On-Grid PV Inverter

Installation and Operation Manual

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Contents

1.About This Manual

1.1 Scope of Validity

This manual describes the installation, commissioning, operation and maintenance of the following on-grid PV inverters produced by Afore New Energy:

Single-Phase (One MPPT Tracker)

HNS3600TL-1

Single-Phase (Two MPPT Trackers)

HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL6
HNS5000TL	HNS6000TL	HNS7000TL	HNS8000TL
HNS9000TL	HNS10000TL		

Please keep this manual all the time available in case of emergency.

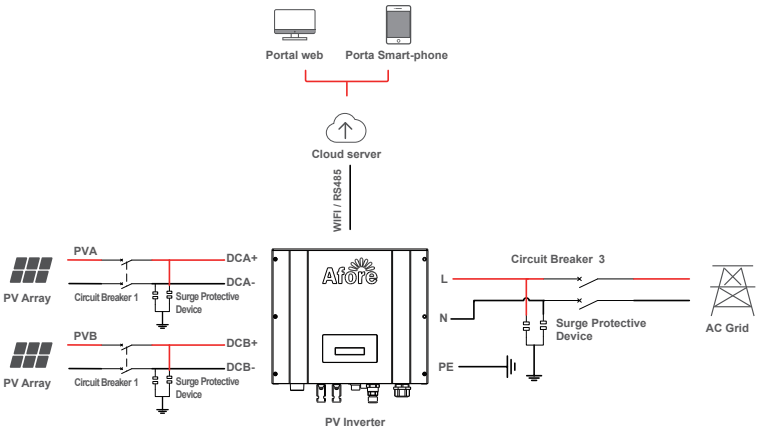
1.2 Target Group

This manual is for qualified personnel. The tasks described in this manual must only be performed by qualified personnel.

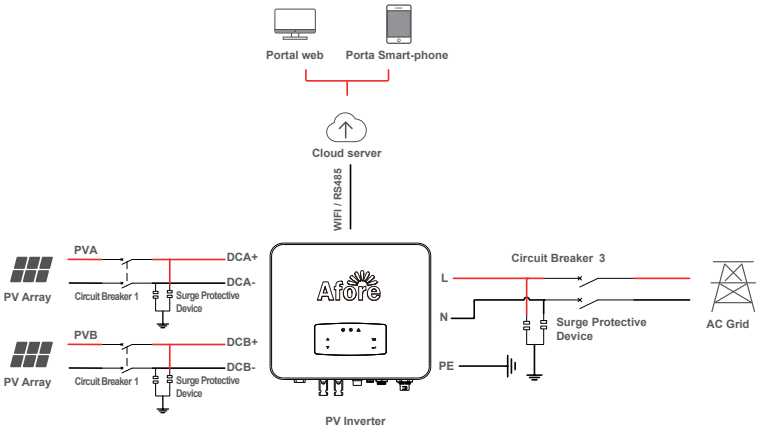
1.3 System Diagram

The typical connection diagram for the entire PV system is on-grid.

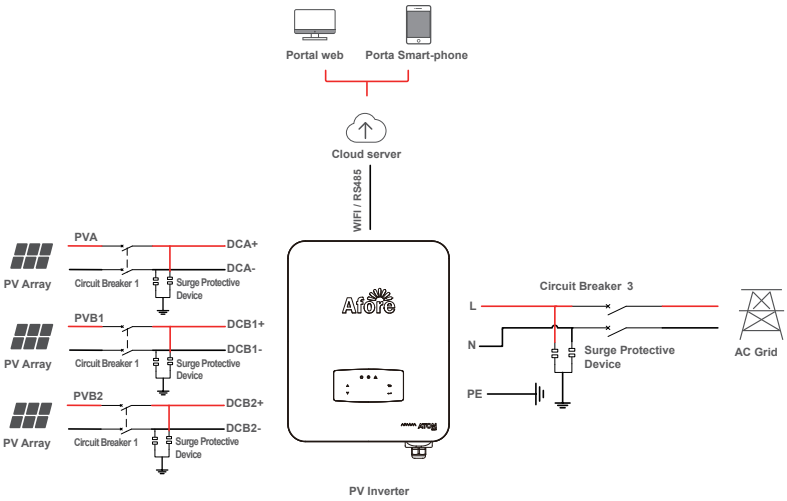
Single-Phase (HNS5000TL):



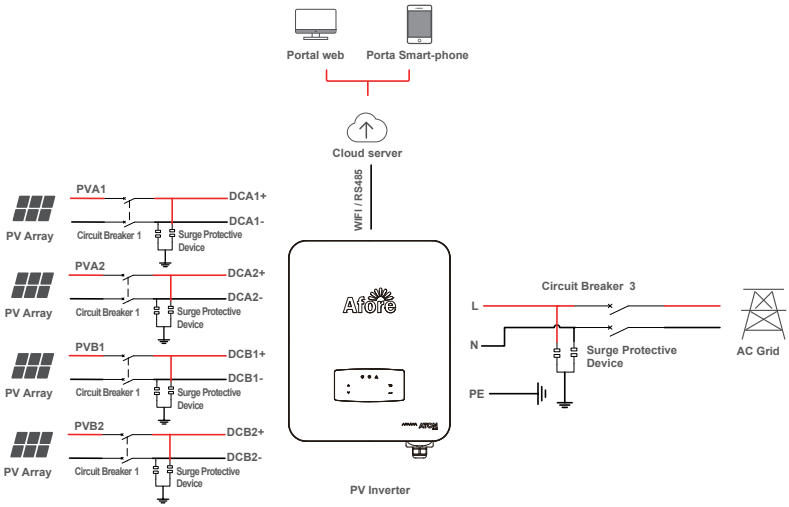
Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL):



Single-Phase (HNS9000TL / HNS10000TL):



Circuit Breaker and Surge Protector Recommendation:

Type	Max AC Current (A)	Rated current of AC breaker (A)
Single-Phase (One MPPT Tracker)		
HNS3600TL-1	17.5	25A
Single-Phase (Two MPPT Trackers)		
HNS3000TL	15	25A
HNS3600TL	17.5	25A
HNS4000TL	20	32A
HNS5000TL6	24	32A
HNS5000TL	24	32A
HNS6000TL	28.7	40A
HNS7000TL	33.6	63A
HNS8000TL	38.3	63A
HNS9000TL	45	100A
HNS10000TL	50	100A

SPD: Lightning protection system, refer to the following options:

• AC side, nominal discharge current 20KA, second grade lightning protection, protection voltage 2.5KV

• DC side, nominal discharge current 20KA, second grade lightning protection, protection voltage 3.2KV

• The wiring distance between the inverter and the distribution box should be at least 5 meters.

• Utility: Referred to as “grid” in this manual, i.e. the media your electric power company provides power to your place. Please note that Inverter can only be connected to low-voltage systems (namely, 220/230Vac, 50/60Hz).

Note:
The Inverter can be only connected to low-voltage grid.
(220 / 230 / 240Vac, 50 / 60Hz).

2.Safety & Symbols

2.1 Safety Precautions

1. All work on the inverter must be carried out by qualified electricians.
2. The device may only be operated with PV generators.
3. The PV generator and inverter must be connected to the ground.
4. Do not touch cover until 3-5 minutes after disconnecting all sources of supply.
5. Please do not touch the surface when the inverter is working, and do not rely too close to the inverter.
6. Please ensure that the used device and any relevant accessories are disposed of in accordance with applicable regulations.
7. Afore inverter should be placed upwards and handled with care in delivery. Pay attention to waterproof.
8.Alternative uses, modifications to the inverter not recommended by Afore or the installation of components not sold by Afore New Energy void the warranty claims.
9. An external RCD is required in addition to the built-in RCMU, type A RCD must be used to avoid tripping.

Inverter model	Rating of the RCD	Leakage current
HNS3600TL-1 HNS3000TL HNS3600TL	25A	100mA
HNS4000TL HNS5000TL6 HNS5000TL HNS6000TL HNS7000TL HNS8000TL	63A	100mA
HNS9000TL HNS10000TL	100A	100mA

2.2 Explanations of Symbols

Afore inverter strictly comply with relevant safety standards. Please read and follow all the instructions and cautions during installation, operation and maintenance.

	Danger of electric shock The inverter contains fatal DC and AC power. All work on the inverter must be carried out by qualified personnel only.
	Beware of hot surface The inverter's housing may reach uncomfortably hot 60°C (140°F) under high power operation. Do not touch the inverter enclosure when operation.
	Residual power discharge Do not open the inverter cover until 5 minutes after disconnection both DC and AC power supply.
	Important notes Read all instructions carefully. Failure to follow these instructions, warnings and precautions may lead to device malfunction or damage.
	Do not dispose of this device with the normal domestic waste.
	Without transformer This inverter does not use transformer for the isolation function.
	CE mark The inverter complies with the requirements of the applicable CE guidelines.
	Refer to manual before service.

3.Installation

3.1 Package

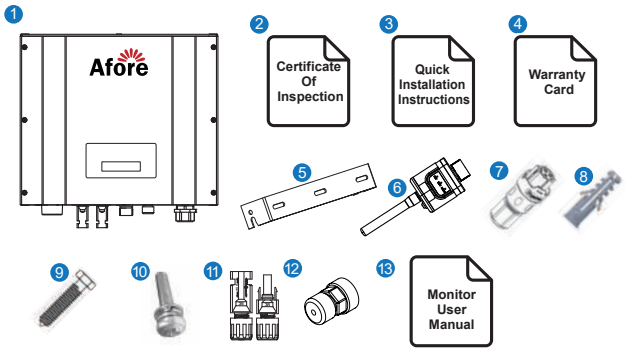
Unpacking

On receiving the inverter, please check to make sure the packing and all of the components are not missing or damaged. Please contact your dealer directly for supports if there is any damage or missing components.

Package List

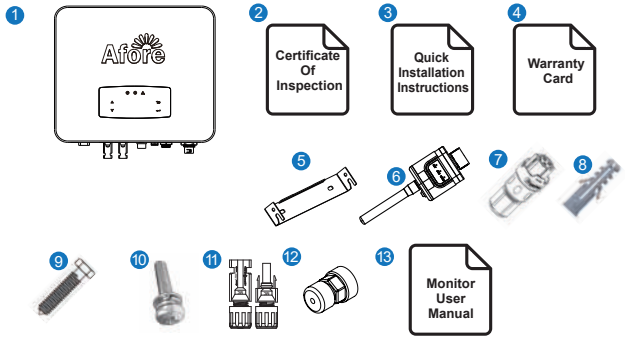
Open the package, please check the packing list shown as below.

