APsystems

Installation / User Manual

APsystems OPT700-RS Rapid Shutdown Device

Rev 1.3

ALTENERGY POWER SYSTEM Inc.
www.APsystems.com

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Important Safety Instructions

This manual contains important instructions to be followed during installation and maintenance of the OPT700-RS. To reduce the risk of electrical shock and ensure the safe installation and operation of the OPT700-RS, 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 www.APsystems.com

⚠ **WARNING**

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

🔔 **NOTICE**

This symbol indicates information that is important for OPT700-RS operation. Follow these instructions closely.

Safety Instructions

✓ **Do NOT** disconnect the PV module from the OPT700-RS without first disconnecting the AC power.

✓ Only qualified professionals should install and/or replace the APsystems OPT700-RS.

✓ Perform all electrical installations in accordance with local codes.

✓ Before installing or using the OPT700-RS, please read all instructions and cautionary markings in the technical documents and on the APsystems microinverter system and the solar array.

✓ Be aware that the body of the running OPT700-RS is the heat sink and can reach high temperatures. To reduce risk of burns, do not touch the body of the OPT700-RS.

✓ **Do NOT** attempt to repair the OPT700-RS. If it fails, contact APsystems Customer Support to obtain an RMA number and start the replacement process. Damaging or opening the OPT700-RS will void the warranty.

✓ **Connect the PV module to the OPT700-RS INPUT1 interface when the OPT700-RS connects with one solar module. Also, use the DC extension cable to make the INPUT2 short-circuited, otherwise the OPT700-RS maybe destroyed.**

Radio interference statement

The equipment could radiate radio frequency energy and this might cause harmful interference to radio communications if not following the instructions when installing and using the equipment. But there is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, the following measures might resolve the issues:

A)   Relocate the receiving antenna and keep it well away from the equipment.

B)   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.

Important Safety Instructions

Symbols replace words on the equipment, on a display, or in manuals

APsystems ALTENERGY POWER	Trademark
	Caution, risk of electric shock
	Equipment protected throughout by double insulation or reinforced insulation
	Refer to the operating instructions
	Caution, hot surface.

APsystems OPT700-RS System Introduction

OPT700-RS with the function of monitoring and rapid shutdown,can gather the detailed working parameters of each PV module, transfer all the information to ECU-R-RS by wireless communication, and send this information to the users' terminal devices by the internet. Meanwhile, OPT700-RS will work continuously when there's heart-beat signal from ECUR-RS. When in an emergency, by switching off the AC break to stop the ECU-R-RS, OTP700-RS can be rapidly shut down, and eliminate the high voltage on DC cable.

The APsystems OPT700-RS system is comprised of four key elements:

- Rapid Shutdown Device (OPT700-RS)
- Inverter
- APsystems Energy Communication Unit (ECU-R-RS)
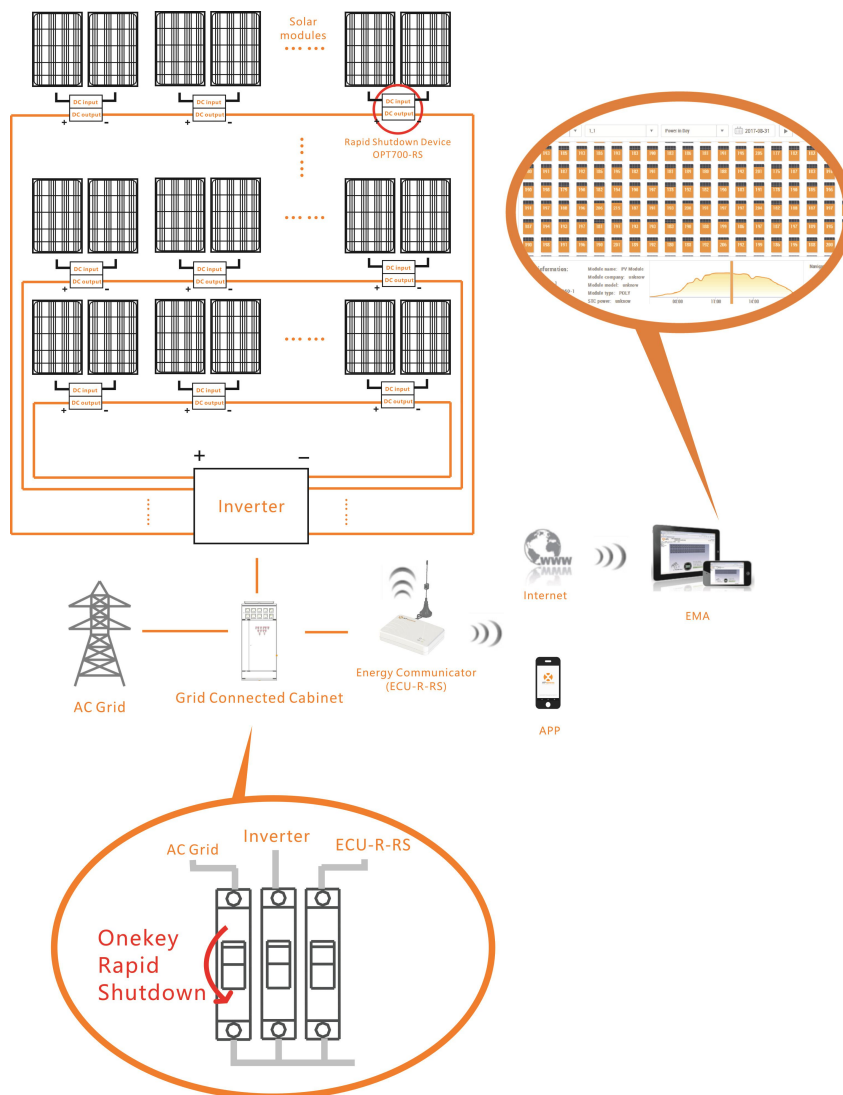- APsystems Energy Monitor and Analysis (EMA) web-based monitoring and analysis system

Figure 1

APsystems OPT700-RS System Introduction

The integrated system realizes the rapid shutdown and improves the security.

The OPT700-RS system is reliable, safe and simple to install

APsystems OPT700-RSs are installed to work with a string / central inverter. They are designed to operate at full power at ambient outdoor temperatures of up to 149°F (65°C). The inverter case is designed for outdoor installation and complies with the IP68/NEMA 6P environmental enclosure rating.Each rapid shutdown device can be easily installed on the racking.

Smart system performance monitoring and analysis

The performance trends and data of OPT700-RS can be monitored and analyzed with the APsystems Energy Communication Unit (ECU-R-RS) and APsystems Energy Monitor and analysis (EMA). The EMA software informs you of abnormal events and shuts down the systems rapidly if needed.

OPT700-RS with the function of rapid shutdown

Rapid shutdown device is built in with RSD function, which meets the NEC690.12 standard. When in an emergency , Energy Communication Unit (ECU-R-RS) stops sending signals and the OPT700-RS shuts down the power output and eliminate the high voltage on DC bus by switching off the AC breaker in the cabinet. The system will be much safer.

APsystems OPT700-RS System Installation

A PV system using OPT700-RSs is simple to install. Each OPT700-RS easily mounts on the PV racking directly beneath the PV module(s).

Installation MUST comply with local regulations and technical rules.

⚠ **WARNING**

① Perform all electrical installations in accordance with local codes.

② Be aware that only qualified professionals should install and/or replace the OPT700-RS.

③ Before installing or using an OPT700-RS, please read all instructions and warnings in the technical documents and on the inverter system itself as well as on the PV array.

④ Be aware that installation of this equipment includes the risk of electric shock.

⑤ Do not touch any live parts in the system, including the PV array, when the system has been connected to the electrical grid.

⑥ Ensure the solar module and inverter has been disconnected before installing an OPT700-RS.

Additional installation components from APsystems

- DC extension cable (sold separately)

Required parts and tools to complete the installation

In addition to your PV array and its associated hardware, you will need the following items:
- Rapid shutdown device installation kit (screw, nut)
- A torque wrench and a Phillips screwdriver
- A multimeter

⚠ **WARNING**

① Be sure to verify the voltage and current specifications of your PV module match with those of the OPT700-RS.

