

Micro Replus™

by ReneSola

User Manual

Replus-250 Replus-250A Replus-250B

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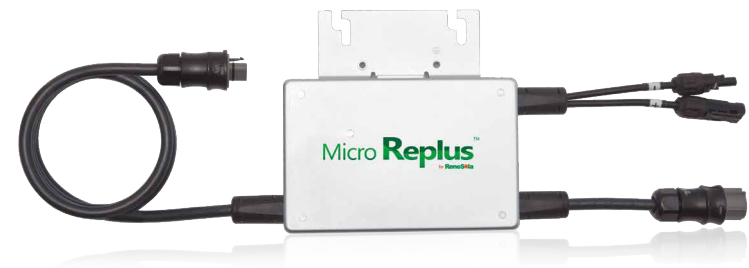
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COMPANY PROFILE

ReneSola has been listed on New York Stock Exchange (NYSE:SOL) in 2008. Its products have been delivered around the world since its establishment. It has multiple locations worldwide, with sales and operations facilities in the United States, Europe, and Asia-Pacific regions. ReneSola has a strong focus on helping customers meet delivery schedules, using high quality photovoltaic modules and PV micro grid-tied inverter.

1. INTRODUCTION

Prefix

Thank you for selecting the ReneSola Micro Replus-250/ Replus-250A/B inverter. We are certain our products will meet your project and business needs. We appreciate your feedback regarding our products, and invite you to contact us at inverter@renesola.com or www.renesola.com for more information.

1.1 Grid-tied PV System

Grid-tied PV systems consist of PV panels, grid-tied inverters, junction boxes, etc. The power generated by the micro inverter is converted from DC to AC energy and feedback to the grid, through net metering, using the Micro Replus-250/ Replus-250A/B .

1.2 How to Use This Manual

This manual provides detailed product information and installation instructions for the Replus-250/ Replus-250A/B micro-inverter. Please read this manual prior to installation and operation.



2. SAFETY INSTRUCTIONS

Warning: Please Read This Manual Before Installation. Any Damage To The Product Due To Not Following This Manual Is Not Covered By The Warrantee. All The Installation Should Be Done By A Certified Electrician. Besides The Cable Connectors, Nothing Else On Or In Microinverter Should Be Modified.

All Installations Should Follow The Local Electriccodes. The Replus-250/ Replus-250A/B Does Not Include Components That Can Be Served By Customers. Opening Or Attempting To Modify Or Change The Construction Or Design Of The Microinverter Shall Void The Warranty. Please Contact Authorized Service Agents For Any Service Work.

Replus-250/ Replus-250A/B Is A Grid-tied Solar Inverter. It May Require Approval From Local Utility Company Prior To Grid Inter Connection.

3. 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 can radiate energy from radio frequencies and, if not installed and used in accordance with the instructions, may cause harmful interference with radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to attempt to correct interference by taking one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation distance between the equipment and the receiver.
- Connect the equipment to 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.

4. INSTALLATION

Warning: Be Aware That Installation Of This Equipment Includes Risk Of Electric Shock. Normally, Grounded Conductors Maybe Ungrounded And Energized When A Ground Fault Is Indicated.

Parts Included

In addition to the Replus-250/ Replus-250A/B micro inverters, PV modules, rack, and associated hardware, you'll need the Replus-250/ Replus-250A/B installation kit. This kit includes the following items:

- Installation fixed screws
- Grounding fixed washers
- User manual
- Warranty Terms and Warranty Card

Other Required Parts And Tools

In addition to your PV array and its associated hardware, you will need to provide the following:

- Junction box
- Continuous grounding wire
- Number 2 Phillips screwdriver
- Sockets and wrenches for mounting hardware
- Torque wrench
- Mounting hardware suitable for module rack

Lightning Surge Suppression

Lightning does not actually need to strike the equipment or building where a PV system is installed to cause damage. Often, a strike nearby will induce surges in the electrical grid that can potentially exceed maximum voltages and damage equipment. The Replus-250/ Replus-250A/B has integral surge protection, greater than most string inverters. However, if the surge has sufficient energy, the protection built into the Replus-250/ Replus-250A/B can be exceeded, and the equipment can be damaged.

