



hoymiles

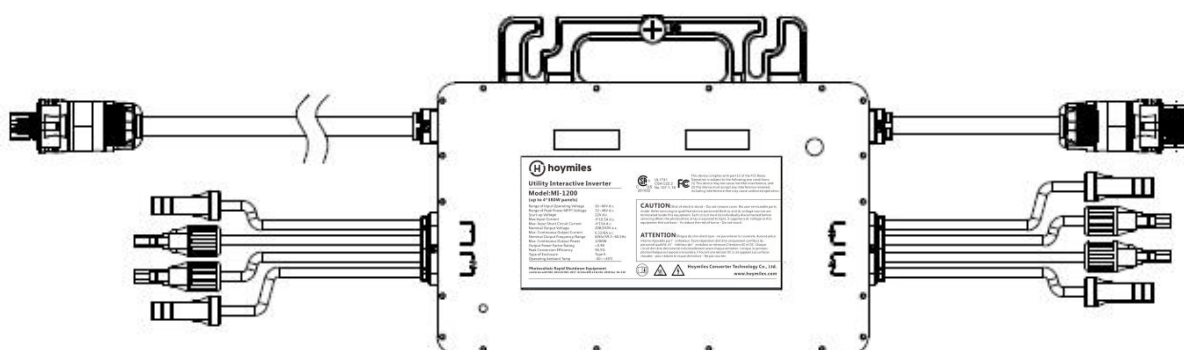
MICROINVERTER

User Manual

(Model: MI-1200 /MI-1000)

for North America

Rev 1.0



Contact Information

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FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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1. IMPORTANT SAFETY INFORMATION

1.1. SAFETY INSTRUCTIONS AND WARNINGS

Hoymiles Converter Technology Co., Ltd. (hereinafter referred to as Hoymiles) MI-1200/ MI-1000 model microinverter (hereinafter referred to as microinverter) is strictly designed and tested according to the national safety regulations. However, the installation and maintenance must follow the instructions below. Improper operation will cause serious damage to the operator and the third party as well as property loss.

- (1) Hoymiles microinverter must be installed and maintained by professionals in accordance with local installation standards and regulations.
- (2) Please read all the warnings and instructions in this manual and warning signs on the microinverter and PV modules before installing and maintaining the Hoymiles microinverter.
- (3) The AC side grid connection must be disconnected before installing and maintaining the microinverter.
- (4) To avoid the risk of burns, do not touch the microinverter casing, the case temperature can reach as high as 80°C.
- (5) The end connector of the AC feeder must be covered with a special waterproof cover.
- (6) Ensure that the DC input voltage is less than the maximum input voltage of the microinverter, otherwise the microinverter will be damaged, and Hoymiles will not be responsible or warranted.
- (7) Do not immerse the microinverter and connector in the liquid and expose it to the oriented, pressurized liquid (spray, etc.).
- (8) Do not try to repair Hoymiles microinverter by yourself. If there is a breakdown, please contact Hoymiles customer services.




WARNING - These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other

than that specified in the operating instructions.






CAUTION - To reduce the risk of fire, connect only to a circuit provided with branch circuit overcurrent protection in accordance with the National Electrical Code, ANSI/NFPA 70.

1.2. SYMBOLIC INTERPRETATION

1) The safety symbols used in this manual are list below and illustrated in detail.

Symbol	Usage
	Indicates a dangerous situation that can result in deadly electric shock hazards, other serious physical injury, or fire hazards.
	Indicates directions which must be fully understood and followed in entirety in order to avoid potential safety hazards including equipment damage or personal injury.
	This points out that the described operation must not be carried out. The reader should stop, use caution and fully understand the operations explained before proceeding.

2) The symbols on the microinverter are list below and illustrated in detail.

Symbol	Usage
	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.
	CSA mark The inverter complies with the requirements of UL1741 and IEEE1547 standards.
	Read manual first Please read the installation manual first before installation, operation and maintenance.

1.3. PV RAPID SHUTDOWN EQUIPMENT (PVRSE)

This product is CSA Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed

according to the following requirements:

- Microinverters and all DC connections must be installed inside the array boundary. Enphase further requires that the microinverters and DC connections be installed under the PV module to avoid direct exposure to rain, UV, and other harmful weather events.
- The array boundary is defined as 305 mm (1 ft.) from the array in all directions, or 1 m (3 ft.) from the point of entry inside a building.

