

Single-phase Microinverter **USER MANUAL**

HMS-1800
HMS-2000

About Microinverter

This system is composed of a group of microinverters that convert direct current (DC) into alternating current (AC) and feed the power to the public grid. The system is designed for the incorporation of one microinverter for four photovoltaic modules.

Each microinverter works independently that guarantees the maximum power generation of each photovoltaic module. This setup enables user to control the production of a single photovoltaic module directly, thus improving the flexibility and reliability of the system.

About the Manual

This manual contains important instructions for the HMS-1800-4T/HMS-2000-4T microinverter and users shall read in its entirety before installing or commissioning the equipment. For safety, only qualified technicians who have received training or demonstrate relevant skills can install and maintain this microinverter under the guidance of this document.

Other Information

Product information is subject to change without notice. User manual will be updated regularly, please refer to Hoymiles official website at www.hoymiles.com for the latest version.

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1. Important Notes

1.1 Product Range

This manual describes the assembly, installation, commissioning, maintenance and failure search of the following model of Hoymiles Three-Phase Microinverter:

- HMS-1800-4T
- HMS-2000-4T

**Note: "1800" means 1800W, "2000" means 2000W.*




HMS-1800/2000-4T is only compatible with Hoymiles gateway DTU-Pro-S and DTU-Lite-S.

1.2 Target Group

This manual is only for qualified technicians. For safety purposes, only those who have been trained or demonstrate relevant skills can install and maintain this microinverter under the guidance of this document.

1.3 Symbols Used

The safety symbols in this user manual are show as below.

Symbol	Description
	This indicates a hazardous situation that can result in deadly electric shocks, other serious physical injury, or fire incidents.
	This indicates that directions must be strictly followed to avoid safety hazards including equipment damage and personal injury.
	This indicates that the act is forbidden. The user should stop, use caution and fully understand the operations explained before proceeding.

1.4 Radio Interference Statement

This microinverter has been tested and complies with the requirements of CE EMC, meaning that it will not be affected by electromagnetic interference. Please note that incorrect installation may cause electromagnetic disturbances.

You can turn the equipment off and on to see if radio or television reception is interfered by this equipment. If this equipment does cause harmful interference to radio or television, please try the following measures to fix the interference:

- 1) Relocate other apparatus' antenna.
- 2) Move the microinverter farther away from the antenna.
- 3) Separate the microinverter and the antenna with metal/concrete materials or roof.
- 4) Contact your dealer or an experienced radio/TV technician for help.








2. About Safety

2.1 Important Safety Instructions

The HMS-1800-4T/HMS-2000-4T microinverter is designed and tested according to international safety requirements. However, certain safety precautions must be taken when installing and operating this inverter. The installer must read and follow all instructions, cautions and warnings in this installation manual.

<ul style="list-style-type: none"> • All operations including transport, installation, start-up and maintenance must be carried out by qualified, trained personnel.
<ul style="list-style-type: none"> • Check the product before installation to make sure there is no transport damage because it can affect the insulation integrity and safety clearances. Choose installation location carefully and adhere to specified cooling requirements. Unauthorized removal of necessary protections, improper use, incorrect installation and operation may cause damage to the equipment or incur serious safety and shock hazards.
<ul style="list-style-type: none"> • Before connecting the microinverter to the power distribution grid, contact the local power distribution grid company to get necessary approvals. This connection must be made only by qualified technical personnel. It is the responsibility of the installer to provide external disconnect switches and Over Current Protection Devices (OCPD).
<ul style="list-style-type: none"> • Each input of the inverter is connected to one photovoltaic module. Do not connect batteries or other sources of power supply. The inverter can be used only if all the technical parameters are observed and applied.
<ul style="list-style-type: none"> • Do not install the equipment in flammable, explosive, corrosive, extremely hot/cold, and humid environment. Do not use the equipment when safety devices in these environments are not working.
<ul style="list-style-type: none"> • Use personal protective equipment, including gloves and goggles during installation.
<ul style="list-style-type: none"> • Inform the manufacturer about non-standard installation conditions.
<ul style="list-style-type: none"> • Do not use the equipment if any operating anomalies are found.
<ul style="list-style-type: none"> • All repairs must be done with qualified spare parts, which must be installed in accordance with their intended use and by a licensed contractor or authorized Hoymiles service representative.
<ul style="list-style-type: none"> • Liabilities arising from components that are not produced by Hoymiles are on the part of their respective manufacturers.
<ul style="list-style-type: none"> • Whenever the inverter has been disconnected from the public grid, please be extremely careful as some components can retain charge sufficient to create a shock hazard. Before touching any part of the inverter please ensure surfaces and equipment are within the limit of safe temperatures and voltage potentials.
<ul style="list-style-type: none"> • Hoymiles is not liable for any damage caused by incorrect or improper operation.
<ul style="list-style-type: none"> • Electrical installation and maintenance shall be conducted by licensed electrician and shall comply with local wiring rules.

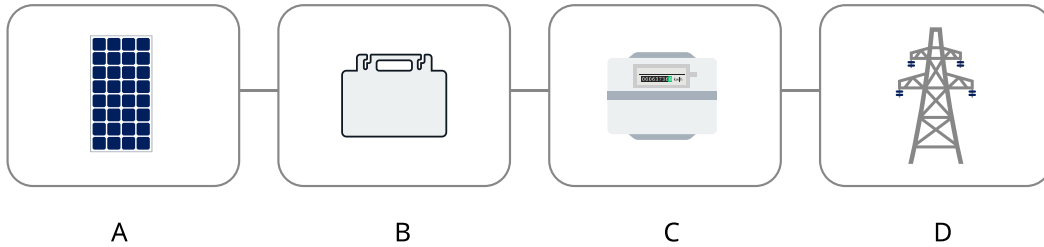
2.2 Explanation of Symbols

Symbol	Usage
	<p>Treatment</p> <p>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.</p>
	<p>Caution</p> <p>Do not come within 8 inches (20 cm) of the microinverter when it is in operation.</p>
	<p>Danger of high voltages</p> <p>Danger to life due to high voltage in the microinverter.</p>
	<p>Beware of hot surface</p> <p>The inverter can become hot during operation. Avoid contact with metal surfaces during operation.</p>
	<p>CE mark</p> <p>The inverter complies with the requirements of the Low Voltage Directive for the European Union.</p>
	<p>FCC mark</p> <p>The inverter complies with the requirements of the FCC standards.</p>
	<p>Read manual first</p> <p>Please read the installation manual first before installation, operation and maintenance.</p>

3. About Product

3.1 About microinverter PV system

HMS-2000/1800-4T is a single-phase grid-connected microinverter, which is an important part of a PV system. The inverter converts the DC power generated by PV modules into AC power that meets the requirements of the power grid, and feeds it into the power grid. A typical application scenario of micro-microinverters is shown as follows.



A	PV module
B	Microinverter
C	Grid-connected metering device
D	Grid

3.2 About microinverter

Microinverter is an inverter that tracks the maximum power point of each PV module separately, and then is connected to the AC power grid after the conversion from DC to AC.

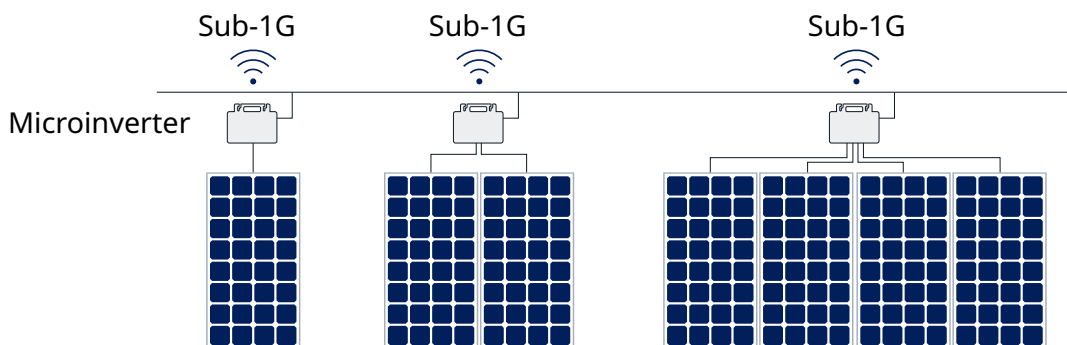
The maximum power tracking voltage range is wide and the module configuration is flexible. There may be voltage and current mismatch between modules. When a module fails or is shaded, it will only affect its own power generation and have no impact on the whole system.

