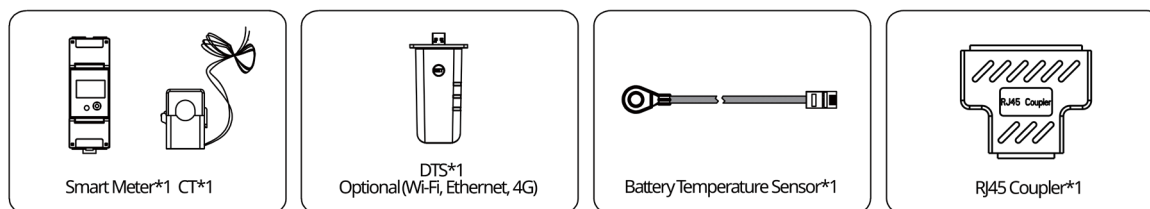
#### Accessories packing list



## HAS Series

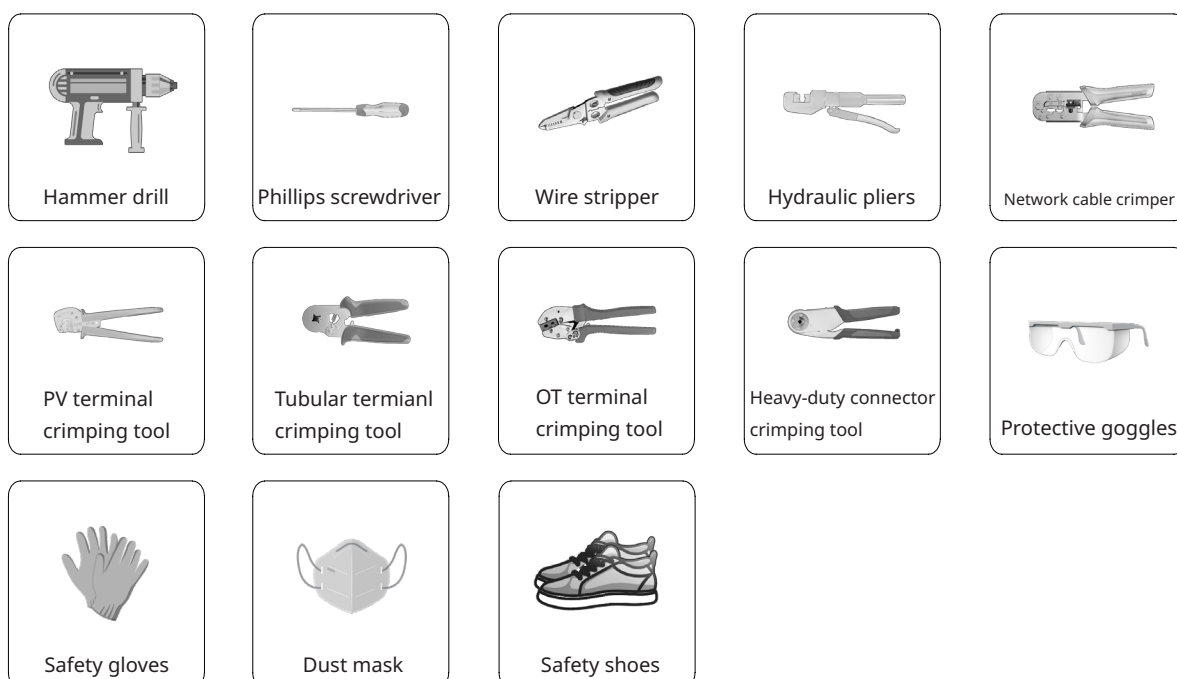


## Accessories packing list





## 3.2 Installation Tools

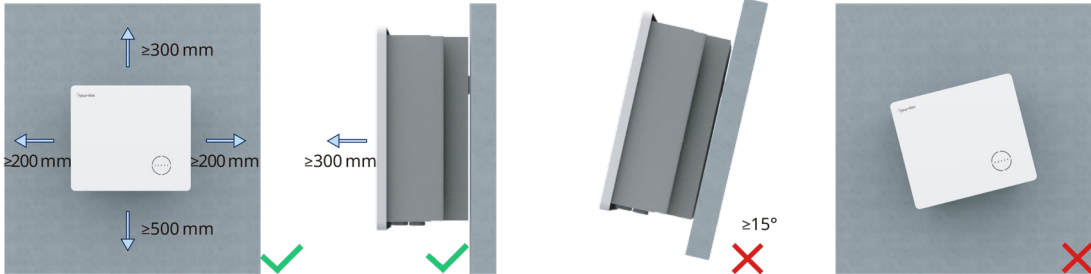
The following tools are recommended in the installation process, and other auxiliary tools can also be used on site if necessary.



3.3 Mounting

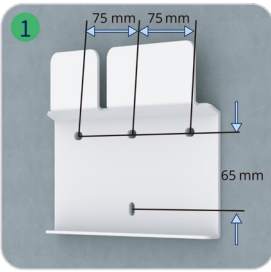
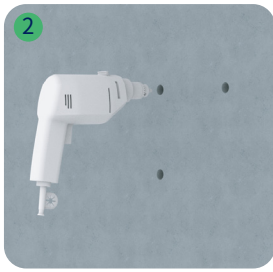
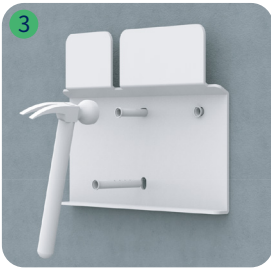
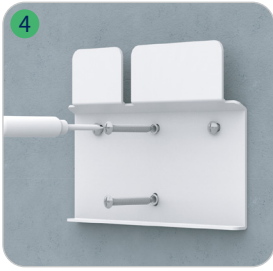
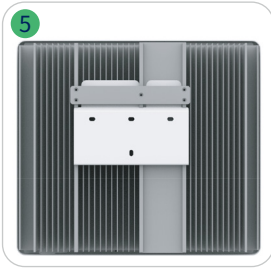
3.3.1 Selecting the Mounting Location

 WARNING	<ul style="list-style-type: none"><li>• Make sure there is no electrical connection before installation.</li><li>• In order to avoid electric shock or other injuries, make sure that holes are not drilled over any electrical parts or plumbing installations.</li></ul>
 NOTICE	<ul style="list-style-type: none"><li>• Make sure the inverter is correctly installed according to the following list. Any incorrect installation would require a risk assessment.</li></ul>


Check List	
<p>1. The inverter installation should be protected by shelter from direct sunlight or bad weather such as snow, rain or lightning.</p> <p>2. The inverter should be installed on a solid surface which is suitable for the inverter’s dimensions and weight.</p> <p>3. The inverter should be installed vertically or at a maximum back tilt of 15°. Leave enough space around the inverter according to the figure below.</p> <div data-bbox="272 911 1367 1184"></div>	
<p>4. The ambient temperature should be between -25°C and 45°C. High ambient temperatures will cause power derating of the inverter.</p> <p>5. The relative humidity should be less than 95%, without condensing.</p> <p>6. The inverter should be installed at eye level for convenient maintenance.</p> <p>7. The product label on the inverter should be clearly visible after installation.</p> <p>8. The inverter should be installed far from flammable materials.</p>	

3.3.2 Mounting Inverter

Install the inverter on the wall using the provided wall-mounting bracket and expansion plug sets.

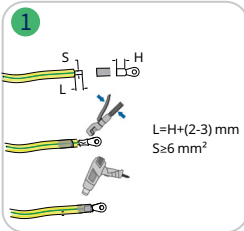
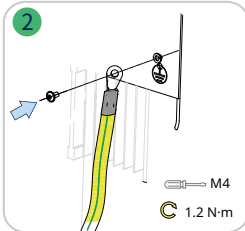
Procedure		
Step 1	Position the bracket against the wall and mark the 4 drilling hole locations.	
Step 2	Drill holes with a driller, and make sure the holes are deep enough (at least 60 mm).	
Step 3	Place sleeves in the holes, and then tighten them.	
Step 4	Fix the wall bracket with expansion screws. Please confirm that the bracket is firmly attached to the mounting surface.	
Step 5	Mount the inverter on the bracket.	

3.4 Electrical Wiring Connection

 WARNING	<ul style="list-style-type: none"><li>Prior to any electrical connections, keep in mind that the inverter has dual power supplies. It is mandatory for the qualified personnel to wear personal protective equipment (PPE) during the electrical work.</li></ul>
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3.4.1 Grounding Connection

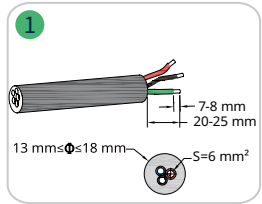
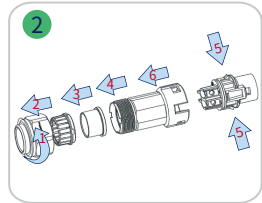
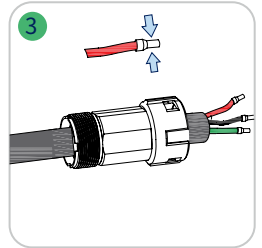
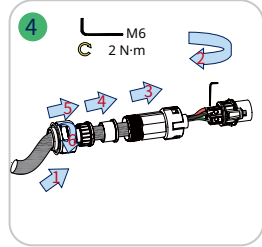
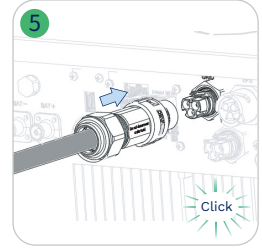
All non-current carrying metal parts and device enclosures in the PV power system should be grounded. There is an additional grounding terminal located at bottom right of the inverter, being connected to a nearby grounding point.

Procedure		
Step 1	Prepare the cable and OT/DT terminal.	
Step 2	Use the screw from the accessory box. Then fasten the cable with a screwdriver.	

