DATA SHEET

HUMIDITY MODULE WITH VOLTAGE OUTPUT AND I²C-BUS - HYTEMOD-I²C

B+B
SENSORS

Description

Characteristic features

- Temperature and humidity measurement
- Digital I²C-interface
- Voltage output 0 … 5 V for humidity
- Calibrated and operational
- Broad spectrum of applications
- Capacitive sensor element
- Weather resistant and long term stable
- Miniaturised dimensions
- Optimum price performance ratio
- Custom made product variants possible

Typical areas of application

- Industrial instrumentation
- Building automation
- Ventilation and air conditioning systems
- White goods
- OEM-Products

Technical data

Humidity sensor module HYTEMOD-I2C	
Humidity sensor	Capacitive Polymer humidity sensor KFS 140
Humidity application range	20 ... 90% rH (max. Dew point = 50 °C)
Measuring accuracy	±3% rH
Temperature application range	-20 ... +60 °C
Temperature sensor	PT1000 class B
Interfaces	I²C-Bus and voltage output
Protection filter (optional)	PP Membrane filter Wire mesh filter
Response time	< 20 sec. without filter
Dimensions	Approx. ø12 x 70 mm, refer drawing
Operating voltage	6 … 12 V
Input current	< 3 mA
Housing	plastic housing, optional stainless steel housing
Connection	connection cable 6-pole with RJ11-plug
Article number	HYTEMOD-I2C

Features

Off late, humidity measurement has found entry into many mass-produced items like ventilation devices, household devices or automotive applications. Normally for such products, a fully integrated and calibrated sub-system is required which can result into a attractive system price with a standard calibrated interface.

The B+B humidity module combines the most modern thin film sensor technology with flexible signal processing of an ASIC and presents an optimum price performance ratio.

The high quality, capacitive humidity sensor guarantees highest measuring accuracy, drift stability, weather resistance as well as an outstanding long-term stability.

The calibrated humidity and temperature values are transmitted over the corresponding analog or digital interface with high resolution, which enables simple integration into customised products. The calibrated and standardized output signal facilitates a very simple integration of the sub-system during development phase, which results in shortest time-to-market product developments.

Besides product variants in plastic housing, a wide variety of customer specific models are available. For example, in stainless steel housing, with protection filter and ready-made connection leads.

Technical changes reserved
0141 0316-119   06/2008

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Standard model

The module is with 6-pole connector. The models available from stock are configured as follows:

- Operating voltage range 6 … 12 V / 3 mA
- Calibrated at 8.0 V
- I²C Interface for temperature and humidity
- Ratiometric voltage output at PIN 6
  0 ... 5 V corresponds to 0 ... 100% rH
- Temperature measurement by integrated PT1000
- Module in plastic housing with connection cable and RJ11 plug connector.

Voltage output

At PIN6, the measured relative humidity values are passed on as voltage signal. The presented measuring range of 0 ... 5 V corresponds to 0 ... 100% rH.
The minimum connection impedance should not be below 10 kOhm. The output impedance is 50 Ohm. The output is protected against short time transients. External voltage at the output can cause a damage of the ASIC and is absolutely to be avoided.

Operating voltage

Standard system is with 6 to 12 V operating voltage which ist stabilized in the module on 5 V. The 5 V operating voltage serves also as reference level for the digital I2C-communication.
For the minimization of the self-heating over 8 V operating voltage, we recommend the stainless steel housing.

I²C-Interface

The communication is as per I²C protocol. All technical specifications of the protocol and commands can be obtained from the documentation "Serial Interface of HYGROSENS ASIC". The documentation is available on request.
The default address of the component is 0x78 and the component can always be communicated at this address. In addition, a second address can also be programmed during configuration at works, under which the humidity probe can be addressed.
Up to 4 bytes can be read at the address 0x78. If temperature values are not required, it is enough to read only the first two bytes. The following allocation is adopted:

Data			
0x78	Byte_0		MSB Humidity
	Byte_1		LSB Humidity
	Byte_2		MSB Temperature
	Byte_3		LSB Temperature

Scaling the measured values

Both humidity and temperature values are converted as 15 Bit values (Bit 0 - 14). From the 15 bit measured values, 11 bit resolution is to be used so that lower side bit (0 - 3) can be ignored.
The high value bit (15) is always 0 under normal operation and in case of an error it is turned to 1. Further instructions on error codes are available in the write-up "Serial Interface of HYGROSENS ASIC".