The microinverter can monitor the current, voltage, power output and power generation of each module to realize module-level data monitoring.

In addition, the microinverter only carries a DC voltage of a few tens of volts, which reduces safety hazards to the greatest extent.

3.3 About 4-in-1 Unit

Microinverters can be divided into 1-in-1, 1-in-2, 1-in-4, etc. depending on how many PV modules are connected to the microinverter. This means that the microinverter can connect to one module, two modules and four modules respectively, as shown below.



With the output power up to 2000 VA, Hoymiles new microinverter HMS-2000 ranks among the highest for 4 in 1 microinverters.

Each microinverter connects to four PV modules at most with independent MPPT and monitoring, enabling greater energy harvest and easier maintenance.

Hoymiles 4-in-1 unit microinverter is an ideal choice for PV system with uneven number of PV modules with world's best CEC weighted efficiency – 96.50% (peak efficiency 96.70%) in 2015.

3.4 About Sub-1G technology

Sub-1G technology is particularly useful for PV microinverters and is different from 2.4GHz technologies in that it has substantially larger range and better interference suppression performance.

Range of Sub-1GHz wireless: Unlike WiFi or Zigbee which both operate on the 2.4 GHz band, Sub-1GHz operates on the 868 MHz or the 915 MHz band. Generally speaking, Sub-1GHz wireless transmission offers 1.5 to 2 times more distance coverage than the 2.4GHz spectrum.

Interference: Sub-1GHz wireless can handle interference better. This is because it operates on a lower frequency, so the communication between the microinverters and the DTUs is more stable. As a result, it is especially useful in industrial or commercial PV power plants.

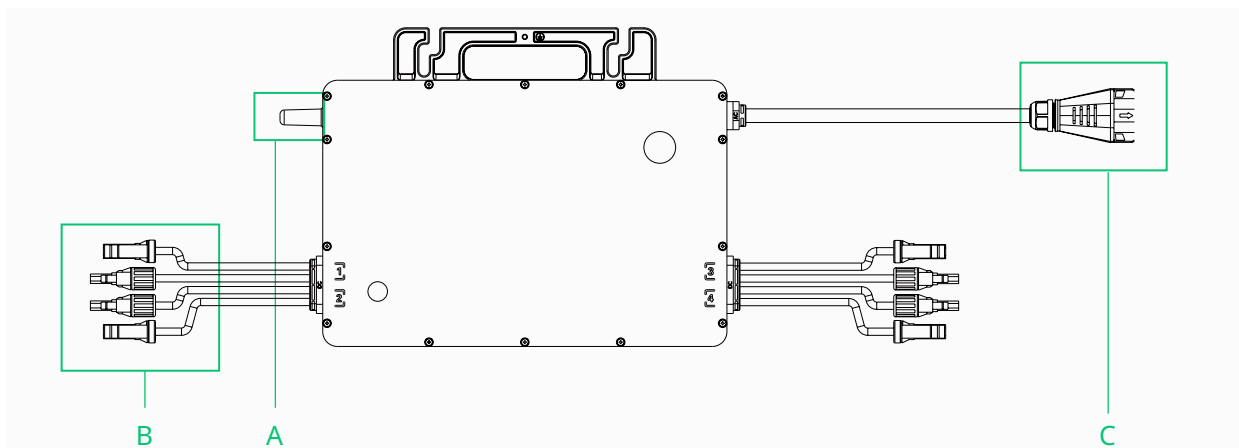
Lower Power Consumption: Sub-1GHz wireless uses less power than Wi-Fi or Zigbee.

Because of the long range and better interference suppression performance, Sub-1GHz networking is particularly well-suited to rooftop PV power stations.

3.5 Highlights

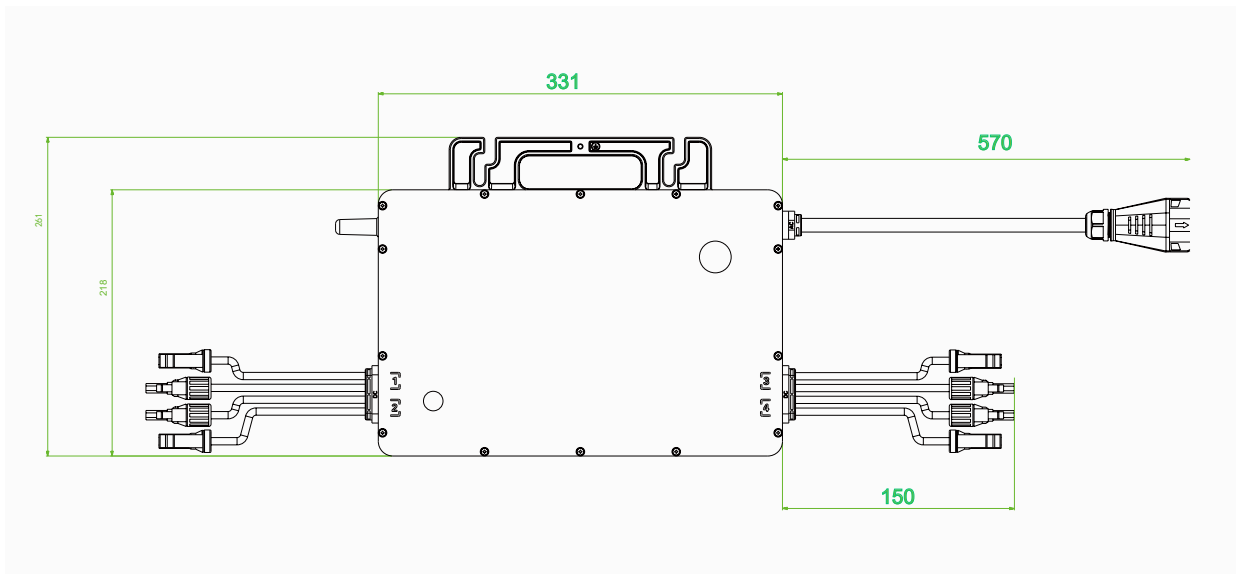
- Maximum output power up to 1800/2000 W
- Peak efficiency 96.50%
- Static MPPT efficiency 99.80%, Dynamic MPPT efficiency 99.76% in overcast weather
- Power factor (adjustable) 0.8 leading.....0.8 lagging
- Sub-1G for stronger communication with DTU
- High reliability: IP67 (NEMA6) enclosure, 6000 V surge↔ protection

3.6 Terminals Introduction



Object	Description
A	Sub-1G Wireless Terminal
B	DC Connectors
C	AC Sub Connector

3.7 Dimension(mm)



4. Installation Preparation

4.1 Position and Space Required

Please install the microinverter and all DC connections under the PV module to avoiding direct sunlight, rain exposure, snow buildup, UV etc. The silver side of the microinverter should be up and facing the PV module.

Allow a minimum of 2 cm of space around the microinverter enclosure to ensure ventilation and heat dissipation.

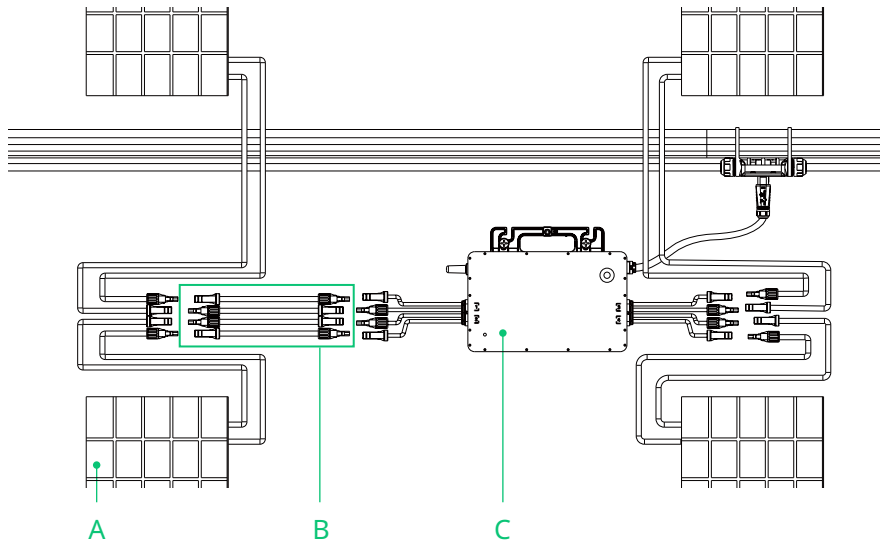
**Note: In some countries, DTU will be required to meet local grid regulations (e.g. G98/99 for UK etc.)*

4.2 Connecting multiple PV modules to microinverter

General Guidelines:

1. The DC input port of a microinverter is connected to a PV module.
2. When the cable is not long enough, use DC extension cable (The DC cable must comply with the regulations in your area. Please consult the local power operator. At the same time, it is recommended that the length of the DC side cable should not exceed 5 m, otherwise it may affect power production.

