

# On-Grid PV Inverter

Installation and Operation Manual

[www.aforeenergy.com](http://www.aforeenergy.com)



**Afore**

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# 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)

HNS1000TL-1	HNS1500TL-1	HNS2000TL-1	HNS2500TL-1
HNS3000TL-1	HNS3600TL-1		

### Single-Phase (Two MPPT Trackers)

HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL
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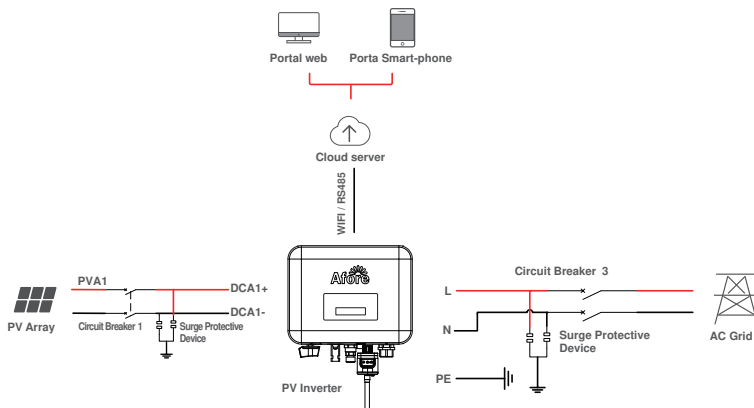
Please keep this manual all the time available in case of emergency.

## 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.



### Circuit Breaker and Surge Protector Recommendation:

Type	Max AC Current [A]	Rated current of AC breaker[A]
Single-Phase (One MPPT Tracker)		
HNS1000TL-1	6	16
HNS1500TL-1	9	16
HNS2000TL-1	12	20
HNS2500TL-1	13	20
HNS3000TL-1	15	25
HNS3600TL-1	18	25
Single-Phase (Two MPPT Trackers)		
HNS3000TL	15	25
HNS3600TL	16	25
HNS4000TL	20	32
HNS5000TL	23	32

- 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. (220/230Vac, 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.

<b>Inverter model</b>	<b>Rating of the RCD</b>	<b>Leakage current</b>
HNS1000TL-1 HNS1500TL-1 HNS2000TL-1	16A	30mA
HNS2500TL-1 HNS3000TL-1 HNS3600TL-1 HNS3000TL HNS3600TL	25A	30mA
HNS4000TL HNS5000TL	32A	30mA

## 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.

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

# 3. Installation

## 3.1 Package

### Unpacking

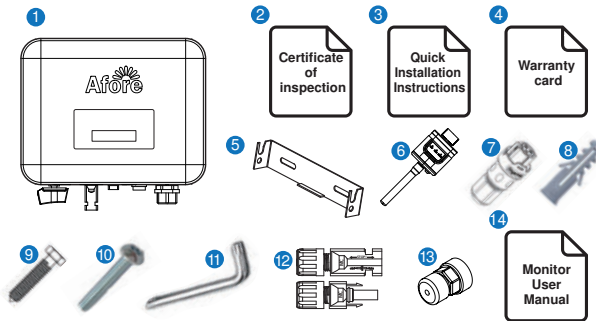
On receiving the inverter, please check to make sure the packing and all of the components are not missing or damaged. Please contact your dealer directly for supports if there is any damage or missing components.

### Package List

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

#### Single-Phase (1-3kW)

HNS1000TL-1      HNS1500TL-1      HNS2000TL-1      HNS2500TL-1  
 HNS3000TL-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	Screwdriver For Security Screw
5	1	Wall Mounting Bracket	12	1	DC Connector set
6	1	Monitor Module	13	1	Rj45 Port
7	1	AC Connector	14	1	Monitor User Manual

**Single-Phase (3-5kW)**

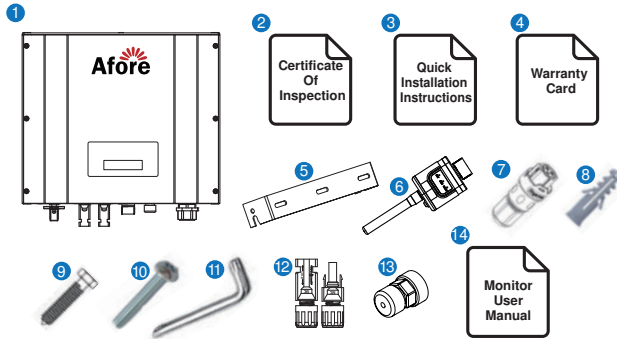
HNS3000TL

HNS3600TL

HNS4000TL

HNS5000TL

HNS3600TL-1



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	1	Screwdriver for Security Screw
5	1	Wall Mounting bracket	12	1/2	DC Connector sets
6	1	Monitor Module	13	1	Rj45 Port
7	1	AC connector	14	1	Monitor User Manual



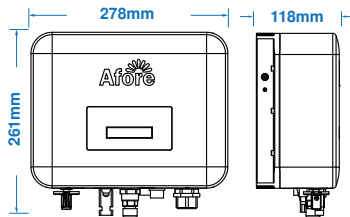
Note: The HNS3600TL-1 is 1 pair of DC plug connector, the HNS3000-5000TL is 2 pairs.



### 3.2 Product Overview

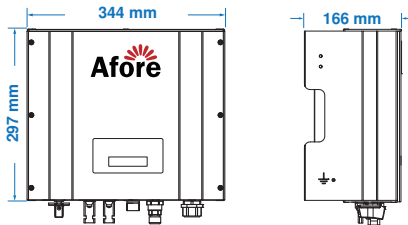
#### Single-Phase (1-3kW)

HNS1000TL-1    HNS1500TL-1    HNS2000TL-1    HNS2500TL-1  
HNS3000TL-1



#### Single-Phase (3-5kW)

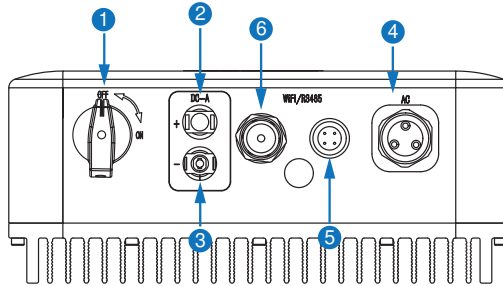
HNS3000TL    HNS3600TL    HNS4000TL    HNS5000TL  
HNS3600TL-1