This rapid shutdown system must be provided with an initiating device and (or with) status indicator which must be installed in a location accessible to first responders, or it must be connected to an automatic system which initiates rapid shutdown upon the activation of a system disconnect or activation of another type of emergency system.

The initiator shall be listed and identified as a disconnecting means that plainly indicates whether it is in the “off” or “on” position. Examples are:

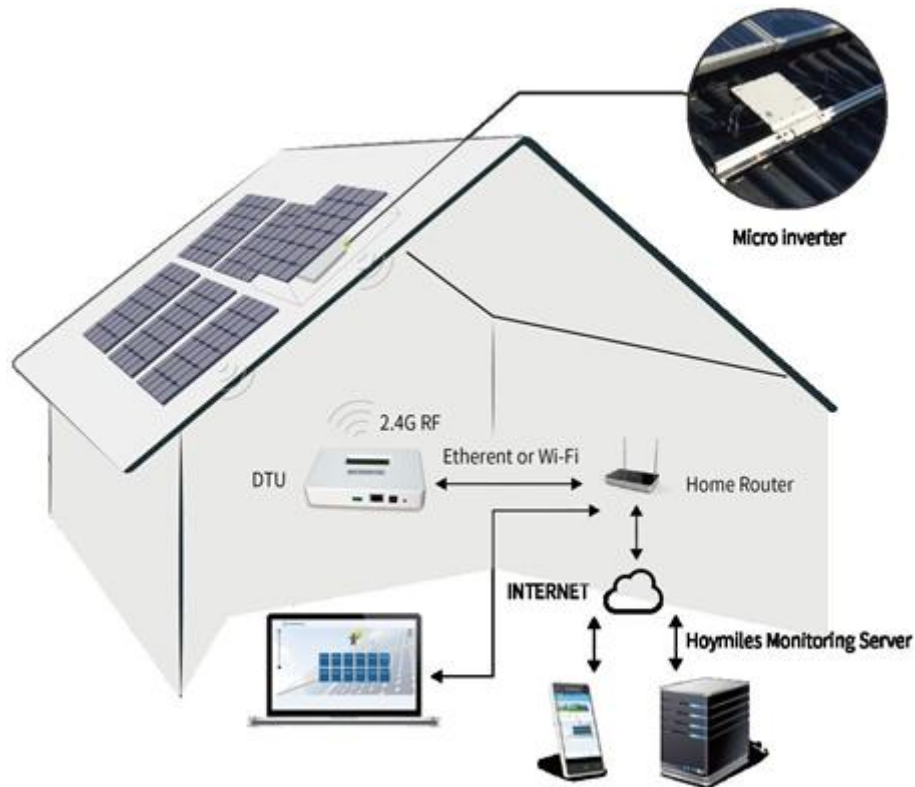
- Service disconnecting means
- PV system disconnecting means
- Readily accessible switch or circuit breaker

The handle position of a switch or circuit breaker is suitable for use as an indicator. Refer to NEC or CSA C22.1-2015 for more information.

2. INTRODUCTION

Hoymiles microinverter system is shown in the figure below. The whole system consists of two parts, PV grid-connected power generation unit and PV monitoring unit. PV grid-connected power generation units include PV modules, microinverters, AC wiring harnesses and other system accessories; monitoring units include DTU (data collector), remote monitoring server and other accessories. Microinverter is the core product of PV grid-connected power

generation unit. On one hand, it is responsible for real-time tracking the maximum power point of the PV module, ensuring that the panels are always working in the optimal output state; on the other hand, it efficiently converting the input PV module DC power into the grid AC power, then delivers to the grid.



Other parts of Hoymiles microinverter system

DTU: The transfer station of the microinverter system power generation information, through the 2.4G RF and the microinverter communication, collect the real-time operating data of the microinverter, and transmit the collected microinverter data to Hoymiles remote monitoring server via Ethernet.

Remote monitoring server: Collects the operating data and status of each microinverter in the system through DTU, and provides module-level monitoring to the user and the operation and maintenance personnel through monitoring portal or APP to achieve remote operation and maintenance, and improve the efficiency of operation and maintenance.

