APsystems Microinverter User Manual

APsystems EZ1D Microinverters

(For EMEA)

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Please scan this QR code to have access to our APPs and Products Information.

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1. Important Safety Instructions

This manual contains important instructions to follow during installation and maintenance of the APsystems Photovoltaic Grid-connected Microinverter. To reduce the risk of electrical shock and ensure a safe installation and operation of the APsystems Microinverter, the following symbols appear throughout this document to indicate dangerous conditions and important safety instructions.

Specifications are subject to change without notice. Please ensure you are using the most recent update found at https://emea.apsystems.com/resources/library/

WARNING:

This indicates a situation where failure to follow instructions may cause a serious hardware failure or personnel danger if not applied appropriately. Use extreme caution when performing this task.

NOTICE:

This indicates information that is important for optimized microinverter operation. Follow these instructions closely.

1.1 Safety Instructions

- ✓ Perform all electrical installations in accordance with local electrical codes.
- ✓ Before installing or using the APsystems Microinverter, please read all instructions and cautionary markings in the technical documents and on the APsystems Microinverter system and the solar array.
- ✓ **Do NOT** disconnect the PV module from the APsystems Microinverter without first disconnecting the AC power.
- ✓ Be aware that the body of the APsystems Microinverter is the heat sink and can reach a temperature of 80°C. To reduce risk of burns, do not touch the body of the Microinverter.
- ✓ **Do NOT** attempt to repair the APsystems Microinverter. If the microinverter is suspected to be faulty, please contact your local APsystems Technical Support to start troubleshooting and obtain a RMA (Return Merchandise Authorization) number to start the replacement process if needed. Damaging or opening the APsystems Microinverter will void the warranty.

1. Important Safety Instructions

1.2 Radio Interference Statement

EMC Compliance: The APsystems Microinverter can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communication.

APsystems Microinverter complies with EMC regulations, which are designed to provide reasonable protection against harmful interference in a residential installation.

Nonetheless, if the Microinverter does cause interference to radio or television reception, you are encouraged to try to correct the interferences by one of more of the following measures:

A) Increase the separation between the Microinverter and the receiver

B) Connect the Microinverter into an outlet on a circuit different from that to which the receiver is connected

If none of the recommendations suggested above bring significant improvement in terms of interferences, please contact your local APsystems Technical Support.

Hereby, [ALTENERGY POWER SYSTEM INC.] declares that the radio equipment type [EZ1D] is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address: https://emea.apsystems.com/resources/library/

