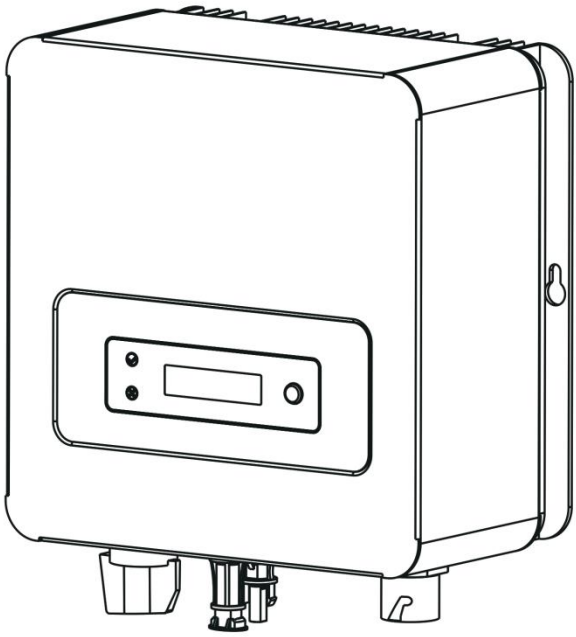
User Manual

SI-1/1.5/2K-S2, SI-2.5/3/3.3K-S2



V1.4

INHENERGY CO., LTD.

CONTENTS

1 Notes on this manual

1.1 Validity

This manual describes the assembly, installation, commissioning and maintenance of the following Inhenergy Inverter model:

SI-1K-S2, SI-1.5K-S2,

SI-2K-S2, SI-2.5K-S2,

SI-3K-S2, SI-3.3K-S2;

Target Group

This manual is for qualified personnel. Qualified personnel have received training and have demonstrated skills and knowledge in the construction and operation of this device. Qualified Personnel are trained to deal with the dangers and hazards involved in installing electric devices.

Additional information

Find further information on special topics in the download area at www.inhenergy.com. The manual and other documents must be stored in a convenient place and be available at all times. We assume no liability for any damage caused by failure to observe these instructions. For possible changes in this manual, Inhenergy Co., Ltd. accepts no responsibilities to inform the users.

1.2 Symbols in this document

Please pay close attention to all the symbols for the purpose of avoiding possible personal injury or equipment break down.

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

	NOTICE is used to address practices not related to personal injury.
	Information that you must read and know to ensure optimal operation of the system.

Markings on this product

Symbol	Explanation
	Caution, risk of electric shock.
	Caution, hot surface.
	Operation after 5 minutes.
	Read the manual.
	Point of connection for grounding protection.
	CE mark. The inverter complies with the requirements of the applicable CE guidelines.
	The inverter must not be disposed of with the household waste.
	Burn warning. Do not touch an operating inverter because it generates high temperatures on the shell.

2 Overview

2.1 Product Introduction

Function

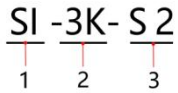
The Inverters is a single-phase grid-tied PV string inverter that converts the DC power generated by PV strings into AC power and feeds the power into the power grid.

Models

This document involves the following product models:

SI-1K-S2, SI-1.5K-S2, SI-2K-S2, SI-2.5K-S2, SI-3K-S2, SI-3.3K-S2;

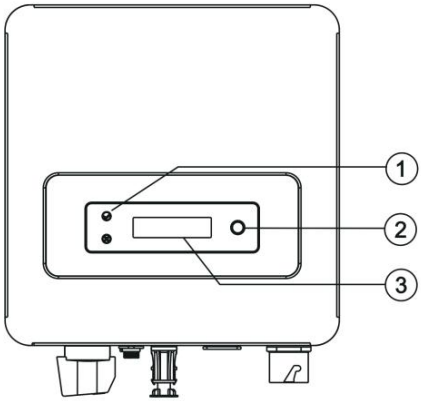
Model description (SI-3K-S2 is used as an example)

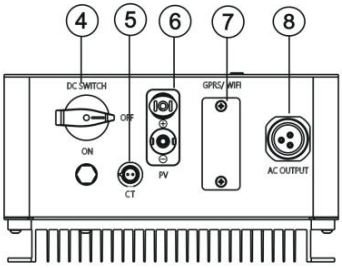


Model description

Icon	Meaning	Description
1	Product	Abbreviation for Solar Inverter.
2	Power level	1K: The rated power is 1 kW. 2K: The rated power is 2 kW. 3K: The rated power is 3 kW. 3.3K: The rated power is 3.3 kW.
3	Product code	S2: Second generation product of single-phase inverter.