3. SYSTEM INSTALLATION

3.1. PREPARE FOR INSTALLING

Before installation, please prepare the relevant installation materials and tools. In addition to microinverter, solar panels and installation brackets, users also need the following accessories:

Hoymiles accessories:

DTU (optional, as a monitor)

AC end cable

AC end cap

Other Accessories:

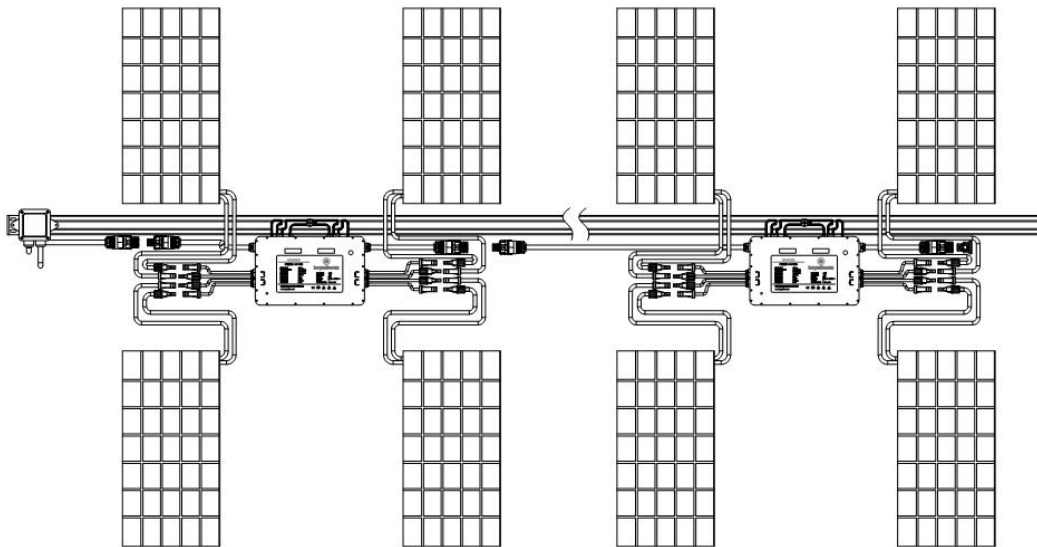
Outdoor waterproof AC junction box

Torque wrench

Cross screwdriver

3.2. ASSEMBLY INSTRUCTION

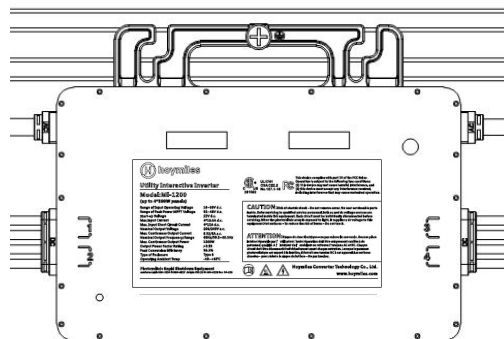
The installation diagram of MI-1200/MI-1000 microinverter is shown in the figure below. One microinverter connects with four panels and places in the middle of them, the junction box of the four panels must be placed close to the microinverter.



Assembly Illustration

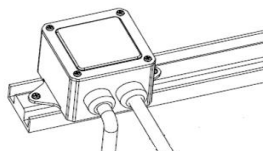
Step 1. Install Microinverter

- a. Mark the approximate center of each panel on the frame.
- b. Install the microinverter shown as below. The silver cover side should be up.



Step 2. Install AC Junction Box

- a. Install an AC junction box at the suitable location on the racking.



- b. Provide an AC connection from the AC junction box back to the electricity network connection using equipment and practices as

required by local jurisdictions.

Step 3. Connect AC Cables of Microinverter

- a. Plug the AC connector of the first microinverter into the connector of the next microinverter, and so forth, to form a continuous AC branch circuit

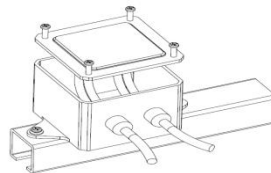


- b. Install the AC End Cap on the open AC connector of the last microinverter in the AC branch circuit



Step 4. Connect AC End Cable

- a. Connect the AC End Cable connector to the adjacent microinverter connector.

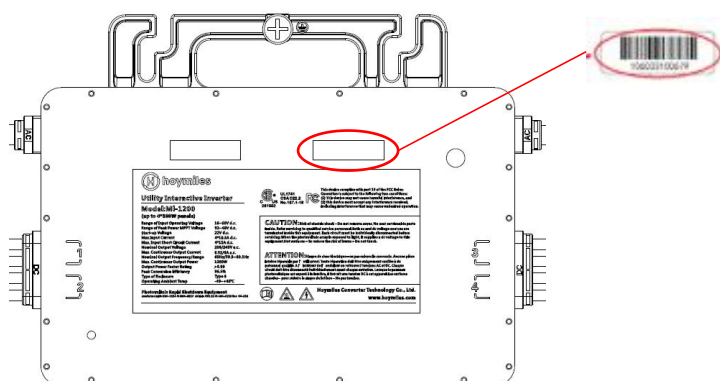


- b. Connect AC End Cable to the junction box and wire with the cable to the electricity network. Close the junction box after the wiring is complete.

