On-Grid PV Inver

Installation and Operation Ma

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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:

Three-Phase

BNT030KTL BNT036KTL BNT040KTL BNT050KTL BNT060KTL

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

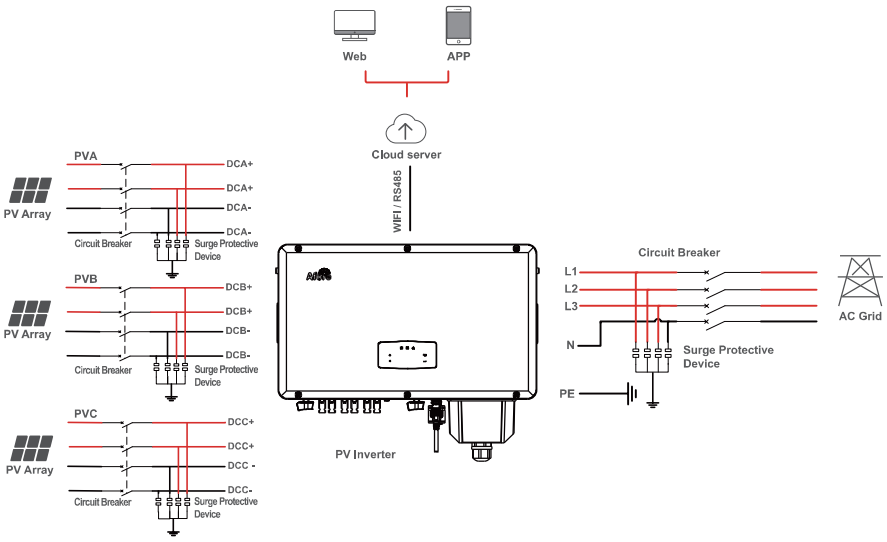
1.2 Target Group

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

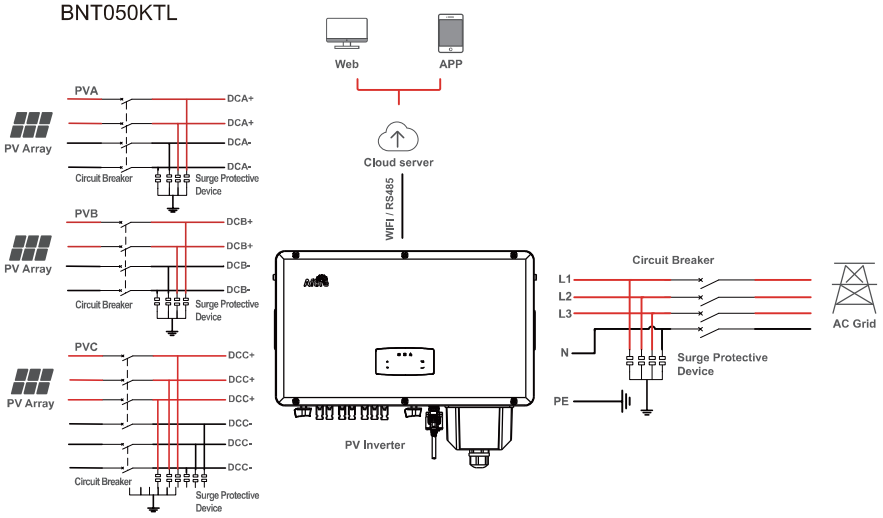
1.3 System Diagram

The typical on-grid PV system connection diagram.

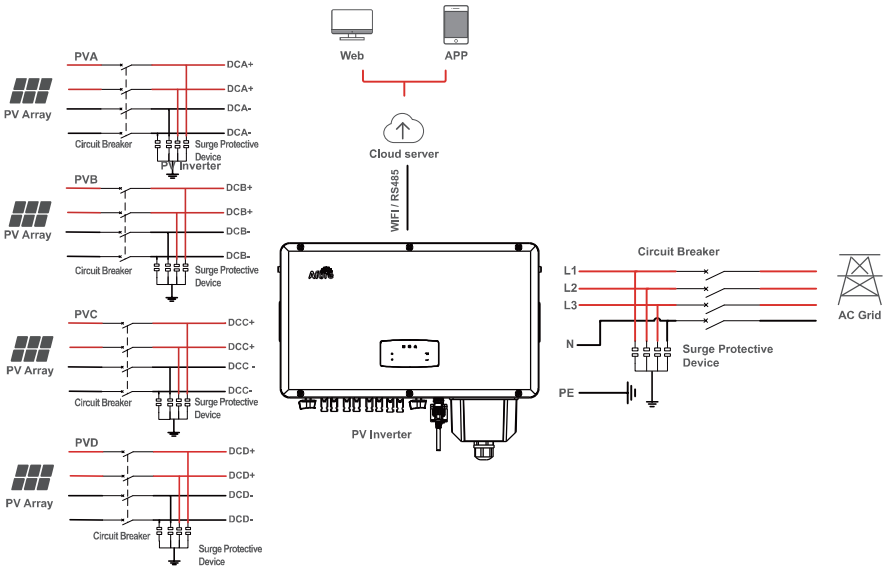
BNT030KTL BNT036KTL BNT040KTL



BNT050KTL



BNT060KTL



Circuit Breaker Recommendation

Type	Max AC Current (A)	Rated current of AC breaker (A)
BNT030KTL	48	63
BNT036KTL	60	100
BNT040KTL	65	100
BNT050KTL	80	100
BNT060KTL	96	125

Surge Protector Recommendation

• 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.

Note:
The Inverter can be only connected to low-voltage grid. (230/400Vac, 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 panels.
3. The PV panels and inverter must be connected to the ground.
4. Do not touch the inverter cover until 5 minutes after disconnecting both DC and AC power supply.

5. Do not touch the inverter enclosure when operating, keep away from materials that may be affected by high temperatures.
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. Do not expose the inverter directly to water, rain, snow or spray.
8. Alternative uses, modifications to the inverter not recommended. The warranty can become void if the inverter was tampered with or if the installation is not in accordance with the relevant installation instructions.

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 Pre-installation

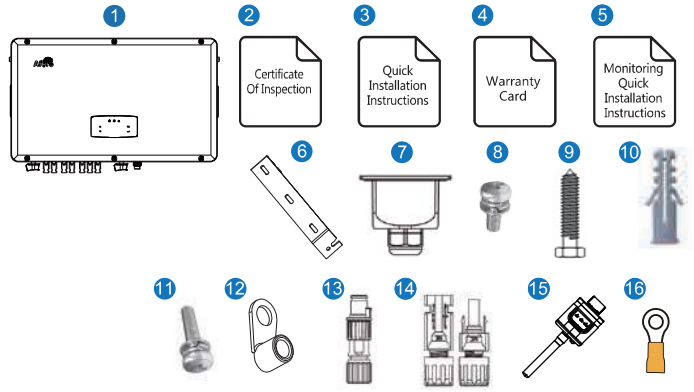
3.1.1 Unpacking & Package List

Unpacking

On receiving the inverter, please check to make sure the packing and all 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.