For the readings following scaling is valid:

Humidity channel		
Numerical value over	0x	0000 ... 7FFF
I²C Interface	dec.	0 ... 32767
Physical value	0 ... 99,9969% rH	
Scaling	rH(%)=V / 327,68	

Temperature channel		
Numerical value over	0x	0000 ... 7FFF
I²C Interface	dec.	0 ... 32767
Physical value	-32 ... +95,9961 °C	
Scaling	T (°C)=V / 256-32	

Connector configuration

RJ 45	Colour	Function	
1	black	VDD	Supply Voltage 6...12 V
2	brown	GND	Ground
3	red	SDA	Serial Data I2C
4	orange	SCL	Serial Clock I2C
5	yellow	VRH	RH Voltage Output
6	green	---	Not used
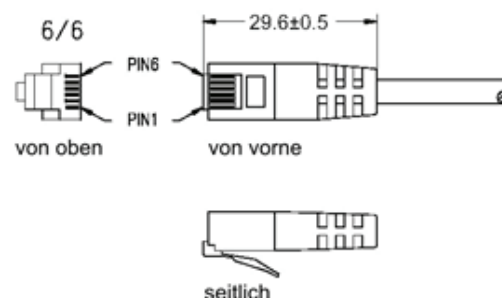
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Application guidelines

First of all, the operating voltage should be selected as low as possible, in case humidity values above 80% rH are to be measured. Because of the compact size, the electronics can get heated slightly, which can result in a loss of measuring accuracy.

The calibration at works is done at 8 V. The specified technical data are valid for this operating voltage. Other configurations and special calibrations as per customer requirements are also possible.

For connection of probes in longer routes, the I²C-Bus, which is used outside the device, should not be used internally, to avoid effect of inter-connection disturbances on internal device communication. The EMV-guidelines are to be followed; use of shielded lines is recommended.

Due to short time interruption of operating voltage, a RESET of humidity probe can be initiated. If the operating voltage is adjustable, then the pull up resistors of I²C Bus must be connected to the triggering voltage.

For simplifying your product development, a communication Board and also an USB-I²C-adapter is available – please contact us !

Outline drawing

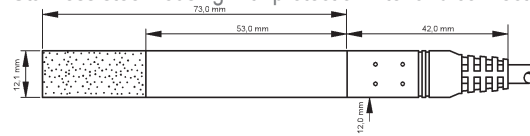Plastic housing with connection cable (Standard)
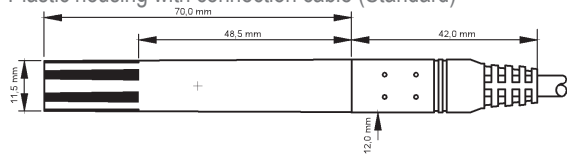
Product variants

The following overview describes the possible options and product variants. You can send us your enquiry for the desired configuration; we shall be pleased to give you an offer!
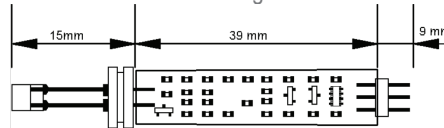
Housing

- Unpackaged module, dimensions 37 x 12mm
- Unpackaged module, with sensor holder and gasket D=12mm, pressure sealed for probe tubes
- In stainless steel housing Ø 12 x 90

Stainless steel housing with protection filter and connection cable

Module without housing with sensor head

TOP:		BOTTOM:	
5	TEMP2/URH	6	TEMP
3	SDA	4	SCL
1	VDD	2	GND

Connection cable

If required, we can also supply module with connection cable. The connection cable can be made with loose strands at the end or with any type of plug.

Protection filter

- Plastic protective case
- Wire mesh filter
- Plastic hydrophobic sinter filter
- Stainless steel sinter filter
- Membrane filter

You can get our complete overview on request!

Other options

The ASIC integrated in the module supports a variety of other operating modes:

- PWM-outputs, contact outputs
- SPI-Interface
- One Wire Interface
- ratiometric voltage output
- 3,3V Supply voltage
- LIN-Bus

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