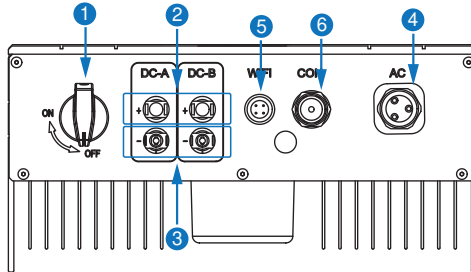
#### Overview of the Connection Area

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

**Single-Phase (1-3kW):**



**Single-Phase (3-5kW):**

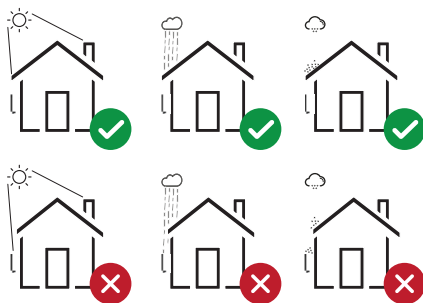


No.	Items
1	DC Switch
2	DC Connectors ( + ) For PV String
3	DC Connectors ( - ) For PV String
4	AC Connector
5	Monitor Module Port
6	RJ 45 Port(DRM)

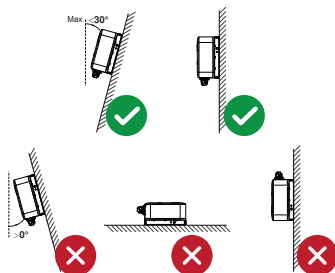
### 3.3 Mounting Location

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:

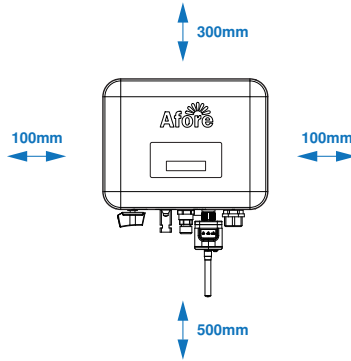
- The inverter should be installed on a solid surface, far from flammable or corrosion materials, where is suitable for inverter's weight and dimensions.
- The ambient temperature should be within  $-25\text{ C} \sim 60\text{ C}$  (between  $-13\text{ }^{\circ}\text{F}$  and  $140\text{ }^{\circ}\text{F}$ ).
- 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.



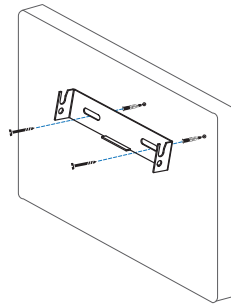
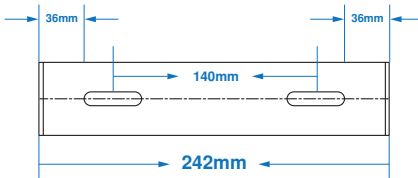
- Leave the enough space around inverter, easy for accessing to the inverter, connection points and maintenance.



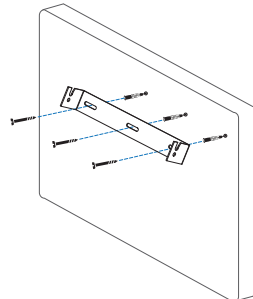
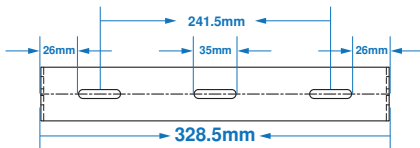
### 3.4 Installation On-grid PV Inverter

**Step 1**

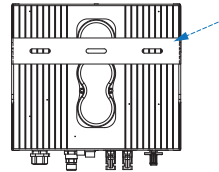
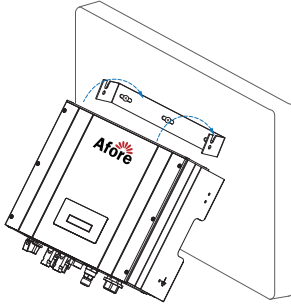
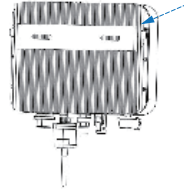
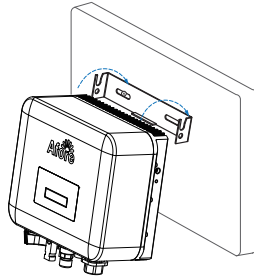
**Single-Phase (1-3kW):**



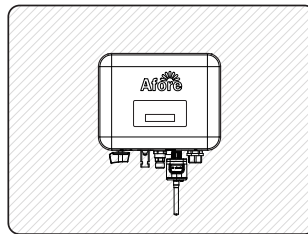
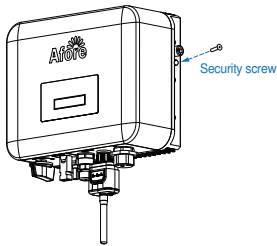
**Single-Phase (3-5kW):**

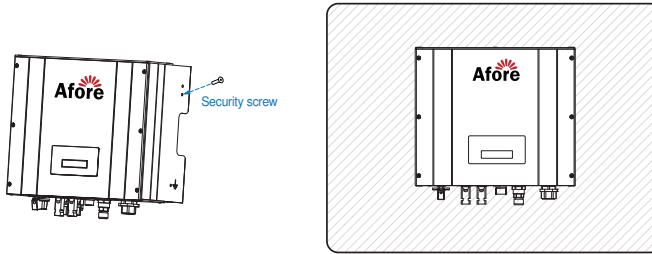


Step 2



Step 3





## 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

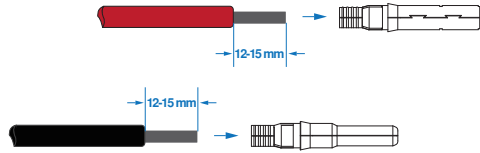


#### **Warning:**

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.

