

Photovoltaic Grid-Connected Inverter

User Manual

COG Series (3000TL-5000TL)

Ver. A00



R33010351 A00

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1. Introduction

1.1 How to use this manual

To use this manual better, please understand the information about its product models, intended audience and conventional symbols first. And please read the manual carefully or contact the dealer before installing or using the machine.

1.2 Model

This manual describes the assembly, installation, commissioning and maintenance of the following inverters:

COG3000TL

COG3600TL

COG4200TL

COG4600TL

COG5000TL

1.3 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.

2. Safety

Please read safety precautions in this manual carefully, if ignored, could result in serious injury or death. Please follow the instructions strictly while installing or using the machine and keep the pamphlet well.

2.1 Safety Instructions

When using the product, please do remember the below information to avoid the fire, lightning or other personal injury:

Ensure that input DC voltage is less than Max. DC voltage.

Over voltage may cause permanent damage to inverter or other losses, which will not be include in warranty!

This chapter contains important safety and operating instructions.







Read and keep this operation Guide for future reference.

Authorized service personnel must disconnect both AC and DC power from the COG series inverter before attempting any maintenance or cleaning or working on any circuits connected to the COG series inverter.

2.2 Glossary Symbol

This section gives a glossary of all the symbols shown on the inverter and the nameplate.

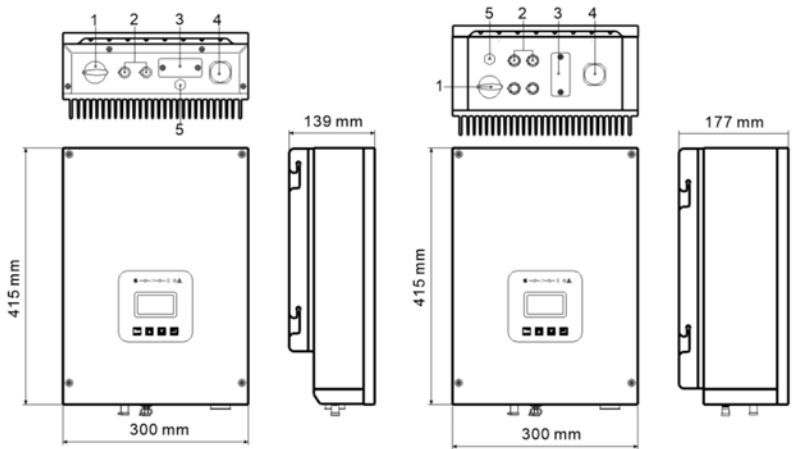
Table 2-1 Symbols on the inverter

Symbol	Meaning
	<p>Danger to life due to high voltage in the inverter</p> <p>There would be residual voltage in the inverter. Before any maintenance, please wait for at least 5 minutes.</p>
	<p>Beware of hot surface</p> <p>The inverter may become hot during operation. Avoid any contact to the surface during operation.</p>
	<p>Danger of high voltage</p> <p>Danger to life due to high voltage in the inverter!</p>
	<p>Requests the user to consult the manual.</p>
	<p>Warning signs</p> <p>Pay attention to the safety of inverter operation.</p>
	<p>Grounding mark</p> <p>The inverter is connected with the ground to achieve the purpose of grounding protection.</p>

3. Product Introduction

3.1 Overview

Figure 3-1 Overview of COG series



COG3000TL Series

COG5000TL Series

1.DC Switch 2.PV Input 3.WIFI/GPRS 4.AC Output 5.Protective Vent

3.2 Electrical Block Diagram

Figure 3-2 COG3000TL series Electrical Block Diagram

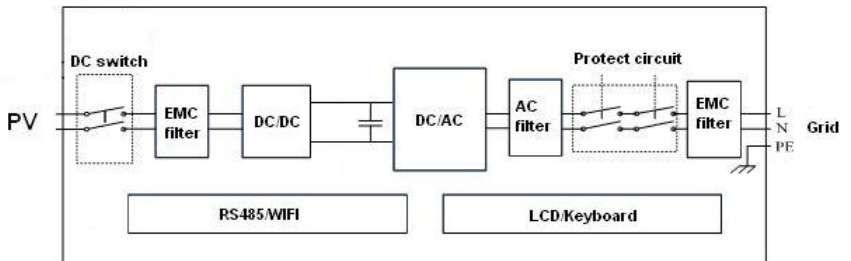
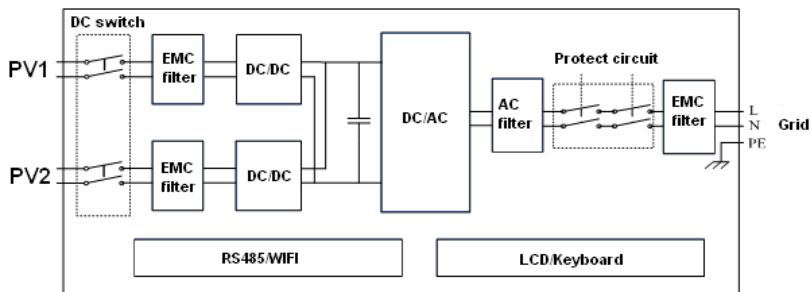






Figure 3-3 COG5000TL series Electrical Block Diagram



3.3 Identifying Nameplates

The nameplate provides a unique identification of the inverter . It contains information of the type model, technical specifications, certificates and approvals. The nameplate is on the side of the enclosure.