Two typical wiring methods are shown below.



A	PV module
B	DC extension cable
C	Microinverter

Note: The voltage of modules (considering the effect of local temperature) must not exceed the maximum input voltage of the microinverter. Otherwise, the microinverter may be damaged (refer to the Technical Data section to determine the absolute maximum input voltage).

4.3 Installation tools

Besides tools recommended below, other auxiliary tools can also be used on site.

Screwdriver	Multimeter
Socket Wrench or Allen wrench	Marker pen
Diagonal pliers	Steel tap
Wire cutters	Cable tie
Wire stripper	Torque and adjustable wrench
Utility knife	

Safety glove	Dust masks
Protective goggles	Safety shoes

4.4 AC Branch Circuit Capacity

Hoymiles HMS-1800-4T/HMS-2000-4T can be used with 12AWG or 10AWG AC Trunk Cable and the AC Trunk Connector which are provided by Hoymiles. The number of microinverters on each 12AWG or 10AWG AC branch shall not exceed the limit as shown below.

	HMS-1800-4T	HMS-2000-4T	Maximum over current protection device (OCPD)
Maximum number per 12AWG branch	2@220 V 2@230 V 2@240 V	2@220 V 2@230 V 2@240 V	20 A
Maximum number per 10AWG branch	3@220 V 4@230 V 4@240 V	3@220 V 3@230 V 3@240 V	32 A 30 A (For the US only)

Note:

- 1. The number of microinverters that can be connected to each AC branch is determined according to the current carrying capacity of the cable.*
- 2. 1-in-1, 1-in-2 and 1-in-4 microinverters can be connected to the same AC branch, as long as the total current does not exceed the cable carrying capacity specified in local regulations.*

4.5 Precautions

Installation of the equipment is carried out based on the system design and the place in which the equipment is installed.

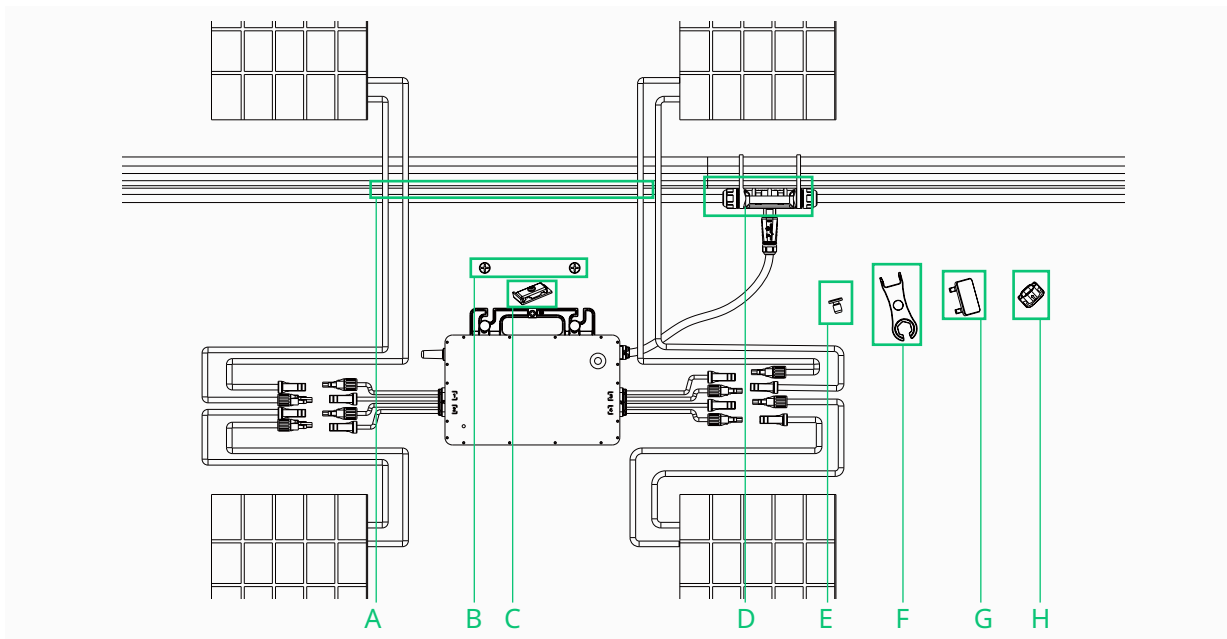
<ul style="list-style-type: none">• The installation must be carried out with the equipment disconnected from the grid (power disconnect switch open) and with the photovoltaic modules shaded or isolated.
<ul style="list-style-type: none">• Refer to the Technical Data to make sure the environmental conditions fit the microinverter's requirement (degree of protection, temperature, humidity, altitude, etc.)
<ul style="list-style-type: none">• To avoid power de-rating due to an increase in the microinverter internal temperature, do not expose it to direct sunlight.
<ul style="list-style-type: none">• To avoid overheating, always make sure the air flow around the inverter is not blocked.
<ul style="list-style-type: none">• Do not install in places where gasses or flammable substances may be present.
<ul style="list-style-type: none">• Avoid electromagnetic interference that can compromise the correct operation of electronic equipment.

When choosing the position of installation, comply with the following conditions:

<ul style="list-style-type: none">• Install only on structures specifically designed for photovoltaic modules (supplied by installation technicians).
<ul style="list-style-type: none">• Install microinverter underneath photovoltaic modules to make sure it works in the shadow. Non-observance may cause the derating of inverter production.

5. Microinverter Installation

5.1 Accessories



	Description
A	AC Trunk Cable, 12/10 AWG Cable
B	M8 × 25 screws (Prepared by the installer)
C	Grounding Electrode
D	AC Trunk Connector
E	AC Trunk Connector Unlock Tool
F	AC Trunk Port Disconnect Tool
G	AC Trunk Port Cap
H	AC Trunk End Cap

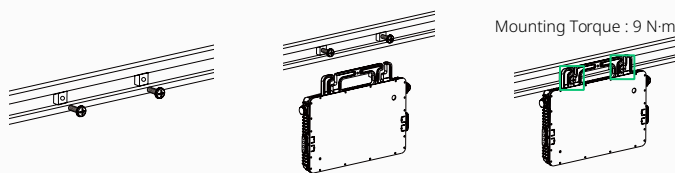
**Note: All accessories above are not included in the package and should be purchased separately.*

5.2 Installation Steps

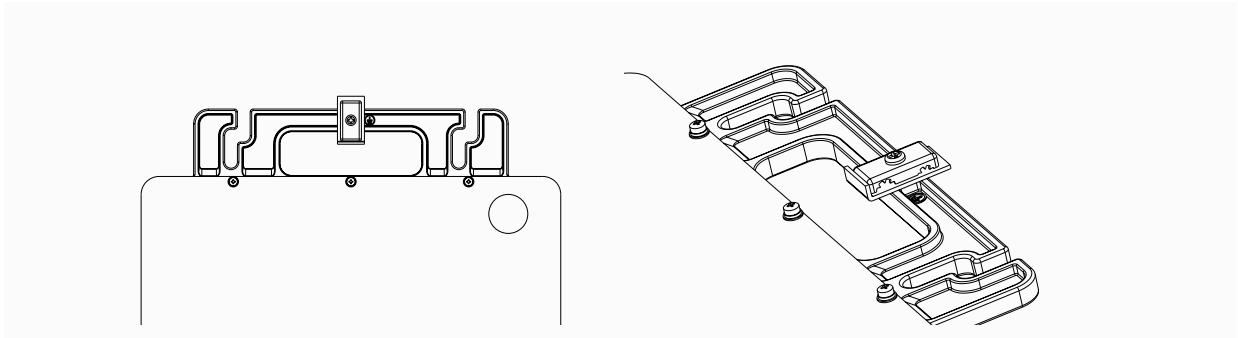
The order of Step 1 and Step 2 can be reversed according to your planned needs.

