

SIGNUX RPG01

Weather and radiation — RS485 · 4-20 mA · Voltage



SX-RPG01



DESCRIPTION

Photosynthetically active radiation sensor for the 400 to 700 nm band, with an RS485 Modbus RTU or analogue output.

It works on the photoelectric principle: in light it produces a voltage signal proportional to the intensity of the incident radiation, and its sensitivity is proportional to the cosine of the angle of incidence. The cosine corrector keeps the standard cosine response.

The dust cover is treated so that dirt does not cling to it and so that environmental factors do not reach the components inside. It is used in meteorology, agriculture and air-pollution research.

FEATURES

- 0 to 2500 $\mu\text{mol}/\text{m}^2\cdot\text{s}$: Resolution of 1 $\mu\text{mol}/\text{m}^2\cdot\text{s}$ and accuracy of $\pm 2\%$.
- Linearity $\leq \pm 1\%$: And an annual stability of $\leq \pm 2\%$.
- 7 to 30 V DC, 0.06 W: Wide-range supply and very low consumption.
- Aluminium, IP67: Bubble level with adjustment handwheel, and -30 to $+75\text{ }^\circ\text{C}$ in service.

AT A GLANCE

Measures	PAR radiation
Output	RS485 · 4-20 mA · Voltage
Protection	IP67
Operating	-30 to $+75\text{ }^\circ\text{C}$

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1 Introduction

The RPG01 measures photosynthetically active radiation, the 400 to 700 nm band. It works on the photoelectric principle: in light it produces a voltage signal proportional to the intensity of the incident radiation, and its sensitivity is proportional to the cosine of the angle of incidence.

The dust cover is specially treated to reduce dust adsorption and to keep environmental factors from interfering with the components inside.

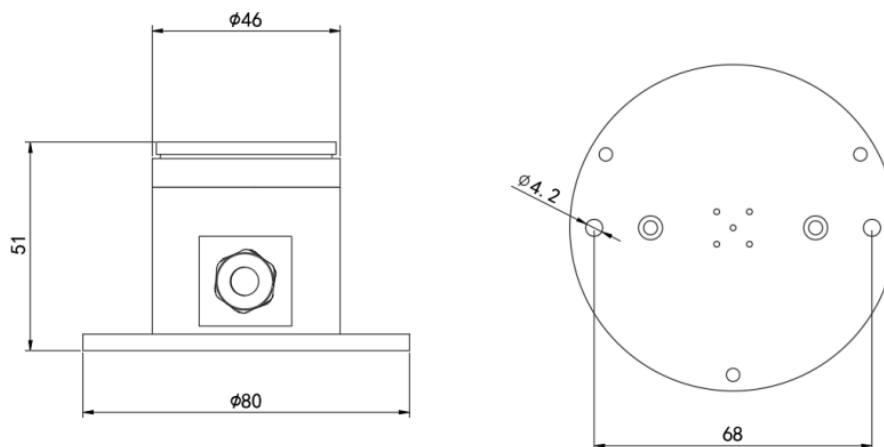
- Response spectral range from 400 to 700 nm.
- All-aluminium housing, rated IP67.
- Built-in bubble level and adjustment handwheel, to set it flat on site.
- High-quality cosine corrector, which ensures the standard cosine response.
- Wide-range supply, from 7 to 30 V DC.

It delivers the reading over a 4-20 mA, 0-5 V or 0-10 V analogue output, or over RS485 with the Modbus RTU protocol. It is used in meteorology, agriculture and air-pollution research.

2 Installation

Before installing, check that everything is there: the unit with its black waterproof connector.

- Pass the screws through the mounting holes on the sensor and fix it to the bracket.
- Leave it parallel to the ground: turn the handwheel and watch the bubble in the level to check it.
- Once it is installed, take off the protective cover.



Dimensions in millimetres

3 Connection

The unit comes out with four wires:

WIRE	WHAT IT IS
Brown	Positive supply, 7 to 30 V DC
Black	Negative supply
Green	485-A
Blue	485-B

On the analogue version those same two wires are the signal: the blue one positive and the green one negative.