2.2 Appearance





① LED indicator ② Function button ③ LCD display ④ DC switch

⑤ CT ⑥ DC input terminals ⑦ GPRS/WIFI output port ⑧ AC output port

LED indicator description

Category	Status	Meaning
	Blinking green at short intervals	Waiting status
	Blinking green at long intervals	Self-check
	Steady green	Normal status
	Blinking red at short intervals	Alarm
	Steady red	Fault
	Off	Faultless

Function button description

Status	Description
Short press (0.5s)	Down: Move cursor to downside or decrease value.
Long press (2s)	Enter: Confirm the selection.

3 Installation

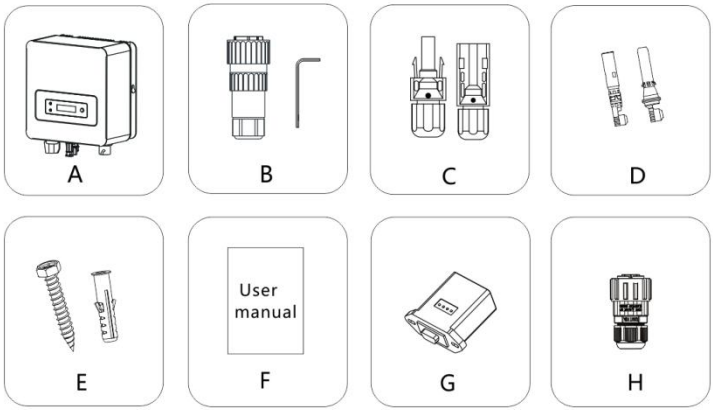
3.1 Check For Physical Damage

Make sure the inverter is intact during transportation. If there is any visible damage, such as cracks, please contact your dealer immediately.

3.2 Packing List

Open the package and take out the product, please check the accessories first.

The packing list shown as below.



Object	Description	Quantity
A	Inverter	1
B	AC connector	1
C	PV connectors (1*positive, 1*negative)	1/1
D	PV pin connectors (1*positive, 1*negative)	1/1
E	Expansion tubes/Set screw	2/2
F	User manual	1
G	WiFi/GPRS module (optional)	1
H	CT connectors (optional)	1

3.3 Mounting

Installation Precaution

SI-3K-S2 series inverter is designed for outdoor installation. (IP 65)

Make sure the installation site meets the following conditions:

◆ Not in direct sunlight.

◆ Not in areas where highly flammable materials are stored.

◆ Not in potential explosive areas.

◆ Not in the cool air directly.

◆ Not in environment of precipitation or humidity (> 95%).

◆ Under good ventilation condition.

◆ The ambient temperature in the range of -20℃ to +60℃.

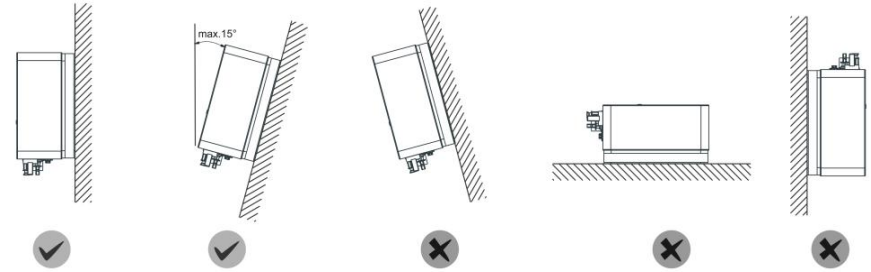
◆ The wall hanging the inverter should meet conditions below.

