EMS Brno

Data Acquisition Environment

Hardware – Software – Cloud application

www.emsbrno.cz

Quantum sensor EMS 12S

Main features:

- 400 to 700 nm range
- Glass diffuser – long time period between recalibrations
- SDI-12 output
- Silicon semiconductor photovoltaic detector
- Connector in sensor body
- Manufactured by EMS

Specification:

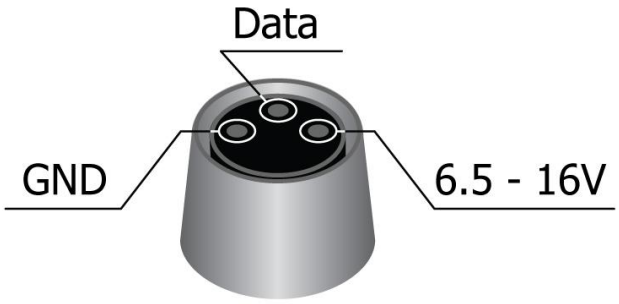
- SDI-12 version 1.3 compatible
- Calibration error under the daylight condition max. 7%
- Recommended recalibration each 10 years
- Linearity better than 1%
- Cosine error <10% up to 85° angle of incidence
- Operating Temperature -20 to 60 °C
- Size: diameter 22 mm, length 66 mm

EMS 12S in AL0171

Specification:

Output	SDI-12
Sensitivity	0.1 µmol s^{-1} m^2
Cosine error	Less than 10% up to 85° angle of incidence
Linearity	Better than 1%
Connection	Three wire Escha M8 connector female
Connection cable length	2 m, 10 m (special lengths on request)
Size (diameter x length)	22 x 66 mm
Weight	48 g
Operating environment temperature	-40 to 80 °C
Operating environment humidity	0 to 100%
Protection	IP 68

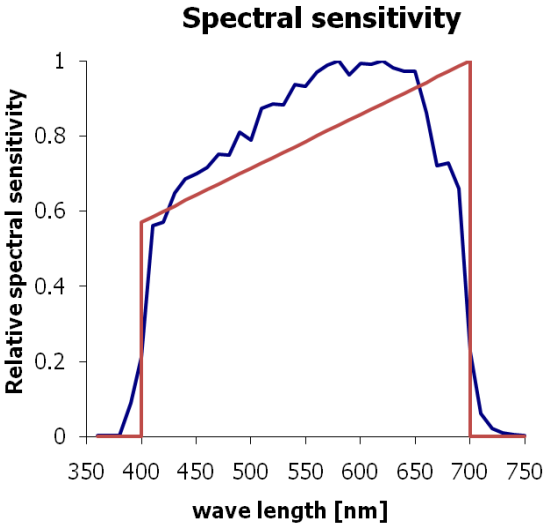
Quantum sensor EMS 12S - female connector wiring

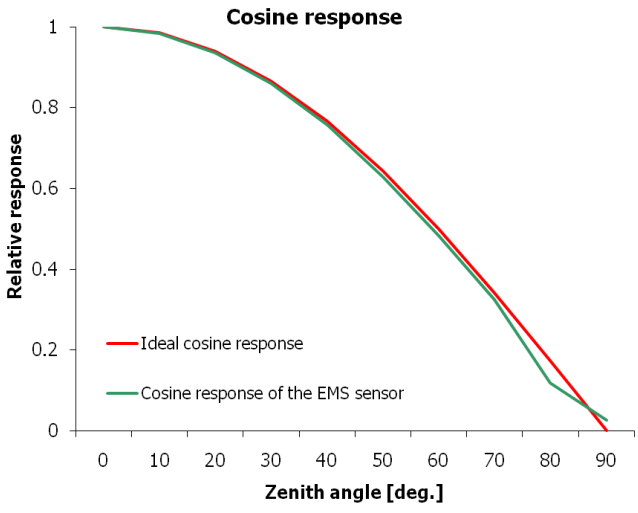


Standard M8 male connector cable wiring

Brown - 6.5-16V
Black - Data
Blue - GND

EMS 12S – sensor characteristic:





SDI-12 interface specification of EMS12S

Sensor EMS12S is compatible with SDI-12 version 1.3 (more info at http://sdi-12.org/archives.php), except for continuous measurements (aR0 - aR9 or aRC0 - aRC9).

Overview of supported commands:

Datalogger commands are in bold. Each response from the sensor is terminated by <CR> <LF>

Info command - aI!

For instance:

1I! 113EMSBrno EMS12S1.5Sn#1234567890

Parameter	Length	Description
1I!	3	Request to read the sensor information at address 1
1	1	Sensor address - here 1
13	2	SDI version - here 1.3
EMSBrno	8	Manufacturer - completed with space 0x20
EMS12S	6	Model - completed with space 0x20
1.5	3	FW Sensor version - here 1.5
Sn#1234567890	13	Serial number of the sensor

Measurement command - aM!

For instance:

1M! 10011

Parameter	Length	Description
1M!	3	Sensor measurement request at address 1
1	1	Sensor address - here 1
001	3	Time after which the measured data will be available in seconds - here 1. If the data is available earlier, the sensor sends the address terminated by the <CR> <LF> - service request.
1	1	Number of variables returned - here 1

Data command - aD0!

For instance (1M):

1D0! 1+1325.32XYZ

Parameter	Length	Description
1D0!	4	Sensor data request at address 1
1	1	Sensor address - here 1
+1325.32	Variable	PAR in umol/m2/s
XYZ	3	16-bit CRC - added only if aMC! or aCC! commands were requested for the measurement

Note: The sensor returns +9999.9 when the PAR value is higher than 3000.

Change Address - aAb!

For instance:

1A2! 2

Parameter	Length	Description
1A2!	4	Request to change the sensor address on the address 1 to address 2
2	1	New sensor address - here 2

Address Query command -?! - Be careful - there must be only one sensor on the line!

For instance:

?! 2

Parameter	Length	Description
?!	2	Retrieving the sensor address
2	1	Attached sensor address - here 2.

Concurrent Measurement - aC!

For instance:

1C! 100101

Parameter	Length	Description
1C!	3	Sensor measurement request at address 1
1	1	Sensor address - here 1
001	3	Time after which the measured data will be available in seconds - here 1
01	2	Number of variables returned - here 1

Measurement command with CRC - aMC!

For instance:

1MC! 10011

Parameter	Length	Description
1MC!	4	Sensor measurement request at address 1 with CRC data control
1	1	Sensor address here 1
001	3	Time after which the measured data will be available in seconds - here 1. If the data is available earlier, the sensor sends the address terminated by the <CR> <LF> - service request.
1	1	Number of variables returned - here 1

Concurrent Measurement with CRC - aCC!

For instance:

1CC! 100101

Parameter	Length	Description
1CC!	4	Sensor measurement request at address 1 with CRC data control
1	1	Sensor address here 1
001	3	Time after which the measured data will be available in seconds - here 1
01	2	Number of variables returned - here 1

Verification command - aV!

For instance:

1V! 10011

Parameter	Length	Description
1V!	3	Sensor measurement request at address 1
1	1	Sensor address here 1
001	3	Time after which the measured data will be available in seconds - here 1
1	1	Number of variables returned - here 1

Acknowledge Active – a!

For instance:

1! 1

Parameter	Length	Description
1!	2	Check the sensor connection
1	1	Sensor address response - here 1