Figure 3-4 templates of COG3000TL and COG5000TL

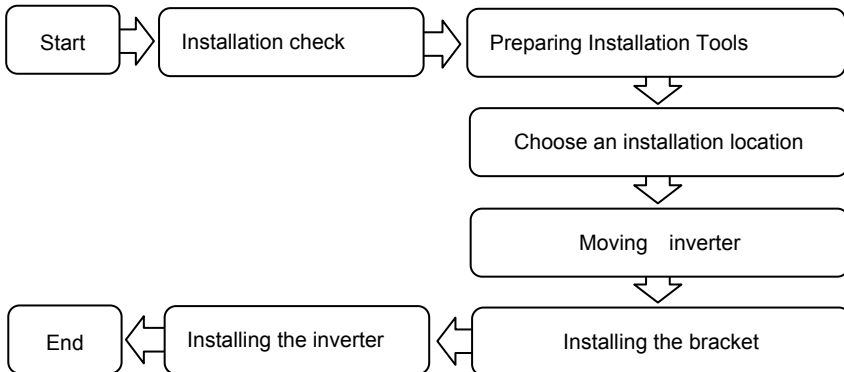
<p>Name: SOLAR INVERTER Model: CO3000TL</p>	<p>Name: SOLAR INVERTER Model: CO5000TL</p>
<p>D.C. Max. Input Voltage :550 Vd.c. D.C. Max. Input Current :12 A D.Cc. MPP Range :70-550Vd.c. A.C. Output Nominal Voltage :220/230/240Va.c. A.C. Nomial Operating Frequency :50/60 Hz A.C. Output Rated Power :3KW A.C. Output Max. Current :14.5A Power Factor :>0.99 Enclosure : IP65 Protection Class: I</p> <p style="text-align: center;">CE</p> <p> S/N:Z070014172100003</p> <p style="text-align: right;"></p>	<p>D.C. Max. Input Voltage :520 Vd.c. D.C. Max. Input Current :12 A D.Cc. MPP Range :70-500Vd.c. A.C. Output Nominal Voltage :220/230/240Va.c. A.C. Nomial Operating Frequency :50/60 Hz A.C. Output Rated Power :5KW A.C. Output Max. Current :24A Power Factor :0.8leading-0.8lagging Enclosure : IP65 Protection Class: I</p> <p style="text-align: center;">CE</p> <p> S/N:Z070014172100004</p> <p style="text-align: right;"></p>

4. Installation

4.1 Installation Process

Installation Process of COG series, as shown in Figure 4-1.

Figure 4-1 Installation Flow chart



4.2 Pre-installation check

Figure 4-2 Deliverables of COG5000TL.

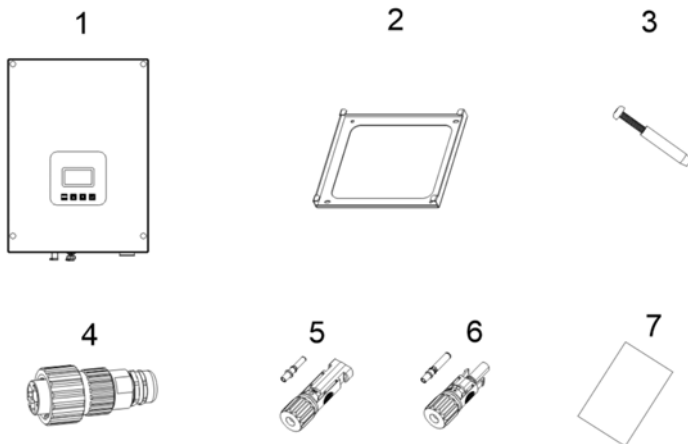


Table 4-1 Deliverables description

Number	Explanation	Quantity (COG3000TL Series)	Quantity (COG5000TL Series)
1	COG series Inverter	1	1
2	Bracket	1	1
3	Expansion bolts and screws	4	4
4	AC output connector	1	1
5	DC input connector of negative	1	2
6	DC input connector of positive	1	2
7	User manual	1	1

4.3 Choose an installation location

The installation method and mounting location must be suitable for the weight and dimensions of the inverter. Select a wall or solid vertical surface which is able to support the PV inverter.