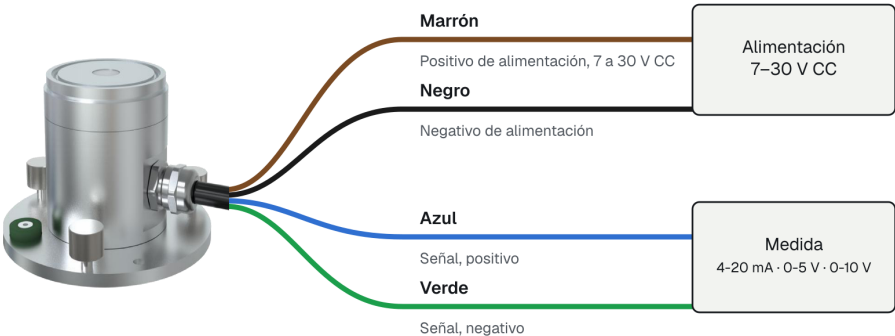


4 Analogue outputs

The unit comes with one independent analogue output as standard and takes both three-wire and four-wire hook-ups. It runs on 7 to 30 V DC, except the 0-10 V output versions, which only work at 24 V.

In current, with the 0 to 2500 µmol range and a 4-20 mA output: the 2500 µmol are spread over the 16 useful mA, so each mA is 156.25 µmol. With 12 mA at the output, the reading is $12 - 4 = 8$ mA, and $8 \times 156.25 = 1250$ µmol.

In voltage, with a 0-10 V output: the 2500 µmol are spread over the 10 V, so each volt is 250 µmol. With 4 V at the output, $4 \times 250 = 1000$ µmol.



Analogue output connection

5 Reading it over RS485

Modbus RTU, with 8 data bits, no parity and one stop bit, and CRC. From the factory it runs at 4800 and at address 1. It takes 2400, 4800 and 9600.

For reading there is function 03 and for writing function 06. The 16-bit values go high byte first.

REGISTER	WHAT IT IS	ACCESS	VALUES
0x0000	PAR radiation	Read only	The actual value
0x0052	Deviation	Read and write	Signed, 16-bit
0x07D0	Address	Read and write	From 1 to 254; from the factory, 1
0x07D1	Baud rate	Read and write	0 = 2400, 1 = 4800, 2 = 9600

5.1 Frame examples

All the frames are for a unit at address 1 and already carry their CRC.

1 · READ THE VALUE

FRAME	DIRECTION
01 03 00 00 00 01 84 0A	sent
01 03 02 00 64 B9 AF	reply

One register from 0x0000. The reply brings two data bytes: 00 64 is 100, that is 100 µmol/m²·s.

2 · WRITE THE DEVIATION

FRAME	DIRECTION
01 06 00 52 00 0A A8 1C	sent

The deviation goes in 0x0052: 00 0A is 10, that is 10 µmol/m²·s. The reply is the same as the request.

3 · CHANGE THE ADDRESS TO 2

FRAME	DIRECTION
01 06 07 D0 00 02 08 86	sent
02 06 07 D0 00 02 08 B5	reply

The reply already comes from the new address.

4 · SET THE BAUD RATE TO 9600

FRAME	DIRECTION
01 06 07 D1 00 02 59 46	sent

The baud-rate code goes in 0x07D1: 0 is 2400, 1 is 4800 and 2 is 9600. The reply is the same as the request.

5 · ASK FOR ADDRESS AND BAUD RATE

FRAME	DIRECTION
FF 03 07 D0 00 02 D1 58	sent
01 03 04 00 01 00 01 6A 33	reply

The question goes to address FF, which any unit answers. The reply says address 1 and baud rate 1, which is 4800.

6 Faults and maintenance

If it does not read what it should, look in this order:

- If it reads zero, check that there is light and that you have taken the protective cover off.
- Check the 485 wiring and that it is not reversed.
- The address may be wrong, or two units may share one; from the factory it is 1.
- Check that the supply is the one on the label.
- If none of the above, the unit is damaged.

Do not wire it with the power on: check the wiring first and power it up afterwards. It is a precision instrument, so do not take it apart.

Keep the surface clean and wipe it with a soft cloth now and then. Check from time to time that it is still level and that the screws have not worked loose.