

Hybrid Inverter FAQ (3.6KW+6KW)

1: IS YOUR PCB BOARD SIMILAR TO VOLTRONICS?

IFT Response: The vast majority of product functions and performance at the same level compare with Voltronic, but there are differences in software and hardware design for the PCB board. Our PCB layout is more compact, and our PCB board has a smaller size at the same rated output power.

The highlights of our PCB design and process are as follows:

1. Dual-Layer PCB | Compliant with the World's Toughest Grid Codes
 - Dual-layer PCBA isolates control and power circuits for superior EMI immunity and heat dissipation.
 - Fully meets IEEE, EN, CEC, G99 standards—true plug-and-play worldwide.
2. Premium Components | Direct Tier-1 Sourcing
 - Core parts sourced directly from Infineon, Texas Instruments, Murata, Panasonic and other top brands.
 - Qualified to AEC-Q100/200 & UL94 V-0 standards, achieving defect rates well below the industry average.
3. DJI & Huawei-Grade Manufacturing | Best-in-Class QA
 - SMT, AOI/SPI, final assembly and 48 h full-load burn-in are performed in DJI/Huawei-certified smart factories.
 - End-to-end MES traceability guarantees rock-solid reliability from day one.

2: WHAT KIND OF PROTECTION IT HAS DC, AC AND BATTERY?

IFT Response:

AC mains input: Abnormal high/low voltage protection for Grid power supply (90~280VAC, minimum starting voltage 90V)

DC battery input: Battery high/low voltage protection (LFP battery 40V -61V)

DC PV input: PV high/low voltage protection

AC output:

over load protection(3.6KW inverter can support 150% overload max at 200ms, 6kw can support 120% overload max in 10S)

Short Circuit Protection

Output overvoltage and undervoltage protection

Once there is reverse polarity operation, the possible consequences are as follows:

Protection Comparison:

Circuit	Reverse Protection	Failure Consequence	Time-to-Failure
Battery	Yes (Active)	Fuse blown	<500ms
Utility AC	No (Not required)	Normal operation	N/A
PV Input	No	IGBT destruction, PCB carbonization	<200ms

3: DOES THE INVERTER WORKS WITHOUT GRID WITHOUT BATTERY? ONLY PV INPUT
 IFT Response: Yes, both 3.6KW and 6KW inverter support work without Grid and without battery under PV input only.

4: WHAT CAPACITY IT WORKS WITHOUT GRID WITHOUT BATTERY? ONLY PV INPUT
 IFT Response: If the PV energy is fully sufficient with good sunshine, it can reach the rated output power.

5: WHAT KIND OF BATTERY COMMUNICATION PROTOCOLS ARE USED AND DOES IT WORKS WITH ALL KIND OF LITHIUM IRON BATTERIES?
 IFT Response:
 3.6KW inverter support low voltage (24V/25.6V)BMS protocol including PYLON 485/CAN;

6KW inverter support low voltage (48V/51.2V)BMS protocol including PYLON 485/CAN;
 Only the LFP battery pack support the above mentioned BMS protocol and can communication with the inverter. The Inverter can support Lead acid battery including AGM and flooded type but no BMS communication.

6: DOES IT WORKS WITH LEAD ACID BATTERY?
 IFT Response: Yes, both 3.6KW and 6KW can works with lead acid battery, detailed connection between inverter and lead acid battery please refer to the user manual :

3.6 Battery Connection

3.6.1 Lead-acid Battery Connection

User can choose proper capacity lead acid battery with a nominal voltage at 24V. Also, you need to choose battery type as 'AGM or FLD(flooded)'



CAUTION!

For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. The recommended size of protector or disconnect is 175A.



WARNING!

All wiring must be performed by a qualified person.



WARNING!

It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below. The cable color mentioned below is for typical reference.

7: HOW THE STRING ARRANGEMENT WILL BE MADE PV 9000 WHERE WE HAVE DC MAXIMUM VOLTAGE AT 500V?