Mount on a solid surface, the mounting location must be accessible at all times.

Vertical installation or tilted backwards by max. 15°.

The connection area must point downwards.

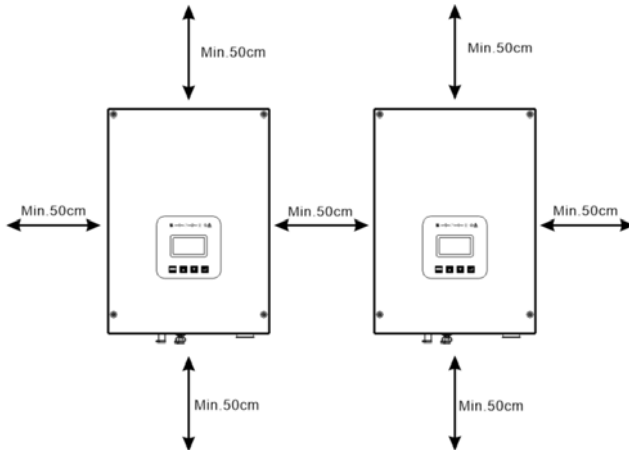
Do not install horizontally.

To ensure good heat dissipation and reserve enough space for installing the COG series, the COG series is at least 400 mm, 600 mm, 600 mm, and 500 mm away from objects on its both sides, top, bottom, and front respectively, as shown in Figure 4-3.

When installing multiple COG series, install them in the same line if sufficient space is available and install them in triangle mode if no sufficient

space is available. The stacked installation mode is not recommended. The clearance between COG series meets requirements shown in Figure 4-3.

Figure 4-3 Minimum installation clearance



NOTICE

When installing multiple COG series Inverters in high temperature areas, please make sure that there is enough space for heat dissipation.

4.4 Installing the COG series



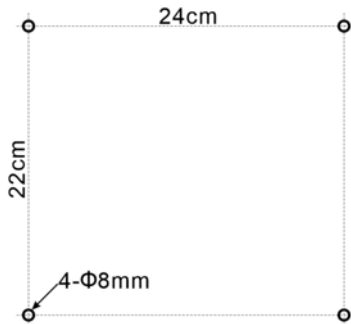
NOTE

If the installation location is near the ground, connect the PGND cable to the ground before installing the COG series on the wall. For details, refer to Figure 5.2 Connecting PGND Cables.

Step 1 Install the bracket

1. Determine the position for drilling holes, level hole positions, and then mark the hole positions by using a marker, as shown in Figure 4-4.

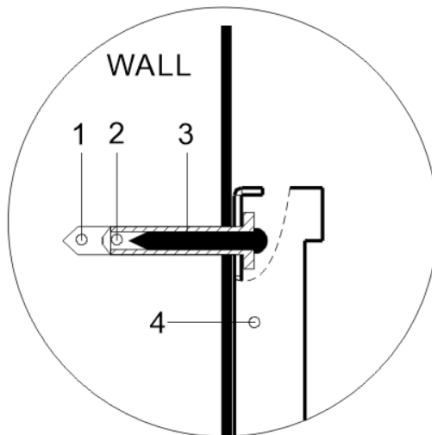
Figure 4-4 Hole positions and dimensions (Unit :mm)



2. Drill holes by using a hammer drill and install expansion bolts.

3. Align the bracket with hole positions, insert expansion bolts into the holes, and use a torque wrench to tighten the expansion bolts, as shown in Figure 4-5.

Figure 4-5 Securing a bracket



1.The hole in the wall 2.Plastic screw socket 3.Tapping screw 4.Bracket

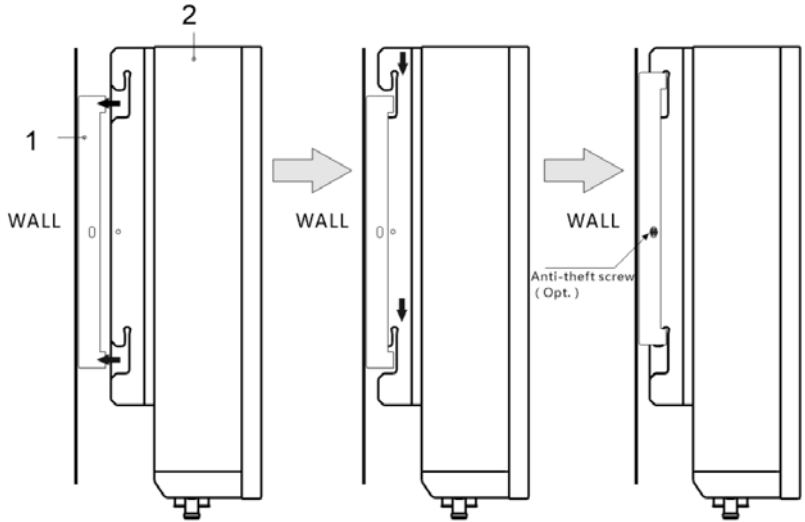
Step 2 Install the COG series.

1. Use one hand to hold the handle at the bottom of the COG series and use the other hand to hold the handle close to the top of the COG series and

then stand the COG series. Two people are required to install the COG series.

2. Mount the COG series on the bracket and keep them aligned with each other, as shown in Figure 4-6.

Figure 4-6 Mounting the COG series on the bracket

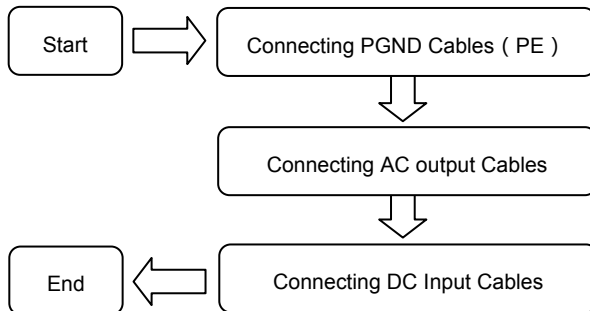


5. Electrical connection

5.1 Electrical connection process

Electrical connection process of COG series as shown in Figure 5-1.

Figure 5-1 Electrical connection flowchart



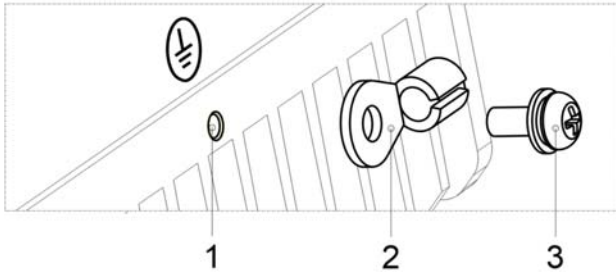
5.2 Connecting PGND Cables (PE)

Good grounding for the COG series can help resist the impact of the surge voltage and improve the EMI performance. First connect the PGND cable before connecting the AC power cable, DC power cable, and communication cable.

For the system with one COG series, connect the PGND cable to the ground. For the system with multiple COG series, connect the PGND cables of all COG series to a ground bar .

If the installation location is near the ground, first connect the PGND cable to the ground before installing the COG series on the wall.

Figure 5-2 Schematic diagram of machine grounding line



1. M4 screw thread (on the heat sink)

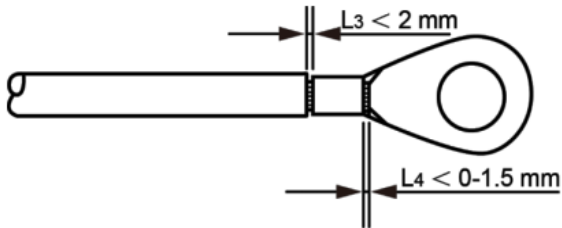
2. Terminal

3. M4 stainless steel screw

Step 1 Remove the insulation layer with an appropriate length using a wire stripper. Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool, as shown in Figure 5-3.

Recommended OT terminals: OT M6.

Figure 5-3 Preparing a ground cable (2)



Step 2 Install the crimped OT terminal, flat washer, and spring washer on the M6 welded stud, and tighten the nut with a socket wrench.

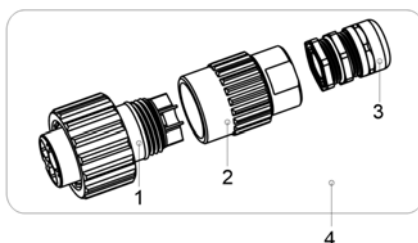
To enhance the anti-corrosion performance of the ground terminals, apply silica gel on them after connecting the ground cable.

5.3 Connecting AC Output Power Cables

Table 5-1 Recommended AC output cable specifications

Inverter Model	Conductor cross-section (mm ²)		Cable diameter (mm)	
	Range	Recommended values	Range	Recommended values
COG3000TL	4.0-8.37 (11AWG-8AWG)	4.0 (11AWG)	11-20	15
COG3600TL	6.0-8.37 (10AWG-8AWG)	6.0 (10AWG)		
COG4200TL				
COG4600TL				
COG5000TL				

Figure 5-4 AC connector diagram



1.adapter 2.Sleeve 3. Cable Gland 4. AC output connector

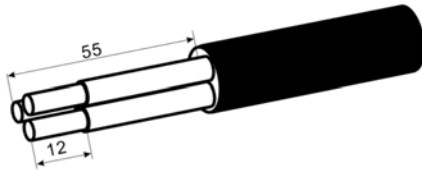
Step 1 Remove the cable gland and the adapter from the AC output connector.

Step 2 Remove the insulation layer of the AC output cable of an appropriate length using a wire stripper.

1. Strip the outer jacket of AC output cable by 55 mm.
2. Cut the core wires of the cables excluding the PGND cable by 2.5 mm. That is, the core wire of the PGND cable should be 2.5 mm longer than that of other four cables.

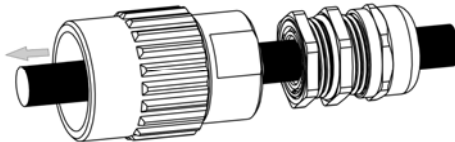
3. Strip the insulation layer of each core wires by 12 mm.

Figure 5-5 Connecting an AC output power cable (1) (unit: mm)



Step 3 Insert AC output cable (L, N, PE) into the cable gland and the adapter, as shown in Figure 5-6.

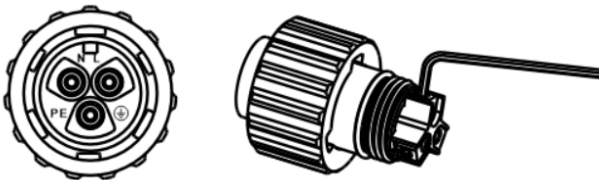
Figure 5-6 Connecting an AC output power cable (2)



Step 4 Loosen the screws inside the coupling nut holes using a screwdriver, insert the core wires into corresponding holes, and tighten the screws, as shown in Figure 5-6.

Tighten the screws to a torque of 0.7 N.m.

Figure 5-7 Connecting an AC output power cable (3)



Connect L to the hole L.

Connect N to the hole N.

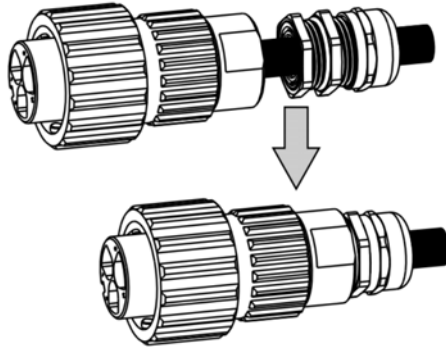
Connect PE to the hole PE .

Step 5 Check that all core wires are properly connected.

Step 6 Secure the adapter to the coupling nut. Tighten the adapter to a torque of 1~2 N.m.

Step 7 Secure the cable gland to the adapter, as shown in Figure 5-8. Tighten the cable gland to a torque of 5 N.m (You need to use some tool to achieve this torque).

Figure 5-8 Connecting an AC output power cable (4)



Step 8 Connect the AC output connector to the bayonet coupling of the AC output wiring terminal on the COG series and rotate it clockwise until you hear a "click" sound.

Because no sufficient space is available on the right of the AC terminal, tighten the terminal using the left hand.

5.4 Connecting DC Input Power Cables



DANGER

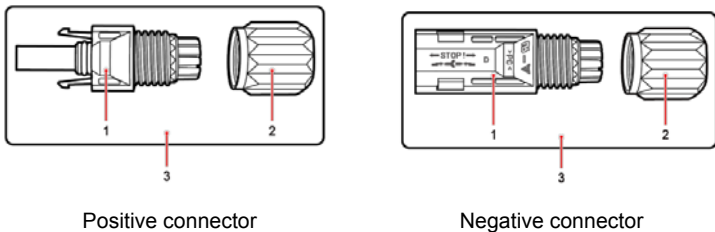
Before connecting the DC input cable, please make sure that the Inverter "DC SWITCH" in the "OFF" status, otherwise, the high voltage can bring about life threatening.

Table 5-2 Recommended DC input cable specifications

Conductor cross-section (mm ²)		Cable diameter range (mm)
Range	Recommended Value	
4.0~6.0	4.0	4.5~7.8

DC input connector include positive connector and negative connector, as shown in figure 5-9.

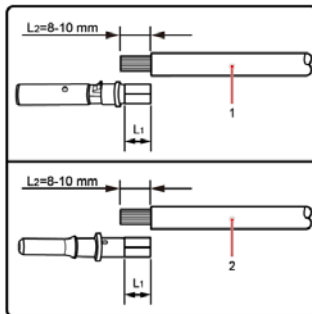
Figure 5-9 Positive connector and negative connector



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 5-10.

Figure 5-10 Connecting DC input power cables (1)

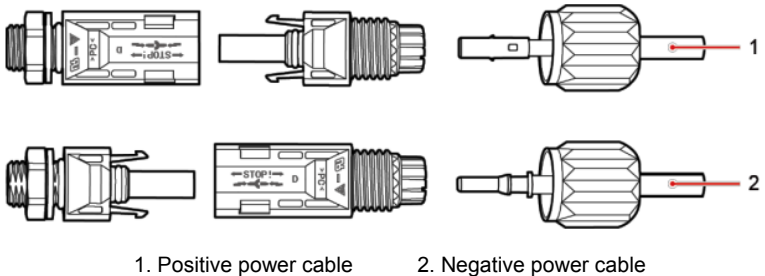


1. Positive power cable 2. Negative power cable

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 are crimped until they cannot be pulled out by force less than 400 N, as shown in Figure 5-11.

Figure 5-11 Connecting DC input power cables (2)

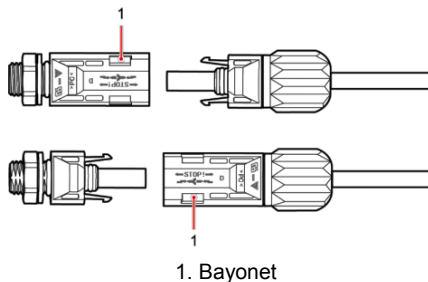


Step 5 Insert crimped power cables into corresponding housings until you hear a "click" sound. The power cables snap into place.

Step 6 Reinstall cable glands on positive and negative connectors and rotate them against the insulation covers. Before performing step 7, the DC switch should be OFF.

Step 7 Insert the positive and negative connectors into corresponding DC input terminals of the COG series until you hear a "click" sound, as shown in Figure 5-12.

Figure 5-12 Connecting DC input power cables (3)





NOTICE

Before removing the positive connector and negative connector, please make sure that the “DC SWITCH” in the “OFF” status.

5.5 Disconnect the electrical connections

- Step 1** Disconnect the circuit breaker between the inverter and the grid.
- Step 2** Ensure that the DC SWITCH is OFF.
- Step 3** Disconnect the RS485 communication cable.
- Step 4** Disconnect the DC input cable.
- Step 5** Disconnect the AC input cable.
- Step 6** Disconnect the ground cable.

6. system operation

6.1 Working mode

COG series has three working mode: standby mode, operating mode, off mode.

6.2 Powering on the COG series

After ensure that electrical connections have been completed correctly, run the operation of power-on, then turn on the inverter.

Step 1 Check that the COG series is installed on the wall correctly and securely. For details, see 4.6 Installing the COG series.

Step 2 Check that all AC output power cables are properly connected. For details, see 5.3 Connecting AC Output Power Cables.

Step 3 Check that all DC input power cables are properly connected. For details, see 5.4 Connecting DC Input Power Cables

Step 4 Ensure that unused DC input terminals are sealed.

Step 5 Switch on the AC circuit breaker between the COG series and the power grid.

Step 6 Ensure that the DC SWITCH at the bottom of the COG series is ON.



NOTICE

The monitoring panel can be activated only after power is supplied to the DC side.

7. Setting Initialization Parameters

7.1 Settings

The monitor panel of COG series includes one LCD ,three LED lights and four keys, as shown in figure 7-1.

Figure 7-1 LCD Panel

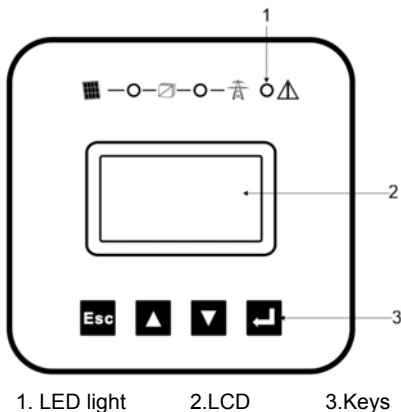


Table 7-1: PV connect indicator LED (Green)

Off	The DC/DC Circuit is off.
Blinking	The DC/DC Circuit is starting
On	The DC/DC Circuit is working normally.

Table 7-2: Grid connection indicator LED (Green)

Off	The DC/AC Circuit is off.
Blinking	The DC/AC Circuit is starting
On	The DC/AC Circuit is working normally.

Table 7-3: Fault LED (Red)

Off	No Error occurs
On	The inverter is in fault status





Normally, after starting up, DC/DC LED and DC/AC LED will be lighted indicating that the Inverter is feeding power to the grid.

Keys

There are four keys on the inverter, which you can use to set parameters of the inverter. Key functions are described in Table 7-4.



Table 7-4 Key functions

Key	Status	Description
	Return	Return/End
	Up	Up/Set parameter
	Down	Down/Set parameter
	Enter	Enter/Enter set parameter

NOTE

Use the "**Up**"+"**Down**"+"**Enter**" key combination to active parameter setting function before trying alter the parameter.