1. Important Safety Instructions

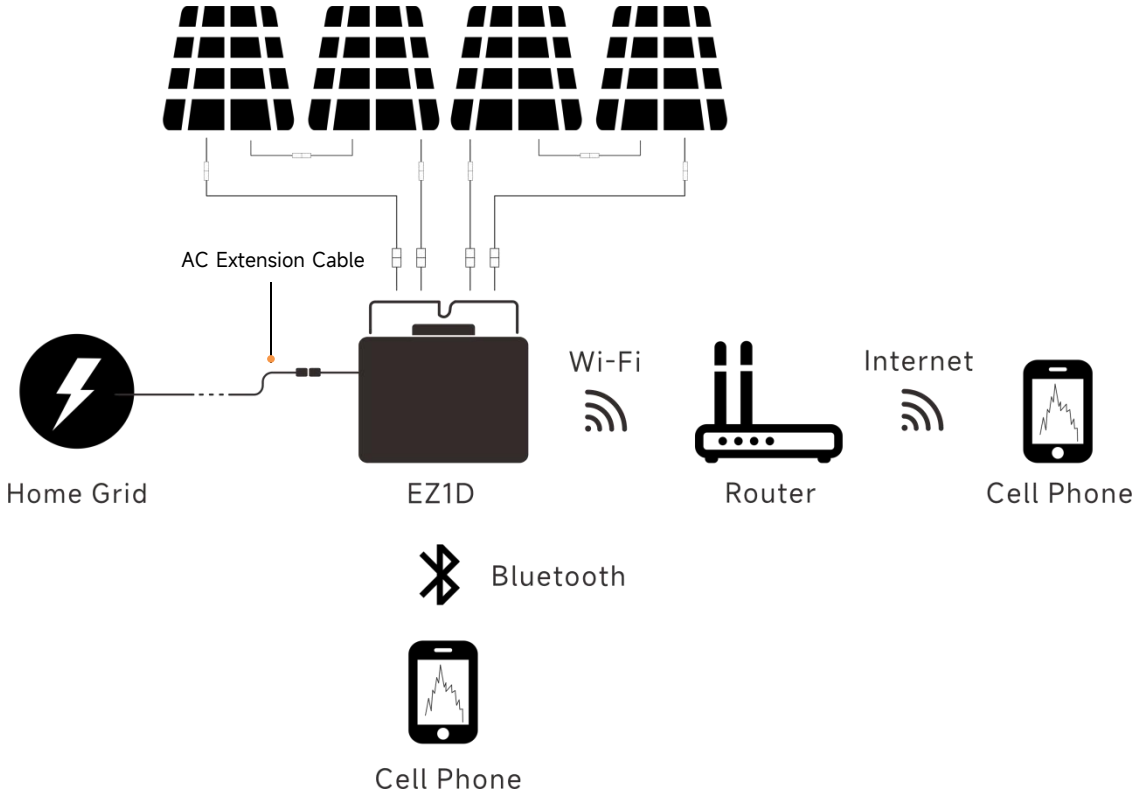
1.3 Symbols in Lieu of Words

APsystems	Trademark.
	Caution, risk of electric shock.
	Caution, hot surface.
	Symbol for the marking of electrical and electronics devices according to Directive 2002/96/EC. Indicates that the device, accessories and the packaging must not be disposed as unsorted municipal waste and must be collected separately at the end of the usage. Please follow Local Ordinances or Regulations for disposal or contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.
	CE mark is attached to the solar inverter to verify that the unit follows the provisions of the European Low Voltage and EMC Directives.
	Refer to the operating instructions.
Qualified personnel	Person adequately advised or supervised by an electrically skilled person to enable him or her to perceive risks and to avoid hazards which electricity can create. For the purpose of the safety information of this manual, a "qualified person" is someone who is familiar with requirements for safety, electrical system and EMC and is authorized to energize, ground, and tag equipment, systems, and circuits in accordance with established safety procedures. The inverter and photovoltaic system may only be commissioned and operated by qualified personnel.

2. APsystems Microinverter System Introduction

The EZ1D APsystems Microinverter is used in DIY applications which comprised of the below key elements (The EZ1D series is not suitable for the rooftop system application scenario.) :

- PV modules
- Betteri connector
- EZ1D microinverter
- Router
- Cell phone



EZ1D microinverters have 2 input channels with independent MPPT and high input current and output power to adapt to today's larger power module. Users could directly connect to EZ1D with their cell phones through Bluetooth and get the real-time data of the solar systems. Besides direct connection, EZ1D could also connect to a router through Wi-Fi and send data to cloud servers for remote monitoring.

1. Please follow the local regulations and laws regarding the method and capacity of grid connection. APsystems does not assume any legal responsibility arising from this.
2. If the wireless signal in the area where the microinverter is weak, it is necessary to add a Wi-Fi signal booster at a suitable place between the router and the microinverter.
3. The EZ1D product is only suitable for the following DIY application scenarios, such as balcony, garden, garage, and carport. The EZ1D is not suitable for the rooftop system application scenario.
4. Under good sunlight conditions, microinverters can operate with the rated output power, in the status of power limiting or peak clipping.
5. The EasyPower App supports monitoring of 2 products from the EZ1D series.

2. APsystems Microinverter System Introduction

This integrated system improves safety; maximizes solar energy harvest; increases system reliability, and simplifies solar system design, installation, maintenance, and management.

Safety with APsystems Microinverters

In a typical string inverter installation, PV modules are connected in series. The voltage adds-up to reach high voltage value (from 600Vdc up to 1000Vdc) at the end of the PV string. This extreme high DC voltage brings a risk of electrical shocks or electrical arcs which could cause fire.

When using an APsystems microinverter, PV modules are connected in parallel. Voltage at the back of each PV module never exceeds PV modules Voc, which is lower than 118Vdc for most of PV modules used with APsystems microinverters. This low voltage negates the risk of electrical shock, electrical arcs and fire hazards.