Note: Red Wire: L1
Black Wire: L2
Yellow/Green Wire: Ground


Step 5. Create an Installation Map

- a. Peel the removable serial number label from each microinverter. The position of the label is shown as below.



Note: the DC inputs of MI-1000 or MI-1200 are identified by 1,2 and 3,4. The left input is 1,2 and the right one is 3,4, shown as above.

b. Affix the serial number label to the respective location on the installation map.

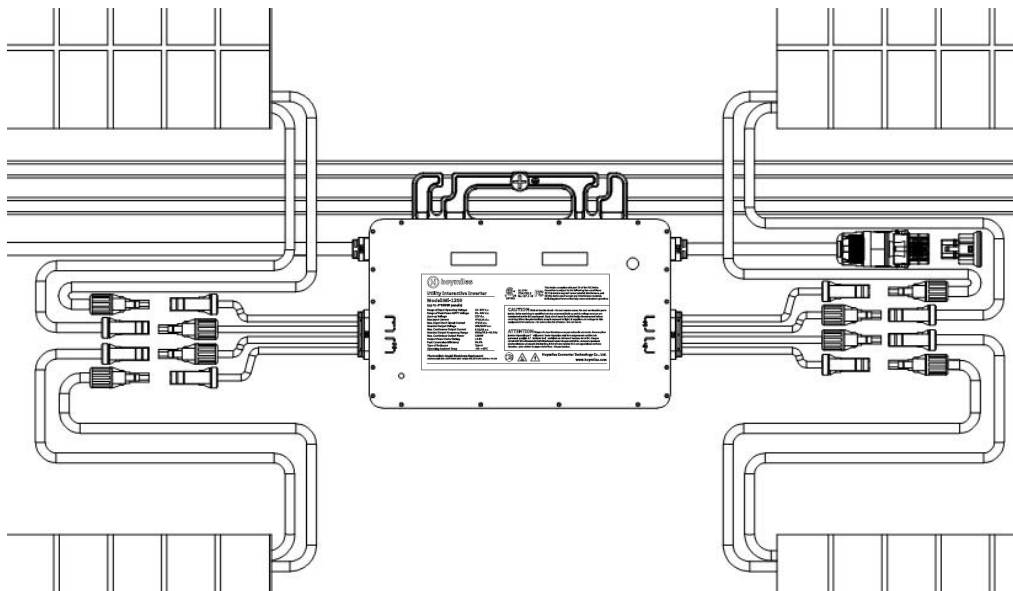
N S E W (circle one)		Panel Group: Azimuth: Tilt: Sheet ____ of ____		Customer Information:				DTU Serial Number:						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	1	3												
B	2	4												
C														
D														

Note: The serial number of MI-1000/MI-1200 microinverter needs to be placed in the middle of 4 blanks, and it is marked 1, 2, 3 and 4, and the micro-inverse dc port connected to the four PV panels.

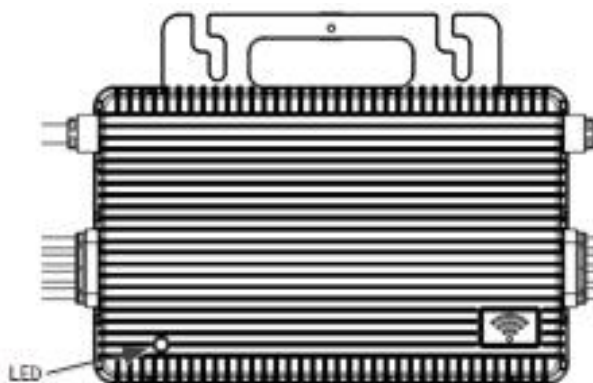
Step 6. Connect PV Modules

a. Mount the PV modules above the microinverters.

- b.** Connect the DC cables of the modules to the DC input side of the microinverter.



- c.** Check the LED on the side of the microinverter. The LED flashes six times at start up. All green flashes indicate normal start up.