Step 1. Plan and Install the Microinverter

- A) Mark the position of each microinverter on the rail according to the PV module layout.
- B) Fix the screws on the rail.
- C) Hang the microinverter on the screws, and tighten the screws. The silver cover side of the microinverter should be facing the panel.



The AC cable contains earth wire, so grounding can be done directly with it. For regions that have special requirements, we offer optional grounding brackets that can be used to complete the external grounding.

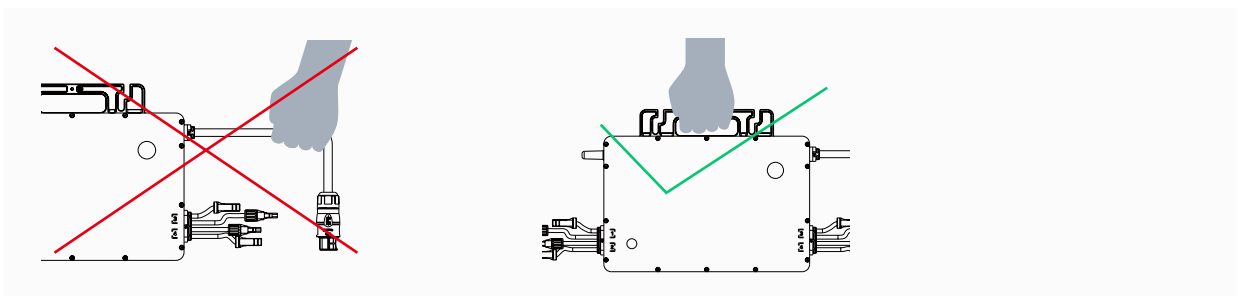


Route a continuous grounding cable through grounding brackets for each of the microinverters to the AC grounding electrode that conforms with local regulations.

Torque each grounding cleat screw to 2 N·m.

Note:

1. Install the microinverter and all DC connections under the PV module to avoid direct sunlight, rain exposure, snow buildup, UV etc.
2. Allow a minimum of 2 cm of space around the microinverter enclosure to ensure ventilation and heat dissipation.
3. Mounting torque of the 8 mm screw is 9 N·m. Do not over torque.
4. Do not pull or hold the AC cable with your hand. Hold the handle instead.

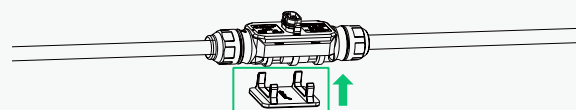


Step 2. Plan and Build the AC Trunk Cable

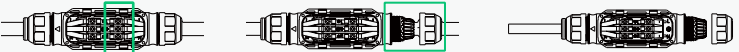
AC Trunk Cable is used to connect the microinverter to distribution box.

- A) Select the appropriate AC Trunk Cable according to the spacing between microinverters. The connector spacing of the AC Trunk Cable should be close to spacing between microinverters to ensure that they can be matched. (Hoymiles provides AC Trunk Cable with different AC Trunk Connector spacing)
- B) Determine how many microinverters you plan to install on each AC branch and prepare AC Trunk Connectors accordingly.
- C) Take out segments of AC Trunk Cable as you need to make AC branch.
 - 1) Disassemble the AC Trunk Connector and remove the cable.

- Use the AC Trunk Connector Unlock Tool to unlock the connector upper cover.

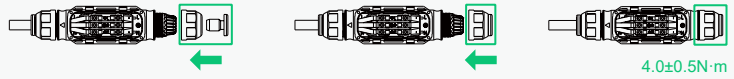


- Loosen the three screws with the screwdriver. Untighten the cap and remove the cable.

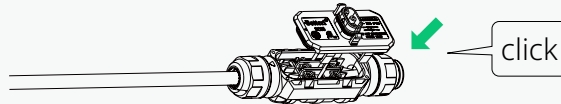


2) Install the AC Trunk End Cap at one side of AC Trunk Cable (the end of AC Trunk Cable).

- Insert the AC Trunk End cap and screw the cap back to port, then tighten the cap.

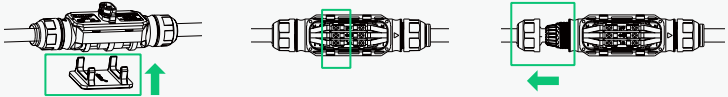


- Plug the upper cover back to the Trunk connector.

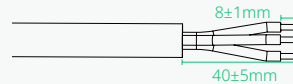


3) Install AC end cable on the other side of AC Trunk Cable (connected to the distribution box).

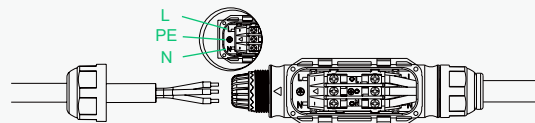
- Unlock the port upper cover, loosen the screws with the screwdriver and remove the extra cable. (Skip this step if there is no cable at this side.)



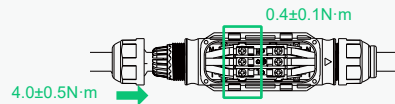
- Prepare a segment of AC cable with suitable length to connect to the distribution box, with stripping requirements fulfilled.



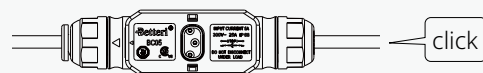
- Insert the cable into the cap in a way that the L, N and PE are in corresponding slots.



- Tighten the screws, and then tighten the cap back to the port.



- Plug the upper cover back to the Trunk connector.



Note:

1. Tightening torque of the cap: $4.0 \pm 0.5 \text{ N}\cdot\text{m}$. Please do not over torque.
2. Torque of locking screw: $0.4 \pm 0.1 \text{ N}\cdot\text{m}$.
3. Do not damage the sealing ring in the AC Trunk Connector during disassembly and assembly.
4. Wires used in Hoymiles microinverter:

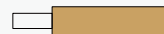
PE (Green-yellow)



N (Blue)



L1 (Brown)



D) Repeat the above steps to make all the AC Trunk Cables you need. Then lay out the cable on the rail as appropriate so that the microinverters can be connected to the Trunk connectors.

E) Attach the AC Trunk Cable to the mounting rail and fix the cable with tie wraps.



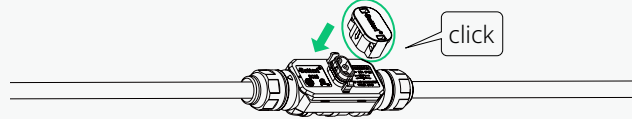
Step 3. Complete the AC Connection

A) Push the AC Sub Connector from microinverter to the AC Trunk Connector until you it clicks.



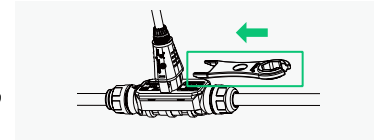
B) Connect the AC end cable to the distribution box, and wire it to the local grid network.

C) Please plug the AC Trunk Port Cap in any vacant AC Trunk Port to make it water and dust-proof.



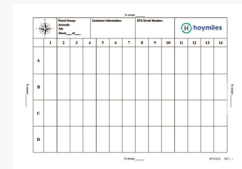
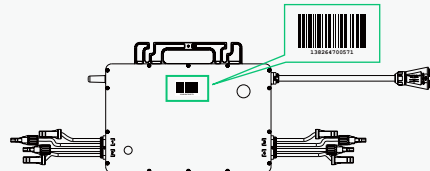
Note:

1. Make sure that the AC Trunk Connectors are kept away from any water-channeling surface.
2. In case you need to remove the microinverter AC cable from AC Trunk Connector, please use the AC Trunk Port Disconnect Tool and insert the tool into the side of AC Sub Connector to complete the removal.



