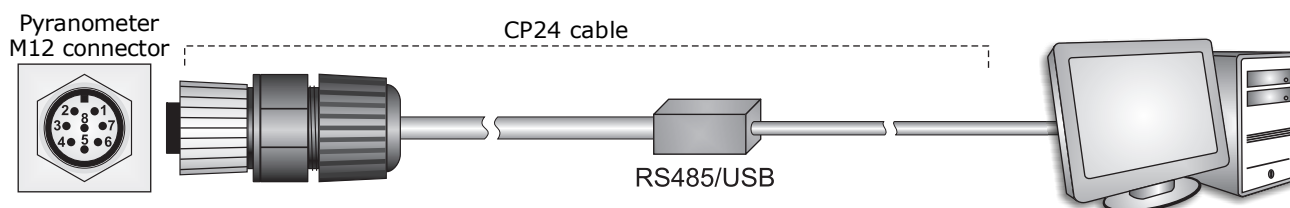


SETTING THE RS485 COMMUNICATION PARAMETERS OF THE PYRANOMETERS WITH A STANDARD COMMUNICATION PROGRAM

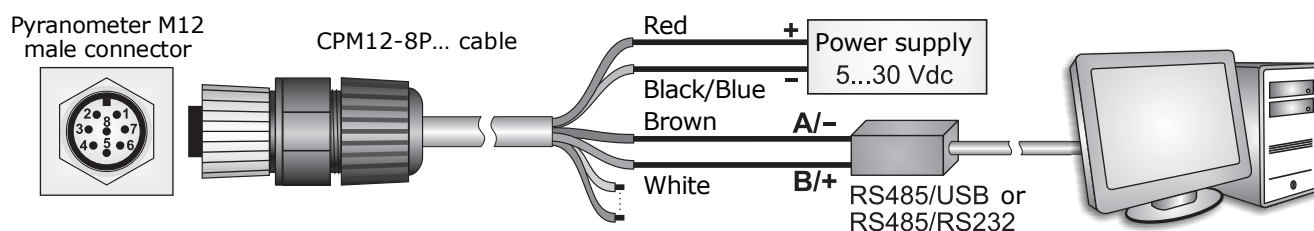
Before connecting the pyranometer to the RS485 network, an address must be assigned and the communication parameters be set, if different from the factory preset.

The parameters setting is performed by connecting the pyranometer to the PC in one of the following two ways:

- A.** By using the optional **CP24** cable, with built-in RS485/USB converter. In this connection mode, the pyranometer is powered by the PC USB port. To use the cable, it is necessary to install the related USB drivers in the PC.



- B.** By using the supplied 8-pole M12 female connector or the optional **CPM12-8P...** cable and a generic RS485/USB or RS485/RS232 converter. In this connection mode, it is necessary to power the pyranometer separately. If a RS485/USB converter is used, it is necessary to install the related USB drivers in the PC.



NOTES ON THE INSTALLATION OF UNSIGNED USB DRIVER: before installing unsigned USB driver into Windows 7 and 8 operating systems it is necessary to restart the PC by disabling the driver signing request. If the operating system is 64-bit, even after installation the request of driver signing have to be disabled each time the PC is restarted. **Disabling is not necessary if the cable CP24 is used.**

PROCEDURE FOR SETTING THE PARAMETERS:

1. Start with the pyranometer not powered (if the CP24 cable is used, disconnect one end of the cable).
2. Start a communication program, such as Hyperterminal. Set the Baud Rate to 57600 and set the communication parameters as follows (the instrument is connected to a COM type port):

Data Bits: 8
Parity: None
Stop Bits: 2

In the program, set the COM port number to which the pyranometer will be connected.

3. Switch the pyranometer on (if the CP24 cable is used, connect both ends of the cable).

4. Wait until the pyranometer transmits the **&** character, then send (within 10 seconds from power on) the **@** command and press **Enter**.

Note: if the pyranometer does not receive the **@** command within 10 seconds from power on, the RS485 MODBUS mode is automatically activated. In such a case, it is necessary to switch off and on again the pyranometer.

5. Send the command **CAL USER ON**.

Note: the command CAL USER ON is disabled after 5 minutes of inactivity.