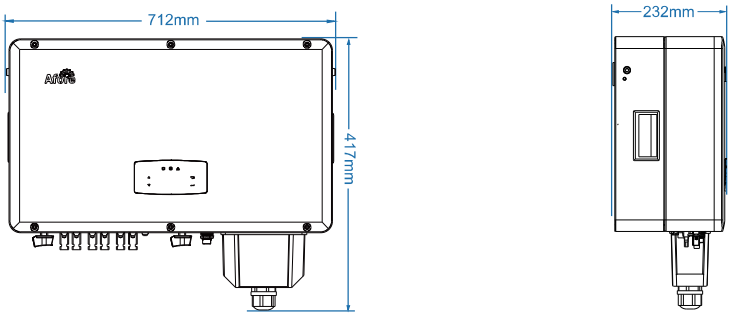


No.	Qty	Items	No.	Qty	Items
1	1	Solar Inverter	9	3	Mounting Bracket Screw
2	1	Certificate Of Inspection	10	3	Plastic Expansion Tube
3	1	Quick Installation Instructions	11	1	Security Screw
4	1	Warranty Card	12	4	AC Wiring Terminal
5	1	Monitoring Quick Installation Instructions	13	1	Zero-Injection Connector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

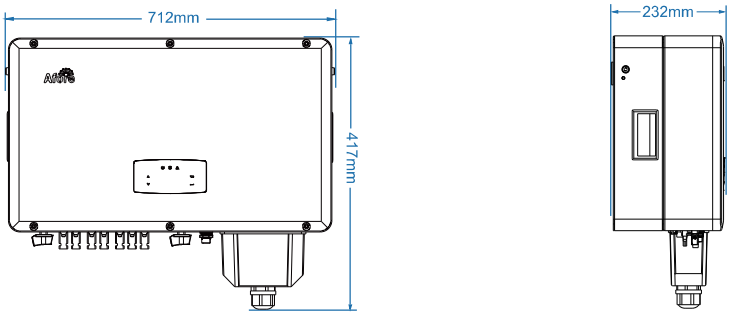
Note:

DC connectors Qty.: 30-40kW 6 pairs, 50kW 7 pairs, 60kW 8 pairs.

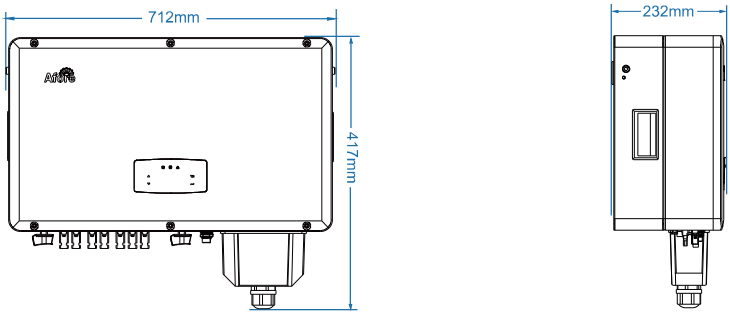
3.1.2 Product Overview



BNT030-040KTL



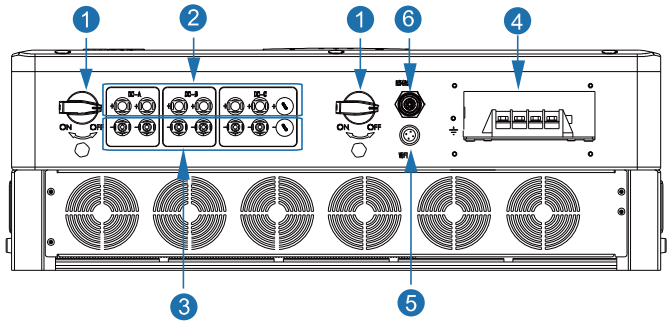
BNT050KTL



BNT060KTL

Inverter Terminals

BNT030-040KTL



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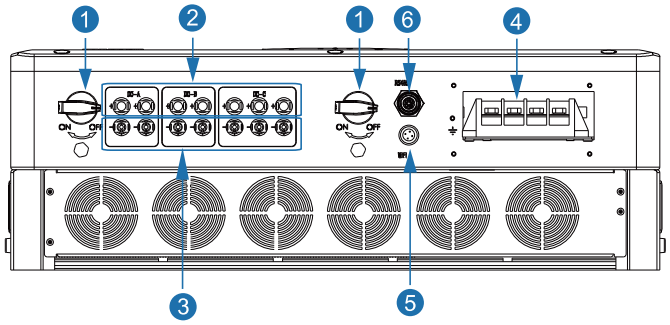

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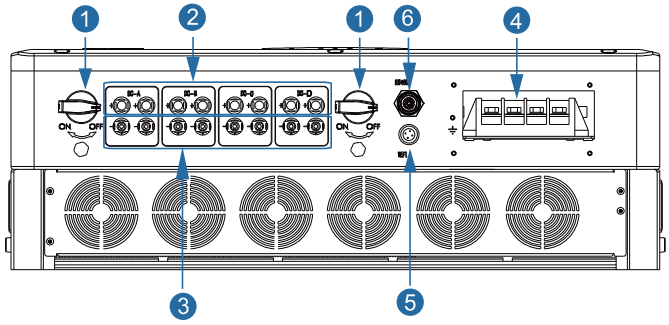
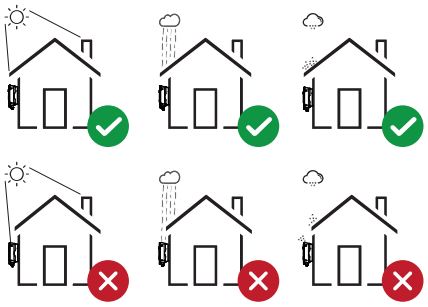


No.	Items
1	DC Switch
2	DC Connectors (+) For PV Strings
3	DC Connectors (−) For PV Strings
4	AC Connector
5	Monitor Module Port
6	Zero-Injection Port (Optional)

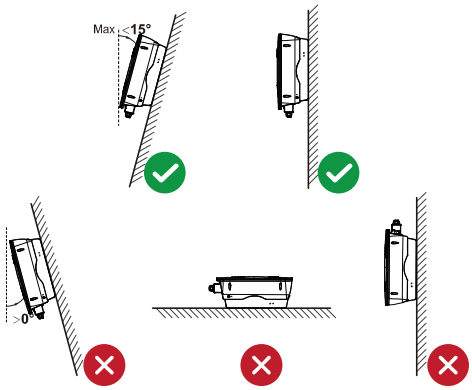
3.1.3 Mounting Location

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:

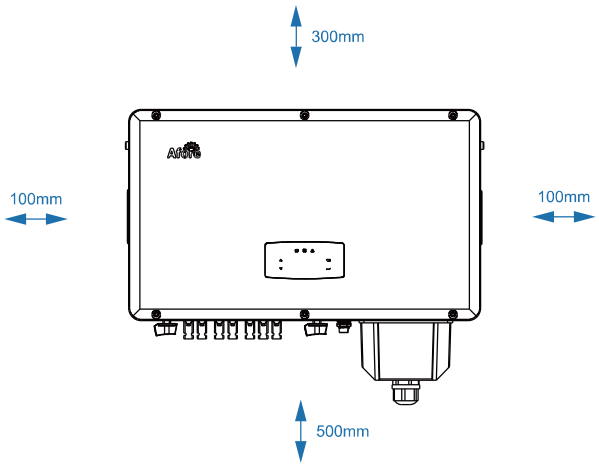
• The inverter should be installed on a solid surface, far from flammable or corrosion materials, where is suitable for inverter's weight and dimensions.
• The ambient temperature should be within -25℃ ~ 60℃ (between -13 °F and 140°F).
• The installation of inverter should be protected under shelter. 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.

