

BENY Microinverter

BYM400/500/550/600 Bluetooth+Wi-Fi



Model	BYM600
Max. AC Output Power	600W
Max. Input DC Voltage	80V
MPPT Range DC Voltage	24-80V
Input Range DC Voltage	18-80V
Max. Input Short Current	24A
Max. DC Current	25A
Peak Conversion Efficiency	98.5%
Type of Inverter	IP67
Max. AC Output Power	600W
Max. AC Voltage	220/230/240V
Max. AC Frequency	50/60Hz
Max. AC Output Current	2.75A
Overvoltage Category	AC II PV II
Protection Class	I
Output Power Factor	>0.99(Defect)
Operating Ambient Temp	-40 ~ +75°C

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VERSION: 20240819-01



User and Installation Manual



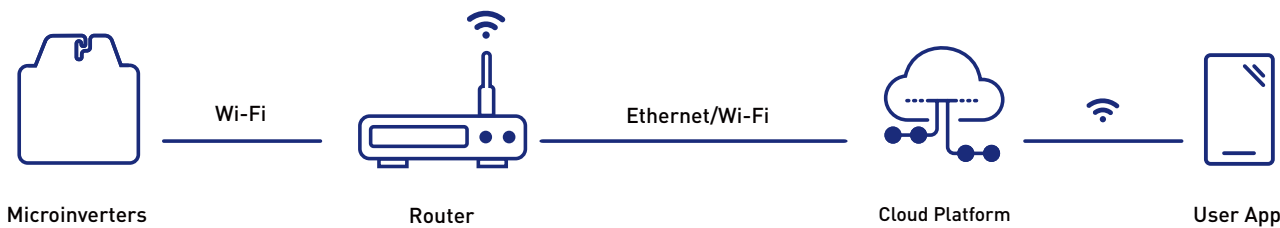
BENY microinverter system description

The system consists of a set of microinverters and other connected accessories.

Microinverters convert direct current (DC) from photovoltaic modules into alternating current (AC) and feed it into the public grid. Each microinverter works independently to ensure that each photovoltaic module generates maximum power. This setup enables users to directly control the power generation of individual PV modules, thereby increasing the flexibility and reliability of the system.

The monitoring equipment monitors the working status of each microinverter and photovoltaic module in the power station, and transmits power generation data and other information to the cloud monitoring platform or local server, so that users can understand and query the working status of the power station.

BENY microinverters provide the option to monitor power generation through Wi-Fi, support real-time, daily, monthly and annual production assessment data query ; support module-level problem detection and facilitate maintenance.



Manual

This manual contains important instructions for BENY microinverters.

It must be read in its entirety before installing or commissioning the equipment.

For safety, only qualified technicians, who have received training or have demonstrated the requisite skills can install and maintain this microinverter under the guidance of this User Manual.

Professional and technical personnel must:

- ① Undergo professional installation training.
- ② Read this User Manual and be proficient in operation-related safety matters.
- ③ Be familiar with the relevant safety regulations of thee electrical system.



Table of contents

1. Security information	01
1.1 Safety instructions	01
1.2 Symbol	01
2. Microinverter product information	02
2.1 BYM400/500/550/600 technical specifications	02
2.2 Bluetooth+Wi-Fi communication	03
2.3 Microinverter system coding instructions	03
3. Microinverter system installation	04
3.1 Installation Notes	04
3.2 Installation tool for BENY microinverter	05
3.3 Installation Step	06
4. Troubleshooting	10
4.1 Troubleshooting microinverter indicator light abnormalities	10
4.2 Platform troubleshooting	10
4.3 On-site inspection-professionals	12
4.4 Microinverter product replacement process	13
5. Microinverter maintenance	13
6. Microinverter storage	14
7. Warranty	14



1.Security information

1.1 Safety instructions

Microinverters are designed and tested in strict accordance with relevant safety standards of various countries. At the same time, for electronic equipment, its installation, debugging, operation and maintenance must comply with relevant safety regulations.

In order to ensure the safe installation and operation of the microinverter and reduce the risk of electric shock, this manual uses safety symbols to indicate some danger instructions and safety precautions. Precautions during specific operations will also be explained in detail in the corresponding chapters.