Single-Phase (HNS5000TL):



No.	Qty	Items	No.	Qty	Items
1	1	Solar Inverter	8	3	Plastic Expansion Tube
2	1	Certificate Of Inspection	9	3	Mounting Bracket Screw
3	1	Quick Installation Instructions	10	1	Security Screw
4	1	Warranty Card	11	2	DC Connector sets
5	1	Wall Mounting bracket	12	1	Rj45 Port
6	1	Monitor Module	13	1	Monitor User Manual
7	1	AC connector			

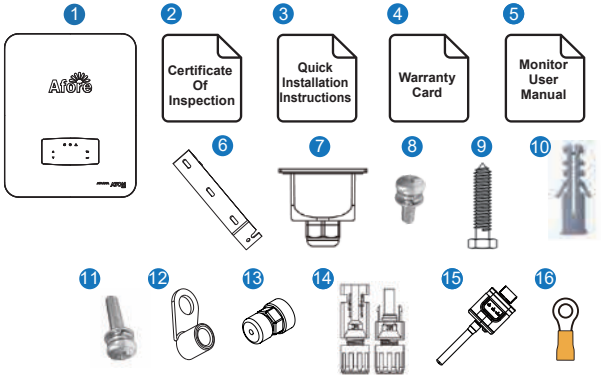
Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



No.	Qty	Items	No.	Qty	Items
1	1	Solar Inverter	8	2	Plastic Expansion Tube
2	1	Certificate Of Inspection	9	2	Mounting Bracket Screw
3	1	Quick Installation Instructions	10	1	Security Screw
4	1	Warranty Card	11	1/2	DC Connector sets
5	1	Wall Mounting bracket	12	1	Rj45 Port
6	1	Monitor Module	13	1	Monitor User Manual
7	1	AC connector			

Note:
The HNS3600TL-1 is 1 pair of DC plug connector, the HNS3000TL/HNS3600TL/HNS4000TL/HNS5000TL6 is 2 pairs.

Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL / HNS9000TL / HNS10000TL):

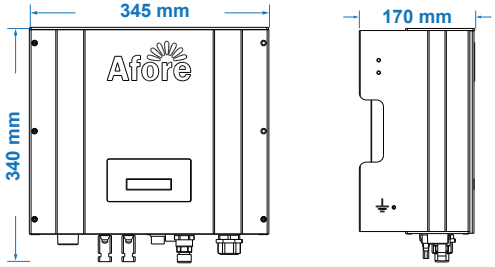


No.	Qty	Items	No.	Qty	Items
1	1	Solar Inverter	9	3	Mounting Bracket Screw
2	1	Certificate Of Inspection	10	3	Plastic Expansion Tube
3	1	Quick Installation Instructions	11	1	Security Screw
4	1	Warranty Card	12	3	AC Wearing Terminal
5	1	Wall Mounting bracke	13	1	Zero-Injection Connector(Optional)
6	1	Wall Mounting Bracket	14	2/3/4	DC Connector sets
7	1	Waterproof Cover	15	1	Monitor Module
8	4	Wiring Cover Screw	16	1	Grounding Terminal

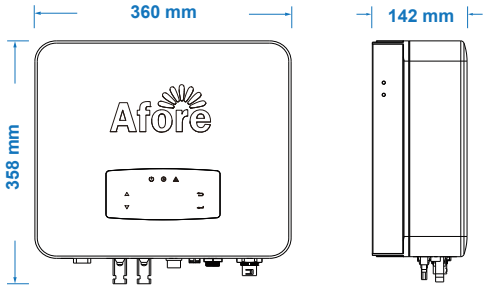
Note:
The HNS6000TL is 2 pair of DC plug connector, the HNS7000-HSN8000TL is 3 pairs,the HNS9000-HNS10000TL is 4 pairs.

3.2 Product Overview

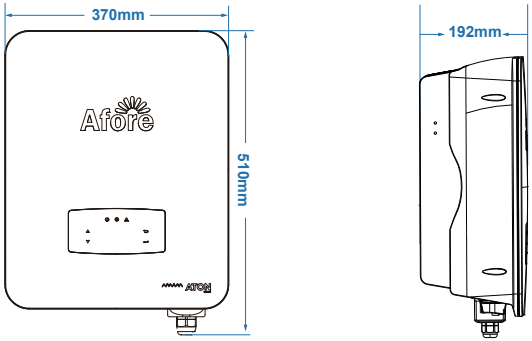
Single-Phase (HSN5000TL):



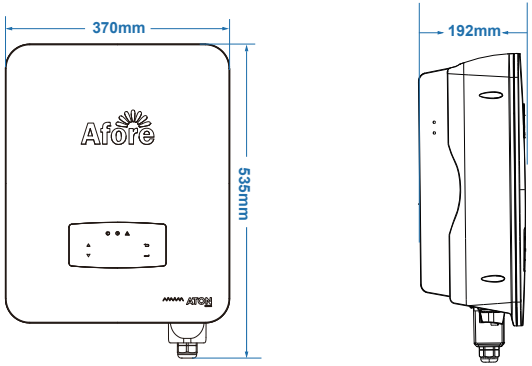
Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL):



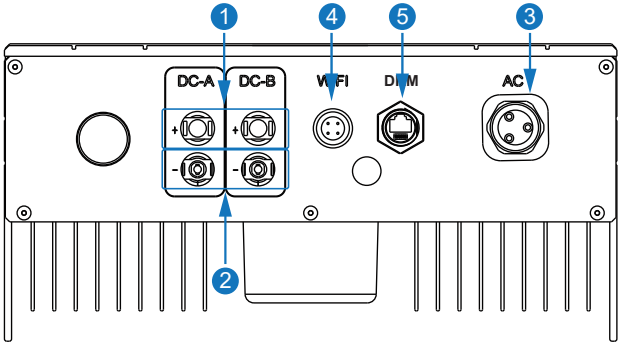
Single-Phase (HNS9000TL / HNS10000TL):



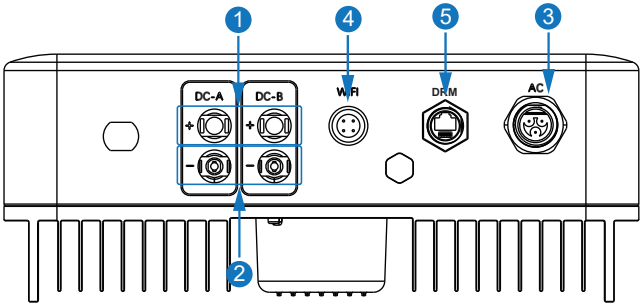
Overview of the Connection Area

The following figures show the assignment of the individual connection areas on the bottom of the inverter.

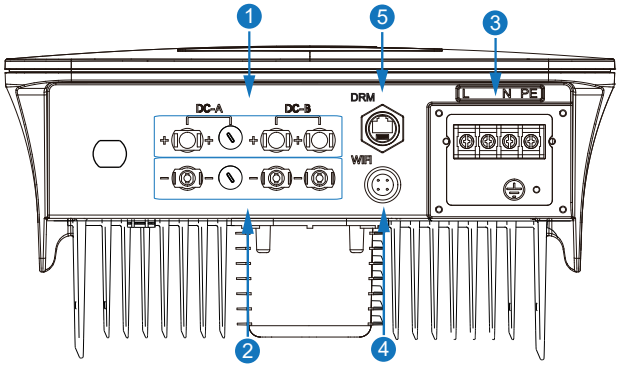
Single-Phase (HNS5000TL):



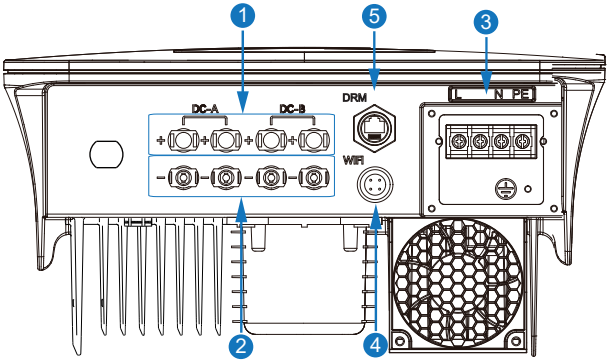
Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL):



Single-Phase (HNS9000TL / HNS10000TL):



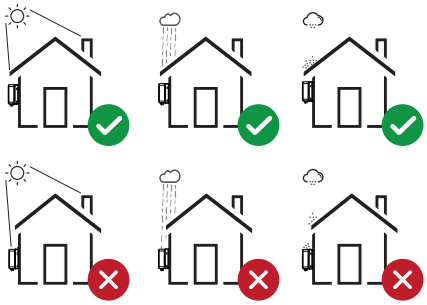
PV Inverter

No.	Items
1	DC Connectors (+) For PV String
2	DC Connectors (−) For PV String
3	AC Connector
4	Monitor Module Port
5	RJ45 Port (DRM)

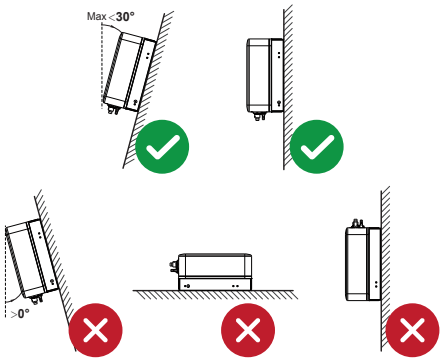
3.3 Mounting Location

The inverters are designed for indoor and outdoor installation (IP65), to increase the safety, performance and lifespan of the inverter, please select the mounting location carefully based on the following rules:

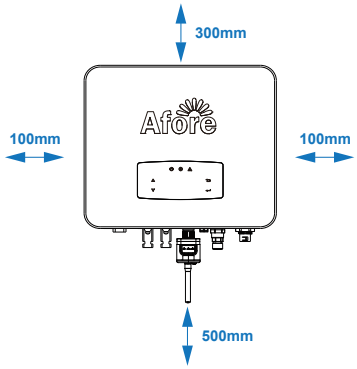
- The inverter should be installed on a solid surface, far from flammable or corrosion materials, where is suitable for inverter's weight and dimensions.
- The ambient temperature should be within -25℃ ~ 60℃ (between -13 °F and 140°F).
- The installation of inverter should be protected under shelter. Do not expose the inverter to direct sunlight, water, rain, snow, spray lightning, etc.



- The inverter should be installed vertically on the wall, or lean back on plane with a limited tilted angle. Please refer to below picture.



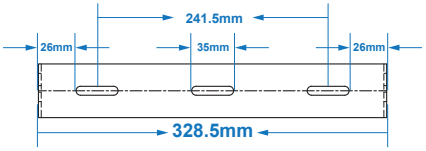
• Leave the enough space around inverter, easy for accessing to the inverter, connection points and maintenance.

