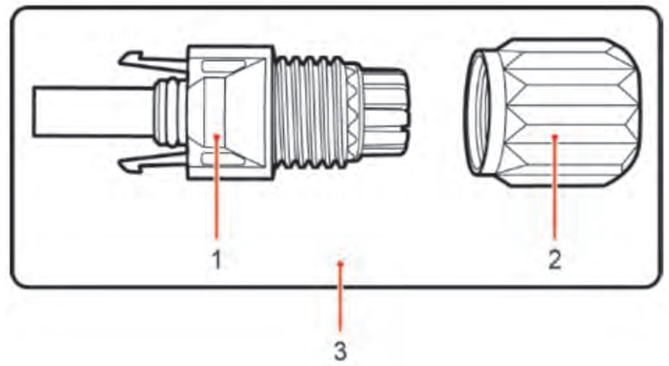
Context

Table 4-3 Recommended DC input cable specifications

Cross-Sectional Area (mm)		External Cable Diameter(mm)
Range	Recommended Value	
4. 0~6. 0	4. 0	4. 5~7. 8

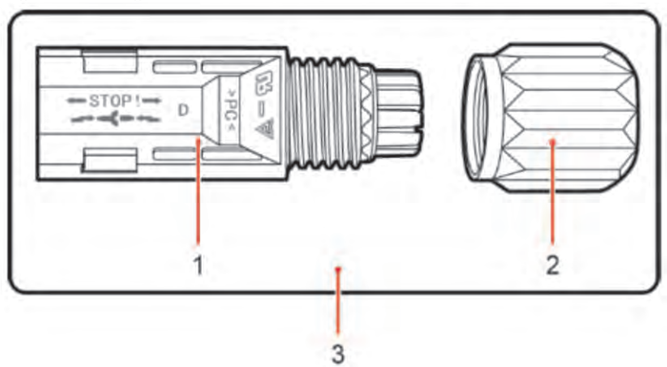
DC input connectors are classified into positive and negative connectors, as shown in Figure 4-13 and Figure 4-15.

Figure 4-13 Positive connector composition



1. Housing 2. Cable gland 3. Positive connector

Figure 4-14 Negative connector composition



1. Housing 2. Cable gland 3. Negative connector

Note

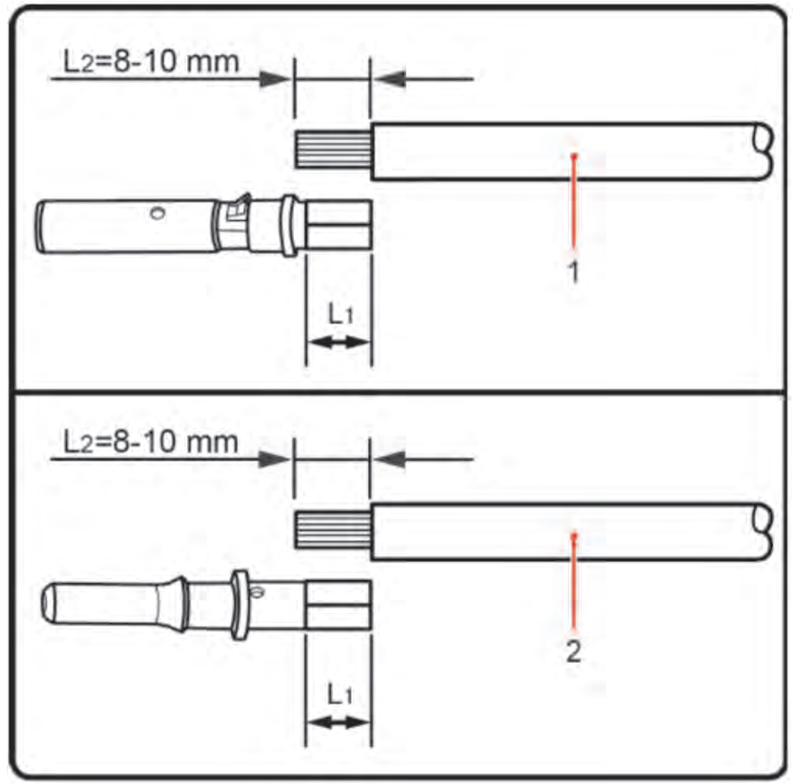
Positive and negative metal terminals are packed with positive and negative connectors respectively. Separate the positive from negative metal terminals after unpacking the Sofar 3.3K～12KTL-X to avoid confusing the polarities.

Procedure

Step 1 Remove cable glands from the positive and negative connectors.

Step 2 Remove the insulation layer with an appropriate length from the positive and negative power cables by using a wire stripper as show in Figure 4-16.

Figure 4-15 Connecting DC input power cables



1. Positive power cable 2. Negative power cable

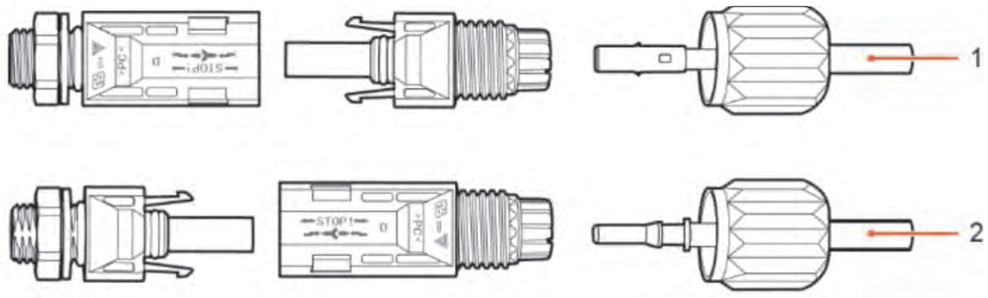
Note

L2 is 2 to 3 mm longer than L1.

Step 3 Insert the positive and negative power cables into corresponding cable glands.

Step 4 Insert the stripped positive and negative power cables into the positive and negative metal terminals respectively and crimp them using a clamping tool. Ensure that the cables arecrimped until they cannot be pulled out by force less than 400 N, as shown in Figure 4-17.

