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CSI SERIES GRID-TIED PV Inverter
CSI-7KTL1P-GI-FL & CSI-8KTL1P-GI-FL
CSI-9KTL1P-GI-FL & CSI-10KTL1P-GI-FL
INSTALLATION AND OPERATION MANUAL
VERSION 1.2



For professional use only

- Professional installer must read these guidelines carefully and strictly follow these instructions. Failure to follow these instructions may result in death, injury or property damage. The installation and handling of Inverters requires professional skills and should only be performed by qualified professionals. The installers must inform end-users (consumers) the aforesaid information accordingly.
- Product specifications are subject to change without notice. Every attempt has been made to make this document complete, accurate and up-to-date. Individuals reviewing this document and installers or service personnel are cautioned, however, that Canadian Solar reserves the right to make changes without notice and shall not be responsible for any damages, including indirect, incidental or consequential damages caused by reliance on the material presented including, but not limited to, omissions, typographical errors, arithmetical errors or listing errors in the material provided in this document.
- Canadian Solar accepts no liability for customers' failure to comply with the instructions for correct installation and will not be held responsible for upstream or downstream systems Canadian's equipment has supplied.
- The customer is fully liable for any modifications made to the system; therefore, any hardware or software modification, manipulation, or alteration not expressly agreed with the manufacturer shall result in the immediate cancellation of the warranty.
- Given the countless possible system configurations and installation environments, it is essential to verify adherence to the following:
 - There is sufficient space suitable for housing the equipment.
 - Airborne noise produced depending on the environment.
 - Potential flammability hazards.
- Canadian Solar will not be held liable for defects or malfunctions arising from:
 - Improper use of the equipment.
 - Deterioration resulting from transportation or particular environmental conditions.
 - Performing maintenance incorrectly or not at all.
 - Tampering or unsafe repairs.
 - Use or installation by unqualified persons.
- This product contains lethal voltages and should be installed by qualified electrical or service personnel having experience with lethal voltages.

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1. Introduction

1.1 Product Description

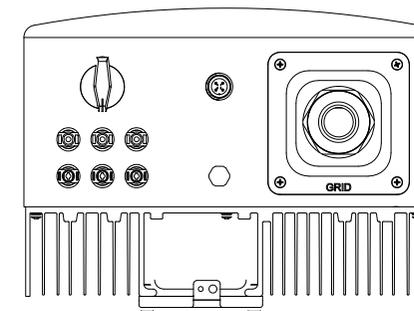
Canadian Solar single phase inverters integrate DRM and backflow power control function, that could suitable for smart grid requirement.

Single phase series inverter contain 4 models which are listed below:

CSI-7KTL1P-GI-FL, CSI-8KTL1P-GI-FL, CSI-9KTL1P-GI-FL, CSI-10KTL1P-GI-FL



▲ Figure 1.1 Front side view



▲ Figure 1.2 Bottom side view

1. Introduction

2. Safety Instructions

1.2 Packaging

When you receive the inverter, ensure that all the parts listed below are included:



Part #	Description	Number
1	PV grid tie inverter	1
2	Wall/pole bracket	1
3	Locking screws	1
4	DC connector	3 pairs
5	Manual	1

▲ Table 1.1 Parts list

Improper use may result in potential electric shock hazards or burns. This manual contains important instructions that should be followed during installation and maintenance. Please read these instructions carefully before use and keep them for future reference.

2.1 Safety Symbols

Safety symbols used in this manual, which highlight potential safety risks and important safety information, are listed as follows:



WARNING:

WARNING symbol indicates important safety instructions, which if not correctly followed, could result in serious injury or death.



NOTE:

NOTE symbol indicates important safety instructions, which if not correctly followed, could result in some damage or the destruction of the inverter.



CAUTION:

CAUTION, RISK OF ELECTRIC SHOCK symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.



CAUTION:

CAUTION, HOT SURFACE symbol indicates safety instructions, which if not correctly followed, could result in burns.

2.2 General Safety Instructions



WARNING:

Please don't connect PV array positive(+) or negative(-) to ground, it could cause serious damage to the inverter.



WARNING:

Electrical installations must be done in accordance with the local and national electrical safety standards.

2. Safety Instructions

3. Overview



WARNING:

To reduce the risk of fire, over-current protective devices (OCPD) are required for circuits connected to the Inverter. The DC OCPD shall be installed per local requirements. All photovoltaic source and output circuit conductors shall have disconnects that comply with the NEC Article 690, Part II. All Canadian Solar single phase inverters feature an integrated DC switch.



CAUTION:

Risk of electric shock. Do not remove cover. There is no user serviceable parts inside. Refer servicing to qualified and accredited service technicians.



CAUTION:

The PV array (Solar panels) supplies a DC voltage when they are exposed to sunlight.



CAUTION:

Risk of electric shock from energy stored in capacitors of the Inverter. Do not remove cover for 5 minutes after disconnecting all power sources (service technician only). Warranty may be voided if the cover is removed without authorization.



CAUTION:

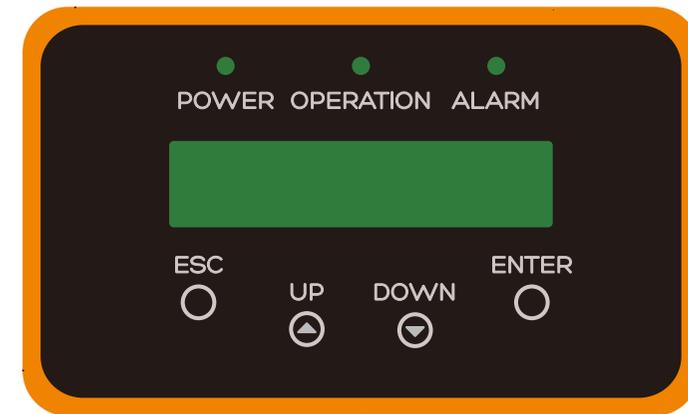
The surface temperature of the inverter can reach up to 75°C (167 F). To avoid risk of burns, do not touch the surface of the inverter while it's operating. Inverter must be installed out of the reach of children.

2.3 Notice For Use

The inverter has been constructed according to the applicable safety and technical guidelines. Use the inverter in installations that meet the following specifications ONLY:

1. Permanent installation is required.
2. The electrical installation must meet all the applicable regulations and standards.
3. The inverter must be installed according to the instructions stated in this manual.
4. The inverter must be installed according to the correct technical specifications.
5. To startup the inverter, the Grid Supply Main Switch (AC) must be switched on, before the solar panel's DC isolator shall be switched on. To stop the inverter, the Grid Supply Main Switch (AC) must be switched off before the solar panel's DC isolator shall be switched off.

3.1 Front Panel Display



▲ Figure 3.1 Front Panel Display

3.2 LED Status Indicator Lights

There are three LED status indicator lights in the front panel of the inverter. Left LED: POWER LED (red) indicates the power status of the inverter. Middle LED: OPERATION LED (green) indicates the operation status. Right LED: ALARM LED (yellow) indicates the alarm status. Please see Table 3.1 for details

Light	Status	Description
● POWER	ON	The inverter can detect DC power
	OFF	No DC power or low DC power
● OPERATION	ON	The inverter is operating properly.
	OFF	The inverter has stopped to supply power.
	FLASHING	The inverter is initializing.
● ALARM	ON	Alarm or fault condition is detected.
	OFF	The inverter is operating properly.