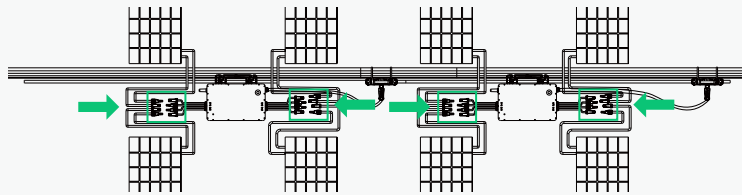
Step 4. Create an Installation Map

- A) Peel the removable serial number label from each microinverter.
- B) Affix the serial number label to the respective location on the installation map (please refer to the appendix).



Step 5. Connect PV Modules

- A) Mount the PV modules above the microinverter.
- B) Connect the PV modules' DC cables to the DC input side of the microinverter.



Step 6. Energize the System

- A) Turn on the AC breaker for the branch circuit.
- B) Turn on the main AC breaker for the house. Your system will start to generate power in about two minutes.

Step 7. Set Up Monitoring System

Refer to the "DTU User Manual", "DTU Quick Install Guide", and "Quick Installation Guide for S-Miles Cloud" to install the DTU and set up monitoring system.

Product information is subject to change without notice. (Please download reference manuals at www.hoymiles.com)

6. Troubleshooting

6.1 Troubleshooting List

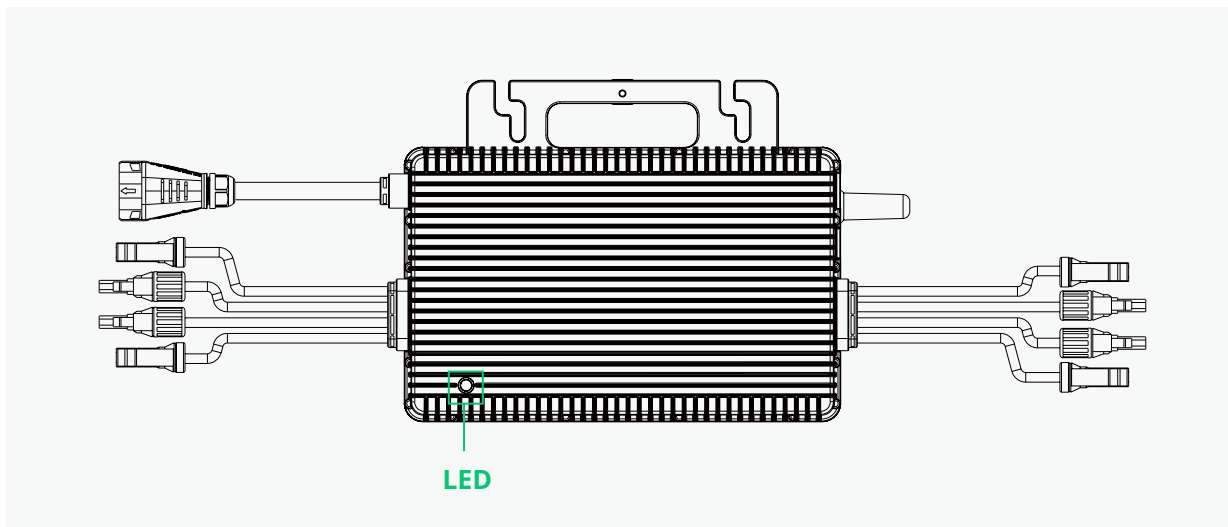
Code	Alarm range	Alarm status	Handling suggestions
121		Over temperature protection	<ol style="list-style-type: none"> 1. Check the ventilation and ambient temperature at the microinverter installation position. 2. If the ventilation is poor or the ambient temperature exceeds the limit, improve the ventilation and heat dissipation. 3. If both the ventilation and ambient temperature meet the requirements, contact your dealer or Hoymiles technical support team.
124		Shut down by remote control	<ol style="list-style-type: none"> 1. Check the status of zero export management and whether the microinverters were manually shut down. 2. If the alarm still persists, please contact your dealer or Hoymiles technical support.
125		Grid configuration parameter error	<ol style="list-style-type: none"> 1. Check if the grid configuration parameter is correct and upgrade again. 2. If the fault still exists, contact your dealer or Hoymiles technical support.
127		Firmware error	<ol style="list-style-type: none"> 1. Check if the firmware is correct and upgrade again. 2. Check the communication between DTU and Hoymiles monitoring system, and between DTU and microinverter. Then try again. 3. If the fault still exists, contact your dealer or Hoymiles technical support.
129		Abnormal bias	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally and the microinverter can still work normally, no special treatment is required. 2. If the alarm occurs frequently and cannot be recovered, contact your dealer or Hoymiles technical support.
130		Offline	<ol style="list-style-type: none"> 1. Please make sure that the microinverter works normally (check if the DC voltage is within normal range and confirm the status of the LED indicator). 2. Check if the SN on microinverter label is the same as on the monitoring platform. 3. Check the communication status between the DTU and Hoymiles monitoring system, and between the DTU and the microinverter. If the communication is poor, try to make some improvements. 4. If the alarm occurs frequently and cannot be recovered, contact your dealer or Hoymiles technical support.
141	Grid	Grid overvoltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid voltage may be abnormal temporarily. The microinverter can automatically recover after grid voltage becomes normal. 2. If the alarm occurs frequently, check whether the grid voltage is within the acceptable range. If not, contact the local power operator or change the grid overvoltage protection limit in the grid profile via Hoymiles monitoring system with the consent of the local power operator.
142	Grid	10 min value grid overvoltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid voltage may be abnormal temporarily. The microinverter can automatically recover after grid voltage becomes normal. 2. If the alarm occurs frequently, check whether the grid voltage is within the acceptable range. If not, contact the local power operator or change the grid overvoltage protection limit via Hoymiles monitoring system with the consent of the local power operator.

143	Grid	Grid undervoltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid voltage may be abnormal temporarily. The microinverter can automatically recover after grid voltage becomes normal. 2. If the alarm occurs frequently, check whether the grid voltage is within the acceptable range. If not, contact the local power operator or change the grid undervoltage protection limit in the grid profile via Hoymiles monitoring system with the consent of the local power operator. 3. If the fault still exists, check the AC switch or AC wiring.
144	Grid	Grid overfrequency	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid frequency may be abnormal temporarily. The microinverter can automatically recover after grid frequency becomes normal. 2. If the alarm occurs frequently, check whether the grid frequency is within the acceptable range. If not, contact the local power operator or change the grid overfrequency protection limit via Hoymiles monitoring system with the consent of the local power operator.
145	Grid	Grid underfrequency	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid frequency may be abnormal temporarily. The microinverter can automatically recover after grid frequency becomes normal. 2. If the alarm occurs frequently, check whether the grid frequency is within the acceptable range. If not, contact the local power operator or change the grid underfrequency protection limit via Hoymiles monitoring system with the consent of the local power operator.
146	Grid	Rapid grid frequency change rate	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid frequency may be abnormal temporarily. The microinverter can automatically recover after grid frequency becomes normal. 2. If the alarm occurs frequently, check whether the grid frequency change rate is within the acceptable range. If not, contact the local power operator or change the grid frequency change rate limit in the grid profile in the grid profile via Hoymiles monitoring system with the consent of the local power operator.
147	Grid	Power grid outage	Please check whether the AC switch, branch breaker and AC wiring is normal.
148	Grid	Grid disconnection	Please check whether the AC switch, branch breaker and AC wiring is normal.
149	Grid	Island detected	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the grid frequency may be abnormal temporarily. The microinverter can automatically recover after grid voltage becomes normal. 2. If the alarms occur frequently on all the microinverters in your station, contact the local power operator to check whether there is a grid island. 3. If the alarm still exists or happens on only several microinverters, please contact your dealer or Hoymiles technical support.
205	MPPT-A	Input overvoltage	<ol style="list-style-type: none"> 1. Please make sure that the PV module open-circuit voltage is less than or equal to the maximum input voltage. 2. If the PV module open-circuit voltage is within the normal range, contact your dealer or Hoymiles technical support team.
206	MPPT-B	Input overvoltage	<ol style="list-style-type: none"> 1. Please make sure that the PV module open-circuit voltage is less than or equal to the maximum input voltage. 2. If the PV module open-circuit voltage is within the normal range, contact your dealer or Hoymiles technical support team.
207	MPPT-A	Input undervoltage	<ol style="list-style-type: none"> 1. Please make sure that the PV module open-circuit voltage is not lower than minimum input voltage. 2. If the PV module open-circuit voltage is within the normal range, contact your dealer or Hoymiles technical support team.

