KSTAR Solar Inverter
User Manual
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1 User Guide

It is appreciating that you purchase single-phase grid-connected inverter produced by KSTAR. The product is non-transforming type inverter, features reliable performance and advanced technology. It converts DC currents from solar arrays into AC currents then fed to municipal Electrical Grid.

This manual contains important safety and operational instructions that must be accurately understood and followed before operating the products. Please refer to this manual once there is any problem during installation or operation. Please contact your local distributors or agent if not recovered by yourselves. Please visit our website: http://www.kstar.com.cn, if you want to obtain latest manual or products information.

Thank you again for using our products, please read this manual completely and hope you are satisfied with our products.

Please retain this manual for future reference.
2 Safety Instructions

1. Electric Shock
The product has alternating current (AC) and direct current (DC) connections, in order to avoid any electric shocks during maintenance or before installation, please make sure the disconnection of these AC or DC ports, grounded for solar system and inverter.

2. Operation of Inverter
The product can be only operated or maintained by professionals. The inverter can only be activated under such situation: the housing or cover in good condition without any damages, all screws are tightened in right positions.
Before opening the inverters, it must be disconnected with solar array and Grid. In order to discharge completely from storage capacitance, you can’t touch the inverter within at least 5 minutes after disconnection,

3. Requirement for Grid Connections
These inverters are only used for supply power for municipal power grid, and don’t try to connect any other energy resources with this inverter.

4. High Temperature Protection
During normal operation period, some parts (such as cooling fins and cover) is heating, sometimes it will reach 60°C. Please don’t touch these parts to avoid scald.
3 Product Warranty

The quality warranty period of the inverter is 5 years. If you like to extend your warranty period, you can apply for it and keep up warranty card well. The maintenance is free of charge during warranty period. The packing material should be original or similar material when the defective inverter is returned back to factory for repairing.

This product is guaranteed to cover all shortage or damage due to design, production, or components. But the warranty doesn’t cover the followings:

- Beyond warranty period
- No effective warranty card and product’s series number
- Damage caused by improper delivery
- Damage caused by improper installation, unauthorized modification, maintenance, or test, etc.
- Damage caused by working in terrible environment which is not complied with stipulations in this manual
- Damage caused by not complying with installation and operation range in relative international standards or regulations
- Damage caused by unnatural environment
4 Overview

4.1 Introduction of Grid-connected System

Basically Grid-connected system is comprised of 4 portions: PV array, PV inverter, AC connection unit and Public Grid connection unit.

Once PV arrays receive sun shines, they will generate DC current and feed into PV inverter which is configured between DC input and municipal AC grid. Through converting DC into AC, the solar energy is transmitted into municipal Electrical Grid.
4.2 Brief Introduction of PV Inverter

The inverter converts DC current from solar units into AC current, and feeds to Municipal Electrical Grid. The inverter is designed and produced as per relative requirement of laws and regulations. The shape and functions of relative parts are described as follows:

1. DC input ports: There are 2 pairs of DC ports, each pair of input ports has positive (+) and negative (-) connectors, please identify the positive and negative positions by referring to "installation" section.
2. RJ45 port: 1 optional water proof communication port, for example, it can be used as RS485 communication port by connecting with Data collection terminal.
3. RS232 port: Via this interface, user can use computer to communicate with the equipment. There is water proof cover to protect RS232 connector.
4. AC output ports: The equipment is connected with municipal Grid through these ports. Please refer to "installation" section to make clear of connection diagram.
5. LCD display panel: display working status and power efficiency etc information
6. Cooling fins: used to release the heat generated from running equipment
7. Company Logo: Name and identification of the company
8. LED and button: 2 LED indicates current working status, 1 button is used to switch current LCD display information

4.3 Features Description

- Beautiful shape design, easy installation
- Convenient maintenance, easy operation
- High transfer efficiency (Max efficiency > 97.5%, European efficiency > 97%)
- High MPPT, Max MPPT > 99.5%
- High reliability
- Rich Man-Machine interface
- Standard RS232 connection, optional RJ45 communication, etc
- Outdoor IP65 protective level
5 Installation

5.1 Packing List of Inverter

Please check carefully before opening the package of the equipment. It may cause the inverter damage in case the packing material is found damage, please contact with forwarder for claim. If necessary please contact us.

