



# RYAZAN METAL CERAMICS INSTRUMENTATION PLANT, JSC

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№ 15 100 21437



## SOLAR MODULES

### TYPE RZMP-220-T

## MANUAL



### MODELS

RZMP-240-TRZMP-235-TRZMP-230-T, RZMP-225-T, RZMP-220-T,

RZMP-215-T, RZMP-210-T, RZMP-205-T, RZMP-200-T

This manual applies to solar modules type **RZMP-220-T**. Please, read the manual completely before installation or use of modules. All instructions should be read and understood before attempting to install, wire, operate, and maintain the solar module. Compliance with operating instructions provides proper performance of modules during their operation life.



**WARNING ELECTRICAL HAZARD**

**This photovoltaic module produces electricity when exposed to light. Follow all applicable electrical safety precautions.** The installation of solar modules requires a great degree of skill and should only be performed by qualified licensed professionals. **Do not damage or scratch the rear surface of the module. Do not handle modules when they are wet.**

**1. APPLICATION**

Solar modules are designed for working in grid connected PV-systems with system voltage up to 1000V not using rechargeable batteries. In case rechargeable batteries are used in PV-systems, operating voltage of a module and charge voltage of batteries should be matched.

**2. TECHNICAL SPECIFICATIONS**

General technical specifications for delivery, operating and storage of modules are indicated in Table1.

Table 1

Specifications	Model RZMP-xxx-T
	Nominal
Peak Power (max.) $P_{mp}$ , (STC) W $\pm 3\%$	xxx
Rated voltage, $V_{MP}$ , (STC) V	0.29
Rated current, $I_{mp}$ , (STC) Amps	0.08
Open circuit voltage, $V_{OC}$ , (STC) V	0.37
Short Circuit Current, $I_{SC}$ , (STC) Amps	0.09
System voltage, V	1000
NOCT, C°	46.8
Area full, m <sup>2</sup>	1.60
Weight	215 kg
Front cover	Albarino S glass 4mm (Saint Gobain)
Back cover	Icosolar 3554 0.35 mm white/white
Encapsulant	EVAElimec or Photocap STRE
Edge sealant	V9000 tape
Frame	Colored structural aluminum
Junction box	Solarlock 1-1740657-0 TYCO
Cells per module	60inseries
Cells Type	Multi crystalline silicon 156mmx156mm
Hail resistance	Ice balls 25 mm in diameter with 23 m/s velocity
Module temperature	From -40C° to +85C°

View, sizes and part sizes are in figure 1.

Solar modules can be used in single-module and multiple-module systems to meet the current or voltage requirements. A photovoltaic module can produce more than its rated current and/or voltage because the conditions of normal use can differ from Standard Test Conditions (STC) at which modules are rated. Accordingly, when determining capacity requirements for components in the photovoltaic output circuit – such as fuse rating, component voltage rating, and control capacity – multiply the nameplate  $I_{sc}$  and  $V_{oc}$  values by a factor of 1.25.

**3. GENERAL INFORMATION**

Solar modules consist of 60multisilicon solar cells connected in series.

There are three bypass diodes in junction boxes of each solar module that allow module operation after darkening. Modules can produce higher output than indicated in the specifications. Industry standard ratings are made at conditions of 1000 W/m<sup>2</sup> and 25°C cell temperature.

Reflection from snow or water can increase sunlight and therefore boost current and power. In addition lower temperatures can substantially increase voltage and power.

For providing proper voltage (current), solar modules can be connected in series or in parallel.

While calculating electrical performance of system components, the values of component electric parameters should be chosen with additional 25%.

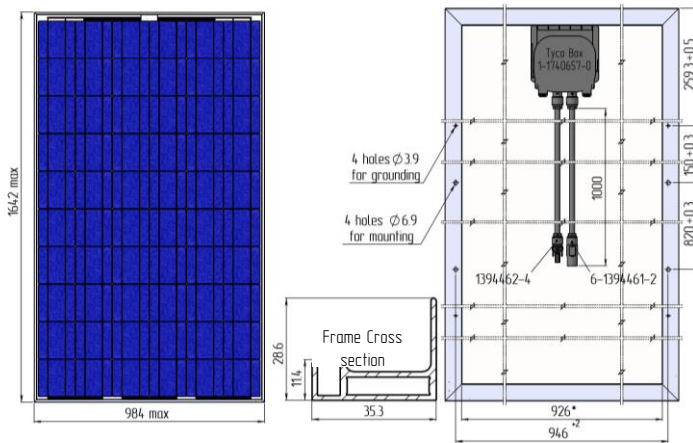


Figure 1. View, sizes and part sizes

#### 4. WARNINGS AND PRECAUTIONS

Solar modules convert energy of solar radiation into direct current (DC). Modules generate DC when exposed to sunlight or other sources of light. Even though single modules produce low voltage and current, shocks and burns can still result from contact with module output wiring. These hazards are increased when multiple modules are connected together to provide higher system voltage or current levels.