IFT Response: Standard configuration recommendation: 9 pieces of 500W or 8 pieces of 600W photovoltaic panels are connected in a string, and 2 strings are connected in parallel to the PV input of the inverter (specific parameters are also related to the photovoltaic panels and can be adjusted accordingly, such as the open circuit voltage and short circuit current of a single photovoltaic panel, ensuring that the total open circuit voltage of each PV string does not exceed 500V, and the total current of the two strings does not exceed 27A)

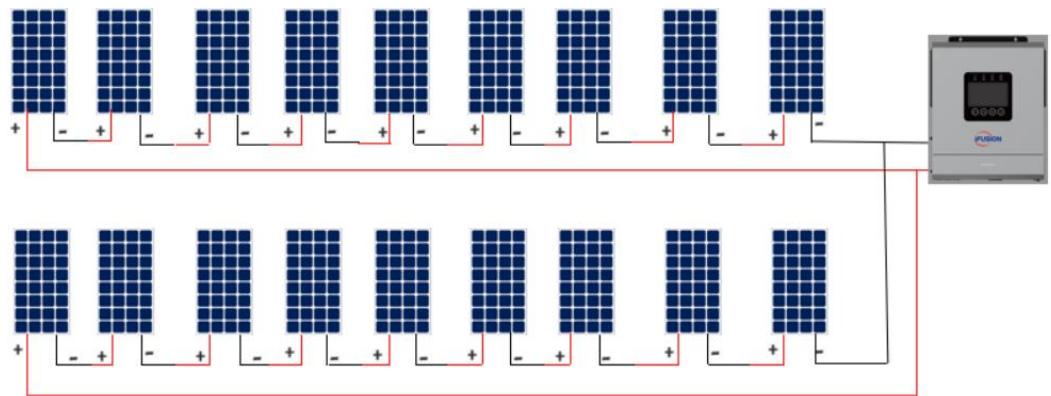
MPPT range for 6KW inverter is 60-450 VDC

Minimal Configuration: 3* PV panels

$V_{total} = V_1 + V_2 + \dots + V_n$

$I_{total} = \min(I_1, I_2, \dots, I_n)$

$P_{total} = P_1 + P_2 + \dots + P_n$



8: HOW MANY INVERTERS CAN BE PARALLEL USED WITH ONE SETUP?

IFT Response: Both 3.6KW and 6KW do not support parallel connection.

9: WILL 3KV WIFI DONGLE WORKS WITH 6KW AS WELL?

IFT Response: WiFi sticks for 3.6KW and 6KW have the same hardware, but different software and communication protocols are loaded, so please do not mixed use.

10: WHAT KIND OF CLEANING AND MAINTENANCE IS REQUIRED FOR THE INVERTER?

IFT Response:

It is recommended to regularly clean the dust screens on both sides of the off grid inverter's air inlet every quarter, especially in some application environments with high dust levels, and increase the cleaning frequency accordingly;

If configured with lead-acid batteries, regular balanced charging can be set to activate battery characteristics

Regularly check for loose or damaged cables each half year.

11: GUIDANCE FOR THE INSTALLATION AND WHAT CAUTION NEED TO BE DONE?

IFT Response:

Please refer to the user manual, and the installation guide video will be available in 3 weeks.

The key steps include wire made, wiring, battery/grid/photovoltaic/load connection, and wall mounted installation of inverters.

Attention, do not reverse the battery connection, and be careful not to reverse the photovoltaic connection.

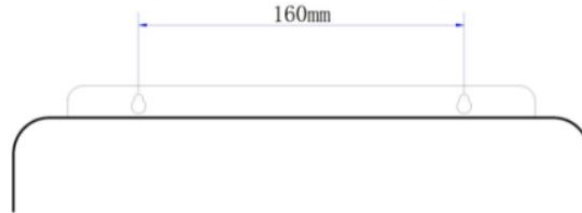
Be careful not to connect the mains input and AC output incorrectly.