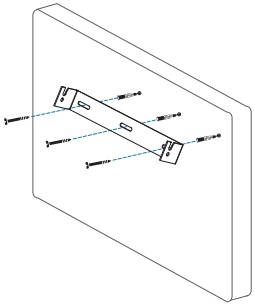


3.4 Installation On-grid PV Inverter

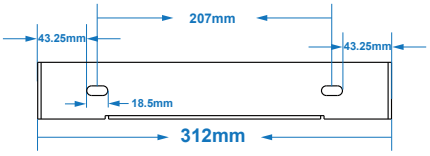
Step 1

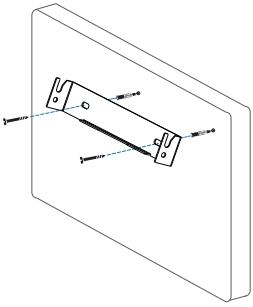
Single-Phase (HNS5000TL):



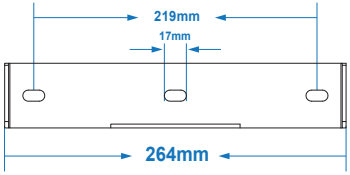


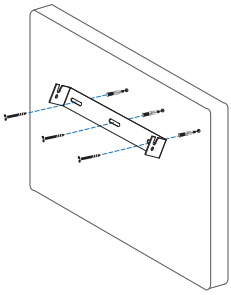
Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):





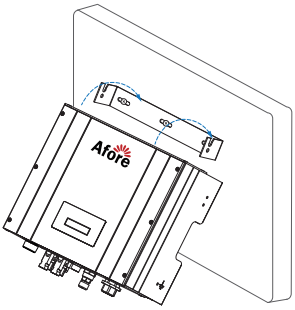
Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL / HNS9000TL / HNS10000TL):

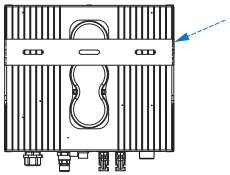




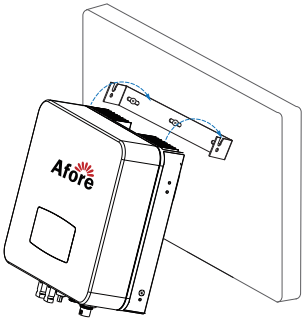
Step 2

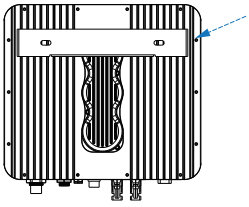
Single-Phase (HNS5000TL):



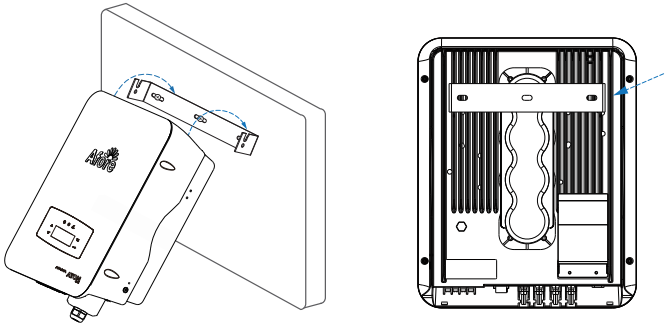


Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



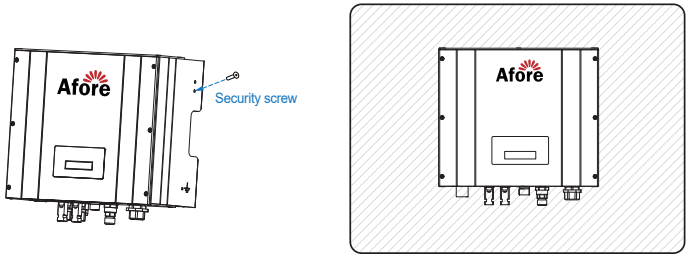


Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL / HNS9000TL / HNS10000TL):

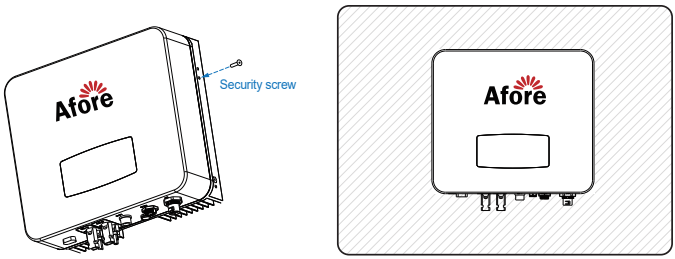


Step 3

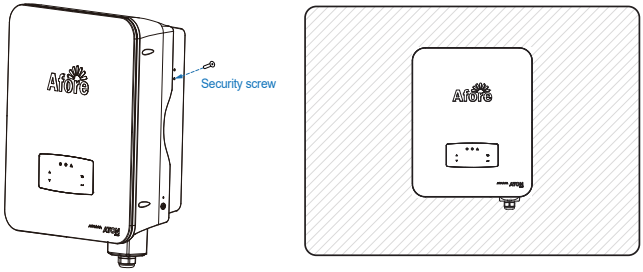
Single-Phase (HNS5000TL):



Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL / HNS9000TL / HNS10000TL):



3.5 Electrical Connection

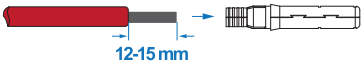
3.5.1 PV Connection

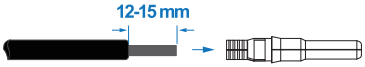
The inverter have one or two-MPPT channels, can be connected with one or two strings of PV panels. Please make sure below requirements are followed before connecting PV panels / strings to the inverter.

· The open-circuit voltage and short-circuit current of PV string must not exceed inverter's range.
· The isolation resistance between PV string and ground must exceed 10 kΩ
· The polarity from PV string are correct
· Use the DC plugs in the accessory
· The lightning protector should be equipped between PV string and inverter
· Disconnect all of the PV (DC) switch during wiring

Warning:
The fatal high voltage may on the DC side, please comply with electric safety when connecting.
Please make sure the correct polarity of the cable connected with inverter, otherwise inverter could be damaged.

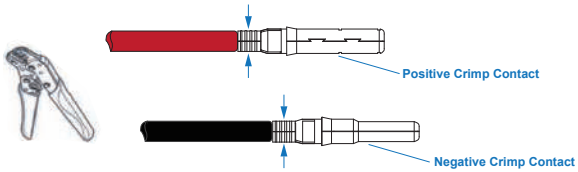
Step 1





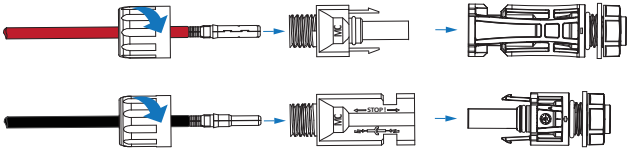
Note:
PV cable suggestion
Cross-section
4mm²

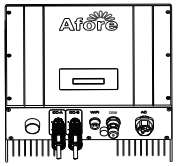
Step 2



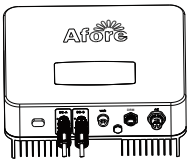
Note:
Please use PV connector crimper to pinch the point of the arrow.

Step 3

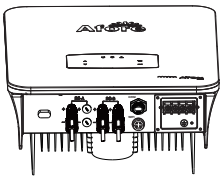




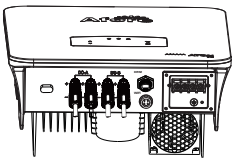
HNS5000TL



HNS3000TL / HNS3600TL /
HNS4000TL / HNS5000TL6 / HNS3600TL-1



HNS6000 / HNS7000 / HNS8000TL



HNS9000 / HNS10000TL

Note:
You'll hear click sound when the connector assembly is correct.

3.5.2 Grid Connection

The on-grid PV inverters work with grid (220/230/240 Vac, 50/60 Hz).

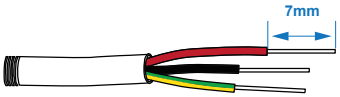
The external AC switch should be installed between inverter and grid to isolate from grid. Please make sure below requirements are followed before connecting AC cable to the inverter.

· The AC (grid) voltage must not exceed inverter's range
· The phase-line from AC distribution box are correctly connected
· Use the AC plugs in the accessory
· The surge protector should be equipped between grid and inverter
· Disconnect the AC (grid) switch during wiring

Warning:
The fatal high voltage may on the AC side, please comply with electric safety when connecting.
Please make sure the right line of AC grid connected with inverter, otherwise inverter could be damaged.

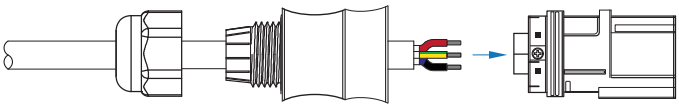
Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1 / HNS5000TL):

Step 1



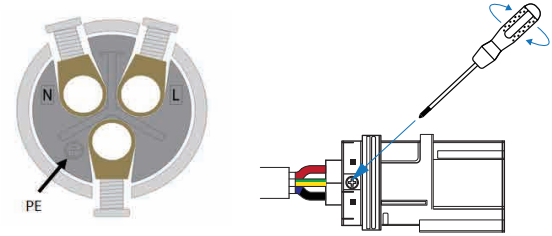
Note:
AC cable suggestion
Cross-section
4mm²

Step 2



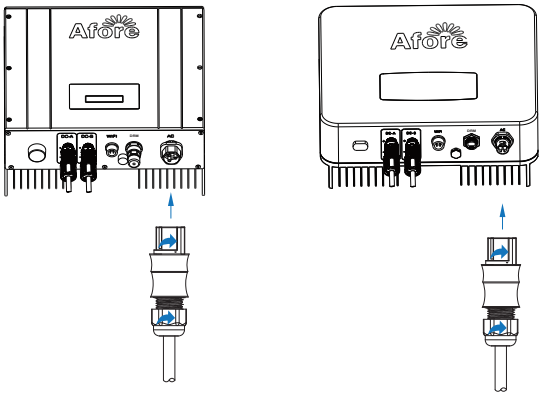
AC line goes through AC terminal waterproof head and cap.

Step 3



Connect AC line, Live line (L), Neutral line (N) and Ground Wire (PE) according to polarity.

Step 4



HNS5000TL

HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1

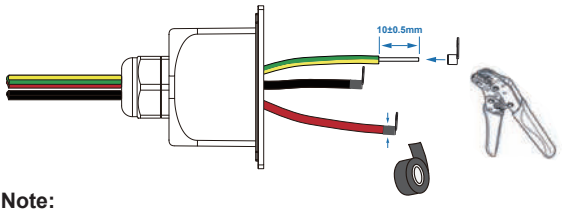
Connect AC terminals and waterproof head, tighten the cap, make sure they clip closely together.
Connect AC connector to AC terminal of the inverter. Ensure firm insertion.

Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL / HNS9000TL / HNS10000TL):

Step 1

Cable suggestion:
6-8kW Cross-section (Copper) 4-6mm² / 10AWG
9-10kW Cross-section (Copper) 6-10mm² / 8AWG

After the terminals are crimpped, wrap the joint position with insulation tape.



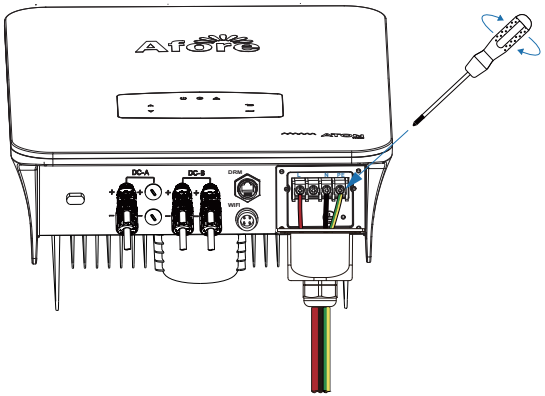
Note:
The wiring terminals should be wrapped with insulation tape, otherwise it will cause a short circuit and damage the inverter.

Step 2

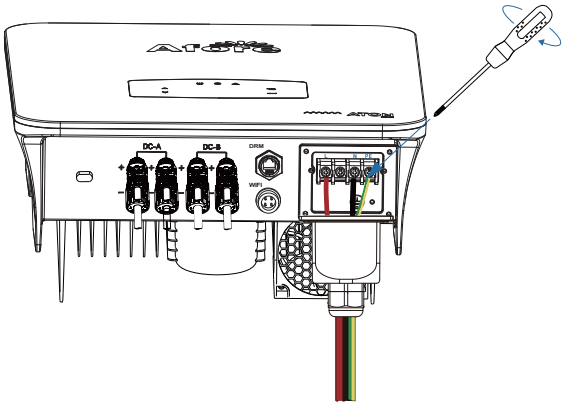
L=Live line
N=Neutral line

Unscrew the row of screws, insert the wire harness into the L, N, PE caps one by one, and tighten the screws.