5.2 Installation of Inverter

Please read the following installation instruction before you start your work so as to achieve best effect of the inverter.

1. In order to keep long life of inverter, the installation site should be always kept dry.

2. Select suitable location to install the inverter, where is not so easy for pedestrian to touch, but consider easy installation and easy maintenance as well.

3. Make sure the inverter should be kept at least 30CM away from other stuff.

4. Don’t directly expose the inverter under the sun light. High temperature will affect the inverter’s working efficiency. When the temperature keeps below 40°C, the inverter will be in best working status, the life of inverter will be maximum.

5. Keep good ventilation so as to reduce heat accumulation

6. Once installing inverter in living environment, don’t mount it in plastics plate or wooden plate to avoid noise, it is better to mount it on the wall.

7. The inverter generates heat during normal working status, don’t install it on a flammable objects or near the place to store flammable materials. Don’t install it near potential explosion area.
5.3 Installation Location

1. The inverter is suitable to be installed on vertical or backwards tilt wall as shown above, the tilt angle should be less 20°.

2. Don’t install the inverter on forward tilt wall.

3. Don’t install inverter on horizontal wall.

4. Mount the inverter at height same as eyesight for easy operation and data reading.
5.4 Installation Procedure

1. Make the mark of mounting holes on the wall, using ø 10 driller kit to drill the holes.

2. Clean the dust inside the holes, and insert expansion pipe into the holes. First tighten 2 screws in upper side. In bottom side, you need use washer to tight other 2 tapping screws.
3. Hang up the inverter along the wall by fitting into 4 tapping screws, and check both sides and keep the inverter in right position, then tighten 4 tapping screws as shown in following pictures.
5.5 Wiring

Remove wiring cover in the inverter, you will see below shown connection ports:

<table>
<thead>
<tr>
<th>A, B, C, D</th>
<th>Connector for DC input, the polarity sequence is positive, negative, negative, positive (+, -, -, +). Please find label with polarity markers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>RS232 communication interface</td>
</tr>
<tr>
<td>F</td>
<td>RS485 communication interface</td>
</tr>
<tr>
<td>G, H, I</td>
<td>Connector for AC output, they are L, N and PE lines</td>
</tr>
</tbody>
</table>

Attention:
1. The wire connection can only be done after the inverter is fixed in proper position on the wall.
2. Make sure the Max. open circuit voltage and short circuit current of solar arrays are not exceeded the stipulated range of the inverter.
3. Choose proper cable for power input and output lines.
4. During connecting the inverter, make sure no connection among AC, DC and any power resources. They also can not be connected when any accident occurs.
5. Identify the polarity of wires and connection ports first, then connect the inverter with solar arrays and municipal Electrical Grid.
5.6 Connection Procedure

1. Connection with Municipal Electrical Grid

First disconnect with municipal Grid by breaker, make sure it will not be connected again even due to accident, then move away wiring cover by loosing 4 screws at front-right side. Pass cable through wiring cover and connect with L, N, PE ports by flat screw driver (shown in packing list). Finally tighten 4 screws back.

2. Connection with Solar Array

In order to guarantee installation and operation of system safety, external manual breaker has to be configured at DC side. The selection of breaker should meet basic current and voltage capacity. Meanwhile, disconnect AC current first before disconnect DC units.

Before connect the inverter with solar Arrays, test max series voltage of solar Arrays, whose value should not be over max input voltage of inverter. Meanwhile the short current of solar Arrays is better not to exceed max DC current. Please check the polarity of solar Arrays before the connection.