### 3.4.2 AC Wiring Connection

#### 3.4.2.1 Grid Connection

	<p>Before connecting the grid, please make sure all requirements listed below are followed.</p> <ul style="list-style-type: none"> <li>• Use the grid connector from the accessory box. Damage to the device due to the use of incompatible connector shall not be covered by the warranty.</li> <li>• An independent three or four-pole circuit breaker must be installed on the output side of the inverter to ensure safe disconnection from the grid.</li> <li>• Multiple inverters cannot share one circuit breaker.</li> <li>• Never connect a load between the inverter and the circuit breaker.</li> </ul>
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Procedure		
Step 1	<ul style="list-style-type: none"> <li>• Remove the cable jacket by 20-25 mm, and strip the wire insulation by 7-8 mm.</li> <li>• The conductor cross-sectional area: 6 mm<sup>2</sup>.</li> </ul>	
Step 2	<ul style="list-style-type: none"> <li>• Unscrew the grid connector counterclockwise.</li> <li>• Disassemble the parts in sequence.</li> </ul>	
Step 3	<ul style="list-style-type: none"> <li>• Insert the cable conductor core into the terminals and crimp them tightly. Make sure the cable jacket is not locked within the connector.</li> <li>• Thread the AC cable of appropriate length through the waterproof terminal.</li> </ul>	
Step 4	<ul style="list-style-type: none"> <li>• Fix all cables to the corresponding terminals with a torque of 2 N•m using the screwdriver according to markings on the connector. Make sure the L/N/PE are correctly assembled.</li> <li>• Assemble the parts in sequence.</li> </ul>	
Step 5	<ul style="list-style-type: none"> <li>• Tighten the waterproof terminal clockwise.</li> <li>• Connect the grid connector to the inverter. There should be a “click” sound, if it is plugged in correctly.</li> </ul>	

### 3.4.2.2 GEN Connection (for HAS series inverters)

The GEN port can be connected with the PV inverter or diesel generator, and the GEN port wiring method is the same as that described in “3.4.2.1 Grid Connection”.

The GEN port limits of connecting the PV inverter are described as follows:

Inverter Model	HAS-3.0LV-EUG1	HAS-3.6LV-EUG1	HAS-4.6LV-EUG1	HAS-5.0LV-EUG1
Nominal Input Voltage of PV Inverter (V)	230	230	230	230
Max. Input Current of PV Inverter (A)	13	16	20	21.7
Recommended AC Breaker	20 A/230 V	20 A/230 V	25 A/230 V	32 A/230 V
Recommended Cable (mm <sup>2</sup> )	6	6	6	6

**Note:**

- Select the appropriate AC breaker in accordance with local laws and regulations.
- The grid-connected PV inverter connected must have the function of overfrequency protection.

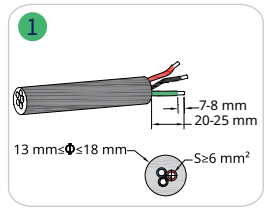
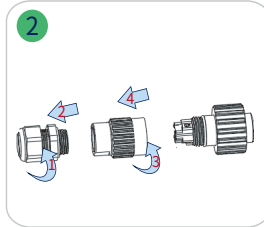
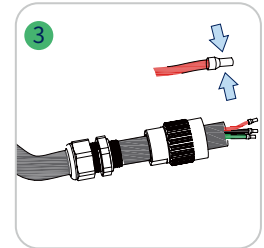
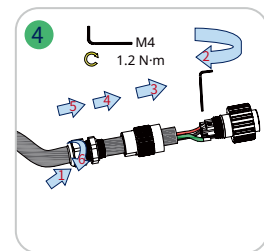
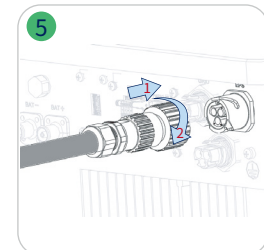
### 3.4.2.3 EPS Connection

HYS/HAS-LV series has on-grid and off-grid function. The inverter will transmit power through the GRID port when the grid is on, and it will transmit power through the EPS port when the grid is off.



A standard PV installation typically consists of connecting the inverter to both panels and batteries. When the system is not connected to the batteries, the manufacturer strongly advises that the backup function shall not be used. The manufacturer will not honor the standard warranty and will not be liable for any consequences arising from users not following this instruction.

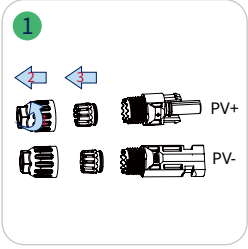
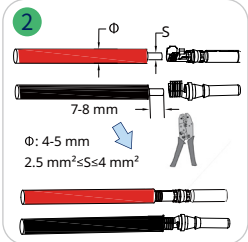
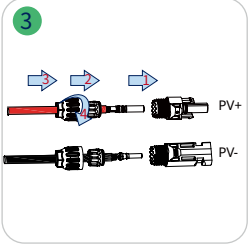
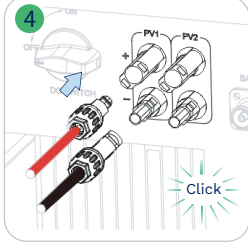


- Before connecting the EPS, please make sure all requirements listed below are followed.
- Use the EPS connector from the accessory box. Damage to the device due to the use of an incompatible connector shall not be covered by the warranty.
- An independent three or four-pole circuit breaker must be installed on the output side of the inverter to ensure safe disconnection from the grid.
- Multiple inverters cannot share one circuit breaker.
- Never connect a load between the inverter and the circuit breaker.
- Make sure the EPS load power rating is within the EPS output rating, otherwise the inverter will shut down with an “overload” warning.
- For the nonlinear load, please make sure the inrush power should be within the EPS output power range.

Procedure		
Step 1	<ul style="list-style-type: none"> <li>Remove the cable jacket by 20-25 mm, and strip the wire insulation by 7-8 mm.</li> <li>The conductor cross-sectional area: <math>\geq 6 \text{ mm}^2</math>.</li> </ul>	
Step 2	<ul style="list-style-type: none"> <li>Unscrew the EPS connector counterclockwise.</li> <li>Disassemble the parts in sequence.</li> </ul>	
Step 3	<ul style="list-style-type: none"> <li>Insert the cable conductor core into the terminals and crimp them tightly. Make sure the cable jacket is not locked within the connector.</li> <li>Thread the AC cable of appropriate length through the waterproof terminal.</li> </ul>	
Step 4	<ul style="list-style-type: none"> <li>Fix all cables to the corresponding terminals with a torque of <math>1.2 \text{ N}\cdot\text{m}</math> using the screwdriver according to markings on the connector. Make sure the L/N/PE are correctly assembled.</li> <li>Assemble the parts in sequence.</li> </ul>	
Step 5	<ul style="list-style-type: none"> <li>Tighten the waterproof terminal clockwise.</li> <li>Connect the EPS connector to the inverter and tighten it.</li> </ul>	

### 3.4.3 PV Wiring Connection (only for HYS series inverters)

 <b>WARNING</b>	<p>Before connecting the PV, please make sure all requirements listed below are followed.</p> <ul style="list-style-type: none"> <li>The voltage, current and power ratings of the panels to be connected are within the allowable range of the inverter. Ensure the polarity is correct, and please refer to the technical parameters in Chapter 5 for voltage and current limits.</li> <li>Since the inverter is a transformerless structure, please do not ground the outputs of PV panels.</li> <li>If the inverter is integrated with a PV switch, please make sure it is in the "OFF" position. Otherwise please use an external PV switch to cut off the PV connection during wiring and when necessary.</li> </ul>
 <b>NOTICE</b>	<ul style="list-style-type: none"> <li>Use the PV connectors in the accessory box for PV connections. Damage to the device due to the use of an incompatible terminal shall not be covered by the warranty.</li> <li>Please make sure the connectors are correct, not the battery connectors, as they look similar.</li> </ul>



Procedure		
Step 1	<ul style="list-style-type: none"> <li>Unscrew the PV connector counterclockwise.</li> <li>Remove the insulator.</li> <li>Remove the inner cable gland.</li> </ul>	
Step 2	<ul style="list-style-type: none"> <li>Strip the insulation from each DC cable by 7-8 mm.</li> <li>The conductor cross-sectional area: 2.5-4 mm<sup>2</sup>.</li> <li>Assemble cable ends with crimp contacts by PV terminal crimping tool.</li> </ul>	
Step 3	<ul style="list-style-type: none"> <li>Lead the cable through the cable gland.</li> <li>Insert the crimp contact into the insulator until it snaps into place.</li> <li>Gently pull the cable backward to ensure a firm connection.</li> <li>Tighten the cable gland and the insulator.</li> </ul>	
Step 4	<ul style="list-style-type: none"> <li>Check the cable connection of the PV string for polarity correctness and ensure that the open-circuit voltage in any case does not exceed the inverter input limit of 550 V.</li> <li>Connect the PV connectors to the inverter. There should be a "click" sound, if they are plugged in correctly.</li> </ul>	

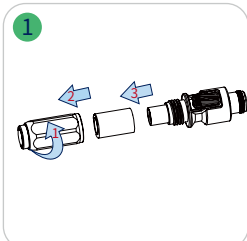
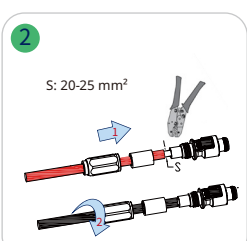
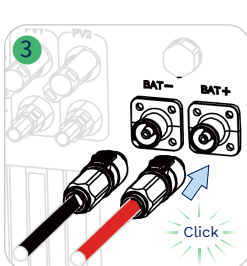
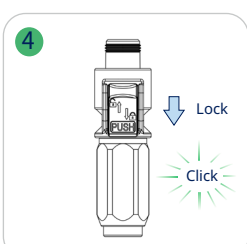
### 3.4.4 Battery Wiring Connection

This section mainly describes the cable connections on the inverter side. Refer to the instructions supplied by the battery manufacturer for the connections on the battery side.

For batteries without a built-in DC breaker, make sure that an external DC breaker is connected.