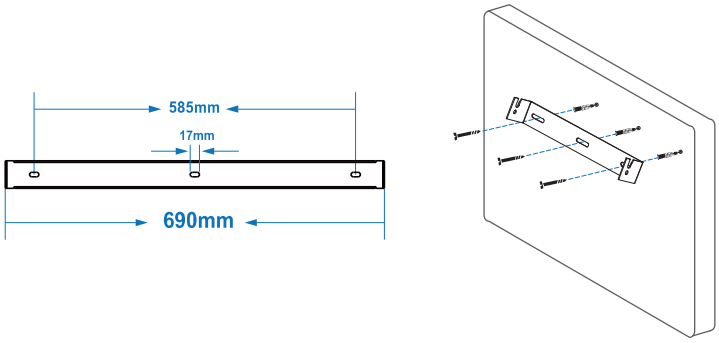


• Leave the enough space around inverter, easy for accessing to the inverter, connection points and maintenance.

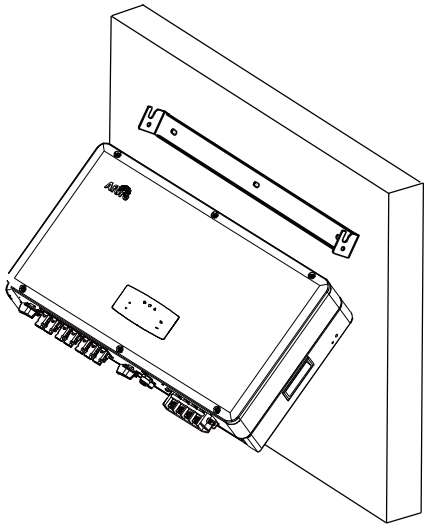


3.2 Mounting

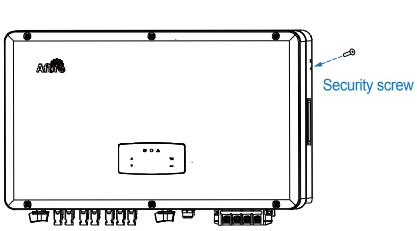
Step 1

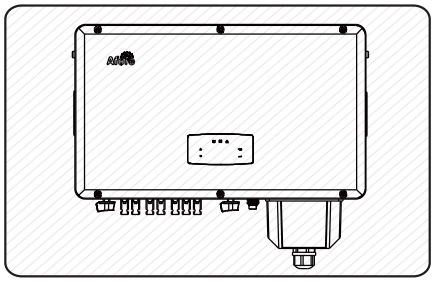


Step 2



Step 3





4. Electrical Connection

4.1 PV Connection

30-40kW three phase inverters have 3 MPPT channels, each channel includes two PV string input;
50kW three phase inverters have 3 MPPT channels, channel A and B includes 2 PV string input, and channel C includes 3 PV string inputs;
60kW three phase inverters have 4 MPPT channels, each channel includes two PV string inputs;

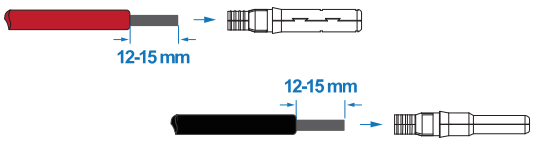
For the best results, make sure that each MPPT channel is correctly connected with PV string. Otherwise, the inverter will activate voltage or current protection automatically.

Please make sure below requirements are followed:

- The open-circuit voltage and short-circuit current of PV string should not exceed the reasonable range of the inverters.
- The isolation resistance between PV string and ground must exceed 10 kΩ.
- The polarity of PV strings 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.

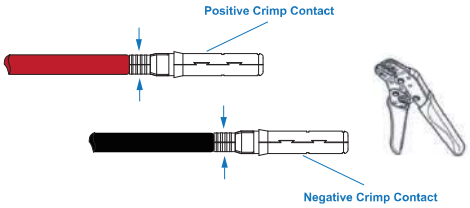
Warning:
The fatal high voltage may on the DC side, please comply with electric safety when connecting.
Please make sure the correct polarity of the cable connected with inverter, otherwise inverter could be damaged.

Step 1



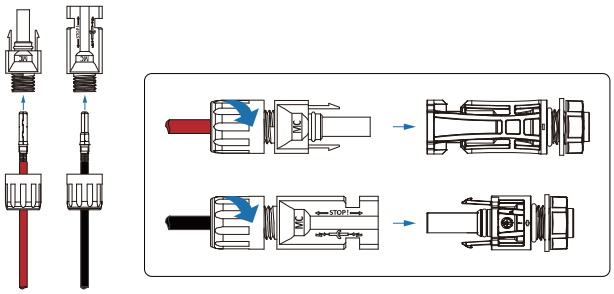
Note:
PV cable suggestion
Cross-section
4mm²

Step 2

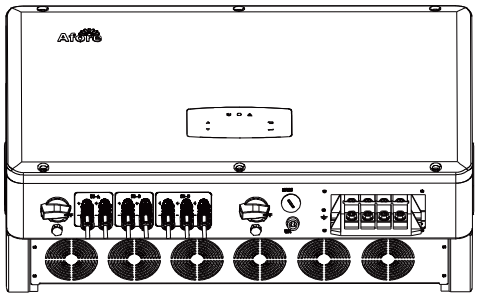


Note:
Please use PV connector crimper to pinch the point of the arrow.

Step 3



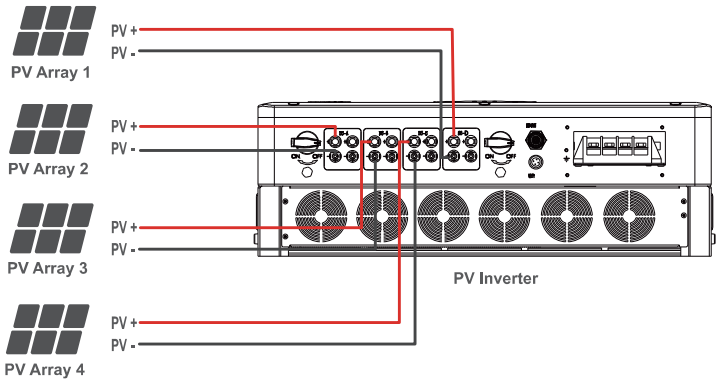
Note:
You'll hear click sound when the connector assembly is correct.