The LCD display's backlight will turn off automatically after 30 seconds. When the LCD is dark, one tap will make it become bright again.

Method of parameter setting:

- 1.Switch to the page you need to change settings.
- 2.Press the **UP** button and the interface will switch to the previous page.
- 3.Hold up the **UP** button to the same time, and then press the **DOWN** button, the interface will return to the current page.

4. While holding down the 2 button cases, and then press the **Enter** button. The parameter can be set up now.

7.2 LCD Display

A summary diagram of the display function is shown as the figure below, the LCD will show next page by tap Up and Down key.

Figure 7-2 Diagram of display function

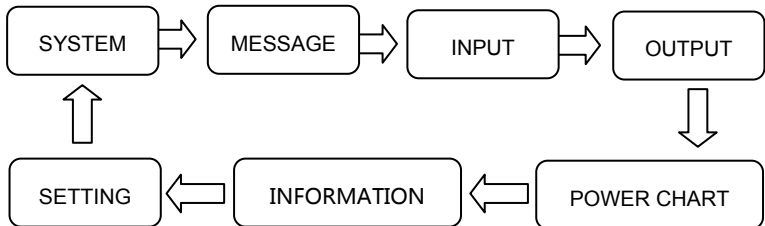


Figure 7-3 System Page

Power:	5000W
E-Today:	8.835Kwh
E-Total:	55.99Kwh
Status:	On Grid

Power: the present power fed into the grid;

E-Today: Energy exported to the grid during the present day, and updated once every hour;

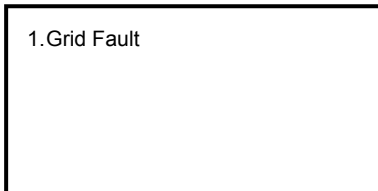
E-Total: Sum of the total energy exported to the grid, and updated once every day.

To ensure a safe operation of the inverter under any temperature and electrical condition, the unit will automatically derate the power to be supplied to the grid.

Status: the LCD displays operation condition: Waiting Mode, Self-Testing Mode, On-grid Mode, and Fault Mode.

“MESSAGE” page. If the fault is removed, the flag will disappear automatically.

Figure 7-4 Message Page



The LCD displays inverter’s warning or fault information. Fault Information is listed as the following table:

Table 7-5

Fault code	Display	Description	Solution
0	Reserved	/	/
1	Reserved	/	/
2	Leakage Fault	The internal hardware that measures ground fault has measured substantially high ground currents.	Check whether the PV cable or solar panels are worn.
3	Grid Fault	Grid Voltage or Frequency out of range	Check whether the grid voltage and frequency meet the standard. You can adjust the settings to change the standard.
4	Boost Fault	Boost circuit fail	Please contact our after-sales service team.
5	PV Over Voltage	PV panel Voltage too high	Check whether the PV voltage is more than 550V.

6	Relay Fault	The AC relay fail	Please contact our after-sales service team.
7	DCINJ High	Output Current DC Offset too high	Please contact our after-sales service team.
8	RCD Fault	The RCD measurement mechanism has failed during the wake-up test phase.	Check whether the PV cable or solar panels are worn.
9	Ov Temp	Over temperature	Please contact our after-sales service team.
10	DC Bus High	DC Bus Voltage Fault	Check whether the PV voltage is more than 550V.
11	Phase Lock Failed	Phase Lock Fail	Please contact our after-sales service team.
12	Reserved	/	/
13	Aux Power Fault	+12V Power fault	Please contact our after-sales service team.
14	ISO Fault	Isolation Fault	Check whether the PV cable or solar panels are worn.
15	Inv Fault	Inverter circuit fail	Please contact our after-sales service team.
16	Boost Over Current	Boost current is too high	Please contact our after-sales service team.
17	Inv Over Current	Inverter current is too high	Please contact our after-sales service team.

Figure 7-5 Input Page

Grid-V:	220V
Grid-F:	50 Hz
Grid-I :	10A
Temp :	25 °C

Figure 7-6 Output Page

PV1-V :	300V
PV1-I :	5A
PV2-V :	300V
PV2-I :	5A

PV1-V : Voltage for battery array 1;
 PV1-I : Current from battery array 1;
 PV2-V : Voltage for battery array 2;
 PV2-I : Current from battery array 2;

Grid-V: Grid Voltage;
 Grid-F: Grid frequency;
 Grid-I : Current exported to the grid;
 Temp : Temperature of radiator;

Figure 7-7 Power Chart Page

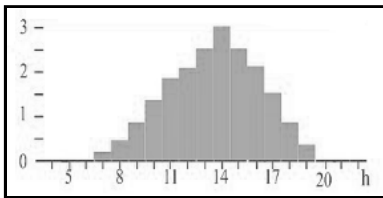


Figure 7-8 Information Page

SN	:	5K015010001
SwVer	:	V190V200
WIFI	:	1 1
IP	:	192.168.1.103

SN: provides the production No. of the inverter;
 SwVer : provides the production Firmware version of the inverter;
 WIFI: "1 1" means the WIFI function is OK.
 IP: IP address of WIFI module.