Figure 4-16 Connecting DC input power cables



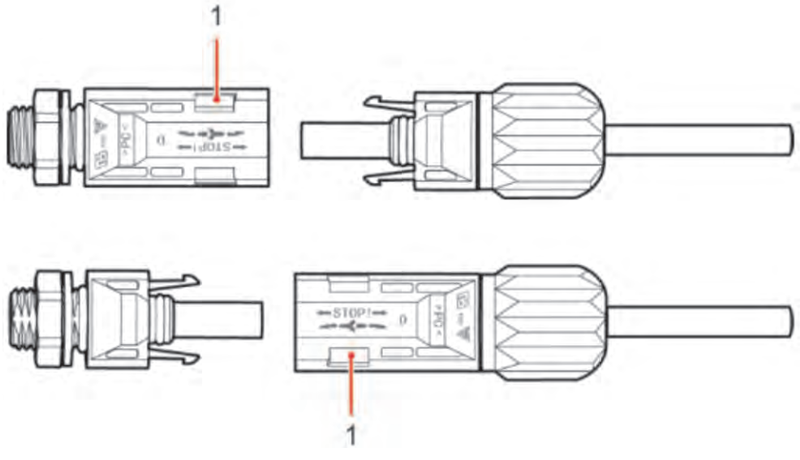
1. Positive power cable 2. Negative power cable

Step 5 Insert crimped power cables into corresponding housings until you hear a "click" sound. The power cables snap into place.

Step 6 Reinstall cable glands on positive and negative connectors and rotate them against the insulation covers.

Step 7 Insert the positive and negative connectors into corresponding DC input terminals of the Sofar 3.3K～12KTL-X until you hear a "click" sound, as shown in Figure 4-17.

Figure 4-17 Connecting DC input power cables



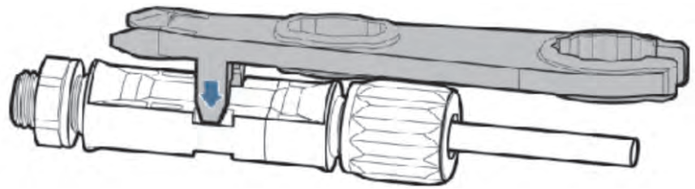
——— **End**

Follow-up Procedure

To remove the positive and negative connectors from the Sofar 3.3K～12KTL-X, insert a removal wrench into the bayonet and press the wrench with an appropriate strength, as shown in Figure 4-18.

Caution	**Before removing the positive and negative connectors, ensure that the DC SWITCH is OFF.**

Figure 4-18 Removing a DC input connector



4.6 Safety check

- **Photovoltaic array**

Before the inverter operation, need to be examined for the photovoltaic array, Check Open circuit voltage of the each PV array whether accord with the requirements.

−Ensure Open circuit voltage of the each PV array accord with the requirements;

−Ensure that the positive and negative polarity is correct.

- **Sofar 3.3K～12KTL-X DC connect**

Use the multimeter to check the DC side voltage and current;

Check the DC cable, Note the positive and negative poles cannot be reversed, Consistent with the positive and negative pole of photovoltaic array, measured each input Open circuit voltage

Compare the voltage, if the difference is greater than 3%, PV array line may be a fault

- **Sofar 3.3K～12KTL-X AC connect**

Ensure the AC breaker of the inverter is off

Check the inverter phase with grid is connected properly, Check the voltage of each phase is within a predetermined range, if possible, Measure the THD, If the distortion is serious, the inverter may not work.

5 Commissioning of inverter

5.1 Safety inspection before commissioning

Attention	**Ensure that DC and AC voltages are within the range permitted by the inverter.**

5.2 Start inverter

Step 1 Turn on DC switch.

Step 2 Turn on AC switch.

When the solar arrays generate adequate power, the inverter will startup automatically. Display showing “normal” indicates correct operation.

Step 3: Choose the correct country code. (refer to section 6.3 of this manual)

Notice: Different distribution network operators in different countries have different requirements regarding grid connections of PV grid connected inverters.

Therefore, it's very important to make sure that you have selected the correct country code according to requirements of local authority.

Please consult qualified electrical engineer or personnel from electrical safety authorities about this.

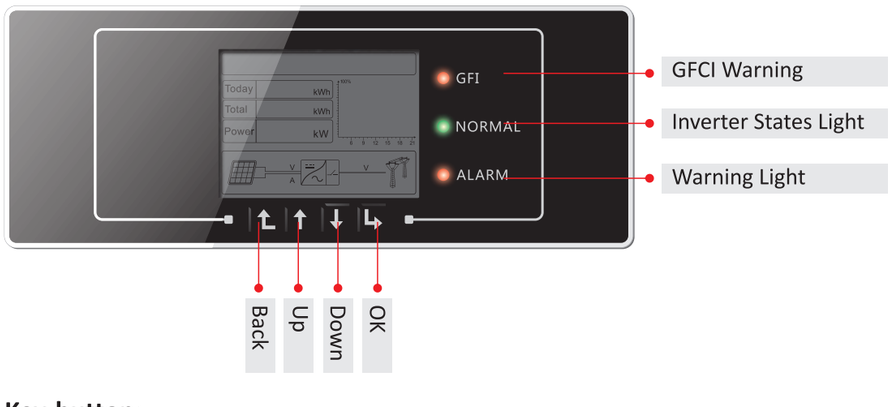
Shenzhen SOFARSOLAR Co., Ltd. is not responsible for any consequences arising out of incorrect country code selection.

If the inverter indicates any other fault, please refer to part 7——error messages for help.

6 Operation interface

6.1 Operation and Display Panel

- Buttons and Indicator lights



Key-button:

- Back : to back up or enter into main interface at standard interface states
- Up : to move up or increase value
- Down : to move down or decrease value
- Enter: to confirm selection

Indicator Lights:

- States Light(GREEN)

  Flashing: Waiting or checking state
  ON: Normal operation
  OFF: Fault or permanent state

- Warning Light (RED)

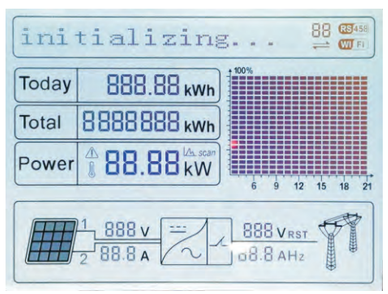
  Flashing: Fans fault
  ON: The inverter is faulty
  OFF: Normal operation

- GFCI Warning Light (RED)

