



EMS Brno

Data Acquisition Environment

Hardware – Software – Cloud application

www.emsbrno.cz

Air temperature, humidity, and pressure sensor EMS 36S

Main features:

- Measuring chip replacement by customer on site – cheaper than recalibration
- Digital SDI-12 output
- Mesh 40 μm PE
- Economy solution
- Manufactured by EMS



Measured values:

Temperature [$^{\circ}\text{C}$]

Air Humidity [%]

Air pressure [hPa]

Calculated values:

Vapor pressure deficit [Pa]

Saturated vapor pressure [Pa]

Actual vapor pressure [Pa]

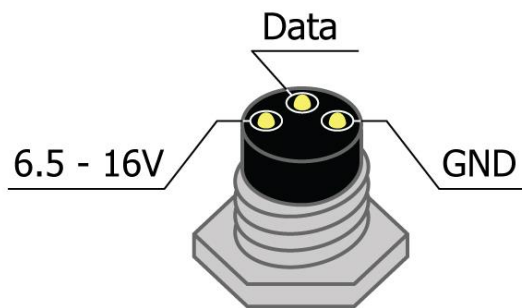
Dew point [$^{\circ}\text{C}$]

Water vapor density [g/m³]

Specification:

Temperature measuring range	-40 to 60 °C
Temperature accuracy	± 0.2 °C
Humidity measuring range	0 to 100%
Humidity accuracy	± 2%
Pressure measuring range	300 to 1300 hPa
Pressure accuracy	± 1 hPa
Size (diameter x length)	20 x 92 mm
Weight	26 g
Operating temperature	-40 to 80 °C
Operating humidity	0 to 100%
Connection	M8 connector male 3-pin

Air temperature and humidity sensor EMS 36S - male connector wiring



Standard M8 female connector cable wiring



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

SDI-12 interface specification

EMS36S sensor is compatible with SDI-12 version 1.3 described in documents on <http://sdi-12.org/archives.php>, except for continuous measurements (aR0 - aR9 or aRC0 - aRC9).

Overview of supported commands (a = sensor address):

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

Info command - aI!

For instance:

1I! 113EMSBrno EMS36S1.1Sn # 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
EMS36S	6	Model - completed with space 0x20
1.1	3	FW Sensor version - here 1.1
Sn#1234567890	13	Serial number of the sensor

Measurement command - aM!

For instance:

1M! 10014

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.
4	1	Number of variables returned - here 4

Data command - aD0!

For instance:

1D0! 1+20.32+60.54+2592+998.22XYZ

Parameter	Length	Description
1D0!	4	Sensor data request at address 1
1	1	Sensor address - here 1
+20.32	Variable	Temperature in °C
+60.54	Variable	Relative Humidity in %
+2592	Variable	Vapor pressure deficit in Pa
+998.22	Variable	Barometric pressure in hPa
XYZ	3	16-bit CRC - added only if aMC! or aCC! commands were requested for the measurement

Measurement command – aM1!

For instance:

1M1! 10014

Parameter	Length	Description
1M1!	4	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.
4	1	Number of variables returned - here 4

Data command - aD0!

For instance:

1D0! 1+3162+632+0.46+4.6XYZ

Parameter	Length	Description
1D0!	4	Sensor data request at address 1
1	1	Sensor address - here 1
+3162	Variable	Saturated vapor pressure in Pa
+632	Variable	Actual vapor pressure in Pa
+0.46	Variable	Dew point in °C
+4.6	Variable	Water vapor density in g/m3
XYZ	3	16-bit CRC - added only if aMC! or aCC! commands were requested for the measurement

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 -?! - 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! 100104

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
04	2	Number of variables returned - here 4

Measurement command with CRC - aMC!

For instance:

1MC! 10014

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.
4	1	Number of variables returned - here 4

Concurrent Measurement with CRC - aCC!

For instance:

1CC! 100104

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
04	2	Number of variables returned - here 4

Verification command - aV!

For instance:

1V! 10014

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
4	1	Number of variables returned - here 2

Acknowledge Active – a!

For instance:

2! 2

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