1.Solid brick/concrete, or strength equivalent mounting surface;

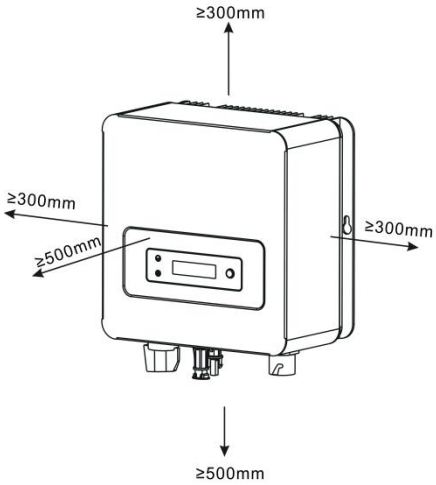
2.Inverter must be supported or strengthened if the wall's strength isn't enough. (such as wooden wall, the wall covered by thick layer of decoration)

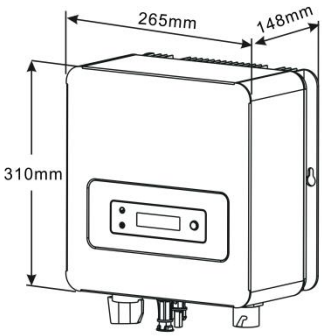
Please avoid direct sunlight, rain exposure, snow laying up during.

◆ The slope of the wall should be within 15°.



3.4 Space Requirement





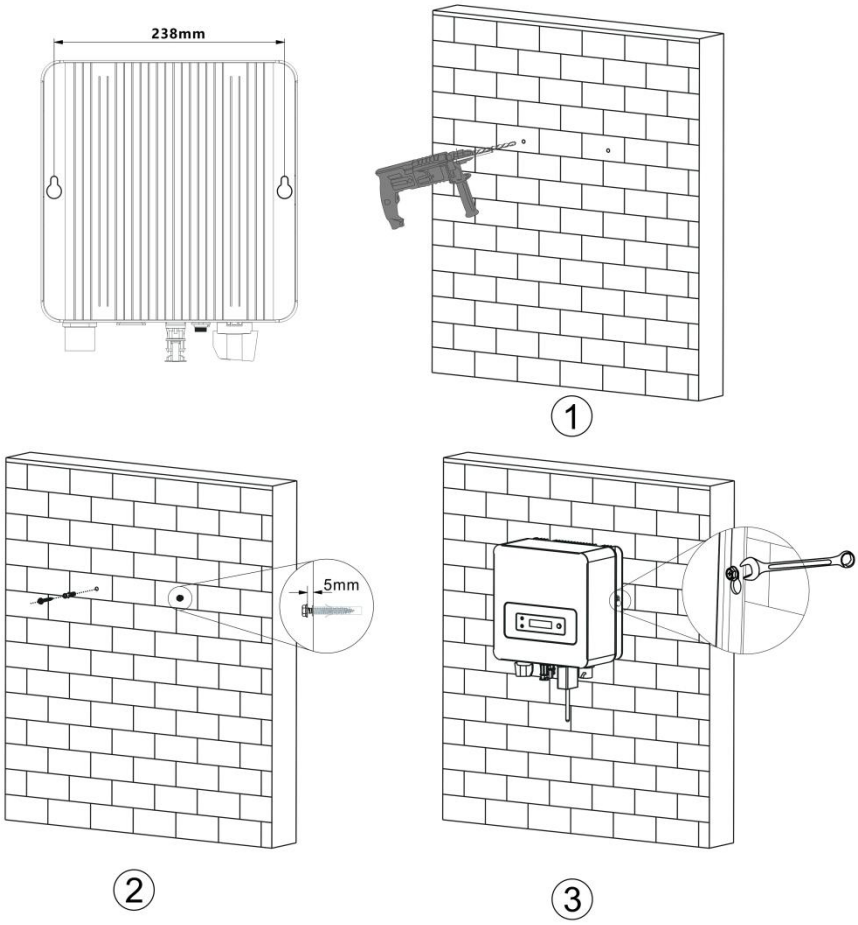
3.5 Mounting Steps

1.Referring to the following figure, mark the position of the 2 holes on the wall.

2.Drill holes with driller, make sure the holes are deep enough (at least 60mm) for installation. (Φ10 driller)

3.Install the expansion tubes in the holes, Install the screws into the expansion tube, reserve about 5mm. (torque: 2.5±0.2Nm)

4.Hang the inverter over the expansion screws, move the inverter close to it, slightly lay down the inverter, and tighten expansion screws.



4 Electrical Connection

4.1 Grid Connection

SI-3K-S2 series inverter are designed for single phase grid. Voltage is 220/230/240V, frequency is 50/60Hz. Other technical requests should comply with the requirement of the local public grid. Micro-breaker should be installed between inverter and grid, any load should not be connected with inverter directly.