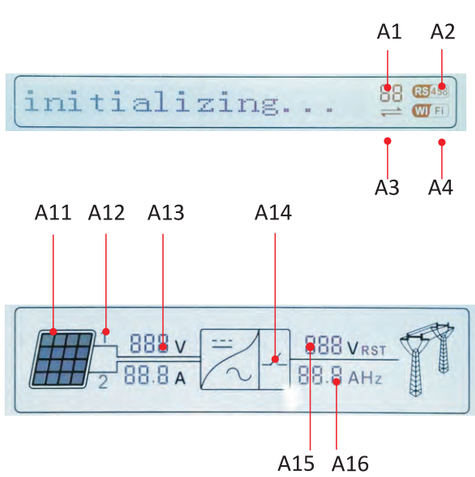
  ON: GFCI fault
  OFF: GFCI normal

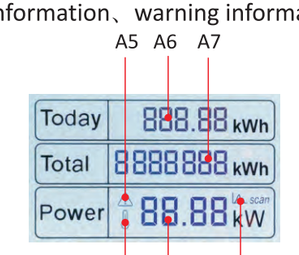
6.2 Standard Interface

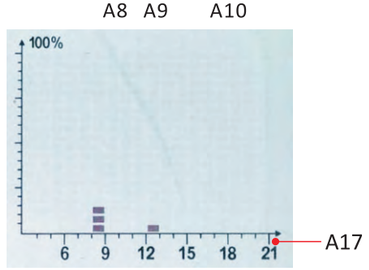
LCD standard interface is used to display inverter states、information and parameter setting etc.



LCD displays the updates of inverter energy、power、input information、warning information etc







A1 - Indicates modbus communication address.
A2 - RS485 communicating
A3 - Light ON for RS485 communicating
A4 - WIFI communicating
A5 - Light flashes to warn over frequency and power derating. Light ON to warn remote off
A6 - Indicates today's energy
A7 - Indicates the total energy
A8 - Light ON warning for inverter high temperature
A9 - Indicates real time output power
A10 - MPPT SCAN function is activated (not available)
A11 - Light ON when input voltage over160V
A12 - Indicates real time input voltage and current channel
A13 - Indicates the input voltage and current of phase 1&2 and displays in turns in every three seconds
A14 - Light ON when the state is normal
A15 - Indicates R/T/S phase voltage and displays in turns in every three seconds
A16 - Indicates R/T/S phase current or frequency and displays in turns in every three seconds
A17 - Indicates the energy from 3:00am-21:00pm in the day

When power-on, LCD interface displays INITIALIZING, refer below picture.

Initializing...

when control board successfully connected with communication board, the LCD display the current state of the inverter, display as shown in the figure below.

Wait 10s	Waiting States, Countdown 10S
Check	Checking
Normal	Normal Power Generation
Fault	Regular error state
Permanent	Unrecoverable error state

Inverter states includes: wait、check、normal、fault and permanent

Wait : Inverter is waiting to Check State at the end of reconnection time. In this state, the PV voltage is more than 180V, grid voltage value is between the max and min limits and so on; If not, Inverter will go to Fault State or Permanent State.

Check: Inverter is checking isolation resistor, relays, and other safety requirements. It also does self-test to ensure inverter software and hardware are functional. Inverter will go to Fault State or Permanent State if any error or fault occurs.

Normal : Inverter enter to Normal State, it is feeding power to the grid; inverter will go to Fault State or Permanent state if any error or fault occurs.

Fault : Fault State: Inverter has encountered recoverable error. It should recover if the errors disappear. If Fault State continues; please check the inverter according error code.

Permanent : Inverter has encountered unrecoverable error, we need maintainer debug this kind of error according to error code.

When the control board and communication board connection fails, the LCD display interface as shown in the figure below.

DSP communicate fail

6.3 Main Interface

Press “Back” button under standard interface to enter into main interface, including:

Normal	Key“Back”
	1. Enter Setting
	2. EventList
	3. SystemInfo
	4. System Time
	5. Software Update

(A) “Enter Setting” Interface as below:

1.Enter Setting
1. Set time
2. Clear Energy
3. Clear Events
4. Set Country Code
5. On-Off Control
6. Enset Country
7. Set Energy
8. Set Address
9. Set Inputmode
10. Set Language
11. Set StartPara
12. Set SafetyVolt
13. Set SafetyFreq
14. Set Insulation
15. Set Reactive
16. Set PowerDerat
17. PE Linecontrol
18. Set RefluxP
19. DRMS0 Control
20. Set PowerRatio
21. Autotest Fast
22. Autotest STD

- **Set Time**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface. Enter “1. Set Time” by pressing“Up” button or “Down” button, then press”OK“button and start to set up time.

Time set from year, month, day, minutes, and seconds in turns, “Up” button or “Down”button to choose different value to set each date. Set each value is need to press “OK” button to confirm setting. “success” is displayed if the setting time is correct, “fail” means failure settings.

◆ **Clear Energy**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface. Then Enter “2.Clear Energy ” by pressing “Up” button or “Down” button, press “OK” button and start to clear produce. “success” is displayed after settings.

◆ **Clear Events**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface.Enter “3. Clear Events” by pressing ”Up” button or “Down” button. Press “OK ”button and start to clear events. “success” is displayed after settings.

◆ **Set Country Code**

Users press “Back” button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “4.Set Country Code” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface(default:0001).If it's shown"set disable" on the screen, then you can NOT choose the operating country, you should enable country setting through " 6. Enset Country " interface. If it's shown "set Country code?" on the screen, then press Confirm button to start country setting. "Success" will be shown on the screen after a successful country setting.

User can check current country code in SystemInfo>>5. Country.

Note: Country code changing will take effect after inverter reboot.

Table 6-1 country code setting

code	country	code	country	code	country
00	Germany VDE AR-N4105	12	Poland	24	Cyprus
01	CEI0-21 Internal	13	Germany BDEW	25	India
02	Australia	14	Germany VDE 0126	26	Philippines
03	Spain RD1699	15	Italy CEI0-16	27	NewZealand
04	Turkey	16	UK-G83	28	Brazil
05	Denmark	17	Greece island	29	Slovakia VSD
06	Greece Continent	18	EU EN50438	30	Slovakia SSE
07	Netherland	19	IEC EN61727	31	Slovakia ZSD
08	Belgium	20	Korea	32	CEI0-21 In Areti
09	UK-G59	21	Sweden	33-49	Reserved
10	China	22	Europe General		
11	France	23	CEI0-21 External		

◆ **On-Off Control**

Users press ''Back'' button to enter ''1.Enter Setting'' interface,Press ''OK'' button to enter main setting interface.Enter ''5.On-Off Control'' by pressing ''UP'' button or ''Down'' button. Press ''OK'' button and enter On-Off Control interface,press ''OK'' button and enter ''Input Password'' Setting interface.Press ''OK'' button to set passwords (default:0001),increase or decrease value though pressing ''Up'' button or ''Dwon'' button,press ''OK'' button to next value setting.''Error! Try again'' will be displayed for wrong passwords.Press ''back'' button and rekey in the correct passwords.It will enter into ''Power on&Power off'' interface if the passwords is correct,then you can select ''Power on'' or ''Power off'' by pressing ''Up'' button or ''Down'' button and press ''OK'' button to finish the setting successfully.If you select ''Power off'',need to set how many days you want the inverter to power off,increase or decrease value though pressing ''Up'' button or ''Down'' button.After you set ''Power off'' successfully,you need to contact manufacturer to supply passwords to re-power on this inverter.