APsystems Microinverters maximize PV energy production

Each PV input channel has individual Maximum Peak Power Tracking (MPPT) control, which ensures that the maximum power is produced to the utility grid regardless of the performance of the other PV modules in the array. When PV modules in the array are affected by shade, dust, different orientation, or any situation in which one module underperforms compared with the other units, the APsystems Microinverter ensures top performance from the array by maximizing the performance of modules per input channel individually within the array.

More reliable than centralized or string inverters

APsystems Microinverters are designed to operate at full power at ambient outdoor temperatures of up to 65 deg C (or 149 F). The inverter case is designed for outdoor installation and complies with the IP67 environmental enclosure rating.

Simple to install

EZ1D micorinverters have 2 input channels with independent MPPT and high input current and output power to adapt to today's larger power module. Users could directly connect to the EZ1D with their cell phones through Bluetooth and get the real-time data of the solar systems. Besides direct connection, EZ1D could also connect to a router through Wi-Fi and send data to cloud servers for remote monitoring.

3. APsystems Microinverter EZ1D Introduction

Key Product Feature:

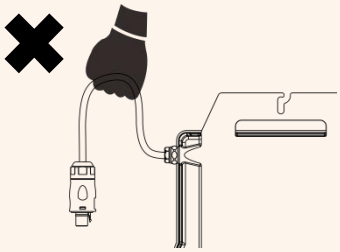
- One microinverter connects to four modules
- Max output power reaching 2000VA for different models
- High Input current to adapter to large modules
- Maximum reliability, IP67
- Built in Wi-Fi and Bluetooth
- Safety protection relay integrated
- Dedicated for DIY applications

4. APsystems Microinverter System Installation

4.1 Installation Procedures

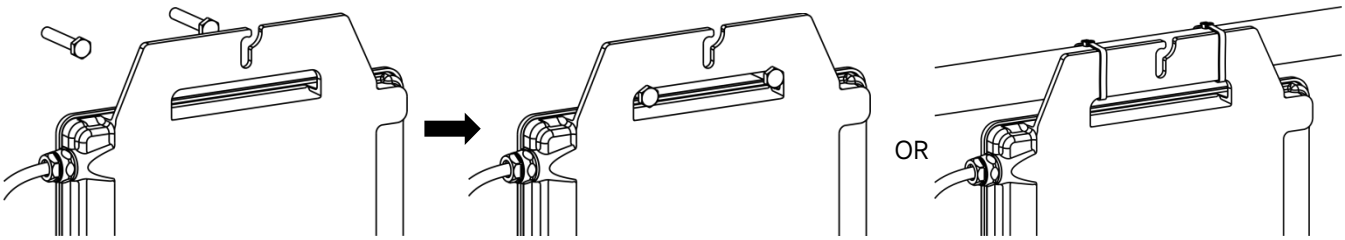
4.1.1 Step 1 - Verify that Grid Voltage Matches Microinverter Rating

Do NOT carry the microinverter by the AC cable. This may cause the AC cable to partially or fully disconnect from the unit, resulting in no or poor operation.



4.1.2 Step 2 - Install the Microinverters In Proper Position

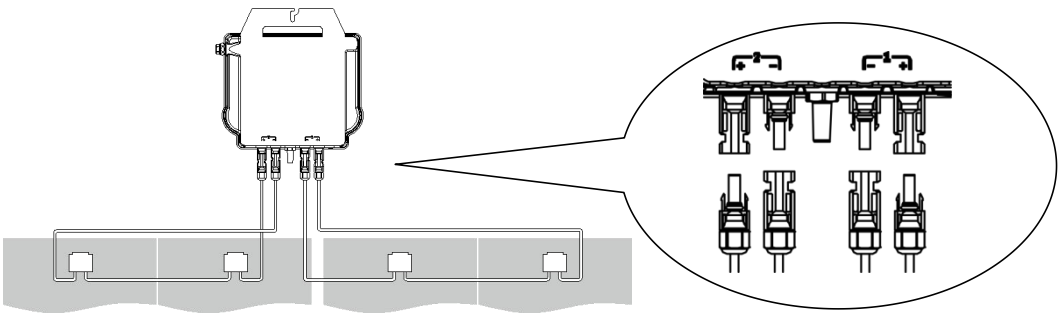
The Microinverter EZ1D can be installed on the balcony wall or fixed to the railing using cable ties. Select an appropriate installation method based on your actual scenario to ensure that the EZ1D is securely installed.