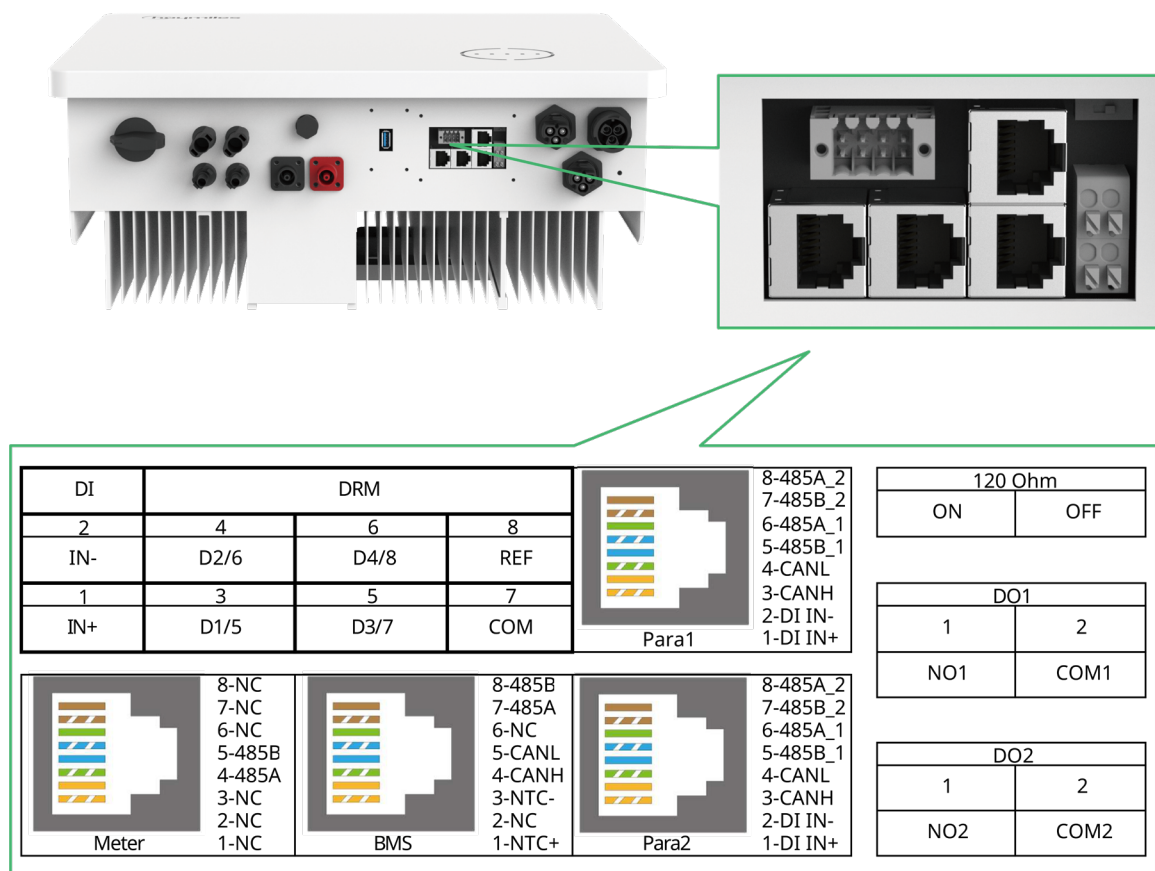
If you need to use this hybrid inverter or AC-coupled inverter as a grid-tied inverter, please contact Hoymiles for help.

 <b>WARNING</b>	<ul style="list-style-type: none"> <li>A two-pole DC breaker with OCP function is compulsory to be installed between the inverter and battery. The battery may have this switch integrated. If not, an external DC switch of proper ratings should be used.</li> <li>Make sure the breaker mentioned above is in the "OFF" position.</li> </ul>
 <b>NOTICE</b>	<ul style="list-style-type: none"> <li>Use the battery connectors in the accessory box for battery connections.</li> </ul>

Procedure		
<p>Step 1</p>	<ul style="list-style-type: none"> <li>Unscrew the battery connector counterclockwise.</li> <li>Remove the insulator.</li> <li>Remove the inner cable gland.</li> </ul>	
<p>Step 2</p>	<ul style="list-style-type: none"> <li>Strip the insulation from each DC cable by 15-18 mm.</li> <li>The conductor cross-sectional area: 20-25 mm<sup>2</sup>.</li> <li>Assemble cable ends with crimp contacts by hydraulic pliers.</li> </ul>	
<p>Step 3</p>	<ul style="list-style-type: none"> <li>Check the cable connection of the battery for polarity correctness and ensure that the open-circuit voltage in any case does not exceed the input limit of 60 V.</li> <li>Connect the battery connectors to the inverter. There should be a "click" sound if they are plugged in correctly.</li> </ul>	
<p>Step 4</p>	<ul style="list-style-type: none"> <li>Push the button downward to lock the connection with a "click" sound.</li> </ul>	

### 3.4.5 Communication Wiring Connection


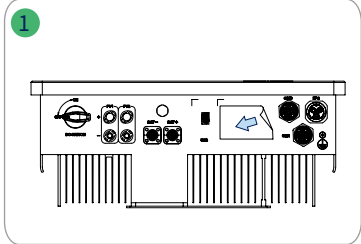
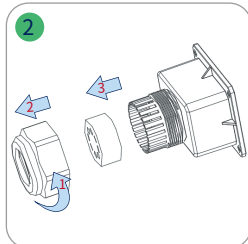
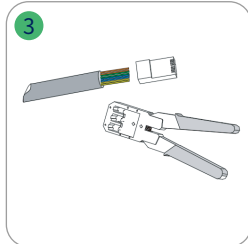
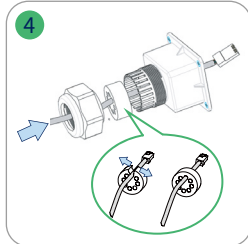
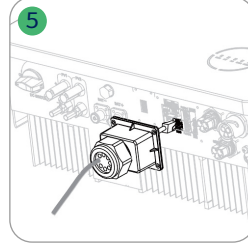
Detailed pin functions of each port on the communication interface are as follows.

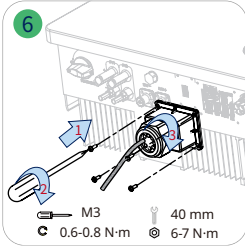


Label	Description
Meter (485A, 485B)	For the Smart Meter.
BMS (NTC+, NTC-, CANH, CANL, 485A, 485B)	For Li-ion battery, communication is via CAN or RS485. For lead-acid battery, temperature is monitored via sensor through NTC+ and NTC-.
DRM (D1/5, D2/6, D3/7, D4/8, REF, COM)	For external Demand Response Enabling Device.
DI (IN-, IN+)	Dry contact input of external bypass contactor.
Parallel (DI IN+, DI IN-, CANH, CANL, 485A_1, 485B_1, 485A_2, 485B_2)	For parallel operation.
120 Ohm (ON, OFF)	120 Ohm termination resistor for parallel operation.
DO1 (NO1, COM1)	Dry contact output. The DO1 can be set to one of the functions as follows: Earth Fault Alarm, Load Control and Generator Control.
DO2 (NO2, COM2)	Dry contact output. The DO2 will control the bypass contactor under certain logic.

### 3.4.5.1 BMS Connection



BMS is used to communicate with the compatible Li-ion battery. If lead-acid battery is selected to work with this inverter, the battery temperature sensor in packing list shall be used to monitor the battery temperature.

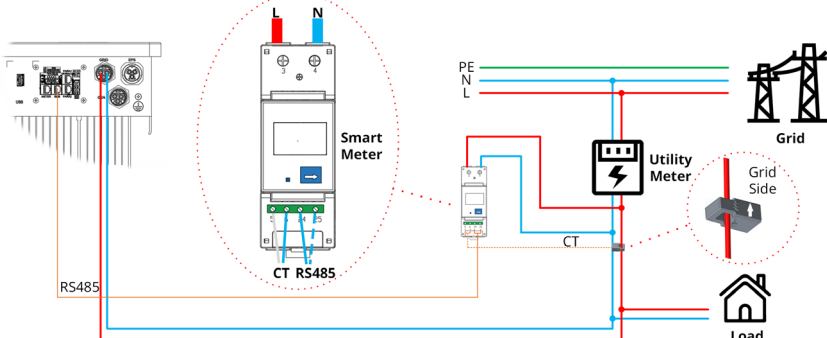
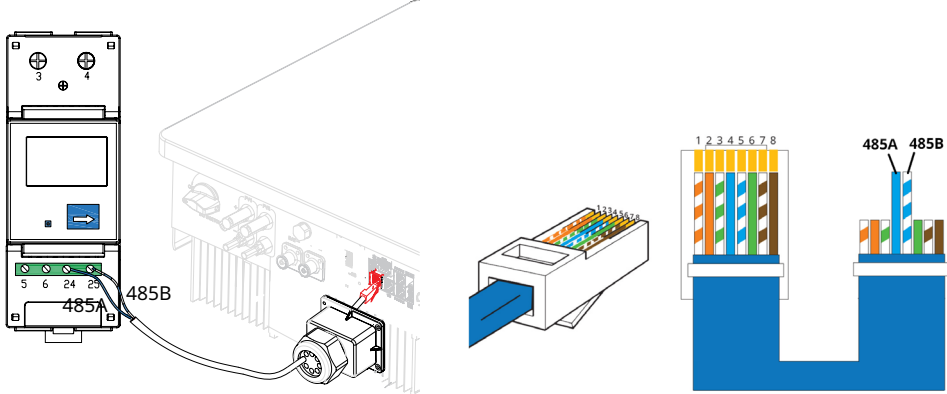
<div><p>NOTICE</p></div>	<ul style="list-style-type: none"><li>Connection of communication box is mandatory whether it is wired or not.</li></ul>	
Procedure		
Step 1	<ul style="list-style-type: none"><li>Peel the stickers off from the communication port.</li></ul>	<div><div>1</div></div>
Step 2	<ul style="list-style-type: none"><li>Unscrew the communication box counterclockwise.</li><li>Disassemble the parts in sequence.</li></ul>	<div><div>2</div></div>
Step 3	<ul style="list-style-type: none"><li>Strip the insulation layer of the communication cable with an ethernet wire stripper, and lead the corresponding signal cables out. Insert the stripped communication cable into the RJ45 plug in the correct order, and crimp it with a network cable crimper.</li><li>The pin definitions of BMS or battery temperature sensor are shown in "3.4.5 Communication Wiring Connection".</li></ul>	<div><div>3</div></div>
Step 4	<ul style="list-style-type: none"><li>Thread the cable of an appropriate length through the communication box.</li><li>Clip the Ethernet cable into the rubber ring.</li></ul>	<div><div>4</div></div>
Step 5	<ul style="list-style-type: none"><li>Insert the RJ45 plug into the BMS port until it clicks into place.</li><li>Tighten the cable gland.</li></ul>	<div><div>5</div></div>

Step 6	<ul style="list-style-type: none"><li>Install communication box with screws.</li><li>Connect the other end of the BMS cable to the battery, following the battery's manual instructions.</li></ul>	
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3.4.5.2 Smart Meter and CT Connection

The smart meter and CT in the accessory box are necessary for system installation, and are used to provide the operating condition of the inverter via RS485 communication.