The ReneSola Limited Warranty does not cover "acts of God" such as lightning strikes, and since lightning strikes can occur any where, it is recommended to install surge protection as part of any solar installation. Installation of surge protection devices should follow vendor instructions.

Installation Procedure

Warning: Do Not Connect Replus-250/ Replus-250A/B To The Utility Grid Or Energize The Ac Circuit(S) Until You Have Completed All Of The Installation Procedures As Described In The Following Sections.

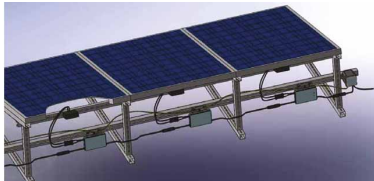
Installing the Replus-250/ Replus-250A/B micro inverter System involves several key steps:

1. Attaching the Replus-250/ Replus-250A/B micro inverter to the rack.
2. Connecting the Replus-250/ Replus-250A/B micro inverter wiring harnesses.
3. Measuring service and installing the AC branch circuit junction box.

Warning: Only Use Electrical System Components Approved For Wet Locations.

4. Grounding the system.
5. Completing the Replus-250/ Replus-250A/B micro inverter installation and connecting the PV modules.

The finished system should be similar as in the diagram. Detailed installation steps are listed in the following section.



Step 1 - Attach the Replus-250/ Replus-250A/B to the Rack

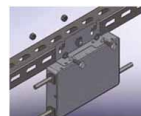
1. Mark the approximate centers of each PV module on the rack system. Evaluate the location of the micro inverter with respect to the PV module junction box or any other obstructions.

Warning: Allow A Minimum Of 0.75 Inches Between The Top Of The Roof And The Bottom Of The Replus-250/ Replus-250a/b. We Also Recommend That You Allow 0.5 Inches Between The Back Of The Pv Module And The Top Of Replus-250/ Replus-250a/b. Do Not Mount Replus-250/ Replus-250a/b In A Location That Allows Long-term Exposure To Direct Sunlight.

2. If using grounding washers to ground the micro inverter chassis to the PV module rack, choose a grounding washer that is approved for the rack manufacturer. Install a minimum of one grounding washer per micro inverter. Tear down barcode from inverter, paste the barcode into the "Connection map". Torque the micro inverter fasteners to the values listed below.

1/4" mounting hardware – 45 in-lbs minimum
5/16" mounting hardware – 80 in-lbs minimum

3. Mount one micro inverter at each of these locations using hardware recommended by your module rack vendor. Mounting slots on the micro inverter are 0.33 inches in diameter. Maximum bolt size is 5/16 inch. The two slots on the micro inverter are 4 inches apart



Step 2 - Connect the Replus-250/ Replus-250A/B Cable

Each Replus-250/ Replus-250A/B comes with one 3-pin bulkhead receptacle (or short pigtail) and one 57-inch AC wire harness with multi-pin connectors. (The DC input wires are approximately six inches long and are terminated with single pole connectors.) The AC connectors are oppositely sexed, so that multiple inverters can be connected to form one continuous AC branch circuit.

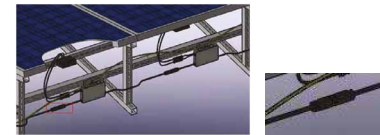
1. Orient the first Replus-250/ Replus-250A/B in each branch with its male connector facing the junction box. The junction box AC interconnect cable has a female connector. The Replus-250/ Replus-250A/B can be mounted with either side facing up to accommodate cable routing. Connect the first Replus-250/ Replus-250A/B to the AC interconnect cable.