1.2 Symbol

Symbol	Usage
	Treatment To comply with European Directive 2002/96/EC on waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device no longer required must be returned to an authorized dealer or approved collection and recycling facility.
	Caution Do not come within 8 inches [20cm] of the microinverter for any length of time while it is in operation.
	Danger of high voltages Danger to life due to high voltage in the microinverter.
	Beware of hot surface The inverter can become hot during operation. Avoid contact with metal surfaces during operation.
	CE mark The inverter complies with the requirements of the low voltage directive for the European Union.
	Read manual first Please read the installation manual first before installation, operation and maintenance.

2.Microinverter product information

2.1 BYM400/500/550/600 technical specifications

Input Data (DC)				
Model	BYM400	BYM500	BYM550	BYM600
Recommended input power (Single)	(STC) 400~700+ Wp , 60 ~75-cell/120~150 half-cell			
Recommended input power (Dual)	(STC) {300~450 Wp} *2 , 72~75-cell/144~150 half-cell (NMOT) Vmp≥34V and Imp≤12A			
MPPT voltage range	24V~50V			
Operating voltage range	16V~60V			
Maximum input voltage	60V			
Max. short circuit current	20A			24A
Max. input current	18A			20A
Output Data (AC)				
Rated output power	400VA	500VA	550VA	600VA
Maximum output power	410VA (Vac≥230,Vmp≥26)	510VA (Vac≥230,Vmp≥31)	560VA (Vac≥230,Vmp≥34)	600VA (Vac≥220,Vmp≥33)
Rated voltage (range)	230V (176V~265V)			
Rated frequency (range)	50Hz/60Hz (46.5Hz~62Hz)			
Maximum continuous output current	1.82A	2.27A	2.5A	2.73A
Maximum harmonic distortion	<4%			
Power factor	>0.99 (Default)			
Maximum connection number in one string (40A circuit breaker,10AWG cable)	21 units	17 units	15 units	14 units
Efficiency				
Peak efficiency	96.5%			
MPPT efficiency	>99.8%			
Night power consumption	<100mW			
Other Parameters				
Communication method	Bluetooth+Wi-Fi			
Safety protection	Class I			
Enclosure rating	IP67			
Operating temperature	-40°C to +70°C			
Storage temperature	-40°C to +85°C			
Relative humidity	0~98%			
Transformer design	High frequency transformer, Electrical isolated			
Overvoltage class	OVC III (AC), OVC II (PV)			



Warranty period	12 / 25 years (Optional)
Dimensions (L*W*H mm)	210*230*34
Weight (kg)	2.39
Safety regulations	IEC/EN 61000-6, CISPR11+A1+A2, IEC/EN 62109-1/2, EN 50549-1:2019 VDE-AR-N 4105:2018/DIN VDE 0124:2020, AS 4777.2 :2020, INMETRO, UTE C15-712-1/DIN VDE 0126/VFR 2019, G98, CEI 0-21:2020, NC RFG, NTS DAKKS .

The BENY microinverter can be directly connected to the single-phase grid, or it can be connected to the three-phase grid by connecting multiple units on the three single-phase grids. Contact customer service support to check compatibility.

2.2 Bluetooth+Wi-Fi communication

BENY microinverter has a built-in communication gateway and adopts a two-in-one communication method of Wi-Fi and Bluetooth to avoid complicated wiring methods, simple and quick connection, and easy operation. The Wi-Fi communication frequency band is 2.4G, with a radius of up to 100 meters, a wide communication range and fast speed, and is responsible for sending the working data of the microinverter to the cloud server. The Bluetooth communication module can communicate directly with the mobile phone APP to realize functions such as network distribution and local data viewing, with higher compatibility and stronger real-time performance.

2.3 Microinverter system coding instructions

- Microinverter adopts the double-code rule that UID and CID coexist, where the UID number is the product serial number SN.
 - a. UID is the complete code of the product, which is the unique ID when it leaves the factory, and contains a total of 16 hexadecimal numbers (0~F).
 - b. The lower 8 digits of UID are CID, which is the abbreviated representation of the product code used in monitoring and communication.
- The SN of the microinverter monitoring gateway is an 8-digit CID number.
- The SNs of other products in the microinverter family are all 8-digit CID numbers.