▲ Table 3.1 Status Indicator Lights

3. Overview

3.3 Keypad

There are four keys in the front panel of the Inverter(from left to right): ESC, UP, DOWN and ENTER keys. The keypad is used for:

- Scrolling through the displayed options (the UP and DOWN keys);
- Access to modify the adjustable settings (the ESC and ENTER keys).

3.4 LCD

The two-line Liquid Crystal Display (LCD) is located on the front panel of the Inverter, which shows the following information:

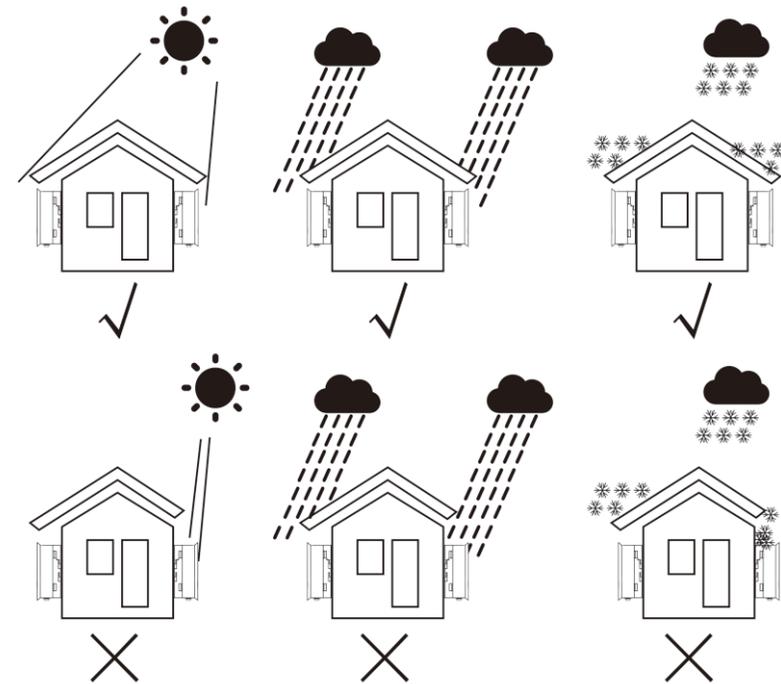
- Inverter operation status and data;
- Service messages for operator;
- Alarm messages and fault indications.

4. Installation

4.1 Select a Location for the Inverter

To select a location for the inverter, the following criteria should be considered:

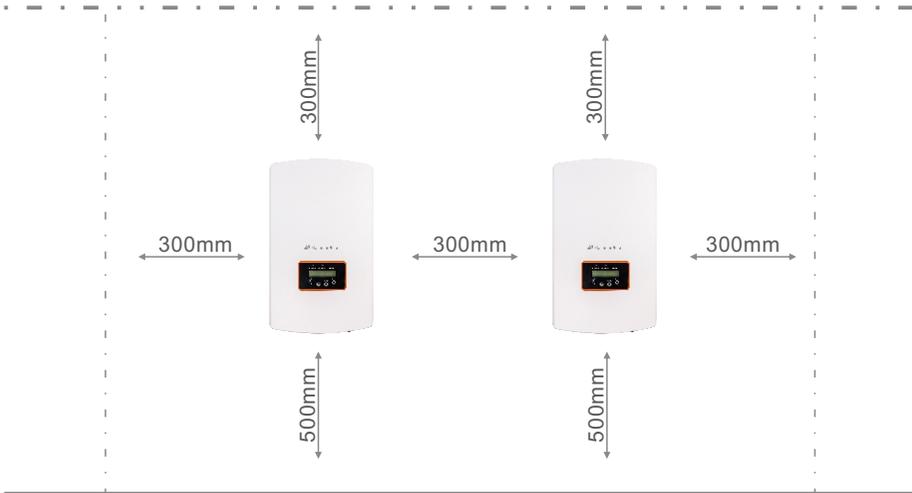
- Do not install in small closed spaces where air can not circulate freely. To avoid overheating, always make sure the flow of air around the inverter is not blocked.
- Exposure to direct sunlight will increase the operational temperature of the inverter and may cause output power limiting. Canadian Solar recommends inverter installed to avoid direct sunlight or raining.
- To avoid over heating ambient air temperature **MUST** be considered when choosing the inverter installation location. Canadian Solar recommends using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 104°F/40°C.



▲ Figure 4.1 Recommended Installation locations

4. Installation

- Install on a wall or strong structure capable of bearing the weight.
- Install vertically with a maximum incline of $\pm 5^\circ$. If the mounted inverter is tilted to an angle greater than the maximum noted, heat dissipation can be inhibited, and may result in less than expected output power.
- When 1 or more inverters are installed in one location, a minimum 12inches clearance should be kept between each inverter or other object. The bottom of the inverter should be 20inches clearance to the ground.



▲ Figure 4.2 Inverter Mounting clearance

- Visibility of the LED status indicator lights and the LCD located at the front panel of the inverter should be considered.
- Adequate ventilation must be provided if the inverter is to be installed in a confined space.



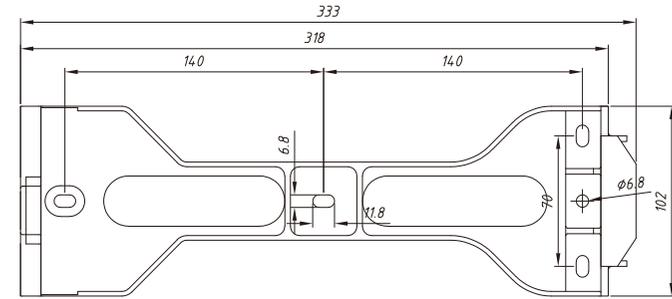
NOTE:

Nothing should be stored on or placed against the inverter.

4. Installation

4.2 Mounting the Inverter

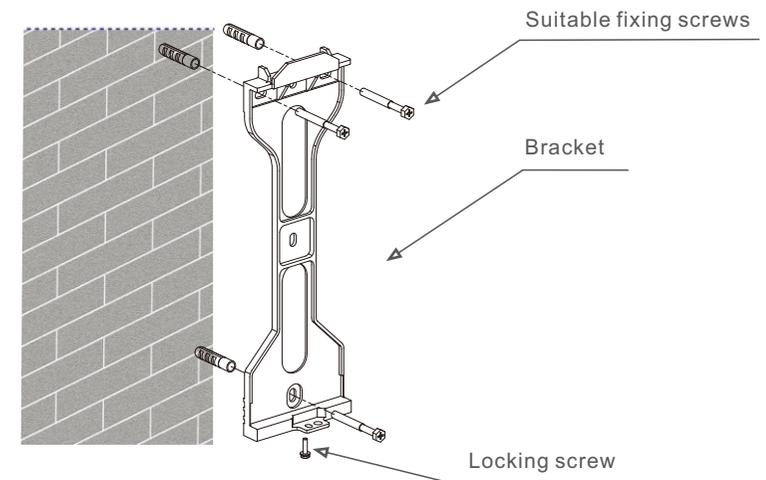
Dimensions of mounting bracket:



▲ Figure 4.3 Inverter wall mounting

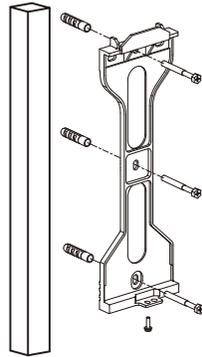
Please see Figure 4.4 and Figure 4.5 for instruction on mounting the inverter to a wall or pillar. The inverter shall be mounted vertically. The steps to mount the inverter are listed below:

1. According to the figure 4.2, select the mounting height of the bracket and mark the mounting holes. For brick walls, the position of the holes should be suitable for the expansion bolts.



▲ Figure 4.4 Inverter wall mounting

4. Installation



▲ Figure 4.5 Inverter pillar mounting

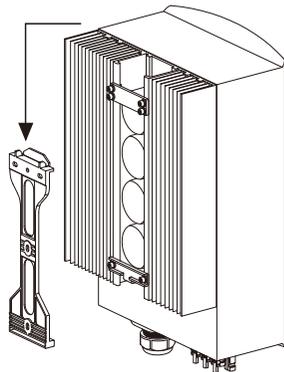
2. Make sure the bracket is horizontal and the mounting holes (in Figure 4.4 and Figure 4.5) are marked correctly. Drill the holes into the wall or pillar at your marks.
3. Use the suitable screws to fix the bracket to the wall.



WARNING:

The inverter must be mounted vertically.

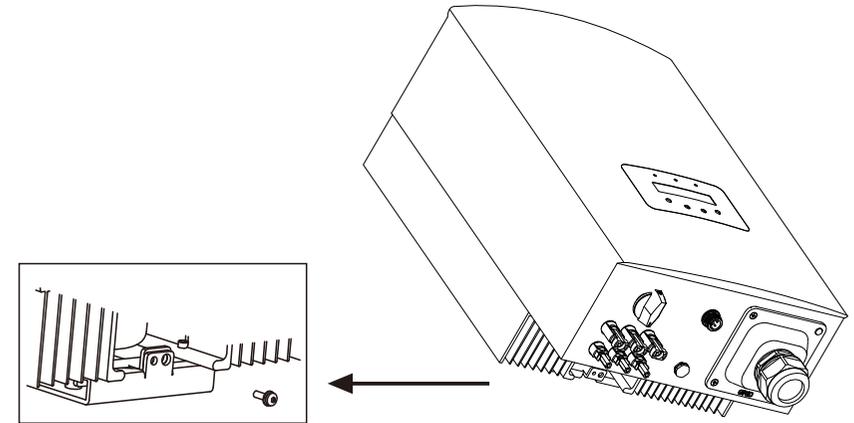
4. Lift up the inverter (be careful to avoid body strain), and align the back bracket on the inverter with the convex section of the mounting bracket. Hang the inverter on the mounting bracket and make sure the inverter is secure (see Figure 4.6)



▲ Figure 4.6 Wall Mount Bracket

4. Installation

5. Use screws to fix the bottom of the inverter to the mount bracket.



▲ Figure 4.7 Fix the inverter

There are two holes at the bottom of bracket, one to fix the inverter, another for the lock. **The diameter of the lock should be less than 0.27in (7mm).**

4.3 Electrical Connections

4.3.1 Connect PV side of inverter

The electrical connection of the inverter must follow the steps listed below:

1. Switch the Grid Supply Main Switch (AC) OFF.
2. Switch the DC Isolator OFF.
3. Assemble PV input connector to the Inverter.



Before connecting inverter, please make sure the PV array open circuit voltage is within the limit of the inverter

4. Installation

4. Installation

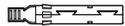
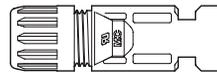
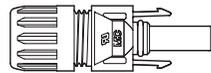
Maximum 600Voc for
 CSI-7KTL1P-GI-FL CSI-8KTL1P-GI-FL
 CSI-9KTL1P-GI-FL CSI-10KTL1P-GI-FL



Please don't connect PV array positive or negative pole to the ground, it could cause serious damages to the inverter



Before connection, please make sure the polarity of the output voltage of PV array matches the "DC+" and "DC-" symbols.



▲ Figure 4.8 DC+ Connector

▲ Figure 4.9 DC- Connector



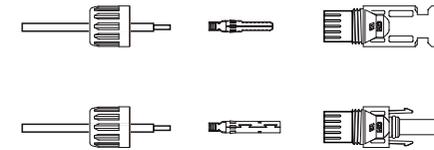
Please use approved DC cable for PV system.

Cable type	Cross section	
	Range	Recommended value
Industry generic PV cable (model:PV1-F)	4.0~6.0 (12~10AWG)	4.0 (12AWG)

▲ Table 4.1 DC cable

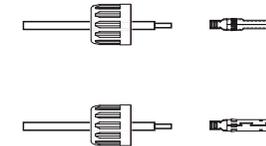
The steps to assemble the DC connectors are listed as follows:

i) Strip off the DC wire for about 7mm, Disassemble the connector cap nut.



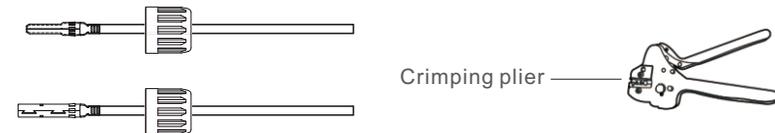
▲ Figure 4.10 Disassemble the Connector Cap nut

ii) Insert the wire into the connector cap nut and contact pin.



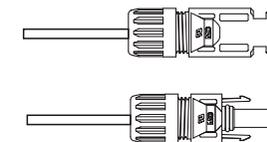
▲ Figure 4.11 Insert the Wire into the Connector Cap nut and contact pin

iii) Crimp the contact pin to the wire using a proper wire crimper.



▲ Figure 4.12 Crimp the contact pin to the wire

iv) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector.

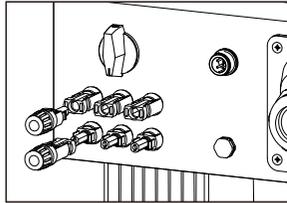


▲ Figure 4.13 Connector with Cap nut Screwed on

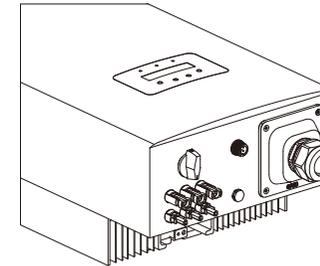
4. Installation

4. Installation

v) Then connect the DC connectors to the inverter. Small click will confirm connection.



▲ Figure 4.14 Connect the DC Connectors to the Inverter



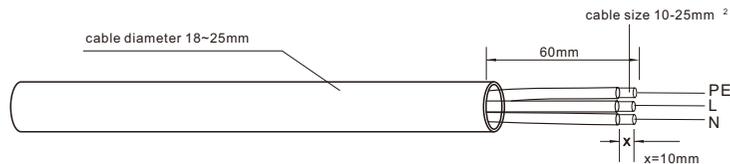
▲ Figure 4.16 Disassemble AC terminal cover

4.3.2 Connect grid side of inverter

For all AC connections, 10- 25mm² 105 °C cable is required to be used. Please make sure the resistance of cable is lower than 1.5ohm. If the wire is longer than 20m, it's recommended to use 16-25mm² cable.