2. Plug the AC connector of the first Replus-250/ Replus-250A/B into the connector of the next Replus-250/ Replus-250A/B, and so forth, to form a continuous AC circuit. Please check the Replus-250/ Replus-250A/B rating label for the maximum allowable number of Replus-250/ Replus-250A/B's on one AC circuit.

Warning: Do Not Exceed The Maximum Number Of Replus-250/ Replus-250a/b's In An Ac Branch Circuit, As Displayed On The Unit-rating Label. Each Replus-250/ Replus-250a/b Ac Branch Circuit Must Be Sourced From A Dedicated Branch Circuit Protected By A 15a Maximum Breaker.

3. Install a protective end cap on the open AC connector of the last Replus-250/ Replus-250A/B in the AC branch circuit.

Warning: Make Sure Protective End Caps Have Been Installed On All Unused Ac Connectors. Unused Ac Replus-250/ Replus-250A/B Wire Harness Connectors Are Live When The System Is Energized By The Utility System.



Step 3 - Install the AC Branch Circuit Junction Box

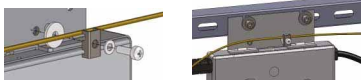
1. Measure service entrance conductors to confirm AC service at the site. Acceptable ranges are shown in the table below:

240 Volt AC Split Phases		208 Volt AC Three Phases		230 Volt AC Single Phase	
L1 to L2	211 to 264 Vac	L1 to L2	183 to 229 Vac	L1 to L2	200 to 270 Vac
L1, L2 to neutral	106 to 132 Vac	L1, L2 to neutral	106 to 132 Vac		

2. Mount the adapter plate at a suitable location on the PV rack system (typically at the end of a row of modules).
3. Install an appropriate junction box with the adapter plate.
4. Connect the open wire end of the AC interconnect cable into the junction box using an appropriate cable.

Step 4 – Ground the System

Each Replus-250/ Replus-250A/B comes with a ground clip that can accommodate a 6-8 AWG conductor. The rack and module could be grounded to this conductor using a crimp connection. An alternative method would be to connect the Replus-250/ Replus-250A/B to the grounded rack using a grounding washer approved for the rack.



Step 5 - Connect the PV Modules and Complete the connection map

Connect the PV Modules

Completely install all Replus-250/ Replus-250A/B and system inter-wiring connections prior to installing the PV modules.

1. Mount the PV modules above the corresponding Replus-250/ Replus-250A/B. Each Replus-250/Replus-250A/B comes with two oppositely sexed DC connectors.
2. First connect the positive DC wire from the PV module to the negatively marked DC connector (male pin) of the Replus-250/ Replus-250A/B. Then connect the negative DC wire from the PV module to the positively marked DC connector (female socket) of the Replus-250/ Replus-250A/B. Repeat for all remaining PV modules using one Replus-250/ Replus-250A/B for each module.



Complete Connection Map

The Replus-250/ Replus-250A/B Connection Map is a diagrammatic representation of the physical location of each Replus-250/ Replus-250A/B in your PV installation. The virtual array in the ReneSola micro inverter gateway, MRG, is created from the map you create.

Each Replus-250/ Replus-250A/B has a serial number, enter this serial number into the MRG according with barcode of “connection map”, so MRG can correspond with micro inverter and internet.

5. COMMISSIONING

- Warning:** Connect Replus-250/ Replus-250a/b To The Electrical Utility Grid Only After Receiving Prior Approval From The Utility Company.
- Warning:** Be Aware That Only Qualified Personnel Must Connect Replus-250/ Replus-250a/b To The Electrical Utility Grid.
- Warning:** Ensure That All Ac And Dc Wiring Is Correct. Ensure That None Of The Ac And Dc Wires Are Pinched Or Damaged. Ensure That All Junction Boxes Are Properly Capped And Not Exposed.