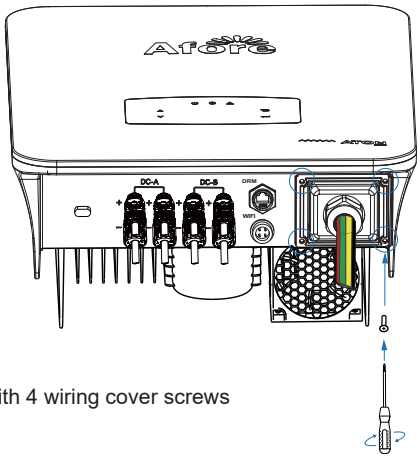
HNS6000TL / HNS7000TL / HNS8000TL



HNS9000 / HNS10000TL



Step 3

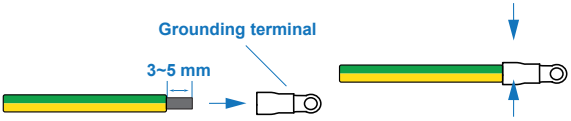


Fix junction box with 4 wiring cover screws

3.5.3 Earth (Grounding) Connection

Note:
The user must connect a protective earth (PE) terminal to prevent electric shock. And make sure this PE terminal is properly grounded.

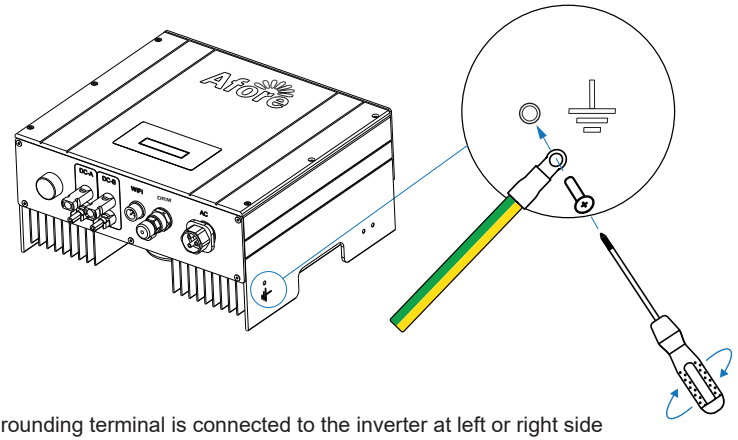
Step 1



Note:
Earth cable PE suggestion:
Cross-section (Copper) 6mm²

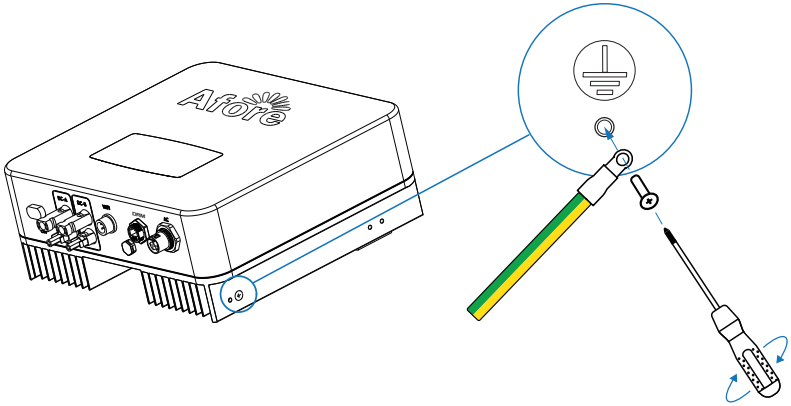
Step 2

Single-Phase (HNS5000TL):

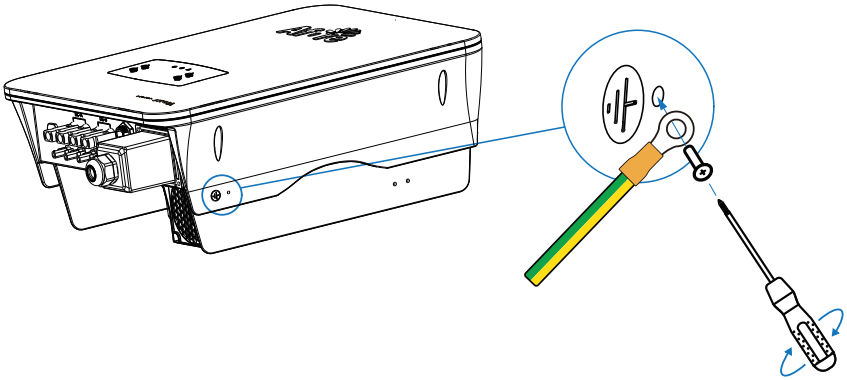


Grounding terminal is connected to the inverter at left or right side

Single-Phase (HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1):



Single-Phase (HNS6000TL / HNS7000TL / HNS8000TL / HNS9000TL / HNS10000TL):



Earth Fault Alarm

The HNS series inverter is equipped with an earth fault alarm. When earth fault occurs, the fault indicator at the front LED screen will light up. And the buzzer of the inverter will keep ringing until the fault is resolved. (This function is only available in Australia and New Zealand).

3.5.4 Communication Connection

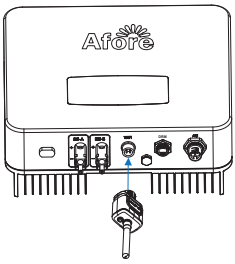
The monitoring module could transmit the data to the cloud server, and display the data on the PC, tablet and smart-phone.

Install the WIFI / Ethernet / GPRS / RS485 Communication

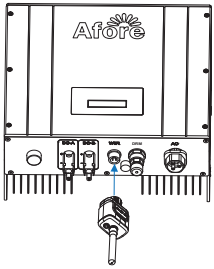
WIFI / Ethernet / GPRS / RS485 communication is applicable to the inverter. Please refer to "WIFI&Ethernet&GPRS Connection Manual" for detailed instruction.

For the use of monitoring, please refer to“HOME APP User Manual” (For end user-APP version), “HOME Web User Manual” (For end user-Web version), “PRO APP User Manual” (For installer-APP version), “PRO Web User Manual” (For installer-Web version).

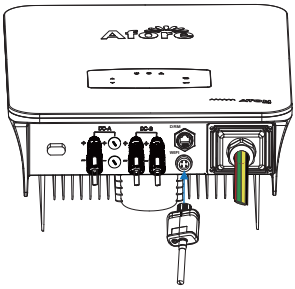
Step 1



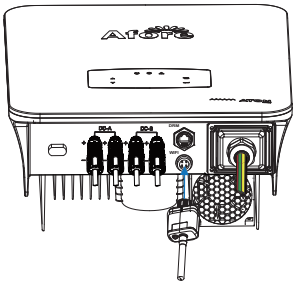
HNS3000TL / HNS3600TL / HNS4000TL / HNS5000TL6 / HNS3600TL-1



HNS5000TL

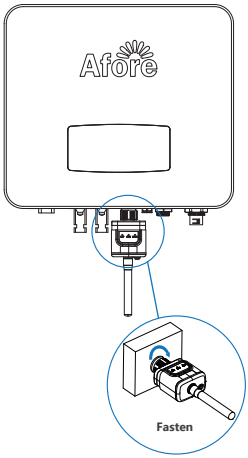


HNS6000 / HNS7000 / HNS8000TL

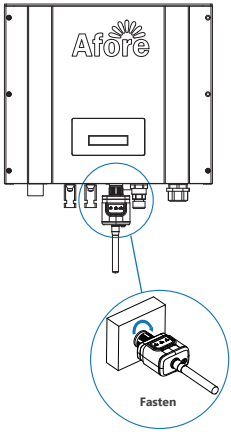


HNS9000 / HNS10000TL

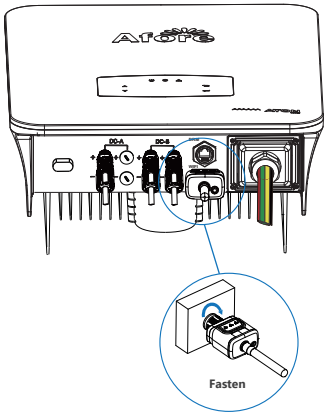
Step 2



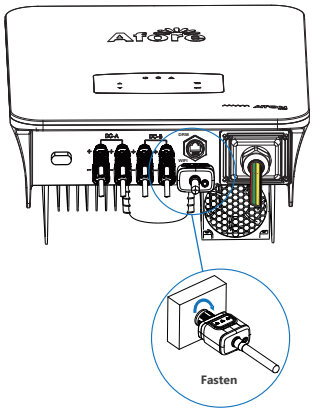
HNS3000TL / HNS3600TL /
HNS4000TL / HNS5000TL6 / HNS3600TL-1



HNS5000TL



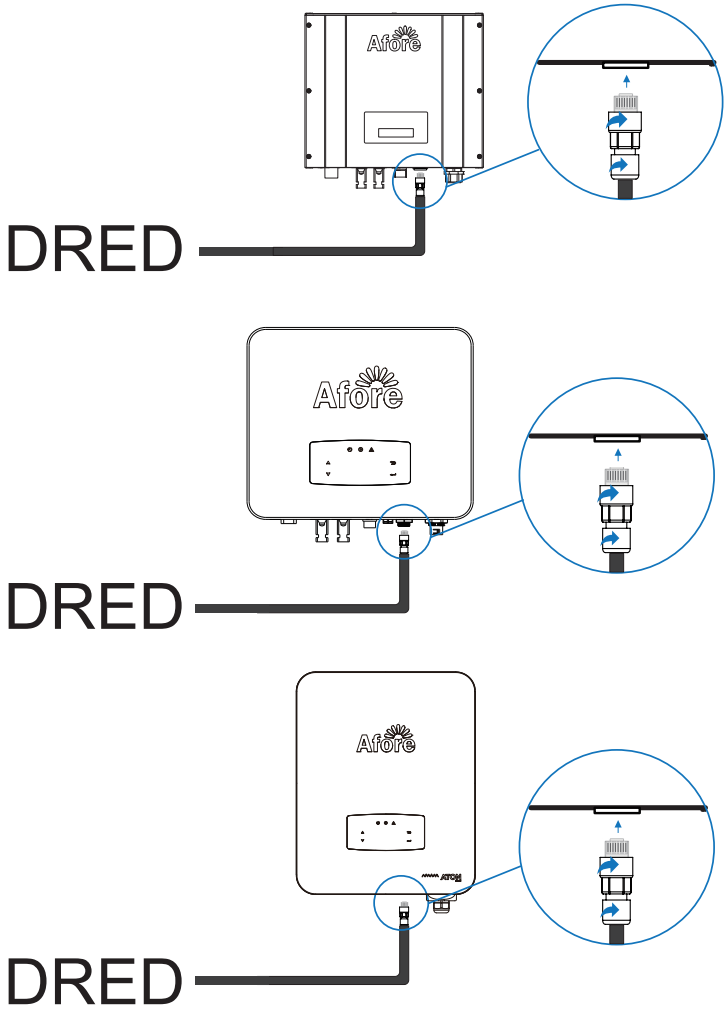
HNS6000 / HNS7000 / HNS8000TL



HNS9000 / HNS10000TL

DRM response modes

DRM is provided to support several response modes by giving control signals.
Prepare RJ45 connector and a communication cable.
Assemble the RJ45 connector, Pins are defined as follow.