208	MPPT-B	Input undervoltage	<ol style="list-style-type: none"> 1. Please make sure that the PV module open-circuit voltage is not lower than minimum input voltage. 2. If the PV module open-circuit voltage is within the normal range, contact your dealer or Hoymiles technical support team.
209	PV-1	No input	<ol style="list-style-type: none"> 1. Please confirm whether this port is connected to the PV module. 2. If the PV module is connected, please check the DC cable connection between this port and the PV module.
210	PV-2	No input	<ol style="list-style-type: none"> 1. Please confirm whether this port is connected to the PV module. 2. If the PV module is connected, please check the DC cable connection between this port and the PV module.
211	PV-3	No input	<ol style="list-style-type: none"> 1. Please confirm whether this port is connected to the PV module. 2. If the PV module is connected, please check the DC cable connection between this port and the PV module.
212	PV-4	No input	<ol style="list-style-type: none"> 1. Please confirm whether this port is connected to the PV module; 2. If the PV module is connected, please check the DC cable connection between this port and the PV module.
213	MPPT-A	PV-1 & PV-2 abnormal wiring	<ol style="list-style-type: none"> 1. Please check whether the DC connections on port 1 and 2 are correct. 2. Check if the DC extension cable is made correctly.
214	MPPT-B	PV-3 & PV-4 abnormal wiring	<ol style="list-style-type: none"> 1. Please check whether the DC connections on port 3 and 4 are correct. 2. Check if the DC extension cable is made correctly.
215	PV-1	Input overvoltage	Check the input voltage of PV-1 port.
216	PV-1	Input undervoltage	Check the input voltage of PV-1 port.
217	PV-2	Input overvoltage	Check the input voltage of PV-2 port.
218	PV-2	Input undervoltage	Check the input voltage of PV-2 port.
219	PV-3	Input overvoltage	Check the input voltage of PV-3 port.
220	PV-3	Input undervoltage	Check the input voltage of PV-3 port.
221	PV-4	Input overvoltage	Check the input voltage of PV-4 port.
222	PV-4	Input undervoltage	Check the input voltage of PV-4 port.
301-314		Device failure	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally and the microinverter can still work normally, no special treatment is required. 2. If the alarm occurs frequently and cannot be recovered, contact your dealer or Hoymiles technical support team.

6.2 LED Indicator Status

The LED flashes five times at start-up. All green flashes (1s gap) indicate normal start-up.




(1) Start-up Process
<ul style="list-style-type: none"> Flashing green five times (0.3s gap): Start-up success Flashing Red five times (0.3s gap): Start-up failure
(2) Run Process
<ul style="list-style-type: none"> Flashing Fast Green (1s gap): Producing power. Slow green flashes (2s gap): Producing power but one input is abnormal. Red flashes (0.5s gap): Invalid AC grid or hardware failure. Refer to Hoymiles Monitoring Platform for more details. Red flashes (1s gap): Not producing power due to invalid AC grid. Solid red: Hardware failure, refer to Hoymiles Monitoring Platform for more details.
(3) Other Status
<ul style="list-style-type: none"> Red and Green flashes alternately: Firmware is broken.

**Note:*

- 1. The microinverter is powered by DC side. If the LED light is not on, please check the DC side connection. If the connection and input voltage are normal, contact your dealer or hoymiles technical support team.*
- 2. All the faults are reported to the DTU. Refer to the local APP of the DTU or Hoymiles Monitoring Platform for more information.*







6.3 On-site Inspection (For qualified installer only)


To troubleshoot a malfunctioning microinverter, follow the steps in sequence.

1	Check if the utility voltage and frequency are within ranges shown in the in section Technical Data of this microinverter.
2	Check the connection to the utility grid. Disconnect the AC and the DC power. Please note that when the inverter is in operation, disconnect the AC power first to de-energize the inverter, and then disconnect the DC power. Re-connect the PV modules to the microinverter. LED will flash red to indicate normal DC connection. Re-connect the AC power. LED will flash green for five times to indicate normal DC and AC connection. Never disconnect the DC wires while the microinverter is producing power. Re-connect the DC module connectors and wait for five short LED flashes.
3	Check the interconnection between all the microinverters in the AC branch circuit. Confirm that each inverter is energized by the utility grid as described in the previous step.
4	Make sure that every AC breaker is functioning properly and is closed.
5	Check the DC connection between the microinverter and the PV module.
6	Make sure that the PV module DC voltage is within the allowable range shown in the section Technical Data of this manual.
7	If the problem persists, please call Hoymiles customer support.
 WARNING	<u>Do not try to repair the microinverter. If the troubleshooting fails, please return it to the factory for replacement.</u>

6.4 Routine Maintenance

1. Only authorized personnel are allowed to carry out the maintenance operations and are responsible to report any anomalies.
2. Always use the personal protective equipment provided by the employer when carry out the maintenance operation.
3. During normal operation, check that the environmental and logistic conditions are correct. Make sure that the conditions have not changed over time and that the equipment is not exposed to adverse weather conditions and has not been covered with foreign bodies.
4. DO NOT use the equipment if any problems are found, and restore the normal conditions after the fault removed.
5. Conduct an annual inspection on various components, and clean the equipment with a vacuum cleaner or special brushes.

 DANGER	Do not attempt to dismantle or repair the microinverter! No user-serviceable parts inside for the sake of safety and insulation!
 WARNING	The AC output wiring harness (AC drop cable on the Microinverter) cannot be replaced. The equipment should be scrapped if the cord is damaged.
 WARNING	Maintenance operations must be carried out with the equipment disconnected from the grid (power switch open) and the photovoltaic modules obscured or isolated, unless otherwise indicated.
 WARNING	For cleaning, do not use rags made of filamentary material or corrosive products that may corrode parts of the equipment or generate electrostatic charges.
 WARNING	Do not attempt to repair the product. All repairs should be done using only eligible spare parts.
 CAUTION	If all the microinverters are connected to the DTU-Pro-S, the DTU can limit the output power imbalance of all the microinverters between phases to below 3.68 kW if required. Please refer to “Hoymiles Technical Note Limit Phase Balance” for more details.

 <p>CAUTION</p>	<p>Each branch should provide a circuit breaker, but no need for central protection unit.</p>
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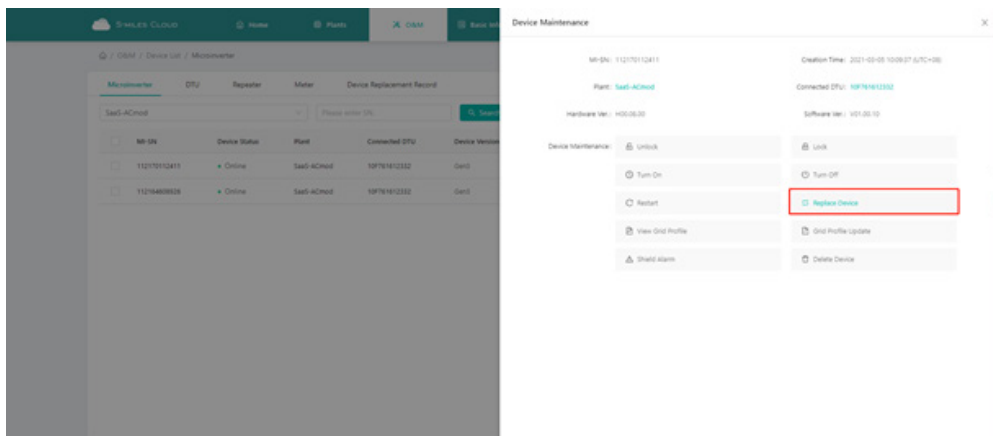
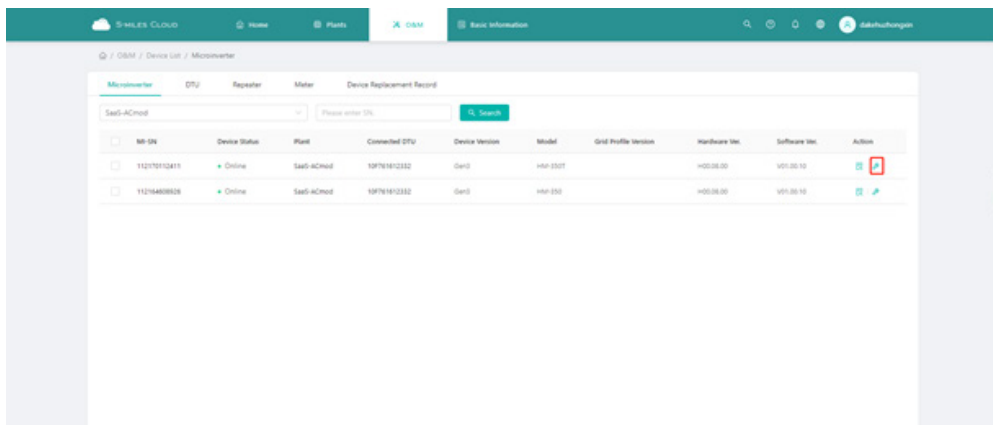
6.5 Replace Microinverter