Install the microinverters in proper position to avoid direct exposure to rain, UV or other harmful weather events.

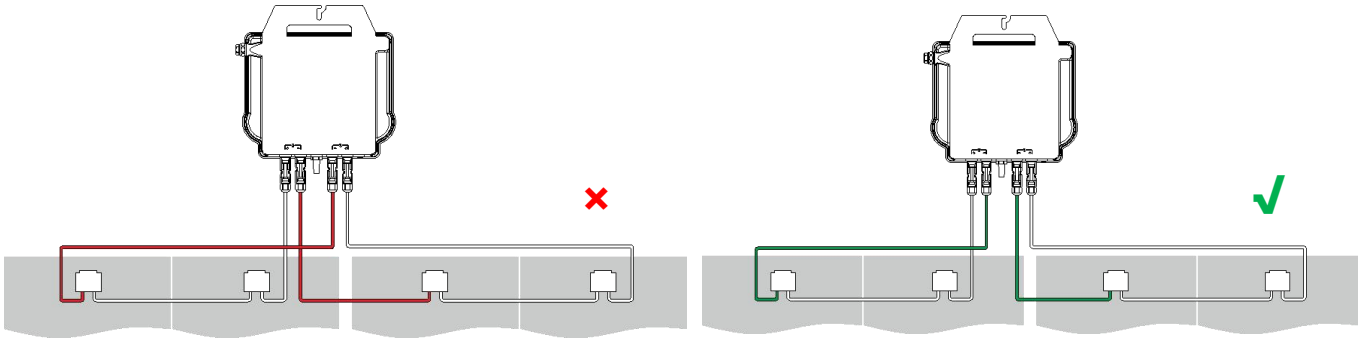
Customer using fixing bolts or cable ties, please prepare them by yourself.

4.1.3 Step 3 - Connect APsystems Microinverters to the PV Modules



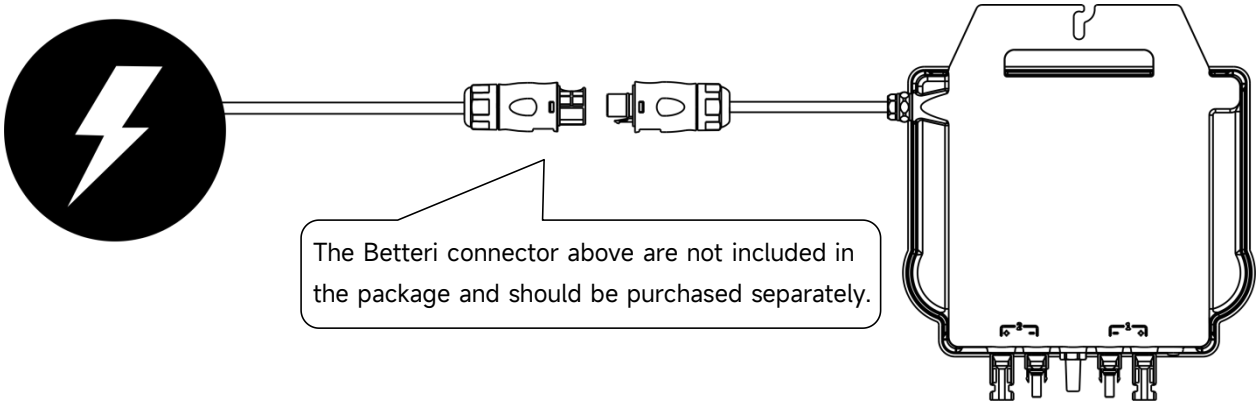
When plugging in the DC cables, the microinverter should immediately blink green ten times. This will happen as soon as the DC cables are plugged in and will show that the microinverter is functioning correctly. This entire check function will start and end within 10 seconds of plugging in the unit, so pay careful attention to these lights when connecting the DC cables.