DRED connection circuit

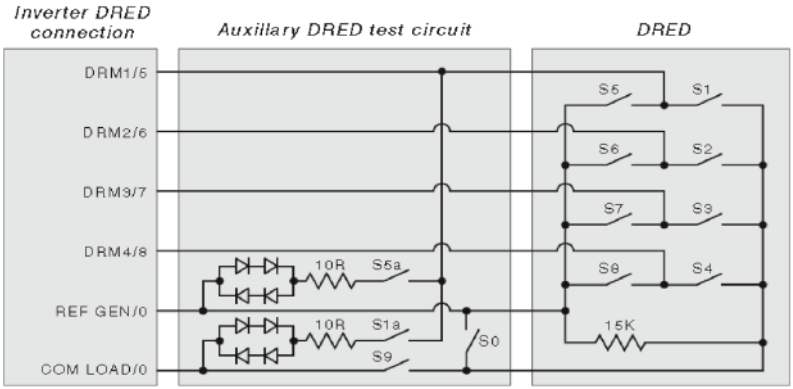
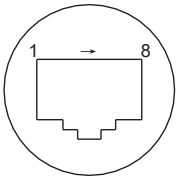


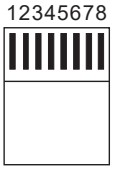
FIGURE I1 DRED CONNECTION CIRCUIT

RJ45 socket pin assignment

Pin Assignments Front View



RJ45 Socket

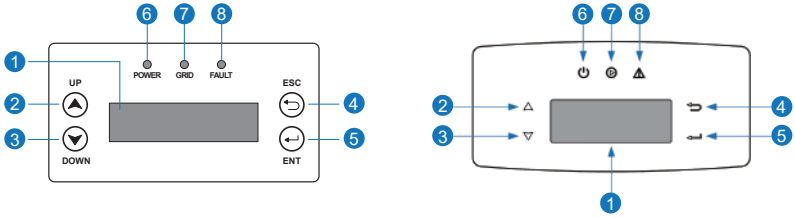


RJ45 Plug

PIN	Assignment	PIN	Assignment
1	DRM 1/5	5	RefGen
2	DRM 2/6	6	COM/DRM0
3	DRM 3/7	7	RS485 A (24)
4	DRM 4/8	8	RS485 B (25)

4. Operation

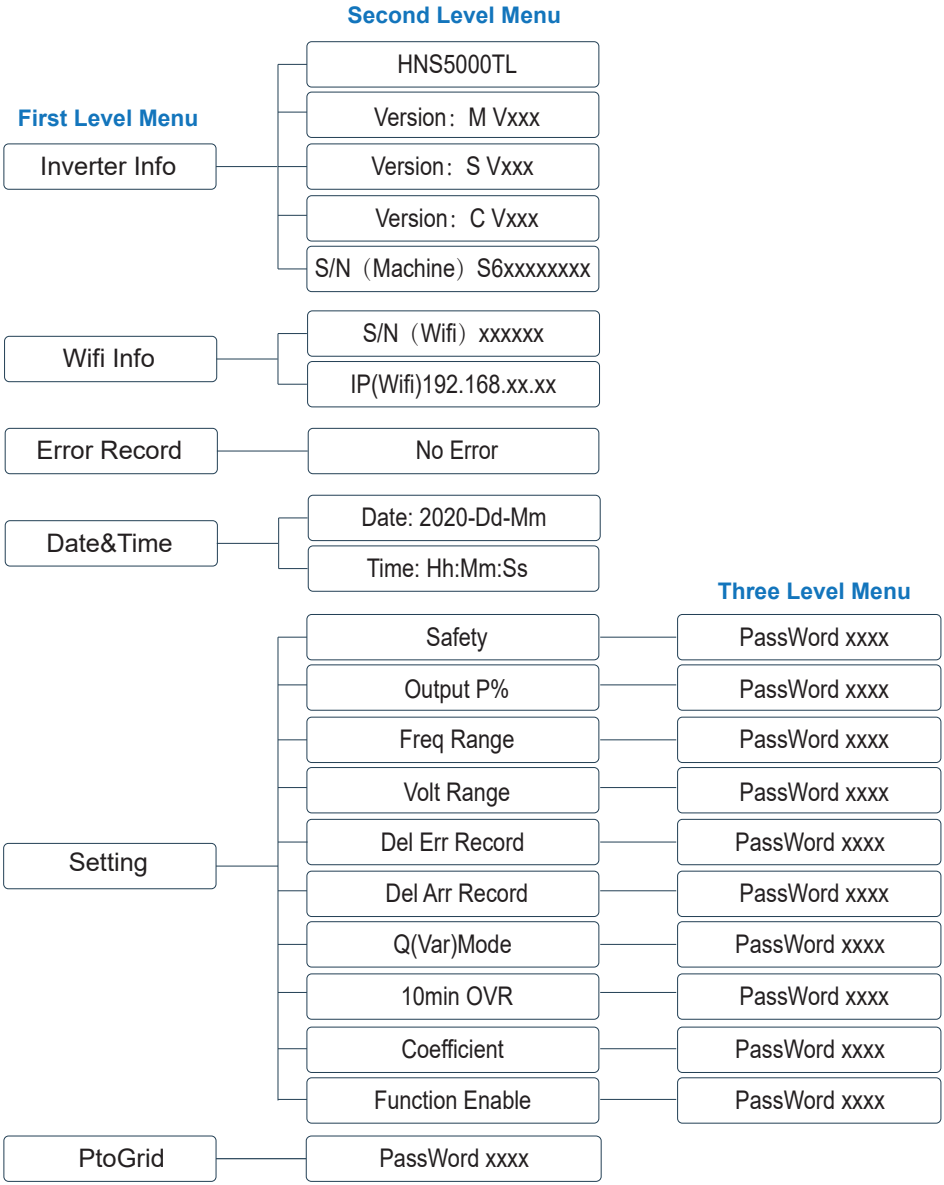
4.1 Control Panel



No.	Items	No.	Items
1	LCD Display	5	**ENT** Touch Button
2	**UP** Touch Button	6	**POWER** LED Indicator
3	**DOWN** Touch Button	7	**GRID** LED Indicator
4	**ESC** Touch Button	8	**FAULT** LED Indicator

Sign	Power	Color	Explanation
POWER	ON	Green	The inverter is stand-by
	OFF		The inverter is power off
GRID	ON	Green	The inverter is feeding power
	OFF		The inverter is not feeding power
FAULT	ON	Red	Fault occurred
	OFF		No fault

4.2 Menu Structure

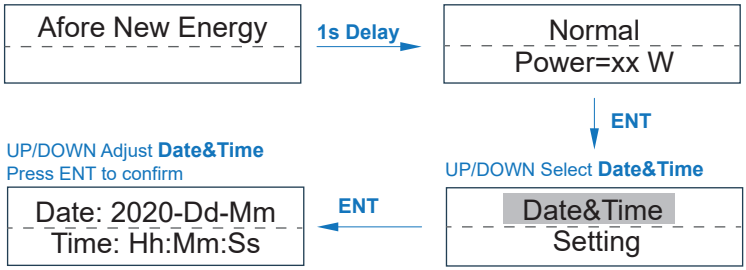


Explanation of LCD Display Content

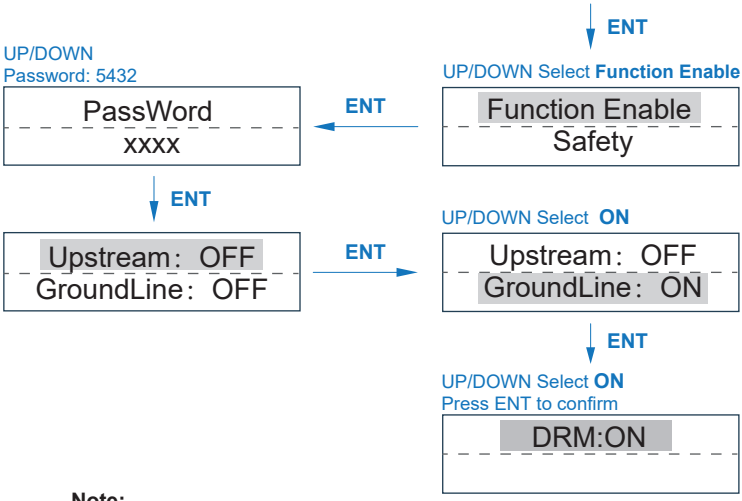
Nouns	Explanation
Inverter Info	Display the serial number and firmware version of inverter
Error Record	Check the error list of inverter including date and time
Wifi Info	Display the WIFI serial number and assigned IP address
Date & Time	Set date and time of the inverter
Setting	Set the protection parameters of inverter
Safety	Set the information of the country/region code
Q(Var)Mode	Power quality response
Function Enable	Function use and closure

4.3 Setting

4.3.1 Startup Setting



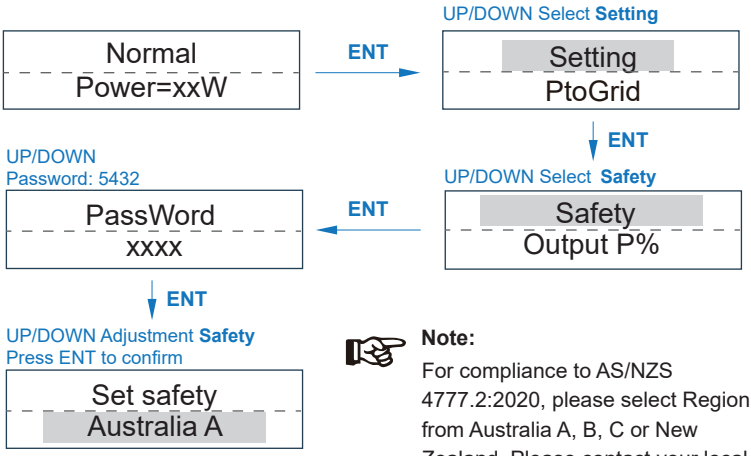
4.3.2 DRM Setting



Note:

If GroundLine is not turned on, it cannot detect whether the machine is grounded. After GroundLine and DRM functions are turned on, the power must be cut off before normal use. If the machine display shows Ground Wire Lost, it means that the machine is not connected to the ground wire.