Be careful not to short circuit the N line of the mains input to the N line of the AC output.

Please note that the L and N wires of the mains input should not be connected in reverse.

Follow the installation steps:

1. Use $\phi 8$ drilling bit drill holes on the mounting surface. The distance between 2 holes is 160mm. Then insert the expansion screw tube. M6 expansion screw is suggested



3.4 AC Input / Output Connection



CAUTION!

Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 25A for 3.6KW inverter.



CAUTION!

There are two terminal blocks with "AC IN", "AC OUT" markings. Please do NOT mis-connect input and output connectors.



CAUTION!

Be sure to connect AC cables with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation



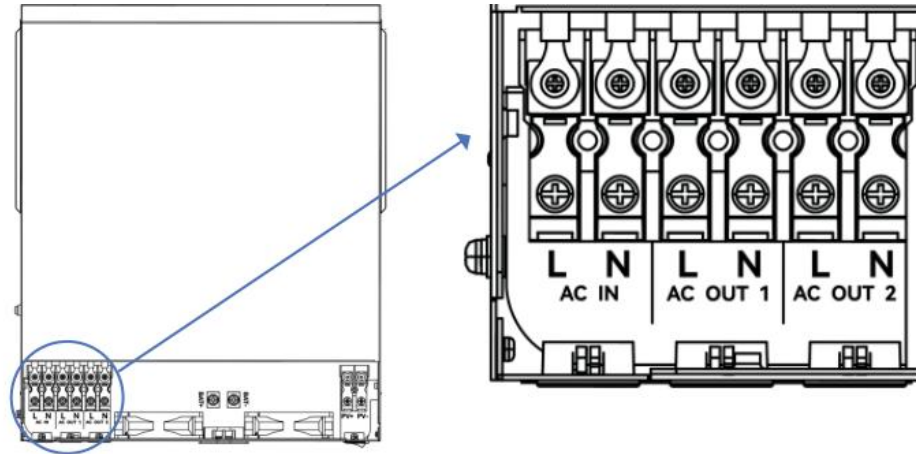
WARNING!

All wiring must be performed by a qualified personnel.



WARNING!

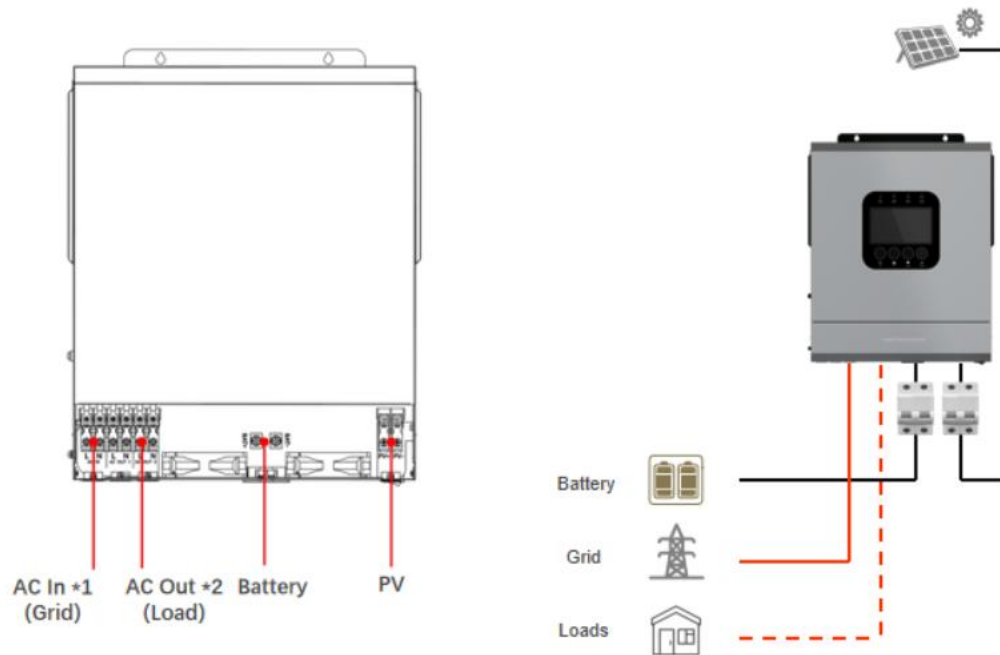
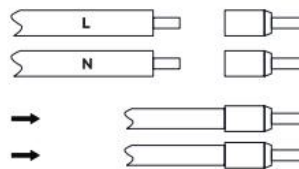
It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please