6. Send the serial commands given in the following table to set the RS485 MODBUS parameters:

Command	Response	Description
CMA _{nnn}	&	Set RS485 address to nnn Ranging from 1 to 247 Preset on 1
CMB _n	&	Set RS485 Baud Rate n=0 ⇒ 9600 n=1 ⇒ 19200 Preset on 1 ⇒ 19200
CMP _n	&	Set RS485 transmission mode n=0 ⇒ 8-N-1 (8 data bits, no parity, 1 stop bit) n=1 ⇒ 8-N-2 (8 data bits, no parity, 2 stop bits) n=2 ⇒ 8-E-1 (8 data bits, even parity, 1 stop bit) n=3 ⇒ 8-E-2 (8 data bits, even parity, 2 stop bits) n=4 ⇒ 8-O-1 (8 data bits, odd parity, 1 stop bit) n=5 ⇒ 8-O-2 (8 data bits, odd parity, 2 stop bits) Preset on 2 ⇒ 8-E-1
CMW _n	&	Set receiving mode after RS485 transmission n=0 ⇒ Violate protocol and go in Rx mode right after Tx n=1 ⇒ Respect protocol and wait 3.5 characters after Tx Preset on 1 ⇒ Respect the protocol

7. You can check the parameters setting by sending the following serial commands:

Command	Response	Description
RMA	<i>Address</i>	Read RS485 address
RMB	<i>Baud Rate</i> (0,1)	Read RS485 Baud Rate 0 ⇒ 9600 1 ⇒ 19200
RMP	<i>Tx Mode</i> (0,1,2,3,4,5)	Read RS485 transmission mode 0 ⇒ 8-N-1 1 ⇒ 8-N-2 2 ⇒ 8-E-1 3 ⇒ 8-E-2 4 ⇒ 8-O-1 5 ⇒ 8-O-2
RMW	<i>Rx Mode</i> (0,1)	Read receiving mode after RS485 transmission 0 ⇒ Violate protocol and go in Rx mode right after Tx 1 ⇒ Respect protocol and wait 3.5 characters after Tx

Note: it is not required to send the CAL USER ON command to read the settings.

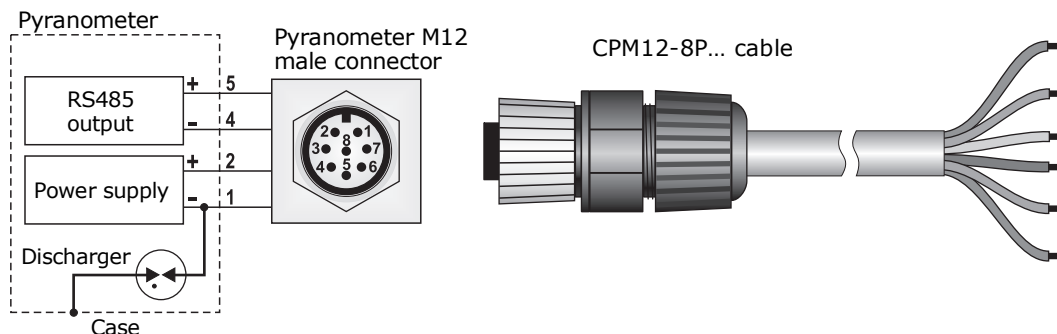
READING OF THE MEASURES WITH THE MODBUS-RTU PROTOCOL WHEN THE PYRANOMETER IS IN OPERATING CONDITIONS (INSTALLED IN A NETWORK)

In MODBUS mode, you can read the values measured by the instrument through the function code 04h (Read Input Registers). The following table lists the quantities available with the appropriate register address:

Address	Quantity	Format
0	Temperature in °C (x10) [if available in the model]	16-bit Integer
1	Temperature in °F (x10) [if available in the model]	16-bit Integer
2	Solar radiation in W/m ²	16-bit Integer
3	Status register bit0=1 ⇒ solar radiation measurement error bit1=1 ⇒ temperature measurement error bit2=1 ⇒ configuration data error bit3=1 ⇒ program memory error	16-bit Integer
4	Average solar radiation in W/m ² The average refers to the last 4 measures	16-bit Integer
5	Signal (in mV x 100) generated by the sensor	16-bit Integer

OPERATING MODE: the pyranometer enters RS485 MODBUS-RTU mode after 10 seconds from power on. In the first 10 seconds from power on the pyranometer does not reply to requests from the MODBUS master unit. After 10 seconds, it is possible to send MODBUS requests to the pyranometer.