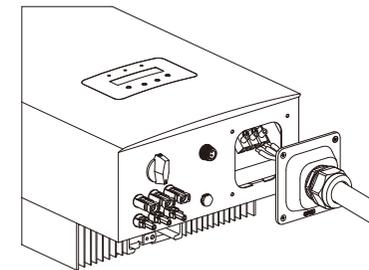
The steps to assemble the AC grid terminals are listed as follows:

A) Strip the end of AC cable outer insulating jacket about 60mm then strip the end of each wire about 10mm. (as shown in figure 4.15)



▲ Figure 4.15 Stripped AC Wires

C) Insert the 3 cables into AC terminal and use the slotted screwdriver to tight the screws. The torque is 2-2.5Nm. (as shown in figure 4.17)



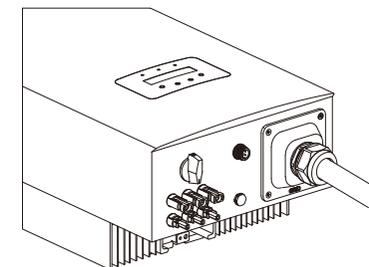
▲ Figure 4.17 Connect cable to AC terminal



WARNING:

Please do not put the insulating layer of the cable in to the terminal when tight the screws, otherwise it will cause poor contact.

D) Push the AC terminals along the rail to the inside of the inverter then tighten the screw under rack. Lock the 4 screws of AC terminal and tighten the cap nut of AC terminal. (as shown in figure 4.18)



▲ Figure 4.18 Tighten the AC terminal



Additional explanation:

If the diameter of the protective layer of the AC cable is less than the recommended (18-25mm) it should be spirally wounded the protective.

B) Disassemble the 4 screws on the AC terminal cover and take out the cover. Disassemble the screw under terminal rack and Pull out the terminal (as shown in figure 4.16)

4. Installation

5. Start & Stop

4.3.3 Max. over current protection device (OCPD)

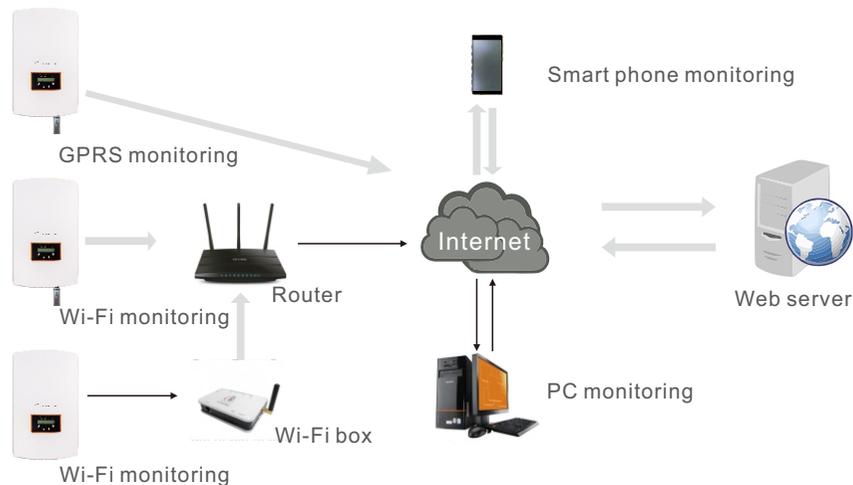
To protect the inverter's AC grid connection conductors, Canadian Solar recommends installing breakers that will protect against overcurrent. The following table defines OCPD ratings for the Canadian Solar 7-10kW single phase inverters.

Inverter	Rated voltage(V)	Rated output current (A)	Current for protection device (A)
CSI-7KTL1P-GI-FL	220/230	31.8/30.4	40
CSI-8KTL1P-GI-FL	220/230	36.4/34.8	60
CSI-9KTL1P-GI-FL	220/230	40.9/39.1	60
CSI-10KTL1P-GI-FL	220/230	45.5/43.5	60

▲ Table 4.3 Rating of grid OCPD

4.3.4 Inverter monitoring connection

The inverter can be monitored via Wi-Fi or GPRS. All Canadian Solar communication devices are optional (Figure 4.18). For connection instructions, please refer to the Canadian Solar Monitoring Device installation manuals.



▲ Figure4.18 Wi-Fi communication function

5.1 Start the Inverter

To start up the Inverter, it is important that the following steps are strictly followed:

1. Switch the grid supply main Switch (AC) ON first.
2. Switch the DC switch ON. If the voltage of PV arrays are higher than start up voltage, the inverter will turn on. The red LED power will light.
3. When both the DC and the AC sides supply to the inverter, it will be ready to generate power. Initially, the inverter will check both its internal parameters and the parameters of the AC grid, to ensure that they are within the acceptable limits. At the same time, the green LED will flash and the LCD displays the information of INITIALIZING.
4. After 30-300 seconds (depending on local requirement), the inverter will start to generate power. The green LED will be on continually and the LCD displays GENERATING.



WARNING:

Do not touch the surface when the inverter is operating. It may be hot and cause burns.

5.2 Stop the Inverter

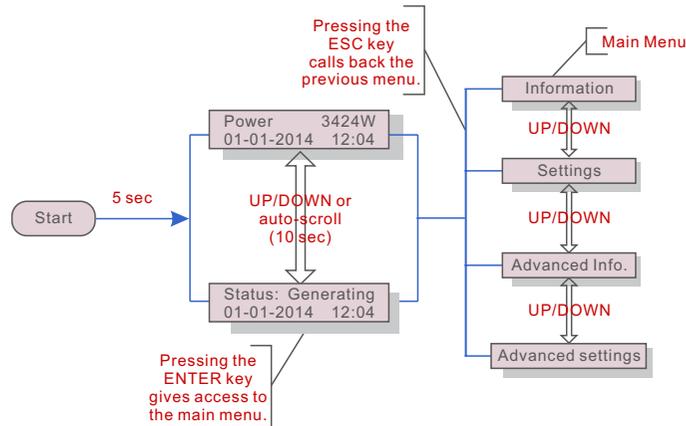
To stop the Inverter, the following steps must be strictly followed:

1. Switch the Supply Main Switch (AC) OFF.
2. Wait 30 seconds. Switch the DC Switch OFF. All the LEDs of the inverter will be off in one minute.

6. Operation

6. Operation

During normal operation, the display alternately shows the power and the operation status with each screen lasting for 10 seconds (see Figure 6.1). Screens can also be scrolled manually by pressing the UP and DOWN keys. Press the ENTER key to access to the Main Menu.



▲ Figure 6.1 Operation Overview

6.1 Main Menu

There are four submenus in the Main Menu (see Figure 6.1):

1. Information
2. Settings
3. Advanced Info.
4. Advanced Settings

6.2 Information

The Canadian Solar Single Phase 4G Inverter main menu provides access to operational data and information. The information is displayed by selecting "Information" from the menu and then by scrolling up or down.