② You must match the DC operating voltage range of the PV module with the allowable inpust voltage range of the OPT700-RS.

③ The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the APsystem OPT700-RS.

Installation Procedures

Step 1 - Attaching the OPT700-RS to the Racking

M8

Figure 2

Step 2 - Connecting the OPT700-RS to the PV Module

Figure 3

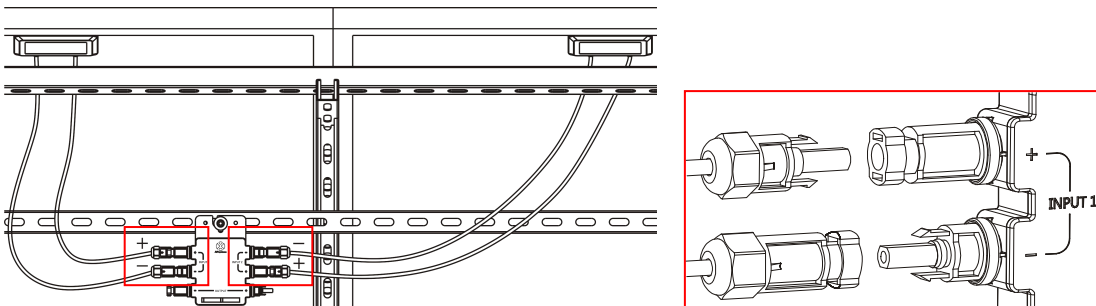## Step 3 - Connecting the OPT700-RS DC output Cables

Figure 4

Step 4 - Completing the APsystems Installation Map

Fill in the APsystems registration cards, which provide system information and the installation map. Feel free to provide your own layout if a larger or more intricate installation map is required. The layout map provided is designed to accomodate labels in vertical or horizontal orientation to meet all the field PV connections.

    a. Each OPT700-RS has removable serial number labels.Peel the labels off, affix one to the respective location on the APsystems installation map, then affix another label to the PV module frame so that it can be easily seen. The warranty cards can be found in the appendix of this manual or at the APsystems website, www.APsystems.com

    b. Fill in the warranty cards and email to APsystems at emasupport@altenergy-power.com

    c. APsystems will create the EMA account and email you the account information. Then you can use the EMA website to view detailed performance of your PV system. You can learn more information on energy monitoring and analysis system from APsystems websitewww.APsystems.com
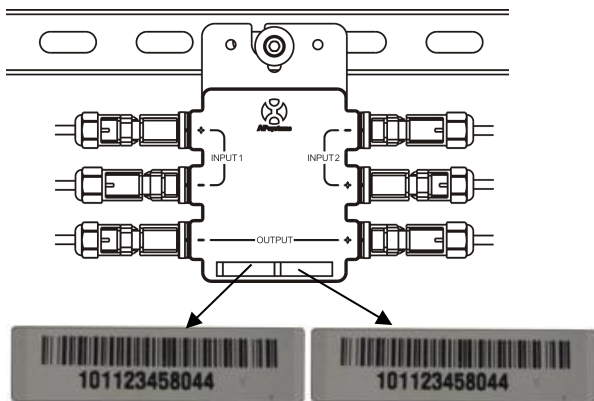
Figure 5

Step 5 - Connecting the OPT700-RS to inverter

Once verification is correct, connect the OPT700-RS to the inverter. Pay attention to polarity.