Note:
PV string suggestion:

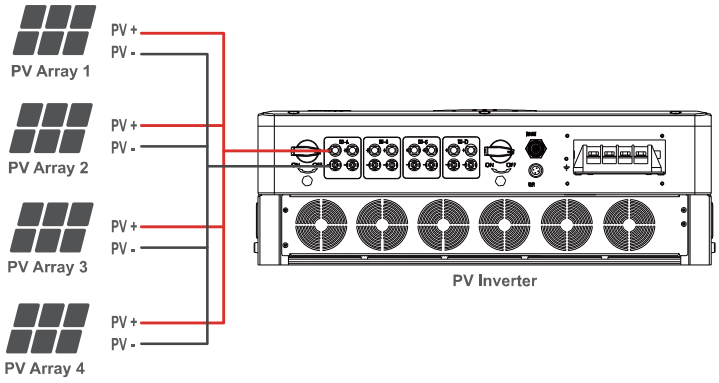
Correct Installation:

Channel A, B, C and D connected with PV strings separately



Wrong Installation:

Do not connect more than two PV strings into one channel



4.2 Grid Connection

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 should not exceed the reasonable range of the inverters.
- 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:

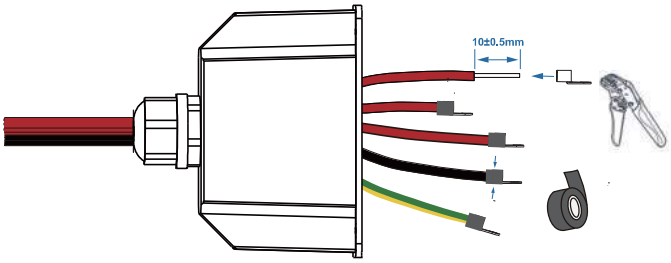
The fatal high voltage may on the AC side, please comply with electric safety when connecting.
Please make sure the right line of AC grid connected with inverter, otherwise inverter could be damaged.

Step 1

Cable suggestion:
30-40kW Cross-section (Copper) 4-6mm² / 10AWG
50kW Cross-section (Copper) 6-10mm² / 8AWG
60kW Cross-section (Copper)10-16mm² / 6AWG

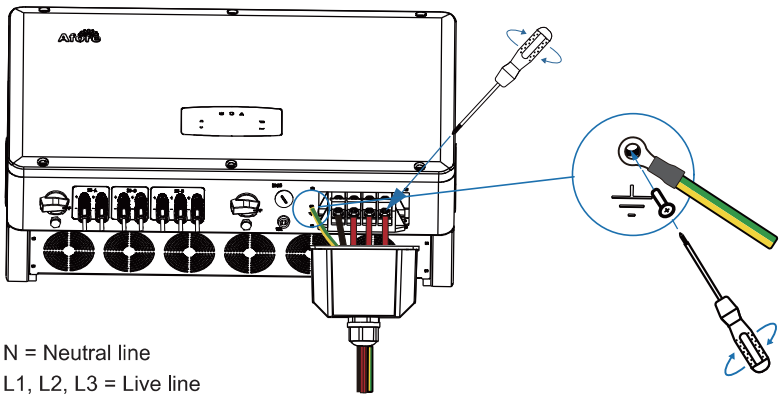
Earth cable PE suggestion:
Cross-section (Copper) 4-6mm² / 10AWG

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

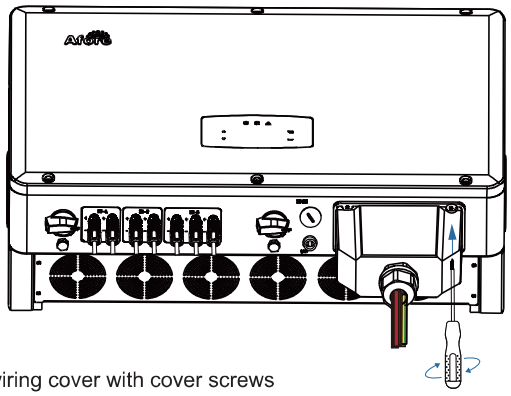


N = Neutral line
L1, L2, L3 = Live line
PE = Earth cable

Unscrew the row of screws, insert the wire harness into the N, L1, L2, L3 caps one by one, and tighten the screws.

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

Step 3



Fix the AC wiring cover with cover screws

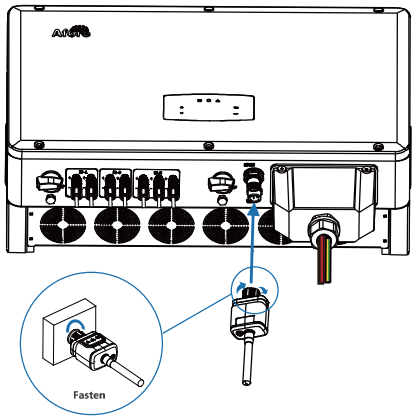
4.4 Communication Connection

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

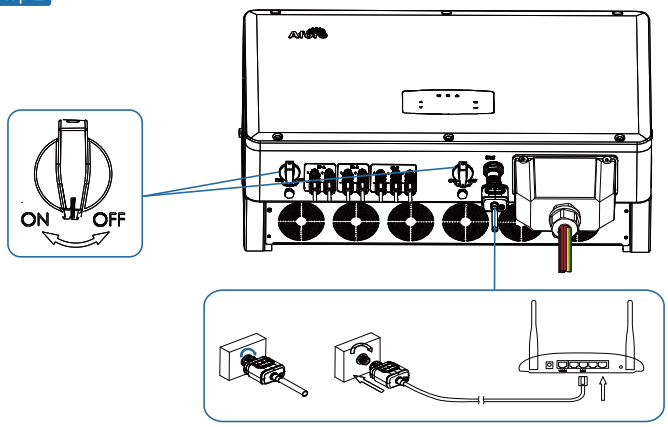
Install the WIFI / Ethernet / GPRS / RS485 Communication

WIFI / Ethernet / GPRS / RS485 communication is applicable to the inverter. Please refer to "Communication Configuration Instruction" for detailed instruction.