Connection Steps:

1.Choose the appropriate wire. (Cable size: refer to Table3)

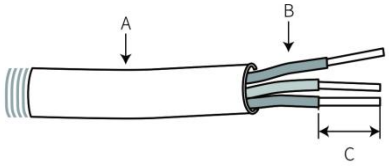
2.Remove 10mm of insulation from the end of wire.

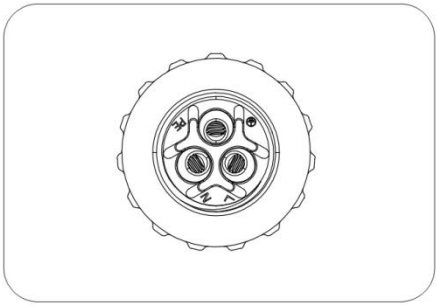
3.Thread cables through pressure screw, seal ring, threaded sleeve in sequence.

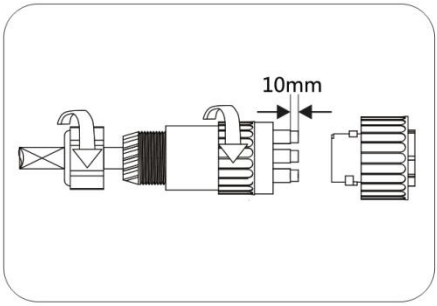
4.Insert the stripped and bared conductors L, N, PE into the screw terminals with sign L, N, PE on the socket element and tighten the screws firmly.

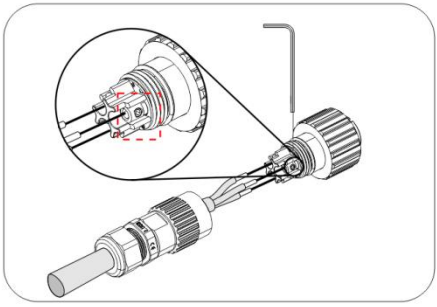
5.Plug the socket into AC output terminal, clockwise rotation to tighten the socket.

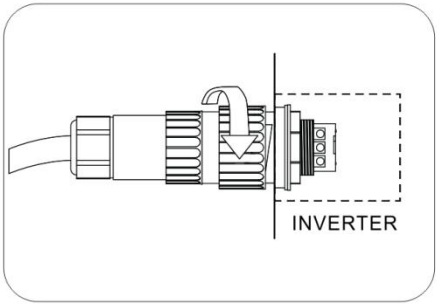
Table 3 Cable recommended

	A	Diameter	10-14mm
	B	Area	2.5-4mm²
	C	Length	10mm









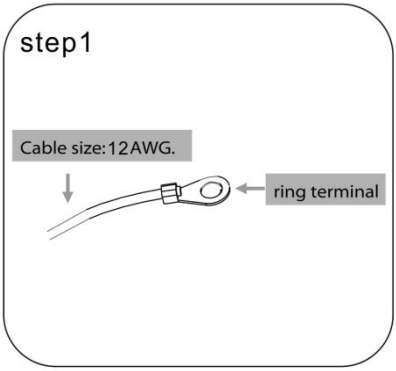
4.2 Earth Connection

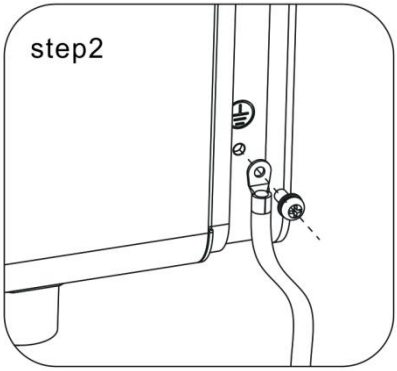
Users must additionally earth the inverter to the enclosure of a second earthing or equipotential bonding. This prevents electric shock if the original protective conductor fails.

Earth Connection Steps:

1.Strip the earthing cable insulation and insert the stripped cable into the ring terminal, then clamp it.

2.Place the ring terminal into the earthing rod and screw the earthing screw tightly.





4.3 PV Connection

◆ Conditions for DC Connection

The inverter has 1 independent input. Notice that the connectors are in paired (male and female connectors). The connectors for PV arrays and inverters are H4 connectors;

DANGER	The solar modules connected to the inverter must conform to the Class A requirements of the IEC 61730 standard.
CAUTION	If the inverter is not equipped with a DC switch but this is mandatory in the country of installation, install an external DC switch. The following limit values at the DC input of the inverter must not be exceeded 14A.