4. APsystems Microinverter System Installation

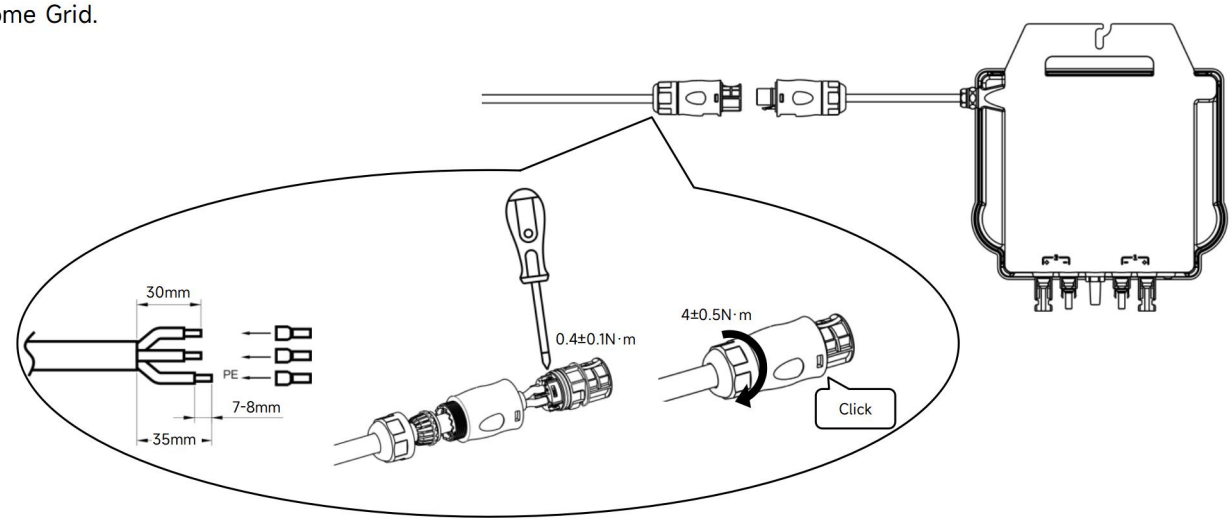


1.Each PV panel must be carefully connected to the same channel.
Make sure to not split positive and negative DC cables into two different input channels: microinverter will become damaged and warranty will not apply.
2.Please ensure each DC cable's length within 3 meters.

4.1.4 Step 4 - Connect the APsystems Microinverter



Connect the AC plug of the microinverter to the Betteri connector*, then connect the microinverter to the house Home Grid.



Installing the Betteri connector(female) at the end of the cable.

* Please contact the salesperson for purchases. The ordering information is as follows.

ORDERING INFORMATION	
2301632304	AC Connector (BC01,3C,female) (Suitable for 10mm~13mm wire diameter.)

5.Install and Use AP EasyPower

5.1 Install APP

Please scan QR code below to have access to our products and APP catalogue, or click this link to download our APPs: https://file.apsystemsema.com:8083/apsystems/apeasypower/download.html .

iOS:

- Go to App Store
- Search "AP EasyPower"
- Download and install

iOS: 10.0 and up.

Android:

Method 1

- Go to Google Play Store
- Search "AP EasyPower"
- Download and install

Method 2

- Open https://apsystems.com
- Select your region
- Click the tab menu "Apps" below "Products"
- Download and install

Android: 7.0 and up.

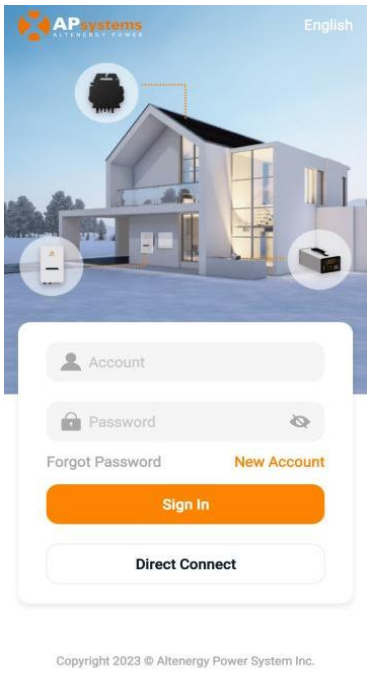
5.2 Connect the APsystems Microinverters

AP EasyPower offers two modes "Direct Connect Mode"and "Remote Mode" to monitor the device.

Direct Connect Mode: APP connects to Bluetooth of the device, so that users can realize local monitoring and control of the device.