Display	Duration	Description
V_DC1 350.8V I_DC1 5.1A	10 sec	V_DC1: Shows input 01 voltage value. I_DC1: Shows input 01 current value.
V_DC3 350.8V I_DC3 5.1A	10 sec	V_DC3: Shows input 03 voltage value. I_DC3: Shows input 03 current value.
V_Grid 230.4V I_Grid 8.1A	10 sec	V_Grid: Shows the grid's voltage value I_Grid: Shows the grid's current value.
Status: Generating Power: 1488W	10 sec	Status: Shows instant status of the Inverter. Power: Shows instant output power value.
Grid Frequency F_Grid 60.06Hz	10 sec	F_Grid: Shows the grid's frequency value.
Total Energy 0258458 kwh	10 sec	Total generated energy value.
This Month: 0123kwh Last Month: 0123kwh	10 sec	This Month: Total energy generated this month. Last Month: Total energy generated last month.
Today: 15.1kwh Yesterday: 13.5kwh	10 sec	Today: Total energy generated today. Yesterday: Total energy generated yesterday.
Inverter SN 00000000000000	10 sec	Display series number of the inverter

▲ Table 6.1 Information list

6.2.1 Lock screen

Pressing the ESC key returns to the Main Menu. Pressing the ENTER key locks (Figure 6.2(a)) or unlocks (Figure 6.2 (b)) the screen.



▲ Figure 6.2 Locks and Unlocks the Screen of LCD

6. Operation

6. Operation

6.3 Settings

The following submenus are displayed when the Settings menu is selected:

- 1.Set Time
- 2.Set Address

6.3.1 Set Time

This function allows time and date setting. When this function is selected, the LCD will display a screen as shown in Figure 6.3.



```
NEXT=<ENT> OK=<ESC>
01-01-2016 16:37
```

▲ Figure 6.3 Set Time

Press the UP/DOWN keys to set time and data. Press the ENTER key to move from one digit to the next (from left to right). Press the ESC key to save the settings and return to the previous menu.

6.3.2 Set Address

This function is used to set the address when multi inverters are connected to single monitor. The address number can be assigned from "01" to "99"(see Figure 6.4). The default address number of Canadian Solar Single Phase Inverter is "01".



```
YES=<ENT> NO=<ESC>
Set Address: 01
```

▲ Figure 6.4 Set Address

Press the UP/DOWN keys to set the address. Press the ENTER key to save the settings. Press the ESC key to cancel the change and return to the previous menu.

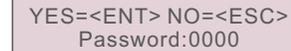
6.4 Advanced Info - Technicians Only



NOTE:

To access to this area is for fully qualified and accredited technicians only. Enter menu "Advanced Info." and "Advanced settings" (need password) .

Select "Advanced Info." from the Main Menu. The screen will require the password as below



```
YES=<ENT> NO=<ESC>
Password:0000
```

▲ Figure 6.5 Enter password

The default password is "0010". Please press "down" to move the cursor, press "up" to select the number.

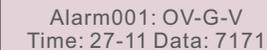
After enter the correct password the Main Menu will display a screen and be able to access to the following information.

- 1.Alarm Message
2. Running message
- 3.Version
4. Daily Energy
5. Monthly Energy
6. Yearly Energy
7. Daily Record
- 8.Communication Data

The screen can be scrolled manually by pressing the UP/DOWN keys. Pressing the ENTER key gives access to a submenu. Press the ESC key to return to the Main Menu.

6.4.1 Alarm Message

The display shows the 100 latest alarm messages (see Figure 6.6). Screens can be scrolled manually by pressing the UP/ DOWN keys. Press the ESC key to return to the previous menu.



```
Alarm001: OV-G-V
Time: 27-11 Data: 7171
```

▲ Figure 6.6 Alarm Message

6. Operation

6. Operation

6.4.2 Running Message

This function is for maintenance person to get running message such as internal temperature, Standard NO. etc.
Screens can be scrolled manually by pressing the UP/DOWN keys.

6.4.3 Version

The screen shows the model version and the software version of the Inverter (see Figure 6.7).



Model: 08
Software Version: D20001

▲ Figure 6.7 Model Version and Software Version

6.4.4 Daily Energy

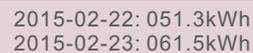
The function is for checking the energy generation for selected day.



YES=<ENT> NO=<ESC>
Select: 2015-02-23

▲ Figure 6.8 Select date for daily energy

Press DOWN key to move the cursor to day, month and year, press UP key to change the digit. Press Enter after the date is fixed.



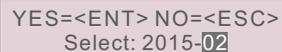
2015-02-22: 051.3kWh
2015-02-23: 061.5kWh

▲ Figure 6.9 Daily energy

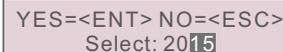
Press UP/DOWN key to move one date from another.

6.4.5 Monthly Energy and Yearly Energy

The two functions are for checking the energy generation for selected month and Year



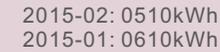
YES=<ENT> NO=<ESC>
Select: 2015-02



YES=<ENT> NO=<ESC>
Select: 2015

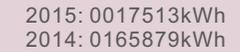
▲ Figure 6.10 Select month for monthly energy ▲ Figure 6.11 Select year for yearly energy

Press DOWN key to move the cursor, press UP key to change the digit. Press Enter after the month/year is fixed.



2015-02: 0510kWh
2015-01: 0610kWh

▲ Figure 6.12 Month energy



2015: 0017513kWh
2014: 0165879kWh

▲ Figure 6.13 Yearly energy

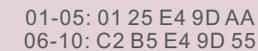
Press UP/DOWN key to move one date from another.

6.4.6 Daily record

The screen shows history of changing settings. Only for maintenance personnel.

6.4.7 Communication Data

The screen shows the internal data of the Inverter (see Figure 6.14), which is for service technicians only.



01-05: 01 25 E4 9D AA
06-10: C2 B5 E4 9D 55

▲ Figure 6.14 Communication Data

6.5 Advanced Settings - Technicians Only



NOTE:

To access to this area is for fully qualified and accredited technicians only. Please follow 6.4 to enter password to access this menu.

Select Advanced Settings from the Main Menu to access the following options:

1. Select Standard
2. Grid ON/OFF
3. Clear Energy
4. New Password
5. Power Control
6. Calibrate Energy
7. AUS STD. Settings

6.5.1 Selecting Standard

This function is used to select the grid's reference standard (see Figure 6.11).



YES=<ENT> NO=<ESC>
Standard:AUS-Q-0.8

▲ Figure 6.15

6. Operation

Press the UP/DOWN keys to select the standard (AS4777, VDE4105, VDE0126, UL-240V-A, UL-208V-A, UL-240V, UL-208V, MEX-CFE, G83/2 (for 1-3.6kW models), G59/3 (for 4-5kW models), EN50438 DK, EN50438 IE, EN50438 NL and "User-Def" function). Press the ENTER key to confirm the setting. Press the ESC key to cancel changes and returns to previous menu.



NOTE:

This function is for technicians use only.

Selecting the "User-Def" menu will access to the following submenu (see Figure 6.16),



▲ Figure 6.16



NOTE:

The "User-Def" function can be only used by the service engineer and must be allowed by the local energy supplier.