The positive of solar Arrays should be connected to positive port in the inverter and the negative of solar Arrays should be connected to negative port in the inverter.
6 Operation of Grid-connected Inverter

System Display
Model: KSG-5K
Ver: V1.00
SN: 0123456789

LED display

Working LED
Error LED
Press button
6.1 Trial Operation

The inverter can be activated only after the following inspections are well executed:
1. Correct connection for AC cables
2. All solar arrays are connected with the inverter correctly. The inverter is working with two independent MPPTs in default status, so there should be two different solar arrays connected with the inverter inputs. If all the solar arrays are needed to be connected in parallel, user needs to change the "Input Mode "setting as 6.4 mentioned.
3. All null DC ports are sealed by sealing plugs, and all screws are tightened.
4. Turn on the breaker between DC and AC
5. The inverter will automatically get started once PV arrays receive enough energy.

6.2 Working Status

Working status is divided into 3 kinds: normal working status, faulty status, and termination status.

1. Normal Working Status

There are two modes: standby status and running status for this stage. Under this mode, the system is running in normal status. Meanwhile tracking all functioning data to keep the system running in its best status.

Once PV array’s voltage is lower than 150V but higher than 140V, the inverter will be in stand-by status, at this period the inverter starts to run and all test functions get ready, but it doesn’t feed power to municipal Electrical Grid. When PV array’s voltage is higher than 150V, the inverter will transfer to running status after self test, and meanwhile start to feed energy to municipal Grid.
The following example shows the process when PV voltage is increased from 140V:

- Turn on the inverter, its model and version will be displayed first.
- The input voltage is less 150V but higher than 140V, the inverter will be in standby status.
- The input voltage is higher than 150V, the inverter will be in self-test status.
- After self testing, the inverter will be in normal working status (the data only for reference).

**Attention:** Before connecting to DC, please make sure input positive (+) and negative (-) connections are correct, otherwise the component of inverter will be damaged, which may cause the inverter in abnormal operation status.
2. Fault Status
The PV inverter is always under intelligent monitoring condition after it gets started. It will become faulty status when any fault occurs (such as municipal voltage is overload, frequency is over range) or components failure. The faulty information can be displayed by LCD, at that time the red LED is on.

![Fault Display](image)

3. Termination Status
When the output voltage from PV array is lower than a certain threshold, the inverter will be in termination status. All LCD or LED light will be off, and no energy from inverter fed to municipal Grid. Meanwhile no energy consumption for inverter itself, any actions on the keys (buttons) are invalid.

6.3 LED Display
In the front panel, here are 2 LED displays: RED light and GREEN light. Under normal working condition, GREEN light keeps on. The display functions of these 2 LED lights are as follows:

Working (GREEN light): it will be on during normal working status. But it will be off during night time when no current is from solar Arrays.
Error (RED light): it will be on when fault alarm occurs or components failure. If you like to realize more error information, please refer to below chapters.

6.4 LCD Display

1. Button and Back Lighting Operation

There are two types of button press, short time press means pressing the button less than 0.5 Second, and long time press means pressing the button more than 3 Seconds. The short time press is used for page up, moving the cursor, the long time press is used for locking the screen, selecting item, setting and returning to upper menu.

The LCD back lighting will be turned off 180 Seconds after the latest button press operation. To lighten the LCD back lighting, please press the button again.

2. Working Mode Display

When the inverter is running in working mode, the short time button press can change the LCD display. What the LCD will display when you press the button is showed below.
If there is long time button press happened when the display stays in some page, then this page of display will be locked. In the same way, long time button press can make the page of display switch between lock and unlock status. The LCD display will return to the first page “Power & Etotal” automatically if there is no any button press operation for a long time and the LCD is not in lock status.

“Auto Test Set” display page will only be shown when the inverter is set to “DK5940” mode.
3. Setting Mode Display

The inverter could enter the setting mode by long time button press when the inverter is running in fault mode, such as the main grid is not connected to the inverter. The long time button press can make the display return to the upper level menu or exit the setting mode, when the cursor point to the title of a page (top line of the page).

- Setting Main Menu

  Setting Option
  1. Grid SPEC
  2. PV Input Mode
  3. COMM Address

  Short time button press move the cursor, and long time button press enter the sub menu.

- Grid Specification Setting Sub Menu

  Grid SPEC
  1. Golden Sun
  2. VDE0126
  3. Australia SPEC

  Grid SPEC
  4. DK5940
  5. RD1663

  Short time button press move the cursor, and long time button press select this item. "■" indicate the item is selected currently.
• Grid Specification Setting Sub Menu

PV Input Mode
- 1. Independant
  2. Parallel

Short time button press move the cursor, and long time button press select this item. “■” indicate the item is selected currently.