Following these steps to commission the Replus-250/ Replus-250A/B PV system:

1. Turn ON the AC disconnect or circuit breaker on each Replus-250/ Replus-250A/B AC branch circuit.
2. Turn ON the main utility-grid AC circuit breaker. Your system will start producing power after a few minutes wait time.
3. The Replus-250/ Replus-250A/B will start to send performance data over the power lines using power line communication (PLC) to the MRG. The time required for each Replus-250/ Replus-250A/B in the system to communicate to the MRG will vary with the number of Replus-250/ Replus-250A/B's in the system.

6. OPERATING INSTRUCTIONS

The Replus-250/ Replus-250A/B is powered on when sufficient DC voltage from the module is applied. The status LED will start flashing after sufficient DC power is applied as an indication that the Replus-250/ Replus-250A/B is live.

Status: standby

The LED light is on by 2 seconds, and off by 2 seconds.





Status: producing power

The LED light is on by 1 second, and off by 1 second.

Status: producing power and communicating with MRG

The LED light is on by 0.5 second, and off by 0.5 second.

7. TROUBLESHOOTING AND MAINTENANCE


-  **Warning:** Do Not Attempt To Repair The Replus-250/ Replus-250a/b; It Contains No User-service Able Parts. If Troubleshooting Methods Fail, Please Return The Replus-250/ Replus-250a/b To Your Distributor For Maintenance.
-  **Warning:** Never Disconnect The Dc Wire Connectors Under Load. Ensure That No Current Is Flowing Inthe Dc Wires Prior To Disconnecting. An Opaque Covering Maybe Used To Cover The Module Prior To Disconnecting The Module.
-  **Warning:** Always Disconnect Ac Power Before Disconnecting The Pv Module Wires From Replus-250/ Replus-250a/b. The Ac Connector Of The First Replus-250/ Replus-250a/b In A Branch Circuitis Suitable As A Disconnecting Means Once The Ac Branch Circuit Breaker In The Load Center Has Been Opened.
-  **Warning:** Replus-250/ Replus-250a/b Is Powered By Dc Power From The Pv Modules. Make Sure You Disconnect The Dc Connections And Reconnect Dc Power To Watch For The Six Short Led Blinks One Minute After Dc Is Applied.

LED indication of error

- **Error report: AC or DC fault**
The LED light is on by 4 seconds, and off by 4 seconds.
- **Error report: GFDI fault**
The LED light stays on.

Troubleshooting an Inoperable Replus-250/ Replus-250A/B

To troubleshoot an inoperable Replus-250/ Replus-250A/B, follow the steps in the order shown:

1. Check the connection to the utility grid. Verify that the utility voltage and frequency are within allowable ranges shown in the label of the Replus-250/ Replus-250A/B.
 2. Verify utility power is present at the inverter in question by removing AC, then DC power. Never disconnect the DC wires while the Replus-250/ Replus-250A/B is producing power. Re-connect the DC module connectors, and then watch for the LED blinks.
 3. Check the AC branch circuit interconnection harness between all the Replus-250/ Replus-250A/B's. Verify that each inverter is energized by the utility grid as described in the previous step.
 4. Make sure that any AC disconnects are functioning properly and are closed.
 5. Verify the PV module DC voltage is within the allowable range shown in the label of the Replus-250/ Replus-250A/B.
 6. Check the DC connections between the Replus-250/ Replus-250A/B and the PV module.
 7. If the problem persists, please contact ReneSola customer support.
-  **Warning:** Do Not Attempt To Repair The Replus-250/ Replus-250A/B; It Contains No User-serviceable Parts. If Troubleshooting Methods Fail, Pleasere Turn The Defective Replus-250/ Replus-250A/B To Your Distributor For Maintenance.