Below is the setting range for "User-Def". Using this function, the limits can be changed manually.

OV-G-V1: 220---290V	OV-G-F1: 50.2-53Hz(60.2-64Hz)
OV-G-V1-T: 0.1---9S	OV-G-F1-T: 0.1---9S
OV-G-V2: 220---290V	OV-G-F2: 50.2-53Hz(60.2-64Hz)
OV-G-V2-T: 0.1---1S	OV-G-F2-T: 0.1---9S
UN-G-V1: 90---210V	UN-G-F1: 47-49.5Hz(56-59.8Hz)
UN-G-V1-T: 0.1---9S	UN-G-F1-T: 0.1---9S
UN-G-V2: 90---210V	UN-G-F2: 47-49Hz(56-59.8Hz)
UN-G-V2-T: 0.1---1S	UN-G-F2-T: 0.1---9S
Startup-T: 10-600S	Restore-T: 10-600S



NOTE:

This inverter including two level protections for voltage and frequency under user-def mode; please set the same value both level one and level two if the grid only have one level requirement, eg. Brazil...etc.

Press the UP/DOWN keys to scroll through items. Press the ENTER key to edit the highlighted item. Press the UP/DOWN keys again to change the setting. Press the ENTER key to save the setting. Press the ESC key to cancel changes and returns to the previous menu.

6. Operation

6.5.2 Grid ON/OFF

This function is used to start up or stop the power generation of Canadian Solar Single Phase Inverter (see Figure 6.17).



▲ Figure 6.17 Set Grid ON/OFF

Screens can be scrolled manually by pressing the UP/DOWN keys. Press the ENTER key to save the setting. Press the ESC key to return to the previous menu.

6.5.3 Clear Energy

Clear Energy can reset the history yield of inverter



These two functions are applicable by maintenance personnel only, wrong operation will prevent the inverter from working properly.

6.5.4 New Password

This function is used to set the new password for menu "Advanced info." and "Advanced information" (see Figure 6.18).



▲ Figure 6.18 Set new password

Enter the right password before set new password. Press the DOWN key to move the cursor, Press the UP key to revise the value. Press the ENTER key to execute the setting. Press the ESC key to return to the previous menu.

6.5.5 Power control

Active and reactive power can be set through power setting button.

There are 5 item for this sub menu:

1. Set output power
2. Set Reactive Power
3. Out_P With Restore
4. Rea_P With Restore
5. Select PF Curve

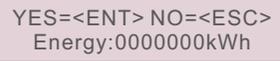


This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

6. Operation

6.5.6 Calibrate Energy

Maintenance or replacement could clear or cause a different value of total energy. Use this function could allow user to revise the value of total energy to the same value as before. If the monitoring website is used the data will be synchronous with this setting automatically. (see Figure 6.19).



▲ Figure 6.19 Calibrate energy

Press the DOWN key to move the cursor, Press the UP key to revise the value. Press the ENTER key to execute the setting. Press the ESC key to return to the previous menu.

6.5.7 AUS STD. Settings

This sub menu is enabled when the grid standard is set to AS4777. To comply with New AUS/ NZ 4777.2, Canadian Solar inverter could set different work mode to work with different grid requirement.

There are 4 setting under AUS STD settings.

- 1. Working mode 2. Power Rate limit 3. Freq. Derate set 4. 10mins OV-G-V set.

There are 5 work mode in working mode submenu.

- 1. Fixed PF 2. Reac. Power 3. Power-PF 4. Volt-Watt 5. Volt-Var.

The parameter in each model could be set as below:

1. Fixed PF

Set PF (-0.8, +0.8), Default 1, Resolution 0.01

2. Reac. Power

Set reactive power (0, 60%), Default 0, Resolution 1%

7. Maintenance

7. Maintenance

Canadian Solar Single Phase Inverter does not require any regular maintenance. However, cleaning the dust on heat-sink will help the inverter to dissipate the heat and increase its life time.

The dust can be removed with a soft brush.



CAUTION:

Do not touch the inverter's surface when it is operating. Some parts of the inverter may be hot and cause burns. Turn off the inverter (refer to Section 5.2) and wait for a cool-down period before any maintenance or cleaning operation.

The LCD and the LED status indicator lights can be cleaned with a damp cloth if they are too dirty to be read.



NOTE:

Never use any solvents, abrasives or corrosive materials to clean the inverter.

8. Troubleshooting

The inverter is designed in accordance with the most important international grid-tied standards and safety and electromagnetic compatibility requirements. Before delivering to the customer, the inverter has been subjected to several tests to ensure its optimal operation and reliability.

In case of failure, the LCD screen will display an alarm message. In this case, the inverter may stop feeding into the grid. The failure descriptions and their corresponding alarm messages are listed in Table 8.1:

8. Trouble Shooting

Alarm Message	Failure description	Solution
No power	Inverter no power on LCD	1. Check PV input connections 2. Check DC input voltage (single phase > 120V, three phase > 350V) 3. Check if PV+/- is reversed
LCD show initializing all the time	can not start-up	1. Check if the connector on main board or power board are fixed. 2. Check if the DSP connector to power board are fixed.
OV-G-V01/02/03/04	Over grid voltage	1. Resistant of AC cable is too high. Change bigger size grid cable 2. Adjust the protection limit if it's allowed by electrical company.
UN-G-V01/02	Under grid voltage	1. Use user define function to adjust the protection limit if it's allowed by electrical company.
OV-G-F01/02	Over grid frequency	
UN-G-F01/02	Under grid frequency	
G-IMP	High grid impedance	
NO-GRID	No grid voltage	1. Check connections and grid switch. 2. Check the grid voltage inside inverter terminal.
OV-DC01/02/03/04	Over DC voltage	1. Reduce the module number in series
OV-BUS	Over DC bus voltage	1. Check inverter inductor connection 2. Check driver connection
UN-BUS01/02	Under DC bus voltage	
GRID-INTF01/02	Grid interference	1. Restart inverter 2. Change power board
OV-G-I	Over grid current	
IGBT-OV-I	Over IGBT current	
DC-INTF OV-DCA-I	DC input overcurrent	1. Restart inverter 2. Identify and remove the string to the fault MPPT 2. Change power board
IGFOL-F	Grid current tracking fail	1. Restart inverter or contact installer.
IG-AD	Grid current sampling fail	
OV-TEM	Over Temperature	1. Check inverter surrounding ventilation. 2. Check if there's sunshine direct on inverter in hot weather.
INI-FAULT	Initialization system fault	1. Restart inverter or contact installer.
DSP-B-FAULT	Comm. failure between main and slave DSP	
12Power-FAULT	12V power supply fault	

8. Trouble Shooting

Alarm Message	Failure description	Solution
PV ISO-PRO 01/02	PV isolation protection	1. Remove all DC input, reconnect and restart inverter one by one. 2. Identify which string cause the fault and check the isolation of the string.
ILeak-PRO 01/02/03/04	Leakage current protection	1. Check AC and DC connection 2. Check inverter inside cable connection.
RelayChk-FAIL	Relay check fail	1. Restart inverter or contact installer.
DCinj-FAULT	High DC injection current	1. Restart inverter or contact installer.