 WARNING	<ul style="list-style-type: none"><li>Before connecting the smart meter and CT, ensure that the AC cable is totally isolated from the AC power source.</li></ul>
 NOTICE	<ul style="list-style-type: none"><li>One smart meter can be used with only one inverter.</li><li>One CT must be used for one smart meter and must be connected on the same phase with the smart meter power cable.</li><li>There is a symbol (arrow) or label on the surface of CT that indicates the correct mechanical orientation of the CT on the conductor under measurement. Please identify the arrow or label before installing the CT.</li></ul>

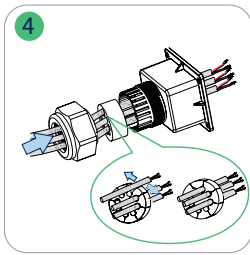
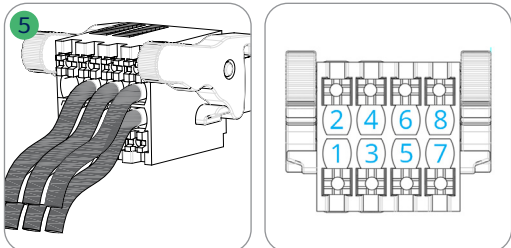
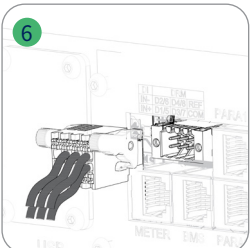
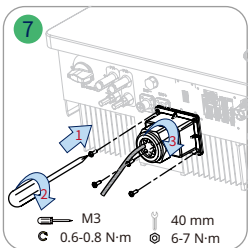
Procedure(for HYS series inverters)		
Step 1	<ul style="list-style-type: none"><li>Connect grid L/N to meter's terminals 3/4.</li><li>Clamp CT to L line and connect wirings to 5/6 respectively. The arrow on the surface of CT should point to the grid.</li></ul>	
Step 2	<ul style="list-style-type: none"><li>Connect the communication cable between the inverter and smart meter.</li></ul>	

Procedure(for HAS series inverters)	
Step 1	<div><ul style="list-style-type: none"><li>The smart meter 1 is conected to the grid port, and the smart meter 2 is connected to the GEN port. The connection method is the same as that described above.</li></ul></div> <div></div>
Step 2	<div><ul style="list-style-type: none"><li>Connect the communication cable between the inverter and smart meter.</li></ul></div> <div></div>

3.4.5.3 DRM Connection

DRM is designed to support several demand response modes by certain control signals, which is used for Australia and New Zealand. Detailed connection of DRM is shown below.

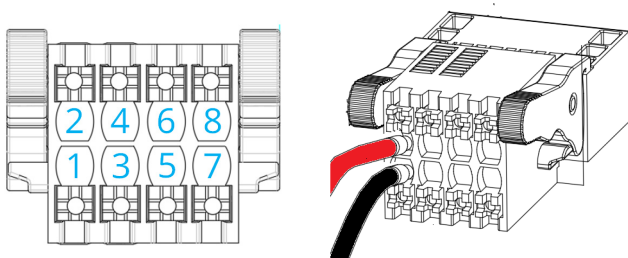
Procedure		
Step 1	<div><ul style="list-style-type: none"><li>Peel the stickers off from the communication port.</li></ul></div>	<div></div>
Step 2	<div><ul style="list-style-type: none"><li>Unscrew the communication box counterclockwise.</li><li>Disassemble the parts in sequence.</li></ul></div>	<div></div>
Step 3	<div><ul style="list-style-type: none"><li>Strip the insulation layer of the communication cable, and lead the corresponding signal cables out. Press the terminal.</li></ul></div>	<div></div>

Step 4	<ul style="list-style-type: none"><li>Thread the cable of an appropriate length through the communication box.</li><li>Clip the cable into the rubber ring.</li></ul>																									
Step 5	<ul style="list-style-type: none"><li>Plug the wires into the terminal block firmly according to following tables.</li></ul>																									
Step 5	<ul style="list-style-type: none"><li>For DRED, wiring from the No.3 to No.8 holes. The function of each connection position is shown below.</li></ul> <table><tr><td>NO.</td><td>4</td><td>6</td><td>8</td></tr><tr><td>Function</td><td>DRM2/6</td><td>DRM4/8</td><td>REFGEN</td></tr><tr><td>NO.</td><td>3</td><td>5</td><td>7</td></tr><tr><td>Function</td><td>DRM1/5</td><td>DRM3/7</td><td>COM/DRM0</td></tr></table>	NO.	4	6	8	Function	DRM2/6	DRM4/8	REFGEN	NO.	3	5	7	Function	DRM1/5	DRM3/7	COM/DRM0	<ul style="list-style-type: none"><li>For Remote Shutdown, wiring the No.7 and No.8 holes. The function of each connection position is shown below.</li></ul> <table><tr><td>NO.</td><td>8</td></tr><tr><td>Function</td><td>REFGEN</td></tr><tr><td>NO.</td><td>7</td></tr><tr><td>Function</td><td>COM/DRM0</td></tr></table>	NO.	8	Function	REFGEN	NO.	7	Function	COM/DRM0
NO.	4	6	8																							
Function	DRM2/6	DRM4/8	REFGEN																							
NO.	3	5	7																							
Function	DRM1/5	DRM3/7	COM/DRM0																							
NO.	8																									
Function	REFGEN																									
NO.	7																									
Function	COM/DRM0																									
Step 6	<ul style="list-style-type: none"><li>Pull the wires outward to check whether they are firmly installed.</li><li>Insert the terminal block into the connector until it snaps into place with an audible click.</li></ul>																									
Step 7	<ul style="list-style-type: none"><li>Tighten the cable gland.</li></ul>																									

#### 3.4.5.4 DI Connection

There is an integrated DI (IN+, IN-) as the dry contact input to the bypass contactor of the inverter. The connection method is the same as that described in "3.3.5.3 DRM Connection". Wiring the No.1 and No.2 holes if used, and the function of each connection position is shown below.

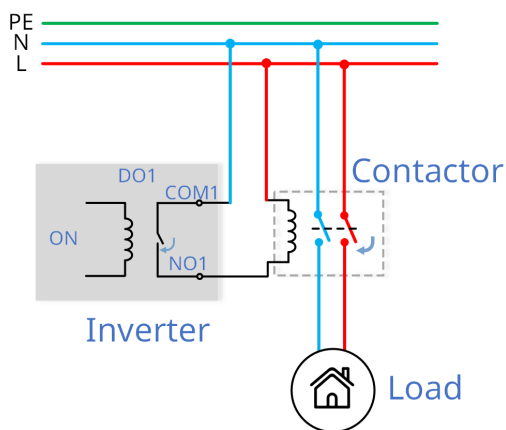
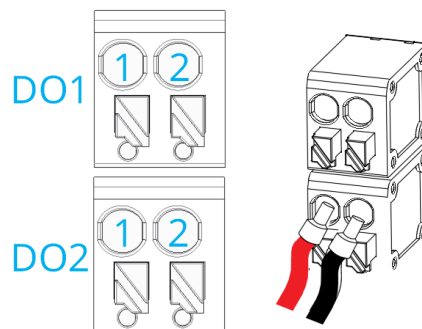
NO.	2
Function	IN-
NO.	1
Function	IN+



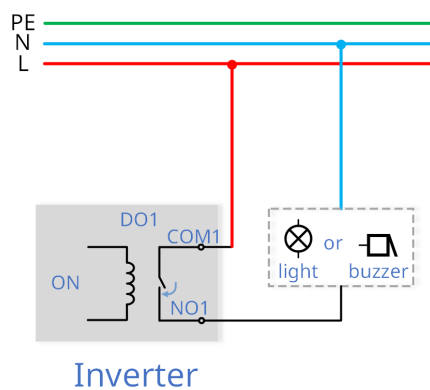
### 3.4.5.5 DO Connection

The inverter has integrated a multiple-function dry contact (DO1 and DO2). The DO1 can be set to one of the functions as follows, Earth Fault Alarm, Load Control and Generator Control. The DO2 can control the external bypass contactor if installed. The connection method is the same as “3.4.5.3 DRM Connection”. The function of each connection position is shown in the figure below.

NO.	DO1 - 1	DO1 - 2
Function	NO1	COM1
NO.	DO2 - 1	DO2 - 2
Function	NO2	COM2



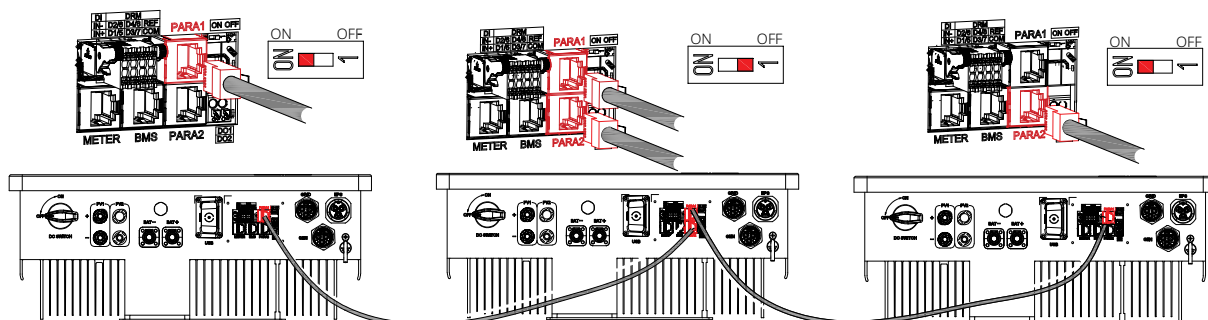
DO1-Load Control



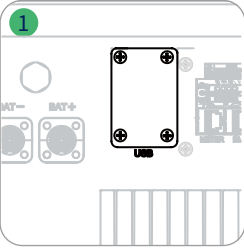
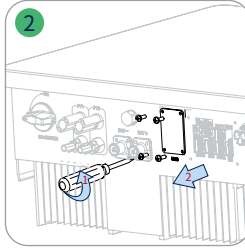
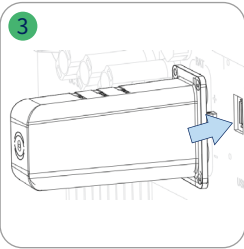
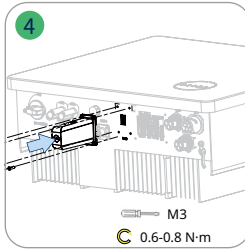
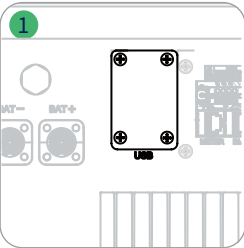
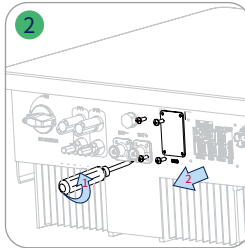
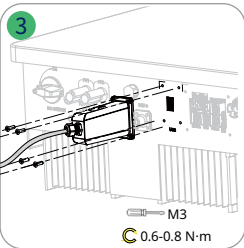
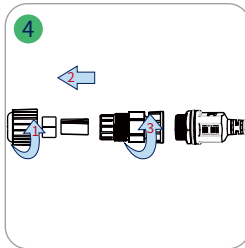
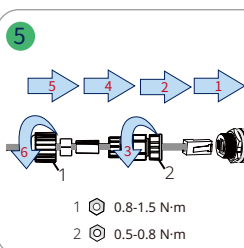
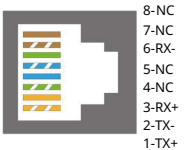
DO1-Earth Fault Alarm

### 3.4.5.6 Parallel Connection

As shown in the figure, parallel operation is performed through PARA1/PARA2 interface. When inverters are used in parallel, the first and the last inverters are “ON”, and the others are “OFF”.