a. How to remove the microinverter

- De-energize the AC branch circuit breaker.
- Remove the PV module from the rack, and cover the module.
- Use an electric meter to measure and make sure there is no current flowing in the DC wires between module and microinverter.
- Use the DC disconnect tool to remove the DC connectors.
- Use the AC disconnect tool to remove the AC Sub Connector.
- Loosen the fixing screws on the top of the microinverter and remove the microinverter from the PV racking.

b. How to replace the microinverter in monitoring platform

- Please record down the new microinverter’s SN.
- Please make sure the AC branch circuit breaker is off, and follow the microinverter installation steps to install the replacement unit.
- Go to the monitoring platform (if customer already register this station online), please access the “Device List” page and find the device that you just replaced. Please click “Device Maintenance” on the right side of the page, and select “Replace Device”. Input the new Microinverter’s SN and click “Ok” to complete the station change.



7. Decommissions

7.1 Decommissions

Disconnect the inverter from DC input and AC output, remove all connection cable from the microinverter, and remove the microinverter from the frame.

Please pack the microinverter in the original packaging, or use a carton box that can hold 5 kg and can be fully closed if the original packaging is no longer available.

7.2 Storage and Transportation

Hoymiles packages adopt proper means to provide protection to components to make transport and subsequent handling easier. Transportation of the equipment, especially by road, must be done in a way that can protect the components (particularly the electronic components) from violent shocks, humidity, vibration, etc. Please dispose of the packaging elements in appropriate ways to avoid unforeseen injury.

Customers shall examine the conditions of the components transported. Upon receiving the microinverter, customers should check the container for any external damage and verify receipt of all items. Call the delivering carrier immediately if there is any damage or if any parts are missing. If any damage is caused to the inverter, contact the supplier or authorized distributor to request a repair/return and ask for instructions regarding the process.

The microinverter storage temperature is -40 to 85°C.

7.3 Disposal

- If the equipment is not used immediately or is stored for a long period of time, make sure that it is properly packed. The equipment must be stored indoors with good ventilation and without any potential damage to the components of the equipment.
- Take a complete inspection when restarting the equipment after it has stopped operation for a long time.
- Please dispose of the microinverters properly in accordance with local regulations after they are scrapped because of potential harms caused to the environment.

8. Technical Data



Be sure to verify the following before installing Hoymiles Microinverter System.

1. Verify that the voltage and current specifications of the PV module match those of the microinverter. The maximum open circuit voltage rating of the PV module must within the operating voltage range of the microinverter.
We recommend that the maximum current rating at A should be equal to or less than the maximum input DC current.
2. The output DC power of PV module is shall not exceed 1.35 times of the output AC power of the microinverter.



Refer to "Hoymiles Warranty Terms & Conditions" for more information.

Model	HMS-1800-4T			HMS-2000-4T		
Input Data(DC)						
Commonly used module power(W)	360-565+			400-625+		
Maximum input voltage(V)				65		
MPPT voltage range(V)				16-60		
Start-up voltage(V)				22		
Maximum input current(A)	4*13.3			4*14		
Output Data(AC)						
Rated output power(VA)	1800			2000		
Rated output current(A)	8.18	7.83	7.5	9.09	8.70	8.33
Nominal output voltage/range(V) ¹	220/180-275	230/180-275	240/180-275	220/180-275	230/180-275	240/180-275
Nominal frequency/range(V) ¹	50/45-55 or 60/55-65					
Power factor(adjustable)				>0.99 default 0.8 leading...0.8 lagging		
Total harmonic distortion				<3%		
Maximum units per 10AWG branch ²	3	4	4	3	3	3
Efficiency						
CEC peak efficiency				96.5%		
Nominal MPPT efficiency				99.8%		
Night power consumption(mW)				<50		
Mechanical Data						
Ambient temperature range(°C)				-40 to +65		
Dimensions(W×H×D mm)				331*218*34.6		
Weight (kg)				4.7		
Enclosure rating				Outdoor-NEMA6(IP67)		
Cooling				Natural convection-No fans		
Features						
Communication				Sub-1G		
Monitoring				S-Miles Cloud ³		
Compliance				EN 50549-1: 2019, VDE-AR-N 4105: 2018, UL1741, ABNT NBR 16150, IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4, IEC/EN 61000-3-2/-3		

9. Appendix 1:

9.1 Installation Map

To sheet _____ ↑

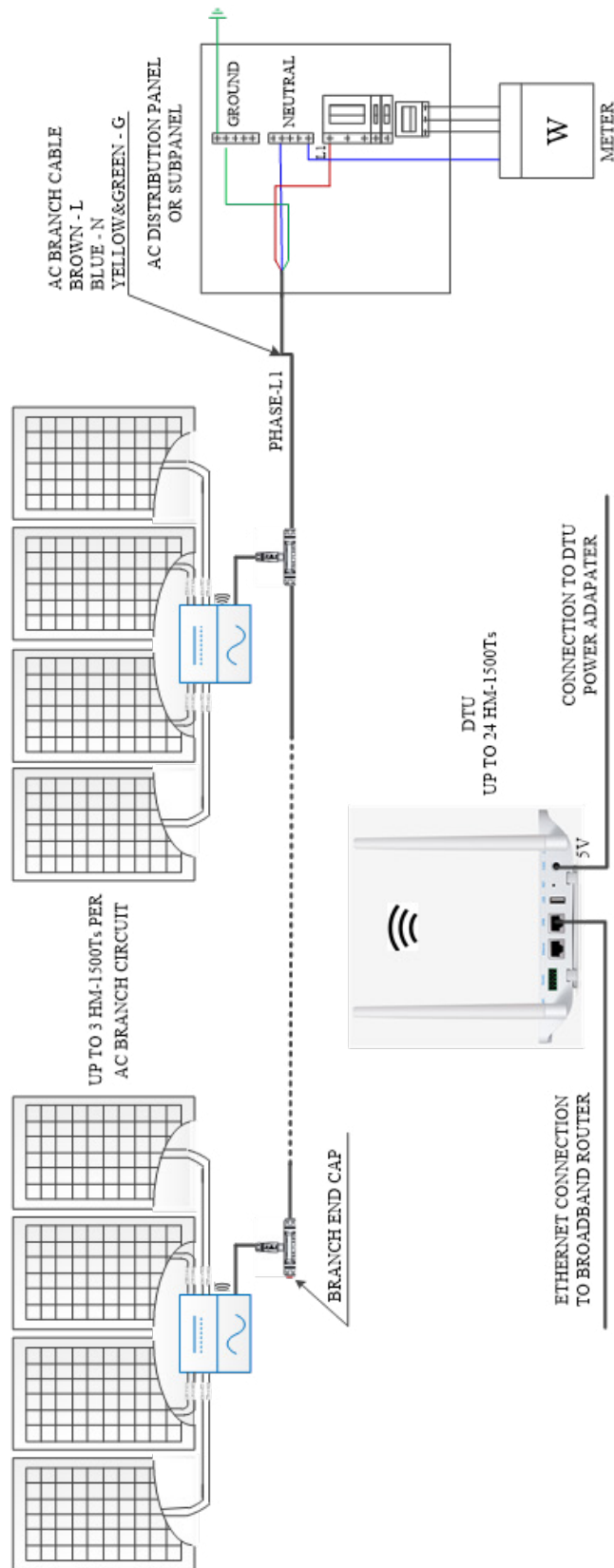
		Hoy miles Microinverter Installation Map																DTU Serial Number					
Please Make N for North 		Customer Information:																AP040228 V1.3					
Panel type: Azimuth: Tilt: Sheet _____ of _____		DTU Serial Number																AP040228 V1.3					
COLUMN	ROW	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
	A																						
	B																						
	C																						
	D																						

