DXH DUCT HUMIDITY SENSOR / SWITCH

Mounting and operating instructions





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SAFETY AND PRECAUTIONS

Read all the information, the datasheet, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using, or maintaining this product. CE For safety and licensing (CE) reasons, unauthorised conversion and / or modifications of the product are inadmissible. The product should not be exposed to abnormal conditions, such as: extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation. All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions. Avoid contacts with energised electrical parts; always treat the product as if it is live. Always disconnect the power supply before connecting, servicing or repairing the product. Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well. Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.

In case there are any questions that are not answered, please contact your

technical support or consult a professional.



PRODUCT DESCRIPTION

The DXH is a sensor / switch for relative humidity measurements in ducts. It provides four predefined ranges and one user-definable range. The unit is equipped with Modbus RTU (RS485) communication and has an analogue output and a relay output.

ARTICLE CODES

Code	Supply	Connection
DXH-G	13—26 VAC 18—34 VDC	3-wire
DXH-F	18—34 VDC	4-wire

INTENDED AREA OF USE

- Monitoring and maintaining constant relative humidity level in duct systems
- For duct use only

TECHNICAL DATA

- Analogue output: 0—10 VDC / 0—20 mA
- Relay output: C/O (230 VAC / 2 A)
- Power consumption:
 - ▶ no load: max. 55 mA
 - ▶ full load: max. 75 mA
- Load resistance:
 - 0-10 VDC mode > 500 Ω
 - ▶ 0—20 mA mode < 500 Ω
- Selectable sensor ranges by trimmer: 20–90 % rH / 0–60 % rH / 0–80 % rH / 0–95 % rH

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- Free selectable sensor range via Modbus: 0–95 % rH
- Selectable switching point: by trimmer or via Modbus
- Hysteresis:
 - ▶ fixed (Standalone mode): 5 % rH
 - selectable (Modbus mode): 1 / 3 / 5 / 7 / 10 % rH
- Accuracy: ± 3 % rH (0–95 % rH)
- Enclosure:
 - ASA, grey (RAL9002)
 - IP54 (according to EN 60529)
- Fixing flange:
 - PE, black (RAL9004)
 - IP20 (according to EN 60529)
- Operating ambient conditions:
 - ▶ temperature: 0—50 °C
- rel. humidity: < 95 % rH (non-condensing)</p>
- Storage temperature: -40—50 °C

STANDARDS

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- WEEE Directive 2012/19/EU
- RoHs Directive 2011/65/EU

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OPERATIONAL DIAGRAMS



WIRING AND CONNECTIONS

Vin	Positive DC voltage / AC ~
GND	Ground / AC ~
А	Modbus RTU (RS485) signal A
/В	Modbus RTU (RS485) signal /B
Ao1	Analogue output (0—10 VDC / 0—20 mA)
GND	Ground
NO1	Normally open contact
COM1	Common contact
NC1	Normally closed contact
Connections	Cable cross section: max. 1,5 mm ² Cable gland clamping range: 5—10 mm

MOUNTING INSTRUCTIONS IN STEPS

Before you start mounting the DXH sensor / switch read carefully **"Safety and Precautions"**. Then proceed with the following mounting steps:

- 1. Open the cover and insert the connecting cables through the cable gland of the unit.
- 2. Do the wiring according to the wiring diagram (see Fig. 1) using the information from section "Wiring and connections".





3. Adjust the standalone settings:

- **3.1** Select the sensor range by JP3. See **Fig. 2** Sensor range selection jumper and the enclosed information.
- **3.2** Select the desired relay switching point by setpoint trimmer VR1. (See **Fig. 3**.)
- 3.3 Select the analogue output mode by JP5. (See Fig. 4.)
- **3.4** To reset the Modbus settings, put and hold jumper P1 for 20 seconds. (See **Fig. 5** *Modbus reset jumper*.)



4. Check if your unit starts or terminates the network (see Example 1 and Example 2). If it does, put the NBT (JP6) jumper onto the pins. If it does not, leave the jumper open. (See Fig. 6 Network bus resistor jumper.)





If an AC power supply is used with any of the units in a Modbus network, the GND terminal should NOT BE CONNECTED to other units on the network or via the CNVT-USB-RS485 converter. This may cause permanent damage to the communication semiconductors and / or the computer!



 Mount the unit outside a duct with the tube mounted inside the duct but fixed outside it. Mind the correct mounting position and unit dimensions. See Fig. 7 and Fig. 8.



- 5.1 Drill a tight-sealing hole according the correct tube section (Ø 13 mm).
- **5.2** Fix the flexible flange (**Fig. 9**) on the duct outer surface using the self- drilling screws, delivered with the unit. Then install the tube inside the flexible flange. Mind the airflow direction.
- **5.3** Install the tube at the desired depth in the duct using the screw in the flexible flange.
- **5.4** Install and connect the cables with a "drip loop". You can also fix the unit outside the duct via the mounting holes and as per the drawing shown in **Fig. 7**.





Installation of the unit near high EMI-emitting devices may lead to faulty measurements. Use shielded wiring in areas with high EMI.

Keep 15 cm (5,9") minimal distance between the sensor lines and the 230 VAC power lines.

Always use two separate transformers: one for the sensor and one for the controller.

- 6. Close the enclosure and fix the cover.
- 7. Switch on the power supply.







Do not exceed the maximum power supply rating! Measure before installation! Unregulated 24 VAC supply units provide higher nominal output voltage and activate the integrated fuse protection.