4.3.3 Safety Setting (Setting Country Code)



Note:

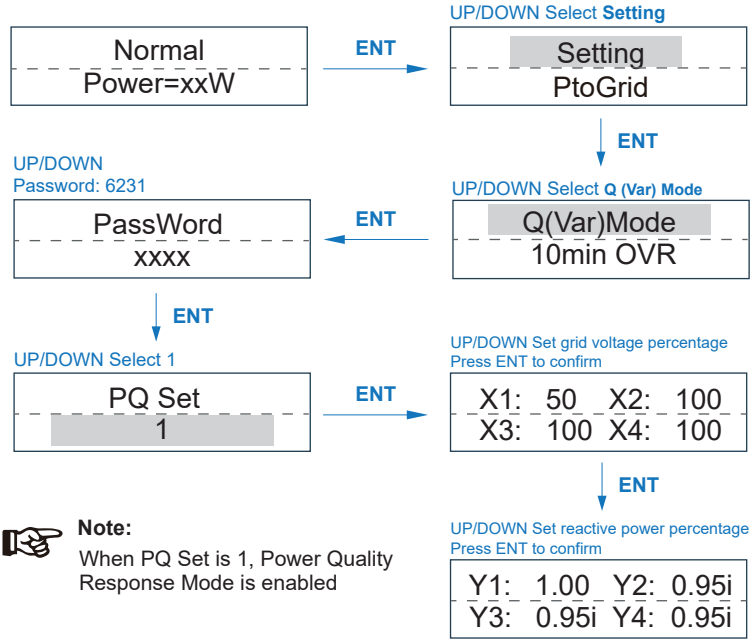
For compliance to AS/NZS 4777.2:2020, please select Region from Australia A, B, C or New Zealand. Please contact your local grid operator on which Region to select.

4.3.4 Power Quality Response Mode Setting

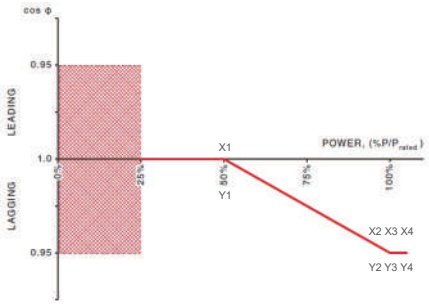
4.3.4.1 Enable Power Quality Response Modes

Power Quality Response Modes can be enabled via the LCD menu. Refer to section 4.3.4.1 (a)~(d) of this manual.

a. Active Power Control Power Factor

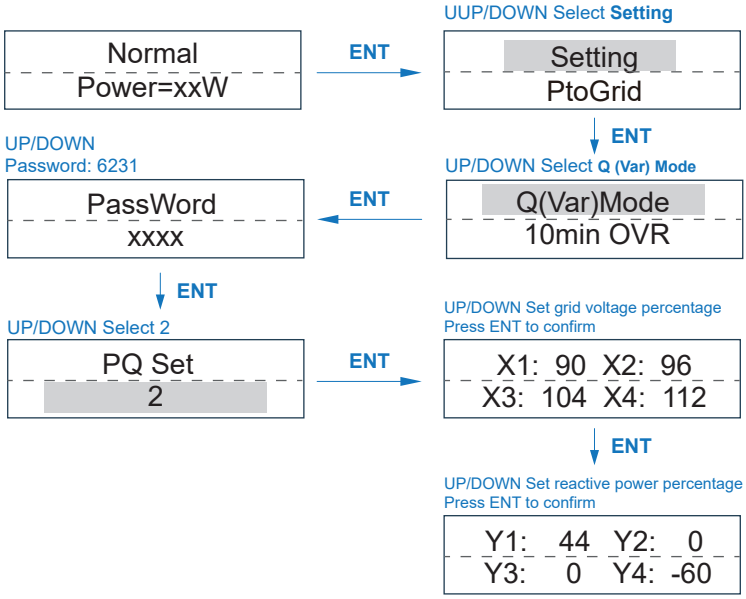


Note:
When PQ Set is 1, Power Quality Response Mode is enabled



Set Pb_Limit: 0-100%, Default 25%
Pc_Limit: 0-100%, Default 50%
Pc_Factor: (-0.8, +0.8), Default -0.95

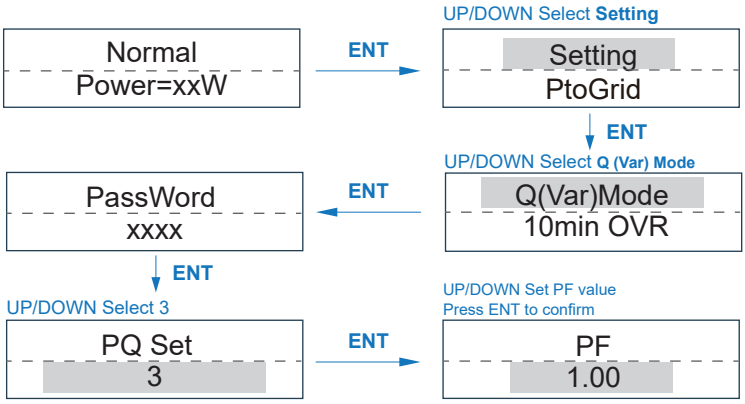
b. Voltage Control Reactive Power



Note:
When PQ Set is 2, Power Quality Response Mode is enabled.

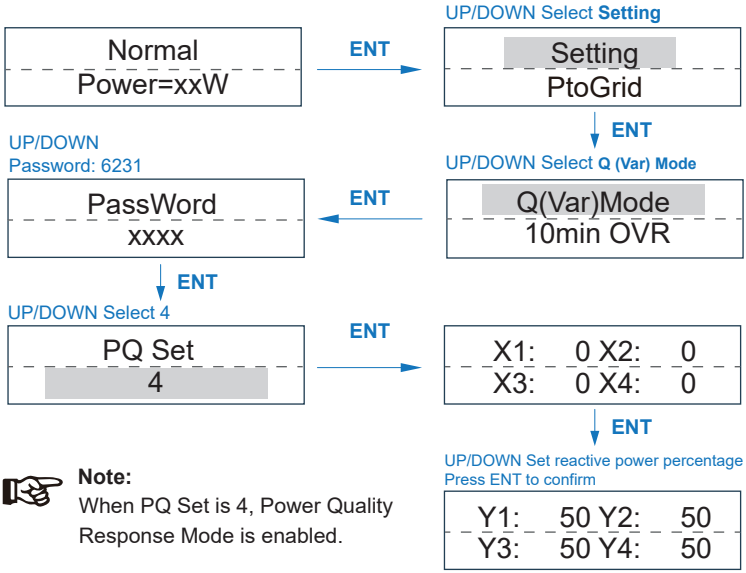
Note:
Volt-var is enabled by default.

c. Fixed Power Factor



Note:
Set PF (-0.8, +0.8), Default 1,Resolution 0.01.
When PQ Set is 3, Power Quality Response Mode is enabled

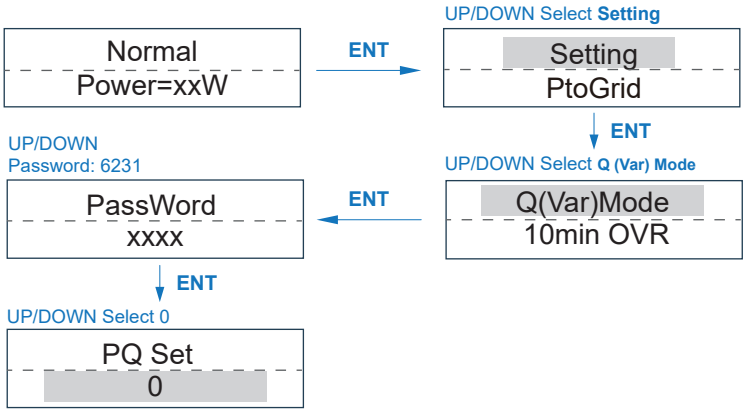
d. Fixed Reactive Power (%)



Note:
When PQ Set is 4, Power Quality Response Mode is enabled.

4.3.4.2 Disable Power Quality Response Modes

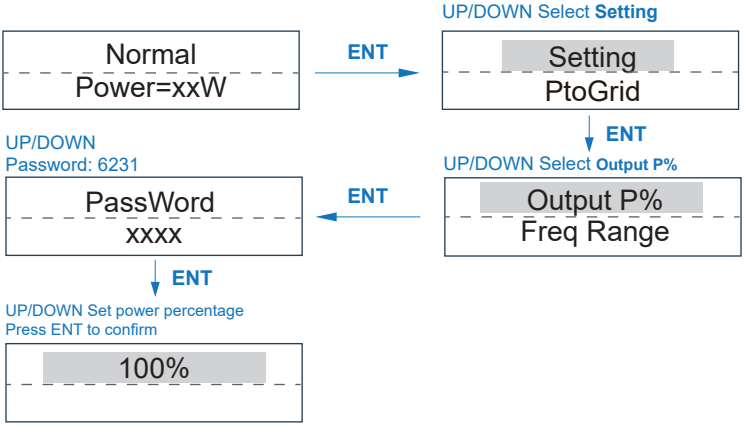
Power Quality Response Modes can be disabled via the LCD menu. Refer to section 4.3.4.2 of this manual.



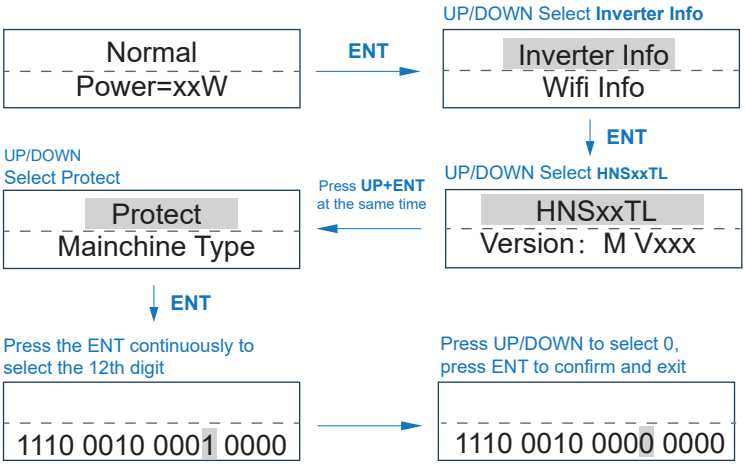
Note:
When PQ Set is 0, Power Quality Response Modes is disabled.