▲ Table 8.1 Fault message and description



NOTE:

If the inverter displays any alarm message as listed in Table 8.1; please turn off the inverter (refer to Section 5.2 to stop your inverter) and wait for 5 minutes before restarting it (refer to Section 5.1 to start your inverter). If the failure persists, please contact your local distributor or the service center. Please keep ready with you the following information before contacting us.

1. Serial number of Canadian Solar Single Phase Inverter;
2. The distributor/dealer of Canadian Solar Single Phase Inverter (if available);
3. Installation date.
4. The description of problem (i.e. the alarm message displayed on the LCD and the status of the LED status indicator lights. Other readings obtained from the Information submenu (refer to Section 6.2) will also be helpful.);
5. The PV array configuration (e.g. number of panels, capacity of panels, number of strings, etc.);
6. Your contact details.

9. Specifications

Model	CSI-7KTL1P-GI-FL
Max. DC input power (Watts)	8000
Max. DC input voltage (Volts)	600
Rated DC voltage (Volts)	330
Startup voltage (Volts)	120
MPPT voltage range (Volts)	100...500
Max. input current (Amps)	10+10+10
Max short circuit input current (Amps)	15.6+15.6+15.6
MPPT number/Max input strings number	3/3
Rated output power (Watts)	7000
Max. output power (Watts)	7700
Max. apparent output power (VA)	7700
Rated grid voltage (Volts)	220/230
Grid voltage range (Volts)	160...285
Rated output current (Amps)	31.8/30.4
Power Factor (at rated output power)	0.8leading~0.8lagging [1]
THDi (at rated output power)	<1.5%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	47...52 or 57...62
Max. efficiency	98.1%
EU efficiency	97.6%
MPPT efficiency	>99.5%
Dimensions	333W*573H*249D (mm)
Weight	18kg
Topology	Transformerless
Operating ambient temperature range	-25°C. . . 60°C
Ingress protection	IP65
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
Max.operation altitude	4000m
Designed lifetime	>20 years
Grid connection standard	EN50438, G83/2, AS4777.2:2015, VDE0126-1-1, IEC61727, VDE N4105
Operating surroundings humidity	0...100% Condensing
Connention	Mc4 connector and Ip67 rated plug
Display	LCD, 2×20 Z.
Communication connections	4 pins RS485 connector
Monitoring	WiFi or GPRS
Warranty Terms	5 Years STD (Extendable to 20 Years)

9. Specifications

Model	CSI-8KTL1P-GI-FL
Max. DC input power (Watts)	9200
Max. DC input voltage (Volts)	600
Rated DC voltage (Volts)	330
Startup voltage (Volts)	120
MPPT voltage range (Volts)	100...500
Max. input current (Amps)	10+10+10
Max short circuit input current (Amps)	15.6+15.6+15.6
MPPT number/Max input strings number	3/3
Rated output power (Watts)	8000
Max. output power (Watts)	8800
Max. apparent output power (VA)	8800
Rated grid voltage (Volts)	220/230
Grid voltage range (Volts)	160...285
Rated output current (Amps)	36.4/34.8
Power Factor (at rated output power)	0.8leading~0.8lagging [1]
THDi (at rated output power)	<1.5%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	47...52 or 57...62
Max. efficiency	98.1%
EU efficiency	97.6%
MPPT efficiency	>99.5%
Dimensions	333W*573H*249D (mm)
Weight	18kg
Topology	Transformerless
Operating ambient temperature range	-25°C. . . 60°C
Ingress protection	IP65
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
Max.operation altitude	4000m
Designed lifetime	>20 years
Grid connection standard	EN50438, G83/2, AS4777.2:2015, VDE0126-1-1, IEC61727, VDE N4105
Operating surroundings humidity	0...100% Condensing
Connention	Mc4 connector and Ip67 rated plug
Display	LCD, 2×20 Z.
Communication connections	4 pins RS485 connector
Monitoring	WiFi or GPRS
Warranty Terms	5 Years STD (Extendable to 20 Years)

9. Specifications

Model	CSI-9KTL1P-GI-FL
Max. DC input power (Watts)	10800
Max. DC input voltage (Volts)	600
Rated DC voltage (Volts)	330
Startup voltage (Volts)	120
MPPT voltage range (Volts)	100...500
Max. input current (Amps)	10+10+10
Max short circuit input current (Amps)	15.6+15.6+15.6
MPPT number/Max input strings number	3/3
Rated output power (Watts)	9000
Max. output power (Watts)	9900
Max. apparent output power (VA)	9900
Rated grid voltage (Volts)	220/230
Grid voltage range (Volts)	160...285
Rated output current (Amps)	40.9/39.1
Power Factor (at rated output power)	0.8leading~0.8lagging [1]
THDi (at rated output power)	<1.5%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	47...52 or 57...62
Max. efficiency	98.1%
EU efficiency	97.6%
MPPT efficiency	>99.5%
Dimensions	333W*573H*249D (mm)
Weight	18kg
Topology	Transformerless
Operating ambient temperature range	-25°C. . . 60°C
Ingress protection	IP65
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
Max.operation altitude	4000m
Designed lifetime	>20 years
Grid connection standard	EN50438, G83/2, AS4777.2:2015, VDE0126-1-1, IEC61727, VDE N4105
Operating surroundings humidity	0...100% Condensing
Connention	Mc4 connector and Ip67 rated plug
Display	LCD, 2×20 Z.
Communication connections	4 pins RS485 connector
Monitoring	WiFi or GPRS
Warranty Terms	5 Years STD (Extendable to 20 Years)

9. Specifications

Model	CSI-10KTL1P-GI-FL
Max. DC input power (Watts)	11500
Max. DC input voltage (Volts)	600
Rated DC voltage (Volts)	330
Startup voltage (Volts)	120
MPPT voltage range (Volts)	100...500
Max. input current (Amps)	10+10+10
Max short circuit input current (Amps)	15.6+15.6+15.6
MPPT number/Max input strings number	3/3
Rated output power (Watts)	10000
Max. output power (Watts)	10000
Max. apparent output power (VA)	10000
Rated grid voltage (Volts)	220/230
Grid voltage range (Volts)	160...285
Rated output current (Amps)	45.5/43.5
Power Factor (at rated output power)	0.8leading~0.8lagging [1]
THDi (at rated output power)	<1.5%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	47...52 or 57...62
Max. efficiency	98.1%
EU efficiency	97.6%
MPPT efficiency	>99.5%
Dimensions	333W*573H*249D (mm)
Weight	18kg
Topology	Transformerless
Operating ambient temperature range	-25°C. . . 60°C
Ingress protection	IP65
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
Max.operation altitude	4000m
Designed lifetime	>20 years
Grid connection standard	EN50438, G83/2, AS4777.2:2015, VDE0126-1-1, IEC61727, VDE N4105
Operating surroundings humidity	0...100% Condensing
Connention	Mc4 connector and Ip67 rated plug
Display	LCD, 2×20 Z.
Communication connections	4 pins RS485 connector
Monitoring	WiFi or GPRS
Warranty Terms	5 Years STD (Extendable to 20 Years)

[1]: For Brazil products, the certificated PF range is 0.9 leading~0.9 lagging, but the actual range is 0.8 leading~0.8lagging.