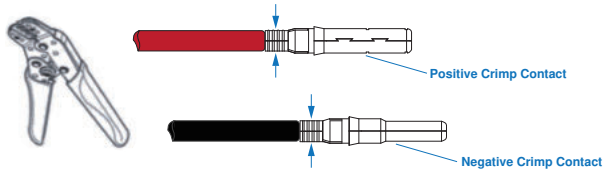
## Step 1



**Note:**  
PV cable suggestion

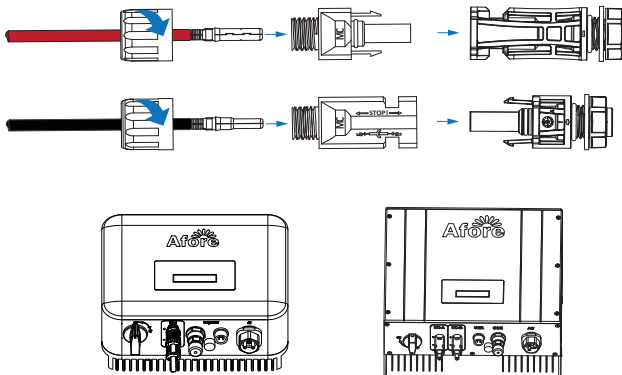
**Cross-section**  
4 mm<sup>2</sup>

## Step 2



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

## Step 3



**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:**

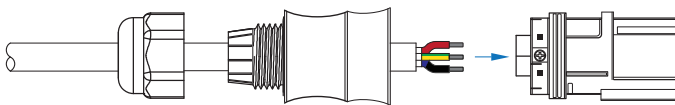
The fatal high voltage may on the AC side, please comply with electric safety when connecting. Please make sure the right line of AC grid connected with inverter, otherwise inverter could be damaged.

**Step 1**



**Note:**  
AC cable suggestion  
Cross-section  
4 mm<sup>2</sup>

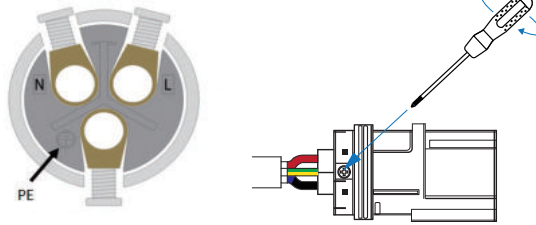
**Step 2**



AC line goes through AC terminal waterproof head and cap



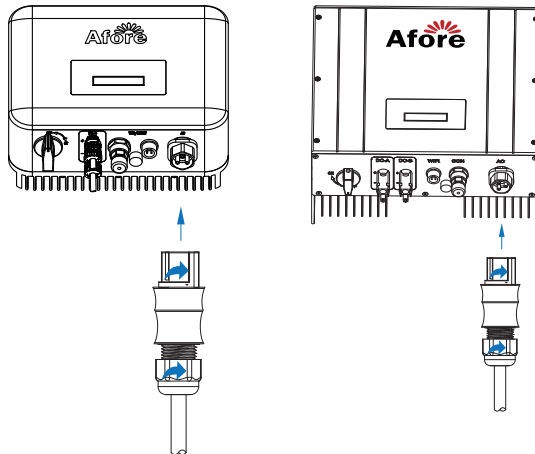
**Step 3**



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

---

**Step 4**



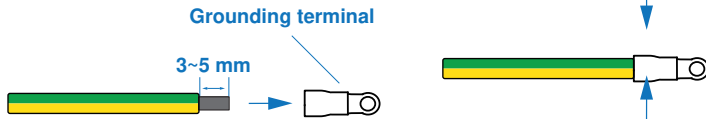
Connect AC terminals and waterproof head, tighten the cap, make sure they clip closely together. Connect AC connector to AC terminal of the inverter. Ensure firm insertion.

### 3.5.3 Earth (Grounding) Connection



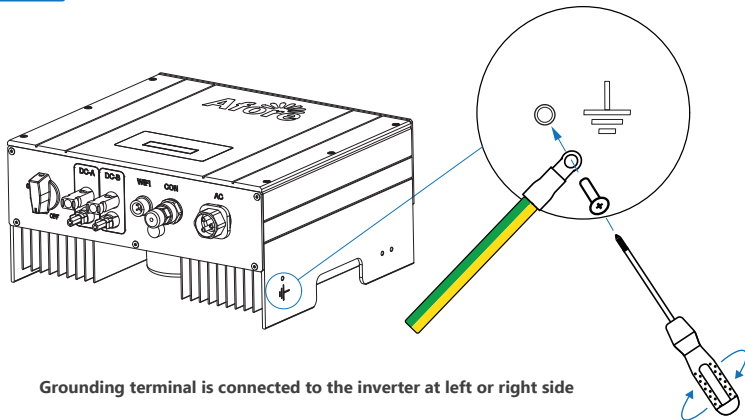
The user must connect a protective earth (PE) terminal to prevent electric shock. And make sure this PE terminal is properly grounded.

Step 1



Note: copper cable or aluminum cable more than 6mm<sup>2</sup>

Step 2



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

### 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

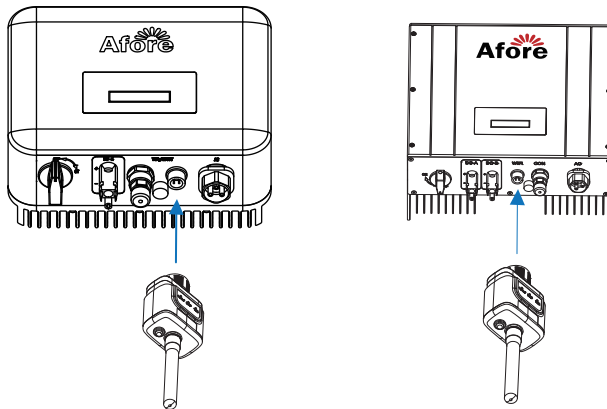
The monitoring module could transmit the data to the cloud server, and display the data on the PC, tablet and smart-phone.

#### Install the WIFI / Ethernet / GPRS / RS485 Communication

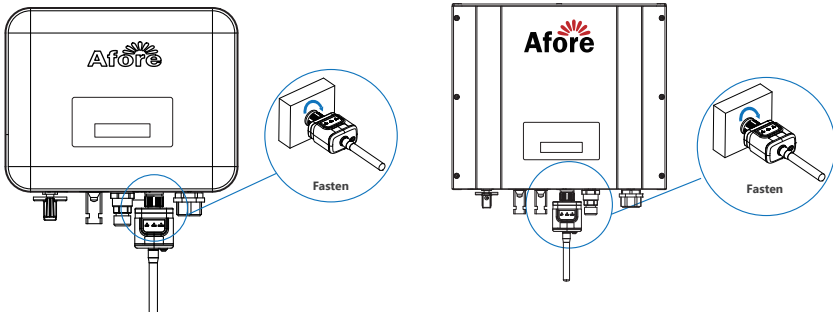
WIFI / Ethernet / GPRS / RS485 communication is applicable to the inverter. Please refer to "WIFI&Ethernet&GPRS Connection Manual" for detailed instruction.