Inverter will work with two independant MPPTs if “Independant” item is selected. If “Parallel” item is selected then inverter will work with a single MPPT, and the two input strings should be connected to the same PV arrays.

• 485 Address Setting Sub Menu

COMM Address
- 002

Short time button press setting the number of this bit, and long time button press change to next bit.

4. Auto Test(DK5940)

Inverter can do auto test when it is running in working mode. Change the LCD display to “Auto Test Set” page, then enter the auto test mode by long time button press. To cancel the auto test, please make a long time button press again.
Auto Test consists of over voltage test, under voltage test, over frequency test and under frequency test, the operation process is shown below.

- Auto Test
  Vmax: 245.0V <= 0.1S
  AC Voltage: 228.0V

- Auto Test
  T OK 228V -- 0.06S

- Auto Test
  Vmin: 195.0V <= 0.2S
  AC Voltage: 228.0V

- Auto Test
  T OK 228V -- 0.06S

- Auto Test
  Fmax: 50.2Hz <= 0.1S
  Frequency: 50.0Hz

- Auto Test
  T OK 50.0Hz -- 0.06S

- Auto Test
  Fmin: 48.2Hz <= 0.1S
  Frequency: 50.0Hz
When the test result of all processes test is successful, then the inverter will display as below.

![Auto Test
AUTO TEST PASSED](image.png)

IF there is any process failed, the inverter will display as below.

![Auto Test
AUTO TEST FAILED](image.png)
## 5. Identification of LCD Display Information

<table>
<thead>
<tr>
<th>Working Conditions</th>
<th>Message display in English</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal working status</td>
<td>No display</td>
<td>PV voltage &lt; 70V, the inverter is switched off</td>
</tr>
<tr>
<td>Not Functioning Period</td>
<td>Stand-by</td>
<td>140V&lt; PV voltage &lt;150V</td>
</tr>
<tr>
<td>Stand-by</td>
<td>Checking</td>
<td>PV voltage &gt; 150V, the inverter get started and self test all modules</td>
</tr>
<tr>
<td>Self-test</td>
<td>Normal</td>
<td>Generate AC power and feed to municipal Grid after self test is completed.</td>
</tr>
<tr>
<td>Normal Power Generation, MPPT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instant Power Rate &amp; Volume Of Electricity Power</td>
<td>XXXX W/ XXXXXX Kwh</td>
<td>Instant power rate &amp; volume of electricity power</td>
</tr>
<tr>
<td>Voltage And Current Of Input DC</td>
<td>DC XXX.X V/ XXX.X A</td>
<td>Voltage and current from PV arrays</td>
</tr>
<tr>
<td>Voltage And Current Of Output AC</td>
<td>AC XXX.X V/ XXX.X A</td>
<td>Municipal Grid voltage and current at the moment with input of solar energy</td>
</tr>
</tbody>
</table>

## System Faulty display

| DCI Over Range                           | Error 1.                   | DC component in output current is over safety regulation                   |
| Current Leakage Fault                    | Error 2.                   | Current leakage too high                                                   |
| AC Disconnection                         | Error 3.                   | No municipal Grid detected                                                  |
| AC Frequency Fault                       | Error 4.                   | AC frequency too high or too low                                           |
| AC Voltage Fault                         | Error 5.                   | AC voltage is over range                                                   |
| PV Voltage High                          | Error 6.                   | Input PV voltage is over regular                                           |
| BUS Voltage High                         | Error 7.                   | BUS voltage too high causes inversion failure                              |
| Fans Fault                               | Error 8.                   | Fans stuck                                                                  |
| Temperature High                         | Error 9.                   | Equipment’s temperature too high                                           |
| Insulation Low                           | Error 10.                  | PV arrays insulation grade too low                                         |
| Automatic Test Fault                     | Error 11.                  | Self test failure                                                          |
| Device Fault                             | Error 12.                  | GFCI device fault                                                          |
| Hole Fault                               | Error 13.                  | Hole sensor fault                                                          |
| Relay Fault                              | Error 14.                  | Relay not connected or touch point adhesive                                |
| EEPROM Fault                             | Error 15.                  | EEPROM read/write fault                                                     |
| Communication Lose                       | Error 16.                  | Primary and secondly CPU communication faulty                              |
| Consistency Fault                        | Error 17.                  | Test inconsistent between primary CPU and secondary CPU                    |
6.5 Max Power Point Tracking (MPPT)