PROJECT NAME _____

LOCATION _____ NUMBER _____



INSTALLATION AND COMMISSIONING CHECKLIST

3 PHASE STRING INVERTERS (KTL SERIES)

Warning: This checklist is not a replacement for the user manual. Please read the user manual prior to inverter site selection and installation.

Step	No.	Content	Details	Values / Notes	Conclusion
INSTALLATION	1	Installation environment	Ensure installation site meets environmental and physical constraints.		<input type="checkbox"/> Good <input type="checkbox"/> Poor
	2	Unpacking	Check inverter condition after unpacking.		<input type="checkbox"/> Good <input type="checkbox"/> Poor
	3	Mounting bracket installation	Install inverter mounting bracket according to installation instructions in user manual. For allowable tilt angle refer to the installation manual.		<input type="checkbox"/> Completed Record Tilt Angle in Notes
	4	Inverter installation	Carefully install the inverter to the mounting bracket and ensure it is firmly attached. Ensure the inverter has proper clearances and are properly ventilated.		<input type="checkbox"/> Completed
	5	Serial number	Record the product serial numbers located on the side label.		Serial Numbers; attached list
	6	Solar modules	Confirm PV module installation completion. Record the total power of the PV modules.		<input type="checkbox"/> Completed Record kWp in Notes
	7	DC input and AC output connection	Switch off the DC and AC distribution unit, connect DC to PV terminals of inverter, and connect AC to AC terminals of inverter. Ensure proper polarity and cable size. Torque to specifications.		<input type="checkbox"/> Completed Record Torque in Notes
	8	PV voltage	Measure and record DC voltage. Ensure voltage and polarities are correct. Confirm the voltages are within 5% tolerance to what was tested.		<input type="checkbox"/> Completed Record V_{DC} in Notes
	9	AC grid	Measure and record AC voltage and frequency. Confirm the V_{AC} voltages are within 5% tolerance to what was tested.		<input type="checkbox"/> Completed Record V_{AC} in Notes
	10	Grounding cable	Ensure ground cable is firmly attached to grounding lug.		<input type="checkbox"/> Good <input type="checkbox"/> Poor

PROJECT NAME _____

LOCATION _____ NUMBER _____



INSTALLATION AND COMMISSIONING CHECKLIST

3 PHASE STRING INVERTERS (KTL SERIES)

Warning: This checklist is not a replacement for the user manual. Please read the user manual prior to inverter site selection and installation.

Step	No.	Content	Details	Values / Notes	Conclusion
COMMISSIONING	1	Communication cable (if function is used)	Connect the RS485 cable to the communication port.		<input type="checkbox"/> Completed
	2	Supply DC / AC power	<p>CSI-xx-KTL-GI:</p> <ol style="list-style-type: none"> 1. Switch the grid supply main Switch (AC) ON first. 2. Switch the DC switch ON. If the voltages of PV arrays are higher than start up voltage, the inverter will turn on. The red LED power will be continuously lit. 3. When both the DC and the AC sides supply to the inverter, it will be ready to generate power. Initially, the inverter will check both its internal parameters and the parameters of the AC grid, to ensure that they are within the acceptable limits. At the same time, the green LED will lash and the LCD displays the information of INITIALIZING. 		<input type="checkbox"/> Completed Record LEDs status in Notes

PROJECT NAME _____

LOCATION _____ NUMBER _____



INSTALLATION AND COMMISSIONING CHECKLIST

3 PHASE STRING INVERTERS (KTL SERIES)

Warning: This checklist is not a replacement for the user manual. Please read the user manual prior to inverter site selection and installation.

Step	No.	Content	Details	Values / Notes	Conclusion
COMMISSIONING	3	Waiting time	CSI-xx-KTL-GI: After 60-300 seconds (depending on local requirement), the inverter will start to generate power. The green LED will be on continuously and the LCD displays the information of GENERATING.		<input type="checkbox"/> Completed Record LEDs status in Notes
	4	Power generation	After grid connection, record power output of inverter.		<input type="checkbox"/> Completed Record power in Notes
	5	Date & Time setting	Set the current date and time using the front panel interface.		<input type="checkbox"/> Completed Record current date/time in Notes
	6	Communication setting (if avail.)	Set communication with a unique address for each inverter.		<input type="checkbox"/> Completed Record address in Notes
	7	Machine version	For maintenance and reference, please record the firmware revisions if applicable.		<input type="checkbox"/> Completed Record with serial numbers
	8	Operating parameter	Record operating parameters of the inverter. Verify IEC62109 or the corresponding On-grid setting is selected. De-rate inverter and attach de-rate sticker as required.		<input type="checkbox"/> Completed Record operating parameters in Notes
	9	Testing	Open and close the DC breaker to confirm whether the inverter reboots and shuts down automatically.		<input type="checkbox"/> Reboot successful <input type="checkbox"/> Not rebooting
	10	Completion	Installation and commissioning is complete if no abnormality.		<input type="checkbox"/> Good <input type="checkbox"/> Issues detected

PROJECT NAME _____

LOCATION _____ NUMBER _____



INSTALLATION AND COMMISSIONING CHECKLIST

3 PHASE STRING INVERTERS (KTL SERIES)

Warning: This checklist is not a replacement for the user manual. Please read the user manual prior to inverter site selection and installation.

System Owner: _____

Address / Location: _____

Inverter model: _____

Number of inverters: _____ Inverter mounting tilt: _____

Output power*: _____ Input DC voltage: _____

Grid: V Max: _____ V Min: _____ Frequency Max: _____ Min: _____

Configuration: MPPT Individual _____ MPPT Parallel _____

Monitoring: RS485: _____ Ethernet: _____

PV module manufacturer: _____ PV model: _____

DC cable size: _____ AC cable size: _____

Number of series connected modules in PV strings: _____

Number of PV strings in parallel per MPPT: _____

Total System size (DC Watts): _____

Note site typical arrangements and variances

Inverter firmware revision: DSP: _____ LCD: _____

Insulation limit (K): _____ PV start-up voltage: _____

Reactive compensation: _____ +/- PF

Monitoring equipment and supplier: _____

Transformer ratings, supplier: _____

*Specify de-rated power and add nameplate power in parenthesis

GENERAL COMMENTS / OBSERVATIONS:

PROJECT NAME _____

LOCATION _____ NUMBER _____



INSTALLATION AND COMMISSIONING CHECKLIST

3 PHASE STRING INVERTERS (KTL SERIES)

Warning: This checklist is not a replacement for the user manual. Please read the user manual prior to inverter site selection and installation.

Inverter serial numbers:

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

12 _____

13 _____

14 _____

15 _____

16 _____

17 _____

18 _____

19 _____

20 _____

21 _____

22 _____

23 _____

24 _____

25 _____

26 _____

27 _____

28 _____

29 _____

30 _____

31 _____

32 _____

33 _____

34 _____

35 _____

36 _____

37 _____

38 _____

39 _____

40 _____

41 _____

42 _____

INSTALLER'S NAME _____

INSTALLER'S SIGNATURE _____

COMPANY _____

DATE _____