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**



**Step 2**

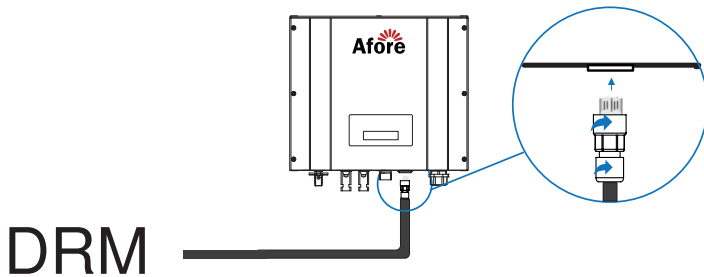
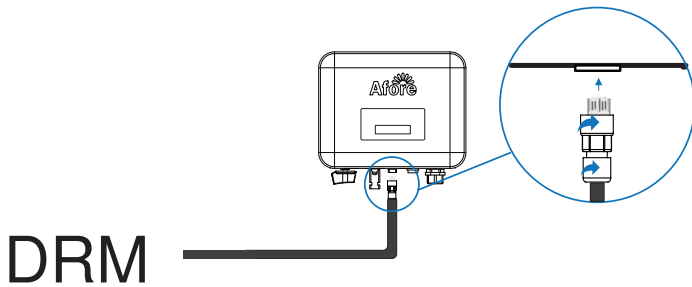


**Install the Zero Injection Smart Meter(optional)**

DRM is provided to support several response modes by giving control signals.

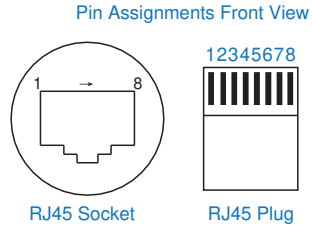
Prepare RJ45 connector and a communication cable .

Assemble the RJ45 connector, Pins are defined as follow.