Since modules produce electricity whenever light is present, the module front surfaces should be completely covered by an opaque cloth or other material before electrical connections to the modules or other system components are handled.

Do not bend the module.

Do not attempt to disassemble the module.

Do not concentrate light on the module attempting to increase its power output.

When working with modules, use properly insulated tools and wear rubber gloves.

All module frames should be grounded for safety. Observe all local electric codes and regulations. The module frame is supplied with 4 grounding holes with self-tapping screws. Consider using a ground clips for outdoor use (SolClipGround Clip TYCO or similar).

#### 5. INSTALLATION

Modules may be mounted at any angle from a vertical orientation to a horizontal one. The appropriate fixed tilt angle and azimuth orientation should be used in order to maximize the exposure to sunlight.

Recommended tilt angles (Table below) for fixed systems – based on winter performance.

Modules should be bolted to support structures through mounting holes located in the frame's back flanges only. Four stainless steel bolts (M6) with nuts washers and lock washers are recommended for module mounting. Making of additional holes for mounting is not recommended and will invalidate the warranty.

The modules are designed for a maximum allowable design pressure of 240 kilograms per square meter. Actual maximum allowable wind speed depends on module type, mounting configuration, location and other factors.

A gap of 50 mm or more behind the modules is recommended to permit air circulation and cooler module operation. Elevated temperatures may lower operating voltage and shorten module lifetime. Gap of 0.5 or more centimeters between modules is required to allow the thermal expansion of the frames.

A solar module can produce more than its rated current and/or voltage because the conditions of normal use can differ from Standard Test Conditions (STC), at which modules are rated. Accordingly, when determining capacity requirements for components in the photovoltaic output circuit – such as fuse rating, component voltage rating, and

control capacity – multiply the nameplate  $I_{sc}$  and  $V_{oc}$  values by a factor of 1.25.

Site latitude in degrees	Fixed tilt angle from horizon
0°...15°	15°
15°...25°	Same as latitude
25°...30°	Latitude +5°
30°...35°	Latitude +10°
35°...40°	Latitude +15°
40°+	Latitude +20°

## 6. STORAGE AND TRANSPORTATION

Solar modules are packed into wooden crates by 4 pieces or on the standard pallet 1000x1200mm by 30 pieces. Solar modules in the manufacturing package can be transported by aircraft, railway, sea and motor transport.

The package with solar modules must be fastened to avoid damage.

## 7. PREVENTIVE MAINTENANCE

Inspect the module twice a year for overall integrity. Make certain that connections to the load and/or battery are tight and free of corrosion. **Loose connections will cause module or array damage.**

Dirt accumulation on the module's front surface can reduce the light energy collected by the module, decreasing its power output. In case of dirtying of a solar module's surface, it should be cleaned with a soft wet napkin. It is possible to use special cleaners for glass. Notice that the napkin should be clean and has no grains of sand or other solid objects that can scratch glass surface of the module.

Modules that are mounted flat should be cleaned more often, as they will not "self clean" as effectively as modules mounted at a 15° tilt or greater.

Even though the module is rugged, handle it with care. A stroke of the front or rear surface can damage the module.

## 8. ACCEPTANCE

Solar module RZMP-220-T model **RZMP-xxx-T** s/n **RZMP-xxx-T-xxxxxxxxxx** meets IEC61215:2005, IEC61730-2:2004 and technical specifications requirements stated in the manual and is considered suitable for operating.

Manufacturing date xx.xx.xxxx

Quality passed stamp \_\_\_\_\_

Manufacturer address: Novaya St., 51 "V", Ryazan, 390027, Russia

 "Ryazan Metal Ceramics Instrumentation Plant, JSC"

## 9. LIMITED WARRANTY

RMCIP warrants the solar modules to be free from defects in material and workmanship under proper installation, application and use for 60 months from the date of delivery from RMCIP.

If the PV modules fail to conform to this warranty, then for a period ending sixty (60) months from date of delivery from RMCIP, RMCIP will, at its option, either repair or replace the product, or if it is not possible to repair or replace the product, refund the purchase price.

Operation time is 10 years with power output not less than 90% of the minimum peak power at STC (nominal-3%).

Operation time is 25 years with power output not less than 80% of the minimum peak power at STC (nominal-3%).

## 10. TRADING ORGANIZATION

Company name: \_\_\_\_\_

Address: \_\_\_\_\_

Date of sale: «\_\_» \_\_\_\_\_ 20\_\_

## 11. INSTALLATION

Company name: \_\_\_\_\_

Address: \_\_\_\_\_

Date: «\_\_» \_\_\_\_\_ 20\_\_