◆ **Enset Country**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface.Enter “ 6. Enset Country ” by pressing “Up” button or“Down”button, press “OK” button and enter “Input Password” Setting interface.

Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error! Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “success” will be displayed if setting successfully,

Attention: when inverter working for power generation over 24h, country setting is forbidden, it can only be set after LCD setting. Key in passwords for country setting through LCD (default: 0001), country setting can be set in 24h after keying in the correct passwords, over 24h, set through LCD again.

◆ **Set Energy**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface.Enter “ 7 . Set Energy ” by pressing “ Up ” button or“Down”button, press “OK” button and enter “Input Password” Setting interface.

Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error! Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “success” will be displayed if setting successfully,

◆ **Set Address**

Users press “Back” button to enter “1.Enter setting” interface, Press ”OK“ button to enter main setting interface. Enter “8. Set Address” by pressing “Up” button or ”Down“ button. Press “OK” button and enter setting interface “Success” or “fail” is displayed after setting.

◆ **Set Inputmode**

Input mode selection：Sofar 3.3K～12KTL-X has 2 MPPT, The two MPPT can run independently, and also can be operated in parallel, According to the system design, the user can choose the mode of MPPT operation.The input mode can be setting by the LCD .

Users press “Back” button to enter “1.Enter setting” interface, Press ”OK“ button to enter main setting interface. Enter “ 9 . Set inputmode” by pressing “Up” button or ”Down“ button. Press “OK” button and enter setting interface. Choose corresponded setting items by pressing “Up” button or “Down” button, then press “OK” button. “Success” or “fail” is displayed after setting.

- **Set Language**

Users press “Back” button to enter “1.Enter setting” interface, Press ”OK“ button to enter main setting interface. Enter “10. Set Language” by pressing “Up” button or ”Down“ button. Press “OK” button and enter setting interface. Choose corresponded setting items by pressing “Up” button or “Down” button, then press “OK” button. “Success” or “fail” is displayed after setting.

- **Set StartPara**

User can change the start parameter by the LCD. First the User need to copy the. TXT file which is used to change the start parameter to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “11. Set StartPara” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set SafetyVolt**

User can change the Voltage protection point by the LCD. First the User need to copy the. TXT file which is used to change the Voltage protection point to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “12. Set SafetyVolt” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set SafetyFreq**

User can change the Frequency protection point by the LCD. First the User need to copy the. TXT file which is used to change the Frequency protection point to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “13. Set SafetyFreq” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set Insulation**

User can change the Insulation protection point by the LCD. First the User need to copy the. TXT file which is used to change the Insulation protection point to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “14. Set Insulation” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set RefluxP**

Users press ''Back'' button to enter ''1.Enter Setting'' interface,Press ''OK'' button to enter main setting interface.Enter ''18.Set RefluxP'' by pressing ''Up'' button or ''Down'' button, press ''OK'' button and enter ''Input Password'' Setting interface.Press ''OK'' button to set passwords (default:0001),increase or decrease value though pressing ''Up'' button or ''Dwon'' button,press ''OK'' button to next value setting.''Error! Try again'' will be displayed for wrong passwords.Press ''back'' button and rekey in the correct passwords.Then select ''Reflux Enable'' or ''Reflux Disable'' by pressing ''Up'' and ''Down'' button.''success'' will be displayed if setting successfully.

- **DRMS0 Control(only Australia)**

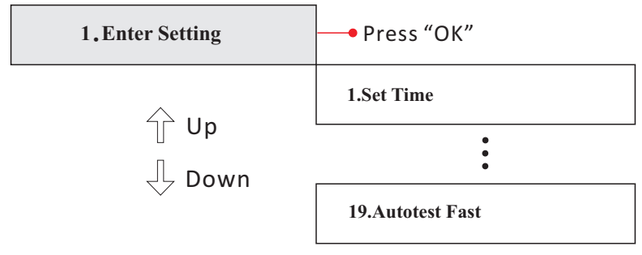
Enable the function to refer "4.4 Connecting communication cables"connection DRED, Users press Back button to enter "1.Enter setting"interface,Press OK button to enter main setting interface.Enter"18.DRMS0 Control"by pressing "Down"button,press"OK" button and enter “ Input Password ” Setting interface . Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords.
If the password is correct, enter the settings "1.enable DRMS0 or press down to enter "2.disable DRMS0", and finally press the OK button to set it successfully.

- **Autotest Fast**

Step 1: During the normal operation of our SOLAR inverters, press “back” button (the leftmost button) to enter the main menu interface.

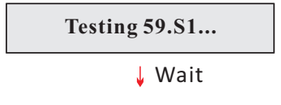
Step 2:Press “Confirm” button (the rightmost button) to enter the “Enter Setting” menu interface.

Step 3:Press “Down” button several times until “Autotest Fast” is shown on the screen.



Step 4:Press “Confirm” button to start Auto Test:

Step 5:Then the Auto Test will start automatically, Press “down” to see the test results



Test 59.S1 OK!

↓ Press “Down” button to see the test results

59.S1:230V 183ms

↓ Wait for another test

Testing 59.S2...

↓ Wait

Test 59.S2 OK!

↓ Press “Down button” to see the test results

59.S2:230V 100ms

↓ Wait for another test

Testing 27.S1...

↓ Wait

Test 27.S1 OK!

↓ Press “Down” button to see the test results

27.S1:230V 384ms

↓ Wait for another test

Testing 27.S2...

↓ Wait

Test 27.S2 OK!

↓ Press “Down” button to see the test results

27.S2:230V 188ms

↓ Wait for another test

Testing 81>S1...