Indicator flashing situation	Microinverter working condition
Flashing green light (2s interval)	Microinverter normal operation and normal communication with DTU

Green light flashes slowly (4s interval)	Microinverter works normally but the communication with the DTU is abnormal
Red light flashes (1s interval)	Grid anomaly

Step 7. Energize the System

- a. If applicable, turn on the AC disconnect or circuit breaker for the branch circuit.
- b. Turn on the main utility-grid AC circuit breaker. Your system will start producing power after about a two-minute wait time.

Step 8. System Monitoring Set Up

Refer to the DTU User Manual or the DTU Quick Install Guide to install the DTU and set up system monitoring.

4. TECHNICAL DATA

Model	MI-1000
Input data(DC)	
Recommended input power (W)	4*200~310
MPPT voltage range (V)	27~48
Operating voltage range (V)	16~60
Maximum input voltage (V)	60
Maximum input current (A)	4*10.5
Maximum short circuit current limit (A)	4*15

Output Data (AC)	
Rated output power (W)	1000
Rated output current (A)	4.17@240V a.c., 4.81@208V a.c.
Nominal output voltage/range (V)	240/211.2-264, 208/183-228.8
Nominal frequency/range (Hz)	60/59.3-60.5
Power factor	>0.99
Output current harmonic distortion	<3%
Max. inverter backfeed current to the array (A)	0
Maximum output overcurrent protection (A)	20
Maximum output fault current	55.2 Apk, 184.67 ms of duration, 7.46 Arms
Maximum Units per 20A Branch	4@240V a.c., 3@208V a.c.
Efficiency	
Peak inverter efficiency	96.5%
CEC weighted efficiency	96.0%
Nominal MPPT efficiency	99.8%
Night time power consumption (mW)	<50
Mechanical Data	
Ambient temperature range (°C)	-40 ~ +65
Storage temperature range (°C)	-40 ~ +85
Relative humidity (%RH)	0-100% condensing

Maximum operating altitude without derating (m)	2000
Dimensions (W×H×D mm)	280×176×33
Weight (kg)	3.75
Enclosure rating	Type 6, outdoor use
Cooling	Natural convection – No fans
Compliance	<p>UL1741/IEEE1547, FCC Part 15 Class B, CSA-C22.2 NO.107.1-16</p> <p>This product is CSA Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 Article 690.12 and CEC-2018 Sec 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.</p>
Integrated ground (no GEC required)	The DC circuit meets the requirements for ungrounded PV arrays in NEC 690.35.
Features	
Communication	Wireless
Design Life	>25 years
¹ Volatage and frequency ranges can be extended beyond nominal if required by the utility	

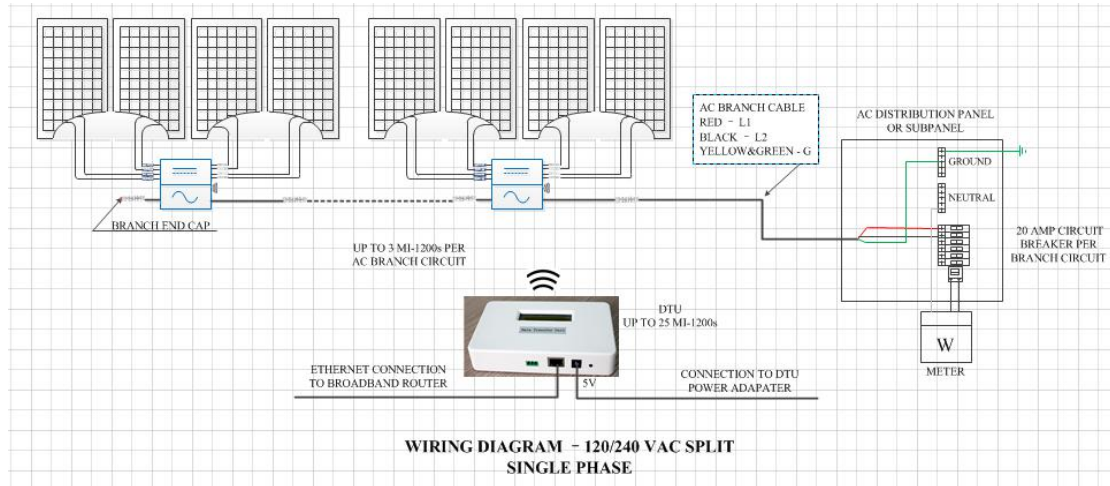
Model	MI-1200
Input data(DC)	
Recommended input power (W)	4*200~350
MPPT voltage range (V)	32~48