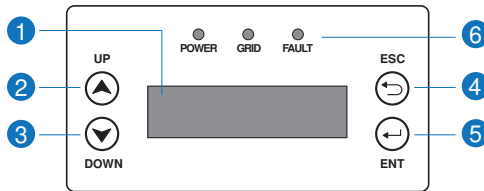
**RJ45 socket pin assignment**

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



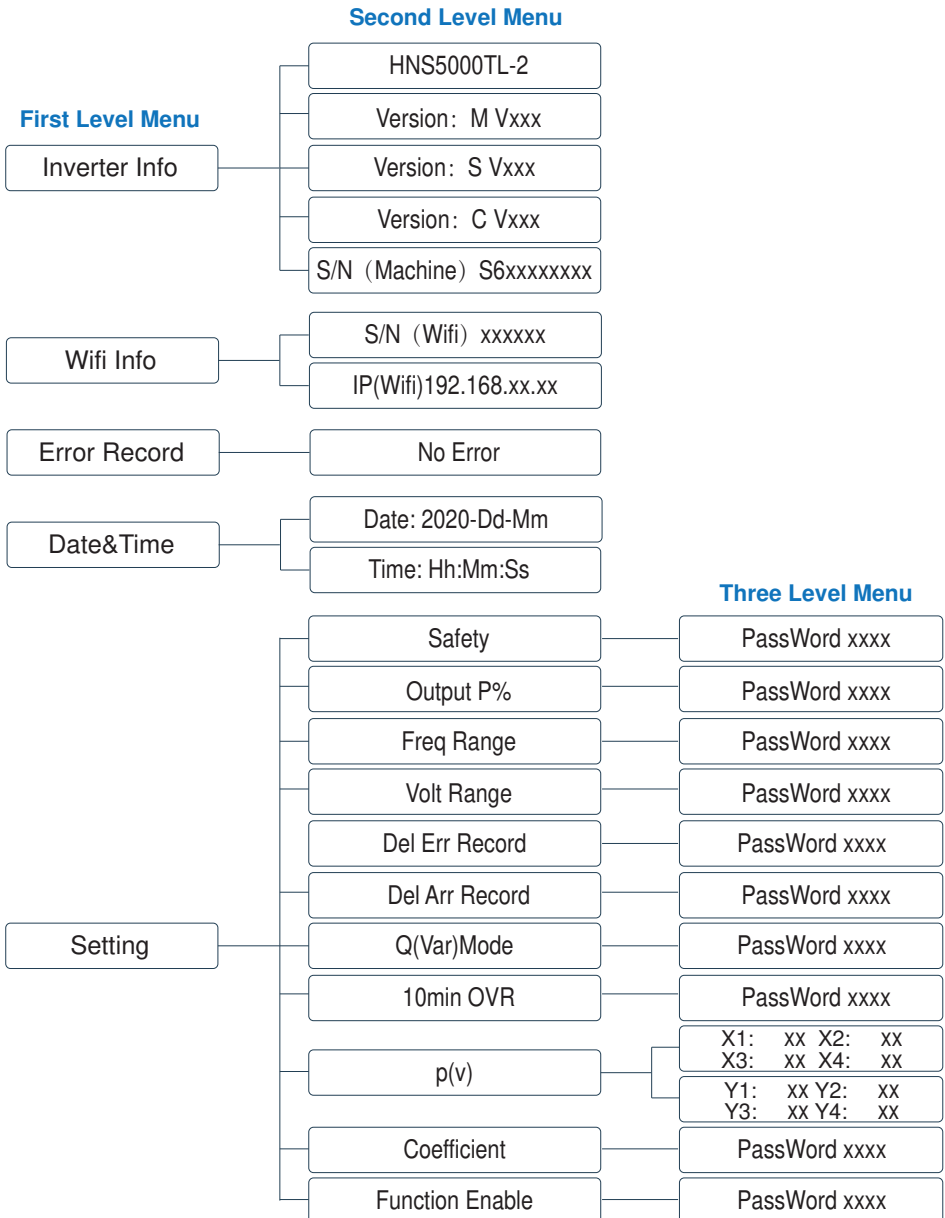
# 4.Operation

## 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		GRID LED Indicator
4	ESC Touch Button		FAULT LED Indicator

## 4.2 Menu Structure

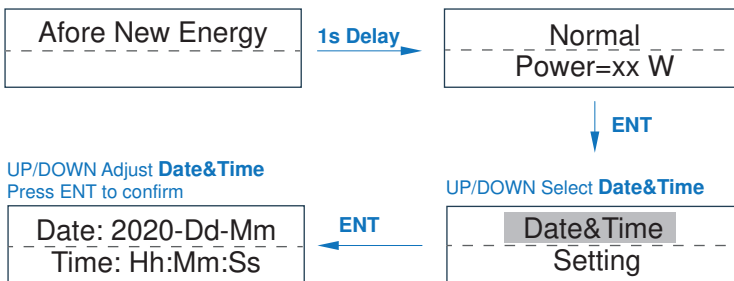


## Explanation of LCD Display Content

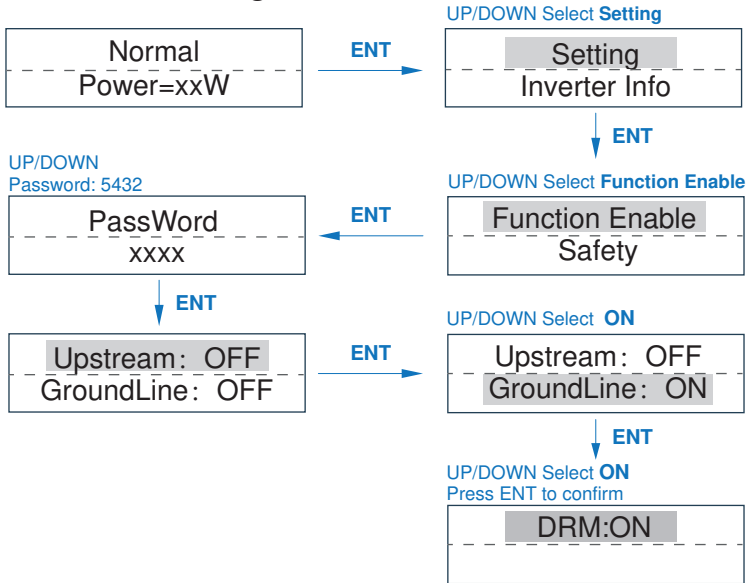
Nouns	Explanation
Inverter Info	Display the serial number and firmware version of inverter
Error Record	Check the error list of inverter including date and time
Wifi Info	Display the WIFI serial number and assigned IP address
Date & Time	Set date and time of the inverter
Setting	Set the protection parameters 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

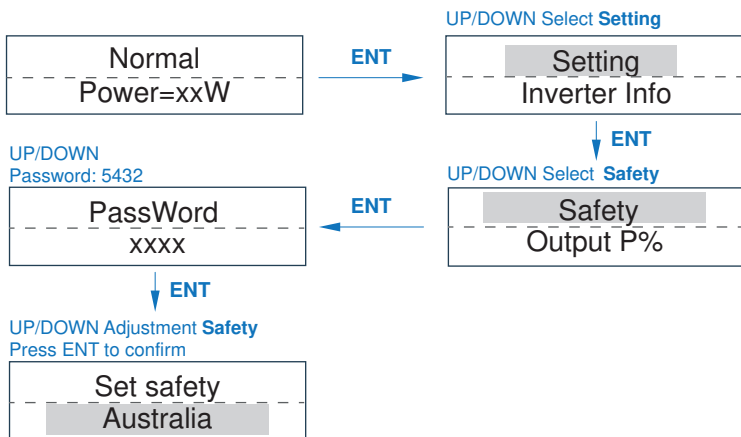


### 4.3.2 DRM Setting



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)



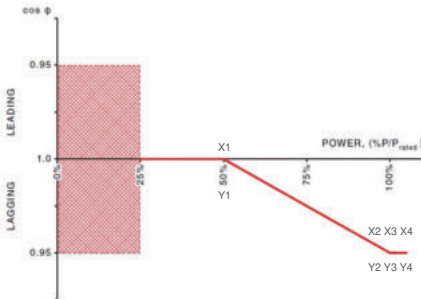
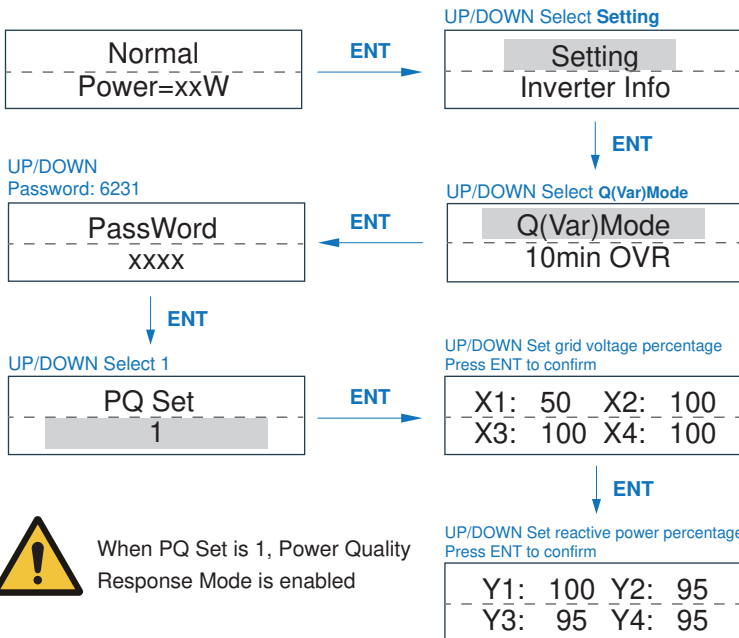