### 3.4.6 DTS Connection

DTS-WIFI-G1 and DTS-4G-G1 Procedure		
Steps	<ul style="list-style-type: none"> <li>Remove the DTS port cover plate.</li> <li>Insert the DTS into the USB port.</li> <li>Fasten the screws.</li> </ul>	    <p>M3 0.6-0.8 N·m</p>
DTS-Ethernet-G1 Procedure		
Step 1&2	<ul style="list-style-type: none"> <li>Remove the DTS port cover plate.</li> </ul>	 
Step 3&4	<ul style="list-style-type: none"> <li>Insert the DTS-Ethernet into the USB port, and fasten the screws.</li> <li>Unscrew the swivel nut from the connector.</li> </ul>	  <p>M3 0.6-0.8 N·m</p>
Step 5	<ul style="list-style-type: none"> <li>Insert the RJ45 plug (pin definition is shown in the right figure) into the connector until there is an audible click sound.</li> <li>Thread the cable of an appropriate length through the connector.</li> <li>Tighten the cable gland.</li> </ul>	 <p>1 ⚙ 0.8-1.5 N·m 2 ⚙ 0.5-0.8 N·m</p>  <p>8-NC 7-NC 6-RX- 5-NC 4-NC 3-RX+ 2-TX- 1-TX+</p>
Indicator	Status	Description
RUN	ON	DTS is powered on.
	OFF	DTS is not powered on.
COM	ON	Proper communication with the inverter.
	OFF	Improper communication with the inverter.
NET	ON	Proper communication with S-Miles Cloud.
	OFF	Improper communication with S-Miles Cloud.
	BLINK	Improper communication with S-Miles Cloud, but the network is connected.

## 3.5 Operation

### 3.5.1 S-Miles Cloud App

The S-Miles Cloud App has been developed for Hoymiles inverter and offers the following features:

- Network configuration;
- Local installation assistant;
- System monitoring.

Please download the S-Miles Cloud App from the Google Play Store or the Apple App Store. The QR code below can also be scanned to download the App. Please refer to the S-Miles Cloud User Manual from [www.hoymiles.com/resources/download/](http://www.hoymiles.com/resources/download/) for details.



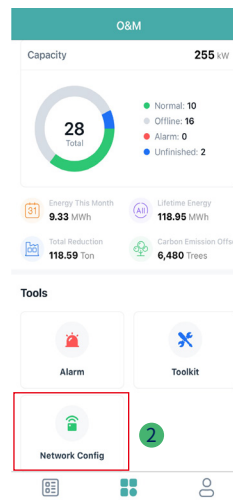
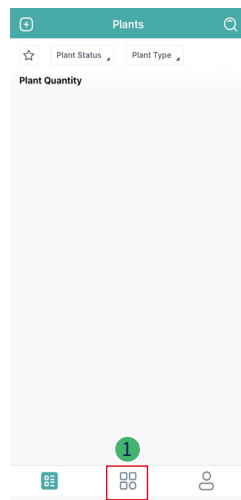
S-Miles Installer



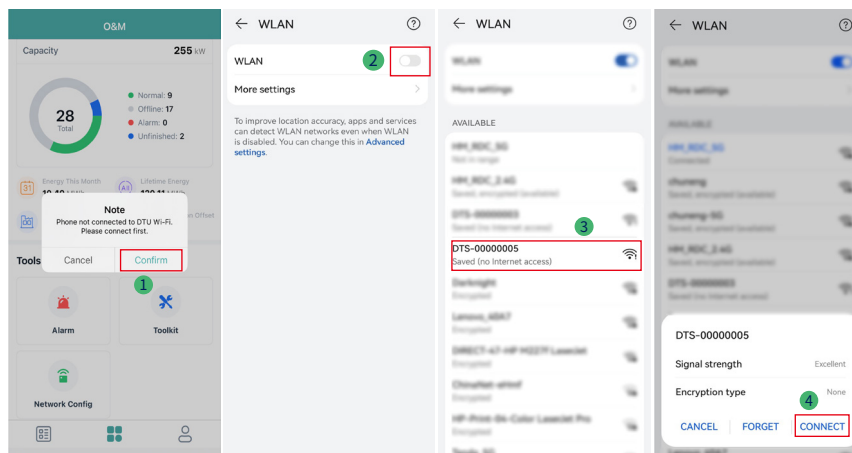
S-Miles End-user

#### 3.5.1.1 DTS Online Setting

1. Search “Hoymiles” in the App Store (iOS) or the Play Store (Android), or scan the QR code to download the Hoymiles Installer App.
  2. Open the app and log in with your installer account and password. For new Hoymiles installers, please apply for an installer account from your distributor in advance.
  3. Use the App to connect to the DTS.
- (a) Open the Installer App on smartphone/tablet and log in. Click on “O&M” at the bottom of the page, and then click on “Network Configuration”.



(b) Select the DTS's wireless network and click "Connect". (The network name of the DTS consists of DTS and product serial number, and the default password is ESS12345.)

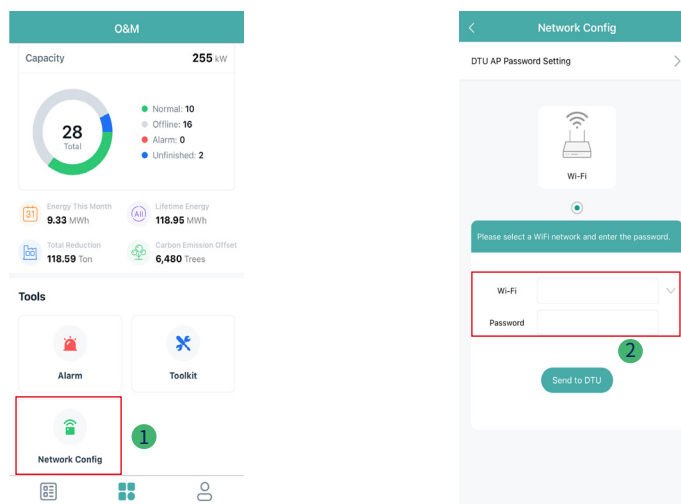


#### 4. Network configuration.

(a) Upon successful connection, click on "Network Config" again and access the Network Configuration page.

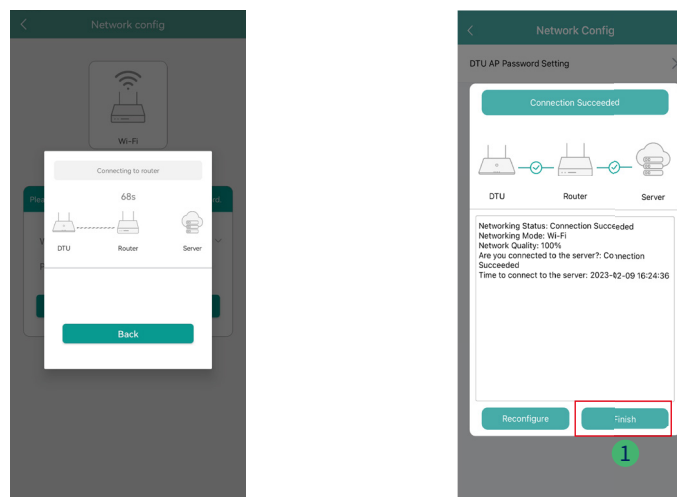
(b) Select the router Wi-Fi and enter the password.

(c) Click on "Send to DTU".



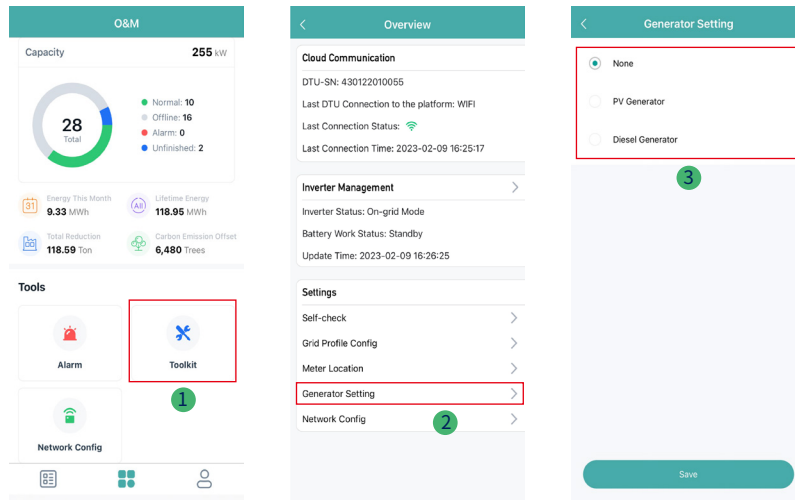
5. Check the DTS indicator for a solid blue light, which signifies a successful connection.

The network configuration takes about 1 minute, please be patient. If the network is not connected, please check the internet as instructed.