X X X X X X X X
S₇ S₆ S₅ S₄ S₃ S₂ S₁ S₀



Example: 9 0 0 0 0 0 0 1 monitoring gateway
1 0 0 1 0 0 1 1 single-in microinverter
S7: Equipment type are defined as:
A,B,C,: Refers to single, dual, quad-in microinverters with Wi-Fi communication mode respectively
5: Paralleling Optimizer(BYPO-2)
7: ToolKit
9: Monitoring gateway(EMU)

3. Microinverter system installation

3.1 Installation Notes

1. The grid voltage at the public connection point must comply with the AC voltage level on the microinverter label.
2. PV module electrical parameters must comply with the DC input range on the microinverter label.
3. The solar modules and brackets for installing and using the microinverter must be connected to a reliable ground.
4. When a ground fault occurs, the equipment is at risk of electric shock. It is strongly recommended to install surge protection devices in the power distribution cabinet.
5. Ensure that the environmental conditions meet the requirements of the microinverter (protection level, temperature, humidity, altitude, etc.)
6. Installation must be carried out when the equipment is disconnected from the power grid (turn off the mains isolation switch) or when the photovoltaic modules are blocked or isolated.
7. Do not expose the microinverter housing to direct sunlight. It can be installed under the photovoltaic module to ensure its normal operation in a cool or shaded environment. Failure to meet this condition may trigger microinverter output derating.

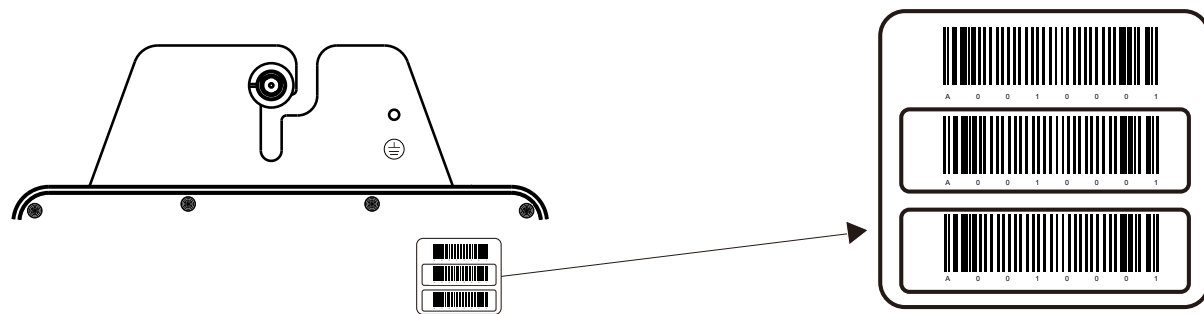


8. To avoid overheating, always ensure that the airflow around the microinverter is not blocked and keep it as high as possible greater than 30mm from any obstructing plane (roof, ground, etc.).
9. Do not install where gas or flammable substances may be present.



10. Only install on metal structures specifically designed for photovoltaic modules (provided by the installation technician).

11. Each BENY microinverter has two detachable serial number labels on the casing and devices can be added later by scanning the QR code through the APP. If it is inconvenient to tear off the barcode after installation, please tear off the barcode in advance and paste it in an easily accessible place.



3.2 Installation tool for BENY microinverter

1. Please check whether the accessories in the box are complete and the product appearance is intact according to your order information. If any parts are lost or damaged during transportation, please contact the carrier immediately. If the microinverter product itself is damaged, please contact your supplier or authorized dealer for repair/return and request instructions on the process.