↓ Wait

Test 81>S1 OK!

↓ Press “Down” button to see the test results

81>S1:49.9Hz 83ms

↓ Wait for another test

Testing 81>S2...

↓ Wait

Test 81>S2 OK!

↓ Press “Down” button to see the test results

81>S2:49.9Hz 89ms

↓ Wait for another test

Testing 81<S1...

↓ Wait

Test 81<S1 OK!

↓ Press “Down” button to see the test results

81<S1:50.0Hz85ms

↓ Wait for another test

Testing 81<S2...

↓ Wait

Test 81<S2 OK!

↓ Press “Down” button to see the test results

81<S2:50.0Hz82ms

↓

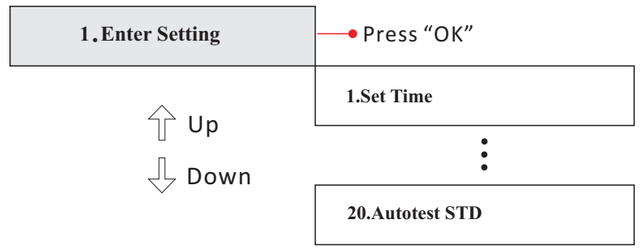
Auto Test OK!

◆ **Autotest STD**

Step 1: during the normal operation of our SOLAR inverters,press “back”button (the leftmost button) to enter the main menu interface

Step 2: Press ″Confirm″button (the rightmost button) to enter the ″setting″menu interface.

Step 3: Press ″Down″button several times until ″Autotest slow″is shown on the screen



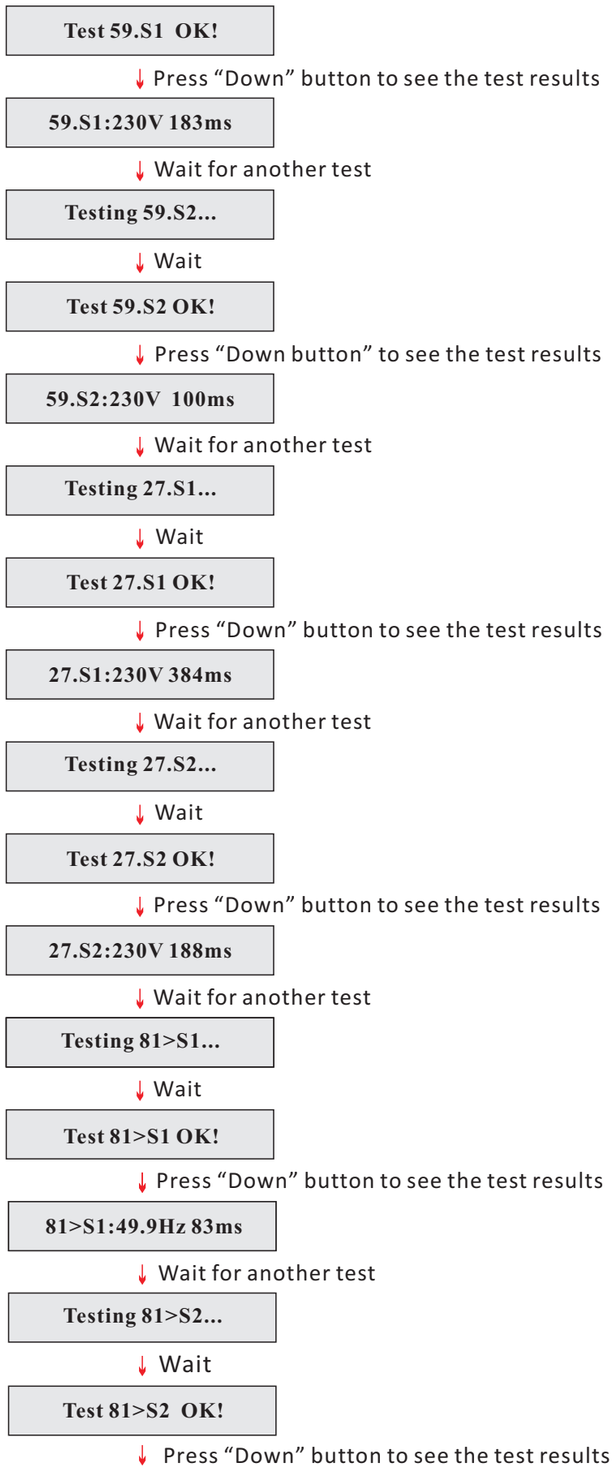
Step 4:Press “Confirm” button to start Auto Test:

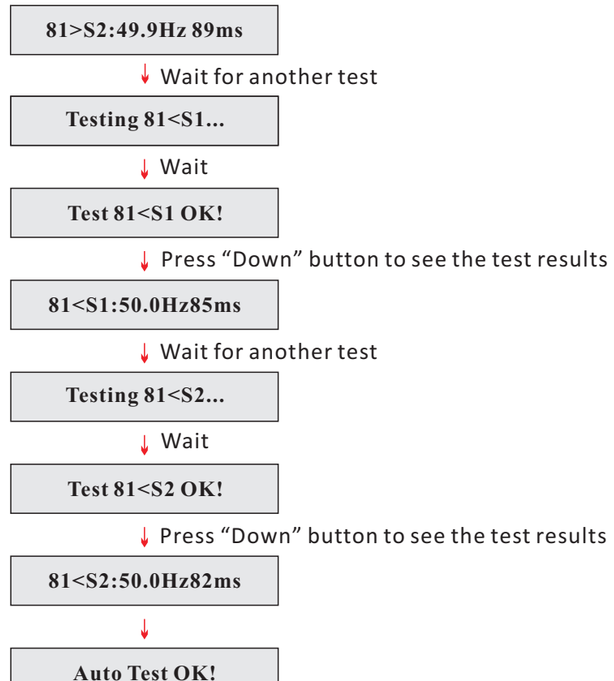
20. Autotest STD

Step 5:Then the Auto Test will start automatically, Press “down” to see the test results

Testing 59.S1...