Step 6 - Install ECU-R-RS

Power on ECU-R-RS with the DC adapter.
1.ECU-R-RS installed on the wall
The antenna wire of ECU-R-RS is connected to the antenna port of ECU-R-RS.Plug the power adapter into the DC input on the ECU-R-RS,and then plug the other end into a outlet.
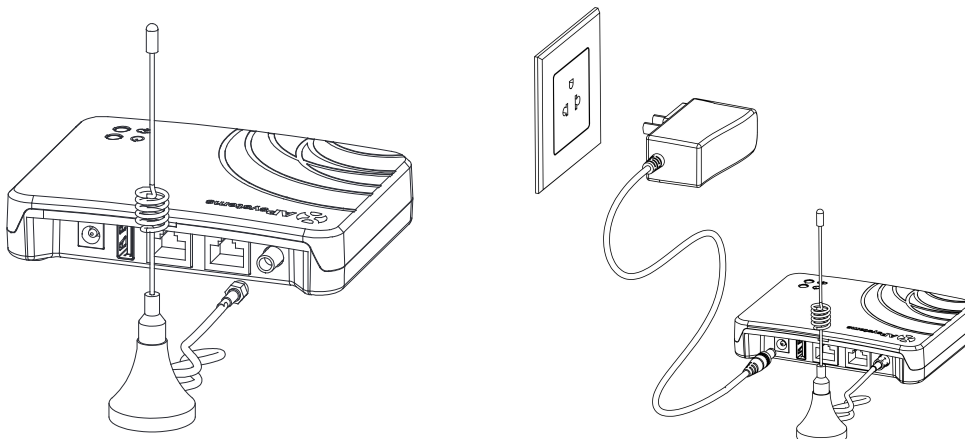
Figure 6

2.ECU-R-RS installed in the distribution box
- Install the guide socket on the guide rail of the distribution box (the guide socket is not provided by APsystems,please prepare by yourself).
- Connect the power adapter to the power connection port at the top of the ECU-R-RS.
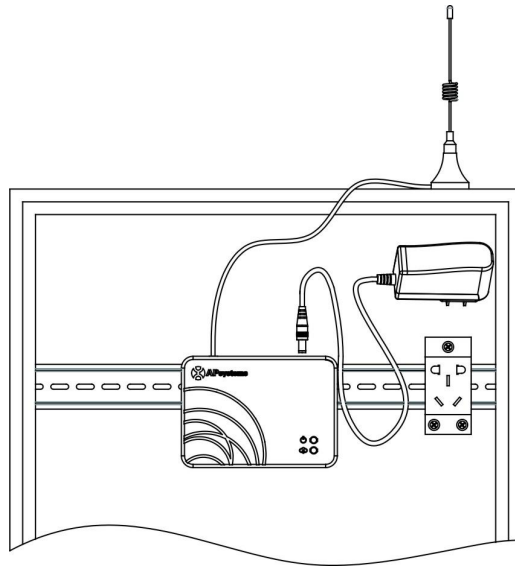
Figure 7

Step 7 - Registered the OPT700-RS

Connecting the OPT700-RS to the inverter
Install 'ECUAPP' on your mobile or ipad. Connect the ECU-R-RS WIFI   hotsopt ,which is 'ECU-R-XXXXXXXXXXXX(ID NO.)' .Check the corresponding ECU ID matched in the homepage. Manually add OPT700-RS UID to the ID management page. Monitor and manage OPT700-RS by using ECU APP.The registration process is refer to 《APsystems Energy Communication Unit ECU-R-RS user manual》.
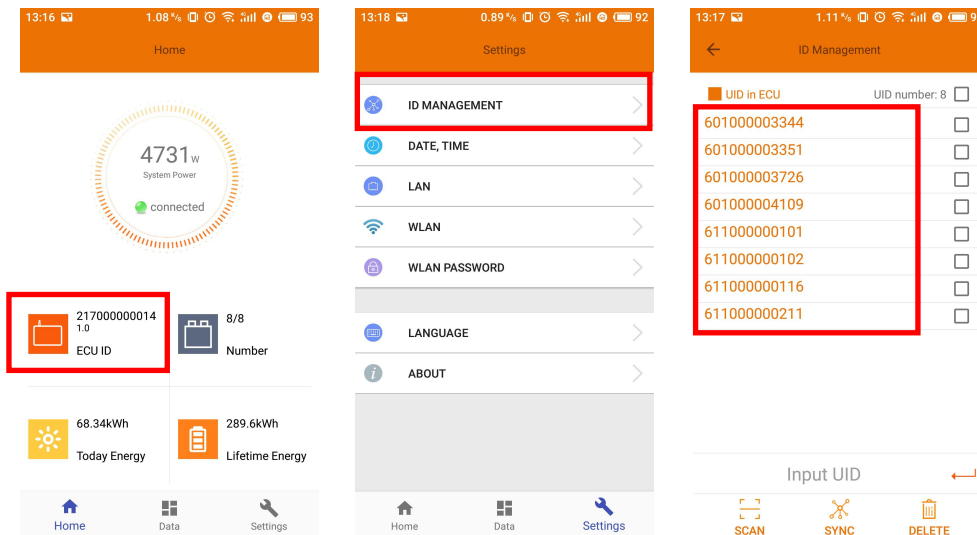
Figure 8