2. In addition to solar array modules and supporting tools, customers need to prepare:



Gloves



Cable Tie



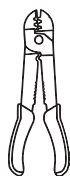
Diagonal Cutter



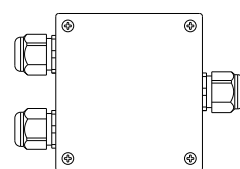
Wire Stripper



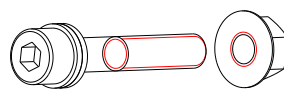
Torque Wrench



Crimping Tool



Outdoor waterproof
junction box

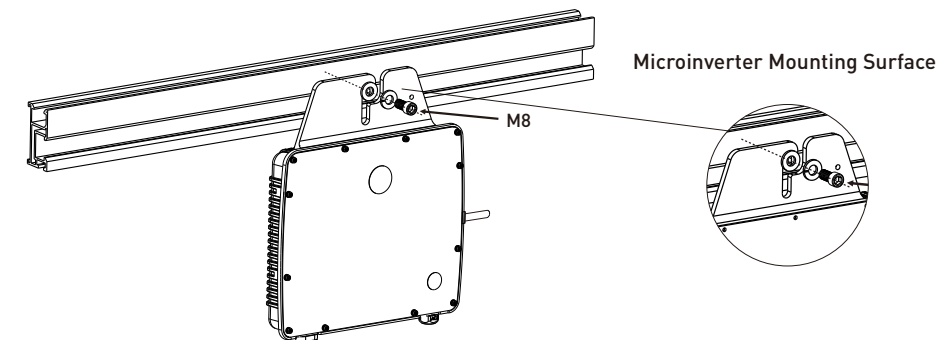


Inverter mounting
kit(screws, nuts)

NOTE: BENY solar microinverters are easy to be installed. Each microinverter can simply be mounted on a rack directly below the module. module-side low-voltage DC connectors can be directly connected to the microinverter, eliminating the danger of high-voltage DC voltages.

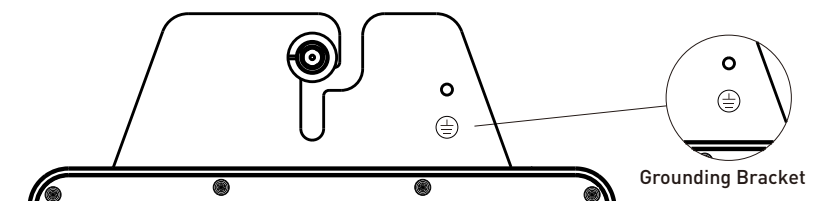
3.3 Installation step

Step 1 Install the BENY microinverter on the bracket



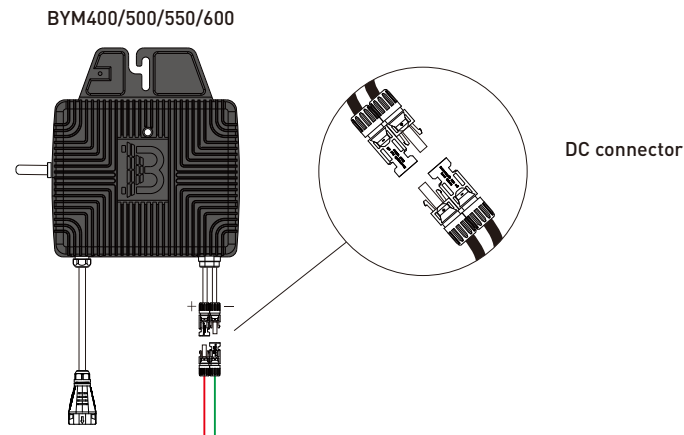
During fixation, the surface of the metal support should be closely fitted to the installation surface of the microinverter and the contact area should be maximized to ensure the thermal conductivity effect.

NOTE: There is a ground wire in the AC cable which can be directly connected to the ground. For areas with special requirements, customers can complete external grounding through grounding brackets. The ground wire can be connected to AC ground through the ground bracket of each microinverter according to local regulations.



Step 2 Connect the solar modules

Connect each BYM400/500/550/600 to the PV modules.



NOTE:

1.If two photovoltaic modules need to be connected in parallel, the specifications of the parallel modules must be met:

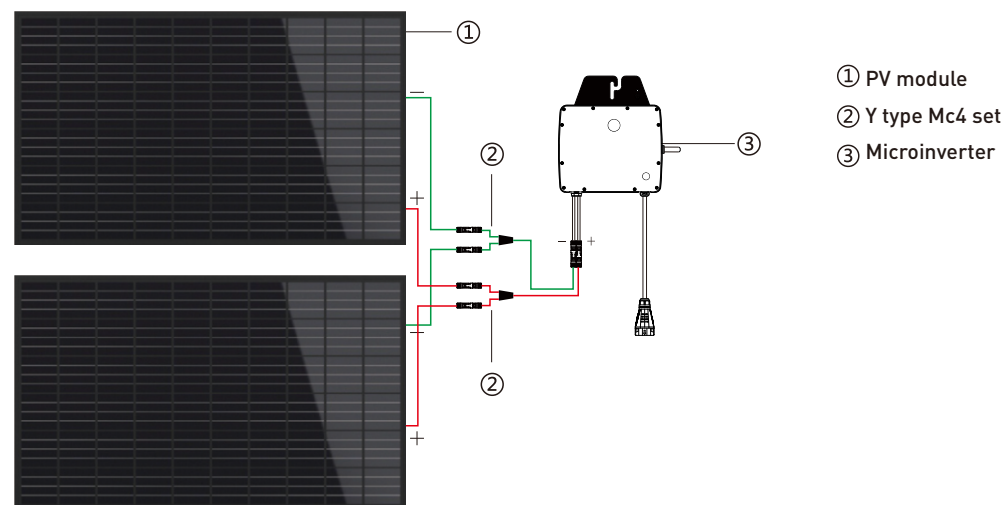
①.(STC) (300~450 Wp) *2 ,72~75-cell/144~150 half-cell