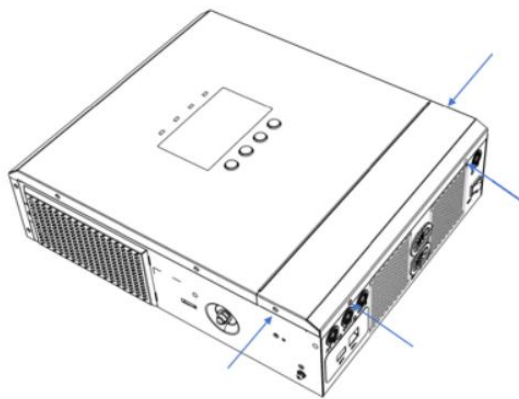


4. Make sure the cables are securely connected.

To implement AC output (OUT1/OU2) connection:

1. Follow the steps as AC input connection of L (LINE) and N (Neutral) cables.





1 Boards: COM * 1
AC IN * 1, AC OUT1 * 1, AC OUT2 * 1, BAT * 1, PV * 1

12: SPECIFY THE VOLTAGE RANGE OF THE GRID AND HOW LOW IT CAN WORK?

IFT Response: Working range 90~280VAC, minimum starting voltage 90V

13: WHAT KIND OF SAFETY FOR LOW AND HIGH VOLTAGE OF THE GRID?

IFT Response: Software cooperates with hardware to sample the voltage of the power grid. When overvoltage or undervoltage is detected, the mains relay is disconnected and automatically switches to battery mode operation.

14: WHAT KIND OF BATTERY SETTINGS NEED TO BE DONE?

IFT Response: If the BMS of the inverter and battery pack can communicate, the BMS configuration parameters of the battery shall prevail

If the battery is connected but the BMS does not communicate, it is necessary to manually set the battery undervoltage alarm point, undervoltage shutdown point, float charging voltage, constant voltage charging voltage, and charging current on the inverter LCD panel.

15: DOES IT HAS SPD PROTECTION FOR DC AND AC SIDE?

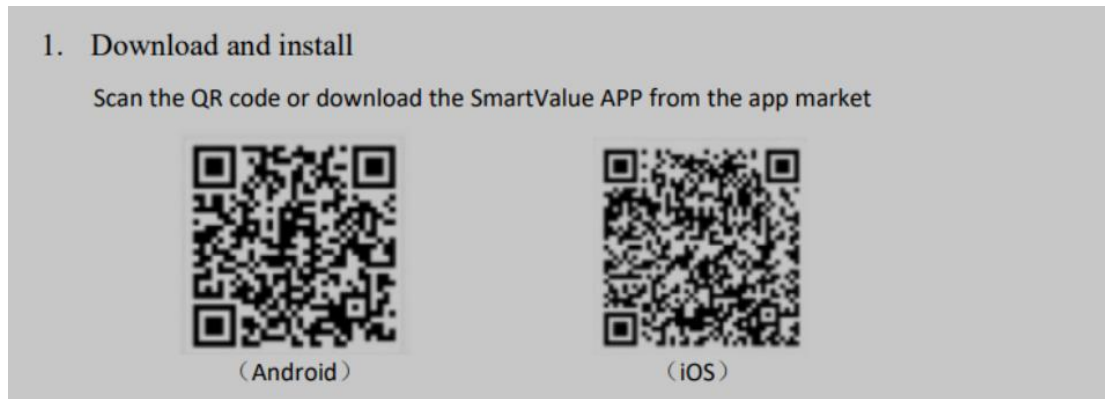
IFT Response: the inverter internally equipped with varistors and gas discharge tubes, without surge protectors (SPDs)

For some areas with frequent lightning strikes and frequent overvoltage of the power supply, it is recommend users need to configure SPD outside the inverter for AC in/out and PV in.