Step 1



Step 2

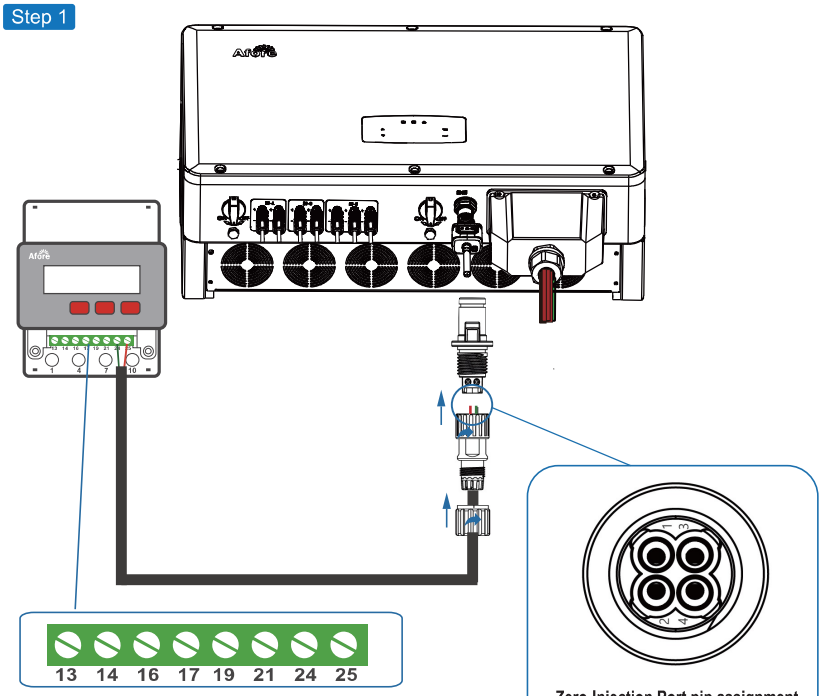


Turn on the DC switch and AC circuit breaker, and wait until the LED indicator on the monitoring module flashes, indicating that the monitoring module is successfully connected.

4.5 Zero-injection Smart Meter (Optional)

Smart meter is an intelligent control equipment which is used for on-grid inverters. Its main function is to measure the forward and reverse power on the grid-connected side, and transmit data to the inverter through RS485 communication to ensure that the power of the inverter is less than or equal to the user's home load, and no current flows into the grid.

Step 1

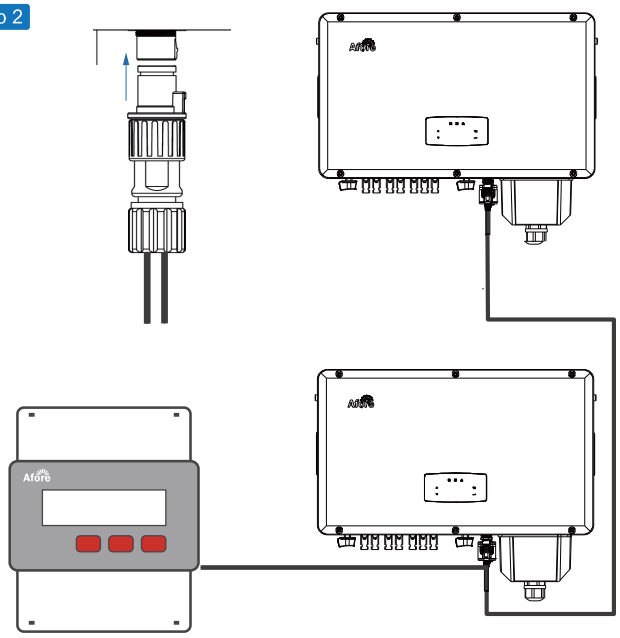


Zero-Injection Port pin assignment

PIN	Assignment
1/2	RS485 B (25)
3/4	RS485 A (24)

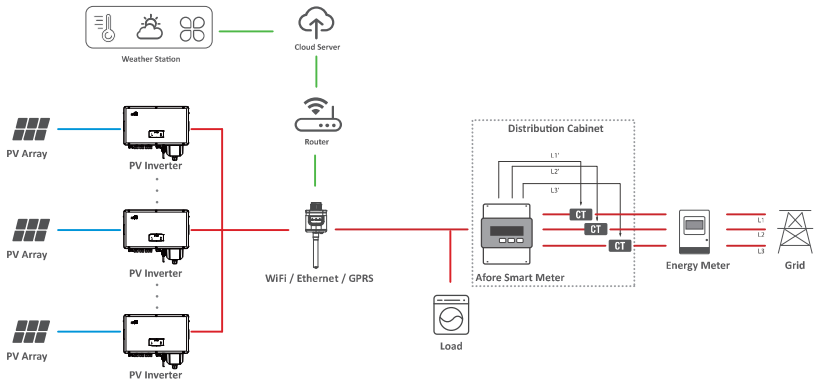
Note:
please follow below pin order
RS485B (Pin 1/2) to three-phase meter (Pin 25)
RS485A (Pin 3/4) to three-phase meter (Pin 24)

Step 2



Note:

When multiple inverters are connected in parallel, the total output power could not exceed the reasonable range of the smart meter.

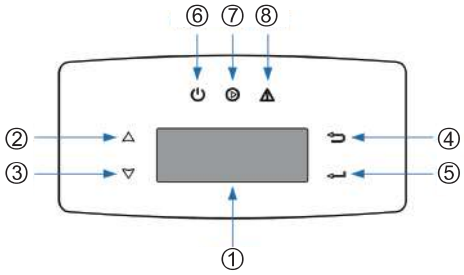


Note:

The Inverter could be connected in parallel with Smart Meter, make sure the total load power not exceed Smart Mater's limitation.