↓ Wait

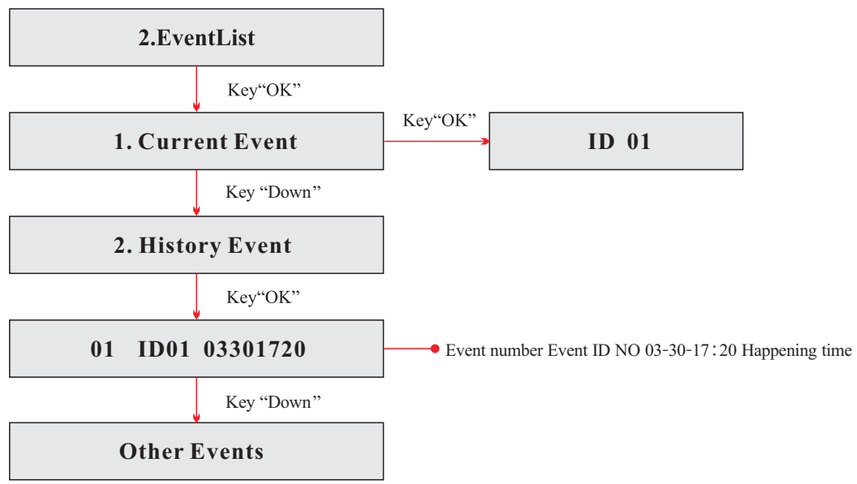




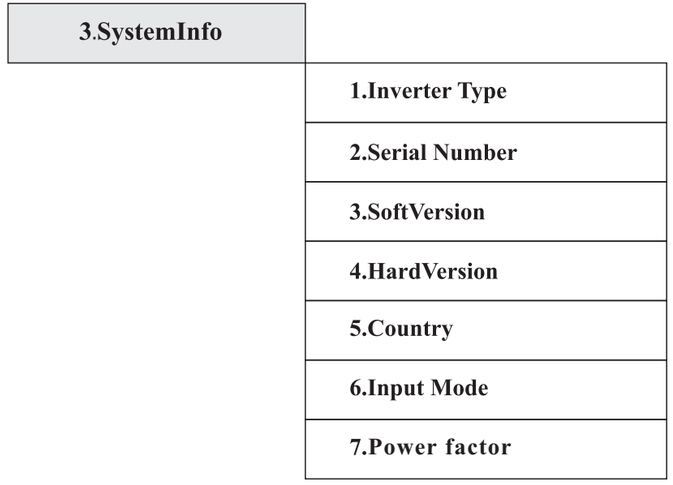
(B) “Event List” Interface as below:

Event List is used to display the real-time event records, including the total number of events and each specific ID No. and happening time. User can enter Event List interface through main interface to check details of real-time event records, Event will be listed by the happening time, and recent events will be listed in the front. Please refer to below picture:

Users press “Back” button and “Down” button in standard interface, then enter into 2.Event List” interface.



(C) “SystemInfo” Interface as below:



- **Inverter Type**

Users press “Back” button and “Up” button or “Down” button enter “3. SystemInfo” interface, Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “1. Inverter Type”,then press “OK” button , the Inverter Type will be displayed.

- **Serial Number**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, Press ”OK“ button to enter enter into system information checking interface,then press“Up” button or “Down” button enter into “2. Serial Number”,then press “OK” button ,the serial number will be displayed.

- **SoftVersion**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “3. SoftVersion”,then press “OK” button , the SoftVersion will be displayed.

- **HardVersion**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “4. HardVersion”,then press “OK” button , the HardVersion will be displayed.

- **Country**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “5. Country”,then press “OK” button , the Country will be displayed.

- **Input Mode**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “6. Input Mode”,then press “OK” button , the Input Mode will be displayed.

- **Power factor**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “ 7. Power factor ”,then press “OK” button , the Power factor will be displayed.

(D) System Time

Press the “Back” button and “Up” button or “Down” key in the standard user interface to enter into “4.System Time”,then press “OK ” button to display the current system time.

(E) Software Update

Press the “Back” button and “Up” button or “Down” button in the standard user interface to enter into “5. Software Update”,then press “OK” button to enter into the”input password” interface,now press the “OK” button to input the password(initial passwords is 0715),Press the“Up” and “Down” button to change the value,then press “OK” button to confirm the current value of input and enter the next set of value .when set over, if the password is wrong, the LCD will display “Error! Try again”,at this time ,you should re-enter your password.If the password is correct, then begin the update process.

User can check the current software version in SystemInfo>>3. SoftVersion.

online update program steps are as follows:

Step 1 First, open Sofar 3.3K～12KTL-X waterproof cover.

Step 2 After open waterproof cover, Press SD card (the SD card as shown in Figure 4-5), Then the SD card will automatically pop up.

Step 3 The SD card reader must be ready by the users, so that SD card so easy to establish the connection with the computer.

Step 4 SOFAR SOLAR will send the Software code to the user who needs to update. After user receive the file, please decompressing file and cover the original file in SD card.

Step 5 Insert the SD card into the SD card slot, there will be a faint clicking sound typically, indicating that has stuck.

Step 6 then enter into the online upgrade to the main menu “5. Software Update” in the LCD display program. The method to enter the menu can refer to operation interface of LCD.

Step 7 Input the password, if password is correct, and then begin the update process, the original password is 0715.

Step 8 System update main DSP、slave DSP、and ARM in turns. If main DSP update success ,the LCD will display “Update DSP1 OK”, otherwise display “Update DSP1 Fail”; If slave DSP update success ,the LCD will display “Update DSP2 OK”, otherwise display “Update DSP2 Fail”.

Step 9 If Fail , please turn off the DC breaker, wait for the LCD screen extinguish, then turn on the DC breaker again,then Continue to update from step 6.

Step 10 After the update is completed, turn off the DC breaker, wait for the LCD screen extinguish, then install waterproof cover, and turn on the DC breaker and AC breaker again, the inverter will enters the running state.

User can check the current software version in SystemInfo>>3. SoftVersion.

7 Trouble shooting and maintenance

7.1 Trouble shooting

This section contains information and procedures for solving possible problems with the sofar 3.3K～12KTL-X inverter.

⊙ **In case of problem with inverter, check the following tips.**

- Check the warning fault messages or Fault codes on the inverter information panel. Record it before doing anything further.
- If inverter does not display any Fault, please check the following lists.
  - Is the inverter located in a clean, dry, adequately ventilated place?
  - Is the DC switch turned ON?
  - Are the cables adequately sized and short enough?
  - Are the input and output connections and wiring in good condition?
  - Are the configuration settings correct for the particular installation?
  - Are the display panel and the communications cable properly connected and undamaged?

Follow the steps below to view recorded problems:

Press “ESC” to enter the main menu in the normal interface. In the interface screen select “Event List”, then press “OK” to enter events.