16: WHICH APP IS USED FOR CLOUD DATA?

IFT Response: SmartValue/Valuecloud

The detailed operation please to the SmartValue APP Operation manual



Note:

1. Please ensure that the signal connected to the network is good and the network is unblocked
2. Currently, routers in 5G band are not supported. Please use routers in 2.4G Band.
3. Make sure that the router password is correct.

17: CAN ALL SETTINGS BE DONE ON APP ONLINE?

IFT Response:

The commonly used settings for users can be set up through the app, the APP including the mobile APP and Web App which can basically cover their needs. If there are special requirements that need to be set up in the cloud,

15:11

       40%

Device Control

Basic Settings

Battery settings Search

OneClickRead

Maximum charging current (A)

Please enter

**12V battery input (V)**

Please enter

**24v battery undervoltage point (V)**

Please enter

**48v battery undervoltage point (V)**

Please enter

**BMS Communication function**

Please select ▼



15:10  40%

<

Device Control

Basic Settings

Battery settings

...

Q Search

OneClickRead

system time

Please enter



Controls the inverter switch

Please select ▼



Restore the default value

Please select ▼



Power generation statistics time

Please enter



Output priority

Please select ▼



Mains charging current (A)

Please enter



Battery Mode

Please select ▼



Inverter output voltage

Please enter



Output mode

Please select ▼



Charging priority

Please select ▼

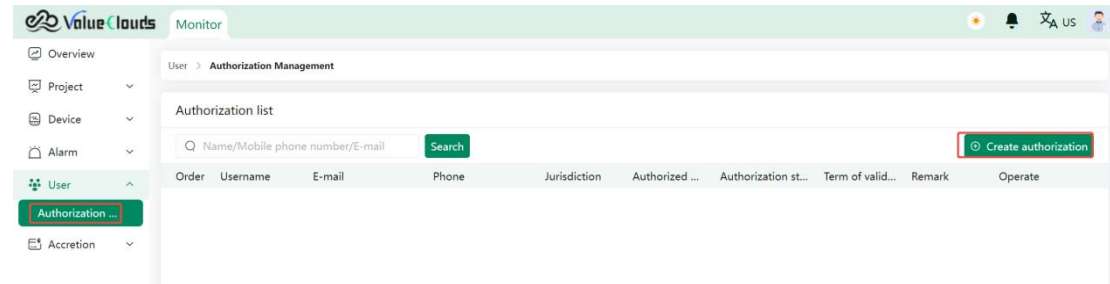




18: HOW THE EPC/INSTALLER CAN MANGE MULTIPLE SYSTEM IN ONE LOGIN?

IFT Response: Create a power station with an installer account and authorize the user to view it.---Log in to the website on a computer with the web app:

<https://www.valueclouds.com/#/system/accreditManagement>



[<](#) Create authorization

Register account

Already have account

Username *

Please enter a username

Authorized project

Q Project name

☐ 我的项目-01

☐ 我的项目-1102

Term of validity

☒ Permanent

☐ Customize

Remark

Confirm

19: WHAT IS THE PROCEDURE TO GIVE CUSTOMER VIEW APP LOGIN BY INSTALLER?

IFT Response: The installer need apply for the authorization from IFT first.

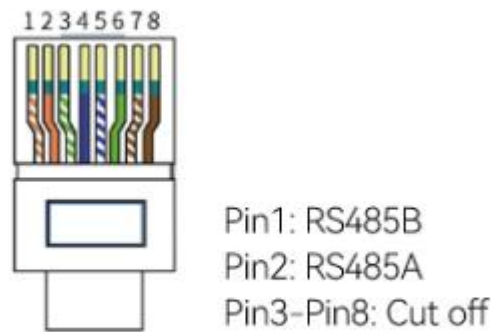
20: CAN WE (FAMN SHINE) CAN SETUP ONE LOGIN TO VIEW AND SUPPORT ALL SYSTEM IN PAKISTAN ONLY BY SERIAL NUMBER?