◆ Connecting the PV Array

DANGER	Danger to life due to lethal voltages! ◆ PV array supplies DC voltage to inverter when exposed to light, before connecting the PV array, cover some light screens above PV arrays, ensure that the DC switch and AC breaker are disconnect from the inverter. NEVER connect or disconnect the DC connectors under load. ◆ Make sure the maximum open circuit voltage (Voc) of each PV string is less than the maximum input voltage of the inverter. ◆ Check the design of the PV plant. The Max.open circuit voltage, which can occur at solar panels temperature of -10℃, must not exceed the Max. input voltage of the inverter.
CAUTION	◆ Improper operation during the wiring process can cause fatal injury to operator or unrecoverable damage to the inverter. Only qualified personnel can perform the wiring work. ◆ Please don't connect PV array positive or negative pole to the ground, it could cause serious damages to the inverter. ◆ Check the connection cables of the PV modules for correct polarity and make sure that the maximum input voltage of the inverter is not exceeded.

Connection Steps:

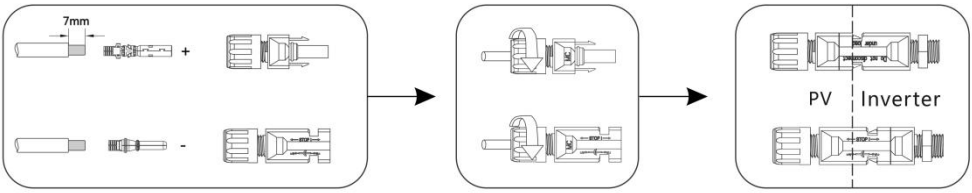
1.Choose the 12 AWG wire to connect with the cold-pressed terminal.

2.Remove 7mm of insulation from the end of wire.

3.Insert the insulation into pin contact and use crimping plier to clamp it.

4.Insert pin contact through the cable nut to assemble into back of the male or female plug. When you feel or heard a "click" sound the pin contact assembly is seated correctly.

5.Plug the PV connector into the corresponding PV connector on inverter.



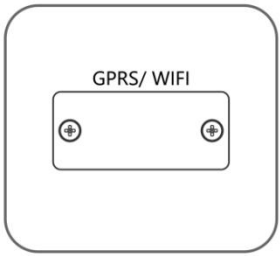
4.4 WiFi/GPRS Connection (optional)

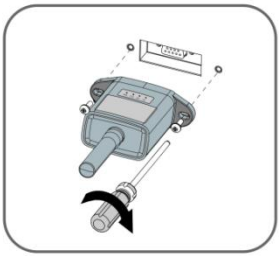
Inverter provides a WiFi/GPRS port, which can collect data from inverter and transmit it to monitoring-website via a WiFi/GPRS module.

Please refer to the accessory manual for specific configuration.

1.Align the serial port of the WiFi/GPRS module with the inverter and plug it in tightly.

2.Fasten the WiFi/GPRS module to the inverter with the screw.





4.5 Turn-off the Inverter

CAUTION	Do not disconnect the DC connectors under load.

Turn-off the inverter step:

1.Disconnect the line circuit breaker from single-phases grid and prevent it from being reactivated.

2.Turn off the DC switch.

3.Check the inverter operating status.

4.Waiting until LED, OLED have gone out, the inverter is shut down.

5 Powering On the System

CAUTION	Before turning on the AC switch between the inverter and the power grid, use a multimeter set to the AC position to check that the AC voltage is within the specified range.

5.1 Start-Up the inverter

1.Turn on the AC switch between the inverter and the power grid.

2.If there is a DC switch between the PV string and the inverter, turn on the DC switch.

3.Turn on the DC switch at the bottom of the inverter.

4.Observe the LEDs to check the operating status of the inverter.