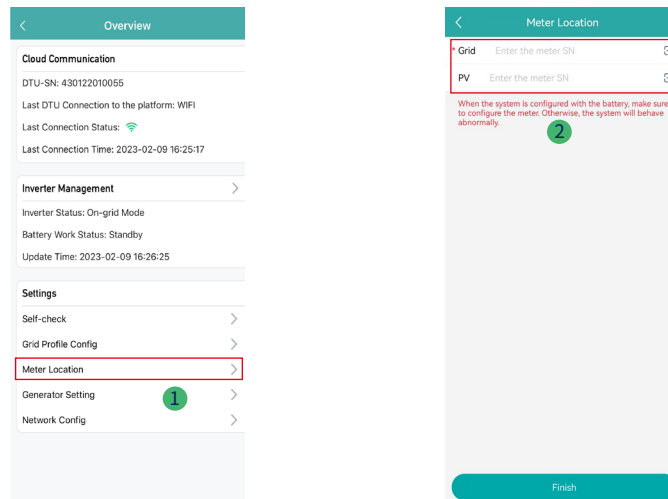


### 3.5.1.2 System Commissioning of Wireless Access Point (AP) Connection

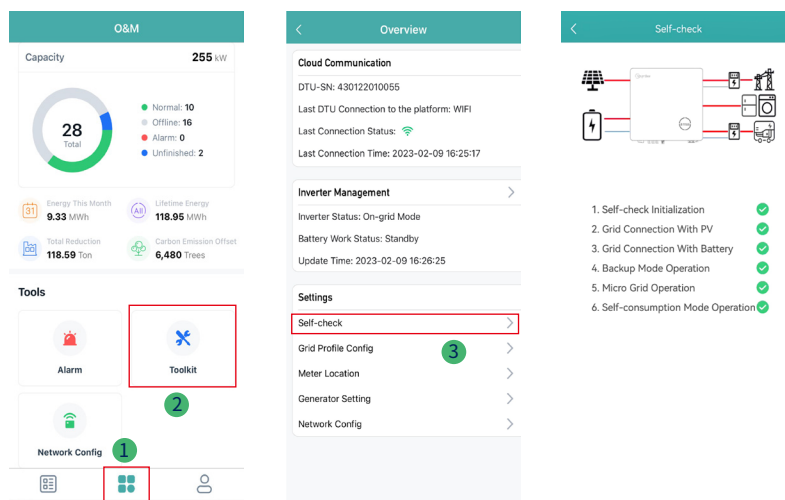
1. Connect the wireless network of DTU. Open the App, choose “Toolkit→Generator Setting”, click the corresponding button according to whether the device connected to the GEN port is “PV Generator” or “Diesel Generator”, and then click “Save”. (The default option is “None”).




2. Click the “Meter Location” to configure the grid side meter. The serial number (SN) can be entered manually or identified through scanning the QR code. If the GEN port is connected with the PV generator or diesel generator, the PV side meter also needs to be configured.



3. Click on “O&M→Toolkit”, access the Overview page and click the “Self-check”. The self check can be completed after PV, battery, grid, EPS and GEN are properly connected.




### 3.5.2 Commissioning

 <p><b>WARNING</b></p>	<p>Before the commissioning of inverter, make sure:</p> <ul style="list-style-type: none"> <li>• The inverter DC switch and external circuit breaker are disconnected;</li> <li>• Check wiring according to “3.4 Electrical Wiring Connection”;</li> <li>• Unused terminals must be sealed using the corresponding sealing plugs;</li> <li>• Nothing is left on the top of the inverter and battery;</li> <li>• Cables are routed in a safe place or protected against mechanical damage;</li> <li>• Warning signs and labels are intact.</li> </ul>
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Procedure	
Step 1	Wire the inverter to the AC circuit breakers.
Step 2	(Only for HYS series inverters) Rotate the DC switch to “ON”.
Step 3	Connect the DC circuit breaker between the battery and the inverter, and power on the battery pack if it's required.
Step 4	Establish a communication connection between the mobile phone and DTS. Configure the parameters in Storage Toolkit and Network Config referring to “3.5.1 S-Miles Cloud App”. Then use the system self-check function to detect if there is a problem with the system.
Step 5	Operate the inverter and the system will work properly.

### 3.5.3 Decommissioning

 <p><b>NOTICE</b></p>	<ul style="list-style-type: none"> <li>• Please strictly follow the following procedure. Otherwise it will cause lethal voltages or unrecoverable damage to the inverter.</li> </ul>
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Procedure	
Step 1	Stop the inverter from working via Hoymiles App.
Step 2	(Only for HYS series inverters) Rotate the DC switch to “OFF”.
Step 3	Turn off the DC circuit breaker between the inverter and the battery.
Step 4	Turn off the AC circuit breakers of GRID, EPS and GEN.
Step 5	Wait at least 10 minutes after the LED indicators turn off to release the internal energy.
Step 6	Disconnect all the power cables. Disconnect all the communication cables. Remove DTS and power meter.
Step 7	Remove the inverter from the wall, and remove the bracket if necessary. Pack the inverter and accessories.

## 4. Troubleshooting

When the system is in alarm, please log into the S-Miles Cloud App to review. The possible causes and their troubleshooting are detailed in the following table:

Display	Possible Cause	Handling Suggestions
Grid Overvoltage	The grid voltage is higher than the permissible range.	Generally, the inverter will reconnect to the grid after the grid recovers. If the alarm occurs frequently: 1. Make sure the safety country of the inverter is set correctly. 2. Make sure that the grid voltage in your area is stable and within the normal range. 3. Check whether the cross-sectional area of the AC cable meets the requirement. 4. If the alarm persists, contact Hoymiles technical support team.
Grid Undervoltage	The grid voltage is lower than the permissible range.	Generally, the inverter will reconnect to the grid after the grid recovers. If the alarm occurs frequently: 1. Make sure the safety country of the inverter is set correctly. 2. Make sure that the grid voltage in your area is stable and within the normal range. 3. Check whether the AC cable is firmly in place. 4. If the alarm persists, contact Hoymiles technical support team.
Grid Overfrequency	The grid frequency is higher than the permissible range.	Generally, the inverter will reconnect to the grid after the grid recovers. If the alarm occurs frequently: 1. Make sure the safety country of the inverter is set correctly. 2. Make sure that the grid frequency in your area is stable and within the normal range. 3. If the alarm persists, contact Hoymiles technical support team.
Grid Underfrequency	The grid frequency is lower than the permissible range.	
No Grid	The inverter detects that there is no grid connected.	Generally, the inverter will reconnect to the grid after the grid recovers. If the alarm occurs frequently: 1. Check whether the grid supply is reliable. 2. Check whether the AC cable is firmly in place. 3. Check whether the AC cable is correctly connected. 4. Check whether the AC circuit breaker is disconnected. 5. If the alarm persists, contact Hoymiles technical support team.
Residual Current Fault	The residual leakage current is too high.	1. The alarm can be caused by high ambient humidity, and the inverter will reconnect to the grid after the environment is improved. 2. If the environment is normal, check whether the AC and DC cables are well insulated. 3. If the alarm persists, contact Hoymiles technical support team.
PV Reverse Connection	The inverter detects that the PV strings are reversely connected.	1. Check whether the corresponding string is of reverse polarity. If so, disconnect the DC switch and adjust the polarity when the string current drops below 0.5 A. 2. If the alarm persists, contact Hoymiles technical support team.
PV Undervoltage	The PV voltage is lower than the permissible range.	1. Check whether the DC cable is firmly in place. 2. Check whether there is a PV module shaded. If so, remove the shade and ensure the PV module is clean. 3. Check whether the PV module is in abnormal aging. 4. If the alarm persists, contact Hoymiles technical support team.
PV Overvoltage	The PV voltage is higher than the permissible range.	1. Check the specification and numbers of corresponding string PV modules. 2. If the alarm persists, contact Hoymiles technical support team.

Display	Possible Cause	Handling Suggestions
Over Temperature	The temperature inside the inverter is higher than the permissible range.	<ol style="list-style-type: none"> <li>1. Make sure that the installation complies with the instructions from User Manual.</li> <li>2. Check whether the alarm "Fan Fault" occurs. If so, replace the faulty fan.</li> <li>3. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
Isolation Fault	The insulation impedance of the PV string to the ground is too low.	<ol style="list-style-type: none"> <li>1. Use a multimeter to determine if the resistance between the earth and the inverter frame is close to zero. If not, please ensure that the connection is good.</li> <li>2. If the humidity is too high, an isolation fault may occur. Attempt to restart the inverter. If the fault persists, check it again when the weather turns fine.</li> <li>3. Check the resistance to ground from the PV module/ cable. Take corrective measures in case of leading to a short circuit or damaged insulation layer.</li> <li>4. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
Arc Fault	The inverter detects that there is an arc fault.	<ol style="list-style-type: none"> <li>1. Disconnect the DC switch and check whether DC cables are damaged and whether the wiring terminals are loose or in poor contact. If so, take corresponding corrective measures.</li> <li>2. After taking corresponding measures, reconnect the DC switch.</li> <li>3. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
EPS Load Overpower	The EPS load power is higher than the permissible range.	<ol style="list-style-type: none"> <li>1. Reduce the power of EPS loads, or remove some EPS loads. The inverter will restart automatically.</li> <li>2. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
Meter Reverse Connection	The inverter detects that the Meter or CT is reversely connected.	<ol style="list-style-type: none"> <li>1. Make sure that the installation complies with the instructions from User Manual.</li> <li>2. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
Meter Communication Fault	The inverter detects that there is a meter communication fault.	<ol style="list-style-type: none"> <li>1. Check whether the Meter communication cable and terminal are abnormal.</li> <li>2. Reconnect the Meter communication cable.</li> <li>3. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
Battery Reverse Connection	The inverter detects that the battery wirings are reversely connected.	<ol style="list-style-type: none"> <li>1. Check the battery for polarity correctness, and correct it if necessary.</li> <li>2. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
Battery Voltage Fault	The battery voltage is higher than the permissible range.	<ol style="list-style-type: none"> <li>1. Check if the battery input voltage is within the normal range.</li> <li>2. If the alarm persists, contact Hoymiles technical support team.</li> </ol>
BMS Communication Fault	The inverter detects that there is a BMS communication fault.	<ol style="list-style-type: none"> <li>1. Check whether the BMS communication cable and terminal are abnormal.</li> <li>2. Reconnect the BMS communication cable.</li> <li>3. If the alarm persists, contact Hoymiles technical support team.</li> </ol>

Display	Possible Cause	Handling Suggestions
BMS Battery Alarm	The inverter detects that there is a battery fault from BMS.	Try to restart the battery. If the fault persists, contact the battery manufacturer.
BMS Battery Fault	The inverter detects that there is a battery fault from BMS.	Try to restart the battery. If the fault persists, contact the battery manufacturer.
Relay Fault	The inverter detects that there is a relay self-check fault.	Try to restart the inverter. If the fault persists, contact Hoymiles technical support team.