### 4.3.4 Power Quality Response Mode Setting

#### 4.3.4.1 Enable Power Quality Response Modes

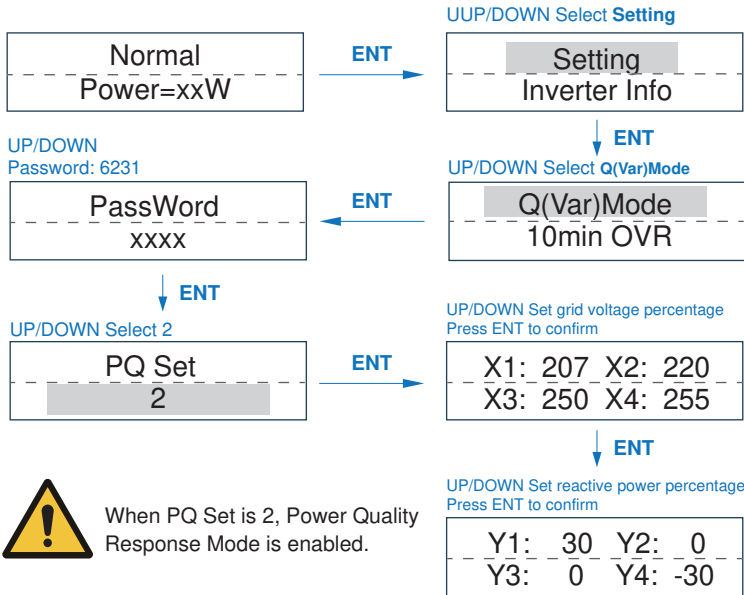
Power Quality Response Modes can be enabled via the LCD menu. Refer to section 4.3.4.1 (a)~(d) of this manual.

##### (a) Active Power Control Power Factor



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

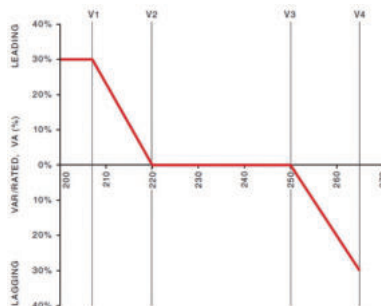


When PQ Set is 2, Power Quality Response Mode is enabled.

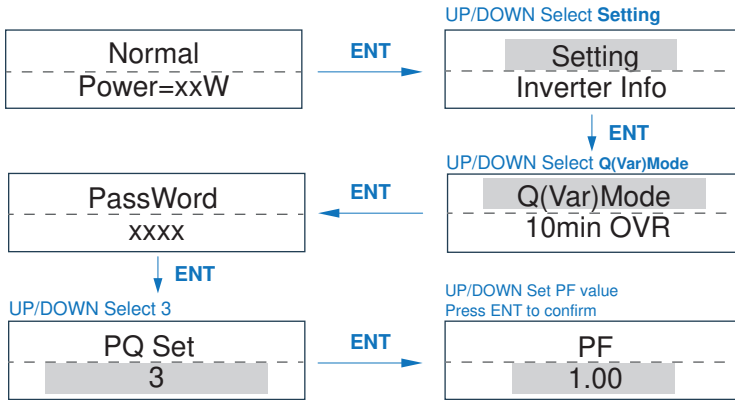


When PQ Set is 2, Volt-var is enabled. Volt-var is disabled by default. After Volt-var was enabled, if you need to disable, please adjust PQ Set=0 to disable.

Set Voltage 1: 207-220V, Default 207V  
 Set Voltage 2: 216-230V, Default 220V  
 Set Voltage 3: 235-255V, Default 250V  
 Set Voltage 4: 244-265V, Default 255V  
 Set Leading: 0 ~ +60%, Default +30%  
 Set Leading: 0 ~ -60%, Default -30%



### (c) Fixed Power Factor

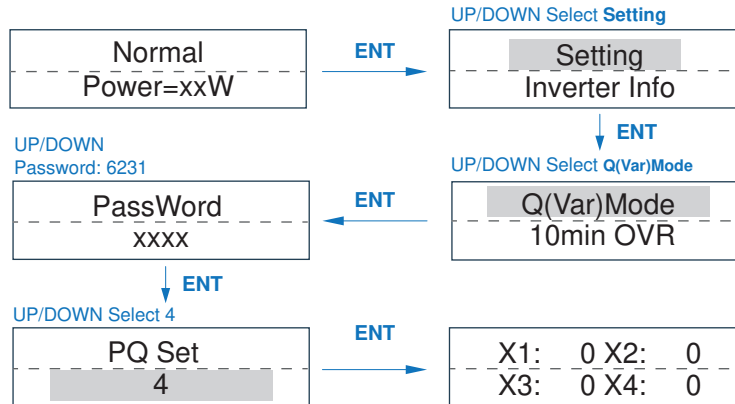


Set PF (-0.8, +0.8), Default 1, Resolution 0.01.