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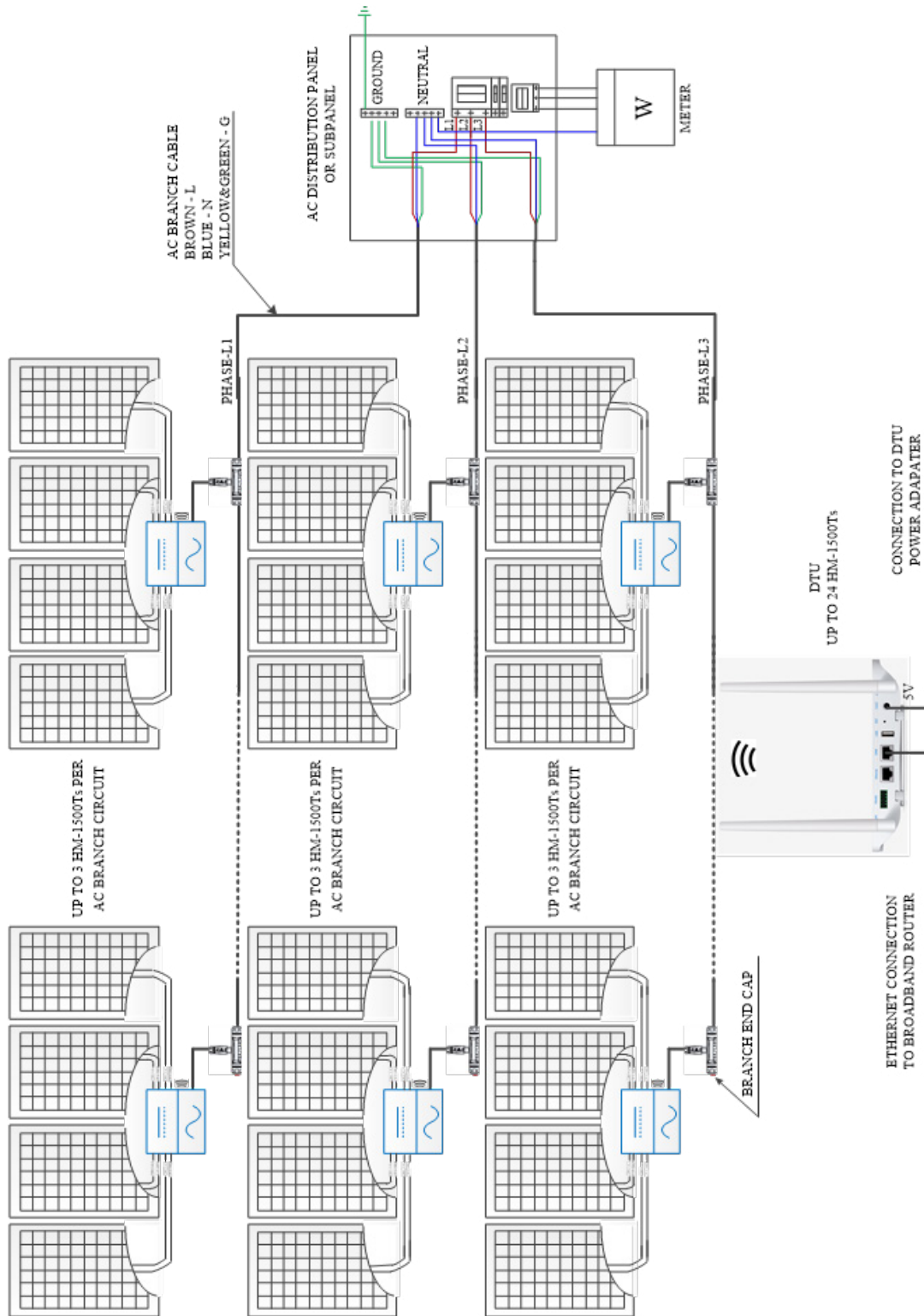
10. Appendix 2:

10.1 WIRING DIAGRAM – 230VAC SINGLE PHASE:



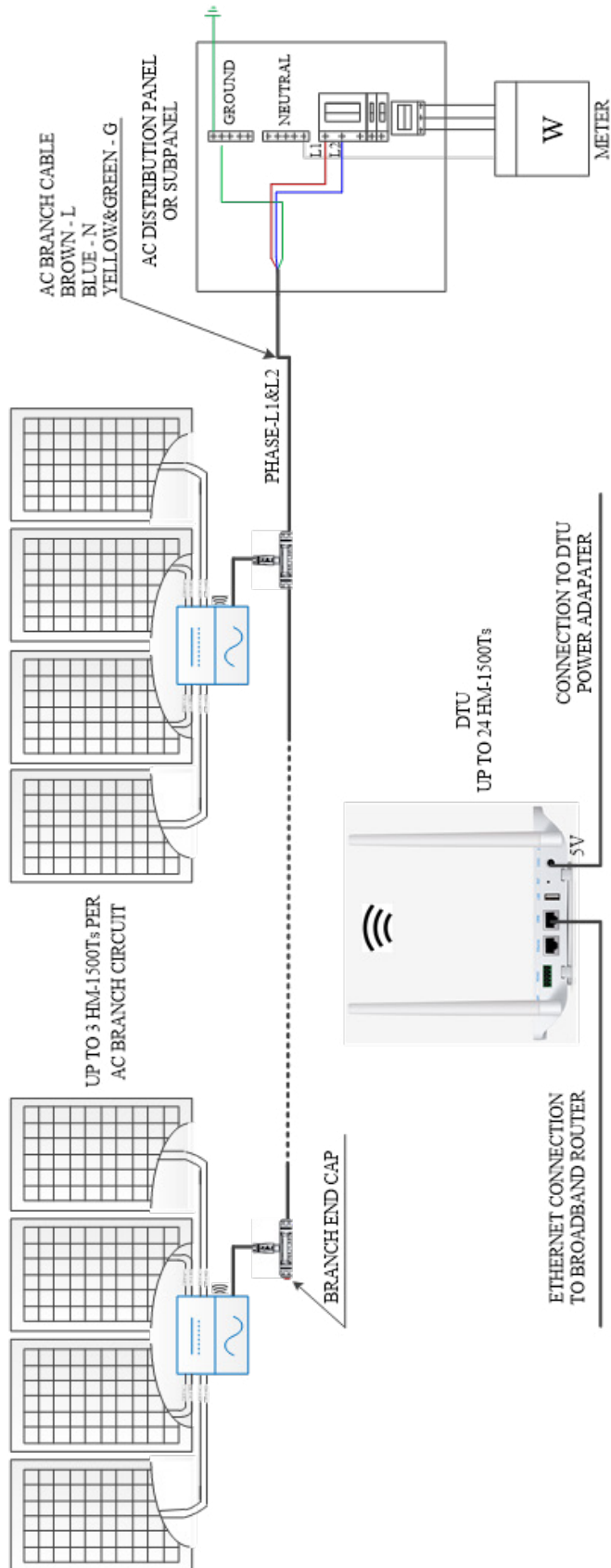
10. Appendix 2:

10.2 WIRING DIAGRAM – 230VAC / 400VAC THREE PHASE:



10. Appendix 2:

10.3 WIRING DIAGRAM -120VAC / 240VAC SPLIT PHASE:



10. Appendix 2:

10.4 WIRING DIAGRAM – 120VAC / 208VAC THREE PHASE:

