USER MANUAL

MAC™ 800R

aptos™
solar technology

www.aptossolar.com

Solar for Innovators

Version 1.0

Product Description

This system is composed of a group of microinverters that convert direct current (DC) into alternating current (AC) and feeds it into the public grid. The system is designed for the incorporation of one microinverter for two photovoltaic modules. Each microinverter works independently which guarantees the maximum power generation of each photovoltaic module. This setup enables the user to control the production of a single photovoltaic module directly, consequently improving the flexibility and reliability of the system.

Manual Overview

This manual contains important instructions for the MAC™ 800R microinverter and must be read in its entirety before installing or commissioning the equipment. For safety, only a qualified technician who has received training or have demonstrated skills, should install and maintain this microinverter under the guide of this document.

Other Information

Product information is subject to change without notice. This user manual will be updated frequently, please refer to Aptos Solar Technology's official website at www.aptossolar.com for the latest version.

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1. Important Information

1.1 Product Range

This manual describes the assembly, installation, commissioning, maintenance and failure search for the following model of Aptos Solar Technology's microinverter:

- MAC™ 800R

1.2 Target Group

This manual is for qualified technicians who have been trained, or who have demonstrated skills to install and maintain this Microinverter under the guidance of this document for safety purposes.

1.3 Symbols Used

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

Symbol	Usage
	Indicates a hazardous 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.
	Indicates the described operation must not be carried out. The reader should stop, use caution, and fully understand the operations explained before proceeding.

2. Safety Overview

2.1 Important Safety Instructions

The MAC™ 800R 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.

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All operations including transport, installation, start-up, and maintenance must be carried out by qualified, trained personnel.
Before installation, check the unit to ensure is free of any transport or handling damage, which could affect installation integrity or safety clearances. Choose installation location carefully and adhere to specified cooling requirements. Unauthorized removal of necessary protections, improper use, incorrect installation/ operation may lead to serious safety and shock hazards or equipment damage.
Before connecting the Microinverter to the power distribution grid, contact the local power distribution grid company to get appropriate 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).
Only one photovoltaic module can be connected to one input of the inverter. Do not connect batteries or other sources of power supply. The inverter can be used only if all the technical characteristics are observed and applied.
Do not install the equipment in adverse environmental conditions such as flammable, explosive, corrosive, extreme high/low temperature, or high humidity. Do not use the equipment when the safety devices do not work or are disabled.
Always use personal protective equipment, including gloves and eye protection during the installation.
Inform the manufacturer about non-standard installation conditions.
Do not use the equipment if any operating anomalies are found. Avoid temporary repairs.
All repairs should be carried out using only qualified spare parts, which must be installed in accordance with their intended use and by a licensed contractor or authorized Aptos service representative.
Liabilities arising from commercial components are delegated to their respective manufacturers.
If the inverter has been disconnected from the public network, please use extreme caution as some components can retain charge sufficient to create a shock hazard. Ensure all surfaces and equipment are under touch-safe temperatures and voltage potentials prior to handling any part of the inverter.
Aptos Solar Technology accepts no liability for damage from incorrect or improper operation.
Electrical installation & maintenance shall be conducted by licensed electrician and shall comply with Local Wiring Rules.

2.2 Explanation of Symbols

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.

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	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.
	FCC mark The inverter complies with the requirements of part 15 of FCC rules.
	Read manual first Please read the installation manual before installation, operation, and maintenance.

2.3 Radio Interference Statement

This microinverter has been tested and found to comply with the limits for part 15 of FCC rules, which can provide reasonable protection against harmful energy. However, if not installed according to instructions, the microinverter may cause harmful interference to radio equipment. There is no guarantee that the interference will not occur in a particular installation.

To confirm that the radio or television reception is interfered by this equipment, turn the equipment *off* and *on*. If this equipment does cause harmful interference to the radio or television equipment, correct the interference using one or more of the following measures:

1) Relocate the receiving antenna.

2) Increase the separation between the microinverter and the receiving antenna.

3) Place the shield between the microinverter and the receiving antenna, such as metal / concrete roof.

4) Contact your dealer or an experienced radio/TV technician for help.

3. Product Description

3.1 About 2-in-1 Unit

“The world’s first daisy-chain, 2-in-1 Unit Microinverter” features extremely wide DC input operating voltage range (16-60V) and low start-up voltage (22V only).

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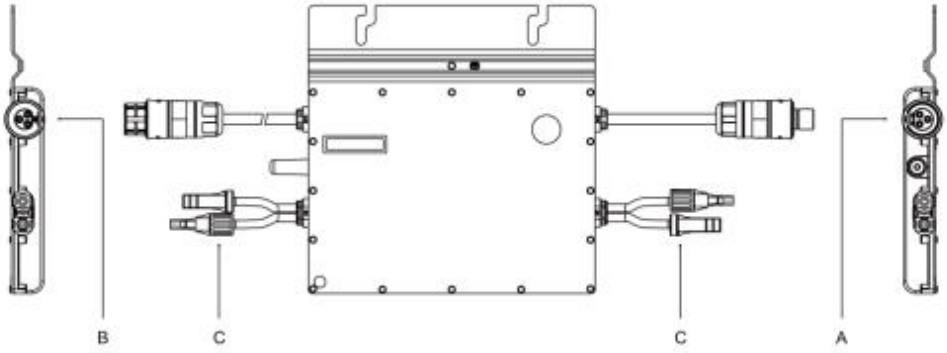
Aptos Solar Technology's 2-in-1 unit microinverter MAC™ 800R is the perfect solution for PV systems with an uneven number of panels due to its industry-leading 96.50% (peak efficiency 96.70%).

3.2 Highlights

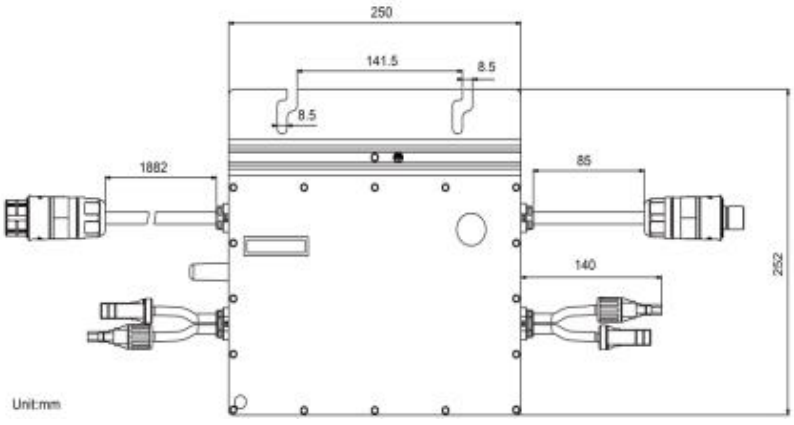
- Peak output power up to 600W/700W/800W; Adapted to 60 & 72 cells PV panels.
- Peak efficiency 96.70%; CEC weighted efficiency 96.50%.
- Static MPPT efficiency 99.80%; Dynamic MPPT efficiency 99.76% in overcast weather.
- Power factor (adjustable) 0.8 leading……0.8 lagging.
- External antenna for stronger communication with DTU.
- High reliability: NEMA6 (IP67) enclosure; 6000V surge protection.

3.3 Terminals Introduction



Object	Description
A	AC Connector (Male)
B	AC Connector (Female)
C	DC Connectors

3.4 Dimension(mm)



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4. Product Function

4.1 Work Mode

Normal: Under this mode, Microinverter is operating normally and will convert DC power into AC power to support the house loads and feed into the Public Grid

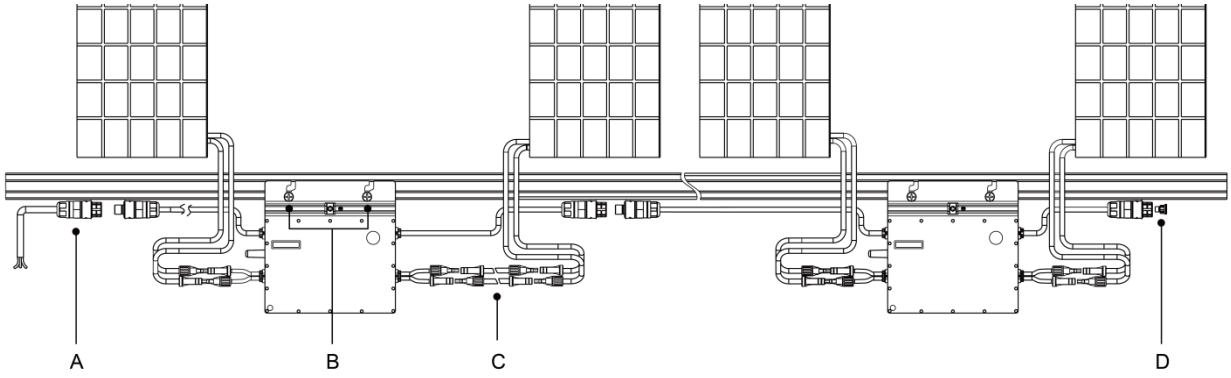
Zero Export Control: Under this mode Microinverter's generation is limit base on the current house loads, there will be no extra power feed in to the Public Grid.

Standby: There are several circumstance that Microinverter will stay in Standby mode:

- The current condition is contradicted with Microinverter operating requirement.
- No house loads or the Export control value has been set as "0" on the DTU under the Zero Export Control mode.

5. Installation Guide

5.1 Accessories



Object	Description
A	AC End Cable (Female), 2m 12AWG Cable
B	M8*25 Screws
C	DC Extension Cable, 1m
D	AC Female End Cap, IP67

**Note: All accessories above are not included in the package and need to be purchased separately. Please contact our sales representative for the pricing. (M8 screws need to be prepared by installer-self.)*

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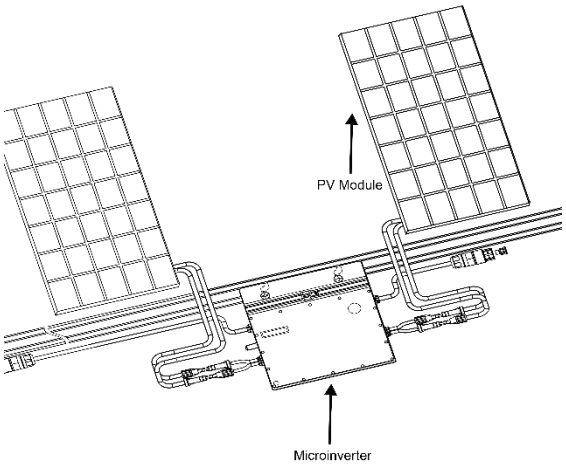
5.2 Installation Precaution

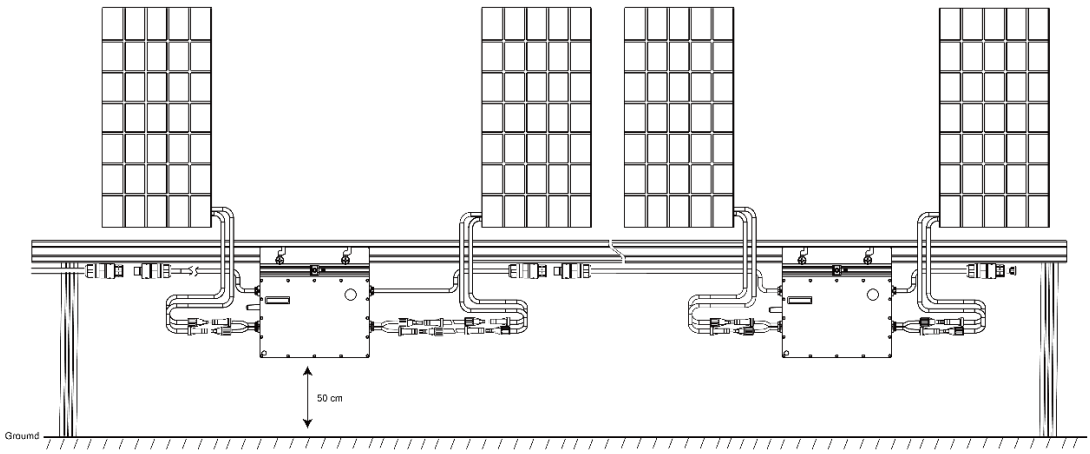
Please install the Microinverter and all DC connections under the PV module to avoid direct sunlight, rain exposure, snow layup, UV, etc. Allow a minimum of 2 cm space around the microinverter enclosure to ensure ventilation and heat dissipation.



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

5.3 Space Distance Required

If the microinverters are installed on a concrete roof or steel roof, the communication with the DTU may be slightly affected. Under such installation conditions, it is better for the microinverters to be installed 50cm above the roof. Otherwise, more DTUs may be required to ensure communication quality between the DTUs and the microinverters.



5.4 Preparation

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

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- 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.
- Referring to the Technical Data to make sure the environmental conditions fit the microinverter's requirement (degree of protection, temperature, humidity, altitude, etc.)
- To avoid power de-rating due to an increase in the microinverter internal temperature, do not expose it to direct sunlight.
- To avoid overheating, always make sure the air flow around the inverter is not blocked.
- Do not install in places where gasses or flammable substances may be present.
- Avoid electromagnetic interference that can compromise the correct operation of electronic equipment.

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

- Install only on structures specifically conceived for photovoltaic modules (supplied by installation technicians).
- Install Microinverter underneath of the photovoltaic modules to make sure it works in the shadow. If this condition cannot be met, it might trigger the inverter production de-rating.