When PQ Set is 3, Power Quality Response Mode is enabled

### (d) Fixed Reactive Power (%)

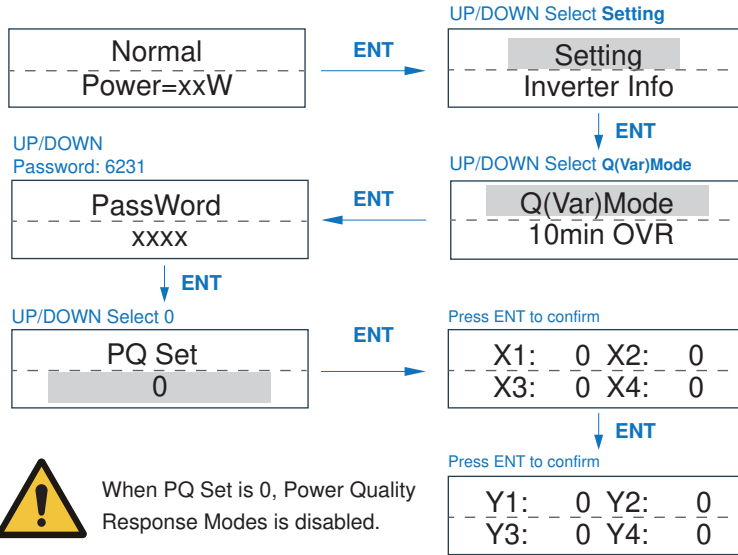


When PQ Set is 4, Power Quality Response Mode is enabled

Y1:	50	Y2:	50
Y3:	50	Y4:	50

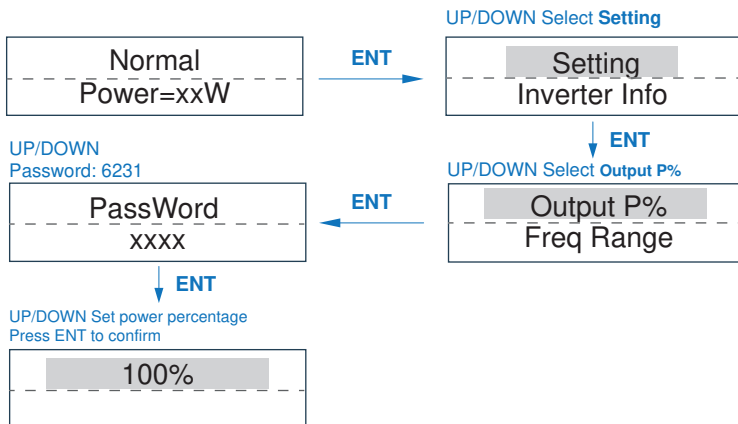
### 4.3.4.2 Disable Power Quality Response Modes

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

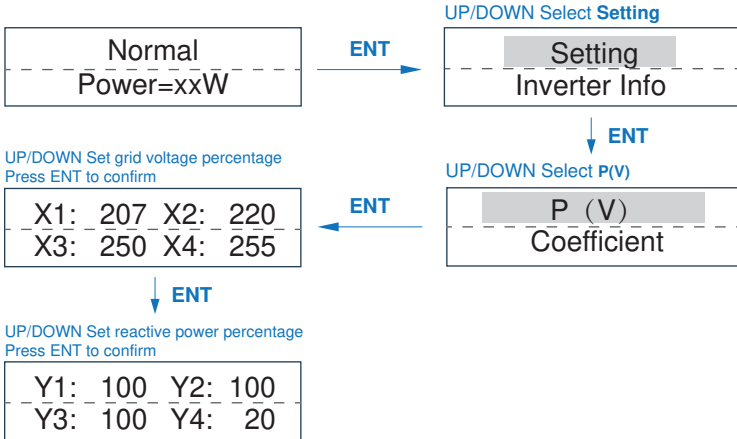


### 4.3.4.3 Active Power Mode Set

#### (a) Active Power Percentage



### (b) Volt-Watt

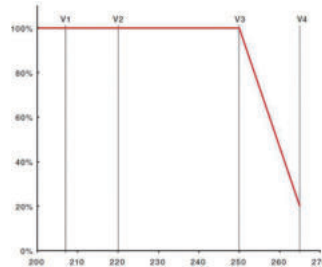


“Y4=100” : Disable the Volt-Watt.

Volt-watt is enabled by default.

After Volt-watt was disabled, If you need to enable,  
please adjust Y4=20 to enable.

- Set Voltage1: 207-220V, Default 207V
- Set P\_Limit1: 20%-100%, Default 100%
- Set Voltage2: 216-230V, Default 220V
- Set P\_Limit2: 20%-100%, Default 100%
- Set Voltage3: 235-255V, Default 250V
- Set P\_Limit3: 20%-100%, Default 100%
- Set Voltage4: 244-265V, Default 255V
- Set P\_Limit4: 20%-100%, Default 100%



## 5. Commissioning

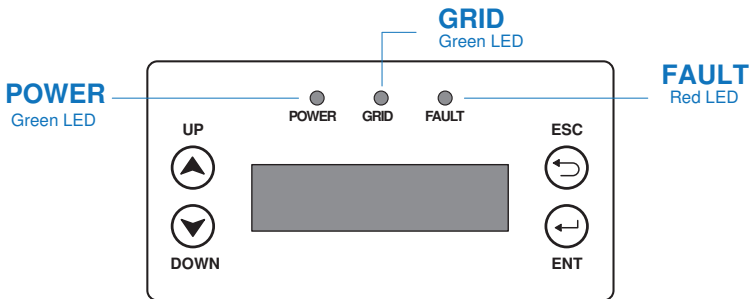
Before starting up commissioning at site, please make sure below procedures and requirements are fully meet.

- 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.

### LED Indication



Sign	Power	Color	Explanation
POWER	On	Green	Power On
	Off		No Power
GRID	On	Yellow	Inverter is feeding power
	Off		Inverter is not feeding power at the moment
FAULT	On	Red	Fault occurred
	Off		No fault

## 6. Shut Down & Restart the Inverter

### 6.1 Shut Down Procedures

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



**Note:**

The inverter will be operable after minimum 5 minutes.

### 6.2 Restart the inverter

Follow the procedures below when the inverter needs to be restarted.

- Follow the Shut Down Procedures of Article 6 to shut down inverter;
- Follow the Commissioning Procedures of Article 5 to turn on the inverter.

## 7. Maintenance & Trouble Shooting

### 7.1 Maintenance

The inverter needs maintenance periodically, the following details should be noticed.

PV connection: check the PV connection twice a year

AC connection: check the AC connection twice a year

Earth connection: check the Earth connection twice a year

Heat sink: clean the heat sink once a year with dry towel

### 7.2 Fault Code and Trouble Shooting

The LCD and LED will report the fault when the error occurs, please follow the trouble shooting list to solve the problem.

## Trouble-Shooting List

Code	Error Display	Error Message	Possible Fault	Corrective 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 several restart 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 wiring and restart the inverter 2. check PV array wiring
E13	Over Temperature Fault	Inverter too hot	· inverter enclosure too hot · temperature 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 wiring 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