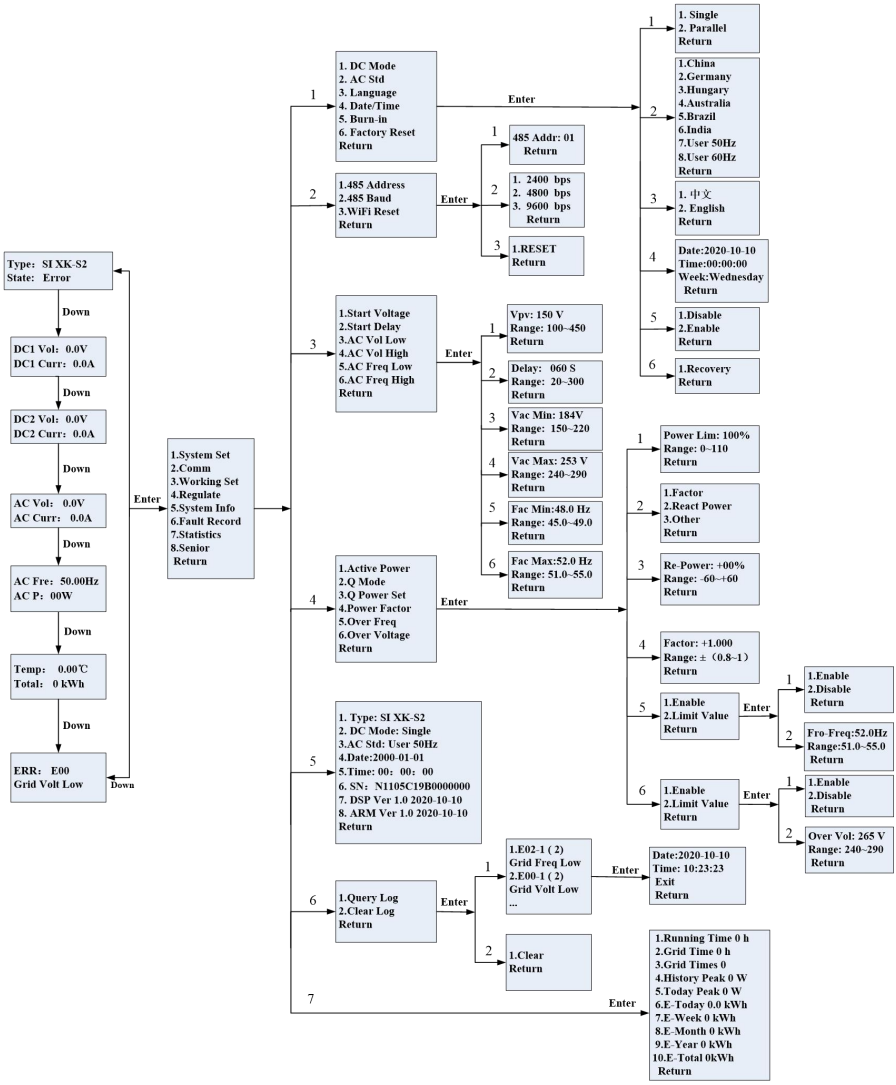
5.2 First run time setting

When the inverter is used for the first time, please set the time first. The set time is the same as the current time, and confirm to save.

6 LCD Operation

The main interface is the default interface, the inverter will automatically jump to this interface when the system started up successfully or not operated for a period of time.

Menu interface



7 Maintenance and Cleaning

7.1 Maintain Periodically

1.Checking Heat Dissipation

If the inverter regularly reduces its output power due to high temperature, please improve the heat dissipation condition. Maybe you need to clean the heat sink.

2.Cleaning the Inverter

If the inverter is dirty, turn-off the AC breaker and DC switch, waiting the inverter shut down, then clean the enclosure lid, the display, and the LEDs using only a wet cloth. Do not use any cleaning agents. (e.g. solvents or abrasives)

3.Checking the DC switch

Check for externally visible damage and discoloration of the DC switch and the cables at regular intervals. If there is any visible damage to the DC switch, or visible discoloration or damage to the cables, contact the installer.

7.2 Trouble shooting

Our quality control program assures that every inverter is manufactured to accurate specifications and is thoroughly tested before leaving our factory. If you have difficulty in the operation of your inverter, please read through the following information to correct the problem.