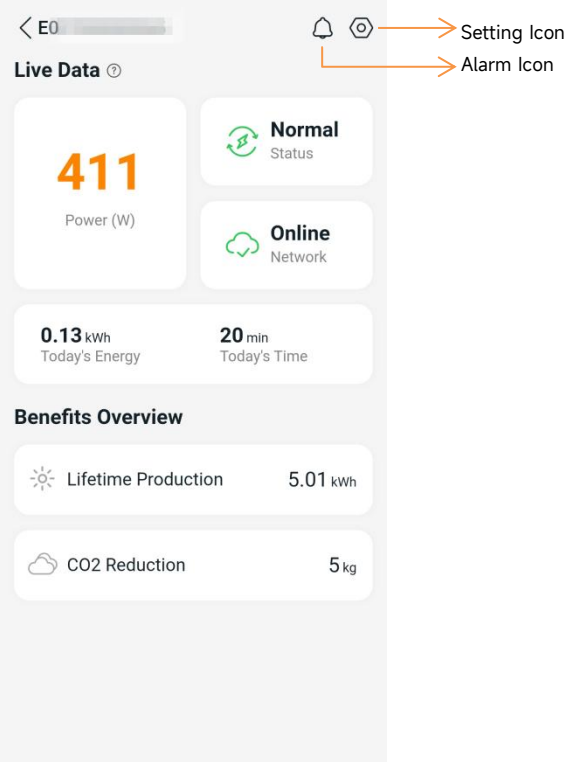
Remote Mode: Login account, users can realize remote monitoring and control of the device.

In the absence of Wi-Fi, users can monitor and control the device in direct connection mode.



5.Install and Use AP EasyPower

5.3 Monitor & Control



On this page, user can visualize

- **Live Data**: The real-time data of the device in current round, including the power, energy, running time, working status and the cloud status.

- Working status

  Normal: The device is working normally.

  Alarm: The device has alarms and you need to check it.

- Cloud status

  Online: The device is connecting the cloud service through the internet.

  Offline: The device is not connecting the cloud service through the internet, maybe the device is not connected the Wi-Fi or the router is down.

- **Benefits Overview**: The lifetime energy produced by the device and the equivalent CO2 reduction.

By pressing "***alarm icon***" to check the alarm information if the device status is alarm.

By pressing "***setting icon***" to set the device. The setting page is shown below.

For Connection and monitoring operation mode, please refer to the AP EasyPower User Manual.

6. Troubleshooting

Users can use the following troubleshooting steps if the PV system does not operate correctly:

6.1 Status Indications and Error Reporting

Assuming they are easily accessible and visible, Operation LEDs can give a good indication of the microinverters status

6.1.1 Start up LED

Ten short green blinks when DC power is first applied to the Microinverter indicates a successful Microinverter startup.

6.1.2 Operation LED

Flashing Slow Green (5 sec. gap) - Producing power and the Microinverter is in normal working status.
Flashing Slow Red (5 sec. gap) - The Microinverter is in protection status or disconnected from grid.

6.1.3 GFDI Error

A solid red LED indicates the Microinverter has detected a Ground Fault Detector Interrupter (GFDI) error in the PV system. Please check if the DC inputs of the inverter are mistakenly connected to ground or contact your local APsystems Technical Support.

6.2 Trouble Shooting Guide

Professional Users can also refer to our Troubleshooting Guide (https://emea.apsystems.com/resources/library/, section libraries)for more in depth guidelines on how to troubleshoot and fix PV installations powered by APsystems microinverters.

6.3 APsystems Technical Support

The APsystems local Technical Support team is available to support professional installers in becoming familiar with our products and to troubleshoot installations when needed.

Do not attempt to repair APsystems Microinverters. Please contact your local APsystems Technical Support.

①. Never disconnect the DC wire connectors under load. Ensure that no current is flowing in the DC wires prior to disconnecting.
②. Always disconnect AC power before disconnecting the PV module wires from the APsystems Microinverter.
③. The APsystems Microinverter is powered by PV module DC power. AFTER disconnecting the DC power, when reconnecting the PV modules to the Microinverter, be sure to watch for the ten short green LED flashes.

6.4 Maintenance

APsystems microinverters do not require any specific regular maintenance.