IFT Response: Yes, All inverter power station systems registered in the app by serial number, and all serial number need to be created under FAMN SHINE account.

21: HOW TO MAKE COMMUNICATION CABLE FOR RS485 AND CAN TO

COMMUNICATE BETWEEN IFT AND LITHIUM IRON BATTERIES OF ANY BRAND?

IFT Response: please make the RS485 communication cable based on the pictures below, currently IFT inverter only can communicate with the lithium iron battery which support PYLON 485/CAN, Voltronic 485 and Growatt 485 and CVTE 485.



Pin number	BMS port
1	RS485B
2	RS485A
3	-
4	CANH
5	CANL
6	-
7	-
8	-

22: KINDLY GIVE US THE PROCEDURE TO SETUP INVERTER ON APP BY INSTALLER AND WHAT KEY SETTINGS TO BE DONE?

IFT Response: please refer to the SmartValue APP Operation manual.

23: HOW CAN WE PROVIDE REPLACEMENT WARRANTY TO CUSTOMER?

IFT Response: please refer to the IFT Hybrid inverter warranty terms and policies. Currently we can provide PCB replacement but regarding the the whole inverter replacement we still need further discussion case by case.

Check actions after product damage

- ① Check the connection of battery, PV, mains input and AC output (whether the positive and negative are connected in reverse, and whether the input and output are connected in reverse);
 - ② Whether the grounding is normal
 - ③ Check the installation environment, whether there is enough ventilation space around the product (inlet and outlet), and whether the air inlet is seriously blocked by dust
 - ④ Open the chassis, check whether the cables are loose, whether the display, communication and other signal cables are loose; check whether the fan is stuck by foreign objects
 - ⑤ Check the appearance of the board, whether there are obvious signs of carbonization and burning; use a multimeter to measure whether the transistors (MOS tubes, IGBTs) on the radiator are broken down and damaged, and the GDS or GCE voltage drop is less than 0.1V; use a multimeter to measure whether the fuse is open
- ; Check whether the aluminum electrolytic capacitor has bulging and overflow, etc.

List of equipment required for testing:

- ① Multimeter (commonly used diode range, resistance range, on/off range, AC/DC voltage range)
- ② 10~60V adjustable DC source
- ③ Oscilloscope (can measure drive signal, voltage, current and other waveforms)
- ④ 12V power adapter (the interface is made into a 2pin 2.54 terminal, which can be directly connected to the power terminal on the plug-in board)
- ⑤ Serial cable and adapter board, used for data reading
- ⑥ Screwdriver, electric soldering iron, hot air gun, diagonal pliers, tweezers, solder sucker, tin wire, anti-static bracelet, brush, board cleaning water.

24: HOW FREQUENTLY THE APP AND FIRMWARE IS UPDATED?

IFT Response: Firmware rarely needs to be upgraded, even if upgraded, users are unaware; APP will be updated 1 year 1 major version in apple store and google play, you can download the app to overwrite the previous version.

25: IN CASE OF POWER FAILURE DOES YOUR INVERTER AUTOMATICALLY SWITCH TO BATTERY?

IFT Response: Yes, when power failure such as lose the Grid or PV or both PV+ grid failure or not sufficient for the load , battery will automatically discharge to inverter to power the load until the battery voltage go to the low-voltage line the inverter into the standby status waiting the PV and grid restore to chare the battery. The pre-conditions is you should do the LCD settings 03(output source priority)

Abnormal switching to battery

- ① Whenever the inverter reports a fault code, the machine will cut off the output protection and cannot maintain the inverter output
- ② Under normal circumstances, if the mains power is abnormal, switching to battery mode is also related to the output priority

PBG mode, photovoltaic>battery>mains power, photovoltaic abnormality, switch to battery discharge, battery power is switched to mains power when it is out of power

PV priority, photovoltaic>mains power>battery, photovoltaic abnormality switches to mains power, mains power abnormality switches to battery

Mains power priority, mains power>photovoltaic>battery, mains power abnormality, switch to photovoltaic, photovoltaic abnormality switches to battery

③If the battery itself is low in power (battery voltage is lower than the shutdown voltage, battery SOC is lower than the shutdown SOC), the mains power abnormality cannot be switched to battery mode at this time

④If it is detected that the battery is not connected, the mains power abnormality cannot be switched to battery mode

⑤When BMS communication is normal, if BMS uploads a signal to prohibit discharge, the mains power abnormality cannot be switched to battery mode.

		Adjustable/settable frequency: 50Hz, 60Hz	
03	Output source priority	Solar first	
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, Grid will supply power to the loads at the same time. The extra power will charge the battery. If solar energy and grid are not sufficient, battery will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
		Grid first (default)	
		Grid provides power to the loads as first priority. Solar power will charge the battery. If solar is not sufficient to charge battery, grid will charge the battery at the same time. If grid is not sufficient to power all connected loads, solar energy will supply power to the loads at the same time. If solar energy and grid are not sufficient, battery will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	

03	Output source priority	PBG priority	
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, battery will supply power to the loads at the same time. If solar energy and battery are not sufficient, grid will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
		MKS	
		Generator provides power to loads as first priority. When generator, PV, battery all exist, the work mode is as PBG. When generator and battery exist (no PV), the work mode is as GPB. When generator and PV exist (no battery), the work mode is as GPB.	

26: COULD YOU PLEASE CONFIRM THE OPERATIONAL TEMPERATURE RANGE OF INVERTER BOTH MINIMUM AND MAXIMUM?

IFT Response: Operating temperature range:-10℃~50℃

Interface	RS485 / RS232
Monitoring	NA
General Data	
Ingress Protection	IP21
Operating Temperature	-10 °C ~ 50 °C
Relative Humidity	5% ~ 95% (Non-condensing)
Storage Temperature	-15 °C ~ 60 °C
Net Weight (kg)	3.2
Dimensions (W*H*D)	347*236*91mm
Max. Operating Altitude	4000m (Derating above 1000m)
Activation	
AC Activation	YES
PV Activation	YES

27: WHAT WILL HAPPENED IF THE AC GRID LOAD SUDDENLY INCREASE TO 200% TO 12KW?

IFT Response:Once the grid load sudden increase, the output current will be limited by control, and then timing will be executed according to overload logic. After reaching the specified overload time, the output will be cut off to protect the inverter. The overload time varies for each product and can be found in the technical datasheet or user manual.

Below attached is the output overload battery mode capability of 3.6KW and 6KW, so 3.6KW inverter can support 150% overload max, 6kw can support 120% overload max in 10S.

3.6KW

Output overload battery mode	102%<Load ≤110%	1 minute minimum, then alarm and turn off output (operation environment temperature -10 - 40°C)	
	110%< Load ≤130%	10 seconds minimum, then alarm and turn off output	
	130%<Load ≤150%	3 seconds minimum, then alarm and turn off output	
	Load>150%	200 ms minimum, then alarm and turn off output	

6KW

Overload capacity (battery mode)	1min@102%~120% load, 10s >120% load	
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28: Preconditions for enabling the feeding into grid

IFT Response:The output priority is set to Solar first as PGB mode, the grid must connect to the AC input port, the grid voltage and frequency are within the specification range, the PV power is sufficient, then the grid-feeding function could be enabled.

29: How to enabling the feeding into grid function

IFT Response:

P36 - Grid-tieinverter function

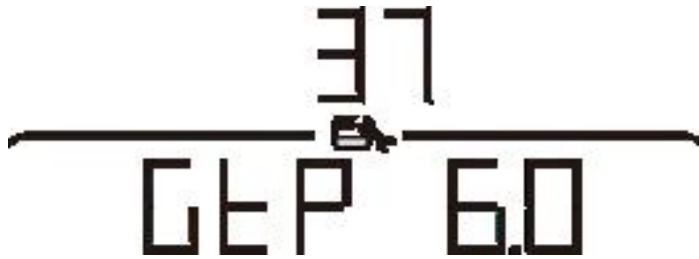
Set whether the inverter is grid fed or not. If the value is 'INT'the inverter can feed to grid according to different output sourcepriority.In PGB mode when battery level is sufficient, as long as grid isconnected, PV can feed energy to grid as much as possible andsurplus energy of PV charges the battery.In PGB mode when battery level is NOT sufficient, PV chargesbattery as much as possible and surplus energy of py feeds to grid.In GPB mode and PBG mode, as long as grid is connected, Pycharges battery as much as possible and surplus energy of PVfeeds to grid.
in MKS mode, inverter does not feed to grid.



P37 - Max Grid Tie Power

Setting the output powwer value to grid. The default is 6.0kw. Thesetting range is [0,

6.0]kW. Every setting step is 0.5kw,



30.The possible risks and hidden dangers when enabling the feed into grid function

IFT Response:

1. Legal and Compliance Risks

Administrative Penalties

Criminal Liability

If personal injury or death is caused, the person shall be held accountable for the crime of major responsibility accident.

2. Technical safety risks

1. Islanding effect (the most deadly risk)

Problem: When the grid is out of power, the privately connected system may continue to transmit power to the grid, and the maintenance personnel may be electrocuted to death.

Formal requirements: The inverter must have UL 1741/IEC 62116 certified islanding protection (power off within 0.2 seconds).

Consequences of private connection: No certified equipment or undebugged protection function → Direct threat to the lives of grid workers!

2. Grid shock and equipment damage

Risk type Mechanism Consequence

Voltage oscillation Failure to synchronize grid phase → Voltage surge/sag Burning of nearby users' appliances (TV, refrigerator)

Harmonic pollution Failure to pass the grid connection test of THD<3% Damage to grid transformer, claim

Frequency drift Inverter output frequency exceeds $50 \pm 0.5\text{Hz}$ Triggering grid protection tripping, regional power outage

3. Fire risk

DC arcing: Privately connected grids often omit DC disconnect switches (mandatory requirements of regulations), and cannot quickly cut off power in case of failure.

31. Under what circumstances can the feed into grid function be disconnected? A brief description of the disconnection mechanism

IFT Response:

- 1) Automatic disconnection of the grid feed function: After the grid feed function is turned on, once the grid power is cut off, the inverter AC end Relay protector disconnects under the following conditions: the Grid voltage or frequency is detected to be lower than the initial value previously set in the APP or the inverter LCD screen.
- 2) Relay protector Disconnection mechanism: It takes 200ms to detect the grid abnormality. The inverter will continuously sample 10 complete electrical pulse cycles. If all 10 samples are lower than the set initial value, it is confirmed that the mains abnormality needs to disconnect the relay protection device. According to the type of mains loss, the relay selects the disconnection waiting time (maximum 10ms), and the relay mechanical switch flight time is 4ms.

32. Introduction to the power derating of the inverter due to overheating.

IFT Response:

- 1) Ambient NTC temperature $\geq 43^{\circ}\text{C}$, (PV input current derating 2A, PV input power derating 1000W, inverter AC output power derating 700W)
- 2) PCB board heat sink INV NTC temperature $\geq 80^{\circ}\text{C}$, (PV input current cumulative derating 2A, PV input power cumulative derating 1000W, battery charging current cumulative derating 20A)
- 3) Heat sink INV NTC temperature $\geq 85^{\circ}\text{C}$, overtemperature fault reported, inverter stops AC power output, fault red light will remain on, the inverter will beep and enter fault mode.