5.Operation

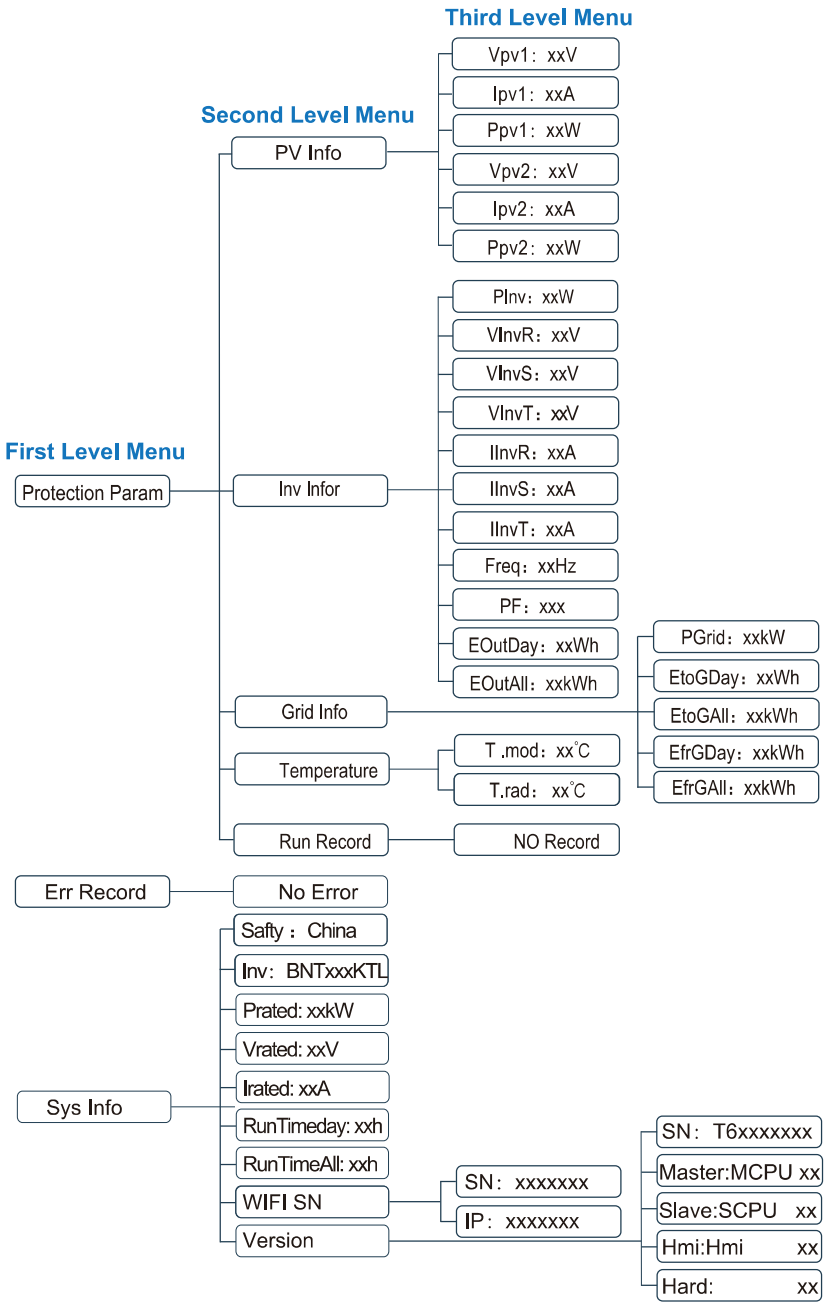
5.1 Control Panel

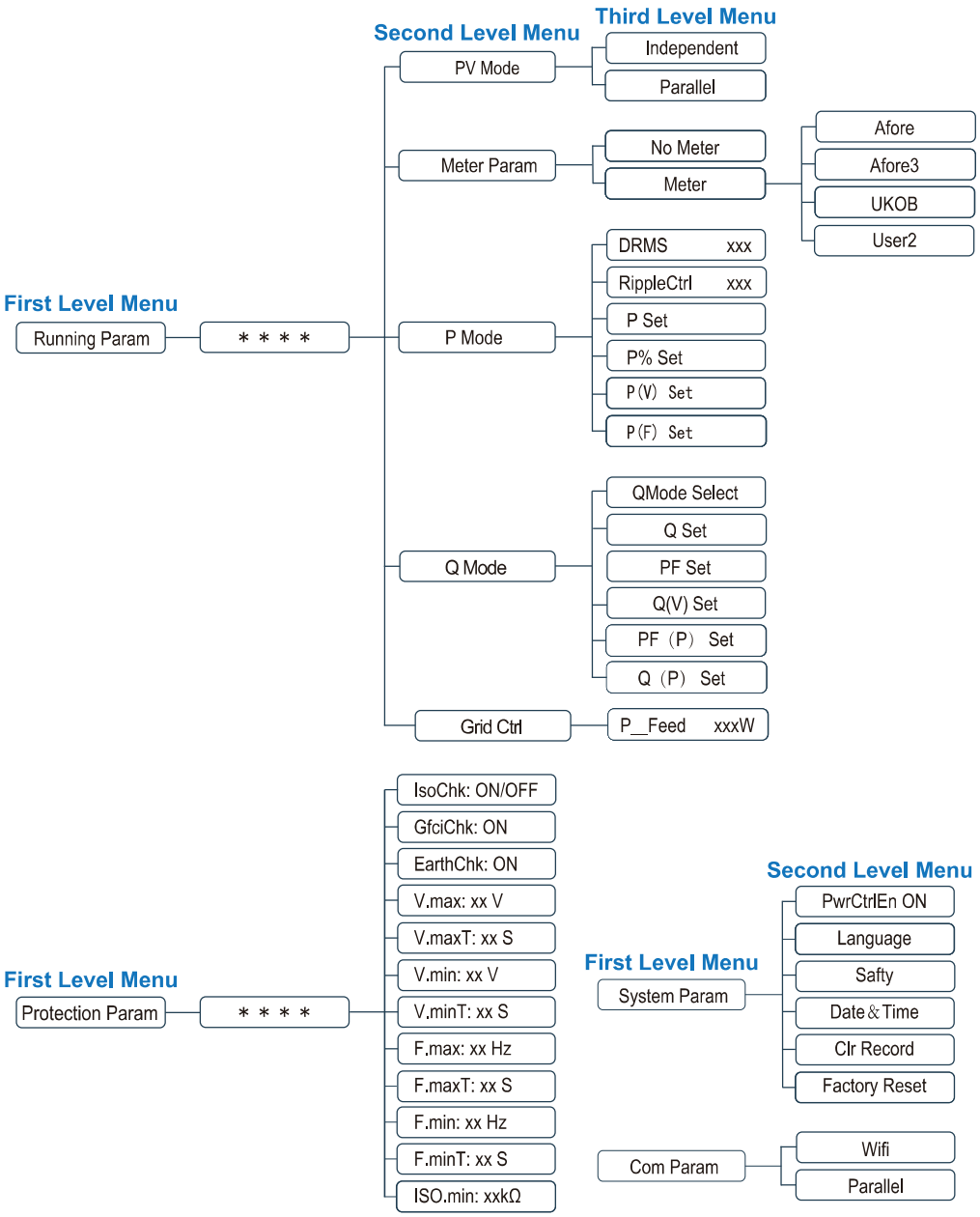


No.	Items	No.	Items
1	LCD Display	5	**ENT** Touch Button
2	**UP** Touch Button	6	**POWER** LED Indicator
3	**DOWN** Touch Button	7	**GRID** LED Indicator
4	**ESC** Touch Button	8	**FAULT** LED Indicator

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

5.2 Menu Structure



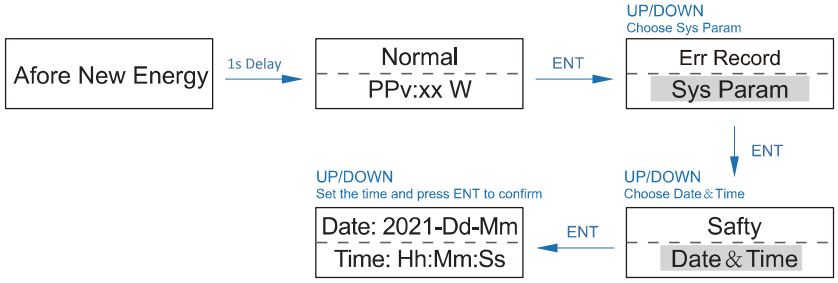

First Level Menu
Running Param
* * * *
Second Level Menu
Third Level Menu
PV Mode
Independent
Parallel
Meter Param
No Meter
Meter
Afore
Afore3
UKOB
User2
P Mode
DRMS xxx
RippleCtrl xxx
P Set
P% Set
P(V) Set
P(F) Set
Q Mode
QMode Select
Q Set
PF Set
Q(V) Set
PF (P) Set
Q (P) Set
Grid Ctrl
P_Feed xxxW
First Level Menu
Protection Param
* * * *
IsoChk: ON/OFF
GfciChk: ON
EarthChk: ON
V.max: xx V
V.maxT: xx S
V.min: xx V
V.minT: xx S
F.max: xx Hz
F.maxT: xx S
F.min: xx Hz
F.minT: xx S
ISO.min: xxkΩ
First Level Menu
System Param
Second Level Menu
PwrCtrlEn ON
Language
Safty
Date&Time
Clr Record
Factory Reset
Com Param
Wifi
Parallel