②.(NMOT) $V_{mp} \geq 34V$ and $I_{mp} \leq 12A$

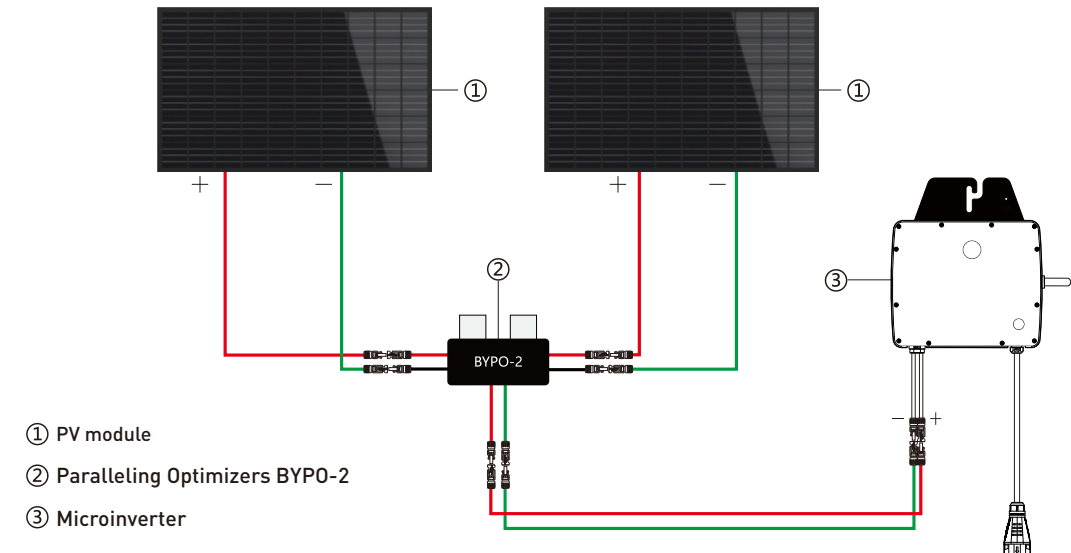
3.The series open circuit voltage of the components cannot be greater than 60V.

4.Two identical PV modules can be connected in parallel using a Y type MC4 set, but two different can only be connected in parallel using a Paralleling Optimizer.

Applications for Y type Mc4 set



Application of Paralleling Optimizer



Step 3 Complete the installation diagram of the BENY microinverter system.

The installation diagram of the microinverter system refers to the schematic diagram of the physical location of each microinverter in the solar system. Customers can use the blank diagram in the appendix of this manual to record the installation position of the microinverter in their own system or they can draw the system installation diagram yourself.

Paste the two tear-off serial numbers on the corresponding positions of the BENY system installation diagram and the frame of the solar module respectively for easy viewing and subsequent APP scanning to quickly add corresponding equipment.



Step 4 Start operating the BENY microinverter PV system

Close the AC main circuit breaker connecting the microinverter system.
Close the on-grid main circuit breaker and the system will generate electricity in about 1 minute.
Always pay attention to the flashing status of the indicator light. When the microinverter is connected to the solar module and the DC side is powered on for the first time, the indicator light will flash red and green at the same time.

Red LED light	Green LED light	Status
Short red-Light blinks	Blinks 1 time	Start up
Not bright	flashes	Normal operation status

- When MI starts power output, green light flashes cycle by cycle.A cycle is 8s.
- During normal operation, the green indicator flashes every second with 0.5s ON,and 0.5s OFF.
- The higher the power output, the more times the green light flashes in a cycle, up to 8 times at most.
- When output is equal to or above the rated power, green light flashes constantly.