7. Replace a Microinverter

Follow the procedure to replace a failed APsystems Microinverter

A. Disconnect the APsystems Microinverter from the PV Module, in the order shown below:
   1. Disconnect the inverter from grid
   2. Disconnect the PV module DC wire connectors from the microinverter.
   3. Remove the Microinverter from the PV array racking.

B. Install a replacement Microinverter to the rack. Remember to observe the flashing green LED light as soon as the new Microinverter is plugged into the DC cables.

C. Insert the microinverter AC connector into the power cord connector.

D. Connect the inverter to grid and verify proper operation of the replacement Microinverter.

8. Technical Data

①. Be sure to verify that the voltage and current specifications of your PV module are compatible with the range allowed on APsystems Microinverter. Please check the microinverter datasheet and Module Compatibility Calculator: https://apsystems.com/wp-content/uploads/module-compatibility-calculator/module-compatibility-calculator-for-EZ1.html?area=EMEA&flag=English .

②. DC operating voltage range of the PV module must be within allowable input voltage range of the APsystems Microinverter.

③. The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the APsystems.

8.1 EZ1D Microinverter Datasheet

Model	EZ1D-L	EZ1D	EZ1D-H
Input Data (DC)			
Recommended PV Module Power (STC) Range	315Wp-610Wp+	315Wp-660Wp+	315Wp-660Wp+
Peak Power Tracking Voltage	56V-90V		
Operating Voltage Range	52V-118V		
Maximum Input Voltage	118V		
Maximum Input Current	20A x 2		
Isc PV	25A x 2		
Maximum Inverter Backfeed Current To Array	0A		
Output Data (AC)			
Maximum Continuous Output Power	1600VA	1800VA	2000VA
Nominal Output Voltage/Range	230V/184-253V		
Nominal Output Current	7.0A	7.8A	8.7A
Nominal Output Frequency/ Range	50Hz/47.5Hz-51.5Hz		
Power Factor	0.99/0.9 leading...0.9 lagging		
Inrush Current	11.92A		
Maximum Output Fault Current	34A		
Maximum Output Overcurrent Protection	10A		
Wi-Fi Frequency Range	2412MHz - 2472MHz		
Wi-Fi Maximum Power (EIRP)	17.56 dBm		
Bluetooth Frequency Range	2402MHz - 2480MHz		
Bluetooth Maximum Power (EIRP)	9.39 dBm		
Efficiency			
Peak Efficiency	96.7%		
Nominal MPPT Efficiency	99.5%		
Night Power Consumption	20mW		
Mechanical Data			
Operating Ambient Temperature Range	-40 °C to +65 °C		
Storage Temperature Range	-40 °C to +85 °C		
Dimensions (W x H x D)	283×233×39.5mm		
Weight	4.2kg		
DC Connector Type	Stäubli MC4 PV-ADBP4-S2&ADSP4-S2		
AC Extension Cable	Customer Self-provided(1)		
Cooling	Natural Convection - No Fans		
Enclosure Environmental Rating	IP67		
Pollution Degree Classification	PD3		
Operate Relative Humidity Range	4%~100%		
Maximum Altitude	<2000m		
Overvoltage Category	OVC II For PV Input Circuit, OVC III For Mains Circuit		
Features			
Communication	Built-in Wi-Fi and Bluetooth		
Isolation Design	High Frequency Transformers, Galvanically Isolated		
Energy Management	AP EasyPower APP(2)		
Warranty(3)	12 Years Standard		
Compliances			
Safety, EMC & Grid Compliances	EN/IEC 62109-1; EN/IEC 62109-2; EN 62920; EN 55011; EN IEC 61000-6-3; EN IEC 61000-6-4; EN IEC 61000-6-1; EN IEC 61000-6-2; EN IEC 61000-3-2; EN 61000-3-3; VDE-AR-N 4105		

(1) It is recommended that customers should use the 2.5 mm² AC extension cable or according to local regulations.

(2) The EasyPower App only supports monitoring of 2 units of product from the EZ1D series.

(3) Support and warranty is not availabe for rooftop installation systems.

(4) APsystems' Microinverter Systems fully meet the rapid shutdown requirement without the need to install additional electrical equipment.