⊙ **EventList information**

Table 7-1 Eventlist

EventList NO.	EventList Name	EventList description	solution
ID01	GridOVP	The power grid voltage is too high	• If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. SOFAR inverter automatically returns to normal operating status when the electric grid’s back to normal. • If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable range. If no, contact SOFAR technical support. If yes, check the AC circuit breaker and AC wiring of the SOFAR inverter. • If the grid voltage/frequency is within the acceptable range and AC wiring is correct, while the alarm occurs repeatedly, contact SOFAR technical support to change the grid over-voltage, under-voltage, over-frequency, under-frequency protection points after obtaining approval from the local electrical grid operator.
ID02	GridUVP	The power grid voltage is too low	
ID03	GridOFP	The power grid frequency is too high	
ID04	GridUFP	The power grid frequency is too low	

ID05	PVUVP	The input voltage is too low	Check whether too few PV modules are series connected in a PV string, thus the voltage(Vmp) of the PV string is lower than the minimum operating voltage of SOFAR inverter. If yes, adjust the number of series connected PV modules to increase the voltage of the PV string to fit the input voltage range of SOFAR inverter. SOFAR inverter automatically returns to normal operating status after correct adjustments.
ID06	Vlvrtlow	Low voltage across	Check the AC wiring connection to the electric grid, if it’s correct, please contact SOFAR technical support.
ID09	PvOVP	The input voltage is too high	Check whether too many PV modules are series connected in a PV string, thus the voltage(Voc) of the PV string is higher than the maximum input voltage of SOFAR inverter. If yes, adjust the number of series connected PV modules to decrease the voltage of the PV string to fit the input voltage range of SOFAR inverter. SOFAR inverter automatically returns to normal operating status after correct adjustments.
ID10	IpvUnbalance	Input current is not balanced	Check the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual.
ID11	PvConfigSetWrong	Incorrect input mode	
ID12	GFCIFault	GFCI Fault	• If the fault occurs occasionally, the possible cause is that the external circuits are abnormal occasionally. SOFAR inverter automatically returns to normal operating status after the fault is rectified. • If the fault occurs frequently and lasts a long time, check whether the insulation resistance between the PV array and earth(ground) is too low, then check the insulation conditions of PV cables.
ID14	HwBoostOCP	Ihe input current is too high,and has happen hardware protection	Check whether the input current is higher than the maximum input current of SOFAR inverters, then check the input wiring, if both are correct, please contact SOFAR technical support.
ID15	HwAcOCP	The grid current is too high,and has happen hardware protection	ID15-ID24 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID16	AcRmsOCP	The grid current is too high	
ID17	HwADFaultIGrid	The grid current sampling error	
ID18	HwADFaultDCI	The DCI sampling error	
ID19	HwADFaultVGrid	The grid voltage sampling error	
ID20	GFCIDeviceFault	The GFCI sampling error	
ID21	MChip_Fault	The master chip fault	
ID22	HwAuxPowerFault	The auxiliary voltage error	
ID23	BusVoltZeroFault	The bus voltage sampling error	
ID24	IacRmsUnbalance	The Output current is not balanced	

ID25	BusUVP	The bus voltage Is too low	If the PV array configuration is correct (no ID5 fault), the possible cause is that the solar irradiance is too low. SOFAR inverter automatically returns to normal operating status after the solar irradiance returns to normal level.
ID26	BusOVP	The bus voltage Is too high	ID26-ID27 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID27	VbusUnbalance	The bus voltage is not balanced	
ID28	DciOCP	The Dci is too high	• Check the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual. • If the input mode is correct, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID29	SwOCPInstant	The grid current is too high	Internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID30	SwBOCPInstant	Ihe input current is too high	Check whether the input current is higher than the maximum input current of SOFAR inverters, then check the input wiring, if both are correct, please contact SOFAR technical support.
ID49	ConsistentFault_VGrid	The grid voltage sampling value between the master DSP and slave DSP is not consistent	ID49-ID55 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID50	ConsistentFault_FGrid	The grid frequency sampling value between the master DSP and slave DSP is not consistent	
ID51	ConsistentFault_DCI	The DCI sampling value between the master DSP and slave DSP is not consistent	
ID52	ConsistentFault_GFCI	The GFCI sampling value between the master DSP and slave DSP is not consistent	
ID53	SpiCommLose	The spi communication between the master DSP and slave DSP is fault	
ID54	SciCommLose	The Sci communication between the control board communication board is fault	
ID55	RelayTestFail	The relays fault	
ID56	PvIsoFault	The insulation resistance is too low	Check the insulation resistance between the PV array and earth(ground), if a short circuit occurs, rectify the fault.
ID58	OverTempFault	The inverter temp is too high	• Ensure the installation position and installation method meet the requirements of Section 3.4 of this user manual. • Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature. • Check whether the ID90~ID92 fault (fan fault) exist, if yes, please replace the corresponding fan.
ID59	OverTempFault_Env	The environment temp is too high	
ID60	Grounding abnormal	Grounding abnormal	Check whether the ground is solid

ID65	UnrecoverHwAcOCP	The grid current is too high,and has cause unrecoverable hardware fault	ID65-ID70 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID66	UnrecoverBusOVP	The bus voltage is too high,and has cause unrecoverable fault	
ID67	UnrecoverIacRmsUnbalance	The grid current is unbalance,and has cause unrecoverable fault	
ID68	UnrecoverIpvUnbalance	The input current is unbalance,and has cause unrecoverable fault	
ID69	UnrecoverVbusUnbalance	The bus voltage Is unbalance,and has cause unrecoverable fault	
ID70	UnrecoverOCPInstant	The grid current is too high,and has cause unrecoverable fault	
ID71	UnrecoverPvConfigSetWrong	Incorrect input mode	Check the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual.
ID74	UnrecoverIPVInstant	The input current is too high,and has happen unrecoverable fault	ID74-ID77 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID75	UnrecoverWRITEEEPROM	The EEPROM is unrecoverable	
ID76	UnrecoverREADEEPROM	The EEPROM is unrecoverable	
ID77	UnrecoverRelayFail	Relay has happen permanent fault	
ID81	OverTempDerating	the inverter has derated because of the temperature is too high	• Ensure the installation position and installation method meet the requirements of Section 3.4 of this user manual. • Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature. • Check whether the ID90~ID92 fault (fan fault) exist, if yes, please replace the corresponding fan.
ID82	OverFreqDerating	the inverter has derated because of the grid frequency too hig	SOFAR inverter automatically reduce the output power when the frequency of electrical grid is too high.
ID83	RemoteDerating	The inverter has derated by the Remote control	SOFAR inverter records ID83 in case of remote power derating operation. Check the wiring of remote input and output control signal port on the communication board according to Section 4.4 of this user manual.
ID84	RemoteOff	The inverter has shut down because by the Remote control	SOFAR inverter records ID84 in case of remote shutdown operation. Check the wiring of remote input and output control signal port on the communication board according to Section 4.4 of this user manual.