Figure 7-9 Setting Page

Country :	Customer-11
Work Mode :	PV1&2 I

Address :	01
PwrLim :	100% PF : 1.0
语言 / Language:	英语/English/ Español

Country: The Grid Standard of the Inverter can work.(If you want to change the country , please see the note in 7-1 .)

Work Mode: work mode of the inverter . “I” means PV1 and PV2 are independent.

Address: RS485 communication address of the inverter.

Language: Language of the display.

PwrLim: Power limit of the inverter.

Table 7-6

Setting	Country
CHN-11	China
GER-11	Germany DIN VDE V 0126-1-1:2006
GER-21	Germany VDE-AR-N 4105: 2011-08
GBR-12	The UK G83 Issue 2 August 2012
GBR-22	The UK G59 Issue 2 August 2010
DEN-11	Denmark
AUS-11	Australia
BRA-11	Brazil
Customer-11	User special customization
Customer-21	User special customization
Customer-31	User special customization
Customer-41	User special customization
Customer-51	User special customization
Customer-61	User special customization

8. Decommissioning

8.1 Dismantling

1. Disconnect the inverter from DC input and AC output.
2. Wait for 5 minutes.
3. Unlock the anti-theft lock at the bottom of the inverter (optional).
4. Remove all connection cables from the inverter.
5. Remove the inverter from the bracket.
6. Remove the bracket.

8.2 Packaging

If possible, it's better to pack the inverter with the original packing.

If original packing is not available, please use similar packing which meets below requirements

- Load ability should be over 20kg.
- With handle.
- Able to fully closed.

8.3 Disposal

Please put the wasted inverters & packing materials to a place which is convenient for relevant department to dispose and recycle.

9. Specifications

PV Input Data

Model Name	COG3000TL	COG3600TL	COG4200TL	COG4600TL	COG5000TL
Max. DC Power	3300W	3960W	4620W	5060W	5500W
Max. DC power each MPP tracker	3300W				
Max. single short-circuit current	15A	15A			
Max. DC Voltage	550V	520			
Max. Input Current of MPP Tracker	12A	12Ax2			
Number of MPP Trackers / Strings per MPP Tracker	1/1	2/1			
Full Load MPPT Voltage Range	270V-500V	175-500	210-500	230-500	250-500
Nominal DC Voltage	360V				
Shutdown Voltage / Start Voltage	75V/100V				
Over voltage category	II				

AC Output Data

Model Name	COG3000TL	COG3600TL	COG4200TL	COG4600TL	COG5000TL
Max.AC Input Power	3000W	3600W	4200W	4600W	5000W
Max.AC Output Current	14.5A	18A	21A	22A	24A
Nominal AC Voltage / AC Voltage Range	220/176-276V				
AC Grid Frequency	50 Hz				
Power Factor (cosφ)	>0.99	0.8Lead-0.8Lag			
THD(at nominal power)	<5%				

Efficiency Safety and Protection

Model Name	COG3000TL	COG3600TL	COG4200TL	COG4600TL	COG5000TL
Max. Efficiency	96.9%	97.9%			
Euro-Efficiency	96.3%	97.3%			
MPPT Efficiency	99.9%				
Over voltage / Under-Voltage Protection	YES				
DC Isolation Impedance Monitoring	YES				
Grid Monitoring	YES				
Ground Fault Current Monitoring	YES				

General Data

Model	COG3000TL	COG3600TL	COG4200TL	COG4600TL	COG5000TL
Dimension(W/H/D) [mm]	300*415*138	415*300*180			
Weight [kg]	9.5Kg	14Kg			
Cooling Concept	Convection				
Operating Temperature Range [°C]	-20°C~+60°C/ derating at 45°C				
Relative humidity range	0%~90% (condensing)				
Pollution Degree	External (III) Internal(II)				
Protective class	Class I				
Degree of Protection	IP65				
LCD display	YES				
Communication Interfaces	WIFI (optional) /GPRS(optional)				
Standard Warranty	5Years/10Years/20Years				Free/opt./opt.

10.Warranty

Warranty Treaty

- Equipment failure occurred in warranty period, we will repair or replace it free of charge.
- The defective products should be returned to us.

Liability waiver

- Transport damage.
- Improper installation and operation.
- Damage caused by abnormal natural environment.
- Change the product or modify the soft code unauthorized.
- Ignored the safety warnings and the relevant safety regulations.