Operating voltage range (V)	16~60
Maximum input voltage (V)	60
Maximum input current (A)	4*10.5
Maximum short circuit current limit (A)	4*15
Output Data (AC)	
Rated output power (W)	1200
Rated output current (A)	5.00@240V a.c.,5.77@208V a.c.
Nominal output voltage/range (V)	240/211.2-264, 208/183-228.8
Nominal frequency/range (Hz)	60/59.3-60.5
Power factor	>0.99
Output current harmonic distortion	<3%
Max. inverter backfeed current to the array (A)	0
Maximum output overcurrent protection (A)	20
Maximum output fault current	57.4A _{pk} , 182.30 ms of duration, 7.89 A _{rms}
Maximum Units per 20A Branch	3@240V a.c., 3@208V a.c.
Efficiency	
Peak inverter efficiency	96.5%
CEC weighted efficiency	96.0%
Nominal MPPT efficiency	99.8%
Night time power consumption (mW)	<50

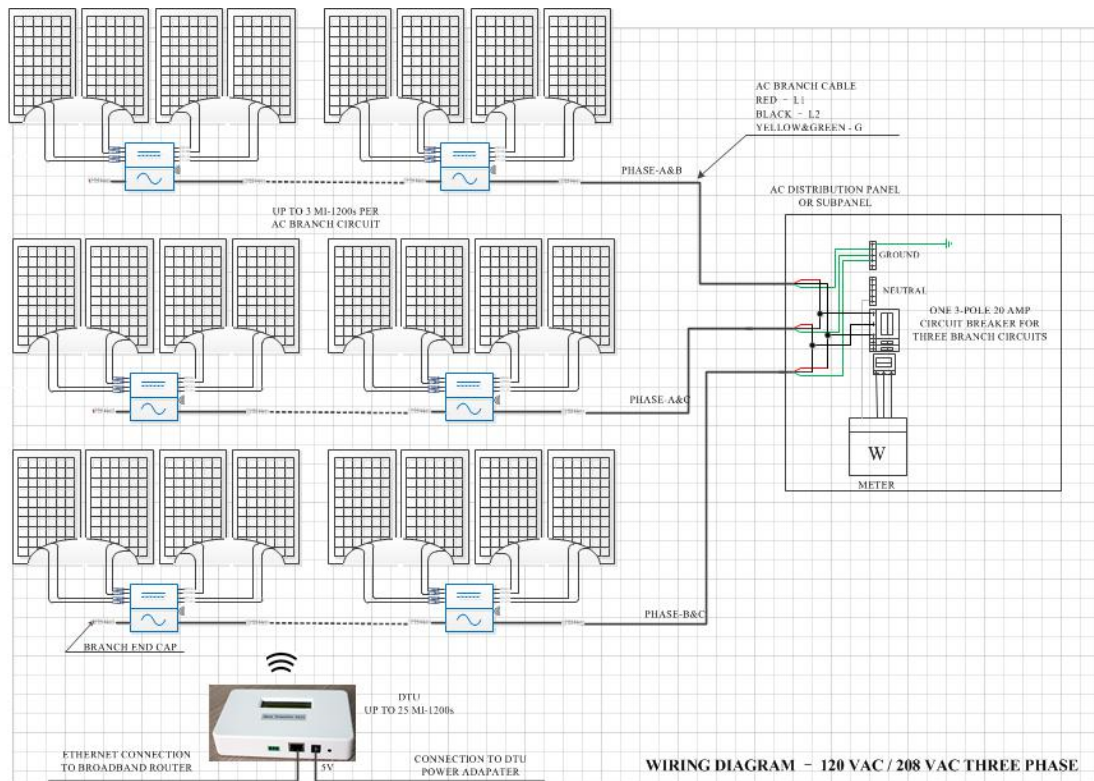
Mechanical Data	
Ambient temperature range (°C)	-40 ~ +65
Storage temperature range (°C)	-40 ~ +85
Relative humidity (%RH)	0-100% condensing
Maximum operating altitude without derating (m)	2000
Dimensions (W×H×D mm)	280×176×33
Weight (kg)	3.75
Enclosure rating	Type 6, outdoor use
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5. INSTALLING DIAGRAM

System Wiring Diagram



(a) 120 / 240Vac split single phase wiring diagram





(b) 120 / 208 Vac three phase wiring diagram

Fig.2. MI-1000 /MI-1200 Microinverter wiring diagram

6. INSTALLATION MAP

To sheet _____

N S E W (circle one) 		Panel Group: Azimuth: Tilt: Sheet __ of __				Customer Information:				DTU Serial Number:							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
A																	
B																	
C																	
D																	

To sheet _____