NOTE:Once the microinverter is powered on correctly, until it starts to work normally, the start-up time will vary slightly according to the regulations of different regions.

Step 5 Download BENY Microinverter monitoring APP to check the working status of the microinverters.

Please search for "Z-BOX" in the Apple App Store (IOS) or Google Store (Android), or scan the following QR code to download Beny Microinverter monitoring APP.



4.Troubleshooting

 **Ensure that the DC side and AC side are properly connected**

4.1 Troubleshooting microinverter indicator light abnormalities

Red LED light	Green LED light	Status
Continuously flashing	Not bright	Disconnect DC input power for 10 seconds, Reconnect and check if it is back to normal after 5 minutes.
Not bright	Not bright	1.DC side reconnect. 2.Measure the output voltage of the PV module to see if it is within the working range of the microinverter. 3.Detect DC input and AC input to see if it's a microinverter or a PV module issue.

4.2 Platform troubleshooting

Alert Reason	Solutions and Recommendations
PV overvoltage	Please ensure that the open circuit voltage of the photovoltaic module is less than or equal to the maximum input voltage of the microinverter. Disconnect the DC side, and measure whether the voltage of the module meets the requirements.
PV undervoltage	Check the status of the photovoltaic modules (whether there is dust or fallen leaves - if so, clean them). check whether the specifications of the photovoltaic modules match the microinverter and whether the connections are reliable.
DC/DC overvoltage	Check whether the voltage parameters of the machine are normal through APP and you can disconnect the DC power supply and restart the microinverter.
DC/DC overcurrent	Check whether the corresponding parameters of the machine are normal through APP and you can disconnect the DC power supply and restart the microinverter.
DC/DC overtemperature	Please check the temperature of the microinverter through APP or use a thermometer to measure the microinverter temperature to see if the microinverter temperature is too high. If the temperature is too high, an alarm will sound. The microinverter can be disconnected for a period of time until it cools down and then the microinverter can be allowed to work.

Inverter island	Check whether the AC side is well connected and whether the power grid is normal. If the power grid is normal, restart the microinverter and check whether the microinverter is working normally. If the power grid is not normal at this time, please wait until the power grid becomes normal and the microinverter will resume work.
Remote poweroff enabled	1. Check whether the temporary power is set to 0 during microinverter control; or whether the microinverter is under zero-feed network control and whether there is any electrical load. 2. The microinverter is in the off state, just turn it on; or please disconnect the DC power supply and let the microinverter restart.
Low Insulation Res	Check whether the microinverter is immersed in water or accumulating water; also check the grounding condition of the microinverter and the photovoltaic modules.
Sync signal error	Please disconnect the DC power supply and allow the microinverter to restart; then check whether the microinverter is normal.
Safety chain error	Please disconnect the DC power supply and let the microinverter restart. Repeat this several times to see if the microinverter is normal.
Grid overvoltage	1. In the event of an unexpected alarm, the grid voltage may be temporarily abnormal. The microinverter will automatically recover after the grid voltage returns to normal. 2. If alarms occur frequently, please check whether the grid voltage is within the range that the microinverter can withstand. If not, please change the grid overvoltage protection limit through the BENY remote monitoring system after obtaining the consent of the local power operator.
Grid undervoltage	1. In the event of an unexpected alarm, the grid voltage may be temporarily abnormal. The microinverter will automatically recover after the grid voltage returns to normal. 2. If alarms occur frequently, please check whether the grid voltage is within the range that the microinverter can withstand. If not, please change the grid undervoltage protection limit through the BENY remote monitoring system after obtaining the consent of the local power operator.
Grid overfrequency	1. If an unexpected alarm occurs, the grid frequency may be temporarily abnormal. The microinverter will automatically recover after the grid frequency returns to normal. 2. If alarms occur frequently, please check whether the grid frequency is within the acceptable range of the microinverter. If not, please change the grid overfrequency protection limit through the BENY remote monitoring system after obtaining the consent of the local power operator.
Grid underfrequency	1. If an unexpected alarm occurs, the grid frequency may be temporarily abnormal. The microinverter will automatically recover after the grid frequency returns to normal. 2. If alarms occur frequently, please check whether the grid frequency is within the acceptable range of the microinverter. If not, please change the grid underfrequency protection limit through the BENY remote monitoring system after obtaining the consent of the local power operator.