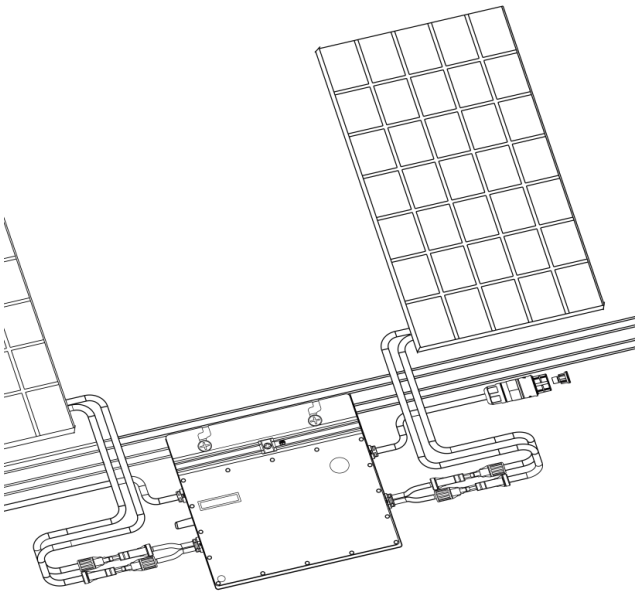

Fig.1 Installation position of microinverter

5.5 Installation Steps

Step 1. Fix Microinverter on the Rail

A) Mark the approximate center of each panel on the frame.

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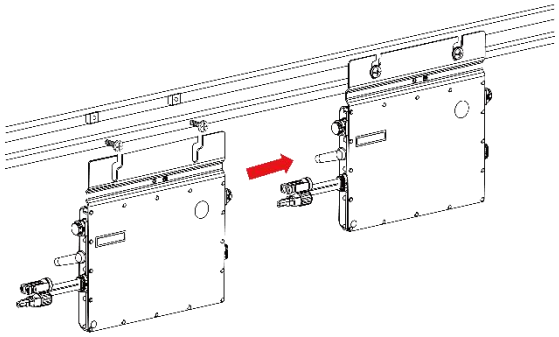
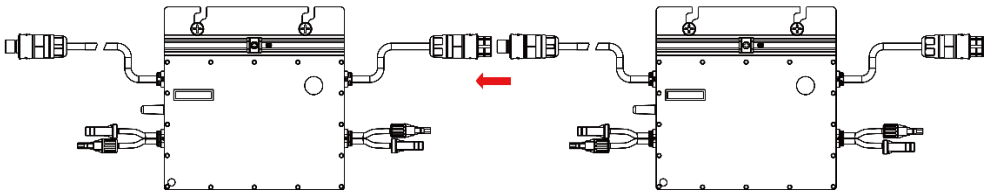
B) Fix the screw on the rail.

C) Hang the microinverter on the screw (shown as pictured below), and tighten the screw. The silver cover side of the Microinverter should be facing the panel.

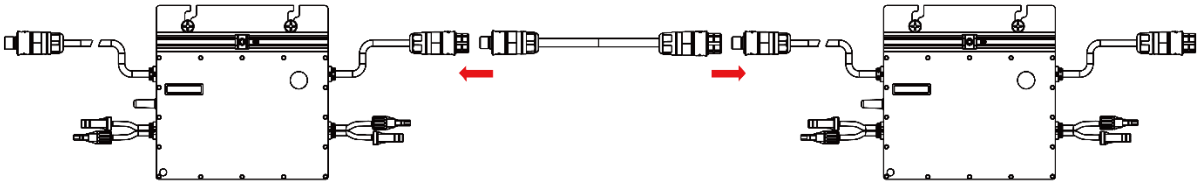


Step 2. Connect AC Cables of Microinverter

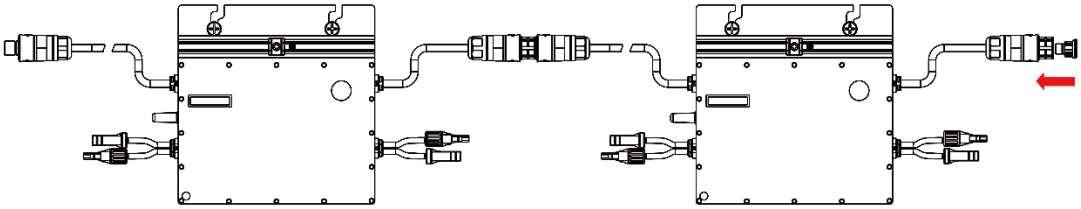
A) Plug the AC connector of the first microinverter with the connector of the second microinverter to form a continuous AC branch circuit.



**Note: The length of AC cable on Microinverter is around 2.06m. If the distance between two Microinverters is more than 1.2m, please use the AC extension cable between two inverters (as picture indicated below).*



B) Install the AC end cap on the open AC connector of the last microinverter in the AC branch circuit.



Step 3. Connect AC End Cable

A) Make the end cable

1. Dissemble the AC port into 3 parts

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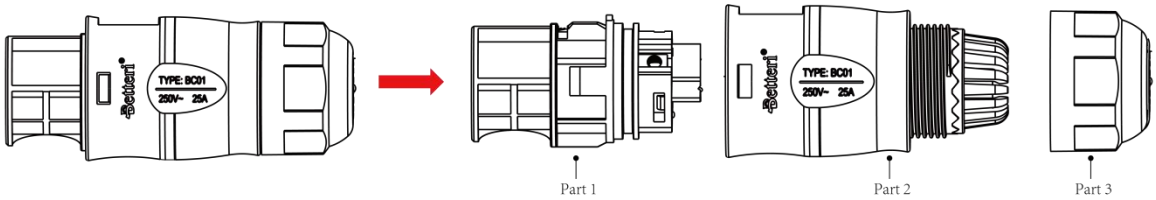
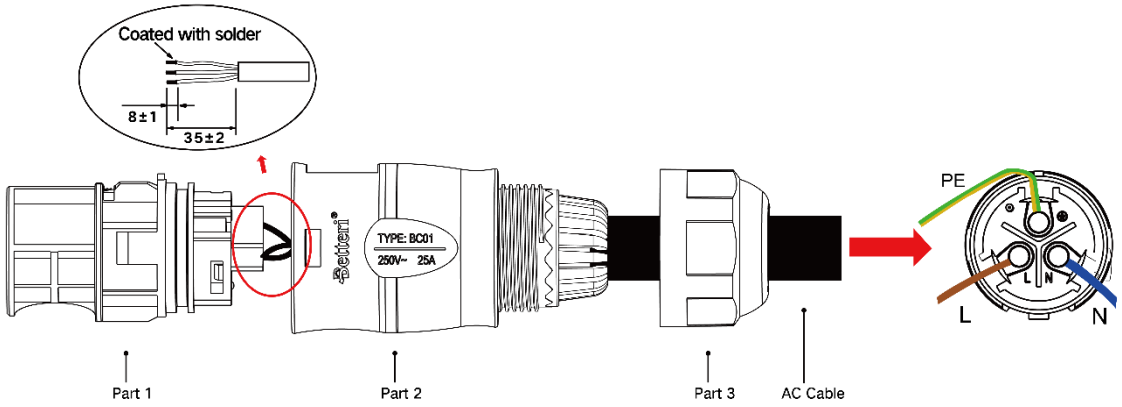