## 5. Technical Datasheet

### 5.1 HYS Series Technical Parameters

Model	HYS-3.0LV-EUG1	HYS-3.6LV-EUG1	HYS-4.6LV-EUG1	HYS-5.0LV-EUG1	HYS-6.0LV-EUG1
Battery					
Battery Type	Li-ion / Lead-acid				
Nominal Battery Voltage (V)	48				
Voltage Range (V)	40-60				
Max. Charge Current (A)	75	90	100	100	100
Max. Discharge Current (A)	75	90	100	100	100
Charging Strategy for Li-ion Battery	Self-adaption to BMS				
Charging Curve	3 Stages / Equalization				
External Temperature Sensor	Optional				
PV Input					
Max. PV Input Power (W)	4500	6000	7500	7500	7500
Max. PV Input Voltage (V)	550				
Nominal Input Voltage (V)	360				
MPPT Voltage Range (V)	125-500				
Start-up Voltage (V)	150				
Number of MPPTs	1	2	2	2	2
Max. Number of PV String per MPPT	1	1/1	1/1	1/1	1/1
Max. PV Input Current (A)	14	14/14	14/14	14/14	14/14
Short-circuit Current of PV Input (A)	17	17/17	17/17	17/17	17/17
AC Input and Output (On-grid)					
Nominal Output Apparent Power (VA)	3000	3680	4600	5000 <sup>(1)</sup>	6000 <sup>(1)</sup>
Max. Output Apparent Power (VA)	3000	3680	4600 <sup>(2)</sup>	5000 <sup>(1)(2)</sup>	6000 <sup>(1)(2)</sup>
Max. Input Apparent Power (VA)	6000	7360	7360	7360	7360
Nominal AC Voltage (V)	230				
Nominal Grid Frequency (Hz)	50/60				
Max. Output Current (A)	13.0	16.0	20.0	21.7	26.0 <sup>(3)</sup>
Max. Input Current (A)	26.1	32.0	32.0	32.0	32.0
Power Factor	0.8 leading ... 0.8 lagging				
Total Harmonic Distortion (@nominal output)	<3%				
AC Output (Off-grid)					
Max. Output Apparent Power (VA)	3000	3680	4600	5000	6000
Peak Output Apparent Power (VA) <sup>(4)</sup>	6000, 10s	7360, 10s	9200, 10s	10000, 10s	10000, 10s
Nominal AC Voltage (V)	230				
Nominal AC Frequency (Hz)	50/60				
Max. Output Current (A)	13.0	16.0	20.0	21.7	26.0
Total Harmonic Distortion (@ linear load)	<3%				

Model	HYS-3.0LV-EUG1	HYS-3.6LV-EUG1	HYS-4.6LV-EUG1	HYS-5.0LV-EUG1	HYS-6.0LV-EUG1
Efficiency					
Max. Efficiency	97.6%	97.6%	97.6%	97.6%	97.6%
Euro Efficiency	97.0%	97.0%	97.0%	97.0%	97.0%
Max. Battery to Load Efficiency	95.0%	95.0%	95.0%	95.0%	95.0%
MPPT Efficiency	99.9%	99.9%	99.9%	99.9%	99.9%
Protection					
Anti-islanding Protection	Integrated				
PV String Input Reverse Polarity Protection	Integrated				
Insulation Resistor Detection	Integrated				
Residual Current Monitoring Unit	Integrated				
AC Over Current Protection	Integrated				
AC Short Current Protection	Integrated				
AC Overvoltage and Undervoltage Protection	Integrated				
Surge Protection	DC Type II / AC Type III				
General					
Dimension (W × H × D [mm])	502 × 461× 202				
Weight (kg)	24				
Mounting	Wall Mounting				
Operation Temperature (°C)	-25 to + 65 (>45, derating)				
Relative Humidity	0-95%, no condensing				
Altitude (m)	≤2000				
Cooling	Natural Convection				
Protection Degree	IP65				
Noise (dB [A])	<40				
User Interface	LED & App				
Communication with BMS	RS485, CAN				
Communication with Meter	RS485				
Communication Interface	RS485, Wi-Fi/Ethernet/4G (optional)				
Digital Input/Output	DRM, 1 × DI, 2 × DO				
Isolation Method (Solar / Battery)	Transformerless / High-frequency Isolation				
Certifications and Standards					
Grid Regulation	EN 50549, VDE-AR-N 4105, AS/NZS 4777.2				
Safety Regulation	IEC 62109-1, IEC 62109-2				
EMC	EN 61000-6-1, EN 61000-6-3				

(1) 4600 for VDE-AR-N 4105 & VDE0126-1-1; 4999 for AS/NZS 4777.2

(2) Max. output apparent power 3680 VA for TOR Erzeuger Type A

(3) 21.7 A for AS/NZS 4777.2

(4) Can be achieved only if PV and battery power are sufficient.

Model	HYS-3.0LV-AUG1	HYS-3.6LV-AUG1	HYS-4.6LV-AUG1	HYS-5.0LV-AUG1	HYS-6.0LV-AUG1
Battery					
Battery Type	Li-ion / Lead-acid				
Nominal Battery Voltage (V)	48				
Voltage Range (V)	40-60				
Max. Charge Current (A)	75	90	100	100	100
Max. Discharge Current (A)	75	90	100	100	100
Charging Strategy for Li-ion Battery	Self-adaption to BMS				
Charging Curve	3 Stages / Equalization				
External Temperature Sensor	Optional				
PV Input					
Max. PV Input Power (W)	4500	6000	7500	7500	7500
Max. PV Input Voltage (V)	550				
Nominal Input Voltage (V)	360				
MPPT Voltage Range (V)	125-500				
Start-up Voltage (V)	150				
Number of MPPTs	1	2	2	2	2
Max. Number of PV String per MPPT	1	1/1	1/1	1/1	1/1
Max. PV Input Current (A)	14	14/14	14/14	14/14	14/14
Short-circuit Current of PV Input (A)	17	17/17	17/17	17/17	17/17
AC Input and Output (On-grid)					
Nominal Output Apparent Power (VA)	3000	3680	4600	5000 <sup>(1)</sup>	6000 <sup>(1)</sup>
Max. Output Apparent Power (VA)	3000	3680	4600	5000 <sup>(1)</sup>	6000 <sup>(1)</sup>
Max. Input Apparent Power (VA)	6000	7360	7360	7360	7360
Nominal AC Voltage (V)	230				
Nominal Grid Frequency (Hz)	50/60				
Max. Output Current (A)	13.0	16.0	20.0	21.7	26.0 <sup>(2)</sup>
Max. Input Current (A)	26.1	32.0	32.0	32.0	32.0
Power Factor	0.8 leading ... 0.8 lagging				
Total Harmonic Distortion (@nominal output)	<3%				
AC Output (Off-grid)					
Max. Output Apparent Power (VA)	3000	3680	4600	5000	6000
Peak Output Apparent Power (VA) <sup>(3)</sup>	6000, 10s	7360, 10s	9200, 10s	10000, 10s	10000, 10s
Nominal AC Voltage (V)	230				
Nominal AC Frequency (Hz)	50/60				
Max. Output Current (A)	13.0	16.0	20.0	21.7	26.0
Total Harmonic Distortion (@ linear load)	<3%				

Model	HYS-3.0LV-AUG1	HYS-3.6LV-AUG1	HYS-4.6LV-AUG1	HYS-5.0LV-AUG1	HYS-6.0LV-AUG1
Efficiency					
Max. Efficiency	97.6%	97.6%	97.6%	97.6%	97.6%
Euro Efficiency	97.0%	97.0%	97.0%	97.0%	97.0%
Max. Battery to Load Efficiency	95.0%	95.0%	95.0%	95.0%	95.0%
MPPT Efficiency	99.9%	99.9%	99.9%	99.9%	99.9%
Protection					
Anti-islanding Protection	Integrated				
PV String Input Reverse Polarity Protection	Integrated				
Insulation Resistor Detection	Integrated				
Residual Current Monitoring Unit	Integrated				
AC Over Current Protection	Integrated				
AC Short Current Protection	Integrated				
AC Overvoltage and Undervoltage Protection	Integrated				
Surge Protection	DC Type II / AC Type III				
General					
Dimension (W × H × D [mm])	502 × 461× 202				
Weight (kg)	24				
Mounting	Wall Mounting				
Operation Temperature (°C)	-25 to + 65 (>45, derating)				
Relative Humidity	0-95%, no condensing				
Altitude (m)	≤2000				
Cooling	Natural Convection				
Protection Degree	IP65				
Noise (dB [A])	<40				
User Interface	LED & App				
Communication with BMS	RS485, CAN				
Communication with Meter	RS485				
Communication Interface	RS485, Wi-Fi/Ethernet/4G (optional)				
Digital Input/Output	DRM, 1 × DI, 2 × DO				
Isolation Method (Solar / Battery)	Transformerless / High-frequency Isolation				
Certifications and Standards					
Grid Regulation	EN 50549, VDE-AR-N 4105, AS/NZS 4777.2				
Safety Regulation	IEC 62109-1, IEC 62109-2				
EMC	EN 61000-6-1, EN 61000-6-3				

(1) 4600 for VDE-AR-N 4105 & VDE0126-1-1; 4999 for AS/NZS 4777.2

(2) 21.7 A for AS/NZS 4777.2

(3) Can be achieved only if PV and battery power are sufficient.

## 5.2 HAS Series Technical Parameters

Model	HAS-3.0LV-EUG1	HAS-3.6LV-EUG1	HAS-4.6LV-EUG1	HAS-5.0LV-EUG1
Battery				
Battery Type	Li-ion / Lead-acid			
Nominal Battery Voltage (V)	48			
Voltage Range (V)	40-60			
Max. Charge Current (A)	75	90	100	100
Max. Discharge Current (A)	75	90	100	100
Charging Strategy for Li-ion Battery	Self-adaption to BMS			
Charging Curve	3 Stages / Equalization			
External Temperature Sensor	Optional			
AC Input and Output (On-grid)				
Nominal Output Apparent Power (VA)	3000	3680	4600	5000 <sup>(1)</sup>
Max. Output Apparent Power (VA)	3000	3680	4600 <sup>(2)</sup>	5000 <sup>(1)(2)</sup>
Max. Input Apparent Power (VA)	6000	7360	7360	7360
Nominal AC Voltage (V)	230			
Nominal Grid Frequency (Hz)	50 / 60			
Max. Output Current (A)	13.0	16.0	20.0	21.7
Max. Input Current (A)	26.1	32.0	32.0	32.0
Power Factor	0.8 leading ... 0.8 lagging			
Total Harmonic Distortion (@ nominal output)	< 3%			
AC Output (Off-grid)				
Max. Output Apparent Power (VA)	3000	3680	4600	5000
Peak Output Apparent Power (VA)	3300, 10s	4048, 10s	5060, 10s	5500, 10s
Nominal AC Voltage (V)	230			
Nominal AC Frequency (Hz)	50 / 60			
Max. Output Current (A)	13.0	16.0	20.0	21.7
Total Harmonic Distortion (@ linear load)	< 3%			
Efficiency				
Max. Efficiency	95.2%	95.2%	95.2%	95.2%
Protection				
Anti-islanding Protection	Integrated			
AC Over Current Protection	Integrated			
AC Short Current Protection	Integrated			
AC Overvoltage and Undervoltage Protection	Integrated			
Surge Protection	DC Type II / AC Type III			