4.3.4.3 Active Power Mode Set

a. Active Power Percentage



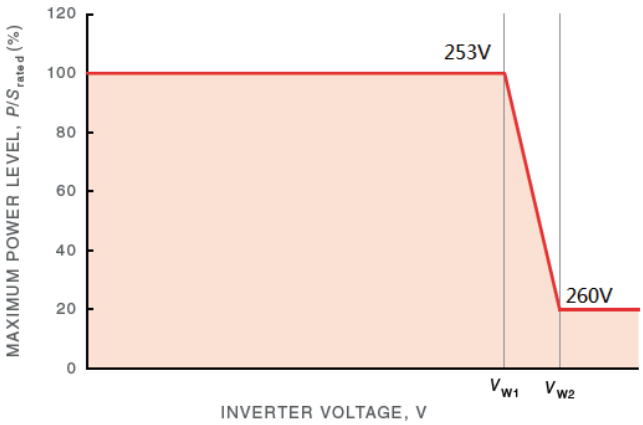
b. Volt-Watt



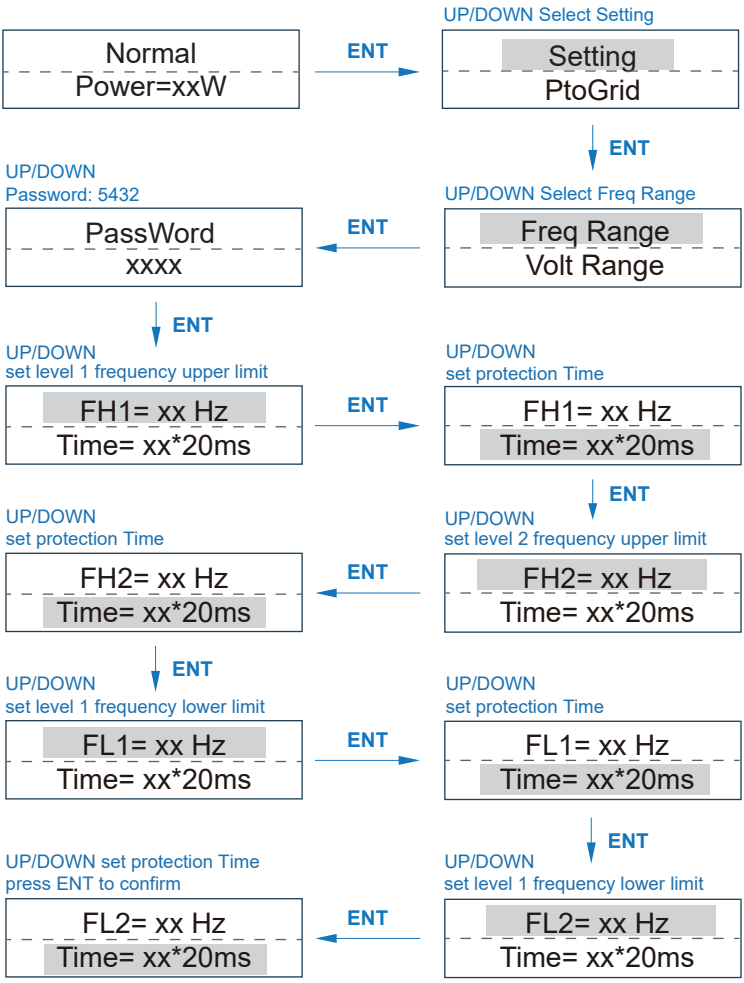
Note:

The volt–watt response mode shall be enabled by default.

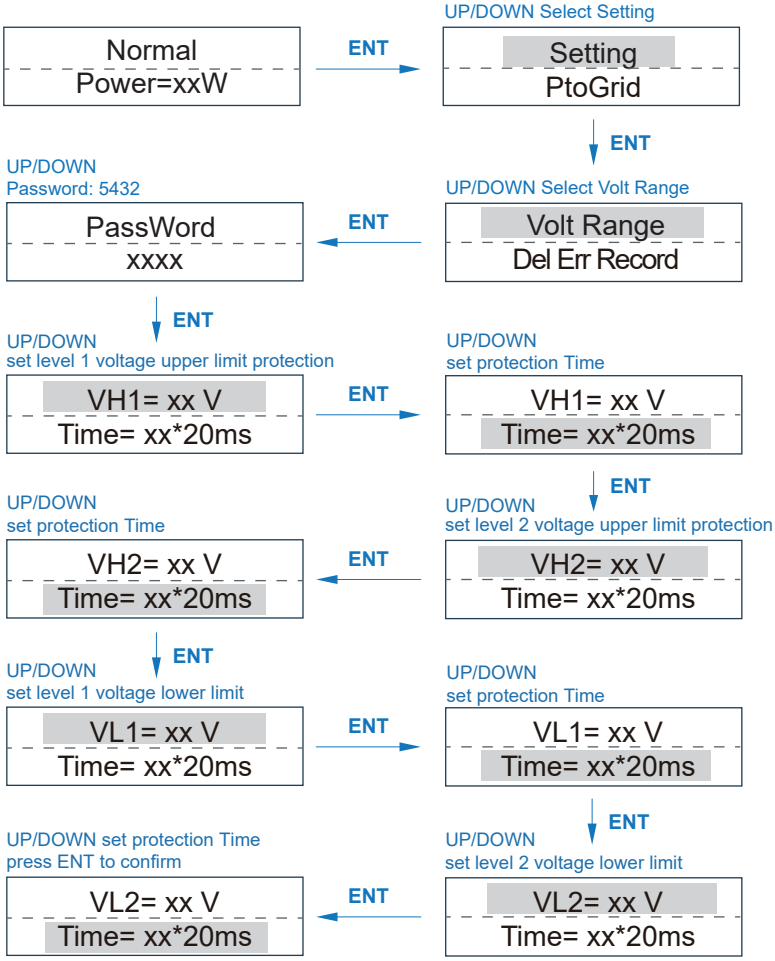
To turn off the volt-watt response mode, change the 12th digit to 0.



4.3.5 Frequency protection range (Freq Range) Setting



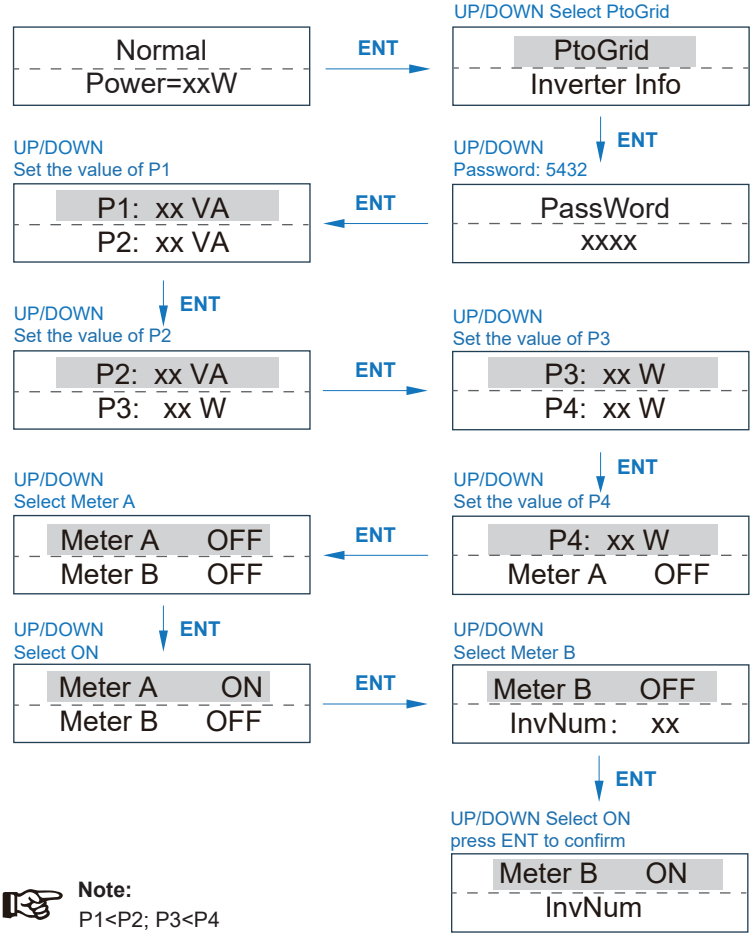
4.3.6 Voltage protection range (Volt Range) set



4.3.7 Multiple inverter combinations

Inverters should not be installed in multiple phase combinations.

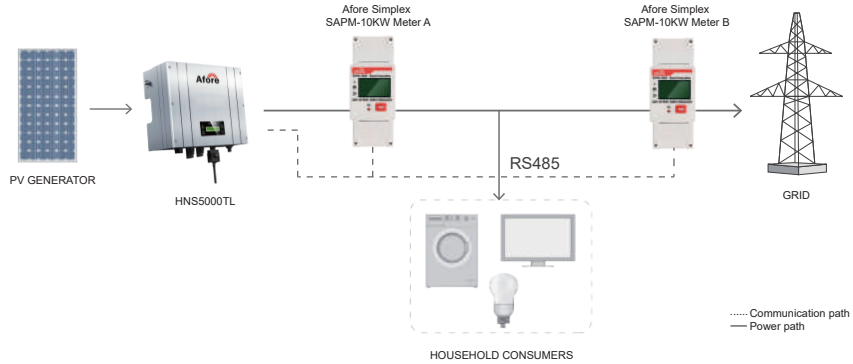
4.3.8 Generation control funcion set

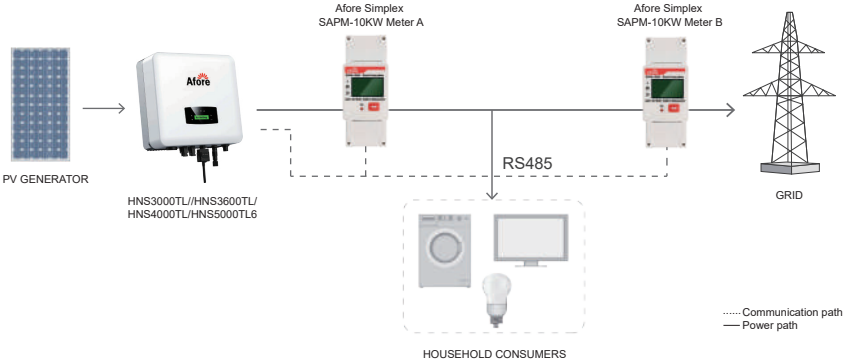


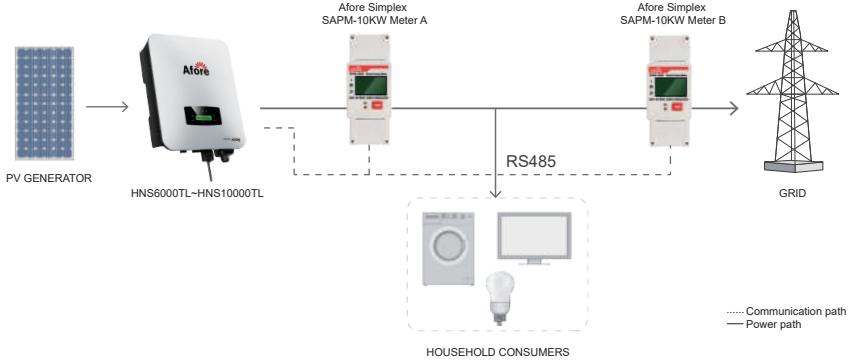
Note:
P1<P2; P3<P4
Meter A: Generation limit (VA)
P1: Generation soft limit;
P2: Generation hard limit.

Meter B: Export limit (W)
P3: Export soft limit;
P4: Export hard limit.

Generation control funcion system diagram



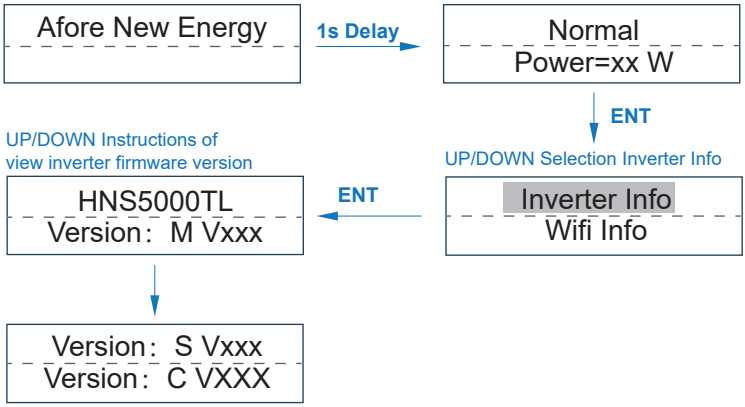




4.4 Active anti-islanding protection

The method of active anti-islanding protection:
Shifting the frequency of the inverter away from nominal conditions in the absence of a reference frequency (frequency shift);

4.5 Instructions of view inverter firmware version



For the viewing of the following functions, please refer to the steps in Chapter 4.3:

Country Grid Code/Region settings;
Power quality response modes settings;
Grid Protection settings;
Inverter firmware version.