Disconnecting a Replus-250/ Replus-250A/B from the PV Module

To ensure the Replus-250/ Replus-250A/B is not disconnected from the PV modules under load, adhere to the following disconnection steps in the order shown:

1. Disconnect the AC by opening the branch circuit breaker.
2. Disconnect the first AC connector in the branch circuit.
3. Cover the module with an opaque cover.
4. Using a DC current probe, verify there is no current flowing in the DC wires between the PV module and the Replus-250/ Replus-250A/B.
5. Care should be taken when measuring DC currents, as most clamp-on meters must be zeroed first and tend to drift with time.
6. Disconnect the PV module DC wire connectors from the Replus-250/ Replus-250A/B.
7. Remove the Replus-250/ Replus-250A/B from the PV array rack.

Installing a replacement Replus-250/ Replus-250A/B

1. Attach the replacement Replus-250/ Replus-250A/B to the PV module rack using hardware recommended by your module rack vendor. If you are using grounding washers (e.g., WEEB) to ground the chassis of the Replus-250/ Replus-250A/B, the old grounding washer should be discarded and a new grounding washer must be used when installing the replacement Replus-250/ Replus-250A/B. Torque the Replus-250/ Replus-250A/B fasteners to the values listed below:
 - 1/4" mounting hardware – 45 in-lbs minimum.
 - 5/16" mounting hardware – 80 in-lbs minimum.
2. If you are using a grounding electrode conductor to ground the Replus-250/ Replus-250A/B chassis, attach the grounding electrode conductor to the Replus-250/ Replus-250A/B ground clamp.
3. Connect the AC cable of the replacement Replus-250/ Replus-250A/B and the neighboring Replus-250/ Replus-250A/B to complete the branch circuit connections.
4. Complete the connection map and connect the PV Modules
 - 1) Complete the connection map.
 - 2) Each Replus-250/ Replus-250A/B has a removable serial number label located on the mounting plate. Enter this serial number into the MRG, and correspond it to a number in the connection map.
 - 3) Connect the PV Modules.
 - 4) Completely install all Replus-250/ Replus-250A/B and all system inter-wiring connections prior to installing the PV modules.
 - a) Mount the PV modules above their corresponding Replus-250/ Replus-250A/B. Each Replus-250/ Replus-250A/B comes with one male and one female DC connector.
 - b) First connect the positive DC wire from the PV module to the negatively marked DC connector (male pin) of the R Replus-250/ Replus-250A/B. Then connect the negative DC wire from the PV module to the positively marked DC connector (female socket) of the Replus-250/ Replus-250A/B.

Repeat for all remaining PV modules using one Replus-250/ Replus-250A/B for each module.

8. SPECIFICATIONS

Technical Specifications				
	Model	Replus-250A	Replus-250B	Replus-250
Input (DC)	Max. PV-Generator Power (Wp)	270		
	Max. DC Voltage (V)	55		
	Maximum input short circuit current (A)	14		
	MPPT efficiency	>99.5%		
	MPPT DC Voltage Range(V)	22 ~ 45		
	Max. Units per Branch Circuit	15		
Output (AC)	Nominal AC Power (W)	225		
	Nominal AC Voltage (V)	240	208	230
	Nominal AC Voltage Range (V)	211 ~ 264	186 ~ 228	200 ~ 270 *
	AC Power Frequency / Range (Hz)	59.3 ~ 60.5	59.3 ~ 60.5	45.5 ~ 54.5 *
	THD (at Nominal Output)	<4%		
	Power Factor (cosφ)	>0.95		
Efficiency	Peak Efficiency	96.3%		
	CEC Efficiency	95.0%		
	Power Consumption at Night (W)	<0.17		
Protection	Over/ Under Voltage Protection	Yes		
	Over/Under Frequency Protection	Yes		
	Anti-Islanding Protection	Yes		
	Over Current Protection	Yes		
	Reverse DC Polarity Protection	Yes		
	Overload Protection	Yes		
General Data	Degree of protection	NEMA6 / IP66		
	Environment Temperature	-40°C ~ +65°C		
	Relative Humidity	0 ~ 95%		
	Display	LED Light		
	Communication way	PLC (Power Line Communication)		
	Dimensions (WxHxD)	230*138*35 mm / 9.06*5.44*1.38 inch		
	Weight	2.0 kg / 4.4 lbs		
Warranty	25 years limited warranty			

* Detailed parameter please see local grid standard, inverter can match local grid standard automatically.