Phase lock error	Please make sure that the power supply of the photovoltaic module is normal. If it is normal, please disconnect the DC power supply and let the microinverter restart. Repeat this several times to see if the microinverter is normal.
Grid Surge	In the event of an unexpected alarm, the power grid may be temporarily abnormal. The microinverter will automatically recover after the grid surge disappears.
SEC MCU undervoltage	Check whether the power supply is normal through APP. If it is normal, please disconnect the DC power supply and let the microinverter restart. Repeat this several times to see if the microinverter is normal.
H bridge overcurrent	Check whether the power supply is normal through APP. If it is normal, please disconnect the DC power supply and let the microinverter restart. Repeat this several times to see if the microinverter is normal.
Grid frequency out of range	Check the grid frequency sampling through APP to check whether the grid frequency reaches the frequency recovery interval.
Grid voltage out of range	Check the grid voltage sampling through APP to check whether the grid frequency reaches the frequency recovery interval.

If the fault still cannot be solved according to the above methods, please contact your dealer or BENY after-sales service center.

4.3 On-site inspection-professionals

Verify that the utility voltage and frequency are within the ranges shown in the technical data of this microinverter.

Check the connection to the grid. When the inverter is still working, disconnect the AC side first, then the DC side.
Check AC branch circuit interconnections between all microinverters. Verify that each microinverter is powered by the utility grid.

Verify that the AC circuit breaker is functional and closed.



Check the connection between the microinverter and the DC side of the solar module.

Verify that the PV module DC voltage is within the allowable range shown in the technical data of this manual.

4.4 Microinverter product replacement process

Follow the steps below to replace a failed BENY microinverter.
Disconnect the BENY microinverter from the solar module in the following order:

- Disconnect the circuit breaker on the AC side of the branch circuit.
- Disconnect the AC bus from the inverter AC connector.
- Disconnect the solar module and microinverter DC connectors.

Install and replace the microinverter on the rack, use a multimeter to measure and make sure there is no current in the DC line between the module and the microinverter when making connections on the DC side of the new machine.

Please ensure that the AC branch circuit breaker is disconnected and strictly follow the microinverter installation steps to install and replace the unit. After the replacement is completed, close the branch circuit breaker and verify the operating status of the replaced microinverter.

Please put the damaged microinverter into its original packaging. If the original packaging cannot be reused, it is recommended to use a cardboard box that can hold 5 kg and can be closed correctly to place the microinverter to be replaced.

5. Microinverter maintenance

1. Maintenance operations can only be performed by authorized professionals and professional personal protective equipment must be used.

2. During normal operation, the working environment should be ensured to meet the technical requirements of the microinverter. Make sure these conditions have not changed over time and that the device has not been exposed to harsh weather conditions or covered with foreign objects.

3. When cleaning, do not use rags that contain filamentous materials or that may corrode equipment parts or corrosive products that generate static electricity.



4. Do not attempt to disassemble the microinverter or perform any internal repairs! In order to maintain safety and insulation integrity, the design of the microinverter does not allow for in-house servicing.

5. If the wires are damaged, the equipment should be scrapped if the cables cannot be replaced, and the replaced cables must meet the working specifications of the BENY microinverter.

6. Maintenance operations must be carried out with the equipment disconnected from the grid (if the grid power switch is on) and when the PV modules are shaded or isolated.

6. Microinverter storage

If the device is not used immediately or has been stored for a long period of time, first make sure that everything is packaged correctly. The device must be stored indoors with good ventilation; ensure that the storage environment has no potential to damage any parts of the device.

NOTE: After the device has been out of operation for a long time, perform a thorough check when restarting.

Discarded microinverters are harmful to the environment. Please handle them properly according to local regulations.

7. Warranty

In order to ensure the normal service life of the microinverter and reduce the risks during use, maintenance must be performed by professionals using approved safety maintenance tools within the specified time.

• Standard warranty period:

Microinverter — 12 years/ 25 years(optional)

Monitoring Device — 3 years

The valid warranty period starts from the earlier date of the two dates:

(1) 3 months later from the date of delivery of product

(2) The date of complete product installation

• Damage caused by operation failure, natural force majeure, incorrect installation or instructions for use is not covered

• Repair can only be performed by professionals. If any problem occurs during installation or use, contact your dealer first.

• For detailed warranty terms, please refer to "Warranty Provision"