Explanation of LCD Display Content

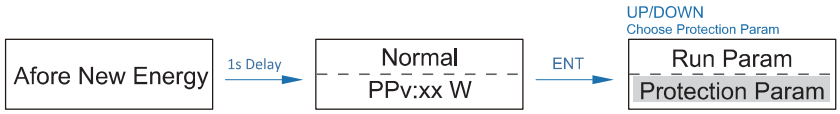
Nouns	Explanation
Sys Info	Check the inverter's real-time operating information
Error Record	Check the inverter's fault records with date and time
System Param	Set the inverter's safty code / lanuage / time & date, restore to factory settings
Version	Check the inverter's SN and firmware version
Protection Param	Set the inverter's protection parameters
Running Param	Set the inverter's operating mode like parellel, active / reactive power control

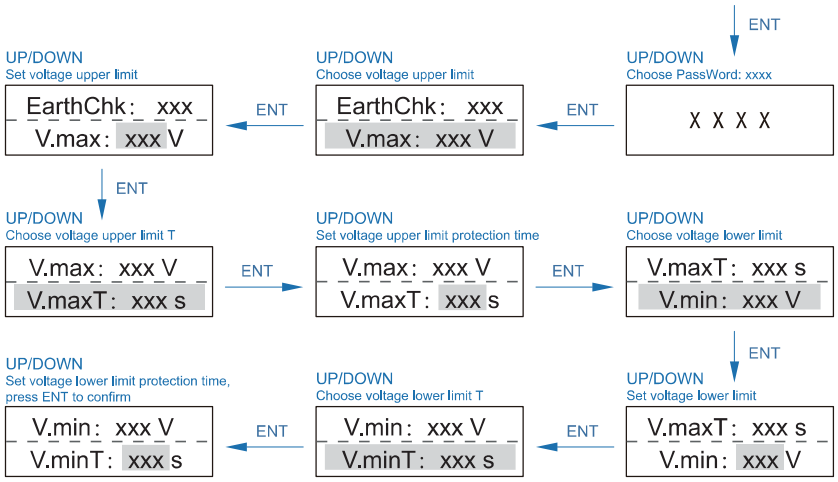
5.3 Setting

5.3.1 Startup

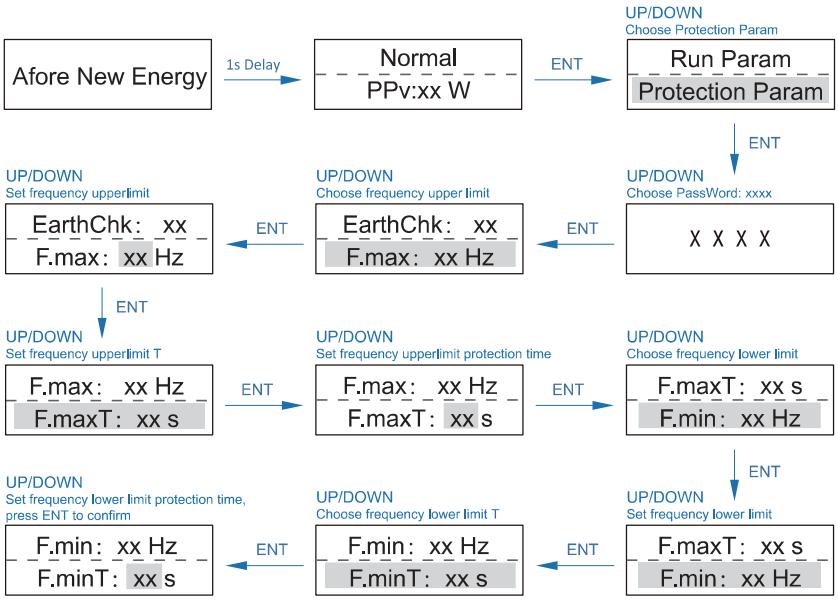


5.3.2 Voltage Range





5.3.3 Frequency Range



Note:
The parameters setting only works after the inverter is restarted.

6. 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.

7. Start-up & Shut Down

7.1 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.

7.2 Restart

- Shut down the inverter according to Chapter 7.1.
- Start-up the inverter according to Chapter 6.

8. Maintenance&Trouble Shooting

8.1 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.

8.2 Trouble Shooting

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

Trouble-Shooting List

Type of Fault	Code	Name	Description	Recommend Solution
PV Fault	A01	PvConnectFault	The actual PV connection type (independent, parallel) different from setup.	• Set PV connection type according to the actual PV connection type.
	A02	IsoFault	ISO check among PV panels/ the wires to the ground is abnormal.	• Check whether the PV modules and its wiring are immersed in water and whether the insulation is damaged, and then make corrections. • If the fault occurs continuously and frequently, contact the local distributors for help.
	A03	PvAfciFault	PV current arcing	• Check whether the PV cables and wiring terminals are broken or connection abnormal, and correct them. • If the fault occurs continuously and frequently, contact the local distributors for help.
	A04	Pvs1OverVoltFault	PV Voltage over, beyond the reasonable range.	• Reconfiguration of PV strings, reduce the PV number of a PV string to reducing inverter PV input voltage. • Contact local distributors for suggestion.
	A05	PVs2OverVoltFault		
	A16	PVs1ReverseFault	PV(+) and PV(-) reversed Connection	• Check whether PV(+) and PV(-) connection reversed or not. If reversed, make correction.
	A17	PVs1ReverseFault		
	A33	Pv1AbnormalFault	Compared with previous voltage and other PV voltages, this PV voltage suddenly becomes higher or lower.	• Check if PV modules are partially blocked or cells are damaged. • Check if PV cables and terminals broken or loose connection, then repair it.
	A34	Pv2AbnormalFault		
DC Fault	E01	Pv1HwOverCurrFault	PV current over, triggered the hardware protection circuit	• Power off, then restart • If fault still occurs continuously and frequently, please ask help for local distributors.
	E02	Pvs2HwOverCurrFault		
	E13	PVs1SwOverCurrFault	PV current over, triggered the software protection circuit	• Power off, then restart • If fault still occurs continuously and frequently, please ask help for local distributors.
	E14	PVs2SwOverCurrFault		