<b>PV Input Data</b>	<b>HNS1000TL-1</b>	<b>HNS1500TL-1</b>	<b>HNS2000TL-1</b>	<b>HNS2500TL-1</b>	<b>HNS3000TL-1</b>	<b>HNS3600TL-1</b>
Max. DC Power ( W )	1500	2250	3000	3750	4200	4200
Max. DC Voltage ( V )	450	450	500	500	500	550
MPPT Voltage Range ( V )	50-400	90-400	120-400	120-400	120-400	120-450
Min Operating DC Voltage( V )	50	90	120	120	120	120
Max. Input Current ( A )	10	10	12	14	17	17
Max. Short Current ( A )	15	15	18	20	25	25
Isc PV (A)	12.5	12.5	15	17.5	21	21
No. of MPP Tracker / No. of PV String	1/1	1/1	1/1	1/1	1/1	2/1
Input Connector Type	MC 4	MC4	MC4	MC4	MC4	MC4
<b>AC Output Data</b>	<b>HNS1000TL-1</b>	<b>HNS1500TL-1</b>	<b>HNS2000TL-1</b>	<b>HNS2500TL-1</b>	<b>HNS3000TL-1</b>	<b>HNS3600TL-1</b>
Max.Output Power ( VA )	1100	1650	2200	2750	3300	3960
Rated Output Power ( VA )	1000	1500	2000	2500	3000	3600
Max. Output Current ( A )	6	9	12	13	15	18
Nominal Output Voltage ( V )	L/N/PE, 220Vac, 230Vac, 240Vac					
Grid Voltage Range	180Vac-276Vac (According to local standard)					
Nominal Output Frequency ( Hz )	50/60					
Grid Frequency Range	45~55Hz/54~66Hz (According to local standard)					
Output Power Factor	1 default (adjustable from 0.8 leading to 0.8 lagging)					
Output Current THD	<3%					
<b>Efficiency</b>	<b>HNS1000TL-1</b>	<b>HNS1500TL-1</b>	<b>HNS2000TL-1</b>	<b>HNS2500TL-1</b>	<b>HNS3000TL-1</b>	<b>HNS3600TL-1</b>
Max. Efficiency	97.50%	97.80%	98.10%	98.10%	98.13%	98.20%
Euro Efficiency	96.60%	96.70%	96.80%	97.23%	97.56%	97.80%
<b>Protection</b>	<b>HNS1000TL-1</b>	<b>HNS1500TL-1</b>	<b>HNS2000TL-1</b>	<b>HNS2500TL-1</b>	<b>HNS3000TL-1</b>	<b>HNS3600TL-1</b>
PV Reverse Polarity Protection	YES	YES	YES	YES	YES	YES
PV Insulation Resistance Detection	YES	YES	YES	YES	YES	YES
AC Short Circuit Protection	YES	YES	YES	YES	YES	YES
AC Over Current Protection	YES	YES	YES	YES	YES	YES
AC Over Voltage Protection	YES	YES	YES	YES	YES	YES
Anti-Islanding Protection	YES	YES	YES	YES	YES	YES
Residual Current Detection	YES	YES	YES	YES	YES	YES
Over Temperature Protection	YES	YES	YES	YES	YES	YES
Integrated DC switch	YES	YES	YES	YES	YES	YES
Surge Protection (DC & AC)	Integrated (Type III)					
<b>General Data</b>	<b>HNS1000TL-1</b>	<b>HNS1500TL-1</b>	<b>HNS2000TL-1</b>	<b>HNS2500TL-1</b>	<b>HNS3000TL-1</b>	<b>HNS3600TL-1</b>
Dimensions (W x H x D, mm)	278 x 261 x 118					395 x 345 x 170
Weight ( kg )	5.1			5.3		12
Protection Degree	IP65					
Enclosure Material	Aluminum					
Ambient Temperature Range (°C)	-20~+55					
Humidity Range	0-100%					
Topology	Transformerless					
Communication Interface	RS485 / WIFI / Wire Ethernet / GPRS (optional)					
Cooling Concept	Convection					
Noise Emission ( db )	<21					<28
Night Power Consumption ( W )	<0.2			<1		
Max. Operation Altitude ( m )	2000					
<b>Certifications and Standards</b>	<b>HNS1000TL-1</b>	<b>HNS1500TL-1</b>	<b>HNS2000TL-1</b>	<b>HNS2500TL-1</b>	<b>HNS3000TL-1</b>	<b>HNS3600TL-1</b>
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 32004-2013, UNT C 15-712-1, ABNT NBR 16149, ABNT NBR 16150					

PV Input Data	HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL
Max. DC Power ( W )	4500	5400	6000	7000
Max. DC Voltage ( V )	550	550	550	550
MPPT Voltage Range ( V )	120-450	120-450	120-450	120-450
Min Operating DC Voltage( V )	120	120	120	120
Max. Input Current ( A )	12 x 2	15 x 2	16 x 2	18 x 2
Max. Short Current ( A )	18 x 2	20 x 2	24 x 2	27 x 2
Isc PV (A)	15 x 2	18.5 x 2	20 x 2	22.5 x 2
No. of MPP Tracker / No. of PV String	2/2	2/2	2/2	2/2
Input Connector Type	MC4	MC4	MC4	MC4
AC Output Data	HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL
Max.Output Power ( VA )	3300	3960	4400	5500
Rated Output Power ( VA )	3000	3600	4000	5000
Max. Output Current ( A )	15	16	20	23
Nominal Output Voltage ( V )	L/N/PE, 220Vac, 230Vac, 240Vac			
Grid Voltage Range	180Vac-276Vac (According to local standard)			
Nominal Output Frequency ( Hz )	50/60			
Grid Frequency Range	45~55Hz/54~66Hz (According to local standard)			
Output Power Factor	1 default (adjustable from 0.8 leading to 0.8 lagging)			
Output Current THD	<3%			
Efficiency	HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL
Max. Efficiency	98.20%	98.20%	98.20%	98.20%
Euro Efficiency	97.80%	97.82%	97.85%	97.90%
Protection	HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL
PV Reverse Polarity Protection	YES	YES	YES	YES
PV Insulation Resistance Detection	YES	YES	YES	YES
AC Short Circuit Protection	YES	YES	YES	YES
AC Over Current Protection	YES	YES	YES	YES
AC Over Voltage Protection	YES	YES	YES	YES
Anti-Islanding Protection	YES	YES	YES	YES
Residual Current Detection	YES	YES	YES	YES
Over Temperature Protection	YES	YES	YES	YES
Integrated DC switch	YES	YES	YES	YES
Surge Protection (DC & AC)	Integrated (Type III)			
General Data	HNS3000TL	HNS3600TL	HNS4000TL	HNS5000TL
Dimensions (W x H x D, mm)	395 x 345 x 170			
Weight ( kg )	12			
Protection Degree	IP65			
Enclosure Material	Aluminum			
Ambient Temperature Range (°C)	-20~+55			
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 )	2000			
Certifications and Standards	HNS3000TL	HNS3600TL	HNS4000TL	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 32004-2013, UNT C 15-712-1, ABNT NBR 16149, ABNT NBR 16150			