5. Commissioning

Before starting up commissioning at site, please make sure below procedures and requirements are fully meet.

- Mounting location is meet the requirements.
- All of the electrical wiring is firmly connected, including PV wiring, Grid wiring and Earth wiring.
- The inverter setting has been finished accordingly to local standards or regulations.

Commissioning Procedures

• Turn on the AC switch between inverter output and the public grid;
• Turn on the DC switch on the inverter;
• Turn on the PV switch of the system.

6. Shut Down & Restart the Inverter

6.1 Shut down

• Turn off the DC switch on the inverter.
• Turn off the DC switch between PV panels and the inverter (if any).
• Close the AC switch between the inverter and the public grid.

Note:
The inverter will be operable after minimum 5 minutes.

6.2 Restart

• Shut down the inverter according to Chapter 6.1.
• Start-up the inverter according to Chapter 5.

7. Maintenance&Trouble Shooting

7.1 Maintenance

Periodically maintenance are necessary, please follow steps as below.
PV connection: twice a year
AC connection : twice a year
Earth connection: twice a year
Heat sink: clean with dry towel once a year.

7.2 Trouble Shooting

Fault messages will be displayed when fault occurs, please according to trouble- shooting table find related solutions.

Trouble-Shooting List

Code	Error Display	Error Message	Possible Fault	Correctie Measure
E0	GFCI Fault	Ground Fault Circuit Interrupter	Ground Fault Circuit Interrupter fault	restart the inverter
E6/E11	Bus High Fault/Bus Fault	Bus Voltage High /Bus Fault	· PV Input voltage high · AC side poor connection	· check PV input voltage within 450Vdc(up to 3.0kw model), 500Vdc(up to 5.0kw model) · check AC connector, circuit breaker well connection
E9	No Utility	Utility loss	· utility loss · AC side circuit breaker turn off · AC side poor connection · inverter fault	· grid back to the normal, the inverter will restart automatically · replace the AC circuit breaker · check AC connector well connection · after seceral retart the fault remains, replace inverter
E10	Ground Current Fault	Leakage current high	1. poor earthing, leakage current high 2. PV(+) or PV(-) earthed	1. check the AC output wring and restart the inverter 2. check PV array wiring
E13	Over Temperatu re Fault	Inverter too hot	· inverter enclosure too hot · temperatrue sensor fault	· turn off the inverter still the temperature down to the normal. Or install the inverter at a well ventilated site. · replace the temperature sensor
E15	PV Over Fault	PV input voltage high	· PV array's Voc high	· re-design the PV array configuration · measure the PV array voltage is the same as inverter displayed.
E17	M Grid Volt Fault	Grid voltage out of range	· grid voltage out of the setting range	· grid back to the normal, the inverter will restart automatically · check Country standard setting is correct
E18	Isolation Fault	Insulation Resistance high	· PV(+) or PV(-) earthed	check the resistance between PV(+) and ground, PV(-) and ground bigger than 2MΩ.
E19	Current DC Offset	DC bias high	· AC side DC bias high	restart the inverter
E12	Over Current	Over current fault	· grid fluctuate · AC side poor connection	· the inverter will restart automatically · check the AC output wring and restart the inverter
E24	Relay 1/2 Fault	Relay fault	· inverter fault	restart the inverter
E29	MGrid FreqFault	Grid frequency out of range	· grid fluctuate · grid frequency out of setting range	· grid back to the normal, the inverter will restart automatically · check inverter frequency setting range correct

8. Specifications

PV Input Data	HNS3600TL-1	HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL6	HNS5000TL
Max. DC Power (W)	5400	4500	5400	6000	7000	7000
Max. DC Voltage (V)	600	600	600	600	600	600
MPPT Voltage Range (V)	70-550	70-550	70-550	70-550	70-550	70-550
Min Operating DC Voltage(V)	70	70	70	70	70	70
Start-up Voltage (V)	70	70	70	70	70	70
Max. Input Current (A)	14	14 x 2	14 x 2	14 x 2	14 x 2	14 x 2
Max. Short Current (A)	18	18 x 2	18 x 2	18 x 2	18 x 2	18 x 2
No. of MPP Tracker / No. of PV String	1/1	2/2	2/2	2/2	2/2	2/2
Input Connector Type	MC4	MC4	MC4	MC4	MC4	MC4
AC Output Data	**HNS3600TL-1**	**HNS3000TL**	**HNS3600TL**	**HNS4000TL**	**HNS5000TL6**	**HNS5000TL**
Max.Output Power (W)	3600	3000	3600	4000	5000	5000
Rated Output Power (VA)	3600	3000	3600	4000	5000	5000
Rated Output current (A)	15.7	13.1	15.7	17.4	21.8	21.8
Max. Output Current (A)	17.5	15	17.5	20	24	24
Nominal Output Voltage (V)	L/N/PE, 220Vac, 230Vac, 240Vac					
Grid Voltage Range	180Vac-276Vac (According to local standard)					
Nominal Output Frequency (Hz)	50					
Grid Frequency Range	45~55Hz (According to local standard)					
Output Power Factor	1 default (adjustable from 0.8 leading to 0.8 lagging)					
Output Current THD	<3%					
Efficiency	**HNS3600TL-1**	**HNS3000TL**	**HNS3600TL**	**HNS4000TL**	**HNS5000TL6**	**HNS5000TL**
Max. Efficiency	98.20%	98.20%	98.20%	98.20%	98.20%	98.20%
Protection	**HNS3600TL-1**	**HNS3000TL**	**HNS3600TL**	**HNS4000TL**	**HNS5000TL6**	**HNS5000TL**
PV Reverse Polarity Protection	YES					
PV Insulation Resistance Detection	YES					
AC Short Circuit Protection	YES					
AC Over Current Protection	YES					
AC Over Voltage Protection	YES					
Anti-Islanding Protection	YES					
Residual Current Detection	YES					
Over Temperature Protection	YES					
Integrated DC switch	YES					
Surge Protection (DC & AC)	YES					
General Data	**HNS3600TL-1**	**HNS3000TL**	**HNS3600TL**	**HNS4000TL**	**HNS5000TL6**	**HNS5000TL**
Dimensions (W x H x D, mm)	358 x 360 x 142					340 x 345 x 170
Weight (kg)	10					12
Protection Degree	IP65					
Protective class	Class I					
Ambient Temperature Range	-25 ~ +60°C (Derating 45°C)					
Inverter Isolation	Non-isolated					
Overvoltage category	OVC III (AC Main), OVC II (PV)					
Humidity Range	0-100%					
Topology	Transformerless					
Communication Interface	RS485 / WiFi / Wire Ethernet / GPRS (optional)					
Cooling Concept	Convection					
Noise Emission (db)	<28					
Night Power Consumption (W)	<1					
Max. Operation Altitude (m)	4000					
Certifications and Standards	**HNS3600TL-1**	**HNS3000TL**	**HNS3600TL**	**HNS4000TL**	**HNS5000TL6**	**HNS5000TL**
EMC Standard	EN/IEC 61000-6-2, EN/IEC 61000-6-3, EN61000-3-2, EN61000-3-3, EN61000-3-11, EN61000-3-12					
Safety Standard	EN/IEC 62109-1/-2 ,UL1547, IEC 60068-2					
Grid-connection	EN50549-1, EN50438, RD 1699,UNE 217001, RD 413, IEC61727, IEC62116, IEC61683, VDE4105, UL1741 VDE0126 AS4777.2 NB/T 32004-2018, UNT C 15-712-1, ABNT NBR 16149, ABNT NBR 16150					

PV Input Data	HNS6000TL	HNS7000TL	HNS8000TL	HNS9000TL	HNS10000TL
Max. DC Power (W)	8400	9800	11200	12600	14000
Max. DC Voltage (V)	600	600	600	600	600
MPPT Voltage Range (V)	70-550	70-550	70-550	70-550	70-550
Min Operating DC Voltage(V)	70	70	70	70	70
Start-up Voltage (V)	70	70	70	70	70
Max. Input Current (A)	14+14	14+26	14+26	26+26	26+26
Max. Short Current (A)	18+18	18+35	18+35	35+35	35+35
No. of MPP Tracker / No. of PV String	2/2	2/3	2/3	2/4	2/4
Input Connector Type	MC4	MC4	MC4	MC4	MC4
AC Output Data	**HNS6000TL**	**HNS7000TL**	**HNS8000TL**	**HNS9000TL**	**HNS10000TL**
Max.Output Power (W)	6000	7000	8000	9000	10000
Rated Output Power (VA)	6000	7000	8000	9000	10000
Rated Output current (A)	26.1	30.5	34.8	39.2	43.5
Max. Output Current (A)	28.7	33.6	38.3	45	50
Nominal Output Voltage (V)	L/N/PE, 220Vac, 230Vac, 240Vac				
Grid Voltage Range	180Vac-276Vac (According to local standard)				
Nominal Output Frequency (Hz)	50				
Grid Frequency Range	45~55Hz (According to local standard)				
Output Power Factor	1 default (adjustable from 0.8 leading to 0.8 lagging)				
Output Current THD	<3%				
Efficiency	**HNS6000TL**	**HNS7000TL**	**HNS8000TL**	**HNS9000TL**	**HNS10000TL**
Max. Efficiency	98.2%	98.2%	98.2%	98.32%	98.40%
Protection	**HNS6000TL**	**HNS7000TL**	**HNS8000TL**	**HNS9000TL**	**HNS10000TL**
PV Reverse Polarity Protection	YES				
PV Insulation Resistance Detection	YES				
AC Short Circuit Protection	YES				
AC Over Current Protection	YES				
AC Over Voltage Protection	YES				
Anti-Islanding Protection	YES				
Residual Current Detection	YES				
Over Temperature Protection	YES				
Integrated DC switch	YES				
Surge Protection (DC & AC)	YES				
General Data	**HNS6000TL**	**HNS7000TL**	**HNS8000TL**	**HNS9000TL**	**HNS10000TL**
Dimensions (W x H x D, mm)	510 x 370 x 192			535 x 370 x 192	
Weight (kg)	17			18	
Protection Degree	IP65				
Protective class	Class I				
Ambient Temperature Range	-25 ~ +60°C (Derating 45°C)				
Inverter Isolation	Non-isolated				
Overvoltage category	OVC III (AC Main), OVC II (PV)				
Humidity Range	0-100%				
Topology	Transformerless				
Communication Interface	RS485 / WiFi / Wire Ethernet / GPRS (optional)				
Cooling Concept	Convection				
Noise Emission (db)	<28				
Night Power Consumption (W)	<1				
Max. Operation Altitude (m)	4000				
Certifications and Standards					
EMC Standard	EN/IEC 61000-6-2, EN/IEC 61000-6-3, EN61000-3-2, EN61000-3-3, EN61000-3-11, EN61000-3-12				
Safety Standard	IEC 60068, UL1741, EN62109				
Grid-connection	IEEE1547, CSA C22, EN50549, VDE4105, VDE0126, RD1699, ABNT NBR16149 & 16150, AS4777.2, NB/T 32004-2018, G98/G99, IEC61727				