<table>
<tr><th>Alarm ID</th><th>Alarm Name</th><th>Suggestion</th><th>Alarm ID</th><th>Alarm Name</th><th>Suggestion</th></tr>
<tr><td>E0</td><td>Grid Volt Low</td><td rowspan="3">Check the AC voltage frequency range</td><td>E16</td><td>Remote Off</td><td>Check background instructions</td></tr>
<tr><td>E1</td><td>Grid Volt High</td><td>E17</td><td>Reserved</td><td></td></tr>
<tr><td>E2</td><td>Grid Freq Low</td><td>E18</td><td>SPI Comm Fault</td><td rowspan="14">Restart the inverter, if the fault does not disappear, contact the manufacturer</td></tr>
<tr><td>E3</td><td>Grid Freq High</td><td>E19</td><td>Reserved</td></tr>
<tr><td>E4</td><td>Bus Volt Low</td><td rowspan="2">Check PV input voltage range</td><td>E20</td><td>GFCI over Fault</td></tr>
<tr><td>E5</td><td>Bus Volt High</td><td>E21</td><td>GFCI Dev. Fault</td></tr>
<tr><td>E6</td><td>Reserved</td><td></td><td>E22</td><td>Volt Cons Fault</td></tr>
<tr><td>E7</td><td>Isolation Fault</td><td>Check PV impedance to ground</td><td>E23</td><td>Curr inconsiste</td></tr>
<tr><td>E8</td><td>Input Curr Over</td><td>Check the PV panel configuration</td><td>E24</td><td>Freq inconsiste</td></tr>
<tr><td>E9</td><td>Hard Curr Over</td><td rowspan="3">Restart the inverter, if the fault does not</td><td>E25</td><td>GFCI inconsiste</td></tr>
<tr><td>E10</td><td>Inv Curr Over</td><td>E26</td><td>Soft start fail</td></tr>
<tr><td>E11</td><td>Inv DCI Over</td><td>E27</td><td>Reserved</td></tr>
</table>

E12	Amb Temp Over	disappear, contact the manufacturer	E32	DSP Comm Fault	
E13	Sink Temp Over		E33	Login Fault	
E14	AC Relay Fault		W16	Clock Warn	Replace the internal button pool
E15	Reserved		W03	Power is zero	Normal shutdown at low power

8 Decommissioning

8.1 Remove the Inverter

◆ Disconnect the inverter from DC input and AC output.

◆ Wait for 5 minutes for de-energizing.

◆ Disconnect communication and optional connection wirings.

◆ Remove the inverter from the bracket.

◆ Remove the bracket if necessary.

8.2 Packaging

◆ Please pack the inverter with the original packaging.

◆ If the original package is no longer available, you can also use an equivalent carton that meets the following requirements.

8.3 Storage and Transportation

◆ Store the inverter in a dry environment where ambient temperature keep always between -20 °C - +60 °C. Take care of the inverter during the storage and transportation, keep less than 4 cartons in one stack.

◆ When the inverter or other related components need to be disposed. Have it carried out according to local waste handling regulations. Please be sure to deliver wasted inverters and packing materials to certain site, where can assist relevant department to dispose and recycle.

9 Technical Data

Model	SI-1K-S2	SI-1.5K-S2	SI-2K-S2	SI-2.5K-S2	SI-3K-S2	SI-3.3K-S2
Input Data						
Max.DC input power	1300W	1950W	2600W	3250W	3900W	3900W
Max.DC input voltage	500V					
Operation voltage range	60V-500V					
Number of independent MPPT/strings per MPPT	1/1					
MPPT max.current	14A					
Max.Short circuit current per MPPT	18A					
AC Output Data						
Rated output power	1kW	1.5kW	2kW	2.5kW	3kW	3.3kW
Max.output power	1100W	1650W	2200W	2750W	3300W	3300W
Rated output voltage	220/230V ±20%					
Rated output frequency	50Hz,60Hz/±5Hz					
Rated output current	4.4A	6.6A	8.7A	10.9A	13.1A	14.5A
Max.output current	5A	7.5A	10A	12A	14.5A	14.5A
Power factor	±0.8					
THDi	<3%					
Grid system pattern	L+N+PE					
Efficiency						
Max.efficiency	97.6%					
Europe efficiency	96.8%					
General Data						

Dimensions (W/L/H)	265mm/310mm/148mm
Weight	<8kg
Operation temperature range	–25 °C ... +60 °C
Noise	≤25dB
Heat dissipation mode	Natural
IP Class	IP65
Features	
LCD display	yes
Communication interface	WiFi/GPRS/RS485

10 Manufacturer Warranty

Please refer to the warranty card

11 Contact

If you have technical problems concerning our products, contact your installer or manufacturer. During inquiring, please provide below information:

1.Inverter type

2.Modules information

3.Communication method

4.Serial number of Inverters

5.Error code of Inverters

6.Display of inverter LCD

INHENERGY CO., LTD.

ADD: INHE Smart Power Distribution Industrial Base, Hi-tech Zone, Zhuhai, China.

P.C.: 519000

Tel: +86-756-368-9696

Web: www.inhenergy.com

Email: info@inhenergy.com