Model	HAS-3.0LV-EUG1	HAS-3.6LV-EUG1	HAS-4.6LV-EUG1	HAS-5.0LV-EUG1
General				
Dimensions (W × H × D [mm])	502 × 461 × 202			
Weight (kg)	21			
Mounting	Wall Mounting			
Operation Temperature (°C)	-25 to +65 ( > 45, derating)			
Relative Humidity	0-95%, no condensing			
Altitude (m)	< 2000			
Cooling	Natural convection			
Protection Degree	IP65			
Noise (dB [A])	< 40			
User Interface	LED & App			
Communication with BMS	RS485, CAN			
Communication with Meter	RS485			
Communication Interface	RS485, Wi-Fi/Ethernet/4G (optional)			
Digital Input/Output	DRM, 1 × DI, 2 × DO			
Isolation Method (Battery)	High-frequency Isolation			
Certifications and Standards				
Grid Regulation	EN 50549, VDE-AR-N 4105, AS/NZS 4777.2			
Safety Regulation	IEC 62109-1, IEC 62109-2, IEC 62477-1			
EMC	EN 61000-6-1, EN 61000-6-3			

(1) 4600 for VDE-AR-N 4105 & VDE0126-1-1; 4999 for AS/NZS 4777.2

(2) Max. output apparent power 3680 VA for TOR Erzeuger Type A

Model	HAS-3.0LV-AUG1	HAS-3.6LV-AUG1	HAS-4.6LV-AUG1	HAS-5.0LV-AUG1
Battery				
Battery Type	Li-ion / Lead-acid			
Nominal Battery Voltage (V)	48			
Voltage Range (V)	40-60			
Max. Charge Current (A)	75	90	100	100
Max. Discharge Current (A)	75	90	100	100
Charging Strategy for Li-ion Battery	Self-adaption to BMS			
Charging Curve	3 Stages / Equalization			
External Temperature Sensor	Optional			
AC Input and Output (On-grid)				
Nominal Output Apparent Power (VA)	3000	3680	4600	5000 <sup>(1)</sup>
Max. Output Apparent Power (VA)	3000	3680	4600	5000 <sup>(1)</sup>
Max. Input Apparent Power (VA)	6000	7360	7360	7360
Nominal AC Voltage (V)	230			
Nominal Grid Frequency (Hz)	50 / 60			
Max. Output Current (A)	13.0	16.0	20.0	21.7
Max. Input Current (A)	26.1	32.0	32.0	32.0
Power Factor	0.8 leading ... 0.8 lagging			
Total Harmonic Distortion (@ nominal output)	< 3%			
AC Output (Off-grid)				
Max. Output Apparent Power (VA)	3000	3680	4600	5000
Peak Output Apparent Power (VA)	3300, 10s	4048, 10s	5060, 10s	5500, 10s
Nominal AC Voltage (V)	230			
Nominal AC Frequency (Hz)	50 / 60			
Max. Output Current (A)	13.0	16.0	20.0	21.7
Total Harmonic Distortion (@ linear load)	< 3%			
Efficiency				
Max. Efficiency	95.2%	95.2%	95.2%	95.2%
Protection				
Anti-islanding Protection	Integrated			
AC Over Current Protection	Integrated			
AC Short Current Protection	Integrated			
AC Overvoltage and Undervoltage Protection	Integrated			
Surge Protection	DC Type II / AC Type III			

Model	HAS-3.0LV-AUG1	HAS-3.6LV-AUG1	HAS-4.6LV-AUG1	HAS-5.0LV-AUG1
General				
Dimensions (W × H × D [mm])	502 × 461 × 202			
Weight (kg)	21			
Mounting	Wall Mounting			
Operation Temperature (°C)	-25 to +65 ( > 45, derating)			
Relative Humidity	0-95%, no condensing			
Altitude (m)	< 2000			
Cooling	Natural convection			
Protection Degree	IP65			
Noise (dB [A])	< 40			
User Interface	LED & App			
Communication with BMS	RS485, CAN			
Communication with Meter	RS485			
Communication Interface	RS485, Wi-Fi/Ethernet/4G (optional)			
Digital Input/Output	DRM, 1 × DI, 2 × DO			
Isolation Method (Battery)	High-frequency Isolation			
Certifications and Standards				
Grid Regulation	EN 50549, VDE-AR-N 4105, AS/NZS 4777.2			
Safety Regulation	IEC 62109-1, IEC 62109-2, IEC 62477-1			
EMC	EN 61000-6-1, EN 61000-6-3			

(1) 4600 for VDE-AR-N 4105 & VDE0126-1-1; 4999 for AS/NZS 4777.2

## Appendix A

### HYS 3.0-6.0LV-G1 Grid Code:

National/Regional Grid Code	Description	HYS-3.0LV-G1	HYS-3.6LV-G1	HYS-4.6LV-G1	HYS-5.0LV-G1	HYS-6.0LV-G1
VDE-AR-N-4105	Germany LV power grid	Supported	Supported	Supported	Supported	Supported
UTE C 15-715-1(A)	France mainland power grid	Supported	Supported	Supported	Supported	Supported
UTE C 15-715-1(B)	France island power grid	Supported	Supported	Supported	Supported	Supported
UTE C 15-715-1(C)	France island power grid	Supported	Supported	Supported	Supported	Supported
CEI0-21	Italy power grid	Supported	Supported	Supported	Supported	Supported
C10/11	Belgium power grid	Supported	Supported	Supported	Supported	Supported
Austria	Austrian power grid	Supported	Supported	Supported	Supported	Supported
G98	UK G98 power grid	Supported	Supported	Supported	Supported	Supported
G99 TRPEA-LV	UK G99_ TRPEA_ LV power grid	Supported	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777_ A-LV230	Australia power grid	Supported	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777_ B-LV230	Australia power grid	Supported	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777_ C-LV230	Australia power grid	Supported	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777_ NZ-LV230	New Zealand power grid	Supported	Supported	Supported	Supported	Supported
RD1699/166	Spain LV power grid	Supported	Supported	Supported	Supported	Supported
EN50549-poland	Poland power grid	Supported	Supported	Supported	Supported	Supported

National/Regional Grid Code	Description	HYS-3.0LV-G1	HYS-3.6LV-G1	HYS-4.6LV-G1	HYS-5.0LV-G1	HYS-6.0LV-G1
TAI-PEA	Thailand grid-tied standard power grid	Supported	Supported	Supported	Supported	Supported
TAI-MEA	Thailand grid-tied standard power grid	Supported	Supported	Supported	Supported	Supported
ABNTNBR16149	Brazil power grid	Supported	Supported	Supported	Supported	Supported
IEC61727	IEC61727 LV(50Hz)	Supported	Supported	Supported	Supported	Supported
IEC61727-60Hz	IEC61727 LV(60Hz)	Supported	Supported	Supported	Supported	Supported
EN50549 -1-Portugal deviation	Portugal power grid	Supported	Supported	Supported	Supported	Supported
EN50549-1-Hungary deviation	Hungary power grid	Supported	Supported	Supported	Supported	Supported
No. 25/2016/TT-BCT 2016	Vietnam power grid	Supported	Supported	Supported	Supported	Supported
DEWA:2016	United Arab Emirates power grid	Supported	Supported	Supported	Supported	Supported
TNB+IEC60068	--	Supported	Supported	Supported	Supported	Supported
AS 4777.2	Israel power grid	Supported	Supported	Supported	Supported	Supported
NOM	Mexico power grid	Supported	Supported	Supported	Supported	Supported

\*The power of Hoymiles hybrid inverter can be limited below 5000 VA in accordance with local grid requirements.

**HAS 3.0-5.0LV-G1 Grid Code:**

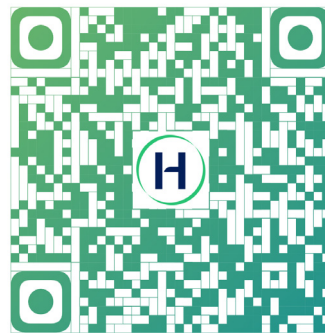
National/Regional Grid Code	Description	HAS-3.0LV-G1	HAS-3.6LV-G1	HAS-4.6LV-G1	HAS-5.0LV-G1
VDE-AR-N-4105	Germany LV power grid	Supported	Supported	Supported	Supported
UTE C 15-715-1(A)	France mainland power grid	Supported	Supported	Supported	Supported
UTE C 15-715-1(B)	France island power grid	Supported	Supported	Supported	Supported
UTE C 15-715-1(C)	France island power grid	Supported	Supported	Supported	Supported
CEI0-21	Italy power grid	Supported	Supported	Supported	Supported
C10/11	Belgium power grid	Supported	Supported	Supported	Supported
Austria	Austrian power grid	Supported	Supported	Supported	Supported
G98	UK G98 power grid	Supported	Supported	Supported	Supported
G99 TRPEA-LV	UK G99_ TRPEA_LV power grid	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777-A-LV230	Australia power grid	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777-B-LV230	Australia power grid	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777-C-LV230	Australia power grid	Supported	Supported	Supported	Supported
AUSTRALIA-AS4777-NZ-LV230	New Zealand power grid	Supported	Supported	Supported	Supported
RD1699/166	Spain LV power grid	Supported	Supported	Supported	Supported
EN50549-poland	Poland power grid	Supported	Supported	Supported	Supported

National/Regional Grid Code	Description	HAS-3.0LV-G1	HAS-3.6LV-G1	HAS-4.6LV-G1	HAS-5.0LV-G1
TAI-PEA	Thailand grid-tied standard power grid	Supported	Supported	Supported	Supported
TAI-MEA	Thailand grid-tied standard power grid	Supported	Supported	Supported	Supported
ABNTNBR16149	Brazil power grid	Supported	Supported	Supported	Supported
IEC61727	IEC61727 LV(50Hz)	Supported	Supported	Supported	Supported
IEC61727-60Hz	IEC61727 LV(60Hz)	Supported	Supported	Supported	Supported
EN50549 -1-Portugal deviation	Portugal power grid	Supported	Supported	Supported	Supported
EN50549-1-Hungary deviation	Hungary power grid	Supported	Supported	Supported	Supported
No. 25/2016/TT-BCT 2016	Vietnam power grid	Supported	Supported	Supported	Supported
DEWA:2016	United Arab Emirates power grid	Supported	Supported	Supported	Supported
TNB+IEC60068	--	Supported	Supported	Supported	Supported
AS 4777.2	Israel power grid	Supported	Supported	Supported	Supported
NOM	Mexico power grid	Supported	Supported	Supported	Supported

\*The power of Hoymiles AC-coupled inverter can be limited below 5000 VA in accordance with local grid requirements.



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