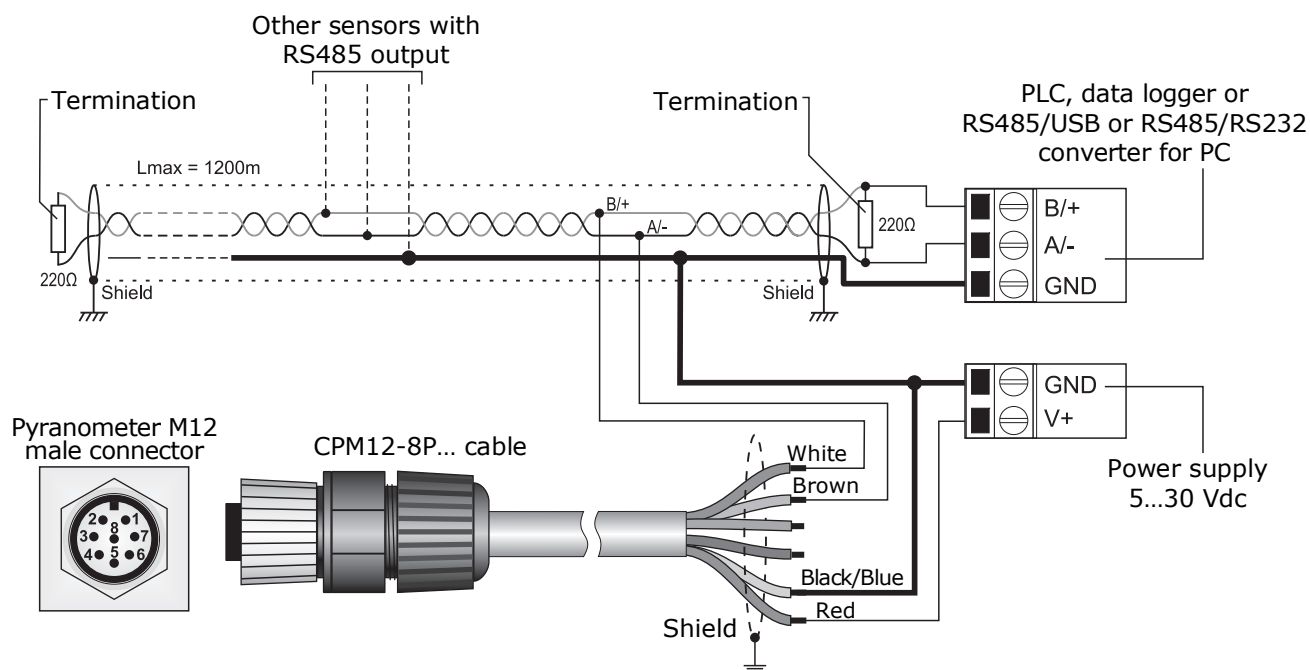
CONNECTION:



Connector	Function	Color
1	Power supply negative	Black or Blue
2	Power supply positive	Red
3	Not connected	
4	RS485 A/-	Brown
5	RS485 B/+	White
6	Not connected	
7	Not connected	
8	Not connected	

Note: the cable shield is not connected to M12 connector.

The RS485 output is not isolated and corresponds to 1 unit load.



Connection of RS485 output

CABLES:

CP24

PC connecting cable for the MODBUS parameters configuration. With built-in RS485/USB converter. 8-pole M12 connector on instrument side and A-type USB connector on PC side.

CPM12-8P.2

Cable with 8-pole M12 connector on one end, open wires on the other side. Length 2 m.

CPM12-8P.5

Cable with 8-pole M12 connector on one end, open wires on the other side. Length 5 m.

CPM12-8P.10

Cable with 8-pole M12 connector on one end, open wires on the other side. Length 10 m.