Under any arrays or any conditions, the system can be rapidly tracked the max. power from the arrays. When the output power is trending to be stable, which expresses that the inverter reach its Max power, meanwhile maximum power will be received and transferred into AC to feed to municipal electricity Grid by the inverter. When the output power is displayed as floating, which means, the inverter is adjusting its own status by tracking maximum power output from Arrays any time.
7 Communication Interface

It provides 2 types of communication method by using RS232 or RS485 interface in this inverter.

7.1 RS232

There is water proof RS232 (DB9 type) communication port. Please open the water proof cover before using RS232 port. Single inverter can be monitored by computer through RS232 interface. The cable length between the inverter and the computer should be less 15M. The software of the inverter can be upgraded through this port as well.

The pin definitions of the RS232 port:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.C.</td>
</tr>
<tr>
<td>2</td>
<td>TxD</td>
</tr>
<tr>
<td>3</td>
<td>RxD</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
</tr>
<tr>
<td>5</td>
<td>Common</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
</tr>
<tr>
<td>7</td>
<td>N.C.</td>
</tr>
<tr>
<td>8</td>
<td>N.C.</td>
</tr>
<tr>
<td>9</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

7.2 RS485

RS485 port is used for multiple inverters’ communication. The inverter is configured 1 optional RJ45 connector. As RS485 communication port, the RJ45 is convenient for multi inverters’ connections and inputs, up to 50 sets of inverters can be communicated
simultaneously through one cable, but the length of connection cable can not exceed 1000 M.

8 Trouble Shooting

It is very easy for the inverter’s maintenance. When you meet any problems, please refer to the following trouble shooting first, please contact your local distributor if the problem can’t be solved by yourself.