Type of Fault	Code	Name	Description	Recommend Solution
DC Fault	E33	Boost1SelfCheckFault	PV boost circuit abnormal when self checking	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	E34	Boost2SelfCheckFault		
	E45	BusHwOverVoltFault	Bus voltage over	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	E46	BusHwOverHalfVoltFault		
	E47	BusSwOverVoltFault		
	E48	BusSwOverHalfVoltFault		
	E49	BusSwUnderVoltFault	Bus voltage under as running	
	E50	BusUnbalancedFault	DC Bus voltage unbalanced	
AC Fault	F01	HwOverFault	Hardware detected that current over / BUS voltage over	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	F02	InvHwOverCurrFault	Hardware detected that inverter current over	
	F03	InvROverCurrFault	R phase /Split phase L1 current over	
	F04	InvSOverCurrFault	S phase /Split phase L2 current over	
	F05	InvTOverCurrFault	T phase current over	
	F06	GridUnbalanCurrFault	3 phase current effective value has big difference	
	F07	DcInjOverCurrFault	DC injection current over	
	F08	AcOverLeakCurrFault	Ac side leakage current over	• Check if PV panels has good ground insulation and ground wires are connected well ground is well, then repair it. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	F09	PLLFault	The phase-locked loop is operating abnormally, and it does not stably track the grid voltage phase.	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	F10	GridRelay1Fault	It is detected that the relay group 1 cannot be opened or closed normally.	

Type of Fault	Code	Name	Description	Recommend Solution
System Fault	G01	PVs1ReverseFault	PV current sampling hardware abnormal	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	G02	PVs2CurAdChanFault		
	G16	RInvCurAdChanFault		
	G17	SInvCurAdChanFault		
	G18	TInvCurAdChanFault		
	G19	RInvDciAdChanFault		
	G20	SInvDciAdChanFault		
	G21	TInvDciAdChanFault		
	G22	LeakCurAdChanFault		
	G23	VoltRef(1.65V)AdChanFault		
	G30	UpsRDcvAdChanFault		
	G31	UpsSDcvAdChanFault		
	G32	UpsTDcvAdChanFault		
	G37	TempAdChanFault	All temperature sensors abnormal	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	G38	VoltAdConflictFault	The sample value of PV, battery and BUS voltage inconsistent with the actual value	
	G39	CPUAdConflictFault	The sample value between master CPU and slaver CPU inconsistent	
	G40	PowerCalcConflictFault	The sum of the PV power, battery and inverter output is too different from zero.	
	G41	EnvirOverTemp1Fault	Installation environment temperature over or low	• Improve or change the installation environment to adjust the inverter installation environment temperature to normal range. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	G42	EnvirLowTemp1Fault		
	G43	CoolingOverTemp2Fault	Cooling temperature over or low	
	G44	CoolingLowTemp2Fault		
	G45	OverTemp3Fault	Temperature3 over or low	
	G46	LowTemp3Fault		
	G46	DSPOverTempFault	CPU temperature over	

Type of Fault	Code	Name	Description	Recommend Solution
System Fault	G48	ModelConflictFault	Version conflict with inverter	• Power off, then restart. • If fault still occurs continuously and frequently, please contact local distributors for software upgrade, version setting details.
Inner Warnning	I01	InterFan1Warning	Fan abnormal	• Check if there is objects which blocking the fan rotation and remove it. • If those faults occurs continuously and frequently, please ask help for local distributors.
	I02	ExterFanWarning		
	I03	Fan3Warning		
	I04	EnvirTemp1AdChanWarning	Some temperature sensors abnormal	• The warning does not affect the normal operation of the inverter. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	I05	CoolingTemp2AdChanWarning		
	I06	Temp3AdChanWarning		
	I07	ExtFlashComWarning	Communication between the master CPU and the Flash is abnormal.	• Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	I08	EepromComWarning	Communication between the master CPU and the Eeprom is abnormal.	
	I09	SlaveComWarning	Communication between slaver CPU and master CPU is abnormal	
	I10	HmiComWarning	Communication between master CPU and HMI is abnormal	
	I11	FreqCalcConflictWarning	Frequency value abnormal	
	I12	UnsetModel	Running model is not initial	• Contact with local distributor.
Outside Warnning	J01	MeterComWarning	Communication between inverter and meter is abnormal.	• Check the meter model, and whether meter wiring and terminals are connected correctly, damaged or loose, if happens, make corrections. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	J02	MeterConnectWarning	Meter/CT wiring fault, or installation position fault.	• Check whether the meter or CT wiring, installation position, and installation direction are wrong, and make corrections. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.

Type of Fault	Code	Name	Description	Recommend Solution
Outside Warnning	J04	GndAbnormalWarning	Poor grounding or no grounding wire has been detected.	• Check whether the ground wire of the inverter is properly connected and whether the ground impedance is over, and make corrections. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.
	J05	ParallelComWarning	Communication between master inverter and slaver ones abnormal in parallel mode.	• Check whether the parallel communication line is damaged, the terminal is loose, the wiring hole position is correct, and make corrections. • Power off, then restart. • If fault still occurs continuously and frequently, please ask help for local distributors.

9. Specifications

PV Input Data	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
Max. DC Power (W)	45000	54000	60000	75000	90000
Max. DC Voltage (V)	1100				
MPPT Voltage Range (V)	200 - 1000				
MPPT Full Power Voltage Range (V)	500 - 850				
Rated Input Voltage (V)	620				
Start-up Voltage (V)	200				
Max. Input Current (A)	38 x 3			40 x 3	38 x 4
Max. Short Current (A)	48 x 3			48 x 3	48 x 4
No. of MPP Tracker / No. of PV String	3/6			3/7	4/8
Input Connector Type	MC4				

AC Output Data	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
Max. Output Power (W)	33000	39600	44000	55000	66000
Nominal Output Power (W)	30000	36000	40000	50000	60000
Max. Output Current (A)	48	60	65	80	96
Nominal Output Voltage (V)	3P+N+PE /3P+PE 230/400				
Grid Voltage Range	260Vac-519Vac (according to local standard)				
Nominal Output Frequency (Hz)	50/60				
Grid Frequency Range	45-55Hz/55-65Hz (according to local standard)				
Output Power Factor	1 default (adjustable from 0.8 leading to 0.8 lagging)				
Output Current THD	<3%				

Efficiency	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
Max. Efficiency	98.50%	98.65%	98.65%	98.80%	99.00%
Euro Efficiency	98.10%	98.20%	98.25%	98.45%	98.50%

Protection	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
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	Integrated (Type II)				
Smart IV Curve Scaning	YES				
Quick Arc Fault Circuit Interruption	Optional				

General Data	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
Dimensions (H x W x D, mm)	712 x 427 x 232				
Weight (kg)	42		43	45	51
Protection Degree	IP65				
Enclosure Material	Aluminum				
Ambient Temperature Range (°C)	-25 to 60				
Humidity Range	0-100%				
Topology	Transformerless				
Communication Interface	RS485 / WiFi / Wire Ethernet / GPRS (optional)				
Cooling Concept	Intelligent Fan Cooling				
Noise Emission (db)	<51			<55	
Night Power Consumption (W)	<1				
Max. Operation Altitude (m)	≤4000				

Certifications and Standards	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
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/T32004, G98/G99, IEC61727				