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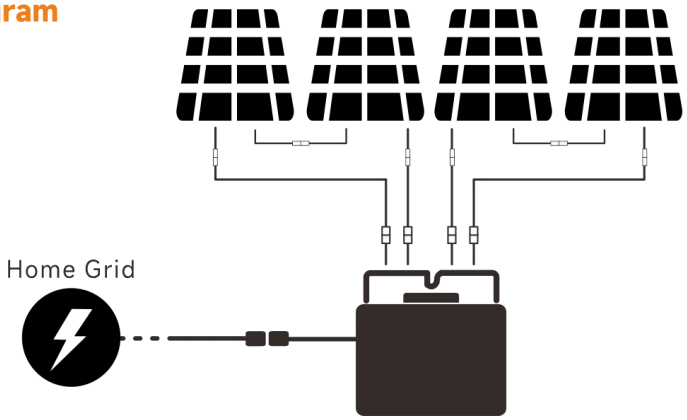
9. EZ1D PV Capacity Expansion Introduction

Product Features

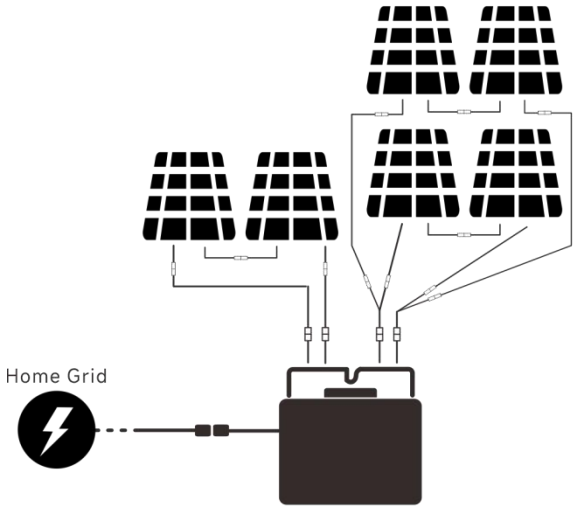
For balcony systems in DIY applications, it happens often that the PV modules produce less power than expected because of reasons such as improper installation angle. Sometimes it can be less than half of the rated output power. Many customers would like to increase the system power by connecting more PV modules. APsystems DIY microinverters EZ1D, with large input current of 20A, offer a safe and reliable solution.

EZ1D has the rated ouput power of 1800W. Each channel can connect to 4 PV modules, In total EZ1D can connect to a maximum of 8 PV modules. See the below wiring diagrams for EZ1D.

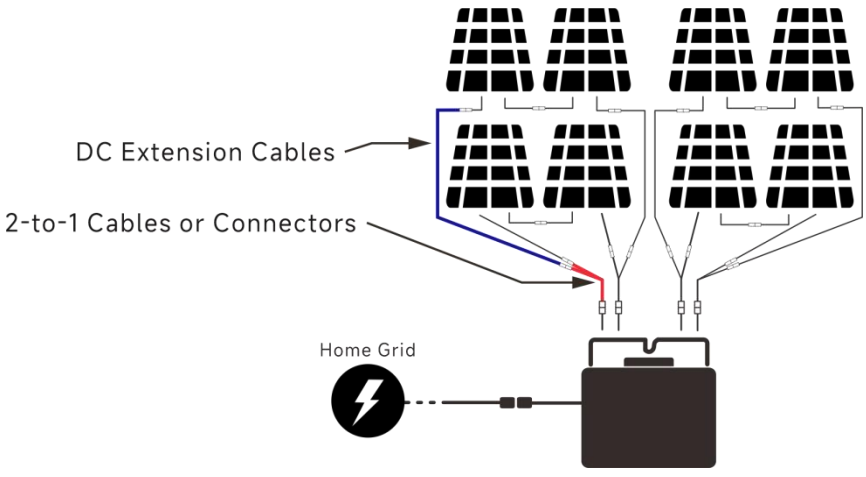
EZ1D Wiring Diagram



One EZ1D connects to 4 PV modules



One EZ1D connects to 6 PV panels



One EZ1D connects to 8 PV panels

Note:

1. For the PV capacity expansion usage, suggest to use the PV modules with STC power not more than 450W.
2. Customers can purchase by themselves DC extension cables, and 2-to-1 cables or connectors.

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