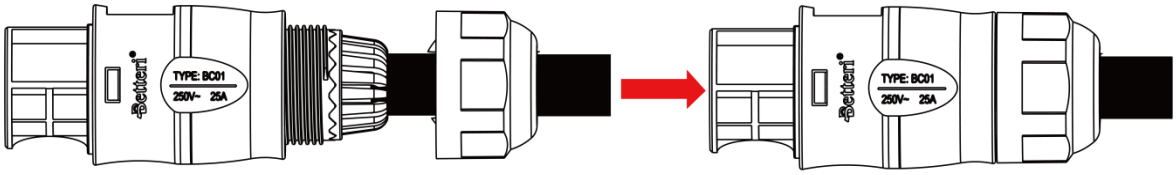
2. Insert the AC cable from Part 3 to Part 2 and complete with wiring for the L, N, and Ground inside Part 1 AC port accordingly:



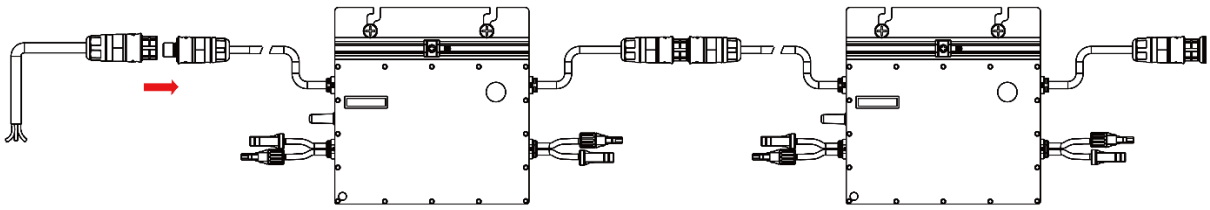
Note: L: Brown wire N: Blue wire G: Yellow/Green wire

Please use 12 AWG cable as AC end cable.

3. Plug the AC port Part 2 into Part 1 once complete with the wiring. Next screw the Part 3 on and complete the AC extension cable:



B) Connect the AC end cable to the AC male connector from the first Microinverter to complete the circuit.



C) Connect the other side of the AC end cable to the distribution box and wire it to the local grid network.

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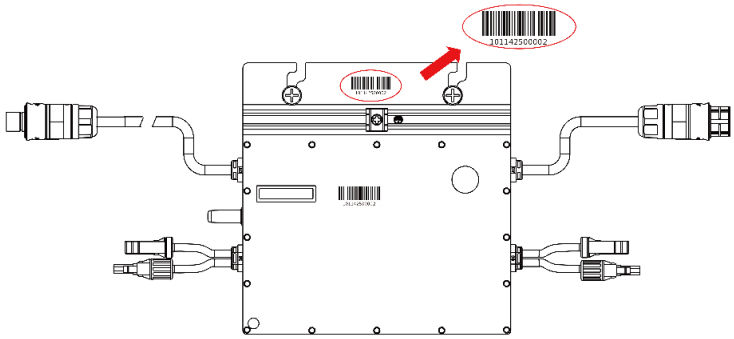
Step 4. Create an Installation Map

A) Peel the removable serial number label from each microinverter (the position of the label is shown as below.)



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:	aptos solar technology

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A														
B														
C														
D														

Step 5. Connect PV Modules

A) Mount the PV modules above the microinverter.

B) Connect the DC cables of the PV modules to the DC input side of the microinverter.

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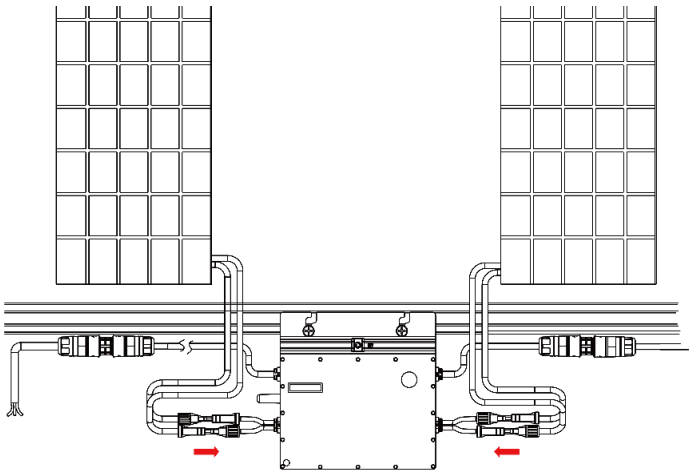

Step 6. Energize the System

A) Turn on the AC breaker of the branch circuit.

B) Turn on the main AC breaker of the house. Your system will start to generate power after about a 2-minute wait time.

Step 7. Set Up the Monitoring System

Refer to the DTU User Manual or DTU Quick Install Guide, and Quick Installation Guide for Aptos Online Registration to install the DTU and set up your monitoring system.

6. Troubleshooting

6.1 Troubleshooting List

Alarm Code	Alarm Name	Suggestion
121	Over temperature protection	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 Aptos technical support.
125	Grid configuration parameter error	1.Check if the grid configuration parameter is correct and upgrade again. 2.If the fault still exists, contact your dealer or Aptos technical support.
126	Software error code 126	1. If the alarm occurs accidentally 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 Aptos technical support.
127	Firmware error	1.Check if the firmware is correct and upgrade again.

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		2.Check the communication between DTU and Aptos monitoring system, the communication between DTU and microinverter. Then try again. 3.If the fault still exists, contact your dealer or Aptos technical support.
128	Software error code 128	1. If the alarm occurs accidentally 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 Aptos technical support.
129	Software error code 129	1. If the alarm occurs accidentally 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 Aptos technical support.
130	Offline	1.Please make sure that the microinverter works normally. 2.Check the communication status between the DTU and Aptos monitoring system or between the DTU and the microinverter. If the communication is poor, try to make some improvements. 3.If the alarm occurs frequently and cannot be recovered, contact your dealer or Aptos technical support.
141	Grid overvoltage	1. If the alarm occurs accidentally, the grid voltage may be abnormal temporarily. The microinverter can recover automatically after grid voltage becomes normal. 2. If the alarm occurs frequently, check whether the grid voltage is within the acceptable range. If no, contact the local power operator or change the grid overvoltage protection limit via Aptos monitoring system with the consent of the local power operator.
142	10-min value grid overvoltage	1. If the alarm occurs accidentally, the grid voltage may be abnormal temporarily. The microinverter can recover automatically after grid voltage becomes normal. 2. If the alarm occurs frequently, check whether the grid voltage is within the acceptable range. If no, contact the local power operator or change the grid overvoltage protection limit via Aptos monitoring system with the consent of the local power operator.
143	Grid undervoltage	1. If the alarm occurs accidentally, the grid voltage may be abnormal temporarily. The microinverter can recover automatically after grid voltage becomes normal. 2. If the alarm occurs frequently, check whether the grid voltage is within the acceptable range. If no, contact the local power operator or change the grid undervoltage protection limit via Aptos monitoring system with consent from the local power operator. 3. If the fault still exists, check the AC switch or AC wiring.
144	Grid overfrequency	1. If the alarm occurs accidentally, the grid frequency may be abnormal temporarily. The microinverter can recover automatically after grid frequency becomes normal.

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		2. If the alarm occurs frequently, check whether the grid frequency is within the acceptable range. If no, contact the local power operator or change the grid overfrequency protection limit via Aptos monitoring system with the consent of the local power operator.
145	Grid underfrequency	1. If the alarm occurs accidentally, the grid frequency may be abnormal temporarily. The microinverter can recover automatically 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 Aptos monitoring system with the consent of the local power operator.
146	Rapid grid frequency change rate	1. If the alarm occurs accidentally, the grid frequency may be abnormal temporarily. The microinverter can recover automatically after grid frequency becomes normal. 2. If the alarm occurs frequently, check whether the grid frequency change rate is within the acceptable range. If no, contact the local power operator or change the grid frequency change rate limit via Aptos monitoring system with the consent of the local power operator.
147	Power grid outage	Please check whether there is a power grid outage.
148	Grid disconnection	Please check whether the AC switch or AC wiring is normal.
149	Island detected	1. If the alarm occurs accidentally, the grid voltage may be abnormal temporarily. The microinverter can recover automatically 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, contact your dealer or Aptos technical support.
205	Input port1 overvoltage	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 Aptos technical support.
206	Input port2 overvoltage	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 Aptos technical support.
207	Input port1 undervoltage	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 Aptos technical support.
208	Input port2 undervoltage	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 Aptos technical support.

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209	Port1 No input	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	Port2 No input	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.
301	Hardware Error Code 301	1. If the alarm occurs accidentally 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 Aptos technical support.
302	Hardware Error Code 302	1. If the alarm occurs accidentally 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 Aptos technical support.
303	Hardware Error Code 303	1. If the alarm occurs accidentally 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 Aptos technical support.
304	Hardware Error Code 304	1. If the alarm occurs accidentally 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 Aptos technical support.
305	Hardware Error Code 305	1. If the alarm occurs accidentally 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 Aptos technical support.
306	Hardware Error Code 306	1. If the alarm occurs accidentally 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 Aptos technical support.
307	Hardware Error Code 307	1. If the alarm occurs accidentally 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 Aptos technical support.
308	Hardware Error Code 308	1. If the alarm occurs accidentally 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 Aptos technical support.

6.2 Status LED Indicator

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

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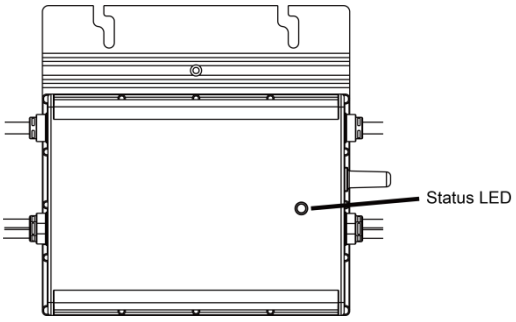

(1) Start-up Process

- ✓ Flashing Green five times (0.3s gap): Start-up success
- ✓ Flashing Red five times (0.3s gap): Start-up failure

(2) Run Process

- ✓ Flashing Fast Green (1s gap): Producing power.
- ✓ Flashing Slow Green (2s gap): Producing power, but one input is abnormal.
- ✓ Flashing Slow Green (4s gap): Producing power, but there is no communication with DTU.
- ✓ Flashing Red (1s gap): Not producing power; AC grid invalid (Voltage or frequency out of range).
- ✓ Flashing Red (0.5s gap): There is a fault except the abnormality of grid.

(3) Other Status

- ✓ Flashing Red and Green alternately: Firmware is corrupted.

**Note: All the faults are reported to the DTU, refer to the local APP of the DTU or Aptos Monitoring Platform for more information.*

6.3 On-site Inspection (For qualified installer only)

To troubleshoot an inoperable microinverter, complete the following steps in the order shown.

1. Verify the utility voltage and frequency are within ranges shown in the appendix Technical Data of this microinverter.

2. Check the connection to the utility grid. Verify utility power is present at the inverter in question by removing AC, then DC power. Never disconnect the DC wires while the microinverter is producing power. Re-connect the DC module connectors and watch for five short LED flashes.

3. Check the AC branch circuit interconnection between all the microinverters. Verify each inverter is energized by the utility grid as described in the previous step.

4. Make sure that any AC breakers are functioning properly and are closed.

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5. Check the DC connections between the microinverter and the PV module.

6. Verify the PV module DC voltage is within the allowable range shown in appendix "Technical Data" of this manual.

7. If the problem persists, please call Aptos customer support.

Warning

- Do not try to repair the microinverter. If the troubleshooting fails, please return it to the factory for replacement.

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 carrying 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, restore the normal conditions after the fault is removed.

5. Conduct an annual inspection on various components and clean the equipment with a vacuum cleaner or special brushes.

Do not attempt to dismantle the Microinverter or make any internal repairs! In order to preserve the integrity of safety and insulation, the Microinverters are not designed to allow internal repairs!

The AC output wiring harness (AC drop cable on the Microinverter cannot be replaced. If the cord is damaged, then the equipment should be properly disposed.

Unless otherwise indicated, maintenance operations must be carried out with the equipment disconnected from the grid (power switch open and the photovoltaic modules obscured or isolated.

For cleaning, do not use rags made of filamentary material or corrosive products that may corrode parts of the equipment or generate electrostatic charges.

Avoid temporary repairs. All repairs should be carried out using only genuine spare parts.

Each branch should provide a circuit breaker, but no need for central protection unit.

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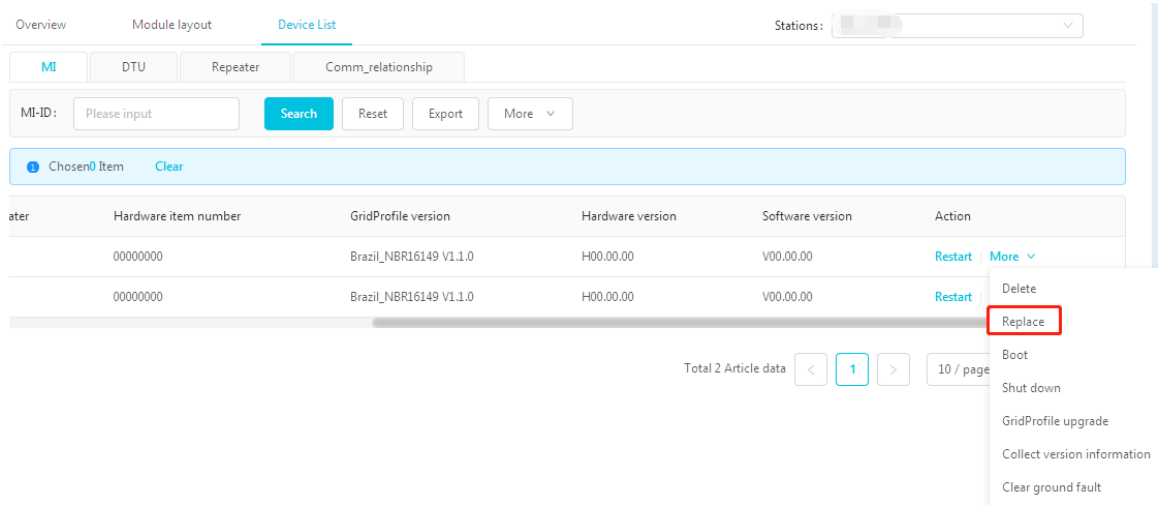
6.5 Replace Microinverter

a. How to remove the Microinverter.

- De-energize the AC branch circuit breaker.
- Remove the PV panel from the racking and cover the panel.
- Use a meter to measure and make sure there is no current flowing in the DC wires between panel and microinverter.
- Use the DC disconnect tool to remove the DC connectors.
- Use the AC disconnect tool to remove the AC connectors.
- Un-screw the fixing screw at the top of the microinverter and remove the microinverter from the PV racking.

b. How to replace the Microinverter:

- Please record the serial number of the new microinverter.
- 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 registered this station online). Access the “Device List” page and find the device that you just replaced. Please click the down arrow next to the “More” on the right side of the page and select “Replace”. Input the new Microinverter’s SN and click “Ok” to complete the station changes.



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7. Decommissions

7.1 Decommissions

Disconnect the inverter from DC input and AC output. Remove all connection cable from the Microinverter. Remove the Microinverter from the frame.

Please pack the Microinverter with the original packaging, or use a carton box that can afford 5kg weight and can be fully closed if the original packaging is no longer available.

7.2 Storage and Transportation

Aptos packages and protects individual components using suitable means to make the transport and subsequent handling easier. Transportation of the equipment, especially by road, must be carried out by suitable ways for protecting the components (in particular, the electronic components) from violent shocks, humidity, vibration, etc. Please dispose of the packaging elements in appropriate ways to avoid unforeseen injury.

It is the customer's responsibility to examine the condition of the components transported. Once receiving the Microinverter, it is necessary to check the container for any external damage and verify receipt of all items. Call the delivering carrier immediately if damage or shortage is detected. If inspection reveals damage to the inverter, contact the supplier or authorized distributor for a repair/return determination and instructions regarding the process.

The microinverter storage temperature is -40-85C.

7.3 Disposal

- If the equipment is not used immediately or is stored for long periods, check that it is correctly packed. The equipment must be stored in well-ventilated indoor areas that do not have potential characteristics that might damage the components of the equipment.
- Take a complete inspection when restarting after a long time or prolonged stop.
- Dispose of all unused material properly in accordance with local environmental regulations.

8. Technical Data

Warning

- Be sure to verify the following before installing Aptos Microinverter System.

Verify that the voltage and current specifications of the PV module must match those of the microinverter.

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The maximum open circuit voltage rating of the PV module must be within the operating voltage range of the microinverter.

The maximum current rating at MPP is recommended to be equal to or less than the maximum input DC current, but the maximum short circuit current must be equal to or less than the maximum input DC short circuit current.

The output DC power of PV module is NOT recommended to exceed 1.35 times the output AC power of the microinverter. Refer to “Aptos Warranty Terms & Conditions” for more information.

8.1 DC Input

Model	**MAC™ 800R**
Commonly used module power (W)	Up to 500 (singe panel)
Peak power MPPT voltage range (V)	34~48
Start-up voltage (V)	22
Operating voltage range (V)	16~60
Maximum input voltage (V)	60
Maximum input current (A)	2*12.5
Maximum input short circuit current (A)	2*15

8.2 AC Output

Model	**MAC™ 800R**
Peak output power (VA)	800
Maximum continuous output power (VA)	766
Maximum continuous output current (A)	3.68@208V 3.19@240V
Nominal output voltage/range (V)	208/183-229 240/211-264
Nominal frequency/range (Hz)	55-65 (under 60Hz @ 220V & 230V)
Power factor	>0.99 default 0.8 leading……0.8 lagging
Output current harmonic distortion	<3%
Maximum units per 20A branch	4@208V 5@240V

8.3 Efficiency, Safety, and Protection

Model	**MAC™ 800R**
Peak inverter efficiency	96.70%
CEC weighted efficiency	96.50%
Nominal MPPT efficiency	99.80%

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Night time power consumption (mW)	<50

8.4 Mechanical Data

Model	**MAC™ 800R**
Ambient temperature range (℃)	-40 ~ +65
Storage temperature range (℃)	-40 ~ +85
Dimensions (W×H×D mm)	250×170×28
Weight (kg)	3.00
Enclosure rating	Outdoor-NEMA (IP67)
Cooling	Natural convection – No fans

8.5 Features

Model	**MAC™ 800R**
Communication	2.4GHz Proprietary RF(Nordic)
Monitoring	Aptos Monitoring System (Aptos DTU is required)
Compliance	UL1741, IEEE1547, UL1741 SA (240Vac), CA Rule21 (240Vac), CSA C22.2 No. 107.1-16, FCC 15B, FCC 15C
PV Rapid Shutdown	Confirms with NEC-2014 and NEC-2017 Article 690.12 and CEC-2018 Sec 64-218 Rapid Shutdown of PV Systems

**Note: Voltage and frequency ranges can be extended beyond nominal if required by the utility.*

9. Grid Support Details

The MAC™ 800R Microinverter is a grid support interactive inverter, which is also known as a Grid Support Utility Interactive Inverter. These microinverters comply with California Rule 21. The Grid Support Support functions are controlled on Aptos Monitoring Platform and the DTU is required in this PV system.

Only an authorized installer is allowed to make Grid profile adjustments by following the requirements of local electrical utility.

Simultaneous use of Fixed Power Factor and Volt/Var is not supported.

- **Manufacturer's Stated Accuracy**

Measurement	**Default Tolerance of Measurement**

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Volts	+/- 1%
Watts	+/- 5%
VAr	+/- 6%
Power factor	+/- 0.05
Hz	+/- 0.1 Hz

- **SA9: Low/High Voltage Ride Through (L/H VRT) and Must Trip Settings**

Region	Voltage at PCC (% Nominal Voltage)	Ride-Through Until	Operating Mode	Maximum Trip Time (s)	Range of Adjustable Maximum Trip Time (s)
High Voltage 2 (HV2)	V ⩾ 120	N/A	N/A	0.16 sec.	0.16 sec.
High Voltage 1 (HV1)	110 < V < 120	12 sec.	Momentary Cessation	13 sec.	1-13 sec.
Near Nominal (NN)	88 ⩽ V ⩽ 110	Indefinite	Continuous Operation	N/A	N/A
Low Voltage 1 (LV1)	70 ⩽ V < 88	20 sec.	Mandatory Operation	21 sec.	21 sec.
Low Voltage 2 (LV2)	50 ⩽ V < 70	10 sec.	Mandatory Operation	11 sec.	11-21 sec.
Low Voltage 3 (LV3)	V < 50	1 sec.	Momentary Cessation	1.5 sec.	1.5-2 sec.