If a G-type article is using the same AC power supply source (transformer) as F-type article, a SHORT CIRCUIT may result when the power supply and analogue signal terminals are connected to the same common ground! In this case always connect different article types to separate AC transformers or use the same article version.

8. Customise the other factory settings to the desired ones, through 3SModbus software (if necessary). For the default factory setting see **Table** *Modbus* register maps.

MODBUS REGISTER MAPS

INPUT REGISTERS							
		Data type	Description	Data	Values		
1	Temperature level	signed int.	Actual temperature level		500 =	50,0 °C	
2	Relative humidity level	unsigned int.	Actual relative humidity level		1.000 =	100,0 % rH	
3	Dew point	signed int.	Calculated dew point		200 =	20,0 °C	
4-10			Reserved, returns 0				
11	Analogue output value	signed int.	Value of the analogue output	0—1.000	0 = 1.000 =	0 % 100 %	
12	Relay status	signed int.	Relay status. When it is On, the contact between COM1 and NO1 is closed.	0—1	0 = 1 =	Off On	
13	Relative humidity range	signed int.	Relative humidity working range selected by a jumper or a holding register	1—5	1 = 2 = 3 = 4 = 5 =	20-90 % rH 0-60 % rH 0-80 % rH 0-100 % rH Custom	
14	Setpoint	signed int.	Setpoint selected by a trimmer or a holding register	0-1.000	500 =	50,0 % rH	
15	Hysteresis	signed int.	Hysteresis for relative humidity relay switching	1-5	1 = 2 = 3 = 4 = 5 =	1,0 % rH 3,0 % rH 5,0 % rH 7,0 % rH 10,0 % rH	
16	Setpoint out of range	signed int.	Flag that shows if the relative humidity setpoint is out of the working range	0—1	0 = 1 =	No Yes	
17-19			Reserved, returns 0				
20	Humidity sensor communication lost	unsigned int.	Flag that shows if the communication with humidity sensor module is lost	0—1	0 = 1 =	No Yes	



HOL	HOLDING REGISTERS							
		Data type	Description	Data	Default	Values		
1	Device slave address	unsigned int.	Modbus device address	1-247	1			
2	Modbus baud rate	unsigned int.	Modbus communication baud rate	1—4	2	1 = 2 = 3 = 4 =	9.600 19.200 38.400 57.600	
3	Modbus parity	unsigned int.	Parity check mode	0—2	1	0 = 1 = 2 =	8N1 8E1 8O1	
4	Device type	unsigned int.	Device type (Read only)	DXH-X = 1032				
5	HW version	unsigned int.	Hardware version of the device (Read only)	XXXX		0 x 0100 =	HW version 1.10	
6	FW version	unsigned int.	Firmware version of the device (Read only)	XXXX		0 x 0140 =	FW version 1.40	
7	Operating mode	unsigned int.	Enables the Modbus control and disables the jumpers and trimmers	0—1	0	0 = 1 =	Standalone Mode Modbus Mode	
8	Output overwrite	unsigned int.	Enables the direct control over the outputs. <i>Always</i> settable. Active only if holding register 7 is set to 1.	0—1	0	0 = 1 =	Disabled Enabled	
9-10			Reserved, returns 0					
11	Relative humidity range	signed int.	Selects the relative humidity working range. Always settable. Active only if holding register 7 is set to 1.	1—5	1	1 = 2 = 3 = 4 = 5 =	20—90 % rH 0—60 % rH 0—80 % rH 0—100 % rH Custom	
12	Minimum custom relative humidity range	signed int.	Minimum value of the custom relative humidity range. Always settable. Active only if holding register 7 is set to 1 and register 11 is set to 5.	0—Max	0	200 =	20,0 % rH	
13	Maximum custom relative humidity range	signed int.	Maximum value of the custom relative humidity range. Always settable. Active only if holding register 7 is set to 1 and register 11 is set to 5.	Min-1.000	1.000	1.000 =	100,0 % rH	
14	Setpoint	signed int.	Selected setpoint for relay switching. <i>Always</i> settable. Active only if holding register 7 is set to 1.	0-1.000	500	500 =	50,0 % rH	
15	Hysteresis	signed int.	Selected hysteresis for relay switching. Always settable. Active only if holding register 7 is set to 1.	1—5	3	1 = 2 = 3 = 4 = 5 =	1,0 % rH 3,0 % rH 5,0 % rH 7,0 % rH 10,0 % rH	
16-20			Reserved, returns 0					
21	Analogue output overwrite value	signed int.	Overwrite value for the analogue output. Always settable. Active only if holding registers 7 and 8 are set to 1.	0-1.000	0	0 = 1.000 =	0 % 100 %	
22-30			Reserved, returns 0					
If you y	vant to find out more about	Modbus over seria	lline please visit: http://www.modbus.org/docs/Modb	us over serial li		df		

VERIFICATION OF INSTALLATION INSTRUCTIONS

Check if the LEDs (LEDTX and LEDRX) blink after you switch on your unit. (See **Fig. 9** *Communication detection indication*.) If they do, your unit has detected Modbus network. If they do not, check the connections again.





The status of both LEDs (LEDTX and LEDRX) can be checked only when the unit is energised. Take the relevant safety measures!



TRANSPORT AND STOCK KEEPING INFORMATION

Avoid shocks and extreme conditions; stock in original packing.

WARRANTY INFORMATION AND RESTRICTIONS

Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

MAINTENANCE

In normal conditions this product is maintenance-free. If soiled, clean with a dry or dampish cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.