Installation Procedures

Step 8 - System Detection

After registering, you can check the system state by ECU APP. If the colour of module turns green, which means the communication is good. But if it is gray,which means failure.
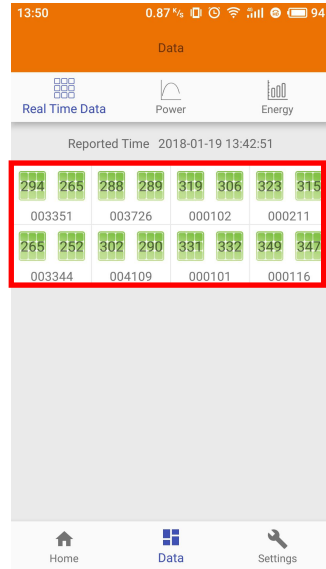
Figure 9

Rapid Shutdown Function Introduction

The adjustment steps of the RSD function.

1.Install the OPT700-RS in the system.

2.Install the ECU-R-RS in the distribution box and input the OPT700-RS UID.

3.After the OPT700-RS being registered and communicated, please check via APP to see if the system works properly.

4.When in an emergency , Energy Communication Unit (ECU-R-RS) stops sending signals and the OPT700-RS shuts down the power output and eliminate the high voltage on DC bus by switching off the AC breaker in the cabinet.

5.Power on the AC breaker and recover the system.

Replace a OPT700-RS

Follow the procedure to replace a OPT700-RS:

A. In the order shown below:
   1. Switch off the supply of ECU-R-RS.
   2. Disconnect the AC by turning off the inverter switch.
   3. Disconnect the DC by turning off the inverter switch.
   4. Wait for at least 5 minutes after switching off the power and then   disconnect the PV module with the OPT700-RS.
   5. Remove the OPT700-RS from the PV array racking.

B. Install a replacement OPT700-RS to the rack .

C. Power on the ECU-R-RS . Re-input the new UID of OPT700-RS and wait it communication and power output.

D. Turn on the DC side switch and then turn on the AC side switch and recover the system.

🔔 NOTICE

The layout on APsystems Energy Monitor and Analysis (EMA) will be changed after the replacement of one or more OPT700-RS. Please login the EMA and reset the system.

APsystems Rapid Shutdown Device OPT700-RS Technical Data

Model	OPT700-RS
Input Data (DC)	
Maximum Input Voltage	50V Per Channel
Maximum Input Curren (Continuous)	12A Per Channel
Maximum Input Power	450W Per Channel
Output Data (DC)	
Maximum Output Voltage	100V
Maximum Output Current	12A
Maximum System Voltage	1500V
Mechanical Data	
Operating Ambient Temperature Range	-40 °C to +70 °C (-40 °F to +158 °F)
Dimensions (without cable&connectors)	191mm x 160mm x 26.6mm
Weight	0.25kg/0.55lbs
Enclosure Rating	IP68 / NEMA 6P
Features & Compliance	
Communication	Wireless
Rapid Shutdown UL Listed	NEC 2017 690.12

Specifications subject to change without notice
please ensure you are using the most recent update found at www.APsystems.com

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System Installation Layout Diagram

The APsystems Installation Map is a diagram of the physical location of each OPT700-RS in your PV installation. Each OPT700-RS has a removable serial number label located on the mounting plate. Peel the label and affix it to the respective location on the APsystems installation map.

Installation Map Template

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

To register your OPT700-RS, please mail this warranty registration card to: emasupport@altenergy-power.com