- **SA10: Low/High Frequency Ride Through (L/H FRT) and Must Trip Settings**

Region	System Frequency Default Settings	Ride-Through Until (s)	Ride-Through Operational Mode	Trip Time Default (s)	Range of Adjustable Trip Time Default (s)
High Frequency 2 (HF2)	f > 62	No Ride-Through	N/A	0.16 sec.	0.16 sec.
High Frequency 1 (HF1)	60.5 < f < 62	299 sec.	Mandatory Operation	300 sec.	0.1-300 sec.
Near Nominal (NN)	58.5 < f < 60.5	Indefinite	Continuous Operation	N/A	N/A
Low Frequency 1 (LF1)	57.0 < f < 58.5	299 sec.	Mandatory Operation	300 sec.	0.1-300 sec.
Low Frequency 2 (LF2)	f < 57.0	No Ride-Through	Not Applicable	0.16 sec.	0.16 sec.

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- **SA11: Ramp Rate (RR) and Soft Start (SS)**

	Units	Adjustment Range		Tolerance
		Max	Min	
Ramp up rate	%Irated/s	100	1	+/- 4%
Soft ramp up rate	%Irated/s	100	0.1	+/- 4%

- **SA12: Specified Power Factor (SPF)**

	Adjustment Range	
	Max	Min
Inductive, under excited, power factor	-0.8	-1.0
Capacitive, overexcited, power factor	1.0	0.8

- **SA13: Volt/VAr (VV)**

	Units	MAC™ 800R
Output power rating	W	766
Reactive power absorption (inductive, under excited)	VAr	245
Reactive power production (capacitive, overexcited)	VAr	245

- **SA14: Frequency-Watt (FW)**

	Units	MAC™ 800R
Output power rating	W	766
Manufacturer's stated P(f) accuracy	%Prated	5%
Maximum slope of frequency droop	%Prated/Hz	100
Minimum slope of frequency droop	%Prated/Hz	20

- **SA15: Volt-Watt (VW)**

	Units	MAC™ 800R
Output power rating	W	766
Output Power accuracy	%Prated	5%
Maximum Slope of active power reduction	%Prated/Hz	50
Minimum Slope of active power reduction	%Prated/Hz	20

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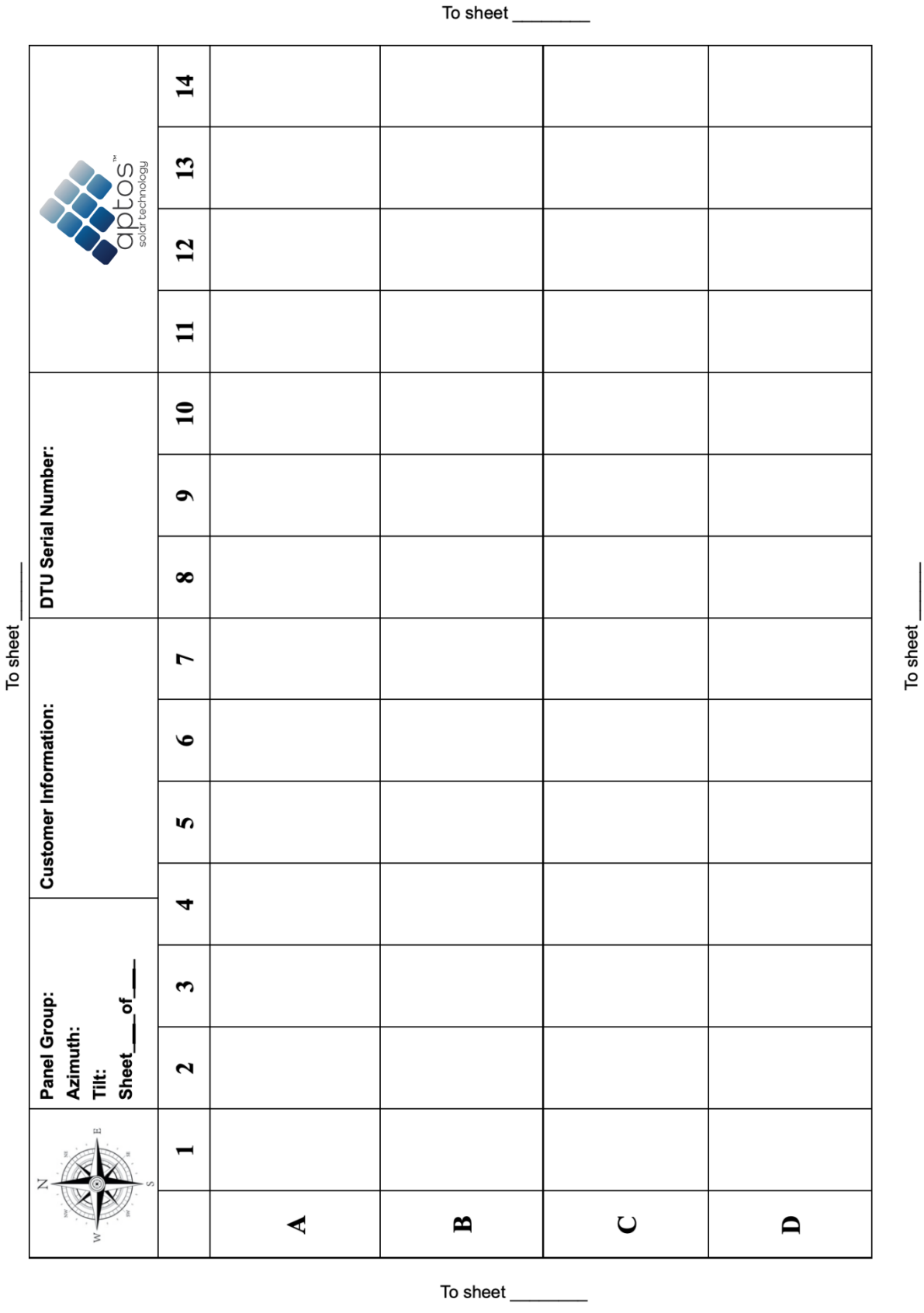
Appendix 1:

Installation Map



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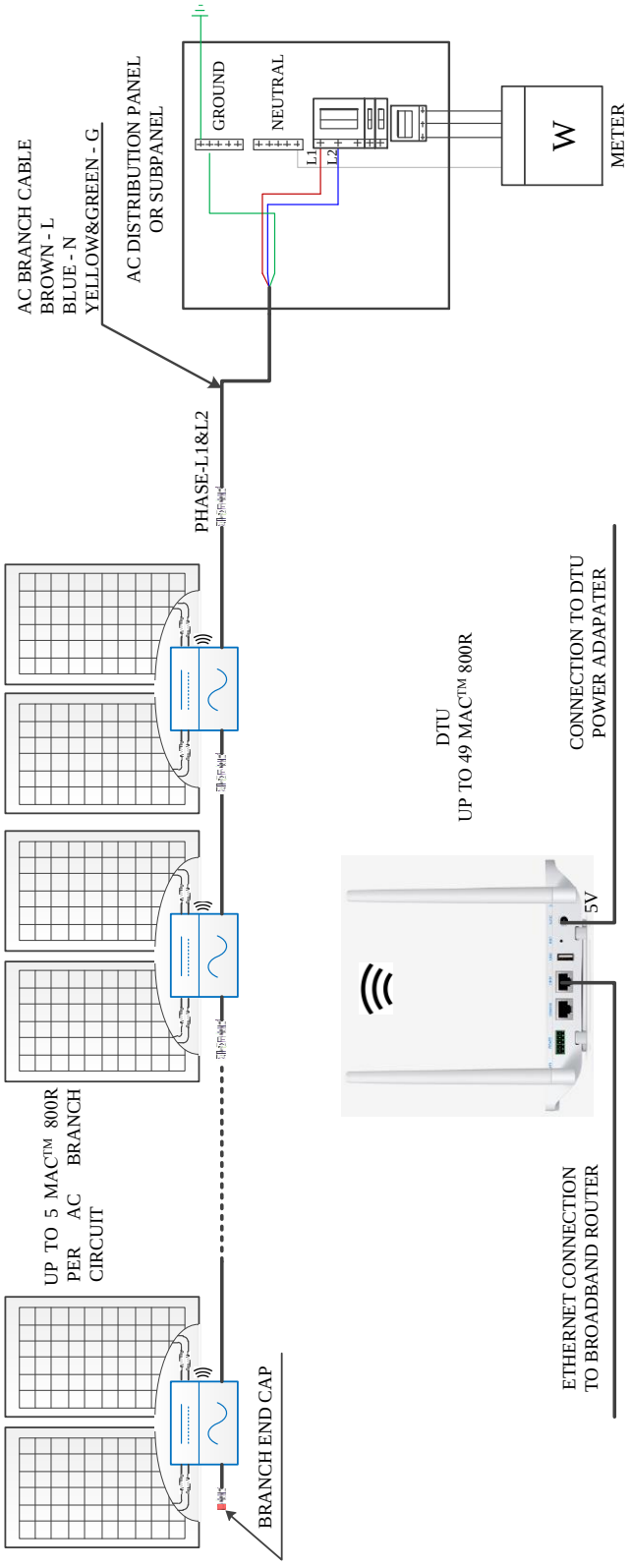
Appendix 2:

WIRING DIAGRAM –120VAC / 240VAC SPLIT PHASE:



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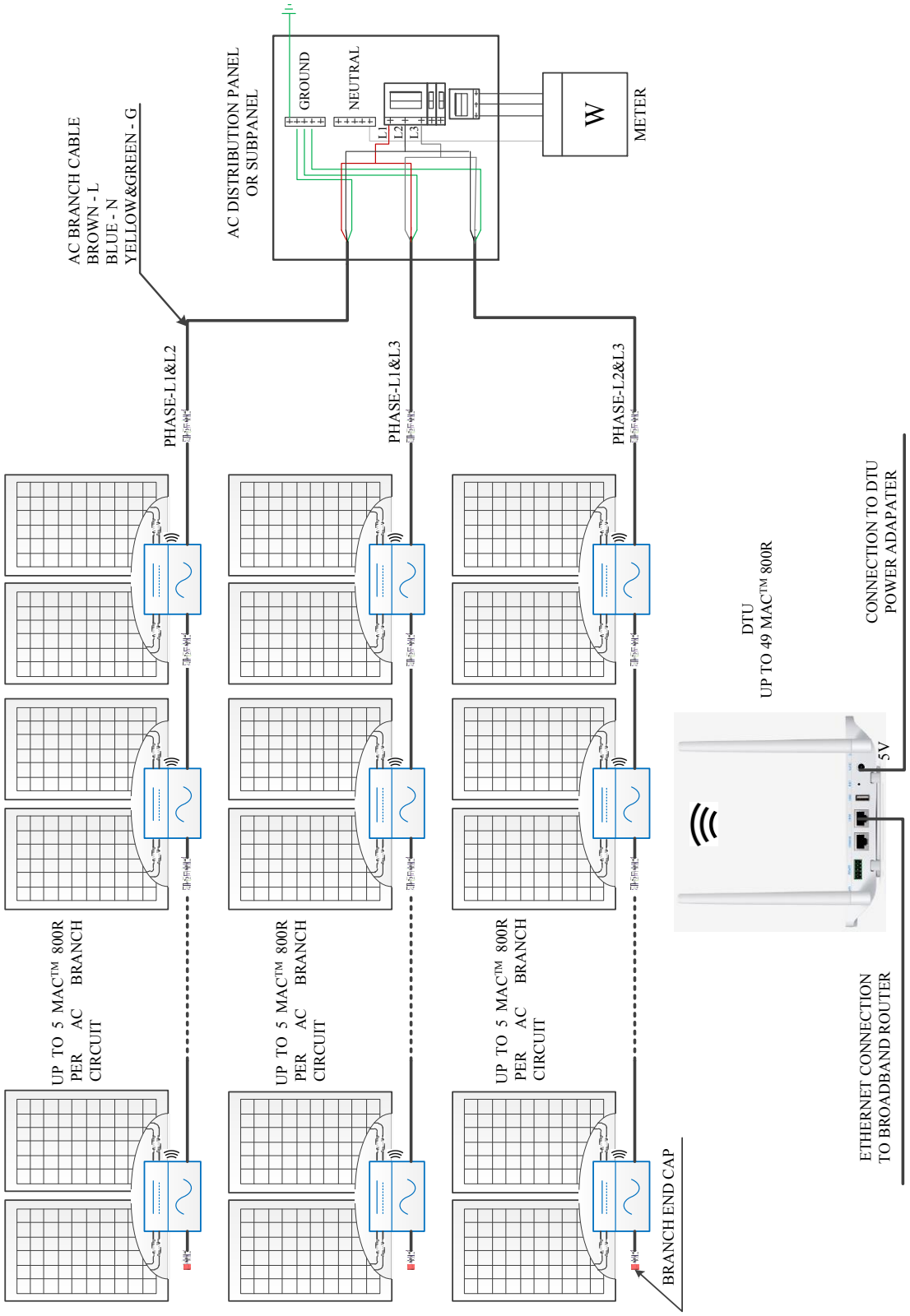
WIRING DIAGRAM – 120VAC / 208VAC THREE PHASE:



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