ID94	Software version is not consistent	The Software between the control board and the communication board is not consistent	Contact SOFAR technical support to upgrade software.
ID95	Communication board EEPROM fault	The Communication board EEPROM is fault	ID95~ID96 are internal faults of SOFAR inverter, turn OFF the "DC switch", wait for 5 minutes, then turn ON the "DC switch". Check whether the fault is rectified. If no, please contact SOFAR technical support.
ID96	RTC clock chip anomaly	RTC clock chip is fault	
ID97	Invalid Country	The Country is InValid	Check the country setting according to Section 4.4 of this user manual.
ID98	SD fault	The SD card is fault	Please replace the SD card.
ID99- ID100	Reserved		Reserved

7.2 Maintenance

Inverters generally do not need any daily or routine maintenance.

- **Inverter cleaning**

  Please use hand blower, soft dry cloth or brush to clean inverters. Water, corrosive chemical substances or intense cleaning agent should not be used for cleaning the cooling fan or inverter. Switch off AC and DC power supply to inverter before undertaking any cleaning activity.

8 Decommissioning

8.1 Decommissioning steps

- Switch off the AC grid
- Switch Off the DC switch
- Wait for 5 minutes
- Release the DC connectors
- Release the AC terminals using screw drivers.

8.2 Package

If possible, please pack the inverter in the original packaging.

8.3 Storage

Store the inverter in a dry place where ambient temperature is between -25 and - +70 °C.

8.4 Disposal

At the end of its life, dispose inverters and packing materials at locations that can handle and or recycle electric equipment safely.

9 Technical data

9.1 Input parameter (DC)

Parameter	Sofar 3.3KTL-X	Sofar 4.4KTL-X	Sofar 5KTL-X	Sofar 5.5KTL-X	Sofar 6.6KTL-X	Sofar 8.8KTL-X	Sofar 11KTL-X	Sofar 12KTL-X
Max. input voltage	1000V							
Start-up input voltage	180V							
Number of independent MPPT	2							
Number of DC inputs	1 for each MPPT							
Operating input volt range	160V-960V							
Max. input MPPT current	11A/11A							
Input short circuit current for each MPPT	14A							
Input range with Full power operation with 2 MPPT parallel	160V-850V	190V-850V	240V-850V	240V-850V	290V-850V	380V-850V	480V-850V	575V-850V

9.2 Output parameter (AC)

Parameter	Sofar 3.3KTL-X	Sofar 4.4KTL-X	Sofar 5KTL-X	Sofar 5.5KTL-X	Sofar 6.6KTL-X	Sofar 8.8KTL-X	Sofar 11KTL-X	Sofar 12KTL-X
Rated power	3000W	4000W	5000W	5000W	6000W	8000W	10000W	12000W
Max. AC power	3300W	4400W	5000W	5500W	6600W	8800W	11000W	13200W
Rated apparent power	3300VA	4400VA	5000VA	5500VA	6600VA	8800VA	11000VA	13200VA
Rated AC voltage	3/N/PE 230V/400V							
Grid voltage range	310-480Vac(adjustable)							
Grid frequency range	44-55Hz/54-66Hz(adjustable,must meet local grid requirements)							
Active power adjustable range	0~100%							
THDI	<3%							
Power factor	1 (adjustable +/-0.8)							
Max. output current	4.8A	6.4A	8.0A	8.0A	9.6A	12.8A	15.9A	19.1A

9.3 Efficiency, Safety and Protection

Parameter	Sofar 3.3KTL-X	Sofar 4.4KTL-X	Sofar 5KTL-X	Sofar 5.5KTL-X	Sofar 6.6KTL-X	Sofar 8.8KTL-X	Sofar 11KTL-X	Sofar 12KTL-X
Max efficiency	98%					98.3%		
Weighted eff. (EU/CEC)	97.5%					98%		
Self-consumption at night	<1W							
Feed in start power	25W							
MPPT efficiency	>99.5%							
Safety protection	Anti islanding, RCMU, Ground fault monitoring							
Certification	CE,CGC,AS4777,AS3100,VDE4105,C10-C11, G59(more available on request)							
Communication	RS485, Wifi(option), GPRS(option)							
Current(inrush)peak and duration	5.5A/28us							
Maximum output fault current a.c.A	23A					42A		
Maximum output overcurrent protection a.c.A	19.5A					39A		

9.4 General Data

Parameter	Sofar 3.3KTL-X	Sofar 4.4KTL-X	Sofar 5KTL-X	Sofar 5.5KTL-X	Sofar 6.6KTL-X	Sofar 8.8KTL-X	Sofar 11KTL-X	Sofar 12KTL-X
Ambient temperature range	-25℃~+60℃							
Allowable relative humidity range	0~100% no condensing							
Topology	Transformerless							
Degree of protection	IP65							
Max. operating altitude	2000m							
Weight	21kg					22kg		
Cooling	Nature							
Dimension	457X452X200mm							
Warranty	5 years							

10 Quality Assurance

Shenzhen SOFARSOLAR Co., Ltd offers 5 years product warranty for Sofar 3.3K～12KTL-X inverters from date of installation. However the warranty period can't exceed 66 months from the date of delivery of the inverter. During the warranty period, Shenzhen SOFARSOLAR Co., Ltd guarantees normal operation of the inverter.

If during the warranty period, the inverter develops fault, please contact your installation contractor or supplier. In case of faults falling within manufacturers' responsibility, Shenzhen SOFARSOLAR Co., Ltd will provide service and maintenance free of any charge.

Disclaimer:

- Use of Sofar 3.3K～12KTL-X inverters for any other purpose than intended;
- Faulty system design or installation;
- Improper operation;
- Use wrong protection settings on the inverter;
- Carry out unauthorized modification on the inverter.
- Damage because of external factors or the majeure force (such as lightning, over-voltage, bad weather, fire, earthquake, tsunami etc);