9. WARRANTY

Warranty terms of Micro Replus™ Grid-Tied Microinverter

Warranty Conditions

Warranty Period: 25-year limited warranty period.

Warranty Time Start: From the date of bill of lading.

Warranty Evidence:The bill of lading date, product(s) serial number(s), and product(s) model number(s), and a completed warranty card.

Scope: Any damages occurring within the WARRANTY PERIOD will be evaluated by ReneSola authorized service partners and qualified ReneSola employees, who will define the scope and responsibility taking into account.

Terms of the Product Warranty:

This warranty is provided in an effort to improve service and peace-of-mind to end users of ReneSola microinverters. All ReneSola authorized Dealers and Distributors are required to complete a ReneSola Warranty Card in the event of a claim, at which point ReneSola will either (a) replace or repair any products or parts of the product during the Warranty Period or (b) the original cost of the Micro Replus inverter, proven defective in design or manufacturing, will be refunded. ReneSola will not be obligated to fulfill on a warranty claim, if all or any of the following is true:

- 1) "Warranty Card" is not returned to Distributor/Dealer or ReneSola;
- 2) Product is modified, the design is changed or parts are replaced by an unauthorized party not pre-approved by ReneSola to specifically do so;
- 3) Modifications, changes, or attempted repairs are made or serial numbers/seals/certification marks are erased by an unauthorized technician not pre-approved by ReneSola to specifically do so;
- 4) Incorrect installation or commissioning;
- 5) Failure to observe the applicable safety regulations (VDE standards, etc.);
- 6) The Product has been improperly stored or was damaged while in possession of the Dealer or end user;
- 7) A claim to cover transportation damage or scratches caused by shipping company must be filed with insurance company when containers are unload and enough evidence is gathered to support the claim;
- 8) Failure to observe and follow guidelines in the user manual, installation guide, and maintenance regulations;
- 9) Incorrect use or inappropriate operation;
- 10) Insufficient ventilation of the device;
- 11) Sub-standard maintenance and service procedures;
- 12) Force majeure (e.g., lightning, overvoltage, storm, fire).
- 13) The product is used as the component of a product expressly warranted by another manufacturer;

14) The product's original identification (trademark, serial number(s), etc) markings have been defaced, altered, or removed;

15) The product was installed outside of the country;

16) Any consequential losses that are attributable to the product losing power whether by product malfunction, installation error, or misuse.

Claims that go beyond the rights cited in the terms of the Product Warranty, in particular claims for compensation for direct or indirect damages arising from the defective device, for compensation for costs arising from disassembly, labor, and installation, or loss of profits, are not covered by ReneSola's warranty. ReneSola is not subject to statutory liability. The Limited Warranty does not cover costs associated the removal, installation, or troubleshooting of the customer's electrical systems. The Limited Warranty value shall not exceed the original cost of the original purchase price of current product price, whichever is lower.

ReneSola will make every effort to remedy defects in a timely fashion and without unnecessary bureaucracy. Please contact our technical department directly for support. Each inverter failure shall be reviewed in ReneSola's testing lab or by an authorized ReneSola service partner, prior to issuing a service reimbursement to the customer. If an inverter has been modified, reimbursement shall be decided upon at the sole discretion of a ReneSola customer service representative.

Warranty Claim Procedure:

Please report defective devices with a brief error description to our service hotline for initial problem identification and return the warranty card to our service department by fax/email for warranty claim. If your claim is approved, ReneSola will generally send an equivalent replacement device, packaged appropriately for transport, within 7 working days. The defective device is to be packed in the original packaging materials for return transport to the closest office of ReneSola or original installer of your PV system within 30 days of the claim approval date.

• If in-field troubleshooting does not solve the problem the claim requests must include the following information:

Defective Product(s) proof-of-purchase in the form of (1) the dated purchase receipt from the original purchase of the product at point of sale to the end user, or (2) the dated dealer invoice or purchase receipt showing original equipment manufacturer status, or (3) the dated invoice or purchase receipt showing the product exchanged under warranty, using Warranty Card, which includes, but is not limited to, the following information:

Model number of the Defective Product.

Serial number of the Defective Product.

Detailed description of the defect.

Shipping address for return of the repaired or replacement product (as applicable).

• All Defective Product authorized for return must be returned in the original shipping container or other packaging that is equally and sufficiently protects the product.

• The returned defective product must not have been disassembled or modified without the prior written authorization of Micro Replus. If ReneSola discovers the products claimed defective have been disassembled or modified without prior ad explicit authorized permission from ReneSola, this warranty shall be null and void.

10. CONTACT US

AUSTRALIA

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E: europe@renesola.com

APMEA & China

Add: F-15, Manpo Intl. Plaza, No. 500 West Yan'an Rd, Shanghai, China 200050

T: +86 21 6280 9180

F: + 86 21 6280 5600

E: apmea@renesola.com

11. APPENDIX

11.1 Warranty Card

Customer Information

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Tel.: _____ Fax: _____ E-mail: _____

System Information

Fault Product(s) Serial Numbers: _____

System Commissioning Date: _____ Product Models: _____

No. of Products Used: _____ Bill of Lading Date: _____

Fault Product(s) Quantities: _____ Fault Time/Date: _____

Fault Message(s) or Code(s): _____

Brief Fault Description and Photos: _____

Installation Information

Modules Used: _____

Modules Quantity: _____ Inverters quantity per string: _____

Installation Company Name: _____

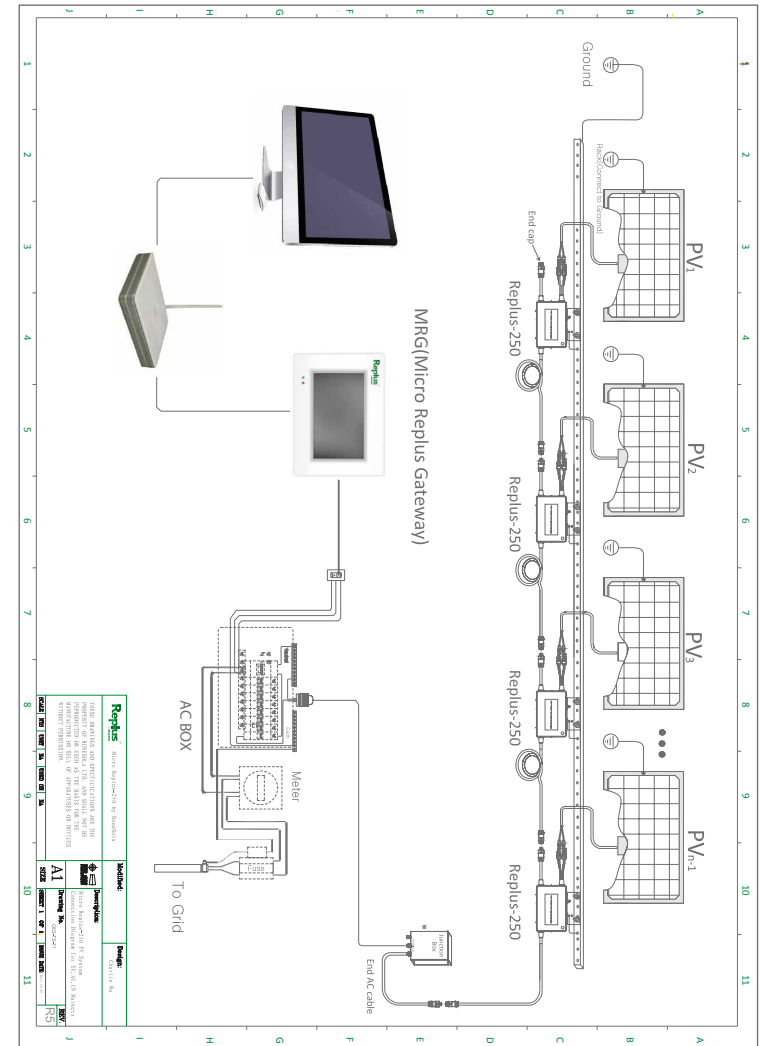
Installer Name: _____

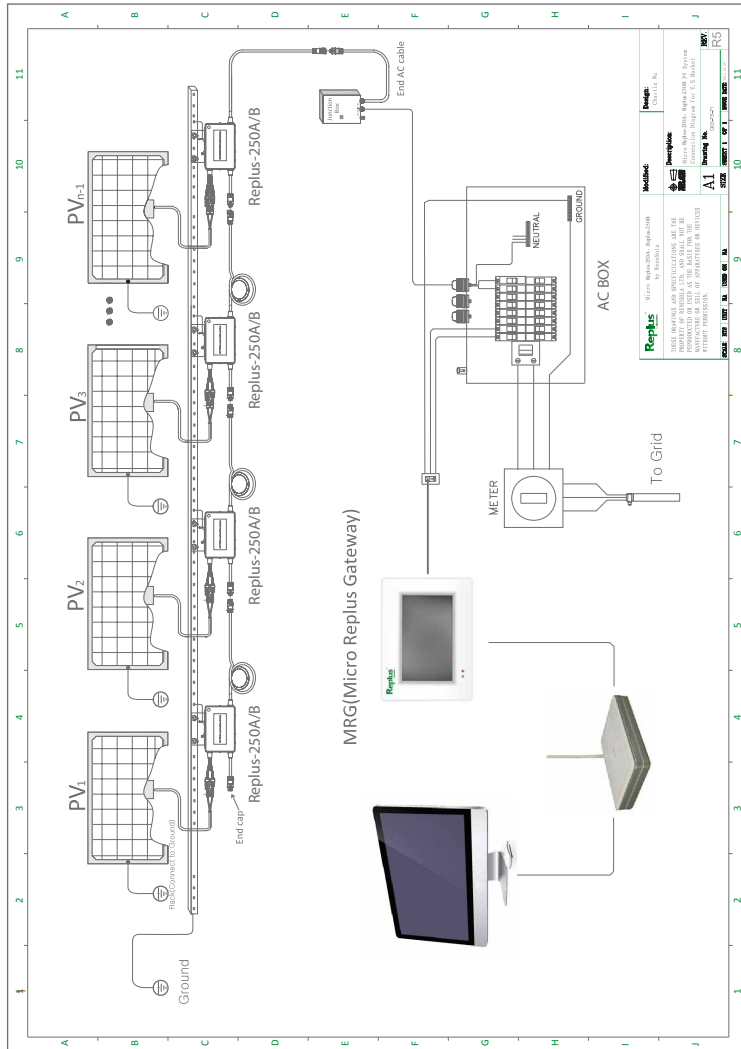
For the information on our warranty terms and conditions, please see our website: www.renesola.com. All fields must be completed in order to process claim.

Customer Signature: _____ Date: _____

11.2 Examples of connection diagram

For EU, AU, CN





11.3 Connection Map:

Micro Replus Connection Map

Micro **Replus** by Enphase Version 1.0

Panel type and quantity: Azimuth: Tilt:		Customer information		Installer information		NESW	
	1	2		3		4	
A							
B							
C							
D							
E							
F							
G							
H							
I							
J							
K							
L							
M							
N							
O							
Installer signature:		Date:		Customer signature:		Date:	