

PM1, PM2.5, PM10 particulate sensor - Quick guide

Model PRPMA3100



1 Introduction

PRPMA3100 is a sensor for simultaneous detection of PM1, PM2.5, PM10 particulate matter. The determination of particulate concentration is based on the light scatter measurement method.

2 Technical specifications

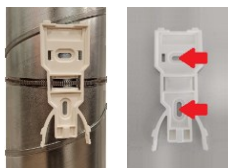
PN	PRPMA3100	
Output	Digital (RS-485)	
Protocol	Modbus RTU	
Sampling frequency	From 5 min to 24 h	
Power supply	5±35 V DC	
Particulate matter	Measuring method	Light scattering measurement
	Measurement range	0÷1000 µg/m ³
	Sensitivity	<ul style="list-style-type: none"> PM1-PM2.5: 0-100 µg/m³: ±5µm+5%; 100-1000 µg/m³: ±10% PM10: 0-100 µg/m³: ±25µm, 100-1000 µg/m³: ±25%
General information	Enclosure	Polycarbonate and polyamide
	Weight	0.4 kg
	Dimensions	81 x 45 x 148 mm
	Protection grade	IP65
	Operative limits	-20÷60 °C, 0÷99% RH
	Compatibility	Alpha-Log

3 Installation

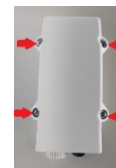
For the installation, consider the following:

- Install the sensor far away from pollution sources that are very close and have insufficient air flow (such as chimneys, air conditioners, etc.) that may disrupt your readings.
- Install the sensor between 3 and 4 meters high.
- For optimal sensor performance, it is recommended to mount the device in a location that is not directly exposed to sunlight or receives as little sunlight as possible.
- To ensure proper operation, the sensor must be installed with the air inlet of the sensor facing downward.

1. Install the mounting bracket on pole or wall. In the first case, fix it to the pole using the stainless-steel hose clamp.
In the second case, attach the mounting bracket to the wall using two screws as shown in the figure.
2. Click onto the bracket the sensor.



3. Unscrew the 4 screws that attach the sensor cover to the sensor.



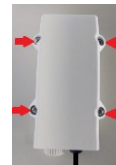
4. Open the cover being careful not to tear the cable that connects it to the internal board.



5. Insert the cable CCFFA3300/400/500 into the cable gland.
6. Connect the wires of the cable to the sensor terminal block.



7. Close the cover and tighten the 4 retaining screws.



4 Communicating with the PRPMA3100

Real-time data access occurs through Modbus RTU protocol over RS-485 communication port.

4.1 Using with LSI LASTEM data logger

If the sensor is used with Alpha-Log, refer to DISACC240039 for the connection.

To configure Alpha-Log to read PRPMA3100 sensor data, use the 3DOM software. Proceed as follows:

- Open the configuration in use in the data logger.
- Add the sensor by selecting the model PRPMA3100 from the 3DOM sensor library.
- Check the acquisition parameters (input, rate, etc.).
- Save the configuration and send it to the data logger.

For more information about the configuration, please refer to the manual of the data logger and the 3DOM online guide.

4.2 Using with a SCADA device

Connect PRPMA3100 sensor to the SCADA device. Use the Modbus RTU commands to read sensor data (§5).

5 Modbus RTU

5.1 Commands

PRPMA3100 sensor supports the Read Holding Register command (function code 0x03).

5.2 Default configuration parameters

- Baud rate: 9600 bps
- Parity: None
- Stop Bits: 2
- Device address: 0

Important constraints in serial parameters configuration

When setting up the Modbus parameters for the sensor, it's important to note the relationship between parity and stop bits. Specifically, if you choose to operate without a parity bit ('No Parity'), the configuration will require the use of 2 stop bits. Conversely, if you opt for including a parity bit (either 'Even' or 'Odd' parity), the system will automatically configure the number of stop bits to 1. This limitation is set by the Modbus library used by the firmware but is also what the Modbus specification defines as outlined in Modbus Specification 2.5.1.

5.3 Modbus registers map

Measure name	Register address (16 bit)	Data type	# Registers	Measure unit
PM1	0x0050	Floating point*	2	µg/m ³
PM2.5	0x0054	Floating point*	2	µg/m ³
PM10	0x0058	Floating point*	2	µg/m ³

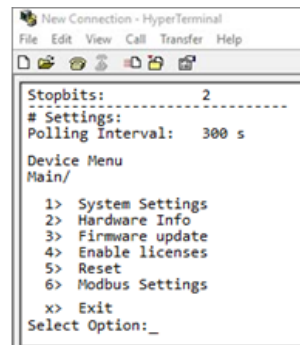
*Floating point: IEEE 754 single-precision floating-point value.

6 PRPMA3100 configuration

A terminal emulator may be used for configuration of the PRPMA3100 sensor through its USB-C interface (CONFIG PORT). To access, open the sensor cover (§3).



1. Disconnect the power supply to the sensor.
2. Connect the sensor to the PC through a USB-C/USB-A cable. The status LED blinking.
3. On the PC, identify the serial port associated with the sensor (*Control Panel -> System -> Hardware Setup*).
4. Run the terminal emulator and set the COM port identified in the previous point.
5. Set 9600 bit per second, 8 data bits, parity none, 1 stop bits, flow control none.



When the communication starts, the status LED remains lit and main menu appears. Navigate the menu to view or change parameters.

7 Diagnostic

PRPMA3100 is equipped with a status LED, which indicates the status of the sensor.

The status LED is visible from the outside and located at the top-right corner of the sensor's base.

- Green: the sensor is on and working.
- Blue: communication in progress.
- Red: sensor is in error; try to disconnect and reconnect the power supply.