The following sheet lists some basic questions may encounter in the operation.
<table>
<thead>
<tr>
<th>Alarm Message</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| **Insulation Resistance Fault** | (1) Turn off the inverter and restart it to check whether alarm occurs again.  
(2) If alarm still exists, check whether the resistance of PV+ to earth and PV− to earth > 2M.  
(3) If resistance > 2M, please contact inverter distributor and PV array’s supplier. |
| **Current Leakage Fault**   | (1) Turn off the inverter and check whether peripheral facility is leakage.  
(2) After elimination of peripheral interference, connect to PV array check leakage again, if still exists, please contact your inverter distributor. |
| **Grid Fault**              | (1) Check the local municipal Grid voltage and frequency comply with that stipulated in this inverter’s specification  
(2) Wait for 2 minutes after alarm occurs, and check whether the inverter can be automatically recovered itself, if not, please contact local distributor. |
| **No Grid**                 | (1) Check whether the inverter is connected to municipal Grid  
(2) Check the cable available between the inverter and municipal Grid.  
(3) Otherwise please contact local distributor. |
| **Input DC Overload**       | (1) Check whether open circuit voltage close to or greater than 550V.  
(2) If not, please contact local distributor. |
| **Communication Fault**     | (1) Restart the equipment and check whether faulty still exists.  
(2) If fault still exists, please contact distributor. |
| **Over Temperature Fault**  | (1) Inverter’s temperature too high, put the inverter in cooling place.  
(2) If faulty still occurs, please contact distributor. |
| **Relay Fault**             | (1) Restart the equipment and check whether faulty still exists  
(2) If fault still exists, please contact distributor. |
| **DCI Fault**               | (1) DC component in output current too high, wait for 2 minutes after alarm occurs, and check whether the inverter can be automatically recovered itself.  
(2) If faulty still occurs, please contact distributor. |
| **EEPROM I/O fault**        | (1) Restart the equipment and check whether faulty still exists  
(2) If fault still exists, please contact distributor. |
| **BUS Over Voltage**        | (1) Restart the equipment and check whether faulty still exists  
(2) If fault still exists, please contact distributor. |
| **Equipment Fault**         | (1) Restart the equipment and check whether faulty still exists  
(2) If fault still exists, please contact distributor. |
# 9 Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>KSG-4K2</th>
<th>KSG-5K</th>
<th>KSG-6K</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DC-Input Parameters</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Input Power (W)</td>
<td>4600</td>
<td>5400</td>
<td>6400</td>
</tr>
<tr>
<td>MPPT Operating Range (Vdc)</td>
<td>150-550</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Input Current (A)</td>
<td>12.5/12.5</td>
<td>15/15</td>
<td>17/17</td>
</tr>
<tr>
<td>Rated Input Voltage (Vdc)</td>
<td>360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Input Current (A)</td>
<td>11.4</td>
<td>14.2</td>
<td>17</td>
</tr>
<tr>
<td>Numbers of Input</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT Channel</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AC-Output Parameters</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Output Power (W)</td>
<td>4400</td>
<td>5200</td>
<td>6200</td>
</tr>
<tr>
<td>Rated Output Power (W)</td>
<td>4200</td>
<td>5000</td>
<td>6000</td>
</tr>
<tr>
<td>Output Voltage Range (Vac)</td>
<td>Refer to &quot;Grid Specification&quot; Table</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Output Current</td>
<td>23</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Rated Output Voltage (Vac)</td>
<td>220/230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Output Current (A)</td>
<td>18.3</td>
<td>21.7</td>
<td>26.1</td>
</tr>
<tr>
<td>Output Frequency Range (Hz)</td>
<td>Refer to &quot;Grid Specification&quot; Table</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Factor</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Harmonic Distortion (THDi)</td>
<td>&lt;3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Efficiency</td>
<td>97.5%</td>
<td>97.6%</td>
<td>97.8%</td>
</tr>
<tr>
<td>European Efficiency &amp; Environment</td>
<td>97%</td>
<td>97.4%</td>
<td>97.5%</td>
</tr>
<tr>
<td>Protective Level</td>
<td>IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Temperature Range (°C)</td>
<td>-20~55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>0~95%, no condensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td>Fan cooling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption During Night Time (W)</td>
<td>&lt;0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise (dB)</td>
<td>&lt;40</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
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<td>LCD</td>
<td>4 lines characters display, the content can be exchanged by pressing button</td>
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<tr>
<td>Communication Interface</td>
<td>RS232 &amp; RS485</td>
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<tr>
<td><strong>Mechanical Parameters</strong></td>
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<tr>
<td>Dimensions (W×D×H) mm</td>
<td>353×182×660</td>
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<tr>
<td>Weight (Kg)</td>
<td>26.5</td>
<td>27</td>
<td>27.5</td>
</tr>
<tr>
<td>Grid Specification</td>
<td>Output Voltage Range(Vac)</td>
<td>Output Frequency Range(Hz)</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------</td>
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<tr>
<td>Golden Sun</td>
<td>187 - 252</td>
<td>49.5 – 50.5</td>
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<tr>
<td>VDE0126</td>
<td>184 - 262</td>
<td>47.5 – 50.2</td>
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<td>Australia SPEC</td>
<td>200 - 262</td>
<td>48 - 52</td>
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<td>DK5940</td>
<td>184 - 262</td>
<td>49.7 – 50.3</td>
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<tr>
<td>RD1663</td>
<td>195 - 253</td>
<td>49 – 51</td>
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<tr>
<td>G83</td>
<td>218 - 253</td>
<td>49.5 – 50.5</td>
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<tr>
<td>60Hz *</td>
<td></td>
<td>59 - 61</td>
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</tbody>
</table>

*The inverter can intelligently recognize whether the grid is 50Hz or 60Hz when it is connected with the grid. If the grid frequency is 60Hz, user could only change the range of output voltage by setting the “Grid Specification”, but the output frequency range is still “59Hz – 61Hz”.